



Derbyshire
Wildlife Trust

WOODVILLE LINK ROAD BIODIVERSITY NET GAIN REPORT

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Author: Molly Gorman

Reviewer: Matt Buckler

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Summary

This report, prepared by Derbyshire Wildlife Trust, provides a supplementary Biodiversity Net Gain assessment of proposed habitat enhancement measures for off-site receptor areas in order to compensate for the identified biodiversity net loss of the Woodville Link Road scheme. A total of six sites were surveyed for their potential to provide enhancements, with three sites identified as being the most suitable in terms of amount of units delivered in the biodiversity metric, existing site tenure, enhancement feasibility, location and strategic position. The three sites; Sandholes, unnamed grassland at Church Gresley and Salts Meadow plantations have been assessed to have the potential to provide 23.9 habitat units through grassland and woodland enhancement measures, providing the scheme with suitable off-site compensation and no net biodiversity loss, satisfying condition 5 of the planning application. The capital works and 32 years of management has been estimated at £143,307, which is highly cost-effective, and the broader benefits of this approach, including heightened physical and mental health of the local community, good quality sites within dispersal range of lost habitats and potential for links with other conservation strategies, are extremely valuable.

1 Introduction

This report has been prepared by Derbyshire Wildlife Trust (DWT) on behalf of South Derbyshire District Council (SDDC) in response to the Woodville Link Road Ecological Design Strategy¹. The strategy sets out the results of a Biodiversity Net Gain (BNG) assessment of on-site post development habitats for the Woodville Link Road (the 'scheme') in order to satisfy condition 5 of the planning application to '*ensure the proposals do not result in a net loss of biodiversity*' and a statutory requirement in the National Planning Policy Framework (NPPF, 2019). The initial calculations carried out by AECOM and presented within the design strategy concluded that the current scheme for on-site habitats is predicted to result in a 66.83% net loss of biodiversity area-based habitat units and a 2030% net gain for linear hedgerow units.

1.1 Aims

The aim of this report is to provide a supplementary BNG assessment of proposed habitat enhancement measures for off-site receptor areas in order to compensate for the identified biodiversity net loss within the scheme. This will include a site selection rationale, off-site baseline habitat data, habitat enhancement rationale, specifications for implementation and management, and an estimation of costs.

1.2 Context

The Woodville Link Road scheme is proposed on a former industrial site located 1.5 miles east of Swadlincote in South Derbyshire. The site comprises an industrial area, plantation woodland, restored grassland, ditches and hedgerows. The scheme will result in the loss of broad-leaved woodland, semi-improved grassland and scrub.

¹ Woodville Link Road Ecological Design Strategy (2020) AECOM.

2 Methodology

2.1 Receptor Site Selection

Sites were selected based on their existing value, condition and proximity to the scheme in order to mitigate impacts of the scheme within the local area. SDDC owned sites were favoured to negate the requirement for land acquisition. A total of six SDDC sites were surveyed for their suitability to be included within the schemes metric.

2.2 Survey data

The receptor sites were surveyed by the author between the 8th and 18th May 2020 using Phase 1 Survey methods and the UK Habitat Classification. Vascular plant nomenclature follows Stace (2019)² and assessment of abundance for plants was made using the DAFOR scale:

- D – Dominant
- A – Abundant
- F – Frequent
- O – Occasional
- R – Rare
- L – Locally (e.g. LF Locally Frequent)

Assessment of the habitat condition was undertaken during the survey based on professional judgement and the condition assessment criteria outlined in Natural England's metric condition tables (technical supplement³). Good, Moderate and Poor conditions are assigned based on the number of criteria the habitat meets and the presence or absence of undesirable species.

2.3 Biodiversity Net Gain Calculations

The initial on-site post-development habitat calculations were carried out by AECOM using the Defra Biodiversity Metric 2.0. This calculates the overall loss or gain of biodiversity projects by assessing the distinctiveness (type of habitat and its value), condition, extent, ecological connectivity and strategic significance of habitats.

The off-site baseline habitat and enhancements have also been assessed using the Defra Metric 2.0 to give the overall result in the schemes biodiversity calculation.

² Stace, C.A (2019) New Flora of the British Isles. 4th Ed. Stowmarket, UK. C&M Floristics.

³ Natural England (2019) The Biodiversity Metric 2.0 – User Guide and Technical Supplement – Beta Test.

2.4 Constraints

The baseline habitat survey of receptor site 1 was undertaken at the beginning of May which is considered slightly early for a grassland survey. Whilst the majority of species will have been recorded and broad habitat types can be determined with a good degree of accuracy, some estimates of plant species percentage cover, required for condition assessments, may be slightly inaccurate. It is, however, not considered that this will have had an impact on the overall outcome of the calculation.

