Newlands Developments

Land West of Sheffield Road, Hoyland – Attenuation Land

BIODIVERSITY ENHANCEMENT & MANAGEMENT PLAN

June 2021

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CONTENTS

TABLES

FIGURES

APPENDIX

1.0 INTRODUCTION

1.1 The following Biodiversity Enhancement Management Plan (BEMP) has been prepared by FPCR Environment and Design Ltd. on behalf of Newlands Developments. The proposed development site is on Land West of Sheffield Road and south of Bell Ground (wood), central grid ref. SK 3586 9894) and incorporates land associated with a consented scheme granted approval by Barnsley Metropolitan Borough Council on 9th November 2020 (Planning Application No. 2020/0647) as well as a further arable parcel to the north. The land currently supports two cultivated arable parcels and a dividing hedgerow.

1.2 This BEMP provides the details of the overall management mechanisms and responsibilities, habitat creation methods, targeted management objectives and prescriptions, monitoring and provisional 5 year work programme objectives.

1.3 The BEMP is based on the GI proposals for the site, annotated on Figure 1: Post Development Habitats Plan and detailed within the separate biodiversity impact assessment calculations (using the Defra 2.0 metric) to provide a measurable biodiversity net gain.

2.0 LEGISLATION, POLICY AND PROTECTED SPECIES

2.1 All relevant EU and UK nature conservation law will be adhered to in relation to the protection of ecological features, ecological habitat creation and enhancements, and ongoing management. This will primarily include the protection afforded to nesting birds and reptiles under the Wildlife and Countryside Act 1981 (as amended); and to badgers under the Protection of Badgers Act 1992. Reference is also made to bats protected under the Wildlife and Countryside Act 1981 (as amended) and Conservation of Habitats and Species Regulations 2017 (as amended). Where appropriate proposals also consider Habitats and Species of Principal Importance (H/SPI) as listed within Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

2.2 All woody and suitable ground nesting vegetation to be affected by ongoing management cutting and pruning works will be removed outside of the nesting season (March – August inclusive) or checked for the presence of nesting birds by an experienced ecologist if within this time.

2.3 For habitat management of scrub, grassland, hedgerow and wetland and where practices require cutting vegetation to ground level this will be undertaken during the reptile active season (March to mid-October) during suitable weather including when daytime temperatures are consistently above 9^{o}C.

3.0 MANAGEMENT AND MONITORING RESPONSIBILITIES

Management structure

3.1 The responsibility for habitats in the onsite scheme will be passed onto a Principal Contractor to ensure they are created and managed by an experienced landscape contractor for the life of the development, or until such a time as it is passed via legal mechanism into the control of a third party, to be agreed by Barnsley Metropolitan Borough Council (BMBC) and any other relevant parties.

Monitoring and review

3.2 Management of the scheme will run for a period of thirty years following initial creation (year one). The offsite habitat creation will be monitored annually for the first five years to ensure effective establishment. Throughout the period the achievement of management objectives through the application of detailed prescriptions should be viewed as a dynamic process, responding to the establishment and development of the habitats and species, as well as to any community needs and aspirations. Towards the end of each five year period the management should be reviewed and amended as necessary to provide a five year rolling programme.

3.3 The progress of habitat creation will therefore be monitored and management prescriptions reviewed and altered where necessary to ensure habitat targets are met. This BEMP should be informed by updated and detailed surveys of the habitats to refine the identified objectives, targets and prescriptions as necessary.

3.4 The aims of future on-going management should continue to maintain the target habitats as set out herein.

4.0 CONSERVATION OBJECTIVES

4.1 The following strategic objectives for the site are set out to provide a steer for the detailed management objectives and management prescriptions set out further on:

- To link with a continuous corridor of habitats on site running north-south by a scheme of strategic habitat creation and enhancement.
- Provision of a range of habitats of value to local fauna including nesting birds and common amphibians.
- Provide measurable and achievable targets appropriate to each habitat to ensure condition targets are met as set out in the Management Target tables below in accordance with Defra Technical Supplement (Natural England, July 2019[1]).

5.0 GENERAL MEASURES

5.1 Habitat creation for the onsite scheme will be in accordance with details set out by Barry Chinn Associates Ltd in the Soft Landscaping Specification for the proposed development.

