Sheffield City Council and South Yorkshire Passenger Transport Executive

Maximising the economic impact of HS2 investment in Sheffield

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Contents

Executive Summary

High Speed Rail & City Economies

High Speed Rail (HSR) presents a real opportunity for the UK's cities, offering a modern, world class, efficient and dynamic transport system that will support prosperity and productivity across the UK. The experience from HSR investments in the rest of the world demonstrates that such services add most economic value when they connect cities. This reflects the role of High Speed services in 'shrinking distance' between major economic hubs and thus driving business efficiencies and city competitiveness. For Yorkshire's key cities, including Sheffield, connectivity to the High Speed 2 (HS2) network, with efficient links to London and European city economies will be critical to achieving long term, sustainable economic growth.

The importance of HS2 station location

For cities that form part of the HSR network, a key issue in maximising impact and economic benefit relates to the location of the station. Station location choice will need to balance a number of factors, including cost, mainline location and connectivity to labour and passenger catchments, as well as maximising economic impacts. Decisions need to give weight to economic impact considerations if the potential for HS2 to influence national economic growth is to be maximised.

For Sheffield and the wider city region, HS2 station location will have important ramifications for the city's ability to maximise economic effects, in particular through service sector growth and agglomeration. Evidence from other locations confirms the propensity for service sector businesses to cluster around HSR stations. On this basis, to maximise economic benefits from HSR investment, stations should be located where they offer greatest prospects for attracting and growing service sector activities. This is critical not only for Sheffield City, but also for the wider Sheffield City Region, the success of which is highly dependent on the economic performance of the core city, particularly the city centre's potential as a focus for high value service sector growth.

Alternative HS2 stations for Sheffield and its City Region

Two alternative station options have been proposed in Sheffield by HS2 Ltd following a multi-stage station short-listing process for South Yorkshire. These two alternative locations offer very different opportunities in spatial and economic terms. As such, the potential economic impacts of the HS2 station in these alternative locations will differ markedly both directly and indirectly. This has been confirmed through previous analysis on behalf of HS2 Ltd.. **Victoria** is located close to the city centre in the heart of a recognised regeneration area, with a focus on creating a new office and mixed-use quarter seamlessly linked to the city centre core. **Meadowhall** is located 4 miles east of the city centre in the Lower Don Valley, the city's industrial heartland where the focus is on developing advanced manufacturing activities.

The two alternatives present very different propositions, with the Victoria context offering greater potential for the HS2 station to influence and accelerate development outcomes.

- At Victoria, the station has much greater potential to become a driver of place development, becoming a centrepiece for a new city centre business quarter. At Meadowhall, place-making is influenced principally by the established use mix including the regional shopping centre and the concentration of manufacturing activities in the Lower Don Valley;
- The propensity to attract added value economic activity will be greater at Victoria given its proximity to other city centre assets important to service sector business location decisions and the record of success for the city centre in attracting regional and national business investments. The business sectors most influenced by HSR services have no similar presence or prospect at Meadowhall ;

- The business sectors most influenced by HSR services are clustered in the city centre. Victoria maximises accessibility benefits for users through more direct proximity to these sectors. Meadowhall has weaker access given the need for connecting trips to the city centre which may compromise business to business transactions, especially in connecting into London and Europe.
- The influence over the type, scale and quality of business investment will be greater at Victoria given the more extensive range of development sites that will be available by the time HS2 is in place. Office development at Victoria has the potential to attract inward investment from outside of the Sheffield City Region, whereas Meadowhall is a lower value office location with a higher propensity to displace existing economic activity from elsewhere in the City Region;
- A station at Victoria will be more readily accessible to the target labour and passenger markets for HS2, particularly the concentration of passenger demand projected by HS2 to be derived from residents in South West Sheffield, for whom public transport connectivity to Meadowhall would require interchange in the city centre.

Sheffield's HS2 station will support the delivery of the city's economic strategy objectives. This will be a major new investment in the city and its location will create a new and high profile gateway and focus for business growth.

In terms of economic benefits, a city centre-based location at Victoria would align fully with the ongoing efforts to regenerate the city centre and act as a major catalyst in accelerating city centre development. A decision to locate the station at Victoria could reinforce momentum in the delivery of key pipeline investments in the city centre.

Relative economic benefits from the alternative locations

A quantitative assessment of the relative economic impacts of the alternative HS2 stations in Sheffield has been developed, refining HS2 Ltd's own analysis of development and employment capacity. The economic impact assessment provides a comparison of the net additional employment and Gross Value Added (GVA) effects projected from the alternative station locations, taking account of deadweight impacts which would occur irrespective of HS2 station investment. The analysis has modelled employment impacts based on projected development take-up and business sector profiles within a 1km zone around each station. This reflects the differential office occupier markets likely to be attracted to the alternative locations given that they differ markedly in terms of business location offer and property market dynamics.

At Victoria a key factor is the propensity to attract higher value business service activities from outside of the City Region seeking city centre proximity, rather than lower value office sector relocations from within the City Region to Meadowhall, with consequential effects in terms of net additional economic benefits. Net additional employment projections over 25 years for each location (allowing for displacement and multiplier effects) suggest that Victoria could generate approximately 9,500 net additional jobs, whilst Meadowhall is projected to generate approximately 3,000 jobs as a result of HS2 station investment. Overall, this assessment indicates a potential to generate between £2bn and £5bn net additional economic value over 25 years if the Victoria station option be selected.

Conclusions

The location of the HS2 station is crucial to the future of Sheffield. The Victoria option would reinforce the existing economic strategy focus on the city centre, stimulating new quality development opportunities and investment in line with the City Region's economic ambitions and is projected to generate a substantial level of additional economic value which should be taken into account alongside the range of other considerations in reaching a decision on the preferred HS2 station location in South Yorkshire.

1 Introduction

1.1 Context

This report and accompanying annexes has been prepared by GENECON LLP on behalf of Sheffield City Council (SCC) and the South Yorkshire Passenger Transport Executive (SYPTE) as a formal response to HS2 Ltd station proposal options for South Yorkshire. The report addresses the strategic economic case for alternative HS2 station locations in Sheffield.

The report is prepared in follow-up to a presentation given by SCC and SYPTE senior officers to the HS2 Board on the 20th January 2012. This makes the strategic economic case for locating the South Yorkshire HS2 station at Victoria close to Sheffield City Centre as opposed to a Parkway Station located 4 miles to the east at Meadowhall in the Lower Don Valley. The analysis identifies that the Victoria Station option has the potential to generate between £2bn and £5bn net additional employment related GVA over a 25 year period from the date of the station location decision, over and above the economic impact at Meadowhall.

1.2 Summary of the case presented

1.2.1 Basis for the analysis – Sift 3 paper

This report builds from the position set out in the Sift 3 document prepared by Drivers Jonas Deloitte (DJD) and SKM Colin Buchanan (December, 2011) on behalf of HS2 Ltd. The Sift 3 paper is the result of on-going work that started over 18 months ago with a long-list of potential HS2 station locations across South Yorkshire and has now been reduced down to two potential station locations - at Victoria close to the city centre or at Meadowhall. The Sift 3 paper has confirmed that an HS2 station at Victoria would support a higher development and gross employment impact than at Meadowhall.

1.2.2 Building on the Sift 3 paper

The analysis presented in this report considers the strategic economic implications of HS2 station location and the key economic factors that should influence locational choice, and seeks to refine the Sift 3 analysis of relative development and employment impacts. The qualitative analysis considers the relative merits of both locations for the HS2 station to act as a new economic driver and its ability to influence the nature and type of investments that are likely to be stimulated over the 25 years following a station decision. The quantitative assessment of economic impact is presented in terms of Gross Value Added (GVA) employment value - looking at both gross additional benefits as presented in Sift 3, but then refining this to identify a net additional position. The analysis suggests that the employment effects in the two locations will have very different displacement and multiplier profiles given the differential market and spatial contexts in which they will operate and thus the HS2 station's propensity to influence economic outcomes at each location.

1.3 Structure of the paper

The report has been structured as follows:

- Section 2 – looks at the development of high speed rail internationally and the evidence from emerging research into the potential economic impacts from investment in high speed rail. It also considers the importance of the UK's Core City

economies as drivers of UK economic growth and the role that investment in the HS2 project can play in maximising this impact;

- Section 3 – considers how the HS2 investment can align to the ongoing economic transformation in the city and add value to other previous and programmed economic investments;
- Section 4 – considers the relative merits of the two locations – Sheffield Victoria and Meadowhall in terms of maximising economic benefits for the city and city region;
- Section 5 – presents a summary of the detailed economic impact assessment, building on the Sift 3 analysis; and
- Section 6 - presents key conclusions.

2 High Speed Rail and city economies

2.1 High Speed Rail – the international experience

2.1.1 A 50 year history

High Speed Rail services in Sheffield will build on the lessons from international experience of similar investments. High Speed Rail (HSR) was developed in Japan in October 1964. In this densely populated country, facing issues of major transport congestion, there was a need to develop a new approach to transporting people in and between cities[1]. In response, the first modern high speed rail link, the Shinkansen (called 'Bullet' Trains in English), was opened between Tokyo and Osaka. The success of HSR in Japan has led to the Shinkansen system growing to a 1,500 mile network (an additional 250 miles is currently under construction and a further 500 miles are planned taking the total network to over 2,000 miles).

