Sheffield City Council

An assessment of the case for a city centre high speed rail station in the Sheffield City Region

FINAL REPORT

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1 Executive Summary

1.1 The economic and regeneration benefits that can be generated by locating the High Speed Rail station in Victoria far outweigh the Meadowhall option. This is already well documented in previous studies and evidence from other countries also supports a city centre station.

1.2 However, the DfT's current appraisal approach only accounts for transport user benefits and some wider economic impacts that result from journey time savings. We think that this misses the potential for the 'transformational' economic impacts that are a key objective of the high-speed rail network.

Introduction and background

1.3 The background to this work is that in January 2013, the Government announced its initial preferred route for the second phase of High Speed 2 ('HS2'). For the Sheffield City Region, Meadowhall was chosen as the Government's initial preferred option with Victoria identified as the second best alternative.

1.4 However, the Sheffield City Council (the 'Council') believes that in order for the Sheffield City Region to maximise the benefits that can be created by HSR, the station must be situated in Sheffield city centre. Volterra has been commissioned to provide an independent assessment of the case for a city centre High Speed Rail ('HSR') station in Sheffield.

The Government's case for station location

1.5 Based on the Government's business case for its preferred route for the second phase of HS2, there are a number of obstacles standing in the way of a city centre station in Sheffield. These include: the additional journey time due to the city centre loop at Victoria; poor connectivity; and, the additional £1 billion in costs.

1.6 It is clear that from the perspective of the Government's business case for HS2 as it stands, the impact of a station at Victoria could result in a reduction in the project's benefit-cost ratio ('BCR'). This will have an impact on both the transport benefits and the wider economic impacts ('WEIs') that make up the bulk of the business case. Accordingly, if the conventional DfT framework continues to form the basis for the assessment of HS2, the case for Victoria will remain weak.

1.7 The Government is currently in the process of producing a number of documents that will form an update to the economic case for HS2 and that will also presente an overall strategic case. The estimates for benefits that have been previously produced are therefore likely to change. However, we believe that, given the approach that has been adopted, it is unlikely that the business case in relation to Victoria will change. For a start, any reduction to the transport business case will affect all parts of the route.

1.8 Meanwhile, if the WEIs analysis becomes more prominent following the production of the land-use transport interaction ('LUTI') modelling, there will be little benefits stemming from different station locations at Sheffield. This is due to two reasons. First, the DfT appraisal guidance assumes that transport investments do not affect the size of the economy – that means there is

no net additionality. Instead, the transport intervention would usually results in a different distribution of households and jobs.

1.9 Second, one of the key inputs to the WEIs is worker productivity, which is measured at district level. This means that Sheffield as a whole is treated as one district with Victoria and Meadowhall both yielding the same levels of productivity – this implies that a job in Meadowhall is worth the same as in Victoria.

1.10 In our view, while the transport user and wider economic impacts are important to the assessment of HS2, they are not enough to justify the case. The appraisal framework should encompass the impact on the economies of the affected regions given the scale of the HS2 investment and its stated objective – including, transforming the economies of the UKs regions.

The framework for appraisals should change…

1.11 However, it is not yet clear whether the criteria for assessing HS2 will remain the same or if the DfT's transport appraisal guidance will be the only framework for option appraisal. After all, one of the key objectives of HS2 is economic development and regeneration, as well as wealth distribution away from London and the South East.

1.12 The economic impact of the development and regeneration cannot be measured within the DfT's appraisal framework if guidance is strictly followed. It could, however, be included within the HM Treasury's Green Book guidance as part of either the strategic case or the regeneration assessment.

1.13 A National Audit Office report recently highlighted that the framework adopted by the DfT has not reflected its stated objectives. For example, the impact on the economic development and regeneration of the affected regions has not been included as part of the appraisal framework. This could include the economic evidence that the Council has presented previously in relation to the station location options, even if it cannot be considered within the Government's BCR.

International evidence supports a city centre station…

1.14 The literature review and evidence from international case studies support the HS2 station location at Victoria. As we will show in this report, international evidence suggests that city centre locations usually perform better than 'out of town' station locations.

1.15 For example, evidence from France suggests that some of the 'parkway-type' stations along the high speed route have failed to generate significant economic activity, if any at all. This includes a number of stations along the high-speed TGV route, such as Picardie, Avignon and Aux de Provence.

1.16 Of relevance to Sheffield is specific evidence from other countries that intermediate stations along HSR routes have seen significant economic development and urban regeneration. These include Zaragoza and Cordoba in Spain, and Nagoya and Yokohama in Japan.

1.17 The HS2 station in the Sheffield City Region will serve as an intermediate station on the route between London and Birmingham to the south and Leeds to the north. Sheffield's low staff cost

and highly-skilled workers make it an ideal location for businesses relocating to the north as a result of HS2.

Economic benefits at Victoria are far higher…

1.18 The Council has already demonstrated, through previously commissioned work, that a city centre station in Victoria will provide some £2 billion to £5 billion in additional benefits compared to a station in Meadowhall. We think that the analysis is conservative and the benefits are likely to be even higher.

1.19 For example, the Genecon report can be extended by increasing the time period to 60 years. Our preliminary analysis shows that, based on Genecon's own annual benefits in the central scenario, there would be around £2.5 billion in additional benefits if the HSR station is located at Victoria. This brings the total additional benefits to between £3.7 billion to £6.7 billion.

Sheffield's economic performance is crucial to its wider city region…

1.20 The economic benefits from station location choices – particularly employment generation – need to be put in the context of the wider Sheffield City Region. Indeed, it should be clear that, if residents from the wider city region are able to access jobs in Sheffield city centre, it is more beneficial for them to support a central location where more jobs can be created. After all, Sheffield is the main employment centre in the wider city region.

1.21 The evidence shows that successful cities are crucial to the performance of the regions around them. The economies of both Bristol and Sheffield have performed better in terms of Gross Value Added (GVA) per worker than the other core cities. The consequence has been that employment and earnings have grown faster in the districts that lie around it than in the regions that surround other core cities.

1.22 Against this backdrop, the potential displacement of current economic activity from other parts of the city itself and the wider region should be factored in to any appraisal of HS2 route options and station locations. In addition, the impacts on the viability of planned and future developments in the areas that are not within the vicinity of the HS2 station should also be taken into account. This is particularly relevant since the frequency of the trains from London to Sheffield at the current Midland station could be reduced from 2 trains per hour to 1.

Conclusions and future work

1.23 In our view, despite the Government's business case for its preferred HS2 route, both the Genecon work and the evidence from other parts of the world clearly support a station at Victoria. Indeed, a change in the appraisal framework that includes the economic and regeneration benefits of the affected regions is likely to support a Victoria location.

1.24 In light of the NAO report and given the comprehensiveness of the HM Treasury's Green Book appraisal guidance, it is possible for the economic and regeneration frameworks to be included in future appraisals. The DfT and HS2 have recently commissioned a number of studies that are looking at the strategic case for HS2, which will fit within the HM Treasury's Green Book guidance. However, it is not clear whether this will alter the proposed route.

1.25 As part of the current consultation process that is due to end in January 2014, the Council needs to address a number of issues. First, the DfT has stressed the importance of projected passenger numbers at each station. The current analysis is preliminary and there is scope to carry out more detailed analysis. This should also consider the fact that historic demand trends are not a good representation of future projections. After all, HS2 will result in a 'step change' in both travel times and capacity, which suggests that the future could look very different.

1.26 Central to passenger demand will be Victoria's connectivity to the wider city region. This is important for both passenger access to the high-speed network and access to jobs in the city centre that will be once HS2 is operational. This should therefore form a key aspect of the Council's work over the coming months.

1.27 Finally, one of the key issues in the Council's case for a city centre station in Sheffield is the additional £1 billion in costs. The Council is already addressing some of the cost issues through the work that is being carried out by CBRE, which has shown that the value of the business rate uplift at Victoria could be in the region of £850 million over 60 years (in present value terms). In contrast, the Meadowhall option is expected to generate around £190 million in business rates over the same period.

1.28 In our view, the Council has a strong economic case for an HS2 station in central Sheffield. In terms of stage 3, we recommend the following extensions if the Council wishes to proceed with its case:

- Carry out a detailed assessment of projected passenger numbers at each station location, including scenarios for a 'step change' in travel times and capacity. This could be done through both quantitative models and by considering case studies where this had happened;
- Carry out an assessment of the station location options against the more comprehensive guidance laid out in the HM Treasury's Green Book – this should aim to build a case that is not purely dependent on standard transport users benefits as set out in the DfT appraisal framework;
- Analyse the potential displacement of jobs, development and economic activity at Meadowhall, including its effects on the wider city region;
- Examine the connectivity issues at Victoria and provide a comprehensive approach to addressing these problems; and,
- Put forward a case for the wider city region on the importance of Sheffield to their economies with the aim of building support at the local and regional level for a city centre HS2 station.

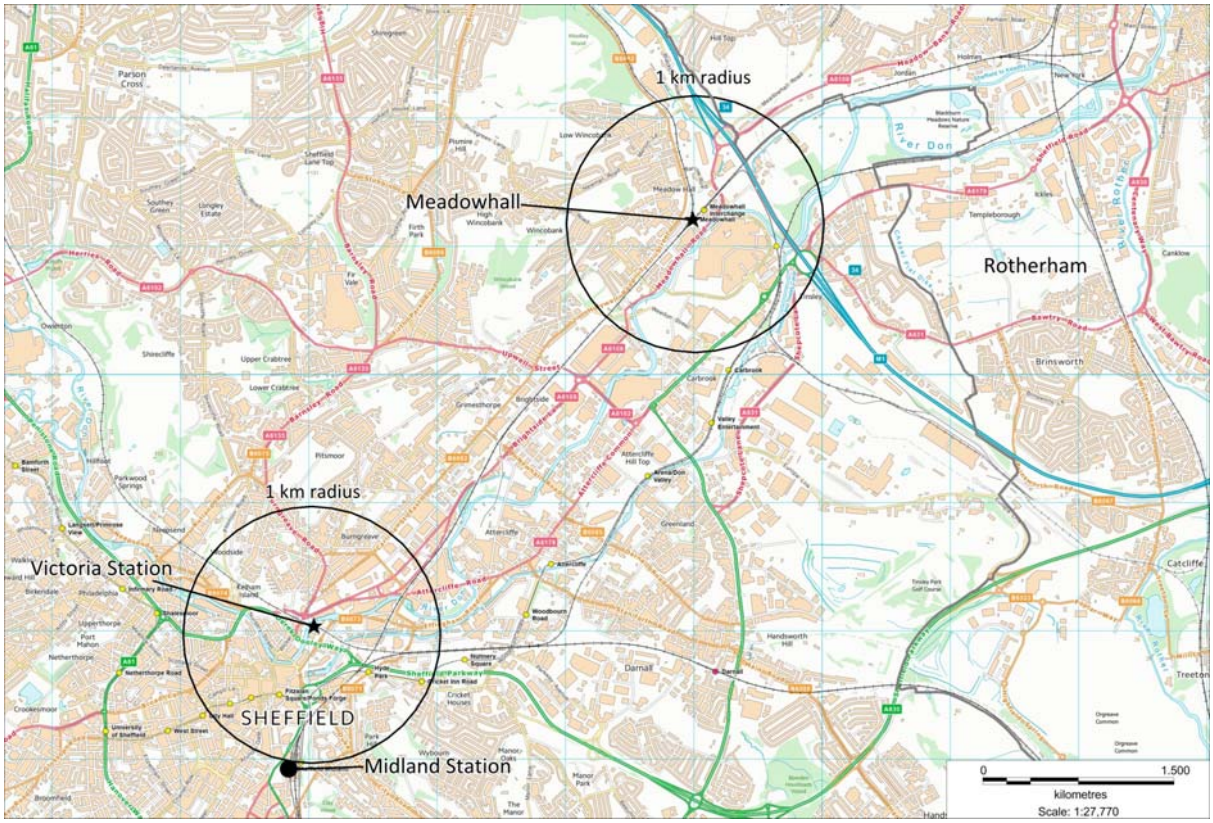
1.29 Finally, it is important to stress that one of the key considerations for the next stages of any work that the Council decides to undertake is that the support of the wider city region will be crucial for the success of its representations to Government in relation to station location options. In this context, the Local Enterprise Partnership, businesses and local political leaders could play a major role, including as key stakeholders in the production of future reports and analysis.

