Written Submissions
for
The Royal Society for the Protection of Birds

7 February 2017

The M4 Motorway (Junction 23 (East of Magor) to West of Junction 29 (Castleton) and Connecting Roads) and the M48 Motorway (Junction 23 (East of Magor) Connecting Road) Scheme 201-

The M4 Motorway (Junction 23 (East of Magor) to West of Junction 29 (Castleton) and Connecting Roads) and the M48 Motorway (Junction 23 (East of Magor) Connecting Road) (Supplementary) Scheme 201-

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The Welsh Ministers (The M4 Motorway (Junction 23 (East of Magor) to West of Junction 29 (Castleton) and Connecting Roads) and the M48 Motorway (Junction 23 (East of Magor) Connecting Road) and the London to Fishguard Trunk Road (East of Magor to Castleton)) Compulsory Purchase Order 201-

The Welsh Ministers (The M4 Motorway (Junction 23 (East of Magor) to West of Junction 29 (Castleton) and Connecting Roads) and the M48 Motorway (Junction 23 (East of Magor) Connecting Road) and the London to Fishguard Trunk Road (East of Magor to Castleton)) Supplementary Compulsory Purchase Order 201-

Objector Number: OBJ0030

rspb yn rhoi cartref i fyd natur giving nature a home

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1. Introduction

1.1 This document sets out the RSPB's position in relation to the proposed orders ("the orders") promoted to facilitate the M4 Corridor around Newport ("M4CaN"). It expands upon various areas set out in our objection letter to the draft orders of 4 May 2016 ("the objection letter"). Insofar as this document does not expand upon the objection letter the points contained within that letter stand. For the avoidance of doubt, the RSPB maintains its objection to the M4CaN.

The RSPB

1.2 The Royal Society for the Protection of Birds (the RSPB) was set up in 1889. It is a registered charity incorporated by Royal Charter and is Europe's largest wildlife conservation organisation, with a membership of more than 1.18 million[1], of which 54,194 live in Wales. The RSPB owns or manages 151,954 hectares of land for nature conservation on 213 nature reserves throughout the UK, of which 16,172 hectares is on 18 nature reserves in Wales, including the Newport Wetlands Centre on the Gwent Levels.

1.3 The principal objective of the RSPB is the conservation of wild birds and their habitats. The RSPB therefore attaches great importance to all international, EU and national law, policy and guidance that assist in the attainment of this objective. It campaigns throughout the UK and in international fora for the development, strengthening and enforcement of such law and policy. In so doing, it also plays an active role in the domestic processes by which development plans and proposals are scrutinised and considered, offering ornithological and other wider environmental expertise. This includes making representations to, and appearing at, public inquiries and hearings during the examination of applications for development consents.

The RSPB's interest in the Gwent Levels

1.4 The RSPB has long-standing concerns about the ongoing, progressive damage and loss of habitat on the Gwent Levels. Consequently, the RSPB has engaged in planning casework around the Gwent Levels for more than twenty years.

1.5 The RSPB has opposed proposals to route the M4 through the Gwent Levels since they were first put forward in the early 1990s because of the significant harm it would cause to the nationally important wildlife of this area.

1.6 The RSPB has managed the visitor and education centre at the Newport Wetlands since it opened in 2008. The centre is leased from Natural Resources Wales who own and manage the overall site. The Newport Wetlands were created as one part of the compensation required for the losses to the Taff/Ely Site of Special Scientific Interest (SSSI) as a result of the construction of the Cardiff Bay Barrage Scheme.

The M4CaN

1.7 The M4CaN is a new section of three lane motorway approximately 23 km in length, running between junctions 29 and 23 of the existing M4. This route takes it through the Gwent Levels,

[1] RSPB Annual Review 2015-2016: https://ww2.rspb.org.uk/whatwedo/annualreview/howyourehelpingusdomorefornature/

and involves direct land take from 4 of the Sites of Special Scientific Interest (SSSI) that lie within the Gwent Levels:

- Gwent Levels – Nash & Goldcliff
- Gwent Levels – Whitson
- Gwent Levels – St Brides
- Gwent Levels – Redwick & Llandevenny

1.8 The route also crosses the River Usk (Lower Usk) SSSI and the River Usk Special Area of Conservation (SAC). The RSPB highlighted its concerns about the likely impacts on these sites as part of its objection letter in May 2016. We do not propose to repeat those concerns here, but they can be found in paras 113 to 117 of the Annex to our objection.

1.9 In this response the RSPB focuses upon the impact on the four Gwent Levels SSSIs ("the Gwent Levels SSSIs").

1.10 The Gwent Levels SSSIs share the following features:

- Reen and ditch habitat
- Insects and other invertebrates
- Shrill Carder bee, for which the Gwent Levels are an acknowledged UK stronghold

1.11 In addition to the above features, there are specific plant and invertebrate interests within the individual SSSIs.

1.12 The RSPB note and are disappointed that the Environmental Statement (ES) does not describe the current condition assessment of these or any other designated sites considered in the ES. Natural Resources Wales (NRW) has yet to provide a formal condition assessment for the Gwent Levels SSSIs. The RSPB understands that a rapid assessment of the SSSI features (which concluded that the SSSIs were in unfavourable/unclassified condition due to lack of appropriate management) has been superseded by a full baseline survey undertaken by the Countryside Council for Wales between 2010-2012. This document was provided to the RSPB in 2016, and the RSPB notes that this is a draft document.

1.13 However, the draft report appears to indicate that the standing water feature (reens and ditches) of the Gwent Levels SSSIs, as well as the Magor and Undy SSSI and the Newport Wetlands SSSIs are unfavourable, with the main causes being:

- Lack of in channel submerged vegetation;
- Over dominance of tall vegetation; and
- Lack of bare ground/poaching across the SSSIs.

1.14 The condition of the standing water features in the Newport Wetlands SSSI is of particular interest as some of the reen features in this SSSI were created as part of the establishment of the Newport Wetlands reserve in the 1990s. As we set out below, this is relevant with regard to SSSI management measures promoted in the ES as "mitigation" and to the likely success or otherwise of the proposed reen creation (compensation) measures.

1.15 The ES fails to acknowledge the apparent unfavourable condition of the various Gwent Levels SSSIs, the remedy to which is identified as a key challenge in the Natural Resources Policy Statement published by the Welsh Government in autumn 2015 (see paragraph 2.44 below in relation to the Environment (Wales) Act 2016). We strongly recommend that a formal condition assessment of all impacted designated sites is obtained from NRW as this is a key element in understanding the baseline condition of those sites *without* the proposed M4CaN and the current need, regardless of the M4CaN, for the implementation of appropriate management to remedy their unfavourable condition. This would enable such remedies to be distinguished from the "mitigation" measures.

1.16 Two of the sites, Gwent Levels – Nash and Goldcliff SSSI and Gwent Levels – Whitson SSSI, formerly held important ornithological features, until boundary amendments in 2010 transferred parts of the SSSIs to the Newport Wetlands SSSI (see ES Appendix S10.2, Annexes B and C). However, it is important to note that the transfer of these ornithological features did not lead to the de-designation of these sites, because they are still special for other nature conservation features.

This document

1.17 This document sets out the RSPB's submissions in relation to law, national policy, and the likely ecological impacts of the proposed M4 Corridor around Newport ("M4CaN") scheme. It develops many of the points raised in the RSPB's objection letter of May 2016 ("our objection letter"). Insofar as we do not repeat points here that we raised in our objection letter we stand by them now, but have no further points to add.

1.18 **Section 2** deals with law and policy issues that have implications for the decision.

1.19 **Section 3** deals with the impacts of the M4CaN on birds.

1.20 **Section 4** deals with the impacts of the M4CaN on bumblebees. This section has been prepared for the RSPB by the Bumblebee Conservation Trust (BBCT).

1.21 **Section 5** considers the mitigation needs for the above species, and evaluates the likely effectiveness of the three mitigation sites that have been proposed as part of the M4CaN.

1.22 **Section 6** sets out the RSPB's overall conclusions on the M4CaN.

2. Law and Policy

The law

2.1 Welsh Ministers must comply with a number of legal duties when deciding whether to approve the M4 Corridor around Newport (M4CaN) scheme. The RSPB focuses on the ones most pertinent to the nature conservation case.

The Wildlife and Countryside Act 1981 (as amended)

2.2 Sites of Special Scientific Interest (SSSIs) are the most important sites for national wildlife and national features in Wales. The Countryside and Rights of Way Act 2000 strengthened the Wildlife and Countryside Act 1981 (WCA) with respect to the legal protection of SSSIs. Specifically, with respect to development it altered the duty on Section 28G authorities (which includes the Welsh Government) from a requirement to 'minimise impacts and mitigate for any loss/damage' to one to 'conserve and enhance'. This is of particular relevance to the Gwent Levels SSSIs.

2.3 The purpose of SSSIs was defined by the Countryside Council for Wales as being:

> "... to safeguard, for present and future generations, the quality, diversity and geographic range of habitats, species, geological features throughout Wales ..."[2]

2.4 SSSIs make a fundamental contribution to the ecological processes upon which we all depend and to human quality of life. Individual SSSIs may also provide, or safeguard for the future, valuable research, educational and amenity resources.

2.5 Under Section 28G(2) of the WCA, public bodies, including the Welsh Government, must:

> "... take reasonable steps, consistent with the proper exercise of the authority's functions, to further the conservation and enhancement of the flora, fauna or geological or physiographical features by reason of which the site is of special scientific interest".

2.6 It is RSPB Cymru's opinion that granting permission would not comply with this duty as the M4CaN, in its current form, would permanently damage the Gwent Levels SSSIs and their notified features. The proposed scheme would involve direct land take from 4 SSSIs, and despite the "mitigation"[3] proposed the sites would experience permanent severance of their northern and southern parts. We contend that this would be directly contrary to fulfilling the duty to conserve and enhance these sites (as required under the Wildlife and Countryside Act, noted above).

The Conservation of Habitats and Species Regulations 2010 (as amended)

2.7 The Conservation of Habitats and Species Regulations 2010 (as amended) ("the Habitats Regulations") set out key duties in relation to the protection of bird species. Regulation 9(3)

[2] Countryside Council for Wales (2006) *Sites of Special Scientific Interest (SSSIs) in Wales. Current state of knowledge Report for April 2005-March 2006.*

[3] The RSPB disagrees with the description of these measures as "mitigation", considering that they are more properly understood and termed as "compensation". We made this point in our May 2016 objection letter at paras 77 to 79, and return to this point at para 2.88 below.

requires a competent authority to "have regard to the requirements of the Directives so far as they may be affected by the exercise" of their functions[4]. Birds listed in Annex I of the Birds Directive (2009/147/EC) are to "be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution."[5] Outside of designated protection areas "Member States shall also strive to avoid pollution or deterioration of habitats."[6]. Common crane is an Annex I species which bred on the Gwent Levels in 2016, and whose habitat would be destroyed by the proposed route. We return to the implications of this point in para 3.22 below.

The Well-being of Future Generations (Wales) Act 2016

2.8 The passing of the Well-being of Future Generations (Wales) Act 2015 ("the WFG Act") provided new legislation of which the Welsh Government and the National Assembly are rightly proud. In the Welsh Government's own words, the Act will help us to create a Wales that we all want to live in, now and in the future. The WFG Act has been praised as world-leading:

> "The Wales Future Generations Act captures the spirit and essence of two decades of United Nations work in the area of sustainable development and serves as a model for other regions and countries. 'One Wales, One Planet' captures it all. We hope that what Wales is doing today the world will do tomorrow. ***Action, more than words, is the hope for our current and future generations***."[7] (our emphasis)

2.9 RSPB Cymru added its voice to the praise.[8] However, the Welsh Government's commitment to the M4CaN leads us to question whether it is content with the *statute* book setting a world leading example, rather than ensuring its *actions* do the same.

2.10 The Act places a duty on named public bodies, including the Welsh Ministers, to carry out sustainable development (section 3), which is defined as

> "*the process of improving the economic, social, environmental and cultural well-being of Wales by taking action, in accordance with the sustainable development principle, aimed at achieving the well-being goals"*.

2.11 The seven well-being goals and their descriptions are listed in section 4 of the Act, as follows:

Goal	Description of the goal
A prosperous Wales.	An innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change); and which develops a

[4] "The Directives" are the Habitats Directive and the revised Birds Directive (regulation 3(1)).
[5] Article 4(1) of the Birds Directive.
[6] Article 4(4), final sentence.
[7] Quote by Nikhil Seth, Director of Division for Sustainable Development, Department of Economic and Social Affairs, United Nations http://thewaleswewant.co.uk/blog/wales-we-want/%E2%80%9Cwhat-wales-doing-today-world-will-do-tomorrow%E2%80%9D-%E2%80%93-united-nations
[8] http://www.rspb.org.uk/community/ourwork/b/martinharper/archive/2015/12/11/lessons-from-wales.aspx

	skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work.
A resilient Wales.	A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).
A healthier Wales.	A society in which people's physical and mental well-being is maximised and in which choices and behaviours that benefit future health are understood.
A more equal Wales.	A society that enables people to fulfil their potential no matter what their background or circumstances (including their socio economic background and circumstances).
A Wales of cohesive communities.	Attractive, viable, safe and well-connected communities.
A Wales of vibrant culture and thriving Welsh language.	A society that promotes and protects culture, heritage and the Welsh language, and which encourages people to participate in the arts, and sports and recreation.
A globally responsible Wales.	A nation which, when doing anything to improve the economic, social, environmental and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being.

2.12 The action a public body takes in carrying out sustainable development must include setting and publishing objectives ("well-being objectives") that are designed to maximise its contribution to achieving each goal, and taking all reasonable steps to meet those objectives. The Welsh Government has recently published its well-being objectives, and these are considered further in paragraph 2.15. Section 5 describes the sustainable development principle:

> "*In this Act, any reference to a public body doing something "in accordance with the sustainable development principle" means that the body must act in a manner which seeks to ensure that the needs of the present are met without compromising the ability of future generations to meet their own needs".*

2.13 Section 5(2) sets out a number of things a public body must take into account in order to act in this manner:

"(a) the importance of balancing short term needs with the need to safeguard the ability to meet long term needs, especially where things done to meet short term needs may have detrimental long term effect;

(b) the need to take an integrated approach, by considering how—

(i) the body's well-being objectives may impact upon each of the well-being goals;

(ii) the body's well-being objectives impact upon each other or upon other public bodies' objectives, in particular where steps taken by the body may contribute to meeting one objective but may be detrimental to meeting another;

(c) the importance of involving other persons with an interest in achieving the well-being goals and of ensuring those persons reflect the diversity of the population of—

(i) Wales (where the body exercises functions in relation to the whole of Wales), or

(ii) the part of Wales in relation to which the body exercises functions;

(d) how acting in collaboration with any other person (or how different parts of the body acting together) could assist the body to meet its well-being objectives, or assist another body to meet its objectives;

(e) how deploying resources to prevent problems occurring or getting worse may contribute to meeting the body's well-being objectives, or another body's objectives."

These things are commonly summarised and referred to as five "ways of working":

- balancing short term needs with the need to safeguard the ability to meet long term needs;
- integration;
- involving people in decisions;
- acting in collaboration; and
- prevention (deploying resources to prevent problems occurring or getting worse).

2.14 The Well-Being of Future Generations Act provides an important lens through which to view the M4CaN proposal. The very fact that the Welsh Government committed to developing the Act signifies its acceptance of the need for a change in approach if we are to attain sustainable development. The recognition, through the Act (in particular the well-being goals – see para 2.11 above), that well-being has environmental, social and cultural – as well as economic elements, is crucial. The RSPB – and, we believe, many others, including the public bodies listed in the Act - will be looking to the Welsh Government to demonstrate leadership in its delivery. The Welsh Government's decision on the M4CaN proposal is seen by many (including

the RSPB) as a "litmus test" of the Welsh Government's own commitment to this new legislation – and by extension, given the Government's leadership role, of the likelihood of success overall in the Act achieving the change it seeks to inspire.

2.15 The scale of the M4CaN proposal and its significant impacts on the environment, including biodiversity, clearly signal that it is not compatible with the purpose and spirit of the WFG Act. The Welsh Government published its well-being objectives, as required by the Act, in November 2016. These broadly re-state the Welsh Government's commitment to the seven well-being goals; among other things they reiterate commitments to enhancing Wales' natural resources, and reducing carbon emissions. We can see no way in which the M4CaN proposal is compatible with these objectives; this is hardly surprising given that the proposal for a new stretch of motorway pre-dates the legislation by decades. Some pertinent examples (including selected text from the rationale provided in the document) are provided below.

> **Objective 6 - Support the transition to a low carbon and climate resilient society:** "*Increasing globalisation, changing technology and responding to a changing climate requires a different response which focuses on sustainable growth and a low carbon economy which also benefits our social, cultural and ecological wellbeing…We know that through our influence over and investment in infrastructure … we can maximise our impact.*"
>
> **Objective 7 – Connect communities through sustainable and resilient infrastructure:** "*Our influence over investment in and use of infrastructure is one of our most important enablers for achieving our shared goals…This includes creating sustainable transport…"*
>
> **Objective 12 – Manage, use and enhance Wales' natural resources to support long-term well-being:** *Wales' natural resources*[9]*… are as fundamental to the long-term success of the economy as they are to the quality of our natural environment and the health and well-being of communities. Maintaining and enhancing a biodiverse and resilient natural environment with healthy functioning systems supports people, contributes to health, supports a sustainable economy and builds resilience and the capacity to adapt to change.*

2.16 During the progress of the Well-being of Future Generations Bill, the RSPB engaged particularly with the "Resilient Wales" well-being goal:

> "*a Wales that maintains and enhances a biodiverse natural environment with healthy, functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change)*."

This goal reflects the critical underpinning role of biodiversity and ecosystems to the society and the economy. The damage and destruction the M4CaN proposal would inflict on the Gwent Levels SSSIs – designated because they support nationally important wildlife – runs directly counter to achieving it; a Government committed to this goal would be seeking to

[9] We point out that Section 2 of the Environment (Wales) Act 2016 defines Natural Resources: the definition includes (but is not limited to) animals, plants and other organisms; air, water and soil.

enhance and restore, rather than to deplete and destroy. In further fragmenting the Levels, the Scheme would diminish their biodiversity, scale and connectivity, reducing ecosystem resilience and, in turn, the ability of the ecosystem to support wider socio-economic resilience and provide benefits for future generations.

2.17 The Government's documents associated with the M4CaN proposal indicate that it would, at best, have a minimal impact on Carbon emissions. This simply does not stand up to the ambition of the goal of a prosperous Wales (*an innovative, productive and low carbon society which recognises the limits of the global environment*), nor to the Welsh Government's commitment to the Paris agreement (see para 2.98 below), or the statutory emissions reduction target enshrined through the Environment (Wales) Act 2016 (para 2.97).

2.18 Finally, we cannot see how promoting the M4CaN proposal is consistent with the application of the sustainable development principle (see para 2.13 above), in particular the requirement to balance short term needs with the need to safeguard the ability to meet long term needs. In seeking to address the immediate problem of congestion on the current route, it places in jeopardy the health of the ecosystem, thereby undermining ecological, social and economic resilience for the longer term. It also arguably compromises Wales' ability to deliver its ambitious commitments to reducing Carbon emissions.

2.19 The Future Generations Commissioner (a statutory appointee under the WFG Act) also raised questions as to the application of the sustainable development principle with regard to the proposal in a letter to the Cabinet Secretary for Economy and Infrastructure in June 2016[10]. The Commissioner particularly raised questions with regard to the integration of the proposal with other transport initiatives, such as the South Wales metro and Wales' Active Travel Act. She stated

> "*there is a real risk that public bodies will be tempted to continue taking decisions in the way that they always have and therefore it is crucially important that the Government itself sets the tone by demonstrating how the sustainable development principles (the five ways of working) have been considered from the outset*".

2.20 As highlighted above, the RSPB wishes to see the Welsh Government set a world leading example through its *actions* for sustainable development, in line with the seventh well-being goal - a "globally responsible Wales" - and accept that the challenge of motorway congestion around Newport should be revisited now that the new legislation is in place.

The M4CaN Sustainable Development Report

2.21 We have considered the Sustainable Development Report ("the Report") provided as part of the current M4CaN order-making process. We wish to point out that this report in no way changes our view that the M4CaN proposal is incompatible with the Welsh Government's responsibilities under the WFG Act. We strongly disagree with the report's concluding statement that:

> "*while acknowledging the potential impacts of the Scheme, these are balanced with opportunities which align with the well-being goals, as far as they are currently*

[10] http://futuregenerations.wales/wp/2016/06/08/sophie-howe-writes-ken-skates-regarding-m4-scheme/

> *developed, and therefore the Scheme is considered to align with the Welsh Government's principles of sustainable development*".

Our reasons for disagreeing with this statement are listed below.

2.22 Para 3.4.2 states: *The requirements of the Welsh Sustainable Development Scheme and the Draft Future Generations (Wales) Bill 2013/14 were reviewed as part of the review of relevant policies, plans and programmes in the SEA, to identify the environmental objectives that are of relevance to the draft Plan (Welsh Government, 2013b)*.

2.23 The WFG Act, which gained Royal Assent in 2015, is the product of significant debate and scrutiny by the National Assembly for Wales (led by the Environment and Sustainability Committee of the last Assembly). Its requirements were strengthened considerably subsequent to the tabling of the Bill by the Welsh Government on 7 July 2014. Therefore, reviewing the M4CaN on the basis of the "Draft Future Generations (Wales) Bill 2013/14" (as per para 3.4.2 in the Report, quoted above) is unlikely to have been as testing as reviewing the requirements of the Act as passed.

2.24 Of course, the final Act could not be considered at earlier stages in development of the M4CaN proposal, but now it has been passed the statutory requirements on the Welsh Government to carry out sustainable development are much stronger than when the Bill was first published in 2013. They are also much stronger than the Welsh Government's pre-existing sustainable development duty, set out in the Government of Wales Act 2006, which required the Welsh Ministers to

> "*make a scheme setting out how they propose, in the exercise of their functions, to promote sustainable development*" (the "Sustainable Development Scheme")."

"Sustainable Development" was not defined by the Government of Wales Act.

2.25 A 2010 report by the Wales Audit Office – Sustainable Development and Business Decision Making in the Welsh Assembly Government[11] - found that there was still much to be done before the Welsh Government's business decision-making processes adequately supported its ambition for a sustainable Wales.

2.26 Therefore (particularly given that the proposal for a new stretch of motorway pre-dates this report by many years) it cannot be assumed that the sustainability framework used to assess earlier stages of development of the M4CaN Proposal was equivalent to that provided by the WFG Act, or that decisions taken would have been taken if assessed in the context of the new lens of the WFG Act (key elements of which are described above). The M4CaN Sustainable Development Report certainly provides no such assessment. The Report concludes that *"the Scheme is considered to align with the Welsh Government's* principles *of sustainable development"*. However, it is clear that this is not based on the most up-to-date version of the principles as articulated in the WFG Act (see para 2.13 above). As the Future Generations

11 https://www.wao.gov.uk/system/files/publications/Sustainable_development_and_business_decision_making_in_the_Welsh_Assembly_Government_English_2010.pdf

Commissioner stated in her June 2016 letter to the Cabinet Secretary for Economy and Infrastructure (referred to in para 2.19 above):

> "*it is the SD principles that specify how decisions should be taken (considering long term, integration, prevention, involvement and collaboration) and these have not been assessed in relation to the delivery of the Plan*".

On this basis, the conclusion that the Scheme aligns with the principles cannot be drawn.

2.27 The Report considers the M4CaN's impact on the Well-being Goals. As stated in the Future Generations Commissioner's letter,

> "*the use of the Act to retrofit the goals onto a decision that has already been made is at odds with the intention of the Act which is to change the way decisions are made to ensure more sustainable outcomes.*"

Given the new framework provided by the WFG Act, we would expect the Welsh Government to start by considering: "What is the most sustainable way to address traffic congestion on the M4 around Newport?", not "how does our pre-identified preferred solution align with the Well-being Goals?".

2.28 The Report's consideration of the Scheme in relation to each of the well-being goals includes some extremely weak arguments, which we consider indicate that it is not a robust justification of the proposal in the context of the WFG Act. The Commissioner stated in her letter that

> "*the standard of evidence provided under each of the goals, for justifying the project, is not comprehensive or as robust as I would expect of this legislation*".

For example:

2.29 **A Prosperous Wales** Paragraph 4.2.15 of the Sustainable Development report states that

> "t*he assessment of carbon emissions indicates that the Scheme would result in a marginal reduction of user carbon emissions when compared to without the scheme, even though the number of vehicle* trips *would increase".*

This simply does not stand up to the ambition of the goal of "an innovative, productive and *low carbon* society which recognises the limits of the global environment …". The Welsh Government should be looking for solutions that significantly reduce Carbon emissions, rather than seeking to justify the proposed Scheme on the basis of "a marginal reduction". The Environment (Wales) Act 2016 enshrines a statutory Carbon reduction target of 80% by 2050, building on a commitment to a 3% annual reduction in Wales' 2010 Climate Change Strategy – it has already been argued this is insufficient given the commitments made in Paris (which are discussed further from para 2.97). Glynn and Anderson (2015)[12] argue that in order to stand a

[12] http://www.wtwales.org/sites/default/files/tyndall_centre_-_the_potential_impact_of_the_proposed_m4_relief_road_on_greenhouse_gas_emissions.pdf

reasonable chance of limiting temperature rises to 2°C or below, emissions from nations such as Wales need to be falling by around 10% per annum. They go on to say

> "*it is essential that the scale of the challenge is not made even more significant by policy decisions that have the potential to increase emissions in the short-term and create lock-in to carbon intensive activities and infrastructure... Concerning the proposed M4 relief road, it is evident that insufficiently rigorous analysis has been presented to appropriately address the implications of the proposal for the total level of greenhouse gas emission",*

Concluding

> "*if the Welsh Government is to uphold its repeated Climate change commitments and develop evidence-based policies informed by science it difficult to envisage how the M4 relief road can be justified"*.

2.30 **A Resilient Wales** The Report argues that the proposed package of mitigation measures will ensure that the interest features of the SSSIs are conserved and enhanced (para 4.3.4), and that the Gwent Levels ecosystem can continue to provide the wide range of social, economic and environmental benefits that it currently does (para 4.3.9). We strongly disagree, as demonstrated by our discussion of the impacts of the proposal and the inadequacy of the "mitigation" measures proposed later in this document. The M4CaN proposal would lead to the destruction of a significant area of land designated for its nationally important wildlife. We consider that protecting and managing such sites is the first fundamental step in achieving the goal of a Resilient Wales. The conclusion that the M4CaN represents a solution that is sustainable (and has a net positive impact in relation to the goal of "a Resilient Wales") is predicated on the acceptability of the use of "mitigation" (more properly referred to as "compensation") to address the impacts on the Gwent Levels. Not only is this fundamentally questionable (as discussed further in relation to the Convention of Biological Diversity below), but the current proposals for compensation are wholly inadequate, and in no sense equate to an environmental net benefit, as discussed in other sections of this submission.

2.31 **A Healthier Wales** This section reports that some people (living in the corridor of the existing M4) would benefit from improved air quality, while air quality around the new alignment and connecting roads would be negatively affected. It is also noted that the disruption caused by construction may impact on people's physical and mental wellbeing. These potential health impacts are weighed against the transport benefits of the scheme. It is also argued that the provision of new walking and cycling routes proposed as part of the scheme would help provide opportunities for improvements in people's mental and physical well-being although it is difficult to quantify these and compare them with the impact arising from the construction of the Scheme. The conclusion is stated (in paragraph 5.1.2) that "*the Scheme would ... help create a healthier and more cohesive community*" – presumably the judgement has been made that potential positive benefits for some people/areas outweigh the negative impacts for others.

2.32 **A More Equal Wales** This section states

"*while the health and well-being impacts of the scheme would not be evenly distributed, there is no clear pattern of adverse or beneficial health outcomes disproportionately affecting areas of high or low multiple deprivation*".

Rather than showing how the Scheme contributes to "a More Equal Wales", this simply states that regardless of wealth or deprivation, people are equally likely to suffer as a result of the Scheme going ahead. The RSPB does not consider that equality of impacts is what is envisaged by "a More Equal Wales". Furthermore, we note that the purported benefits of this Scheme (and the extremely large financial investment it entails) would not be equally felt by the people of Wales – in fact they would be felt by a relatively restricted subsection of the population in the south east of the country. Finally, the benefits would be felt by the subsection of the population who are car owners; we contend that a more equitable approach to investment to provide transport benefits for more people would focus on public transport solutions.

2.33 **A Wales of Cohesive Communities** This section dismisses the loss of "land used by the community" (such as village greens, allotments and public open space) by saying that exchange land would be provided, while financial compensation would be offered for residential and commercial properties that have to be demolished. It describes improvements to the local road network without exploring or explaining how they will improve community cohesion (which surely is, at least in part, down to people and the facilities available to them and valued by them *within their communities,* rather than access to other places). We would expect to be given a clear understanding of both the impacts and the benefits of the scheme, and a clear indication of places along the route where the negative impacts on community cohesion (of which we strongly suspect there must be some) outweigh the benefits.

2.34 **A Wales of vibrant culture and thriving Welsh language** This section claims that by enhancing reliability and resilience of journeys to West Wales the Scheme will support tourism in Welsh speaking areas, therefore it supports the Welsh language. No evidence is provided for this. At para 4.7.3, the Report includes a quote from the Welsh Government's policy on the Welsh language in relation to South West Wales, which seems to us to be irrelevant: "*The language renewal task must go hand in hand with improving social infrastructure of these areas to help ensure that better employment opportunities and more affordable housing become available, so that people can remain in their communities*"[13]. It says nothing about how such improvement is contingent on the Scheme, or how the Scheme relates to the wider issues identified.