Japan's impetus for the introduction of HSR was the need to meet increasing demand for passenger rail travel and to reduce congestion by other forms of transport. A key success of the HSR system has been in connecting large cities leading to significant effects on Japan's business, economy and society. As identified by Okada (2009) time savings are estimated at 400 million hours per annum, with an economic impact of 500 billion yen (approximately £4bn / €4.8bn) per annum[2]. The HSR connections are also seen to have rejuvenated towns and cities that now form part of the HSR network, previously too distant from major centres.

HSR's success story in Japan contributed to the growth of the idea in Europe. This has coincided with growing concerns across Europe in relation to rising oil prices, growing environmental interest and rising traffic congestion on European road systems, as well as HSR representing an important symbol of greater political and monetary union.

Today, there are many HSR lines around the world. The largest networks are found across Europe (3,480 miles), China (3,700 miles) and Japan (1,500 miles), with smaller networks emerging in South Korea, Taiwan, Saudi Arabia, Morocco and the USA.

2.1.2 The European network

As outlined, HSR has emerged across Europe over the past 30 years. The first lines opened in the early 1980's (Paris to Lyon opening first in 1981). Since then, there has been a particularly heavy investment in HSR construction in France, Germany, Italy and Spain. Major planned extensions are currently under construction in Spain and Turkey.

Over the past 30 years, HSR has emerged as an increasingly popular mode of transport, with several countries building extensive high-speed networks,

European High-speed rail lines (2011)

[1] Hood, C (2007) *'Shinkansen – From Bullet Train to Symbol of Modern Japan'*
[2] Okada, H (2009) *'30 years of High-Speed Railways – Economic and Social Effects of the Shinkansen'*

with several cross-border high-speed rail links now in existence. The development of a Trans-European high-speed rail network is a stated objective for the European Union and is a critical infrastructure in the drive towards greater political and monetary union. In 2010, the EU confirmed agreement to link France and Spain's HSR networks, with plans to promote further links between Helsinki and Berlin and Lyon to Budapest.

It is expected that the European HSR network will expand substantially over the next few decades, connecting cities and regions even more effectively and faster.

2.1.3 Economic impact analysis from Europe and Japan

There is a growing body of literature studying the impact of high-speed rail on local economies and the attractiveness of high-speed rail locations for new investment. Some studies have looked solely at transport benefits whereas others have considered the non-transport benefits to an area of being connected to high-speed rail. However, the precise nature and extent of its effects are still the subject of much debate (Vickerman, 2009; Lewis, 2008; Willigers, 2006)[3]. However, for the UK the evidence from Europe and Japan suggests the potential for substantial positive outcomes.

- ***Connected cities***

Several authors identify that the primary effect of HSR infrastructure is the increase in accessibility and overall reduction in journey times between connected cities and regions. These benefits particularly accrue for passengers such as commuters, international business passengers and tourists.

Such close connections provide inter-city benefits enabling firms to access wider markets and other hubs of knowledge and expertise and greater opportunities for face-to-face contact which facilitates knowledge exchange and transfer of skills (Takagi, 2005; Duranton and Puga, 2004)[4].

- ***Agglomeration***

Business agglomeration is considered to be a key economic benefit of HSR. The agglomeration effect (clustering) that occurs in cities is seen as one of the main reasons why they have become key drivers for growth. Cities provide the opportunity to create agglomerations where productivity is higher, competition more effective and innovation fostered.

Agglomeration describes the geographical clustering of businesses and people, benefiting from closer interaction and an enlarged pool of skills and talent. Generally it is understood that such benefits are greater the larger the agglomeration – the implication being that the improved links created by HSR between firms and people will support enhanced knowledge-sharing, greater specialisation of staff resources and enhanced competition between suppliers all of which lead to higher productivity benefits from agglomeration (Audretsch, 1998; Hall and Chen, 2009; Graham and Melo, 2010)[5].

[3] Vickerman, R (2009) *'Indirect and wider economic impacts of high speed rail'*; Lewis, A (2008) *'Effects of investment in High speed rail infrastructure'*; Willigers, J (2006) *'Impact of high speed railway accessibility on the location choices of office establishments'*
[4] Takagi, R (2005) *'High-speed railways: the last 10 years'*; Duranton, G and Puga, D (2004) *'Micro-foundations of urban agglomeration economies'*
[5] Audretsch, D, (1998) *'Agglomeration and the location of innovative activity'*; Hall, P, and Chen, C-L (2009) *'The Impacts of High-Speed Trains on British Economic Geography'*; Graham, D and Melo, P (2010) *'Advice on the assessment of wider economic impacts: a report for HS2'*

- ***Catalyst for regeneration and attracting investment***

HSR investments act as a catalyst for regeneration and new investment in and around stations, particularly in terms of its potential to strengthen a city's business base and generate additional commercial development. For example, in Japan, cities like Yokohama have seen huge developments around stations, with the focus on maximising the role of the HSR station as a key gateway to the city. This example demonstrates the potential role that HSR stations can play as the centre of economic commercial activity and in stimulating regeneration in the surrounding area (Bonnafous, 1987; Urban and Regional Policy, 2009; Albalate and Bel (2010)[6].

Many of the studies (Willigers, Floor and Van Wee, 2005; Pol, 2010)[7] identify that cities and towns with an HSR connection have witnessed a positive impact, improving the location's attractiveness for investment and development. For example, there have been increases in property prices and office rents, lower vacancy rates or increase in house prices. In France, Lyon saw a 43% increase in office space around the station, with land prices reported to have risen by 35% (Lewis, 2008; Hall and Chen, 2009).

In particular, the examples of Lille and Lyon are often cited as cities that have prospered since the arrival of HSR, in particular developing their service economies and office market (Greengauge 21, 2006)[8]. Both cities have seen economic and land-use impacts associated with the development of HSR. A key finding from the research that has been undertaken is that an even greater impact appears to be likely if service sector activities already form a key function in the area close to the station creating the critical mass. HSR can then become a catalyst for continued growth and needs to fit with the strategy for the city. Greengauge 21 conclude that *"to be effective the high-speed rail station needs to become the focus of major redevelopment and regeneration activities, geared to the service economy."*

- ***Enhancing image and perception of place***

HSR connections and stations are seen to enhance the perception of a place, improving the attractiveness of an area for development and in turn influencing location decisions for businesses (Willigers et al 2005; van den Berg and Pol, 1998)[9]. There is a perception that being connected to a high-speed rail link leads to a positive economic influence on an area, with centrality and connectivity important factors for business decisions, particularly in the location of offices.

In addition, an HSR station can be attractive to new inward investment, making cities more competitive for companies with strategic or internationally linked offices. However, at present there does not appear to be any commercial or academic literature that has quantified the effect of HSR connections on inward investment.

2.2 High Speed Rail in the UK

HSR is relatively new to the UK, with the 68-mile High-Speed 1 (opened in 2007) connecting London to the Channel Tunnel and linking onwards to mainline Europe. Network Rail[10] reports that by 2025, China will have 5,678 miles of HSR in place or

[6] Bonnafous, A (1987) *'The regional impact of the TGV'*; Urban and Regional Policy (2009) *'Complementary measures to facilitate regional economic benefits from High Speed Rail'*; Albalate, D and Bel, G (2010) *'High speed rail: lessons for policy makers from abroad'*
[7] Willigers, J, Floor, H and van Wee, B (2005) *'High Speed Rail's Impact on the Location of Office Employment within the Dutch Randstad area'*; Pol, P (2010) *'The Economic Impact of the High-Speed Train on Urban regions'*
[8] Greengauge 21 (2006) *'High Speed Trains and the development and regeneration of cities'*
[9] Van den Berg, L and Pol, P (1998) *'The urban implications of the developing European high-speed train network'*
[10] Network Rail (2009) *'Meeting the Capacity Challenge: the case for new lines'*

planned, Spain 4,415 miles; France 4,135 miles; Japan 3,774 miles and Germany 2,237 miles. The UK lags considerably behind other countries, indeed it is likely to lag behind Morocco (with 422 miles) and Saudi Arabia (with 342 miles).

As set out above, much of Europe has well-established and growing high-speed networks. In the UK, on the 10th January 2012 the Government announced its commitment for the development of an HSR network signalling a *"commitment to providing 21st century infrastructure and connections – laying the groundwork for long-term, sustainable economic growth"*[11] through rapid rail connections of the UK's major cities.

High-Speed 2 (HS2) builds on the recognised benefits of intercity connectivity and the consequent benefits of enhanced passenger capacity and economic efficiencies. HS2 proposes to link London to Birmingham (Phase 1) with the HS2 Y network proceeding to provide direct, high capacity, high speed links to Leeds and Manchester, with intermediate stations in the East Midlands and South Yorkshire. Construction of the first phase, London to Birmingham, is expected to commence in 2017 with trains operating by 2026. It is estimated that HSR will reach the North of England by 2032-33.

Investing in HS2 will deliver hugely enhanced rail capacity and connectivity between the UK's major conurbations, with faster rail services leading to journey time savings for users and improved connectivity to London and beyond into Europe. Indeed, with HS2 using separate track, the projection of the existing network reaching capacity by 2020-2025 will be relieved, leading to benefits for all rail services in terms of reduced journey times and reliability as well as freeing up what is referred to as the 'classic' network for increased passenger and freight services.

