Gloucestershire Wildlife Trust

Gloucestershire Wildlife Trust A417 Missing Link: TR010056 Response to ExA Q1

December 2021

Reference: GWT TR010056 – Response to ExQ1

Interested party number: 20028970

Contents

1. GWT response to the Examining Authority's Written Questions (ExQ1)

1.1. ExQ1 1.3.1: Biodiversity metric

3.1.1 GWT concurs that the full metric calculations should be presented. The net change in biodiversity units is a much better reflection of biodiversity impacts than area of habitat alone. Ideally the calculations should be made using version 3.0 of the Defra metric.

3.1.2 GWT wishes to highlight that providing additional biodiversity units is not the only benefit of reverting the Barrow Wake car park to calcareous grassland. This would also buffer and potentially expand a SSSI, improve the condition of a SSSI and strengthen the NRN.

3.1.3 GWT would be willing to discuss incorporating management of the created habitat at Barrow Wake into that of its landholdings.

1.2. ExQ1 1.3.2: Biodiversity Net gain

3.2.1 GWT has suggested factors that should be considered in securing the newly establish habitat its full representation (2.17) and in its responses to ExQ1 (3.5)

1.3. ExQ1 1.3.4 (a): Calcareous grassland question

Chapter 15 of the ES [APP-046] purports to provide a gain of 72.5 hectares of calcareous grassland habitat. Is this expected delivery robust and is there evidence to suggest the full quantum stated would be successfully delivered?

3.3.1 GWT believes that there is insufficient evidence in the LEMP to expect 100% success in creating 72.5 ha of calcareous grassland habitat.

3.3.2 The DCO documents, particularly the LEMP, do not detail the precise mechanism of habitat creation or management or the duration of ongoing management. This information is critical because creating calcareous grassland habitat is not straightforward. In some cases, calcareous grassland creation achieved plant assemblages resembling the target ones within two years [1] but in other examples this took nine years [2].

3.3.3 It will take several decades or centuries for newly created grassland to fully resemble species-rich ancient grassland [3,4] because specialist plants, which are better indicators of success [5], often take a long time to appear.

3.3.4 A study of road scheme habitat creation goals found that only 33% were fully or mostly achieved [6]. With careful design and management the A417 scheme can exceed this but it must account for the range of factors that affect success [7,8], particularly long-term management.

1.4. GWT recommendations for additional information

GWT recommends that the following additional information is produced to assess this question adequately

- GWT supports the commitment to using a local provenance seed mix because characteristic calcareous grassland species may not be persistent in the seed bank [9]. However, the application should specify where the seed will be obtained from and demonstrate that sufficient quantity will be available.

- Specify the seed sowing rates because this influences the likelihood of success [1].

- An assessment of the suitability of habitat creation sites, including factors that have a strong influence on success rates, such as soil pH and fertility [3].

1.5. GWT recommendations for the LEMP

Based on the information currently available, GWT recommends that the LEMP should include the following information and approaches**.**

- Specify whether a cutting or grazing management regime will be adopted. If this varies across the scheme, produce a map denoting different management regimes.

- Wherever possible manage the habitat through conservation grazing. GWT considers this to be the most beneficial approach for this habitat type, creating a more naturalistic and varied habitat mosaic.

- Follow an adaptive management system, integrating ecological monitoring and climatic variation information.

- Clarify who is responsible for delivering long-term management and how will it be funded. If livestock are required, where will the infrastructure for this be located and how will long-term livestock management be resourced.

- Clarify the target National Vegetation Classification (NVC) community and set a specific monitoring methodology based on this. This should include species evenness and appropriate indicators species, in addition to the measures already suggested.

- Based on ecological monitoring data, set appropriate thresholds where remediation work will be activated if progress towards the target communities is inadequate.

- Provide a clear description of remediation actions, when these will be triggered, who is responsible for delivering them and how this work will be funded.

- Detail the governance process that will ensure that effective monitoring, management, review, remediation, and funding are in place. Including good practice control procedures that have been developed to improve the success rate of compensation measures [6].

