

High Speed 2

# **More capacity on WCML: an alternative to HS2**

Paper prepared by HS2 Action Alliance

February 2011



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## Version updates

Date	Issue	Main amendments	Sections
4 Feb 2010	V 1.0	Draft to economics group	
14 Feb 2011	V 1.1	Added Summary Tables, clarified sources of proposals, drafting changes throughout, added new section 4 on variants to RP2	1, 2, 3, 4, 5
18 Feb 2011	V1.2	Added a section of DfT misrepresentation of capacity increases	1, 4

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## More capacity on WCML: an alternative to HS2

### 1 Summary

A range of rail and road alternatives to building a new railway were developed by Atkins for DfT and published as part of the March 2010 case for HS2. The most promising rail proposal (Rail Package 2) concerned upgrading the existing WCML.

The tables below summarise the impact of upgrades to WCML, and the effect on rolling stock capacity. They include proposals not developed by Atkins but suggested by HS2AA.

#### Summary of Potential Rail Alternatives (developed or could be developed)

Option	Scope	Comment/issues	Capacity effect <sup>1</sup>
1. Rail Package 1 (RP1) (DfT)	Train lengthening (up to 12 car). 12-car principle established but problems for Liverpool, and need 3 more platforms at Euston.	No firm RP1 proposals developed Nor is 12 car proposed by Atkins as part of any other option eg RP2	See below
2. Rail Package 2 (RP2) (DfT)	Lengthens trains (to 11 car). Increases sets from 56 to 90. Changes the rolling stock. Addresses infrastructure pinch points.	Not an optimised solution (but still a better NBR (3.63) than HS2 (2.4). Ignores 12 car opportunity. Not implemented until 2026. Capacity effect not shown by Atkins. Less crowded option than HS2. NBR misrepresented in command paper (showing a variant only).	+ 135% more seats than now ( + 165% if RP2 is 12 car)
3. ERTMS (HS2AA)	In-cab signalling allows 140mph operation on WCML (and ECML).	Not discussed by Atkins for WCML (although planned for WCML) Some reduction to journey times	small
4. First class (HS2AA)	Changing balance of first and standard class (to reflect usage): <ul style="list-style-type: none"> <li>▪ Reduce to 2 (from 4) out of 9</li> <li>▪ Reduce to 2 out of 11</li> <li>▪ Reduce to 3 out of 12</li> </ul>	Not discussed by Atkins work. Produces large increases in standard class capacity (where overcrowding occurs) and a smaller benefit in overall seats.	Eg reduce to 2 out of 9: + 51% in standard, 14% overall

#### Summary of effect on rolling stock capacity (of longer trains and more sets)

Train lengthening	Total seating	Capacity increase <sup>2</sup>	Note
9-car (52 sets)	22,985		2008 base
Part (ie 31) 11 car + 4 sets (56 sets)	30,404	32%	Already planned for 2013 (and included in 'do minimum' case)
All 11-car (56 sets)	33,600	46%	Shows effect of 11-car on all the 56 sets, not just 35 sets. (Not any proposed option)
All 12-car (56 sets)	37,856	65%	Shows effect of increasing to 12-car (on all the 56 sets). (HS2AA proposal)
All 11-car (90 sets)	54,000	135%	This is the Atkins RP2 proposal for DfT
All 12-car (90 sets)	60,840	165%	Shows the effect of increasing RP2 proposal to 12-car. (HS2AA proposal)

<sup>1</sup> Increase in capacity is based on rolling stock capacity compared with 2008 base of 9-car and 52 sets. The actual increase in seats on the services for RP2 (11 car or 12 car) will be greater because new diagrams are required (see section 3.3 below)

<sup>2</sup> Rolling stock capacity rather than total seats on services

The tables show that there are options that have already been developed for DfT ie RP2, that will meet the forecast capacity ie the 133% increase in background growth forecast by HS2 Ltd, and have a better NBR than HS2. It also shows that these could be improved upon by considering 12 car operations and rebalancing first class/standard class (reducing first class).

In the Command Paper DfT are misleading about the rail alternatives: they misrepresent their best alternative, RP2, both concerning

- the level of extra capacity it creates (about 50% rather than 135%)
- the net benefit ratio (2.2 instead of 3.6), by using a variant assesses on a different basis for HS2

These misrepresentations are crucial as they lead the reader to believe that RP2 does not create sufficient capacity to carry forecast demand, and that RP2 is worse value for money than HS2. Both of these are false impressions.

## 2 Introduction

This note discusses the alternatives to a *new* High Speed Railway (HS2) ie alternatives that involve uprating the existing rail infrastructure. It sets out the current position (pre-February 2011 consultation) as regards materials produced by DfT/HS2 Ltd as part of the HS2 case.

