

This document outlines the strategy for the enhancement of biodiversity within the property and gardens of Fernlea, a replacement dwelling that is currently being built, located on Buxton Road in Chinley.

Purpose

The purpose of this strategy is to outline the considerations and decisions that have been made to support the enhancement of biodiversity during the design of the replacement dwelling “Fernlea” and its surrounding small parcel of land or garden. The strategy contains commitments that the owners are committed to delivering during construction and landscaping on site, and to maintaining thereafter.

Background

The site was originally two adjacent rectangular-shaped residential plots to the southwest of Buxton Road (A624) at the eastern edge of Chinley village just past the junction with Hayfield Road. The eastern plot was previously occupied by a single detached bungalow and three outbuildings with the western plot being used as additional lawned garden. The site’s topography falls from northeast to southwest and is bounded by Buxton Road to the north and open agricultural land to the other three sides. The site is not in a conservation area but does sit within the Green Belt in a landscape character area defined as Dark Peak, and with the landscape character type Settled Valley Pastures¹.

An Arboricultural Survey was carried out in December 2017² as part of an application for planning consent³. The lawned gardens previously had a mix of recent natural colonisation and non-native ornamental species that the Survey reported as either “out of keeping with the rural character of the locale” or contributing “very little to the character and appearance of the area”.

Planning consent was awarded for the demolition of the bungalow and its outbuildings and for the building of a replacement dwelling and garage⁴. This consent includes the removal of seven trees, three hedges and one shrub, the majority of which were non-native ornamentals which the Arboricultural Survey had concluded were “not in keeping with the rural character of the surrounding area”. The consent also requires that a biodiversity enhancement strategy be submitted and approved prior to the occupation of the dwelling to ensure no net loss for biodiversity. Measures within the strategy need to include the following items:

- a) details of bird, bat and insect boxes (positions/specification/numbers) which shall also detail the inclusion of bat and bird boxes within the fabric of the dwelling;
- b) measures to maintain connectivity throughout the site for wildlife;
- c) ecologically beneficial landscaping; and,
- d) planting specifications for the green roof and living walls.

The consent requires that these approved measures are implemented in full prior to the first occupation of the replacement dwelling and maintained thereafter.

¹ The Landscape Character of Derbyshire (fourth edition, March 2014) published by Derbyshire County Council

² Arboricultural statement on proposed development at Fernlea, Buxton Road, Chinley SK23 6DT – Cheshire Woodlands arboricultural consultancy document reference CW/8957-AS dated 17 December 2017

³ Planning application no. HPK/2017/0643 determined on 20 March 2018

⁴ Planning application no. HPK/2018/0266 determined on 26 July 2018

Project Objectives

The owners of the site and clients for this project are passionate about sustainability and the natural world and want their new home and garden to have as minimal an impact as possible upon the environment. The project is therefore grounded upon sustainable principles and will, for instance, only select construction materials that have a low carbon footprint, recycle as many items on site as possible and install rainwater harvesting technology. Furthermore, the replacement dwelling will be an ultra-low energy house constructed to the Passivhaus Standard⁵.

Fernlea is to be the owners' "forever" home and they want to create a building of genuine significance for the High Peak, and one that demonstrates how the principles of Passivhaus are a highly effective way of reducing energy use and carbon emissions from buildings in the UK, as well as providing high standards of comfort and building health. They are also keen that, with the construction of the replacement dwelling and garage and in the creation and landscaping of the garden, the site allows biodiversity to fully flourish. It is of personal importance to them that relevant measures are in place to allow local wildlife to prosper and native species to thrive.

This biodiversity enhancement strategy therefore sets out the key ecological considerations and plans relevant to the site, the principles behind the management of biodiversity on the site, and the actions that will be carried out to support such biodiversity management.

Habitat Enhancements

It is planned to improve the ecological value of the site by implementing a range of biodiversity enhancements as summarised below.

1. Bio-solar Roof

The successful application for planning consent had proposed that approximately one-third of the roof would feature intensive solar photovoltaic (PV) panels, with the remainder of the roof consisting of a sedum or similar green roof. Since then, greater experience of green roofs across the world has led to best practice emerging for a bio-solar approach whereby green roof and solar technologies are integrated in a seamless fashion⁶. True bio-solar green roofs genuinely maximise biodiversity⁷.