- Detail the process for considering and agreeing alternative habitat enhancements in the event of long-term repeated failure to establish calcareous grassland in one area. This should include recalculation of biodiversity units with a plan for delivering any shortfall.

1.6. ExQ1 1.3.4 (b): Calcareous grassland

With reference to paragraph 2.8.48 of Chapter 2 to the ES [APP-033], is the creation of calcareous grassland possible on a bridge?

3.6.1 GWT believes that it is possible to create calcareous grassland on the 'multiple-use overpass' design proposed for the Gloucestershire Way crossing. A Natural England Literature Review [10] cites one example - the A67 Ecoduct which aimed to create species rich grassland and the ecological monitoring data from this structure would be a useful case study. The review refers to several examples of large green bridges in the Netherlands, which demonstrates that grassland can be successfully established and maintained on bridges.

3.6.2 Existing examples of green bridges are mostly designed as mammal crossings rather than providing connectivity for species rich calcareous grassland and associated invertebrates, which is a primary goal for the Gloucestershire Way crossing. Examples relevant to calcareous grassland creation are

- The Weymouth Relief Road, which created 4.4 ha of new chalk grassland cuttings [11]
- The HS2 Chilterns Enhancement and Integration Plan (CEIP, which contains Detailed Design Principles for the creation of chalk grassland on engineered rail structures [12]
- The creation of calcareous grassland on green roofs [13].

3.6.3 GWT staff have observed calcareous grassland plants colonising and persisting on road verges where the substrate and management are both suitable. The most important factors in establishing species-rich calcareous grassland are sowing rates, soil pH, fertility, ongoing management and time [1,3,7,14,15]. Guided by this, it should be entirely possible to design the bridge with suitable physical conditions for species-rich calcareous grassland.

3.6.4 The most difficult factor to design on an artificial structure is suitable drainage. Ancient species-rich calcareous grasslands sit on land that drains quickly due to its geology. If the bridge drainage is too slow it will not provide good conditions for calcareous grassland, however, if it drains too quickly some vegetation may not survive periods of drought. Despite this challenge, GWT believes that it is possible to achieve a suitable drainage system on the bridge.

1.7. GWT recommendations to increase the likelihood of success

3.7.1 As stated in previous answers, created species-rich calcareous grassland can take decades or over a century to fully reflect the expected assemblages of plants. The LEMP refers to management of habitats on the bridge (4.3Ixiii) but needs to provide more detail on monitoring protocols, target condition and what management inteventions will be used.

3.7.2 The following actions to increase the likelihood of successfully establishing calcareous grassland on the Gloucestershire Way Bridge.

- The bridge design creates a low fertility substrate based on the geology of the surrounding land, with minimal phosphorus levels and an appropriate pH.

- A suitable drainage system is designed to provide the well-drained conditions that are required by CG5 grassland.

- Detailed design should draw knowledge from similar structures on other schemes, such as the A303.

- Information is provided on seed sourcing and sowing rates.

- The LEMP includes an adaptive management plan ideally in perpetuity, but as a minimum 30 years.

- Grassland on the bridge is managed through conservation grazing, which creates habitat that supports greater biodiversity than hay cutting.

- The LEMP defines the target condition, with named ecological indicators and protocols for monitoring progress.

- The LEMP describes remediation plans and the processes by which they will be triggered and delivered.

1.8. ExQ1 1.3.4 (c): Calcareous grassland question

Would the habitat be able to survive with potential nitrogen deposition and air pollutants emanating from the road below, given the summary in paragraph 8.8.8 of ES Chapter 8 [APP-039]?

3.8.1 Airborne nitrogen deposition and other pollutants have an adverse effect on species rich calcareous grassland. Excess NOx reduces the diversity of plants [16], with the largest effect on rare specialist plants [17].

3.8.2 With the information currently available it is not possible to say whether the target species-rich calcareous grassland (CG5) can survive on the Gloucestershire Way crossing given the potential impacts of NOx and other airborne pollutants.