3 Results

3.1 Site Selection Rationale

Existing SDDC sites with relatively low existing ecological value and/or habitats in poor condition have been selected to provide the enhancements for the scheme. They provide a valuable area for the local community and stepping stones for a variety of wildlife but are not currently of high ecological distinctiveness or good condition due to lack of funding for appropriate enhancement and management. Use of these sites within the schemes BNG metric will secure their long-term management and prevent an otherwise inevitable decline in their ecological value. All of the sites are within the LPA and ≤ 1.5 miles of the link road scheme therefore providing mitigation directly within the impact zone. This has many and broad benefits:

- Enhanced habitats are within the dispersal range for species that may have been displaced from habitats lost to the scheme.
- The use of local, publically accessible sites will contribute to the physical and mental health and wellbeing of the local community and foster better connections between people and wildlife.
- The enhancements can be incorporated and strategically designed alongside other council habitat improvements to deliver bigger, better, more and joined up landscape scale conservation.

Three of the sites are existing Green Space or Local Wildlife Sites (LWS), protected by policy in the Local Plan and therefore have high strategic significance.

Site 1, here-in-after referred to as 'Sandholes' is located 1.2 miles north-west of the proposed scheme. It consists of improved grassland, broad-leaved woodland, scrub and hedgerows. The site is surrounded by housing and roads on all sides, therefore having low habitat connectivity.

Site 2, here-in-after referred to as 'Unnamed grassland' is located in Church Gresley and approximately 1 mile west of the proposed scheme. It comprises improved grassland with self-set scrub and small trees. It is surrounded by a small band of broad-leaf woodland to the south, playing fields and sports pitches to the west and housing and roads to the north and east, therefore having relatively low habitat connectivity.

Site 3, here-in-after referred to as 'Salt Meadow plantations' is located approximately 0.5 miles north of the proposed scheme. The plantations form part of a wider Local Wildlife Site comprising broadleaf woodland, scrub, semi-improved grassland and ponds. The site is surrounded by housing and roads to the east and west, with further a LWS (Midway Fishing ponds) and potential LWS (Swadlincote Woodlands) to the north

and south. Despite this apparent good connectivity to other sites, the technical advice⁴ leads to this site being assigned a low habitat connectivity multiplier.

Three other SDDC sites were surveyed with the view to including their enhancement on this schemes BNG metric. Two of the sites, Salts Meadow and Swadlincote Woods, as a result of their existing moderate condition and an improvement in their management over the past few years by the councils Green Space team, were considered likely to achieve good condition over the next 5-10 years without further capital works. Therefore, any further enhancement and resources received through this scheme would demonstrate additionality and have therefore not been included. The third site, Hall Wood pond, while in poor condition and requiring enhancement works, was removed from the scheme due to the high risk of failure. The pond, shown in Photograph 1, was covered in a thick mat of duckweed caused by eutrophication. Before any enhancement work could take place, an investigation into the source of eutrophication would have been required and the findings of this would determine the success. Work was completed to try and include the pond, firstly for the importance of having good condition ponds within an LWS; secondly, to provide like-for-like habitat compensation for the loss of wetland habitats within the scheme, however, enough units could be achieved without the inclusion of the pond and it was considered the risk of failure was too high. Furthermore, enhancement of ponds is a very high cost to benefit ratio, with price per unit much higher than that of woodland or grassland.

Photograph 1: Hall Wood pond



⁴ In the beta version of biodiversity metric 2.0 all High and Very High distinctiveness habitats should be assigned a Medium connectivity multiplier, other habitats a Low connectivity multiplier.

3.2 Baseline Habitat Data

3.2.1 Site 1 – Sandholes (2Ha)

Sandholes is an amenity green space, used heavily by the local community, especially dog walkers. It supports species poor, improved grassland dominated by grasses including perennial ryegrass *Lolium perenne*, timothy *Phleum pratense* and meadow foxtail *Alopecurus pratensis*, frequent cocks-foot *Dactylis glomerata* and Yorkshire fog *Holcus lanatus* and occasional red fescue *Festuca rubra* and rough meadow grass *Poa trivialis*. Herb species include locally abundant white clover *Trifolium repens*, frequent creeping buttercup *Ranunculus repens*, common sorrel *Rumex acetosa*, hogweed *Heracleum sphondylium*, broad-leaved dock *Rumex obtusifolius* and ribwort plantain *Plantago lanceolata* and occasional chickweed *Stellaria media* and meadow buttercup *Ranunculus acris*. Anecdotal evidence suggests that the grassland was once much more diverse but has been improved through mowing for amenity purposes. In small areas in the main grassland, species indicative of slightly lower nutrient levels including pignut *Conopodium majus* and field woodrush *Luzula campestris* are present in low abundances. A small slope to the east of the site supported a slightly higher botanical diversity, with species including bird's-foot trefoil *Lotus corniculatus*, speedwell *Veronica sp.*, hairy sedge *Carex hirta* and mouse-ear hawkweed *Pilosella officinarum*.

