



Mr C. Gaddes

Windmill Hill Quarry, Brierley Road, Grimethorpe
LANDSCAPE & ECOLOGICAL MANAGEMENT PLAN

December 2021

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1.0 INTRODUCTION

- 1.1 The following Landscape & Ecological Management Plan has been prepared by Robinson CLA on behalf of the client, Mr C. Gaddes. This document sets out the habitat protection, creation and management approaches for the landscape proposals within the proposed development at Windmill Hill Quarry, Brierley Road, Grimethorpe.
- 1.2 This document should be read in conjunction with the Ecological Impact Assessment Report prepared by Whitcher Wildlife Ltd, and the landscape proposals designed by Robinson CLA.
- 1.3 For reference, a biodiversity summary of the landscape proposals is shown in **Appendix A**.

Background

- 1.4 This document has been prepared to discharge condition 4 in respect of planning application 2021/0077.
- 1.5 This states:
“Prior to any works commencing, except for the installation of any protective fencing for retained landscaping, remediation works and site clearance works, full details of the mitigation measures identified in the Ecological Impact Assessment and the Soft Landscape and Ecological Mitigation Plan, including a timetable for their implementation and management strategy for a period of 30 years, shall be submitted to and approved in writing by the Local Planning Authority. The development shall be implemented in accordance with the approved details.”

Legislation & Policy

- 1.6 All relevant EU and UK nature conservation law will be adhered to in relation to the protection of ecological features and ecological enhancement. This includes the protection afforded to nesting birds under the Wildlife and Countryside Act 1981 (as amended) and with reference to the protection of great crested newts and bats and their roosts under the Conservation of Habitats and Species Regulations 2010 (as amended). Regard has also been given to the Local Biodiversity Action Plan (LBAP) and Habitats of Principle Importance (HPI) as listed within Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

Health & Safety

- 1.7 Care will be undertaken throughout the design process and during construction at all stages to consider the health and safety aspects of the proposals.
- 1.8 The site may contain some potentially hazardous features such as steep embankments, overhanging trees and also potentially hazardous operations, including tree works, maintenance works near or on highways, works involving the use of cutting machinery and potentially hazardous chemical agents, works to steep slopes, works near buried services and overhead services and frequently a combination of these.
- 1.9 The Landscape Management Company will check for below and above ground services, including land drainage, in the vicinity, and give notice if they may be affected and obtain instructions before proceeding. The Landscape Management Company will comply with Arboriculture and Forestry Advisory Group Safety leaflets.

- 1.10 The scheme should be implemented by competent landscape managers and operatives, who are responsible for the application of best practice standards and all relevant health and safety procedures, protection of the environment, avoidance of pollution and protection of protected species and habitats. The management items set out in this document in no way remove their responsibilities to current, or any future, statutory and best practice procedures or obligations.
- 1.11 Care must be taken during the management and the design of that management to assess, and where practicable reduce or eliminate risks. To this end the Management Company will periodically carry out a Health and Safety Audit for any public open space. This audit will review health and safety considerations and make recommendations on works necessary to maintain the public open space in a safe condition. Consideration in particular should be given to the growth of newly planted trees with a future potential to overhang adjacent public highways, dwellings or private gardens, which will require arboricultural assessments as and when appropriate. These will be worked into the landscape management as it evolves.

2.0 VISION, AIMS & OBJECTIVES

Vision

- 2.1 The landscape design strategy has been prepared in the context of a thorough and detailed understanding of the site landscape and its context and within the framework of relevant policy and design guidance. The landscape design embraces broader Green Infrastructure (GI) and sustainable development principles and seeks to maximise biodiversity wherever practicable. Green infrastructure has been devised to integrate the residential plots with the landscape and surrounding ecology and connect the Site to the wider landscape.

The **Vision** for the landscape design strategy is to:

Increase the biodiversity and landscape value of the site over the long-term

Aims & Objectives

- 2.2 The Vision consists of four main Aims, with each Aim being sub-divided into its Objectives. The **Aims** are outlined below, with **Objectives** described in detail on the following pages.

Aim 1: Maintain and enhance the biodiversity value of the site

Objective 1: Protect and maintain retained habitats and protected species within the site;

Objective 2: Create a matrix of complimentary new habitats within a GI framework. To maximise the provision and establishment of native species and species of local provenance that are appropriate to the immediate surrounds and local area.

Aim 2: Balance development amenity with wildlife

Objective 3: Provide a safe and pleasant landscape setting for new residential dwellings and to provide a high quality landscape structure that enhances the appearance and character of the site and its environs. To create new habitat structures and foraging/sheltering opportunities for invertebrates, birds and small mammals through new native and semi-ornamental planting.

Aim 3: Manage the site for biodiversity in the long-term

Objective 4: Ensure the matrix of new and existing habitats establish and are suitably maintained to ensure long-term biodiversity gain. To provide new roosting/nesting opportunities for bat and bird species and create new sheltering and hibernation opportunities for amphibians, reptiles, invertebrates and small mammals.

Aim 4: Monitor the site and review the Plan

Objective 5: Provide a framework of monitoring and review periods.

3.0 HABITATS & PROTECTED SPECIES TO BE RETAINED & PROTECTED

Objective 1: Protect and maintain retained habitats and protected species within the site.

- 3.1 Existing habitats will be retained where feasible within the development, and will be protected through the enabling and construction phases.

Pre-construction Mitigation Measures

- 3.2 The following outlines the ecological mitigation measures to be undertaken ahead of commencing on site in order to minimise impact from construction works.

Existing Vegetation

- 3.3 Scattered trees and sections of scrub along embankments to the periphery of the site are to be retained within the proposed scheme. Retained trees will be left unmanaged unless otherwise dictated for reasons of public safety or to benefit the woodland structure or other adjacent or associated habitats or species.
- 3.4 During construction, any sections of retained hedgerows will be protected in accordance with BS5837:2012 and trees will be protected by fencing erected according to their calculated root protection area (RPA). No removal of woody vegetation will take place during the bird nesting season (**March to September** inclusive) unless a thorough survey by an appropriately experienced ecologist first confirms that no active nests are present. Any work will accord with the Wildlife and Countryside Act 1981 (as amended).
- 3.5 Trees will be inspected for signs of stress, disease or damage and appropriate remedial action taken. Arisings from any tree management activity will, where appropriate, be retained on site in piles to create wood habitat to maximise invertebrate and bryophyte biodiversity. Where it accords with health and safety inspection, standing dead wood will be left in-situ to provide additional dead wood habitats.

Mitigation Measures during Construction

Existing Hedgerows and Trees

- 3.6 Protective fencing will be maintained around the retained trees and hedgerows throughout the site. Regular checks will be undertaken throughout the enabling and construction phase to ensure these are maintained.
- 3.7 Any trees that require felling will be in accordance with an Arboricultural Method Statement if available or under the supervision of a qualified arborist/ tree surgeon and shall be assessed for bat roosts by a suitably qualified Ecologist.
- 3.8 Any hedgerow removal should be checked and overseen by a suitably qualified Ecologist, and will be undertaken with care in stages using hand tools.
- 3.9 It is recommended that any removal of woody vegetation including hedgerow sections and trees should occur outside of the bird breeding season to minimise the risk of disturbance to breeding birds.

- 3.10 If this is not possible, such vegetation must be checked prior to removal by a suitably experienced ecologist to confirm the absence of active nests.
- 3.11 If any nesting birds are present, the nest and a 5m buffer surrounding it must be retained undisturbed until the birds have fledged. If works are undertaken outside of the bird breeding period, such restrictions do not apply.

Existing Grassland

- 3.12 During the construction phase, existing retained grassland will be kept short through mowing or grazing to prevent it becoming colonised by reptiles.
- 3.13 Appropriate working methods comprise directional strimming of tall ruderal and grassland habitats prior to site clearance works, and the subsequent maintenance of on-site habitats with a short sward throughout works to minimise the potential for terrestrial fauna being harmed.

Site Storage

- 3.14 Care should be taken to store building materials off the ground, for example on pallets, to avoid creating temporary refugia.

Lighting

- 3.15 No construction lighting will be permitted on retained hedgerows or the rockface embankment to protect nocturnal animals such as bats. Alternatively, construction will be restricted to daylight hours, finishing at least 30 minutes before sunset and commencing at least 30 minutes after sunrise during the main bat activity season (**April to October** inclusive).

Excavations

- 3.16 Trenches or large excavations will be covered overnight to prevent wildlife falling in and failing to escape, or a strategically placed plank will provide a means of escape. Any large bore pipes will be capped at the end of the day to reduce the potential for wildlife to enter and become trapped.

Bats

- 3.17 Refer to Ecological Impact Assessment Report sections 4.4-4.5 for construction phase mitigation measures.

Reptiles

- 3.18 Refer to Ecological Impact Assessment Report section 4.6 for construction phase mitigation measures.

Nesting Birds

- 3.19 Refer to Ecological Impact Assessment Report section 4.7 for construction phase mitigation measures.

Hedgehogs

- 3.20 Refer to Ecological Impact Assessment Report section 4.8 for construction phase mitigation measures.

4.0 LANDSCAPE & ECOLOGICAL SPECIFICATION

Objective 2: Create a matrix of complimentary new habitats within a GI Framework.

- 4.1 The Plan will create a matrix of new and existing habitats and corridors through the site to encourage the establishment and movement of wildlife.
- 4.2 The following section outlines the specification and implementation, with **Section 5** outlining the works programme and management regime.

