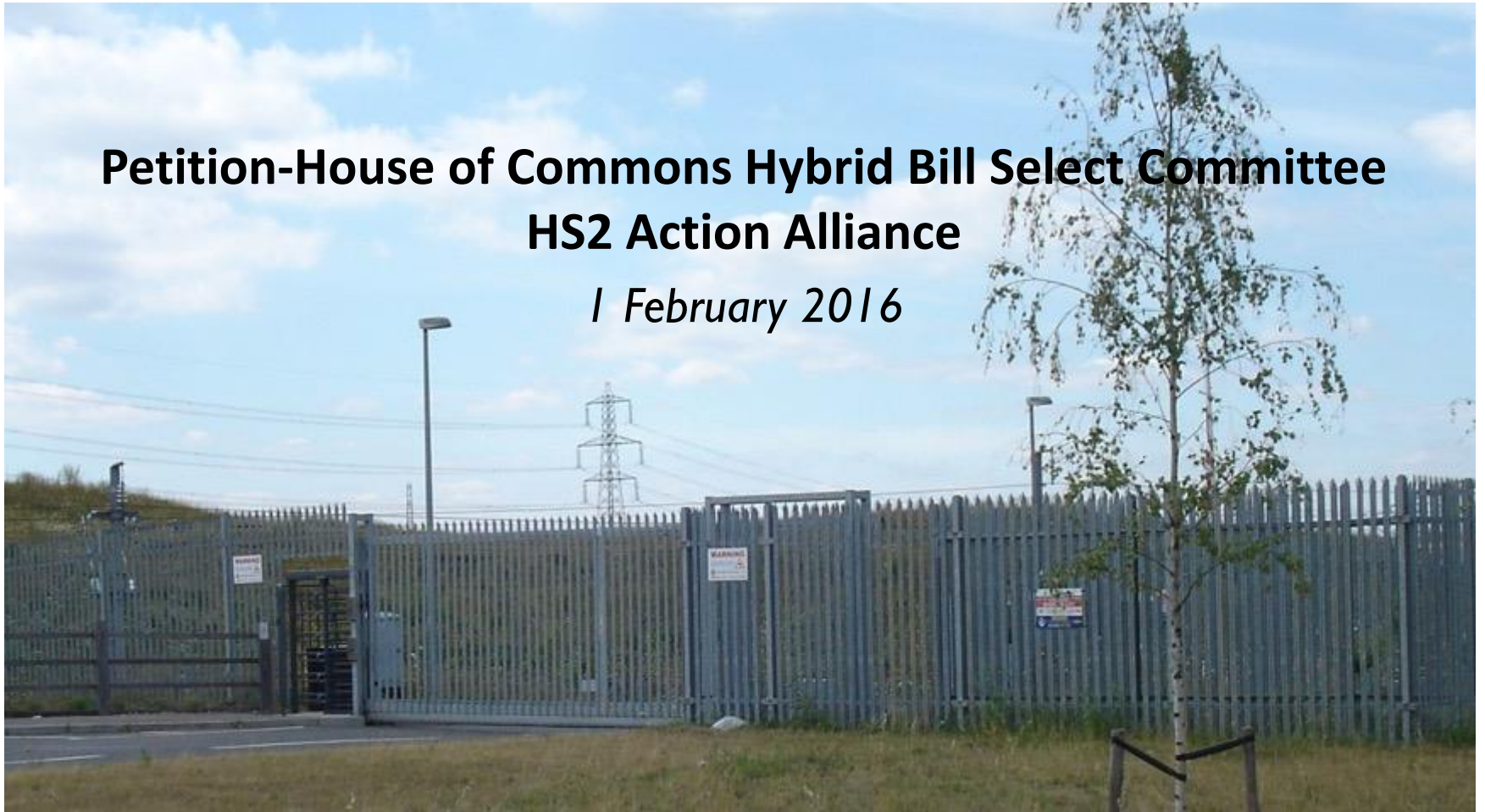


**Petition-House of Commons Hybrid Bill Select Committee
HS2 Action Alliance**

1 February 2016



Who Are We?

HS2 Action Alliance was founded in 2010, around 15,000 registered supporters in 430 of 636 UK Parliamentary constituencies.

Making the business, environmental and transport case against HS2 and, should the scheme proceed, pushing for effective environmental mitigation.

Sought, and denied, Legal Aid to adduce expert evidence across a wide range of route wide topics which are called out in the Environmental Statement to the Select Committee.

Bringing expert evidence today on rail, noise, ecology, landscape, carbon, trees, air quality and waste.

Costs of experts and legal counsel

A2068 (2) ively met by donations from members of the public



Colne Valley, Hillingdon, Site of Proposed Viaduct



Cubbington, Warwickshire, Site of Cutting

HS2 Ltd's Listening In Action.....

Request	Response
Correct defects in Environmental Statement	Partial
Independent oversight body	No
Reducing the speed of HS2 to 300 kph	No
Revised noise limits in accordance with national noise policy	No
Local authority oversight of noise	No
Binding obligation for additional mitigation if noise limits breached.	No
Identify and protect areas of tranquility.	No
No Net Loss of Biodiversity	No
60 year environmental monitoring	No
Revised carbon assessment	No
Proper arrangements for tree planting	No
Revised waste monitoring strategy	No
Local authority agreement to waste mitigation	No
EIA Concerns	No

Request	Response
Air quality baseline in line with Air Quality Standards Regulations 2010	No
Binding air quality limits reflecting relevant standards	No
Requirement to stop work if air quality limits breached	No
Extension to Voluntary Purchase Scheme/Need to Sell Scheme	No
Introduction of Property Bond	No
Other measures to provide fair compensation	No
Proper Code of Construction Practice.	No
Eliminate or reduce limits of deviation	No
Deletion of clauses on water quality	No
Deletion of clauses on Railways Act	No
Enforcement against nominated undertaker in courts	No
Health Impact Assessment subject to consultation	No

40 plus requests... 0 accepted by HS2 Ltd

What are we asking the Select Committee to consider?

Request 1- The Committee consider the specific points on each of the topics raised through expert evidence and ensure they are adequately addressed by the Promoter.

Request 2- The speed of the trains travelling at HS2 be slowed down to 300kph from the current forecast speed of 360kph

Request 3- The Select Committee recommend the construction and operation of HS2 be overseen by an independent regulatory body.

Request 4- The legal regime for ensuring environmental outcomes reflect what is agreed by the Select Committee is put on a properly robust footing to allow for effective enforcement.

Request 5-the commitment to plant two million trees is made real.

Who Will You Hear From Today?

We are submitting evidence from a selection of experts on a variety of route wide environmental topics which will be hugely impacted by the proposals of Phase 1 of HS2

Rail - Piers
Connor, Rail
Consultant

Noise - Kieran
Gayler, Sharps
Acoustics

Air Quality –
Philip
Branchflower,
SLR

Landscape –
Colin Pill,
Tyler Grange

Ecology -
Jo Treweek
TEC

Trees - Jon
Berry, Tyler
Grange

Carbon – Julie
Gartside, SLR

Waste –
Nigel
Cronin, SLR



Drummond Street, London



St James's Gardens, London



Marston, Staffordshire

Reducing The Speed of HS2

“20 minutes off the journey to Birmingham is almost irrelevant. It is nice but it is not important. It should always have been about capacity”

Rt Hon. Patrick McLoughlin MP, September 2013

“HS2 Ltd and the Department should therefore examine the scope for requiring a reduced maximum speed for the trains until electricity generation has been sufficiently decarbonised to make that a marginal issue, and publish the calculations that would underpin such a calculation.”

Environmental Audit Committee, April 2014



Reducing The Speed of HS2

Reducing the speed of HS2 will mean far better environmental outcomes than the current scheme.

But the advantages don't stop there:

- Cheaper.
- Reduces the technical risks which the project has struggled with since the outset.
- Lower operating costs-lower ticket prices

No route finalised for Phase 2-so this change would mean even greater environmental benefits for the entire project.



Piers Connor

- Over 50 years railway experience;
- MSc in Railway Systems Engineering;
- Member CILT, IRO;
- Worked in operations, maintenance, engineering, planning; training and education;
- Projects include Channel Tunnel, HS1, New York subway, Hong Kong KCRC, London Underground, Los Angeles, Johannesburg.

A Railway is a System

- Infrastructure
- Rolling stock
- Power supply
- Train control
- Operations



Photo by Christoph Schmitz

The higher the train speed, the greater the adverse effect on all these.

Train Performance

- Acceleration and braking are not constant throughout speed range;
- Use straight line average for headway calculation;
- Pragmatic 0.3m/s^2 for acceleration and 0.5m/s^2 for braking;
- HS2 using 0.67m/s^2 for braking;
- HS2 acceleration not specified but reverse; engineering suggests 0.14m/s^2 between 225 and 360 km/h.

Train Speeds

- German Siemens Velaro
 - Top speed 300 km/h
 - Acceleration 0.38 m/s^2
 - Braking 0.5 m/s^2
- French TGV
 - Top speed 300 km/h
 - Acceleration 0.38 m/s^2
 - Braking 0.3 m/s^2
- Japanese
 - Top speed 300.
 - Acceleration 0.34 m/s^2
 - Braking 0.30 m/s^2