2 Introduction

2.1 Sheffield City Council (the 'Council') has commissioned Volterra to provide an independent assessment of the case for a city centre High Speed Rail ('HSR') station in Sheffield. The background to this work is that in January 2013, the Government announced its initial preferred route for the second stage of High Speed 2 ('HS2'). For the Sheffield City Region, Meadowhall was identified as the Government's preferred option.

2.2 However, although the Council is fully supportive of the HSR project – specifically a station in the Sheffield City Region – it believes that in order for the Sheffield City Region to maximise the benefits that can be created by HSR, the station must be situated in Sheffield city centre. Fundamentally, the proposition of a city centre station is different to that in Meadowhall. As shown in chart 1, the location of Meadowhall sits far from Sheffield's central activities zone.

Figure 1: Station location options in Sheffield



2.3 Indeed, in the run up to the Government's initial decision, the Council and South Yorkshire Passenger Transport Executive ('SYPTE') commissioned research to assess the economic impact of the two potential station locations.

2.4 This study found that a station at Victoria could generate between £2 - £5 billion more growth and approximately three times as many new (net) jobs compared to Meadowhall. Regardless, both the Government and HS2 Ltd have argued that the economic benefits do not justify the additional financial costs of locating the station at Victoria.

2.5 Looking ahead, a formal consultation period has started and is likely to end in January 2014, which provides an opportunity to refresh the case for a city centre station in Sheffield.

Accordingly, the overall purpose of this project is to independently assess the case for a city centre high speed rail station that could form part of the Council's submission to Government.

2.6 To achieve this, we have agreed with the Council (as per the Council's scope of work) that the work should be divided into the following three stages:

- Stage 1: Analysing Government Business Case for Sheffield station location;
- Stage 2: Desk top review of existing research into impacts of two station options; and,
- Stage 3: Additional economic research to address Government business case and complement existing research into economic impact.

2.7 It has also been agreed that stages 1 and 2 are carried out as an initial phase 1, specifically to inform the work required for stage 3. Accordingly, this report provides details of our work on stages 1 and 2, including an assessment of how the Council's acknowledged case could be further developed.

2.8 As the development of HSR in the UK is in itself a new concept, the assessment of its likely benefits is undoubtedly difficult and clouded by uncertainty. Based on this, our approach to this assessment recognises this fact and attempts to balance the Government's official guidance on transport appraisals with more strategic and qualitative issues that may not be captured by the conventional approaches, yet may be as important, if not more.

2.9 To this end, we have utilised the international literature on HSR in other countries to help us understand the likely trajectory of economic benefits in a UK context and, specifically, how this may impact on the decisions over station location. Indeed, as we will show in this assessment, the experience in other parts of the world may be highly relevant to the UK and, more specifically, to the Sheffield City Region.

2.10 For the avoidance of doubt, we have not considered the effects on all the route options but only the part of the route that will impact on the Sheffield City Region. After all, each of the affected regions will have their own set of socio-economic conditions.

2.11 This report is structured as follows:

- First, we describe the context of this review;
- Second, we provide an explanation of the Government's case;
- Third, we assess the economic work that has been carried out by the Council;
- Fourth, we review the literature and case studies from other regions;
- Fifth, we assess the impact on Sheffield and its wider city region;
- Sixth, we explore other issues in relation to the station location options; and,
- Seventh, we conclude on stages 1 and 2, and make recommendations for stage 3.

3 The Context of this Study and Overall Guiding Principles

3.1 It is not the objective, or even within the scope, of this project to assess the Government's case for HSR. Indeed, the Council is fully supportive of the overall HSR programme - particularly the fact that the Sheffield City Region has been included in the route.

3.2 Instead, the work in this project will focus on the merits of the preferred station location and the alternative options put forward by the Government in relation to the Sheffield City Region.

3.3 This falls within the Government's objectives for the overall HSR project - namely the key objective of the expected economic and regeneration benefits that the transport infrastructure and connectivity is set to generate in many regions of the country. Therefore, understanding the role of station location in maximising the economic impact of HSR is critical.

3.4 In this regard, although we have analysed the Government's business case, the approach we have so far taken to complete this review and analysis is not one that could be described as a standard transport appraisal in the sense that the DfT guidelines describe.

3.5 It can, however, be read with the guidance proposed in the HM Treasury's Green Book in mind. These offer a more comprehensive appraisal framework that covers, among a multitude of factors, strategic and regeneration objectives that should form a key part of the appraisal for a scheme that is of the scale of HS2.

3.6 Against this backdrop, since economic regeneration is a key objective, we have focused on whether the decision regarding station location will boost the economy of the Sheffield City Region. And where there are two competing locations, which option provides the most beneficial economic outcome, taking costs and risks into account.

3.7 Accordingly, the assessment could be fundamentally split into two sections. First, the national economic case for HS2 as presented by the Government's business case. And second, the regional economic impact of the proposed route and station location options.

4 Review of the Government's Case in Relation to Station Location

The Government's approach to transport appraisals and HSR

4.1 Before going into the details of the Government's case for its preferred HS2 Phase 2 route, it is worth explaining its approach to transport appraisals and how this relates to HSR. Although this work is not concerned with the overall business case for HS2, an assessment of the guidance should help to inform stage 3.

4.2 In the UK, decisions on transport investments follow a cost-benefit analysis ('CBA') approach that is informed by evidence set out within a business case. The guidelines for how this evidence must be produced in line with the HM Treasury's Green Book. In relation to transport projects, this is contained within WebTAG ('Web-based Transport Analysis Guidance') – the DfT's transport appraisal guidance.

4.3 However, it is important to note that the HM Treasury's Green Book guidance provides a more comprehensive appraisal framework that encompasses more factors than those in the DfT guidance. The Green Book's framework is also less prescriptive since it is concerned with a wide range of public interventions.

4.4 The DfT's conventional approach to appraisals requires that a number of impacts – beyond the direct impacts on the transport users and providers – are assessed, including environmental and taxation impacts.

4.5 However, the largest share of the impacts of transport interventions is still usually captured within the direct user benefits. Namely through:

- journey time savings;
- reduced congestion;
- increased frequency; and,
- increased safety/reliability.

4.6 Of those, journey time savings typically account for the majority of monetised benefits in the benefit-cost ratio ('BCR'). Indeed, in the context of HS2, the Government's most recent economic update shows that over 70% of the transport benefits (some £34.3 billion) will be due to journey time savings for commuters, business and leisure users.

4.7 Apart from the transport benefits, the DfT guidance for transport appraisals allows for the estimation of wider economic impacts ('WEIs'). The WEIs must be estimated separately from the transport user benefits. WebTAG provides guidance on how to estimate the following WEIs:

- agglomeration;
- output change in imperfectly competitive markets;
- labour supply impacts; and,

- move to more/less productive jobs (this is usually applied as a sensitivity only).

4.8 The approach for the estimation of WEIs was originally developed by Volterra and Colin Buchanan in 2007 for the appraisal of Crossrail, a domestic rail network. It was also applied to parts of HS1 since it delivered additional commuter capacity. However, this approach is not wholly suitable for the assessment of a large-scale inter-regional rail network, such as HS2.

4.9 Nonetheless, in its most recent economic case, the Government provided an estimate for the WEIs of HS2. This was largely due to agglomeration benefits that are likely to have been due to the reduction in journey costs stemming from time savings – since this is a key component of agglomeration impacts. The WEIs totalled £15.4 billion, over 77% of which was due to agglomeration benefits.

4.10 It is important to note that the overarching guideline from the DfT in relation to transport appraisals is that these should not result in an increase in the size of the economy. This suggests that there should be no net additional jobs. Instead, any additional jobs will be displaced from other locations that are outside of the study area.

4.11 The implication of all this is that land use impacts of transport interventions are not taken into account in these appraisals – or at least not in the core business case. Instead, WebTAG allows for land use impacts to be measured as sensitivities, ideally when a land use transport interaction ('LUTI') model is available. This is used to forecast potential land use changes due to the transport intervention, which are essential to estimating the move to more/less productive components of the WEIs.

4.12 A number of LUTI models have been developed in the UK, including TfL's LonLUTI, Scotland's TELMoS and the Urban Dynamic Model used by the West Yorkshire PTE. The DfT and HS2 have commission David Simmonds Consultancy to develop LUTI models for the UK. Once this is available, it will be possible to include other WEIs in the overall business case for HS2. Overall, the current DfT guidance for transport appraisals allows for the estimation of direct transport benefits and wider economic impacts, with parts of the latter only applied as a sensitivity.

4.13 This means that other economic and regeneration benefits that could arise from the HS2 network cannot be included within the framework of the current guidance – or at least not the business case that underpins the scheme's 'value for money' assessment. However, the Government's guidance for policy and intervention appraisals, as laid out in the HM Treasury's Green Book, allows for more factors to be included in the assessment of HS2 than those stipulated in the DfT's own guidance.

4.14 Within the context of station location, this suggests that these benefits cannot be included within the overall assessment of the scheme. After all, the regeneration of the affected parts of the country and the distribution of economic activity to these regions are a key objective of HS2. Accordingly, the framework for assessing route options should take this as one of its key criteria as pointed out in the recent National Audit Office ('NAO') report into the DfT's appraisal of HS2.

4.15 Nonetheless, the costs and negative impacts on the actual business case must also be taken into account as this will affect the 'value for money' criteria that the Government must abide by. The BCR for HS2, as shown in the most recent business case, is in the range of 1.8 to 2.5 with WEIs included (1.6 to 1.9 without). This suggests that, using the current guidelines, the BCR for HS2 falls within the medium 'value for money' category excluding the WEIs, making it highly sensitive to any changes in costs or reduction in benefits. If the BCR were to fall to below 1.5, it would be classified in the low 'value for money' category.

4.16 Against this backdrop, the fact that the government has also recently changed its contingency planning for HS2 to include an additional £10 billion does not bode well as this takes the overall budget to a total of £42.6 billion. However, it is not yet clear how this will impact on the overall business case, especially since this is likely to change once the range of new economic reports are published by HS2 over the coming months.

Overview of Government's case over its preferred route

4.17 Taking all this into account, we can only review the case for the Government's decision over its preferred route for the second phase of HS2 – particularly its decision over the station location in the Sheffield City Region – based on the most recent available reports. These were published by the Government in January 2013, following a period of planning and consultation.

4.18 The Government decided that the most beneficial location for an HSR station serving the Sheffield City Region (and South Yorkshire as a whole) is Sheffield Meadowhall. This is located approximately 5 kilometres north-east of Sheffield city centre. In the Government's view, this location is deemed to provide the strongest balance between positive effects for Sheffield and non-negative effects for the remainder of the High Speed network.

4.19 Specifically, the government argued that the Meadowhall location does not cause any great deviation from the main Eastern branch of the Y-Network between Birmingham and Leeds, retaining the overall journey time savings that form the core business case for HS2, while still offering sufficient access to the network for Sheffield and the surrounding area.

4.20 The other locations considered in Sheffield were the current mainline station on the eastern edge of the city centre, Sheffield Midland, and the disused Victoria station site to the north-eastern edge of the city centre, in the Wicker area of the city.

4.21 Early on in the consultation, the work required to facilitate a High Speed lines through Sheffield Midland station was deemed too costly and disruptive to be viable. Accordingly, this location was not given serious consideration beyond the initial phases of discussion. Meanwhile, Victoria was deemed to be the only truly viable location in the city centre.