5.2 Scrub and aquatic planting is to be delivered and planted in accordance with Horticultural Trades Association (HTA) Standard 'Handling and establishing landscape plants' (obtainable from the HTA) Part III, paragraphs 6.2 to 6.6.

5.3 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.

5.4 All planting is to be true to name and free from pests, diseases, discoloration, weeds, fungus and physiological disorders.

5.5 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.

5.6 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.

5.7 If plants/trees are unobtainable alternatives are to be agreed with the Ecologist/Landscape Architect in writing prior to ordering.

5.8 After planting water plants to ensure that the full depth of topsoil is wetted. Apply water evenly and without damaging or displacing plants or soil. Continue to water as necessary to ensure the successful establishment and continued thriving of planting.

5.9 If water supplies are restricted or likely to become restricted by emergency legislation, do not carry out planting until instructed. If planting has been carried out, obtain instructions on watering.

[1] Natural England (July 2019) *The Biodiversity Metric 2.0 – auditing and accounting for biodiversity – Technical Supplement (Beta Edition)*

5.10 Bare root deciduous planting shall be carried out from late October to late March; 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.

5.11 Notices will be provided at strategic locations, such as beside footpath entrances and the play area to encourage self-removal of general litter and dig waste. A general litter pick should be undertaken as appropriate to avoid harm to wildlife or encouragement of pests.

6.0 CREATION SCHEME

Habitat Creation, Management Objectives and Prescriptions

Management Targets

6.1 Target times to deliver management objectives have been provided within the tables, where these don't match the below (final condition targets required to achieve biodiversity units in accordance with the calculations tables – Appendix A) they are provided as desirable but not essential targets to enable identification of likely failing stands and trigger any early intervention necessary.

Essential Timing Targets (years) – to meet required condition

- Woodland (moderate condition) - 33
- Scrub (good condition) – 7
- Other neutral grassland (good condition) – 15
- Attenuation (pond- moderate condition) – 3
- Native hedgerow (good condition) – 10
- Other neutral grassland (poor condition) - 1
- Amenity grassland (poor condition) – 1

6.2 Habitats in Table 1 below will be created in accordance the submitted offsetting calculations and as detailed in the following section.

Table 1: Habitat Creation

Habitat Type	Distinctiveness	Condition	Extent (hectares/km)
Broadleaved woodland	Medium	Moderate	0.71
Mixed scrub (native)	Medium	Good	0.18 ha.
Neutral grassland	Medium	Good	2.26 ha.
Neutral grassland	Medium	Poor	2.95 ha
Native species-rich hedgerow	Medium	Moderate	0.23 km
Attenuation (standing water)	High	Moderate	0.1 ha.
Amenity grassland	Low	Poor	0.27 ha.

Broadleaved Woodland

Creation

6.3 Inclusion of a range of broadleaved tree and shrub species providing fruit/flower/seed resources will be utilised for woodland creation. These will provide foraging opportunities for a wide range of vertebrate and invertebrate wildlife. Notwithstanding the structural screening requirements the inclusion of species of varied size and form will provide visual interest and structural wildlife value throughout the year.

Table 2: Proposed Woodland Mix Planting

Common Name	Scientific Name	%
Understorey		
Wych Elm	*Ulmus glabra*	10
Common Alder	*Alnus glutinosa*	5
Downy Birch	*Betula pubescens*	5
Hazel	*Corylus avellana*	20
Hawthorn	*Crataegus monogyna*	30
Holly	*Ilex aquifolium*	5
Crab apple	*Malus sylvestris*	5
Blackthorn	*Prunus spinosa*	5
Pedunculate oak	*Quercus robur*	5
Canopy (feathered trees)		
Field Maple	*Acer campestre*	1
Common Alder	*Alnus glutinosa*	1
Downy Birch	*Betula pubescens*	1
Wild Cherry	*Prunus avium*	1

Common Name	Scientific Name	%
Pedunculate oak	*Quercus robur*	1

Management

6.4 Detailed management interventions and targets are provided in Table 3 below with the aim of meeting at least 10 of the 12 criteria by year 33 with only minor variation. A target time to achievement is provided for each criterion to enable identification of likely failing stands and trigger early intervention.