High-Speed 2: Y Network

In addition to the transport benefits of HSR connections there is evidence that HSR will create and facilitate significant economic impacts and wider benefits. As set out in the case prepared by the DfT and HS2 Ltd[12] a high-speed rail network will result in significant regional impacts and wider economic benefits across the UK. Based on evidence from elsewhere, investment in HSR will be a major factor in making the UK a more attractive place for business globally. It will lead to greater efficiency in the economy through improved linkages between the UK's major cities, time and productivity savings for firms and their workers and around these key transport gateways clustering and agglomeration impacts. There may be significant local effects where, for example, the new stations act as magnets for economic activity and driving regeneration where located on the fringe of existing city centres.

As such, for UK cities a location on the HSR network has the potential to be a powerful driver for their future economic development.

[11] Justine Greening MP, Minister for Transport (2012) *Statement to the House of Commons*
[12] Department for Transport (2012) *'Economic Case for HS2: Updated appraisal of transport user benefits and wider economic benefits'*

2.3 Cities as the drivers of UK economic growth

2.3.1 The importance of the UK's cities in re-balancing the economy

The recent Government report *'Unlocking Growth in Cities'* (December, 2011) confirms England's post-industrial core cities as the major engines of future growth and key drivers of future economic prosperity. The eight core cities include: Birmingham; Bristol; Leeds; Liverpool; Manchester; Newcastle; Nottingham; and Sheffield.

Analysis of the UK's economic statistics shows the importance of London and England's core cities. Cities are by far the most important source of economic activity and growth in the UK economy. Nearly 60% of the UK's population live in London and England's core cities; millions commute in to them every day; combined they generate 50% of the UK's wealth; and, they contain 30% of the nation's highly skilled workforce (graduates or above)[13].

Over recent decades, England's core cities have been evolving and developing new economic roles, seeking to restructure from their industrial past and reshaping their economies in order to become home to a more diversified range of businesses.

The UK is facing a period of unprecedented economic challenge. Given the importance of cities to the economy, they must play a critical role in driving future economic recovery, productivity and rebalancing of the economy. HSR offers the mechanism to link many of the core cities together.

2.3.2 Successful Core City economies

There has been considerable work undertaken on what makes a successful competitive city (Centre for Cities (2008); Core Cities (2011); Fujita, Krugman and Venables (2001); Parkinson et al, 2004; Buck et al, 2004)[14]. This literature suggests that successful and competitive cities are vibrant places where people want to live, work and visit. Successful core city economies are those able to exploit their unique portfolio of knowledge economy assets, to develop distinctive roles and to gain international reputations. Cities are where the exchange of knowledge is facilitated through enabling face-to-face contact that can stimulate creativity, innovation and new opportunities.

Every city is different but successful cities offer a blend of assets. The key feature of the UK's core city economies include: a concentration of high value service sector activities in their central areas – trading on innovation and knowledge transfer. The picture is one of talented and enterprising people (often connected to the presence of universities); clusters of market leading businesses; pools of highly qualified/highly skilled people; strengths in financial and business services; company headquarters; communications hubs; concentrations of creative and cultural activities often around high quality and vibrant public spaces supported by infrastructure such as good quality retail, restaurants, bars, hotels and conference facilities. This asset blend is rarely found outside of city centres. Agglomeration of activity and investment in city centres has become increasingly important as a determinant of city competitiveness and a key factor in the economic restructuring of cities to a more knowledge-based economy.

As a consequence, the growth of 'knowledge' and 'service' sector activities such as research, science, design, finance and business services has led to growth in employment in city centre locations, where face-to-face interaction is best facilitated in

[13] Core Cities (2011) *'Driving economic recovery: The Core Cities'*
[14] Centre for Cities (2008) *'UK cities in the Global Economy'*; Core Cities (2011) *'Driving economic recovery'*; Fujita, M, Krugman, P and Venables, A (2001) *'The Spatial Economy, Cities, Regions and International Trade'*; Parkinson, M, Simmie, J, Clark, G and Verdonk, H (2004) *'Competitive European Cities: Where do the core cities stand*'; Buck, N, Gordon, I, Harding, A and Turok, I (2004) *'Changing Cities – Rethinking urban competitiveness, cohesion and governance'*

order to do business, but also in providing support services for the sectors often located outside the central area, such as manufacturing, yet still critical to the balance of the wider city region's economy.

London has demonstrated its core city capabilities on the world stage – and has created high levels of growth, jobs and prosperity in the surrounding South East region. The UK's core cities (including Sheffield) are seeking to emulate this effect and to maximise their own full and distinctive economic potential.

2.4 High Speed Rail – the benefits to the UK's Core Cities

The UK's future economy must continue to remain competitive against European cities, many of which are being drawn closer together by a rapidly expanding HSR network. This increased connectivity between European cities is potentially increasing their advantage over UK's core cities. HS2 provides a real opportunity to connect the UK's cities, businesses and people. In turn, this would support economic competitiveness within the core cities.

As set out in the HS2 Ltd report presented to Government, *'Economic Case for HS2: Updated appraisal of transport user benefits and wider economic benefits'* (January, 2012) there are a number of major benefits for the UK's core cities from the introduction of HSR. These are outlined below.

2.4.1 Time savings

Much of the appraisal case for HS2 has been constructed around the significant reductions in journey times between the core cities. HS2 will bring Birmingham within one hour's travel time of London, with the proposed Y network bringing Leeds, Manchester and Sheffield within 73-80 minutes. This will make business and leisure trips more convenient and attractive; opens up new ways of working and increased productivity (for an example, facilitating a morning meeting in London, but still a productive afternoon back in Manchester, Leeds or Sheffield); and will bring economic centres closer together.

Figure 2.1: Comparison of existing journey times to the Y network

Route	Journey Time (hours:minutes)	
	Existing Rail	Y network
London – East Midlands	1:49	0:53
London – South Yorkshire	2:09	1:15
London – Manchester	2:08	1:13
London – Leeds	2:20	1:20
London – Liverpool	2:10	1:37
London – Newcastle	2:52	2:37
Birmingham – Manchester	1:30	0:49
Birmingham – Leeds	2:00	1:05
Birmingham Interchange - Heathrow	n/a	0:33

Source: HS2 Ltd

These time savings would be of particular significance for business activity as less productive time is lost whilst travelling and the shorter travel times, facilitating the potential for greater commuting between the large cities.

2.4.2 Rail underpins service sector growth

Cities with a higher or growing proportion of people employed in the service sector, where information is being produced and exchanged, are likely to benefit most from HSR and improved accessibility.

The major strength of HSR is that as a mode of transport it can improve the competitiveness of cities. This is particularly the case in supporting growth in a service and information economy, facilitating innovation and knowledge based businesses, particularly if such activities are concentrated in relatively small geographic areas, such as city centres. The HSR network supports high densities of travel and would enable large numbers of people to commute into and between cities and access employment.

2.4.3 The role of stations in creating hubs of economic activity

The evidence from elsewhere suggests that well designed and strategically focused transport infrastructure, such as an HSR station, provides a real opportunity for cities. The HSR station will be a major gateway to the city and in turn acts as a magnet for major new development attracting key business sectors, commercial activities and new inward investment.

HSR has the potential to be a real catalyst to attract new activities and add significant value to regeneration initiatives within cities. The experiences of Lille and Lyon in France, Cologne in Germany, Cordoba in Spain and Turin in Italy demonstrates that when HSR links are incorporated into wider land-planning initiatives, then major improvements in economic activity and quality of life benefits can result (Volterra and Arup, 2011).[15]

Significantly, the literature identifies that the benefits of an HSR station in terms of new development, particularly geared to the service economy, are principally seen within a 'primary development zone'. This zone relates to the direct accessibility of the HSR station by foot or public transport and is principally within a 15 minute walk or 1km zone around the station (Schutz, 1998; Greengauge 21, 2006)[16]. This 1km zone is important in terms of economic impact analysis of HSR stations. This area is primarily where new jobs will be created, attracting new development and investment with high-grade office and residential functions and where increases in land and property values can be expected.

2.5 Implications for Sheffield

As a UK Core City, Sheffield is well placed to capitalise on the economic potential of HS2. The city has a growing service sector, benefiting from its central location in the UK and ability to serve markets north and south. Investment in the city centre has strengthened its potential to act as a focus for service sector agglomeration and HS2 offers the opportunity to further develop Sheffield's role as a Core City through connections to London and other city economies. The choice of station location in the city will have important ramifications for Sheffield's ability to maximise economic effects through service sector growth and agglomeration. The following section explores how the city's economy has changed and the implications for maximising economic leverage from HS2 investment.

[15] Volterra and Arup (2011) *'Understanding the transport infrastructure requirements to deliver growth in England's Core Cities'*
[16] Schutz, E, (1998) *'Urban development by High-Speed Traffic';* Greengauge 21 (2006) *'High Speed Trains and the development and regeneration of cities'*

3 Maximising HS2's benefit for Sheffield

3.1 Sheffield – a changed city and changed economy

3.1.1 Historical legacy and change over the past 25 years

Over the last 25 years, Sheffield has been a focus for economic regeneration, transforming the city from one in severe economic decline into a dynamic, modern cosmopolitan city. Economic analysis from Sheffield City Council reports a 60% increase in Gross Value Added between 1997 and 2007 (total of £9.2billion in 2007). In particular, these statistics point to the differences before and after 2000 – between 1993 and 1996, Sheffield's economy grew at just 2.9% pa; post-2000, year-on-year averages of 5.4% have been achieved, better than the Yorkshire & Humber Region (5.1%) and just short of national growth rates (5.6%). Sheffield is a designated UK Core City, reflecting its importance as a national economic driver.