4.22 However, despite the accepted economic benefits that a more central location would bring to the Sheffield City Region, the Government decided that a range of negative effects made such a location impractical. The Government identified the following negative effects:

- first, the distance between the proposed HS2 node and current regional transport links;
- second, the loss of journey time savings for other parts of the HS2 network;

- third, the destructive impact of construction on the area surrounding the required lines and station; and,
- finally, the greater costs of implementing the Victoria location as opposed to the Meadowhall option.

4.23 While Victoria is located centrally within Sheffield, and therefore closer to the productive services industries that are most likely to benefit from a High Speed rail link to other large conurbations, its distance from current transport hubs at Midland and Attercliffe means that connectivity to the wider City Region would be poor compared with Meadowhall. The latter is already well connected to local rail, tram and bus services. In our view, while there are some connectivity issues at Victoria, it is possible for these issues to be addressed. Indeed, with Council support, SYPTE have commissioned further research into connectivity issues for both Victoria and Meadowhall.

The Government's case for HS2

4.24 Before discussing the Government's case in more detail, it is important to note that since the estimate of transport and economic benefits are highly dependent on route assumptions it is not possible to calculate the costs and benefits of an alternative route – such as the one that would go through Victoria.

4.25 Accordingly, for the purpose of this report, we will aim to get an idea of the likely scale of changes to the benefits due to an alternative route rather than an exact estimate. At the same time, we have consulted with HS2 Ltd on the impact on the business case of a route through Victoria but have not yet been provided with their estimates.

4.26 Table 1 shows a breakdown of the benefits of the entire Y-Network as presented by the Government in August 2012 – its most recent update on the business case for HS2. This shows that the majority of the benefits (some 76%) are due to transport benefits.

Table 1: Government estimated benefits of HS2

Benefit Type	£ millions	% of Total
Transport User Benefits (Business)	34,292	53.9
Transport User Benefits (Other)	16,742	26.3
Other quantifiable benefits (excl. Carbon)	1,046	1.6
Loss to Government of Indirect Taxes	-3,831	-6.0
Net Transport Benefits	**48,250**	**75.8**
Wider Economic Impacts	15,377	24.2
Net Benefits including WEIs	**63,627**	**100.0**

Source: HS2 Ltd

4.27 At this stage, it is important to bear in mind that the current Government assumptions, based on the scenario of the preferred route as it stands, are not set in stone. Indeed, recent statements from Government already show that there may be changes, such as its decision to invest in tunnelling under the M6 motorway, which was not accounted for in previous assessments. It is likely that there will be further changes to the route (even if station locations are not changed) as thorough environment impact assessments are carried out in the future.

4.28 In addition, the Government is currently undertaking a more comprehensive economic assessment of the route options. We don't yet know the results of this work yet, or whether it will consider alternative routes or just focus on the preferred options. Once this is completed, it is likely that the outcomes of the cost-benefit analysis of the HS2 Y-Network will look different to the current estimates.

4.29 Although it is not clear yet, the updated economic case could include an overall strategic case for HS2, which has so far not been explicitly made. Indeed, the Government and HS2 Ltd have commissioned five work streams that are looking at the likely benefits of the Y-Network, which will form the strategic case for the project. These are:

- Workstream 1: a literature review of the impacts of high speed rail and transport overall on the economy;
- Workstream 2: international evidence on the impact of high speed rail;
- Workstream 3: using land-use transport interaction (LUTI) modelling to measure the potential impact of the proposed HS2 scheme;
- Workstream 4: understanding the evidence on business-to-business networks, trade and specialisation in the case of HS2; and,
- Workstream 5: specific economic case studies for the areas served by HS2.

4.30 Needless to say, the analysis carried out in these studies, as well as any other adjustments to the Government's transport business case in the coming months, will alter the overall case for HS2.

4.31 This could also have a negative impact on the case as the Government is currently looking at changing one of the key assumptions underpinning its transport business case – namely the productivity of business users when they travel.

4.32 Currently, the Government's approach assumes that business users do not carry out any work while travelling. If this is changed so that some allowance is made for productive activity, the benefits from reduced journey times will fall. This will have a significant impact on the transport business case as it will impact on both journey time savings and agglomeration benefits. However, the results of this assessment are unlikely to be available in the next version of the business case.

The impact on the benefits for the station location at Sheffield

4.33 Notwithstanding the connectivity issues that are yet to be addressed at Victoria, the two key obstacles standing in the way of a station from a Government perspective are the additional journey time and the cost of a loop into the city centre.

4.34 The more significant negative impact from a station at Victoria will come through the additional journey time that will result from the loop into the city centre. This will affect both the transport business case and the wider economic impacts. While it is not possible to get an exact estimate

from the data that are publicly available, it is likely that these combined effects will have a significant impact on the Government's business case.

4.35 The DfT have estimated that running the High Speed line into Sheffield City Centre would add roughly 5 to 6 minutes to the journey time between Birmingham and Leeds on the Eastern branch of the HS2 Phase Two Y-Network – currently estimated at 57 minutes when running via Meadowhall. This represents an additional 11%, which will impact the journey time savings that justify the HS2 project as a whole.

4.36 During our consultation with the DfT, it was made clear that it may be difficult to get an estimate of the exact monetary value of the additional journey time and what this would practically mean for the business case. However, since the benefits from journey time savings affect both the transport benefits and the WEIs, it is likely that the reduction in benefits will be significant. As shown earlier, the WEIs are mostly dependent on agglomeration benefits, which rely on journey time savings as a key input. Accordingly, on top of the reduction in transport benefits, there will also be a blow to the WEIs.

4.37 Of concern is the fact that although not mentioned directly in the Government literature, it appears obvious that they do not view Sheffield as a primary target city for the High Speed rail network. Indeed, estimates in other documents suggest that demand for High Speed travel from Leeds to London will be up to five times greater than demand between Sheffield and London, meaning that adding to journey times will have a far greater impact than the actual numbers would suggest at face value.

4.38 However, the analysis carried out so far is based on historic trends of passenger numbers. The DfT has also confirmed that the transport models are still preliminary and subject to change. In our view, the fundamental flaw is that these projections fail to take into account the 'transformative' aspects of HS2 where the significant reduction in journey times and additional could lead to a 'step change' in passenger travel in the UK.

4.39 This has major implications for the economic development of some of the country's major cities, such as Sheffield. This is in relation to the fact that their past performance should not be an indication of their future trajectory when a major investment, such as HS2, is undertaken. Continuing to base public sector investment decisions in these cities on past activity will only help to reinforce the vicious circle of poor performance and constrain their future growth prospects.

4.40 Against this backdrop, it is reassuring that the DfT have indicated that their final decision on the HS2 route and station locations will take into account some of these aspects. In addition, recent comments from Government have underplayed the importance of journey time savings, suggesting that capacity and the economic development of the Midlands and the North carry are more important. We expect that these factors will be addressed in greater detail in forthcoming Government reports.

4.41 Apart from the impact on benefits, the Government identified a number of other issues at Victoria. For a start, construction costs involved in a central location would be significantly

greater. The DfT has estimated that using the Victoria location would add at least £1 billion to the current costs compared to the plans which involve using the Meadowhall location.

4.42 However, some of these costs could be offset through business rate uplifts as shown in the work that is being carried out by CBRE. The results from this work suggest that the present value of the business rate uplift due to the additional developments at Victoria will be in the region of £850 million over a 60 year period (in present value terms). In contrast, the Meadowhall option is expected to generate around £190 million in business rates over the same period.

4.43 CBRE's report highlights the potential scale of regeneration at Victoria and its ability to generate significant development and employment densities. The result is a boost in business rate revenues. The work also discusses the scope for reducing the demands on the public purse to facilitate regeneration as the viability and profitability of development improves.

Other issues at Victoria

4.44 Turning away from the direct financial costs, the route through Victoria would need to pass through either an Enterprise Zone to the south of Sheffield or current residential and commercial areas. The Enterprise Zone has been highlighted as an area for development which will have a significant bearing on the future economic prosperity of the city, while routes avoiding this zone would require major demolition and relocation work.

4.45 It is worth noting that the HS2 route is not yet fixed and a consultation is on-going to determine the least disruptive route. For example, one of the proposed options that would avoid a key manufacturing site (Firth Rixson) was found to have a significantly greater impact on Waverley new community with more substantial severance and wide impact on the likely housing that could be achieved. Meanwhile, without a Meadowhall station, it is possible that this impact could be somewhat mitigated by a further route adjustment as the station bulk doesn't have to be shoehorned in. However, an alignment of the loop into Victoria would also need to be worked up to remove its impact on the Advanced Manufacturing Park

4.46 Furthermore, under HS2 Ltd's current plans, the return of a station at Victoria would result in some further demolition, including that of a Grade II listed hotel. The Council's position is that they would seek to incorporate the hotel as a key iconic feature of the station design..

Potential spur at Victoria

4.47 One consideration that HS2 have suggested is that the Sheffield City Region could put forward a case for a spur into the city centre in phase 2 of the HSR programme, which could become a full city centre loop in phase 3. We currently have no detailed data on what this would entail – particularly from a benefit perspective.

4.48 The Government had previously considered a spur into Sheffield's city centre, as shown in its paper: "Options for phase 2 of the high speed rail network" – published March 2012. In the Government's view, spurs are only possible when it serves cities with high demand (such as in the case of Birmingham). In Sheffield's case, passenger demand projections mean that it is not a viable option and a spur would only support one train per hour. In addition, there are time

penalties to those passengers that will be going through to Leeds, which will impact on the transport business case.

4.49 However, the preliminary estimates showed that the cost of spur into the city centre in phase 2 is similar to the cost of the Meadowhall station option. Furthermore, the additional economic and regeneration benefits of a station in the city centre have already been established (this will be discussed in more detail in section 5 of this report).

4.50 In our view, this therefore warrants further investigation. As discussed earlier, one of the central objectives of HS2 is to have a 'transformational' impact on the economies of the regions that will be affected by the transport intervention and connectivity. Against this backdrop, basing future projections on historic trends, such as in the case of passenger rail demand, will always favour locations that have been more successful in the past. This, in turn, means that the potential for 'transformational' impacts is likely to be limited. This, therefore, defeats one of the central objectives of HS2.

4.51 Later on in this report, we will consider evidence from other countries on the impact of high speed rail. One of the key factors that will be looked at is the ability of the transport intervention to generate business investment and employment growth in stations along the line, particularly in smaller interchange locations. This is one example of a transformational economic impact that could be experienced in Sheffield and its city region. If such an impact were to materialise, the completion of a city centre loop in phase 3 of HS2 (following the spur in phase 2) will become a viable option.

4.52 In addition to the loop and spur options at Victoria, HS2 have also considered a number of other options for serving central Sheffield. This includes a 'through' option at both Midland and Victoria, and a number of other options at Midland. The options at Midland were quickly dismissed, due to a number of reasons including: the scale of work required in the station; flood risks; disruption to current services; and, the amount of demolition needed.

4.53 Another option that was dismissed is a 'through' service at Victoria, which was primarily excluded due to the fact that there will be a time penalty to onward passengers. We don't have any details on the scale of the time penalty if a 'through' service at Victoria is implemented. Given that the Government has shifted its position on time savings, it may be worth revisiting this option since (similar to the loop option) it will generate a higher number of passengers than in Meadowhall. In our consultation with the DfT, it was clear that passenger numbers are a key consideration, and more so that time savings.

Conclusions

4.54 Overall, it is clear that from the perspective of the Government's business case for HS2 as it stands, the impact of a station at Victoria would result in a significant impact on the BCR. Accordingly, if the conventional DfT framework continues to form the basis for the assessment of HS2, the case for Victoria will remain weak.

4.55 In addition, we don't believe that the new assessment of the business case that HS2 Ltd is currently undertaking is likely to yield much benefit for a station at Victoria. For a start, any reduction to the transport business case will affect all parts of the route.