General

- 4.3 Shrub, tree and hedgerow planting are to be delivered and planted in accordance with HTA Standard 'Handling and establishing landscape plants' (obtainable from the Horticultural Trades Association) Part III, paragraphs 6.2 to 6.6 and should also accord with the planting plans. All plants should be stored only when necessary in accordance with the HTA's '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.
- 4.4 Planting is to remain materially undamaged, sturdy, healthy and vigorous, planted upright or well balanced with best side to front. Trees and shrubs are to be of good shape and without elongated shoots, grown in a suitable environment and hardened off before being delivered to the site. All planting is to be true to name, of UK provenance and free from pests, diseases, discoloration, weeds, fungus and physiological disorders.
- 4.5 All trees should take into consideration the recommended minimum distances to foundations as set out in Chapter 4.2 of the NHBC Standards. Planting should accord with these standards unless checked and verified by the project engineer. For further species calculations refer to Chapter 4.2 of the NHBC Standards, and for species not included use a mature height of 2/3 the specified height in A. Mitchell's 'Trees of Britain and Northern Europe'.
- 4.6 All works are to be undertaken with due diligence being sure to leave the works in a clean and tidy condition at completion and after any maintenance operations. Protect areas affected by planting operations using boards/ tarpaulins and do not place excavated or imported material directly on adjacent grassed areas.
- 4.7 Bare root deciduous planting shall be carried out from late October to late March; conifers and evergreens either September/October or April/May, herbaceous plants [including aquatic and marginal] September/October or March/April. Container grown plants at any time of year if ground and weather conditions are favourable. Bare root deciduous planting to be carried out only during suitable ground and weather conditions. Planting shall not be carried out in waterlogged or frozen ground.

Native Scrubland Planting Mix

- 4.8 New scrub planting should be planted between October and March, avoiding periods of inundation or prolonged ground frost. This will accord with BS 8545:2014. Plants are to be mulched using wood chippings or bark to establish a 1m diameter around the plant stem or use proprietary mulch matting. Woodland planting should be well heeled, protected by rabbit proof guards with a cane support.

4.9 New native scrub planting will comprise the following species:

Species	Density	Size	Root	%
<i>Corylus avellana</i> (Hazel)	1m centres	60-90cm	BR	10
<i>Cornus sanguinea</i> (Dogwood)	1m centres	40-60cm	BR	5
<i>Crataegus monogyna</i> (Hawthorn)	1m centres	60-90cm	BR	20
<i>Ilex aquifolium</i> (Holly)	1m centres	5L	C	5
<i>Lonicera periclymenum</i> (Honeysuckle)	1m centres	9P	C	5
<i>Prunus spinosa</i> (Blackthorn)	1m centres	60-90cm	BR	10
<i>Rhamnus cathartica</i> (Buckthorn)	1m centres	60-90cm	BR	10
<i>Rosa canina</i> (Dog Rose)	1m centres	40-60cm	BR	5
<i>Rosa arvensis</i> (Field Rose)	1m centres	40-60cm	BR	5
<i>Salix caprea</i> (Goat Willow)	1m centres	40-60cm	BR	5
<i>Salix cinerea</i> (Grey Willow)	1m centres	40-60cm	BR	5
<i>Sambucus nigra</i> (Elder)	1m centres	40-60cm	BR	5
<i>Ulex europaeus</i> (Gorse)	1m centres	40-60cm	BR	5
<i>Viburnum opulus</i> (Guelder Rose)	1m centres	40-60cm	BR	5

Native Tree Planting

- 4.10 New trees should be planted between October and March, avoiding periods of inundation or prolonged ground frost. This will accord with BS 8545:2014. Trees are to be mulched using wood chippings or bark to establish a 1m diameter around the tree stem or use proprietary mulch matting.
- 4.11 Trees will also be planted to form 'bat hop-overs' linear vegetative features, i.e. where local landscape juxtaposition of hedgerows and tree boundaries, are punctured by roads and paths. These will promote habitat connectivity and specifically ensure that bat navigational features remain intact and that bats cross the road / path at a safe height. Trees will be planted either side of the road and / or path with overhanging braches that create will try to create a continuous canopy over the gap as the planting matures.
- 4.12 Within the site wide green infrastructure, new tree planting will comprise the following species:

Native Tree Species (Off Plot)	Stem	Size	Root
<i>Acer campestre</i> (Field Maple)	Clear-stem	8-10cm	RB
<i>Betula pendula</i> (Silver Birch)	Clear-stem	8-10cm	RB
<i>Prunus avium</i> (Gean)	Clear-stem	8-10cm	RB
<i>Prunus padus</i> (Bird Cherry)	Clear-stem	8-10cm	RB
<i>Sorbus aucuparia</i> (Rowan)	Clear-stem	8-10cm	RB

- 4.13 New specimen on plot and public open space street trees will comprise the following species:

Street Tree Species	Stem	Size	Root
<i>Acer campestre</i> 'Elegant' (Field Maple cultivar)	Clear-stem	12-14cm	RB
<i>Amelanchier lamarckii</i> 'Robin Hill' (Serviceberry cultivar)	Clear-stem	12-14cm	RB
<i>Betula utilis jacquemontii</i> (Himalayan Birch cultivar)	Clear-stem	12-14cm	RB

- 4.14 A grouping of Field Maples (*Acer campestre* 'Elegant') will be planted within a meadow verge at the apex to the lane junction with Brierley Road, and will serve as a 'gateway' threshold landscape feature to the Grimethorpe settlement.
- 4.15 Field Maple is attractive to aphids and their predators, including many species of birds and insects. The flowers provide nectar and pollen sources for bees and birds, and its fruit provide food for small mammals.
- 4.16 Serviceberry and Himalayan Birch have been selected for their seasonal interest and their small compact growth habits for the on plot landscape setting. Serviceberry trees have nectar-pollen rich flowers good for bees and other pollinators in addition to their berry bearing capacity for birds. *Betula utilis* is known for attracting bees and birds and provides shelter and habitat.

Native Species Rich Hedgerow Planting

- 4.17 Hedgerows are identified as a Habitat of Principle Importance (HPI) as listed within Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.
- 4.18 New hedgerows will be created to provide site boundary enclosure and to be maintained at 1.8m in height.
- 4.19 New hedgerows will be planted during the planting season (October to March inclusive) and will comprise mixed, native species planting at a density of 5 plants per linear metre, with plants arranged in an off-set double staggered row (DSR) in species groups of 5 to 11. All new hedgerow planting will be provided with 75mm bark mulch. Individual spiral guards and bamboo canes will be required to prevent damage to saplings by browsing rabbits.
- 4.20 The standard hedgerow planting mix will comprise the following species:

Species	Density	Size	Root	%
<i>Acer campestre</i> (Field Maple)	5/Lm DSR	60-90cm	BR	10
<i>Cornus sanguinea</i> (Dogwood)	5/Lm DSR	40-60cm	BR	5
<i>Corylus avellana</i> (Hazel)	5/Lm DSR	60-90cm	BR	20
<i>Crataegus monogyna</i> (Hawthorn)	5/Lm DSR	60-90cm	BR	45
<i>Euonymus europaeus</i> (Spindle)	5/Lm DSR	40-60cm	BR	5
<i>Ilex aquifolium</i> (Holly)	5/Lm DSR	5L	C	5
<i>Rosa canina</i> (Dog Rose)	5/Lm DSR	40-60cm	BR	5
<i>Viburnum opulus</i> (Guelder Rose)	5/Lm DSR	40-60cm	BR	5

- 4.21 The thornless hedgerow planting mix (to site perimeter adjoining gardens) will comprise the following species:

Species	Density	Size	Root	%
<i>Acer campestre</i> (Field Maple)	5/Lm DSR	60-90cm	BR	10
<i>Cornus sanguinea</i> (Dogwood)	5/Lm DSR	40-60cm	BR	5
<i>Corylus avellana</i> (Hazel)	5/Lm DSR	60-90cm	BR	45
<i>Malus sylvestris</i> (Crab Apple)	5/Lm DSR	60-90cm	BR	20
<i>Euonymus europaeus</i> (Spindle)	5/Lm DSR	60-90cm	BR	10
<i>Ilex aquifolium</i> (Holly)	5/Lm DSR	5L	C	5
<i>Viburnum opulus</i> (Guelder Rose)	5/Lm DSR	40-60cm	BR	5

Single Species Native Hedgerow Planting

4.22 A single species native hedgerow will form an enveloping buffer to the residential plots and the wider site green infrastructure, providing structure to the landscape framework.

4.23 This hedgerow will comprise the following species:

Species	Density	Size	Container	%
<i>Ilex aquifolium</i> (Holly)	4/Lm	20-40cm	2L	100

4.24 Plants must be set in the holes at the same depth at which they have previously been growing with planting holes excavated approximately 150mm larger than the root balls and backfilled with a mixture of topsoil. To be maintained at 1.2m in height.

4.25 Plants to be a minimum of 300mm from any adjacent hard surface. All stock to be well watered when planted with 20L of water per m². Following planting and watering operations, all beds are to be mulched with 75mm of mulch (5-75mm particle size, British origin, FSC certified).

Single Species Ornamental Hedgerow Planting

4.26 A new ornamental hedgerow will be created along the entrance driveway into the development to provide a welcoming and pleasant setting. To be maintained at 60cm in height.

4.27 The hedgerow planting will comprise the following species:

Species	Density	Size	Container	%
<i>Lavandula angustifolia</i> 'Hidcote'	5/Lm	40-60cm	3L	100

4.28 Lavender not only provides sensory and ornamental value but has many wildlife benefits for pollinators and butterflies.

4.29 Plants must be set in the holes at the same depth at which they have previously been growing with planting holes excavated approximately 150mm larger than the root balls and backfilled with a mixture of topsoil.

4.30 Plants to be a minimum of 300mm from any adjacent hard surface. All stock to be well watered when planted with 20L of water per m². Following planting and watering operations, all beds are to be mulched with 75mm of mulch (5-75mm particle size, British origin, FSC certified).

