

**PUBLIC INQUIRY**

**IN THE MATTER OF THE HIGHWAYS ACT 1980 AND THE ACQUISITION OF  
LAND ACT 1981**

**AND IN THE MATTER OF:**

**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-**

**-and-**

**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-**

**-and-**

**THE M4 MOTORWAY (WEST OF MAGOR TO EAST OF CASTLETON) AND THE  
A48 (M) MOTORWAY (WEST OF CASTLETON TO ST MELLONS) (VARIATION  
OF VARIOUS SCHEMES) SCHEME 201-**

**-and-**

**THE LONDON TO FISHGUARD TRUNK ROAD (EAST OF MAGOR TO  
CASTLETON) ORDER 201-**

**-and-**

**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) (SIDE ROADS) ORDER 201-**

**(‘THE M4 CORRIDOR AROUND NEWPORT’)**

**PROOF OF EVIDENCE ON THE GWENT LEVELS SITES OF SPECIAL  
SCIENTIFIC INTEREST**

**OF**

**JESSICA POOLE**

**ON BEHALF OF THE NATURAL RESOURCES BODY FOR WALES**

## **Contents**

**1. Introduction**

**2. Relevant Background**

**3. Site Context**

**4. Issues**

**5. Proposed Mitigation**

**6. Alternatives**

**7. Conclusion**

**8. References**

## **1. INTRODUCTION**

- 1.1. I am Jessica Ruth Laura Poole. I am the M4 Corridor around Newport (CaN) Coordinator for Natural Resources Wales (NRW), a position I have held for a year. I have worked for NRW, and one of its predecessor bodies, the Countryside Council for Wales (CCW) for 20 years.
- 1.2. I hold a BSc Honours Degree in Environmental Biology from the University of Liverpool and an MSc in Conservation from University College London.
- 1.3. From April 2013, I was Team Leader for the Cardiff and Newport District Team, where I was responsible for managing a team of five conservation specialists, with responsibility for the Gwent Levels Sites of Special Scientific Interest (SSSIs). Prior to this, from 2003, I was the Senior Conservation Officer within the same team. During my employment, I have provided specialist advice on numerous development proposals likely to effect the Gwent Levels SSSIs. I also undertook an internal placement for a year as Team Leader for the Brecon Beacons National Park District Team and two years on secondment to the Department of Energy and Climate Change. In these roles, I provided nature conservation advice on numerous infrastructure projects, including the Felindre to Tirley Gas Pipeline and the Severn Tidal Power Feasibility Study.

## **2. RELEVANT BACKGROUND**

- 2.1 SSSIs are the most important sites for Wales' natural heritage. They help conserve and protect the best wildlife, geological and physiographical heritage for the benefit of present and future generations. There are over 1,000 SSSIs in Wales, covering about 12% of the country's surface area.
- 2.2 SSSIs are notified under the Wildlife and Countryside Act 1981 as amended<sup>1</sup> ('the 1981 Act') by the relevant country agency; in Wales this is NRW. SSSIs are highly protected to safeguard the range, quality and variety of habitats, species and geological features in all parts of Wales. In general terms, section

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<sup>1</sup> WG Core Document 3.1.7

28 of the 1981 Act is an important statutory protection for SSSIs containing important and threatened habitats and species, of a habitat network approach to conservation, and latterly as part of a wider landscape-scale ecosystem approach to the sustainable management of the environment.

2.3 The 1981 Act places a duty on NRW to notify any area of land which, in its opinion, is '*of special interest by reason of any of its flora, fauna, or geological or physiographical features*'.

2.4 Guidance on the Great Britain wide approach to site selection is provided in *Guidelines for the Selection of Biological SSSIs*<sup>2</sup>, published by the Joint Nature Conservancy Council ("the JNCC"). These set out general principles, supplemented by detailed selection guidelines for different habitat types and species groups, which inform NRW's judgments regarding special scientific interest.

2.5 Section 28G of the 1981 Act, places a duty on "Competent Authorities" to

*'[...] take reasonable steps, consistent with the proper exercise of their functions, to further the conservation and enhancement of the features for which the site is of special scientific interest.'*<sup>3</sup>

2.6 The Highways Act 1980 ("the 1980 Act") provides that, before making or confirming a scheme under section 16 of the 1980 Act, the Minister must have regard to the requirements of local and national planning policy.<sup>4</sup> In Wales, the statutory protection and enhancement of SSSIs under the 1981 Act is reflected in national planning policy through Planning Policy Wales ("PPW")<sup>5</sup> and Technical Advice Note 5, on Nature Conservation and Planning ("TAN 5").<sup>6</sup>

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<sup>2</sup> Bainbridge, I., Brown, A., Burnett, N., Corbett, P., Cork, C., Ferris, R., Howe, M., Maddock, A., Mountford, E., Pritchard, S (editors). JNCC (2013) Guidelines for the Selection of Biological SSSIs – Part 1 Rationale, Operational Approach and Criteria for Site Selection

<sup>3</sup> Subsection 28G(2)

<sup>4</sup> Highways Act 1980, subsection 16(8)

<sup>5</sup> Planning Policy Wales (Edition 9, November 2016)

<sup>6</sup> Technical Advice Note 5 Nature Conservation and Planning

- (a) PPW (at paragraph 5.5.8) states that there is a presumption against development likely to damage a SSSI.
- (b) Paragraph 5.4.2 of TAN 5 recites the duty on public bodies, under the 1981 Act, to take reasonable steps, consistent with the proper exercise of these functions, to further the conservation and enhancement of the features for which the site is of special interest.
- (c) Paragraph 5.4.4 of TAN 5 goes on to state that there is an expectation that Section 28G authorities will apply strict tests when carrying out functions within or affecting SSSIs, to ensure that they avoid, or at least minimise, adverse effects.

2.7 Statutory protection of SSSIs in Wales is also provided by Part 1 of the Environment (Wales) Act 2016 ('the 2016 Act').<sup>7</sup> NRW has also considered the proposals for the M4 CaN scheme in the context of Part 1 of the 2016 Act.

2.8 The purpose of Part 1 of the 2016 Act is '*the sustainable management of natural resources in Wales*'. Section 2 of the 2016 Act defines "natural resources" as including (but not limited to)—

- (a) animals, plants and other organisms;
- (b) air, water and soil;
- (c) minerals;
- (d) geological features and processes;
- (e) physiographical features;
- (f) climatic features and processes.

