2022

Integrated Rail Plan for the North and The Midlands
CP490 – 14th November 2021

COMMENTARY, REVIEW AND ANALYSIS

Michael Byng FRICS, MAIQS (CQS), MPWI, AACE (USA) UNTEC Fr.
Chartered Quantity Surveyor

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Contents Section 1 – Integrated Rail Plan – Review and Analysis

Contents – Section 2 – Alternatives to the IRP

1. Executive Summary

Refer to The Integrated Rail Plan, CP 490, published 14th November 2021

Conclusions

From the emerging, ever increasing Estimated Final Cost of the HS2 Project is that current funding for the IRP is inadequate to complete the HS2 Project or to deliver any or all the non-HS2 projects described in it.

Due to the undue concentration of money and resources on the HS2 Project, the IRP contains little or nothing of substance to improve passenger connectivity in the Midlands and the North.

The IRP contains no measures to improve freight connectivity.

For the amount of public money being spent on the IRP, there is little evidence the plan with improve connectivity for passengers or freight in the North and the Midlands.

The absence in the IRP of projects with confirmed funding to develop strong electrified railways and increased capacity around our regional hubs, confirms that the IRP does not assist the levelling up process around the country.

The concentration of funds on the HS2 Project coupled with the decision to proceed with it, despite there not being a ceiling on its costs deprives other parts of the country of the facilities, labour, plant, materials and professional support, to deliver their needs.

Without access to competent independent professional support, which has knowledge of local needs, the regional authorities do not have means to deliver the IRP.

The rail schemes in the IRP are neither integrated with HS2 nor do they interact with HS2.

The selection methodology appears to be driven by commitment to the HS2 Project, which benefits London primarily, with only passing regard to the needs of the North and the Midlands.

The IRP represents extremely poor value for money, reflecting the problems found by "The Oakervee Review" to justify a positive business case for the HS2 Project, which is at the centre of the IRP. The future reduction in demand for long distance rail services, post Covid-19 will further reduce the business case for HS2.

Michael Byng FRICS, MAIQS (CQS), MPWI, AACE (USA), UNTEC (Fr)

Chartered Quantity Surveyor

mbpc

Construction Cost Management for Infrastructure
mbpc Infrastructure Limited

2. Introduction

a. Commentary

I gave writing evidence to Transport Committee on 27th January 2022. The written evidence was limited to three thousand words, which left me with limited opportunities to support it. This commentary follows on from my written evidence and is based on the professional work for clients, promoting work on the Network Rail systems, including the "Reversing Beeching" and "Restoring Your Railways" programmes, and for clients affected by the HS2 (High-Speed 2) project.

b. Professional experience

I am a Chartered Quantity Surveyor in private practice, providing construction cost to the railway industry in the United Kingdom and overseas. I have specialised in providing capital and operational cost advice to the industry since 1993.

In Great Britain, I have contributed, through Network Rail, the Royal Institution of Chartered Surveyors and the Railway Industry Association, to a better understanding of costs of capital and maintenance works for use in project appraisal and the commercial management of works.

c. Basis of my evidence

The evidence I gave to the Transport Committee was on my own behalf and on behalf of the many clients I have acted for, who wish to promote new railway infrastructure projects in Great Britain. In my evidence I also drew on my experience from taking part in The Oakervee Review[1] into the HS2 Project between August 2019 and February 2020.

Where I make comment on the challenges faced by Central and Local Government in delivering the Integrated Rail Plan (IRP), my evidence includes my personal professional "hands-on" experience in teaching quantity surveying and constructional appraisal techniques to members of Network Rail and HS2 Limited's supply chain as well as to undergraduates following courses to obtain professional qualifications at universities.

My evidence on the topics included in the Call for Evidence is confined to the costs and periods for delivery of the various projects referred to in the IRP and the methods used for project delivery. I am not qualified to comment on capacity nor on railway operations so my evidence should be read in that context.

d. Basis of costs

Any development, enhancement or increase in rail infrastructure, providing it meets demand (established or projected), and has relevant connections to the existing Network Rail operated rail network is to be welcomed, providing it is delivered in a manner that

[1] "The Oakervee Review" published 11th February 2020, sets out the independent Oakervee Review's advice to government on 'whether and how' to proceed with HS2.

provides Value for Money (VfM) for the country. My review of costs of the projects referred to in the IRP and the suggested alternatives are given on that basis.

References to project costs are at 4th Quarter 2019 prices and are calculated using data obtained from Network Rail or High-Speed (HS2) Limited adjusted, where necessary, using the structure and principles of the Rail Method of Measurement (RMM) suite published by Network Rail.[2]. The rail activities used to calculate the costs I have included in my evidence are taken from Rail Method of Measurement (RMM2) published by Network Rail.[3]

Where reference is made to the HS2 project in part or as a whole, I have used the costs identified and established during The Oakervee Review into the project, undertaken between August 2019 and February 2020.

During the period I participated in the review, I worked with KPMG, advising the Department for Transport (DfT), reconcile the cost of the HS2 Project, all phases, with the scope of the project and various statements of Estimated Final Cost made in Parliament and by HS2 Limited between February 2017, Royal Assent for Phase 1 and August 2019.

All of the estimated costs referred to in my evidence included: -

a. Construction Costs for the railway and operation buildings, station platforms and maintenance depots.
b. Design and Project Management fees
c. Land acquisition including professional fees associated with acquisitions
d. Other Project Costs including Parliamentary fees, where appropriate, planning and building regulation fees, lobbying costs and the costs arising from the obligation to compensate for disruption of trains services and moving and relocating persons or businesses affected by the works.
e. Risk allowance calculated on the same basis as the Oakervee Review applied to its analysis of HS2 Limited costs contained in the Stocktake Report published by its then Chairman in August 2019.

All estimated costs are based on prices at 4th Quarter 2019 and are benchmarked to the "All Construction Price Index" published by the Office for National Statistics (ONS), unless otherwise stated.

f. In the index published on 11th November 2021, the entry for the estimated costs at 4th Quarter 2019 prices is 100.7.
g. The date referred to by the Rail Minister, Nus Ghani MP, when advising Parliament of the cost of the HS2 Project, 4th Quarter 2015 (31st December 2015); In the index published on 11th November 2021, the entry for the estimated costs at 4th Quarter 2015 prices is 100.1

All estimated costs included in this commentary are taken from a cost database prepared by Railway Cost Information Service Limited[4] (RCIS) using average outturn costs for similar projects completed in Great Britain.

[2] Rail Method of Measurement – Order of Cost Estimating, Cost Planning and Detailed Measurement of Rail Infrastructure Works (RMM1), 1st Industry Edition, 1st July 2018 published by Network Rail CLG
[3] Rail Method of Measurement – Primary Rail Activity Cost Models for Rail Infrastructure Works (RMM2), 1st Industry Edition, 18th July 2019 published by Network Rail CLG
[4] Rail Cost Information Services Limited; registered in England and Wales, No. 08600675

3. HS2 – The predominant project

a. The significance of the project and its effect on the IRP

The IRP makes numerous references to the HS2 project, including: -

1. The Government's intention to complete the construction of Phases 1 and 2a, London to the West Midlands, West Midlands to Crewe as well as the western leg of the project, Crewe to Manchester.[5]
2. The construction of the truncated HS2 Phase 2b East between the West Midlands and East Midlands Parkway and/or Toton.[6]
3. The amount of funding available for the projects including in the IRP is £96 bn[7] of which £42 bn is included and "ring-fenced" for HS2 Phases 1 and 2a between London, the West Midlands and Crewe.[8]

The plans for the HS2 project, already under construction, have a major impact on the other projects in the IRP, especially in respect of the funds available for the latter. If the cost of delivering Phases 1 and 2a of the HS2 Project exceed £42 bn, then the balance of IRP funding, stated at £54 bn[9] is reduced accordingly.

b. HS2 Outturn cost – Current assessment of cost

The assessment of cost of the project is challenged from within HS2 Limited and its supply as the estimated delivery dates for its completion. The challenges are supported by contemporary documents provided by concerned members of its staff.

The current Estimated Final Cost (EFC) for Phases 1, 2a, 2b West (to Manchester) and Phase 2b (East) West to East Midlands is shown in the table below. The sources of information used for the estimate are shown in the table overleaf.

[5] Secretary of State for Transport Foreword, IRP, page 10, fourth paragraph
[6] Secretary of State for Transport Foreword, IRP, page 10, fourth paragraph
[7] Secretary of State for Transport Foreword, IRP, page 10, second paragraph
[8] Prime Minister Foreword, IRP, page 7, sixth paragraph
[9] Prime Minister Foreword, IRP, page 7, sixth paragraph

The current Estimated Final Cost (EFC) for Phases 1, 2a, 2b West (to Manchester) and Phase 2b (East) West to East Midlands (continued)

Phase	Scope	Cost/£ billion	Comment
1	London to the West Midlands	78.05[10]	Sources: information received from "Whistle-blowers"[11] as of 31st December 2021 and independent assessment by M H Byng[12]
2a	West Midlands to Crewe	13.97	
2b (West)	Crewe to Manchester	22.32[13]	
2b (East)	West Midlands to East Midlands	11.18[14]	
	Estimated Total Final Cost[15] including Risk Allowances[16]	**125.52[17]**	

The Estimated Final Cost of the HS2 Project is £29.52 bn greater than the entire funding available for the IRP.