6.5 The following management techniques will be provided to promote structural variation and allow light to reach the developing ground flora and scrub layer.

6.6 Monitoring and infill planting into gaps to replace any dead or diseased specimens during establishment (years 1 to 5)

6.7 Trimming following establishment period (from year 5) including maintenance of a sinuous edge with a graded margin down to field/shrub layer (tapering edge from canopy height to 20cm).

6.8 Selective thinning of some dense stands to allow light to reach the ground and promote regeneration of seedlings and saplings (from year 5) – 1/3 to ½ of each compartment on rotation every 3-5 years.

6.9 Retention of all deadwood/trimmings (where not diseased) in situ including in brash piles and windrows as well as standing deadwood where safe to do so.

Table 3: Woodland Management Targets

Condition Assessment Criteria/Objective	Management Intervention	Target Time
1. Area of complete canopy cover	• Early promotion of canopy species including weed management and understorey scrub management. • Replacements of like-for-like in event of failure or promotion of neighbouring established specimens as deemed necessary.	By year 15
2. Native species dominant (non-native species <10% vegetation cover)	• Periodic monitoring and control/removal of non-native species as necessary	By year 5
3. A diverse age and height structure of trees	Periodic trimming/management of understorey scrub in planting groups including: • Regular cutting to create dense stands with graded margin (at woodland/glade edge); and • Infrequent management of selective stands to promote more open stands (including thinning of stands and light trimming to aid succession of canopy species).	By year 32+
4. Free form damage from stock or wild mammals [bark stripping; browse line; damage to shoot tips] with <20% of vegetation browsed (in last 5 years).	• Plantings protected with rabbit guards as necessary. • Monitoring and installation of deer fencing or other protection as deemed necessary.	By year 5
5. Evidence of successful tree regeneration (i.e. not browsed before well established) such as seedlings, saplings and young trees.	• Periodic monitoring and control of browsing pressure as indicated above.	By year 32+
6. Standing and fallen dead wood of over 20 cm diameter are present including fallen large dead branches/stems and stumps.	In every management year: • Retention of trimmings following management (where not diseased) in brash piles and windrows. • Retention of standing deadwood including branches and whole trees (where not diseased).	By year 32+
7. Wetland habitat if they exist within the wood has little sign of drainage or channel straightening.	N/A	N/A

Condition Assessment Criteria/Objective	Management Intervention	Target Time
8. The area is protected from damage by agricultural and other adjacent operations.	• Through fencing or agreement with neighbouring tenant/land manager where adjacent land uses such as arable or pony grazing present.	By year 1
9. There should be no evidence of inappropriate management (e.g. deep ruts, animal poaching or compaction).	• Monitoring in successive years following planting	By year 1
10. Invasive non-native plants* are below 5%	• Periodic monitoring and control/removal of non-native species as necessary	By year 5
11. No signs of significant nutrient enrichment present.	• No nutrient enriched substrate/topsoil or fertilizers to be used during creation/establishment or at other times. • Periodic monitoring and prevention of inappropriate management.	From year 1
12. More than 3 different native trees and 3 shrub species in an average 10 m radius.	• To be provided through varied planting matrix from outset.	By year 1

*** American skunk cabbage *Lysichiton americanus*, Himalayan balsam *Impatiens glandulifera*, Japanese knotweed *Reynoutria japonica*, Cherry Laurel *Prunus laurocerasus*, Shallon *Gaultheria shallon*, Snowberry *Symphoricarpos albus*, Variegated yellow archangel *Lamiastrum galeobdolon subsp. Argentatum*, Rhododendron *Rhododendron ponticum***

Scrub

Creation

- Planting between November and March during the plants dormant period and protected from rabbits with spiral guards as conditions on site require.
- Plant in groups with each group supporting a mix of species with two to three or more of the same species planted together.
- Planting in irregular groups creating sinuous edge habitat (where appropriate in the context of the overall scheme) to maximise variation in microclimate, for the benefit of invertebrates.

