



e3p

Biodiversity Metric Report

Lickers Lane, Halsnead

Reference: 80-571-R5-4

Date: July 2023



BIODIVERSITY METRIC REPORT

Lickers Lane
Halsnead

Prepared for:
Vistry Partnerships

Report Ref: 80-571-R5-4
Date Issued: 05/07/2023

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REMARKS	Final	Updated Landscape Plans	Updated Landscape Plans
DATE	September 2022	June 2023	July 2023
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EXECUTIVE SUMMARY

Site Address	Lickers Lane, Halsnead, Whiston, Knowsley, Merseyside, L35 3SR
Co-ordinates	E 347506, N 390503
Site Area	Approximately 2.6 ha
Current Site Use	The site is located within a residential and agricultural area of Whiston Cross, south of Whiston. Lickers Lane defines the northern site boundary, with arable fields featuring to the east, west and south where the adjacent housing development is proposed. Sandfield Natural Play Centre runs along the eastern boundary with Fox's Bank Cemetery located further east. An active treelined railway is located approximately 550 m north of the site.
Proposed Development	Development proposals include the construction of a residential development with an associated access road.
Results	The biodiversity metric results show a loss of 16.20 habitat units. A 64.87% loss in habitat units will be incurred on-site as a result of development.
Conclusions and Recommendations	The retention of the current on-site habitats such as the dense scrub or semi-improved grassland would reduce the overall loss in habitats. Additional habitats could also be created onsite to increase the habitat units. If a gain in biodiversity is not achieved on-site it is likely that off-site compensation or conservation offset payment will be required for the development to proceed. Consultation with the Local Planning Authority (LPA) will be required to determine if an offset payment is suitable for the scheme. Additional species enhancements could be provided on-site, which could include bat and bird boxes, hedgehog houses and hibernacula.



Table of Contents

EXECUTIVE SUMMARY	2
1.INTRODUCTION	4
1.1. Background	4
1.2. Previous Surveys	4
1.2.1. Cheshire Ecological Services Ltd, 2017 and 2020	4
1.2.2. E3P, 2021	4
1.3. Site Location	4
1.4. Objectives	5
2.METHODOLOGY	6
2.1. Biodiversity Metric	6
2.2. On-Site Habitat Baseline Data	6
2.3. Post Development Habitat Creation	6
2.4. Limitations	6
3.RESULTS	7
3.1. On-Site Baseline Condition Assessment Results	7
3.2. Habitat Retention	8
3.3. Habitat Creation Condition Assessment	8
3.4. Strategic Significance	10
3.5. Biodiversity Unit Result	10
4.CONCLUSIONS AND RECOMMENDATIONS	12
5.REFERENCES.....	13
APPENDIX I PHASE 1 HABITAT PLAN	14
APPENDIX II LANDSCAPE PLANS	15
APPENDIX III LOWLAND MEADOW INDACATOR SPECIES	16



1. INTRODUCTION

1.1. BACKGROUND

E3P has been instructed by Vistry Partnerships to undertake a Biodiversity Metric Calculation at Lickers Lane, Halsnead hereafter referred to as “the site”.

This report has been prepared by Graduate Ecologist Rhian Keating, BSc (Hons) MSc QCIEEM. Rhian has experience conducting a range of protected species surveys across the UK and has completed internal training on how to undertake Biodiversity Net Gain projects.

This report should be read in conjunction with ‘Biodiversity Metric 4.0 Calculation Tool – Halsnead, Lickers Lane’.

1.2. PREVIOUS SURVEYS

1.2.1. CHESHIRE ECOLOGICAL SERVICES LTD, 2017 AND 2020

Surveys were undertaken by Cheshire Ecological Services Ltd in 2017 and 2020 as part of the wider Halsnead Garden Village scheme in which the badger (*Meles meles*) surveys and great crested newt (*Triturus cristatus*) surveys included the same survey area as the site. The results of the surveys are detailed within the Halsnead Garden Village Biodiversity Statement (report reference: 31631/A5/ES2020) and detailed great crested newt surveys results are within Appendix 10.13, Great Crested Newt Survey (report reference: 1349/06/20/LO).