Combining solar panels with green roofs can bring amazing benefits. These bio-solar green roofs bring together the energy-generating capability of a solar PV array (electricity-producing solar panels) and the water retaining, habitat generating benefits of a green roof system; a win-win situation. Research has also shown that on extremely hot summer days, solar panels can become less efficient. The bio-solar solution increases the efficiency of the array because the vegetation preserves ambient rooftop temperatures, helping to keep solar modules at optimal output. Research has shown that compared to flat "un-greened" roofs, green roofs can be up to 21°C cooler, clearly providing additional performance benefits for solar PV arrays.

⁵ set by The Passivhaus Trust, an independent body based in the UK but affiliated internationally

⁶ Initial insights on the biodiversity potential of biosolar roofs: a London Olympic Park green roof case study (C. Nash, J. Clough, D. Gedge, R. Lindsay, D. Newport, M.A. Ciupala and S. Connop (2016))

⁷ Green roof and solar array – comparative research project, University of Technology Sydney (final report July 2021)

Besides the obvious benefits of freely generated electricity, the solar and green roof combination adds several additional eco opportunities. The panels create a mixture of sunny, shaded and wind-shielded areas to give a matrix of different habitats for a broader range of vegetation whilst also providing refuge areas for small invertebrates from inclement weather; this allows a large range of species to thrive in what would otherwise be a very exposed area. For instance, rain run-off from the panels creates damper areas to the front and drier areas at the back creating a “habitat mosaic” which again supports a greater diversity in vegetation, attracting a wider range of species such as butterflies, bees, beetles, birds and others. Undulations in the substrate further enhance the diversity of flowering plants that then provides a rich foraging environment. All of these increase the overall biodiversity because of the bio-solar combination.

This bio-solar approach will therefore be applied across 100% of the roof spaces rather than the 33% previously planned for the intensive solar PV panels. Green roof substrate will ballast/provide an anchor for the solar PV base, eliminating penetration of the waterproof roof membrane. The substrate will be vegetated using a system such as the Bauder GREEN Flora 3 seed mix⁸, which is a blend of low growing and shade tolerant plants native to Britain. Plug plants will be used to add specific wildflower species that are local to the Peak District and vegetation blankets will provide instant coverage around the PV array, stabilising the substrate in exposed locations. Planting will be accredited/certificated by appropriate schemes such as the Royal Horticultural Society’s Perfect for Pollinators, Buglife (an invertebrate charity) or Flora Locale.

Full details of the planting, including samples, will be outlined in the Scheme for Landscaping that is required to be submitted and approved prior to occupation of the replacement dwelling.

2. Living Walls

Given the proximity of the busy Buxton Road and the Hope Valley railway line to the site, two sections of living wall will be created that directly face the road/railway. These will be populated with native plants that have a high level of absorption of carbon dioxide but also collect and absorb harmful atmospheric pollutants such as fine particulate matter (PM2.5 and PM10) and nitrogen oxides (NO_x and NO₂). Living walls also provide resources for an estimated 125 invertebrate species; they therefore provide a habitat and act as a food source for a range of species across the food web, including bats and birds.

Full details of the planting, including samples, will be outlined in the Scheme for Landscaping.

3. Boundary Treatments

There are four boundaries that are described in the Boundary Treatments Plan⁹. It had previously been planned for boundaries 1, 2 and 4 to be a traditional drystone wall with boundary 3 being the existing common hawthorn (*Crataegus monogyna*) hedge; however, the drystone wall forming boundary 4 will now reduce to ground level at the end of the emergency escape stairs from the replacement dwelling and a hawthorn hedge will take over from there to where it joins boundary 3.

This decision has been made to increase the amount of hedge habitat available on site to allow for connectivity for animals such as hedgehogs. In addition, common hawthorn can support hundreds of other species. It is the foodplant for caterpillars of moths, including the hawthorn, orchard ermine, pear leaf blister, rhomboid tortrix, light emerald, lackey, vapourer, fruitlet-mining tortrix, small eggar

⁸ <https://www.bauder.co.uk/assets/media/BauderMedia/Products/Green-Blue-Roof-Components/Green-Roof/Vegetation-and-fertiliser/i-Flora-Seed-Mix/BauderGREEN-Flora-Seed-Mix-Range-Technical-Data-Sheet.pdf>

⁹ Fernlea Boundary Treatments Plan version 3 dated 13 November 2024

and lappet moths. Its flowers are eaten by dormice and provide nectar and pollen for bees and other pollinating insects. The haws are rich in antioxidants and are eaten by migrating birds, such as redwings, fieldfares and thrushes, as well as small mammals. Plus the dense, thorny foliage makes fantastic nesting shelter for many species of bird.