Table 4: Proposed Thicket Planting Mix (including feathered trees)

Common Name	**Scientific Name**	**% cover***
Wych Elm	*Ulmus glabra*	10
Field Maple	*Acer campestre*	5
Dogwood	*Cornus sanguinea*	5
Hazel	*Corylus avellana*	15
Hawthorn	*Crataegus monogyna*	20
Holly	*Ilex aquifolium*	5
Wild Privet	*Ligustrum vulgare*	5
Blackthorn	*Prunus spinosa*	10
Dog-rose	*Rosa canina*	5
Goat Willow	*Salix caprea*	5
Elder	*Sambucus nigra*	5
Guelder Rose	*Viburnum opulus*	10
Feathered Trees		
Field Maple	*Acer campestre*	-
Common Alder	*Alnus glutinosa*	-
Silver Birch	*Betula pendula*	-
Downy Birch	*Betula pubescens*	-
Aspen	*Populus tremula*	-
Wild Cherry	*Prunus avium*	-
Pedunculate Oak	*Quercus robur*	-

***% as indicated by planting schedule provided for thicket mix only.**

Management

6.10 The following management techniques will be provided to promote structural variation and allow light to reach the developing ground flora and scrub canopy.

- Monitoring and infill planting into gaps to replace any dead or diseased specimens during establishment (years 1 to 5)
- Trimming following establishment period (by year 5 or 6) including maintenance of a sinuous edge with a graded margin down to field layer.
- Selective thinning of some stands and creation of open areas within/between stands to allow light to reach ground flora and promote regeneration of young shrubs.
- Retention of all deadwood/trimmings (where not diseased) in situ including in brash piles and windrows as well as standing deadwood where safe to do so.
- Selective clearing of scrub edge (roughly 1/3 to 1/5 every 2-3 years) down to ground to reduce dominance of species such as blackthorn and hawthorn and promote regeneration of young shrubs/herb edge.
- Annual mowing of herb/grass margin at scrub edge (mid-July to late August to allow seed dispersal) to maintain herb margin free of scrub growth.

Condition Assessment Rationale

6.11 Detailed management interventions and targets are provided in Table 5 below with the aim of meeting all 5 criteria with only minor variation for 'Good' condition scrub.

Table 5: Scrub Management Targets – Good Condition

Condition Assessment Criteria/Objective	Management Intervention	Target Time
1. At least three woody species, with no one species comprising more than 75% cover	• To be provided through varied planting matrix from outset. • Maintained through regular management	From year 1
2. A good age range – a mixture of seedling, saplings, young shrubs and mature shrubs	Periodic trimming/management of scrub in planting groups including: • Periodic clearance down to ground level in some areas at scrub edge to promote seedling and sapling growth; • Periodic cutting to create some dense stands with graded margin (at scrub/glade edge); and • Management of selective areas to promote more open stands (including thinning of stands and light trimming to aid regeneration).	By year 7
3. Pernicious weeds and invasive species make up <5% of ground cover	• Periodic monitoring and control/removal of non-native species as necessary.	By year 5
4. Well developed edge with ungrazed tall herbs	• Periodic cutting of scrub edges to create and maintain a graded margin. • Annual mowing of grassland/herb ground flora to maintain adjacent areas free of scrub growth.	By year 5
5. Many clearings and glades within the scrub	• Managed as above for criterion 2 and 4.	By year 5

Other Neutral Grassland

Creation

6.12 To avoid issues relating to high soil nutrient levels such as excessive pernicious weed growth which, can be difficult to solve upon establishment care should be taken in ground preparation and works should utilise subsoil to form the finished upper soil layer. Soil sampling across the intended site is recommended as deemed appropriate to establish the soil phosphate levels. An extractable phosphorous level of between 0 and 15 mg/l would be considered ideal. This is based on Warwickshire County Council guidance (May, 2018).

6.13 In the event that nutrient levels are elevated, employment of topsoil stripping or inversion may be used to reduce soil nutrients available to establishing grassland. Ground preparation should include harrowing to a fine tilth and rolling to create a firm seed bed.

6.14 Emorsgate EM3 Special General Purpose Meadow Mix will be sown in spring or autumn when soil moisture levels are higher, at a rate of 40kg/ha, 4g/m².

