

Craigforth House Estate Ecological Management Plan



Working Draft

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1 Introduction

1.1 Background

Babbity Environmental Ltd was commissioned by RULLP to prepare an Ecological Management Plan (EcMP) for a mixed-use development at Craigforth in Stirlingshire. The Ecological Management Plan will be based on the findings of a preliminary ecological survey conducted at the site in October 2019. This will need to be updated prior to construction activities occurring on site.

The Ecological Management Plan should be considered a working framework document and will need to be updated, to include specific action plans for each phase of construction, prior to works being carried out on site.

1.2 The Site Location

The Development site lies adjacent to, and west of the Raploch area in Stirling. The Site is primarily used as a business park, but also accommodates a children's nursery within Craigforth House, a substantial 18th century building, surrounded by extensive broadleaf woodland in the centre of the Site. The area to the south of the site is primarily agricultural. The wooded section of the site has been identified as being a potential local nature conservation site (pLNCS). The aim of restoring this woodland and its potentially associated fauna and flora has been adopted by this EcMP.

1.3 Aim and Objectives

This EcMP aims to provide a prescriptive management plan to be used by developers to preserve and enhance greenspaces, within the development, for local wildlife and tenants. It aims to ensure that the proposed the Craigforth Crag Local Nature Conservation Site (LNCS) is not adversely impacted by the development, in line with the publication 'SG: Natural Environment Biodiversity and Landscape' (Stirling Council 2018).

The aim of this EMP is to provide a quantifiable habitat management plan, for the development site, which considers the following objectives:

- Objective 1: To ensure that the River Teith SAC is not adversely affected by construction activities or by future occupiers of the development;
- Objective 2: Ensure and, where possible, enhance the setting and nature of the proposed Craigforth House Local Nature Conservation Site;
- Objective 3: Create habitats of wildflower areas for pollinating insects;
- Objective 4: Ensure that no European or nationally protected species, or their breeding sites, are adversely effected by the development;
- Objective 5: Set out prescriptions for the treatment or removal of invasive species on site; and
- Objective 6: Safeguard and improve roosting and foraging opportunities for bats.



1.4 Background and Consultation

The Craigforth Site contains Craigforth House and gardens, and an extensive woodland area that occupies most of the central area of the site (some 16.5 ha).

This woodland is listed on the Ancient Woodland Inventory as 'Long Established Woodland of Plantation Origin' (LEWPO).

Areas to the north of the Site are of less ecological interest whilst the south of the Site consists mainly of farmland (see Appendix 14.1 Figure 1).

This Ecological Management Plan has been formed through consultation with Stirlingshire Council's planning office, SEPA and SNH through a formal scoping exercise and direct communication with Stirling Council's sustainability officer (Guy Harewood).

2 Habitat Requirements

2.1.1 Statutory designations

River Teith SAC

The only site within the proximity that contains national or internationally important ecological features, is the River Teith SAC. This designation takes in the River Teith that lies within 200 metres of the site and the River Forth which forms some of the western boundary to the site. The River Forth is fed by the Raploch Burn that runs through the site.

The accompanying Habitats Risk Assessment for the Site (Appendix 14.3) concluded that there is no likelihood of the SAC being impacted on after construction. Provided that construction practices, identified in 3.1 of this report, are strictly adhered to, then there will be no impact on the integrity of the qualifying features of the SAC.

The central wooded area forms a proposed local nature conservation site (LNCS) and, as such, forms a central feature to this Ecological Management Plan. Connecting this piece of woodland to the wider rural ecology, in order to encourage the migration of European protected species (EPS) to the Site, is a major aim of this plan.

3 Habitat Management Prescriptions

3.1 Objective 1: Ensure that Construction Activities do not cause silting or pollution of The Raploch Burn, the River Forth and River Teith

The River Teith's qualifying features includes Atlantic Salmon (*Salmo salar*) whose spawning grounds are exceptionally sensitive to silting up. Other qualifying species are brook, river and sea lamprey, all these species are very sensitive to pollution.

There is extensive regulation and guidance established to protect water courses from both pollution spills and siltation and this should be strictly adhered to.

