England National Office
620 Bristol Business Park
Coldharbour Lane
Bristol BS16 1EJ

Tel 0117 906 6000
Fax 0117 931 2859
fcengland@forestry.gsi.gov.uk

High Speed Rail Consultation
PO Box 59528
LONDON
SE21 9AX

19 July 2011

Dear Sir/Madam

Consultation: **High Speed Rail: Investing in Britain's Future**
HS2 London to the West Midlands – Appraisal of Sustainability

Thank you for the opportunity to respond to your consultation on the Government's proposals for High Speed 2 (HS2).

The Forestry Commission is the government department responsible for protecting and expanding England's forests and woodlands and increasing their value to society and the environment.

We have shared and discussed our comments with Natural England and the Environment Agency. Similarly, the Forestry Commission has seen and discussed their responses, which we acknowledge and support. In this document we have commented on and referred to any common issues.

If you need any further information about this consultation response or wish to discuss Forestry Commission England's future role in high speed rail, please contact me.

Yours faithfully

Joe Watts
Policy and Programme Manager
Sustainable Resource
joe.watts@forestry.gsi.gov.uk
07788 190 733

Department for Transport consultation (February 2011) on the proposed High Speed Rail between London to the West Midlands.

Forestry Commission England notes the considerable amount of work that has been done already in the planning of the project and outlined in the Appraisal of Sustainability (AoS) and the efforts taken to minimise the potentially adverse affects of the proposed route.

Our response covers:

- the likely impacts of HS2 on forests, woodlands and trees;
- principles to be considered during planning of mitigation of the likely impacts.

Our recommendations are set out in **bold type**.

1 Likely impact of HS2 on forests, woodlands and trees.

1.1 General impacts

We have undertaken preliminary analysis of the impact on woodlands – this is laid out in Annex 1 broken down by total woodland, ancient woodland and woodland to which the public have access ('accessible woodland').

Total woodland loss is in the order 125 ha (157 woodland polygons) of which 29 ha is ancient woodland, 13 ha accessible woodland and 6 ha on the Public Forest Estate managed by the Forestry Commission. The calculation is based on the new National Forest Inventory digital woodland map which is freely available (http://www.forestry.gov.uk/forestry/infd-8eyjwf) and maps all woodlands above 0.5ha. In addition there would be smaller woods and individual trees that would be affected and would need to be considered. The total impact is arguably significantly greater than this simple calculation of loss, due to the fragmentation impacts on habitat continuity, public access and landscape.

We estimate that the building of HS2 would cause the release of around 40,000 t CO_2 as a result of the loss of habitat and soil disturbance within and close to the HS2 consultation route. As indicated in Annex 2, the majority of emissions are associated with loss of woodland habitat.

Woodland is a habitat that is dearly loved by the public and very valuable to the wider environment. The recent UK National Ecosystem Assessment (http://uknea.unep-wcmc.org/Resources/tabid/82/Default.aspx) said that "Woodlands provide the highest identified number of ecosystems services including regulating climate, air quality and water flows, providing timber and other wood products as well as a range of cultural benefits." It is this multi-purpose quality of woodlands that make them so valuable to society. Consequently when considering mitigation (see later) it is this quality that makes it necessary to get the design, location and management of new woodland right to ensure the fullest expression of the potential ecosystem services that can be derived from woodland.

The AoS[1] says "*Tree retention could be adopted as a design principle where practicable and restrictions on working space could be imposed to avoid loss of trees*". We would go further than

[1] Main report Volume 1 p 90

this and say **tree retention *should* be adopted as a design principle where practicable and restriction on working space *should* be imposed to avoid loss of trees.**

A full survey is required to identify and characterise all woodland that may be affected and the likely impact on significant (particularly veteran) trees (see below).

1.2 Specific Impacts - Ancient woodland

We estimate the direct impact on ancient woodland to be 29 ha. A National Ancient Woodland Inventory is maintained by Natural England and this is reviewed in light of new information, for example ongoing research work in the Chilterns. There may be small ancient woods (less than 2 ha) which are not yet on the inventories and these would need to be identified.