Photo from Siemens



Photo by Rafal Tomasiak



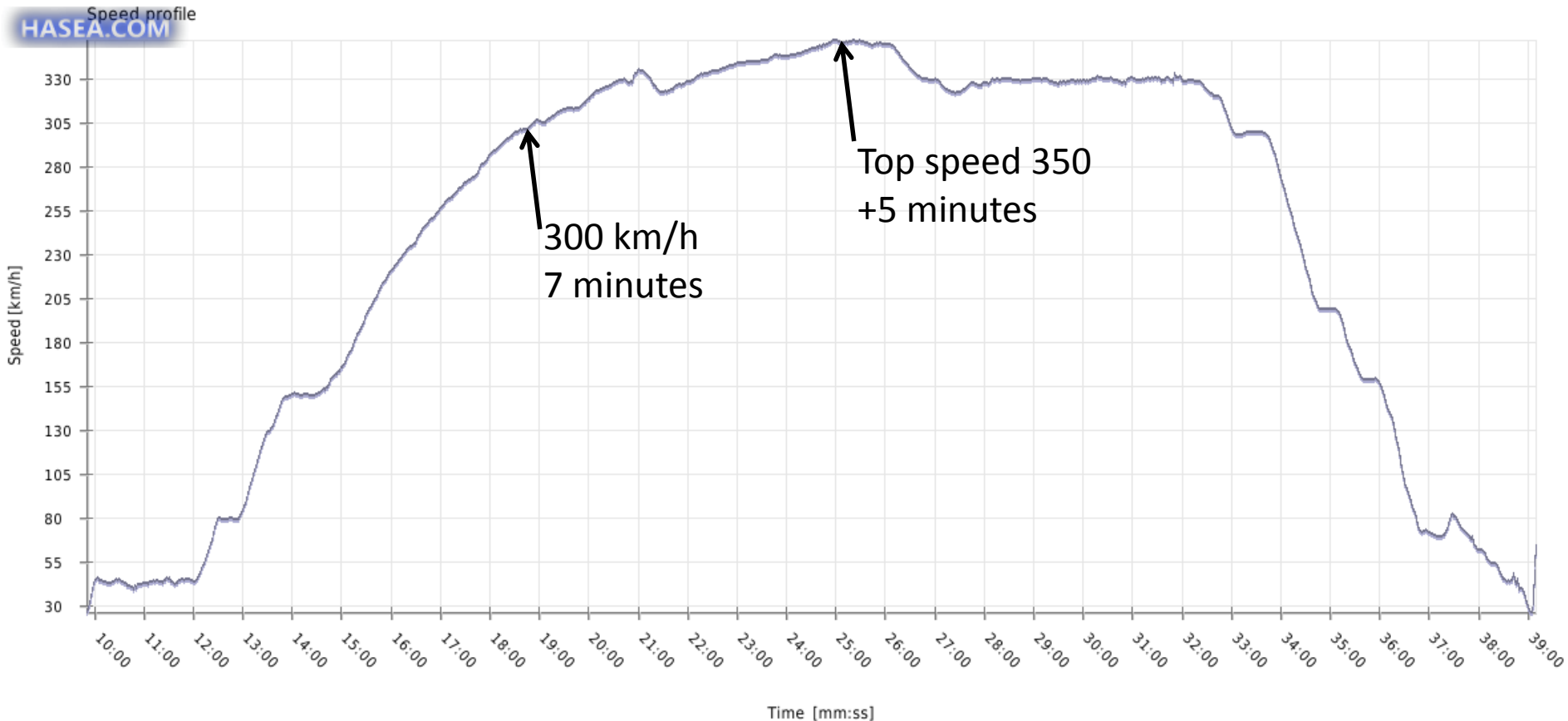
HOC/01591/0019

Train performance plot Tianjin – Beijing 117km

Acceleration 0.46 m/s² up to 130km/h, 0.13m/s² up to 330km/h

Braking 0.4 m/s²

Top speed was 350 km/h (used in plot), now 300.



A2068 (19) rney time reduction at 300 km/h is 3 minutes; for HS2 it is 4.25 to 5.5 minu HOC/01591/0020

Comparison

- Train Top Speed: 300km/h 360km/h
 - Braking distance 7444m 10600m
 - Acceleration time: 7mins. 12mins.
 - Energy: +19%
 - Noise: ~90dB(A) ~97dB(A)*
 - Trains per hour: 13.5 10

Final Comments

- International acceptance of 300km/h as normal;
- Saves energy;
- Cost reduction for maintenance of rolling stock & infrastructure;
- Could provide some reduction of route construction costs
- So, a lower top speed provides significant advantages.

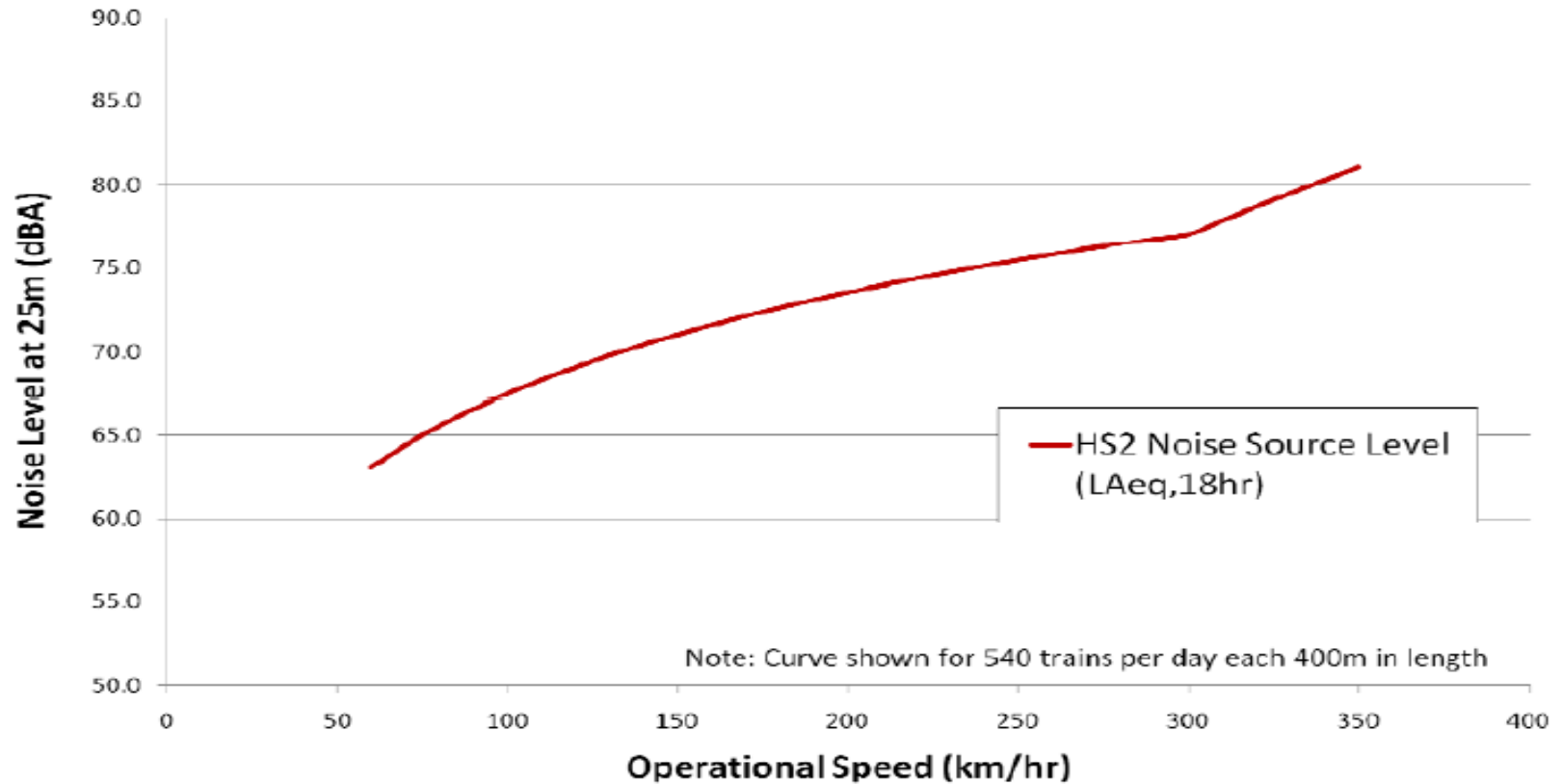


Sharps Acoustics LLP

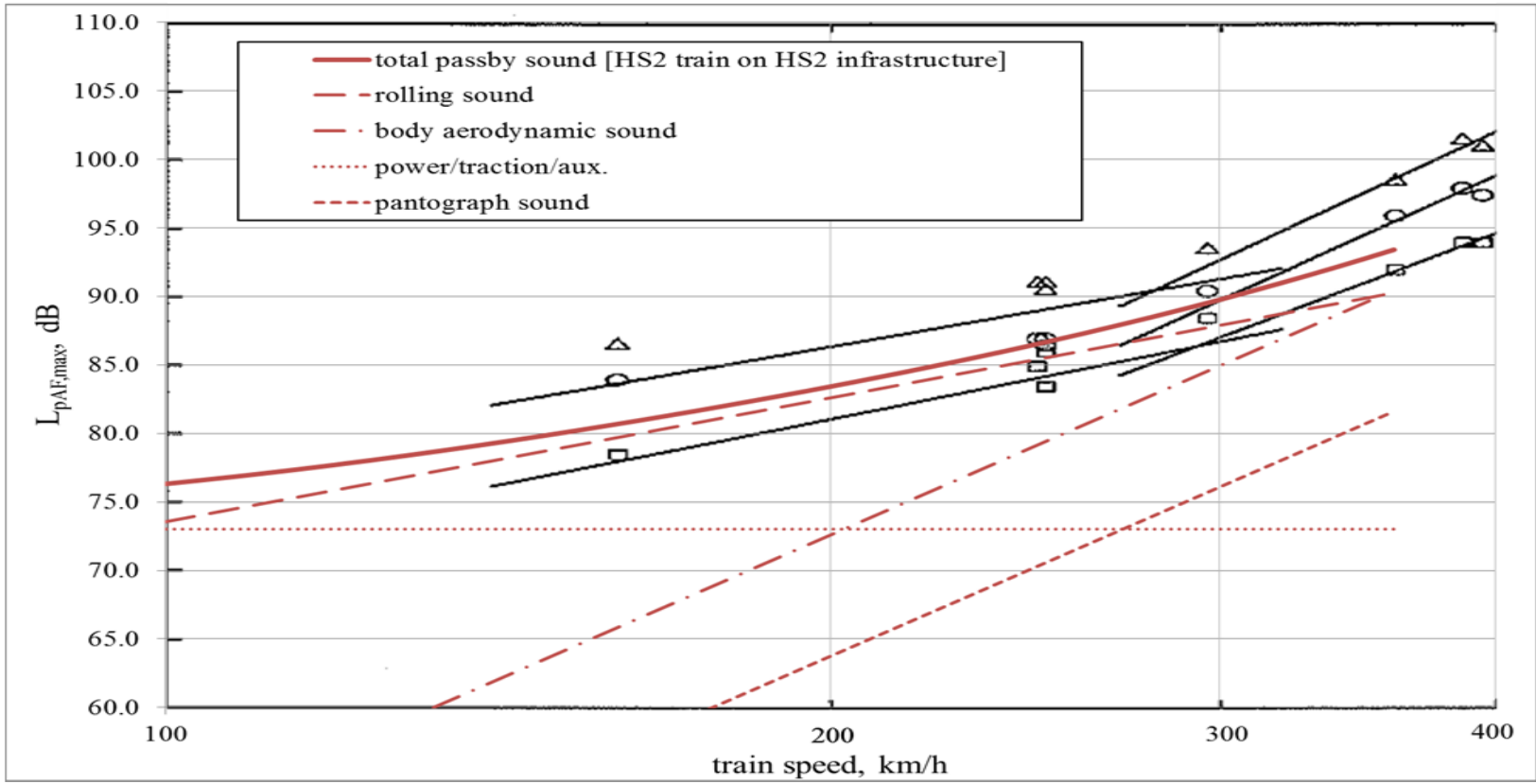
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HOC/01591/0023

HS2 Noise Source Level Curve for AoS



From a response by HS2 under Freedom of Information legislation. May 2010



HS2 ES Appendix SV-oo1-000Annex D2 Fig 5. Level at 25 metres from track.