2.35 We emphasise that we do not accept the Sustainable Development Report, in any way, as demonstrating the compatibility of the M4CaN proposal with the WFG Act. In our view it is incompatible with many of the well-being goals, and it is clear the decision making on the proposal, to date, has not been undertaken in the context of the sustainable development principle (section 5 of the WFG Act). We repeat our view that the advent of the WFG Act requires the Welsh Government to consider the problem of congestion through a new lens, in order to identify the most sustainable solution.

[13] From the Welsh Government's policy on the Welsh Language ("*A living language: a language for living*" at p34 (Welsh Government, 2012).

The Environment (Wales) Act 2016 – Part 1

2.36 Part 1 of the Environment (Wales) Act 2016 (which came into force on 21st March 2016[14]) establishes a new framework for the **sustainable management of natural resources (SMNR).** As explained in the Explanatory Memorandum which accompanied the Environment Bill[15], SMNR is based on the Ecosystem Approach described under the 1992 Convention on Biological Diversity (the CBD).

2.37 The Explanatory Memorandum explains that the ecosystem approach seeks to maintain the integrity and functioning of ecosystems as a whole to avoid rapid undesirable ecological change. It states that the role of the ecosystem approach in the management of natural resources is to make explicit the link between the status of natural systems and ecosystem services that support human well-being. Ecosystem services include provisioning services (e.g. the provision of food, fibre or fresh water), regulating services (e.g. climate regulation and flood alleviation), cultural services (e.g. recreation, tourism, cultural heritage and aesthetic experience), and supporting services (e.g. soil formation, nutrient cycling and water cycling).

2.38 In making the case for new legislation, the Explanatory Memorandum highlighted that "*key evidence, such as the 2011 National Ecosystem Assessment on the state of UK ecosystems, shows a continuing decline in biodiversity with around a third of the services provided by our natural environment either degraded or in decline…Overall, there is a substantial evidence base which highlights that more integrated management of our natural resources is needed, which better recognises the value of our ecosystems and the services they provide*" (para 23). SMNR is promoted as the way to deliver this. However, it was made clear throughout the scrutiny of this legislation that it does not replace the existing legal framework for nature conservation, but rather acts along with it. Thus it in no way alters (for example) the requirements of the Wildlife and Countryside Act relating to SSSIs, as set out above.

2.39 SMNR is defined in section 3 of the Act, as follows:

> *(1) In this Part, "sustainable management of natural resources means" -*
>
> *(a) Using natural resources in a way and at a rate that promotes achievement of the objective in subsection (2)*
> *(b) Taking other action that promotes achievement of that objective, and*
> *(c) Not taking action that hinders achievement of that objective.*
>
> *(2) The objective is to maintain and enhance the resilience of ecosystems and the benefits they provide and, in so doing-*
>
> *(a) meet the needs of present generations of people without compromising the ability of future generations to meet their needs, and*

[14] By virtue of section 88(2)(a) of the Act it came into force on the day the Act received the Royal Assent (21st March 2016).
[15] http://www.assembly.wales/laid%20documents/pri-ld10201-em/pri-ld10201-em-e.pdf

(b) contribute to the achievement of the well-being goals in section 4 of the Well-being of Future Generations (Wales) Act 2015.

2.40 This clearly shows the link between SMNR and sustainable development, and further reinforces the contribution of ecosystems to well-being.

2.41 Section 4 of the Act lists a set of principles of SMNR, which are broadly based on the principles of the Ecosystem Approach as described under the CBD (these are discussed further in paragraph 2.62 below). These include recognition of the benefits and intrinsic value of natural resources and ecosystems (4(f). They also include a description of what is meant by the "resilience of ecosystems", in section 4(i):

take account of the resilience of ecosystems, in particular the following aspects –

(i) diversity between and within ecosystems;
(ii) *the connections between and within ecosystems;*
(iii) *the scale of ecosystems*
(iv) *the condition of ecosystems (including their structure and functioning);*
(v) *the adaptability of ecosystems*.

2.42 Natural resources are defined in section 2 of the Act, to include, among other things, "*animals, plants and other organisms*" (i.e. all biodiversity), "*air, water and soil*", and "*physiographical features*".

2.43 Key components of the delivery framework for SMNR are (with the relevant section of the Act provided in brackets):

- A new general purpose for Natural Resources Wales (NRW) – to pursue SMNR and apply the principles of SMNR (section 5).
- A State of Natural Resources Report (SoNaRR) to be published by NRW, containing its assessment of the state of natural resources in relation to Wales (section 8). The first SoNaRR was published at the end of September 2016.
- A National Natural Resources Policy (NNRP) to be published by the Welsh Ministers setting out their general and specific policies for contributing to achieving the sustainable management of natural resources (section 9). In exercising functions under this section of the Act the Welsh Ministers are required to apply the principles of SMNR. The first NNRP is due to be published in March 2017; a Consultation to inform the development of the Natural Resources Policy was launched on 14 November 2016 (and closes on 13 February 2017).
- Area statements to be prepared by NRW for the purpose of facilitating the implementation of the NR Policy (section 11). Development of area statements will begin following the publication of the NR Policy in March 2017 and the first set of area statements is expected to be completed by 2019. The scale of the area to be covered by each statement has not yet been determined.
- A new "Biodiversity and resilience of ecosystems duty" on public bodies (section 6), which includes planning and reporting requirements.

- A duty on Welsh Ministers to publish a list of the living organisms and types of habitat considered to be of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales, and to take steps to maintain and enhance listed species and habitats, applying the principles of SMNR (section 7).

2.44 As noted above, the Welsh Government is currently undertaking a consultation exercise towards the first NNRP, which will set out its policies to contribute to achieving SMNR[16]. However, a precursor to the NNRP – the "Natural Resources Policy Statement"[17] was published for illustrative purposes during the passage of the Environment Bill. The Natural Resources Policy Statement presented biodiversity decline – including poor condition of designated sites – as a key challenge, and recognised better use and management of designated sites as a priority. The Natural Resources Policy Statement has been recognised in the current consultation, and the Welsh Government has emphasised its continued relevance. The current consultation identifies a number of key challenges, including "improving the quality and connectivity of our habitats", "safeguarding and increasing carbon stores", and "retaining the distinctiveness of our places and historic landscapes". It also sets out three "priority themes" for the NNRP (currently subject to consultation): Accelerating green growth by increasing resource efficiency, renewable energy and supporting innovation; Delivering nature based solutions to improve resilience and the benefits derived from natural resources; and Improving community and individual well being by taking a place and landscape based approach.

2.45 Under the priority theme of "Improving community and individual well being by taking a place and landscape based approach" the consultation document sets out the ambition of

> *"improving the condition of priority areas while expanding and making connections between them, to improve the resilience of ecosystems and help develop protected sites as the cores of large-scale functional networks rather than as 'islands' within the landscape"*

It cites the 2011 "Lawton Review"[18], which outlined the need to

> *"embrace a new, restorative approach which rebuilds nature and creates a more resilient natural environment for the benefit of wildlife and ourselves*".

A key finding of the Review was that in order to provide resilient ecological networks, designated sites for wildlife need to be "more, bigger, better and joined". While the Lawton Review was specifically focused on wildlife sites in England, Professor John Lawton provided written evidence during the scrutiny of the Environment Bill, in which he stated that

[16] https://consultations.gov.wales/sites/default/files/consultation_doc_files/161114-consultation-to-inform-the-development-of-the-natural-resources-policy-en.pdf

[17] http://gov.wales/docs/desh/publications/150914-natural-resources-policy-statement-en.pdf

[18] Making Space for Nature – a review of England's wildlife sites and ecological network. Chaired by Professor Sir John Lawton CBE FRS
http://webarchive.nationalarchives.gov.uk/20130402151656/http:/archive.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf

"*the scientific principles underpinning its recommendations apply broadly to any kind of habitats anywhere in the UK"*[19].

2.46 Another critical point highlighted by the Lawton Review relates to the provision of replacement habitat:

> "Based on the evidence of developer contributions in England and other biodiversity offsetting schemes from around the world, including the use of 'conservation credits' and habitat banking in other countries, there are a number of principles that must underpin an effective system:
>
> (i) Biodiversity offsetting must not become a 'licence to destroy' or damage existing habitat of recognised value. In other words, offsets must only be used to compensate for genuinely unavoidable damage. Development should avoid adverse impacts first, mitigate impacts second and compensate for unavoidable impacts as a last resort.
>
> (ii) Where developers propose to create replacement habitat there needs to be some certainty that the habitat type can be (re-) created. Applying the precautionary principle, and recognising that some habitat creation schemes may be less successful than individually planned, each individual offset schemes should aim to achieve a net gain for biodiversity.
>
> ...
>
> (vi) Suitable multiplier ratios need to be applied to compensation in recognition that the new site may be of a different value to the network than the original one, and to take account of factors such as distance from the site of the damage, the time needed for habitat creation, the types of habitat being lost and accessibility for people. Usually these multipliers will be greater than one, but they need not always be.
>
> (vii) Wherever possible, the created habitat should be in place before the original site is lost."[20]

2.47 The concerns about compensation becoming a licence to destroy are extremely pertinent here. The acceptability of the scheme, in ecological terms, hinges on the provision of compensatory habitat. It is on this basis that the Welsh Government contends that the environmental impact is minimised but, on the basis of the text above, it is clear that this assessment is incorrect.

2.48 The proposal to build a new motorway through a number of designated sites – thereby increasing habitat fragmentation and the "island' effect"- is clearly in strong conflict with the NNRP priority theme of "improving community and individual well-being by taking a place and landscape based approach" . It also conflicts with the ambition of "accelerating green growth"

[19] http://www.senedd.assembly.wales/documents/s42266/Paper%209.pdf
[20] Lawton, para. 6.4.3.

(the first of the priority themes set out above), which is described in the consultation document as

> "*a means of fostering economic growth and development which is socially equitable and ensures the sustainable use of the wealth of natural resources"*.

Indeed, we argue that the M4CaN proposal is rooted in "old thinking" – it is clear to us that it should be reconsidered following the advent of Wales' new legislative framework (the Environment (Wales) Act, together with the WFG Act).

2.49 The first SoNaRR (the key evidence base for SMNR, including for the NNRP) was published in late September 2016. It is the first assessment of the state of Wales' natural resources, including an assessment of ecosystem resilience.

2.50 The first SoNaRR reports losses of habitats and species' populations over at least the last century, indicating chronic declines in the diversity of Wales' natural resources and ecosystems. It also notes that we may see further declines in resilience due to past events (e.g. further depletion and losses of species populations due to historic habitat loss). This is a concern not least because diversity (including biodiversity) is fundamentally important to ecosystem resilience. Furthermore, it is a direct indication that Wales' ecosystems are *not* resilient, because species are not recovering.

2.51 The SoNaRR found that all habitats have problems with one or more attributes of resilience (based on section 4(i) of the Act these are described in the SoNaRR as diversity, extent/scale, condition and connectivity – it is argued that adaptability is a function of these four). Not one of Wales' ecosystems is found to be resilient (and, as such, the capacity to provide ecosystem services and benefits may be at risk). The SoNaRR points out that floodplains (within which category we would include the Gwent Levels) show significant problems across all attributes of resilience.

2.52 In terms of action required, the SoNaRR states

> "*the priority is to ensure that mechanisms are in place to minimise further loss, and that conditions allow for species' populations to expand and naturally recolonise their former range or adapt to future change (requiring improvements in extent, condition and connectivity)*".

It further argues that

> "*a combined approach is needed, so that existing biodiversity is maintained in the context of plans to re-establish adequate areas of habitat with connectivity between them in a planned and informed way*".

2.53 The Welsh Government's proposal for the M4CaN is clearly counter to these recommendations. It would jeopardise species populations by destroying and fragmenting habitats. It is a proposal that, one would hope, would not have been put forward in the context of the new frameworks for sustainable development (WFG Act) and SMNR.

2.54 The new biodiversity duties imposed by the Act are already in effect, and must be applied by the Welsh Government as it undertakes its functions in relation to decision making on the M4.

Biodiversity and resilience of ecosystems duty

2.55 Section 6 of the Environment Act places a duty on all public authorities "to seek to maintain and enhance biodiversity in the exercise of functions relating to Wales, and in so doing promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions". "Public authority" is defined at section 6(9). The term includes (but is not limited to) the Welsh Ministers and Ministers of the Crown, as well as government departments, local authorities and strategic planning panels.

2.56 In complying with this duty public authorities are to have regard to the resilience of ecosystems. Section 6(2) reiterates the following aspects of resilience: diversity between and within ecosystems; the connections between and within ecosystems; the scale of ecosystems; the condition of ecosystems (including their structure and functioning); and the adaptability of ecosystems. We consider that the M4CaN will compromise all of these aspects. Our evidence below will give weight to this concern.

2.57 A subset of "public authorities", which specifically excludes Ministers of the crown and UK Government departments, but includes Welsh Ministers, are required to have regard to the list of priority species and habitats (which Welsh Ministers must publish under section 7 of the Act), the SoNaRR, and any relevant area statement. The current section 7 list features a number of species which would be impacted by the Scheme, including lapwing, shrill carder bee, brown banded carder bee, red shanked carder bee and moss carder bee. It also features coastal and floodplain grazing marsh, which would be impacted by the Scheme, as a priority habitat type.

2.58 In addition, in complying with the section 6(1) duty, the Welsh Ministers, the First Minister for Wales, the Counsel General to the Welsh Government, a Minister of the Crown and a government department must have regard to the UN Convention on the Conservation of Biological Diversity of 1992 ("the CBD"). The CBD is discussed further in paragraphs 2.70 to 2.80 below.

2.59 The duty also requires Welsh public bodies to prepare and publish a plan setting out what those bodies intend to do to meet this duty, to report every three years (first report in 2019), and to review the plan in the light of this report. This gives some structure to support Welsh public bodies (including the Welsh Government) in delivering their responsibilities under the Wellbeing of Future Generations Act. During the passage of the Environment Bill it was made clear by the Welsh Government that the reporting requirements under this duty could be synchronised with parallel requirements under the WFG Act (for example, paragraph 77 of the Explanatory Memorandum to the Environment Bill states:

> "The intention is to achieve integration [of] benefits for those bodies that fall under the Well-being of Future Generations (Wales) Act 2015 as they will be able to report on how they are delivering the biodiversity duty in their reports on how they are meeting their well-being objectives. For these bodies this will also ensure that the

requirement is joined-up and embedded within the Well-being of Future Generations (Wales) Act 2015 obligations".

This clearly indicates that the fulfilment of the Biodiversity and Resilience of Ecosystems duty is necessary for public bodies (including the Welsh Government) to meet their obligations to carry out sustainable development under the WFG Act.

Biodiversity lists and duty to take steps to maintain and enhance biodiversity

2.60 Section 7(1) of the Environment (Wales) Act requires the Welsh Ministers to prepare and publish a list of the living organisms (species) and types of habitat which in their opinion are of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales (this is henceforth referred to as "the Section 7 list"; the Welsh Ministers must consult Natural Resources Wales as to the species and habitats that should be included on the list (section 7(2)).

2.61 Welsh Ministers are further required to take all reasonable steps to maintain and enhance the species and habitats included in the list, and to encourage others to take such steps (section 7(3)). In exercising their functions under this section the Welsh Ministers are required to apply the principles of sustainable management of natural resources (section 7(5).

2.62 The nine principles of sustainable management of natural resources are set out in section 4 of the Act. As stated in paragraph 40 of the Explanatory Memorandum that accompanied the Environment Bill,

> "*the principles which underpin the sustainable management of natural resources provide the method by which its objective is to be delivered. These principles incorporate the ecosystem approach as adopted by the UN Convention on Biological Diversity*".

The principles include the following, which we consider particularly pertinent in relation to this case:

> (f) take account of the benefits and intrinsic value of natural resources [including biodiversity according to section 2 of the Act] and ecosystems;
>
> (g) take account of the short, medium and long term consequences of actions;
>
> (h) take action to prevent significant damage to ecosystems;
>
> (i) take account of the resilience of ecosystems, in particular the following aspects:
>
> i) diversity between and within ecosystems;
>
> ii) the connections between and within ecosystems;
>
> iii) the scale of ecosystems;
>
> iv) the condition of ecosystems (including their structure and functioning);
>
> v) the adaptability of ecosystems.

2.63 We contend that one "reasonable step" the Welsh Ministers should take to maintain the species and habitats listed under section 7 is to review the M4CaN proposal, in the context of the new legislation that has come into force (including this biodiversity duty and that in section 6 of the Environment (Wales) Act, but also the sustainable development duty imposed by the WFG Act). In so doing they should apply the principles of SMNR, including those we have listed above. We do not consider that the M4CaN proposal gives appropriate consideration to the intrinsic value of biodiversity or the benefits provided by the floodplain/wetland ecosystem of the Gwent Levels. It does not represent "action to prevent significant damage to ecosystems", nor consider their resilience – particularly pertinent given the conclusions of the first SoNaRR (see paras 2.50-2.53 above) that none of Wales' ecosystems is resilient. Furthermore, it fails to take proper account of the short, medium and long term consequences, including damage to biodiversity and ecosystems and failure to reduce carbon emissions from transport, and the impacts these will have on future generations.

2.64 As noted in paragraph 2.57 above, the current section 7 list features a number of species which would be impacted by the Scheme, and which are considered later in this submission, including lapwing, shrill carder bee, brown banded carder bee, red shanked carder bee and moss carder bee. It also features coastal and floodplain grazing marsh, which would be impacted by the Scheme, as a priority habitat type. As shown by the evidence provided in section 4 of this submission, the scheme will threaten the medium and long term future of the shrill-carder bee both in Wales and in the UK – clearly a situation that should not be permitted to arise, if the Welsh Government takes its biodiversity duties (sections 6 and 7 of the Environment (Wales) Act seriously).

The Nature Recovery Plan for Wales

2.65 The Nature Recovery Plan for Wales, published in December 2015, sets the ambition *"To reverse the decline in biodiversity, for its intrinsic value, and to ensure lasting benefits to society".* The publication of the Plan fulfils the Welsh Government's commitment, under the CBD, to put in place a national biodiversity strategy and action plan.

2.66 The Plan sets out the Welsh Government's commitment to the mission – *to take urgent action to halt the loss of biodiversity* – and the vision of the CBD Strategic Action Plan for Biodiversity 2011-2020: *"By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people."*

2.67 The Nature Recovery Plan sets out six objectives, stating: "*It is essential that these objectives inform all of our approaches to reversing the loss of biodiversity, across all of our policies, strategies and programmes*". The objectives are:

1. Engage and support participation and understanding to embed biodiversity throughout decision making at all levels.
2. Safeguard species and habitats of principal importance and improve their management

3. Increase the resilience of our natural environment by restoring degraded habitats and habitat creation
4. Tackle key pressures on species and habitats
5. Improve our evidence, understanding and monitoring
6. Put in place a framework of governance and support for delivery

2.68 These objectives show strong links to the thinking embedded in the WFG Act and the Environment (Wales) Act, discussed above. All embrace the position that a biodiverse natural environment is central to sustainable development and well-being, and promote its better integration into decision making. The Nature Recovery Plan also explicitly acknowledges the importance of traditional nature conservation approaches including protected sites, and taking steps to secure the conservation of priority species and habitats. The current consultation to develop the NNRP (see paragraphs 2.44-2.48 above) describes the Nature Recovery Plan as "a strong pro-active platform which supports action on biodiversity across the public sector" and refers to its role in embedding action into Area Statements (under the Environment Act) and other plans and processes. The RSPB is currently calling for this link to be made yet more explicit in the NNRP, so that the role of the Nature Recovery Plan as part of the SMNR delivery framework is clear.

2.69 We argue that the M4CaN proposal clearly runs counter to the first four of the Nature Recovery Plan objectives. The decision to promote the Scheme suggests that biodiversity is *not* embedded as a key factor in Welsh Government decision-making (objective 1); the Scheme would cause direct damage to protected sites and to species and habitats of principal importance (objective 2); it would further degrade the natural environment through increasing habitat fragmentation (objective 3); and it increases pressures on species and habitats, through direct impacts of construction as well as ongoing issues, for example, pollution (objective 4).

The United Nations Environmental Programme Convention on Biological Diversity (CBD)

2.70 As noted above, the CBD has been central to the Welsh Government's thinking in the development of the Environment (Wales) Act 2016 and the Nature Recovery Plan. The prospect of "Brexit" has brought the importance of international agreements to the fore, and the Welsh Government has reiterated its commitment to them. For example, in the Ministerial Foreword to the consultation to inform the development of the NNRP, the Cabinet Secretary for Environment and Rural Affairs states

> *"Looking forward, the Environment Act and the Well-being of Future Generations Act enshrine in legislation the commitment to key international obligations that will not change as a result of the UK's exit from the European Union*".

In a recent debate in the National Assembly for Wales on the 2016 State of Nature Report, the Cabinet Secretary said

> *"Following the decision to leave the EU, we will not roll back on our existing legislation, nor on our commitment to biodiversity".*

We therefore consider it helpful to set out some of the key elements of the CBD as part of the context within which the decision over the M4CaN proposal will be taken.

2.71 Like the Environment Act and the Nature Recovery Plan, the intrinsic value of biodiversity is central to the CBD. The Convention's Preamble opens with the statement "*Conscious* of ***the intrinsic value*** of biological diversity" (our emphasis). The environmental acceptability of the Government's case for the M4CaN proposal is predicated on the assumption that damage to important wildlife can be "mitigated" (or, more properly, compensated for). We argue that, besides the practical difficulties of providing compensation habitat that is comparable to that which would be lost, this approach fails to recognise the intrinsic value of the biodiversity of the Gwent Levels.

2.72 The Preamble also includes two further important statements:

> "*Noting* that it is vital to anticipate, prevent and attack the causes of significant reduction or loss of biological diversity ***at source***." (our emphasis)

And:

> "*Noting further* that the fundamental requirement for the conservation of biological diversity is the *in-situ* conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings."

2.73 Article 2 explains "'*In-situ conservation*' means the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings".

2.74 Taken together these point to protection of biodiversity where you find it (i.e. the Gwent Levels as currently constituted).

2.75 Article 8, In-situ Conservation, resonates with the messages of the SoNaRR and the NNRP, reflecting the importance of protecting biodiversity where it is, and seeking to restore degraded ecosystems and allow depleted species to recover. It states that:

> "Each Contracting Party shall, as far as possible and appropriate:
>
> ...
>
> (d) Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species ***in their natural surroundings***: (our emphasis)
>
> (e) Promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of those areas:
>
> (f) Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species, *inter alia.,* through the development and implementation of plans or other management strategies:
>
> ...

(i) Endeavour to provide the conditions needed for compatibility between present uses and the conservation of biological diversity and the sustainable use of its components:"

2.76 Article 14, Impact Assessment and Minimizing Adverse Impacts, states:

"1. Each Contracting Party, as far as possible and as appropriate, shall:

(a) Introduce appropriate procedures requiring environmental impact assessment of its proposed projects that are likely to have significant adverse effects on biological diversity ***with a view to avoiding or minimising such effects*** ... (our emphasis)

(b) Introduce appropriate arrangements to ensure that the environmental consequences of its programmes and policies that are likely to have significant adverse impacts on biological diversity are duly taken into account:"

The text above establishes a clear expectation that important biodiversity resources will be conserved where they are found, rather than attempts being made to replicate them elsewhere.

The Aichi Biodiversity Targets

2.77 The Aichi Biodiversity Targets are part of the UN Convention on Biological Diversity's Strategic Plan for Biodiversity 2011-2020 which was adopted at Nagoya in the Aichi Prefecture of Japan in October 2010. There are 20 targets under 5 strategic goals. We highlight the ones that are most pertinent to the M4CaN.

Strategic goal A. Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society	
1.	"By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.
2.	"By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems."
4.	"By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits."
Strategic goal B. Reduce the direct pressures on biodiversity and promote sustainable use	
5.	"By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced."
Strategic goal C. Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity	
11.	"By 2020, at least 17 per cent of terrestrial and inland water areas ... of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes."
12.	"By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained."
Strategic goal D. Enhance the benefits to all form biodiversity and ecosystem services	
14.	"By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded ..."

15.	"By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation ..."
Strategic goal E. Enhance implementation through participatory planning, knowledge management and capacity building	
19.	"By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied."

2.78 The Convention on Biological Diversity published *Quick Guides to the Biodiversity Targets.* Although this is not an official document of the Convention on Biological Diversity it provides useful insights into the implications of each of the targets. In relation to Target 1 it notes that

> "Addressing the direct and underlying driver of biodiversity loss will ultimately require behavioral change by individuals, organizations and governments."

2.79 Our arguments around the impact the new Welsh legislation should have on the M4CaN *proposal* aligns with this point: the success of the WFG Act and the Environment Act depends upon people (particularly the public bodies captured by the Acts) doing things differently. Transformational change is required. It is natural to expect the Welsh Government to show leadership in the implementation of this new legislation; if it does not, we fear its impact with other public bodies will be lessened. In this vein, we believe it is critical that the Welsh Government reconsider the issue of congestion around Newport, with a view to identifying the most sustainable solution (as defined by the WFG Act).

2.80 The current *assumption* that the valuable biodiversity of the Gwent Levels can be readily replaced (through "mitigation" or compensation), and that it is acceptable to embark on such an approach, to us resonates with the kind of "old thinking" that the WFG Act should confine to history. In relation to Target 2, the *Guides* notes

> "The values of biodiversity are not widely reflected in decision-making. ... Integrating and reflecting the contribution of biodiversity, and the ecosystem services it provides, in relevant strategies, policies, programmes, and reporting systems is an important element in ensuring that the diverse values of biodiversity and the opportunities derived from its conservation and sustainable use are recognised and reflected in decision-making."

This is one of the key challenges the WFG and Environment Acts seek to address – that of integrated decision making, which recognises the crucial role played by natural resources and ecosystems in underpinning society and the economy. The Welsh Government's decision to promote the M4CaN has not been taken in this context.

Brief discussion of the evidence base on biodiversity and ecosystems

2.81 As discussed above (from para 2.36) the development of the Environment Act (Part 1) was driven by evidence of ongoing biodiversity decline, and a recognition of the implications this has for people.

2.82 For example, in 2011, the UK National Ecosystems Assessment (UK NEA)7 identified that *"the natural world, its biodiversity and its constituent ecosystems are critically important to our*

well-being and economic prosperity, but are consistently undervalued in conventional economic analyses and decision making."

2.83 The Gwent Wildlife Trust has calculated, based on the UKNEA approach, that the ecosystem services provided by the Gwent Levels are worth at least £67,665,312 per year[21]. (The services they identify, not all of which can be valued economically, include biodiversity, water provision and quality regulation, flood alleviation, aesthetic and cultural services, recreation, health and wellbeing, education and tourism).

2.84 The key findings of the State of Nature 2016 report were as follows:

- Since the 1970s, 57% of vascular plants, 60% of butterflies and 40% of birds have declined in Wales. In the short term (since 2002), this pattern was unchanged for vascular plants but worse for birds - 58% of bird species declined during this period. Over the short term 37% of butterfly species declined.
- Of the 5,221 species in Wales that were assessed using modern Red List criteria, 14 are known to have gone extinct from Great Britain and 354 (7%) are considered to be at risk of extinction. We also know that 86 species of plants (including flowering plants, mosses, liverworts and lichens) have been lost from Wales since the 17th century.
- Across the UK since 1970, 56% of species declined, with 40% showing strong or moderate declines; 31% showed little change and 29% showed strong or moderate increases. These measures are based on quantitative trends for nearly 4,000 terrestrial and freshwater species in the UK.
- 249 of 575 species on the Welsh priority species list (now the section 7 list described in para 2.60 above) were assessed for *State of Nature 2016: Wales*. Over the last decade 33% of these species have continued to decline and 43% are stable or have showed little change in their status (i.e. they are still conservation priorities due to long term decline or threat). However, the outlook for 24% has improved in the last ten years, largely due to either improved evidence and understanding or genuine recovery due to conservation effort.
- Across the UK, the populations of species of highest conservation concern have declined by 77%. Their distribution - i.e. the areas they inhabit - has decreased by 35% since 1970. This means that these already threatened species are being squeezed into fewer areas and are also fewer in numbers. This highlights the importance of measures in the wider countryside to ensure space for nature to thrive and recover.
- Across the UK, more than one third of (known) marine vertebrate and marine plant species have declined and three quarters of marine invertebrate species have declined.

2.85 The report included a new measure that assesses how intact a country's biodiversity is – the "Biodiversity Intactness Index". The report noted:

[21] http://www.gwentwildlife.org/sites/default/files/m4_cem_gwt_response.pdf

> "It has been suggested that BII values below 90% indicate that ecosystems may have fallen below the point at which they can reliably meet society's needs. Therefore the value for Wales – 82.8% - gives great cause for concern; of the 218 countries for which BII values have been calculated Wales is ranked 49th from the botton. This puts Wales in the lowest quarter of all the countries analysed."(page 3)

2.86 The findings of the first SoNaRR report align with this; SoNaRR found that none of Wales' ecosystems is resilient, when assessed using the four attributes of diversity, condition, extent and connectivity. Floodplains fail in relation to each of these attributes.