The grassland is characterised by dominant, fast growing grasses on fertile, neutral soils, with the abundance of perennial ryegrass above 25% in areas. In addition, the presence and abundance of undesirable species such as white clover, curled dock *Rumex crispus*, ragwort *Senecio jacobaea*, nettle *Urtica dioica* and creeping buttercup (undesirable species shown in red on Appendix 1 – Species Lists) confirms that the grassland meets the **poor condition** assessment criteria.

Photograph 2: Species poor, improved grassland



3.2.2 Site 2 – Unnamed Grassland (1.3 Ha)

The unnamed grassland in Church Gresley is a former colliery spoil tip, with shale deposits still visible. It supports species poor, semi-improved grassland with a rough, tussocky, grass-dominant character. It had a dense sward and a thick thatch layer. Abundant/ locally abundant grasses included rough meadow grass, red fescue and perennial ryegrass with cock's-foot, sweet vernal grass *Anthoxanthum odoratum*, Yorkshire fog, meadow foxtail, crested dog's tail *Cynosurus cristatus* and tufted hair grass all present at lower abundances. Herb species within the sward included black knapweed *Centaurea nigra*, pignut and lesser stitchwort *Stellaria graminea* all recorded locally in small patches with more widespread herb species including dandelion, goats beard *Tragopogon pratensis*, common sorrel and cleavers *Galium aparine*. Species indicative of poor condition were widespread and abundant comprising common ragwort, creeping thistle, cow parsley, curled dock, common nettle, and creeping buttercup. Encroaching scrub and small trees were extensive across the site and included pedunculate oak *Quercus robur*, hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, bramble *Rubus fruticosus* agg. and silver birch *Betula pendula*. Ash *Fraxinus excelsior* trees present on the site showed signs of Ash Dieback *Hymenoscyphus fraxineus*. The site has many signs of physical damage including deep ruts and areas of bare shale deposits. These factors indicate that the grassland is in **poor condition** when assessed against the condition criteria.

Photograph 3: Species poor, semi-improved grassland



3.2.3 Site 3 – Salt Meadow Plantations (1.2 Ha)

The plantation woodlands surrounding Salts Meadow are dominated by silver birch. Trees are young and all the same age and height structure. A small amount of natural regeneration is present with occasional pedunculate oak and goat willow *Salix caprea* on the margins. Ground flora was dominated by grasses including tufted hair grass *Deschampsia caespitosa*, tall fescue *Festuca arundinacea* and cock's-foot. Robust herb species including rosebay willowherb *Chamerion angustifolium*, creeping thistle, common nettle and field horsetail *Equisetum arvense* were also present. The woodland block adjacent to the road recorded slightly higher species diversity with young regenerating species included hawthorn, hazel *Corylus avellana* and horse chestnut *Aesculus hippocastanum* at relatively low abundances. Given the lack of species and structural diversity within the canopy, the visible planting lines and absence of large standing or fallen deadwood, the woodland blocks are assessed to be in **poor condition**.

Photograph 4: Silver birch plantations



4 Habitat Enhancement

Site reference	Objective	Actions	Indicators of success
1. Sandholes grassland	To enhance the improved grassland, increasing the condition from poor to good by increasing species diversity and decreasing undesirable species.	Sow with wildflower grassland seed mix and manage with a late-summer hay meadow cut.	All of the following criteria are met: <ol style="list-style-type: none"> 1. Wildflowers and sedges above 30% excluding white clover and creeping buttercup. 2. Cover of bare ground >10%. 3. Cover of undesirable species (creeping thistle, spear thistle, curled dock, broad-leaved dock, common ragwort, common nettle, creeping buttercup, white clover, cow parsley, marsh thistle and marsh ragwort) < 5%. 4. Cover of bracken <20% and cover of scrub and bramble <5%. 5. No indicators of physical damage (from management, machinery etc).
2. Unnamed grassland	To enhance the semi-improved grassland, increasing the condition from poor to good by increasing species diversity and decreasing undesirable species.	Sow with wildflower grassland seed mix and manage with a late-summer hay meadow cut. Retained scattered scrub at current levels.	All of the following criteria are met: <ol style="list-style-type: none"> 1. Wildflowers and sedges above 30% excluding white clover and creeping buttercup. 2. Cover of bare ground >10%. 3. Cover of undesirable species (creeping thistle, spear thistle, curled dock, broad-leaved dock, common ragwort, common nettle, creeping buttercup, white clover, cow parsley, marsh thistle and marsh ragwort) < 5%.

			<ol style="list-style-type: none"> 4. Cover of bracken <20% and cover of scrub and bramble <5%. 5. No indicators of physical damage (from management, machinery etc).
<p>3. Salt Meadow plantations</p>	<p>To enhance the silver birch plantations, increasing the condition from poor to moderate by increasing species diversity, age range and structure, ground flora diversity and amount of deadwood, both standing and fallen.</p>	<p>Selective fell of silver birch, plant additional broadleaf species, ring-bark to create deadwood and seed ground flora with wildflower mix.</p>	<p>All of the following criteria are met:</p> <ol style="list-style-type: none"> 1. A diverse species, age and height structure of trees. 2. Standing and fallen deadwood of over 20cm diameter are present. 3. Original planting lines no longer obvious. 4. Invasive non-native plants <20%. 5. No evidence of inappropriate management (deep ruts, poaching or compaction). 6. Free from damage by animals.