The projected dates for delivery of the HS2 Project, which is central to the IRP, are set on pages 134 and 135 of the plan.[18]

1. HS2 Phase 1 and 2a is delivered by 2035
2. HS2 Phase 2b Western Leg (to Manchester) is delivered by 2043

As the HS2 Project is already underway and has Royal Assent in parts, it has priority on the available funding[19]. The likelihood, according to "Whistle-blowers" of greatly escalating costs and delays to final delivery pose a major threat to the remaining projects in the plan.

4. Smaller rail schemes in the North and the Midlands until 2025

[10] The Estimated Final Costs for Phases 1 and 2a have been independently assessed by M H Byng and confirmed by "Whistle-blowers" within HS2 Limited by reference to cost files held by the company
[11] The "Whistle-blowers" form a disparate group of employees within HS2 Limited and its supply chain, who have provided contemporary evidence of the cost of the HS2 project, as calculated by HS2 Limited, but withheld from Parliament and the public.
[12] The independent assessment is based on a measured, elemental "Order of Cost Estimate", prepared by M H Byng, based on plans, drawings and specifications produced by HS2 Limited to obtain Royal Assent or the approval of Parliament for the project's construction; the Order of Cost Estimate uses and is presented in the forms proscribed by RMM1 and RMM2.
[13] HS2 Phase 2b (West) Crewe to Manchester Railway costs taken from KPMG reconciliation for the Oakervee Review; this EFC is supported by contemporary evidence from "Whistle-blowers" and by independent assessment by M H Byng.
[14] The cost of truncated Eastern leg is taken from HS2 Phase 2b (East) West Midlands to Leeds Railway costs taken from KPMG reconciliation for the Oakervee Review; this EFC is supported by contemporary evidence from "Whistle-blowers" and by independent assessment by M H Byng.
[15] Estimate Final Cost at 4th Quarter 2019 prices
[16] Risk Allowance is assessed at 35% of basic project cost in line with the process used in The Oakervee Review
[17] EFC based on information available to 30th September 2021, assessed at 4th Quarter 2019 prices.
[18] Figure 9: IRP investment blueprint for the IRP Core Pipeline, pages 134 and 135
[19] Prime Minister Foreword, IRP, page 7, sixth paragraph

a. The North and Northern Powerhouse Rail

The smaller schemes are not clearly defined but are likely to be

1. West Yorkshire Combined Authority Mass Transit System[20]
2. Leeds, New Pudsey, Bradford enhancement and electrification[21]
3. Contactless ticketing systems across the North of England[22]
4. Hope valley line, upgrade and electrification[23]
5. HS2 services; works to enable these services to reach Leeds[24]

b. Midlands Connect Area

As with the north, these schemes are not clearly defined but could be: -

1. Birmingham (Moor Street) new services via the proposed Bordesley curves[25] to Bromsgrove and the south west and to Coventry and the east.
2. HS2 serving the centres of Derby and Nottingham[26]
3. Nottingham to Newark[27] and Lincoln[28], enhancement and electrification

The current Estimated Final Cost (EFC) for these smaller rail schemes is shown in the table below. The sources of information used for the estimate are shown in the overleaf.

c. "Reversing Beeching" and "Restoring Your Railways" programmes

Although passing reference is made to the "Reversing Beeching" programme[29] in the IRP, no mention is made of the "Restoring Your Railways" programme, which was launched in February 2020.

There does appear to be any funding for either of these programmes within the NRP.

The current Estimated Final Cost (EFC) for these smaller rail schemes is shown in the table below. The sources of information used for the estimate are shown in the table overleaf.

[20] Integrated Rail Plan, page 15 second paragraph
[21] Integrated Rail Plan page 15, second paragraph, last sentence
[22] Integrated Rail Plan page 15, third paragraph
[23] Integrated Rail Plan, page 17, first paragraph
[24] Integrated Rail Plan, page 17, second paragraph
[25] The Bordesley curves are new railways from Birmingham (Moor Street) Station built on curved viaducts to allow trains using the station to serve the south west via the Camp Hill lines (ELR:SKN) and to the east via the Rugby and Birmingham line (ELR:RBS1); the concept was originally developed and proposed by Birmingham City Council in the late 1990's as part of its Birmingham Railway Renaissance Programme
[26] Integrated Rail Plan, page 16, second paragraph
[27] Integrated Rail Plan, page 16, third paragraph
[28] Mott MacDonald "Strategic Alternatives to High Speed 2 Phase 2b – MML, ECML and Eastern Leg Combined Options". Published 13th October 2021. Paragraphs 3.2.4.5 and 4.5
[29] IRP page 37 paragraph 2.4

Smaller rail schemes, Estimated Final Costs (continued)

Section	Description	Pages	Sub total/£ billions	Total/£ billions
01	**Smaller rail schemes in the North and the Midlands until 2025**			
01.01	**The North and Northern Power House Rail**			
01.01.01	West Yorkshire Combined Authority Mass Transit System		0.02	
0.01.02	Leeds, New Pudsey, Bradford enhancement and electrification		0.14	
0..01.03	Contactless ticketing systems across the North of England		0.01	
0.01.04	Hope valley line, upgrade and electrification		0.67	
0.01.05	HS2 services; works to enable these services to reach Leeds		0.43	
	Sub Total - North		1.27	1.27
1.02	**Midlands Connect Area**			
1.02.01	Birmingham (Moor Street) new services via the proposed Bordesley curves to Bromsgrove and the south west and to Coventry and the east.		2.20	
1.02.02	HS2 serving the centres of Derby and Nottingham		2.10	
1.02.03	Nottingham to Newark and Lincoln, route enhancement and grade segregated junction and Newark and electrification		1.15	
	Sub Total - Midlands		5.45	5.45
	Total - Smaller rail schemes in the North and Midlands until 2025			**6.72**
	Office for National Statistics "All Construction Price Index"			***110.70***

The estimated costs in this table are comparable with those shown in the table on page 31 of the Integrated Rail Plan

5. Transpennine Route Upgrade (TRU) base scope including full electrification (Option F)

The IPR does not clearly define the programme, although there is a summary of page 100, which offers: the following schemes between Liverpool and York-

- 40 miles of new build high speed line between Warrington, Manchester and Yorkshire (to the east of Standedge Tunnel
- upgraded and electrified conventional line for the rest of the route
- significant improvements to the previous Transpennine Route Upgrade (TRU) plans between Manchester and Leeds, including electrification of the whole route, digital signalling throughout, significantly longer sections of three and four-tracking and gauge enhancements to allow intermodal container freight services
- electrification of Leeds – York with some sections of four-tracking
- upgrade and electrification of the Leeds – Bradford section of the Calder Valley line; and

The current Estimated Final Cost (EFC) of the Transpennine Route Upgrade (TRU) base scope including full electrification is shown overleaf.

Transpennine Route Upgrade (TRU) base scope including full electrification (Option F) (continued)

Item	Description	Sub total/£ billions	Total/£ billions
01	**Northern POWERHOUSE Rail; Warrington to Marsden**		
01.01	Warrington via Manchester to Marsden; west of Huddersfield; new railway	1.71	
0.1.02	Stalybridge, Huddersfield Leeds; enhancement and electrification	1.14	
01.03	Manchester to Leeds via Rochdale and Hall Royd Junction; enhancement and electrification	0.65	
	Sub total - Northern Powerhouse Rail - Warrington, Manchester & Marsden	**3.49**	**3.49**
02	**Northern Powerhouse Rail - Transpennine Route Upgrade**		
02.01	Transpennine Route via Copy Pit enhancement and electrification	1.03	
02.02	Leeds to York enhancement and electrification	1.16	
02.03	Leeds to Bradford "Calder Valley" enhancement and electrification	0.46	
	Sub total - Northern Powerhouse Rail - Transpennine Route Upgrade	**2.66**	**2.66**
	Northern Power House Rail - Transpennine Route Upgrade (TRU) base scope including full electrification (Option F)		**6.15**
	Office for National Statistics "All Construction Price Index"		***110.70***

6. HS2 East Core Network (including HS2 Eastern Leg, Midland Main Line and East Coast Upgrades)

The IRP provides for the following rail projects: -

- HS2 Eastern Leg between the West Midlands and East Midlands Parkway and/or Toton
- Midland Main Line Electrification from Kettering to Sheffield with the intention to allow HS2 trains serve Leeds by this route[30]
- East Coast Main Line electrification upgrade and line speed enhancements between Kings Cross and Newcastle.[31]

Details of these proposals are described in the report, "Strategic Alternatives to High-Speed Phase 2b, MML, ECML and Eastern Leg Combined Options, October 2021.[32]

The costs of each project have been prepared from: -

- HS2 Eastern Leg; Estimated Final Costs (EFC) prepared by independent assessment of the scheme drawings, considering the information provided by HS2 Limited to the Oakervee Review; these costs, included earlier in this commentary, have been confirmed by "Whistle-blowers", within the HS2 Supply Chain.
- Midland Mainline Electrification costs are taken from information available from Network Rail and confirmed by independent assessment using cost data included in the "RIA Electrification Cost Challenge" published in March 2019.[33]

To enable HS2 trains to reach Leeds using the truncated HS2 Eastern Leg, the MML electrification will be extended beyond Sheffield to Swinton and Moorthorpe Junction and via Swinton and Doncaster to provide the necessary traction power.