3.8.3 Observational evidence indicates that some calcareous grassland plants can survive existing levels of nitrogen deposition along the A417. An area of roadside verge adjacent to the Barrow Wake SSSI (Grid Reference 393283,215557) supports several specialist calcareous grassland species such as Musk Orchid (*Herminium monorchis*). It does not however, support the full range of species that would be expected of CG5 grassland in favourable condition.

3.8.4 To assess whether calcareous grassland habitat of sufficient quality can survive airborne pollution levels on the Gloucestershire Way crossing, further information is required regarding critical loads of NOx and other airborne pollutants that can adversely impact this habitat, such as heavy metals [18]. This should consider both short-term and long-term exceedance of critical loads because airborne pollutants may inhibit vital seasonal-specific processes such as pollination[19].

3.8.5 If NOx levels on the Gloucestershire Way crossing regularly exceed the critical load by >1% then the impact of this on the ecological functions of the crossing need to be assessed.

3.8.6 It may not be realistic to expect the calcareous grassland habitat on the bridge to achieve a SSSI level of plant and invertebrate diversity. The applicant needs to

demonstrate that airborne pollution does not impede the ability of Gloucestershire Way Crossing to support CG5 grassland and function as a corridor for species associated with this habitat. Evidence to support this, and any mitigation that will enable success, is not currently available.

1.9. GWT recommendations for additional information

GWT recommends that the following additional information is produced to assess this question adequately

- Annual and monthly breakdowns of anticipated NOx critical loads affecting the Gloucestershire Way crossing during operation.
- An assessment of whether NOx levels at the Gloucestershire Way crossing will exceed 1% of the critical loads for calcareous grassland habitat from construction to full establishment of the habitat (30-100 years). This should include any cumulative or in-combination effects with other sources of nitrogen or airborne pollutants.
- Set the NOx critical load threshold using the figure for the Crickley Hill and Barrow Wake Site of Special Scientific Interest (SSSI). In the absence of this, 15 kg N/ha/yr should be used, following Chartered Institute of Ecology and Environmental Management (CIEEM) guidance [20].
- Detail what mitigation will be provided if NOx levels are projected to exceed the critical load by >1%, either directly or via cumulative/in combination effects. This should consider the benefits of grazing [16] and mitigation covered in the CIEEM guidance [20].
- Given the projected NOx levels, assess the likelihood of establishing calcareous grassland with sufficient diversity and structure to function as a corridor connecting the two units of the Barrow Wake and Crickley Hill SSSI.

1.10. GWT recommendations for the LEMP

Based on the information currently available, GWT recommends that the LEMP should take the following approach

- Monitor the impact of NOx on calcareous grassland creation at the crossing. This should use calcareous grassland indicators plants and insects rather than general measures of biodiversity, because NOx deposition can increase the number of non-target species that are not appropriate indicators of success [21].

1.11. ExQ1 1.3.5 (a): Wildlife crossings question

What evidence is there to demonstrate the success/ effectiveness of wildlife crossings, such as the one proposed here for the Gloucestershire Way, from other road schemes?

3.11.1 There are multiple examples demonstrating that similar wildlife crossings are effective for terrestrial mammals such as badgers and deer [10,22].

3.11.2 Underpass crossings can be effective for bats if they remain unlit [23]. The Conservation Evidence Institute concluded that bat overpasses were likely to be

beneficial if they were vegetated [24]. However, in some cases they do not fully restore the reduced habitat connectivity caused by roads [25].

3.11.3 Roads can be significant barriers to insects, increasing mortality [26] fragmenting populations [27,28] and inhibiting pollination [29]. As discussed in the response to question 1.3.4 there are few examples of wildlife crossings that connect species rich grasslands. As a result, less is known about the efficacy of the proposed crossing designs for less mobile species, such as the rare and threatened insect assemblages associated with the Crickley Hill and Barrow Wake SSSI.