4.1 Habitat Enhancement Rationale

Neutral grassland makes up the majority of the habitat enhancement. The loss of species-rich neutral grassland within the UK over the past half-century has been well-documented, as summarised within the Lowland Derbyshire Biodiversity Action Plan⁵ (BAP).

'In Derbyshire it is estimated that there has been an 80 to 91% decline between 1984 and 1999.'

The BAP has a target to restore 150 Ha of lowland neutral grassland within the National Forest action area by 2020. Whilst this date precedes the date for the period covered by this plan, future revision of the BAP will

⁵ Lowland Derbyshire Biodiversity Action Plan 2011-2020 (2011) Lowland Derbyshire Biodiversity Partnership.

invariably see new targets set. Restoration of 3 Ha of neutral grassland would make a valuable contribution to current and predicted targets within the BAP.

The creation of woodlands in the National Forest action area over the last 20 years has been well supported, however, the BAP did not reach its target for mixed deciduous woodlands in appropriate management in 2011. The enhancement and long-term management of the woodlands surrounding Salts Meadow will contribute to the 2000 Ha current and future predicted targets within the BAP.

The habitats selected for enhancement provide an almost exact like-for-like replacement of those lost to the development of the scheme. Given the local proximity of the sites to the scheme, these areas have the potential to support a range of wildlife that have been affected by the loss of habitats.

5 Biodiversity Net Gain Calculations

Off-site baseline data and habitat enhancements were assessed using the Biodiversity Metric 2.0 in order to measure the habitat units gained through the enhancements. The results table below shows the proposed enhancement works to the three sites will have a total net unit change of 0.26 habitat units, providing a biodiversity net gain of 0.73%. This is an increase from the original scheme of 23.9 habitat units. Full biodiversity metric calculations are provided in a separate spreadsheet.

On-site baseline	<i>Habitat units</i>	35.37
	<i>Hedgerow units</i>	0.17
	<i>River units</i>	0.00
On-site post-intervention (Including habitat retention, creation, enhancement & succession)	<i>Habitat units</i>	11.73
	<i>Hedgerow units</i>	3.53
	<i>River units</i>	0.00
Off-site baseline	<i>Habitat units</i>	13.11
	<i>Hedgerow units</i>	0.00
	<i>River units</i>	0.00
Off-site post-intervention (Including habitat retention, creation, enhancement & succession)	<i>Habitat units</i>	37.01
	<i>Hedgerow units</i>	0.00
	<i>River units</i>	0.00
Total net unit change (including all on-site & off-site habitat retention/creation)	<i>Habitat units</i>	0.26
	<i>Hedgerow units</i>	3.36
	<i>River units</i>	0.00
Total net % change (including all on-site & off-site habitat creation + retained habitats)	<i>Habitat units</i>	0.73%
	<i>Hedgerow units</i>	2030.03%
	<i>River units</i>	0.00%

Detailed results of the habitat units delivered by each site is shown below. The majority of the units will be achieved through the enhancement of the grassland sites, with smaller units being achieved by enhancement of the plantation woodlands.

3	2	1	Ref	
Woodland and forest - Young Trees planted	Grassland - Modified grassland	Grassland - Modified grassland	Baseline habitat	Baseline habitats
1.2	1.3	2	Area (Ha)	
Medium	Low	Low	Distinctiveness	
Poor	Poor	Poor	Condition	
Low	Low	Low	Ecological connectivity	
High strategic significance	High strategic significance	High strategic significance	Strategic significance category	
5.52	2.99	4.6	Habitat units	
Woodland and forest - Other woodland; broadleaved	Grassland - Other neutral grassland	Grassland - Other neutral grassland	Proposed habitat	Enhancement
Medium - Medium	Low - Medium	Low - Medium	Distinctiveness change	
Poor - Moderate	Lower Distinctiveness Habitat - Good	Lower Distinctiveness Habitat - Good	Condition change	
Moderate	Good	Good	Condition	
Medium	Low	Low	Ecological connectivity	
Within area formally identified in local strategy	Ecologically desirable but not in local strategy	Within area formally identified in local strategy	Strategic position	
High strategic significance	High strategic significance	High strategic significance		
15	15	15	Time to target condition	
Medium	Low	Low	Difficulty of enhancement category	
Compensation inside LPA	Compensation inside LPA	Compensation inside LPA	Spatial risk category	
7.69	11.24	18.08	Habitat units delivered	