Speed (Km/hr)	Noise Level at 25 m 540 trains (LAeq,18hr), dBA	Reduction in Noise Level versus Design Speed (360 km/hr)
360	83	n/a
350	82	1 dB
340	81	2 dB
330	80	3 dB
320	79	4 dB
310	78	5 dB
300	77	6 dB
290	77	6 dB
270	76.5	6.5 dB
260	76	7 dB
250	76	7 dB
240	75	8 dB
230	75	8 dB

From "Noise Source Level Curve" – Slide 2

Summary

- Reduction in speed from 360 to 300 kph brings about a 6 dB reduction in noise level.
- Further reductions may result from better screening where aerodynamic noise is less influential.
- 3dB reduction is “significant” and would have a “significant positive impact”. 6 dB reduction would be substantially beneficial ($\frac{2}{3}$ as loud, $\frac{1}{4}$ as much energy).
- This reduction in speed is a reasonably practical mitigation measure.

HS2 – Air Quality

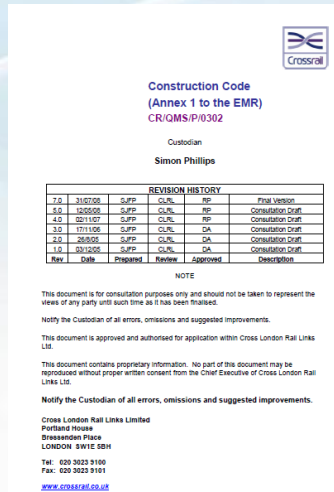
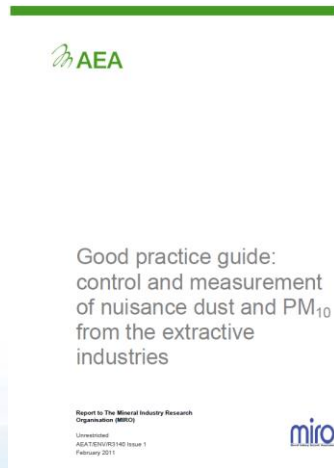
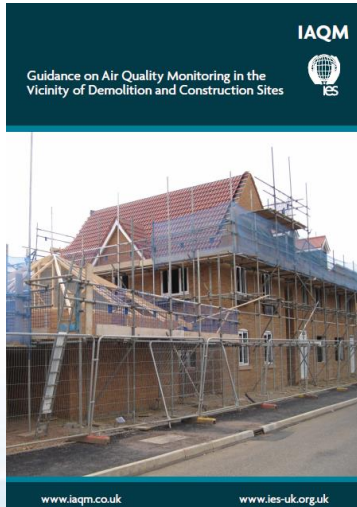
Philip Branchflower
Technical Director
SLR Air Quality



Required Actions

- Demonstrate how HS2 can be undertaken without worsening or delaying compliance with the AQ Directive.
- All HGV's to comply with HS2's proposed standard of 'Euro VI'.
- All Non-road Construction Vehicles to comply with the London NRMM LEZ.
- A detailed, definitive and bespoke Dust Management Plan is developed for all CFA's.

Required Monitoring



These documents all define a similar monitoring regime for particulate matter which has been ignored by HS2, despite it being applied for Crossrail.

They must be applied for HS2

TYLER GRANGE

1st February 2016

HS2 Landscape and Visual

Colin Pill CMLI



Tyler Grange

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Birmingham ▪ Cotswolds ▪ Exeter ▪ London ▪ Manchester

HOC/01591/0038



Introduction

Landscape and Visual Amenity Aspects of HS2:

My name is Colin Pill. I am a Chartered Landscape Architect and Partner with Tyler Grange who are one of the country's leading environmental consultants and landscape and visual impact assessment specialists.

I would like to talk to you about landscape and visual assessment (commonly known as LVIA), including the guidance used and the key stages, and will provide you with my professional opinion as to why there are serious issues with the HS2 Ltd LVIA work.

I have been instructed by HS2AA to undertake an independent review and had no preconceived ideas as to whether HS2 Ltd had followed good practice with regards to the landscape and visual impact assessment work.

I have reviewed the landscape aspects of Volumes 1, 2, 3, 4 and 5 submitted in December 2013 as well as the subsequent ES addendums.



Marston, Staffordshire

Tyler Grange

What is LVIA?



Colne Valley

LVIA is a *‘tool used to identify and assess the significance of and the effects of change resulting from development on both the landscape as an environmental resource in its own right and on people’s views and visual amenity’.*

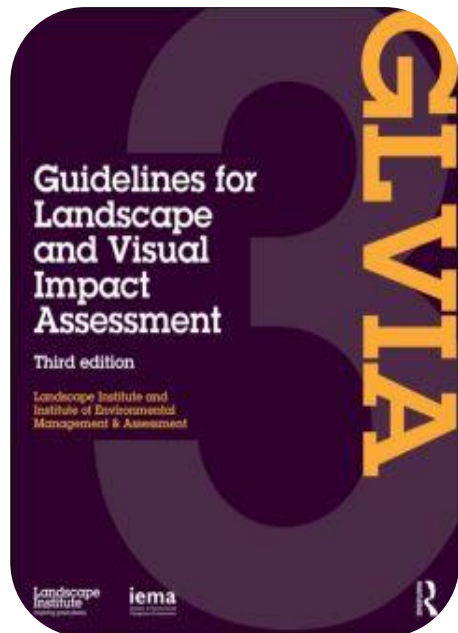
It is essentially a process that allows us to understand and manage change effectively within the landscape. When done well it helps ensure that development is as best fit as possible and adverse effects are kept to a minimum through sensitive planning, design or mitigation.

LVIA is one of a suite of 3 different but related assessment tools that are commonly used, the others being townscape assessment (TVIA) and seascape assessment.

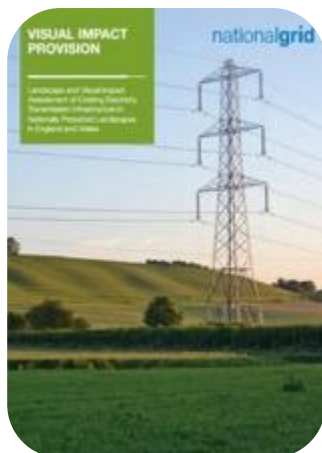


Leam Valley, Warwickshire

LVIA Guidance



GLVIA3



What Guidance should be followed?

For LVIA the standard guidance is set out in 'Guidelines for Landscape and Visual Impact Assessment' which is published by The Landscape Institute and Institute of Environmental Management & Assessment. The third edition was published in 2013 and is known as GLVIA3.

National Grid have recently undertaken a whole range of landscape assessments which followed GLVIA3 as part of their review of existing electricity infrastructure within protected landscapes and for new infrastructure associated with the North West Coast Connections.

The Key Components and Steps of LVIA

- Agree the scope. At the scoping stage 'the extent of the study area to be used for landscape and visual effects should be identified';
- Establish the existing baseline;
- Identify, describe and evaluate change and effects on the baseline;
- Identify and set out Mitigation Proposals;
- Write LVIA ES Chapter and technical appendices ; and
- Implement mitigation / monitor effects.

Issues with HS2 Ltd LVIA



Streethay

There are a number of high level issues with the LVIA work that HS2 Ltd has undertaken and submitted as part of the ES. These issues include weaknesses in what has been produced, gaps in information, areas where further work is needed and inconsistencies often between different sections of the route.

Some issues are relatively minor but others are fundamental to the assessment process with the result that it is simply not possible to understand from the information provided what the full effects of the proposals would be on the townscape / landscape character and visual amenity of the route.

These fundamental defects can be summarised into the following main headings each of which I will explain in more detail as we proceed:

- Type of Assessment Undertaken
- Compliance with Guidance (GLVIA3) including:
 - Study area;
 - Level of Assessment Undertaken;
 - Level of Detail;
 - Level of Discussion;
 - Level of Analysis
- Gaps in Information and Assessment.
- Presentation and Communication of Material.

Type of Assessment



LVIA and TVIA

HS2 have used LVIA to assess the entire route, however many sections are within urban settings where townscape assessment is required.

Night-time Assessment

Further work is needed to assess night-time effects of the proposals.

Cumulative Assessment

Further work is needed to assess potential cumulative effects of the proposals in combination with the effects of other developments.



Denham, Buckinghamshire

GLVIA Compliance



For the LVIA assessment work the HS2 Ltd ES LVIA chapters do not properly consider or follow the GLVIA3 guidance

Set out below are some of the areas of non-compliance which are crucial to the assessment process :

- Study Area;
- Level of Assessment and Analysis;
- Evaluation of Value;
- Level of Detail of the Proposals;
- Presentation and Communication of the ES chapters; and
- Mitigation.

GLVIA Compliance



Mixbury, Oxfordshire

Study Areas

The study areas used in the Environmental Statement (ES) are not clearly defined or are very arbitrary and narrow and have not been agreed with the competent authorities.

Level of Assessment and Analysis

The level and detail of assessment and evaluation within the ES (with regard to effects on character and visual amenity) is insufficient for the scale and complexity of the project and too simplistic and as a result fails to establish the true effects of potential change to landscape character and visual amenity. Much more assessment is required.

The ZTVs used in the assessment underplay the potential geographical extent of potential effects as they do not take into consideration some of the tallest components of the proposals including cranes, bridges and structures and the OLE.

The choice and distribution of viewpoints has not been fully agreed and there is no rationale for the choice of their locations. There is a shocking inconsistency in the number of views in each section.

There are issues with how the illustrative material (including baseline photography and photomontages) has been presented which does not follow the relevant technical guidelines (which are strict).

Tyler Grange

GLVIA Compliance



South Cubbington Ancient Woodland

Evaluation of Landscape Value

Landscape value and sensitivity judgements within the HS2 Ltd LVIA have been largely based on the designation approach with no methodology or criteria set out on how undesignated landscapes have been valued and not enough discussion within the ES to show how judgements have been made.

Level of Detail Provided for the Proposals

The design proposals are not yet detailed and are of a high level rather than in detail. Much of the information is generic and not specific, especially with regards to mitigation proposals. There is not enough detail in the information submitted.

Presentation and Communication of the LVIA

One of the biggest problems for the audience of the ES is trying to establish exactly what the proposals are and in turn what the predicted effects are likely to be as the information required is spread out and split up over a wide area and over many reports. Trying to follow it is a paper chase.

The illustrative material presented in the Map books are extremely busy, spread out and complicated which makes them difficult to follow, particularly if you are interested in different sections or an area which straddles two CFA's.

Mitigation



New Woodland Planting

Mitigation and Residual Effects

The mitigation proposed within the ES is very generic and in some cases should be considered enhancement rather than mitigation. The level of detail is poor and difficult to understand.

The issues with the assessment work already noted bring into question the level of mitigation which has already been identified. Most importantly many potential effects have so far not been identified and therefore would not be addressed by the current mitigation proposals.



