OX LEE QUARRY

Restoration and Aftercare Report

On behalf of:

WAVIN LTD

January 2025

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OX LEE QUARRY – RESTORATION & AFTERCARE REPORT

1. Introduction

1.1 Silkstone Environmental has prepared this report to detail the restoration and aftercare proposals for the restoration of Ox Lee Quarry to a combination of improved agricultural grassland, hedgerow planting and woodland.

1.2 The restoration scheme that can be provided is reliant on full replacement of the topsoil, subsoil and overburden which has been stored on site. This will create a final profile, similar to the existing ground levels when, in particular, the overburden is placed within the void.

1.3 This report describes the treatment and measures to be taken to restore the land to an ecologically sustainable after use with the end aim for agricultural use.

1.4 The restoration and aftercare proposals also provide a long-term management regime to maximise the sustainability of the reinstated land.

1.5 To ensure successful establishment and long-term care of the restored landscape the proposed maintenance and management operations during the aftercare period will follow on from the tree planting and grassland seeding. The management regime for the woodland, wetland and grassland areas has been designed to maximise potential wildlife habitats and improve the ecological value of the land.

1.6 The restoration and aftercare proposals will provide an integrated landform to the surrounding area. The long-term management regime will maximise the sustainability of the reinstated features.

2. Restoration Principles

2.3 This report addresses the strategic framework for the re-instatement of soils, creation of tree planting and vegetative areas, their management and the maintenance principles required to achieve this objective.

2.4 The key elements are: -

- The creation of an attractive landscaped setting.
- The integration of an area with additional native tree planting within the surrounding landscape.
- An increased diversity of landscape habitat through the provision of improved agricultural grassland.
- A pond/wetland feature to add biodiversity to meet BNG requirements

2.5 The long-term management regime will maximise the sustainability of the reinstated features.

3. Proposed Restoration

3.1 Ox Lee Quarry's landform will be reinstated to contours detailed on the submitted restoration plan, Ref 21123 Rev C. No significant soils are present within the site however limited soils are present throughout the southwestern section of the site. The volume of these is unknown as are

intermixed with some overburden material from historic quarrying operations. Where identified such soils will be stripped and stored appropriately pending their ultimate use in restoration.

3.2 Following re-contouring, seeded areas shall only be respread having regard to the weather conditions prevailing at the time. If too large an area is prepared to receive subsequent layers which become saturated this will not only delay the re-spreading operations as the profile will need to dry out before re-spreading can recommence.

3.3 The volume of materials identified stored on site from the mineral extraction works undertaken on site are as follows:

Topsoil:	12,284 m³ (cubic metres)
Subsoil:	18,032 m³
Overburden	87,114 m³

3.4 0.75 Hectares of native woodland has been added to the scheme. The access track has also been removed and soils stored along the edges will be replaced along with the section of tarmaced road from Bedding Edge Road as required by planning conditions 3 & 4. This will be seeded with a seed mix shown in Appendix 2.

3.5 A new drainage ditch has been included to the north which would intercept any potential sediment run off during overburden and soils removal towards the settlement ponds, prior to discharge into the adjacent watercourse. This is included due to concerns raised in the pre-application response by KC LLFA.

3.6 It is also proposed to keep the lagoon system in place for drainage purposes as they act as a filter mechanism for ochres water discharge from the coal seams within the site. Also, they have ecological value and contain reed beds which assist with the filtering system prior to final discharge into an adjacent watercourse.

3.7 The new area of wetland proposed to the north will be sustained by groundwater drainage from fields to the south which naturally fall towards this area.

3.8 It is important that soils shall both at the stripping and reinstatement stage only be traversed when their plastic limit is such as to minimise the effect of disturbing them. Soils stored under the correct conditions are less likely to deteriorate and develop anaerobic conditions. Through adhering to the code of practice for the handling of soils this will greatly assist the soils reinstatement under the optimum conditions.

4. Woodland Areas

4.1 Following the completion of the ground profiling and seeding, tree planting shall be carried out in the first planting season following commencement of the development (between October and March inclusive).

Plant Stock:

4.2 Plant stock to be supplied in accordance with the size and description specified on the plant schedule in Appendix A.

4.3 Plant stock shall be healthy, vigorous, free from pests and diseases and suitably hardened off for the proposed situation of planting and lifted at a time in accordance with good nursery practice. Stock shall have a well formed fibrous root system and be free from perennial weeds.