2.9 Section 3(1) of the 2016 Act provides the "sustainable management of natural resources" means—

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<sup>7</sup> WG Core Document 3.1.16

*‘(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.’*

2.13 Section 3(2) of the 2016 Act provides 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  
(b) contribute to the achievement of the well-being goals in section 4 of the Well-being of Future Generations (Wales) Act 2015 (anaw 2).’*

2.14 Part 1 of the 2016 Act imposes a ‘biodiversity and resilience of ecosystems duty’ on public authorities exercising functions in Wales. Subject to exception, by section 6 of the 2016 Act, 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.’*

2.15 The 2016 requires all public authorities in Wales to report on the actions they are taking to improve biodiversity and promote ecosystem resilience.

2.16 In the 2016 Act, “biodiversity” is defined as ‘...*the diversity of living organisms, whether at the genetic, species or ecosystem level*’.<sup>8</sup>

2.17 The 2016 Act specifies certain matters relating to the “resilience of ecosystems” which public authorities must take into account in complying with the duty under section 6:

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<sup>8</sup> Section 26

*‘... 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.’*

2.18 At the time that this proof of evidence was drafted, the Welsh Ministers had not published statutory guidance for public authorities, including NRW, subject to the biodiversity and resilience of ecosystems duty under section 6 of the 2016 Act. In relation to the Gwent Levels SSSIs, NRW will assist the Inquiry with detailed comments in respect of statutory guidance if and when circumstances change during the course of the Inquiry.

2.19 Under section 8 of the 2016 Act, NRW has a duty to prepare State of Natural Resources Report (SoNaRR). In September 2016, NRW published the first SoNaRR.<sup>9</sup> In complying with the duty under section 6 of the 2016 Act, public authorities subject to the biodiversity and resilience of ecosystems duty (including the Welsh Ministers) must have regard to SoNaRR.

2.14 The Welsh Ministers have a separate duty, under subsection 7(3) of the 2016 Act, to *‘take all reasonable steps to maintain and enhance the living organisms and types of habitat included in any list published under this section’*. Interim section 7 lists have been published.<sup>10</sup> A number of species and habitats on the interim section 7 lists would be affected by the M4 CaN scheme. These include: Coastal and Flood Plain Grazing Marsh, Eutrophic Standing Waters, Shril Carder Bee and *Oenanthe fistulosa* (tubular water drop-wort).

2.15 Section 3 of the Well-being of Future Generations (Wales) Act 2015 (‘the 2015 Act’) creates a ‘well-being duty’ by which public bodies, including the Welsh

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<sup>9</sup> SoNaRR is published on Natural Resources Wales’ website

<sup>10</sup> The Welsh Ministers’ Interim Section 7 lists (for habitats and for species respectively) are published on the Wales Biodiversity Partnership website.

Ministers, ‘... *must carry out sustainable development*’.<sup>11</sup> The 2015 Act provides that this must include setting and publishing “well-being objectives” designed to maximise its contribution to achieving each of the well-being goals and ‘*taking all reasonable steps (in exercising its functions) to meet those objectives*’.<sup>12</sup>

2.16 In the 2015 Act, “sustainable development” means:

*‘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’.*<sup>13</sup>

2.17 Section 4 of the 2015 Act sets out “well-being goals” amongst which is ‘A resilient Wales’, which is defined in the 2015 Act as:

*‘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).’*

2.18 In November 2016, the Welsh Ministers published their Well-being Objectives [WG Core Document, 5.1.11].

### **3. SITE CONTEXT**

3.1 Much of what is now referred to as the Gwent Levels is below the Mean High Water Mark. Historically the sea level has varied and at times was much lower than today. The remains of a submerged, Bronze Age forest have been recorded at Collister Pill. During this period wild boar, deer and cattle known as aurochs roamed this landscape. Mesolithic footprints have been recorded within the inter-tidal muds in the Goldcliff area, including recently exposed Crane footprints.

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<sup>11</sup> 2015 Act, section 3(1)

<sup>12</sup> 2015 Act, section 3(2)

<sup>13</sup> 2015 Act, section 2

3.2 Reclamation from the sea started during Roman times. Tidal saltmarshes were gradually drained and enclosed through the creation of a complex network of drainage channels. It has been maintained in its present form for at least a thousand years. Today, the Gwent Levels are protected from tidal inundation by flood risk management structures (sea walls) along the Severn Estuary, River Usk and River Ebbw. The pattern and sequencing of land reclamation and enclosure is still visible today, and recognised by its inclusion in the Register of Landscapes of Outstanding Historic Interest in Wales.

3.3 The Gwent Levels represent the largest area of coastal and inland floodplain grazing marsh (wet pasture) in Wales comprising two main component blocks, separated by the River Usk; the Wentlooge Level to the west and Caldicot Level to the east. The Severn Estuary borders the area to the south.

3.4 The suite of Gwent Levels SSSIs sits within this wider landscape context and at 5856 hectares is, collectively, by far the largest complex of lowland SSSIs in a coastal and floodplain grazing marsh context in Wales. The next largest comparable site is Malltraeth Marsh/Cors Ddyga which extends to 1355 hectares. Comparable sites in England are the Somerset Levels, Romney Marsh and the Pevensy Levels.

3.5 Traditional drainage of the fields of the Gwent Levels is carried out by a series of ridge and furrow grips. These allow water to drain into the extensive network of ditches that surround each field. Field ditches in turn connect to larger ditches, known locally as reens, which are managed by the Caldicot and Wentlooge Internal Drainage District (IDD), part of NRW. Larger reens, designated as main rivers, also the responsibility of NRW, convey water to the Severn Estuary, where discharge occurs via tidal flaps.