On Plot Ornamental Planting

4.31 The on plot ornamental shrub planting will comprise the following species:

Species	Density /m ²	Size cm	Container
<i>Carex elata</i> 'Aurea'	7		3L
<i>Deschampsia cespitosa</i> 'Goldtau'	4		3L
<i>Festuca glauca</i> 'Blauglut'	7		3L
<i>Miscanthus sinensis</i> 'Morning Light'	1		3L
<i>Aucuba japonica</i> 'Rozannie'	4	30-40	3L
<i>Brachyglottis</i> 'Sunshine'	4	30-40	3L
<i>Choisya ternata</i> 'Sundance'	4	30-40	3L
<i>Cornus alba</i> 'Sibirica'	3	40-60	3L
<i>Cornus sanguinea</i> 'Midwinter Fire'	3	40-60	3L
<i>Cornus stolonifera</i> 'Flaviramea'	3	40-60	3L
<i>Euonymus fortunei</i> 'Emerald'n'Gold'	4	30-40	3L
<i>Euonymus fortunei</i> 'Silver Queen'	4	30-40	3L
<i>Hebe</i> 'Red Edge'	4	30-40	3L
<i>Lavandula angustifolia</i> 'Hidcote'	4	40-50	3L
<i>Lonicera nitida</i> 'Baggesen's Gold'	4	30-40	3L
<i>Lonicera nitida</i> 'Maigrun'	4	30-40	3L
<i>Pittosporum tenuifolium</i> 'Tom Thumb'	4	30-40	3L
<i>Prunus laurocerasus</i> 'Otto Luyken'	4	30-40	3L
<i>Sarcococca hookeriana</i> var. <i>humilis</i>	4	30-40	3L
<i>Santolina chamaecyparissus</i> 'Lemon Queen'	5	30-40	3L
<i>Skimmia japonica</i> 'Rubella'	4	30-40	3L
<i>Viburnum davidii</i>	4	30-40	2L
<i>Vinca minor</i> 'Gruner Teppich'	8	15-20	2L

4.32 This palette comprises berry bearing and nectar rich cultivars which are beneficial to birds and insects.

4.33 Plants must be set in the holes at the same depth at which they have previously been growing with planting holes excavated approximately 150mm larger than the root balls and backfilled with a mixture of topsoil.

4.34 Plants to be a minimum of 300mm from any adjacent hard surface. All stock to be well watered when planted with 20L of water per m². Following planting and watering operations, all beds are to be mulched with 75mm of mulch (5-75mm particle size, British origin, FSC certified)

Long / Meadow Grassland

4.35 New areas of meadow grassland will be seeded using a species-rich meadow grassland mix such as **Emorsgate EM3 –General Purpose Meadow Mix**, sown at 4g/m² as per the manufacturer's instructions.

%	Latin name	Common name
0.4	<i>Achillea millefolium</i>	(Yarrow)
0.4	<i>Agrimonia eupatoria</i>	(Agrimony)
0.1	<i>Anthyllis vulneraria</i>	(Kidney Vetch)
0.1	<i>Betonica officinalis</i> - (<i>Stachys officinalis</i>)	(Betony)
2.7	<i>Centaurea nigra</i>	(Common Knapweed)
2.5	<i>Centaurea scabiosa</i>	(Greater Knapweed)
1.5	<i>Daucus carota</i>	(Wild Carrot)
1	<i>Galium album</i> - (<i>Galium mollugo</i>)	(Hedge Bedstraw)

0.1	<i>Geranium pratense</i>	(Meadow Crane's-bill)
1.3	<i>Knautia arvensis</i>	(Field Scabious)
3.2	<i>Leucanthemum vulgare</i>	(Oxeye Daisy - (Moon Daisy))
0.2	<i>Medicago lupulina</i>	(Black Medick)
0.1	<i>Origanum vulgare</i>	(Wild Marjoram)
0.4	<i>Pastinaca sativa</i>	(Wild Parsnip)
0.5	<i>Poterium sanguisorba</i> - (<i>Sanguisorba minor</i>)	(Salad Burnet)
0.1	<i>Primula veris</i>	(Cowslip)
2.5	<i>Prunella vulgaris</i>	(Selfheal)
0.2	<i>Ranunculus acris</i>	(Meadow Buttercup)
0.2	<i>Rumex acetosa</i>	(Common Sorrel)
0.1	<i>Silaum silaus</i>	(Pepper Saxifrage)
1.4	<i>Silene vulgaris</i>	(Bladder Campion)
0.5	<i>Torilis japonica</i>	(Upright Hedge-parsley)
0.5	<i>Vicia cracca</i>	(Tufted Vetch)
8	<i>Agrostis capillaris</i>	(Common Bent)
28	<i>Cynosurus cristatus</i>	(Crested Dogtail)
24	<i>Festuca rubra</i>	(Red Fescue)
4	<i>Phleum bertolonii</i>	(Smaller Cat's-tail)
16	<i>Poa pratensis</i>	(Smooth-stalked Meadow-grass)

- 4.36 Only areas disturbed through landscape works will be seeded. These areas will include Public Open Space such as the vergeside treatment of the apex node adjacent junction with Brierley Road and unnamed lane north of the site.
- 4.37 Areas to be sown will be first rotovated and raked or harrowed to produce a medium fine, firm tilth. Fertiliser will not be applied at any point as this will lead to dominance of nutrient loving species such as broad-leaved grasses, nettles and docks. The seed mix will be sown at a density as per the general manufacturer's recommendation to allow space for each species to establish and to produce good ground cover.
- 4.38 Seed will be sown in the autumn or spring, selecting a time when the soil is moist and can be worked. Seeding will be sown by hand broadcasting, seed fiddle, spinner, hydroseeding or grass seed drill on the surface and will not be raked or harrowed in.

Tussocky Grassland

- 4.39 Established grassland that is not mown or grazed each year will become rough and "tussocky" in character. This grassland type is not as diverse or attractive as meadowland, but once established requires minimal maintenance. This can form useful refuge habitat on corners and margins of a site.
- 4.40 Tussock grassland is not as diverse as meadow grassland; however dense tussocks establish a layer of thatch that provide valuable shelter and over wintering areas. In order to expedite this establishment, the tussock grassland areas will have minimal maintenance and will not require harrowing or the removal of arisings.

- 4.41 New areas of tussocky grassland will be seeded along the embankment using an appropriate mix such as **Emorsgate EG10 – Tussocky Grassland Mix**, sown at 4g/m² as per the manufacturer's instructions.

%	Latin name	Common name
1.25	<i>Alopecurus pratensis</i>	(Meadow Foxtail)
20	<i>Cynosurus cristatus</i>	(Crested Dogstail)
20	<i>Dactylis glomerata</i>	(Cocksfoot)
5	<i>Deschampsia cespitosa</i>	(Tufted Hairgrass)
30	<i>Festuca rubra</i>	(Strong creeping Red Fescue)
1.25	<i>Holcus lanatus</i>	(Yorkshire Fog)
12.5	<i>Schedonorus arundinaceus</i> - (<i>Festuca arundinacea</i>)	(Tall Fescue)
10	<i>Schedonorus pratensis</i> (<i>Festuca pratensis</i>)	(Meadow Fescue)

- 4.42 Seed will be sown in the autumn or spring, selecting a time when the soil is moist and can be worked. Seeding will be sown by hand broadcasting, seed fiddle, spinner, hydroseeding or grass seed drill on the surface and will not be raked or harrowed in.

- 4.43 Only areas disturbed through landscape works will be seeded.

Amenity Grassland

- 4.44 New short sward amenity grassland areas will be established using a suitable species-rich native flowering grassland mix such as **Emorsgate EL1 – Flowering Lawn Mixture**, sown at 4g/m² as per the manufacturer's instructions.

%	Latin name	Common name
4	<i>Galium verum</i>	(Lady's Bedstraw)
0.5	<i>Leontodon hispidus</i>	(Rough Hawkbit)
1	<i>Leucanthemum vulgare</i>	(Oxeye Daisy - (Moon Daisy))
3.7	<i>Lotus corniculatus</i>	(Birdsfoot Trefoil)
3	<i>Primula veris</i>	(Cowslip)
4	<i>Prunella vulgaris</i>	(Selfheal)
3.5	<i>Ranunculus acris</i>	(Meadow Buttercup)
0.3	<i>Trifolium pratense</i>	(Wild Red Clover)
8	<i>Agrostis capillaris</i>	(Common Bent)
40	<i>Cynosurus cristatus</i>	(Crested Dogstail)
28	<i>Festuca rubra</i>	(Red Fescue)
4	<i>Phleum bertolonii</i>	(Smaller Cat's-tail)

- 4.45 Only areas disturbed through landscape works will be seeded. This will include areas within Public Open Space, incidental greenspaces and verges.

- 4.46 Areas to be sown will be first rotovated and raked or harrowed to produce a medium fine, firm tilth. Seed will be sown in the autumn or spring, selecting a time when the soil is moist and can be worked.

- 4.47 The above seed mix includes many perennial species that can be slow to germinate and grow. Ground cover will therefore likely take longer to develop than conventional lawn sowings and may

take 12-18 months to knit together as turf. Newly seeded areas will therefore be protected to prevent seedling destruction by pedestrians.

Existing Grassland Undisturbed During the Construction Process

- 4.48 Areas undisturbed during the construction process (and hence will not be seeded) will be created through the cutting management regime.

Bulb Planting

- 4.49 Areas of bulb planting are to be included within areas of amenity grassland. Planting will take place from late summer through to autumn. Topsize bulbs should be planted 300mm apart, planted in random swathes in the areas shown, at three times their depth.
- 4.50 Planting will comprise the following species:

Species

Narcissus obvallaris

To be grade 12/+ and planted at 30/m² densities.