2.87 In relation to the Gwent Levels SSSIs in particular, there is evidence that they are in unfavourable condition. As set out in paras 1.12-1.14 above, the RSPB has seen a draft report of a full baseline survey of the SSSIs undertaken by CCW in 2010-12. This report indicates that the standing water features of the SSSIs are in unfavourable condition.

2.88 The SoNaRR places emphasis on the need to minimise further loss of habitat, and provide conditions for species' populations to naturally recolonise their former range or adapt to future change. This means both maintaining existing biodiversity and restoring areas of habitat with connectivity between them, in accordance with the findings of the Lawton Review. Properly protecting – including avoiding damage to – designated sites, such as the Gwent Levels SSSIs, is fundamental to this. Rather than proposing a heavily damaging development the Welsh Government should be looking for opportunities to enhance and restore habitats on the Gwent Levels and beyond.

Discussion of "mitigation" of the damage the M4CaN proposal would cause to biodiversity

2.89 In section 5 of this submission we consider in detail what would be required to compensate for the damage caused to specific features of the Gwent Levels SSSIs and other species of importance. We do this without prejudice, in the context of our strong opposition to the proposal.

2.90 However, we wish to challenge an assumption inherent in the proposal – evidenced particularly in the Environmental Statement and the Sustainable Development report – that damage to biodiversity, including designated sites and their features, can be made good through "mitigation" (more properly referred to as "compensation").

2.91 The CBD, and Wales' own Environment Act and Nature Recovery Plan, recognise the intrinsic value of biodiversity. The CBD emphasises the need for in situ conservation (para 2.75 above), and the SoNaRR also emphasises the need to protect biodiversity where it is, while looking for opportunities to reconnect fragmented habitats and allow species to recover, in order to rebuild ecosystem resilience.

2.92 Of course, should the Scheme go ahead, the provision of adequate compensatory habitat and mitigation measures will be essential. However, such provision should in no way be considered to remove the obstacles the legal framework puts in the way of development with the aim of safeguarding biodiversity (habitats and species). The fact that the proposal would have a significant impact on a number of statutorily protected sites means that it should go ahead only as a last resort, if there are no alternative solutions to the congestion problem. A

key impact of Wales' WFG Act should be that the consideration of alternatives is not focused on a small number of similar routes – but on the best l.ong term solution, taking into account Wales' legislative and policy commitments to, for example, biodiversity and climate change.

2.93 We further argue that the new legislation in Wales (the WFG and Environment Acts) calls for an enhanced approach to the issue of "compensation". The legislation places emphasis on the need for "healthy, functioning ecosystems" and for "maintaining and enhancing the resilience of ecosystems and the benefits they provide". These commitments are further cemented in policy coming forward under the legislation – including the Welsh Government's Well-being Objectives, and the consultation to develop the first NNRP.

2.94 As the SoNaRR points out, none of Wales' ecosystems is resilient and restorative measures are required – protecting important habitats and seeking to reconnect them to enable species to recover. We would argue that there is a clear requirement for the Welsh Government to commit resources to these measures in any case, in pursuance of delivering these laws and policies. However, we would argue strongly that, should the damaging M4CaN proposal go ahead, the Welsh Government should commit to investing resources linked to the overall financing of the Scheme in projects to support recovery of biodiversity and build the resilience of ecosystems, beyond the direct compensation requirements arising.

2.95 The Welsh Government has funded RSPB Cymru to develop a wetland strategy, looking at benefiting wildlife while enhancing resilience in terms of water management and adaptation to climate change. While it is still in early stages of development it identifies the three key "2030 aims":

- Existing "wetland gems" are in favourable condition supporting key species
- More stepping stone sites at a maximum of 20km intervals across South Wales
- At least two major wetland complexes in excess of 200 hectares providing habitats for key species.

2.96 It is our view that the Welsh Government should commit to such measures in line with its aspirations to rebuild resilient ecosystems and enable them to provide benefits (such as carbon and water storage) that in turn enhance the socio-economic resilience of Wales.

The Environment (Wales) Act 2016 – Part 2

2.97 Part 2 of the Environment (Wales) Act establishes a statutory emissions reduction target: The Welsh Ministers must ensure that the net Welsh emissions account for the year 2050 is at least 80% lower than the baseline. This is discussed further below in relation to the Paris agreement under the United Nations Framework Convention on Climate Change.

The Paris Agreement

2.98 The Paris Agreement was concluded at the end of 2015 by all but a very few nations of the World, 197 in all, including all of the big emitters. It has now been ratified by 128 countries, including the USA, China, India and the EU and has come into force, i.e. it is operational. It can be seen here:

http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf

2.99 The sustainability of the construction of a new motorway cannot be considered in isolation of both the likely greenhouse gas emissions of the scheme and their implications in relation to the cuts in greenhouse gas emissions that need to be made, and the timeframe within which they need to be made. The question which must be answered by the Welsh Government is whether the solution to current traffic congestion problems will make it harder, or indeed impossible, to achieve the necessary cuts in greenhouse gas emissions.

2.100 Article 2 (1)(a) of the Paris Agreement strengthens the existing United Nations Framework Convention on Climate Change by aiming to hold "the increases in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognising that this would significantly reduce the risks and impacts of climate change;".

2.101 Article 4(1) of the agreement states that " ... Parties aim to reach global peaking of greenhouse gas emissions as soon as possible ... and to undertake rapid reductions thereafter in accordance with the best available science". Article 4(4) goes further, "Developed country Parties should continue taking the lead by undertaking economy-wide absolute emission reduction targets."

2.102 It will be very hard to reach the Paris Agreement goal of 1.5°C. The UN's scientific body, the Intergovernmental Panel on Climate Change, estimates that at current global emission levels, the global carbon budget for standing a good chance (≤66%) of reaching 1.5°C will run out in about six years. If we are to meet the Paris goal, emissions must decline very steeply and, in addition, carbon dioxide will need to be actively extracted from the atmosphere starting in the next ten years or so. By or before mid-century global emissions will need to be net zero.[22] The RSPB contends that the construction of a new motorway is – to put it mildly - unlikely to help with the rapid reductions in greenhouse gas emissions envisaged.

2.103 The UK Government ratified the Agreement in November 2016. The Explanatory Memorandum submitted alongside the Agreement text provided to Parliament[23] set out important contextual information about the implications of the Agreement and domestic measures such as for the M4CaN:

> "... Once it has deposited its instrument of ratification, the UK, like all Parties to the Agreement, will be bound by international law to act consistently within the new global-level aims of limiting global warming to well below 2°C; pursuing efforts to 1.5°C and achieving net-zero emissions in the second half of the century. However there are no legally-binding emissions reductions targets for individual countries in the Agreement. The UK already has ambitious domestic laws and commitments on

[22] See, Intergovernmental Panel on Climate Change, AR5 synthesis report, table 2.2, IPCC, 2014, or for a simpler explanation see https://www.carbonbrief.org/analysis-only-five-years-left-before-one-point-five-c-budget-is-blown .

[23] Cm 9338 *Paris Agreement*.

climate change. The UK's 2008 Climate Change Act already sets a target to reduce UK emissions by at least 80% by 2050 compared to 1990 levels."[24]

2.104 Wales' Cabinet Secretary for Environment and Rural Affairs issued a statement on 22 November 2016 welcoming the UK Government's ratification of the Paris Agreement, and asserting the Welsh Government's commitment to tackling climate change[25]. She stated:

> "The Welsh Government has always fully supported these Agreements and has actively pushed forward these global agendas".

The Cabinet Secretary attended the 2016 Conference of the Parties (COP22) in Marrakech, as part of the UK delegation, and

> "took the message that whilst Wales may only be a small country, we are ready to play our part and recognise our global responsibility".

The statement goes on to explain that

> "the Environment (Wales) Act sets solid foundations for delivering the Paris Agreement and puts in place clear statutory targets and a robust monitoring reporting framework."

2.105 We have noted above that Glynn and Anderson (2015) argue that in order to stand a reasonable chance of limiting temperature rises to 2degC or below (as agreed in Paris), emissions from nations such as Wales need to be falling by around 10% per annum – much faster than committed to via the statutory target in the Environment (Wales) Act – an 80% reduction by 2050, and Wales' 2010 Climate Change Strategy which commits to a 3% annual reduction.

2.106 At the UK level, we note that alongside heat, transport has been identified as one of two areas of the economy where emissions reductions have not been sufficiently delivered[26]. This lack of transport decarbonisation has contributed to the UK being off course to meet its fourth and fifth carbon budgets under the UK Climate Change Act[27], jeopardising the UK's overall ability to fulfil its international climate change commitments under the Paris Agreement (noted in paras 2.100-2.101). To contribute to limiting temperature rises to 1.5 degrees, the Committee on Climate Change has also concluded that the UK's existing carbon budgets may not be ambitious enough, and therefore the UK may be even further off course in terms of meeting this goal[28]. In order to put the UK back on track to meeting its carbon budgets, and to enable Wales to do the same, upholding these international commitments, decarbonising the

[24] *Explanatory Memorandum The Paris Agreement,* Nick Hurd MP, Minister of State, Department for Business, Energy and Industrial Strategy –, para 6.
[25] http://gov.wales/about/cabinet/cabinetstatements/2016-new/cop22/?lang=en
[26] https://www.publications.parliament.uk/pa/cm201617/cmselect/cmenergy/173/173.pdf
[27] https://www.theccc.org.uk/publication/meeting-carbon-budgets-2016-progress-report-to-parliament/

[28] https://www.theccc.org.uk/wp-content/uploads/2016/10/UK-climate-action-following-the-Paris-Agreement-Committee-on-Climate-Change-October-2016.pdf

transport sector will be vital. We argue that one of the best ways to reduce transport emissions is to reduce demand – constructing a new section of motorway runs directly counter to this. A report published in 2014 by the Public Policy Institute for Wales (PPIW) – Moving Forward: Improving Strategic Transport Planning in Wales[29] – found that "*for road infrastructure, provision leads to exponential growth suggesting Say's Law is applying – supply is creating its own demand"*.

2.107 The RSPB questions how the construction of an entirely new motorway, coupled with the retention of the existing road as a new trunk route, will help towards the reductions envisaged and required above. We again note the conclusion of Anderson and Glynn 2015, that "*if the Welsh Government is to uphold its repeated Climate change commitments and develop evidence-based policies informed by science it difficult to envisage how the M4 relief road can be justified."* The RSPB considers that the present M4CaN proposal is entirely incompatible with the Welsh Government's legal obligations, including that not to prejudice future generations by short term decisions. The decision on whether to consent the M4CaN proposal needs to be considered in that light.

Policy

Planning Policy Wales (9th Edition, November 2016)

2.108 Planning Policy Wales emphasises the Welsh Government's commitment to sustainable development. It notes (para 4.1.6) that the Welsh Government's approach to sustainable development is consistent with, and builds upon, the shared UK principles:

- **living within environmental limits**: by setting out a pathway to using only our fair share of the earth's resources and becoming a One Planet nation within the lifetime of a generation;
- **ensuring a strong, healthy and just society**: our focus on how a sustainable approach will improve the quality of life and well-being of the people of Wales and especially those in our less well-off communities;
- **achieve a sustainable economy**: by setting out how we want to transform our economy so that it is low carbon, low waste;
- **promoting good governance**: through confirming sustainable development as the central organising principle of the Welsh Government and through encouraging and enabling others to embrace sustainable development as their central organising principle; and
- **using sound science responsibly**: through the use of our sustainable development principles as part of our evidence-based approach to policy making.

2.109 It goes on to consider the role of planning in achieving "A Resilient Wales" (the second of the well-being goals listed in para 2.11 above), stating that this is to

> "*contribute to the protection and improvement of the environment, so as to improve the quality of life, and protect local and global ecosystems. In particular, planning should seek to ensure that development does not produce irreversible harmful effects on the natural environment and support measures that allow the natural heritage to adapt to the effects of climate change. The conservation and enhancement of*

[29] http://ppiw.org.uk/files/2014/11/Approaches-to-strategic-transport-planning.pdf

statutorily designated areas and of the countryside and undeveloped coast; the conservation of biodiversity, habitats, and landscapes; the conservation of the best and most versatile agricultural land; and enhancement of the urban environment all need to be promoted (4.10, 4.11.10, Chapters 5 and 13)".

We have added emphasis (underlining) to highlight the focus on protection of ecosystems through the planning system, and the role of designated areas (such as SSSIs).

2.110 PPW also seeks to make an important contribution to reducing Wales' ecological footprint – ensuring that Wales uses its fair share of the Earth's resources, in line with the Welsh Government's Sustainable Development Scheme (which pre-dated the WFG Act) and now central to the well-being goal of "A globally responsible Wales". PPW states

"*The current footprint shows that, if everyone on the Earth lived as we do, we would use 2.7 planets worth of resources. Reducing Wales' ecological footprint will require a large reduction in the total resources used to sustain our lifestyles. The policy and guidance set out here in PPW will make an important contribution to reducing our footprint, whilst delivering sustainable development and tackling climate change"* (para 4.5.11).

We fail to see how the M4CaN can be compatible with this commitment, given the impact on natural resources and climate change it will entail.

2.111 PPW goes on to consider issues of natural heritage (para 5.1.1), which includes geology, land forms and biodiversity as well as natural beauty and amenity. It states *"Attractive and ecologically rich environments are important, both for their own sake and for the health and the social and economic well-being of individuals and communities*".

2.112 Para 5.1.2 sets out the Welsh Government's objectives for the conservation and improvement of the natural heritage, these being to:

- "promote the conservation of landscape and biodiversity, in particular the conservation of native wildlife and habitats;
- ensure that action in Wales contributes to meeting international responsibilities and obligations for the natural environment;
- ensure that statutorily designated sites are properly protected and managed;
- safeguard protected species, and to
- promote the functions and benefits of soils, and in particular their function as a carbon store.

2.113 PPW goes onto affirm the Welsh Government's commitment to the CBD (para 5.2.1) and to explicitly recognise the importance of protecting sites in fulfilling the Welsh Government's commitments to biodiversity. For example para 5.3.1 states

"*Many of the most important areas of landscape quality and nature conservation have been statutorily designated. These statutorily designated sites make a vital*

contribution to protecting landscape and biodiversity and can also be important in providing opportunities for sustainable economic and social development';

and para 5.3.9

"*The Welsh Government will ensure that international responsibilities and obligations for conservation are fully met, and that, consistent with the objectives of the designation, statutorily designated sites are protected from damage and deterioration, with their important features conserved by appropriate management"*.

2.114 Later, it reiterates the responsibilities of public bodies under s28G of the Wildlife and Countryside Act to take reasonable steps, consistent with the proper exercise of their functions, to further the conservation and enhancement of the features by reason of which a SSSI is of special interest, and states "*there is a presumption against development likely to damage a SSSI*" (para 5.5.8).

2.115 The M4CaN proposal fails on all of these counts.

2.116 In relation to transport, PPW says the following:

"8.1.1 The Welsh Government aims to extend choice in transport and secure accessibility in a way which supports sustainable development and helps to tackle the causes of climate change by: encouraging a more effective and efficient transport system, with greater use of the more sustainable and healthy forms of travel, and minimising the need to travel. This will be achieved through integration:

- *within and between different types of transport;*
- *between transport measures and land use planning;*
- *between transport measures and policies to protect and improve the environment; and*
- *between transport measures and policies for education, health, social inclusion and wealth creation.*

For example, ensuring that development is accessible by means other than the private car will help to meet the Welsh Government's objectives for social inclusion. Encouraging cycling and walking will contribute to the aim of improving the levels of health in Wales."

2.117 We note that, in her letter to the Cabinet Secretary for Economy and Infrastructure of June 2016, the Future Generations' Commissioner questioned the integration of the M4CaN proposal with other transport priorities (such as the South Wales Metro), and also raised concerns that it showed a lack of consideration of future trends in transportation.

TAN 5: Nature Conservation and Planning (September 2009)

2.118 Within Planning Policy Wales, the specific Technical Advice Note (TAN) on nature conservation – TAN 5, reinforces the importance of biodiversity, stating:

> *"Biodiversity is important in its own right and essential to maintain the life support systems that allow life, including human life, to exist on the planet. Wildlife and its habitats are of fundamental importance to our future well-being and prosperity because a rich and diverse environment supports a long-term sustainable economy and contributes to a healthier and happier society. Biodiversity is an important indicator of sustainable development. Biodiversity and geodiversity add to the quality of life and local distinctiveness"* (para 1.5.1).

2.119 It goes onto state:

> "*biodiversity conservation and enhancement is an integral part of planning for sustainable development",*

noting that

> *"past changes have contributed to the loss of integrity of habitat networks through land-take, fragmentation, severance, disturbance, hydrological changes and other adverse impacts" (para 1.5.2).*

2.120 TAN 5 emphasises (para 2.1) that the town and country planning system in Wales should "*ensure that the UK's international and national obligations for site, species and habitat protection are fully met in all planning decisions"; and"'look for development to provide a net benefit for biodiversity conservation with no significant loss of habitats or populations of species, locally or nationally"*. It should also "*plan to accommodate and reduce the effects of climate change by encouraging development that will reduce damaging emissions and energy consumption and that help habitats and species to respond to climate change*".

2.121 The TAN also sets out the Welsh Government's expectations of "Section 28G authorities" (those public bodies to which the duty in s28 of the Wildlife and Countryside Act applies, including the Welsh Government itself). They should:

- apply strict tests when carrying out functions within or affecting SSSIs, to ensure that they avoid, or at least minimise, adverse effects;
- adopt the highest standards of management in relation to SSSIs which they own; and
- as owners, or otherwise, take positive steps, wherever possible, to enhance the special interest features of a SSSI where their activities may be affecting it, or where opportunities arise in the exercise of their functions.

2.122 In relation to developing development plan policies and assessing planning applications, TAN 5 states that authorities should *"ensure that the range and population of protected species is sustained (PPW 5.2.3, 5.5.11 and 5.5.12)"*. This is particularly pertinent regarding the shrill carder bee discussed in section 4 of this submission.

2.123 On the issue of mitigation and compensation, TAN 5 calls for

> *"a step-wise approach to avoid harm to nature conservation, minimise unavoidable harm by mitigation measures, offset residual harm by compensation measures and look for new opportunities to enhance nature conservation; where there may be significant harmful effects local authorities will need to be satisfied that any reasonable alternative sites that would result in less or no harm have been fully considered (PPW 5.2.2, 5.2.7 and 5.5.2)"*.

We commonly refer to this approach as the "avoid –mitigate – compensate hierarchy".

2.124 We would argue that insufficient effort has been put into *avoiding* the damage to the Gwent Levels SSSIs, particularly given the new context of the WFG Act. In this context we would expect the Welsh Government's consideration of alternative solutions to the problem of congestion along the M4 corridor around Newport to be broader than the consideration of different motorway route options. We also argue that the approach taken to "mitigation" (more properly termed compensation) in the proposal is woefully inadequate – notwithstanding very real concerns over whether it is indeed possible to compensate for damage at this scale to the habitats and species concerned. "Mitigation" proposals are considered in more detail in Section 5 of this submission.

TAN 18 – Transport

2.125 TAN18 makes it clear that "*Adverse impacts associated with transport infrastructure projects, on the natural, historic and built environment should be minimised."* (paragraph 9.10). RSPB Cymru submits that the heavy reliance by the M4CaN on compensatory measures is a clear indication that this important provision has not been adhered to.

Local Plan Policy

2.126 The RSPB commented on the policies within the *Newport Local Development Plan 2011-2026* (January 2015) ("Newport LDP") in paragraphs 69 to 73 of our objection letter.

2.127 There are a number of additional elements within the Newport LDP which have a bearing on the present scheme. In the supporting text to policy SP3, Flood Risk, the plan states

> "Watercourses within the Internal Drainage Board (IDB) area must not be culverted and development must avoid obstructing the water course by providing a buffer zone of 12.5m minimum for reens and 7m minimum for field ditches in order to allow on-going maintenance."[30]

2.128 Policy SP16, Major Road Schemes, contains only a route safeguarding reference to the M4 Relief Road[31]. However, it does offer a helpful insight into the issue of resilience within the road network that the Welsh Government advances as a key tenet of its case.

> "The Welsh Government has taken control of the **steelworks access road (Queensway)** and is upgrading this from Junction 23A at Magor to Queensway Meadows at Spytty. This road will serve Glan Llyn (the Llanwern Regeneration Site) and improve access for the major

[30] Newport Local Development Plan 2011-2026, para 2.16.
[31] Newport Local Development Plan 2011-2016, para 2.65.

employment areas in South East Newport. Queensway also provides a new strategic East - West link between the Southern Distributor Road and Junction 23A at Magor, providing relief for the M4, including Junction 24 (the Coldra), at times of peak congestion and for incident management. The road also gives access to the proposed railway station at Llanwern, providing important opportunities for park-and-ride. The road is being built largely on the line of the existing road with new and upgraded junctions being provided as required to serve the Glan Llyn development site and the existing steel works and related uses. The utilisation of the line of the existing road minimises environmental impact and is considered a sustainable use of existing road infrastructure."[32]

The implications of law and policy for the route

2.129 As we have set out in the sections above, it is our strongly held view that the current legal and policy framework in Wales proscribes firmly against the M4CaN proposal going ahead.

Planning Policy Wales and TAN 5

2.130 The Welsh Government's proposal to destroy parts of the Gwent Levels SSSIs is clearly counter to its own Planning Policy and technical advice. A particularly important aspect for is the guidance offered by paragraph 2.4 of TAN5, which clearly sets out the policy of the Welsh Government that a sequential approach should be used when considering proposals that may affect nature conservation: the avoid-mitigate-compensate hierarchy (we note that this is equivalent to the "avoid-reduce-remediate" hierarchy in the Design Manual for Roads and Bridges as described in paragraph 10.5.2 of the ES). Those terms are generally understood to have the following meanings:

- **Avoid:** measures that are taken to avoid creating an impact from the outset, and which completely avoids impacts on key components of biodiversity;
- **Mitigate:** measures that are taken to reduce the duration, intensity and/or extent of impacts on biodiversity components that cannot be completely avoided;
- **Compensate:** measures that are taken to compensate for impacts that cannot be avoided or mitigated. This would include the provision of replacement habitat for that damaged or destroyed. Compensation is generally considered to be a measure of ***last resort***.

2.131 In its Statement of Case, the Welsh Government contends:

> "*The effect of the proposed new section of motorway on the biodiversity of the Gwent Levels, including taking into consideration all of the proposed mitigation, has to be weighted against the significant social, economic and other environmental benefits that the Scheme would bring to Newport, the wider Cardiff region and Wales as a whole*." (para 2.8.8)

And further:

> "*To the extent that there are localised impacts these must be balanced against the wider economic and environmental benefits of the scheme. Our proposal is considered to be the sustainable, long-term solution taking into account all social,*

[32] Newport Local Development Plan 2011-2026, para 2.58.

environmental and economic factors. It forms an essential part of the vision for an efficient integrated transport system in South Wales." (para 2.8.27)

2.132 The RSPB considers that the balancing exercise set out above is fundamentally flawed and fails to reflect the legal obligations which exist upon the Welsh Government. In applying this flawed approach the Welsh Government has fundamentally misled itself into misunderstanding the severity of the impacts on biodiversity.

The Wildlife and Countryside Act 1981 (as amended)

2.133 The Welsh Government's Statement of text highlights that the legal protection for SSSIs is not a blanket ban on development. It continues:

"*The Welsh Ministers are required to take reasonable steps to conserve and enhance the SSSIs, consistent with the exercise of their functions. They have given a significant amount of attention to mitigating the impacts on the SSSI, so far as is possible, in order to be able to fulfil this requirement.*" (para 2.8.34)

2.134 The RSPB has highlighted above that what the Welsh Government has described as "mitigation" is more properly described as "compensation". Consequently we take issue with the assertion that the Welsh Ministers have taken reasonable steps to conserve and enhance the SSSIs. In sections 3 to 5 below we set out the detailed impacts of the scheme and consider the likely effectiveness of the compensation package being proposed by the Welsh Government. This consideration leads us to conclude that the statement above is fundamentally incorrect.

2.135 The M4CaN would cause damage to four SSSIs, which have been designated for their nationally important wildlife. Section 28G of the Wildlife and Countryside Act 1981 (as amended), as explained in TAN 5 requires the Welsh Government to act to conserve and enhance these sites. Planning Policy Wales sets out the Government's strong commitment to SSSIs, emphasising the role of the planning system in ensuring they are properly protected and managed. It is regrettable that the Gwent Levels SSSIs have been assessed as being in unfavourable condition (see paras 1.12-1.14 of this submission), but this should create a focus on investing resources in the appropriate management to attain favourable condition – not in any lesser protection of these sites via the planning system.

The Conservation of Habitats and Species Regulations 2010 (as amended)

2.136 It is devastating that this proposal would destroy the habitat used by the common crane, an Annex I species, which bred on the Levels in 2016 – the first time the species has bred successfully in Wales for 400 years. The proposed route would cross the cranes' breeding territory, making it impossible for the birds to return to breed at the same site. As noted above (para 2.7), and discussed further in Section 3 of this submission, the Regulations require Annex I species to "*be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution*."[33]

[33] Article 4(1) of the Birds Directive.

Environment (Wales) Act 2016

2.137 The M4CaN proposal would also destroy critical habitats for a number of priority species, including lapwing and four carder bee species (moss carder, red-shanked carder, brown-banded carder and shrill carder), as well as destroying a significant area of the priority habitat "coastal and floodplain grazing marsh". These priority species and habitats are listed under section 7 of the Environment (Wales) Act, which it is the Government's responsibility to publish; it is also their duty to take all reasonable steps to maintain and enhance the listed species and habitats, having regard to the principles of SMNR – these include taking account of the benefits and intrinsic value of natural resources (including biodiversity) and ecosystems, taking action to prevent significant damage to ecosystems, and taking account of the resilience of ecosystems.

2.138 Like other public bodies, the Welsh Government is subject to the "biodiversity and resilience of ecosystems duty" in section 6 of the Environment Act, which requires it to "maintain and enhance biodiversity [that is, all biodiversity, but having regard to the "section 7 list"], and in so doing promote the resilience [that is the diversity, condition, scale, connectedness and adaptability] of ecosystems. In doing this it is also required to have regard to the SoNaRR, which provides evidence that none of Wales' ecosystems is sustainable, and that floodplains fail in respect of all attributes of resilience.

2.139 These duties contribute to the wider policy framework established by Part 1 of the Environment (Wales) Act, which as set out by the Welsh Government is intended to enshrine the ecosystem approach (as described by the CBD) into Welsh law. The Act shares common features with the CBD (and Wales' Nature Recovery Plan) in its recognition of intrinsic value, as well as its recognition of the value of ecosystem services – termed "benefits" within the Act – and the need to bring these to the fore in decision making. The products that have so far emerged under the Environment Act – the SoNaRR and the consultation to inform the development of the NNRP – have pointed to the need to protect designated sites as essential building blocks of wider resilience, and to restore habitats to enhance the connections between them (endorsing the approach of the 2010 "Lawton Review" calling for important areas for nature to be "more, bigger, better and joined" to form ecologically resilient networks).

2.140 The Welsh Government's proposal for the M4CaN was not developed in the context of these duties, and the heightened recognition of the importance of ecosystem resilience (and of biodiversity as an aspect of this). It is wholly incompatible both with specific legal obligations to species, habitats and sites, and with the ambition inherent in the legislation to secure resilient ecosystems. (The SoNaRR makes clear that the former make a key contribution to the latter).

2.141 Part 2 of the Environment (Wales) Act enshrines a statutory emissions reduction target of 80% by 2050. The Welsh Government's commitment to tackling climate change was reinforced by the Cabinet Secretary for Environment and Rural Affairs, in her comments relating to the UK's ratification of the Paris Agreement under the UN Convention on Climate Change, and her attendance at the most recent Conference of Parties. We have noted above that Glynn and Anderson (2015) advise that achieving the promises of the Paris agreement requires a much

more steep reduction in emissions than is currently planned in Wales. The development of the M4CaN proposal is a commitment to road travel, and will do nothing to address the key priority of demand management (in fact, it is likely to increase demand in accordance with Say's law). It is absolutely incompatible with the Welsh Government's commitment to tackling climate change.

The Well-being of Future Generations (Wales) Act

2.142 This Act seeks to inspire transformational change in decision making by requiring public bodies to carry out sustainable development by working towards the seven well-being goals, and by applying the sustainable development principle. The Sustainable Development report, provided as part of the evidence in favour of the M4CaN proposal, provides thin and equivocal arguments as to how the proposal would impact on each of the Well-being Goals. However, it completely misses the point that the WFG Act provides a new way to consider problems – using the sustainable development principle with its five ways of working: balancing short term and long term needs, integration, involving people in decisions, collaboration, and prevention (deploying resources to prevent problems occurring or getting worse). If the problem of congestion on the M4CaN were to be considered today, using the lens of the Act, without over 20 years of embedded commitment to a new motorway as the solution, and with proper consideration given to all of the well-being goals, we cannot believe that the current proposal would be advanced. If not the eyes of the world, then certainly the eyes of the Welsh public sector will be on the Welsh Government, looking for leadership in the implementation of the Act. As noted earlier, the decision on this proposal can be considered a "litmus test" of the Welsh Government's commitment to sustainable development.

2.143 The goal of a Resilient Wales, "*a nation that maintains and enhances a biodiverse natural environment with healthy, functioning ecosystems that support social, economic and ecological resilience, and the capacity to adapt to change (for example climate change)*", recognises the fundamental importance of biodiversity and ecosystems in underpinning society and the economy. It is extended through the objective of SMNR in the Environment (Wales) Act – to maintain and enhance the resilience of ecosystems and the benefits they provide. A development which would destroy substantial areas of semi-natural habitat, providing a home to numerous priority species as well as essential ecosystem services to people, is clearly not in line with the intent of these laws. .To fulfil them, the Government should be creating, not destroying habitat.