The AoS[2] states there is a potential landtake at up to 19 ancient woodlands, although much would potentially be avoided through further design work.

Ancient woodland is the most important category of woodland for nature conservation and this is acknowledged in the recent Natural Environment White Paper[3] and Planning Policy Statement 9 (Biodiversity and Geological Conservation). Although the AoS refers to PPS 9[4] paragraph 10 of the statement is not considered

> "Ancient woodland is a valuable biodiversity resource both for its diversity of species and for its longevity as woodland. Once lost is cannot be recreated… [planning authorities] should not grant planning permission for any development that would result in its loss or deterioration unless the needs for, and benefits of, the development in that location outweigh the loss of the woodland habitat"

Similarly the following statement on habitat networks in PPS 9 has not been considered in the AoS

> "Networks of natural habitats provide a valuable resource [providing] routes or stepping stones for the migration, dispersal and genetic exchange of species in the wider environment".

.

The Forestry Commission's advice is to emphasise the importance of ancient woodland. This is a habitat that cannot be recreated so every effort should be made to avoid direct landtake on ancient woodland as this cannot be mitigated.

The Forestry Commission' advice is that the requirements of PPS 9 on *ancient woodland*, and *habitat networks* should be fully addressed including further survey work and designing for the minimisation of any damage.

1.3 Specific Impacts - Veteran Trees

Veteran trees (very old trees of cultural and/or biological interest) are not covered in the AoS although their value and protection are clearly stated in PPS 9

[2] Main report Volume 2 p14
[3] The Natural Choice, HM Government 2011 http://www.defra.gov.uk/environment/natural/whitepaper/ – "The government is committed to providing appropriate protection to ancient woodlands"
[4] Main report Volume 1 p41

> "Aged or 'veteran' trees found outside ancient woodland are also particularly valuable for biodiversity and their loss should be avoided. Planning authorities should encourage the conservation of such trees as part of development proposals."

The subject of wood-pasture and parkland sites also seem to have been overlooked in the AoS. **The Forestry Commission's advice is that the requirements of PPS 9 on *veteran trees* should be fully addressed including further survey work and designing for the minimisation of any damage.**

1.4 Specific Impacts - Deer

We understand that there is an existing problem with wild deer being struck by trains. This problem is likely to escalate with the trend of increasing wild deer populations and with the introduction of high-speed trains. This subject appears not to have been addressed within the AoS. One approach to reduce the risk of deer breaking through fenced-off areas as they try to move through the landscape between wooded areas would be to introduce additional "green bridges". In areas where, potentially, additional tunnels would reduce the destruction of woodland, this would be another reason for such investment and should feature in any cost benefit analysis involving their construction.

1.5 Specific Impacts - Bats

We note that Natural England advocates additional surveys so that they are able to advise on the proposed route on bats, and that the rare Bechstein's bat (among others) are active in the area of the route. The rarer bats are closely associated with old established stands of trees. We reiterate the need to avoid damage to trees but this is particularly important where these are the home to European Protected Species such as bats. Clearly Natural England is the statutory authority with primary responsibility for these species. We would add that one possible approach to mitigation would be to intervene in existing, older nearby woodland stands (currently unoccupied by bats) near to the route that could perhaps be made more amenable to bats as an alternative habitat rather than 'starting from scratch' with new planting which would take considerably longer to mature into suitable condition.

2 Principles to be taken forward when considering mitigation

We reiterate that tree retention *should* be adopted as a design principle where practicable and restriction on working space *should* be imposed to avoid loss of trees. However we recognise, with regret, that some destruction of trees and woodland would be inevitable. We therefore put forward the following principles to be considered to mitigate such destruction.

2.1 Additional planting

We recognise the necessary mitigation option presented in the AoS[5] to introduce, "*some two million trees along the rail corridor, as part of a general landscape mitigation strategy, [helping] to screen views and integrate the scheme within the landscape*". We welcome and support this option.