- ***Made in Sheffield***

Sheffield has a history rich in steel production. During the 18th century the Industrial Revolution brought large scale steel production to Sheffield, particularly focused on the Lower Don Valley the birthplace of the 'Made in Sheffield' brand. However, due to the streamlining and automation of steel manufacture and the globalisation of steel production many steel firms closed particularly during the 1960's and 1970's. Sheffield entered a period of decline, leaving a legacy of derelict sites and unemployment exceeding the national average. By the early 1990's, the UK recession severely hit Sheffield, further weakening the City's economy.

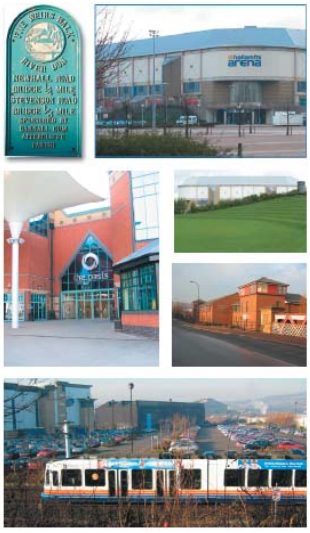
In order to address the economic and social problems the city was experiencing, Sheffield City Council embarked on an ambitious re-investment plan, later to become the Sheffield Economic Regeneration Strategy. This plan focused specifically on two geographical areas: the Lower Don Valley, the city's major industrial area where most of the former jobs in steel and heavy industry were concentrated and where dereliction was most visible; and the City Centre, where the Council sought to promote the growth of new higher-value service sector activities to re-balance the city economy.

- ***Lower Don Valley***

The Lower Don Valley formed the hub of Sheffield's steel making industry, but by the mid-1980's almost 1,000 acres of land (400ha) was derelict and countless buildings stood vacant. Between 1971 and 1988, 75,000 manufacturing jobs were lost. For Sheffield, and the surrounding sub-region of South Yorkshire, the demise of industry on such a scale created a major challenge.

In 1988, the European Commission recognised the area as requiring special economic assistance. At the same time, the Sheffield Development Corporation (SDC) was established and tasked with leading the clean-up and regeneration of the Lower Don Valley.

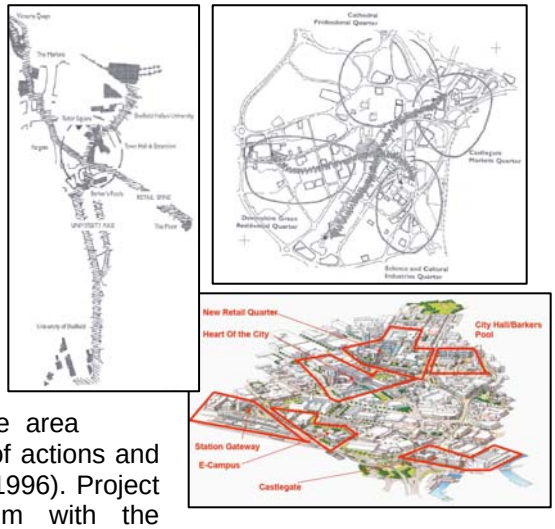
During its existence the SDC was responsible for regenerating some 900 hectares of derelict land with substantial investment made in supporting the retention of a consolidated manufacturing base alongside new 'land-hungry' leisure and sports facilities and amenities. In 1990, Meadowhall Shopping Centre was developed on the former Osborn Hadfields steel works site. At that time Meadowhall was the second largest shopping centre in the UK with over 280 stores - it now attracts approximately 27 million visitors per year. Other major developments included: over 35,000m^2 of new industrial and commercial development space; the Don Valley Stadium and Sheffield Arena developed to attract the World Student Games (1991); Meadowhall Transport Interchange providing a new main line rail station and bus interchange (1990); and Supertram (Line 2) linking Meadowhall to Sheffield City Centre (1993) some four miles to the west.



In 2000, despite improvements to the economic performance of the area, Sheffield along with Barnsley, Doncaster and Rotherham were collectively designated as an Objective 1 Area[17]. Primarily, as a consequence of the available European funding and the work undertaken by the SDC, there has been a strong and focused effort to regenerate large areas of the Lower Don Valley and to become a focus primarily for modern manufacturing, out-of-centre retailing and commercial leisure/sporting facilities.

- ***City Centre***

In parallel with the focus on modern manufacturing and large-scale leisure/retail in the Lower Don Valley, in 1994, *'A new city: Sheffield's City Centre Strategy'* set out a vision of how the city centre would be developed. This focused on tackling issues of image, access and quality in parallel with the release of development opportunities to support service sector growth. The strategy introduced a number of key principles including: a structure developed along two spines (retail and university) and delivering four distinct quarters in the city (Professional Quarter, Science and Cultural Industries Quarter, Markets Quarter and Residential Quarter). Since 1994, the City Council has been working to develop the core area concept, known as the 'Heart of the City', with a set of actions and timescales set out in the City Centre Business Plan (1996). Project activity in the city centre picked up momentum with the establishment of the Urban Regeneration Company – Sheffield ONE, in 2000, and the development of the City Centre Masterplan (launched in February 2001), which set out key project objectives and an intervention strategy. This Masterplan provided a catalyst for recovery and redevelopment, building upon the earlier work.



The Masterplan prioritised new physical development and investment into the city centre and set out a clear framework for its revival, defining four strategic objectives:

1. ***Building a new high technology-based economy in the city centre*** – including the development of e-Campus; further development to the Cultural Industries Quarter

[17] This status recognised that the region's GDP per head is below 75% of the EU average. The attainment of Objective 1 status led to an allocation of over £700 million of EU Structural Funding for the area to 2007.

and building on the growth of the knowledge economy, linked to the city's Universities;

2. ***Creating a vibrant city*** – the creation of a new central business district, including a new retail quarter, new office provision and reinforcing the cultural and leisure offer of the city centre;
3. ***Improving accessibility*** – improvements to public transport, car parking and signage; and,
4. ***Celebrating the public realm*** – upgrading existing public spaces, creating new spaces, and enhancing the city's rich green heritage.

Significant progress has been achieved in delivering these objectives. The Heart of the City has created a new Civic, Cultural and Commercial Core, including the Peace Gardens, Barker's Pool and City Hall, Millennium Galleries, Millennium Square and the Winter Garden, all of which have provided the backdrop and setting for the development of high quality new mixed-use commercial schemes – St. Paul's Place and Leopold Square providing high quality city centre office space, hotels, apartments, restaurants etc that simply were not previously present in the city centre. These projects have made the city centre more attractive to residents, investors and visitors, enticing in institutional investors such as Standard Life, encouraging investment by RBS and Barclays Bank and retaining key commercial companies such as DLA Piper in the city centre.

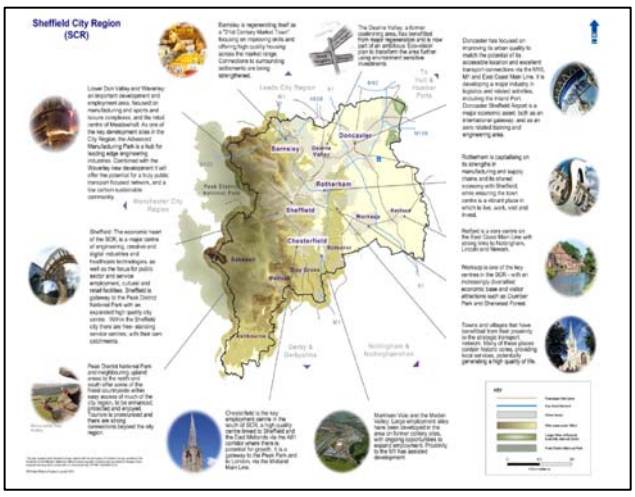
The Masterplan has since been refreshed in 2008, setting out the physical development and delivery framework for the next phase of Sheffield's economic transformation over the coming 15 years. The Masterplan includes the following key themes:

- Building assets for the 21st century;
- Increasing innovation and harnessing knowledge; and,
- Creating the conditions for sustainable growth.

The current Masterplan, which is itself being refreshed in response to current economic conditions, reinforces the role of the city centre as a business hub supporting city-wide prosperity and growth.

3.1.2 Current strategy – the push towards a balanced economy

There are a number of strategies at sub-regional and local level setting the future vision for Sheffield and its role within the city-region, all supporting the push towards developing a balanced economy.



The Sheffield City Region Local Enterprise Partnership prospectus provides an over-arching framework for future job creation and economic growth by attracting investment, building the business and employment base and targeting identified business sectors. Within this context, the prospectus is focused on unlocking the economic potential of seven key

development areas within the city-region, including Sheffield City Centre and the Lower Don Valley.

The prospectus identifies Sheffield City Centre as the economic heart of the city-region with a high proportion of service employment, a developing creative and digital industries sector and high-quality cultural and retail offer. The Lower Don Valley is recognised as an important development and employment area with a particular focus on the development of advanced manufacturing and engineering sectors. The prospectus identifies the need to continue to support and develop the most important sectors with the greatest growth potential in the city-region.

The Sheffield Economic Strategy is currently undergoing a refresh in order to refocus and simplify the city's ambition and reflect the new economic conditions and changed political and financial context. Some key elements of the current strategy will remain as key pillars moving forward:

- ***Developing competitive sectors*** – by targeting key growth sectors for the city;
- ***Building assets to support economic growth*** – continuing to develop an improved range and quantity of good quality office facilities in the city centre and industrial premises in the Lower Don Valley;
- ***Maximising Sheffield's reputation and image*** – by focusing on increasing investment into the city, attracting talented people to live and work and attracting visitors; and,
- ***Creating the conditions for sustainable growth through improved connectivity*** – by improving international connectivity, with improved links to London and other key northern cities and to establish an accessible city centre that will enable the expansion of economic activity.