Two waterbodies within 250 m of the site returned negative results for great crested newts and no evidence of badger was recorded within the survey area or within 30 m of the site during the 2020 surveys.

1.2.2. E3P, 2021

E3P undertook a Preliminary Ecological Appraisal on-site in September 2021 (report reference: 80-571-R2). The survey included a Condition Assessment of the on-site habitats. During the updated survey, the site was found to comprise broadleaved woodland, dense scrub, semi-improved grassland, tall ruderal, arable land and scattered trees.

1.3. SITE LOCATION

The site is located within a residential and agricultural area of Whiston Cross, south of Whiston. Lickers Lane defines the northern site boundary, with arable fields featuring to the east, west and south. Sandfield Natural Play Centre runs along the eastern boundary with Fox’s Bank Cemetery located further east. An active treelined railway is located approximately 550 m north of the site. Please refer to Figure 1.1 for the approximate site location.



FIGURE 1.1 APPROXIMATE SITE LOCATION



1.4. OBJECTIVES

The objectives of the Biodiversity Metric are to:

- ✚ Identify percentage change in on-site habitat.
- ✚ Identify the number of habitat units lost/gained on-site; and
- ✚ Determine the need for a conservation offset payment or off-site habitat creation.

The findings of the calculation are detailed within this report, along with recommendations.



2. METHODOLOGY

2.1. BIODIVERSITY METRIC

Department for Environment, Food and Rural Affairs' (DEFRA) Biodiversity Metric 4.0 2023 version was used to undertake the metric calculation. The metric was undertaken following guidance as detailed within The Biodiversity Metric 4.0 User Guide (Natural England, 2023), the Biodiversity Metric 4.0 Technical Supplement (Natural England, 2022) and the Summary of Changes Biodiversity Metric 3.1 to 4.0 (2023).

This metric was calculated by Graduate Ecologist Rhian Keating, BSc (Hons) MSc QCIEEM. Rhian has undertaken training on Biodiversity Net Gain and using the Biodiversity Metric Calculation Tool.

The report has been reviewed by Associate Director, Celia Barlow, BSc (Hons) MSc MEnvSc CEnv MCIEEM. Celia has undertaken a number of online training courses with CIEEM including 'Calculating and Using Biodiversity Units with Metric 2.0' and 'Biodiversity Net Gain Through Development'. Celia has also completed Condition Assessments on a number of sites across the UK and holds a Level 3 Field Identification Skills Certificate (FISC).

2.2. ON-SITE HABITAT BASELINE DATA

The baseline data used to inform the condition assessment was collected on 26th August 2021 during the Preliminary Ecological Appraisal. The Biodiversity Metric 4.0 – Technical Annex 1 – Condition Assessment Sheets and Methodology (Natural England 2023) was used to undertake the condition assessment. The methodology follows the Biodiversity Metric 4.0 – User Guide (Natural England 2023).

On-site baseline habitats were measured off the Phase 1 Habitat Plan using QGIS. Scattered tree areas were calculated using the root protection areas (RPA) from the Arboricultural Impact Assessment (AIA) Report (report reference: 80-571-R1). Retained trees along the northern site boundary were measured as retained broadleaved woodland. This was calculated by measuring the RPA of trees being removed, as detailed in the AIA, and subtracting it from the area of broadleaved woodland. Please see Appendix I for the Phase 1 Habitat Plan.

Phase 1 habitat types were translated into UKHab habitat types using the metrics Technical Data Translation Tool.

2.3. POST DEVELOPMENT HABITAT CREATION

The General Arrangement Plan was used to measure habitat creation on-site (June 2023, drawing reference UG_1599_LAN_POS_DRW_01 P15). The areas of proposed habitat were measured using AutoCAD from the DWG drawing. Tree measurements reflect the RPA of the trees to be retained. Areas of proposed trees were measured using the biodiversity metric Urban Tree Helper. Please see Appendix II for the Landscape Plans.