3.1.1 Prescription 1: Adherence to Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended)

All fuels stored on site during construction activities must meet the following requirements:



- The containers must be strong enough to hold the fuels without leaking or bursting;
- The containers must be positioned to avoid damage as far as is reasonably practicable;
- A secondary containment system, such as a bund or drip tray, must be provided to catch any oil leaking from the container or its ancillary pipe work and equipment;
- The secondary containment system must have sufficient capacity to contain at least 110% of the maximum contents of the container. If more than one container is stored, the bund should be capable of storing at least 110% of the largest tank or 25% of the total storage capacity, whichever is the greater (in the case of drums, the capability should be at least 25% of total storage capacity);
- Fuels stored in mobile bowsers must also be banded;
- Bund base and walls must be impermeable to water and oil and checked regularly for leaks;
- Any valve, filter, sight gauge, vent pipe or other ancillary equipment must be kept within the bund when not in use;
- Above-ground pipe work must be properly supported;
- Below-ground pipe work must be protected from physical damage and have adequate leak detection. If mechanical joints have to be used, they should be readily accessible for inspection; and
- Emergency procedures for managing leaks must be in place and approved by SEPA.

3.1.2 Prescription 2: Management of Silt

Silt management will be carried out in strict adherence to the following policies and guidance:

- PPG1: General Guide to the Prevention of Water Pollution;
- PPG5: Works In, Near or Liable to Affect Watercourses;
- PPG6: Working at Construction and Demolition Sites.

Prior to any works being carried out on site, a detailed silt management plan should be replaced and agreed with the local authority and with SEPA (as part of a controlled activities licence). It is best practice to retain vegetation cover, minimise soil stripping and establish new vegetation on bare ground at the earliest opportunity. Erosion of soils can be caused by wind but is normally attributed to rainfall. Sheet flows cause slips, gulleys and rills to form, whilst drainage channels can give rise to scouring of bed and banks; all factors that can increase the mobilisation of material.

Storage of large amounts materials close to the water courses should be avoided and the run-off from any construction activities should be controlled using common barrier methods such as:

- Silt Mat – captures sediment and prevents resuspension;
- Silt Wattle – reduces flow on sloping ground and in channels & ditches;
- Floc Mat – traps sediment using a mild anionic flocculant;
- Silt Net – for placement in lagoons to aid sediment deposition;
- Treated Geo-Jute – for polishing water and lining channels;
- Rock Check – reduces and distributes water flow in channels;



- Water Lynx™ anionic flocculant – used to support silt and water separation; and
- Pipe Reactor – mobile water treatment unit.

3.1.3 Prescription 3: Avoidance of Nuisances to animals using the watercourse

See section 3.5

3.2 Objective 2: Maintenance of the proposed LNCS

The 'Crag Woodland' comprises a canopy formed by a range of native and ornamental species including sycamore *Acer pseudoplatanus*, Corsican pine *Pinus nigra*, sitka spruce *Picea sitchensis*, pedunculate oak *Quercus robur*, horse chestnut *Aesculus hippocastanum*, silver birch *Betula pendula* and alder *Alnus glutinosa*. The understorey, where present, comprises smaller growing tree species such as holly *Ilex aquifolium* and rowan *Sorbus aucuparia*, along with patches of rhododendron *Rhododendron ponticum* and bramble *Rubus fruticosus* agg scrub. The ground flora comprises a range of grasses such as brome *Bromus sp*, ferns and patches of bluebells *Hyacinthoides non-scripta*. Wetter areas at the edge of the woodland also contain great reedmace *Typha latifolia*.

The development of the site should ensure that there is no detrimental impact on the Crag Woodland, however, the ecology survey, carried out in 2019, found a disappointing biofauna associated with the woodland. This is thought to have been due to the woodland being fragmented and isolated for the wider rural ecology.

3.2.1 Prescription 1: Tree survey and management plan

A full tree survey should be carried out, prior to construction, to ensure site clearance, building, and site access will not impact on any mature trees and that any other tree removal is kept to an absolute minimum. The boundary of the pLNCS should be respected and minimal development should occur within the area.

Due care must be given to avoid damage to any trees retained within the final development, which includes damage caused by compaction of the root zone. This should be in line with the recommendations in BS5837:2012, Trees in Relation to Design, Demolition and Construction.