Management

- Regular mowing in the first year to a height of 40-60mm is recommended to control annual weeds and balance growth of grasses and wildflowers (removing arisings).
- Dig out or spot treat pernicious weeds as necessary.
- Following establishment mow after flowering in July or August to around 50mm, removing arisings after they have dried (around 48 hours) to reduce soil nutrients.
- Mow re-growth in late autumn/winter and again in spring if needed (to around 50mm) to remove excess growth and take away arisings.
- Suspend cutting each year from mid-spring until after flowering in late summer and once established cutting can be reduced to a maximum of 2 cuts per year.

Condition Assessment Rationale – Good Condition

6.15 A condition score of 'Good' is targeted for grassland around the attenuation basins targeting all grassland criteria included in the table below.

Table 6: Grassland Management Targets – Good Condition

Condition Assessment Criteria/Objective	Management Intervention	Target Time
1. The area is clearly and easily recognisable as a good example of this type of habitat and there is little difference between what is described in the relevant habitat classifications and what is visible on site.	• Mowing in late summer (following seeding of wildflowers) with all arisings removed from grasslands after 48 hours (to allow for seed dispersal) to reduce soil nutrients.	By year 15

Condition Assessment Criteria/Objective	Management Intervention	Target Time
2. The appearance and composition of the vegetation on site should very closely match the characteristics for the specific Priority Habitat [i.e as described by either the Phase 1 Habitat Classification or the UK Habitat Classification], with species typical of the habitat representing a significant majority of the vegetation.	• Management as above for criterion 1. • Where wildflower cover is low in successive years use of conservation harrowing to create bare areas necessary to promote wildflower germination should be considered including addition of wildflower seed following harrowing. • Autumn sowing of yellow rattle following mowing/harrowing should be considered to reduce dominance of grasses.	By year 15
3. Total cover of wildflowers and sedges >30% excluding white clover, creeping buttercup and injurious weeds*.	• Management as above for criterion 1. • Habitat creation on nutrient-poor substrate will help reduce cover of rye-grass. • Introduction of yellow rattle as above (criterion 2) should be considered where excessive cover of rye-grass persists.	By year 15
4. Undesirable species* and physical damage <5% cover.	• Where large patches of injurious weeds persist cutting in early spring is recommended with arisings removed straight away. • Use of weed wipes to treat persist pernicious weeds (occurring in successive years over 5%). • Where excessive and persistent physical damage evident use of fencing and interpretation should be considered depending on cause and where deemed likely to be effective.	By year 10
5. Cover of bare ground >10% (including localised areas, for example, rabbit warrens).	• Where bare ground is below threshold in successive years conservation harrowing as described above is recommended. • Where use of harrow not considered appropriate scarification by hand (on smaller areas) should be considered.	By year 10
6. Cover of bracken <20% and scrub and bramble <5%.	• Annual mowing to remove scrub.	By year 10

***creeping thistle *Cirsium arvense*, spear thistle *Cirsium vulgare*, curled dock *Rumex crispus*, broad-leaved dock *Rumex otusifolius*, common ragwort *Senecio jacobea*, common nettle *Urtica dioica*, creeping buttercup *Ranunculus repens*, white clover *Trifolium repens*, cow parsley *Anthriscus sylvestris*, marsh thistle *Cirsium palustre* and marsh ragwort *Senecio aquaticus*.**

Native Hedgerow

Creation and Management

- New hedgerows will be planted with a mix of species so that a minimum of 5 species are present in each 30m section.
- Planting will be undertaken between October and the end of March avoiding hard frosts.

- Upon establishment (year 2-3) cut 50% of each length on a rotational basis between January and February (so that autumn fruits are available for wildlife) and again avoiding frost periods.
- Cut to no less 2m high.
- Retain a minimum 1.5m margin at base and cut every 3 years to promote dense cover.
- Laying hedge once new plantings have established between November and the end of February to maintain a dense structure.

Table 7: Hedgerow Mix

Common Name	Scientific Name	%
Dogwood	*Cornus sanguinea*	10
Hazel	*Corylus avellana*	10
Hawthorn	*Crataegus monogyna*	50
Holly	*Ilex aquifolium*	2.5
Wild Privet	*Ligustrum vulgare*	2.5
Blackthorn	*Prunus spinosa*	10
Dog-rose	*Rosa canina*	5
Wych Elm	*Ulmus glabra*	5
Guelder Rose	*Viburnum opulus*	5

Condition Assessment Rationale

6.16 A condition score of 'Good' is targeted which allows for the failure of no more than 2 criterion (A1-D2 from Table 8 below) in total and no more than one failure in any functional group e.g. failure of attributes A1&B1 = Good condition.