DfT commissioned Atkins to develop options for upgrading the existing infrastructure as alternatives to HS2. Atkins developed options for enhancing both the existing rail and road infrastructure.

Atkins' analysis covered longer trains on WCML, (at Rail Package 1), but no package of longer trains was developed, nor were longer trains incorporated in other packages (beyond 11-car formation, which is already due for part implementation in 2012). However, Atkins clearly indicated that longer trains might be combined with other changes.

Atkins did develop an option of up rating the WCML, called Rail Package 2 (RP2), basically to de-bottleneck the route so as to allow more frequent services to be run, hence increasing its carrying capacity. However, it only involved extending the entire fleet to 11-car, and had an implementation date to match HS2 – rather than being implemented incrementally so as to address the projected increases in demand, although Atkins did point out that the elements in the package could be implemented incrementally<sup>3</sup>. RP2 is not therefore an optimised solution.

Atkins also considered options for uprating the Chiltern Line to achieve faster services and greater capacity. However, these options are more costly and have worse Net Benefit Ratios (NBR) than the WCML upgrade.

Atkins also considered in-cab signalling, which is necessary for trains to travel above 125mph because of safety regulations. Surprisingly, Atkins did not consider its application to WCML, but only to uprating the Chiltern Railway route to Birmingham. This is despite fitment to WCML being part of the ERTMS Implementation plan.

HS2 AA has proposed a variant on uprating WCML that would involve 12-car operation and reducing the proportion of seating that is first class. To meet HS2 Ltd's projected demand this would mean that some of the infrastructure changes might not be needed. The measures could be implemented both earlier than HS2 and incrementally. This means that some of the benefits would be delivered earlier than in the DfT analysis (improving the NBR), and achievement of the required capacity would be cheaper.

The application of in-cab signalling to the Pendolinos of WCML would permit speeds of up to 140mph (the design speed of this class of train). ERTMS incorporating in-cab signalling is

<sup>3</sup> High Speed 2 "Strategic Alternatives" Study Rail Interventions Report, section 4.2.3 page 12

already planned for implementation in the UK, with WCML planned for completion in 2030<sup>4</sup>. Besides allowing higher speeds, ERTMS is claimed to have capacity benefits.

This paper focuses on the rail alternatives.

### 3 Key issues for rail alternatives

Key issues for the alternatives to HS2 (that relate to the phase 1 build) are:

1. Train lengthening
2. Removing pinch points on WCML
3. Capacity
4. ERTMS
5. Changing the balance of first and standard class.

#### 3.1 Train lengthening

The RP2 option developed by Atkins for DfT did not include 12-car operations (only 11-car).

Atkins' discussion<sup>5</sup> of longer trains indicates that there are two serious impediments to 12-car operation. Liverpool Lime Street could not accommodate them, and Euston also has problems as some of the platforms used by Intercity trains which are too short for 12-car. Some other stations will require platform lengthening.

Generally running longer trains (with platforms lengthened as required) is a relatively inexpensive means of creating more capacity. We would therefore assume that to create more capacity the remainder of the 390 (Pendolino) fleet would be lengthened to 11-car, as is proposed for RP2, and then the fleet would be lengthened (in stages) to 12-car.

#### Pendolino services

Set length	seating/train	total seating	increase over 9-car	comment
9-car (52 sets)	442	22,984		2008 base
part 11-car + 4 sets (56 sets)	442/600	30,404	32%	Planned for 2013
all 11-car (56 sets)	600	33,600	46%	
all 12-car (56 sets)	676	37,856	65%	HS2AA proposal
all 12-car (56 sets) – 3 1 <sup>st</sup> class	706	39,536	72%	HS2AA proposal

As can be seen from the table the HS2AA proposal that trains operate in 12 car formation would add 65% to the 2008 capacity. This compares with the 46% that having entirely 11-car operations would deliver, of which the first 32% will be done by 2013 in any event.

The last row of the table looks at changing the balance of first and standard class.

If we assumed that the increase to 12-car were accompanied by converting one 1<sup>st</sup> class car per set to standard class (ie reduce from four to three, see section 3.5 below) this would raise overall capacity by a further 7%, to give an overall 72% increase in capacity. This is

<sup>4</sup> 'ERTMS National Implementation Plan', DfT, September 2007, page 2

<sup>5</sup> Section 4.3.1 and Appendix E1 of 'High Speed 2: Strategic Alternatives Study – Rail Interventions'

approaching the level of long distance rail growth that has been previously predicted by DfT for 2006 to 2030 of 73%<sup>6</sup>, or that forecast by Network Rail for WCML to 2036<sup>7</sup>.