4.56 More importantly, if the WEIs analysis becomes more prominent following the production of the LUTI modelling, there will be little benefits stemming from different station locations at Sheffield. This is due to two reasons. First, the DfT appraisal guidance assumes that transport investments do not affect the size of the economy – that is there is no net additionality. Instead, the transport intervention usually results in a different distribution of households and jobs.

4.57 Second, one of the key inputs to the WEIs is worker productivity, which is measured at district level. This means that Sheffield as a whole is treated as one district with Victoria and Meadowhall both yielding the same levels of productivity – that implies that a job in Meadowhall is worth the same as in Victoria.

4.58 However, other parts of the analysis, specifically the literature review and international case studies may support the location at Victoria. As we will show in a later section in this report, international evidence suggests that city centre locations usually perform better than 'out of town' stations. In addition, there is strong evidence that intermediate stations along HSR routes in some countries have seen significant economic benefits.

4.59 Furthermore, the option of a spur into Sheffield city centre should also be explored further. The costs of the spur option are similar to those at Meadowhall. Meanwhile, the benefits, as the Government acknowledges, are far higher for a city centre location.

4.60 Finally, it is not yet clear whether the criteria for assessing HS2 will remain the same or if the DfT's appraisal guidance will be the only framework for option appraisal – such as a more comprehensive appraisal approach as the one specified in the HM Treasury's Green Book. After all, one of the key objectives of HS2 is economic development and regeneration, as well as wealth distribution away from London and the South East.

4.61 The NAO report has already highlighted that the current framework adopted by the DfT has not reflected its objectives. To this effect, the economic development and regeneration should form part of the criteria. With this in mind, we consider next the economic evidence that the Council has presented previously in relation to the station location options.

5 The Economic Case for Station Location

5.1 The Council has already commissioned a comprehensive study into the economic benefits of the different station options, Victoria in the city centre and Meadowhall in the outskirts of the city. The work, carried out by Genecon in 2012, demonstrated that if the station were to be located in Victoria, this would generate an additional £2 billion to £5 billion over a 25 year period.

5.2 In our opinion, the methodology used in this work is sound and it has been widely accepted by the stakeholders, including SYPTE, the Government and HS2. However, it is important to keep in mind that, based on the current appraisal guidelines, the results of this work (or similar analysis) cannot be included as part of the Government's business case for HS2.

5.3 In addition, the factsheets for each region, which the Government published earlier this year, suggests that the station at Meadowhall will generate 5,000 additional jobs. The Genecon report suggests that 3,000 net additional jobs could be created at Meaowhall. The difference between the data published in the Government's regional factsheet and those in the Genecon's report is that the Government uses the gross figure quoted in Genecon.

5.4 In our view, the work carried out by Genecon provides a comprehensive assessment of the likely impacts of the two station options. Therefore, this work could be used as an input into the assessment of the economic impacts in future studies and the Government's own consultation. It could also help to inform the debate on the monetised values of economic and regeneration benefits in the alternative station location options, even if the results cannot be used as part of the BCR.

5.5 The work could also be used by the relevant stakeholders in Sheffield and its wider city region to understand the local impacts of the proposed station options. As we will show later on in this report, Sheffield is the most important centre of employment in the wider city region and for its constituent districts.

5.6 Accordingly, the magnitude of job creation within Sheffield city has an impact on employment opportunities for residents in the wider city region. Overall, the success, or indeed failure, of Sheffield will have far-reaching impacts on other parts of the city region.

Economic benefits from the alternative station location options

5.7 Turning back to the Genecon report, the analysis carried out here involved both a qualitative and quantitative assessment of the station location options. The qualitative part of the analysis suggested that the Victoria option has the following attributes:

- a greater potential to become a driver of place development, becoming a centrepiece for a new business quarter in the city centre;
- it has a greater propensity to attract value-added economic activity given its proximity to city centre assets, building on recent successes at the city centre;
- the additional benefits from the fact that the business sectors most influenced by HSR services are clustered in the city centre;
- the greater availability of suitable potential development sites at Victoria will influence the type, scale and quality of business investment; and,

- the fact that a station in Victoria will be more readily accessible to the target labour and passenger markets in the Sheffield area.

5.8 Meanwhile, the quantitative assessment of the station location options showed that a station at Victoria would generate 9,500 net additional jobs, while one in Meadowhall will lead to only 3,000 net additional jobs.

5.9 This is based on the development potential in the 1km zone surrounding each station. In relation to actual economic values, this suggests that the Victoria option has the potential to generate between £2 billion and £5 billion net additional economic value over 25 years.

Possible extensions to the Genecon work

5.10 As part of our work, we are looking into potential extensions to the work carried out by Genecon. This is not required to be extensive in stages 1 and 2. However, a number of possible extensions are relatively straightforward. For example, the work that Genecon have carried out extends to only 25 years, while transport assessments usually extend to 60 years.

5.11 Indeed, if we extend this work to 60 years – that is estimating the benefits over years 26 to 60 – the additional economic benefits from Victoria are likely to increase by around £1.2 billion – specifically £1.7 billion for Victoria and £0.5 billion for Meadowhall.

5.12 This analysis is based on the annual economic benefits generated from Genecon's central scenario, which is £448 million for Victoria and £120 million for Meadowhall. Based on this, it is therefore possible to estimate that the additional economic benefits from the Victoria option could be in the range of £3.7 billion to £6.7 billion during its operational phase.

The impact of productivity gains

5.13 In addition, the guidance for transport assessment often ignores the impact of increases in productivity over the operational phase of an investment or intervention. This is particularly relevant to the HSR programme, which is expected to have a transformational impact on the locations that are due to be affected. Therefore, it is reasonable to at least include productivity improvements as a sensitivity check.

5.14 In here, we use an annual productivity growth range of between 0.5% to 2% to demonstrate the impact. If we assume that this starts at the beginning of year 26 when the construction is complete, then the benefits from the Victoria option could rise to between £2.0 billion and £3.8 billion. This means that given a 1% per annum rise in productivity (at both Victoria and Meadowhall), the additional economic benefits from the Victoria option could be in the range of £4.5 billion and £7.5 billion.

Conclusions

5.15 The analysis contained within the Genecon work and any extensions thereof cannot be assessed within the Government's appraisal framework. However, it should be used to both make the case to the wider city region and could form part of any changes to the appraisal framework. This could be supplemented by the evidence from other countries, which we discuss next.

6 Evidence From Other Parts of the World

Background

6.1 The difficulty of analysing the likely benefits of specific routes for HS2, and hence the choice over station location options, suggests that there is merit in assessing the experience of other countries where HSR has been in use for some time. This should help to inform the Government's consultation that has started in July.

6.2 As a background, it is important to note that the objectives of HSR programmes differ across the countries that have invested in it. For example, the main objective of Spain's investment in its HSR network was to stimulate economic development in its poorer regions and to promote territorial cohesion between its autonomous regions.

6.3 Similarly, a key part of Germany's HSR network was to promote economic cohesion between East and West Germany. Meanwhile, the key objective of Japan's HSR network was to relieve capacity constraints on inter-city transport routes. On the other hand, France's HSR network focused on commercial viability, which meant that it should serve routes with sufficient demand.

6.4 The UK Government's stated objectives for HS2 share some of those in other countries, including promoting economic cohesion, relieving capacity and commercial viability. However, as shown in the NAO report, the economic case made so far does not reflect the key objectives and focuses mainly on journey time savings.

6.5 Of relevance to the analysis in this study is the station location choices in these countries and whether there is evidence of performance differences due to these decisions. We start with an overview of the literature on station location and then move to specific examples from other countries that are relevant to the types of development that can happen in Sheffield.

Literature on station location

6.6 To start with, it is important to remember that it is difficult to estimate the economic and regeneration benefits of the location of HSR stations due to three key reasons. First, the evidence from other parts of the world, where HSR has been in operation for some time, is conflicting. Second, while transport investment is important, it is only made successful by other policy measures and place characteristics. And third, it is not possible to make a 'counterfactual' argument – that is which type of economic trajectory these places could have seen without an HSR station.

6.7 Nonetheless, the importance of locating stations in the most appropriate places has been documented in a number of studies. Indeed, according to the Greengauge21 report (2009), the current consensus is that elsewhere in the world HSR benefits have been enhanced more by direct connectivity than via 'Parkway' stations. The types of economic activity that benefit most from the improved linkages offered by HSR are concentrated in city centres. It is therefore thought that the greatest economic benefits come from serving them directly, with centrally-located stations. Greengauge 21 stated that: "*The overwhelming weight of both theory and experience points to the need for HSR stations to be located in city centre locations to generate the connectivity into regional economies that is the necessary starting point for regional economic benefit.*"

6.8 The examples of underperforming stations are often those located outside urban areas (lacking an efficient multimodal supply and a dynamic economic area surrounding the station). In Montchanin, the High Speed Train ('HST') link attracted only four firms, creating only 150 new jobs. As Albalate and Bel (2010) stated: '*It is perhaps worth pointing out that only those cities with a significant weight of services in their economic structure appear to benefit from HSTs. In other words agricultural and industrial activities are indifferent to HST stops.*'

6.9 Indeed, the benefits of locating stations in city centres were seen by some to outweigh the additional cost associated with providing the service in these locations. For instance, Vickermann (2007) cites the example of the costs associated with tunnelling required to provide a high speed service into Antwerp being viewed as offset by the benefits that this would generate. The decision was made to place the route through the main railway station of Antwerp, involving a very expensive tunnelling operation, but ensuring that rail penetrated the heart of the city.

6.10 Similarly, the location of the through station in Lille has helped to generate additional commercial activity in its centre. Lille's city authority pushed for the high-speed rail station to be located in the city, rather than out of town. This paid off as the location of the station and the fact that journey times between Paris and Lille were reduced by 60%, from around 121 minutes to 49 minutes, helped to transform the city. For example, a new urban district (EuraLille) developed next to the station, which has since emerged as the third largest commercial centre in France.

6.11 Overall, the conclusion of a number of studies suggest that effective decision-making should attempt to balance the costs of creating links into city centres (and potentially using a parkway station instead) against the benefits of bringing improved rail services to these hubs of business activity that will benefit most from the connectivity. Both city and regional authorities must play a role here since a major urban centre, such as Sheffield, acts as the gateway into the economies of the wider region that surround the city.

Specific evidence from other countries

6.12 Meanwhile, there is also some strong evidence from some of the other countries where HSR has been in operation that, apart from the fact that central locations are more beneficial, intermediate stations along the network could see some significant economic development and urban regeneration.

6.13 This is relevant to Sheffield where the relocation of activities from London and the South East to cheaper locations in the north is an important aspect of the overall objectives of HS2, the so-called 'north-shoring' of businesses. The city has already seen some relocation of businesses in key services sectors, such as legal, financial and media services. As will be shown later in this report, Sheffield has the potential to attract business occupiers given its highly skilled workers and low salaries – compared with the other core cities.

6.14 In Spain, Zaragoza (which lies in the middle of the Madrid-Barcelona HSR route) saw a significant transformation in its economic fortunes. The city's cost competitiveness encouraged business services occupiers and investment in high-quality meeting space in the vicinity of the station made it a centre for business meetings. There was also a boost to urban tourism.

6.15 Meanwhile, in Spain too, Cordoba (which lies in the route between Madrid-Seville and Madrid-Malaga) saw urban regeneration around the HSR station, which was built in the city centre. This started first with residential developments. But hospitality and office developments started to develop afterwards.

6.16 In France, the development of Lille's HSR station, linked directly by EuraLille to the classic rail station, transformed the city's economic fortunes. EuraLille emerged to become the third biggest business centre in France over the last decade. This new urban district of around 70 hectares now boasts commercial offices, residential apartments, hotels and a shopping mall.