6 Habitat Implementation and Management

Site reference and habitat	Management Prescriptions	Monitoring
<p>Sites 1 & 2</p> <p>Improved / semi-improved grassland</p>	<p><u>Year 1</u></p> <ul style="list-style-type: none"> a) Carry out late summer (Aug/Sept) cut as short as possible. b) Immediately after chain harrow the grassland twice in immediate succession and in a different direction each time. c) Broadcast wildflower seed mix in October/ November once grass growth has started to slow. Example seed mix – Emorsgate EM2F Standard general purpose 100% wild flowers. This is designed to create a permanent wildflower area and includes 6% yellow rattle in order to suppress the competition of grasses. d) Flat roll the grassland to ensure good seed to soil contact. e) Limit trampling pressure whilst wildflowers establish using signs asking members of public to stay on the mown paths. <p><u>Year 2-4</u></p> <ul style="list-style-type: none"> f) Remove the grass canopy in early spring and late autumn to allow the wildflowers to become established and compete with the grasses in the area. g) Cut the area down to around 10cm leaving the cuttings for up to a week before removing. This will allow them to dry and shed seeds back into the soil. h) Mow paths through the grassland on a regular basis to avoid trampling throughout the field. <p><u>Year 5 onwards</u></p> <ul style="list-style-type: none"> i) Once the wildflowers have established and grasses are less vigorous, carry out an annual late-summer hay cut. Leave arising on site for 3-4 days before removing to ensure seed dispersal. j) If the weather is particularly mild or the grass growth is strong, additional cuttings may be required, however avoid doing so before or immediately after flowering to ensure best results. 	<p><u>Years 2-4</u></p> <p>Botanical survey including 20 2m x 2m quadrats per ha of grassland.</p> <p><u>Years 6, 8, 10 then every 5 years</u></p> <p>Botanical survey including 20 2m x 2m quadrats per ha of grassland.</p>

	<p>k) As an ongoing process, observe and remove any weeds which invade the area. Carry out targeted removal (pulling or cutting) of undesirable species as required.</p> <p><u>Site 2 only</u> Retained scattered scrub at current levels (approx. 5%). Monitor scrub encroachment and removed where necessary.</p>	
<p>Site 3</p> <p>Young plantation woodland</p>	<p><u>Year 1</u></p> <ul style="list-style-type: none"> a) Thin woodland canopy up to 20%, favouring the removal of smaller trees and allowing larger trees more light to thrive. b) Ring bark approx. 10% of trees to provide standing deadwood. Lop ringbarked trees to 10ft to reduce safety risks. c) Retain all felled trees as fallen deadwood or habitat piles. <p><u>Year 2</u></p> <ul style="list-style-type: none"> d) Carry out late summer (Aug/Sept) cut to ground flora. e) Rake the ground to remove any thatch and open up the sward. f) Sow wildflower seed mix in October/ November once grass growth has started to slow. g) Trample seed to ensure seed to soil contact. <p><u>Year 3</u></p> <ul style="list-style-type: none"> h) Plant a mixture of broad-leaf trees (pedunculate oak, sessile oak, hazel, field maple, rowan) at 5-6 metre spacing filling the gaps created by felling. i) Protect trees from browsing using tree guards and stakes. j) In high light levels, ground flora may require a scythe, especially where nettle and bramble are outcompeting wildflower. 	<p><u>Year 2</u></p> <p>Carry out 50x50 quadrat survey.</p> <p><u>Year 3</u></p> <p>Carry out 50x50 quadrat survey.</p>

	<p><u>Year 5 onwards</u></p> <p>k) Coppice hazel on a 5-10 year rotation. l) Thin 5% of woodland every other year and retain on woodland floor or in habitat piles.</p>	<p><u>Year 5</u></p> <p>Carry out 50x50 quadrat survey. Repeat every 5 years.</p>
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Management prescriptions for the enhancement of the grassland and woodland sites are provided above, however, it should be noted that for many of the outcomes a variety of capital works and long-term management methods could be used and an amount of flexibility is anticipated depending on timing, staff experience and habitat conditions providing the target condition is met. Standard seed mixes have been recommended but these could be varied depending on local conditions and an acid grassland or wet grassland mix may be more suitable on some areas of the sites. The monitoring of sites will feed back into the management prescriptions and where necessary changes can be made to ensure the target condition is achieved. Furthermore, additional council funded or volunteer work could run alongside enhancement within the metric, such as bulb planting or creation of bare ground providing that the overall habitats and target conditions are achieved.

6.1 Constraints

Ideally green hay would be used for the grassland enhancement in order to ensure local genetics and avoid the inclusion of agricultural varieties, however, diverse hay meadow donor sites are severely lacking in the South Derbyshire area and this is unlikely to be feasible. Wildflower seeding is therefore proposed, however two key points are recommended in order to avoid any negative impacts of seeding.

- It is recommended that the ground is prepared for seed application without the use of chemicals, using either chain harrow or disc overseeder. Chemicals should be avoided in the long-term management of the grasslands, even where non-desirable species are present. With the change in management soil nutrients will decrease and eventually non-desirable species will die out naturally. Targeted pulling or mowing of undesirable species will also speed up this decline where required.
- Seed mixtures should contain only native species from UK origin and should not include agricultural species such as cornflower and corn marigold.