If it is the case that tree removal is unavoidable, this should be carried out in consultation with Stirling Council and compensatory mitigation agreed.

3.2.2 Prescription 1: Hedgerows and Scattered Trees

Existing hedgerows on site are largely unmanaged and bushy, which provides some benefit to invertebrates and wildlife. Managing and adding extra hedgerows (particularly connecting the River Forth Banks and Woodland) would enhance faunal migration and improve nest opportunities for birds, increasing invertebrate populations and providing rich foraging for bats.

3.2.3 Prescription 3: Protecting and Enhancing Local Wildlife

There is little in the way of development proposed within this area, other than the regeneration of Craigforth House. For this development, access should be designed to cause as little



disruption as possible and techniques for avoiding disturbance to bats, EPS species, and badgers should be followed, as outlined in Section 3.4.

Inward migration of species, through the provision of wildling corridors (as highlighted in Section 3.3) should be a central feature of the final design and be integrated into the detailed design of the northern part of the Site. Due to the lack of other dense patches of woodland in the area, the most efficient method for improving biodiversity would be improving the connectivity between the river woodland and the River Forth.

3.3 Objective 4: Amenity Spaces Fit for People and Nature (Northern development)

The northern section of the site will form phase 1 of the development and the EIA has carried out an assessment of the detailed design in this area.

Semi-natural habitats present within the northern area of the site comprise lines of standard trees, most notably a group of mature oak trees. An area of rank marshy grassland lies to the northwest of the car park, beyond which lies the River Forth. A small pond lies in the west of the northern section of the site (Target Note 7), however this feature was choked with great reedmace *Typha latifolia* and held little to no standing water at the time of survey.

The proposed development here contains extensive greenspace which can be managed in such a way as to aid water management, as well as provide wildlife sites and corridors.

3.3.1 Prescription 1: Retention of Trees (North Site)

The oak trees in this area are mature and will be host to wide-ranging invertebrate, avian and small mammal species. They may be important with regards to bats. Unless absolutely necessary, these trees should be maintained within the new development. If any tree is to be removed, a bats survey should be completed in line with BCT guidelines¹. As this site is subject to a detailed application, a programme of tree retention and management should be provided, prior to any site activity taking place.

3.3.2 Prescription 2: Creation of Wildflower Habitats

Wildflowers attract pollinators, which are both ecologically and agriculturally important. They also form the basis of a food chain that can support protected species such as bats, red squirrel, and badgers, in addition to a plethora of bird species. Establishment of wildflower meadows in the project's greenspaces would enrich and support the woodland's wildlife and provide an ecological corridor between the pLNCS and the watercourses to the west of the site.

Perennial meadows thrive best on poor, thin soils because the grasses compete less with the wildflowers. If the soil is rich, it is worth removing the top layer and sowing directly into dug or rotovated sub-soil. Soil fertility is typically reduced by removing the topsoil (approximately the upper 20cm) to reveal the subsoil. Alternatively, it is possible to mix subsoils, overburdens, building or quarry waste materials with the topsoil which also reduces fertility. The following ground preparation steps are vital to wildflower growth:

¹ Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition



- For larger areas and where vigorous perennial weeds, such as nettles, docks, and dandelions (which indicate high nutrient content), are present in large numbers, non-chemical control methods may not be effective. In such cases, spraying off existing vegetation (unless it is already species-rich) with non-residual glyphosate weed killers may be the best option;
- Dig or rotovate the soil, then firm and rake to make a seedbed as for a new lawn;
- Don't incorporate manure or fertiliser, as high fertility encourages excessive vigour in grasses that then crowd out the wildflowers;
- Allow four to six weeks for the soil to settle and for any weed seeds to germinate. Spray or hoe these off before sowing;
- On very fertile soils it may be an advantage to remove the topsoil but, for anything other than the smallest area, this requires machinery. An alternative approach (on soils other than clays and those with high organic matter) is to put the land down to oil-seed rape or mustard for a season to reduce fertility, removing the crop at flowering time. A final method that may be utilised is to introduce semi-parasitic plants such as yellow rattle (*Rhinanthus minor*) which will take nutrients from surrounding grasses, reducing their vigour.