The *'Sheffield Development Framework - Core Strategy'* (2009) reinforces the LEP prospectus and the emerging Economic Strategy by setting out clear roles for the Lower Don Valley and the City Centre. The Core Strategy identifies the Lower Don Valley as a strategic employment area for the city and city-region that will support businesses that complement the city centre. The focus of activity is on manufacturing, along with sports and leisure activities deemed inappropriate for a city centre location and retail at Meadowhall. The City Centre is identified as a key driver for the city and the city region and will continue to play a crucial role in the transformation of the city's economy. The city centre will remain the primary focus for new development of offices, retail, leisure, culture, higher education and other services.

The manufacturing role of the Lower Don Valley is further reinforced by the emerging Sheffield Rotherham Masterplan and the designation of this area within the approved Sheffield City region Enterprise Zone as a Modern Manufacturing and Technology Growth Area (MMTGA) made up of several key areas and sites linked by the M1 corridor. With the Enterprise Zone designation it is expected that a number of sites within the Lower Don Valley will be brought forward for development much more quickly, many in advance of HS2 delivery.

The City Centre will continue to play a critical role as the central location for the provision of high quality office and business accommodation, providing an attractive place to work as well as offering complementary retail, cultural and leisure facilities. The focus remains on productive and competitive businesses that stimulate increased innovation, harnessing knowledge and sustainable growth in key sectors.

3.1.3 Sectoral strengths and trends

As set out in the table below, the economic structure of Sheffield has undergone significant change over the past 30 years, with a significant shift towards service sector employment whilst aiming to develop a more balanced economy.

Sheffield Employment structure (1981-2011)				
Sectors	1981	1991	2001	2011
Manufacturing	58,643 (26.9%)	49,250 (23.3%)	35,555 (15.4%)	21,579 (9.1%)
Services	142,610 (65.4%)	149,485 (70.7%)	184,440 (79.6%)	205,249 (86.2%)

Source: NOMIS, Annual Business Inquiry (2012)

The drive continues to support and develop growth sectors as key drivers for the Sheffield City Region economy (both existing and in the future). A spatial focus on office and service industries in the city centre and high-value added manufacturing in the M1 corridor including the Lower Don Valley is central to the strategy.

Research recently undertaken by the Sheffield City Region Executive Team[18] and the local universities[19], drawing on an understanding of trends in the local economy and use of Yorkshire Forward's Regional Econometric Model, identifies a number of key economic sectors that provide the greatest potential to drive future productivity and growth in the City Region.

- ***Sheffield City Region Economic Assessment***

This provides a detailed and comprehensive economic assessment of the Sheffield City Region and has informed the Local Enterprise Partnership's strategy on key target sectors, as identified within the LEP Prospectus and the EZ proposal to Government.

The starting point of the analysis are the five 'priority sectors' identified by Yorkshire Forward as being *"key to the economic growth and development of the Yorkshire and Humber region",* including: advanced engineering and materials; healthcare technologies; food and drink (manufacturing); digital and new media industries; and environmental technologies.

Analysis for the Sheffield City Region found that these five sectors accounted for 16.6% of total employment in 2008, above both England and regional proportions and represents a strong base on which to build future economic growth. More specifically the Economic Assessment identifies that for the Sheffield City Region there is real focus on the advanced manufacturing and materials, and creative and digital sectors as two prime areas of activity for future growth.

- ***New Industries New Jobs – Shaping the future of the Sheffield City Region***

The '*New Industries New Jobs'* report, commissioned by Sheffield City Region, demonstrates how the private sector, working with the public sector and knowledge-based institutions such as the universities of Sheffield and Sheffield Hallam, can make the city region a knowledge hub for 'new industries and new jobs'. The report identifies four key sectors considered to offer the greatest potential to drive productivity growth in the City Region:

[18] Sheffield City Region Executive Team (2010) *'Sheffield City Region Strategic Economic Assessment*'
[19] University of Sheffield and Sheffield Hallam University (2010) *'New Industries New Jobs – Shaping the Future of the Sheffield City Region Economy'*

1. Advanced manufacturing (including materials and engineering) by drawing on the area's established base in manufacturing;
2. Healthcare – driven by the need to care for an ageing population in an affordable way – the city-region has strength in advanced engineering and materials research, a high concentration of medical device companies and a growing reputation as a centre for innovative healthcare technologies.
3. Digital and new media industries are growing at a faster rate in the Sheffield City Region than anywhere else in the UK in terms of number of companies and jobs, with Sheffield city centre one of the leading centres of creativity and digital innovation in the country.
4. Low carbon and environmental technology businesses are also identified as a key sector for the City Region. This builds on the strength in manufacturing, with focus on emerging opportunities including nuclear and carbon capture and storage.

In addition a number of other growth sectors are identified such as tourism, retail, construction and culture, leisure and sport. The growth in professional, financial and business services will provide the support to these sectors with a particular importance for services in Sheffield City Centre.

3.2 Propensity for Sheffield to benefit from HS2

3.2.1 Supporting Sheffield's balanced economy

As set out above, the current economic and land-use strategy for Sheffield is focused on creating an exemplar rebalanced economy. This strategy reflects the city's new economic structure. As shown in the tables below this confirms the city centre is the primary focus for business and employment density and particularly for service sector activities:

- Business and employment density in the City Centre is 4 times that of Meadowhall and the Lower Don Valley;
- Service sector employment in the City Centre is 12 times that of Meadowhall and the Lower Don Valley;
- There is a critical mass of service sector activities in Sheffield City Centre, accounting for 20% of the city region's services employment[20]; and,
- Retail activities are the dominant sector in the Meadowhall area representing 56% of total employment.

Numbers of businesses and employees by key sectors (2008)	City Centre (1km zone)		Rest of City Centre		Meadowhall (1km zone)		Sheffield district		Sheffield City Region	
	Businesses	Employees	Businesses	Employees	Businesses	Employees	Businesses	Employees	Businesses	Employees
Total Manufacturing	376	7,400	23	315	55	1,212	1,389	26,108	4,192	84,817
Total Retail	548	5,835	198	2,627	331	6,763	3,913	40,444	12,216	114,229
Total Services	1,299	33,536	428	8,805	163	2,816	7,680	90,788	21,646	215,369
Total Others	393	8,219	89	12,973	83	1,205	4,087	90,440	14,309	259,973
Overall Total	2,616	54,991	738	24,720	632	11,990	17,069	247,781	52,363	674,389

[20] The strength of the service sector in Sheffield district accounts for 42% of Sheffield City Region. This is at a similar level to Leeds which represents 40% of the Leeds City Region (although Leeds and the Leeds City Region has twice the number of jobs).

A more forensic analysis of the services sector demonstrates the concentration of particular types of activities within the city centre. As shown in the table below, 38% of the city-region's jobs in the financial and insurance activities are located in Sheffield City Centre. Other key sectors for the city centre include: professional, scientific and technical activities (20.3%) and administrative and support service activities (18.5%).

% of employees in Sheffield City Region (2008)	City Centre (1km zone)		Rest of City Centre		Meadowhall (1km zone)		Sheffield City Region
	Employees	%	Employees	%	Employees	%	Total Employees
I : Accommodation and food service activities	2,128	5.6%	1,696	4.5%	861	2.3%	38,106
J : Information and communication	2,077	14.1%	1,248	8.5%	117	0.8%	14,712
K : Financial and insurance activities	5,971	34.1%	696	4.0%	235	1.3%	17,518
L : Real estate activities	1,149	14.6%	392	5.0%	397	5.1%	7,848
M : Professional, scientific and technical activities	6,707	20.3%	968	2.9%	188	0.6%	33,073
N : Administrative and support service activities	7,989	18.5%	526	1.2%	850	2.0%	43,254
O : Public administration and defence; compulsory social security	5,552	15.6%	2,739	7.7%	47	0.1%	35,570
R : Arts, entertainment and recreation	1,036	7.4%	385	2.8%	10	0.1%	13,942
S : Other service activities	927	8.2%	155	1.4%	111	1.0%	11,346
Totals	**33,536**		**8,805**		**2,816**		**215,369**

The comparative physical characteristics and employment base of the city centre and the Meadowhall/Lower Don Valley areas are reflected in the different product mix and rental values in both locations.

As set out in the Knight Frank (2011) *'Market Activity Report'*, Sheffield is the principal commercial centre for the city-region, with the traditional office sector focused in the central core of the city centre. Within the city centre office developments are typically up to 5/6 storeys, with recent transactions setting a headline rent for the Sheffield market of £20.00 per sq ft. This is seen to underline the robust demand for the very best city centre accommodation as Sheffield has proved attractive to the market with prime yield improvement that compares favourably with other regional cities. Indeed, Sheffield is one of only three of the UK's regional markets to see prime headline rents rise in 2010. In contrast, the out-of-town office market, as seen at Meadowhall, is serving a different market with buildings typically of 2/3 storeys and rents of £12.50 per sq ft.

Despite Sheffield's relatively strong performance in terms of city centre rents, the current rental levels are still considered to be relatively marginal without some assistance in relation to the development of prime office space. The introduction of HS2 provides a real opportunity to provide a step-change in rents in the city centre. For example, a 20% uplift would see rents increase to £24.00 per sq ft in the city centre. This would make a substantial impact in terms of development viability improvements. In contrast, a 20% rent increase at Meadowhall up to £15.00 per sq ft is likely to have a minimal impact on the type of product that could be delivered in this area.