Item	Description	Sub total/£ billions	Total/£ billions
1	**Midland Main Line Electrification; Sheffield to Leeds**		
1.01	Sheffield; Nunnery Main Line Junction to Moorthorpe Junction	0.29	
1.02	Swinton to St James Junctions, Doncaster	0.14	
	Sub total - Midlands Main Line Electrification Sheffield to Leeds	0.43	0.43
	Midlands Main Line Electrification Sheffield to Leeds - Total Cost 4Q 2019 prices		**0.43**
	Office for National Statistics "All Construction Price Index"		110.7

[30] IRP page 13, first paragraph
[31] IRP page 14, last paragraph and page 15 first paragraph
[32] Mott MacDonald report, pages 17 to 25 inclusive for ECML upgrades and pages 30 to 32 inclusive for MML upgrades
[33] "RIA Electrification Cost Challenge" published by the Railway Industry Association, March 2019

- East Coast Mainline electrification and route enhancement costs are taken from information available from Network Rail and confirmed by independent assessment using cost data included in the "RIA Electrification Cost Challenge" published in March 2019.[34] And the technical data included in the New Electrification Project, Cost Modelling – Documents, published by Network Rail in April 2010[35].

Item	Description	Sub total/£ billions	Total/£ billions
1	**East Coast Main Line Electrification; Kings Cross to Doncaster**		
1.01	ECML South Kings Cross to Doncaster	5.49	
	Sub total - East Coast Main Line South Electrification Upgrade; Kings Cross to Doncaster	5.49	5.49
2	**East Coast Main Line Electrification; Doncaster, Leeds, Newcastle**		
2.01	ECML North Doncaster to Newcastle	2.85	
2.02	ECML North Doncaster to Leeds	0.65	
	Sub total - East Coast Main Line Electrification Doncaster to Newcastle	3.50	3.50
	East Coast Main Line Electrification; Kings Cross, Doncaster, Leeds, Newcastle - Total Cost 4Q 2019 prices		**8.99**
	Office for National Statistics "All Construction Price Index"		110.7

[34] "RIA Electrification Cost Challenge" published by the Railway Industry Association, March 2019
[35] Network Rail, internal document, "New Electrification Project, Cost Modelling Documents", April 2010.

7. NPR Core Liverpool – York (including TRU Option G enhancement)

In the absence of any publicly available design or specification information from either The Department for Transport or Transport for the North, I am unable to provide a detailed analysis of cost. I would, however, state that, given the extent of other projects in the IRP, I am at loss to understand how £17.20 bn can be spent on this project.

8. Integrated Rail Plan core pipeline – Provision 2019 prices

a. Summary

The table below summarizes the costs of the projects contained in the IRP, after independent assessment and the review of cost information provided by "Whistle-blowers" within HS2 Limited at 31st December 2021.

Item	Integrated Rail Plan Core Pipeline	Sub total Cost/£ billion	Total Cost £/billion
01	**Completion of HS2 Phase 1 and Phase 2 (March 2020) onwards**		
01.01	HS2 Phase 1 London to The West Midlands Railway	78.05	
01.02	HS2 Phase 2a West Midlands to Crewe Railway	13.97	
	Sub-total HS2 Phases 1 and 2a	**92.02**	**92.02**
02	**HS2 Phase 2b Western Leg (including Golbourne link)**	**22.32**	**22.32**
03	**Smaller schemes in the North and the Midlands**	**6.72**	**6.72**
04	**Transpennine Route Upgrade (TRU) base scope including full electrification (Option F)**	**6.15**	**6.15**
05	**HS2 East Core network (including HS2 Eastern Leg) Midland Main Line and East Cost Upgrades**		
05.01	HS2 Eastern Leg truncated	11.18	
05.02	Midland Main Line Electrification Kettering to Sheffield	1.62	
05.03	Midland Main Line Electrification Sheffield to Leeds	0.43	
05.04	East Coast Main Line electrification upgrade	8.99	
	Sub- total HS2 East Core Network (including Eastern Leg, MML & ECML upgrades	**22.21**	**22.21**
06	**NPR Core Liverpool-York (including TRU Option G enhancement)**	**17.20**	**17.20**
	Total Cost - £ billions		**166.62**
	Office for National Statistics "All Construction Price Index"		***110.70***

The independently estimates costs show that: -

1. the total amount provided in the IRP has a shortfall of £70.22 bn (72.84%) even before an accurate assessment of the amount spent to date on the HS2 Project is considered
2. The amount already spent on the project, at 30th September 2021, exceeds £13 billion[36], which increases the funding gap in the IRP to £75.22 bn.
3. Contrary to the statement made on page 24 of the IRP, there is little evidence of lessons learned from previous projects, Great Western Main Line Electrification, Crossrail 1 or HS2 Phase 1.
    a. Estimates offered do NOT reflect the excellent cost data assembled by Network Rail since 2010[37].
    b. There is NO evidence that the costs disclosed to The Oakervee Review have been considered and understood, especially the need to protect the public purse from the risks created by HS2 Limited in its choice of contract for construction works, see below.
    c. The methods of procurement suggest the continued use (and misuse) of the New Engineering Form (NEC) Forms of Contract

Without additional Government funding in the immediate future, the prospects of projects to develop rail transport in the North and the Midlands are in jeopardy.

Conclusion

From the emerging, ever increasing Estimated Final Cost of the HS2 Project is that current funding for the IRP is inadequate to complete the HS2 Project or to deliver any or all the non-HS2 projects described in it.

[36] "Whistle-blowers" in HS2 Limited and its supply chain

[37] The development of the "Rail Method of Measurement" (RMM) suite, published by Network Rail in July 2014 and revised in July 2018 and July 2019

9. IRP Other criteria

a. Passenger – connectivity - Emphasis on HS2

Much of the emphasis in the IRP is placed on the HS2 Project and the need to connect to it. The HS2 Project is a North/South route with London as its focal point. The only confirmed location of stations, outside the London area are: -

1. Birmingham Interchange
2. Birmingham Curzon
3. Crewe Hub
4. Manchester Piccadilly
5. East Midlands Parkway/Toton

Of the 5 (five) station, in the Midlands and the North, only Crewe Hub and East Midlands Parkway affords direct passenger connections from the HS2 route with the existing railway network, which are not available on the existing network. In both locations, the connections are on a North/South axis.

HS2 Limited does not provide new East/West connections for the North and the Midlands, which are not already available in the existing railway network.

In the same Core Pipeline diagram, works to deliver enhancements and electrification between Manchester Leeds and York are shown as being delivered by 2033, with further work to improve the route with connections to Liverpool by 2043.

No works, other than the projected HS2 West to East Midlands, delivery 2045, are shown for the Midlands, which is a major constraint to the improvement of connectivity between the West and East Midlands.

The absence of proposals in the IRP to" ring-fence" funding and guarantee the enhancement and electrification of existing connections in the North and the Midlands, independently of the HS2 Project is a major constraint on the economic development of both regions.

Due to the undue concentration of money and resources on the HS2 Project, the IRP contains little or nothing of substance to improve passenger connectivity in the Midlands and the North

10. Freight – connectivity

a. IRP – absence of detailed proposals

The IRP provide very little detail of how it will improve freight connectivity, there is one page, 121, on which at paragraph 3.113, promises are made that *"the IRP will free up capacity on parts of the Network, These will deliver improved capacity and capability to benefit rail freight travelling across the Midlands and the North"*, without providing detail or funding proposals for which routes will be dealt with.

It is unfortunate that the report, study and analysis of the effects on rail freight capability arising from the HS2 Project, prepared for the Department of Transport has neither been published nor referred to.[38]

The connectivity required to improve freight connectivity are by improving the routes from Britain's major container ports: -

1. Thames Valley to the Midlands and the North via the Chiltern line, Birmingham and the West Coast Main Line
2. Felixstowe and the East Coast ports to the Midlands and the North via Peterborough and Nuneaton
3. Liverpool to Manchester, Leeds, Hull and the East Coast ports via Diggle or the Calder Valley.

Each route also requires complete gauge clearance accommodation W12[39] loading gauge for containers, with clearance for future electrification. The IRP is silent on the development of these routes and for gauge enhancement.

Similarly, the needs of the North to develop access for W12 container trains to its major container ports at: -

4. Teesport
5. Hull
6. Liverpool

Have been ignored in their entirety

The IRP contains no measures to improve freight connectivity.