4.4 All plant stock, plant handling and planting to be undertaken in accordance with the following British Standard Specifications and Code of Practice:

- BS 3936:1992 Part 1 Nursery Stock - Specification for trees and shrubs;
- BS 4428:1989 - Code of Practice for General Landscaping Operations
- BS 8545:2014 Trees from Nursery to Independence in the Landscape

4.5 In addition to the cultivation operation in producing the seedbed, prior to planting additional ground preparation for tree planting shall be carried out once the grass sward has established. These works will consist of subsoiling with a single tyne subsoiler which shall be carried out slightly across the contours at 2 mtr centres. This operation will assist plant roots to penetrate, establish and will promote the movement of and retention of water along the rip lines in all aiding the development of plants.

4.6 The trees and shrubs to be planted are detailed in Appendix No 1, the species shall consist of native species which in the main shall be planted as whips bare rooted stock. The planting will be at a spacing of 2 mtrs between plants in species groups.

4.7 All transplants shall be notch planted, the notches shall be vertical with sufficient depth to allow the roots to hang freely. When the plant is in position, the notch shall be closed and the soil well firmed around the roots. A top dressing of a suitable fertiliser shall be applied as determined through soil analysis. No fertiliser shall be placed against the stem or foliage of the plant.

4.8 All plant material is to be healthy, vigorous and sound transplanted nursery stock with well-formed fibrous roots and heads and to have been grown at or for the supply nursery.

4.9 All plant material is to be packed at the supply nursery to ensure that there is no drying out in transit. After delivery, if planting is not to be carried out immediately bare rooted plants are to be heeled in by placing the roots in prepared trenches and covered with soil in accordance with BS8545:2014 – Trees from Nursery to Independence.

4.10 Replacement of failed plants will be undertaken annually to achieve by the end of year five, a ninety percent survival rate providing that any failed planting stations are evenly distributed throughout the areas.

4.11 During the aftercare period maintenance tasks are considered necessary in order to achieve the establishment of the tree and shrub planting, these are detailed at Appendix No 3.

5. Drainage

5.1 Currently, groundwater issues and surface water run-off is channelled by a number of drainage ditches to a series of water treatment lagoons, three of which are located adjacent to the access road into the main quarry excavation area and a further two in the north-eastern corner of the quarry.

5.2 Groundwater flow is towards the north and falls to a level of 320 metres above ordnance datum, where it is intercepted by cut off ditches which channel the water to the quarries lagoon system.

5.3 Further groundwater springs are noted at estimated levels ranging from 305 metres down to 296 metres A.O.D. from below the northern most lagoons and along the northern boundary of the quarry. This water discharge is noted along most of Ox Lee Lane, which is located for a good part of its length in a cutting adjacent to the quarries northern boundary.

5.4 Although Condition 4 states the removal of the settlement lagoons, these are now well established features of the site and assist with the surface water management currently and would be equally effective once the site is restored so the proposed scheme submitted has retained these lagoons as ponds for this reason.

6. Wetland Creation

6.1 It is proposed to create that a small area of marshy wetland will form on the margins of the settlement lagoons to replicate the existing wetland to the east. Areas of deeper water (maximum 0.5m depth), ditches and shallow seasonally scrapes will be created as part of the restoration.

Establishment

6.2 To prevent nutrient levels becoming too high the shallow margins will be topped with 1m depth of subsoil with the topsoil being reserved for the deeper areas of the water bodies. The margins will be seeded with Wetland and Pond Areas seed mix (WFG 9) available from Germinal Seeds or similar. A typical mix would include the following range of species:

Seed Mixture

Caltha palustris	Marsh Marigold
Filipendula ulmaria	Meadow Sweet
Iris pseudacorus	Yellow Flag
Iris Lotus uliginosus	Marsh Trefoil
Lychnis flos-cuculi	Ragged Robin
Prunella vulgaris	Self-heal
Pulicaria dysenterica	Common Fleabane
Ranunculus acris	Meadow Buttercup
Sanguisorba officinalis	Greater Burnet
Succisa pratensis	Devil's Bit
Scabious Vicia sativa	Common Vetch
Cynosurus cristatus	Crested Dogstail
Festuca rubra ssp litoralis	Slender Creeping Red Fescue
Festuca arundinacea	Tall Fescue

5 Year Aftercare

6.2 Monitor vegetation establishment to control undesirable invasive species and promote biodiversity through planting of wetland species.