2.4. LIMITATIONS

Some areas on the site are double counted, including root protection zones and areas of habitat, where overlap is shown. This means areas of habitat pre- and post-development do not total to the same area.



3. RESULTS

3.1. ON-SITE BASELINE CONDITION ASSESSMENT RESULTS

Table 3.1 shows the details of the habitat condition assessment used for input into the metric calculation tool.

TABLE 3.1 HABITAT BASELINE CONDITION ASSESSMENT RESULTS

HABITAT TYPE (PH1)	HABITAT TYPE (UKHAB)	AREA (HA)	CONDITION ASSESSMENT	DESCRIPTION
ARABLE	Cropland – Cereal crops	0.6215	N/A	N/A – automatically assigned by metric
BROADLEAVED WOODLAND	Woodland and Forest – Other woodland; broadleaved	0.1888	Moderate	Scores 30 out of 39 Score between 26 and 32 required for Moderate Condition Assessment
DENSE SCRUB	Heathland and shrub – Mixed scrub	0.8827	Poor	Passes 2 of 5 Condition Assessment criteria - There is an absence of invasive non-native species and species indicative of sub-optimal condition make up less than 5% ground cover. - The scrub has a well-developed edge.
SCATTERED TREE	Urban – Urban tree	0.0636 x23 trees (T1-16, T20, T22, G1-3, partially G6-9)	Moderate	Passes 4 of 6 Condition Assessment criteria - The tree is a native species. - There is little or no evidence of an adverse impact on tree health. - Micro-habitats for birds, mammals and insects are present. - More than 20% of the tree canopy area is oversailing vegetation beneath.
SEMI-IMPROVED GRASSLAND	Grassland – Other Neutral grassland	1.2595	Good	Passes 5 of 5 Condition Assessment criteria The appearance and composition closely matches the characteristics of the specific grassland habitat.



HABITAT TYPE (PH1)	HABITAT TYPE (UKHAB)	AREA (HA)	CONDITION ASSESSMENT	DESCRIPTION
				- Sward height is varied. - Cover of bare ground between 1% and 5%. - Cover of bracken less than 20% and cover of scrub less than 5%. - There is an absence of invasive non-native species. Damage and undesirable species make up less than 5% of cover.
TALL RUDERAL	Sparsely Vegetated Land – Ruderal/Ephemeral	0.3978	Poor	Passes 1 of 4 criteria. Cover of bracken, scrub and trees less than 25%.

3.2. HABITAT ENHANCEMENT

All areas of habitat will be removed within the site to facilitate development. Some broadleaved woodland will be retained and enhanced by eradicating the invasive species, Rhododendron (*Rhododendron ponticum*), increasing its condition. Table 3.2 outlines the area of habitat to be enhanced.

TABLE 3.2 HABITAT ENHANCEMENT

HABITAT TYPE (LANDSCAPE PLAN)	HABITAT TYPE (UKHAB)	AREA (HA)	CONDITION
BROADLEAVED WOODLAND	Woodland and Forest – Other woodland; broadleaved	0.1850	Good

3.3. HABITAT CREATION CONDITION ASSESSMENT

A number of habitats are proposed within the site which are located outside of residential gardens and in areas of Public Open Space (POS). Table 3.3 shows the details of the target condition assessment and total areas of habitat creation. It has been assumed that there will be no significant delay in the creation of the proposed habitat features, as such the delay in starting habitat creation has been set to zero.