3.11.4 The Gloucestershire Way crossing needs to function as an ecological corridor for species associated with calcareous grassland. The design should draw on studies that indicate the minimum criteria for functioning insect corridors. The effectiveness of a corridor largely depends on its size, distance to the nearest connecting patch and the mobility of the target species. A minimum width of 25 m of habitat should be sufficient to connect patches 150m apart for butterflies, as long as the total patch area is more than 1.5 ha [30,31].

3.11.5 Other factors that may influence connectivity for insects are airborne pollution, [28] and wind turbulence. The high parapets included in the current proposals should help to mitigate the impact of wind turbulence.

1.12. GWT recommendations for additional information

GWT recommends that the following additional information is produced to assess this question adequately

- Information on the size of habitat patches, the distances between them and the likelihood of the bridge providing functional connectivity for indicator insects of calcareous grassland assemblages in this area.

- An assessment of projected airborne pollution and wind turbulence on the Gloucestershire Way crossing and whether this creates a barrier to insect or bat movements.

1.13. GWT recommendations for the LEMP

Based on the information currently available, GWT recommends that the LEMP should take the following approach

- Long-term monitoring of bat populations to ensure that the crossing has mitigated the anticipated fragmentation of habitat.

- Long-term monitoring of indicator insects of calcareous grassland assemblages to ensure that the crossing has mitigated the anticipated fragmentation of habitat.

1.14. ExQ1 1.3.5. (b): Wildlife crossings question

Is it a robust solution to protect or provide for biodiversity in this manner?

3.14.1 GWT strongly supports the proposal for a large green bridge at the Gloucestershire Way crossing. This can be a robust solution to mitigating the increased fragmentation caused by widening the road.

3.14.2 To achieve this, it must be combined with the creation of suitable habitat corridors/steppingstones connecting the crossing to two units of the Barrow Wake and Crickley Hill SSSI. This will also prevent further fragmentation of a strategically important north-south corridor in the NRN. Without the green bridge the fragmentation would have much wider consequences for the NRN connectivity, limiting some species' ability to adapt their ranges to climate change.

3.14.3 It is important to note that the green bridge will not provide functional connectivity until habitat of sufficient quality is established, so the fragmentation will remain unmitigated until that point.

3.14.4 Any change to the current design proposals, such as de-segregating access routes from the wildlife habitat, may adversely impact the robustness of this measure.

1.15. ExQ1 1.3.7: Ancient woodland protection

GWT supports an increase in the buffer around the ancient woodland at Ullenwood if this will reduce the area of ancient woodland that is adversely impacted by NoX.

1.16. ExQ1 1.3.9: Emma's Grove - Ancient woodland

Over the development period of the road scheme GWT has received conflicting reports from the applicant regarding the habitat at Emma's Grove. The status remains unclear, so GWT reserves comment until this information is available. Should the site meet ancient woodland criteria then removal would represent a further major, adverse impact on irreplaceable habitat.

1.17. ExQ1 1.3.14: Barrow Wake Car Park

3.17.1 GWT is a key stakeholder in this discussion. GWT owns the surrounding land and deals with many of the consequences of anti-social behaviour. The NT should also be a stakeholder as they have a Farm Business Tenancy on GWT's land. The operations of both GWT and NT are directly affected by the issues associated with the car park.

3.17.2 As stated in GWT's full written representation there are multiple biodiversity benefits to closing the car park (see section 2.6). GWT considers these benefits to be of national importance whereas the recreational benefits are of local importance.

3.17.3 It is important that people can continue to access the landscape and experience nature, but wherever possible visitors must be drawn away from designated sites that are been degraded by excessive recreational pressure. New accessible nature-rich green spaces should be created, with design informed by a visitor insight survey.

1.18. ExQ1 1.3.15: SAMM for Crickley Hill and Barrow Wake SSSI

3.18.1 GWT and the NT should be consulted because they jointly own and manage Crickley Hill. GWT owns Barrow Wake, and the NT is involved in management through a Farm Business Tenancy.