[38] Mike Garratt, Chairman, MDS Trans Modal, Spring 2020

[39] W12 Gauge allows 2.9 m (9'6") high *Hi-Cube* shipping containers to be carried on standard wagons and also allows 2.6 m wide (8'2") wide *Euro* shipping containers to accommodate refrigerated containers but requires extra clearance within existing and new structures such as bridges and tunnels and sometimes, platform canopies

11. Midlands and the North Connectivity

a. Passengers and freight

The need in the Midlands and the North is for modern, efficient, dependable, carbon-free transport to develop the regional hubs in: -

1. Birmingham
2. Derby/Nottingham
3. Liverpool
4. Manchester
5. Leeds/Bradford
6. Sheffield and Hull

There are no references to developing improved connectivity for: -

- Newcastle, Sunderland and Middlesbrough in the North East.
- Wolverhampton, Telford and Shrewsbury
- Chester, to the Midlands and the North

For the amount of public money being spent on the IRP, there is little evidence the plan with improve connectivity for passengers or freight in the North and the Midlands

12. Levelling up communities in the Midlands and the North

a. Regional hubs

The regional Mayors in the Midlands and the North have been unanimous is calling for the provision of economical, affordable public transport comparable with that provided in London through Transport for London.

To achieve that aim, regional networks are required around these hubs to allow more free flowing regular access to them.

There is no reference to developing these regional networks in the IRP, which hinders the process of levelling up.

The absence in the IRP of projects with confirmed funding to develop strong electrified railways and increased capacity around our regional hubs, confirms that the IRP does not assist the levelling up process around the country

13. IRP affect on rail infrastructure outside the Midlands and the North

a. Project emphasis

With its focus on the delivery of the HS2 Project, as a priority, between 2021 and 2045 and use of the majority, if not all the funds, set aside for the IRP, rail infrastructure outside of the Midlands and the North will be adversely affected by it.

The HS2 Project, in addition to absorbing time and money over an extended period of time, is also using much if not all of the resources for the Midlands and North regions[40] to complete it.

The IRP starves rail infrastructure projects, other than the HS2 Project, of resources thus blocking or delaying projects elsewhere as well as causing exceptional inflation[41] by its absorption of available resources, making the cost of projects higher than they otherwise would have been.

The concentration of funds on the HS2 Project coupled with the decision to proceed with it, despite there not being a ceiling on its costs deprives other parts of the country of the facilities, labour, plant, materials and professional support, to deliver their needs.

[40] IRP page 126, the rail supply chain has an estimated workforce of over 35,000 in the North and the Midlands, over one-third of the Great Britain total

[41] RMM1 provides in Group Element 5.01 and Component 5.01.01.02.02 for "Exceptional Inflation", which it defines as *"The additional cost of items or services that are in short supply or subject to abnormal market conditions shall be classed as exceptional inflation"*

14. Challenges to Central Government and other delivering the IRP

a. Funding

The greatest challenge is funding or the lack of it.

The cost of the HS2 Project absorbs all the moneys in the IRP and much more. The delivery of this project has risen exponentially since its inception, as indicated in 2019, when the cost rose from £55.70 bn[42], to £88 bn[43] to £106.545 bn[44] (all at 4th Quarter 2015 prices[45]) although there had been no expansion of project scope.

In a period of 3 (three) months the costs of the project had increased by over 91%, even before the major works contracts to deliver the rail had commenced.

Although the IRP confirms the truncation of HS2 Phase 2b East, West Midlands to Leeds rail, the cost of the reduced scheme is 30.75% greater than the total amount of funding in the IRP

The increase in costs, at 4th Quarter 2019 prices, over the period for project delivery (2019 to 2045) appears to be inevitable, thus depriving promoters of other projects for funds for year to come.

Competencies and industry capacity

The is extremely limited supply of competent personnel in the following areas: -

1. Project creation, appraisal including cost forecasting and cost management
2. Project management and commercial management of major projects

In August 2015, during a review within Network Rail of the use of the RMM suite, which is applied industry-wide for project estimating and appraisal, NR admitted to M H Byng, that

"Of the 650 people the company employed on commercial construction appraisal work, less than 15% (fifteen per centum) had the required level of professional competencies to discharge their duties".

This scarcity of competent staff has not changed and has been exacerbated by the need for staff for the HS2 Project.

HS2 Limited also experienced this problem as evidenced at its presentation made to "The Oakervee Review" at the "HS2 Costs Roundtable" meeting on 2nd October 2019, it was unable to present a structured estimate for the project to the review panel, in spite of

[42] Nus Ghani MP, then the HS2 Minister, speech in House of Commons 15th July 2019
[43] Allan Cook, the Chairman of HS2 Limited, "Stocktake Report", August 2019
[44] "The Oakervee Review", "HS2 Costs Roundtable" Meeting at The Institution of Civil Engineers, 2nd October 2019
[45] The prices adjusted for inflation to 4th Quarter 2019 are, £61.59 bn, £97.32 bn and £117.83 bn for the original "Y" scheme

having spent approximately £414 million on consultancy fees, of which £11.4 million was for quantity surveying and cost engineering purposes up to 31st December 2018[46].

One of the unintended consequences of these shortages of staff is the misuse of allowances for "Risk" and "Optimum Bias" by project creation teams, which artificially increase the costs of projects making them unaffordable.

The choice of construction contracts for the HS2 Project, which is repeated elsewhere, exacerbates the scarcity of competent staff.

The New Engineering Contract (NEC Suite): -

1. Reduces the importance of measurement, estimating and valuation competencies thus depriving cost databases of robust information for present and future planning.
2. Increases contractors' management costs due to its bureaucratic, consultant centred management processes, leading to "man-marking" in the supply chain.
3. Reduces construction productivity, in the absence of lump sum contracts, at a time when real increases are required considering scarce resources.

Although detailed project appraisals have been provided to MC and NPR, the lack of available competent staff in the regions means that these organisations have no-one to turn to for independent advice.

Without access to competent independent professional support, which has knowledge of local needs, the regional authorities do not have means to deliver the IRP.

[46] Source DfT; data provided by the website of the Department of Environment in spreadsheet form; the data has since been deleted from the website

15. Rail Schemes in the IRP – integration and interaction with HS2

a. Absence of connectivity

HS2 Limited has not resolved the following connectivity issues with other rail schemes

1. HS2 Limited has NOT identified a safe and cost-effective entry to London Euston Station for its tunnels from Old Oak Common
    a. Passengers from the North and the Midlands will have a poorer and reduced access to the West End and to HS1 at London St Pancras Station than they enjoy with the existing trains
    b. They will have to reply on Crossrail 1 (the Elizabeth Line) for access via Old Oak Common HS2 Station, to the West End and the City of London
2. HS2 provides terminal station solutions and therefore does NOT connect with the existing rail network at: -
    a. Birmingham Curzon Station
    b. Manchester Piccadilly Station
    c. Leeds

    In both cases, passenger may only make connections with rail services on foot.

3. Although the IRP expresses a wish to extend HS2 trains using the Phase 2b Eastern leg over the existing network to Leeds[47], the proposal for extending Midland Main Line electrification is extended to Sheffield leaving an unelectrified railway between Sheffield and Leeds, via Swinton and Moorthorpe Junction, via Swinton and Pontefract (Baghill) or via Mexborough, Conisbrough and Doncaster. HS2 trains will not be able to reach Leeds with an extension to the electrification proposed by the IRP
4. Leeds does not receive a high-speed rail connection from Manchester until 2030, at the earliest, or increases in capacity until 2045[48], nor will it have any connection to HS2 in medium to long term,
5. Liverpool does not gain access to the HS2 Western Leg, via Warrington until 2043 nor to West/East high-speed line until 2045, with the completion of Northern Power House Rail Phase 2 in 2045.

The rail schemes in the IRP are neither integrated with HS2 nor do they interact with HS2.

[47]East Midlands to Leeds, paragraph 3.47, page 86 and "Taking HS2 trains to Leeds", paragraph 3.99, page 112, IRP

[48] Figure 9: IRP investment blueprint for the IRP Core Pipeline, pages 134 and 135

16. IRP rail improvement schemes – selection methodology and equity

a. Funding

The demands for funding the HS2 Project has taken priority over the other schemes within the plan, thus limiting the selection methodology to those schemes, which can be afforded from the balance of the IRP fund, £54 bn[49].

Locations

There appears to little equity in the selection of other schemes as: -

1. Schemes west of the Pennines, in Lancashire, are piecemeal with very extended dates for delivery
2. Leeds, Sheffield, and Hull receive little or no improvement to their rail services in the medium to long term future.
3. Bradford, one of youngest, highest skilled and most diverse cities in the UK is ignored in the IRP.
4. There is no mention of any improvements to the regional hub in the North East centred on Newcastle-upon-Tyne, Middlesbrough or Sunderland
5. Other than the proposed truncated HS2 Phase 2b East, there no scheme focussed on improving rail in the West or East Midlands
6. Wolverhampton, Telford, Shrewsbury and Chester as well as Leicester are ignored

The selection methodology appears to be driven by commitment to the HS2 Project, which benefits London primarily, with only passing regard to the needs of the North and the Midlands.