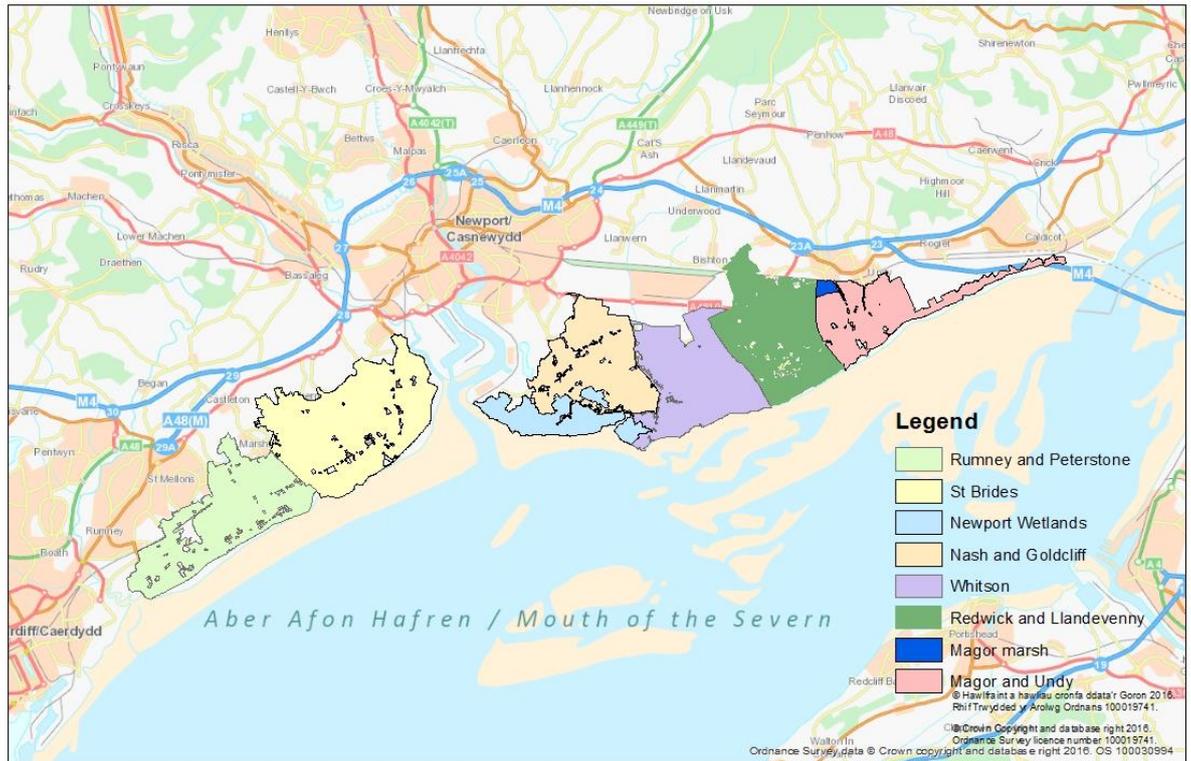
3.6 The drainage network is constructed so that drainage is primarily by gravity. NRW, as the IDD, has responsibility for complex water level management within the IDD area. Water levels are managed by various water level control structures including penning sluices, and more recently tilting weirs. During the summer months, the IDD staff maintain a high Summer Penning Level (SPL), for a variety of purposes.

These traditionally included agricultural purposes, wet fencing and stock watering, but are now also managed for nature conservation purposes. This is achieved by physically removing or adding wooden boards (slats) from the older style sluices or mechanical means for the tilting weirs. This management practice essentially creates a static water body during the summer period. During the winter the water level is lowered to a Winter Penning Level to retain capacity for flood water to drain from the land into the drainage network and discharge to the Severn Estuary.

3.7 Management of the reed and ditch network to maintain the water conveyancing capacity of the network is primarily undertaken by periodic desilting alongside more routine de-weeding/ flailing of bankside vegetation. NRW undertake maintenance works on main rivers and IDD reens under permissive powers. The respective landowner has responsibility for management of field ditches.

3.8 A wide range of wetland plants and invertebrates, including many rare or scarce species, have been able to take advantage of the specific environmental conditions created by the extensive network of the Gwent Levels drainage network and the pattern of both water level and vegetation management which has occurred over many years. This special interest was recognised by CCW, and its predecessor body, the Nature Conservancy Council (NCC), and led to the notification of a suite of eight SSSIs over the Gwent Levels area, which together cover 5,856 hectares.

3.9 Magor Marsh SSSI was the first to be notified in 1982 as the last remaining extensive area of fen on the Gwent Levels. The remainder of the area of SSSI standard were divided into 6 areas and notified separately due to the extensive area included and the corresponding high number of owners and occupiers. The boundaries broadly coincided with catchment areas. Notification started in 1987 with the Gwent Levels: Nash & Goldcliff SSSI and was completed in 1993 with Gwent Levels: Rumney & Peterstone SSSI. Newport Wetlands SSSI was notified more recently, in 2010, to include additional special interest features, present due to the specific management of the Newport Wetlands National Nature Reserve, created as part of the compensation package for the loss of the Taf/Ely Estuary SSSI due to the construction of the Cardiff Bay Barrage. The following map shows the locations of all 8 SSSIs.



3.10 Four of the eight SSSIs in the Gwent Levels, would be directly affected by the proposed M4 CaN scheme. These are:

- Gwent Levels: St. Brides SSSI;
- Gwent Levels: Nash and Goldcliff SSSI;
- Gwent Levels: Whitson SSSI; and
- Gwent Levels: Redwick and Llandevenny SSSI.

3.11 The four remaining SSSIs could be indirectly affected by the M4 CaN scheme, as they are linked by the interconnected drainage system of either the Wentlooge or Caldicot Level. These are:

- Gwent Levels: Rumney and Peterstone SSSI;
- Gwent Levels: Magor and Undy SSSI;
- Newport Wetlands SSSI;<sup>14</sup> and

<sup>14</sup> Newport Wetlands SSSI was notified in 2010 to include all land of SSSI quality within the Newport Wetlands National Nature Reserve boundary. As such it included land which had been previously

- Magor Marsh SSSI, Caldicot Level.

3.12 As part of the notification process, each SSSI has a citation, site boundary map, site management statement and a list of operations likely to damage the special interest<sup>15</sup>.

3.13 There is a large degree of overlap of the special features for which these 8 SSSIs were notified. The exception to this are the wetland bird features of Newport Wetlands SSSI; however NRW considers it unlikely that there could be significant effects arising from the construction or operation of the M4 CaN scheme on these bird species. They are therefore not considered further within this Proof.