[5] Main report Volume 1 page 90

However, it is unlikely that such linear, screening planting would fully compensate for the loss of ecosystem functionality that would be caused by the scheme.
We therefore suggest that, *in addition* to the screening planting, further woodland is created, on a scale and of a nature to fully compensate for the lost woodland area and character (and especially ancient woodland and accessible woodland).

This new woodland could:

- contribute to the improvement of the country's woodland biodiversity account;
- extend, link and improve existing habitats;
- expand existing woodlands, increasing their ecological and economic viability;
- sequester carbon (see the Woodland Carbon Code[6] for estimates for different woodland types) – providing some mitigation for emissions associated with the loss of habitats and soil carbon associated with construction;
- address the loss of effective area of accessible woodland;
- improve the wider landscape of the rail corridor and surroundings; and
- contribute to water management and provide accessible green infrastructure providing recreational opportunities in the rail corridor.

The multiple benefits from such woodlands can be maximised through careful:

- design (appropriate to the nature of the local environment and landscape);
- location (including linking with existing woodlands); and
- consultation with local communities.

This principle supports the creation of fewer, larger new woodlands and implies avoidance of piece-meal plantings. This could provide economies of scale and greater impact though would clearly need to be balanced with the wishes of local communities who may prefer any compensatory planting closer to their homes.

The Forestry Commission would welcome exploring the opportunities for this additional woodland planting at the appropriate time.

2.2 Subsequent management

The subsequent management of the immediate rail-side areas (within the railway alignment) after construction and the restoration of land temporarily used during construction represent significant potential for environmental gain. If these areas were managed with trees (through planting or natural regeneration) or other semi-natural vegetation this could provide additional mitigation for the scheme (in a similar way to the 'green corridor' concept of the existing rail network). Such networks are explicitly sought by the recent Natural Environment White Paper[7]

2.3 Use of timber

The AoS states that construction of the scheme is estimated to need some 1.4 million tonnes of concrete and 0.22 million tonnes of steel. The carbon emissions associated with the manufacture

[6] http://www.forestry.gov.uk/carboncode
[7] The Natural Choice, HM Government 2011 http://www.defra.gov.uk/environment/natural/whitepaper/ – "Better management of these green corridors [natural edges of our strategic roads and railways] could connect and enhance fragmented habitats. The Government will work with its transport agencies… to contribute to the creation of coherent and resilient ecological networks"

and transportation of these materials and potential construction site activity is estimated to be 1.2 $MtCO_2e$[8] (0.29 to 2.12 range).

Timber as a construction material has significantly fewer net CO_2 emissions than concrete and steel – sawn timber's net emissions are in the order of –(minus)1 tonne of CO_2 per m3 compared to around +0.2 tonnes of CO_2 per m3 of concrete and around +5.2 for steel I beam[9].

We fully recognise that HS2 cannot be made entirely of wood, but judicious specification of sustainable timber where appropriate may make a significant contribution to reducing the embedded carbon of the project. Uses of timber could include fencing (permanent and temporary), sound baffles, building associated with HS2 and woodfuel for their heating systems. By following UK Government timber procurement policy[10] this could also contribute to sustainable forest management and the associated environmental benefits.

The principles outlined would provide effective mitigation of some of the impacts of HS2 and potentially a valuable public demonstration of the environmental awareness of the project.

3 Future engagement

If the HS2 project proceeds, the Forestry Commission's key role would be to advise on the impacts of the protection or expansion of forests and woodlands. The Forestry Commission would like to take a full part (either directly or where appropriate through our colleagues in the Environment Agency or Natural England) in the development and implementation of proposals for mitigation and compensation where forests and woodlands are affected.

4 Summary

The Forestry Commission notes the considerable amount of work that has been done already in the planning of the project and the efforts taken to minimise the potentially adverse affects of the proposed route. Total woodland loss is in the order 125 ha of which 29 ha is ancient woodland and some 13 ha is publically accessible woodland. The total impact is significantly greater than this due to the fragmentation impacts on the habitat continuity, public access and landscape of these woodlands.
Tree retention *should* be adopted as a design principle where practicable and restriction on working space *should* be imposed to avoid loss of trees. The Forestry Commission's advice is to emphasise the importance of ancient woodland and mitigate accordingly. This is a habitat that cannot be recreated.