Marston, Staffordshire

Putting it right



In order to understand the full effects of the proposals on the landscape character and visual amenity the following areas of work are required:

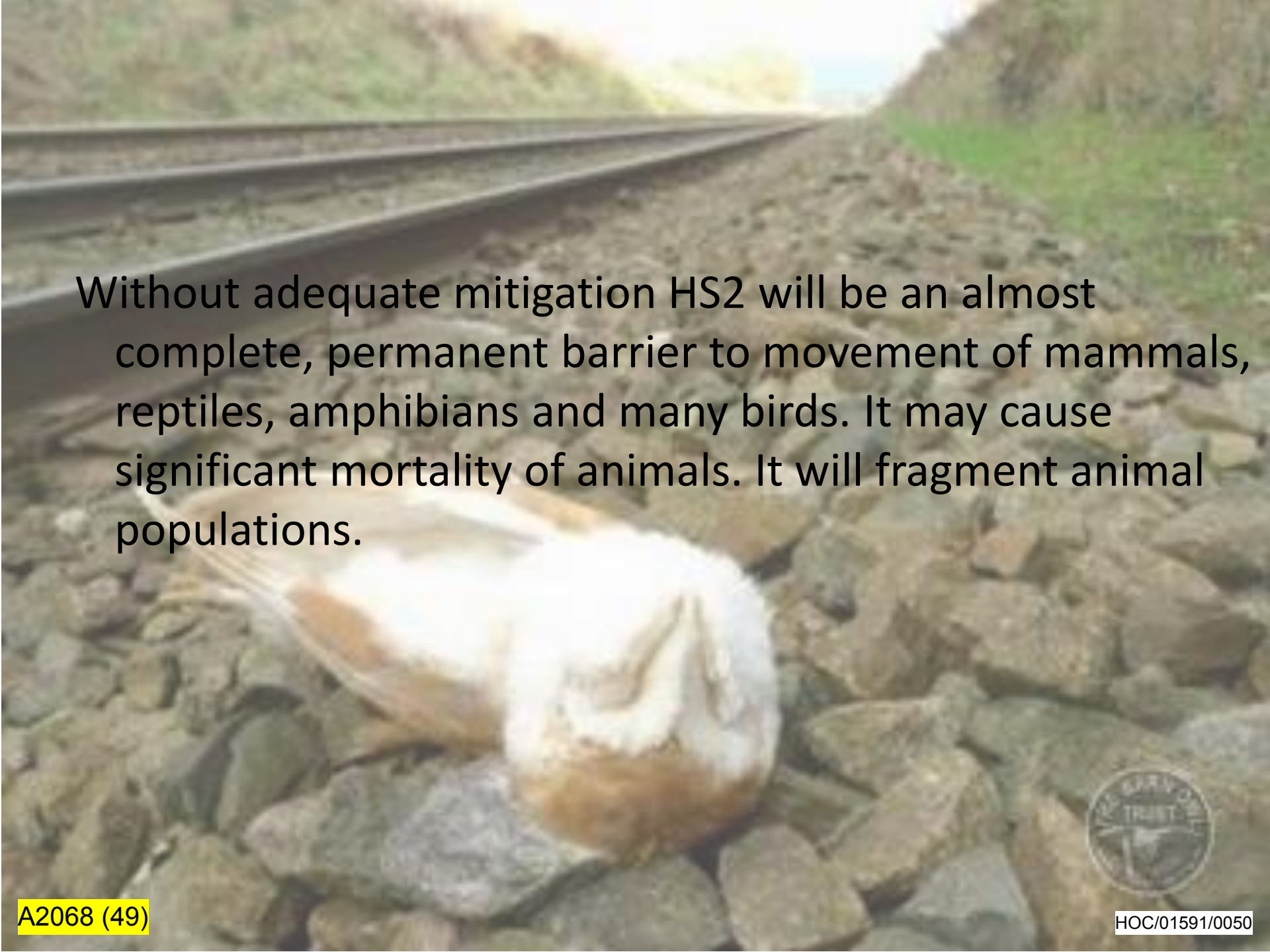
- For the urban areas of the route TVIA's should be undertaken to an agreed methodology.
- An adequate level of Night-time assessment needs to be undertaken to an agreed methodology which establishes the night-time baseline conditions and identifies the sources of light and the effects.
- A robust cumulative assessment of landscape and visual effects needs to be undertaken to an agreed methodology.
- Further work is required on the landscape and visual baselines to ensure there is an appropriate level of information so that sensitive receptors are identified and the full extent of the effects can be assessed.
- More discussion and analysis is required on how judgements and decisions have been made.
- Many more photomontages are required to help people understand what the proposals would comprise and how the landscape would change. These photomontages need to be produced and presented in accordance with technical guidelines. (which are strict)
- Mitigation proposals need to be worked up in more detail and made more specific to particular areas, long term management of the mitigation needs to be agreed in principle.
- Where adequate information is not available or not yet detailed a set of parameters should be used for assessment purposes.

Ecology

Jo Treweek is an ecologist, with 25 years of experience in research and EIA practice.

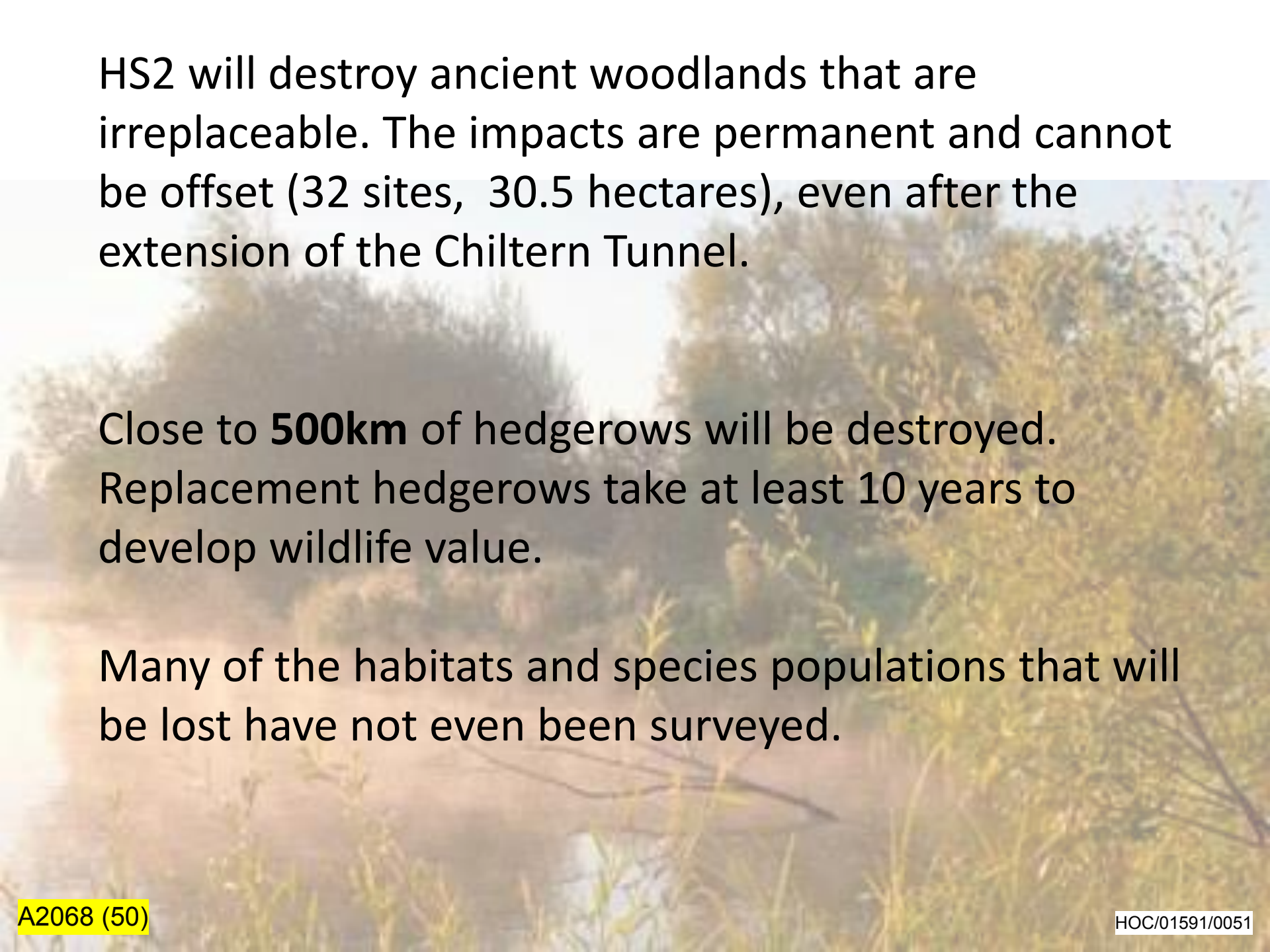
She has contributed to national guidance on ecological impact assessment (IEEM EcIA Guidelines) and designed the first version of the Defra biodiversity offset metric being used by HS2.

She has been instrumental in developing international standards and audits large scale infrastructure projects on behalf of international finance institutions (IFC and EBRD), including mining, oil and gas and linear infrastructure projects in the EU and Africa.

A photograph showing a dead bird, possibly a pigeon, lying on its back on a bed of grey gravel. The bird is positioned in the foreground, with its head towards the right. In the background, a railway track with two parallel rails runs across the frame, receding into the distance. The surrounding area is a mix of gravel and some sparse green grass. The overall scene suggests an animal casualty at a railway crossing.

Without adequate mitigation HS2 will be an almost complete, permanent barrier to movement of mammals, reptiles, amphibians and many birds. It may cause significant mortality of animals. It will fragment animal populations.





HS2 will destroy ancient woodlands that are irreplaceable. The impacts are permanent and cannot be offset (32 sites, 30.5 hectares), even after the extension of the Chiltern Tunnel.

Close to **500km** of hedgerows will be destroyed. Replacement hedgerows take at least 10 years to develop wildlife value.

Many of the habitats and species populations that will be lost have not even been surveyed.

What should happen to protect ecology from HS2 Phase 1?

In line with government policy, international performance standards and normal expectations for large infrastructure projects, HS2 should:

- Commit to a Net Positive Objective: Highways England and Network Rail have done this.
- Follow the mitigation hierarchy (avoid, reduce, restore, offset) for no Net Loss as a minimum.
- Follow good environmental practices. This includes survey of important habitats **in advance**, to allow avoidance and identify mitigation.
- Achieve a connected landscape using well-designed wildlife crossings.
- Publish an offset strategy for review and allow offsetting outside the rail corridor.
- Demonstrate that acceptable outcomes are achieved through independent, transparent accounting, monitoring and reporting.

What is planned for HS2?