As discussed below at 3.2 below the additional platforms at Euston form part of RP2, so the 12-car operation is complementary to this development. With exception of Liverpool Lime Street it should be possible to accommodate 12-car without major difficulty. Further detailed work would be needed to establish what would need to be done to overcome the constraints at Liverpool Lime Street; if this is not possible, it would be necessary to retain a number of 11 car sets for Liverpool services.

### 3.2 Removing pinch points on WCML

Atkins considers de-bottlenecking WCML in RP2<sup>8</sup>. This takes WCML to what they regard as the maximum capacity without going beyond 4-track infrastructure.

Unlike the previous route modernisation, which involved wholesale replacement of track and signalling, Atkins' proposals are focussed removing specific pinch points.

The rolling stock changes in the RP2 package are:

- Replacing the entire Pendolino fleet with 90 sets of 11-car formation of new stock of the same specification except better braking and acceleration.
- Replacing some commuter Desiros with 125mph capable stock so that they do not delay the fast trains.

The increase in the number of sets is to provide the additional services that are made possible by eliminating pinch-points. As the table below shows increasing the fleet provides an increase over the current 9-car trains of 135% for 11-car operation, and 165% for 12-car operation.

If we also assumed that there were three instead of four first class per set (see section 3.5) there could be a small additional increase in capacity (to 176%).

#### Fast services

Set length	seating/train	total seating	increase over 9-car	comment
9-car (52 sets)	442	22,984		2008 base
all 11-car (90 sets)	600	54,000	135%	RP2 proposal
all 12-car (90 sets)	676	60,840	165%	HS2AA proposal
all 12-car (90 sets) – 3 1 <sup>st</sup> class	706	63,540	176%	HS2AA proposal

The infrastructure changes in RP2 are:

- Stafford area by-pass,
- Grade-separated junction between Cheddington and Leighton Buzzard,
- Extra 3 new platforms at Euston,
- Extra platforms at Manchester (with grade separation at Ardwick),

<sup>6</sup> 'Delivering a Sustainable Railway', Cm 7176, Dft, July 2007, paragraph 6.6, page 60

<sup>7</sup> Network Route Utilisation Strategy, Scenarios and Long Distance Forecasts, Network Rail, June 2009, page 66 – used in WCML Route Utilisation Strategy, Network Rail December 2010.

<sup>8</sup> Section 5 of 'High Speed 2: Strategic Alternatives Study – Rail Interventions'

- 4 tracking Attleborough – Brinklow (including freight capacity works at Nuneaton),
- Northampton area speed improvements
- 4 tracking Beechwood Tunnel – Stechford

### ***Stafford by-pass***

This provides grade separation between trains with different destinations. Network Rail is already considering some works concerning this, as set out in the WCML RUS<sup>9</sup>.

### ***Grade-separated junction between Cheddington and Leighton Buzzard***

This involves creating a new junction to avoid crossing movements at the existing Ledburn junction. This requires additional land, but the surrounding land is farmland.

### ***Three extra platforms at Euston***

These are planned to be just under 300m and consequently capable of accommodating 12-car sets.

The platforms could be built on existing railway land.

The turn-arounds of some of the long distance trains train is over 1 hour, which is long. The need for extra platforms could be reduced by eliminating long turn-arounds, which would also reduce operating costs, as fewer trainsets would be required; Ryanair routinely has 25 minute turn-arounds, and is Europe's most punctual airline.

### ***Extra platforms at Manchester and grade separation at Ardwick***

Three extra platforms are created at Manchester Piccadilly, which are 300m long (long enough for 12-car) – although there is space for them to be 400m. This would be done on existing railway land.

It will create additional capacity at the station for other services or performance improvements, but this is not assessed.

The grade separation involves a new approach to Manchester Piccadilly, and a viaduct, with some additional land required. It is not clear from the provided plans to what extent housing would need to be purchased.

It is not clear why three extra platforms are required at Manchester Piccadilly for, at the most, one additional train per hour. Also, the Atkins work did not take into account the Manchester Hub proposals which, if implemented, would significantly increase the capacity in the Manchester Piccadilly area and probably avoid the need for the proposed extra platforms.

### ***4 tracking Attleborough – Brinklow***

This involves four-tracking some of the only section of WCML that is 3-track south of Stafford.

This stops freight trains travelling north impeding fast trains. The adjacent land is mainly farmland, but it is not clear what land take would be required.

The package also involves a new layout at Nuneaton that prevents freight trains crossing the fast lines restricting traffic. However, the remodelling at Nuneaton is already committed.

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<sup>9</sup> West Coast Main Line Route Utilisation Strategy Draft for Consultation December 2010, p115

### **Northampton area speed improvements**

This involves re-canting the track to make it suitable for higher speeds.