The Forestry Commission's advice is that the requirements of PPS 9 on *ancient woodland*, *habitat networks* and *veteran trees* should be fully addressed.

A full survey is required to identify and characterise all woodland that may be affected and the likely impact on significant (particularly veteran) trees.

[8] This is approximately equivalent to the amount of carbon sequestered by 2,200 ha of managed oak woodland during its first 100 years after planting. http://www.forestry.gov.uk/carboncode
[9] Taken from the Read report, Figure 7.4 page 131. http://www.forestry.gov.uk/readreport
[10] This requires "Central government departments, their executive agencies and non-departmental public bodies only to procure timber and wood-derived products originating from either legal and sustainable or FLEGT licensed or equivalent sources. Local government is encouraged to comply." http://www.cpet.org.uk/uk-government-timber-procurement-policy

We recognise the mitigation option to introduce “some two million trees along the rail corridor”. However we suggest ***additional*** woodland is created, of a scale and nature to fully compensate for the lost woodland area and character. Careful design, location and consultation with local communities would ensure that the multiple benefits from such woodlands are maximised. **This is likely to support the creation of fewer, larger new woodlands that could provide economies of scale and greater impact.**

Appropriate management of rail side areas during operation of HS2 and increased use of timber during its construction and with associated infrastructure would also contribute significantly to mitigation of any impacts.

Forestry Commission England

Annex 1 Estimated impact

Table 1: Woodland That Might Be Lost Within and Close to the High Speed 2 Consultation Route

	Entire Route		South East		West Midlands		East Midlands		London		East of England	
	No. of woodland polygons	Area (ha)	No. of woodland polygons	Area (ha)	No. of woodland polygons	Area (ha)	No. of woodland polygons	Area (ha)	No. of woodland polygons	Area (ha)	No. of woodland polygons	Area (ha)
A. Woodlands within the proposed HS2 railway alignment and the 15m buffer												
All Woodland at 31 March 2010	144	95.4	53	38.4	58	38.2	13	5.2	20	13.5	0	0
B. Woodlands within the proposed HS2 railway alignment and the 25m buffer												
All Woodland at 31 March 2010	157	125.6	56	51.3	60	49.6	15	7.2	26	17.5	0	0
C. Average of the Two Scenarios Shown Above (ie15m and 25m Scenarios)												
All Woodland at 31 March 2010	150.5	110.5	54.5	44.9	59	43.9	14	6.2	23	15.5	0	0

Source of woodland data: National Forest Inventory (NFI) (Forestry Commission)
Note 1: Figures are a best estimate. In places actually figures, after a fuller cleaning of the data received from HS2 Ltd, could be very slightly greater.

Forestry Commission England

Table 2: Ancient Woodland That Might Be Lost Within and Close to the High Speed 2 Consultation Route

	Entire Route		South East		West Midlands		East Midlands		London		East of England	
	No. of woodland polygons	Area (ha)	No. of woodland polygons	Area (ha)	No. of woodland polygons	Area (ha)	No. of woodland polygons	Area (ha)	No. of woodland polygons	Area (ha)	No. of woodland polygons	Area (ha)
A. Ancient Woodlands within the proposed HS2 railway alignment and the 15m buffer												
All Ancient Woodland	**24**	**22.0**	**10**	**10.9**	**13**	**10.9**	**1**	**0.2**	**0**	**0**	**0**	**0**
Of which:												
Ancient Semi-Natural Woodland	19	14.0	7	7.7	11	6.1	1	0.2	0	0	0	0
Plantations on Ancient Woodland Sites	5	8.1	3	3.3	2	4.8	0	0	0	0	0	0
B. Ancient Woodlands within the proposed HS2 railway alignment and the 25m buffer												
All Ancient Woodland	**25**	**28.5**	**11**	**13.8**	**13**	**14.4**	**1**	**0.4**	**0**	**0**	**0**	**0**
Of which:												
Ancient Semi-Natural Woodland	20	18.3	8	9.6	11	8.4	1	0.4	0	0	0	0
Plantations on Ancient Woodland Sites	5	10.2	3	4.2	2	6.0	0	0	0	0	0	0
C. Ancient Average of the Two Scenarios Shown Above (ie15m and 25m Scenarios)												
All Ancient Woodland	**24.5**	**25.3**	**11**	**12.3**	**13**	**12.6**	**1**	**0.3**	**0**	**0**	**0**	**0**
Of which:												
Ancient Semi-Natural Woodland	19.5	16.1	8	8.6	11	7.2	1	0.3	0	0	0	0
Plantations on Ancient Woodland Sites	5	9.1	3	3.7	2	5.4	0	0	0	0	0	0