2.144 Finally, we point out that both the intrinsic value of biodiversity and its role in the resilience of ecosystems are clear within the new framework. The critical role that protected sites have to play in delivering resilience is clearly endorsed in the SONaRR, the consultation on the NNRP, and Planning Policy Wales. Planning Policy Wales also sets out a clear hierarchy for decision making where development affects protected sites – which we know, in short form, as the 'avoid, mitigate, compensate' hierarchy. As set out above, in the context of the new Welsh legislation not nearly enough has been done by the Welsh Government to seek to avoid the damage that the M4CaN proposal would cause, and the RSPB opposes the proposal unreservedly.

2.145 Strictly without prejudice to this position, we comment in detail in Section 5 of this response on the mitigation and compensation we believe would be required, in relation to specific features, to have a change of achieving 'no net loss' if the proposal were to proceed. The proposals currently outlined are wholly inadequate. In addition, as per our arguments above relating to the direction set by the new Welsh legislation, we argue that the Welsh Government should look to make a significant investment in building resilience through new wetland habitat creation – going above and beyond considering the immediate, substantial losses that this proposed motorway development would cause.

3. The impact of the M4 on birds

3.1 The proposed M4CaN is likely to have impacts on a number of bird interests. We set out our concerns in relation to the bird species below. We also have concerns about the efficacy of the survey work which has been undertaken. Because this impacts upon our ability to discuss the impacts of the M4CaN on the bird interests we deal with the survey implications first.

Bird surveys

3.2 The sections of our objection letter dealing with birds were largely focused on our concerns about the adequacy of the survey work that had been undertaken (paras 81 to 86) and breeding birds (paras 137 to 141). We revisit those concerns in the light of the further information that was supplied at the beginning of September as part of the Environmental Statement Supplement ("the ES September Supplement") and December ("the December ES Supplement").

3.3 The RSPB note that much of the M4 route has not been covered in the surveys reported in the ES Supplement, in particular in the breeding season surveys. Our concerns at these limitations are set out below.

Winter Bird Survey

3.4 In our objection letter we highlighted significant concerns about the 2013-14 and 2014-15 surveys (Annex, para 82). There were focussed on the fact that (i) the Arup survey did not commence until January 2014, missing the first half of the winter, and that (ii) access restrictions had led to incomplete coverage of the survey area.

3.5 The RSPB has carefully considered the *Wintering Bird Survey* work produced by Thomson Ecology as part of the ES Supplement (Volume 3: Appendix S10.4). We note that it has covered the whole of the winter season, which partially addresses our concern in relation to point (i) above. However, a reduction in survey transects from 7 to 5 to focus on the Gwent Levels has implications on the surveying of more widespread species (including SPA species such as mallard) possibly being slightly under-recorded compared to the previous winter surveys.

3.6 The RSPB considers that there is enough impact or potential impact on wintering birds that specific compensation should be included that extends beyond the small scale compensation proposals associated with the M4CaN. Mitigation measures for species of wintering duck and waders impacted by the scheme are recommended in paragraphs 5.16 to 5.17 below.

3.7 The RSPB consider that the Arup 2014 survey, which identified 12+ mallard indicates poor survey coverage, particularly when contrasted with the 160 birds found by Hyder in winter 2014/15 and the 107 by Thomson Ecology in winter 2015/16. However, given the higher subsequent values we consider that this problem has been addressed. A summary of the Hyder and Thomson Ecology data are presented in the table below. It should be noted these data are minimal because of the gaps in the survey work.

	SPA total ES: T 10.9 &10.10	Hyder (H) 2014/15	% SPA	Thomson Ecology (TE) 2015/16	% SPA	Average H & TE	%SPA
Redshank	2536	690+	27.1	102	4.0	396	15.5
Gadwall	241	33	13.7	30	12.45	31.5	13.1
Teal	4459	102	2.29	111	2.49	106.5	2.4
Pintail	511	25	4.89	5	0.98	15	2.9
Mallard	2713	160	5.9	107	3.94	133.5	4.9
Shoveler	448	6	1.34	7	1.54	6.5	1.4
Curlew	3768	125	3.3	4	1.0	64.5	1.7

3.8 The RSPB agrees with the high value for redshank, gadwall and pintail assigned by the survey. However, we consider that the values for mallard (which equates to more than 2% of the SPA) and shoveler (which exceed more than 1% of the SPA population) should be increased to medium to match teal.

Breeding Bird Survey

3.9 The RSPB has carefully considered the information provided in the ES Supplement (Volume 3, Appendix S10.5), but have found it difficult to compare the breeding bird surveys conducted by Arup in 2014 with the 2015/16 work undertaken by Thomson Ecology due to confusing results. Given the inadequacies of pulling the three breeding season surveys together, this is only a minor issue; but it is symptomatic of a more fundamental problem with the overall impact assessment. We expand on these concerns below.

3.10 The Arup survey covered 8 transects[34], whereas the Thomson Ecology surveys covered just 3 transects. Thomson Ecology's area BBS1[35] appears to be more or less the same as Arup's transect T2, but the others are clearly different. Thomson Ecology's Area BBS2[36] appears to include both, or parts of Arup's transects 5 and 6. While it is acknowledged that there are differences between the areas covered by all surveys, a detailed and critical assessment of the results is missing and is required.

3.11 However, all surveys are focussed on identifying representative bird communities of the survey areas chosen, rather than properly assessing the bird populations affected along the M4CaN route. The RSPB understands that this approach has been taken following advice from NRW, but the RSPB respectfully disagrees with the advice NRW has given. As a result of the

[34] M4CaN Environmental Statement, volume 3, appendix 10.13 plan 1
[35] M4CaN Environmental Statement, volume 3, appendix 10.28 figure 2a
[36] M4CaN Environmental Statement, volume 3, appendix 10.28 figure 2b

surveys following NRW's advice, the RSPB has been unable to identify any proper survey of the entire route for breeding birds. There are large unsurveyed areas between the transects which have been undertaken.

3.12 In addition we are concerned that from a review of the information available on the maps of the transects undertaken by Arup and Thomson Ecology are likely to have covered less than 50% of the area enclosed by the survey areas. Consequently, even the limited number of areas that have been surveyed have been only partly covered. The RSPB considers this approach wholly inadequate, and would have expected the whole route of the M4CaN to have been surveyed. We suggest the appropriate methodology for this approach below. Without such an assessment we consider that it is not possible to reach sound conclusions about the likely ornithological impacts of the route or to devise an appropriate mitigation and compensation package in the event that the scheme is approved.

3.13 The RSPB is concerned by the survey approach adopted. We note that a variant of the Breeding Bird Survey (BBS) methodology has been used for the site assessments (employing 3 rather than 2 visits per year). However, this methodology involves too few visits to assess territories accurately, and it is important to note that visits to "within approximately 100 metres" (para 2.3.2) will fail to record many species accurately, in particular rare or cryptically plumaged birds. Indeed, this methodology does not aim to record every bird using the site.

3.14 This is a significant concern given that the standard width of a three lane motorway with hard shoulder is likely to be less than 40m in width, excluding its associated embankment. The BBS is a methodology designed to assess population trends in widespread breeding birds over a very large area (i.e. at regional or country level), whereas what is needed here is a far more detailed territory mapping over a much more discrete area – in which case the use of the Common Bird Census (CBC) method would be much more appropriate. This involves 6 - 10 visits to each survey area during March-July to map territories. Using this method surveyors should get to within 50m of very part of the site rather than the 250m used for the BBS. It is widely acknowledged to be a much more accurate method for site characterisation (Gilbert et al).

3.15 A final problem with analysing the data is that the maps in the Supplement contain dense data about the birds that have been surveyed, but there has been no attempt to draw general conclusions on the overall impact of the route.

Breeding Wader Survey

3.16 In our objection letter we highlighted significant concerns about the 2015 survey work (Annex, para 84). To summarise, the 2015 survey was undertaken in May and June only, which is not a full breeding season, and that limited access meant that the standard breeding bird survey methodology could not be followed. We made it clear that re-surveying needed to be undertaken (Annex, para 86). We are disappointed to note that the breeding wader survey was not repeated across a full breeding season. We highlight some consequences about this decision below in relation to Lapwing under "other bird species".

Impacts on key breeding bird species

3.17 This section expands upon our comments in paras 137 to 141 of our objection letter, and includes information to reflect a new breeding success on the Gwent Levels in summer 2016.

3.18 The original ES identified significant effects on two species of breeding birds, Cetti's warbler and barn owl. Since then common cranes have successfully bred on the Gwent Levels.

Common crane (*Grus grus*)

3.19 The crane is amber listed in the 2015 Birds of Conservation Concern 4.

3.20 The RSPB is one of the leading crane conservation organisations in the UK. We carry out ecological research and undertake practical management for cranes on our nature reserves and monitor their response to our management. We also run an ambitious crane re-introduction programme in south-west England through the Great Crane Project (GCP). We are members of the UK Crane Working Group, and coordinate crane conservation at a national level with our statutory and NGO partners.

3.21 In 2016, a pair of common cranes *Grus grus* bred at an undisturbed, sensitive location on the Gwent Levels (Site X), where they fledged a single chick. This was the first successful breeding by cranes in Wales since at least the 1600s (Lovegrove *et al* 1994; Boisseau & Yalden 1998).

3.22 We consider that the proposed M4CaN would have an adverse impact on breeding cranes at this site. Below, we set out evidence to support these concerns. We conclude that the M4CaN is likely to result in the permanent displacement of breeding cranes from Site X. Common cranes have Annex I status under EU Directive (2009/147/EC) on the Conservation of Wild Birds, which requires Member States including the UK, 'to take special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution'. This includes taking appropriate steps to avoid deterioration of habitats or any disturbances affecting the birds. *In situ* conservation of the breeding crane habitat is the best way to achieve this objective i.e. the M4CaN should not be consented. However, if the M4CaN road scheme is constructed the creation and management of replacement breeding and foraging habitat for cranes at a suitable receptor site is likely to provide the best way of retaining breeding cranes on the Gwent Levels and in South Wales.

History of breeding cranes in the UK

3.23 A small breeding population of common cranes was re-established in East Anglia in the late 1970s through wild birds from mainland Europe. Further UK re-colonisation has been slow, with population growth limited by low productivity (Stanbury *et al* 2011). The GCP was set up in 2006 by the RSPB, the Wildfowl & Wetlands Trust (WWT) and the Pensthorpe Trust, to help restore a healthy population of common cranes in the UK through a re-introduction programme in south-west England.

3.24 The Somerset Levels were chosen as the reintroduction site. The Somerset Levels supports many undisturbed pools suitable for nesting cranes and extensive areas of invertebrate-rich wet grassland for foraging cranes and their chicks. A critical feature of the Levels is the low density of roads, bridleways and other paths in core areas of breeding habitat. This is important because cranes are very wary birds, and human disturbance is a major influence of

nest and foraging locations (Stanbury & Sills 2012). The Somerset Levels are close to other freshwater wetlands, including the Severn Vale and the Gwent Levels. It was considered likely that these sites would be colonised by birds from the re-introduced population over time.

Use of the Gwent Levels & Site X by cranes 2014-16

3.25 The two adult cranes recorded at Site X were released as colour-ringed juveniles on the Somerset Levels through the GCP. The male bird 'Lofty' was released in 2011 and the female bird 'Gibble' was released in 2012. They were first observed at Goldcliff Lagoons in the spring of 2014 and again in the spring of 2015, although no breeding attempt was observed on either occasion. Common cranes typically breed from 4-5 years old and remain productive until about fifteen years old, with frequent pair bonding between immature birds.

3.26 RSPB staff were alerted to the presence of the two cranes at Site X in the spring of 2016 by a local observer who provided regular updates on the behaviour of the birds during the breeding season. Follow-up visits by RSPB staff were carried out in August. The following is a summary of observations from the 2016 breeding season. All information has been provided by the local observer unless stated:

- The two cranes were first observed on 22 March close to suitable nesting habitat at Site X. The cranes spent much of their time in this area, which led to the suspicion that they were nest building. The birds were later identified through coloured leg rings as Lofty (aged five) and Gibble (aged four).

- It is likely that egg incubation started in the second week of April, when the pair became very secretive. The presence of a nest was later confirmed visually.

- The birds were using similar habitat to that commonly used elsewhere in the UK and Europe. Cranes typically lay two eggs on a hummock of old reed and similar material, often screened by dense reed. (RSPB)

- Incubation normally takes 28-30 days in common cranes. (RSPB)

- The adults were observed near the nest site on 22 May behaving as though they had young. They were then seen with two chicks on 24 May west of the nesting site in grassland. Based on their size, the chicks were thought to be about two weeks old. This is consistent with a laying date of early-April and a hatching date of early-May. The adults and chicks were then observed on 26 May in a small area of marshy grassland west of the nesting site.

- It is not clear how long the adults foraged with the chicks in the grassland west of the nesting site. By late June however, the adults were observed with only one chick, in invertebrate-rich fields south-west of the nesting site. The chick was estimated to be about six weeks old at the time. The fate of the other chick is unknown, but it is likely that it was predated by a fox *Vulpes vulpes* or gull somewhere within the breeding territory.

- The invertebrate-rich fields seem to have been the main foraging area for the adults with the remaining chick for at least six weeks from late June into mid-August. The birds were observed in at least five fields during this time. RSPB staff observed them at a distance of

c. 300 m from an adjacent path on 4 July 2016, when they became alert to the observer and moved into cover. The chick was about ¾ the size of an adult bird, and was estimated to be about eight weeks old. They were also seen feeding in the invertebrate-rich fields by RSPB staff in early August.

- Cranes roost at night in shallow open water, where they have some protection from ground predators such as foxes. The corridor between the nesting site and the invertebrate-rich fields contains areas of dense vegetation, and it is thought unlikely that the adults returned regularly to the nesting site to roost. The adults and chick are thought to have roosted close by the invertebrate-rich fields for much of the foraging period.

- The cranes were last recorded in the invertebrate-rich fields on 10 August. They were seen again on 30 August in fields south of the invertebrate-rich fields, and then on 13 September in a nearby harvested maize field. Subsequently, the three birds were seen together on land close to the Severn Estuary, after the chick had fledged, and then on the Somerset Levels on 25 September. They were last recorded on the Somerset Levels on 28 January 2017, where they have spent the 2016-17 winter.

Suitability of Site X for breeding cranes

3.27 The Site X cranes successfully fledged a chick at their first attempt, despite being inexperienced parents. This indicates that the site has all the critical habitat elements of a favourable breeding location. Indeed, the site looks very similar to many of the breeding territories elsewhere in the UK. Cranes are site faithful and will return to the same nesting site year after year, so it is anticipated that the site will be used again. Cranes do not necessarily use the same nest location within a site every year, but if options are limited, as they seem to be at Site X, they are likely to use the same nesting site again. The following habitat elements were likely to have been particularly important in 2016:

- A secure nesting site: this location provides a typical nesting site for cranes, providing some nest seclusion and protection from predators such as foxes, a major predator of crane chicks (Leito 2005).

- Productive foraging areas adjacent to the nest site: grassland close to the nesting site was used over a ten day period post-hatching, probably for longer. This pattern of behaviour is regularly observed at RSPB Lakenheath, Thorne & Hatfield Moors National Nature Reserve (NNR) and on the Somerset Levels. The foraging area is estimated to be up to c. 3.5 ha, although not all this area is likely to have been utilised. Young cranes are fed by their parents on a range of prey items, notably invertebrates taken from surrounding vegetation, including beetles, grasshoppers and caterpillars as well as grass seed (Nowald, 2003).

- Productive wider foraging area: crane parents select foraging habitats with highest food availability (Nowald 2003). As crane chicks get older and stronger, adults take chicks to larger foraging areas further from the nest. There were no observations of the adults and chicks east of the nesting site, suggesting that foraging opportunities were limited there. It is significant that the adults chose to take the chick(s) to invertebrate-rich fields away from the nesting site, despite the apparent difficulties of getting through dense

vegetation. The invertebrate-rich fields consist of dry unimproved or semi-improved grassland, sheltered within hawthorn hedges. The fields were closed up for hay throughout most of the chick rearing period, so the habitat would have remained productive for foraging until at least mid-August. The presence of pylons does not seem to have deterred the cranes from foraging in this area, where the risk to a juvenile crane prior to fledging is minimal.

- A safe roosting pool close to the invertebrate-rich fields: adult cranes and their chicks roost at night at the nesting site or a similar pool elsewhere. Pools near the invertebrate-rich fields may have provided this function, keeping the birds secure at night from ground predators, especially foxes. Since the cranes are likely to have roosted in this area, the inference is that human disturbance must have been low.

- Limited human disturbance at the nest site and immediate foraging area: there is no public access to Site X, so disturbance would have been minimal when the adult cranes set up their breeding territory, during incubation and the first few weeks of foraging with the two chicks in the immediate vicinity of the nesting site. It is particularly important that cranes are not disturbed by people during this period. Leito *et al* 2005 found that human activity had a significantly negative effect on the breeding success of cranes in Estonia, where mean brood size was significantly smaller in nests that were located closer to sources of human disturbance.

- Limited human disturbance in the foraging area: it is important that cranes are not disturbed when they have unfledged chicks. The crane family are unlikely to have experienced significant human disturbance in the invertebrate-rich fields, and their reaction to the presence of RSPB staff in early July gives an indication of how intolerant they are to people.

3.28 Crane territories can vary in size considerably, depending on factors such as habitat quality and levels of disturbance. At Lakenheath Fen RSPB reserve, for example, which includes c. 260 ha of wetland habitat, a breeding pair was observed over nine years, with territory estimates ranging from 20–40 hectares per year. Another territory at the same site ranged from 16-50 ha per year over a nine year period. The estimated territory of the successful Somerset Levels pair was c. 26 ha in 2015 and c. 55 ha in 2016. The 2016 figure was larger because an important hay meadow in the 2015 territory was grazed in 2016 and will have been avoided by cranes, which do not like cattle. All Lakenheath data is from Norman Sills *pers. comm*.

3.29 We estimate the territory size at Site X was up to c. 22 ha, including the nesting site, the immediate foraging area and the invertebrate-rich fields used by chick in six weeks pre-fledging. This estimate assumes that the cranes used a relatively small foraging area west of the nesting site in the first few weeks after the chicks had hatched, which is a pattern observed elsewhere in the UK. The crane family was seen in fields totalling c. 10 ha, but the cluster as a whole is c. 16 ha, and it is likely that some or all of this would have been used during this period. The figure does not include the roosting site near the invertebrate-rich fields which was used by the cranes during the six weeks pre-fledging. This area, which includes other potential feeding habitat could add another c. 5-10 ha to the overall territory

size, giving a larger territory size estimate of up to c. 32 ha, although this roosting area may have been used only because of the difficulty in returning regularly to the nesting site to roost.

Significance of Site X for breeding cranes

3.30 The Site X cranes are part of the larger UK crane breeding population. 2016 saw a record number of breeding cranes across the UK as the eastern UK population grew and as released GCP birds reached early maturity. In summary:

- There were 48 territorial pairs of cranes across the UK.
- 37 of these pairs bred. 25 of the 37 pairs failed at egg or chick stage (68%) and 12 pairs fledged a total of 14 chicks (32%).
- The GCP was responsible for 21 known territorial pairs across south-west England and south Wales. GCP pairs made 25 breeding attempts, producing seven hatched chicks of which three currently survive (September 2016).
- Six pairs from the GCP bred for the first time in 2016, including the Site X pair, which was the only pair to fledge a chick.
- Chick survival to fledging at Site X was 50%. In terms of productivity, this is significantly higher than the UK average.

3.31 These figures show that the Site X pair was very productive in 2016. They successfully reared a chick to fledging, unlike other GCP pairs which also nested for the first time. Chick mortality pre-fledging can be significant in common cranes, and the loss of one of the chicks at Site X, probably to predators, is not unusual, even at a productive site.

3.32 Since 2015, GCP pairs have successfully bred in Somerset, Gloucestershire, Wiltshire, Oxfordshire and Gwent, as birds have dispersed from the release site. Of the 93 birds introduced to the GCP founding flock, at least 71 birds are known to be alive, in addition to four surviving juveniles from 2015 and three from 2016, including the juvenile from Site X. For further information on the Great Crane Project, please refer to the project website at www.thegreatcraneproject.org.uk

Potential impacts of the M4CaN on breeding cranes at Site X

3.33 The behaviour of the nesting cranes at Site X is consistent with what we know about crane breeding ecology at other UK sites (e.g. Stanbury & Sills 2012). We can anticipate therefore that the Site X pair will be affected by similar impacts to those other sites.

3.34 The spatial relationship between the Site X breeding territory and invertebrate-rich fields and the proposed M4CaN route corridor is critical:

i. The proposed route corridor would lie close to the nesting site. The nesting site and part of the adjacent foraging habitat would be severely impacted or destroyed by the proposed route corridor.

ii. c. 50% of the foraging habitat lies close to the proposed route corridor, and would be very vulnerable to disturbance effects during construction and operation of the proposed road.

iii. The route corridor would permanently separate the nesting site from key foraging areas in the invertebrate-rich fields, effectively removing the main source of food for crane chicks.

3.35 The effects of roads on wildlife are well documented. In the case of birds, several studies have shown that species diversity and abundance is reduced near roads (Reijnen *et al* 1996, Fahrig & Rytwinski 2009), although separating the impacts of linked effects is difficult. Most studies have linked declines in species diversity and abundance with the effects of traffic noise, suggesting that noise impairs communication, increases predation risk and increases anti-predator vigilance, leading to reduced foraging time. However, a causal relationship has not been established, and Summers *et al* (2011) suggest that other possible mechanisms, correlated with traffic noise, may be involved, including the influence of vehicle lights and movement, toxic car exhaust and changing levels of vehicle collision risk with distance from roads.

3.36 There is some evidence of road impacts on wetland bird species. Hirvonen (2001) assessed the impacts of a new two-lane highway east of Helsinki on wetland birds breeding in coastal meadows and reedbeds, including common cranes. The abundance of wetland birds declined by 50% during road construction, and 80% following highway use. Much of this decline was due to impacts on bittern *Botaurus stellaris*, marsh harrier *Circus aeruginosus*, crane, ruff *Philomachus pugnax* and little gull *Hydrocoloeus minutus*. The effects on breeding waders was most significant up to 200 m. No specific details were provided on the effects of the new road on the breeding crane population, or the distances that the effects occurred over. Hirvonen speculated that traffic noise may have been the main reason for the declines: where traffic noise remained below 56 dB, wader abundance remained fairly constant, whereas above this level, the number of breeding waders declined.

3.37 There is limited information on the potential impacts of new roads on breeding common cranes. Research in north-eastern Germany has shown that breeding cranes, especially when they have young, are much more vigilant than non-breeding adults, and favour nesting locations away from human activity and roads (Nowald 2001). Nowald (2003) demonstrated that the vicinity of roads also affected the foraging range of adult cranes with chicks. On average, the minimum distance adult cranes foraged with chicks was between 141 – 308 m from a road. In one crane territory next to a rural road, this safety distance effectively reducing territory size by 20%. There was a significant difference between the average safety distances adjacent to local streets, rural roads and national highways, with safety distances being lowest on national highways at c.140 m. Nowald suggests that this may be related to the fact that traffic frequency on national highways is much higher and therefore more constant than on country roads.

3.38 There is considerable evidence that common cranes are highly sensitive to human disturbance, and some evidence that they do not like machinery. Since re-colonisation of eastern England in the late 1970s, crane vulnerability to disturbance has been recognised as a

key determinant of breeding success (Stanbury & Sills 2012). Sensitivity varies with a number of factors, including site topography, vegetation cover around nest sites and the behaviour of individual pairs. Cranes are most alert and sensitive during incubation and when foraging with chicks. Observations from RSPB reserves in East Anglia suggests that cranes with chicks in open habitat can react adversely to people and machinery more than 500 m away (Norman Sills *pers. comm*).

3.39 A number of studies have recorded lower crane breeding productivity in more disturbed environments (Leito *et al.* 2005) due to disruption of chick foraging, leading to undernourishment. This can lead to a decline in reproductive success (Nowald 2001). Persistent disturbance can also lead territorial pairs to abandon otherwise suitable nesting sites and disrupt incubation, increasing egg mortality risk through increased predation (Beate Blahy *pers. comm*.[37]).

3.40 Some general parameters are used to guide RSPB reserves management. These are based on close observation of over 30 crane nesting attempts on RSPB reserves. Human activity should be avoided in nesting, foraging and roosting areas from mid-February. In addition, if visitors have access to a site, at least 200 m should be left around nesting and foraging areas in tall-vegetation habitats such as reed, and at least 500 m in short-vegetation habitats such as sedge beds or rush-dominated fields.

3.41 This evidence from RSPB reserves suggests that the breeding cranes at Site X would be very vulnerable to disturbance impacts from the proposed M4 extension. Site preparation and motorway construction is likely to expose the cranes to many irregular disturbance events over a long time period. The extent of the disturbance impact zone during the construction period would depend on a number of factors, including the size and shape of the construction area within and adjacent to the proposed corridor, the type of construction machinery, where it is deployed, seasonality of use, noise levels, intermittency and vibration. To this must be added the potential impacts of lighting, dust and other construction noise. It is not possible for us to fully assess these impacts without further information. In our experience, although cranes may habituate to regular low-impact human activity in some circumstances, they are much less tolerant of irregular activity and noise. This was evident at Site X in 2016, where the adult cranes became alert to RSPB staff at 300 m. Cranes are similarly unlikely to tolerate disturbance during site preparation and road construction, when the presence of construction personnel and machinery is likely to have an adverse impact at distances up to 500 m. In our view, it is unlikely that any *in situ* mitigation could be effective enough to prevent breeding cranes from abandoning Site X because of the proximity and likely scale and duration of disturbance.

3.42 The likely post-construction disturbance impacts of the proposed M4 extension are uncertain, but would arise from the combined effects of visible traffic, traffic noise, light and dust during operation, and presence of maintenance personnel. As outlined above, there is little research on the potential impacts of new motorways on breeding cranes, although given the close

[37] Beate Blahy is our main crane contact in Eastern Germany. She jointly runs Vielfalt Biosphere – the NGO for the Schorfheide-Chorin Biosphere where all our crane eggs came from. She is also a prominent member of Kranichschutz Deutschland, the main crane NGO conservation organisation in Germany.

proximity of a new road to the breeding territory, it is highly likely that the cranes would abandon Site X. In our view, it is unlikely that *in situ* mitigation could prevent breeding cranes from abandoning Site X because of the proximity and likely scale and duration of disturbance.

Site fragmentation

3.43 The availability of suitable foraging areas for chicks is one of the key determinants in nest site selection for cranes. The M4CaN route corridor would permanently separate the invertebrate-rich fields from the nesting area, and any unfledged crane chicks would be unable to reach them. There is no evidence that the grasslands immediately adjacent to the nesting site could support crane chicks to fledging, and it is clear that the adult birds took the chick to the invertebrate-rich fields in preference to other areas surrounding the nesting site. We have discussed this scenario with our German crane colleagues. Experience from Brandenburg and Mecklenburg-Vorpommern suggests that cranes would abandon a breeding site if the main foraging area cannot be reached (Gunther Nowald *pers. comm*).

Habitat loss or change

3.44 We do not have information on the width of the motorway and construction areas. However, the nesting site is likely to be destroyed although direct loss of foraging habitat is likely to be limited. If additional operational areas are required during the construction period, the area of impact would increase.

3.45 No information has been provided on the hydrology of the crane breeding site, or the potential impacts of a new road on freshwater flow into the nesting area and adjacent habitats. It is therefore impossible to assess the indirect hydrological impacts of the proposed motorway extension on the nesting site, adjacent foraging area, the invertebrate-rich fields, or the corridor between them. It is critical that the hydrology of the nesting site and the key foraging habitats are maintained in order to secure them in suitable condition for feeding chicks.

3.46 In summary, it is our considered view that the M4CaN would result in the loss of this crane breeding site due to:

- Construction disturbance,
- Destruction of the nesting site, and
- Severance of the nesting and foraging areas.

Compensation for potential effects of the M4CaN on breeding cranes at Site X

3.47 ES Supplement Appendix SR10.35 Draft SSSI Mitigation Strategy December 2016 ('the Mitigation Strategy') sets out the draft proposed "mitigation" measures for the M4CaN. The document makes no reference to the breeding cranes at Site X, nor does it identify specific crane compensation measures.

3.48 Given the predicted loss of the Site X crane breeding site if the M4CaN is consented, compensation measures will be required to provide suitable nesting and foraging habitat elsewhere on the Gwent Levels. This would need to be in place ***before*** the construction of the M4CaN commences.