[49] Prime Minister Foreword, IRP, page 7, sixth paragraph

17. IRP Value for money

a. Focus on the HS2 Project

Given its focus on the HS2 Project, the cost of which has increased exponentially since 2015 with ever more pessimistic dates for delivery, the funds allocated to the IRP are poorly spent.

HS2 provides little or no benefit to the North and the Midlands and no benefit, whatsoever to Wales and the West, East Anglia, the North East, or Scotland.

The country seeks transport links to all parts or it, from Aberdeen in the North East to Penzance in the South West, from Holyhead to Felixstowe, as well as modern railway links between our major cities, apart from London.

The IRP represents extremely poor value for money, reflecting the problems found by "The Oakervee Review" to justify a positive business case for the HS2 Project, which is at the centre of the IRP. The future reduction in demand for long distance rail services, post Covid-19 will further reduce the business case for HS2.

18. IRP review and analysis

a. Conclusions

The Executive Summary at the front of this commentary repeats the conclusions below.

- ***From the emerging, ever increasing Estimated Final Cost of the HS2 Project is that current funding for the IRP is inadequate to complete the HS2 Project or to deliver any or all the non-HS2 projects described in it.***
- ***Due to the undue concentration of money and resources on the HS2 Project, the IRP contains little or nothing of substance to improve passenger connectivity in the Midlands and the North.***
- ***The IRP contains no measures to improve freight connectivity.***
- ***For the amount of public money being spent on the IRP, there is little evidence the plan with improve connectivity for passengers or freight in the North and the Midlands.***
- ***The absence in the IRP of projects with confirmed funding to develop strong electrified railways and increased capacity around our regional hubs, confirms that the IRP does not assist the levelling up process around the country.***
- ***The concentration of funds on the HS2 Project coupled with the decision to proceed with it, despite there not being a ceiling on its costs deprives other parts of the country of the facilities, labour, plant, materials and professional support, to deliver their needs.***
- ***Without access to competent independent professional support, which has knowledge of local needs, the regional authorities do not have means to deliver the IRP.***
- ***The rail schemes in the IRP are neither integrated with HS2 nor do they interact with HS2.***
- ***The selection methodology appears to be driven by commitment to the HS2 Project, which benefits London primarily, with only passing regard to the needs of the North and the Midlands.***
- ***The IRP represents extremely poor value for money, reflecting the problems found by "The Oakervee Review" to justify a positive business case for the HS2 Project, which is at the centre of the IRP. The future reduction in demand for long distance rail services, post Covid-19 will further reduce the business case for HS2.***

In Section 2, which follows, the scope and costs of alternative schemes, better meeting the criteria of the IRP. Each scheme has a Estimated Final Costs (EFC) at 4th Quarter 2019 prices,.

Michael Byng FRICS, MAIQS (CQS), MPWI, AACE (USA), UNTEC (Fr)

Chartered Quantity Surveyor

mbpc

Construction Cost Management for Infrastructure
mbpc Infrastructure Limited
Seven Stars House
1 Wheler Road
COVENTRY CV3 4LB
United Kingdom
Registered in England and Wales No. 7845469

T: + 44 (0) 1675 463956
M: + 44 (0) 7710 456601

19. Alternatives to the IRP

a. Better use of Funds Available

i. Meeting the IRP criteria

In Section 2, I set out a series of schemes with their estimated costs, at 4th Quarter 2019 prices which improve: -

1. Connectivity
2. Levelling up
3. Decarbonising the railway
4. Enhance rail freight
5. Reducing the cost impact of the cancellation of the HS2 project.

With each project is: -

- The routes it creates or completes
- A commentary on its scope
- Points of connection to the electrified railway, where applicable
- Estimate of cost, at 4th Quarter 2019 prices

b. Pricing notes

As with the first part of this report, all estimated costs are offered on the same basis as those attached to the review of the IRP projects

c. Procurement routes

Where appropriate the delivery of alternative projects using procurement strategies other than the complicated and unduly expensive process offered by the New Engineering Contract (NEC suite) are stated.

d. Sources of Project Information

Regional public authorities

Projects for which there is demand in the regions have been selected for review

1. Northern Powerhouse Rail
2. Midlands Rail Hub

Rail Industry Bodies

Industry bodies, such as the Rail Freight Group, which are seeking to develop their own markets have been consulted

Private Rail Promotors

Bodies, which are proposing schemes under: -

1. The "Reverse Beeching"
2. "Restoring Your Railway" programmes

Have also been consulted.

e. Projects/schemes proposed as alternatives to the IRP

The projects illustrated are offered in the following order: -

1. IPR schemes that benefit the North and the Midlands, which should be developed as a matter of urgency
    a. Transpennine Route Upgrade (TRU) base scope including full electrification (Option F)
    b. Midland Main Line route enhancement and electrification to Sheffield and onwards to Leeds
    c. East Cost Main Line route enhancement and electrification between Kings Cross, Leeds and Newcastle-upon-Tyne.

    The HS2 Eastern Leg should be abandoned as part of the proposal to enhance and electrify the Cross-Country route, thus removing duplication between the East and West Midlands

2. Schemes benefitting the North and the Midlands, as well as other regions of Great Britain
    a. Passenger
    b. Freight
3. North of England, equating to the area covered by Northern Powerhouse Rail (NPR)
    a. General schemes
    b. Schemes developing regional hubs
4. The Midlands, equating to the area covered by the Midlands Rail Hub (MRH)
    a. General schemes
    b. Schemes developing regional hubs
5. HS2 Limited, aborted works, reuse
    a. The Midlands
    b. The Chilterns and London

Finally, should the Government's commitment to the HS2 Project, be cancelled, the reuse of works completed to date, are considered to mitigate the cancellation cost.

6. HS2 Project – nett cost of cancellation
    a. Completed works repurposed
    b. Sales of land acquired but no longer needed

20. IPR Schemes retained in whole or in part

a. Transpennine Route Upgrade (TRU) base scope including full electrification (Option F)

The project is described on page 9 of this commentary and its independently estimated cost shown: -

Total	**Northern Power House Rail - Transpennine Route Upgrade (TRU) base scope including full electrification (Option F)**		**6.15**
	Office for National Statistics "All Construction Price Index"		***110.70***

b. HS2 East Core Network (excluding HS2 Eastern Leg, Midland Main Line and East Coast Upgrades

The project should be retained in the light of alternative projects to the IPR, with the exception of the omission of the HS2 Eastern Leg.

Electrification of the Cross-Country Network and the extension of the Midland main Line Electrification removes the need for the project.

The estimated cost of the Cross-Country route electrification is shown later in the commentary and review.

The Estimated Final Cost (EFC) for HS2 East Core Network schemes is shown in the table below.

05	**HS2 East Core network (including HS2 Eastern Leg) Midland Main Line and East Cost Upgrades**		
05.01	Midland Main Line Electrification Kettering to Sheffield	1.62	
05.02	Midland Main Line Electrification Sheffield to Leeds	0.43	
05.03	East Coast Main Line electrification upgrade	8.99	
	Sub- total HS2 East Core Network (including Eastern Leg, MML & ECML upgrades	**11.06**	**11.06**
	Total Cost - £ billions		**11.06**
	Office for National Statistics "All Construction Price Index"		***110.70***

21. IRP – Alternative schemes that meet its criteria

National Schemes

a. Cross Country – York to Bristol; Didcot to Birmingham

The Cross-Country route from York to Leeds, Sheffield, Derby, Birmingham and Bristol will benefit from route enhancement and electrification to remove bottlenecks, increase capacity and journey speeds. The works will benefit the North and the Midlands as well as the South and South West.

The works described complement the electrification work on the Network Rail system described in the NRP.

Scope

The work included is the route enhancement and electrification between: -

1) South West; Bristol (Westerleigh Junction) to Bromsgrove including: -
   a) The Gloucester Triangle and Gloucester Station
   b) The Worcester loop from Abbotswood Junction to Stoke Works Junction via Worcester (Shrub Hill) and Droitwich Stations
   c) The Camp Hill line from Kings Norton to Grand Junction and Landor Street Junction

2) Midlands; Birmingham Grand Junction and Landor Street Junction to Derby London Road Junction including: -
   a) Lichfield Trent Valley (High Level) to Wichnor Junction

3) South; Birmingham, Bordesley Junction, to Leamington Spa, Banbury, Oxford and Didcot including: -
   a) Coventry (Limit of Electrification) to Leamington Spa North Junction

The works proposed connect with electrified lines at

- Bristol (Westerleigh Junction) – Great Western Main Line
- Birmingham (New Street) – West Coast Main Line to Liverpool, Manchester and Scotland
- Derby – Midland Main Line electrification

The electrification of the Cross-Country route from Bristol, Birmingham to Derby, connection with the Midland Main Line Electrification included in the IRP.