Bird and Bat Boxes

- 4.51 Bat boxes will be erected under the eaves of new dwellings. The bat boxes will be installed in accordance with standard best practice, such that the boxes are positioned at least 4m above the ground, with the entrances to the boxes facing south-west to south-east. The entrances to the boxes are to be free of obstacles such that there is a clean and clear flight path to the new potential roost sites. This measure will provide increased roosting opportunities across the site over the existing situation.
- 4.52 Bird boxes will also be erected under the eaves of new dwellings. Using a variety of nest box types will provide new suitable nesting opportunities for a range of birds and potentially encourage new bird species into the site. The bird boxes will be installed in accordance with standard best practice, such that the boxes are positioned generally around 1-3m above the ground, with the entrances to the boxes facing between north and east. The entrances to the boxes are to be free of obstacles such that there is a clean and clear flight path to the new potential nesting sites.
- 4.53 The following boxes will be installed under eaves of new dwellings as shown in Appendix A:
- 2 x Bat Boxes; eg Habibat In-Built Bat Brick
 - 2 x Bird Boxes; eg Habibat In-Built Bird Nest Box Brick
 - 5 x Swift Bird Boxes eg Habibat In-Built Swift Box Brick
- 4.54 Bat boxes will be situated at least 4m high and on to south and south easterly facing aspects within the dwelling elevations.
- 4.55 No artificial lighting is to be used near or directed towards the bird and bat bricks.

Hedgehog Highways

- 4.56 Hedgehog highways will be created throughout the development to maintain habitat connectivity. Holes and / or channels measuring 13cm by 15cm will be incorporated into garden fences / field boundaries which are sufficient for a hedgehog to pass through but too small for most pets.
- 4.57 Interpretation signage will be affixed to fence detail above hedgehog highway portals to ensure dwelling occupants are aware of their presence and function in order to promote these access points are left clear and unblocked. Recycled plastic interpretation signage can be procured from the British Hedgehog Preservation Society website www.shop.britishhedgehogs.org.uk.
- 4.58 Refer to Ecological Impact Assessment Report section 5.4 and Drawing 9315-BT-01A Boundary Treatments for further detail.

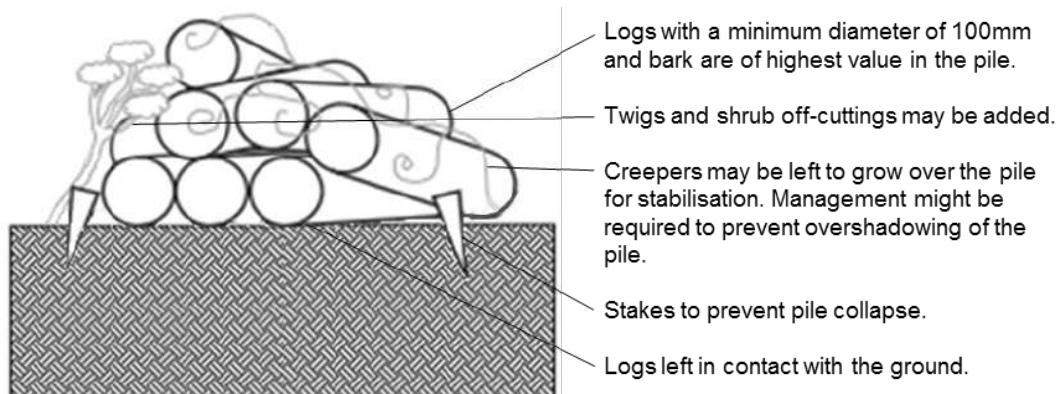
Lighting Design

- 4.59 To minimise potential effects to the local bat population artificial lighting should be carefully designed adjacent to existing and new potential bat foraging areas including tree groups, hedgerows and commuting lines.
- 4.60 Proposals will include a sympathetic lighting scheme designed to minimise light impact on bat foraging routes. Lighting will be kept to the minimum required for safety and will comprise down lighting only. As far as possible lighting will be designed to only be on for the minimum period of time and to turn off overnight.
- 4.61 The proposed lighting scheme will be designed in compliance with the Bat Conservation Trust publication 'Bats and Artificial Lighting in the UK' (2018).

Log Piles

- 4.62 Log piles will ideally be created from tree work arisings from site and placed at the interface between woodland and grassland habitats, avoiding north facing areas. The logs should be left in contact with the ground in dappled shade and built into a compact pile to maintain humidity. Stakes should be driven into the ground either side of the log pile to prevent the pile from collapsing.
- 4.63 Larger diameter logs (at least 100mm thick) with bark are of most value, particularly hard wood like ash, oak and beech, whereas freshly cut willow and poplar may re-sprout. Twigs, stems and shrub off-cuttings may also be added. Climbers may be allowed to grow thinly over the dead wood pile for stabilisation and moisture. Full sun will dry and heat the wood, supporting little life, whereas dense shade will promote the growth of fungi but may be too cool for insects.

Figure 3: Log Pile Detail



4.64 Locations are shown on Figure 1 denoted by the symbol H.

Objective 3: Provide a safe and pleasant landscape setting for new residential dwellings. Inspiring recreational and leisure resource.

4.65 The scheme will incorporate areas of visually attractive meadow grassland, tussock grassland, short sward / amenity grassland, trees, scrubland, a variety of hedgerow features and ground flora. The 'inner enclave' of the site will incorporate several relatively open informal incidental greenspace with ornamental hedges, planting borders and small trees to provide structure and interest.

4.66 This 'inner enclave' will be enveloped by the site wide green infrastructure comprising a mosaic of scrubland, grassland, boundary hedgerows and groups of trees. There will be public access thereby fully optimising for habitat creation potential.

Fencing and Gates

4.67 Fencing to the site boundaries will take the form of post and wire mesh fencing which will serve as the supporting central fenceline to new native hedgerow planting.

4.68 Lockable steel gates will be provided at the top of the unnamed lane for maintenance access.

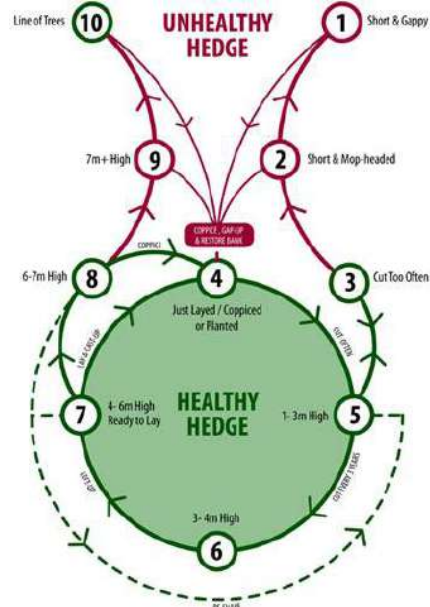
4.69 Set out and erect fencing following straight lines or smoothly flowing curves. The tops of posts are to follow the profile of the ground. Posts are to be erected and set rigid, plumb and to specified depth, or greater where necessary to ensure adequate support. All components are to be securely fixed.

4.70 Ensure all fencing and gates are secure, undamaged and in a good state of repair. Should any part of a fence or gate be deemed below standard obtain guidance and/ or repair or replace as required.

4.71 Set out and erect gates to ensure that they are erected and set rigid, plumb and to specified depth, or greater where necessary to ensure adequate support. Tighten all fixings before handover and ensure that all hinges, latches and closers are suitably adjusted so as to provide smooth operation. Lubricate where necessary.

side annually, alternating between the two sides of the hedgerow each year.

In the long term, hedgerows will be taken through a Hedgerow Management Cycle (HMC)¹. The ten steps of the HMC are shown below. The cycle shows a healthy green core and two unhealthy red offshoots. The aim should be to keep the hedge in the green part (steps 3 to 8), periodically laying or coppicing it, with trimming at appropriate intervals in between. If the hedge is not permitted to go through this cycle, it will either, if cut too often, become short and gappy (steps 1 – 3) or, if neglected, develop into a line of trees (steps 8 to 10).



As required

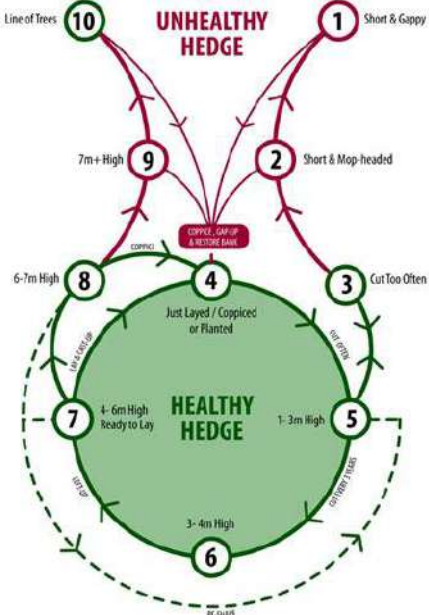
Native Scrubland Planting Mix

Replace failed specimens on a like-for-like basis. Top up mulch to a depth of 75mm where necessary.	✓	✓	✓	✓	✓					
Spraying or strimming of weeds to reduce competition and aid establishment. Not required if weed suppression matting used. Spray and hand weed around tree boles.	✓	✓	✓	✓	✓					
Examine all stakes, ties and guarding, replace or adjust as appropriate. If the tree has yet to establish, replace or adjust ties, spacers and tree tubes as appropriate. If the tree has established	✓	✓	✓	✓	✓					