3.14 This proof of evidence considers the Gwent Levels SSSIs as a 'suite', although NRW considers that the statutory duty under the 1981 Act applies to each individual SSSI. The following table sets out the qualifying features for each of the 8 SSSIs:

SSSI Name	GL:Magor & Undy	GL:Nash & Goldcliff	GL:Redwick & Landevenny	GL:Rumney & Peterstone	GL:St Brides	GL:Whitson	Magor Marsh	Newport Wetlands
Feature								
<i>Qualifying Habitats</i>								
Standing Water (habitat)	✓	✓	✓	✓	✓	✓	✓	✓
Swamp							✓	✓
Marshy grassland							✓	
<i>Independently qualifying species</i>								
<i>Potamogeton trichoides</i> (water plant – hairlike pondweed)	✓	✓	✓	✓	✓	✓		✓
<i>Wolffia arrhiza</i> (water plant – rootless duckweed)		✓	✓	✓	✓	✓		✓
<i>Carex elata</i> (wetland plant)						✓		
<i>Bagous tubulus</i> (weevil)				✓				
<i>Bombus sylvarum</i> (shrill carder bee)		✓	✓	✓	✓	✓		✓

notified as part of the Gwent Levels: Nash & Goldcliff SSSI and Gwent Levels: Whitson SSSI. These two sites have yet to be have their notifications amended to take account of their reduced boundaries  
<sup>15</sup> SSSI Citations are provided in the WG Core Documents at 11.4.1-11.4.7 and the Site Management Statements at 11.3.7-11.3.12

<i>Coenagrion pulchellum</i> (variable damselfly)				✓	✓	✓		
<i>Hydaticus transversalis</i> (water beetle)		✓	✓	✓	✓	✓		✓
<i>Hydrophilus piceus</i> (water beetle)	✓	✓	✓		✓	✓	✓	✓
<i>Laccornis oblongus</i> (water beetle)							✓	
<i>Limnoxenus niger</i> (water beetle)			✓			✓		
<i>Odontomyia ornata</i> (fly)	✓	✓	✓	✓	✓	✓	✓	✓
<i>Plateumaris braccata</i> (beetle)				✓	✓			
<i>Anas clypeata</i> (bird - shoveler)								✓
<i>Numenius arquata</i> (bird - curlew)								✓
<i>Cettia cetti</i> (bird - Cetti's warbler)								✓
<i>Tringa totanus</i> (bird - redshank)								✓
<i>Vanellus vanellus</i> (bird - lapwing)								✓
<i>Recurvirostra avosetta</i> (bird - avocet)								✓
<i>Panurus biarmicus</i> (bird - bearded tit)								✓
<i>Rallus rallus</i> (bird - water rail)								✓
<b>Assemblages</b>								
Fen invertebrate assemblage							✓	
Grazing levels invertebrate assemblage	✓	✓	✓	✓	✓	✓		✓
Rare Aquatic Plant Assemblage (includes frogbit <i>Hydrocharis morsus-ranae</i> , <i>Sagittaria sagitifolia</i> , <i>Ceratophyllum</i> sp, <i>Sparganium</i> spp)	✓	✓	✓	✓	✓	✓	✓	

3.15 These qualifying features can be categorised under four headings:

- **Reen and Ditch Habitat** – this habitat is a qualifying feature in own right due to the species it supports
- **Plant Species** – both individually qualifying species and assemblage of rare wetland and marginal plant species
- **Insects and Other Invertebrates (aquatic)** – both individually qualifying species and assemblage of grazing marsh invertebrates. Over 260 species of wetland insect and other invertebrates have been recorded throughout the Gwent Levels. For several species including the soldier fly *Odontomyia ornata* and the water beetle *Hydaticus transversalis*, the Gwent Levels are the only recorded locations in Wales
- **Shrill Carder Bee** – a terrestrial insect, once fairly widespread, now known from less than 20 sites in the UK. Within the Gwent Levels SSSIs it is associated with the reen, ditch and field margins as well as road verges and the sea wall, where there are abundant sources of pollen.

3.16 With the exception of shrill carder bee, all other remaining features of interest are dependent on the following factors:

- Appropriate water quality
- Appropriate water quantity;
- Connectivity and diversity of the drainage system; and,
- Appropriate management.

### **3.17 Water Quality**

3.17.1 A key factor affecting all aquatic habitats, including the Gwent Levels drainage network is water quality, with pollution events having multiple effects on freshwater habitats and their species. Water quality issues, in relation to the Gwent Levels SSSIs, are covered in detail in the Water Quality Proof of Evidence of my colleague, Dr Tristan Hatton Ellis.

### **3.18 Water Quantity**

3.18.1 Continuation of the current pattern of water level management, including the practice of a SPL, is an important aspect of the management necessary to support the SSSI features of interest. Without enough water the special features (both plants and invertebrates) of the Gwent Levels suite of SSSIs are unable to complete their lifecycles.

3.18.2 The Gwent Levels drainage network is effectively a static water body during the period of SPL. To maintain this situation it is important that all discharges to the Gwent Levels drainage network occur at the equivalent of greenfield run-off rate

### **3.19 Connectivity and diversity of the drainage system**

3.19.1 The drainage system of both the Wentlooge Level and Caldicot Level respectively form a connected drainage network. This, combined with the range of size of the various aspects of the drainage network (grips, field ditches and reens) creates a range of physical conditions which, overall, supports the full range of the features of interest of the Gwent Levels suite of SSSIs.

### **3.20 Appropriate management**

3.20.1 The phased programme of management of the Gwent Levels drainage network ensures that there are always areas at all stages of habitat succession, which enables the rich assemblage of aquatic plants and invertebrates to exist within the network as a whole. Historically, this was a by-product of management for other reasons (including retention of flood storage capacity and water conveyancing) but now is able to be tailored to include nature conservation requirements as well.

## 4 ISSUES

4.1 NRW considers that the proposed M4 CaN scheme would place at risk the features for which the suite of Gwent Levels SSSIs were designated. In particular NRW has concerns due to the extent of loss of SSSI, impacts on both water quality and water quantity during the construction and operational phases, concerns about connectivity and design of the proposed replacement reed and ditch network and security of long-term appropriate management. All of these issues apply to the four SSSIs (Gwent Levels: St Brides, Gwent Levels: Nash & Goldcliff, Gwent Levels: Whitson and Gwent Levels: Redwick & Llandevenny) which would be directly affected. For the four SSSIs which could be indirectly affected (Gwent Levels: Rumney & Peterstone, Gwent Levels Magor & Undy, Magor Marsh and Newport Wetlands) water quality and water quantity concerns are applicable. Each of these issues is considered in turn, with the exception of water quality which is considered by Dr Tristan Hatton Ellis [NRW Documents, 1.3.1].