Overall strategy for biodiversity

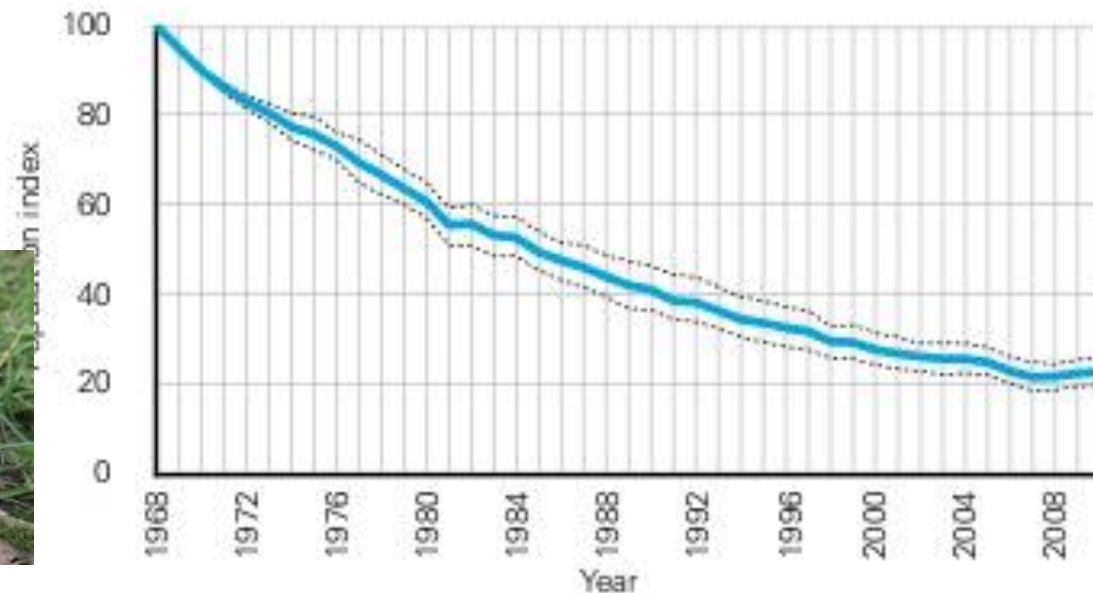
- Key ecological findings and commitments are confusingly dispersed throughout the Environmental Statement, Information Papers, the Environmental Memorandum and other documents that haven't been disclosed. Route wide impacts are not accounted for.
- HS2's biodiversity position and commitments are unclear and absent from the Environmental Memorandum.
- A NNL strategy has not been presented.
- Compliance, "where appropriate, with other relevant nature conservation policy" suggests weak and partial commitment.
- There is inadequate provision for mitigating impacts on populations of priority species, meaning overall loss is likely.

What is No Net Loss?

Despite best efforts to avoid or minimize impacts, even well-designed projects cause damage.

The UK's biodiversity is in freefall: 421 species have gone extinct since 1814. CEH (2015) reports "highly significant" decline in several essential ecosystem services such as carbon sequestration and pollination.

The No Net Loss principle responds to this serious risk: ecological impacts must be avoided or compensated properly to prevent further decline.



HOC/01591/0054

No Net Loss commitment is enshrined in EU and UK Government policy

- EU 2020 Biodiversity Strategy and “Roadmap to a Resource Efficient Europe”:
 - “halt loss of biodiversity by 2020”
 - Aim for “***no net loss of ecosystems***” .
- Defra:
 - “We will move progressively from net biodiversity loss to net gain..”.
 - Our 2020 mission is to **halt overall biodiversity loss**, support healthy well-functioning ecosystems and establish coherent ecological networks.. (Defra 2014).
- Highways England’s Strategic Business Plan:
 - by 2020, the company must deliver **no net loss of biodiversity**,
A2068 (54) and by 2040 it must deliver a net gain.

TYLER GRANGE
1st February 2016
HS2 AA – Arboricultural Summary Report

Jonathan Berry CMLI AIEMA M.Arbor.A



Tyler Grange

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Birmingham • Cotswolds • Exeter • London • Manchester

HOC/01591/0060

Introduction & Scope



Veteran tree in Warwickshire

My name is Jonathan Berry, I am a Chartered Landscape Architect, a Professional Arboricultural Consultant and an Associate of the Institute of Environmental Management and Assessment.

My presentation sets out my assessment of the approach that has been taken to determine the impacts of Phase 1 of HS2 on trees and woodland.

I have been instructed by HS2AA to undertake an independent review and have no preconceived ideas as to whether HS2 Ltd had followed good practice in this topic area.

I provide advice on measures the Select Committee should require to be implemented to provide a high degree of confidence that the commitments in the ES concerning mitigation and trees are delivered successfully.

As an arboricultural consultant I welcome the planting of two million trees; however, I have considerable doubts about the successful delivery and on-going management of the proposed mitigation.

Tyler Grange

The Approach to the Assessment of Trees

BS 5837:2012



BSI Standards Publication

Trees in relation to design, demolition and construction – Recommendations



BS5837 publication and extract of a typical Tree Survey assessment

The ES contains no commitment by HS2 Ltd to comply with BS5837 ‘Trees in relation to design, demolition and construction – Recommendations’.

The latest iteration of the BS also applies much greater focus on the need to consider site planning, suitability of tree species, social proximity and future growth, micro-climatic implications and on-going management. This has not been considered.

Amenity valuation of trees and woodlands is also undertaken in the UK to place an opinion of value or worth on one or more trees as an identifiable asset, but it does not form part of the current assessment.

These are commonly accepted assessment methods and for a project of this scale it would be necessary to assess worst case development implications (tree loss).



Established woodland flora under threat in Chilterns AONB

Issues with HS2 Ltd

Assessment of Trees



No specific 'Arboricultural ES Chapter' has been provided and no Technical Appendix assessment appears to be available.

No valuation exercise has been undertaken to establish the amenity value or financial asset value of the trees / woodland that are to be lost as a result of HS2; so how can a cost benefit analysis be informed.

In terms of the content of the ES, there is also no technical assessment undertaken in arboricultural terms that demonstrates that the tree loss predicted would be mitigated.

There is no guarantee that the specification, procurement, propagation and phased implementation of 2 million trees will be successfully delivered; or, how mitigation will be monitored, audited and defects resolved.

It would also be expected to see the harm of 'protected' tree loss to be quantified, so that the significance of the impact overall could be clearly assessed.

Planning & Design of Arboricultural Mitigation Measures

Most mitigation planting appears within the narrow operational rail corridor, taking the form of screen planting.

At present the planting of 2 million trees has not been derived via a well-considered constraint and opportunity led design process.

Overall, and based on the aforementioned technical deficiencies, it is worryingly apparent that the planning and design process has not properly considered the mitigation measures that relate to both the operational corridor and the wider land take.

Neither the mitigation hierarchy nor the ES sets out provision or parameters for how, where and when planting will be phased; and, how will it be audited, managed and maintained.



Typical example of new landscape
planting

Implementation of Arboricultural Mitigation Measures



Semi-mature tree stock at wholesale nursery

The horticultural industry expressed concern at the end of 2015 as to whether the planting demands associated with Phase 1 could be met.

No information provided on how consistency in plant stock be guaranteed and audited by HS2 Ltd.

No mechanism or procurement and research initiative is apparent within the ES material to judge the likely success of being able to successfully deliver the required mitigation for a complex scheme.

The logistics of being able to undertake the required amount of tree removal works is not linked with overall phasing or consideration of how felled material will be handled.

Currently no Tree Protection Strategies (TPS) and / or Arboricultural Method Statements (AMS) available to ensure retained trees are adequately safeguarded during the construction process.



Delivery, Maintenance & Management of Arboricultural Mitigation Measures

The delivery of necessary mitigation measures will be controlled via the hybrid Bill through Environmental Minimum Requirements (EMR) and an Environmental Memorandum. The EMR currently contains no substantive controls concerning trees.

A Code of Construction Practice (CoCP) has been promised and Environmental Management Plans will be in place; however, what operational strategy is in place to ensure mitigation is implemented and audited consistently. Further details of any independent regulatory body and defined roles is required.

Landscape and woodland management plans have not been prepared in line with established principles and no timescales are presented to guide the successful delivery of specific mitigation referenced in the ES.

There is no clear mechanism in place or strategy to control contractual assurances, consistency with adjoining mitigation measures and the availability of funding for future management.

Woodland management in Staffordshire

Resolving Arboricultural Issues



Projected route of HS2 through Chilterns woodland

Confirmation and assurance was required from the ES co-ordinators that arboricultural effects have been fully assessed; and, that a full arboricultural baseline has been delivered to the recognised standards of BS5837. But the ES offers no such assurance. This is a serious deficiency in the assessment of the HS2 proposal.

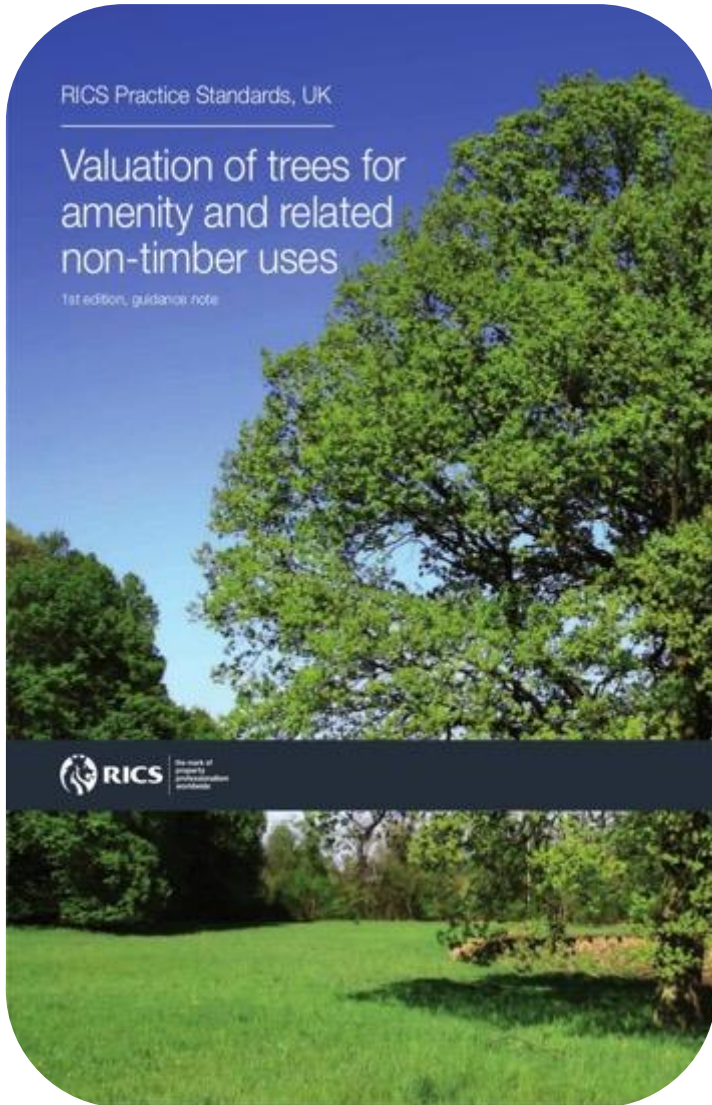
The ES does not provide an assessment of arboricultural effects beyond the relatively narrow operational rail corridor (i.e. on the wider corridor and in associated with other infrastructure works). This assessment is required.