¹ The Hedge Management Cycle (HMC). Art work by Will Field. Management Cycle concept developed by Nigel Adams. Hedgelink UK

well, then remove all stakes, ties, spacers, tubes etc. and make good surfaces disturbed – filling any holes with suitable topsoil.										
Where periods of extreme drought occur, trees that have not yet established (not healthy, not in full leaf, suppressed growth) need to be watered where their tolerance to drought is deemed to be insufficient.	✓	✓	✓	✓	✓					
Scrubland to be thinned once between years 10 and 15 by removing weaker specimens. Inspect and identify low quality/over suppressed trees whose removal or thinning would support creation of a more uneven, diverse canopy structure. Generally thin invasive species in favour of less common species- these to be encouraged through formative pruning and crown lifting as appropriate. Arisings will be left in windrows within the woodland blocks unless there is a large quantity of material in which case it will be removed from site. Any diseased wood should be removed from site. Further thinning will be carried out after year 20 & 30 if necessary.						✓		✓		✓
Tree Planting										
A weed-free mulched 1m diameter circle around the tree stem to a minimum depth of 75mm. When trees have reached independence, the sward can be allowed to grow up to the trunk, although tall weeds, bramble and ivy will be removed from around the trees. Care will be taken when using strimmers or mowers to avoid damaging trees. Weeds and grass within 100mm of the trunks will be removed by hand.	✓	✓	✓	✓	✓					
Examine all tree stakes and ties, replace or adjust as appropriate. If the tree has yet to establish, replace or adjust ties, spacers and tree tubes as appropriate. If the tree has established well, then remove all stakes, ties, spacers, tubes etc. and make good surfaces disturbed – filling any holes	✓	✓	✓	✓	✓					

with suitable topsoil. Top up mulch to a depth of 75mm where necessary.										
Examine condition of trees and replace failed specimens on a like-for-like basis & maintain replacement planting as noted above. Weeds and grass within 100mm of specimen tree trunks will be removed by hand. Top up mulch to a depth of 75mm where necessary.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Where periods of extreme drought occur, trees that have not yet established (not healthy, not in full leaf, suppressed growth) need to be watered where their tolerance to drought is deemed to be insufficient.	✓	✓	✓	✓	✓					
Throughout the management period there will be a continual process of formative pruning as appropriate to encourage good growth and shape, if required. Once trees have reached 150mm diameter at breast height (DBH) a formal process of tree inspection, for the discharge of a tree owner's duty of care.			✓		✓	✓	✓	✓	✓	✓
Any trees that are overhanging highways, footways or obstructing signs / lighting columns will be pruned back for safety reasons.					✓	✓	✓	✓	✓	✓
Native Hedgerow Planting (standard & thornless mixes)										
Following planting, water hedgerows in periods of extreme drought (2 or more weeks without substantial rainfall) (new and translocated hedgerow planting).	✓	✓	✓	✓	✓					
Replace failed specimens on a like-for-like basis.	✓	✓	✓	✓	✓					
Examine all guards and replace or adjust as appropriate. Remove guards once hedgerows established	✓	✓	✓	✓	✓					
Spraying or strimming of weeds to reduce competition and aid establishment. Not required if weed suppression matting used.	✓	✓	✓	✓	✓					
Side trimming of hedgerows in an 'A' profile to promote healthy hedgerow base. Starting in year 4 after planting new hedgerows will be cut along one side annually, alternating between the two sides of the hedgerow each year. Top up mulch as required.				✓	✓	✓	✓	✓	✓	✓

Prune any diseased or rotten wood back to sound wood. Remove all cut material from site.				As required
<p>In the long term, hedgerows will be taken through a Hedgerow Management Cycle (HMC)². The ten steps of the HMC are shown below. The cycle shows a healthy green core and two unhealthy red offshoots. The aim should be to keep the hedge in the green part (steps 3 to 8), periodically laying or coppicing it, with trimming at appropriate intervals in between. If the hedge is not permitted to go through this cycle, it will either, if cut too often, become short and gappy (steps 1 – 3) or, if neglected, develop into a line of trees (steps 8 to 10).</p>  <p>The diagram illustrates the Hedgerow Management Cycle (HMC) with 10 numbered steps arranged in a circular path. A central green circle represents the 'HEALTHY HEDGE'. Steps 4, 5, 6, 7, and 8 form a ring around this core, representing the healthy state. Step 4 is 'Just Layed / Coppiced or Planted'. Step 5 is '1-3m High'. Step 6 is '3-4m High'. Step 7 is '4-6m High Ready to Lay'. Step 8 is '6-7m High'. Step 9 is '7m+ High'. Steps 1, 2, and 3 form an outer ring representing the 'UNHEALTHY HEDGE'. Step 1 is 'Short & Gappy'. Step 2 is 'Short & Mop-headed'. Step 3 is 'Cut Too Often'. Step 10 is 'Line of Trees'. Arrows indicate the progression from step 4 to 5, 5 to 6, 6 to 7, 7 to 8, 8 to 9, 9 to 10, 10 to 1, 1 to 2, 2 to 3, 3 to 4, and 4 back to 5. A red box labeled 'COPPER, GAFFUP & RESOLVE DATE' is positioned between steps 4 and 5. A dashed line labeled 'RE-SHAPE' encircles the entire cycle.</p>				As required

Single Species Hedgerow Planting

Following planting, water shrubs in periods of extreme drought (2 or more weeks without substantial rainfall).	✓	✓	✓	✓	✓					
Replace failed specimens on a like-for-like basis.	✓	✓	✓	✓	✓					
Remove weed growth by hand and top up mulch levels as necessary. Dead-head after flowering.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Prune hedgerows to a square cross section during October to March.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

² The Hedge Management Cycle (HMC). Art work by Will Field. Management Cycle concept developed by Nigel Adams. Hedgelink UK

<p>Spot treat persistent pernicious weeds using herbicide following the first season's growth and/or manual hand strimming of target areas either in late summer when adjacent grassland is mown or in early spring. Care will be taken when using herbicide adjacent to riparian and aquatic habitats to prevent pollution of such habitats.</p>	<p>As required</p>
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Tussocky Grassland

<p>To control scrub and bramble development tussocky areas may need cutting every 3 years between October and February. For wildlife this cutting is best done on a rotational basis so that no more than one third of the area is cut in any one year leaving part as an undisturbed refuge. Care shall be exercised when mowing or strimming around trees and hedges or other structures. Strimming should not occur with 100mm of tree stems. Arisings will be left for 48 hours to allow dispersal of seeds and invertebrates prior to removal, to encourage grassland establishment and prevent soil enrichment and thatching.</p>		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
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<p>Spot treat persistent pernicious weeds using herbicide following the first season's growth and/or manual hand strimming of target areas either in late summer when adjacent grassland is mown or in early spring. Care will be taken when using herbicide treatments.</p>	<p>As required</p>											
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Amenity Grassland: Flowering Lawn Mix

<p>During initial establishment of new grassland, mow regularly (every 7 -10 days during growing season) throughout the first year of establishment. Cut to a height of 40-60mm. Dig out any residual perennial weeds such as docks. Once established, mow regularly as a lawn but not too short (25-40mm). To permit flowering, mowing can be relaxed from late June. Cut again when the sward gets untidy (after 4-8 weeks). Mowing may be suspended earlier in the year to allow cowslips to flower. Heavy quantities of cuttings should be</p>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
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The bank must be managed to maintain sparse vegetation so that bare ground is always visible. Sections of the bank should be cleared annually of weeds in rotation, ideally in February , to minimise disturbance.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
The grass sward atop the bank will be managed during its first summer with typically three cuttings which commence when the sward reaches 10cm in height to encourage grasses to tiller and help control invasive annual weeds. Cutting should not occur within months May to August inclusive to avoid disturbing nests. Once established, the sward will typically only need cutting once annually to remove dead tussocks and promote tussock regeneration	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fences and Gates										
Fencing and gates shall have a twice annual inspection in spring and autumn.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
General										
Check for, and control of INNS (Invasive Non-Native Species)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Litter will be removed from the site as part of the general management and maintenance visits. All litter, stones or other debris will be collected and removed by the Contractor immediately prior to grass cutting operations.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ecological visual inspection by a qualified ecologist for the first year to provide baseline data for future surveys to be monitored against.	✓				✓					✓
Arboricultural visual inspection, as part of a tree safety risk assessment for the development.						✓	✓	✓	✓	✓
Work programme review by those members of staff involved in site management.					✓					✓

General Notes

- 5.2 In general the objectives relating to the soft landscape are to allow for potential periodic thinning of plant beds should beds become excessively overcrowded, to remove dead or damaged plants and undertake further replacement planting where necessary and reinstate any grassed areas subject to erosion or damage.
- 5.3 Hedgerow trimming will be carried out in January / February to avoid the bird nesting season and to allow birds to eat any berries.
- 5.4 All hedgerow and tree works will be carried out with consideration of the potential presence of legally protected and priority species. Prior to commencement of any arboricultural or pruning works any trees with the potential to support roosting bats will be inspected by a qualified ecologist. Works will be scheduled to avoid the bird nesting season (March to August). Some deadwood will be retained to create additional log/brush piles and potential hibernation sites for fauna.
- 5.5 Amphibians and reptiles are typically active from March to October so care is to be taken when cutting grass during these months. Short, heavily managed grassland will be short sward (exposed) therefore of very low risk, however medium to tall sward have a higher risk of amphibians and reptiles being present and therefore the grassed areas (edges in particular) should be walked slowly prior to cutting to encourage any amphibians and reptiles to move away of their volition (if present). Medium to tall sward grass should not be cut to ground level immediately and cutting should be undertaken in a directional manner, working from the middle of a space outwards to enable time for the amphibians and/or reptiles to escape.
- 5.6 Wildflower grasslands and flowering plants provide a valuable nectar and food source for invertebrates. Once established, wildflower grassland should be left to seed before a cut is taken (i.e. a late summer cut). Pruning of shrubs and herbaceous species should be undertaken once flowering has finished.

Implementation of the Maintenance Works

- 5.7 Planting should be maintained by the landscape contractor for a minimum of 12 months following planting, with any defective planting replaced by the end of the first year.
- 5.8 Maintenance of the landscape areas shall be undertaken by a competent Landscape Contractor, registered with the British Association of Landscape Industries (BALI).
- 5.9 All soft landscape areas to be maintained to BS7370-4:1993 Grounds Maintenance.
- 5.10 The landscape maintenance of the site is to be carried out to a high standard at all times and in accordance with the schedule and specifications within this management plan.
- 5.11 The contractor shall ensure that the site is left tidy and safe following all maintenance works. All arisings should be removed from site in accordance with the maintenance schedule.
- 5.12 The contractor shall programme their visits to coincide with appropriate weather conditions for carrying out maintenance operations including the use of chemicals and the mowing of grass. Grass mowing in excessively wet conditions is prohibited. Chemicals are not to be used if children and pets are present.
- 5.13 A record of all maintenance visits should be completed by the maintenance contractor and these should be submitted to the Client for review every six months.