Table 8: Hedgerow Management Targets

Attributes and functional groupings (A-D)	Criteria (min. requirements for 'favourable condition')	Description	Target Time
A1. Height	>1.5 m average along length	• The average height of woody growth estimated from base of stem to the top of shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees. • Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice) • A newly planted hedgerow does not pass this criterion (unless it is > 1.5m height)	By year 5
A2. Width	>1.5 m average along length	• The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees. • Outgrowths (e.g. blackthorn suckers) are only included in the width estimate when they >0.5 m in height. • Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice).	By year 5
B1. Gap - hedge base	Gap between ground and base of canopy <0.5m for >90% of length (unless 'line of trees')	This is the vertical gappiness of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth. Certain exceptions to this criterion area acceptable (see page 65 of the Hedgerow Survey Handbook).	By year 5
B2. Gap – hedge canopy continuity	• Gaps make up <10% of total length; and • No canopy gaps >5m	• This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). • Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate).	By year 5

Attributes and functional groupings (A-D)	Criteria (min. requirements for 'favourable condition')	Description	Target Time
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).	-	By year 3
C2. Undesirable perennial vegetation	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground	The indicator species used are nettles (*Urtica spp*.), cleavers (*Galium aparine*) and docks (*Rumex spp*.). Their presence, either singly or together, should not exceed the 20% cover threshold.	By year 5
D1. Invasive and neophyte species	>90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species	• Neophytes are plants that have naturalised in the UK since AD 1500. • For information on neophytes see the JNCC website and for information on invasive non-native species see the GB Non-Native Secretariat website.	By year 5
D2. Current damage	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities	• This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes. • This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (e.g. excessive hedge cutting).	By year 5

Attenuation

Other Neutral Grassland Creation (basins) & Amenity Grassland (slopes)

6.17 Emorsgate EM8 Meadow Mixture for Wetlands will be sown in the basins in spring or autumn when soil moisture levels are higher, at a rate of 40kg/ha, 4g/m². Seeding of DLF Promaster or similar amenity grass mix will be sown on a prepared bed in accordance with suppliers instructions.

Management

- Regular mowing in the first year to a height of 40-60mm and throughout successive years spring through autumn to meet adoptable standards.
- Remove arisings where excessive.
- Dig out or spot treat pernicious weeds as necessary.
- Cutting between 1st and 20th March and scarification to create 5-10% bare areas is recommended to provide suitability for lapwing. Following this and to ensure nests are left undisturbed cutting would need to be suspended until mid to late May. The larger area of Basin

1 would be most suitable however if pausing of mowing is not feasible here such management should be restricted to Basin 2 only.

Condition Assessment Rationale – Poor Condition

6.18 A condition score of 'Poor' is targeted for the grassland in the attenuation basins due to regular cutting needed unavoidable to comply with Yorkshire Water adoptable standards. While some management interventions have been included to help maximise diversity within the constrained management regime criteria 2, 3 and 5 (threshold levels for wildflowers, rye-grass/clover and undesirable species) have been lowered and criterion 5 (bare ground threshold) removed.

6.19 Target condition for the more limited amenity grassland areas will be as criteria 1-4 and 6 below with the sward dominated by rye-grass and smooth-stalked meadow-grass (excluding criterion 1).

Table 9: Grassland Management Targets – Poor Condition

Condition Assessment Criteria/Objective	Management Intervention	Target Time
1. Semi-improved sward supporting typical grasses including: cocksfoot, common bent, creeping bent, false oat-grass, red fescue, meadow foxtail, crested dogs-tail, Timothy, tufted hair-grass, sweet vernal grass an Yorkshire fog.	• Regular mowing throughout spring and summer and into autumn is unavoidable to comply with Yorkshire Water adoptable standards. Arisings, where excessive.	By year 1
2. Cover of wildflowers and sedges well below 30% threshold for 'Good' condition due to regular mowing.	• Management as above for criterion 1.	By year 1
3. Rye-grass and white clover cover may be well above 25%	• Management as above for criterion 1. • Habitat creation on nutrient-poor substrate will help reduce cover of rye-grass.	By year 1
4. Cover of undesirable species* and physical damage may be >15% cover.	• Where large patches of injurious weeds persist cutting in early spring is recommended with arisings removed straight away.	By year 1
6. Cover of bracken <20% and scrub and bramble <5%.	• Mowing to remove scrub and comply with adoptable drainage standards.	By year 1