Wildflower and grass seed mixes can be hand sown at a rate of 5g per m². These tiny amounts can be difficult to broadcast evenly and therefore mixing with silver sand often means that the seeds are easier to handle. To further ensure that the seed is scattered evenly, sow half lengthways and the remaining half widthways. Rake in lightly, water thoroughly and leave to grow naturally.

The Scotia Seeds (2018) Mavisbank mix (or variation) is a suitable flower mix for the Development site. Additionally, where rapid cover is required, fast growing annuals may be utilised in prior consultation with SNH and GCC.

3.3.3 Prescription 2: Hard Wearing Grassland

The amenity grassland could be a combination of hard-wearing grasses, for recreational activities, or a low maintenance grass that reduces management costs and benefits as well as water vole and badger as a foraging resource.

Typically, the grass mixture will be sown onto bare topsoil, but over-seeding, followed up by regular cutting may also be appropriate. Grassland mixes should be suitable for the conditions present within the development site. At present, it is expected that hard wearing mixes should include the following species:

- 35% Verdi Perennial Ryegrass;
- 35% Platinum Perennial Ryegrass; and
- 30% Herald Strong Creeping Red Fescue.

The sowing rate should be 35 – 50g/m²; Over-seeding: 25 - 50g/m² with the mowing height down to 12mm.

3.3.4 Prescription 3: Low Maintenance Grassland

Low maintenance amenity grassland mixes could consist of the following species:



- 45% Maxima Strong Creeping Red Fescue
- 15% Triana Hard Fescue
- 15% Quatro Sheeps Fescue
- 10% Samanta Slender Creeping Red Fescue
- 10% Crested Dogstail
- 5% Highland Browntop Bentgrass

The sowing rate should be 25 - 50g/m² or 4g/m² when sowing with wild flora; Overseeding: 15 - 25g/m². Mowing height should be down to 20mm or twice/year to approx. 100mm. If left unmown, the height of the grassland would be approximately 150mm-200mm (dependant on fertility).

3.4 Objective 5: Invasive Species Management

Two invasive vascular plant species, listed on Schedule 9 of the Wildlife and Countryside Act, were recorded during the survey visit. Giant hogweed *Heracleum mantegazzianum* was recorded at the western edge of the car park in the central section of the site, along the River Forth, on the western boundary of the site, and in the rank marshy grassland in the northern section of the site. Himalayan balsam *Impatiens glandulifera* was also recorded along the banks of the River Forth.

Both of these species are listed on Schedule 9 of the Wildlife and Countryside Act (1981), which make it an offence to plant them or cause them to grow in the wild.

Dependent on the detailed design, options will exist to either remove or control stands of these species present on site. As a precautionary measure, removal is recommended where stands exist within 10m of proposed new building work.

Where removal is not considered necessary, measures to control these species, using suitable (glyphosate) solutions and applying either through stem injection, or spraying, should also be considered to prevent further spread.

3.5 Objective 6: Protected Species

3.5.1 Prescription 1: Otters and Beaver

There was no evidence of otter or beaver found on site, however they are known to frequent the section of the River Forth that runs parallel with the site. Actions to ensure visiting otters are not harmed or disturbed and to encourage otter onto the site and improve the habitat for them include:

- Pre-construction otter surveys of watercourses and nearby areas of woodland and dense scrub will be undertaken in order to locate any potential otter holts or resting places within 50 m of the works area or 100m of launch sites required for trenchless installation within two weeks of works starting;
- All surveys will be completed in accordance with the methodology described in Bang and Dahlstrøm (2001) and Chanin (2003);



- A report of survey findings and implications for construction, including the potential need for an SNH licence for otters, will be produced by the ECoW and provided to the Developer and Site Manager as soon as practicable;
- If surveys confirm the presence of a previously unidentified otter holt, or resting place, within the survey area, and if it is not practicable to micro-site working areas to include appropriate works-free buffer zones, an SNH development licence for otters will be obtained by the ECoW, prior to the commencement of works in the area.
- An SNH licence would be required for any works that would result in the loss or disturbance of an otter holt or resting place, or significant disturbance or displacement of otters.
- The ECoW will inform the Developer and Site Manager of the need to halt works in the area (i.e. within a 50 m to 100 m buffer zone around the holt or resting place, as described above) until an SNH licence has been obtained;
- A licence will require the contractor to work in accordance with an agreed method statement and works schedule.