- 5.14 The maintenance contractor shall ensure that any chemical application is undertaken by trained personnel only with the appropriate NPTC certificates and in accordance with the manufacturer's recommendations.
- 5.15 The 'Code of Practice for the Safe Use of Pesticides for Non-agricultural Purposes' will be observed where applicable. The use of any chemicals shall be included within the maintenance visit records as described above.
- 5.16 The Contractor should notify the Client immediately to any significant pest or disease problem affecting plant stock and a suitable strategy for treatment should be discussed and agreed with the Client.

6.0 MONITOR THE SITE AND REVIEW THE PLAN

Objective 5: Provide a framework of monitoring and review periods.

- 6.1 The applicant will be responsible for the management and monitoring for the 30-year management period.
- 6.2 Due to the small scale of development it has been agreed by the LPA (refer Katie Lawrence email 040422) that monitoring undertaken in years 2, 5, 15 and 30 is considered acceptable.
- 6.3 In order to ensure that the habitats created within the site reach and maintain their maximum value to nature conservation, all habitats will be monitored.
- 6.4 Results of this monitoring will be used to inform changes to the management plan and 30 year work programme. The prescriptions provided here will not be set in stone and will be altered if required in agreement with the Local Planning Authority (LPA). The management plan will run for a period of 30 years, with the work programme fully reviewed at the end of the initial five year period by those members of staff involved in site management, and the LEMP updated accordingly, to be updated for the life of the development.
- Regular arboricultural visual inspections, as part of the tree safety risk assessment for the development.
 - Ecological inspection by a qualified ecologist in years 2, 5, 15 and 30 to provide baseline data for future surveys to be monitored against.
- 6.5 Results of monitoring should be submitted to the LPA and will include condition assessments of the habitats, noting which condition assessment criteria have been passed/failed. The monitoring report would also detail any revisions that may be required to the management plan if habitats are not achieving the anticipated condition.
- 6.6 Monitoring should also include checks of proposed bat and bird boxes and hedgehog highways (where access allows) and recommendations for replacement/ re-instatement of these features, if necessary.

Monitoring Programme - Habitat Condition Assessment

Mixed Scrub Monitoring Programme

- 6.7 The Biodiversity Metric 3.0 requires that scrub should meet all five condition criteria to achieve good condition. It is assumed condition Fairly Good will meet the same criteria as Good.

Table 2. Mixed Scrub Monitoring Programme

Mixed Scrub Monitoring Programme – Fairly Good Condition		
Objective category	Objective	Expected timescale
Condition 1	Habitat is representative of UKHab description (where in its natural range). There are at least three woody species, with no one species comprising more than 75% of the cover	Year 5
Condition 2	There is a good age range – all of the following are present: seedlings, young shrubs and mature shrubs.	Year 15
Condition 3	Through monitoring and management, the cover of invasive non-native species (as listed on Schedule 9 of WCA, 1981) and undesirable species ³ will be targeted to make up less than 5% of ground cover.	Year 15
Condition 4	The scrub has a well-developed edge with scattered scrub and tall grassland and/or herbs present between the scrub and adjacent habitat(s).	Year 15
Condition 5	There are clearings, glades or rides present within the scrub, providing sheltered edges.	Year 5

³ Undesirable species for this habitat include: creeping thistle *Cirsium arvense*, common nettle *Urtica dioica*, cherry laurel *Prunus laurocerasus*, snowberry *Symphoricarpos* spp., buddleia *Buddleja* spp., cotoneaster *Cotoneaster* spp., Spanish bluebell *Hyacinthoides hispanica* (or hybrids).

Hedgerow Monitoring Programme

6.8 The Biodiversity Metric 3.0 requires that moderate condition native species rich hedgerow with trees should have:

- No more than 4 failures in total; and
- Does not fail both attributes in more than one functional group (e.g. fails attributes A1, A2, B1 & C2 = Moderate condition) the following table sets the binding objectives for the newly created hedges. Due to the flexibility in the hedge condition assessment over time the specific allocation of passes may vary but the minimum requirement to deliver moderate condition will be maintained.

Table 3. Hedgerow Monitoring Programme

Hedgerow Monitoring Programme – Moderate Condition		
Objective category	Binding objective	Expected timescale
Condition 1	A1. - Height - >1.5 m average along length	Year 5
Condition 2	A2. - Width - >1.5 m average along length	Year 5
Condition 3	B1. - Gap - hedge base - Gap between ground and base of canopy <0.5 m for >90% of length	Year 15
Condition 4	B2. - Gap - hedge canopy continuity – Gaps make up <10% of total length and no canopy gaps >5 m	Year 15
Condition 5	C1. - Undisturbed ground and perennial vegetation - >1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of length: measured from outer edge of hedgerow, and is present on one side of the hedge (at least)	Year 5
Condition 6	C2. - Undesirable perennial vegetation - Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	Year 5
Condition 7	D1. - Invasive and neophyte species - >90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	Year 15
Condition 8	D2. - Current damage - >90% of the hedgerow or undisturbed ground is free of damage caused by human activities	Year 5
Condition 9	E1. - Tree age - At least one mature tree per 30m stretch of hedgerow. At ten years this will be a well-developed tree managed as a standard in the hedgerow.	Year 15

Hedgerow Monitoring Programme – Moderate Condition

Condition 10	E2. - Tree health - At least 95% of hedgerow trees are in a healthy condition (excluding veteran features valuable for wildlife). There is little or no evidence of an adverse impact on tree health by damage from livestock or wild animals, pests or diseases, or human activity.	Year 5
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Neutral Grassland Monitoring Programme

- 6.9 The Biodiversity Metric 3.0 requires that neutral grassland should meet three or four condition criteria to achieve moderate condition, including essential criterion 1.

Table 4. Neutral Grassland Monitoring Programme

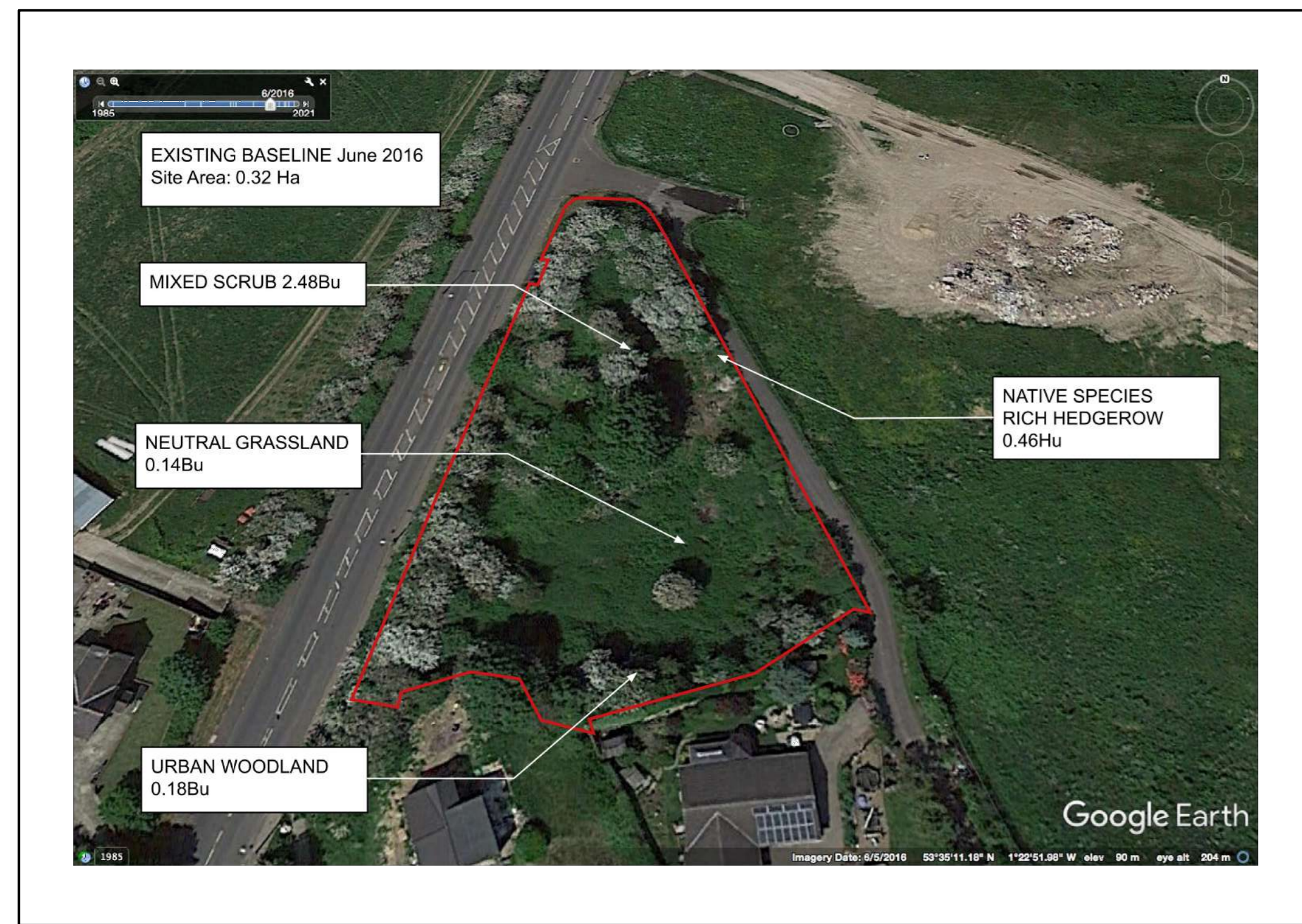
Neutral Grassland Monitoring Programme – Moderate Condition		
Objective category	Objective	Expected timescale
Condition 1	Habitat is representative of UKHab description (where in its natural range). Wildflowers, sedges and indicator species for the neutral grassland habitat type are very clearly and easily visible throughout the sward.	Year 5
Condition 2	Sward height is varied (at least 20% of the sward is less than 7cm and at least 20% is more than 7cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Year 15
Condition 3	Cover of bare ground between 1% and 5% including localised areas eg rabbit warrens.	Year 15
Condition 4	Cover of bracken less than 20% and cover of scrub (including bramble less than 5%).	Year 15
Condition 5	There is an absence of invasive non-native species (as listed in schedule 9 of WCA, 1981). Combined cover of species indicative of sub-optimal condition 1 and physical damage (such as excessive damage from machinery use or storage, damaging levels of access or any other management activities) accounts for less than 5% of total area.	Year 15
Condition 6	There are greater than 9 species per metre squared	Year 15