3.2.2 Potential of HS2 to influence key markets

As identified within current literature the cities that appear to have benefitted the most from HSR are those that are existing major regional centres servicing a wider region and those cities that are heavily orientated towards service sector business activities or committed to moving in this direction.

As set out above, the current economic and land-use strategy in Sheffield has seen a push towards rebalancing the economy. This has led to an increasing number of service

sector jobs and businesses over the past 30 years, with a major focus for such service sector activities within the city centre. Indeed 70% of jobs in the top ten private sector businesses in Sheffield are located in the city centre.

The coming of HS2 to Sheffield therefore represents a real opportunity to strategically reinforce and grow the burgeoning service sector activities in Sheffield.

3.2.3 Potential of HS2 to link with other investments in the city

The opportunity offered by HS2 and crucial to capturing maximum benefit of its development is to consider how it integrates with the fabric of the surrounding area and the services necessary to support new economic activities. Examples elsewhere identify that an HSR station has been influential in the development of new commercial areas with offices, hotels and conference facilities, retail and leisure – together with some high quality housing. Depending on the location of the HSR station this could involve further development within an existing commercial area or the redevelopment and regeneration of a designated area. Whatever the basis for the station location, the most effective HSR stations are seen to be those where cities use the HSR station as an integral part of the city strategy, that links with both past and future investments.

For Sheffield, HS2 provides a real opportunity to link with key investments. At Meadowhall, an HSR station would be servicing an area dominated by manufacturing and engineering businesses and would need to integrate into local and regional transport networks to access the existing major commercial centres. In contrast, an HSR station in the city centre would form part of the on-going physical transformation of the city centre. To date the focus has been on the development of award-winning quality public spaces that has led to developments such as Peace Gardens and Millennium Gardens. This is alongside a focus on stimulating a strong service base where innovation and information exchange can blossom. There has been support for a growing knowledge economy through investments such as Digital Campus, a burgeoning regional/national office base such as St Paul's and the city centre plays host to two leading Universities with over 58,000 students. The transformation of the city centre is continuing with Hammerson's planned £200m investment in the Sevenstone new retail quarter.

3.3 Maintaining transformational momentum

It is clear that the investments in both Sheffield City Centre and the Lower Don Valley have achieved significant physical transformation in terms of key new development and attracting employment. Although still a work in progress, Sheffield has achieved much to date. Sheffield has been transformed from a city in severe economic decline into a dynamic, modern city, identified as one of England's eight Core Cities with significant potential to drive national economic growth and rebalancing.[21]

HS2 now provides a real opportunity to further drive the economic growth momentum in Sheffield and the wider city-region. The location of the station is a key factor in ensuring that Sheffield can maximise the economic effects of HSR. The next section considers the relative merits of two station locations at Meadowhall and in the city centre.

[21] Core Cities Group 2011 - 'Driving Economic Recovery'

4 Station location – the economic case

4.1 Introduction

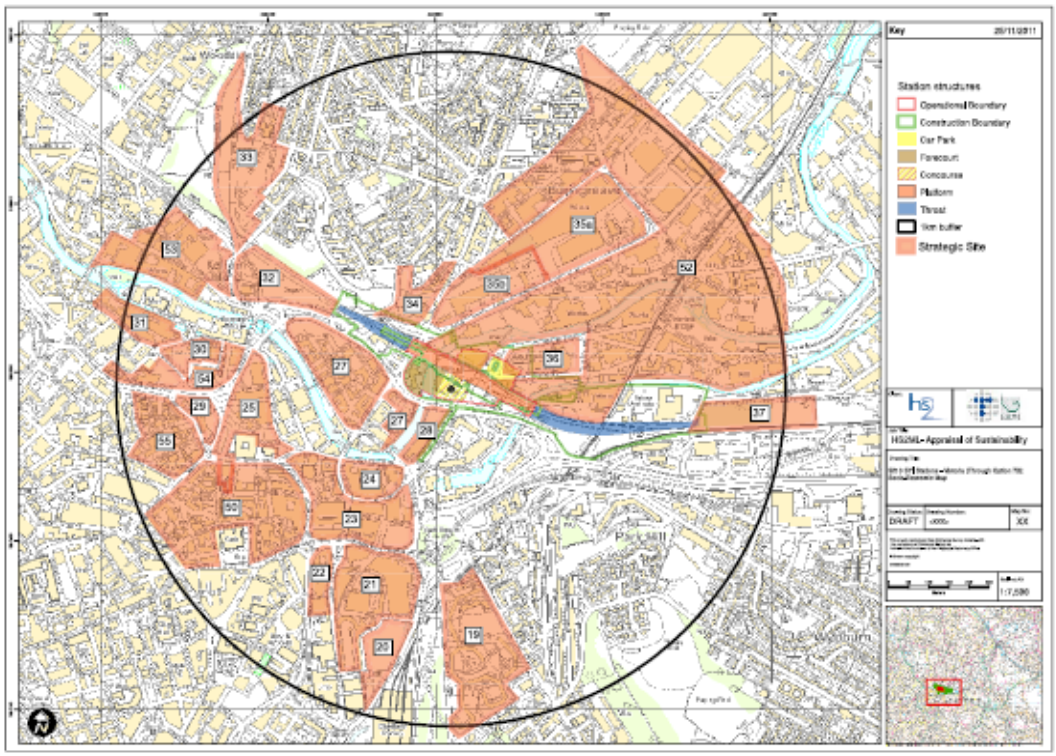
The location of the HS2 station in Sheffield will be critical in terms of securing maximum economic benefit from this major new investment. Like any new infrastructure, it will deliver catalytic effects by influencing, to a greater or lesser degree, the location, timing and form of investment decisions by others – this has been clearly demonstrated in the experience of other High Speed Rail stations in Europe and elsewhere. Indeed, it is widely accepted in other analyses that additional employment impacts are expected to be generated by HS2 as a consequence of the increased pace and density of development in the areas immediately adjoining new HS2 stations. In this context, the importance of the HS2 station location decision to the future of Sheffield's economy cannot be overstated. It will have fundamental implications for the delivery of the city's well established strategic economic ambitions and consequently for the wider City Region economy.

Station location choice will need to balance a number of factors, including cost, mainline location and connectivity to labour and passenger catchments, as well as maximising economic impacts. Decisions will need to give weight to economic impact considerations if the potential for HS2 to influence national economic growth is to be maximised.

Two alternative station locations have been proposed by HS2 following a multi-stage station short-listing process:

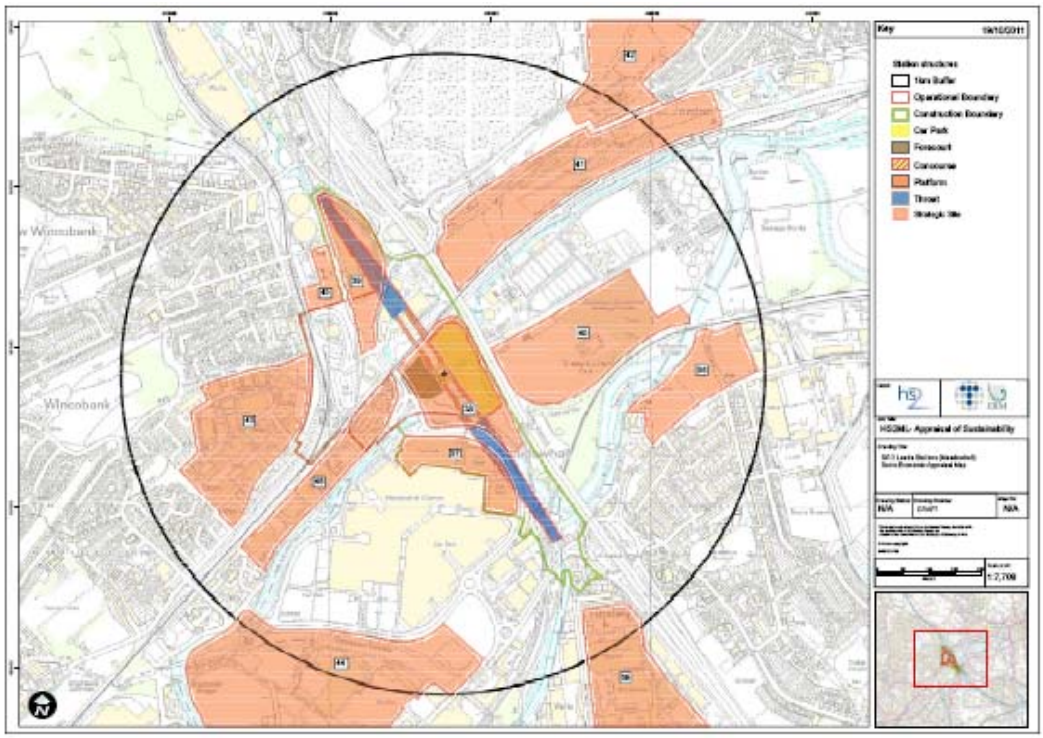
- **Victoria** – this location adjoins the heart of city centre and makes use of the existing east-west rail line on the northern edge of the city centre. The station location lies in an area of the city centre with major identified development potential to grow the city centre's commercial office core and associated uses. This is a recognised regeneration area known as Wicker Riverside, with a strategy seeking to create a new mixed use area, creating a seamless office quarter reconnected to the city centre.