3.5.2 Water vole

No sightings of water voles were made on site, however, as pointed out by consultees, the site does offer what would normally be a good habitat for these creatures. The reason for water voles not being found on Site are thought to be the unsuitable profile of the bank along the with relation to this species requirements. Disturbance by the present occupiers of Craigforth may also contribute to the absence of water voles.

However, the site could be a prime site, especially the smaller water courses, such as the drainage ditch that transects the site. As there is the opportunity for water voles to be on the site, water vole surveys of all suitable watercourses will be undertaken in accordance with the survey methodology described in Strachan and Moorhouse (2011).

A report of survey findings and implications for construction will be produced by the ECoW and provided to the Developer and Site Manager as soon as practicable.

If pre-construction surveys identify previously unrecorded water vole activity along watercourses, which will be affected by construction, a detailed method statement will be developed, as required, in order to protect water voles from the direct impacts of construction works. Although development licences for water voles are not typically issued, SNH will be consulted and an NE licence will be obtained prior to the commencement of any licensable works if requested by SNH.

The ECoW will inform the Developer and Site Manager that a works-free buffer zone, of at least 15m (or 50m where trenchless installation is being undertaken) should be established around watercourses supporting water voles until an SNH licence has been obtained.

3.5.3 Prescription 2: Badger

No badger setts were found on site, however there may have been badger activity in the woodland and may be future badger activity on site due to inward migration.



If, in the future, a main or annex badger sett is identified during site clearance, which would be lost or damaged as a result of the development, a badger mitigation strategy will be required.

A badger mitigation strategy typically includes the provision of a new sett, outside the development area, to ensure that the badger clan can persist. Any sett provided would be fenced off in order to protect it from interference by humans and dogs. Monitoring of any artificial sett will be undertaken to determine whether badgers are using it. The results of these surveys will be used to inform any required changes to the EcMP.

The retention of the majority the hedgerow and trees will ensure suitable foraging habitat for badgers is retained on the site, following the completion of the development. This provision of additional hedgerows, which will be managed to maximise the potential for wildlife, will provide additional foraging corridors on the site for badgers. Furthermore, the creation of wildflower grassland on the site within amenity spaces will also provide enhanced habitat for badger foraging.

So additional lighting should be provided outside the application area and sensitive lighting regimes will need to be designed for the construction works on the Craigforth House during that phase of the development.

3.5.4 Prescription 3: Birds

If vegetation clearing activities should be required, during the migratory bird breeding season (March through July), pre-construction breeding bird surveys would be conducted, prior to these activities. A qualified biologist would survey potentially suitable habitat for nesting activity and other evidence of nesting. Were active nests to be located, or other evidence of nesting to be observed, appropriate protection measures, including establishment of buffer areas and constraint periods, would be implemented until the young had fledged and dispersed from the nest area. This measure would minimize potential effects to breeding raptor and migratory bird species, if construction or vegetation clearing activities should be required during the breeding season.

3.5.5 Prescription 4 Bats

Due to the Corona Crisis in 2020, incomplete bat surveys have been carried for the site. Initial bat surveys recorded moderately high usage of the site by common pipestrelle and soprano piperstrelle. Evidence for brown long eared bats has also been discovered.

Detail Bat Roosting Surveys

Now that the country is coming out of the Corona Virus crisis, it is proposed that a series bat roost surveys will be undertaken and that each survey will be accompanied by a bat activity survey. The following surveys have been commissioned and are scheduled to take place. All surveys will be undertaken prior to any construction activities involving the building in question. This includes demolition or modification works. If bats are found to be occupying any building then a species-specific management plan will be agreed with the local authority and SNH to carry out works under licence.