***creeping thistle *Cirsium arvense*, spear thistle *Cirsium vulgare*, curled dock *Rumex crispus*, broad-leaved dock *Rumex otusifolius*, common ragwort *Senecio jacobea*, common nettle *Urtica dioica*, creeping buttercup *Ranunculus repens*, white clover *Trifolium repens*, cow parsley *Anthriscus sylvestris*, marsh thistle *Cirsium palustre* and marsh ragwort *Senecio aquaticus*.**

Pond Creation and Management

6.20 As shown on Figure 1 attenuation will be created with the following features engineered in:

- Sinuous margins and sloping sides (graded profile between 45^{o} and 20^{o}) to maximise niches for wildlife and opportunities for emergent plants.
- A minimum depth of 1.5m in some areas, sufficient to provide permanent water.

6.21 The open water margins will be seeded with Emorsgate EP1 Pond Edge Mix and ground preparation, seeding and management will follow the above methods for neutral grassland.

6.22 This bankside habitat creation will be supplemented with introduction of the following native submerged and floating aquatic plants:

- Common water starwort - *Callitriche stagnalis*
- Spiked water milfoil - *Myriophyllum spicatum*
- Broad-leaved pondweed - *Potamogeton natans*

6.23 Management will include:

- Cutting 1/3 to ½ of bankside vegetation on rotation every 2-3 years to control cover
- Mechanical removal of emergent vegetation on rotation to maintain 1/3 to ½ open water.
- Management before 20th March each spring to reduce tussock cover (30-40cm high) to <30% and further cutting suspended until September – to maximise suitability for breeding/foraging lapwing.

Condition Assessment Rationale

6.24 While creation methods and management aims to maximise biodiversity value given the artificial nature and drainage function of the feature it is acknowledged there is a limit to the attainable biodiversity value. Two of the main assessment criteria relating to presence of semi-natural riparian vegetation for 10m from pond edge and absence of artificial connections to other waterbodies have therefore been removed from the below table.

6.25 'Moderate' condition is targeted which allows some failure of the main assessment criteria and Table 10 below has therefore been supplemented with additional management intervention to meet the following targets:

- Non-native species comprise no more than 10% of vegetation
- Submerged and floating plants limited but still present

Additional Amphibian Enhancement

6.26 Up to three hibernacula will be provided in the vicinity of the above pond sited in partial shade in accordance with the following specifications:

- Dimensions 2m long x 1m high x 1m wide.
- Sited within free-draining soils avoiding waterlogging or drying and benefitting from shelter.
- Comprising a pit (at least 20cm deep) and infilled with a mix of topsoil, inert rubble and logs and topped with soil but debris left exposed at the sides (for amphibian access).

Table 10: Pond Management Targets – Moderate Condition

Condition Assessment Criteria/Objective	Management Intervention	Target Time
1. Good water quality, with clear water (substrate can be seen) and no obvious sign of pollution in the water body.	• Periodic cut and removal of emergent vegetation (in accordance with above management). • Management/planting to promote emergent vegetation around inflow headwall (to help filter pollution/suspended material) including supplementary planting if deemed necessary • Monitor habitat quality and take remedial steps to prevent or treat pollution/eutrophication such as use of barriers/filters in event of upstream pollution event or removal of severe algal bloom/duckweed.	By year 3 Annual
2. Non-woodland ponds should be dominated by plants, be they submerged or floating (note dominance of duckweed is a sign of eutrophication).	• Management to promote broad margin of emergent vegetation around permanent water/drawdown zone. • Supplementary planting including of submerged/floating species.	By year 3
3. Non-woodland ponds [i.e. that have always been open] should not be shaded more than 50%	• Periodic trimming of bankside vegetation at least once every three years as necessary.	By year 3
4. Many ponds will be fishless, those which naturally contain fish should not be stocked and should contain a native fish assemblage.	• No to be stocked with fish. • Periodic monitoring and removal of non-native fish introductions/other non-native animals$^{\pm}$ where evident.	Annual
5. There are some artificial connections to other water bodies, but they are not delivering water of poor water quality or preventing water level fluctuations.	• Creation to provide an area of permanent water with some water fluctuation.	By year 1
6. Non-native species* should be absent (or make up no more that 10% of vegetation – to achieve 'Moderate' condition).	• Monitoring and control of non-native plants as necessary through normal management (to maintain threshold limits). • Avoidance of herbicides and manually/mechanically remove persistent non-natives if necessary.	By year 3
7. Less than 10% of the pond should be covered with duckweed or filamentous algae.	• Monitor/treat/removal as necessary (as detailed for criterion 1.	By year 3