The logistics of tree removal, seasonal constraints and guarantee that the native stock of local provenance has been suitably procured is essential to the successful delivery of HS2 but lacking in the ES.

Inadequate information is supplied regarding the operational strategy for the delivery of mitigation planting and who will be responsible for funding, monitoring and auditing the completed works against EMR policies, EMP's and the CoCP.

How will necessary landscape mitigation measures be safeguarded from future development pressures (i.e. will Restrictive Covenants be applied). Does the hybrid Bill protect the proposed mitigation proposals in perpetuity?

How to Make it Right



RICS Practice Standards, UK

Valuation of trees for amenity and related non-timber uses

1st edition, guidance note



Valuation methods established to define trees as financial assets

It is strongly advised that the Select Committee instruct HS2 Ltd to undertake a review of arboricultural deficiencies and ensure that the following tasks are undertaken to ensure robust assessment and commitment to the delivery of necessary mitigation measures:

1. Commitment to undertaking full baseline arboricultural surveys for the wider HS2 corridor in accordance with the provisions of BS5837;
2. The formulation of Arboricultural Impact Assessments (AIA) to determine the accurate extent of tree loss; and, the production of tree protection strategies in the form of Arboricultural Method Statements (AMS);
3. Targeted amenity valuation tree surveys undertaken to enable the cost benefit analysis of final route options;
4. The production of a delivery and implementation strategy, to demonstrate how tree stock will be specified, ordered, delivered and phased along the route of HS2;
5. The establishment of an independent regulatory body and clear definition of its scope, powers and objectives to deliver the proposed mitigation; and
6. Additional information is required regarding the on-going legal protection of all implemented HS2 mitigation planting (i.e. a framework of restrictive covenants or specific legal protection applied through Tree Preservation Orders).

Tyler Grange

Greenhouse Gas impacts from HS2 construction and operation

Julie Gartside



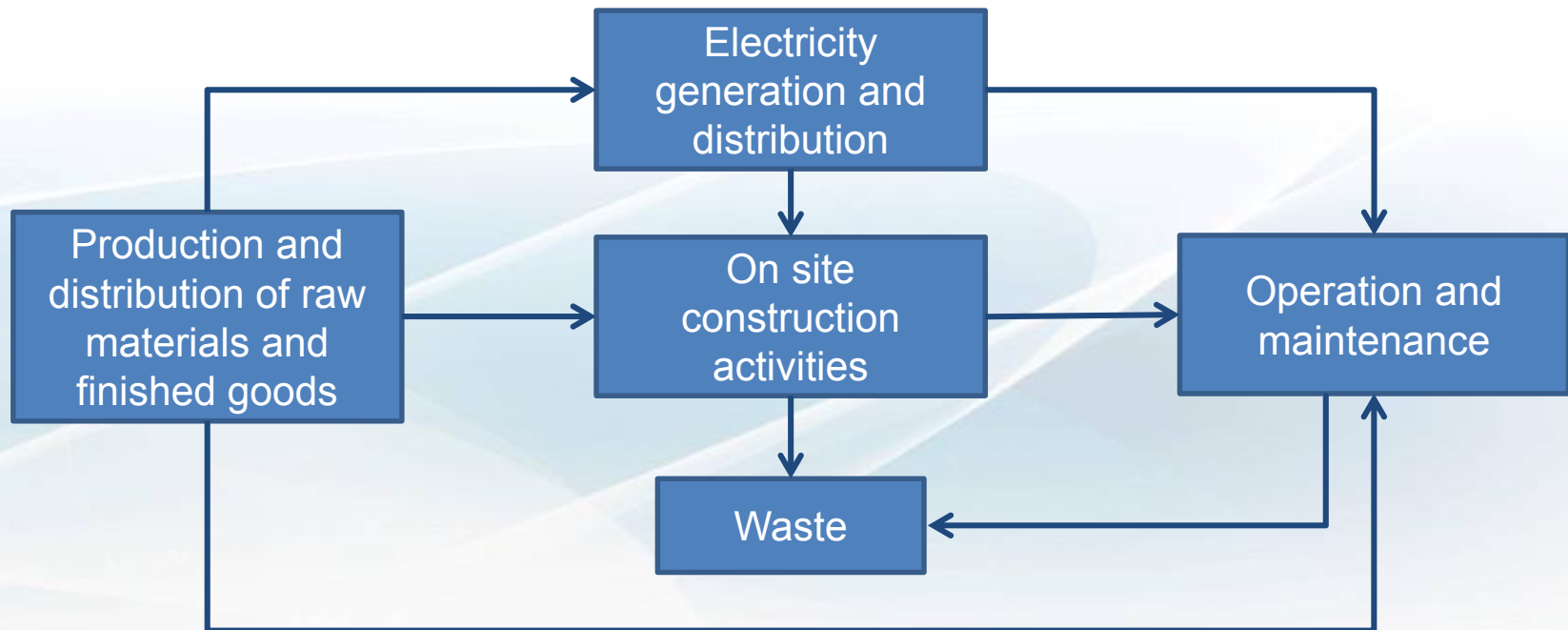
Julie Gartside



- 1st class Masters Degree in Mechanical Engineering and Energy Systems.
- 15 years experience in delivering carbon and energy mitigation strategies.
- Produced greenhouse gas life cycle assessments for construction companies, councils, food and drink companies.
- Supported governments on carbon development policy and low carbon development strategies.
- Wrote and delivered the Carbon Trust's workshop on carbon footprints.
- Chair of the Emissions Trading Group's 'Domestic Measures' group.

What is a GHG Assessment?

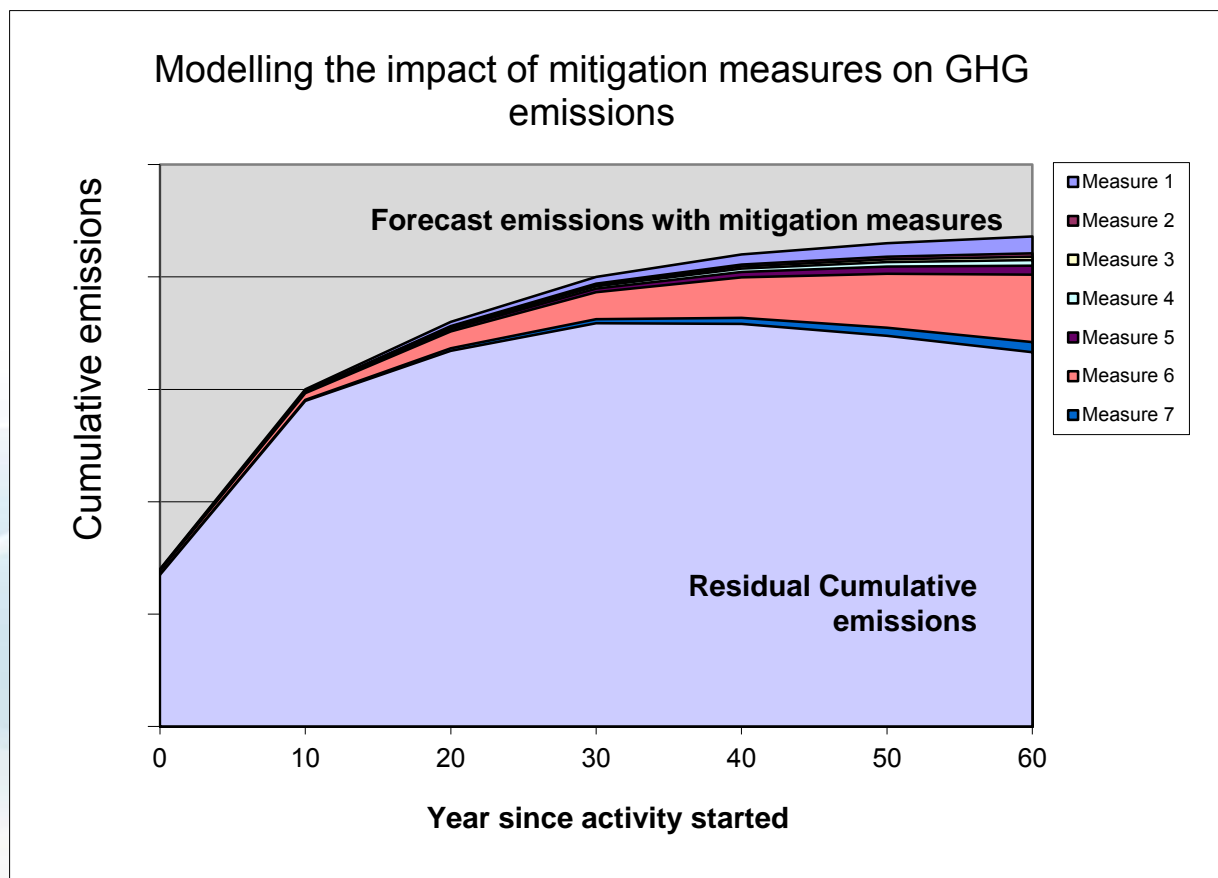
- Quantification of the greenhouse gas (GHG) emissions arising from all the life-cycle impacts of an activity.
- Simplistic overview:



Why do a GHG Assessment?

It enables:

- the expected GHG emissions to be modelled based on assumptions,
- an assessment of the potential mitigation options to reduce the GHG emissions to be evaluated, and
- a comparison against other scenarios or activities to be made to assess other low carbon options.