### 4.2 Extent of loss

4.2.1 Information on SSSI loss due to the scheme has been provided in the ES Supplement (September 2016) in Table 4.1 (pages 47-48).<sup>16</sup> The draft scheme, if undertaken, would lead to the direct loss of 104.98 hectares of SSSI area across four Gwent Levels SSSIs: St. Brides, Nash & Goldcliff, Whitson and

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<sup>16</sup>WG Core Document 2.4.4

Redwick & Llandeenny SSSIs. Each SSSI would lose between 0.5-4% of its total area.

4.2.2 Part of this loss is due to the location of the proposed Glan Llyn Junction infrastructure, which would fall partially within the Gwent Levels: Nash and Goldcliff SSSI. NRW has estimated, on the basis of the plans provided (including ES Volume 2, Figure 2.4, sheet 9 of 16<sup>17</sup>), that this aspect of the proposals would lead to the loss of approximately 12 hectares of SSSI area and require the infilling of 550m of reën (the whole of Middle Reën) and 330m of field ditch. NRW advances no separate evidence on highways infrastructure. However, NRW considers that the ES does not detail whether, and if so how, SSSI land take has been minimised. NRW considers that this clarity is required to demonstrate compliance with TAN 5, paragraph 5.4.4, as set out in 2.8 above.

4.2.3 The table below sets out existing losses in area alongside losses which would occur due to the M4 scheme. This includes both land already developed as well as allocations within the relevant Local Development Plans yet to be developed. Existing losses have been calculated by NRW. Losses due to the M4 scheme have been taken from the September ES Supplement, Volume 1: Main Text, Table 4.1.<sup>18</sup>

Name of SSSI	SSSI Area (ha)	SSSI existing losses		M4 CaN permanent area losses		Total	
		Area (ha)	%	Area (ha)	%	Area (ha)	%
<b>Rumney &amp; Peterstone</b>	969.3	182.17	18.8	0	0	182.17	18.8
<b>St Brides</b>	1312	19.3	1.4	35.04	2.7	54.34	4
<b>Nash &amp; Goldcliff<sup>19</sup></b>	760.7	35.0	4.6	27.66	3.6	62.66	8.2

<sup>17</sup> WG Core Document 2.3.2

<sup>18</sup> WG Core Document 2.4.4

<sup>19</sup> The areas of Nash & Goldcliff SSSI and Whitson SSSIs quoted here are less than on their notification maps due to the reductions in their areas caused by the notification of Newport Wetlands

<b>Whitson</b>	891.3	0	0	5.08	0.5	5.08	0.5
<b>Redwick &amp; Llandevenny</b>	940	94.7	10.0	37.2	4	131.9	14
<b>Magor &amp; Undy</b>	586.6	0	0	0	0	0	0
<b>Newport Wetlands</b>	374.2	0	0	0	0	0	0
<b>Magor Marsh</b>	21.9	0	0	0	0	0	0
<b>Overall</b>	<b>5856</b>	<b>331.17</b>	<b>5.6</b>	<b>104.98</b>	<b>1.8</b>	<b>436.15</b>	<b>7.4</b>

4.2.4 In addition to area loss, the scheme would also result in the permanent loss of 2,755m of reens and 9,373m of field ditches across the Gwent Levels: St. Brides, Nash and Goldcliff, Whitson and Redwick and Llandevenny SSSIs. Each SSSI would lose between 0.2-2.9% of its total reen/ditch length.

4.2.5 Development pressure has not been uniform across the Gwent Levels. Significant loss has occurred in specific locations, which, in some cases, would be further increased by the development of the road scheme. For example 10% of the Gwent Levels: Redwick and Llandevenny SSSI has been or has the potential to be (LDP land allocations) affected by development and would lose a further 4% from the implementation of the scheme. Gwent Levels: St Brides and Gwent Levels: Nash and Goldcliff would lose a further 2.6 and 2.9% respectively of their SSSI area.

4.2.6 Existing losses of Gwent Levels SSSI area have occurred where land allocations had already been made within development plans prior to SSSI notification and/or prior to the the protection of SSSIs being increased by amendment of the 1981 Act made by the Countryside and Rights of Way Act 2000 (discussed above): the duty on Section 28G authorities *to 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*

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SSSI – see foot note 9 for further detail. This has no effect on the area loss figures quoted in Table 4.1, but does alter the % loss areas for Nash & Goldcliff SSSI

*which the site is of special scientific interest.* Allocation of land for development occurred subsequent to the 2000 Act with Strategic Site H, 96.2 hectares within the Gwent Levels: Rumney and Peterstone SSSI, in Cardiff City Council's Local Development Plan. This allocation was made against the advice of NRW. Newport City Council removed proposed land allocations from its LDP, in accordance with NRW's advice.

- 4.2.7 At the time of notification, CCW considered that reens and ditches could be recreated to successfully mitigate for losses due to development. CCW published guidelines on this, as best practice, in 1991<sup>20</sup>. Experience, gained over 25 years has now shown that it is difficult to replicate the complex drainage system with its niche habitats, even at a small scale. Appendix A to this Proof of Evidence presents photographs and commentary, in support of this view.
- 4.2.8 NRW considers the scale of permanent loss of SSSI in the Gwent Levels under the scheme is unprecedented and would not be in accordance with the statutory duties with respect to SSSIs under Section 28G of the 1981 Act and / or with respect to biodiversity and ecosystem resilience under Section 6 of the 2016 Act and would be contrary to national planning policy.
- 4.2.9 The Guidelines for the Selection of Biological SSSIs (Bainbridge, I. et al (2013), in the context of SSSI size and site integrity states, at 5.3 that “the loss or damage to any part of a site cannot be justified by the survival of the larger fraction of the site.”
- 4.2.10 The Chartered Institute of Ecology and Environmental Management notes, within its online guidance on Impact Assessment at 5.32, that the concept of SSSI (in the UK) has been to secure boundaries around

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<sup>20</sup> CCW (1991). Chapter 6 *Conservation Guidelines for Development Proposals*. In *Nature Conservation and Physical Developments on the Gwent Levels. The current and Future Implications*.

tightly defined interest features and consequently they represent the minimum necessary to maintain the scientific interest.<sup>21</sup>

### **4.3 Water Quantity**

4.3.1 NRW considers that adverse effects can arise during both the construction phase and operational phase of any development.