3.18.2 GWT's understanding is that a SAMM aims to manage adverse recreational pressure and would be informed by updated visitor surveys.

3.18.3 GWT supports the proposal of a SAMM but believes that on-site measures alone are not sufficient to mitigate increased recreational pressure resulting from the scheme. There is a need to draw visitor pressure away from the SSSI to alternative nature-rich

green spaces where people can have a suitable experience. GWT does not believe that the Air Balloon Way will provide this but is happy to discuss potential solutions.

3.18.4 As the cumulative impact assessment concluded no adverse impacts on the Crickley Hill and Barrow Wake SSSI during operation, the full cost of the SAMM should be borne by the scheme. GWT does however, disagree with the conclusion of the cumulative assessment (2.12), which might mean that cost of delivering a SAMM could be shared between developments.

1.19. ExQ1 1.3.23 (a): Edge habitat

Is a 2m buffer between works compounds and hedgerows sufficient to maintain 'edge habitat' for wildlife as stated in ES Chapter 8 paragraph 8.9.47?

3.19.1 It may not maintain sufficient edge habitat in all circumstances. For example, edge habitat is often used by foraging birds of prey, such as barn owls (*Tyto alba*) and current Government agricultural payment schemes (Countryside Stewardship) recommend minimum buffer strips of 4-6 m for barn owls.

1.20. GWT recommendations for the LEMP

Based on the information currently available, GWT recommends that the LEMP should take the following approach

- The buffer is increased to a minimum of 4m to align with the requirements of the Government's emerging Sustainable Farming Incentive

1.21. ExQ1 1.3.23 (b): Edge habitat

Should this separation distance be wider to avoid noise, vibration, dust and disturbance through human activity?

3.21.1 This depends on the activities that would be conducted close to the perimeter of the compound. The actual buffer should not be considered as 2m but the distance from the hedgerow and edge habitat to the nearest activity that causes an adverse impact.

3.21.2 GWT understands that the 2m minimum buffer is based on the cross-compliance guidance designed to protect hedgerows from agricultural activities. This is a sensible starting place, but some road construction activities will have different impacts compared to agricultural activities and may require a larger buffer. GWT has particular concerns about particulate deposition [32] and noise/vibration[33] on hedgerows and the species that use them.

1.22. GWT recommendations for the LEMP

Based on the information currently available, GWT recommends that the LEMP should take the following approach

- Compounds have a bespoke buffer plans according to the uses of the compound, the topography of the land and the biodiversity value of the adjacent hedgerow. Potentially adverse activities should be located where the impact would be minimized.

- Larger buffers should be provided for important hedgerows and those that may support breeding populations of red listed birds.

1.23. ExQ1 1.3.37: Nature Recovery Network

With reference to your Relevant Representation provide a high-level summary of what the Nature Recovery Network comprises and what its objectives are. How important are the identified nature reserves to the overall integrity of the network?

3.23.1 The Gloucestershire NRN was produced by Gloucestershire Wildlife Trust and has been adopted by the Gloucestershire Local Nature Partnership, which includes all local authorities, statutory agencies and eNGOs.

3.23.2 The Gloucestershire NRN is a countywide map that combines three ecological networks: open habitats, woodland habitats and wetland habitats. An arable network is due to be added in 2022 and the maps will be updated as new habitat information becomes available. At present, the NRN is the most comprehensive representation of Gloucestershire's ecological networks.

3.23.3 The NRN identifies land that forms core areas of importance due to the habitats present there. Core areas largely consist of designated biodiversity sites and known areas of national priority habitat. The NRN shows connectivity between these core areas, their viability, resilience to fragmentation and prioritised zones for nature's recovery.

3.23.4 The objectives of the Nature Recovery Network (NRN) are largely defined by legislation and Government policy. The Government's 25 Year Environment Plan (25 YEP) committed to developing Nature Recovery Networks "to protect and restore wildlife, and provide opportunities to re-introduce species that we have lost from our countryside" [34]. These networks will "complement and connect the best wildlife sites, and provide opportunities for species conservation", which includes "more effectively linking existing protected sites and landscape"'.