6.17 In Japan, some of the intermediate cities along the HSR routes, notably Nagoya and Yokohama, saw an increase in job densities while this fell in some of the bigger cities at either end of the HSR network.

6.18 On the other hand, there is also strong evidence from other countries that 'interchange' stations, such as the one proposed at Meadowhall, are unlikely to lead to significant economic activities and in many cases virtually none. Examples include some of the interchange stations along France's high speed rail network, such as Valence, Avignon and Aux de Provence.

6.19 The key point here is that there is a significant opportunity for the Sheffield City Region to boost its economy through the position of its main urban centre as an intermediate city in the route. After all, it shares some of the competitive characteristics (namely business costs) that are associated with some of the successful intermediate cities in other countries.

7 Implications for Sheffield and its Wider City Region

7.1 One of the key considerations for the next stages of any work that the Council decides to undertake is that the support of the wider city region is crucial for the success of its representations to Government in relation to station location options. The support of the local business community and political leaders will also be important.

7.2 With this in mind, we have carried out a preliminary assessment of the importance of a successful Sheffield to the wider city region. In our view, the success of the economic objectives of the Sheffield City Region is likely to depend largely on what the future economic trajectory of its main urban centre ends up looking like.

7.3 Indeed, the evidence suggests that the districts around successful cities perform better than those close to less successful urban centres. In relation to the core cities, the most successful performers in terms of growth in Gross Value Added (GVA) per worker over the past ten years were Bristol and Sheffield. This is specifically in relation to growth of GVA per worker relative to the country as a whole.

7.4 As shown in table 2, GVA per worker in Bristol and Sheffield grew by 51% and 41% respectively over the period 2001 to 2011 (the most recent data). The two cities were the only core cities that performed either as well or better than the national average. At the same time, the districts that are directly surrounding these two cities saw faster employment growth and better performance in terms of earnings.

Table 2: City and wider region performance

	Best Performers		Worst Perfromers	
	Bristol	**Sheffield**	**Liverpool**	**Birmingham**
GVA per worker 2001 (£)	33,640	29,885	29,481	31,943
GVA per worker 2011 (£)	50,787	42,134	40,902	44,417
Percentage change in GVA per worker (%)	51	41	39	39
Growth relative to country average (1=average)	1.07	1.00	0.98	0.98
Employment growth in surrounding region from 2001 to 2011 (%)	***16***	***8***	***-4***	***-5***
Earnings growth in surrounding region from 2001 to 2011 (%)	***32***	***35***	***26***	***29***

Source: Office of National Statistics, Volterra calculations

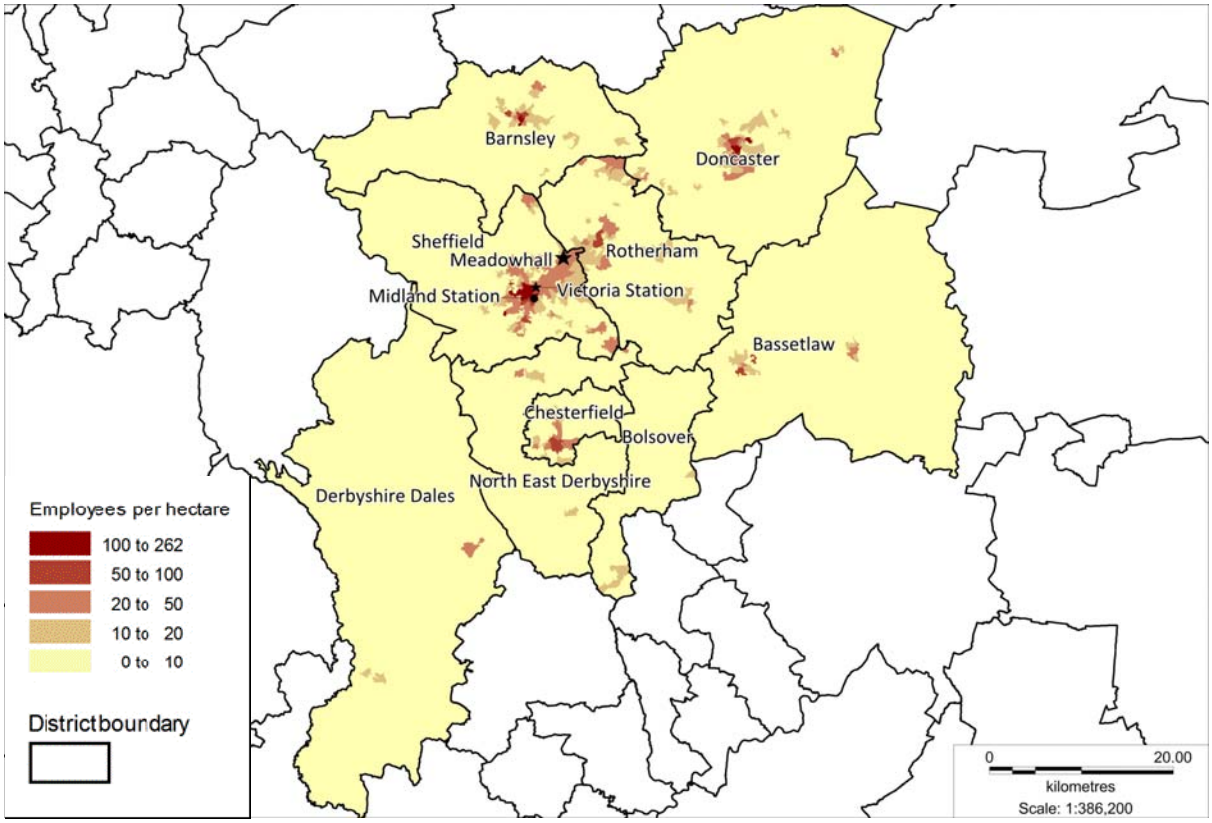
7.5 Although it is difficult to establish a strong linkage between the performance of urban centres and their wider region, there is some evidence to support this assertion. For example, SQW and Cambridge Econometrics were jointly commissioned by DEFRA in 2006 to examine the economic performance of rural areas inside and outside of city regions. The findings were supportive of the role of city economies in their wider regional prosperity. The study found that the levels of earnings and productivity are 18% and 8% higher respectively in rural areas within city regions than those outside of city regions. In addition, rural areas within two or more city-regions generally perform better than those in only one.

7.6 The importance of the HS2 station location option in this regard comes through three key dimensions. First, the urban development and regeneration around the HS2 station will be a key determinant of the scale of employment generation and economic output potential. Second, the potential displacement of current activity from other parts of the city itself and the wider region. And third, the impact on the viability of planned and future developments in the areas that are not within the vicinity of the HS2 station.

The Sheffield City Region's economic geography

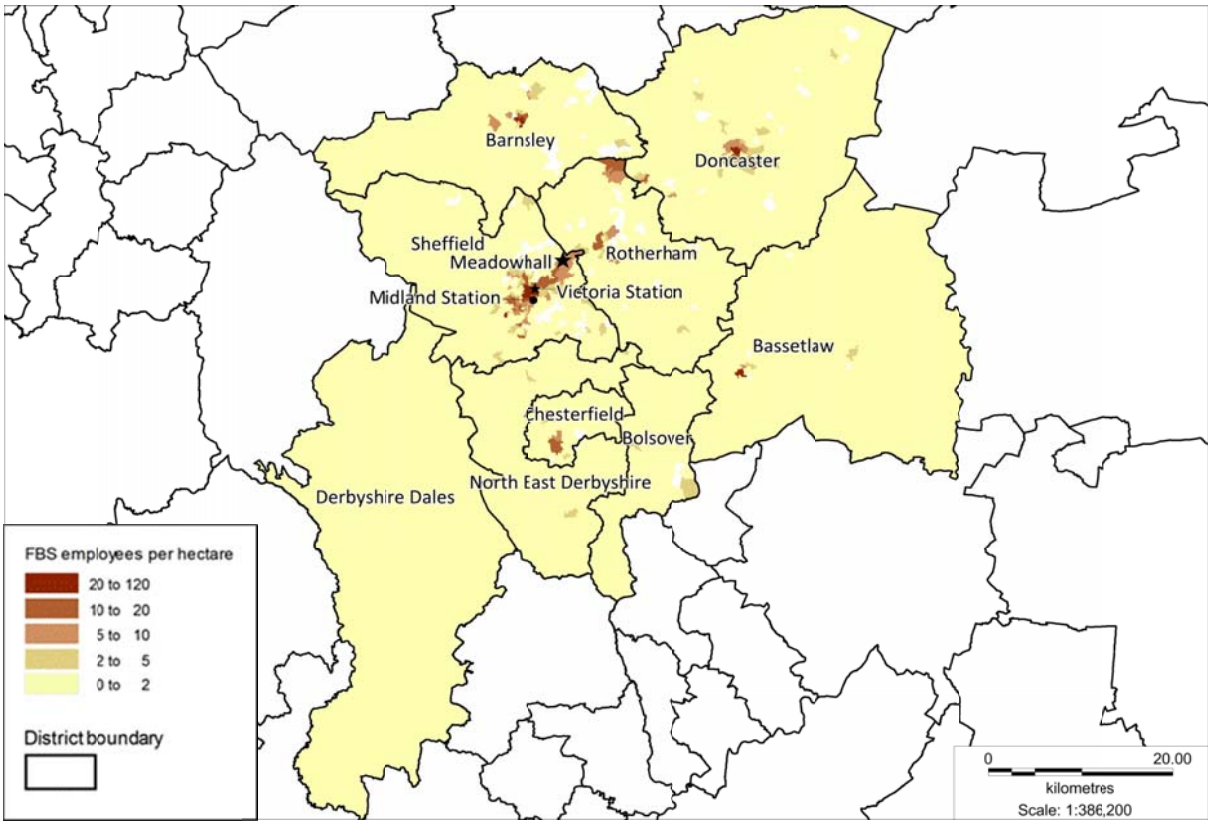
7.7 As a start to our assessment, it is important to understand the economic geography of the Sheffield city region and where the city itself sits. Figure 2 shows a map of the key employment centres within the city region as it currently stands. As expected, the main urban centres, namely Sheffield, Doncaster, Rotherham and Barnsley, are the key employment centres.

Figure 2: Employment density by lower super output area, employees per hectare



7.8 Of importance to the location of the HS2 station is the concentration of business services employees, shown in figure 3. This is concentrated in Sheffield city centre, in close proximity to the current station – Sheffield Midland – and in close proximity to the proposed HS2 station at Victoria. Meanwhile, Meadowhall is further away. Other part of the city region – where financial and business services employment is concentrated – are also far away from Meadowhall.

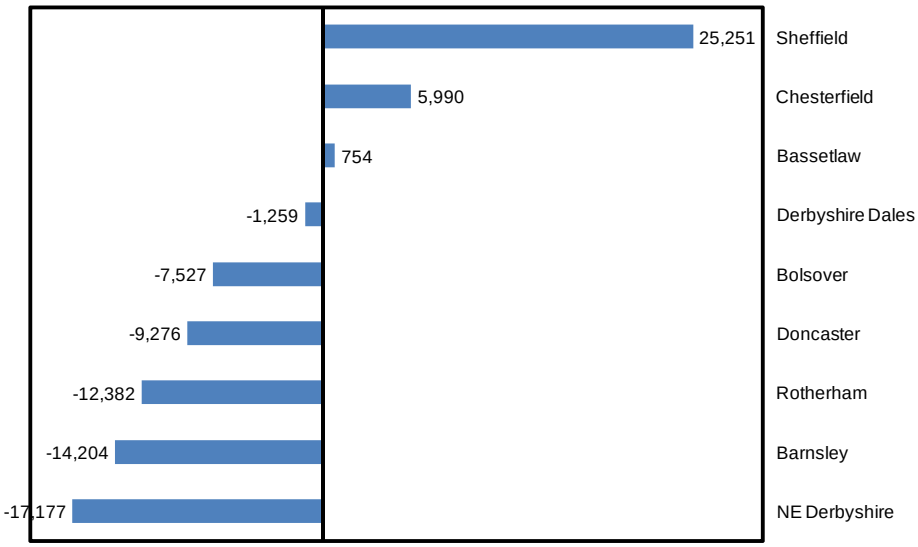
Figure 3: Finance and business services employment, employees per hectare



7.9 While the maps above demonstrate the relevance of Sheffield city as a key employment location, they may not adequately demonstrate its placing within the wider city region. One way to look at this is through commuting statistics, which inform us about where people are living and where they are working.