#### **4 tracking Beechwood Tunnel – Stechford**

This is the most extensive of the works – involving four tracking a 9 mile length of track. Most but not all of this can be done on existing railway land.

This may not be necessary to achieve the required capacity improvements, particularly if the scope for increased use of the Chiltern route is taken into account.

#### **Additional power supply**

No specific issues, it is just a cost.

### **3.3. Capacity**

The increased capacity provided by RP2 and going to 12 car has been shown in Sections 3.1 and 3.2 in terms of additional seat capacity. This is straightforward to calculate, although it was not shown in the Atkins work. It showed that RP2 produced a further 135% in terms of extra capacity, ie more than the 133% increase in background growth forecast by HS2 Ltd.

However, the actual increase in capacity will depend on the seats in service and reflect the new diagrams required. Again these figures are not shown by Atkins, but a minimum figure can be derived from published data.

DfT's reports (shaded green and blue) allow the load factors and capacity of RP2 and the 12-car options to be calculated, as shown in the table below.

#### **WCML capacity**

	WCML daily demand (passengers)	WCML + Chiltern seats (16hr 2-way)	WCML load factor (16 hr 2-way)	WCML seats# (daily demand /load factor)	WCML increase over 2008 seats
2008 (base)	45,000		49%	91,837	
2033 'do minimum'	105,000	164,700	81%	129,630	41%
RP2	115,768	253,500	53%	218,430##	138%##
RP2 extra	10,768	88,800		88,800##	
RP2+12car			47%	246,101*	168%##
RP2+12car	150,121		61%**	246,101	

Green (light shade): Command Paper, page 91

Blue (deep shade): High Speed 2: Strategic Alternatives Study – Strategic Outline business case', section 3.5.1.5, page 38

# overestimates 16-hr 2-way seats, as assumes all passengers travel in 16-hours

## Adding actual extra 16-hr seats to the estimated 'do minimum' WCML seats

underestimates relative increase in capacity

\* Assumes additional 76 seat vehicle per set

\*\* Load Factor forecast for HS2

The table shows that RP2 delivers 138% increase in capacity. This 138% figure is not shown in the published documentation. The 138% exceeds the exogenous demand that HS2 Ltd forecast ie the 133% increase in background growth, before the uplift for HS2 itself. The table

also shows that an additional 30% more capacity (making an 168% increase) could be provided by having 12-car operations.

The figures for additional capacity are in close agreement from that calculated from the additional rolling stock alone, (see section 3.2) which give the 135% increase in capacity for RP2 running 11-car trains, and 165% additional capacity with 12-car trains.

The third row of the table also shows that RP2 is expected to carry 157% more passengers than the 2008 base – ie 10% more than the ‘do minimum’ case (nearly 116 thousand passengers compared with 45 thousand).

The last row of the table shows that if WCML operated at the same load factor as HS2 with 12-car sets, it could carry 150,000 passengers a day, which is only 15,000 passengers fewer than HS2 Ltd forecast for HS2 and WCML combined in 2033.

The ratio of 16-hour seats provided to total seats in the fleet for the 90 sets of RP2 is the same as for the 2008 case (with 52 sets)<sup>10</sup>. This is despite claiming 10% reduction<sup>11</sup> to the rolling stock requirement because a ‘clock face’ time table (ie no intensive services in the peak).

### ***Capacity and Crowding***

Crowding is forecast to be greater on HS2 than the RP2. HS2 is forecast to have a 61% load factor (ratio of passengers to seats), while RP2 has only 53%.

### ***Implementation date***

As the changes in the railway package are discrete, it is practicable to implement them incrementally, and in response to demand growth. This is recognised by Atkins, but in the assessment RP2 is assumed to be implemented to the same timescale as HS2 ie 2026.

Clearly incremental implementation eliminates the risk associated with long term forecasting, and ensures that demand can be accommodated without excessive crowding developing.

### ***DfT misleading on capacity of alternatives***

DfT’s presentation of the capacity available from upgrading the WCML is misleading. It gives the false impression that the extra capacity is inadequate to accommodate forecast demand growth.

Table 2.4 of Command Paper 7827 (page 51) shows the maximum potential capacity increase of the ‘mid scale rail upgrade’ (RP2a) as about 50%. This is profoundly misleading. The additional rolling stock capacity on WCML that RP2 and RP2a bring is 135% (and available seats on services by over 138%, as discussed above). This is more than the background growth that HS2 Ltd forecast for WCML (133%). This in itself is not the full potential, as there is scope of running 12-car (instead of 11-car) that would raise rolling stock capacity by 165%.