4. Tree and Shrub Planting

Tree and shrub planting within the site will be comprised of native species such as silver birch (*Betula pendula*), hazel (*Corylus avellana*), holly (*Ilex aquifolium*), rowan (*Sorbus aucuparia*), blackthorn (*Prunus spinosa*) and wild cherry (*Prunus avium*) which are considered appropriate as they have both aesthetic and nature conservation qualities. Night-scented flowers and climbing plants/shrubs that attract nocturnal insects will also be included, such as butterfly bush (*Buddleia davidii*), honeysuckle (*Lonicera*), lavender (*Lavendula sp.*) and jasmine (*Jasminum sp.*). These provide good foraging opportunities for bats.

Full details of the planting will be outlined in the Scheme for Landscaping.

5. Landscaping Areas

While it is planned for the majority of the garden to be planted with trees and shrubs, where there are grassed areas then an amenity grassland seed mix which contains a mixture of wear tolerant native species, such as the Emorsgate Eg22 Mix, will be used. Any ornamental species proposed will be of native origin and locally sourced. Of most benefit to wildlife is fruiting and flowering species that will increase the garden's value for birds, bats and invertebrates. Additional native species that will be considered to support this include crab apple (*Malus sylvestris*) and bird cherry (*Prunus padus*).

Full details of the landscaping, both hard and soft, will be outlined in the Scheme for Landscaping.

6. Pond

It is planned to have a wildlife-friendly pond within the garden. The guidance document Creating Garden Ponds for Wildlife¹⁰, which is recommended by Derbyshire Wildlife Trust, will be used as the primary guide to implement this.

Species Enhancements

The following proposed habitat and landscape features will provide enhancements for the species groups as stated below.

1. Birds

The work on site has initially resulted in a very small decrease in nesting bird habitat by the removal of the original "out of keeping" trees and scrub. The impacts of this will be mitigated by the installation of several bird boxes throughout the site.

Build-in swift boxes provide a permanent no-maintenance location situated within the fabric of a building for swifts to nest in an environment where nesting sites have been lost. While the best location for these boxes is at a height of 4-5m above ground, if the nesting box is sited out of direct sunlight and in a location protected from predators then it can be as low as 1.5m above ground. A

¹⁰ <https://content.freshwaterhabitats.org.uk/2013/09/Creating-Garden-Ponds-for-Wildlife.pdf?>

suitable location is therefore along the top of the western wall of the garage, where it is planned to site three build-in swift boxes.

In addition, four traditional wooden nest boxes will be located upon new trees that are to be included around the site as detailed in the Scheme for Landscaping. Two of these will have a 25mm diameter circular entrance hole, suitable for the smaller tit species such as blue and coal tits, whilst two will have a 32mm diameter entrance hole, that will attract a wide range of garden birds including great tits, house sparrows and nuthatches. These nest boxes will also provide vital roosting spaces for birds during the cold winter months and their thick wooden walls will ensure that roosting birds stay warm.

2. Bats

The site provides the opportunity to increase the number of roosting opportunities for bats as no evidence of roosting bats has been seen on site previously. It is planned that built-in multipurpose bat boxes will be installed within the fabric of the building, with the requirement for a sheltered sunny place meaning that two crevice boxes will be situated high up on the southeastern side of the building. These will each feature two chambers suitable for the common pipistrelle and soprano pipistrelle bats.

3. Invertebrates

The site will provide many suitable habitats for invertebrates such as within the traditional drystone walls, the bio-solar roof and the living walls. The maintenance of the garden is intended to be “light touch” leaving many areas to be subject to natural decay with leaves and fallen tree branches, for instance, to be left where they fall. This will encourage bountiful levels of invertebrates with the concomitant increase in other species; invertebrates form the main diet of hedgehogs, many of our garden birds, frogs, shrews and more. The plan is to attract plenty of invertebrates to the garden and if we succeed in this endeavour, then other wildlife will quickly follow.

Conclusion

This strategy has set out the planned actions that will enhance biodiversity for the replacement dwelling Fernlea and its garden. The site previously had low ecological value but it is anticipated that, after construction of the replacement dwelling and with the inclusion of the stated actions, the site’s value for wildlife will be increased.