TABLE 3.3 HABITAT CREATION CONDITION ASSESSMENT RESULTS

HABITAT TYPE (LANDSCAPE PLAN)	HABITAT TYPE (UKHAB)	AREA (HA)	TARGET CONDITION	DESCRIPTION/ TARGET TIME TO CONDITION
RESIDENTIAL GARDENS	Urban – Vegetated garden	0.817	N/A – automatically assigned by metric	Target time to condition will be one year.
BUILDINGS AND HARDSTANDING/ HARDWORKS	Urban – Developed land; sealed surface	2.1361	N/A – automatically assigned by metric	N/A
PROPOSED TREES	Urban – Urban tree	0.5659 x139 small trees	Passes 3 of 6 Condition Assessment criteria - The tree is a native species - There is little or no evidence of an adverse impact on tree health - More than 20% of the tree canopy area is oversailing vegetation beneath	Target time to condition will be 27 years.
PROPOSED NATIVE SHRUB PLANTING	Heathland and shrub – Mixed scrub	0.1568	Good Passes 5 of 5 Condition Assessment criteria - Habitat is representative of UKHAB description - There is a good age range. - There is an absence of invasive non-native species and species indicative of sub-optimal condition make up less than 5% ground cover. - The scrub has a well- developed edge. - There are clearings, glades or rides present within the scrub	Target time to condition will be ten years.
PROPOSED WILDFLOWER MEADOW	Grassland – Lowland meadows	0.2459	Good Passes 5 of 5 Condition Assessment criteria - The appearance and composition closely matches the characteristics of the specific grassland habitat. - Sward height is varied.	Target time to condition will be ten years.



HABITAT TYPE (LANDSCAPE PLAN)	HABITAT TYPE (UKHAB)	AREA (HA)	TARGET CONDITION	DESCRIPTION/ TARGET TIME TO CONDITION
			- Cover of bare ground between 1% and 5%. - Cover of bracken less than 20% and cover of scrub less than 5%. - There is an absence of invasive non-native species. Damage and undesirable species make up less than 5% of cover.	
PROPOSED SHRUB PLANTING	Urban – Introduced shrub	0.0893	N/A – automatically assigned by metric	Target time to condition will be one year.
PROPOSED GROUND COVER PLANTING	Cropland – Horticulture	0.0061	N/A – automatically assigned by metric	Target time to condition will be one year.
PROPOSED PLANTING TO POCKET PARK	Grassland – Modified grassland	0.0147	Poor Fails criteria 1 which is essential for achieving moderate condition as there will be less than 6 to 8 species per m ² .	Target time to condition will be one year.

3.4. STRATEGIC SIGNIFICANCE

The strategic significance was defined as 'Location ecologically desirable, but not in local strategy'. The site is located within a residential and agricultural area of Whiston Cross, south of Whiston. Lickers Lane defines the northern site boundary, with arable fields featuring to the east, west and south. Sandfield Natural Play Centre runs along the eastern boundary with Fox's Bank Cemetery located further to the east. An active treelined railway is located approximately 550 m north of the site. The site is expected to provide some value to local wildlife, with the broadleaved woodland and dense scrub expected to offer nesting or roosting opportunities for birds and bats. Residential housing extends to the north of the site which are anticipated to be of limited value for local wildlife. Sandfield Park Local Wildlife Site (LWS) is located adjacent to the site boundary.

Adjacent to the north-east of the site is Sandfield Natural Play Centre, providing some ecological value. Beyond this to the south is an area of grassland, scrub, and woodland, used for agriculture, which connects to the M62 approximately 700 m south of the site boundary. This habitat is expected to act as a resource for a range of local fauna and has the potential to provide roosting and nesting opportunities for bats and birds.

3.5. BIODIVERSITY UNIT RESULT

The headline results of the metric show an overall loss of 16.20 habitat units as a result of development. Table 3.4 shows the headline results detailed within the Biodiversity Metric.



TABLE 3.4 HEADLINE RESULTS

HEADLINE	CATEGORY	RESULT
TOTAL NET UNIT CHANGE	Habitat Units	-16.20
	Hedgerow Units	N/A
	River Units	N/A
TOTAL NET % CHANGE	Habitat Units	-64.87%
	Hedgerow Units	N/A
	River Units	N/A

The trading rules of the metric have not been satisfied within the metric as habitats lost have been 'traded down'.