The misleading number of about 50% is derived from Table 3.7 (High Speed 2 Strategic Alternatives Study – Strategic Outline Business Case), which gives the increase in seats of RP2 over the ‘do minimum’ of 54%. This is misleading because:

- the 54% refers to the combination of Chiltern Railways and WCML – not simply WCML

<sup>10</sup> RP2 provides 90 x 600 = 54,000 seats, and 2008 has 52 x 442 = 22,982 seats, both giving ratios of 4.0 to their respective 16-hr seats (218,430 and 91,837)

<sup>11</sup> Section 5.3.1.1 of High Speed 2: Strategic Alternatives Study – Rail Interventions

- the 'do minimum' case itself has a 32% increase in fleet capacity for WCML over the 2008 base.

The table below shows how the actual increase in WCML fleet capacity for RP2 is 135% not about 50% (or 54%). The fleet capacity figures are as shown in the summary table on page 3 of this report eg 2008 base is 52 sets of 9-car, while RP2 is 90 sets of 11-car.

### Demand and capacity

	demand on WCML (increase as % of 2008)	WCML + Chiltern (fleet capacity increase as % 'do minimum')	WCML (fleet capacity increase as % of 2008)
2008 base			
'do minimum' 2033	133%		32%
Rail Package 2 2033	157%	54%	135%
Rail Package 2 +12-car			165%

As explained earlier, because of the revised services, the actual increase in seat available to passengers for RP2 is higher than the increase in the seats in the fleet giving a total of at least 138% (rather than 135%).

### 3.4 ERTMS

Currently WCML (and ECML) have rolling stock that can operate at higher speeds than they now do, ie it could operate at 140mph compared with the current 125mph. However, this requires in-cab signalling to be fitted. The Atkins work did not suggest fitting ERTMS to WCML.

The capacity improvements discussed at 3.3 above and assumed by RP2 *exclude* any benefit from ERTMS that is planned for fitment to WCML by 2030<sup>12</sup>. WCML is planned to be fitted after East Coast Main Line and the Great Western, as WCML has recently been renewed with conventional signalling. The fitment to trains is intended to precede line fitment and so avoid the need for two signalling systems to be operated at the same time (as conventional signalling is required as long as any rolling stock remains unfitted with in cab equipment).

The DfT plan is to implement ETCS Level 2, which eliminates lineside signalling but still employs fixed 'blocks' for train control purposes. This has cost advantages in terms of re-signalling and maintenance, besides allowing higher speeds.

Train tilting technology (as employed in the Pendolinos) and ETCS Level 2 would allow existing track on its current alignments to operate at maximum speeds of 140mph or more.

Operating at 140mph may be more appropriate solution to implementing HSR for the UK, as it is densely populated and compact. The accepted definition of HSR is that defined by the EU (which for uprating existing lines is 125 mph, and for new lines 150 mph).

### 3.5 Changing the balance of first and standard class

None of the Atkins work done for DfT on the rail alternatives to HS2 (published in March 2010) has considered reductions to the provision of first class.

Currently WCML Pendolinos operate in 9-car formation with 4 cars as 1<sup>st</sup> Class and five as standard class. An impact of the recent recession and changes in the Civil Service rules on 1<sup>st</sup> Class travel has been a sharp reduction in the level of 1<sup>st</sup> Class travel, making it

<sup>12</sup> ERTMS National Implementation Plan, DfT, September 2007, page 2

practicable to reduce the 1<sup>st</sup> Class accommodation without sacrificing revenue – we understand that current first class load factors average less than 20%.

#### Pendolino Capacity (seats per train<sup>13</sup>)

	current configuration		declassify from 1 <sup>st</sup> 2-cars		modify seating		
	1 <sup>st</sup>	Standard	1 <sup>st</sup>	Standard	1 <sup>st</sup>	Standard	total
seats per train	146	296	56	386	56	448	504
% increase			-62%	+30%	-62%	+51%	+14%

Declassifying 2 of the 4 1<sup>st</sup> class cars gives about a 30% increase in effective capacity for virtually nothing – with no lead time or disruption, or cost (as 1<sup>st</sup> Class revenues remain unchanged).

Capacity can be further increased by changing the declassified cars seating arrangements to the more dense standard class configuration. Modifying the seating of 2 of the 4 1<sup>st</sup> class cars gives a total of 51% of additional capacity for the cost of minor refurbishment, with minimal deviation from normal servicing arrangements. Although total capacity only increases by 14%, crowding is normally a standard class issue where capacity increases by 51%.

The tables at section 3.1 and 3.2 above showed the effect of declassifying just one (not two) of the four first class cars.

## 4. WCML upgrade variants

This paper has used the main RP2 case developed by Atkins, with rolling stock costs assessed on the same basis as with HS2 (ie treated as capital). Other variants were produced, but all deliver the same improvements to capacity. RP2a variants were developed as sensitivities. All the variants are shown in the table below.