APPENDIX A

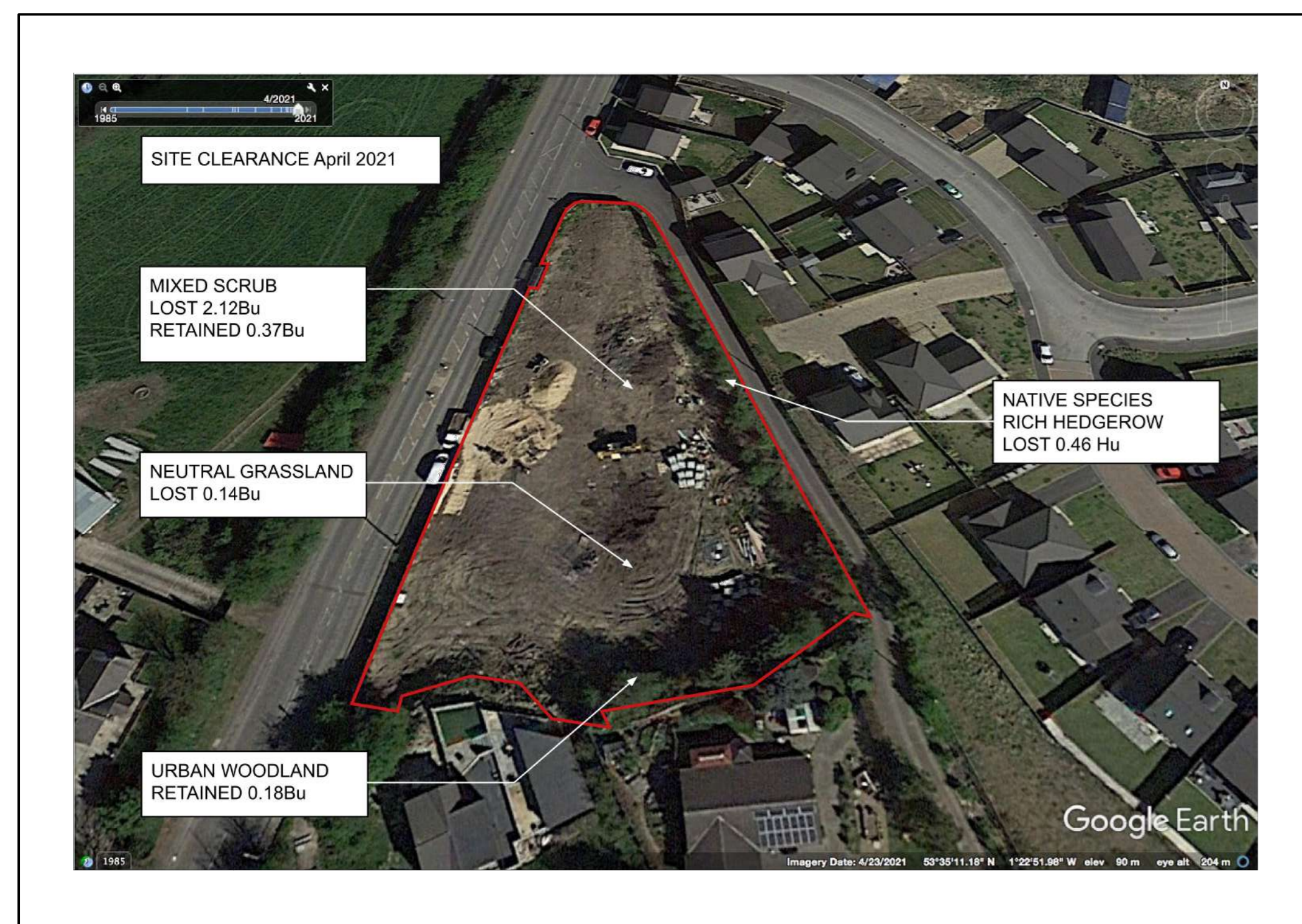
Ecological Summary

9315-BNG-01

EXISTING BASELINE



AFTER SITE CLEARANCE



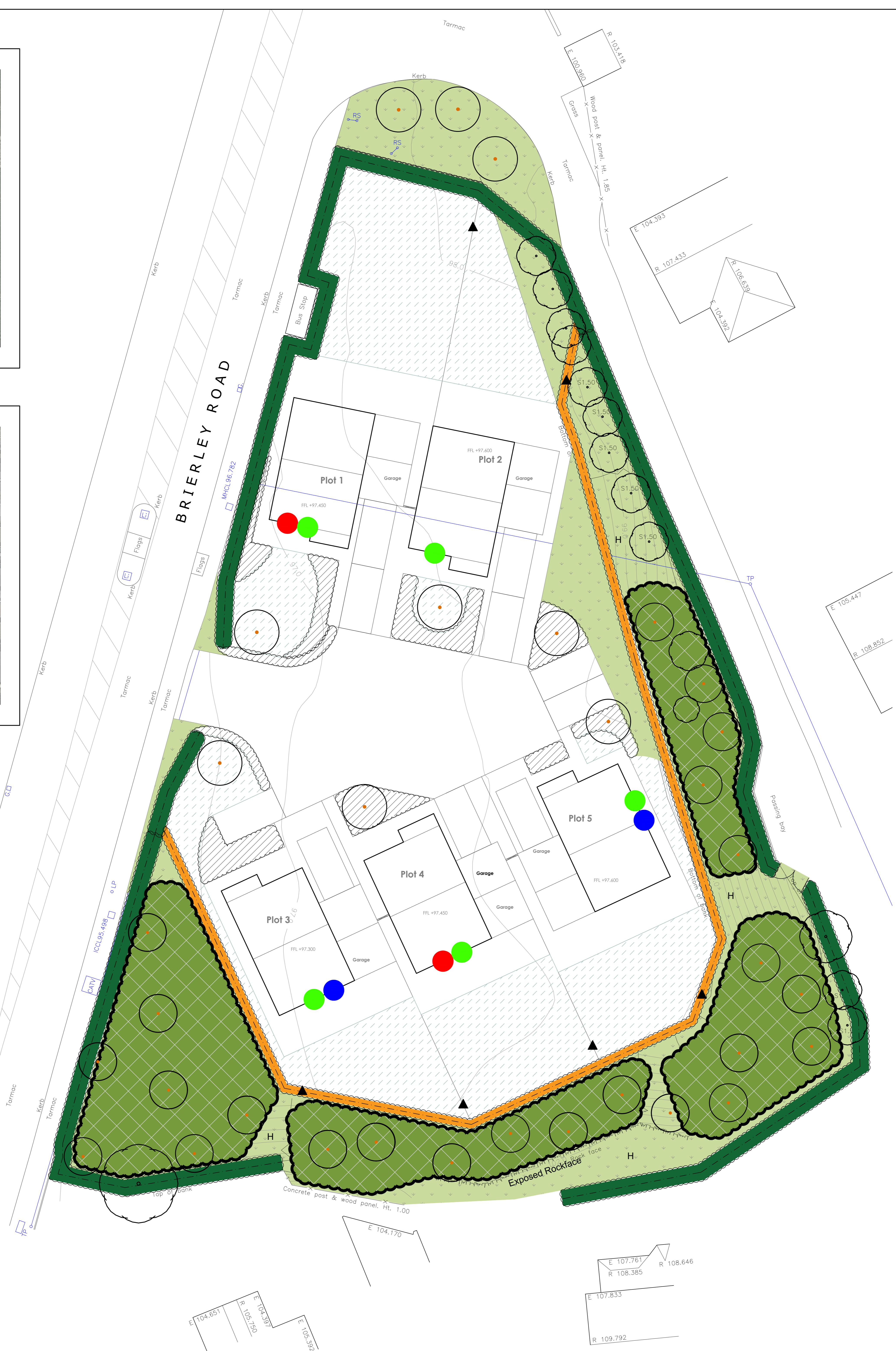
Courtesy of Google Maps/Earth 2021

Grimethorpe- Landscape & Woodland Implementation Programme

INDICATIVE IMPLEMENTATION PROGRAMME

The timing of implementation for the landscape works is outlined in the table below:

Landscape Element	Timescale
Native Scrubland Planting	January–February/ November–February
Native Hedgerow Planting	January–February/ November–February
Specimen & Standard Tree Planting	January–February/ November–February (for bare earth & root ball stock)
Ornamental on-plot borders	Containerised stock- As and when plot completion with appropriate weather & ground conditions
Ornamental single species hedgelines	Containerised stock- As and when phase completion with appropriate weather & ground conditions
Bulb Planting	September–November (depending on when tree planting is undertaken)
Flowering (amenity) Grassland	March–May/ August–September (depending on when tree planting is undertaken)
Meadow & Tussock Grassland	March–May/ August–September