Longer term Management

6.3 Generally, the best long-term management is to allow gradual, natural succession, excavating new ponds as the old ones become overgrown. Many ponds when left alone will fill with sediment, becoming shallower with gradually changing communities. However, where individual plant species are starting to dominate the wetland, removing a portion of the invasive plant may promote species diversity. Also, any alien species that have started to colonise the pond will be removed completely as soon as possible

7. Aftercare Proposals

7.1 This section of the report describes the proposed maintenance and management operations which will be carried out to ensure successful establishment and long term care of the restored areas, these activities will follow on from the construction, planting and seeding phases described above. The management regime for the tree planted areas has been designed to maximise the physical features within the landscape and potential of wildlife habitats and corridors. The operative aim is to create sustainable features.

Future Management

7.2 To ensure successful establishment and long-term care of the restored landscape, this section of the report describes the proposed management and maintenance to be carried out during the statutory 5 year aftercare period. These works will follow immediately on from and will to some extent overlap with the construction planting and seeding phases described above. The management regime has been designed to maximise the physical features within the landscape, the creation of sustainable habitats.

7.3 On completion of the construction and planting works the following components will exist on site.

- New native woodland planting
- Pond/Wetland area
- Amenity grassland
- Hedgerow Planting

8. Schedule of Tasks during the 5-year Aftercare Period

Years 1-2

Grassland

8.1 Following the reinstatement of the soils the land shall be cultivated and managed in such a way as to promote its development and promote a healthy grass sward.

Tree Planting

8.2 This shall be carried out during the first available planting season. Ground preparations will comprise of subsoiling along the line of planting into which the tree species will be planted. Planting shall be to the agreed specification and quantities detailed further in this report.

Years 3 – 5

Grassland

8.3 To be managed through a regime of mowing throughout the growing season.

Tree areas

8.4 Annual assessment of the plants growing shall be undertaken. All failed plant will be replaced during the appropriate season. Weed control shall be undertaken as necessary during the growing season to eliminate competition from rank vegetation. A schedule of annual maintenance is detailed at Appendix No 3.

9. General

9.1 In order to ensure the objectives, set out in this report are achieved annual aftercare reports shall be prepared detailing tasks undertaken and those intended for the forthcoming season, in addition annual aftercare meetings shall be held to inspect the progress of the aftercare works.

9.2 The management phase will be over a 5-year aftercare period, which is crucial in establishing the features following, which they can progress through to maturity and productivity. The aim of the management period for the tree and shrub area is to create and maintain the newly planted areas in such a way as to ensure their development into healthy, mature species with diverse composition and height structure through carrying out a regular cycle of thinning, removal of dead and damaged plants and gapping up and control of invasive species.

Years One to Five

9.3 Weed control in the early establishment years is perhaps the most important management operation determining to a large extent the success of new planting. During the first three years after planting, a weed free zone will be maintained around each planting station, to achieve this regular inspection throughout the growing season April to October shall be made. Weed control will be by an approved method of chemical application and or hand weeding as appropriate given site conditions at the time. During this period, attention will be given to watering the plants in times of drought particularly larger nursery stock. Firming up of plants shall be undertaken annually following frosts and excessive windy periods to prevent exposure of roots.

9.4 Any stakes or canes used to support trees will be checked annually and replaced and secured as necessary. Pruning of any dead, dying, diseased or damaged branches will be carried out with an appropriate tool to leave a clean angular cut to prevent disease. Replacement of failed plants will be undertaken annually to achieve by the end of year five, a ninety percent survival rate providing that any failed planting stations are evenly distributed throughout the areas.

9.5 The following are tasks considered necessary in order to achieve the establishment of tree planting.

Operation	**Timing**
Maintain weed free zone around each planting station	April - September
Water as required in time of drought	As necessary
Check stakes, canes and ties	Twice a year
Apply fertiliser, pesticides	As necessary April – June
Re-firm plants after frosts or stormy weather	Once a year
Replace initial planting to 100% where planting has failed	October – March
Remove stakes and ties	As soon as plant is wind firm

Site Inspection

8.6 In order to ensure the objectives set out in this report are achieved annual aftercare reports shall be prepared detailing tasks undertaken and those intended for the forthcoming season, in addition annual aftercare meetings shall be held to inspect the progress of the aftercare works.