3.49 We have discussed the suitability of the Maerdy Farm, Tatton Farm and Caldicott Moor replacement habitat sites for breeding cranes with RPS. We have not had the opportunity to visit any of the sites, so can only comment on the information provided in the draft Mitigation Strategy. Critical factors such as topography, elevation, soil type, water budget, water management infrastructure and human disturbance, all have an important bearing on the viability of these sites to support breeding cranes. Each site has therefore been assessed against the following criteria, recognising the limitations of our knowledge of the sites:

i. Capacity of a site to support crane breeding pools – i.e. is there sufficient water and are soil conditions likely to be adequate to maintain a pool of 1-2 ha to a depth of up to 1 m during the breeding season? This assumes that any necessary water management infrastructure can be put in place to maintain agreed water levels.

ii. Capacity of a site to support invertebrate-rich grassland for foraging cranes – assuming at least a 1:1 replacement for the foraging habitat at Site X, i.e. 19 ha or more. Suitable foraging habitat developed from arable or improved swards is likely to take several years to mature to the state where it provides adequate foraging habitat for breeding cranes. Given that cranes are a site faithful species, if replacement habitat has not been created before the likely displacement of breeding cranes from Site X, it may be several years before an alternative site is used by another pair, thereby greatly increasing the risk of cranes abandoning the Gwent Levels as a breeding area.

iii. Levels of disturbance in and around a site – what are the likely levels of disturbance to a breeding pool and foraging areas within the site and adjacent to it? This includes disturbance from existing or new roads, adjacent residential and industrial facilities, and paths and tracks.

iv. Hazards associated with a site – are there any obvious flight hazards, e.g. pylons within or close to the site? Pylons are known to present significant risks to cranes in some circumstances (Janss & Ferrer 2000).

v. Other factors influencing use of a site by breeding cranes – e.g. levels of predation by ground predators including foxes and domestic cats.

Tatton Farm (Figure 2a in the Mitigation Strategy)

3.50 Although the total site is c. 44 ha, c. 9 ha of the site would lie to the south of the M4CaN and would be isolated from the rest of the replacement habitat. We estimate that the total effective area of the site available to cranes would therefore be c. 35 ha.

3.51 We do not have enough information about site hydrology to comment on whether the site has the capacity to support a viable breeding pool for cranes.

3.52 We note the intention to enhance grassland over large parts of the site. Without further information, it is impossible to say whether the sward is currently good enough to support large numbers of invertebrates. If the existing sward is agriculturally improved, it is likely to take several years before these fields would provide suitable foraging habitat for breeding cranes.

3.53 Fig. 2a shows a series of lagoons and ponds on a small area of land south of the proposed road. This area is unlikely to support breeding cranes for a number of reasons: it is located within 150 m of the proposed road; the area of potential foraging habitat is restricted to c. 10 ha and isolated from the main site; and the lagoons lie underneath two sets of pylons. Spatially, the most suitable area for breeding lagoons would appear to be in the north-eastern part of the site, furthest from the road and the Queensway Meadows Industrial Estate. The potential for this area to provide suitable nesting habitat depends on a number of factors, including land use and access to the east of the site, and a water budget which is sufficient to maintain a pool of 1-2 ha to a depth of up to 1 m during the breeding season. We have no information about these important factors.

3.54 Disturbance is likely to be a key issue at this site:

- Some 25% of the site lies within 200 m of the proposed road, and c. 90% within 500 m of the road, suggesting the potential for a high degree of disturbance over a large part of the site, depending on a number of factors, including shelter afforded by intervening hedgerows. We have no information about the amount of shelter provided by hedges and other intervening cover.

- Approximately half the site lies within 200 m of the Queensway Meadows Industrial Estate and residential development along Longditch Road. All parts of the site lie within 500 m of these developments, making the site very vulnerable to disturbance from industrial machinery, noise, lighting and recreational pressure. There is also an unofficial travellers' site to the west, within Queensway Meadows Industrial Estate. In the absence of further information, we assume that levels of human disturbance would be too high.

3.55 Crane chicks could also be at high risk of predation by cats. Local authorities in Dorset and south-east England have adopted a 400 m buffer around heathland SSSIs located close to existing or new housing developments in order to minimise urban effects, including cat predation, on wildlife within designated sites. It is fair to assume that a similar buffer against these urban effects would be needed at this site.

3.56 Given the apparent site constraints at Tatton Farm, we believe it is extremely unlikely that this site would be suitable for breeding cranes.

<u>Maerdy Farm (Fig. 2b in the Mitigation Strategy)</u>

3.57 This site covers c. 35 ha, with c. 25-30% lying within 200 m of the proposed road, and c. 90% within 500 m, including the south eastern corner of the site where lagoons and ponds are identified. The reedbeds adjacent to the proposed road are extremely unlikely to be used by cranes, and presumably this is not their main function.

3.58 We note from fig. 2b the proposed lagoons and pools in the south-eastern part of the site. We do not have enough information about site hydrology to comment on whether the site has the capacity to support a viable breeding pool for cranes.

3.59 We note the intention to revert most of the site, currently down to arable, to species-rich grassland. It is likely to take several years before these fields would provide suitable foraging habitat for breeding cranes.

3.60 We have concerns about the levels of disturbance that breeding cranes might experience within the site:

- Level of disturbance from the M4CaN – this depends on the amount of shelter provided by intervening hedges and the existing railway line. The railway line itself is not likely to be a major source of disturbance to nesting cranes, and might provide a degree of protection from the road. We have no information about the amount of shelter provided by hedges and other intervening cover.

- Levels of disturbance to breeding pools - within the site and from access and activity in surrounding fields and access tracks. It is impossible to assess the level of access and human disturbance at the site from the document, although we note that Maerdy Farm, the access track to it, and the bridge and path over the railway line, provide opportunities for access to large parts of the site, including the fields with proposed lagoons and ponds. There is no information on the level of use of adjacent tracks on e.g. Wheel Lane. In the absence of further information we assume that levels of human disturbance would be too high.

- Levels of disturbance to foraging areas – we have concerns about the level of disturbance that breeding cranes might experience within the foraging area. Much of which is located within 200 m of the new road, and close to Maerdy Farm buildings and access tracks, e.g. Percoed Lane. In the absence of further information we assume that levels of human disturbance would be too high.

- The presence of pylons crossing this area could present a significant collision risk within the site, especially to foraging cranes.

3.61 Given the apparent site constraints at Maerdy Farm, we believe it is very unlikely that this site would be suitable for breeding cranes.

<u>Caldicot Moor (Fig. 2c in the Mitigation Strategy)</u>

3.62 This site covers c. 55 ha, with c. 40% lying within 200 m of the existing M4 and Severn Bridge toll, and c. 99% within 500 m. Lagoons and pools are identified in the western part of the site, all situated within 200-350 m of the existing motorway.

3.63 Fig. 2c shows lagoon and ponds in the western side of the site. We do not have enough information about site hydrology to comment on whether the site has the capacity to support a viable breeding pool for cranes, although we assume this is the wettest area currently, and therefore the most obvious location for a breeding pool. Aerial photographs of the site suggest the fields are intensively managed and very dry, and we would have concerns about the feasibility of creating and maintaining permanently wet areas.

3.64 We note from fig. 2c the intention to enhance existing grassland across c. 80% of the site and to revert existing arable cover on the remaining c. 25%. It is likely to take several years before these fields would provide suitable foraging habitat for breeding cranes, and enhancement and reversion would therefore need to be carried out several years before the breeding pair at Site X is disturbed.

3.65 We also have concerns about the levels of disturbance that breeding cranes might experience within the site, including disturbance from the following sources:

- Existing M4 motorway and toll – this would depend on the amount of shelter provided by intervening hedges. Given the close proximity of the proposed lagoons and ponds to the existing road, there is a high risk of disturbance. However, because the motorway already exists and traffic movement and noise is likely to be fairly constant, this may pose lower levels of disturbance risk to nesting and foraging cranes. Whether cranes would choose to prospect this site remains uncertain, and there remains a significant risk that they would still avoid this site.

- Peripheral tracks – the site is bounded on two sides by unnamed tracks, and there is no information on their level of use, or on access into and use of internal tracks within the site. However, we understand that the south-western drove is a public right of way and forms part of NCN 4 - the Celtic Trail cycle route. The site also lies close to the Wales Coast path. Given that the proposed lagoons and much of the foraging area would lie within 10-50 m of the Celtic Trail, it is very unlikely that the site would be used by cranes. In the absence of further information we assume that levels of human disturbance are likely to be too high.

- The presence of pylons crossing the southern and eastern part of the site area also presents a significant collision risk within the site, especially to foraging cranes.

3.66 Given the apparent site constraints at Caldicot Moor, we believe it is unlikely that this site would be suitable for breeding cranes without significant reduction in the potential levels of human disturbance and a review of the other potential constraints outlined above.

3.67 In summary, none of the three “mitigation” areas would be suitable as compensation for the loss of Site X for breeding cranes.

<u>Alternative sites for breeding cranes</u>

3.68 We strongly recommend that a more systematic review of alternative sites across the Gwent Levels and adjacent areas is carried out. This should be achieved with input from the Living Levels Partnership and through access to existing habitat databases, focusing on areas of existing and former wetland habitats, and in particular unimproved areas of coastal and floodplain grazing marsh away from major roads, built development and pylons.

3.69 We have carried out a brief assessment of Goldcliff Lagoons and Newport Wetlands. Neither site is likely to be suitable in our view due to a combination of factors, including current levels of human disturbance. In addition, there may be significant constraints at Newport Wetlands, a site which was created to provide compensatory habitat for the Cardiff Bay Barrage, with specific objectives for non-breeding shoveler and wigeon.

Conclusions

3.70 Common crane *Grus grus* is listed as an Annex I species in the EU Directive 2009/147/EC on the Conservation of Wild Birds. The legal duties that flow from this are set out in para 2.7 above, and require the UK, ‘to take special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution’.

3.71 The proposed M4 Corridor around Newport (M4CaN) would bisect the cranes' breeding area. It is the RSPB's view that the motorway would have an adverse impact on the cranes through the combined effects of habitat fragmentation, disturbance and other factors. We believe there is a high probability that the cranes would permanently abandon this breeding site as a direct result of the proposed road. It seems unlikely to us that any on-site mitigation measures could reduce these impacts to a level which would allow the cranes to continue to breed successfully at this site. We have assessed the proposed off-site habitat replacement sites in the draft mitigation strategy. In our view none of the options presented are likely to be suitable compensation for breeding cranes. We strongly recommend that a systematic review of other potential sites is carried out with input from the Gwent Levels 'Living Levels' Partnership.

Cetti's warbler (*Cettia cetti*)

3.72 The RSPB has significant concerns about the approach used to estimate the population set out in the *2016 Breeding Season Ornithological Surveys* (ES Supplement Volume 3: Appendix S10.5). It highlights that the last national population estimate of Cetti's warbler (Musgrove *et al.,* 2013) was 2,000 singing males and then makes the assertion that "Based on the fact that multiple females can occur in a single male's territory, this represents a minimum of 4,000 birds" (para 4.2.1). However, there is no reliable scientific data in relation to the number of females to males. As a result all Cetti's warbler numbers should be measured solely on the reliable basis of the singing males.

3.73 The *Rare Breeding Birds in the UK 2014* (Holling *et al*., 2016) population estimate for Cetti's warbler was 1,789 males in the UK. This found no evidence for the suggested doubling in population every four years that had been suggested in para 4.2.2 (relying on Holling & RBBP, 2010). In the period 2009 to 2014 Holling *et al.* considered that the population was 1,622 breeding pairs. On this basis we disagree with the suggested population of 4,000 birds in para 4.2.2 of the 2016 Breeding Seasons Ornithological *Surveys* report. On the basis of the figures provided by Holling *et al*., the population percentage given in para 4.2.4 should be given as 2.73% of the 2014 figure, or 3.0% of the 2009 to 2014 5 year mean, rather than the 2.45% suggested.

3.74 It is important to note that the 49 singing males mentioned in para 4.2.4 of the *2016 Breeding Season Ornithological Surveys* report represents a substantial population of birds. On the basis that there are an estimated 222 singing males in the whole of Wales (Holling *et al*., 2016) this population represents 22% of the entire Welsh population, indicating that this is probably the most important site for Cetti's warblers in all of Wales.

Barn owl (*Tyto alba*)

3.75 In para 141 of our objection letter we highlighted concerns about potential collision risks to barn owls, stating "It is important that habitat creation measures are in place to discourage birds from hunting in close proximity to the carriageway". We are consequently concerned about the details of the proposed planting of the motorway verges, which are likely to provide habitat that will encourage barn owl hunting in this dangerous area for them, due to the increased risk of mortality through collision with vehicles. Roads account for approximately 51% of known barn owl mortality (Shawyer, CR (1987)). Most road mortality occurs in the

autumn and involves young barn owls. There are a number of studies including work by Grilo et al (2012) that have looked at barn owl road mortality and the effect of habitat, which demonstrate that having suitable barn owl habitat (such as the rough semi-natural grassland verges in the proposal) close to roads increases the risk of mortality.

3.76 We are concerned that barn owl mitigation measures through the provision of nest boxes in very close proximity to the route corridor could be counterproductive. As it could lead to an increased collision risk to young barn owls during post-fledging dispersal. Locations identified for next box provision are land at Green Moor; and Maerdy SSSI "mitigation" area both of which are adjacent to the route corridor. The provision of nest boxes in the SSSI "mitigation" area at Caldicot Moor is also of concern as it is adjacent to the existing M4. There is no established safe distance at which nest boxes could safely be deployed. Thus, nest boxes would need to be relocated to the furthest points from the M4CaN.

Issues with other important bird species

3.77 The RSPB would have expected to see summaries for key species in the area. We are disappointed that these have not been included. We use the song thrush as in illustration of the challenges this creates:

Song thrush (*Turdus philomelos*)

3.78 The song thrush is Red listed in the 2015 Birds of Conservation Concern 4, because of a recent decline of its breeding population and range; and a recent decline of its winter population and range. It is listed as Amber in Wales[38] owing to its Red category at a UK level and is listed as a priority species in Section 7 of the Environment (Wales) Act 2016.

3.79 The RSPB note significant differences between the numbers recorded in the three years of surveying:

2014 – 32 breeding pairs (Arup)

2015 – no numbers summarised (Thomson Ecology)

2016 – 8 breeding pairs (Thomson Ecology)

3.80 Between 2014 and 2016 there has been a 75% decline in the number of birds reported in the surveys. Unfortunately no explanation has been advanced to accompany this information – for instance whether the differences relate to different survey areas, time of survey or whether this represents a rapid and substantial decline in the survey area. The RSPB would expect to see the reasons for such a significant decline in the reported figures explained within the report, and it is a matter of concern that this has not been done.

Marsh tit (*Poecile palustris*) and Willow tit (*Poecile montanus*)

3.81 The marsh tit and willow tit are both Red listed in the 2015 Birds of Conservation Concern 4.

[38] A revised population status of the bird species in Wales, based on the method of the 2015 UK review: Johnstone, I. & Bladwell, S. 2016. Birds of Conservation Concern in Wales 3: the population status of birds in Wales. Birds in Wales 13(1): 3-31.

3.82 Both species are Red listed in Wales because of severe long term declines of their breeding populations and they are listed as a priority species in Section 7 of the Environment (Wales) Act 2016.

3.83 Both willow tit and marsh tit were recorded a single time in Area 3 during Visit 3 (ES Supplement Volume 3: Appendix S10.5, Table 5 and figure 8). The report considers that the willow tit was not displaying breeding behaviour (Table 5).

3.84 Willow tit is very scarce and Hollings et al 2016 had only 7 pairs reported in 2014 from Wales, including 1 from Gwent. These figures are likely to be an underestimate, but there is no way of identifying the scale of the underestimate. However, these low figures are particularly important in relation to the records of willow tit in Area 2.

3.85 Willow tit was recorded 3 times in Area 2 during both Visits 2 and 3 (Table 4 and figure 6 and Table 5 and figure 9). This highlights that this area is important for this species. If the area had been surveyed by the CBC method it would be possible to have a much clearer understanding of the use of this site and the overall size of the population. It is regrettable that this is not the case.

3.86 Cramp S *et al* (1993) Handbook of Birds of Europe, the Middle East and North Africa Vol. VII, p176 indicates that the birds will stay in their territories throughout the year. This gives an indication of territory sizes:

> "Average territory size Baden-Wurttenburg 7.3ha (gross area) or 5.0ha (area actually used (1973). Study in Eichsfield area (between Harz and Thuringer Wald, East Germany) in mixed valley woodland, indicated much smaller territories of c1ha (but larger, at least 2ha, during nest site prospecting and much larger, up to c10ha, in winter (Wodner 1980)."

3.87 The implication of these studies is that due to the survey method used it is very difficult if not impossible to be certain about the status of Willow Tit in this area but at face value the population of willow tit in Area 2 is one of the largest in Wales and is of national significance.

3.88 Given the perilous situation of these species the failure to have a clearer idea of the population and its distribution is a source of concern, and highlights the problems that have been caused by the use of the BBS methodology. More detailed surveying needs to be carried out for these species.

Lapwing (*Vanellus vanellus*)

3.89 The lapwing is Red listed in the 2015 Birds of Conservation Concern 4. It is Red listed in Wales owing to a severe a short-term and long-term decline of the breeding population and is listed as a priority species in Section 7 of the Environment (Wales) Act 2016.

3.90 The 2015 Breeding Bird Survey identified 3 or more pairs of lapwing in survey area BBS1. There was only one sighting of two birds (in BBS1) (ES Supplement, Volume 3: Appendix S10.5, Table 3 and Figure 2) across all three survey areas during all three visits in 2016. Given the higher level found in 2015 it would have been appropriate to investigate this further, which could have been done if a Breeding Wader Survey had been undertaken in 2016 as we

suggested in our objection letter. The RSPB considers that the possibility of breeding cannot be ruled out, despite the note in Table 3 that breeding behaviour had not been recorded.

4. The impact of the M4 on bumblebees

4.1 In our objection letter we drew attention to the fact that the ES had highlighted one Section 7 species - Brown banded carder bee (*Bombus humilis*) but had failed to address impacts on two other Section 7 species, Red shanked carder bee (*Bombus ruderarius*) and Moss carder bee (*Bombus muscorum*), both of which are known to occur in the area from CCW and NRW reports (Annex, para 95). The text below has been prepared by Dr. Richard Comont of the Bumblebee Conservation Trust on behalf of the RSPB. His qualifications and information about the Bumblebee Conservation Trust are set out at Appendix 4.

Scope

4.2 This section describes:

- The ecological and conservation status of bumblebees
- Bumblebees on the Gwent Levels, particularly priority species for conservation
- Requirements of the conservation priority bumblebee species
- Likely impact of the M4 Corridor around Newport (M4CaN) on populations of conservation priority species
- Suitability of the survey work to date with respect to bumblebees
- Suitability of existing "mitigation" proposals for bumblebees

Ecology and conservation status of bumblebees

4.3 Bumblebees are one of the UK's most endangered species groups. Of 27 historically-resident species, three are already extinct, and seven are listed as species of principal importance for conservation in at least one of Wales, Scotland and England. Principal species are those listed on Section 7 of the Environment (Wales) Act 2016, Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (in England) or on the Scottish Biodiversity List. Designation denotes species which are of the highest priority for conservation in each country, and which are likely to decline significantly or go extinct altogether without conservation action. Eusocial[39] bees and wasps, including bumblebees, have a colonial lifecycle which makes them particularly vulnerable to habitat loss or degradation compared to most other species, particularly at certain times of the year (such as early spring – discussed in more detail below).

4.4 Each bumblebee colony contains a single reproductive female, the queen, and 40 to 400 (usually c. 100) sterile female workers (and later on, also males). Therefore, for every reproductive female, an area of land must also support a large number of sterile workers, which consume food but which do not reproduce. This means that a population which is genetically-viable in the medium or long term, generally accepted as a minimum 15-25 breeding females, must also have enough food to support the minimum 600-10,000 worker

[39] Eusocial animals are those which show a high level of complex social organisation, typically including a division of labour, with castes specialised to particular roles, including a sterile worker caste who care for the offspring of their reproductive relatives.

bumblebees as well. This is much less feasible than maintaining a population of non-colonial species, which have far fewer non-breeding individuals to feed without producing offspring

4.5 On average, worker bumblebees forage less than one kilometre from the nest[40]. This means that the area within that 1km radius from the nest must contain enough flowers (and thus pollen and nectar) to sustain all the nest's inhabitants, up to 400 bees. No single flower species can provide this for the lifespan of the nest, which can be from March through until early October, so the area must also have a succession of nectar- and pollen-rich flowers for the full time period. Research in farmland suggests that supporting populations of bumblebees and other common pollinator species requires a minimum of 2ha flower-rich areas and 1km of flowering hedgerows in every 100ha[41]. This figure is likely to be similar (or higher) for rare species.

4.6 When foraging in less flower-rich habitat, workers must forage for longer or over a wider area to collect the same quantity of pollen to feed to larvae. This means that the nest receives less pollen overall, reducing the number of larvae and thus decreasing the number of adult worker, queen and male bees and, ultimately, the viability of the population. Ultimately, as habitat is lost or degraded there is less food available for the bumblebees. Habitat loss (including habitat degradation, fragmentation and isolation) is thought to be the major driver for bumblebee declines over the past century.[42]

4.7 Towards the end of summer, the queen lays eggs which turn into new reproductive individuals – males and new queens. The numbers produced by each nest fluctuate hugely between years. This is dependent on the availability of pollen: new queens consume around three times as much pollen during their larval stage as do workers or males, so the nest must have amassed a pollen surplus or there will not be enough food for the new queens to develop.

4.8 Males and new queens mate, before the new queen goes into hibernation and all the others (males, workers, old queens) die off before winter. Queens emerge from hibernation in the spring and establish nests on their own, laying worker eggs and feeding them pollen until there are sufficient worker bumblebees to take over foraging.

4.9 This means that bumblebee populations are reduced to a tiny fraction – around 1% - of their peak summer numbers by the end of autumn, and they suffer an estimated further 50% loss of queens over the winter. Comparatively tiny numbers of queen bumblebees emerge in spring, and must, on their own, collect enough nectar to survive and enough pollen to raise offspring.

4.10 Consequently early-season forage (March-May) is vital, or no nests will be established. Similarly, late-season forage (August-September) is important as this is what will be fed to the developing larvae that hatch into males or new queens, next year's nest-builders. Queens are

[40] Knight et al. 2005. An interspecific comparison of foraging range and nest density of four bumblebee (*Bombus*) species. Molecular Ecology 14 (5), pp. 1811-1820

[41] Dicks et al 2015. How much flower-rich habitat is enough for wild pollinators? Answering a key policy question with incomplete knowledge. Ecological Entomology 40 (SI1), pp 22-35

[42] Carvell et al. 2006. Declines in forage availability for bumblebees at a national scale. Biological Conservation 132 (4), pp. 481-489

produced in August-September, generally entering hibernation during mid-August to mid-September. Workers and males will be about after this, but only the queens survive the winter.

4.11 Queens generally establish nests less than five km from where they hatched out[43]. This limited dispersal ability means that bumblebee populations are reliant on highly-connected landscapes not just for foraging, but for breeding. For habitat areas to be 'well-connected', there need not be a physical connection between habitat patches, but there must be enough patches of good-quality (flower-rich) habitat that bees can find and pass between them easily. This has been calculated for (potentially less-demanding) common species as around 2% of the area (2ha plus 1km flowering hedge in 100ha) in farmland[3].

4.12 Bumblebee colonies in good habitat patches within a fragmented landscape may have enough food for the nest to survive in the short term, but are not genetically sustainable in the medium or long term due to the isolation and small size of the population. For bumblebee populations to survive, let alone thrive, in the medium to long term they need large areas of well-connected habitat which is flower-rich from March to September.

4.13 This colonial lifecycle, with few reproductive individuals in any one area, means bumblebee populations tend to form metapopulations (series of small populations in areas of suitable habitat scattered across the landscape which are linked by dispersing reproductive bees and by inter-area matings). This allows declines in any one area to be arrested by colonialisation from other habitat patches. Generally, for bumblebees, each metapopulation requires a minimum of 10-20 km^2 with a series of forage and nesting areas. As these habitats become more fragmented and isolated within the landscape, it both supports fewer bees (as there is outright less habitat) and it becomes more difficult for bees to disperse between suitable areas. This leads to a progressive series of local extinctions, each further fragmenting the overall connectivity, and the eventual extinction of the entire metapopulation.

Bumblebees on the Gwent Levels

4.14 The Gwent Levels as a whole (inclusive of, but not restricted to, the series of SSSIs) are home to a good diversity of bumblebee species. Indeed, as a large expanse of near-contiguous flower-rich grazing marshland, drainage ditches and brownfield areas with populations of four bumblebee species of principal conservation importance, the Gwent Levels are one of the most important bumblebee areas in the UK. Both the M4CaN 2015 terrestrial invertebrate survey report (ES Volume 1, Chapter 10: *Ecology and Nature Conservation*) and a 2011 bumblebee survey[44] for CCW found 12 bumblebee species on the Levels. To place this in context, the mean number of species found per year on each of the sites monitored through

[43] Lepais et al 2010. Estimation of bumblebee queen dispersal distances using sibship reconstruction method. Molecular Ecology 19 (4), pp. 819-831

[44] Smith, M.N. 2011. The status and distribution of the shrill carder bee *Bombus sylvarum* on the eastern Gwent Levels and within the Caerwent and Caldicot areas of Gwent in 2010. CCW Contract Science Report No. 972. Countryside Council for Wales, Bangor.

BBCT's BeeWalk citizen-science monitoring scheme[45] across the UK is just five, and only seven species are thought to remain both widespread and abundant in the UK.

4.15 There are five species of bumblebee listed on Section 7 of the Environment (Wales) Act 2016 as Species of Principal Importance in Wales. The Gwent Levels are home to four of these: the Shrill Carder *Bombus sylvarum*, Moss Carder (*B. muscorum*), Brown-banded Carder (*B. humilis*), and the Red-shanked Carder (*B. ruderarius*). The only Section 7 bumblebee species which has not been recorded on the Gwent Levels is the Ruderal bumblebee (*B. ruderatus*), although this species is frequently overlooked because of a strong similarity to the common Garden bumblebee (*B. hortorum*).

Moss Carder (*Bombus muscorum*)

4.16 The Moss Carder is a large ginger bumblebee, which has declined significantly in terms of distribution since 1970, particularly in England and Wales. During the 21st century, it has been recorded from only 58% of the 10x10km Ordnance Survey grid squares which comprise the species' all-time distribution (Figure 1). Flying between May and September, it is generally found on large open areas of flower-rich grassland. The species nests on the ground surface and feed mostly on flowers with long corolla in the families *Fabaceae*, *Lamiaceae*, *Scrophulariaceae*, and the red-flowered *Asteraceae*.

4.17 The species now has a patchy distribution around the coast of Wales, virtually all west of the projected work area. It has been recorded only once within five km of the proposed route (Table 1), although a population is known just outside the western edge of this affected area.

[45] BeeWalk is a standardised bumblebee monitoring scheme where volunteers walk a fixed route (a transect) on a monthly basis between March and October, counting and identifying the bumblebees that they see. For full details see www.beewalk.org.uk.