7.10 Indeed, the dynamics of the labour market are driven not only by transport linkages between places and available job opportunities, but also by a variety of other factors such as history (where people have always lived but they now work elsewhere) and quality of life (living somewhere due to quality of schools, healthcare, etc.). The bar chart below shows the net difference of commuters travelling in and out of the nine districts in the Sheffield City Region (see figure 4). This shows that Sheffield has the highest level of incoming workers, whereas North East Derbyshire has the lowest.

Figure 4: Net commuter flows, 2001 (most recently available data)



Source: Office of National Statistics

7.11 Meanwhile, table 3 below highlights this further by considering all commuter flows between pairs of districts within the Sheffield City Region. This highlights the importance of Sheffield as the main employment hub in the city region, with the largest flows of people coming from Rotherham, North East Derbyshire and Barnsley. It also highlights the importance of Chesterfield as an employment centre for the southern part of the city region.

Table 3: Commuter flows in the Sheffield City Region, % of total commuters, 2001

	From...								
To...	Barnsley	Doncaster	Rotherham	Sheffield	Bassetlaw	Bolsover	Chesterfield	DerbyDales	NEDerbys
Barnsley	67%	2%	3%	2%	0%	0%	0%	0%	0%
Doncaster	2%	76%	5%	1%	5%	0%	0%	0%	0%
Rotherham	6%	5%	61%	5%	3%	2%	1%	0%	3%
Sheffield	8%	3%	22%	84%	4%	4%	6%	5%	21%
Bassetlaw	0%	2%	2%	0%	71%	7%	1%	0%	1%
Bolsover	0%	0%	0%	0%	1%	38%	3%	1%	3%
Chesterfield	0%	0%	1%	1%	1%	10%	68%	3%	20%
DerbyDales	0%	0%	0%	0%	0%	1%	3%	66%	3%
NEDerbyshire	0%	0%	1%	1%	0%	4%	9%	1%	36%
Leeds	4%	2%	1%	1%	0%	0%	0%	0%	0%
Rest of Yorks	11%	7%	2%	1%	2%	0%	0%	0%	1%
Rest of EMids	1%	1%	1%	1%	10%	29%	6%	17%	9%
Other	2%	2%	2%	2%	2%	3%	2%	6%	2%

Source: Office of National Statistics

7.12 The key point here is that Sheffield is the main employment centre in the city region and the future economic development within it is crucial to the success of the overall Sheffield City Region. Accordingly, the scale of employment that can be created within the city centre is much larger than that in Meadowhall. This means that there is a larger pool of jobs to share amongst the districts that make up the city region, even if some parts of it (such as Rotherham) could benefit proportionally more from a station at Meadowhall.

7.13 Indeed, as shown earlier, evidence from the UK shows that smaller cities and settlements on the periphery of major cities may benefit from 'spill-over' effects that translate into higher incomes and employment. Better accessibility and faster connections may help to facilitate links between the core and the periphery and enhance the scale of wider economic benefits from core cities. Examples include Milton Keynes (which is in close proximity to London) and Warrington (which lies strategically between Manchester and Liverpool). Both have performed better than England's average in terms of GVA per capita.

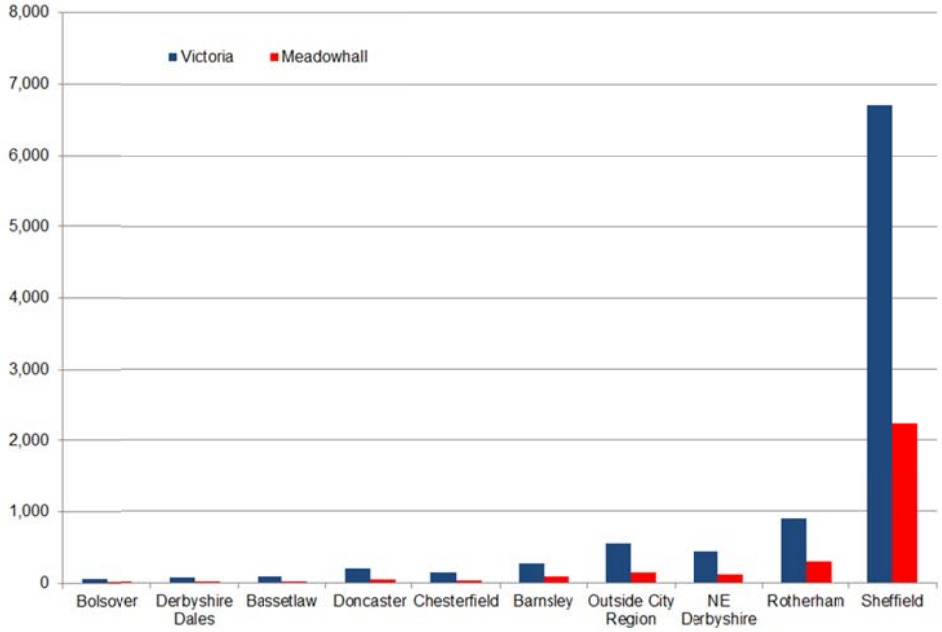
The impact of the station location options

7.14 In this regard, the location of the HS2 station in Sheffield will play a key role. It has already been demonstrated by the Genecon work that the potential development, and the associated economic activities, that could be generated around Victoria are significantly more beneficial than in Meadowhall.

7.15 Taking into account the position of Sheffield in the wider city region would suggest that much of these additional jobs will be taken up by residents in other districts. This would be further enhanced by addressing connectivity issues with the other urban centres in the Sheffield City Region.

7.16 Figure 5 shows the predicted jobs in each of the districts that make up the Sheffield City Region, based on the travel-to-work patterns in the 2001 Census and the distribution of jobs by sector in the Genecon report. This shows that, while residents in Sheffield would take up most of the jobs that will be created, the absolute number jobs taken up by residents in each of the districts are higher in Victoria than in Meadowhall.

Figure 5: Number of jobs by District in each station location option



Source: Office of National Statistics and Genecon

7.17 There will in fact be at least three times as many jobs taken up by residents in each of the districts in the Victoria case than in Meadowhall. The jobs in the city centre will also be more productive. This subsequently has a significant impact on the economies of these districts through higher spending and larger knock-on benefits.

7.18 Of great importance to this assessment is the scale of displacement of activity that may happen if the HS2 station is finally located in Meadowhall. This has also been addressed, albeit partially, in the Genecon work. This has suggested that displacement at Meadowhall is likely to be much larger than at Victoria given the fact that commercial rents are low at Meadowhall – this could attract occupiers away from both Sheffield's city centre and other parts of the city region. This means that the cost advantage in some of the other parts of the city region, such as Rotherham, would greatly diminish, making it more attractive for companies to locate in Meadowhall.

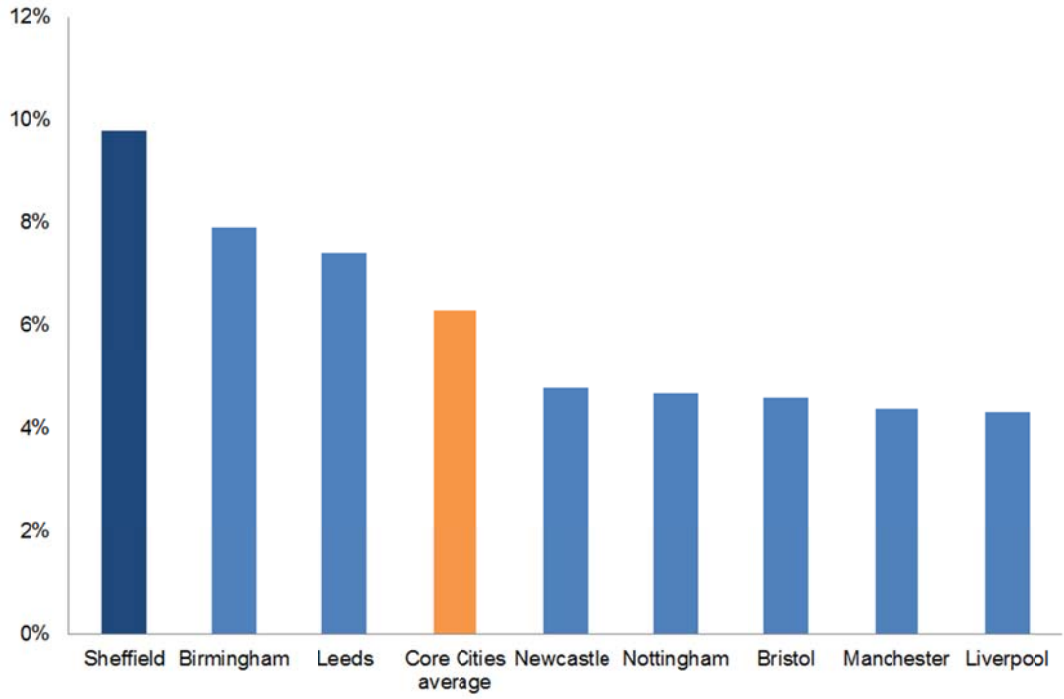
7.19 In addition, in relation to the HS2 station in the Sheffield City Region, early plans suggest that the route could pass through some of the key industrial sites in the city if the Meadowhall option is finally chosen.

7.20 The current proposed route also has an impact on the Sheffield city region's tax-friendly Enterprise Zones, which were set up to attract foreign investors. As the manufacturers' group, the EEF, recently pointed out, investors are likely to steer clear from industrial sites that have uncertainty hanging over them. The key point here is that the final route decision should not be delayed further and it should aim to minimise disruption to these activities as they form a key part of the Government's economic plan.

7.21 Admittedly, much has already been reported about the shift that the Sheffield economy has experienced away from manufacturing and into service-based industries so we will not delve deep into this topic for the purposes of this report. Nonetheless, the manufacturing sector is still a major GVA-driving sector in the city (see figure 6). Compared to an average of less than 6% in

the core cities group (which include Birmingham, Manchester, Leeds, Nottingham, Liverpool, Bristol, Newcastle and Sheffield), a tenth of Sheffield's jobs are in manufacturing.

Figure 6: Percentage of employees in manufacturing, 2011



Source: Office of National Statistics

7.22 Of course, the strength of the manufacturing sector in Sheffield is not a disadvantage for the city, or indeed the country as a whole. After all, a large proportion of the industries in the city have moved away from traditional heavy industries to advanced manufacturing. The latter is earmarked as one of the key sectors within the Government's national economic plan – the Plan for Growth published in 2011.

7.23 Accordingly, although the manufacturing sector is unlikely to be a major beneficiary of the HSR programme, it is important that it has a minimal impact on the sector as the exact route and station locations are determined.

7.24 In our view, the preservation of current industrial land should be a key part of the considerations for the HS2 route, even if the manufacturing sector is unlikely to be directly contributing to future employment growth or a main user of HS2.

7.25 The importance of the manufacturing sector comes through two channels. First, its direct contribution to the economy of the city and its region through GVA currently stands at some 15% of the total. Second, the input-output data, published by the Office of National Statistics (ONS), suggest that the indirect multiplier effect of manufacturing in the UK is equivalent to 1.745. This means that for every one additional unit produced in the manufacturing sector, the indirect impact on the rest of the economy is an additional 0.745 units (excluding induced effects that are currently not measured by the ONS).