#### Assessment of options (£bn)

	(1) RP2	(2) RP2	(3) RP2a	(4) RP2a	HS2
treatment of rolling stock cost	capital	lease	capital	lease	capital
NPV benefits	<b>£7.349</b>	£7.349	£6.819	£6.819	<b>£28.7</b>
NPV costs	<b>£2.025</b>	£2.581	£2.557	£3.119	<b>£11.9</b>
Net benefit	<b>£5.325</b>	£4.769	£4.261	£3.699	<b>£16.8</b>
net benefit ratio	<b>3.63</b>	2.85	2.67	2.19	<b>2.4</b>

All RP2 options from 'High Speed 2 Strategic Alternatives Study – Strategic Outline Business Case' HS2 figures from Cm 7827 page 95

HS2 is assessed with rolling stock as a capital cost. (1) RP2 (in the table) has rolling stock costs assessed the same way. Variant (2) treats this as a lease cost. This is more expensive as effectively it includes a cost for capital that is not included in the way HS2 is assessed.

While there are exceptions, with the current structure of the industry, passenger train operating companies normally lease rolling stock from ROSCOs. For HS2 there were thought to be difficulties in leasing being viable, so the costs were assessed as capital.

<sup>13</sup> Pendolino seating plan (including wheelchair provision): Virgin web site

Notwithstanding, a valid comparison should be on a common basis – if HS2 does not include additional costs reflecting leasing, neither should the rail alternatives. In the description of the treatment of costs, Atkins state:

‘ In order to be consistent with the appraisal assumptions of HS2 Ltd., it was assumed that the rolling stock fleet required to operate each package would be purchased.’<sup>14</sup>

In explaining the use of a leasing cost variant, Atkins cite the impact of reducing capital costs and making the upgrade ‘more affordable’. This is unconvincing when the comparison is against HS2 that has greatly higher capital requirements.

### *RP2a*

RP2a is a sensitivity on the base case of RP2. It involves exactly the same physical works as RP2 (and hence achieves the same capacity), but is assumed not to achieve the same time savings to ‘protect reliability’. This change to time savings is made despite it not being raised in the discussion of performance<sup>15</sup>. And it is despite the timings of RP2:

- being based on the actual WCML working time table (not the shorter sectional running times) with only the changes specifically attributed to the infrastructure works being made:
  - 1 minute for trains using Ledburn
  - 2.5 minutes for Crewe trains and 1.5 minutes for Stoke trains from the Stafford cut off
  - 1 minutes reduction from the Ardwick viaduct for Manchester trains
- ‘All other performance and engineering allowances remain as present.’<sup>16</sup>
- Having no reduction being made to timings for the better acceleration and deceleration capabilities of the new fleet (potentially worth 30 seconds per station stop)<sup>17</sup>
- being protected by a 3 minute performance window every 15 minutes<sup>18</sup>.

The train timings of RP2 were used as the basis of rail packages 3, 4, and 5, which also involve uprating the Chiltern Railway and represent less good value for money.

### *Misrepresentation of RP2 in the Command Paper*

In the White Paper, DfT do not report the figures for RP2. DfT use RP2a in a table<sup>19</sup> comparing various capacity options. RP2a is on the basis of leased rolling stock, while in the same table HS2 is included with rolling stock treated as capital. This is misleading, as it concealed the fact that RP2 has the best net benefit ratio (3.63) as opposed to HS2’s 2.4. The table should have used the figures for (1) RP2, not (4) RP2a.

However, on DfT’s published figures, even RP2a has a better net benefit ratio than HS2 when costs are treated in a consistent manner (2.67 compared to 2.4).

Failure to use RP2 in the assessment given in the Command Paper has been raised with DfT.

<sup>14</sup> ‘High Speed 2 Strategic Alternatives Study – Strategic Outline Business Case’, page 56

<sup>15</sup> ‘High Speed 2 “Strategic Alternatives” Study Rail Interventions Report’, Appendix B

<sup>16</sup> ‘High Speed 2 “Strategic Alternatives” Study Rail Interventions Report’, Appendix G pages 53 and 54

<sup>17</sup> ‘High Speed 2 “Strategic Alternatives” Study Rail Interventions Report’, Appendix G page 53

<sup>18</sup> ‘High Speed 2 “Strategic Alternatives” Study Rail Interventions Report’ section 4.3.2.1 page 15

<sup>19</sup> Table 2.4 page 51, ‘Mid-scale rail upgrade package’

## 5 Rebuttal to Government's response on alternatives to HS2

The Secretary of State (SoS) says in recent speeches and correspondence that he is unconvinced that the alternatives to HSR proposals are *credible*<sup>20</sup> or *practical*<sup>21</sup> options.

The following gives a response to the points Philip Hammond makes.