4.3.2 Road carriageways increase the area of impermeable surface, which would lead to an increased run-off rate to the Gwent Levels drainage network, and concerns that a greenfield run-off rate could not be achieved. In addition, issues could also arise if there was insufficient water, of appropriate quality, to discharge into the Gwent Levels SSSI drainage network. This could arise if, for example, the operational scheme was unable to treat road run-off to a standard suitable for discharge to the Gwent Levels drainage network

### **4.4 Design and connectivity of the drainage system**

4.4.1 The existing Gwent Levels drainage network is not uniform in its physical form. Variation arises from differences in the dimensions of water channels (both reens and ditches) and their banks alongside variations in water depth and substrate type. This physical variation gives rise to a range of environmental conditions which provide different habitat niches which collectively are able to support the diverse range of specialist wetland plants and animals for which the SSSIs are of special interest.

4.4.2 This variation is illustrated by a number of Appendices to the ES, including in Volume 3, Appendix 10.14 (Aquatic Macrophyte Survey

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<sup>21</sup> Chartered Institute of Ecology and Environmental Management. Impact Assessment. Online guidance

2014 Report), Appendix 10.30 Aquatic Macrophyte Survey 2015 report and 10.32 River Corridor Survey 2015.<sup>22</sup>

- 4.4.4 NRW considers that variation in physical features of the replacement reed and ditch network is required as an important component of seeking to recreate the variety of habitat niches to give a greater chance of enabling the features of interest of the Gwent Levels suites of SSSIs to colonise and flourish. Variation in water depth is an important component; marginal, shallow water areas can support a wide range of aquatic and wetland plants whereas deep water areas can support a more restricted range of mainly submerged and floating species.
- 4.4.5 This view is supported by JNCC's Common Standards Monitoring Guidance for Ditches<sup>23</sup>, which states at 5.6 in relation to habitat structure and channel form that the presence of shallow wet margins to ditches increases habitat diversity for aquatic plants and aquatic and semi-terrestrial invertebrates. Trapezoidal channels lack these shallow water areas. Non-trapezoidal profiles include those where the banks have been trampled by stock, where the ditch has been allowed to silt up but still contains water, or where berms have been constructed. Berm creation is especially desirable in sites where there is little opportunity for extensive stands of emergent vegetation to develop
- 4.4.6 The watercourse margins are regarded as the most important aspect of the drainage network for wetland invertebrates. Variety is created here through the drawdown of water creating variable wetness zones which expose areas of bare mud. This variation is increased where the surrounding land use is grazing which can lead to areas of bare mud, within a diverse, wetland margin sward structure.

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<sup>22</sup> WG Core Document 2.3.2

<sup>23</sup> Joint Nature Conservation Committee (2005) Common Standards Monitoring Guidance for Ditches

4.4.7 This range of field ditches and reens form an inter-connected network across the Wentlooge and Caldicot Level respectively. This connectivity is an important aspect; it provides resilience to changing environmental conditions including natural habitat succession and enables the features of interest to recolonise areas following management operations within the Gwent Levels drainage network.

#### **4.5 Appropriate management**

4.5.1 Management of the Gwent levels drainage network is an essential part of maintaining their water carrying and flood storage functions. It also ensures that a range of habitat conditions are present at any one time across the drainage network.

4.5.2 The presence of this range of management stages, and therefore physical conditions, concurrently across the drainage network as a whole provides environmental conditions which give rise to the full range of habitat succession – from open water to mature wetland habitat. This staggered pattern of management helps to support the full range of SSSI features of interest.

4.5.3 Adverse effects can arise during both the construction and operational phase of the development. There will be a requirement to demonstrate that broadly similar management regimes, including in relation to frequency of management, to those currently undertaken, can continue both during the construction and operational phase so that the variety of habitat succession continues to be present.

### **5. PROPOSED MITIGATION**

5.1 The requirement to mitigate adverse effects on the Gwent Levels SSSIs is recognised throughout the ES. NRW considers that there are instances where the mitigation is either inadequate or it has been insufficiently demonstrated

that adverse effects on the Gwent Levels SSSIs can be fully mitigated during both the construction and operational phase.

## 5.2 Extent of loss

### 5.2.1 Reens and ditches

5.2.1.1 The ES Volume 3, Appendix 2.3 Reen Mitigation Strategy<sup>24</sup> sets out reen and ditch replacement proposals, on an approximately 1:1 equivalent basis across the Scheme as a whole. NRW accepts the principle of replacing Gwent Levels SSSI drainage network at a 1:1 length ratio.

5.2.1.2 However, with respect to reens, and when considered per SSSI, the proposals do not provide replacement length equivalent to length lost in all cases. Gwent Levels: Nash and Goldcliff SSSI and Gwent Levels: Whitson have no replacement reens (despite losing 775m and 65m respectively of reen) and Gwent Levels: Redwick and Llandevenny SSSI has 310m proposed reen replacement, compared to 795m of loss. Consequently, Gwent Levels: St Brides SSSI has reen replacement on a greater than 1:1 basis (1067m lost, 2583 m replaced)<sup>25</sup>. NRW consider that this does not provide the appropriate quantity of reen mitigation for each affected SSSI. In addition there would be an imbalance in the provision of mitigation between the Wentlooge Level and the Caldicot Level. Gwent Levels Nash and Goldcliff SSSI, Gwent Levels: Whitson SSSI and Gwent Levels: Redwick and Llandevenny SSSI are on the Caldicot Level, Gwent Levels: St Brides SSSI is on the Wentlooge Level. Consequently the reen mitigation proposal would lead to the loss of 1635m of reen on the Caldicot Level, with 310m of replacement and the loss of 1067m of reen on the Wentlooge Level with 2583m of replacement.

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<sup>24</sup> WG Core Document 2.3.2

<sup>25</sup> This data was provided to NRW in an email from Dr Keith Jones on 08/09/16

5.2.1.3 NRW considers that the field ditch replacement proposals are satisfactory, when considered both overall and with respect to each affected SSSI.

5.2.1.4 NRW's opinion is that, in respect of the Gwent Levels SSSIs, it has not been demonstrated that the re-en mitigation proposals, with respect to location of replacement, would be in accordance with the statutory duty under Section 28G of the 1981 Act and/or the biodiversity and ecosystem resilience duty under Section 6 of the 2016 Act.

## **5.2.2 Grazing Marsh**

5.2.2.1 Mitigation for grazing marsh loss is set out in the December 2016 Environmental Statement Supplement at Appendix SR10.35 Draft SSSI Mitigation Strategy<sup>26</sup> and considers three areas of land.