Table 3-1: Bat Activity Surveys

Species/Guild	Level of Bat Potential	Number of Activity Surveys Required	Number of Surveyors Required for Effective Coverage
Gatehouse building	Low	One	Two
Small brick building between Riverside Building and Administration Centre	Low	One	Two
Main/Central buildings	Low	One	Eight
Craigforth House	High	Three	Four
Dining Hall and Conference Centre	Low	Two	Four
Bungalow 1	Low	One	Two
Bungalow 2	Low	One	Two

Bat Management Plans

Those features which are likely to be used by commuting and foraging bats (hedgerows and mature trees) are retained. Management, described in 3.2.2, will ensure their structural integrity, and will maximise their density, flowering and fruiting, therefore encouraging invertebrates, including flying insect prey of bats, such as moths.

The retention of dark, unlit corridors, along the western boundaries, will allow bats to continue to use the River Forth as a major migration corridor. The provision of dark corridors, wild flower planting and hedgerows between the River and the Woodland will encourage Bats to freely move through the site. The planting of additional hedgerows on the application area boundaries will also offer additional foraging and commuting corridors. Furthermore, the proposed changes to the grassland management on the site (3.3) should improve invertebrate diversity and therefore increase available prey for bats.

All trees will need to be surveyed at the northern Site and trees for bat roost potential identified. Any trees with such potential should be retained. If their loss is unavoidable, any bat must be relocated by a licenced bat specialist. Suitable compensatory storage will need to be provided.

Some bats species, such as common and soprano pipistrelle and possibly brown long-eared (*Plecotus auritus*) bats may forage over new gardens and could roost in new buildings. In order to provide additional roosting opportunities for bats, eight bat boxes, including Schwegler 2F DFP and 1FD, will be attached on retained mature trees with four proprietary bat bricks on new buildings (such as Schwegler 1FR) fronting on to suitable habitats (siting to be agreed with ECoW). The exact locations of these should be agreed by a bat specialist in consultation with the local authority.



They will be installed at least 4m above ground level on trees, or as close to the eaves as possible, or at the gables, on new buildings, to provide a variety of environmental conditions to be used at different temperatures and in different weather conditions, *i.e.* located facing between south-west to south-east, in clusters and away from direct lighting.

Bat boxes will be left undisturbed, unless damaged to the extent that it is obvious that no bats are roosting within them (*i.e.* large holes allowing the inside of the box to be viewed from the ground). These will be monitored at least every two years, from implementation of the EcMP by appropriate bat licence holders (from the local bat group, for instance), with any bat roost records provided to the local biological records centre. In the event that bat boxes are not used after three years, then they will be moved to other trees by the local bat group.

Bat bricks and tiles should be incorporated into the design of the new buildings on site to enhance roosting opportunities for this group. The design will also minimise artificial light spill at any new roost features. Furthermore, the incorporation of linear green connectivity routes for fossorial water vole, discussed above, will provide additional navigational pathways and foraging resource for this group.

4 Monitoring

With any Ecological Management Plan, monitoring is the vital measure of success. Where this plan is to be incorporated, monitoring should be completed in Years 1, 3 and 5 after implementation to track success and provide recommendations for improvement, where necessary.

The pre-construction Ecological Management Plan for each stage of the development should identify targets and a monitoring regime for each stage of works.

Surveys for informing and monitoring a management plan have different calendar constraints and these are illustrated in Table 2.



Table 2: Optimal Periods for Survey Works

Works description	jan	Feb	March	April	May	June	July	August	Sept-	Oct	Nov	Decr
Pre-construction survey for breeding birds.												
Pre-construction daytime survey of trees for potential bat roosts												
Pre-construction emergence/re-entry bat roost survey of trees.												
Installation of bat boxes.	Summer roost	Summer roost	Hiber-nation	Hiber-nation	Hiber-nation	Hiber-nation	Hiber-nation	Hiber-nation	Hiber-nation	Summer roost	Summer roost	Summer roost
Pre-construction survey for badgers – sett locations												
Pre-construction survey for badgers – badger activity.												
Pre-construction survey for otter activity.												
Pre-construction survey for water vole burrows.												
Pre-construction survey for signs of water vole activity.												
Up-rooting of vegetation or clearance of materials (e.g. piles of rubble) of potential value to hibernating reptiles.												
Above ground habitat management to deter reptiles.												

1



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