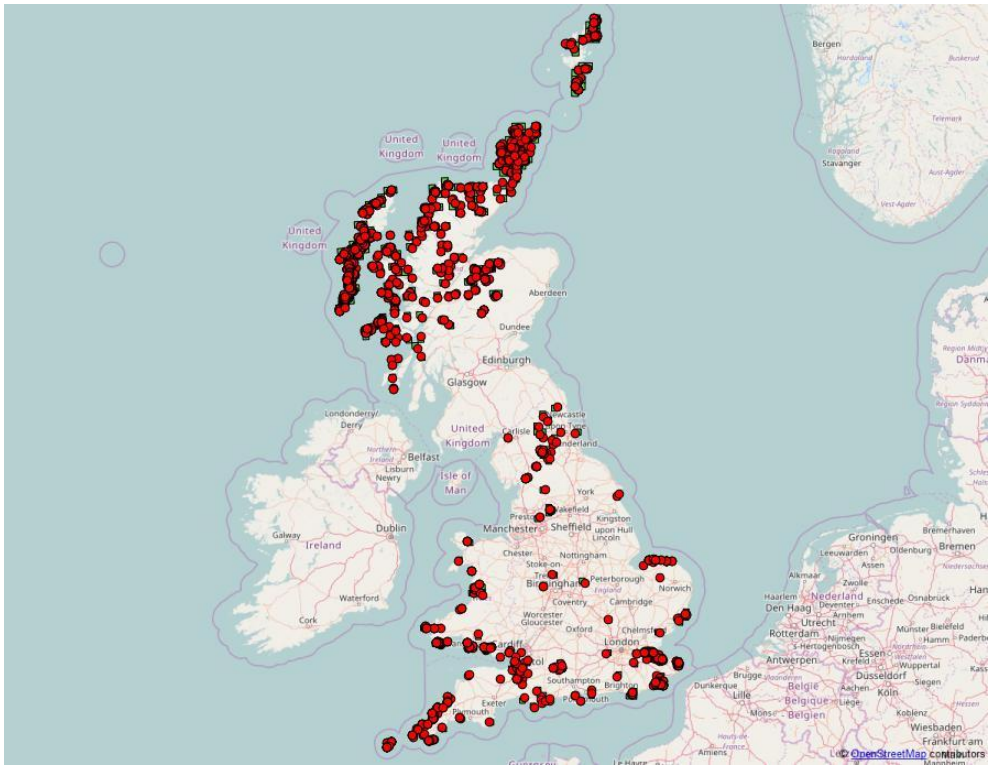

Figure 1: Post-2000 recorded distribution of the Moss Carder bumblebee (*Bombus muscorum*)

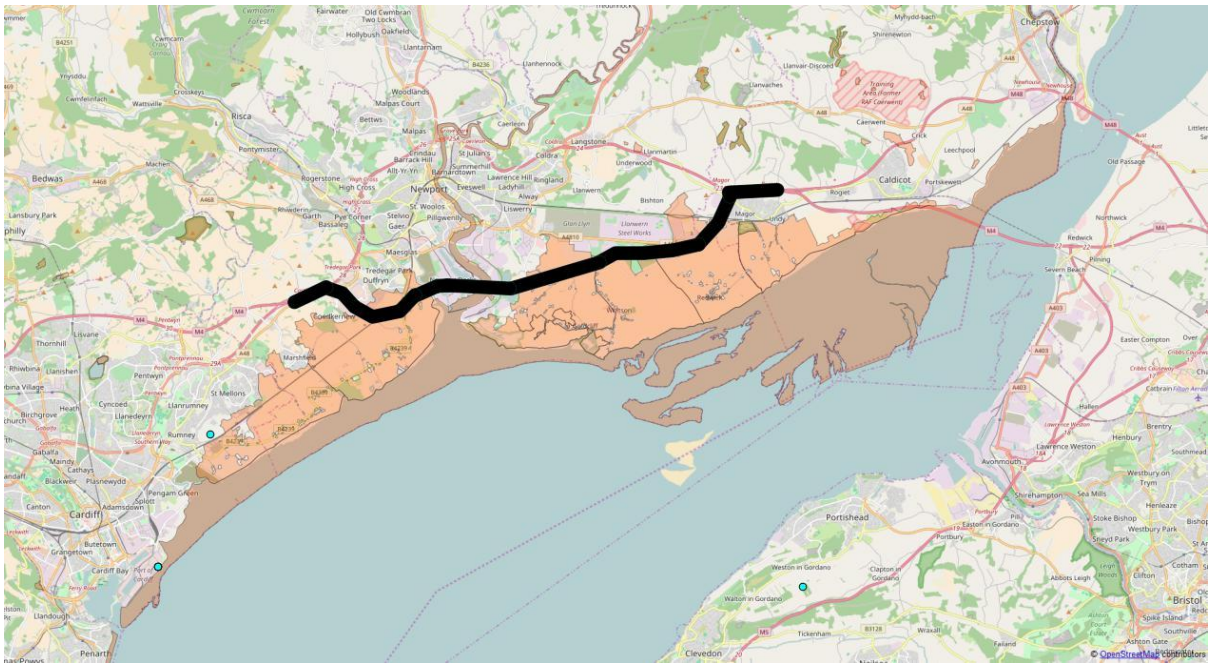

Figure 2 - Post-2000 recorded distribution of the Moss Carder bumblebee (*Bombus muscorum*) relative to the proposed new M4 route (black) and the Gwent Levels SSSIs (pink)

Red-Shanked Carder (*Bombus ruderarius*)

4.18 The Red-Shanked Carder is a small black bumblebee with a red tail which, while widespread, appears to be largely restricted to sizeable areas of unimproved grassland or low-intensity grazing land. Nationwide, the species has only been recorded from 36% of its all-time range since 2000 (Figure 3). The species is on the wing between April and August, nesting on the ground's surface and foraging mainly from flowers in the families *Fabaceae*, *Scrophulariaceae*, and *Lamiaceae*. The early emergence of this species makes it more reliant than the other rare species on spring forage.

4.19 Within Wales, the Red-shanked Carder has mostly been found along the South Wales coast from St Davids to Caldicot, with a handful of scattered records elsewhere. There are just seven Welsh records held by the national recording body BWARS for the period 2000-2015, although it should be noted that the species is difficult to distinguish from the commoner Red-tailed bumblebee *B. lapidarius* and is thus likely to be considerably under-recorded.

4.20 Two of these Red-shanked Carder records were from the vicinity of the proposed route during CCW surveying during 2010[4], almost 30% of the total Welsh records (Table 1).

Species	**Britain**	**Wales**		**< 5km from black route**			**< 1km from black route**		
	R	**R**	**GB**	**R**	**GB**	**W**	**R**	**GB**	**W**
Brown-banded carder	1774	599	33.8%	208	11.7%	34.7%	47	2.6%	7.8%
Moss Carder	2239	182	8.1%	1	0%	0.5%	0	0%	0%
Red-shanked carder	375	7	1.9%	2	0.5%	28.6%	1	0.3%	14.3%
Shrill Carder	924	570	61.7%	277	30.0%	48.6%	72	7.8%	12.6%

Table 1. Number of recorded sightings (R) of the four Section 7 bumblebee species known from the Gwent Levels in Great Britain (GB) as a whole, and Wales, as well as within 5km and 1km of the M4 relief road black route. Counts within each smaller area are also expressed as percentages of the total number of sightings in the UK (UK) and Wales (W). Data are publicly-available from the NBN Gateway.

4.21 The two remaining species are those which will suffer most from the motorway redevelopment (see sections below on the likely impacts of the scheme for more details).

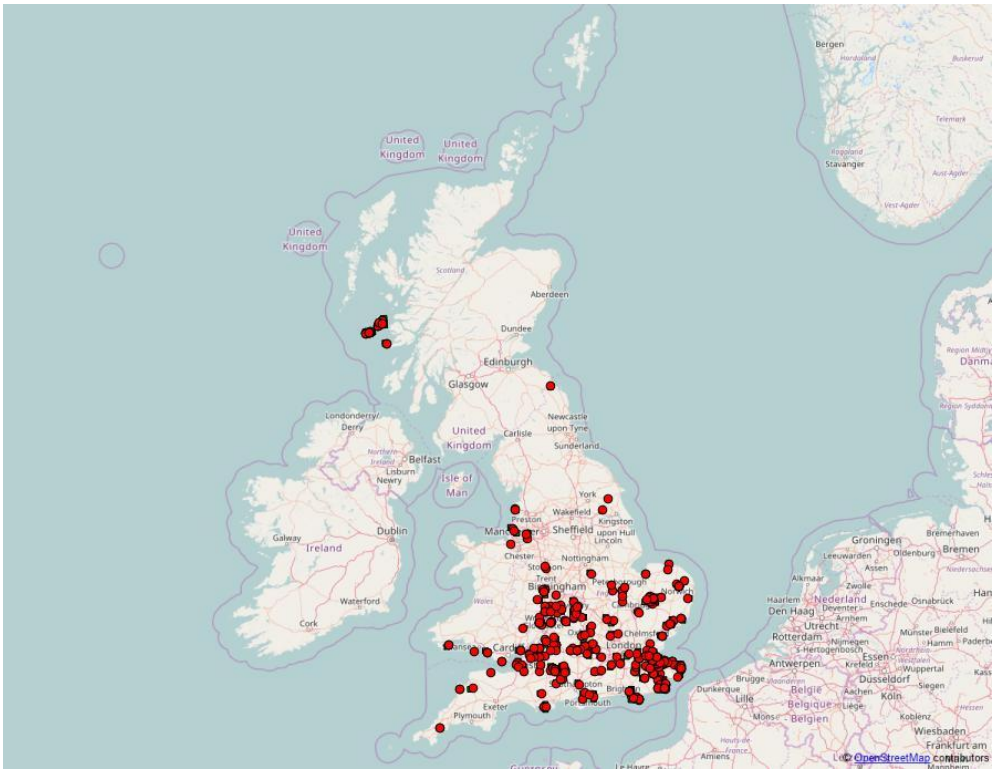

Figure 3 - Post-2000 recorded distribution of the Red-shanked Carder bumblebee (*Bombus ruderarius*)

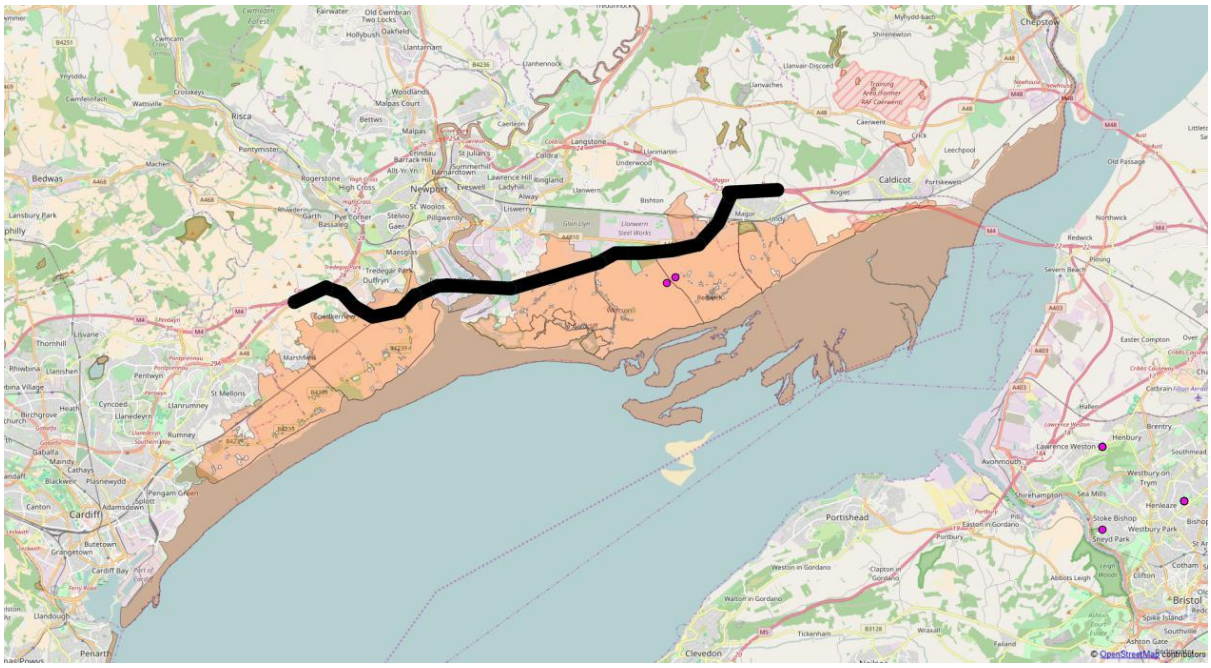

Figure 4 - Post-2000 recorded distribution of the Red-shanked Carder bumblebee (*Bombus ruderarius*) relative to the proposed new M4 route (black) and the Gwent Levels SSSIs (pink)

Brown-banded Carder (*Bombus humilis*)

4.22 The Brown-banded Carder is a medium-sized ginger bumblebee, very similar in appearance to the Moss Carder and the Common Carder (*B. pascuorum*) and similarly flying between May and September. The species has been lost from 57% of its former range (Figure 5) and is now largely restricted to extensive areas of coastal grasslands which are rich in flowers of the families *Fabaceae*, *Scrophulariaceae*, and *Lamiaceae*. Particular hotspots include the Atlantic coast of Devon and Cornwall, Salisbury Plain, the Thames Estuary, and scattered metapopulations along the south coast of England (Studland Peninsula, Hayling Island, Eastbourne & Dungeness) and Wales (St David's, Castlemartin, Gower peninsula, Porthcawl, and the Gwent Levels).

4.23 Like the closely-related Moss Carder, it has declined significantly in recent years, and is now largely restricted to scattered populations spread around the south coast from Anglesey to East Anglia. In Wales, the southern coast is a particular hotspot for the Brown-banded Carder and a third of the 21st-Century British records of the species have been from Wales. A third of the Welsh records (and 12% of the UK total) have been made less than five km from the proposed route (Table 1).

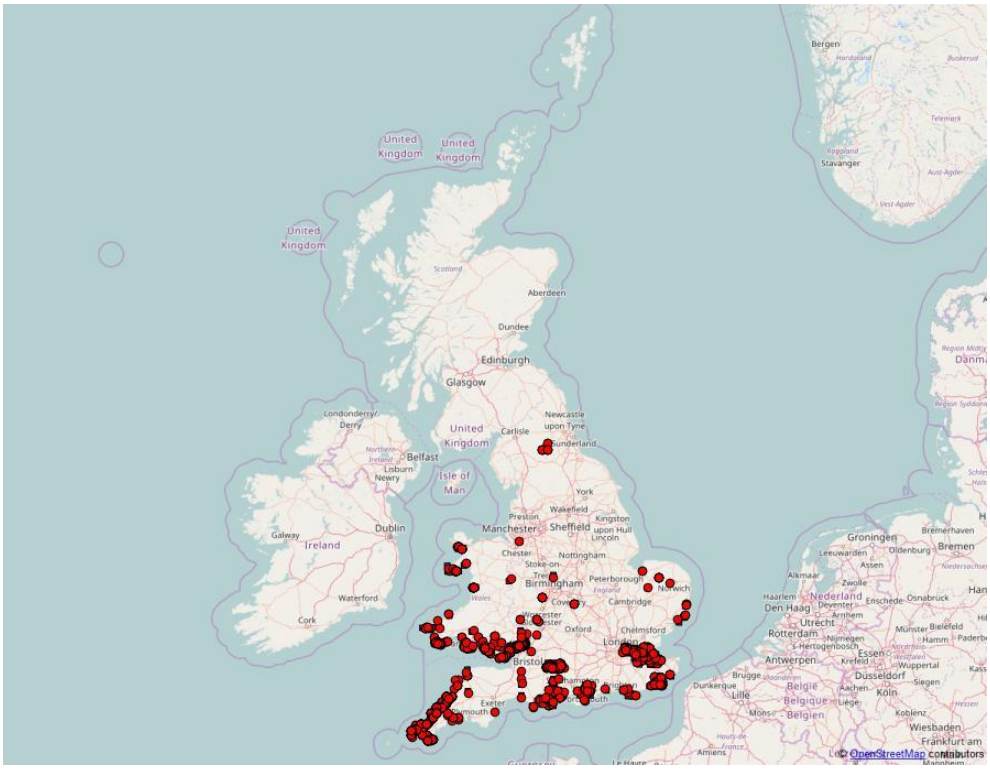

Figure 5- Post-2000 recorded distribution of the Brown-banded Carder bumblebee (*Bombus humilis*)

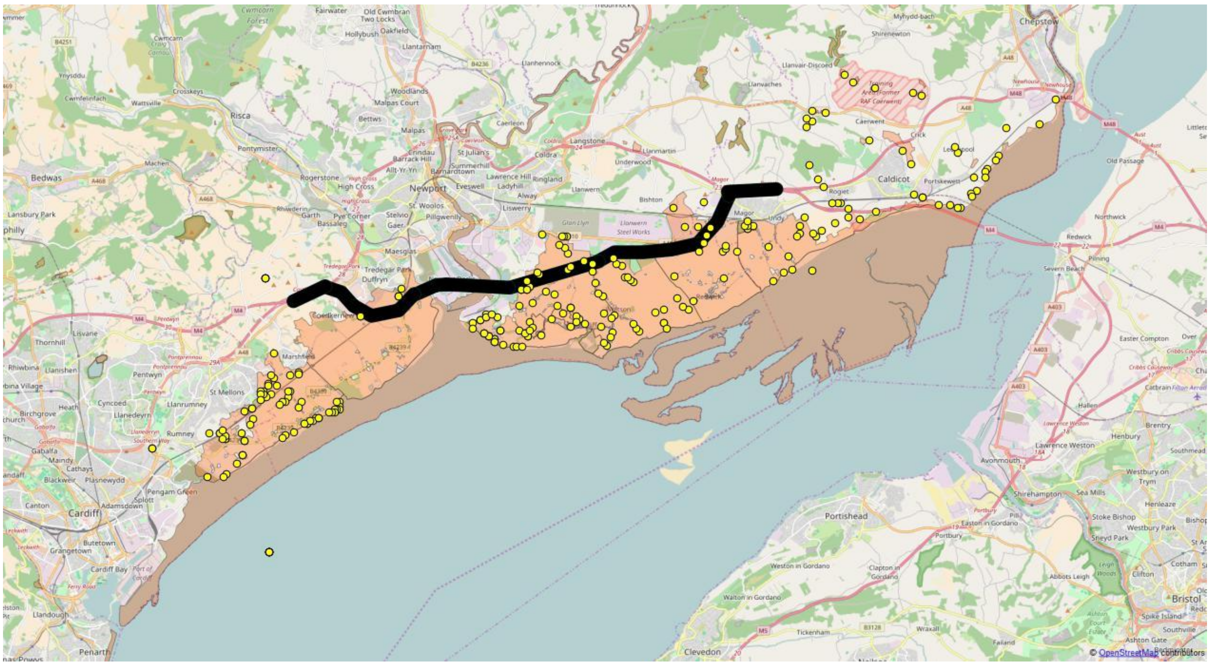

Figure 6 - Post-2000 recorded distribution of the Brown-banded Carder bumblebee (*Bombus humilis*) relative to the proposed new M4 route (black) and the Gwent Levels SSSIs (pink).

4.24 The M4CaN environmental surveys have recorded this species west of the River Usk which would at least partially fill in the gap south of the western end of the proposed new M4, as well as on the Tata Steel site to the north of the route (neither plotted as exact locations not known).

Shrill Carder (*Bombus sylvarum*)

4.25 The figures are even starker for the Shrill Carder, Britain's most endangered bumblebee. A small grey-yellow species with an orange tail named for the high-pitched buzz it produces in flight, it has declined catastrophically over the past 50 years. The species has been lost from 79.5% of its former distribution, and there are records from just 64 10km grid squares since 2000 (Figure 7). It is largely restricted to open flower-rich habitats, flying from May to late September. The species feeds from the flowers of a wide range of plant families, particularly *Fabaceae*, *Scrophulariaceae*, *Lamiaceae*, and *Boraginaceae*.

4.26 Formerly widespread across lowland England and Wales, by 2000 the species was reduced to just seven populations, four in England and three in south Wales. Two of the English populations have since gone extinct (Salisbury Plain and Dungeness). Of the remaining five populations, two (Castlemartin Peninsula and Somerset Levels) have undergone significant post-2000 declines, one (Kenfig) appears to be geographically limited with low recent counts, and only two (Thames Estuary and Gwent Levels) are thought to be large enough to be genetically sustainable in the long term[46]. The Gwent Levels are the most important area in Wales for the species, and the joint most important area (level with the Thames Estuary) in Britain. Reasons for this decline are not known for certain, but habitat fragmentation from

[46] Ellis et al 2006. Extremely low effective population sizes, genetic structuring and reduced genetic diversity in a threatened bumblebee species, *Bombus sylvarum* (Hymenoptera: Apidae). Molecular Ecology 15, pp. 4375-4386

loss of flower-rich grassland and agricultural intensification are thought to have been key factors.

4.27 Wales has 62% of the post-2000 British sightings, and 30% of the British records (49% of the Welsh records) are from within five kilometres of the proposed Black Route (Table 1). The suggestions in the M4CaN environmental report that Shrill Carder 'seems to be doing very well in South Wales with strong populations from Pembrokeshire to the Gwent Levels (NBN)' and that the 'population in the Gwent Levels is one of seven remaining populations in the UK' are incorrect, misleading and around a decade out of date. There are just five remaining populations nationwide: there have been no records on Salisbury Plain since 2008 and no Cornish records since 2004 (and even these records appear to be suspect as they do not appear in the 2016 Cornwall Bumblebee Atlas). There remain three separate populations in Wales, two of which currently appear to be shrinking, rather than being 'strong populations'. The only strong population – quite possibly the only genetically sustainable population - in South Wales is on the Gwent Levels. The M4CaN environmental surveys have recorded this species west of the River Usk, which would at least partially fill in the gap south of the western end of the proposed new M4, as well as on the Llanwern Steelworks site to the north of the route (neither mapped as exact locations are not known).

Figure 7- Post-2000 recorded distribution of the Shrill Carder bumblebee (*Bombus sylvarum*)

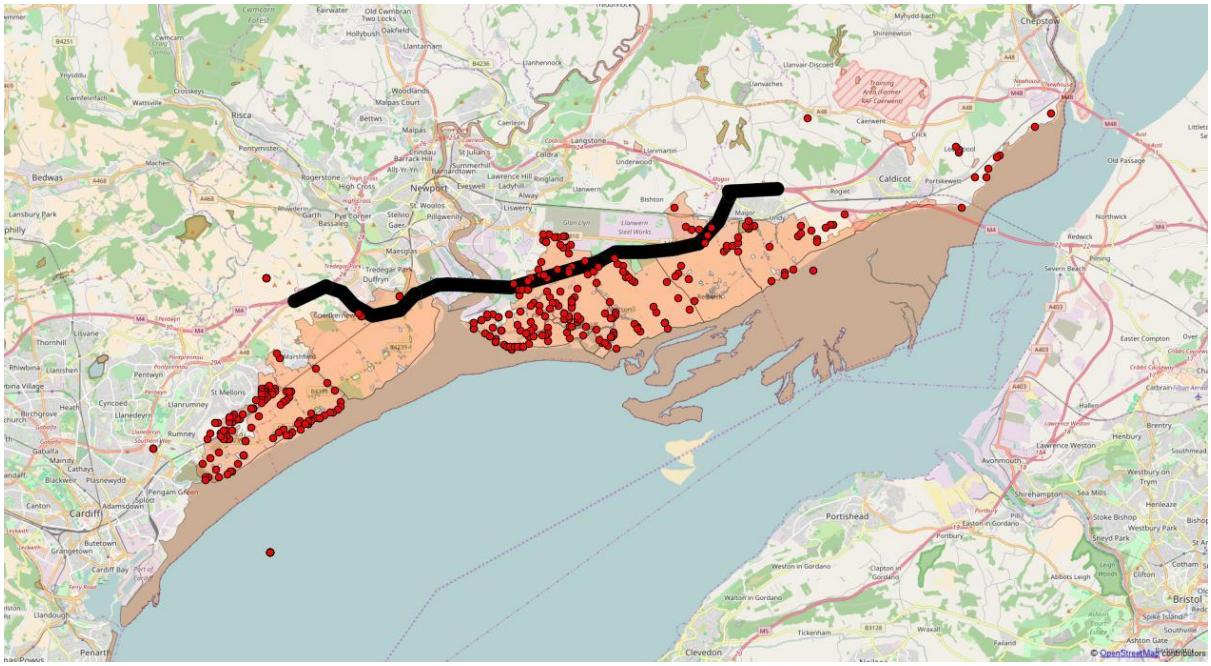

Figure 8 - Post-2000 recorded distribution of the Shrill Carder bumblebee (*Bombus sylvarum*) relative to the proposed new M4 route (black) and the Gwent Levels SSSIs (pink). The M4CaN environmental surveys have recorded this species west of the River Usk which would at least partially fill in the gap south of the western end of the proposed new M4, as well as on the Tata Steel site to the north of the route (neither plotted as exact locations not known).

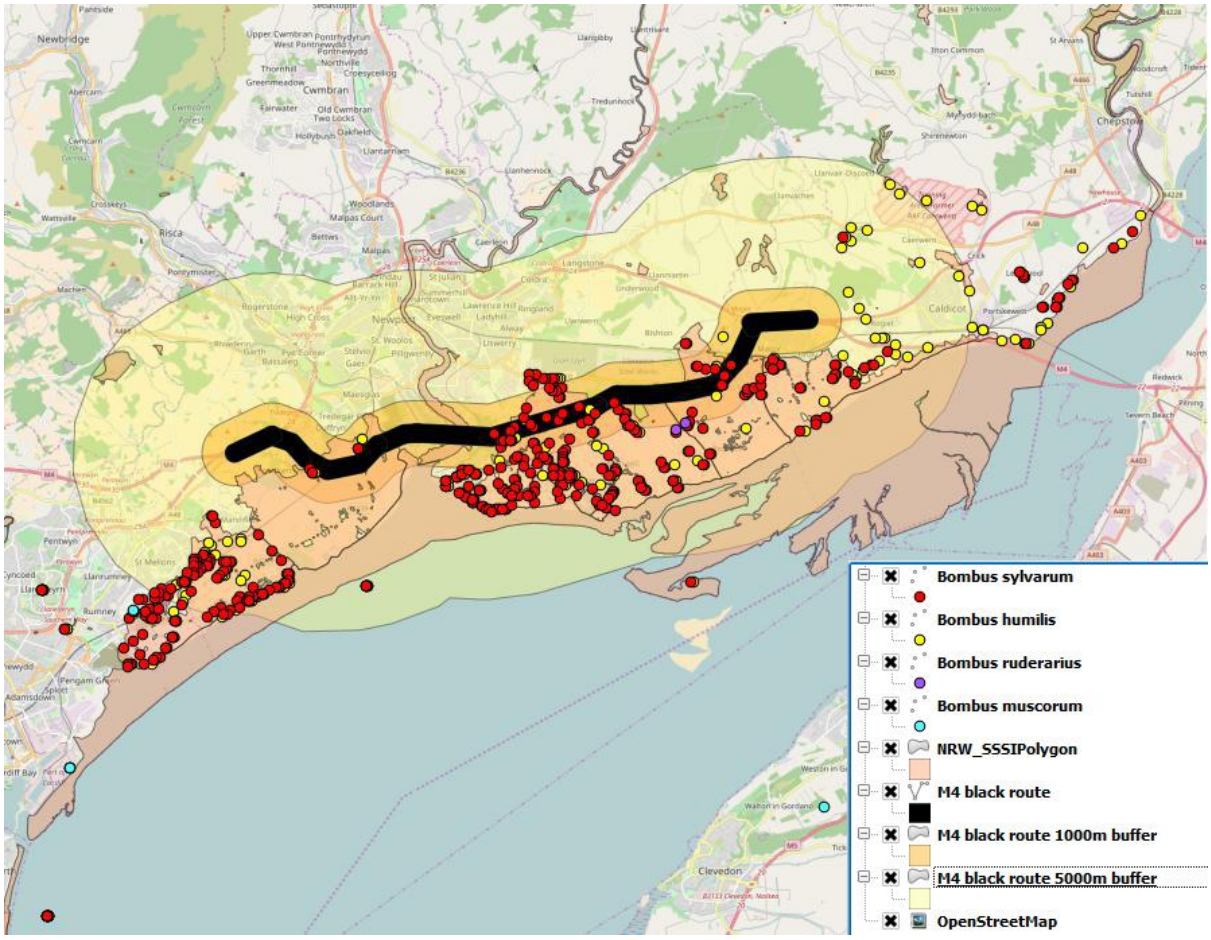

Figure 9 - All post-2000 records of Section 7 Priority Species for Conservation bumblebees in the affected area. The two loci around the proposed M4 black route are 1km and 5km from the motorway route. Sightings within the black would

be within the 250m footprint of the motorway itself, those within the inner locus would potentially have foraging disrupted, and within the outer locus would potentially have queen dispersal affected.

Seasonality of all four bumblebee species

4.28 Timing, as well as location, is key to bumblebee's continued survival. Queens of all four Section 7 bumblebee species emerge from hibernation between mid-April and mid-June (with some variation due to species and weather conditions). Queens then must establish a nest and raise a first batch of workers on their own: this spring period, with heavy demands and minimal foraging resources, is the first key period for bumblebees. Colonies increase in size through the summer, peaking in August-early September. New reproductive individuals (males and new queens) are produced at this point, requiring considerable extra amounts of pollen (and to a lesser extent nectar) from the foraging workers. This is the second critical period for the group. After emerging from the nest, males and new queens mate before the queens go into hibernation and the males and remaining workers gradually die off. Bumblebee populations are at their lowest absolute numbers during the winter and are vulnerable to disturbance of hibernation sites.

Requirements of the conservation priority bumblebee species

4.29 We focus on the Shrill Carder from now on, as it is the rarest species both nationwide and within Wales, as well as the bumblebee species most at risk from this planning proposal. However, unless specifically stated, these comments apply equally to the three other Section 7 species listed above.

4.30 It is clear that the Gwent Levels (in a broad sense) are ***the major stronghold*** for the Shrill Carder bumblebee in the UK, with 30% of the post-2000 sightings of the species (Figure 9). The species is a Qualifying Feature of six of the eight SSSIs on the Levels (Nash & Goldcliff, Newport Wetlands, Redwick & Llandevenny, Rumney & Peterstone, St. Brides and Whitson)[47,48]. It is also present on two more SSSIs (Magor Marsh and Magor & Undy), where it should also be listed as a qualifying feature as the species forms a landscape-scale metapopulation across the Levels. This metapopulation also extends beyond the SSSI boundaries onto the surrounding brownfield areas such as the TATA Steel land, Llanwern Steelworks, and the Associated British Ports land at Newport. Brownfield sites such as these are often flower-rich and very good forage areas for rare bumblebees such as the Shrill Carder: indeed, the Thames Estuary population is almost entirely found on brownfield sites.

4.31 The landscape-wide metapopulation nature of bumblebees' population structure means that preservation of any one of the SSSIs would not be enough to secure the conservation of the Shrill Carder. The SSSIs, while playing a central role, are only part of the story in the wider context of the Shrill Carder's Gwent range, and areas outside the SSSI boundaries must be considered as functionally linked to the SSSI populations. Loss or severance of any part of this existing range is likely to negatively impact the survival of the population, and thus the survival of the species in the UK. The positioning of the M4 Black Route is such that it is likely to divide the existing large population into three smaller, less-viable populations: west of the

[47] M4CaN Environmental Statement Supplement vol 3 appendix S10.3. Howe, 2012. The distribution of the Shrill Carder bee *Bombus sylvarum* on the Gwent Levels, 1998-2010

[48] M4CaN Environmental Statement Supplement vol 3 appendix S10.2

River Usk (37% of the current population by number of sightings); East of the Usk and south of the new M4 (53%); and east of the Usk and north of the new M4 (10%) (Figure 9).

4.32 Bumblebees, including the rare Section 7 species such as Shrill Carder, have two main requirements: food and a home. Home means nesting sites and places for queens to overwinter. These tend not to be in short supply: the species forms small nests on the ground surface, usually beneath moss, in rough vegetation. Food is more difficult: bumblebees require a large-scale mosaic of well-connected forage areas, with flowers producing enough nectar and pollen to sustain the bumblebees between March and October.