5.2.2.2 Two areas, Maerdy Farm and Tatton Farm, fall within the Gwent Levels SSSIs, and the third, Caldicot Moor, is not designated as SSSI. NRW accept in principle, that works within the Gwent Levels SSSIs could be regarded as making a contribution to mitigating the loss of SSSI grazing marsh, in particular proposals which sought to restore current arable land use to grazing marsh.

5.2.2.3 For all three sites, NRW considers it essential that management control and the practical ability to manage the areas can be secured in perpetuity. It is noted that the parcels of land have, where relevant, been included within the Draft Compulsory Purchase Order.

5.2.2.4 NRW considers that further detail is required with respect to the methodology for undertaking the initial habitat restoration, alongside a

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<sup>26</sup> WG Core Document 2.4.14

commitment to undertake these works prior to the loss of the original habitat. In addition, a commitment is required to secure and finance appropriate ongoing management, both of the grazing marsh and drainage network, in perpetuity.

5.2.2.5 The area of land under consideration at Caldicot Moor is now smaller than that published as Appendix 10.35 (SSSI Mitigation Strategy) as part of the original ES in March 2016<sup>27</sup>. The original proposal would have been contiguous with the Gwent Levels: Magor and Undy SSSI both to the west and south, whereas in the latest iteration continuity would only be to the west. NRW considers that it has not been demonstrated how water levels can be managed within the proposed mitigation area to support the restoration of grazing marsh while not altering the current water level management on the now excluded parcels of land to the south.

5.2.2.6 NRW's opinion is that, in respect of the Gwent Levels SSSIs, it has not been demonstrated that the grazing marsh mitigation proposals, with respect to ongoing management, would be in accordance with the statutory duty under Section 28G of the 1981 Act and/or the biodiversity and ecosystem resilience duty under Section 6 of the 2016 Act.

### **5.3 Water Quantity**

5.3.1 NRW considers that the design of the operational phase drainage system, set out in the ES Volume 3 at Appendix 2.2 Drainage Strategy<sup>28</sup> alongside a supplement published in September 2016, Appendix S2.2 Drainage Strategy<sup>29</sup> meets its requirements as it will ensure that water can be discharged at greenfield run-off rate. NRW also considers that the proposals set out in Appendix SR3.1 Buildability Report<sup>30</sup> will ensure

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<sup>27</sup> WG Core Document 2.3.2

<sup>28</sup> WG Core Document 2.3.2

<sup>29</sup> WG Core Document 2.4.4

<sup>30</sup> WG Core Document 2.4.14

that the construction phase drainage to the Gwent Levels SSSI drainage network would be discharged at green field run-off rate

- 5.3.2 No contingency plans have been tabled should it not be possible to discharge treated road drainage to the Gwent Levels SSSI drainage network due to unacceptable water quality. In this scenario, there would be a reduction of water entering the drainage network compared to the current position. Additional sources of water, of appropriate quality, would therefore need to be provided.

#### **5.4 Design and connectivity of the drainage system**

- 5.4.1 The replacement reens have been designed as linear features which include, in accordance with NRW's recommendation, a berm. The reens would be located adjacent to the new M4. The proposals are set out in the ES Volume 3 at Appendix 2.3, Reen Mitigation Strategy with Supplementary material published in September 2016 as Appendix S2.1<sup>31</sup> It would create a uniform structure over 10km long with the only variation to the physical characteristics of the replacement watercourses being between reen and field ditch Whilst this is acceptable from an Internal Drainage District perspective, as set out in Matt Bajowski's Proof of Evidence, it is not the preferred option with respect to the Gwent Levels suite of SSSIs.

- 5.4.2 NRW consider that the replacement reens should be designed and constructed to include variation in width and depth to better replicate the range of diversity of reen and field ditch losses, which provides the habitats diversity necessary to support the range of Gwent Levels SSSI features.

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<sup>31</sup> WG Core Document 2.4.4

- 5.4.3 The scheduling and timing of new reed and ditch creation is important. NRW recommends autumn or winter, alongside connected coexistence of old (to be removed) and new channels for as long as possible and the ability to translocate both aquatic flora and substrate, where appropriate. These Guidelines are taken from Chapter 6, section 6.1.2 of Nature Conservation and Physical Developments on the Gwent Levels. NRW considers that it has yet to be demonstrated that this best practice could be followed.
- 5.4.4 NRW, and previously CCW, has experience of providing advice on a range of, smaller scale, development proposals across the Gwent Levels over the past 25 years. Initially CCW considered, given the historical man-made nature of the drainage network, that it could be possible to recreate the physical environment necessary to support the SSSI features of interest. Experience gained over this period has shown how difficult it is to replicate the complex drainage system with its niche habitats.
- 5.4.5 Appendix A to this proof of evidence presents photographs and commentary on the success, or otherwise, of reed and ditch creation required as the result of a variety of developments within the suite of Gwent Levels SSSIs. They have mostly failed to recreate conditions which support the full range of SSSI features, although NRW recognises that some examples have been more successful than others. Important elements in the most successful cases appear to be that the replacement reed or ditch has been constructed in advance of the infilling of the drainage channel to be lost and the two co-exist for a number of months, that the surrounding land use continues to be agricultural grazing and that variation in physical form, including in water depth occurs. Within Appendix A to this proof of evidence, examples which illustrate this are Longcross reed diversion (photo 3) and Waundeiladd reed diversion (photo 10). None of these examples have been of the scale which would be required for this scheme. Indeed, the loss of reeds at this scale is unprecedented. NRW is not confident that replacement reeds and

ditches can be provided which would support the features of interest of the suite of Gwent Levels SSSIs and fully mitigate the losses.

- 5.4.6 This view is supported by work led by the JNCC<sup>32</sup>, which states that “translocation of habitats cannot reproduce the essential environmental conditions and the ecological processes, for example, migration, grazing and predation, which determine the composition of the original plant and animal communities”.
- 5.4.7 NRW’s opinion is that, in respect of the Gwent Levels SSSIs, it has not been demonstrated that the reed mitigation proposals, in respect of design, would be in accordance with the statutory duty under Section 28G of the 1981 Act and/or the biodiversity and ecosystem resilience duty under Section 6 of the 2016 Act.

## **5.5 Appropriate management**

### **5.5.1 Reens and ditches**

- 5.5.1.1 NRW considers that certainty of future management, in perpetuity, of the newly created reens and ditches is required.
- 5.5.1.2 The principle of NRW taking on the long-term management of the newly created reens and ditches has been raised. Negotiations have not yet commenced, and so at this stage NRW’s requirement for certainty on this aspect has not been met.

