

Adran yr Economi a'r Seilwaith
Department for Economy and Infrastructure



Llywodraeth Cymru
Welsh Government

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) (Amendment) Scheme 201-

The London to Fishguard Trunk Road (East of Magor to Castleton) Order 201-

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-

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 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 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-

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-

Summary Proof of Evidence

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Welsh Government, Carbon

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1. Author

1.1 Personal profile and qualifications

- 1.1.1 I am a professional civil engineer. I hold degrees in Civil Engineering and Soil Mechanics. I hold Chartered Engineer status in both the UK and Ireland and am a Fellow of the Institution of Civil Engineers and of the Institution of Engineers of Ireland. I am also a member of the British Geotechnical Association, the British Tunnelling Society and the Geotechnical Society of Ireland. I am registered with the Register of Geotechnical Engineering Professionals (RoGEP) as an “Adviser”, its highest category.
- 1.1.2 In 2014, I was elected to the Royal Academy of Engineering, the UK’s national academy for engineering, as a Fellow. I am now a member of its Policy Committee.
- 1.1.3 I have been employed by Arup since September 1987 and became a director in December 2004. I became leader of Arup’s London-based geotechnical and tunnelling group in November 2006. Since August 2011, I have been leader of the Infrastructure London Group, comprising all the design skills for major economic infrastructure and sit on Arup’s UK Infrastructure Sector Executive.
- 1.1.4 I led the Institution of Civil Engineers’ report on a trajectory for low carbon infrastructure (2011) for which I won the Presidential Medal of the Institution of Civil Engineers also in 2011. In October 2016, I was appointed to the National Infrastructure Commission’s Technical Expert Advisory Group.
- 1.1.5 Since 2015, I have been a member of the UK’s Green Construction Board (GCB). The GCB is a consultative forum for government and the UK design, construction, property and infrastructure industry. The GCB is the sustainability work stream of the Construction Leadership

Council. The role of the GCB is to provide leadership and action to enable the whole value chain (clients, contractors, product manufacturers and suppliers) to become more environmentally sustainable, more productive and better placed to exploit the growing global market.

1.1.6 I am also active on the GCB's infrastructure working group, of which I have been a member since 2012, which is establishing the necessary framework of client leadership so that infrastructure projects can be made lower carbon. I was a steering group member for the UK Government's Infrastructure Carbon Review (2013) and was the Arup director responsible for the world's first standard for the reduction of carbon in infrastructure PAS 2080:2016, produced jointly with colleagues from Mott MacDonald.

1.2 Relevant experience

1.2.1 I have worked on a wide range of building and infrastructure projects ranging from the very small to the very large.

1.2.2 A detailed summary of relevant experience is included in my CV in Appendix A to this report.

1.3 Personal Role on the Scheme.

1.3.1 I am the Carbon Reviewer for the Scheme, providing assessment and advice on the Whole Life Carbon emissions associated with the Scheme.

1.3.2 I am using Carbon as a shorthand for Greenhouse Gas Emissions (GHG) across the whole of the Proof of Evidence.

1.3.3 I first became involved in the project in October 2015.

1.4 Declaration of truth

1.4.1 This Proof of Evidence represents my true and professional opinion and is given in accordance with the Institution of Civil Engineers Code of Professional Conduct¹.

2. Scope of Proof of Evidence

2.1.1 My Proof of Evidence will address the Whole Life Carbon emissions aspects for the Scheme and the associated impact on climate change.

2.1.2 My Proof of Evidence is presented in the following structure:

1. Author
2. Scope of Evidence
3. The Scheme
4. General Evidence related to the carbon emissions of the Scheme
5. Objections related to the carbon emissions of the Scheme

¹ <https://www.ice.org.uk/ICEDevelopmentWebPortal/media/Documents/About%20Us/ice-code-of-professional-conduct.pdf>

3. Summary of Carbon Proof of Evidence

- 3.1.1 My Proof of Evidence relates to the Whole Life Carbon aspects of the Scheme (as defined in PAS 2080) – relating to Carbon (as shorthand for overall Greenhouse Gas) emissions as a contributor to Climate Change.
- 3.1.2 Whilst various pieces of legislation require UK and Welsh Governments to make large overall savings in Carbon, they should still spend carbon in ways that are beneficial for their citizens – those mandated reductions are not required at an individual project level. It is of course important for every project that Carbon is invested deliberately and wisely, hence the production of the analysis in the Carbon Report (in the ES) analysis to inform decision making.
- 3.1.3 Analysis of the traffic flows on the wider network (both on the existing M4 and new section of motorway) shows, even with forecast traffic increases, that the Scheme is effectively Whole Life Carbon neutral, with calculations showing a small saving overall. This is because of a combination of the new route being some 2.8km shorter and also it having significant congestion alleviation benefits over the “Do Minimum” scenario on the existing M4.
- 3.1.4 Modelling shows that overall, the scheme would result in a User Carbon saving of some 4,324 tonnes per year emitted on the Welsh highway network initially, increasing savings into the future. This would mean that the Capital Carbon of around 522,516 tonnes invested in building the Scheme would be repaid after around 45 years of operation, so by 2066. At this point, the Scheme would achieve Whole Life Carbon neutrality.
- 3.1.5 Transport Planning Objective 10 relates to Carbon (“reduced greenhouse gas emissions per vehicle and/or person kilometre”) and is met by the Scheme proposals.