7 Estimated Costs

Sandholes Grassland (2 Ha)			
Action	Amount	Estimated cost (exc. VAT)	Description
Capital works			
Preparations and improvements	2 Ha	£2,997	Including short cut, harrow, broadcasting and flat rolling.
Wildflower seed	30 Kg	£4,230	Based on a sowing rate of 15kg per Ha – Emorsgate EM2F Standard general purpose 100% wild flowers. www.wildseed.co.uk .
Management			
On-going management – removing hay	2 Ha	£1,520 x 32 years = £48,640	32 years management. Possibility to reduce/eradicate this cost if an agreement with a local farmer can be arranged – they may accept it as a standing crop and take it for free. £350 per additional day as required to carry out smaller targeted cuts in March.
Monitoring			
Surveys, data analysis & report	5.5 days per survey. £350/day	£1925 x 10 years = £19,250	Quadrat surveys. Plus an annual inflation increase of approximately 2%.
ESTIMATED TOTAL		£75,117	(~£5,572 per unit)

Church Gresley Grassland (1.3 Ha)			
Action	Amount	Estimated cost (exc. VAT)	Description
Capital works			
Preparations and improvements	1.3 Ha	£2,304	Including short cut, harrow, broadcasting and flat rolling.
Wildflower seed	20 Kg	£2,820	Based on a sowing rate of 15kg per Ha – Emorsgate EM3F Standard general purpose 100% wild flowers. www.wildseed.co.uk .
Management			

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On-going management removing hay –	1.3 Ha	£980 x 32 years = £31,360	32 years management. Possibility to reduce/eradicate this cost if an agreement with a local farmer can be arranged – they may accept it as a standing crop and take it for free. £350 per additional day as required to carry out smaller targeted cuts in March.
Monitoring			
Surveys, data analysis & report	3.5 days per survey. £350/day	£1225 x 10 years = £12,250	Quadrat surveys. Plus an annual inflation increase of approximately 2%.
ESTIMATED TOTAL		£48,734	(~£5,907 per unit)

Silver Birch Plantations (1.2 Ha)			
Action	Amount	Estimated cost (exc. VAT)	Description
Capital works			
Woodland thinning, including ring barking and lopping.	1.2Ha	£2,054	Assumes tractor can access site, material to be chipped and remain on site.
Woodland planting	1.2 Ha	£2,347	Planting 200 - 400 trees with tube guards and stakes. P.Oak, S.Oak, Hazel, Rowan and Field Maple range between £0.78 and £0.95 – www.heathwood.co.uk .
Woodland ground flora enhancement	1.2 Ha	£1,405	Creation of sections of woodland meadow within clearings. Including wildflower seed, based on a sowing rate of 15kg per Ha – Emorsgate EW1F Wild flowers for woodlands. www.wildseed.co.uk .
Management			
Ongoing woodland management	£350/day.	£5,250	Coppicing on 5 year rotation. 5% thin every other year. Scythe ground flora where required. Additional days may be required where undesirable species are present.
Monitoring			

Surveys, data analysis & report	3 days per survey. £350/day	£1050 x 8 = £8,400	Quadrat surveys. Plus an annual inflation increase of approximately 2%.
ESTIMATED TOTAL		£19,456	(~£8,966 per unit)
Contingency costs (10%)			
Site 1		£7,511	
Site 2		£4,873	
Site 3		£1,946	
	TOTAL	£16,344	

7.1 Approach Rationale

The aforementioned proposals are considered to be the most cost-effective strategy whilst delivering valuable habitat enhancement and providing the scheme with no net loss in biodiversity. A number of factors highlight the benefit of this approach over alternative methods of delivering biodiversity offsetting:

- Mitigation is local and will provide enhanced habitats directly for wildlife that may have been displaced from the loss of habitats within the scheme.
- The local community will benefit from the enhanced sites, providing some compensation for their loss of natural areas and increase in development. This has many broader benefits including positive impacts on health and wellbeing.
- All proposed mitigation is in the same Local Planning Authority (LPA) as the development scheme meaning the units can be achieved with smaller areas (as they have a higher multiplier). This has significant capital works and long-term management cost benefits.
- The sites are of medium to high strategic importance, being designated as LWS's, Green Spaces or directly connected to such a site.
- Enhancements are cost-effective and much of the long-term management can be incorporated into the councils existing schedule. By the very nature of the enhancements, long-term management is not expected to be onerous once established.
- Sites are already owned by the council therefore reducing the initial capital outlay significantly.
- Other biodiversity offsetting methods include use of the habitat bank. This can cost up to £15,000 per unit (approx. £375,000 over the lifetime), as opposed to the proposed average of £5,996 per unit (approx. **£143,307** over the lifetime of the project).