The estimated costs of these works, at 4th Quarter 2019 prices is shown overleaf

Summary of Costs – Cross Country Enhancement and Electrification continued

Item	Description	Sub total/£ billions	Total/£ billions
01	**Cross Country South West Enhancement and Electrification**		
01.01	Bristol to Birmingham; main line	1.23	
01.01.01	Gloucester Triangle	0.10	
01.01.02	Worcester (Shrub Hill) Loop	0.21	
01.01.03	Kings Norton to Proof House Junction and Landor Street Junction	0.12	
	Sub total - Cross Country South West	**1.67**	**1.67**
02	**Cross Country Midlands**		
02.01	Birmingham Grand Junction and Landor Street Junction to Derby London Road Junction	0.85	
02.01.01	Lichfield Trent Valley (High Level) to Wichnor Junction	0.08	
	Sub total - Cross Country Midlands	**0.94**	**0.94**
03	**Cross Country South**		
03.01	Birmingham Bordesley Junction to Leamington Spa, Banbury, Oxford and Didcot	1.04	
03.02	Coventry (Limit of Electrification) to Leamington Spa North Junction	0.09	
	Sub total - Cross Country South	**1.13**	**1.13**
	Cross Country - Enhancement and Electrification - Total Cost 4Q 2019 prices		**3.73**
	Office for National Statistics "All Construction Price Index"		*110.70*

The estimated cost of Overhead Line Electrification for these schemes is taken from "The RIA Electrification Cost Challenge" published by the Railway Industry Association in March 2019.

b. East Coast Main Line (ECML) – NPR projects

If the excessive demands on funding and the use of resources made by the HS2 project is addressed, then funds can be available for the earlier enhancement and upgrading of the ECML.

The projects are listed below: -

1. Extending 4-track railway at Northallerton from the south to the north of the station
2. Newcastle Station; extending bay platforms
3. Darlington; additional platform on the east side of the station with bays
4. Upgrading the Stillington route

Item	Description	Sub total/£ billions	Total £/billions
1	Northern Powerhouse Rail; East Coast Main Line schemes		
1.01	Extending 4-track railway at Northallerton from the south to the north of the station	0.07	
	Sub total NPR – East Coast Main Line schemes	**0.97**	**0.97**
2	Northern Powerhouse Rail; Station upgrades and enhancement schemes		
2.01	Newcastle Station; extending bay platforms	1.60	
2.02	Darlington; additional platform on the east side of the station with bays	0.75	
	Sub total NPR – ECML Station upgrades and enhancement schemes	**2.35**	**2.35**
3	Northern Powerhouse Rail; reinstated route capacity		
3.01	The Stillington Line; Northallerton, Eaglescliffe, Norton-on-Tees Junctions to Ferryhill; enhancement and electrification;	0.22	
3.02	The Leamside Line reinstatement; enhancement and electrification	0.72	
	Sub-total NPR – ECML Station upgrades and enhancement schemes	**0.94**	**0.94**
	Northern Powerhouse Schemes – East Coast Main Line schemes - Total Cost 4Q 2019 prices		**4.26**
	Office for National Statistics "All Construction Price Index"		*110.70*

Northern Powerhouse Rail

c. Manchester, Bradford and Leeds Direct Railway

The omission of Bradford from mainline high-speed electrified lines is addressed by the creation of "The Manchester, Bradford and Leeds Direct Railway" by the upgrading of existing routes, from Manchester, through Rochdale, from Halifax to Bradford and from Bradford to Leeds.

The new route will be completed by: -

- New twin single-bore tunnels from Littleborough, near Rochdale, to Dryclough Junction, near Halifax
- The Bradford Central railway, which creates a new Bradford Central Station on a through route making the existing Bradford Exchange and Bradford Forster Square Stations redundant and freeing their sites for commercial redevelopment

The new railway also provides the enhancement and electrification of the existing railway from Mill Lane Junction, Bradford, to Leeds via Wortley West Junction.

Complete details of "The Manchester, Bradford and Leeds Direct Railway" are available from Network North[50], which has prepared the design.

Item	Description	Sub total/£ billions	Total/£ billions
01	**Northern Powerhouse Rail; Manchester, Bradford and Leeds Direct Railway**		
01.01	Manchester (Thorpes Bridge Junction) to Littleborough via Rochdale enhancement and electrification	2.70	
01.02	Twin single-bore tunnels from Littleborough to Dryclough Junction)	1.56	
01.03	Dryclough Junction via Halifax to Bradford; enhancement and electrification	0.75	
01.04	Bradford Central Railway and Bradford Central through station	3.25	
01.05	Bradford to Leeds (Armley Junction) capacity reinstatement and extended electrification	1.13	
	Sub total – Manchester, Bradford and Leeds Direct Railway	**9.39**	**9.39**
02	**Northern Powerhouse Rail – Bradford and Leeds route schemes**		
02.01	Bradford (Mill Lane Junction) to Leeds Holbeck Junction – limit of electrification; enhancement and electrification	0.14	
	Sub total - Midlands Connect - Nottingham Network	**0.14**	**0.14**
	Northern Powerhouse Rail Manchester, Bradford and Leeds Direct Railway - Total Cost 4Q 2019 prices		**9.53**
	Office for National Statistics "All Construction Price Index"		***110.70***

[50] Network North, owned by Network 2020 Limited, company registered in England and Wales No. 08398469, Manor Farm, Church Lane, Nether Poppleton, York YO26 6LF

d. NPR - Regional Projects

The regional hubs surrounding the major cities of the north, west and east, require major upgrading to provide "London-style" commuting facilities.

The IRP makes no commitment to commuting projects around: -

1. Liverpool
2. Manchester
3. Bradford
4. Leeds
5. Newcastle, Middlesbrough and Sunderland

Sheffield is mentioned on pages 109 to 122 inclusive, in connection with the upgrading of the Hope Valley line. Unfortunately, for Sheffield, the project is not shown in the IRP Investment blueprint for the IRP core pipeline on pages 134 and 135.

Merseyside and Liverpool Schemes

To the west of the Pennines, around Liverpool the upgraded routes are: -

1. Liverpool to Ormskirk, via Sandhills
2. Wigan Wallgate to Southport
3. The Frodsham branch
4. The route from Acton Grange Junctions, Warrington, via Runcorn East to Helsby Junction connecting with the Manchester to Chester line at Mickle Trafford Junction

The works proposed connect with electrified lines at: -

- Liverpool (Lime Street) via Bootle Branch Junction
- Wigan Wallgate at Wigan Station Junction
- Halton Junction and Acton Grange Junctions

The estimated cost of Overhead Line Electrification for these schemes is taken from "The RIA Electrification Cost Challenge" published by the Railway Industry Association in March 2019 and are shown overleaf.

Merseyside and Liverpool Schemes (cont'd)

Item	Description	Sub total/£ billions	Total £/billions
1	**Northern Powerhouse Rail; Merseyside Schemes**		
1.01	Hunts Cross via Liverpool Central Low Level to Ormskirk	0.46	
1.02	Wigan Wallgate to Southport	0.21	
	Sub total NPR - Merseyside schemes	**0.67**	**0.67**
2	**Liverpool Regional schemes**		
2.01	Halton Junction to Frodsham Junction; enhancement and electrification	0.04	
2.02	Action Grange Junctions via Runcorn East Station and Helsby Junction to Mickle Trafford Junction	0.27	
	Sub total NPR Liverpool Regional Schemes	**0.31**	**0.31**
	Northern Powerhouse Schemes - Merseyside Schemes Network - Total Cost 4Q 2019 prices		**0.98**
	Office for National Statistics "All Construction Price Index"		*110.70*

e. Greater Manchester and Sheffield schemes

Manchester suffers severe congestion at Piccadilly Station from traffic using the Castlefield Corridor. Capacity enhancement and upgrading of the line from Ordsall Lane Junction, via Castlefield Junction and Manchester Piccadilly to Slade Lane Junction would remove this problem.
The work to relieve the congestion in the corridor extends from Ordsall Lane Junction to Slade Lane Junction: -

1. The two-track section between Water Street Junction to Castlefield Junction being quadrupled
2. Two additional tracks between Castlefield Junction and Manchester Piccadilly East Junction
3. Two additional tracks on the west side of the viaduct between the Out Gantry, 188 mils 27 chains and Slade Lane Junction, 186 miles 46 chins
4. Additional viaduct long the corridor between Castlefield Junction and Manchester Piccadilly East Junction
5. A further through island platform to the west of Manchester Piccadilly Station

The works proposed continue the electrified lines at: -

- Ordsall Lane Junction
- Manchester Piccadilly East Junction
- Slade Lane Junction

These works improve connections and capacity for freight trains using Trafford Park via Castlefield Junction and Trafford Park West Junction.

Manchester has an electrified railway network to Bolton and Preston in the North West, to Liverpool in the West and is served by Manchester Metrolink in its north east suburbs and surrounding areas. To complete this electrified network, the following route should be enhanced and electrified. Their completion will go a long way to removing diesel traction from City and Region as well as providing a modern, "London-style", commuter network with increased capacity and sustainability.