The policy background

Current major policies influencing emissions during life of HS2:

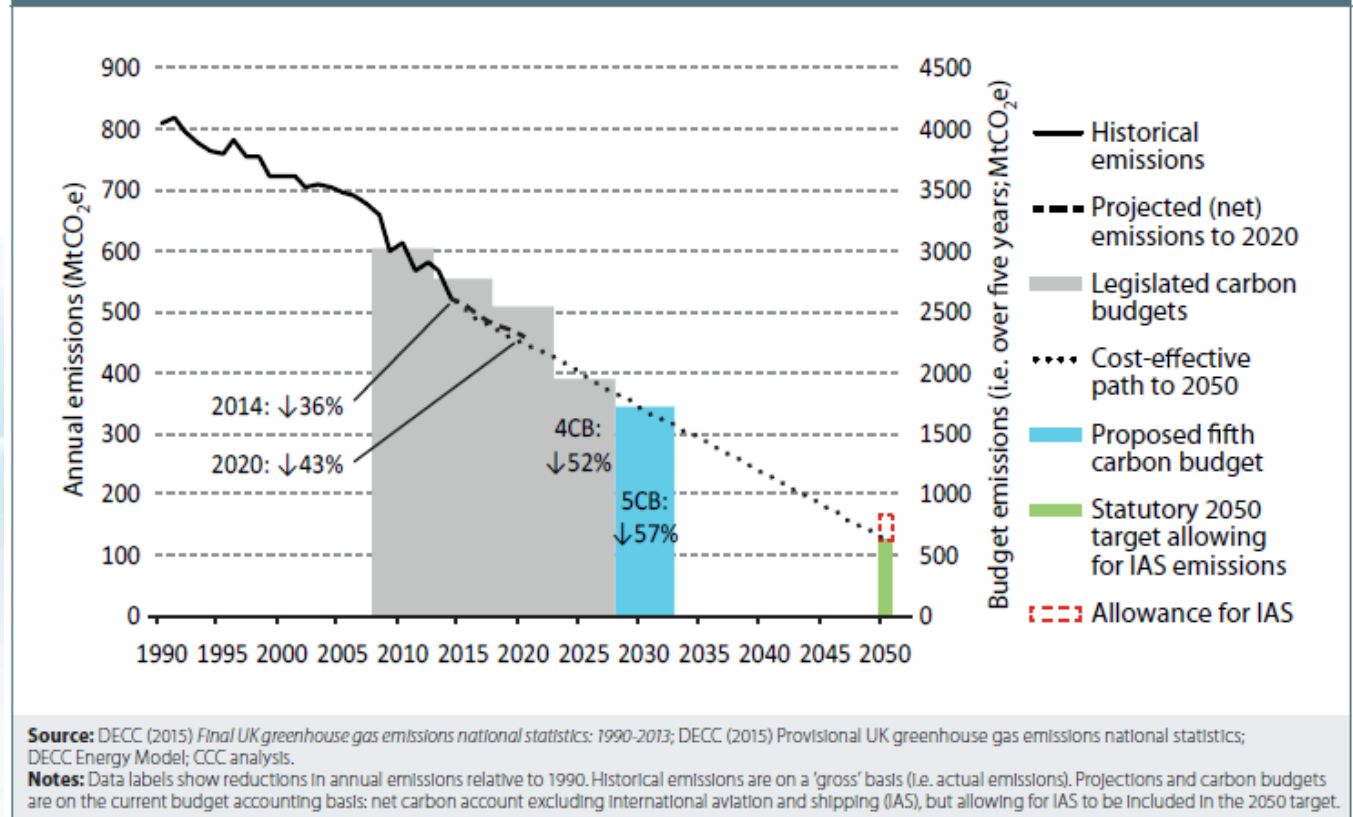
UK Climate Change Act (2008)

EU Emissions Trading Scheme

Contracts for Difference

ESOS

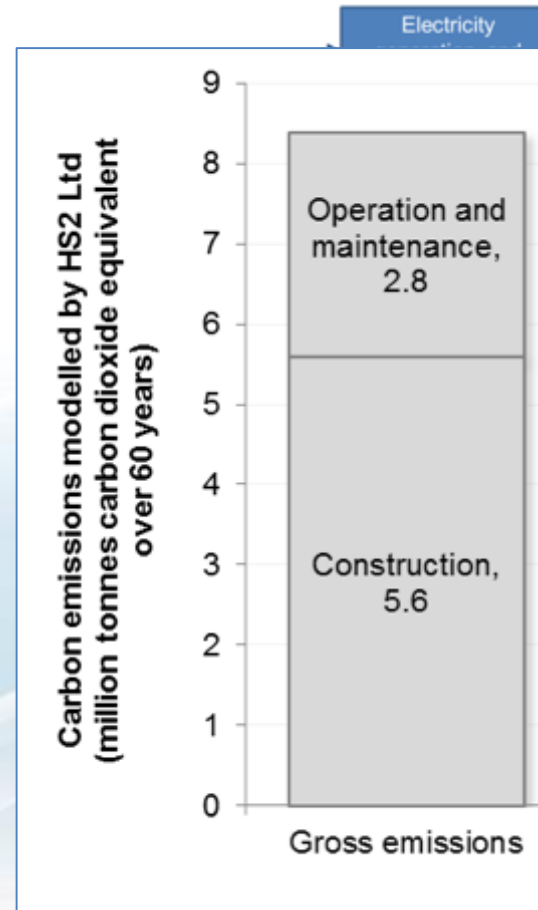
Figure 1: The recommended fifth carbon budget would continue emissions reduction on the path to the UK's 2050 target



The HS2 assessment of emissions (1)

Critical assumptions:

- Design of infrastructure.
 - Influences volume of raw material required and operational emissions.
- Use of HS2.
 - Will influence operational emissions.
- Decarbonisation of grid electricity.
 - Will influence operational emissions significantly.
- Decarbonisation of production of raw materials.
 - Will influence construction emissions significantly



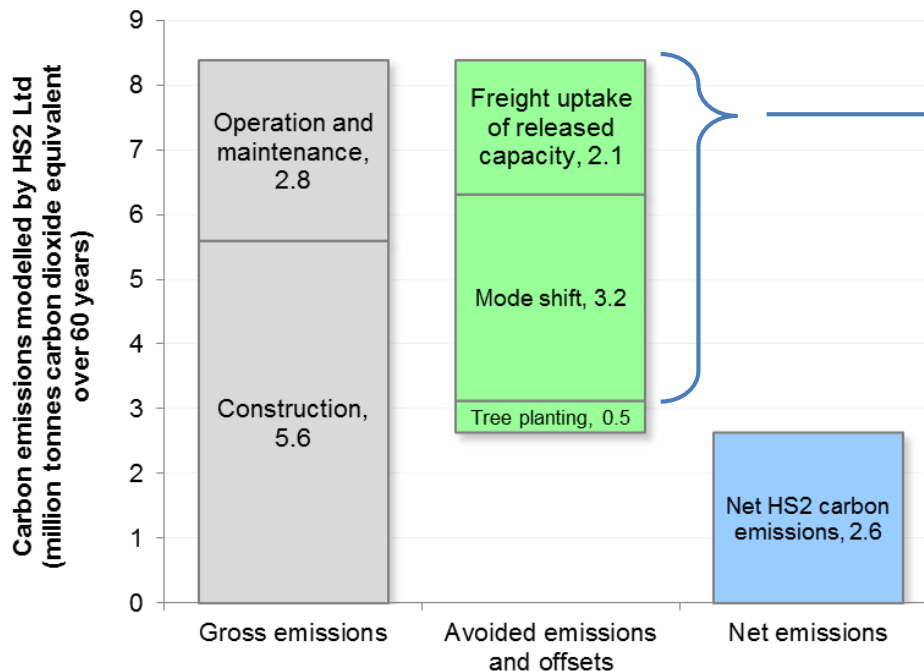
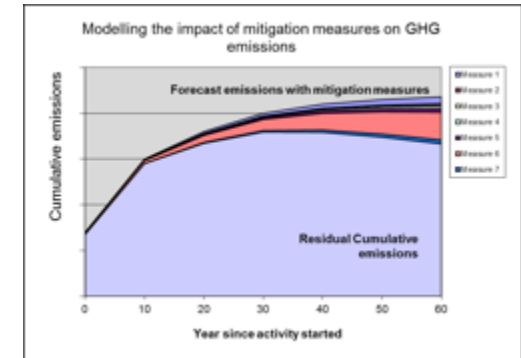
8.4 million tonnes CO_{2e} equates the annual carbon emissions of 1.85 million households (7% of all households)

Powering HS2's peak electrical requirement during operation would require around 390 wind turbines to cover an area equivalent to Manchester

The HS2 assessment of emissions (2)

Mitigation measures:

- ‘Carbon Minimisation Policy’ states that low carbon options will be considered.
- ‘Offsetting’ included in modelling – achieved through planting trees.



‘Avoided’ emissions:

- Looked at what other emissions may be reduced as a result of HS2.
- Links back to use of HS2 and hence the shift from other forms of transport to HS2.

Concerns regarding HS2's assessment (1)

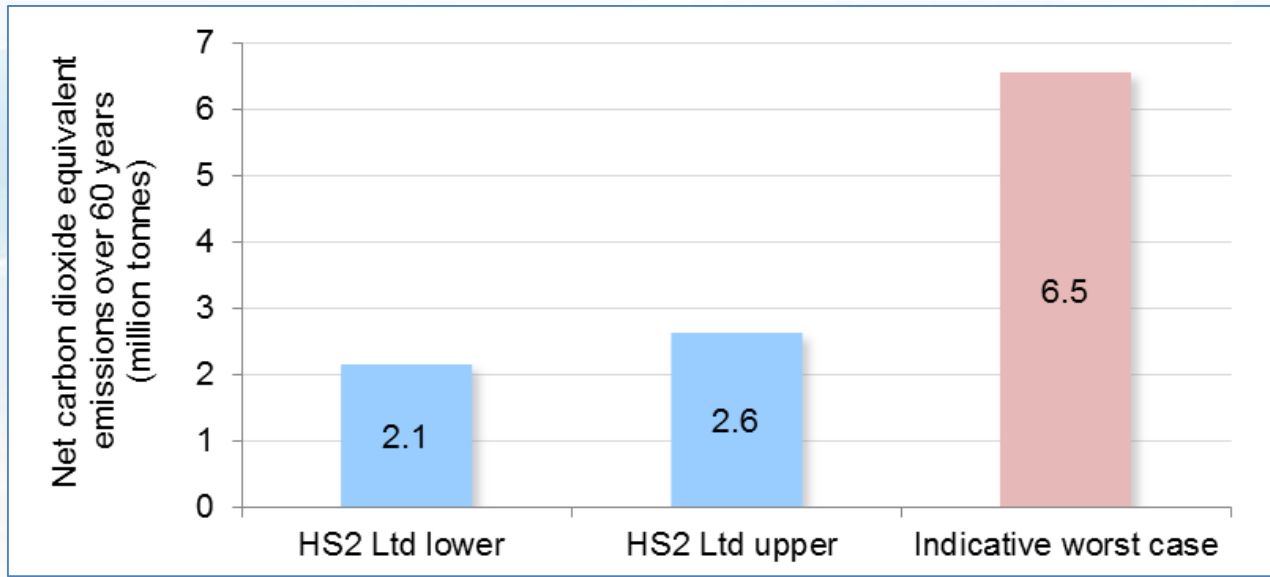
- Decarbonisation of grid electricity
 - Government forecasts predict significant reductions in GHG emissions from electricity generation; over 80%. The majority of operational emissions will be due to the electricity use of HS2 trains.
- 'Modal shift'
 - Assumptions are very unclear, but do appear to assume that there will be:
 - a decrease in air travel due to HS2.
 - a decrease in road freight due to HS2.
 - a decrease in car use due to HS2.
 - We believe these assumptions currently overstate the magnitude of modal shift that will be achieved.

Concerns regarding HS2's assessment (2)

- Decarbonisation of raw material production
 - Recent studies set out 'roadmaps' for steel and cement industries to decarbonise but they are significantly influenced by decarbonisation of grid electricity and carbon capture and storage.
- Mitigation measures
 - The environmental and economic benefits of different mitigation measures have not yet been evaluated sufficiently.
- Sequestering
 - The environmental and economic benefits of planting trees does not appear to have been evaluated.
 - Offsetting standards should be followed if adopted to ensure additionality and permanence.