8 Conclusion

To conclude, this report has identified three SDDC owned sites that have the potential to provide off-site compensation in order to deliver the Woodville Link Road scheme with no net biodiversity loss. The sites have been chosen as they can provide like-for-like habitat enhancement; achieving the required units in the biodiversity metric and offering valuable habitats within close proximity to the scheme. In addition, and not given weight within the metric, the sites are publically accessible; the increase in biodiversity and wildlife on these sites provides compensation for the loss of other natural areas and increase in development and contributes to the physical and mental health of the local community. The sites and enhancement proposals offer a highly cost-effective solution, with estimated costs less than half those of other strategies, and can be delivered quickly and effectively with relatively low risk of failure.

Appendix 1: Botanical Species Lists

Site 1. Sandholes Improved Grassland			
Scientific Name	Common Name	Abundance	Location
<i>Acer pseudoplatanus</i>	Sycamore	O	Scattered
<i>Achillea millefolium</i>	Yarrow	LA	Grassland
<i>Alopecurus pratensis</i>	Meadow Foxtail	LD	Grassland
<i>Anthriscus sylvestris</i>	Cow Parsley	F	Grassland
<i>Arrhenatherum elatius</i>	False Oat-grass	O	Margins
<i>Capsella bursa-pastoris</i>	Shepherd's-purse	R	Grassland
<i>Cardamine hirsuta</i>	Hairy Bitter-cress	R	Grassland
<i>Carex hirta</i>	Hairy Sedge	LF	Grassland
<i>Cerastium fontanum</i>	Common mouse-ear	O	TN1
<i>Chamerion angustifolium</i>	Rosebay Willowherb	F	Margins
<i>Cirsium arvense</i>	Creeping Thistle	F	Margins
<i>Conopodium majus</i>	Pignut	R	Grassland
<i>Crataegus monogyna</i>	Hawthorn	O	Scattered
<i>Dactylis glomerata</i>	Cock's-foot	LA	Grassland
<i>Festuca rubra</i> agg.	Red Fescue	LF	Grassland
<i>Galium aparine</i>	Cleavers	O	Grassland
<i>Galium verum</i>	Lady's Bedstraw	R	TN1
<i>Geranium pyrenaicum</i>	Hedgerow Crane's-bill	O	Margins
<i>Heracleum sphondylium</i>	Hogweed	F	Grassland
<i>Holcus lanatus</i>	Yorkshire-fog	A	Grassland
<i>Hyacinthoides hispanica</i>	Spanish Bluebell	R	Grassland
<i>Lamium album</i>	White Dead-nettle	LF	Grassland
<i>Lolium perenne</i>	Perennial Rye-grass	LD	Grassland
<i>Lotus corniculatus</i>	Common Bird's-foot-trefoil	O	TN1
<i>Luzula campestris</i>	Field Wood-rush	R	Grassland
<i>Myosotis sylvatica</i>	Wood forget-me-not	O	Margins
<i>Phleum pratense</i> sens.lat.	Timothy	O	Grassland
<i>Pilosella officinarum</i>	Mouse-ear-hawkweed	R	TN1
<i>Plantago lanceolata</i>	Ribwort Plantain	F	Grassland
<i>Plantago major</i>	Greater Plantain	O	Grassland
<i>Poa annua</i>	Annual Meadow-grass	O	Grassland
<i>Poa trivialis</i>	Rough Meadow-grass	O	Grassland

<i>Populus alba</i>	White Poplar	F	Margins
<i>Quercus robur</i>	Pedunculate Oak	O	Scattered
<i>Ranunculus acris</i>	Meadow Buttercup	O	Grassland
<i>Ranunculus repens</i>	Creeping Buttercup	O	Grassland
<i>Rubus fruticosus</i> agg.	Bramble	F	Margins
<i>Rumex acetosa</i>	Common Sorrel	F	Grassland
<i>Rumex crispus</i>	Curled Dock	O	Grassland
<i>Rumex obtusifolius</i>	Broad-leaved Dock	F	Grassland
<i>Senecio jacobaea</i>	Common Ragwort	O	Grassland
<i>Stellaria media</i>	Common Chickweed	O	Grassland
<i>Taraxacum officinale</i> agg.	Dandelion	F	Grassland
<i>Trifolium repens</i>	White Clover	LA	Grassland
<i>Urtica dioica</i>	Common Nettle	LF	Grassland
<i>Veronica</i> sp.	Speedwell	R	TN1
<i>Vicia sativa</i>	Common Vetch	O	Margins