Appendix No 1

Tree and Shrub Species

Bare rooted notch planted

Common Name	Scientific name	% Mix	Height	No of Trees	Planted in Groups of:
Blackthorn	*Primus Spinosa*	10%	30-45cm	170	5-7
Pedunculate Oak	*Quercus robur*	10%	100-120cm	170	3-5
Rowan	*Sorbus aucuparia*	15%	60-90cm	250	3-5
Silver Birch	*Betula pendula*	30%	60-90cm	500	3-5
Sycamore	*Acer pseudoplatanus*	10%	60-90cm	170	5-7
Hawthorn	*Crataegus monogyna*	10%	60-90cm	170	5-7
Hazel	*Corylus avellana*	5%	45-60cm	80	3-5
Field Maple	*Acer campestre*	10%	60-90cm	170	3-5
		100%		**1680**	

Native trees planting at 2 metre centres.

Appendix No 2

Proposed Grass Seed Mixtures.

Mixture No 1 (Improved Grassland)

Perennial Ryegrass	Fenema	8.0
Perennial Ryegrass	Gilford	12.0.
Perennial Ryegrass	Glen	8.0
Timothy	Motim	3.0
White Clover	Avoca	1.0
White Clover	Menna	2.0
Creeping Red Fescue	(Festuca rubra rubra)	8.0
	Seed Rate per Ha	42.0 Kg/ha

Mixture No 2 (Access Road)

Strong Creeping Red Fescue	21.0
Highland Browntop	7.0
Smooth Stalked Meadow grass	4.0
Hard Fescue	4.0
Seed rate per Ha	36.0 Kg/ha