HABITAT CREATION

- Urban- Street Tree : 0.07 Bu**
 - Street Trees
 - Field Maple 'Elegant' cultivar
 - Serviceberry 'Robin Hill' cultivar
 - Himalayan Birch cultivar
- Grassland- Neutral Grassland 0.39 Bu**
- MEADOW GRASSLAND (POS)**
 - Wild Flowers
 - % Common name
 - 0.4 Yarrow
 - 0.4 Agrimony
 - 0.1 Kidney Vetch
 - 0.1 Betony
 - 2.7 Common Knapweed
 - 2.5 Greater Knapweed
 - 1.5 Wild Carrot
 - 1 Hedge Bedstraw
 - 0.1 Meadow Crane's-bill
 - 1.3 Field Scabious
 - 3.2 Oxeye Daisy - (Moon Daisy)
 - 0.2 Black Medick
 - 0.1 Wild Marjoram
 - 0.4 Wild Parsnip
 - 0.5 Salad Burnet
 - 0.1 Cowslip
 - 2.5 Selfheal
 - 0.2 Meadow Buttercup
 - 0.2 Common Sorrel
 - 0.1 Pepper Saxifrage
 - 1.4 Bladder Campion
 - 0.5 Upright Hedge-parsley
 - 0.1 Tufted Vetch
 - 20 Grasses
 - 8 Common Bent
 - 28 Crested Dogstail
 - 24 Red Fescue
 - 4 Smaller Cat's-tail
 - 16 Smooth-stalked Meadow-grass
 - 80
 - 100
- Native Species Rich Hedgerow Mix : 1.03 Hedge Units**
 - Thornless Mix to garden boundaries only
 - 10% Field Maple
 - 5% Dogwood
 - 45% Hazel
 - 20% Crab Apple
 - 10% Spindle
 - 5% Holly
 - 5% Guelder Rose
- Standard Mix to site boundaries**
 - 10% Field Maple
 - 5% Dogwood
 - 20% Hazel
 - 45% Hawthorn
 - 5% Spindle
 - 5% Holly
 - 5% Dog Rose
 - 5% Guelder Rose
- Native Hedgerow : 0.38 Hedge Units**
 - 100% Holly
- Heathland & Shrub- Mixed Scrub : 0.48 Bu**
 - 10% Hazel
 - 5% Dogwood
 - 20% Hawthorn
 - 5% Holly
 - 5% Honeysuckle
 - 10% Blackthorn
 - 10% Buckthorn
 - 5% Dog Rose
 - 5% Field Rose
 - 5% Goat Willow
 - 5% Grey Willow
 - 5% Elder
 - 5% Gorse
 - 5% Guelder Rose
- Urban- Introduced Shrub 0.02 Bu**
- Urban Amenity Grassland 0.21 Bu**
- Bird Box eg Habitat In-Built Bird Nest Box Brick**
- Swift Bird Box eg Habitat Swift Box In-Built Brick**
- Bat Box eg Habitat In-Built Bat Brick**
- Hedgehog Corridor**
 - 13 x 15cm portals provided within garden boundaries incorporating interpretation signage to fence detail (cut ends to be made safe where portals are required within wire mesh hedge support fencing)
- H Hibernacula**
- ON PLOT AREAS**
 - PLOTS: 429.5 sqm
 - HARDSTANDING: 780 sqm
 - GARDEN CURTILAGES: 743 sqm (front & rear)
 - TOTAL AREA: 0.32 Ha
- TOTAL HABITAT AREA CREATED= 1.17Bu**
- TOTAL HEDGE UNITS CREATED= 1.42 Hu**
- TUSSOCK GRASSLAND AREAS TO EMBANKMENT**
 - % Common name
 - 1.25 Meadow Foxtail
 - 20 Crested Dogstail
 - 20 Cocksfoot
 - 5 Tufted Hairgrass
 - 30 Strong creeping Red Fescue
 - 1.25 Yorkshire Fog
 - 12.5 Tall Fescue
 - 10 Meadow Fescue
 - 100
- FLOWERING LAWN MIX TO AMENITY GRASS AREAS (POS)**
 - Wild Flowers
 - % Common name
 - 4 Lady's Bedstraw
 - 0.5 Rough Hawkbit
 - 1 Oxeye Daisy - (Moon Daisy)
 - 3.7 Birdsfoot Trefoil
 - 3 Cowslip
 - 4 Selfheal
 - 3.5 Meadow Buttercup
 - 0.3 Wild Red Clover
 - 20 Grasses
 - 8 Common Bent
 - 40 Crested Dogstail
 - 28 Red Fescue
 - 4 Smaller Cat's-tail
 - 80
 - 100

NOTES:
 This drawing is to be read in conjunction with all relevant contract documentation from the design team, with any conflicting information to be brought to the attention of Robinson Chartered Landscape Architecture in writing before commencing on site.
 The contractor is to check and verify all levels and dimensions before construction. Any discrepancies are to be brought to the attention of Robinson Chartered Landscape Architecture in writing before commencing on site.
 All dimensions in mm, unless otherwise stated.
 Do not scale from this drawing.
 All sub base and concrete specification to engineer's details.
 Waterproofing of any element to be specified by others.
 All proprietary products shall be installed in accordance with manufacturers written instructions.
 Plants should be ordered to suit site areas in accordance with scheduled plant densities.
 Any proposed plant substitution shall be agreed with the landscape architect prior to ordering.
 Do not scale areas or dimensions from this plan as the layout has been derived from a large scale OS base plan.
 It is the contractors responsibility to ascertain the positions of all underground and above services.
 Tree locations and design layout may be subject to change following an accurate survey of all service locations.

DATE	ISSUE	DESCRIPTION OF REVISION	REVISION LETTER	CHECKED BY
29/07/22	CR	Swift Boxes shown	C	CR
29/07/22	CR	Hedgerow corridors shown	B	CR
23/02/22	CR	Formal Issue	A	CR
07/02/22	CR	OSM F-Box Bat boxes added	-	CR
28/11/21	CR	OSM F-Box	-	CR

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 W www.robisonclia.com

Drawing status: **Planning**

Client: **Mr C. Gables**

Project: **Windmill Hill Quarry, Brierley Road, Grimethorpe**

Drawing title: **ECOLOGICAL SUMMARY**

Drawing title	Drawn by	Drawn date
1:100	CR	28/11/21
Appr date	Checked by	Checked date
28/11/21	CR	28/11/21

Drawing number: **8115-BNG-01** Revision: **0**

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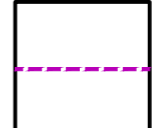

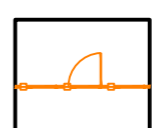
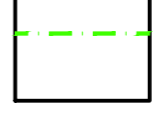
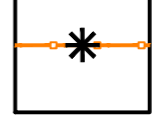
TO BE READ IN CONJUNCTION WITH INFORMATION SUBMITTED BY ECOLOGICAL CONSULTANTS

APPENDIX B

Boundary Treatment (showing Hedgehog Highways)

9315-BT-01A

KEY

-  900mm high Timber Hit & Miss Fenceline
double sided pressure treated softwood
eg Jacksons Fencing
-  1.8m high Close Boarded Timber Hit & Miss Fenceline
double sided pressure treated softwood with stainless steel
fixings, gravel boarding & capping and incorporating trellis top panel
eg Jacksons Fencing Canterbury Combi Slatted Panel
or standard Hit & Miss type
-  1.8m high Hit & Miss Single Gate
-with lockable catch mechanism as option
(to match rear garden fencelines)
-  1.2m high Timber Post & Wire Mesh Fenceline
-wire mesh 100mm square gauge
(central supporting fencing to all hedgelines)
-  Location of 130 x 150mm Hedgehog Highway portals to
Garden Boundary Fencelines with recycled plastic
interpretation signage screwed to fence detail above
each doorway using stainless steel fixings.

Use 2no. 50 x 50 x 600mm timber pegs driven into earth for portal doorframes in order to secure gravel boarding detail either side.

For supporting hedgeline wire mesh fencing, create Hedgehog Highway adjacent to fenceline timber post & affix interpretation signage to post in a manner which visually relates to the hedgehog portal until hedge establishes. Ensure any cut ends of wire mesh are filed down and made safe with no sharp ends.



Recycled plastic interpretation signage available at British Hedgehog Preservation Society website; <https://shop.britishhedgehogs.org.uk/product/hedgehog-highway-sign/>

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Tree locations and design layout may be subject to change following an accurate survey of all service locations.

Native Mixed Species Hedgerow to Site Boundary
-maintain at 1.8m height
-supporting central post & wire mesh
fenceline to assist establishment
See drawing 9315-SL-01A

Low Ornamental Hedgeline
-Maintained at 600mm height
See drawing 9315-SL-01A

Native Single Species Hedgerow
-maintain at 1.2m height
-supporting central post & wire mesh
fenceline to assist establishment
See drawing 9315-SL-01A

Maintenance Access
-Heavy Metal Field Gate & Posts
eg Jacksons Fencing

**TO BE READ IN CONJUNCTION WITH
SOFT LANDSCAPE PLAN 9315-SL-01A
& PLANTING SETTING OUT 9315-PP-01**

DATE	REVISION LETTER	DESCRIPTION OF REVISION	CHECKED BY
09/07/22	CR	Hedgehog Highway & signage added	A
23/02/22	CR	09/07/21	CR

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Drawing status: Planning
Client: Mr C. Gaddes
Project: Windhill Hill Quarry, Brierley Road, Grimehope

Drawing title: SUGGESTED BOUNDARY TREATMENT

Drawn by	Checked by	Drawn date
ML	CR	09/07/22
Appr. date	Checked date	Checked by
08/08/22	08/08/22	CR

Drawing number: 9315-BT-01
Revision: A
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