6. Stockport (Edgeley No. 2) Junction via Northenden Junction and Deansgate Junction to Northwich and to Chester via Mickle Trafford Junction
7. The Hope Valley (Dore and Chinley) line from Dore, Sheffield via Chinley and New Mills South Junction and the Reddish Branch to Ashbury's Junction; from New Mills South Junction and Hazel Grove Junction to Hazel Grove

The works proposed connect with electrified lines at: -

- Stockport (Edgeley No. 2) Junction
- Ashburys East Junction, Manchester, connecting with the Manchester and Sheffield line
- Hazel Grove, connecting with the line to Stockport
- Dore, connecting with the proposed Midland Mainline electrification to Sheffield

The estimated cost of the works in the Greater Manchester region and Sheffield are: -

Item	Description	Sub total/£ billions	Total £/billions
1	**Northern Powerhouse Rail; Greater Manchester schemes**		
1.01	The "Castlefield Corridor"; removal of capacity and speed constraints between Ordsall Lane Junction and Manchester Piccadilly East Junction	1.81	
1.02	Manchester Piccadilly East Junction to Slade Lane Junction; enhancement of capacity and speed restrictions	1.70	
	Sub total NPR – Manchester schemes	**3.51**	**3.51**
2	**Northern Powerhouse Rail; Manchester and Sheffield schemes**		
2.01	Hope Valley Line enhancement and electrification, Dore to Ashburys East Junction via Chinley and New Mills South Junction	0.52	
2.02	New Mills South Junction to Hazel Grove.	0.15	
	Sub total NPR – Manchester and Sheffield schemes	**0.67**	**0.67**
	Northern Powerhouse Schemes – Greater Manchester and Sheffield Schemes Network - Total Cost 4Q 2019 prices		**4.18**
	Office for National Statistics "All Construction Price Index"		***110.70***

With the enhancement of the Hope Valley line between Sheffield and Manchester, used by Transpennine Express trains serving Sheffield, Doncaster, Scunthorpe and Cleethorpes, using the benefits of a rolling programme of electrification to extend the electrification from Sheffield to Doncaster, towards Scunthorpe and Cleethorpes.

The routes involved are: -

1. Marshgate Junction, Doncaster, to Kirk Sandal and Thorne Junctions to Scunthorpe
2. Scunthorpe to Wrawby Junction, Barnetby to Cleethorpes

The primary purpose of the project is to allow "Transpennine Express", and its successors provide service by electric traction to and from Cleethorpes. The enhancement ill also provides better facilities for freight to and from Immingham. The route does not require "Gauge Enhancement" for container traffic, which does not serve Immingham.

The works proposed connect with electrified lines at: -

- The East Coast Main Line at Marshgate Junction, Doncaster
- The proposed Midland Main Line and Cross-Country Electrification at St James Junctions, Doncaster
-

The estimated cost of the works between Cleethorpes, Grimsby and Doncaster is: -

Item	Description	Sub total/£ billions	Total £/billions
1	**Northern Powerhouse Rail Grimsby Projects**		
1.01	Cleethorpes, Grimsby via Barnetby, Wrawby and Kirk Sandal Junctions to Marshgate Junction, Doncaster	1.05	
2	**Northern Powerhouse Schemes – Grimsby Projects - Total Cost 4Q 2019 prices**		**1.05**
	Office for National Statistics "All Construction Price Index"		***110.70***

The estimated cost of Overhead Line Electrification for these schemes is taken from "The RIA Electrification Cost Challenge" published by the Railway Industry Association in March 2019 and are shown below.

f. Northern Powerhouse Rail – Teesside and Wearside Projects

The development of the regional economies of Teesside and Wearside is hampered by the absence of any proposals to develop rail services to Middlesbrough and Sunderland.

Teesside will be helped with the improvement of railway routes to Middlesbrough and Teesport, benefitting both passengers and freight traffic. Tees Port is a container port, which will further helped by Gauge Enhancement to W12 Gauge for container trains.

Sunderland services will be improved by route and enhancement to Sunderland Station, making connection with Tyne and Wear Metro.

The improved rail services to the area are: -

1. The reinstatement of the Leamside line between Thursdale Junction and Pelaw Junction, providing better connectivity between the South, North Yorkshire, Durham and Cleveland
2. The enhancement and electrification of the route between Northallerton Station and Eaglescliffe.
3. The enhancement and electrification of the route between Darlington South Junction, Eaglescliffe, to Thornaby, Middlesbrough and Saltburn
4. The section of route between Stockton Cut Junction, Bowesfield Junction, Hartburn Junction and Norton-on-Tees Junctions is also enhanced and electrified
5. The enhancement and electrification of the route between Ferryhill South Junction, Norton-on-Tees West, South and East Junctions to Hartlepool and Sunderland.

The estimated cost of Overhead Line Electrification for these schemes is taken from "The RIA Electrification Cost Challenge" published by the Railway Industry Association in March 2019 and are shown overleaf.

Item	Description	Sub total/£ billions	Total £/billions
1	**Northern Powerhouse Rail Wearside Projects**		

1.01	The Leamside line; reinstatement; enhancement and electrification	0.87	
1.02	Northallerton Station to Eaglescliffe South Junction; reinstatement; enhancement, passenger and freight, and electrification	0.16	
1.03	Darlington South Junction to Saltburn; passenger and freight enhancement to Teesport, and electrification	0.24	
	Sub total NPR - Wearside Projects	**1.27**	**1.27**
2	**Northern Powerhouse Rail Teesside Projects**		
2.01	Ferryhill South Junction, Norton-on-Tees West, South and East Junctions to Hartlepool and Sunderland; enhancement and electrification	0.16	
2.02	Stockton to Sunderland; enhancement and electrification	0.37	
	Sub total NPR Teesside Projects	**0.53**	**0.53**
3	**Northern Powerhouse Schemes - Wearside & Teesside Schemes - Total Cost 4Q 2019 prices**		**1.80**
	Office for National Statistics "All Construction Price Index"		***110.70***

g. Midlands Connect schemes

Regional hub schemes

To develop the regional hubs around Birmingham and Derby/Nottingham, route enhancement and electrification of route from the West Midlands and from Nottingham will enhance connectivity and levelling up by providing a "London-style" travel to work network

In the West Midlands, the lines involved are: -

1) Wolverhampton to Shrewsbury, via Telford including the Oxley Chord
2) Shrewsbury to Chester
3) Whitacre Junction to Nuneaton, Hinckley and Wigston North Junction, Leicester including the Wigston South Curve

The works proposed connect with electrified lines at: -

- Wolverhampton – West Coast Main Line
- Whitacre Junction – to the proposed Cross-Country electrification
- Nuneaton – West Coast Main Line South
- Wigston North Junction, Leicester – Midland Main Line electrification, North
- Wigston South Curve – Midland Main Line electrification – South

The estimated costs of these works, at 4th Quarter 2019 prices is shown below: -

Item	Description	Sub total/£ billions	Total/£ billions
01	**Midlands Connect; Wolverhampton to Shrewsbury**		
01.01	Oxley (Limit of Electrification) to Shrewsbury (Coton Hill South)	0.20	
02	**Midlands Connect; Shrewsbury to Chester**		
02.01	Shrewsbury (Coton Hill South) to Chester East Junction	0.85	
	Sub total - Midlands Connect - Wolverhampton to Shrewsbury and Chester Network	**1.06**	**1.06**
03	**Midlands Connect; Birmingham to Leicester**		
03.01	Whitacre West Junction to Nuneaton (COM), Nuneaton North Chord, Cemetery Siding (LOE) to Glen Parva Junction and Wigston North Junction; Wigston South Curve	0.34	
	Sub total - Midlands Connect - Birmingham to Leicester Enhancement and Electrification	**0.34**	**0.34**
	Midlands Connect - Birmingham Network - Total Cost 4Q 2019 prices		**1.40**
	Office for National Statistics "All Construction Price Index"		*110.70*

In the East Midlands, the lines involved are: -

- Nottingham to Grantham
- Nottingham to Newark Castle Station, on to Lincoln

The works proposed connect with the electrified East Coast Main Line lines at Grantham, and with the proposed Midland Main Line electrification at Nottingham

The estimated costs of these works, at 4th Quarter 2019 prices is shown below

Item	Description	Sub total/£ billions	Total/£ billions
01	**Midlands Connect; Nottingham to Grantham**		
01.01	Nottingham to Grantham via Netherfield Junction; enhancement and electrification	0.55	
	Sub total - Midlands Connect - Nottingham to Grantham	**0.55**	**0.55**
02	**Midlands Connect; Nottingham to Newark and Lincoln**		
02.01	Netherfield Junction to Newark Castle Station; enhancement and electrification	1.05	
02.02	Newark Castle to Lincoln; Newark Crossing South Junction to Newark Crossing North Junction; enhancement and electrification	0.86	
02.03	Newark ECML; grade segregated junction for Nottingham to Lincoln line	1.15	
	Sub total - Midlands Connect - Nottingham to Newark and Lincoln	**3.06**	**3.06**
	Midlands Connect - Nottingham Network - Total Cost 4Q 2019 prices		**3.61**
	Office for National Statistics "All Construction Price Index"		***110.70***

22. HS2 Limited, aborted works, reuse and repurpose

a. The HS2 Project and London Euston

Extensive works are underway at London Euston Station, which can be repurposed and incorporated into the Network Rail system.