Source of Ancient Woodland data: Natural England.
Note 1: Figures are a best estimate. In places actually figures, after a fuller cleaning of the data received from HS2 Ltd, could be very slightly greater.

Forestry Commission England

Table 3: Accessible Woodland That Might Be Lost Within and Close to the High Speed 2 Consultation Route

	Entire Route		South East		West Midlands		East Midlands		London		East of England	
	No. of woodland polygons	Area (ha)	No. of woodland polygons	Area (ha)	No. of woodland polygons	Area (ha)	No. of woodland polygons	Area (ha)	No. of woodland polygons	Area (ha)	No. of woodland polygons	Area (ha)
A. Ancient Woodlands within the proposed HS2 railway alignment and the 15m buffer												
Accessible Woodland	11	10.0	5	8.0	6	2.0	0	0	0	0	0	0
B. Ancient Woodlands within the proposed HS2 railway alignment and the 25m buffer												
Accessible Woodland	11	13.1	5	10.2	6	2.9	0	0	0	0	0	0
C. Ancient Average of the Two Scenarios Shown Above (ie15m and 25m Scenarios)												
Accessible Woodland	11	11.6	5	9.1	6	2.5	0	0	0	0	0	0

Source of Accessible Woodland data: Woods for People version 7 summer 2010 (Woodland Trust and Forestry Commission).
Note 1: Figures are a best estimate. In places actually figures, after a fuller cleaning of the data received from HS2 Ltd, could be very slightly greater.

Forestry Commission England

Annex 2

Approximate Estimates of Carbon Emissions that Might Result from Loss of forestry, Semi-Natural and agricultural Land Cover Within and Close to the High Speed 2 Consultation Route

Measure	Values
Full length of route	188.6 km
Less where route runs on or adjacent to existing railway	30.8 km
Less where route crosses roads	1.2 km
Leaves length of route that is semi-natural land cover	156.6 km

Average width of completed railway corridor between fences	22 metres	Direct Emissions (tonnes of Co2 per hectare)	Soil-Related Emissions (tonnes of CO2 per hectare)	Total Emissions (Tonnes of CO2 per hectare)
Area of completed railway corridor	334.5 hectares			
Woodland in the corridor (22m between fences) See Note 2	38.4 hectares	684	37	721
Arable (say 65% of what is not woodland)	183.7 hectares	7	26	33
Pasture (say 30% of what is not woodland)	91.8 hectares	15	29	44
Semi-natural (say 5% of what is not woodland and say heather)	15.3 hectares	40	44	84
Total Estimates Carbon Emissions from Change of Land Cover				**39,000 tCO2 (to the nearest thousand tonnes of CO2)**

Source of woodland data: National Forest Inventory (NFI) (Forestry Commission)
Source of carbon emissions data: Morison et al 2011 (semi-natural and soils), Ostle et al 2009 (arable and improved grassland), Bradley et al 2005 (soils)
Note 1: Figures are a very approximate estimate.
Note 2: a pro-rata estimate of woodland loss in the 22m corridor based on actual calculations using the National Forest Inventory in the 72m width (25m on one side plus 22m in the middle plus 25m on the other side).