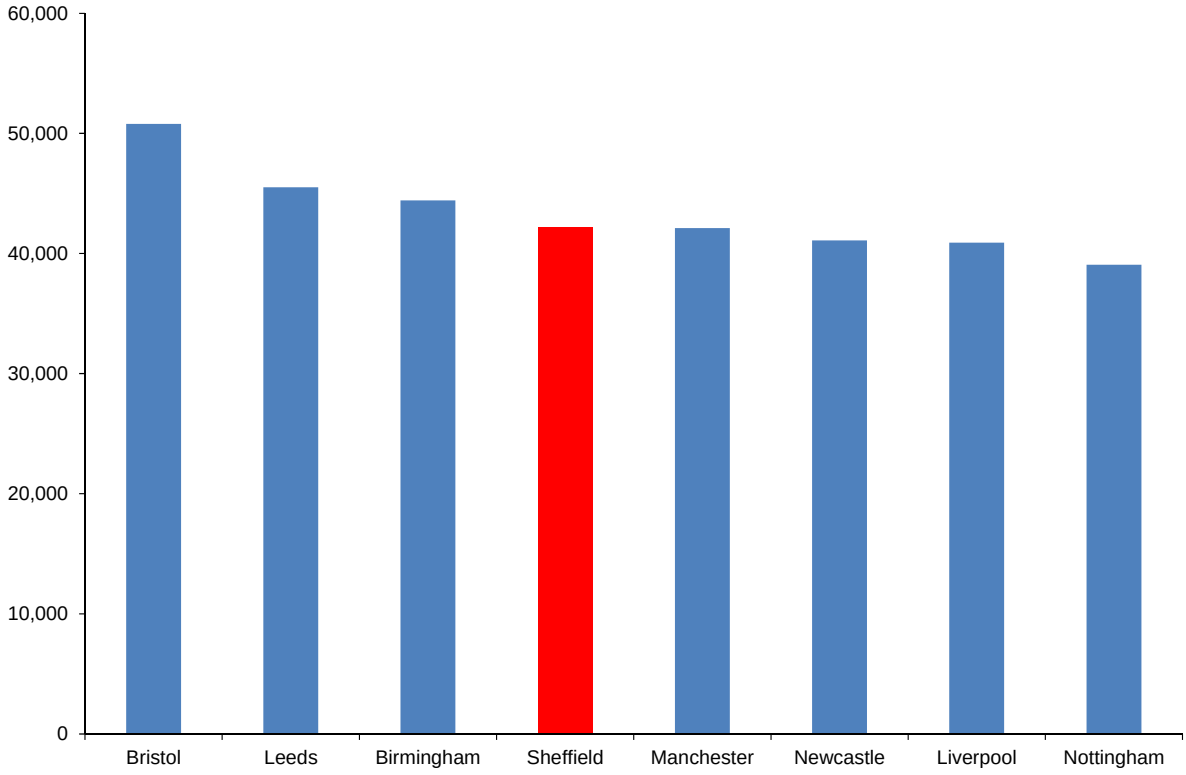
7.26 The Sheffield City Region Economic Review (published in March 2013) expects that future job growth in the city is likely to come from other sectors, including business and financial services

and the creative and digital industries. These types of sectors will be the main users of the HS2 network.

7.27 Importantly, these sectors will most probably be located in the city centre. The concern is that in the other city regions, the proposed locations for HS2 stations are in city centres, which puts the Sheffield City Region at a disadvantage.

7.28 The growth in high value sectors should reflect on Sheffield's overall economic output, measured typically through GVA. As things stand, Sheffield ranks better than most of the core cities in terms of GVA per worker (see figure 7).

Figure 7: GVA per capita, 2011



Source: Office of National Statistics

7.29 Looking ahead, Sheffield's GVA per head will need to grow at a faster rate than the other core cities if the city is to catch up with its more successful peers. Assuming similar population growth rates in the future, a boost to productivity is therefore set to be the key source of economic catch up. While much of this should come through the city's plans for a wide range of industries (as stipulated in the Sheffield Economic Strategy), the HS2 programme could account for a significant proportion of productivity growth.

7.30 Indeed, the business sectors that mostly benefit from passenger transport investments are the knowledge-based services industries. To understand this, we need to consider the relevance of agglomeration to transport investments. In particular, the agglomeration benefits due to different industrial sectors, which is usually measured through agglomeration elasticities.

7.31 One way economists use the term elasticity is when they want to see how one thing changes in response to a change in something else. The most common use is how much the demand for a

good changes when its price is adjusted. In this way, agglomeration elasticities measure the extent to which productivity changes in response to a change in clustering of employment. The theory is that as more businesses co-locate they become more productive, creating higher levels of output per worker.

7.32 The DfT commissioned work from Dr Dan Graham and issued guidance on Wider Economic Benefits, or more recently Wider Impacts. This provides the framework within which to assess productivity benefits which can be attributed to investment in transport. Graham has issued several papers on the topic but the main two are the original work from 2005/06 and the more recent work, published in 2009. The more recent work includes estimates for agglomeration elasticities, as calculated by Graham, Gibbons and Martin. The method used to calculate the indices changed, this time using a panel approach and estimating a variable which shows distance decay as well as the elasticities.

7.33 Under these assumptions the elasticities have only been presented for four sectors which are shown below (see table 4). These elasticities can be interpreted to show that Business Services productivity has by far the largest positive response to clustering, and manufacturing the least, although this figure is only marginally lower than Consumer Services.

Table 4: Elasticities by the Four Industry Groups

Industry Group	Manufacturing	Construction	Consumer Services	Business Services
Agglomeration Elasticity	0.021	0.034	0.024	0.083

Source: Graham 2009

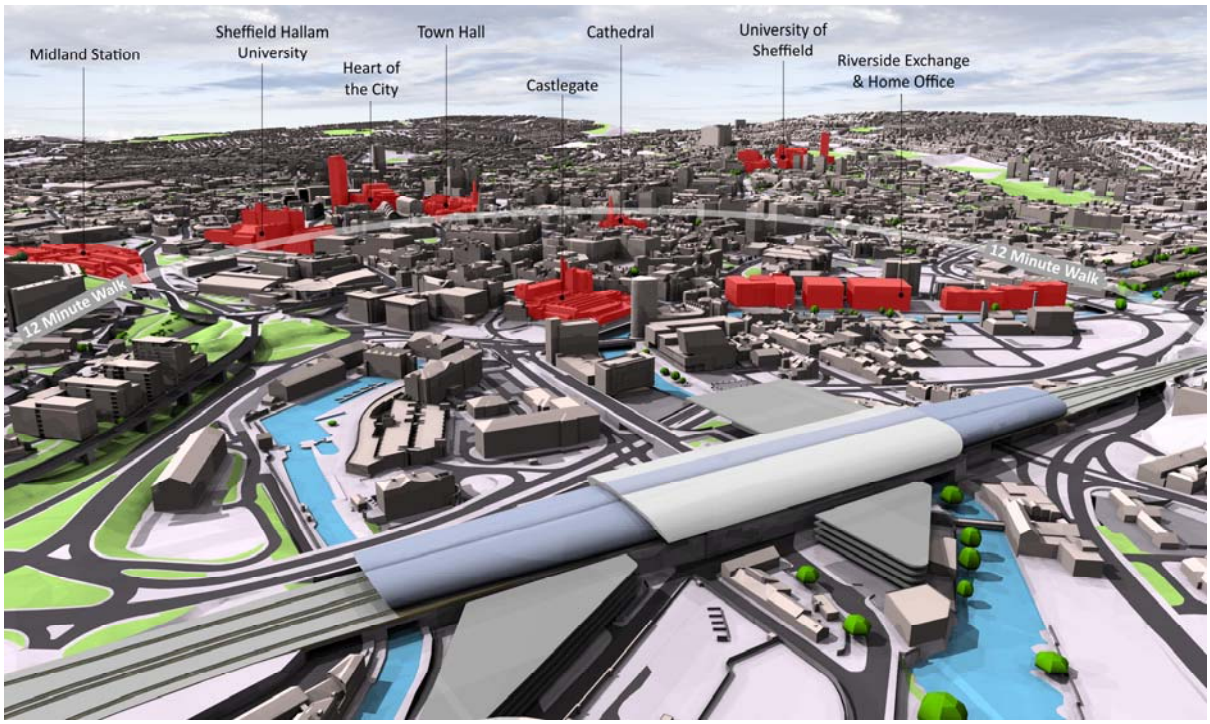
7.34 The implications of these estimates on the station location choices in the HS2 programme is that the most beneficial economic outcome is likely to be achieved in the locations where job densities will increase most. Since this is likely to be in major city centres, it should form a key part of the analysis relating to station locations choices.

More at stake from station location options

7.35 However, there is a lot more at stake than the simple displacement of jobs, planned investment or the potential loss of productivity. Important too is the fact that the viability of some of the planned developments outlined in the Sheffield city masterplan may be questioned. If these were to go ahead, the scale of planned and consented development will lead to a significant increase in employment capacity in the city centre.

7.36 The station location options will play a big part in enabling development within the city centre and will attract new business occupier, which is unlikely to be matched in scale anywhere else in the city region. Figure 8 below shows an indicative illustration of the Victoria station and its position as a key asset in the city centre. The station is within a 12 minute walk from most parts of the city centre. The Victoria station will help to enable the development of the proposed Riverside Business District in Sheffield – a mixed-use scheme which forms a key part of the Sheffield city centre masterplan.

Figure 8: Indicative illustration of the Victoria station (source: SCC)



7.37 The successful delivery of the proposed developments in the Sheffield city centre masterplan will help to boost the city's competitiveness. Indeed, one major factor to take into account is the ability of the city and its wider region to attract investment and business occupiers. So far, the analysis that has been carried out by Government in support of HS2 has paid little attention to the potential competition between cities that lie on the proposed route.

7.38 One way to think about this is through the factors that businesses consider when making location decisions, particularly those in highly-skilled sectors such as creative industries and business services. The transport infrastructure, such as HS2, is only one factor that businesses will take into consideration when making location choices. The impact of good connectivity, through service frequency and proximity, is through lower generalised transport costs in a firm's production function.

7.39 However, there are other factors that are at least as important. These include the availability of skilled workers and other costs of production – including commercial rents and wages. In both measures, Sheffield scores well compared with the other core cities. As shown in table 5, the percentage of residents with NVQ 4+ qualifications is better than the core cities average and the proportion of those without qualifications is also low. Meanwhile, current annual earnings are the lowest among the core cities suggesting that it is competitive business location.

Table 5: Skills and earnings in core cities

	% with NVQ4+	% with no qualifications	Average annual earnings (£)
Manchester	37.4	13.3	32,461
Birmingham	27.6	15.9	31,325
Bristol	42.6	9.1	31,264
Liverpool	24.1	17.5	30,547
Nottingham	29.4	10.5	30,326
Leeds	35.1	10.2	29,569
Newcastle	34.9	11.5	29,539
Sheffield	***33.0***	***10.6***	***28,882***

Source: Office of National Statistics

7.40 Sheffield is therefore in a good position to compete for occupiers on both fronts. However, plans to locate the station outside of its city centre, combined with the fact that the frequency of service into Sheffield Midland will be reduced to one train per hour in the current HS2 assumptions bode ill (see the August 2012 update of the economic case of HS2 where assumptions related to capacity release are shown).

7.41 The impact of this could be two fold. First, it will add further pressure on the development of the city centre. The concern is that the developments in the city centre could be held back. Steer Davies Gleave conducted a quantitative analysis in 2011 to determine the extent of any changes in property values and economic activity from station investment for Manchester Piccadilly and Sheffield.

7.42 In Sheffield, using the data from the Valuation Office Agency (VOA) within a 400m radius of the station, the study found that total rateable values in the area rose from £8.7 million to £14.7 millon between 2003 and 2008. These findings suggest that the anticipated development of Sheffield station was having an effect on property and investment decisions prior to completion of the development. The development of an HS2 station in the city centre could have a similar, if not a larger, impact. Conversely, the reduction in frequency at Sheffield Midland would have a negative impact on developments in the city centre.