4. CONCLUSIONS AND RECOMMENDATIONS

The proposed scheme and associated landscape plans show a total loss of 16.20 habitat units. A net loss of habitats will be incurred on-site as a result of development.

The metric assumes that the proposed wildflower meadow will use seed containing species indicative of lowland meadow habitat in order to achieve a moderate condition. Please note, if the seed mix does contain optimal species for lowland meadow, the target condition would decrease therefore generating further loss of habitat units in the metric. A list of indicator species can be found in Appendix III.

If a gain in biodiversity is not achieved on-site it is likely that an off-site compensation or conservation offset payment will be required for the development to proceed. Consultation with the Local Planning Authority (LPA) will be required to determine if an offset payment is suitable for the scheme.

A financial contribution will be made towards Stadt Moers Q4 Local Wildlife Site in order to provide habitat creation and enhancement as part of off-site compensation.

The Biodiversity Metric does not take account for additional species enhancements within the site, and to further increase the site's value for wildlife the following could be provided:

-  Creation of hibernacula (following guidance set out within Froglife, 2001) for common amphibians.
-  Hedgehog houses may be installed to enhance the site for hedgehogs.
-  Bat and bird boxes could be integrated into the proposed residential units.



5. REFERENCES

- ✿ Cheshire Ecological Services Ltd (2020) Halsnead Garden Village North, Knowsley, Biodiversity Statement. 31631/A5/ES2020.
- ✿ Cheshire Ecological Services Ltd (2020) Halsnead Garden Village North, Knowsley, Great Crested Newt Survey. 1349/06/20/LO .
- ✿ E3P (2021). Arboricultural Impact Assessment and Report. Lickers Lane, Halsnead (80-571-R1).
- ✿ E3P (2021). Preliminary Ecological Appraisal. Lickers Lane, Halsnead (80-571-R2).
- ✿ E3P (2021). Biodiversity Metric Report. Lickers Lane, Halsnead (80-571-R3).
- ✿ National Planning Policy Framework (2021). Ministry of Housing, Communities and Local Government.
- ✿ Natural England Joint Publication JP039. (2023). The Biodiversity Metric 4.0. User Guide. Technical Annex 2.
- ✿ Natural England Joint Publication JP039. (2023). The Biodiversity Metric 4.0. User Guide.
- ✿ Natural England. (2023). The Biodiversity Metric 4.0. Technical Annex 1. Condition Assessment Sheets.
- ✿ Urban Green. Lickers Lane Knowsley- General Arrangement Plan. Drawing No. UG_1599_LAN_POS-DRW_01 P15.

END OF REPORT



APPENDIX I

PHASE 1 HABITAT PLAN

Key:

— Site boundary

Arable

Broadleaved woodland

Dense scrub

Semi-improved grassland

Tall ruderal

Notes

Issue: 1	Revision: 1	Date: 13/07/2022	Drawn: RK	Authorised: CB
Client: Vistry Partnerships			Job No. 80-571	Date: 13//07/2022
			Drawing No. 80-571-005	Scale: 1:2750 @ A4
Job title: Halsnead, Lickers Lane			Drawing title: Phase 1 Habitat Plan (BNG)	



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0 50 100 150 200 m



APPENDIX II

LANDSCAPE PLANS

The background of the page is composed of several geometric shapes in shades of orange. A large, dark orange shape occupies the top right. A lighter orange shape is on the left, meeting the dark one at a diagonal line. The bottom left corner features a triangular area filled with a fine, light-colored grid pattern. The overall design is modern and minimalist.

Notes:-

paper or electronic image.

Graphical representations of equipment on this drawing have been co-ordinated, but are approximations only. Please refer to the specifications and / or details for actual sizes and / or specific contractor construction information.