Concerns regarding HS2's assessment (3)

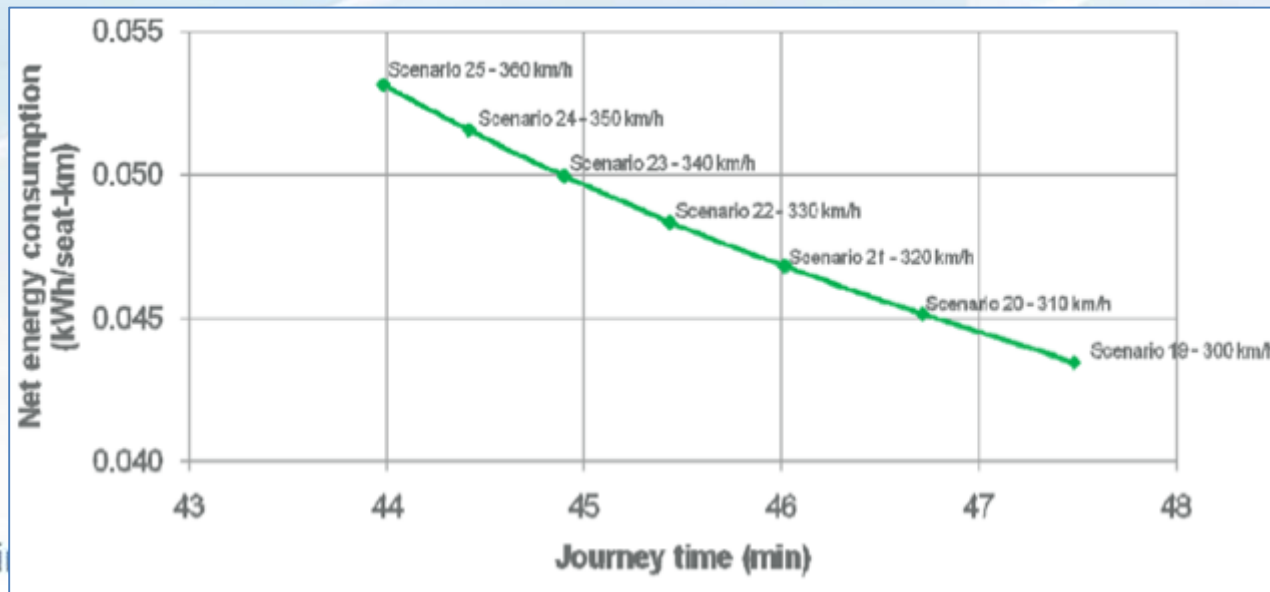
- Overall impact of concerns on predicted emissions
 - We believe that the total emissions are underestimated.
 - Our estimations in comparison to HS2 Ltd's are provided below. We have assumed that decarbonisation forecasts are less than anticipated and the modal shift achieved is not as great as currently modelled.



Our recommendations

- 1) Quantification of the potential emission reductions from various mitigation measures with an associated cost benefit analysis should be undertaken.

Example: Reducing the speed from 360 to 300 km/hr would result in a 23% energy saving and would only increase the journey time by 3.5 minutes. GHG emissions would be reduced through the decrease in energy requirements for the operation of the HS2 trains and construction of less noise abatement measures along the route.



Our recommendations

- 2) Assumptions and research substantiating the potential modal shift should be made publically available for review and comment.
- 3) A full environmental and cost benefit analysis of implementing sequestration projects should be undertaken and if adopted then required to comply with an appropriate offsetting standard (e.g. PAS 2060).
- 4) Modelling of emissions associated with subsequent phases of the high speed rail link should be started/published to help understand the overall project wide carbon benefits that can be achieved through different mitigation measures. If some measures are adopted on a larger scale it may improve the economic benefits and implementation of those measures.

HS2 - Waste Management

Nigel Cronin
Technical Director
SLR Waste and Resource Management



Nigel Cronin



- Masters in Business Administration
- 35 years in the construction materials and waste management sectors
- Undertaken several international, UK wide and regional waste infrastructure assessments for public and private sector clients
- Held General Management and Business Development roles within European waste management companies
- Developed the UK Quality Protocol for Recycled Materials – now adopted by the Environmental Services Association (ESA)
- Currently on secondment to a UK Local Authority on a Defra funded infrastructure strategy.

HS2 Waste Generation – headline numbers

HS2 will generate:

- 130 million tonnes of excavated waste;
- 1.7 million tonnes of demolition waste;
- 3.1 million tonnes of construction waste.

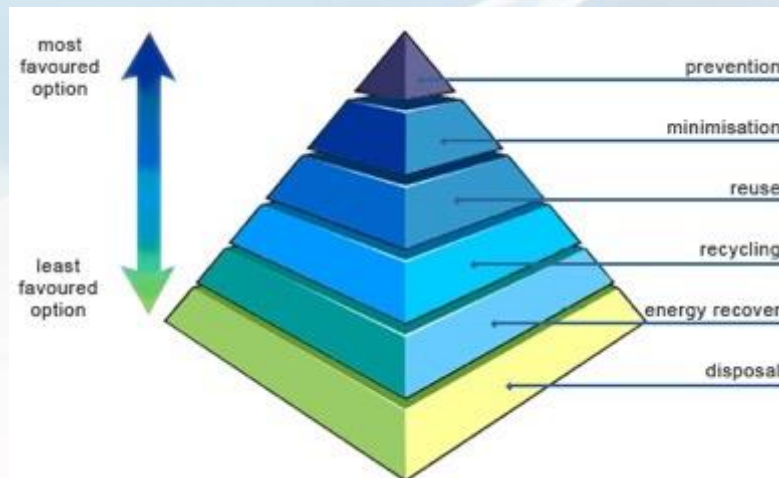


HS2 aim to reuse 90% of excavated waste within the proposed route, within embankments and the use of “Sustainable Placement Areas” (SPA). However, the latest HS2 waste data confirms the intention to landfill 14.4 million tonnes of surplus excavation waste and non recyclable construction waste.

To put this into context, the total volume of waste landfilled at inert landfills and landfill tax exempt sites was 19 million tonnes (Source – HMRC Landfill Tax Bulletin). The *annual* volume of construction, demolition and excavation waste generated within England and Wales in 2012 was 77 million tonnes.

The Waste Hierarchy

- The hierarchy is a key element of the EU and UK Waste Framework Directive and has the legal effect with a requirement to consider all options above landfilling before this last resort is used
- HS2 has elected to select landfill – either via the SPA route or by direct shipment from the route - for 18 million tonnes without any evidence that it has considered any of the options that outrank that choice.



HS2 and Crossrail

- Crossrail is the most recent large scale infrastructure for direct comparison with HS2. Crossrail generated 7.3 million tonnes of excavated waste requiring disposal compared with HS2 at 14.4 million tonnes (equivalent to 1.4 million HGV movements)
- HS2 quotes the environmental performance of Crossrail as evidence that it can achieve 90% diversion of its' waste generation
- However, Crossrail had the benefit of direct access to the Thames and secured a significant environmental project at Wallasea Island for 98% of the soils which were delivered to the island by barge



HS2 Approach to Planning

- HS2 appears to have overlooked the legal requirement to seek to avoid the landfilling of waste except as a last resort when other options have been ruled out;
- HS2 has misinterpreted the proximity principle to justify its' decision to landfill waste. The proximity principle can only be applied once the correct waste management method has been identified in accordance with the waste hierarchy;
- All of the regional Waste Planning Authorities that HS2 will pass through have adopted policies stating that landfill should be seen as a last resort and only selected when all other options within the waste hierarchy have been evaluated.

Example: The EIA Scoping report from the Planning Inspectorate for the North West Connections Project transmission line across Cumbria stated:

“Given the potential for significant effects to arise in relation to transport, a full justification should be provided in relation to the final choice of material importation and waste disposal routes and these should be developed in consultation with the relevant highways authorities. Transport of spoil between rail freight facilities and disposal sites must be assessed”.

HS2 Management of Waste Materials

HS2 generation of 135 million tonnes

- Two SPA accepting 4.8 million tonnes
- 112.3 million tonnes reused within the scheme
- 14.4 million tonnes of excavated waste to landfill
- 308,000 tonnes of non recyclable construction waste to landfill
- 172,000 tonnes of non recyclable demolition waste to landfill

The recent changes within HS2 SES3 and AP4 (Oct 2015) require almost a four fold increase in the original quantity of surplus excavated waste of 4.9 million tonnes.

HS2 has stated this as a 'minor adverse' effect and that it is seeking to identify opportunities for the off-site reuse for the increased volume.

HS2 Existing Landfill Capacity

- HS2 is assuming the availability of landfill capacity for the 13.4 million tonnes but quotes 12.5 million tonnes of existing inert landfill capacity within the 5 regions affected by HS2 –potentially exhausting all regional capacity.
- This does not take into account the difference between consented and available landfill capacity i.e. some capacity will be within mineral sites where the aggregate has yet to be removed.
- There is no mechanism within the HS2 Environmental Statement to recognise and evaluate that excavated soils may have to travel outside the regions
- There is no mechanism to understand and evaluate the environmental impacts of waste movements (traffic, noise, carbon, air quality) unless the final disposal point is known.
- HS2 recognises that the above scenario also exists in relation to hazardous waste which will take up 50% of the regional capacity

HS2 Assumptions on Material Distribution

- HS2 has identified that materials will have to be transferred between Community Forum Areas (CFA) in order to distribute surplus materials that cannot be retained elsewhere. The two CFA's require 22 million tonnes of 're-distribution'.....

Example:

18.2.3 “The majority of excavated materials that will be generated in the Offchurch and Cubbington area (CFA17) is *expected to be suitable* for beneficial re-use as engineering fill material or in the environmental mitigation earthworks of the proposed scheme, either within this area or elsewhere along the route”.

16.2.4 “ The construction of the proposed scheme within the Greatworth to Lower Boddington area (CFA15) will also be able to *beneficially incorporate selected types of excess materials* from other areas along the route”.

It must be recognised that this level of forward planning is at best wishful thinking and avoids the obligation for detailed assessment of the potential additional environmental impacts that could be generated.

Recommendations to HS2

- ✓ That HS2 undertakes a full assessment of alternative management options for all surplus materials in line with the accepted Waste Hierarchy within the Waste Framework Directive;
- ✓ That HS2 conducts a detailed assessment of options for the recovery of waste and landfill capacity within the region affected by the route for any materials that cannot be diverted towards more sustainable options. This could be progressed via a simple 'Expression of Interest' process in order to secure industry interest and allow HS2 to evaluate the most appropriate environmental option;
- ✓ That HS2 undertakes a detailed assessment of material flows within the proposed route in order that it can fully understand the potential environmental impacts that may occur as a result of millions of HGV movements. Without this assessment, the entire cut and fill programme is based on insufficient knowledge.