Site 2 – Unnamed Semi-improved Grassland

Scientific name	Common name	Abundance	Location
<i>Acer</i> sp.	a maple	O	Scattered
<i>Alopecurus pratensis</i>	Meadow Foxtail	LF	Grassland
<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass	O	Grassland
<i>Anthriscus sylvestris</i>	Cow Parsley	LA	Grassland
<i>Arrhenatherum elatius</i>	False Oat-grass	O	Grassland
<i>Betula pendula</i>	Silver Birch	O	Scattered
<i>Centaurea nigra</i>	Common Knapweed	LF	Grassland
<i>Cerastium fontanum</i>	Common mouse-ear	R	Grassland
<i>Cirsium arvense</i>	Creeping Thistle	F	Grassland
<i>Conopodium majus</i>	Pignut	LO	Grassland
<i>Convolvulus arvensis</i>	Field Bindweed	O	Grassland
<i>Crataegus monogyna</i>	Hawthorn	O	Grassland
<i>Cynosurus cristatus</i>	Crested Dog's-tail	O	Grassland
<i>Dactylis glomerata</i>	Cock's-foot	F	Grassland
<i>Deschampsia caespitosa</i>	Tufted Hair-grass	F	Grassland
<i>Festuca rubra</i> agg.	Red Fescue	LA	Grassland
<i>Fraxinus excelsior</i>	Ash	O	Grassland
<i>Galium aparine</i>	Cleavers	O	Grassland
<i>Heracleum sphondylium</i>	Hogweed	LA	Grassland

<i>Holcus lanatus</i>	Yorkshire-fog	O	Grassland
<i>Juncus effusus</i>	Soft Rush	LF	Grassland
<i>Juncus inflexus</i>	Hard Rush	R	Grassland
<i>Lolium perenne</i>	Perennial Rye-grass	LA	Margins
<i>Luzula campestris</i>	Field Wood-rush	R	Grassland
<i>Malus sp.</i>	an apple	O	Scattered
<i>Plantago lanceolata</i>	Ribwort Plantain	R	Margins
<i>Poa annua</i>	Annual Meadow-grass	O	Grassland
<i>Poa trivialis</i>	Rough Meadow-grass	A	Grassland
<i>Prunus spinosa</i>	Blackthorn	O	Scattered
<i>Quercus robur</i>	Pedunculate Oak	O	Scattered
<i>Ranunculus acris</i>	Meadow Buttercup	R	Grassland
<i>Ranunculus repens</i>	Creeping Buttercup	O	Grassland
<i>Rubus fruticosus agg.</i>	Bramble	O	Scattered
<i>Rumex acetosa</i>	Common Sorrel	O	Grassland
<i>Rumex crispus</i>	Curled Dock	F	Grassland
<i>Senecio jacobaea</i>	Common Ragwort	F	Grassland
<i>Stellaria graminea</i>	Lesser Stitchwort	LF	Grassland
<i>Taraxacum officinale agg.</i>	Dandelion	O	Grassland
<i>Tragopogon pratensis</i>	Goat's-beard	O	Grassland
<i>Urtica dioica</i>	Common Nettle	F	Grassland
<i>Vicia sativa</i>	Common Vetch	O	Grassland
<i>Vicia hirsuta</i>	Hairy Tare	R	Grassland
Site 3 – Salts Meadow Plantations			
Scientific name	Common Name	Abundance	Location
<i>Fraxinus excelsior</i>	Ash	F	Understory/regen
<i>Rubus fruticosus agg.</i>	Bramble	O	Ground flora
<i>Rumex obtusifolius</i>	Broad-leaved Dock	O	Ground flora
<i>Dactylis glomerata</i>	Cock's-foot	O	Ground flora
<i>Urtica dioica</i>	Common Nettle	F	Ground flora
<i>Salix fragilis</i>	Crack Willow	R	Ground flora
<i>Cirsium arvense</i>	Creeping Thistle	O	Ground flora
<i>Equisetum arvense</i>	Field Horsetail	LF	Ground flora
<i>Salix caprea</i>	Goat Willow	A	Canopy
<i>Crataegus monogyna</i>	Hawthorn	F	Understory/regen
<i>Corylus avellana</i>	Hazel	F	Understory/regen

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<i>Stachys sylvatica</i>	Hedge Woundwort	O	Ground flora
<i>Geranium robertianum</i>	Herb-robert	O	Ground flora
<i>Epilobium parviflorum</i>	Hoary Willowherb	O	Ground flora
<i>Aesculus hippocastanum</i>	Horse-chestnut	F	Understory/regen
<i>Acer sp.</i>	a maple	O	Understory/regen
<i>Quercus robur</i>	Pedunculate Oak	F	Understory/regen
<i>Chamerion angustifolium</i>	Rosebay Willowherb	O	Ground flora
<i>Betula pendula</i>	Silver Birch	D	Ground flora
<i>Festuca arundinacea</i>	Tall Fescue	O	Ground flora
<i>Deschampsia caespitosa</i>	Tufted Hair-grass	F	Ground flora



Site 1
Sandholes
Improved grassland
2Ha

— Enhancement area

0 50 100 m





Site 2
Unnamed grassland at
Church Gresley
Semi-improved grassland
1.3Ha

— Enhancement area

0 25 50 m

A horizontal scale bar with three segments. The first segment is black and labeled '0'. The second segment is white and labeled '25'. The third segment is white and labeled '50 m'.



Site 3
Salts Meadow plantations
1.2Ha

— Enhancement area



Proximity of sites to
Woodville Link Road
scheme



0 250 500 m