3.23.5 The Government's 25 Year Environment Plan made the following NRN commitments that are relevant to A417 scheme.

- Roll out a Nature Recovery Network which will provide an additional 500,000 hectares of wildlife habitat.
- Consider how landscape scale restoration of wildflower rich grassland could be part of the Nature Recovery Network to provide better access for people alongside improved habitat for pollinating insects.
- Consider delivery options for the Nature Recovery Network and investigate the use of other new and innovative funding mechanisms.

3.23.6 The NRN will function as the habitat map that is required to guide the objectives of the Local Nature Recovery Strategy (LNRS), which is a new flagship mandatory duty introduced by The Environment Act 2021 (Part 6: 105 and 106).

3.23.7 Crickley Hill/ Barrow Wake SSSI and Ullenwood Local Wildlife Site are both core areas of the NRN. Core areas have the highest level of importance and reducing their size, condition or connectivity can have a significant impact on the integrity of ecological networks [35,36] .

3.23.8 Because the NRN is an ecological network [37] it is not necessarily aligned with land parcel boundaries or restricted to designated sites. Therefore, reference to the NRN maps is essential to identify the status of any land affected.

3.24 Ex1 1.4.23: Replacement Common Land

Paragraph 12.10.41 in reference to the replacement common land repurposed from the A417 states it is to be planted as Calcareous Grassland Habitat, in co-ordination with Gloucestershire Wildlife Trust, who would become owner of the replacement land. Is there a written agreement or obligation to this effect and, if so, can it be provided?

3.24.1 Gloucestershire Wildlife Trust supports the principle of the replacement common land being used to buffer the Barrow Wake unit of the SSSI and would be interested in becoming the owner of this land.

3.24.2 At present there is no written agreement in place because National Highways has only recently engaged GWT's land agent.

3.24.3 One point for clarification is whether there is overlap between the proposed replacement common land, and land already under GWT ownership. Based on the maps provided in the DCO submission (chapter 2.3, sheets 2 and 3), GWT cannot confidently answer this question, however, they appear to show an overlap.

3.25 ExQ1 1.8.8: Compliance with NPSNN

Notwithstanding any disputes over landscaping and the effectiveness thereof, what are the parties' views of how the Proposed Development complies with the National Policy Statement for National Networks specifically in regard to development within an AONB?

3.25.1 GWT will not comment on compliance with matters other than biodiversity, as this would fall outside of the Trust's charitable remit and expertise.

3.25.2 GWT acknowledges the need for the road scheme and has been consistent in this position throughout its engagement. GWT also accepts that there has been sufficient scoping of alternative options, although it is disappointing that options that would have caused significantly less adverse impacts on biodiversity were ruled out on budgetary grounds.

3.25.3 GWT has not carried out a holistic cost benefit analysis to assess whether the scheme is in the public interest. If this is not already available, then one should be provided by the applicant.

3.25.4 GWT objects to the summary assessment of likely significant effects on biodiversity (Environmental Statement, Table 16-1). The Trust believes that this underestimates the adverse effects for reasons detailed in its full representation. The Trust's view is that the scheme's overall impact on biodiversity is likely to be moderate, adverse with large significance.

3.25.5 GWT supports the shared landscape vision, design principles, objectives and sub-objectives of the scheme, but questions whether the scheme is currently falling short of these due to the scale of adverse impacts on biodiversity.

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3. Glossary

Nature Recovery Network: A countywide map that combines three ecological networks: open habitats, woodland habitats and wetland habitats. The most comprehensive representation of Gloucestershire's ecological networks. It identifies land that forms core areas of importance, connectivity between these core areas, their resilience to fragmentation and prioritised zones for nature's recovery.

Biodiversity Net Gain – A net increase in biodiversity units as calculated using the latest version of the Defra Biodiversity Metric (currently 3.0). The minimum mandatory gain set by the Environment Act for new NSIPS is 10%.