The works incorporated into the NR system are: -

1. Rebuilding London Euston Station to provide additional platforms and oversite deck for commercial development; the additional platforms, intended for the HS2 project allocated to a new Chilterns line enhancement and electrification project
2. Tunnel portals – two bore tunnels at Queens Park as described in petition HoL-00691[51] dated 11th October 2016
3. Twin single bore tunnels from Queens Park to the surface at Old Oak Common, making use of the HS2 Project works underway
4. Old Oak Common HS2 Station including the Victoria Road box

The new line will connect with the Chiltern line at Old Oak Common, forming a new electrified route to the West Midland via Aynho Junction, where it joins the electrified and enhanced Cross Country line.

The estimated costs of these works, at 4th Quarter 2019 prices is shown below: -

Item	Description	Sub total/£ billions	Total/£ billions
01	**Northolt Junction - Aynho Junction Electrification**		
01.01	Northolt Junction - Aynho Junction; enhancements and electrification	0.71	
	Sub total - Northolt Junction - Aynho Junction enhancement and electrification	**0.71**	**0.71**
02	**London Euston to Northolt Junction - New Line**		
02.01	London Euston Station - rebuilding	5.25	
02.02	London Euston Tunnel Portal - Queens Park	1.10	
02.03	Queens Park to Northolt Junction - two single bore tunnels	7.55	
02.04	Victoria Road Tunnel Portal	0.85	
02.05	Old Oak Common HS2 Station repurposed	1.67	
	Sub total - London Euston to Northolt Junction - New Line	**16.42**	**16.42**
	HS2 London Euston schemes - repurposed		**17.12**

[51] Petition by Mr. Sam Price, "Euston Express" to House of Lords Select Committee on HS2 Phase 1, London to West Midlands Railway, presented 11th October 2016

	Office for National Statistics "All Construction Price Index"	***110.70***

b. The HS2 Project in the West Midlands

In the West Midlands, works started by HS2 Limited, which can be repurposed are: -

1. The "Railway Corridor" cleared for the HS2 project between Crackley, Kenilworth) and Birmingham Airport
2. The site cleared for Birmingham Curzon Station.

The "Railway Corridor" can be repurposed to create a new dual carriageway road between the University of Warwick, Coventry, and the A46 trunk road and Birmingham Airport, providing traffic relief between the two centres as well as a needed bypass to the A452 trunk road through Balsall Common.

Birmingham Curzon Station becomes the rail hub in the centre of the City of Birmingham

The estimated costs of these works, at 4th Quarter 2019 prices is shown below: -

Item	Description	Sub total/£ billions	Total/£ billions
01	**New road University of Warwick, A46 Bypass to Birmingham Airport**		
01.01	University of Warwick, A46 Trunk Road to Birmingham Airport; new road	1.84	
	Sub total - University of Warwick, A46 Trunk Road to Birmingham Airport; new road	**1.84**	**1.84**
02	**Birmingham Curzon Station – repurposed for NR/Midlands Rail Hub use**		
02.01	Birmingham Curzon Street – NR iteration	3.10	
02.02	Connections to WCML and Chiltern lines; new chords	1.80	
	Sub-total - Birmingham Curzon Station – repurposed for NR/Midlands Rail Hub use	**4.90**	**4.90**
	HS2 London Euston and West Midlands scheme schemes - repurposed		**6.74**
	Office for National Statistics "All Construction Price Index"		***110.70***

23. HS2 Project – nett cost of cancellation

The IRP states that the previous spend on the HS2 project is £8.3 bn[52], a figure that is challenged by "Whistle-blowers" with HS2 Limited and its supply chain.

The "Whistle-blowers" claim, with evidence that the total cost spent and committed to the project at 30th September 2021 is £13.82 bn. In the table that follows, the higher figure, £13.82 bn, is used to calculate the nett cost of cancelling the project.

The estimated nett cost of cancelling the HS2 Project, at 4th Quarter 2019 prices is shown below: -

Item	Description	Sub total/£ billions	Total/£ billions
01	**HS 2 Project Cost spent or committed to 30th September 2021**		
01.01	Property acquired by compulsory purchase under the Act	5.82	
01.02	Construction and design work, completed or underway	5.80	
1.03	Parliamentary and legal fees incurred to promote the Act of Parliament for HS2 Phase and Phase 2a	2.20	
	Sub-total - HS2 previously spent or committed	**13.82**	**13.82**
HS2 Project Costs recovered by repurposing works completed			
02	**Construction and design work, completed or underway; repurposed**		
02.01	London Euston Station- rebuilding costs; spent to date	1.35	
02.02	Enabling works and design to tunnel to Old Oak Common	0.85	
02.03	Old Oak Common Victoria Road Box; spent to date	0.65	
	Sub total - London Euston to Old Oak Common; works repurposed	**2.85**	**2.85**
03	**HS2 Railway Corridor from Stoneleigh to Birmingham Airport**		
03.01	"Railway Corridor" incorporated into new trunk road	0.91	
	Sub-total - HS2 Railway Corridor from Stoneleigh to Birmingham Airport	**0.91**	**0.91**
03.02	Birmingham Curzon Street repurposed for Network Rail use	1.10	
	Sub-total - Birmingham Curzon Station repurposed for Network Rail use	**1.10**	**1.10**

[52] Integrated Rail Plan Pipeline, page 31, table at head of page.

04	**Disposal of land no longer required for the HS2 Project; Crichel Down principles**		
04.01	Land and property between Old Oak Common and Stoneleigh	1.82	
04.02	Land and property between Birmingham NEC and Birmingham Eastside	1.26	
	Sub total - Disposal of land no longer required for the HS2 Project; Crichel Down principles	**3.08**	**3.08**
	Total - HS2 Project Costs recovered by repurposing works completed		**7.94**
	HS2 previous spend - sunk costs - lost		**5.88**
	Office for National Statistics "All Construction Price Index"		***110.70***

24. Alternative Rail Schemes

a. Summary of Costs

The summary of the costs of alternative schemes to those described in the IRP is shown in the table below:-

Item	Description	Sub-total £ billions	Total £ billions
01	**IRP Schemes to be continued**		
01.01	Northern Power House Rail - Transpennine Route Upgrade (TRU) base scope including full electrification (Option F)	6.15	
01.02	HS2 East Core Network (excluding HS2 Eastern leg) Midland Main Line and East Coast Main Line Upgrades	11.06	
	Sub-total - IRP schemes to be completed	**17.21**	**17.21**
02	**Alternative Schemes meeting IRP criteria**		
02.01	**National schemes**		
02.01.01	Cross Country enhancement and electrification; Bristol, Birmingham to Derby (connecting with MML Electrification)	**3.73**	**3.73**
02.02	**Northern Powerhouse Rail schemes**		
02.02.01	NPR; East Coast Main Line Station Upgrades and enhancement schemes	4.26	
02.02.02	NPR Manchester, Bradford and Leeds Direct Railway	9.53	
02.02.03	NPR Manchester Piccadilly Underground Station	2.25	
02.02.04	NPR Manchester Piccadilly to Manchester Victoria Tunnel; to connect with the Manchester, Bradford Leeds Direct Railway	5.25	
02.02.05	NPR Leeds Underground Station	2.55	
02.02.06	NPR Leeds to Micklefield tunnelled railway	2.80	
02.02.07	NPR Merseyside and Liverpool schemes	0.98	
02.02.08	NPR Greater Manchester and Sheffield schemes	4.18	
02.02.09	NPR Cleethorpes, Grimsby via Barnetby to Marshgate Junction, Doncaster	1.05	
02.02.10	NPR Wearside and Teesside schemes	1.80	
	Sub-total - NPR schemes to be completed	**34.65**	**34.65**
02.03	**Midlands Connect schemes**		
02.03.01	Midlands Connect; Birmingham Regional Electrification schemes	1.40	

02.03.02	Midlands Connect; Nottingham to Grantham, Newark and Lincoln Electrification schemes	3.61	
	Sub-total - MC schemes to be completed	**5.01**	**5.01**
03	**HS2 Phase 1 Works to be reused and incorporated into new projects**		
03.01	HS2 Euston Station remodelling to improve NR services; Railway Corridor between Stoneleigh and Birmingham Airport; Birmingham Curzon Station	6.74	
03.02	Northolt Junction - Aynho Junction Electrification; London Euston to Old Oak Common - New Line	17.12	
	Sub-total - HS2 Phase 1 work repurposed	**23.86**	**23.86**
04	**HS2 spent & irrevocably committed; not repurposed**		
04.01	HS2 previous spend - sunk costs - lost	5.88	
	HS2 previous spend - sunk costs - lost	**5.88**	**5.88**
	Total - IRP Alternative schemes at 4th Quarter 2019 prices		**90.34**
	Office for National Statistics "All Construction Price Index"		***110.70***

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