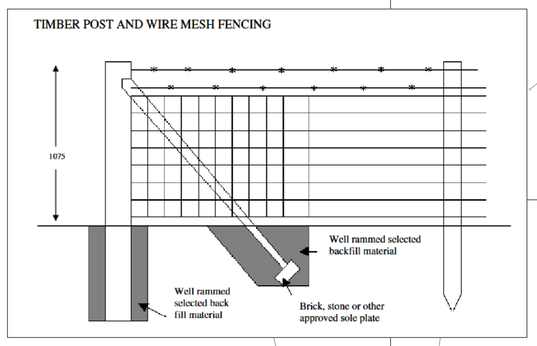
Appendix No 3

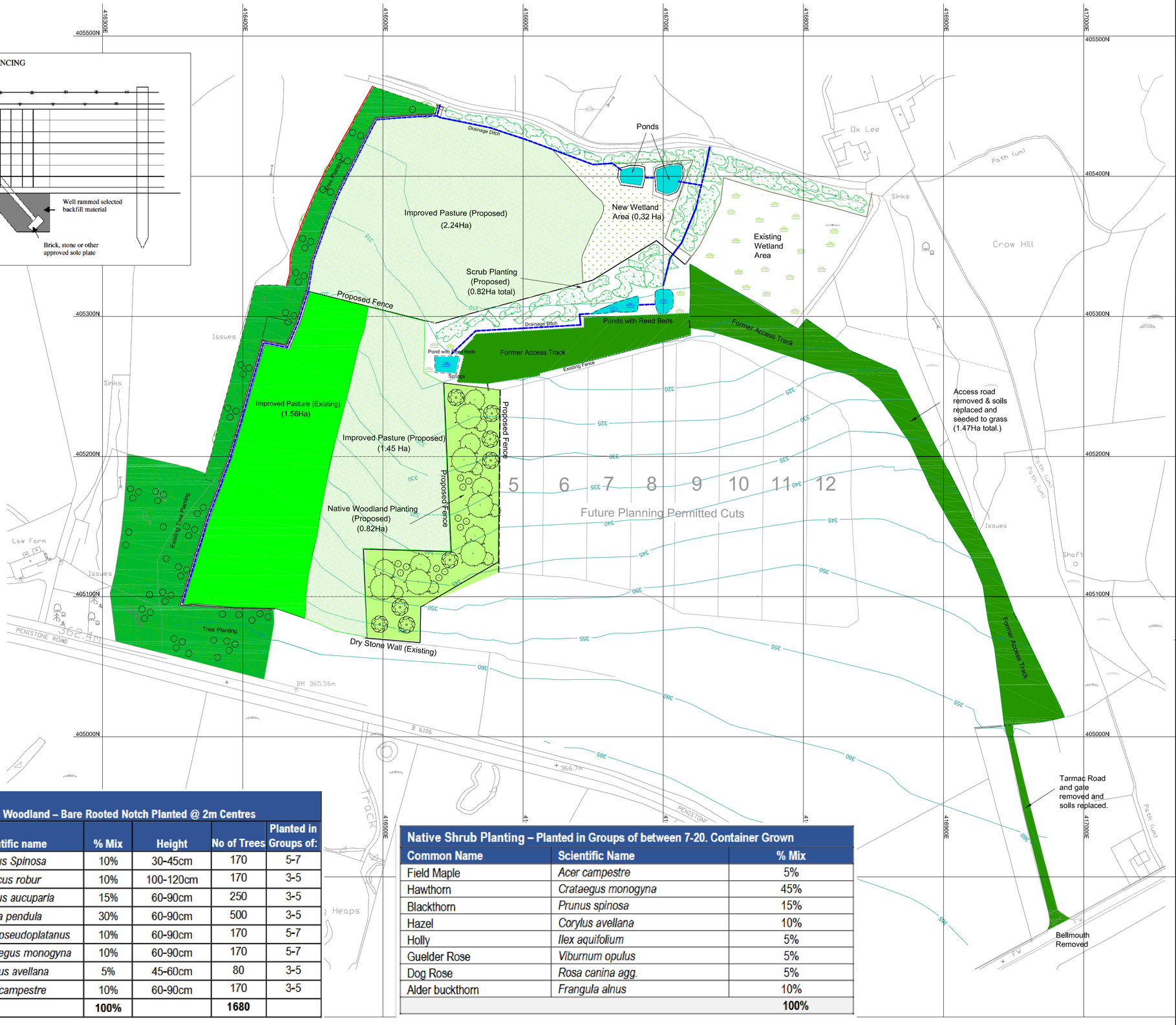
Annual Tree Maintenance Requirements

Operation	Timing
Maintain a weed free zone 0.5 metre in diameter around each planting station	April, June & September
Water as required in times of drought	As necessary April - September
Apply fertiliser, pesticides as appropriate	April - June
Re-firm plants after frost or strong winds	Once per year
Replace initial planting to 100% where plants have failed	Once per year October - March
Remove guards and canes	As soon as tree is wind firm

Silkstone Environmental
January 2025

Proposed Restoration Scheme
21123/503 Rev C





Native Species Woodland – Bare Rooted Notch Planted @ 2m Centres					
Common Name	**Scientific name**	**% Mix**	**Height**	**No of Trees**	**Planted in Groups of:**
Blackthorn	*Primus Spinosa*	10%	30-45cm	170	5-7
Pedunculate Oak	*Quercus robur*	10%	100-120cm	170	3-5
Rowan	*Sorbus aucuparia*	15%	60-90cm	250	3-5
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Hazel	*Corylus avellana*	5%	45-60cm	80	3-5
Field Maple	*Acer campestre*	10%	60-90cm	170	3-5
		100%		**1680**	

Native Shrub Planting – Planted in Groups of between 7-20. Container Grown		
Common Name	**Scientific Name**	**% Mix**
Field Maple	*Acer campestre*	5%
Hawthorn	*Crataegus monogyna*	45%
Blackthorn	*Prunus spinosa*	15%
Hazel	*Corylus avellana*	10%
Holly	*Ilex aquifolium*	5%
Guelder Rose	*Viburnum opulus*	5%
Dog Rose	*Rosa canina agg.*	5%
Alder buckthorn	*Frangula alnus*	10%
		100%

Grid : OS National Grid.
Using the OS GPS Network and applying OSTN15 transformation and then removing the scale factor for true distances with a one-step transformation centred on S1.

Datum - OS Level Datum.
Using the OS GPS Network and applying OSGM15 National Geoid Model to obtain local area corrections.

Direction of North

Key:

- Native Woodland Planting (Proposed)
- Dense Shrub (Proposed)
- Access Track Seeded to Grass (Proposed)
- Improved Pasture (Proposed)
- Improved Pasture (Existing)
- New Area of Wetland
- Existing Retained Wetland
- 170 — Contours at 5m interval
- Fence

Station Listing

Rev	Description	Date	By
C	Tree Species & Sizes Added	01/25	PS
B	Further Revisions	11/24	PS
A	Revised Scheme	09/24	PS

Wavin Ltd

Ox Lee Quarry

Revised Restoration Scheme

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Project No.	Dwg No.	Sheet No	Issue:
21123	21123/503	C	Ø
Surveyed:	Drawn: PS	Checked:	
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