4.33 Plant species which are particularly important to bumblebees include red bartsia *Odontites vernus*, red clover *Trifolium pratense*, creeping thistle *Cirsium arvense*, common bird's-foot trefoil *Lotus corniculatus*, common knapweed *Centaurea nigra* and viper's bugloss *Echium vulgare*. On the Gwent Levels, CCW/NRW surveys have recorded Shrill Carders collecting pollen and/or nectar from 26 plant species, especially narrow-leaved everlasting-pea *Lathyrus sylvestris*, common knapweed *Centaurea nigra*, tufted vetch *Vicia cracca*, red clover *Trifolium pratense*, common bird's-foot-trefoil *Lotus corniculatus* and sunflower *Helianthus annuus*[49]. None of these plants are particularly difficult to grow, but several are not common components of meadow seed mixes and would need to be added specifically. Others do better with particular planting regimes, such as scarification or co-seeding with yellow rattle (*Rhinanthus minor*), which parasitizes grasses and reduces their vigour, allowing wild flowers to flourish.

4.34 Connectivity between forage patches is essential. No single site has enough plants, flowering in succession from May to October, to support a viable population of the bumblebee. Therefore the population depends on uninterrupted access to a series of different sites, each with the different mixture of plant species supported by differences in soil type and other environmental conditions. This provides a continual range of pollen and nectar sources staggered throughout the bumblebees' flight season, but the bees must be able to access a range of these habitat patches.

4.35 This connectivity can be enhanced by favourable management of reens, ditches, road verges, and field margins, creating a flower-rich network linking larger habitat patches together. Favourable management in this sense is that which ensures an abundance of flowers which the bees are known to use.

Suitability of the survey work to date with respect to bumblebees

4.36 Invertebrates vary widely in their emergence and activity times both within a day and through the year. Best practice to ensure the full spectrum of invertebrates are surveyed is to revisit the site multiple times between March and October to ensure at least spring-, summer-, and autumn-active invertebrates are covered[50,51]. Once Phase 1 and desktop studies identify a site as potentially important for invertebrates, a 'typical site' of 10-50ha should receive a

[49] Smith, M.N. 2011. The status and distribution of the shrill carder bee *Bombus sylvarum* on the eastern Gwent Levels and within the Caerwent and Caldicot areas of Gwent in 2010. CCW Contract Science Report No. 972. Countryside Council for Wales, Bangor.
[50] IN180: Organising surveys to determine site quality for invertebrates (2006). English Nature, Peterborough.
[51] Good practice planning for invertebrates (2015). Buglife, Peterborough.

minimum of 3-7 days of field surveying (5-7 hours in the field) (plus 3-7 days identification work and 2-5 days writing up)[50]. The proposed new M4 route is much larger than this: the straight-line distance between junctions 23 and 29 is 18 km, so the site is at least 450ha even if only the 250m-wide corridor is considered. Despite this, the terrestrial invertebrates received at most nine days field surveying (three days on the Tata Steel land, three days bumblebee surveying, and 'three visits' to the western Newport Docks area.

4.37 Clearly then, the timing and methodology of the environmental survey work commissioned to date leaves much to be desired. In particular, the survey was not done over a long enough period, and there was no repeat surveying of areas. Invertebrate survey guidance states that several visits should be undertaken between March and October in order to capture the full diversity of such areas. In this case, surveys were only carried out between July and September, completely neglecting the invertebrates of spring, autumn, and early summer.

4.38 Although bumblebees are active for several months from late spring through to early autumn, they do not use the same areas equally throughout this period. As previously noted, the Shrill Carder bumblebee is reliant on a mosaic of sites across the landscape for forage at different times of the year. Areas used in one month may not be suitable in another, and the bees will be foraging somewhere completely different with different forage plants. On top of this, the different management regimes in place at different sites (e.g. mowing, grazing) will further affect the timing and availability of forage plants. This means that a series of single visits to sites, particularly in less than ideal weather, as these were, provides no more than a partial snapshot of how bees happen to be using sites over the three surveyed days during their five-month flight season.

4.39 The survey was also worryingly limited geographically, covering only the directly-impacted 250m-wide buffer zone and road footprint. The direct impacts of the new road will be felt much more widely, not least in the areas north of the road which will be used for storage of materials during construction, and should have been surveyed. The environmental surveys also did not pursue access to several areas within the designated area: "The area that was not sampled could be seen to be improved pasture of low floral diversity, very unlikely to be different from the adjacent fields that were searched". Due to the nature of their foraging, bumblebees do not need floristically-diverse habitat as long as the diversity exists across the site matrix. Improved horse pasture such as the sites ignored here often contain stands of important forage plants such as red bartsia and have been found to be used by Shrill Carder during NRW surveys at Kenfig[52].

4.40 Both the environmental survey and the scoping report (desk study) appear to be unaware of the Shrill Carder surveys of the area commissioned by CCW in 2009[53], 2010[54] and 2012[55].

[52] Stewart & Roberts (2014). The status and distribution of the Shrill Carder bee *Bombus sylvarum* in the Kenfig-Port Talbot area in 2013. NRW evidence report 23

[53] Smith, M.N. (2010). The status and distribution of the Shrill Carder bee *Bombus sylvarum* on Magor & Undy SSSI and Whitson SSSI on the Gwent Levels and on Newport Wetlands National Nature Reserve in 2009. CCW Contract Science Report No. 919. Countryside Council for Wales, Bangor.

[54] Smith, M.N. 2011. The status and distribution of the shrill carder bee *Bombus sylvarum* on the eastern Gwent Levels and within the Caerwent and Caldicot areas of Gwent in 2010. CCW Contract Science Report No. 972. Countryside Council for Wales, Bangor.

Although a CCW summary of the Gwent Levels status of the species is included as Appendix 10.3, this dates from 2010 and only includes the 2009 survey (Magor & Undy and Whitson SSSIs). Possibly related to this, the M4CaN paperwork completely misses the presence of a Section 7 bumblebee with very few recent Welsh records (*B. ruderarius*) on both the Whitson and Redwick & Landevenny SSSIs.

4.41 The combination of limited surveying and missing of existing survey reports means that it is impossible to have confidence in the conclusions reached. The potential for harming the Gwent Levels Shrill Carder population – a nationally-important area for a nationally rare species - has been considerably underestimated.

Likely impact of the scheme on populations of conservation priority species

4.42 The M4CaN proposal would cross the Gwent Levels, passing through a series of sites holding British and European conservation designations, as well as several sites of regional importance for wildlife. The Gwent Levels are some of the most extensive and important areas of wet pasture in the UK. They are the largest such area in Wales, and are only comparable to three English sites (Romney Marsh, Pevensey Levels, and the Somerset Levels).

4.43 It will directly cross and thus remove land from five SSSIs (St Bride's SSSI, Nash and Goldcliff SSSI, Whitson SSSI, Redwick and Llandevenny SSSI, and the River Usk (Lower Usk) SSSI) as well as the River Usk (Lower Usk) Special Area of Conservation (SAC). It will also cross and remove land from nine locally-designated Sites of Importance for Nature Conservation (SINCs) (plus another three during construction) and two areas of ancient woodland[56].

Direct habitat loss:

4.44 The route would directly consume 721[57] hectares of land (including land for construction and mitigation)[58]. Within the Gwent Levels SSSI network 135 hectares of land would be destroyed permanently, and a further 20ha would be lost as habitat for the projected four years of construction.

4.45 The SSSI sites are primarily designated for the Shrill Carder and the reen and ditch habitat which supports the bee and many other rare invertebrate species. The M4CaN plan proposes essentially 1:1 like-for-like replacement by length for the 2755 metres of reen and 9373m of ditch[59] destroyed by construction of the road (2657m and 9771m respectively), but this will not solve the loss of connectivity across the route of the road: Even where the reens and ditches remain connected beneath the road, they will not be on the surface and so the vegetation, which is the value of the network for Shrill Carder, will be permanently lost.

4.46 Habitat lost across these sites will include woodland, hedgerows, saltmarsh, grazing marsh, and brownfield open mosaic habitats. Loss of the last two in particular will threaten the Shrill

[55] Smith, M.N. 2013. The status and distribution of the shrill carder bee *Bombus sylvarum* on Gwent Levels – Rumney and Peterstone SSSI and Gwent Levels – Nash and Goldcliff SSSI in 2012. CCW Contract Science Report No. 1030. Countryside Council for Wales, Bangor.
[56] M4CaN Environmental Statement: Non-technical Summary, March 2016, p37.
[57] Numbers for land take (overall, per habitat, and per site), metres of reen and ditch destroyed, etc, all vary considerably between documents, raising questions over thoroughness
[58] M4CaN Statement of Case, Part 1, para 1.7.3.
[59] M4CaN Environmental Statement Supplement, volume 1, para 2.1.82.

Carder population in the short, medium and long term across the Gwent Levels region, not just within the SSSI areas. Some 77.6ha of SSSI grassland, a major area of habitat for the Shrill Carder, is within the direct footprint of the road and would be destroyed. Hedgerows and woodland edges are likely to be important nesting and overwintering sites for the bees, and their destruction would represent a significant loss to the species. This is particularly true if these were to be destroyed during the winter, as this is when bumblebee populations are at their lowest ebb (only queens overwinter), and these overwintering queens will be in hibernation sites around the bases of hedgerows, etc.

Bumblebee population fragmentation and isolation:

4.47 Further Shrill Carder habitat would be lost from the vegetated brownfield areas at Great Pencarn, Newport Docks, and Tata Steel during construction of the new road. Loss of spring and summer foraging habitat in these brownfield areas is particularly important as they support the northern offshoots of the current population, which will be turned into small, vulnerable populations when they are cut off from the larger southern population by the new road.

4.48 Loss of habitat at Newport Docks will also make it more likely that the Shrill Carder population epicentres east and west of the River Usk would be severed from each other, a risk exacerbated by both the new road and the new access road to Docks Way. While the river poses a barrier at the moment comparable in width to the proposed new road, the effect is minimal in comparison because of a lack of barriers along the edges (eg motorway escarpments), and the lack of the air turbulence and roadkill risk posed by several thousand vehicles per day passing at high speed.

4.49 While it is claimed that the construction sites at Great Pencarn, Newport Docks and Tata Steel would be restored post-construction, this would still result in a four- or five-year period when the areas were unsuitable for the bumblebee, reducing the available foraging area before the compensation areas are created. As bumblebees have an annual lifecycle, this means that populations would be unable to use the area for 4-5 generations, causing the population to shrink just at the time it is most vital that populations are expanded to minimise the harm done by dividing them with the new road.

4.50 The new motorway (and other large roads built as part of the development) are likely to represent significant barriers to the Shrill Carder and other bumblebee species. Bumblebees are known to treat transport links such as roads and railways as barriers in the landscape, and rarely cross them[60]. Tall hedges and lines of trees are also known to be significant barriers to flying insects[61,62] although they can also provide foraging and nesting resources. This, combined with the removal (or forcing underground) of ditches and reens across the new route of the motorway and the addition of screening banks and trees on either side of the

[60] Bhattacharya, M., Primack, R, & Gerwein, J. (2003). Are roads and railroads barriers to bumblebee movement in a temperate suburban conservation area? Biological Conservation 109(1) p. 37-45

[61] Wratten et al (2003). Field boundaries as barriers to movement of hover flies (Diptera: Syrphidae) in cultivated land. Oecologia 134 (4) p. 605-611

[62] Dover, F.G. & Fry, G. (2001). Experimental simulation of some visual and physical components of a hedge and the effects of butterfly behaviours in an agricultural landscape. Entomologia Experimentalis et Applicata 100 (2) p. 221-233

road footprint, make it highly likely that the development will present a near-impenetrable barrier to bumblebee. This is contrary to the overly-optimistic judgement of the M4CaN Statement of Case Part 2 & 3 that the road "would not be likely to prevent exchange of individuals between sites".

4.51 As these bee-suitable habitat corridors are lost, so too is the connectivity between Shrill Carder populations north and south of the proposed route. This severance is likely to split the existing Shrill Carder metapopulation on the Levels into at least two (north and south of the new route). It may even fragment the population into three (one north of the route, and one either side of the River Usk south of the new route) (Figure 8). Although there is some distance between different epicentres within this metapopulation, there are no major barriers to dispersal between them. This would change with the erection of the proposed new M4.

4.52 Bumblebees need large areas of suitable habitat to survive in the long term, as laid out previously, and it is very unlikely that the population north of the road will survive, let alone thrive. This northern population will be most at risk of local extinction if the road is built to the proposed specifications, yet there are no plans for compensation north of the route. Bees which did attempt to cross the new motorway would be at severe risk of becoming roadkill. Road mortality tends to be proportionally lower amongst rare bees than common species[63], but only because rare species have a tendency to forage closer to the nest, increasing the severance effect of the road in dividing what is currently a single large, healthy population into three smaller, less-viable populations.

4.53 The populations south of the road which make up 37% (west of the Usk) and 53% (east of the Usk) of the post-2000 population are more viable, though their prospects would be greatly enhanced if they were to remain connected (encompassing 90% of the current population). However, any proposal to wilfully reduce the size of one of just five remaining British populations of our most endangered bumblebee is taking an unnecessary and unjustified risk with the future of the species in our country.

4.54 The scattered nature of the Shrill Carder's remaining handful of British populations means that there is no realistic chance of any parts of the split population receiving the reinforcements from other populations that could help them survive: the nearest other population is at Kenfig, 36km west of Rumney, the edge of the current population, and 48km from the what would be the western edge of a population north of the new M4.

Habitat degradation:

4.55 One of the main reasons that bumblebees such as the Shrill Carder are thought to have become rare is that they exhibit preferences for flowers such as those of family *Fabaceae*, many of which are predominantly found in comparatively low-nutrient-input areas such as hay meadows. A diffuse impact of the relocation of the motorway will be the greatly increased emission of nitrogenous exhaust fumes through the Gwent Levels. Nutrient fertilisation from road traffic emissions on even small roads is known to change the species composition of

[63] Williams, P. & Osborne, J. (2009). Bumblebee vulnerability and conservation world-wide. Apidologie 40 p. 367-387

vegetation assemblages up to hundreds of metres from the road footprint itself[64]. The change is towards more-nitrogen-tolerant species such as coarse grasses and away from less-nitrogen-tolerant species such as the preferred forage plants of the Shrill Carder and other rare species. This will produce a zone of degraded habitat of little to no use for bumblebees on either side of the new road, as well as widening the effective barrier width of the new motorway and increasing the severance effect of the project.

Suitability of existing "mitigation" proposals for bumblebees

4.56 The bumblebee-focused "mitigation" proposals (more accurately 'compensation proposals') for this project include measures "to improve the species diversity of existing grasslands, to create new species-rich grassland on areas which are currently arable land, to enhance the biodiversity of existing reen and ditch banks, and to create new ditches, with associated bank vegetation"[65]. This would be centred on three "mitigation" sites: Caldicot Moor, Tatton Farm (both east of the River Usk), and Maerdy Farm (west of the river). Additionally, cuttings, south-facing slopes of motorway embankments, and the bunds of associated infrastructure would be sown with a bumblebee-friendly seed mix, as would be existing grassland at the Tatton Farm "mitigation" site. Arable farmland would be converted to grassland at the Caldicot Moor and Maerdy Farm "mitigation" sites, overall replacing the 77.6ha of grassland lost with 26.1ha of "species-rich grassland"[24].

4.57 The construction sites at Great Pencarn, Newport Docks and Tata Steel will be restored "as far as practicable"[66] to mosaic habitat including "areas with food plant species of value to shrill carder bee"[24]. This restoration is to be welcomed, as brownfield mosaic habitats are a major habitat for Shrill Carder, but does not address the loss of habitat during the construction phase. There must also be clarity on which particular 'food plant species of value to the Shrill Carder' will be used. This must be added to the mitigation strategy.

4.58 Reens and ditches would be restored at an approximately 1:1 ratio with those destroyed (2568 metres of reen lost, 2657m recreated and 9136m of ditch lost, 9771m recreated[67]). It is not clear whether reens and ditches converted to culverts would be regarded as lost in this scenario. Although the waterbody remains in place and connected, the littoral vegetation which provides value for the Shrill Carder and other bumblebee species would be lost and thus these culvertised sections should be regarded as lost as far as bumblebees are concerned. The littoral vegetation of reconstructed reens and ditches should consist of a varied structure of open flower-rich areas interspersed with shelter belts of scrub and trees.

4.59 The 1:1 habitat replacement ratio is too low for a site of this quality. Habitat compensation for this project should attempt not just to replace the habitat destroyed by the project, but also repair the damage inflicted by the severance effect of the road, fragmenting a large healthy population into two smaller, less-viable populations. Therefore compensation for bumblebees should take place on both sides of the proposed route, not just in the south with the largest

[64] Angnold, P.G. (1997). The impact of a road upon adjacent heathland vegetation: effects on plant species composition. Journal of Applied Ecology 34 p. 409-417
[65] M4CaN Environmental Statement, volume 1. Chapter 19, Conclusions. Paragraph 19.8.55
[66] M4CaN Environmental Statement, volume 1. Chapter 10, Ecology and Nature Conservation.
[67] M4CaN Environmental Statement, volume 3, appendix 10.35 para 1.3.2.

remaining population. On both sides of the new road, enough suitable habitat should be provided that each population is able to remain stable at the very least. This will require much more than the approximately 1:1 reen & ditch replacement ratio, and the approximately 1:3 recreated:destroyed ratio for grassland. In particular this is because suitable compensation must be provided on both sides of the new road, where the nationally-important bumblebee populations will be divided at least into two.

4.60 The three "mitigation" areas are of reasonable size (Tatton Farm 17ha, Maerdy Farm 24ha, Caldicot Moor 113 ha) but it is unclear how much of each would be used in compensation in general, let alone to provide Shrill Carder habitat ("the actual extent of land within these areas which would be required to provide compensation is to be agreed with NRW."[24]). This will clearly have a major impact on the overall suitability (or not) of the compensation scheme, although the placement of the compensation areas means that the population remnant north of the proposed road and east of the Usk will not be helped however much of the three sites is used for compensation. All three new sites are south of the proposed M4 route: although this population will be reduced in size and will require support, the 10% of the population north of the proposed route is by far the most likely to be forced to extinction. The existing "mitigation" proposals do not even attempt to address this, and support for this northern population beyond reversion of the Tata Steel construction site to mosaic habitat is imperative to include within the compensation scheme. A starting point might be the temporary compensation of the 'temporary' construction land take at the time when the land is unavailable for bumblebees, rather than afterwards once the road is finished and the construction sites are reverted to open mosaic habitats.

4.61 A specimen of the Shrill Carder was seen at Caldicot Moor during CCW surveys in 2009[68], so the species clearly uses the area although breeding at the site is not proven. Focused planting and management work has the potential to significantly increase the size of the Shrill Carder population on the eastern end of the Gwent Levels, and increase connectivity with the small population around Portskewett. The species currently appears to have a smaller population at the eastern end than it does in the west, so this work would stand a reasonable chance of undoing some of the damage these works would do to one of the best populations of Britain's most threatened bumblebee species.

4.62 When the compensation proposals are produced in detail, it is essential that flower-rich areas of compensation should be connected to existing Shrill Carder populations as far as is possible. The landscape must be made permeable to bumblebees by the provision of flower-rich corridors along reens, ditches, field edges and transport pathways such as road verges. This will ensure the population remains as unfragmented as possible on each side of the new road.

4.63 The suggested seed mix for the Mitigation Strategy's conversion of land to species-rich grassland for the Shrill Carder looks to be a broadly appropriate starting point, but should also include yellow rattle and red bartsia. Both these plant species are hemi-parasitic on grasses, reducing their vigour and allowing flower species to establish. This will be particularly

[68] Smith, M.N. (2010). The status and distribution of the Shrill Carder bee *Bombus sylvarum* on Magor & Undy SSSI and Whitson SSSI on the Gwent Levels and on Newport Wetlands National Nature Reserve in 2009. CCW Contract Science Report No. 919. Countryside Council for Wales, Bangor.

important on the agriculturally-improved farmland of the proposed compensation areas, as they will help reduce the competitive advantage enjoyed by grasses in enriched soils. Both species are also good forage plants for bumblebees, particularly red bartsia which is a favourite of the Shrill Carder. Overall, it is important that the compensation seed mix includes a range of flower species which provide a succession of forage resources to bumblebees between at least May and September, the main flight period of the Shrill Carder, in South Wales.

4.64 It is unclear how the grassland compensation areas are to be managed, particularly in the long term, but best results are likely to come from the sympathetic management of flower-rich swards within pasture land. This lack of clarity makes it impossible to have confidence in even the best-case scenario which could be construed from these vague compensation proposals. Even in a best-case scenario (which would be all three proposed "mitigation" areas devoted to bumblebees in their entirety, reens and ditches restored), the site management (mowing regime, seeding mixture, timing & ground treatment, etc) is essential to make the areas actually suitable for bumblebees. The Shrill Carder is a particularly late-flying bumblebee species and the mowing/grazing regime must reflect this, with flowers remaining available until queen bumblebees have begun hibernation in late September. At a minimum, NRW and the Bumblebee Conservation Trust should be consulted over the establishment and management strategies and the compensation land locked into long-term management goals.

4.65 For the compensation strategy to effectively compensate for the loss and fragmentation of habitat and Shrill Carder populations, it is important that the fine-scale microhabitat of the lost habitat is replicated in the replacement areas. For bumblebees, this is particularly important with nesting habitat as there is little data on the nesting preferences of rare bumblebee species such as the Shrill Carder.

Conclusion

4.66 There are serious concerns that the proposed M4CaN using the Black Route would have considerable adverse impacts on the rare bumblebee populations on and around the Gwent Levels SSSIs. In particular, the detrimental effect on the Shrill Carder bumblebee *Bombus sylvarum* could significantly weaken the species' status in the UK as a whole.

4.67 The Gwent Levels are an area of national significance for bumblebees, especially for the Shrill Carder bee. Although these species are centred on the SSSI land, they are not restricted to it and brownfield sites are particularly important both as foraging and nesting habitat and as resource-rich dispersal corridors between SSSI areas.

4.68 Because of the way bumblebee populations are structured at a landscape scale, fragmentation of large areas of suitable habitat can be as detrimental to them as habitat destruction. The proposed M4 development will divide the nationally-important site of the largest Shrill Carder population in Wales into either two or three smaller populations. This will at best have significant detrimental effects on the viability of the population north of the new route (10% current population), and is likely to eradicate this population completely by cutting it off from the larger population(s) south of the road.

4.69 The section of the current population west of the River Usk and south of the proposed route (35% current population) is also likely to be cut off from the main extent of the current population, with negative effects. It is likely to remain viable in at least the medium term, but far more vulnerable to extinction through random events (eg flooding, a very wet summer, etc). The main area of the current population is likely to remain viable but at a fraction of its former size (around 53% of the current population), as the loss of the northern (and possibly western) areas will weaken the population correspondingly. This will in turn make any and all of the smaller remaining populations more susceptible to extinction through external pressures, as well as far closer to the threshold of genetic unsustainability. With the Kenfig and Castlemartin populations showing apparent declines in recent years, this development could sound the death knell for the Shrill Carder as a Welsh species.

4.70 A further indirect effect of road developments such as this tends to be 'filling in' land between the road and the town with residential or industrial developments. Loss of this strip of habitable land north of the proposed motorway route would be particularly damaging for the Shrill Carder and other bumblebee species and should be addressed specifically in the M4CaN plan. In light of the strong requirement for compensation areas north of the proposed motorway it would be sensible to use some of this land as compensation.

4.71 Overall, the "mitigation" strategy is limited and lacking in detail. At present, there can be no confidence it will address the serious and significant impacts on the Shrill Carder bumblebee identified here. It is impossible, from the information provided, to agree with the conclusion of the Environmental Strategy that adverse effects can be avoided on rare bumblebee species, principally the Shrill Carder and Brown-banded Carder bumblebees. This is particularly true during the construction phase, when the land take is greatest, but the severance and fragmentation effects of the proposed development during the operational phase also pose a major threat to the bumblebee populations.

4.72 In particular, it is far from clear that the overall "mitigation" strategy will fully mitigate for the loss of SSSI area, let alone the extra effects of fragmenting a nationally-important population of Shrill Carder, one of just two large, healthy metapopulations in the UK. It is particularly unclear how the project will meet the statutory duty to maintain and enhance biodiversity imposed on the Welsh government by the new Environment (Wales) Act 2016 in the context of the probable diminution of the Shrill Carder population in the affected area.

4.73 If the road is to be built in the proposed location, a large enough area of suitable habitat must be created north of the route to allow the northern population to become self-sustaining, in addition to compensation south of the motorway. As a first priority the compensation package must be made clear: currently the proposals are far too vague for any real scrutiny. Secondly, the package will need to cover more areas and thus is likely to need to be made larger.

4.74 The proposed M4 relief road will actively harm rare bumblebee species directly and indirectly, and that the proposed compensation measures are not yet fit for their stated purpose of preventing this.

5. The mitigation/compensation package for the M4CaN

5.1 The RSPB has evaluated the mitigation/compensation package from a bird and bumblebee perspective only.

5.2 As highlighted above, the RSPB consider that much of the work described by the Welsh Government as "mitigation" is more properly termed "compensation" as it does not prevent or reduce the harm being caused by the M4CaN, but rather seeks to provide replacement habitat elsewhere. The RSPB considers it essential that measures are properly described as compensation to reflect the destructive nature of the works that have necessitated them. We request that the Inspectors adopt the correct terminology in their Report.

5.3 The RSPB made a number of detailed comments in relation to the proposed mitigation and compensation measures in the Annex attached to its objection letter of 4 May 2016. This section develops and expands upon those points. For ease of reference key parts from that Annex are reproduced in this section.

5.4 The RSPB considers that the mitigation/compensation package is wholly inadequate and requires fundamental changes to make it fit for purpose. We set out our reasons, and the changes that are needed, below.

What is needed overall

Birds

5.5 The RSPB has highlighted that the bird assessment work has not focussed on the overall route of the M4CaN, but rather key survey areas. This means that the total bird population required to be covered by the compensation package has not been identified, and that therefore it is likely that the measures proposed do not provide adequate compensation for the species affected. The RSPB has highlighted the species for which this is the case.

Common crane

5.6 One pair of cranes is affected by the M4CaN.

5.7 Crane territory size is quite variable, usually between 20-50ha. Site X appears to be on the small size at up to c. 22 ha. It is split into two discrete parcels, one for nesting and one for foraging, with the land between these used as a corridor for movement between the two areas. This corridor would be destroyed by the motorway, severing the two parts of the breeding site. We also consider that the nesting site would be destroyed. The RSPB considers that the construction and operation of the M4CaN would cause the cranes to abandon this site.

5.8 Replacement habitat would need to be of sufficient size and quality to encourage the cranes to establish a breeding territory. Based on our experience in the UK and Germany, we suggest that the following elements would need to be provided at a compensation site:

- A wetland area of c. 1.7 ha, including a vegetated island surrounded by a 3 m ditch to a depth of 1 m throughout the breeding season. The island and ditch edge should support dense reed to provide cover for nesting cranes. Our experience of creating breeding pools for cranes in undisturbed habitat suggests that cranes may not start to

use a new breeding pool for three to four years, after which vegetation cover may be sufficiently mature to provide the level of concealment that cranes require.

- Up to 19 ha of invertebrate-rich grassland, accessible to foraging adults with chicks. This includes:
    - 2-3 ha of invertebrate-rich hay meadow adjacent to a breeding pool for foraging in the first two weeks after hatching. The key requirement is to secure some uncut, very lightly managed (or unmanaged) blocks adjacent to the breeding pool areas where an invertebrate-rich sward is provided within an area of cover for newly-hatched chicks.
    - Up to 16 ha of additional invertebrate-rich hay meadow within the breeding territory.
- The foraging habitat at Site X was clearly sufficient to support a pair of breeding cranes and a single chick to fledging. Given the modest size of the foraging area, it is likely that the habitat quality was very high.
- It would help greatly to have reliable field data on the quality of foraging habitat at Site X and the compensation sites. This would help determine how much replacement foraging habitat would be required to meet the needs of breeding cranes, and how quickly this might be achieved.
- In the absence of empirical data, we should assume that the current foraging value of habitats within the three proposed replacement sites is low. It is unlikely that conversion to high value foraging habitat would occur in less than five years. We believe that the area of replacement foraging habitat would therefore need to be significantly larger than the area available at Site X. A replacement ratio of 2:1 is not unreasonable in our view, suggesting an area of replacement foraging habitat of up to c. 38 ha plus a breeding pool**, giving a total replacement area of c. 40 ha.** This is still comfortably within the range of estimated territory size for cranes elsewhere in the UK.
- Replacement habitat may need to be buffered by up to 500m against specific disturbance features, depending on e.g. the amount of intervening cover and accessibility. This would include public rights of way.[69]
- There should be no housing or industrial development within 500m of a crane territory. This would minimise impacts from both human disturbance and cat predation.

[69] This suggests that a disturbance-free area of up to 128ha may be required, depending on topography and cover. This area would incorporate a breeding pool and foraging habitat of up to 40ha, depending on the foraging value of grassland at a compensation site. The site could be smaller if the site is well screened – for instance with lots of hedgerows in areas where human access is clearly restricted (e.g. the absence of Public Rights of Way). Ordinary farming operations are probably okay.

- The site should be free from overhead pylons to minimise the risk of collision or the birds avoiding the site.