KEY

Hard Works

- Pedestrian Asphalt Surface**
Black colour.
- Vehicular Asphalt Surface**
Black colour.
- Vehicular Asphalt Surface for Driveways**
Ultronatural colour.
- Vehicular Tegula Block Paving**
Traditional colour.
- Precast Concrete Flag Paving**
to private paths and patios
Buff colour.
- Precast Concrete Sett Paving**
to raised table
Bracken colour.
- Self binding gravel**
Natural buff colour.
- Natural Play Equipment / Outdoor Gym Equipment**
TBC
- Play element**
Safety surfacing specification TBC
To be installed as per BS EN 1176
- Timber Closeboard Fence**
With matching gates.
- Brick Wall**
1800mm high. Brick to match architecture.
- Metal Railing**
1.1m high.
- Timber Bench**
Timber bench, 500 x 2000 x 500mm
- Timber Cube Seating**
Timber cube seating, 600 x 600 x 500mm
- Stepping logs**
Stepping timber logs, 300mm diameter
- Bird boxes**
No.10, locations TBC
- Bat boxes**
No.10, locations TBC

Soft Works

- Existing Tree**
- Proposed Trees**
No.139
- Proposed Specimen shrub**
No.17
- Proposed Ornamental Hedge Planting**
Approx. 899m²
- Proposed Native Hedge Planting**
Approx. 99m²
- Proposed Shrub Planting**
Approx. 893m²
- Proposed Planting to Pocket Park**
Approx. 147m²
- Proposed Native Shrub Planting**
Approx. 1568m²
- Proposed Seeded Grass**

PROPOSED DEVELOPMENT BY OTHERS SUBJECT TO PLANNING

PROPOSED DEVELOPMENT BY OTHERS SUBJECT TO PLANNING

AVENUE PLANTING TO BE DONE BY OTHERS

Plot	Date	Status	SH
P15	05/07/23	UPDATED	SH
P14	03/07/23	UPDATED	SH
P13	30/06/23	UPDATED	SH
P12	29/06/23	UPDATED	SH
P11	21/06/23	UPDATED	RS

Hard Works

Hard Works

- | | |
|---|--|
|  | Pedestrian Asphalt Surface
<i>Black colour.</i> |
|  | Vehicular Asphalt Surface
<i>Black colour.</i> |
|  | Vehicular Asphalt Surface for Driveways
<i>Ultracolor Natural colour.</i> |
|  | Vehicular Tegula Block Paving
<i>Traditional' colour.</i> |
|  | Precast Concrete Flag Paving
to private paths and patios
<i>Buff colour.</i> |
|  | Precast Concrete Sett Paving
to raised table
<i>Bracken colour.</i> |
|  | Self binding gravel
<i>Natural buff colour.</i> |
|  | Natural Play Equipment /
Outdoor Gym Equipment
TBC |
|  | Play element
Safety surfacing specification TBC
To be installed as per BS EN 1176 |
|  | Timber Closeboard Fence
With matching gates. |
|  | Brick Wall
1800mm high, <i>Brick to match architecture.</i> |
|  | Metal Railing
1.1m high. |
|  | Timber Bench
Timber bench, 500 x 2000 x 500mm |
|  | Timber Cube Seating
Timber cube seating , 600 x 600 x 500mm |
|  | Stepping logs
Stepping timber logs, 300mm diameter |
|  | Bird boxes
No. 10, locations TBC |
|  | Bat boxes
No. 10, locations TBC |

Soft Works

- | | |
|---|--|
|  | Existing Tree |
|  | Proposed Trees
No. 139 |
|  | Proposed Specimen shrub
No. 17 |
|  | Proposed Ornamental Hedge Planting
Approx. 895m ² |
|  | Proposed Native Hedge Planting
Approx. 99m ² |
|  | Proposed Shrub Planting
Approx. 893m ² |
|  | Proposed Planting to Pocket Park
Approx. 147m ² |
|  | Proposed Native Shrub Planting
Approx. 1568m ² |
|  | Proposed Seeded Grass |
|  | Proposed Wildflower Meadow
Approx. 2459m ² |
|  | Proposed Turf Grass |
|  | Proposed Groundcover Planting
Approx. 61m ² |