**5.1 New capacity required:** *SoS places much emphasis on the capacity challenge, and that a new line is the way to meet this huge projected demand, rather than improving existing lines.*

We would agree with the SoS that the key issue is capacity and not speed. But his own Department developed an option for improving WCML – Rail Package 2 (RP2). It may not be the best way of doing it, but it is sufficiently good to be preferable to HS2, with a Benefit cost ratio of 3.63, compared to 2.4, and a capital cost of £4.2bn compared with £17.8bn for HS2.

A major benefit of improving WCML, compared to building HS2, is the improvements can be done in stages, and as demand develops. Not only is this prudent practice, given the uncertainty in demand forecasts, but it avoids the problem repeatedly referred to – of capacity running out in 7 to 10 years<sup>22</sup>, which is of course long before HS2 will ever be built (15 years time). If the SoS's demand estimates are right, the overcrowding that would result could only be alleviated by improving WCML.

But does RP2 meet the forecast demand? On HS2 Ltd's modelling RP2 would not only meet forecast demand (the something above the 133% background growth, as faster journeys are forecast to increase the number of passengers), but do so with less crowding than HS2 (with a load factor of 53%, compared to 61% for HS2).

RP2 is cheaper (net cost £2bn), better value for money (NBR 3.63), and meets all the demand. So why don't we do it? DfT tell us that RP2 gives nowhere near the capacity required. By this we understand them to mean *spare* capacity is wanted to run additional local and freight services, should they prove necessary. However, if this spare capacity is really so important it is strange that DfT didn't bother to assess it for RP2.

Apparently DfT are replacing the doubtful policy of 'predict and provide' with the economically squanderous one of 'predict and over-provide'.

It's worth noting that RP2 costs just 2 to 3 times what is being spent on planning for HS2 in this term of parliament (over £750m).

**5.2 Poorer reliability:** *SoS says upgrading WCML would cause reliability to 'undoubtedly deteriorate' by 'trying to squeeze ever more capacity out of existing, mixed-use, railway lines' while HS2 could improve reliability by 'increasing segregation between different service types'*

How do the improvements to the WCML (under RP2) actually affect reliability?

First, the existing headways would be maintained, that's the time interval between trains – despite new trains having better acceleration and deceleration characteristics that make the headways and timings generous (as they were not reduced to reflect this).

Second, running a greater proportion of longer trains doesn't damage reliability.

Third, running more trains, that is achieved by separating out fast and slow traffic, and junction changes makes both fast and slow trains less susceptible to interference with each other.

Fourth, there will be faster commuter trains that won't clog up the fast lines.

<sup>20</sup> Speech by Philip Hammond at Transport Times High Speed Rail Conference (4 Nov. 2010)

<sup>21</sup> Response by Philip Hammond to oral question raised by Tony Baldry, MP (28 October)

<sup>22</sup> Theresa Villiers at Lobby Day 25 October, Portcullis House

This is not a recipe for worse reliability.

**5.3 More disruption:** *SoS refers to the disruption that would be caused by delivering huge capacity improvements on the busiest commuter line and refers to the disruption caused by last WCML upgrade (4 Nov 2010 speech)*

The last WCML upgrade started as an exercise in stupendous optimism. It was to be the first application of a yet to be developed technology that did away with the cost and capacity limitations of line side signals and train detection. It was a case study in how not to do a project. It involved completely renewing track, signaling and electrification – the same track and signalling that the services need to use on a daily basis.

Lessons have been learnt: Chiltern Railway (with its Evergreen projects) show how it can be done to time, budget, with minimum disruption, and without subsidy.

As the SoS knows, RP2 is totally unlike the previous WCML route modernisation project. It is about addressing specific pinchpoints. Much can be achieved without interfering with the track in use and how to mitigate some impacts is even discussed in the write up published. Crucially there are opportunities for further lengthening the fleet (to 11 car on all services and 12 car for all but Liverpool), which is not disruptive, although 12-car is not part of RP2.

There will be some disruption to passengers (again factored in by DfT's plans), but minor compared to the huge disruption and dislocation HS2's construction will wreak on communities the length of the line for years at a time – and at Euston where effectively constructing and integrating a new station with the existing dispersal arrangements will make it a travel nightmare. The total reconstruction of Euston planned for HS2 will certainly create greater disruption, over a longer period, than the specific improvements put forward in RP2.

**5.4 Demolition of houses:** *SoS says 'a very large number of houses would need to be demolished' (4 Nov 2010 speech) if WCML were up graded to provide the capacity improvements.*

It is HS2 that requires a swathe cut into central Birmingham for a new station, and effectively a new station built at Euston, on ground that people currently live on. It will also cut a swathe through the countryside demolishing and rendering uninhabitable numerous dwellings. This is in contrast to RP2 for which the creation of the additional platforms at Euston and Manchester can, like most of the other improvements, be achieved on existing railway property.