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<sup>32</sup> Joint Nature Conservation Committee 2003 A Habitats Translocation Policy for Britain. Joint Nature Conservation Committee on behalf of the Countryside Council for Wales, English Nature and Scottish Natural Heritage. JNCC, Peterborough. Section 7.1 - [http://jncc.defra.gov.uk/pdf/habitats\\_policy.pdf](http://jncc.defra.gov.uk/pdf/habitats_policy.pdf)

5.5.1.3 NRW's opinion is that, in respect of the Gwent Levels SSSIs, it has not been demonstrated that the reed mitigation proposals, regarding ongoing management, would be in accordance with the statutory duty under Section 28G of the 1981 Act and/or the biodiversity and ecosystem resilience duty under Section 6 of the 2016 Act.

## **5.5.2 Grazing marsh**

5.5.2.1 NRW considers that certainty that both management control and the practical ability to manage the recreated habitats has been secured in perpetuity, and that development could not occur in these areas.

5.5.2.2 NRW considers that information needs to be provided setting out how, when and by whom the habitat restoration works would be undertaken as well as proposals for how long term management can be secured in perpetuity, to include the funding of this work.

5.5.2.3 NRW's opinion is that, in respect of the Gwent Levels SSSIs, it has not been demonstrated that the grazing marsh mitigation proposals would be in accordance with the statutory duty under Section 28G of the 1981 Act and/or the biodiversity and ecosystem resilience duty under Section 6 of the 2016 Act.

## **6. ALTERNATIVES**

### **Blue Route**

6.1 NRW's understanding of the Blue Route is that for the most part it would involve the expansion of existing roads (the A48 and A4810 (Steelworks Access Road)) which are not within any of the Gwent Levels SSSIs. New carriageway construction would be required at the eastern end of the Steelworks access road to provide connection to Junction 23a of the M4, which would fall partly within the Gwent Levels: Redwick and Llandevenny SSSI.

6.2 In the absence of an equivalent level of design and environmental assessment to WG's scheme proposal NRW is unable to comment fully with respect to likely effects on SSSIs. However, the scale of construction and permanent footprint of the road within the Gwent Levels suite of SSSIs would be significantly reduced compared to WG's proposed scheme.

## **7. CONCLUSIONS**

7.1 NRW considers the scale of permanent loss of SSSI in the Gwent Levels under the scheme would be unacceptable. Furthermore, it has not been demonstrated that the mitigation proposals put forward are capable of providing the mitigation required to justify the scale of loss if the scheme, as published, were to proceed.

7.2 Experience, as NRW and previously CCW, of advising on development proposals across the Gwent Levels over a 25 year period, and observing the outcomes, has demonstrated that, where the creation of new reens or ditches is required, it is challenging to recreate the conditions required to support the SSSI features, even at relatively small scale. NRW is not confident that this scheme could deliver reen and ditch habitat recreation which can support the full range of qualifying SSSI features.

7.3 NRW considers that evidence has yet to be provided to demonstrate that water of appropriate quantity can be discharged to the SSSI drainage network from the scheme during both the construction and operational phase.

7.4 NRW has not been assured that long-term, appropriate, management of both the replacement drainage network and SSSI mitigation land has been secured, and financed, in perpetuity.

7.5 NRW considers that, in the context of the Gwent Levels SSSIs, it has not been demonstrated that the proposals under the M4 CaN scheme would be in accordance with the statutory duty under section 28G of the 1981 Act and / or the biodiversity and ecosystem resilience duty under section 6 of the 2016 Act.

7.6 For the reasons set out above, as regards section 7 of the 2016 Act, NRW considers that the evidence presented does not demonstrate that the proposals under the M4 CaN scheme would constitute the taking of reasonable steps to maintain and enhance listed species (organisms) and habitats in the Gwent Levels SSSIs.

7.7 Further, considering the scale of permanent loss of SSSI in the Gwent Levels, identified adverse impacts on the Gwent Levels SSSIs and concerns as to the prospects of success of proposed mitigation measures, NRW considers that the Welsh Government has not demonstrated that the M4 CaN scheme would constitute sustainable development within the context of the Welsh Ministers' well-being duty under the 2015 Act.

### **DECLARATION**

I confirm that the facts and matters referred to in this proof of evidence are true to the best of my knowledge and belief. The opinions I have expressed represent my true and complete professional opinions on the matters to which they refer.

Signed:



Dated: 7 February 2017

## 8. REFERENCES

- 8.1 Bainbridge, I., Brown, A., Burnett, N, Corbett, P, Cork, C, Ferris, R, Howe, M, Maddock, A, Mountford, E, Pritchard, S (editors). JNCC (2013) Guidelines for the Selection of Biological SSSIs – Part 1 Rationale, Operational Approach and Criteria. [NRW 7.9]
- 8.2 Chartered Institute of Ecology and Environmental Management. Impact Assessment. Online guidance for Site Selection [NRW 7.10]
- 8.3 Chartered Institute of Ecology and Environmental Management, Guidelines for Ecological Impact Assessment in the UK and Ireland, Terrestrial, Freshwater and Coastal (Second Edition, January 2016) [NRW 7.11]
- 8.4 Countryside Council for Wales (1991). Chapter 6 *Conservation Guidelines for Development Proposals*. In *Nature Conservation and Physical Developments on the Gwent Levels. The current and Future Implications* [NRW 7.12]
- 8.5 Joint Nature Conservation Committee (2003). A Habitats Translocation Policy for Britain. Joint Nature Conservation Committee on behalf of the Countryside Council for Wales, English Nature and Scottish Natural Heritage. JNCC, Peterborough. Section 7.1. [NRW 7.13]
- 8.6 Joint Nature Conservation Committee, Common Standards Monitoring Guidance for Ditches (2005) [NRW 7.14]
- 8.7 NRW, The State of Natural Resources Report (SoNaRR): Assessment of the State of Natural Resources (September 2016) [NRW 2.5]
- 8.8 Wales Biodiversity Partnership, Interim Section 7 Biodiversity list: species [NRW 2.10]
- 8.9 Wales Biodiversity Partnership, Interim Section 7 Biodiversity list: habitats [NRW 2.11]
- 8.10 Welsh Government, Planning Policy Wales (9<sup>th</sup> ed.November 2016) [WG 5.1.12]
- 8.11 Welsh Government (2009) Technical Advice Note 5: Nature Conservation and Planning (2009) [WG 11.2.14]