P15	05/07/23	UPDATED	SH	SA
P14	03/07/23	UPDATED	SH	SA
P13	30/06/23	UPDATED	SH	SA
P12	29/06/23	UPDATED	SH	SA
P11	21/06/23	UPDATED	RS	SA
P10	15/06/23	UPDATED	RS	SA
P09	14/06/23	UPDATED	TH	SA
P08	13/06/23	UPDATED	RS	SA
P07	08/06/23	UPDATED	TH	SA
P06	25/10/22	Information updated	KT	SA
P05	08/09/22	Information updated	KT	SA
P04	08/09/22	Information updated	KT	SA
P03	07/09/22	UPDATED	KT	SA
REV.	DATE	DESCRIPTION	DRAWN	CHKD

Client:	Project:	Drawn:	Checked:	Approved:	Date:	U R B A N G R E E N A: Ground Floor, The Tower, Deva City Office Park, Trinity Way, Manchester M3 7BF T: +44 (0) 161 312 3131 weareurbangreen.co.uk
Vistry Partnerships	LICKERS LANE, KNOWSLEY	TH	SA	MT	15/07/22	
Issue:	Title:	Dwg No:	Scale @ A1:		Revision:	
PLANNING	GENERAL ARRANGEMENT PLAN	UG_1599_LAN_GA_DRW_01	1:500		P15	

APPENDIX III

LOWLAND MEADOW

INDACATOR SPECIES

LOWLAND MEADOW OPTIMAL SPECIES

Common bent (*Agrostis capillaris*), Lady's mantle species (*Alchemilla* sp.), wood anemone (*Anemone nemorosa*), sweet vernal-grass (*Anthoxanthum odoratum*), quaking-grass (*Briza media*), spring-sedge (*Carex caryophyllaea*), glaucous sedge (*Carex flacca*), common knapweed (*Centaurea nigra*), marsh hawk's-beard (*Crepis paludosa*), crested dog's-tail (*Cynosurus cristatus*), orchid (*Dactylorhiza* sp.), heath-grass (*Danthonia decumbens*), eyebright (*Euphrasia officinalis* agg.), red fescue (*Festuca rubra*), meadowsweet (*Filipendula ulmaria*), Lady's bedstraw (*Galium verum*), meadow crane's-bill (*Geranium pratense*), wood crane's-bill (*Geranium sylvaticum*), bitter vetch (*Lathyrus linifolius*), meadow vetchling (*Lathyrus pratensis*), hawkbit (*Leontodon* sp.), oxeye daisy (*Leucanthemum vulgare*), fairy flax (*Linum catharticum*), common bird's-foot trefoil (*Lotus corniculatus*), Adder's-tongue (*Ophioglossum vulgatum*), burnet saxifrage (*Pimpinella saxifraga*), greater butterfly-orchid (*Platanthera chloratha*), tormentil (*Potentilla erecta*), cowslip (*Primula veris*), primrose (*Primula vulgaris*), meadow buttercup (*Ranunculus acris*), bulbous buttercup (*Ranunculus bulbosus*), yellow-rattle (*Rhinanthus minor*), Devil's-bit scabious (*Succisa pratensis*), red clover (*Trifolium pratense*), tufted vetch (*Vicia cracca*).

SUB-OPTIMAL SPECIES

Creeping thistle (*Cirsium arvense*), spear thistle (*Cirsium vulgare*), curled dock (*Rumex crispus*), broad-leaved dock (*Rumex obtusifolius*), common nettle (*Urtica dioica*), creeping buttercup (*Ranunculus repens*), greater plantain (*Plantago major*), white clover (*Trifolium repens*), cow parsley (*Anthriscus sylvestris*).