Plan of the 1km zone around the proposed Victoria HSR station



- **Meadowhall** – this location lies 4 miles east of the city centre on the fringe of Sheffield's main urban area and adjoins the existing Meadowhall Regional Shopping Centre. The station location is close to the M1 motorway (junction 34) in the Lower Don Valley, the city's industrial heartland where advanced manufacturing activities are being actively promoted, including through Enterprise Zone designation.

Plan of the 1km zone around the proposed Meadowhall HSR station



These are very different station opportunities in spatial and economic terms;

- They play distinct, albeit complementary, roles in the growth of the city economy, as confirmed in a range of strategy statements;
- Victoria lies within an area being promoted for growth of the service sector through office development linked to the city centre's assets;
- Meadowhall falls within the Lower Don Valley where the focus of development will be predominantly in the manufacturing sector;
- Each location offers different levels of accessibility to the city / city region labour catchment as well as to HS2 users;
- Each has a different capacity for development in the zone around the station in terms of identified development opportunities that will be influenced by proximity to HS2 services.

As such the potential economic impacts of the HS2 station in these alternative locations will differ markedly both directly and indirectly.

The relative merits of each alternative location in terms of securing catalytic economic impacts for Sheffield are considered below, reflecting on the following factors:

- Place-making effects and regeneration impacts;
- Propensity to attract added value economic activity to the city;
- Maximising development outcomes in the station area;
- Accessiblity to target labour markets and users.

4.2 Place-making effects and regeneration impacts

Sheffield's HS2 station will create a major new gateway to the city. It will play an important role in developing the city's distinctive brand and image. The physical presence of the station and associated developments offers an important opportunity to enhance the profile and marketability of Sheffield as a UK Core City, as well as contributing to the sense of arrival in a major urban centre. The extent of this place-making impact will vary depending on the physical context of the chosen station location and the opportunities available for new development to create a distinctive city gateway.

Moreover, the scale of investment proposed in new station development has the potential to act as a major stimulus to area regeneration through property market effects and the linked investments that will flow. As such, place-making impacts will be maximised in a location in which the station has the greatest potential to act as a driver of urban change.

HS2 at Victoria

At Victoria the HS2 station will play a key role in area regeneration. It will act as the centrepiece of a wider area development plan across Wicker Riverside, linking directly to the city centre, extending the concentration of service sector business activity in this part of the city. In this location the HS2 station will act as a major investment catalyst, repositioning the profile and image of this part of the city centre and contributing directly to established regeneration objectives. It will become a defining physical feature of the locality and be instrumental in driving regeneration momentum. Direct accessibility from the core city centre will ensure that it becomes an integral element of the city centre asset base, adding to the established and improving range of business infrastructure. Importantly, HS2 users will be able to access the city centre, Sheffield's core service business destination, without further transport interchange.

Importantly, a station investment at Victoria would underpin the ongoing transformation of Sheffield city centre as a primary economic driver for the city region. A number of other key investments will be influenced by the location choice, such as Hammerson's proposed investment in a New Retail Quarter in the city centre. There is a clear potential that a decision to locate the HS2 station at Victoria could reinforce the established strategy for the city centre and provide the long term investment confidence required to secure this and other pipeline development projects. A decision to invest at Meadowhall may place the continued delivery of city centre regeneration in jeopardy.

HS2 at Meadowhall

At Meadowhall the HS2 station will be located in an area of very different character. The location is defined by the established shopping mall and the M1 motorway, together with a concentration of larger scale manufacturing operations. It is, to all intents and purposes, a 'place apart' from Sheffield city centre and has been a focus for larger scale forms of investment, unsuitable for the city centre, as part of the balanced economic strategy for the city. The M1 provides an existing gateway for the city for car borne commuters and the retail centre is a major regional destination for shopping and leisure. There is an existing major sewerage works located close to the proposed HS2 station and there are advanced proposals for a bio-mass power station in the vicinity. The introduction of an

HS2 station in this location would have limited, direct economic integration with existing activities and little significant new place-making effect. While the station would have some catalytic effect on development outcomes in the area, it will not create the transformational impacts that could be achieved at Victoria – the physical centrepiece of the area will continue to be Meadowhall shopping centre, essentially an inward-looking development, the form and function of which will not be influenced by the HS2 station. Moreover, the Lower Don Valley will continue to be promoted as a focus for modern manufacturing businesses, with much less synergy with the economic potential of HS2 than would be the case in the city centre where service sector businesses predominate.

4.3 Attracting added value economic activity to the city

Evidence from other High Speed Rail station investments has demonstrated a propensity to attract and serve particular forms of business activity – principally higher value service sector businesses seeking the inter-city connectivity advantages that proximity to High Speed Rail can offer. Sheffield is making strong progress in building its service sector economy, complementing the ongoing transformation of its manufacturing base. For the city to gain maximum economic benefit from HS2, the selection of station location should have regard to the prospects for attracting service sector business activities to locate within the development zone around the station. This zone has been defined a 1km around the station.

HS2 at Victoria

The HS2 station at Victoria would have a development zone extending into the city centre. As outlined in section 3, the city centre has demonstrated a strong propensity to attract office based service businesses – it has 12 times as many service sector employees compared to the 1km zone around Meadowhall. Within 15 minute walk time (1km zone) there are approximately 55,000 people in employment, with over 33,500 people employed in service sector activities. The city has had some notable successes in attracting inward investment from major service sector companies, with the city centre being the preferred location in most cases. Indeed, 70% of the total employment in Sheffield's 10 largest employers falls within the city centre. Given proximity to the city centre, a Victoria HS2 station would therefore lie within an area with a demonstrable potential to attract service sector activities of the type likely to be most influenced by proximity to an HS2 station.

Moreover, the city centre contains the full range of assets required to attract and grow service sector business activity, particularly higher value sectors seeking not only high levels of inter-city connectivity but also access to innovation related assets, such as the Universities, high quality cultural and leisure facilities and vibrant urban working environments.

HS2 at Meadowhall

In contrast, the area around the Meadowhall station location has comparatively limited service sector business activity in the 1km zone and does not possess the wider range of assets capable of attracting high value service sector businesses. It continues to be attractive for modern manufacturing activity, drawn by land availability, motorway access and, now, through Enterprise Zone benefits, but there is no evidence to suggest that such activities are directly influenced in their location decisions by proximity to High Speed Rail. Thus, there is a clear prospect that an HS2 station at Meadowhall would have much less potential than Victoria to act as an attractor for the type of high value service sectors that Sheffield is seeking to develop. This differential is quantified in section 5.

4.4 Maximising development outcomes

The comparative analysis of potential development outcomes around the station options of Victoria and Meadowhall has confirmed that, over a 20-30 year time horizon, the relative development capacity around each location is markedly different. In gross terms, the SIFT 3 assessment confirmed a potential new employment capacity around Victoria almost double that for Meadowhall. This, combined with the clear propensity for Victoria to be a more attractive location for service sector business growth than Meadowhall, would in itself provide a strategic economic rationale to support a preference for the HS2 station to be located at Victoria.

Importantly, however, there is also a clear differential between the locations in terms of the type and value of business activity and employment likely to grow in response to the presence of HS2. In part this is demonstrated by the type of property product deliverable in these alternative locations.

HS2 at Victoria

In market terms, the city centre is a proven location where property market fundamentals are in place, and a number of national and regional occupiers are in evidence. In the city centre, Grade A office space has been delivered by the private sector to meet the needs of regional and national occupiers seeking high quality facilities in a central location, close to the range of other economic, cultural and place assets on offer. Rental levels in excess of £20 per sqft have been achieved in the city centre, enabling such high quality property investments to proceed. National occupiers such as HSBC and Aviva have been attracted as a consequence, bringing genuine added value to the city's employment base rather than displacing employment from elsewhere in the city region.

HS2 at Meadowhall

The area and Meadowhall in the Lower Don Valley has attracted limited office-based service sector business activity. While some small-scale office development has occurred, this has been comparatively low quality and scale, targeting small businesses. Rental levels for office space in the vicinity of Meadowhall are in the order of £12.50 per sqft, insufficient to generate investment interest in Grade A space. This is in part due to the nature of this location, remote from the other city centre assets that, in combination, can attract major office occupiers. The provision of an HS2 station at Meadowhall may have some marginal uplifting effect on demand and thus office rental levels in the vicinity, but the absence of the wider locational assets found in the city centre will remain a constraint. As a result, the type of service business activity most likely to be attracted to locate in proximity to an HS2 station at Meadowhall would be lower value, local and sub-regional businesses. Such activities would have a greater propensity to be displaced from elsewhere in the city region rather than be genuine inward investments.

Consequently, the economic value to the city is likely to be much less than in the case of higher value, city centre-based business activities. This differential in economic value between HS2 at Victoria and at Meadowhall is examined in more detail in section 5.

4.5 Accessibility to target labour markets and HS2 users

Continued business growth in Sheffield requires effective access to a diverse and skilled labour pool. The alternative locations for Sheffield's HS2 station offer quite different propositions in terms of accessibility to the city region labour markets that will support business growth in the city.

The business sectors most likely to be influenced by the introduction of HS2 connectivity in Sheffield will be higher value service sector activities, seeking access to higher skilled labour resources. The focus of these activities in the city centre is reflected in the

concentration of graduate level employees in employment in city centre office-based businesses.