5.9 It is essential that sufficient replacement habitat for cranes is available ***before*** M4CaN impacts at Site X occur. The RSPB note the tight timescale for construction currently proposed by the Welsh Government, and consider that it is unlikely to get the necessary compensation measures in place in order to meet that timing.

Cetti's warbler

5.10 Cetti's warbler is listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended. It is an offence under section 1 of the Act to either intentionally or recklessly disturb this species at, on or near an active nest or whilst it has dependent young.

5.11 The Welsh Government have identified 49 singing male Cetti's warblers centred on the reens of the Llanwern Steelworks which may be impacted (ES Volume 3, Appendix S10.5, *2016 Breeding Season Ornithological Surveys*). This makes it probably the most important site in Wales. Compensation provided here will need to be of an exemplary standard to ensure that this crucial population is not negatively impacted.

5.12 As a full route survey has not been undertaken it is not possible to do a proper territory analysis. This means that the Welsh Government either need to accept the figure of 49 pairs from their own survey or alternatively undertake a route survey for this species to identify how many pairs need to be mitigated for. The RSPB's views are set out on the basis of the 49 pairs identified by the Welsh Government.

5.13 The RSPB anticipates that Cetti's warblers would use any reens which are fringed by a mixture of reeds and/or mixed scrub. However, we are aware that NRW would like more open reens with some reed and limited scrub in order to maximise the value for the aquatic flora and fauna of the reens[70]. Until the vegetation along the replacement reens has been agreed it is consequently not possible for the RSPB to be confident that they would provide suitable habitat for the Cetti's warblers.

5.14 The Cetti's warblers would be likely to use habitat provided for cranes. To help facilitate this, the provision of small willow bushes on the edges of the ditches would provide suitable habitat for the warblers without causing any problems for the cranes.

Lapwing

5.15 Some suitable compensation for lapwing will need to be secured. Due to issues associated with the bird survey work that we have highlighted above it is not yet clear how large an area will be needed for this purpose. However it is possible to set out some key points now: The land cannot go into the Newport Wetlands SSSI and National Nature Reserve (NNR) due to its role as compensation for Cardiff Bay and the targets associated with that. However, the RSPB considers that an area of search between the M4 and Newport Wetlands would be the best to focus on. Breeding lapwing require pasture with a short sward, high spring water levels (to provide surface 'splash') and an open vista, which is managed by grazing. Heavy grazing

[70] A specified in Annex 3 NRW Comment on Environmental Information of NRWs written response to the Draft Orders dated 4th May 2016.

(preferably with cattle) from late summer onwards will provide a short sward for nesting lapwings for the following spring. Whilst the land needs to be wet for wintering lapwing. Livestock should be removed or reduced in numbers during the breeding season (late March to June).

Other birds

5.16 Some additional water area, referred to in 5.15 within the compensation sites would provide suitable habitat for teal and mallard, whilst wintering birds require a more substantial expanse of wet areas c200ha It may also have some value for shoveler and (less) for pintail.

5.17 The creation of scrapes within the three compensation areas formed part of the SSSI Mitigation Strategy (Sections 3 and 4 of ES Volume 3: Appendix 10.35). The objective of scrape creation is to provide habitat for aquatic/semi-aquatic plants and insects. Surface water features such as scrapes would also benefit wetland birds, especially lapwing and redshank. However, scrape creation has been removed from the revised draft SSSI Mitigation Strategy (ESS Appendix SR10.35). In the absence of an explanation, we find it difficult to understand why this important surface water feature no longer forms part of the SSSI Mitigation Strategy.

Bees

5.18 The key issues that need to be addressed are:

- The severance effect of the motorway route: splitting one large bumblebee population into two or three small populations
- Loss of further connectivity through loss or re-routing of reens and ditches
- Direct loss of current habitat to infrastructure
- Indirect degradation of habitat through incorrect management of compensation sites including verges

5.19 More land is needed than is currently offered. The lost: destroyed 1:1 reen and 1:3 grassland ratios are far too low. This should largely be provided in the form of flower rich hay meadows. It has been suggested that 2ha of highly-concentrated wildflower strips and 1km of flowering hedges in every 100ha of land can sustain populations of common generalist bumblebees (Dicks *et al* 2015). For rare species, which exhibit greater foraging preferences and shorter foraging ranges, these figures should be doubled.

5.20 Provision of some brownfield mosaic habitat to replace that lost to construction is required, during the construction phase rather than afterwards. These should be situated as close to construction storage areas as possible to minimise disruption to foraging bumblebees.

5.21 Compensatory habitat needs to be provided on both the north and south sides of the motorway. It is currently only proposed to the south and that decision imperils the part of the population north of the motorway as the area that is left is too small for it to remain as a viable population.

5.22 The habitat that is replaced needs sympathetic management, particularly as regards to the mowing and grazing regimes and seed mixes used, in order to replace the fine-scale habitat variability lost during the development and which are crucial for bumblebees.

5.23 In addition to securing the land for bee mitigation a clear and effective management regime needs to be put into place to ensure that the habitat remains suitable for bumblebees in perpetuity. This would need to detail what work will be carried out when, over what area, with clear details on how the work will be carried out, and which is informed by best practice guidelines and consultation with experts.[71] The evidence on bees above demonstrates that there are key times of the year when the vegetation needs to be mowed, for instance. As a general rule, management should aim to provide a flower-rich sward from spring through to early autumn, with constancy of flower provision. Grazing should not be too intensive (or flowers are trampled or eaten) and mowing cuts should be staggered, only up to half the area being cut at any one time to ensure there are always flowers available. Hedgerows and scrubby or tussocky areas provide nesting and overwintering habitats, as well as spring forage (many hedgerow herb-layer plants such as ground ivy and dead-nettles are bumblebee-friendly early-season nectar plants, as are Blackthorn, cherry-plum and others in the hedgerow itself).

5.24 The reen and ditch edges should have a varied structure of open flower-rich habitats interspersed with scrub/trees to provide shelter. Shrill carder bees will not use dense reedbeds or lagoons, but the rest of the habitat work suggested for Cetti's warbler and cranes would be suitable.

5.25 The severance effect of the road is a particular problem for the bees, and it is likely that it cannot be overcome. Trees planted along the verge are likely to be a further barrier to bee passage. Consequently, we recommend that the lower part of any embankment is planted with flower-rich vegetation and that the upper slopes are planted with scrub rather than trees. This will help reduce the collision risk to foraging bees whilst ensuring a sufficiently open area for post-breeding queen and male bee dispersal. However, it is important to note that this will not ensure that the severance risk is overcome. To ensure the viability of the shrill-carder populations to the north of the motorway it will be essential that significant habitat creation works are undertaken to ensure that this northern population can be self-sufficient with a much reduced genetic exchange with the southern population (probably down to an occasional dispersing queen).

5.26 In addition, to ensure that the metapopulation is kept intact it will be important to incorporate flower-rich habitat "stepping stones" for genetic exchange along the route. Ideally these should be no more than 1km from each other.

[71] For example: "In year 1 for site 1, x hectares of Site X will be topped for seed collection during September 201-. This seed mix will have Yellow-rattle seed added to it at the rate of X kg/ha and the resulting mixture will be spread over a y-hectare area of compensation site Y centred on [grid reference] immediately after this is scarified, also in September 201-. The recipient site will be divided into two sections as per map X, and these will be cut for hay during July 201- approximately two weeks apart, to maintain floral continuity. All cut material will be removed from the site in order to gradually reduce soil fertility and thus improve floral diversity in the sward."

5.27 In relation to the proposed compensation sites, we offer the following comments to optimise the efficiency of the compensation measures:

- At Maerdy Farm, the surrounding fields are all in arable use and would need extensive and possibly lengthy conversion to flower-rich meadows. The site would have the potential to help the western Shrill Carder populations if it is managed sympathetically.
- Major works should not be carried out during August and September if Shrill Carders are present on site as this is a critical time for the production of new reproductive individuals. It is noted that pesticide applications may be undertaken 'where necessary to manage the spread of perennial weeds that are dominating small areas of the sward' (ES, Vol.3, Appendix 10.35, section 4.10.38). This should not be done where these are bee-friendly plant species such as thistles, especially not whilst in flower.
- The hay cut should be staggered as detailed above, rather than being carried out in one go as this would remove any remaining Shrill Carder foodplants at a critical time for the nest.

Reens

5.28 Any replacement will need to be at substantially more than the present 1:1 currently being proposed: We defer to Gwent Wildlife Trust for an indication of the most appropriate ratio. The areas which are culverted should be discounted from compensation figures as they are effectively lost to many of the interests that would use them and are therefore not an equivalent replacement in ecological terms.

5.29 The reens compensation will need to repair the severance effect of the road.

What is currently offered and what changes must be made to improve it

5.30 In the Annex to the RSPB's objection letter we highlighted that 2 of the 3 proposed compensation areas were located within Sites of Special Scientific Interest (SSSI) (Maerdy Farm is located within the Gwent Levels – St Brides SSSI and Tatton Farm within the Gwent Levels – Nash and Goldcliff SSSI). For convenience we repeat them here:

> "104. There is, therefore, a responsibility already on NRW to work with owners and occupiers of these SSSIs to secure the restoration of those features in unfavourable condition through implementation of appropriate site management measures.
>
> 105. It is only acceptable to consider the management of existing SSSI features as a compensation measure (not mitigation, as it does not reduce the *in situ* loss) in very narrow circumstances. That is where the proposed management would clearly enhance the SSSI feature(s) over and above favourable condition. Given the apparent unfavourable condition of the SSSI features and the need to restore them to favourable condition, we consider this option is not currently available. Notwithstanding that, for completeness we comment on the effectiveness of the proposed SSSI management measures below."

5.31 The RSPB's overall conclusion on the adequacy of the package of measures was as follows:

"107. Overall, RSPB Cymru is not convinced as to the effectiveness of the proposed mitigation and compensation measures and on our current understanding they cannot be relied upon to address the predicted direct and indirect impacts.

- **Measures to manage existing SSSI watercourses should properly be considered compensation and only come into play once the SSSI features have been restored to favourable condition.** In the absence of more detailed understanding of the reasons for unfavourable condition and measures in place to restore favourable condition, we do not consider it is possible to enhance these features over and above favourable condition i.e. compensation is not currently feasible.
- **The successful creation of new reens and ditches is questionable.** As well as practical design concerns, RSPB Cymru considers that the likelihood of success cannot be assured given the apparent unfavourable condition of existing reens and ditches[72], the lack of a full understanding of the underlying causes of that unfavourable condition and implementation of suitable mechanisms to remedy those cause."

5.32 The RSPB maintains its position that the Gwent Levels – St Brides SSSI and the Gwent Levels – Nash and Goldcliff SSSI must be restored to a favourable condition ***before*** the delivery of compensation at Maerdy Farm and Tatton Farm can be considered. It is important to note that the construction of the M4CaN through these SSSIs will make it all the more difficult to achieve the favourable condition that is a necessary precursor to the compensation packages. At present it is the RSPB's considered view that two of the three compensation sites proposed are consequently ***undeliverable*** and cannot therefore be taken into consideration when evaluating the overall impact of the M4CaN.

5.33 Before considering the individual sites we offer some generic comments, based upon the comments submitted in the Annex to our objection letter.

5.34 The RSPB has expressed concern about the adequacy of the of the replacement ratios, at 1 above and in our original objection, which we repeat here for ease of reference:

"128. The ratio of replacement of infilled reen and ditches appears to be led by drainage, rather than ecological considerations (ES paragraph 10.5.44) as , based on the figures supplied in the ES, it would increase the length of the reens by just 3.5% and the length of the ditches by 7%. If it was an ecologically led approach we would expect that the area and connectivity of the reens would be maximised and the need for structures limited, as well as a larger areas of reen and ditch supplied to ensure that the ecological integrity of the Gwent Levels was not harmed by the construction works."

"129. As currently proposed the new reens and ditches would have to be close to an exact replica of the features being lost to avoid harm. We consider that it is highly unlikely that it would be possible to achieve this as an ecosystem which has

[72] This includes reens and ditches created on what is now the Newport Wetlands SSSI as part of the Cardiff Bay compensation measures.

developed over a very long timescale would need to be fully recreated during the 42 month construction phase. To ensure the best possible ecological outcomes we would expect to see more suitable wetland habitat away from potentially polluted area. It is also important to ensure that newly created drains are designed so that they do not dry out. Low water levels in the summer can cause low levels of dissolved oxygen which is harmful to fish including eels. We are also concerned that the proposed "*use of plant material from existing reens and ditches to encourage colonisation of new reens and ditches by aquatic macrophytes*" (ES, paragraph 10.5.11, final bullet point) may risk the spread of invasive species, whilst also failing to address the loss of the essential invertebrate populations within the existing reens and ditches."

5.35 There are 2 important principles to secure in the implementation of these replacements:

- New reens and ditches and historic ditch and grip recreation should avoid a 1:1 shape and should instead seek to provide a 1:5 (or even shallower) profile.
- Any seeding of these new ditches should be undertaken following a clearly devised and fully implemented protocol to ensure that invasive non-native species already present in the Gwent Levels are not spread further by these works.

5.36 The RSPB also expressed concern about the ability to replace coastal grazing marsh BAP habitat:

> "136. There are significant constraints on creating BAP floodplain and coastal grazing marsh to support breeding waders which would have lost habitat as a result of the motorway works.
>
> - The size of the area available for the creation of suitable grazing marsh: the area available (approximately 60ha, Table 1.1, Appendix 10.35, SSSI Mitigation Strategy) is likely to mean that the area would be too small to support a sufficiently large population of waders to reduce the impacts of generalist predators.
> - The presence of the new M4 nearby may have a small negative effect on the functioning of the land.
> - The presence of trees as boundary features would be avoided by waders such as redshank – which would be a particular problem if there are proposals to plant trees to help screen the motorway from the compensation site.
> - It is difficult to create species-rich grassland on most ex-arable/semi-improved grassland as low soil nutrients are a key feature and most agricultural management is likely to have raised these significantly, and it would take a long tie to reduce the nutrient levels to an appropriate level."

The implications of the Welsh legislative framework – particularly the WFG Act and the Environment Act – in relation to mitigation and compensation

5.37 We have outlined the minimum requirements to directly compensate for specific features that would be lost or impacted should the scheme go ahead. However, the WFG Act and the Environment Act (and the international obligations they reflect in Welsh law) both require the

Welsh Government to maintain and enhance the resilience of ecosystems. The SoNaRR has highlighted that no ecosystems are currently resilient, and the M4 scheme would further impact on the condition, connectedness, diversity and scale of the Gwent Levels wetlands. We therefore argue the WG should look both to invest in the management of the Gwent Levels SSSIs to bring them into favourable condition, and to create or restore wetland habitat above and beyond that needed to directly compensate for damage caused by the scheme.

5.38 The Welsh Government has funded RSPB Cymru to develop a wetland strategy, looking at benefiting wildlife while enhancing resilience in terms of water management and adaptation to climate change. While it is still in early stages of development it identifies the three key '2030 aims':

- Existing "wetland gems" are in favourable condition supporting key species
- More stepping stone sites at a maximum of 20km intervals across South Wales
- At least two major wetland complexes in excess of 200 hectares providing habitats for key species.

We suggest the Welsh Government should invest in such an approach.

Conclusions

5.39 The RSPB strongly recommend looking at all of the existing SNCI network as a starting place to look for the various features that will be required for potential crane breeding sites, and in particular exploring whether there are any such sites on the Gwent Levels. The site will need to offer secure nesting (probably on a reedbed island, productive foraging areas adjacent to the nest site, coupled with productive wider foraging areas, a safe roosting pool close to the foraging areas, limited human disturbance at the nest site and the foraging areas.

5.40 A critical issue for the crane compensation will be how long it would take to generate new invertebrate-rich hay meadow. This is particularly important given the need for the compensation package to be in place before the damage caused by the construction works for the motorway.

5.41 For bumblebees it will be essential to overcome the severance effect of the motorway route. Further loss of connectivity through loss or re-routing of reens and ditches must be avoided. Careful attention will need to be given to the management of compensation sites and verges to avoid indirect degradation of habitat.

6. Overall conclusions

6.1 In section 1.23 of its Statement of Case, the Welsh Government insists that:

> "The M4 Corridor around Newport Scheme is considered to be the long term, sustainable solution to the social, environmental and economic problems associated with this main gateway into Wales." (para 1.23.1)

For the reasons set out in the previous sections, the RSPB does not consider this to be a long term sustainable solution, due to the environmental issues that the M4CaN gives rise to.

6.2 We consider that, in light of the severe ecological impacts of the scheme and its likely negative impact on the Welsh Government's ability to deliver on its international climate change commitments, the M4CaN proposal cannot be considered a 'sustainable solution'. This is particularly the case considering Welsh legislation passed in recent years – the Well-being of Future Generations (Wales) Act 2015 and the Environment (Wales) Act 2016.

6.3 The Well-being of Future Generations (Wales) Act calls for transformational change in the way public bodies make decisions, placing them under a duty to carry out sustainable development. We argue that the Scheme is wholly incompatible with the Welsh Government's sustainable development duty; this reflects the fact that the proposal for a new motorway first appeared over 25 years ago. Our understanding of sustainable development and the urgent need for change has developed considerably in that time and the WFG Act represents a major advance in the framework for sustainable development. We therefore argue that the Government should show leadership in the implementation of the WFG Act and reconsider the problem of congestion around Newport, seeking the most sustainable solution.

6.4 The Environment (Wales) Act establishes a new framework for the 'sustainable management of natural resources', which recognises the important benefits (often called ecosystem services) people derive from ecosystems. The objective of SMNR is "*to maintain and enhance the resilience of ecosystems and the benefits they provide*", and in so doing, contribute to sustainable development.

6.5 Evidence published under the Act (in the first State of Natural Resources Report - the SoNaRR) shows that biodiversity is declining and none of Wales' ecosystems is resilient, and emerging Government Policy (as shown in the current consultation to develop a Natural Resources Policy) identifies the need to restore habitats so that designated sites become the core of wider ecologically resilient networks (drawing on the findings of the 2010 Lawton Review).

6.6 The Environment (Wales) Act also places two biodiversity duties on the Welsh Government – the 'biodiversity and resilience of ecosystems duty' (section 6), and the duty to prepare a list of priority habitats and species, and take steps to further their conservation (section 7). The M4CaN proposal is in direct contravention of these duties, with serious implications for the shrill carder bee.

6.7 The Environment Act, as well as Wales' Nature Recovery Plan draw heavily on the UN Convention for Biological Diversity; recognition of the intrinsic value of biodiversity is a key shared theme. Planning Policy Wales, including Technical Advice Note 5 (nature conservation)

reinforce the importance of biodiversity to society and the economy, and underline the importance of respecting nature conservation designations (such as SSSIs). Again, the M4CaN proposal largely disregards this body of law, policy and advice.

6.8 Climate change is the greatest threat faced by nature and people alike, and failure to address emissions from transport is currently causing the UK to fail to meet its carbon budgets. The Welsh Government has shown its commitment to tackling climate change by creating a statutory emissions reduction target (80% by 2020) in Part 2 of the Environment (Wales) Act, but it has been argued that this is insufficient (in terms of scale and pace) to meet the requirements of the Paris agreement to limit global temperature rise. The M4CaN proposal will lock in an unsustainable approach to transport, and is not compatible with the Welsh Government's commitments.

6.9 The Wildlife and Countryside Act 1981 (as amended) requires the Welsh Government (and other public authorities including local authorities and NRW) to conserve and enhance SSSIs; it is highly disappointing that the Gwent Levels SSSIs have been allowed to fall into unfavourable condition, making this duty even more pressing.

6.10 The Conservation of Habitats and Species Regulations (2010) require the Welsh Government to take measures for the conservation of Annex I species; the common crane is one such species.

6.11 The scheme will result in the loss of the breeding ground of the first (and only) Welsh breeding cranes in more than 400 years.

6.12 The scheme will threaten the medium and long term future of the shrill-carder bee both in Wales and in the UK, representing a serious failure of the Government in undertaking its biodiversity duties at sections 6 and 7 of the Environment Act.

6.13 The scheme will result in a substantial loss of SSSI land. The proposed "mitigation" measures are actually compensation measures (i.e. measures to offset losses), and should be properly considered as such. Compensation measures cannot be considered to cancel out the scheme's negative impacts (making it sustainable), and, in any case those proposed are extremely inadequate. An entirely new breeding site will be needed for the cranes, and new sites north of the M4CaN for bumblebees in order to attempt to maintain the northern parts of the bumblebee populations severed from the rest of the Gwent Levels populations. This is particularly important for the shrill carder bumblebee.

6.14 It will not be possible to implement the necessary "mitigation" measures within the M4CaN construction timeframe intended by the Welsh Government.

6.15 In addition, Wales' new legislation (the WFG Act and the Environment Act) emphasises the need to enhance the resilience of ecosystems; the evidence (particularly the first State of Natural Resources Report – SoNaRR – produced under the requirements of the Environment Act) is that Wales' ecosystems are not resilient, with floodplains failing in relation to all aspects of resilience. Therefore the Welsh Government should not limit its approach to compensating for direct losses, should the scheme go ahead; it should look to undertake

wetland restoration and creation at a large scale, with a view to building ecological, social and economic resilience.

6.16 The extent of the issues highlighted above lead the RSPB to conclude that the M4CaN scheme should be rejected.

Appendices

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Appendix 2: Sections from the Well-being of Future Generations (Wales) Act 2015

Section 5 - The sustainable development principle

(1) In this Act, any reference to a public body doing something "in accordance with the sustainable development principle" means that the body must act in a manner which seeks to ensure that the needs of the present are met without compromising the ability of future generations to meet their own needs .

(2) In order to act in that manner, a public body must take account of the following things—

(a) the importance of balancing short term needs with the need to safeguard the ability to meet long term needs, especially where things done to meet short term needs may have detrimental long term effect ;

(b) the need to take an integrated approach, by considering how—

(i) the body's well-being objectives may impact upon each of the well-being goals;

(ii) the body's well-being objectives impact upon each other or upon other public bodies' objectives, in particular where steps taken by the body may contribute to meeting one objective but may be detrimental to meeting another;

(c) the importance of involving other persons with an interest in achieving the well-being goals and of ensuring those persons reflect the diversity of the population of—

(i)Wales (where the body exercises functions in relation to the whole of Wales), or

(ii)the part of Wales in relation to which the body exercises functions;

(d) how acting in collaboration with any other person (or how different parts of the body acting together) could assist the body to meet its well-being objectives, or assist another body to meet its objectives;

(e) how deploying resources to prevent problems occurring or getting worse may contribute to meeting the body's well-being objectives, or another body's objectives

Appendix 3: Sections of the Environment (Wales) Act 2016

Section 6 - Biodiversity and resilience of ecosystems duty

(1) A public authority must seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in so doing promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions.

(2) In complying with subsection (1), a public authority must take account of the resilience of ecosystems, in particular the following aspects—

(a) diversity between and within ecosystems;

(b) the connections between and within ecosystems;

(c) the scale of ecosystems;

(d) the condition of ecosystems (including their structure and functioning);

(e)the adaptability of ecosystems.

(3) Subsection (1) does not apply to—

(a) the exercise of a function by Her Majesty's Revenue and Customs, or

(b) the exercise of a judicial function of a court or tribunal.

(4) In complying with subsection (1)—

(a) the Welsh Ministers, the First Minister for Wales, the Counsel General to the Welsh Government, a Minister of the Crown and a government department must have regard to the United Nations Environmental Programme Convention on Biological Diversity of 1992, and

(b) any other public authority must have regard to any guidance given to it by the Welsh Ministers.

(5) In complying with subsection (1), a public authority other than a Minister of the Crown or government department must have regard to—

(a) the list published under section 7;

(b) the state of natural resources report published under section 8;

(c) any area statement published under section 11 for an area that includes all or part of an area in relation to which the authority exercises functions.

(6) A public authority other than a Minister of the Crown or government department must prepare and publish a plan setting out what it proposes to do to comply with subsection (1).

(7) A public authority must, before the end of 2019 and before the end of every third year after 2019, publish a report on what it has done to comply with subsection (1).

(8) A public authority that has published a plan under subsection (6)—

(a) must review the plan in the light of each report that it publishes under subsection (7), and

(b) may revise the plan at any time.

(9) In this section—

"Minister of the Crown" ("*Gweinidog y Goron*") has the same meaning as in the Ministers of the Crown Act 1975 (c. 26);

"public authority" ("*awdurdod cyhoeddus*") means—

(a) the Welsh Ministers;

(b) the First Minister for Wales;

(c) the Counsel General to the Welsh Government;

(d) a Minister of the Crown;

(e) a public body (including a government department, a local authority, a local planning authority and a strategic planning panel);

(f) a person holding an office—

(i) under the Crown,

(ii) created or continued in existence by a public general Act of the National Assembly for Wales or of Parliament, or

(iii) the remuneration in respect of which is paid out of money provided by the National Assembly for Wales or Parliament;

(g) a statutory undertaker.

(10) In subsection (9)—

"local authority" ("*awdurdod lleol*") means a council of a county, county borough or community in Wales;

"local planning authority" ("*awdurdod cynllunio lleol*") has the meaning given by the Town and Country Planning Act 1990 (c. 8);

"statutory undertaker" ("*ymgymerwr statudol*") means any of the following—

(a) a person authorised by any enactment to carry on any railway, light railway, tramway, road transport, water transport, canal, inland navigation, dock, harbour, pier or lighthouse undertaking or any undertaking for the supply of hydraulic power;

(b) an operator of an electronic communications code network (within the meaning of paragraph 1(1) of Schedule 17 to the Communications Act 2003 (c. 21));

(c) an airport operator (within the meaning of the Airports Act 1986 (c. 31)) operating an airport to which Part 5 of that Act applies;

(d) a gas transporter (within the meaning of Part 1 of the Gas Act 1986 (c. 44));

(e) a holder of a licence under section 6(1) of the Electricity Act 1989 (c. 29);

(f) a water or sewerage undertaker;

(g) the Civil Aviation Authority or a holder of a licence under Chapter 1 of Part 1 of the Transport Act 2000 (c. 38), to the extent that the person holding the licence is carrying out activities authorised by it;

(h) a universal service provider within the meaning of Part 3 of the Postal Services Act 2011 (c. 5);

"strategic planning panel" ("*panel cynllunio strategol*") means a strategic planning panel established under section 60D of the Planning and Compulsory Purchase Act 2004 (c. 5).

Section 7 - Biodiversity lists and duty to take steps to maintain and enhance biodiversity

(1) The Welsh Ministers must prepare and publish a list of the living organisms and types of habitat which in their opinion are of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales.

(2) Before publishing a list under this section the Welsh Ministers must consult the Natural Resources Body for Wales ("NRW") as to the living organisms or types of habitat to be included in the list.

(3) Without prejudice to section 6, the Welsh Ministers must—

(a) take all reasonable steps to maintain and enhance the living organisms and types of habitat included in any list published under this section, and

(b) encourage others to take such steps.

(4) The Welsh Ministers must, in consultation with NRW—

(a) keep under review any list published by them under this section,

(b) make such revisions of any such list as appear to them appropriate, and

(c) publish any list so revised as soon as is reasonably practicable after revising it.

(5) In exercising their functions under this section, the Welsh Ministers must apply the principles of sustainable management of natural resources.

Section 26 - General interpretation of this Part

In this Part –

"biodiversity" (*"bioamrywiaeth"*) means the diversity of living organisms, whether at the genetic, species or ecosystem level;

Appendix 4: Professional experience of Dr. Richard Comont

Dr. Richard Comont holds a BSc (Hons) degree in Environmental Biology from the University of Plymouth (2007) and a DPhil (PhD) in Zoology from the University of Oxford (2014).

He has been a full-time employee of the Bumblebee Conservation Trust (BBCT) for three years, since November 2013, first as Data Monitoring Officer and latterly as Science Manager. He leads BBCT's scientific focus across England, Scotland and Wales. This includes coordinating and leading analysis of the citizen-science recording schemes BeeWalk and BeeWatch, managing BBCT's research partnerships, and carrying out rare species surveys. At BBCT, he manages a team of four staff and has overall responsibility for delivering monitoring, analysis and research partnerships across the Trust.

He has spent his entire career in conservation and ecological research, primarily related to insects. Prior to joining BBCT he worked for the University of Bristol on urban pollinators, for the University of Exeter on the provision of ecosystem services (principally pollination and pest control) on Salisbury Plain, and for the Centre for Ecology & Hydrology on a range of insect-centred projects. Prior to that he worked as a reserve assistant for the RSPB at Aylesbeare Common in Devon, and as a volunteer for the Bedfordshire, Cambridgeshire, Northamptonshire & Peterborough Wildlife Trust.

He has a keen interest in all aspects of natural history, and pursues this interest both inside and outside of work. He is a National Recorder for ladybirds and various other beetle families, a member of the UK Ladybird Survey coordinating team, and a member of the National Garden BioBlitz coordinating team. He is a member of the Royal Entomological Society, the Bees, Wasps and Ants Recording Society, the RSPB, Worcestershire Wildlife Trust, and Bristol Naturalists.

He also contributes to a number of national recording schemes and takes part in a number of BioBlitzes annually as an expert entomologist.

The Bumblebee Conservation Trust

The BBCT was established in 2006 and is a registered charity. The principal strategic aims of the Trust are to support the conservation of all bumblebees, rare or common, and to raise awareness and increase understanding of bumblebees and the social benefits they provide.

The BBCT consequently attach great importance to all national and international laws and conservation site designations which assist the attainment of these objectives.