7.43 Second, the image of Sheffield and its ability to compete for business occupiers will be dealt a blow by plans to locate the HS2 station at Meadowhall. The combination of the displacement of activity outside of the city centre and the fact that other competing cities will have centrally-located stations could affect firms' location decisions. While Sheffield's skilled population and low-cost characteristics put the city in a good position to compete, poor connectivity (through both journey times and indirect service to its centre) will place it behind other core cities.

7.44 The costs of poor performance in Sheffield will also impact on its wider city region. As shown earlier, the city is a major generator of jobs for residents in its wider region and the economic success of the latter is interlinked with the city's own performance. As the region's main urban centres, it competes for business occupiers with other similar cities in the country and its performance spills over into smaller urban centres and rural locations in neighbouring districts.

The view from the wider city region

7.45 Regardless of the fact that the location of the HS2 station is likely to have a significant impact on the wider Sheffield City Region, there is still no consensus among the key stakeholders.

7.46 As part of this project, we have consulted with the South Yorkshire Passenger Transport Executive ('SYPTE'), the Local Enterprise Partnership ('LEP') and Rotherham's local authority. It was made clear to us that the SYPTE has a neutral position on the matter as it represents the interests of the wider city region. This is reflected in the fact that although recently completed studies commissioned by the SYPTE focused almost exclusively on the Meadowhall option, further work has now been commissioned by SYPTE to address gaps in understanding in relation to Victoria.

7.47 Meanwhile, at the time of writing, Rotherham supports the proposed Meadowhall Station option that has been presented by Government and has significant concerns about the adverse impact that the route of a potential loop to access a Victoria City Centre option would have on the strategic development sites at Waverley, including the Advanced Manufacturing Park and Waverley New Community.

7.48 Previously, SYPTE analysed the proportions of passengers expected to use the High Speed service for various journeys, based on the two possible station locations. The figures given are only presented as proportions of the total passengers making each journey, so it cannot necessarily be used to assess absolute numbers of expected users.

7.49 However, the analysis shows that a station location in the Lower Don Valley (Meadowhall) would secure a higher share of passengers travelling to and from Rotherham, Doncaster and Barnsley, as well as its immediate surroundings, whereas the Victoria location would secure a higher share of passengers in and out of central Sheffield.

7.50 Following on from this point, SYPTE highlights that a service focussed on central Sheffield will draw from a smaller catchment area, supporting a relatively infrequent service. Meanwhile, a station at Meadowhall would encourage use from a wider area, enabling more trains per hour. It, therefore, seems logical that a more frequent service which engages a larger market is preferable.

7.51 The SYPTE report also highlights the need to improve rail infrastructure outside of the HS2 project. Other projects mentioned include electrification and line speed improvements which could be delivered in advance of high speed rail. Also mentioned is strengthening local transport infrastructure, including rail, tram and bus provision.

7.52 The Victoria location is currently served by high-frequency bus routes but not directly served by tram and train routes (although these are in walking distance, so work would be required to link the station to the local area). Meanwhile, Meadowhall is very well linked, with plans to improve this provision further.

7.53 While we agree that the current connectivity at Victoria is poor, future proposals to improve connections to the wider city region are likely to come forward. In addition, the analysis does not address the position of Victoria in the city centre and close proximity to Sheffield Midland, which has excellent connections to other parts of the city and the wider region. In any case, given the scale of opportunity at Victoria, it is unreasonable to narrow the debate on its current connectivity issues, even before proposals are made to address these problems.

7.54 According to the SYPTE reports, the majority of connectivity improvements identified would support a High Speed node at Meadowhall. The report suggests that there is a strong possibility that journeys on HS2 to Meadowhall then changing onto a local link into central Sheffield would work out faster than a High Speed journey direct into Victoria, negating the argument that Sheffield needs a central HS2 station to facilitate job creation in the city centre.

7.55 We are not convinced by this argument given the potential for development in the city centre compared to Meadowhall. Despite the Government's approach to appraising transport interventions, faster journey times alone are not sufficient for the economic development and regeneration of cities. And in any case, the difference of two or three minutes is trivial in the context of the HS2 scheme and some of the benefits will be offset by the fact that there will be waiting times and mode-change into the city centre from Meadowhall.

7.56 In addition, even if a station at Meadowhall leads to faster journeys into the city centre, the decision over station location option will impact on development potential as shown in the Genecon work. This means that any benefits from slightly faster journey times are likely to be offset by the difference in economic impacts between Victoria and Meadowhall.

7.57 Also discussed in this document is the smaller market for travel to and from London that is found in Sheffield, when compared to other cities involved in the HS2 plans, such as Birmingham, Manchester and Leeds. SYPTE estimates that demand for travel to London is up to five times greater from Leeds than from Sheffield, highlighting the need to optimise the line for use on this journey as opposed to Sheffield journeys, which would support the Meadowhall location based on the additional journey time savings between other cities.

7.58 Apart from the work already carried out, SYPTE has commissioned two studies that will look at the capacity release due to HS2 and at maximising the economic benefits that are likely to come from the HS2 station.

7.59 These reports are yet to be published and we have only seen early drafts so it is not possible to comment at this stage. However, we have spoken with WSP Group – WSP are carrying out the work related to maximising the economic benefits of the HS2 station location. Meanwhile, Steer Davies Gleave has been commissioned to look at the options for capacity release on the classic rail lines in South and West Yorkshire.

7.60 Overall, given our consultation with WSP and early drafts of the two recent reports, these have focused on the Meadowhall option. However, it is worth pointing out that, as previously mentioned, SYPTE have commissioned work on the Victoria option. This will allow for a direct comparison of the two options. Other studies have also been commissioned to assess the impact of the two station options.

8 Conclusions and Recommendations for Future Work

Summary and conclusions

8.1 In our view, despite the Government's business case for its preferred HS2 route, both the Genecon work and the evidence from other parts of the world clearly support a station at Victoria. Indeed, a change in the appraisal framework that includes the economic and regeneration benefits of the affected regions is likely to support a Victoria location.

8.2 In light of the NAO report and given the comprehensiveness of the HM Treasury's Green Book guidance for the appraisal of interventions, it is possible that the economic and regeneration benefits could be included in future appraisals. We believe that there is a heavy weighting in favour of transport user benefits, mainly journey time savings, in the current appraisal framework. At the same time, there is little attention paid to other impacts, such as the transformation of the economies of the UK regions.

8.3 Based on the Government's business case for its preferred route for the second phase of HS2, there are a number of obstacles standing in the way of a city centre station in Sheffield. These include: the additional journey time due to the city centre loop at Victoria; poor connectivity; and, the additional £1 billion in costs.

8.4 It is clear that from the perspective of the Government's business case for HS2 as it stands, the impact of a station at Victoria could result in a reduction in the project's benefit-cost ratio. This will have an impact on both the transport benefits and the wider economic impacts that make up the bulk of the business case. Accordingly, if the conventional DfT framework continues to form the basis for the assessment of HS2, the case for Victoria will remain weak.

8.5 The Government is currently in the process of producing a number of documents that will form an update to the economic case for HS2 and that will also presente an overall strategic case. The estimates for benefits that have been previously produced are therefore likely to change.

8.6 However, it is not yet clear whether the criteria for assessing HS2 will remain the same or if the DfT's transport appraisal guidance will be the only framework for option appraisal. After all, one of the key objectives of HS2 is economic development and regeneration, as well as wealth distribution away from London and the South East.

8.7 Turning away from the DfT's appraisal framework, the literature review and evidence from international case studies support the HS2 station location at Victoria. The evidence suggests that city centre locations usually perform better than 'out of town' station locations.

8.8 For example, evidence from France suggests that some of the 'parkway-type' stations along the high speed route have failed to generate significant economic activity, if any at all. This includes a number of stations along the high-speed TGV route, such as Picardie, Avignon and Aux de Provence.

8.9 Of relevance to Sheffield is specific evidence from other countries that intermediate stations along HSR routes have seen significant economic development and urban regeneration. These include Zaragoza and Cordoba in Spain, and Nagoya and Yokohama in Japan.

8.10 The HS2 station in the Sheffield City Region will serve as an intermediate station on the route between London and Birmingham to the south and Leeds to the north. Sheffield's low staff cost and highly-skilled workers make it an ideal location for businesses relocating to the north as a result of HS2.

8.11 The Council has already demonstrated, through previously commissioned work, that a city centre station in Victoria will provide some £2 billion to £5 billion in additional benefits compared to a station in Meadowhall. We think that the analysis is conservative and the benefits are likely to be even higher.

8.12 For example, the Genecon report can be extended by increasing the time period to 60 years. Our preliminary analysis shows that, based on Genecon's own annual benefits in the central scenario, there would be around £2.5 billion in additional benefits if the HSR station is located at Victoria. This brings the total additional benefits to between £3.7 billion to £6.7 billion.

8.13 The economic benefits from station location choices – particularly employment generation – need to be put in the context of the wider Sheffield City Region. Indeed, it should be clear that, if residents from the wider city region are able to access jobs in Sheffield city centre, it is more beneficial for them to support a central location where more jobs can be created. After all, Sheffield is the main employment centre in the wider city region.

8.14 The evidence shows that successful cities are crucial to the performance of the regions around them. The economies of both Bristol and Sheffield have performed better in terms of Gross Value Added (GVA) per worker than the other core cities. The consequence has been that employment and earnings have grown faster in the districts that lie around it than in the regions that surround other core cities.

Recommendations for future work

8.15 As part of the current consultation process that is due to end in January 2014, the Council needs to address a number of issues. First, the DfT has stressed the importance of projected passenger numbers at each station. The current analysis is preliminary and there is scope to carry out more detailed analysis. This should also consider the fact that historic demand trends are not a good representation of future projections. After all, HS2 will result in a 'step change' in both travel times and capacity, which suggests that the future could look very different.

8.16 Central to passenger demand will be Victoria's connectivity to the wider city region. This is important for both passenger access to the high-speed network and access to jobs in the city centre that will be once HS2 is operational. This should therefore form a key aspect of the Council's work over the coming months.

8.17 Finally, one of the key issues in the Council's case for a city centre station in Sheffield is the additional £1 billion in costs. The Council is already addressing some of the cost issues through the work that is being carried out by CBRE, which has shown that the value of the business rate uplift at Victoria could be in the region of £850 million over 60 years (in present value terms). In contrast, the Meadowhall option is expected to generate around £190 million in business rates over the same period.

8.18 Overall, the Council has in our view a strong economic case for an HS2 station in central Sheffield. In terms of stage 3, we recommend the following extensions if the Council wishes to proceed with its case:

- Carry out a detailed assessment of projected passenger numbers at each station location, including scenarios for a 'step change' in travel times and capacity. This could be done through both quantitative models and by considering case studies where this had happened;
- Carry out an assessment of the station location options against the more comprehensive guidance laid out in the HM Treasury's Green Book – this should aim to build a case that is not purely dependent on standard transport users benefits as set out in the DfT appraisal framework;
- Analyse the potential displacement of jobs, development and economic activity at Meadowhall, including its effects on the wider city region;
- Examine the connectivity issues at Victoria and provide a comprehensive approach to addressing these problems; and,
- Put forward a case for the wider city region on the importance of Sheffield to their economies with the aim of building support at the local and regional level for a city centre HS2 station.

8.19 Finally, it is important to stress that one of the key considerations for the next stages of any work that the Council decides to undertake is that the support of the wider city region will be crucial for the success of its representations to Government in relation to station location options.

8.20 In this context, the Local Enterprise Partnership, businesses and local political leaders could play a major role, including as key stakeholders in the production of future reports and analysis. The DfT has indicated that a region-wide representation, including support from the private sector and local political leaders, will be important as it makes its final decision over the HS2 route and station locations.