$^{\pm}$Frequently occurring non-native animals include signal crayfish, zebra mussels, killer and demon shrimp and carp.

***Any non-native species. Frequently observed non-native plant species include water fern, Australian swamp stonecrop parrot's feather, floating pennywort, Japanese knotweed and giant hogweed (on the banks).**

MONITORING

6.27 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 annually by the appointed landscape contractor. Regular monitoring by a suitably experienced ecologist will also be undertaken during the habitat establishment stage to ensure that creations measures are suitable to achieve the objectives.

6.28 Results of this monitoring will be used to inform changes to the management plan (including five-year work programme) which this BEMP will inform. The detailed management prescriptions set out in the management plan will be altered if required following monitoring and in agreement with the landscape contractor, Barnsley Metropolitan Borough Council and any other stakeholders. This BEMP and work programme will be reviewed on a five-year rolling basis, with the work programme fully reviewed at the end of the initial five year period by those involved in site management.

6.29 A detailed work programme will be set annually by the landscape contractor or other parties managing the site.

6.30 While general monitoring will be undertaken annually to inform the forthcoming year's work programme a more detailed habitat assessment of the semi-natural habitats should also be undertaken between April and September at years 2 and 5 of the work programme by an experienced ecologist. Results should be reported back and feed into a five-year management plan review, to enable assessment of the management prescriptions against the defined objectives for each habitat. Where objectives are not being adequately met, appropriate action will be put in place (such as detailed in the Management Target tables for each habitat) to amend management prescriptions, with any refinements incorporated into the updated management plan and annual work programme. At this time the need for, and frequency of, detailed habitat assessments should be set accordingly for each habitat as necessary and incorporated within subsequent management plan periods.

Five Year Work Programme

Table 11: Five Year Work Programme

Habitat/ Feature	Regular Operations/Works (Years 1-5)	Anticipated Frequency of Visits/Operations (see note below)												Frequency, notes
		J	F	M	A	M	J	J	A	S	O	N	D	
Scrub	Planting													Year one only
	Maintenance													Annually to year 5
	Selective thinning & trimming a sinuous edge													From year 2 – to promote regeneration of seedlings and saplings
	Control of pernicious weeds/undesirable ground cover													Annually as needed to Year 5 then thereafter as determined by monitoring
Other Neutral Grassland EM8 mix)	Seeding													Year 1 only in spring and/or autumn
	Cutting/weed control													Year 1 as required for weed control (including in spring), otherwise annually from year 2 Grassland in Basin 2 (and Basin 1 where consistent with water authority adoption) to be cut and up to 10% bare soil created before 20th March each year.
Hedgerow (native)	Planting													Year 1 only
	Maintenance													To year 5
	Cutting													From year 3/ as necessary subject to monitoring
Wet Grassland & Amenity (EM8	Seeding													Year 1 only in spring and/or autumn
	Cutting/weed control													Year 1 regular mown spring through to autumn to meet adoptable standards

Habitat/ Feature	Regular Operations/Works (Years 1-5)	Anticipated Frequency of Visits/Operations (see note below)												Frequency, notes
		J	F	M	A	M	J	J	A	S	O	N	D	
& DLF Trifolium Promaster mixes)														
Pond	Creation & planting													
	Maintenance/replacement													To year 5
	Management – cutting and mechanical removal													Cutting on rotation 1/3 to ½ every 2-3 years – removing arisings. Mechanical removal as needed to maintain 1/3 to ½ open water