We requested information from DfT (through an FOI) on what houses were supposed to be demolished, but received the reply that it had not identified any specific residential properties that would be required.<sup>23</sup> It is now said the SoS was referring to the disruption caused by building a new WCML railway. Rather a different proposition!

It is perverse that SoS rejects improving existing infrastructure on the basis of its impact on residents, when the alternative that he supports is building a new railway that has massive impacts on 10,000s of residents, businesses and habitats.

**5.5 No huge journey time improvements:** *SoS says 'no upgrade of existing infrastructure can deliver the huge improvements in journey times' that HS2 delivers (4 Nov 2010 speech)*

It is entirely true that the alternatives cannot deliver huge improvements in journey times. But the journey time savings the SoS refers to are worth little. The reason his Department thinks a 30 minute saving is so important is because they believe no one works on trains and so there will be a massive productivity benefit from reducing this wasted time.

The SoS has himself expressed disquiet at this assumption<sup>24</sup>, but said it would make little difference to the answers. But he is wrong. In fact it makes a massive difference as it

<sup>23</sup> Response to FOI request ref: P0007057, 10 December 2010 to B Weston

<sup>24</sup> At meetings with representatives on the route on 22 September eg in Amersham

accounts for a quarter of the benefits. To ignore the increasing use of technology by passengers on trains never mind now but in the future is simply unrealistic.

It is no defense to say it is just using standard DfT assumptions, it is still at odds with the facts, never mind past studies done for DfT on this topic. Neither is it a defense to say sometimes people are not working but using their laptops for leisure purposes<sup>25</sup>, unless of course we never do this in working time elsewhere! In fact DfT recognise the issue may not be a gain in working time but a loss by referring to studies that show people would not use the time 'saved' usefully, but waste it for example getting up later<sup>26</sup>!

The UK's current journey times are not poor by comparison with the rest of Europe. What Eddington said about the UK having extensive fast inter-city services is still true. We have routes capable of 200km/h (125mph) – with quicker rail journey times between the capital and the five largest cities than in other major West European countries (averaging 145 mins in UK, 151 mins Spain, 184 mins Italy, 221mins France, and 244 mins Germany).

**5.6 No transformation benefits:** *SoS says a new high speed network would bring 'a step-change transformation to of our economic geography' (4 Nov 2010 speech), that would not be delivered by an upgrade to existing infrastructure.*

An upgrade would not deliver transformational benefits. But neither would HS2. Nobody has yet produced credible evidence that HS2 would deliver any rebalancing of the economy, never mind 'tackle the North/South divide more effectively than half a century of regional policy,' as the SoS said.

The standard economic benefits (business time savings and reliability improvements) and wider economic benefits are already included in the business case using DfT's approach. The latter were just 11% of HS2s benefits (£3.6bn). HS2 Ltd thought there might be something extra and employed experts from Imperial College to assess whether high speed connections would lead to additional agglomeration benefits and growth. But they got a disappointing answer - the potential was very small - £8-10m/a.

HS2 Ltd included a review of the evidence that HS2 might be catalytic in triggering other investments, changes in land use and hence growth. Such benefits were found to be uncertain, and there were risks that the gravitational pull of London might attract jobs from the regions, rather than the reverse.

The Transport Select Committee has recently heard evidence from two recognised experts in this area (one who advises HS2 Ltd) who both said there is 'no convincing evidence base' to support transformational benefits. Surely the SoS does not want to build a railway on basis of unsupported supposition?

The Prime Minister says HS2 will breathe economic life beyond the M25. But the best regeneration prospect identified by HS2 Ltd is Old Oak Common – which is in London.

In fact the redistributive effects may mean it is London, UK's dominant city, not the regions that benefits. Buried in the detail is a DfT assumption that trips *to* London will grow twice as fast as those *from* London – and given 70% will be leisure travelers, the consequences are obvious.

Most recently the SoS is reported to have referred to the economic benefits calculated by KPMG in a piece of work for Greengauge 21. This work covers an entire high speed network, with forecasts to 2040, using an insufficiently developed methodology that overestimates

<sup>25</sup> At meetings with representatives on the route on 22 September eg in Amersham

<sup>26</sup> As raised at the HS2 Ltd/DfT Technical Seminars of October/November 2010

benefits as demonstrated in a piece of work done by leading academics<sup>27</sup> for a Greengauge21 supporter (the Northern Way)!

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<sup>27</sup> 'Review of Methodologies to Assess Transport's Impacts on the size of the Economy', September 2010, ITS Leeds University, James Laird and Peter Mackie