Equally, analysis of potential passengers for HS2 in Sheffield [ref?] has confirmed that a high proportion of passengers will be from professional and managerial occupations seeking to benefit from high speed access to other UK cities, particularly London. Mapping of projected HS2 patronage clearly demonstrates that the greatest concentration of users will be derived from areas to the south west of Sheffield District. On this basis, the location of the HS2 station could have significant implications both for its accessibility and therefore attractiveness for potential passengers and for its ability to stimulate growth in target economic sectors in the city economy.

HS2 at Victoria

An HS2 station at Victoria would be highly accessible to residents to the south west of Sheffield. There are direct public transport links to Sheffield city centre, enabling potential passengers for HS2 to access the station without the need for interchange, thus maximising the convenience and thus propensity for use. Equally, business growth linked to the station would benefit from ready access to the south west Sheffield labour pool, enhancing the competitiveness of the city centre as a business hub.

HS2 at Meadowhall

In contrast, Meadowhall is comparatively remote from south west Sheffield. While arguably better located for wider access to the Sheffield City Region labour market, passenger projections suggest that a limited proportion of HS2 users will come from outside of Sheffield District. Thus, for HS2 to have maximum economic benefit for the City Region, effective access to south west Sheffield residents will be a key factor. Access to a station at Meadowhall by public transport would require interchange in the city centre, thus reducing user convenience and efficiency. Access by car would also be constrained by the growing levels of congestion in the road network between south west Sheffield and Meadowhall. Consequently, the ability of an HS2 station at Meadowhall to maximise economic impact for the city and city region and to maximise convenience and efficiency for target users would be compromised.

4.6 Summary

The selection of a preferred location for Sheffield's HS2 station has important ramifications for the delivery of the city's economic strategy objectives. This will be a major new investment in the city and its location will create a new and high profile gateway and focus for business growth. Getting maximum economic value for the city and city region is critical objective for the City Council and wider stakeholders.

In terms of economic benefits, a city centre-based location at Victoria would align fully with the ongoing efforts to regenerate the city centre and act as a major catalyst in accelerating city centre development. A decision to locate the station at Victoria could reinforce momentum in the delivery of key pipeline investments in the city centre.

At Meadowhall, the context is very different. The propensity for HS2 to influence business location decisions and to create a new business hub is considerably weaker given that this location lacks the wider assets required to grow the service sector businesses most likely to cluster around a station investment. While a Meadowhall station would benefit from linkages to the M1, it is remote from the target passenger and labour markets in south west Sheffield, which can access Victoria by public transport without the need for interchange.

The SIFT 3 analysis has confirmed that the development and employment generating capacity of sites in the vicinity of Victoria far exceed the potential at Meadowhall. On this

basis, there is a strong strategic economic rationale for supporting an HS2 station at Victoria rather than Meadowhall.

The following section seeks to examine the relative value of the economic benefits to be derived from development at each alternative location.

5 Measuring the relative impact of City centre or Meadowhall locations

The development of a HSR link in Sheffield would create development capacity that will generate a range of economic impacts in the Sheffield economy. These would include direct and indirect employment and GVA impacts as a result of potential new commercial floorspace and increased business activity.

A key question however, is to assess how the potential impact varies between the location of the HSR station on the edge of Sheffield City Centre and at Meadowhall.

Drivers Jonas Deloitte and SKM Colin Buchanan have looked at this issue as part of their Sift 3 analysis. This work has undertaken detailed modelling of projected development impact within 1km zones around the two locations, netting off their assessment of projections of what is likely to come forward without HS2.

In this section, GENECON have extended this Sift 3 analysis to project potential employment GVA impact, as well as consideration of different additionality impacts at the two locations, given that the development proposition at Meadowhall has a greater propensity to result in sub-regional displacement within the Sheffield City Region, given it has lower property product quality and rental values when compared with Sheffield City Centre.

A detailed step by step narrative of the GENECON analysis is set out at Annex 1. This section summarises the main highlights.

5.1 Sift 3 impact assessment

The Sift 3 analysis considered the development impacts of an HS2 station at Meadowhall and at Victoria in Sheffield City Centre. This analysis identifies that they consider Victoria would be the location which supports a higher development impact compared with Meadowhall as a result of HS2 and the primary factors for this include:

- Better accessibility and connectivity to major development sites moving southwards towards the city centre in comparison to Meadowhall; and
- A greater regeneration potential than Meadowhall due to the proximity to the city core and potential for higher density development.

The table below provides a summary of the Sift 3 analysis in terms of potential development outputs within the 1km zone around the two station locations. This includes projections of estimated development that may be supported over the next 25 years under both 'with' and 'without' HS2 scenarios (Projection 1 below), as well as a more aspirational scenario if higher densities were permitted (Projection 2).

Sift 3 Projection 1: Additional floorspace, job and residential unit outputs supported by HS2 (i.e. after deducting off projected development without HS2)

Station option	Commercial	Residential	Jobs	Residential units
Meadowhall	120,000 sq.m	20,000 sq.m	5,200	350
Victoria	170,000 sq.m	40,000 sq.m	9,400	650

Sift 3 Projection 2: Additional floorspace, job and residential unit outputs supported by HS2 in more aspirational policy environment (i.e. after deducting off projected development without HS2)

Station option	Commercial	Residential	Jobs	Residential units
Meadowhall	140,000 sq.m	30,000 sq.m	6,200	500
Victoria	220,000 sq.m	50,000 sq.m	12,100	800

The Sift 3 analysis estimates that the number of jobs supported by HS2 will range from 5,200 to 12,100 depending on station location with "*a station at Sheffield Victoria having a significantly greater impact than that at Meadowhall*".

5.2 Quantifying *Gross* Economic Impacts from HS2 in Sheffield

Set out below is GENECON's step by step approach to calculating projected employment GVA impacts on the Sheffield economy. This analysis builds on the Sift 3 projections of gross additional impacts.

Step 1: Re-create Sift 3 gross job allocations across principal uses

As GENECON has not had access to the Sift 3 sectoral jobs allocation, this has been estimated from floorspace figures provided in the Sift 3 Annex for Projection 1 figures:

	Victoria	Meadowhall
Retail	600 jobs	350 jobs
Leisure	-	200 jobs
Education	400 jobs	-
Office	6,900 jobs	2,100 jobs
Other	1,500 jobs	2,550 jobs
TOTAL	**9,400 jobs**	**5,200 jobs**

Step 2: Refinement of gross jobs projections and apportionment across sectors

A further refinement of the job allocations set out in Step 1 has been to apportion job numbers across sectors, based upon the existing job profiles in the City Centre and at Meadowhall. To allocate the 'Office and Other' allocations, this analysis allocates across the service and manufacturing sectors in accordance with the existing profiles at each location.

	Victoria	Meadowhall
Manufacturing	-	1,275 jobs
Wholesale & retail trade	600 jobs	350 jobs
Accommodation and food service	533 jobs	1,036 jobs
Information & communication	520 jobs	142 jobs
Financial and insurance services	1,496 jobs	284 jobs
Real estate activities	288 jobs	476 jobs
Professional, scientific, technical	1,680 jobs	226 jobs
Administrative and support service	2,001 jobs	1,023 jobs
Public admin & defence	1,391 jobs	57 jobs
Arts, entertainment and recreation	259 jobs	200 jobs
Other service	232 jobs	132 jobs
Education	400 jobs	-
TOTAL	**9,400 jobs**	**5,200 jobs**

Step 3: Sectoral GVA projections

GENECON have then drawn on recognised sectoral GVA data, utilising the Yorkshire & Humber Regional Econometric Model to apply a GVA per job output for each gross additional job apportioned across identified sectors.

This analysis enables per annum projections on GVA impacts, indicating that by the time all the development has been built out and jobs are in place (SIFT 3 suggests this would be around Year 25 from the point of station decision), the GVA differential would be as follows:

- HS2 station at Victoria: Gross per annum GVA impact at Year 25: £404m
- HS2 station at Meadowhall: Gross per annum GVA impact at Year 25: £192m

Step 4: Calculating cumulative GVA over the 25 year build-up period

To calculate cumulative GVA impact over the 25 year build-up period, without access to the SIFT 3 build-up model, GENECON have applied a cautious take-up projection profiled out over the 25 year period, broadly following a standard S-curve approach over this period.

For this analysis, two approaches to calculating cumulative GVA have been followed:

- Version 1: Cumulative GVA calculated from annual take-up projections and therefore jobs for each year according to the 25 year S-curve development profile. A 10 year

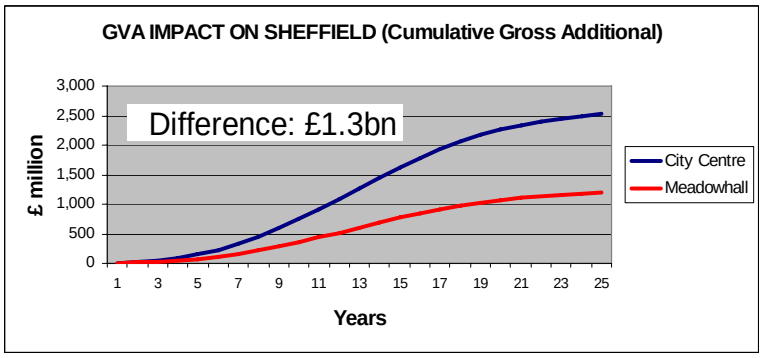
persistence and 10% pa decay assumption has been applied to job impact profiles.[22] (i.e. GVA from jobs created in Year 1 assumed to last until Year 10); and

- Version 2: Cumulative GVA impact of jobs generated calculated over the full 25 year period, excluding persistence and decay assumptions.

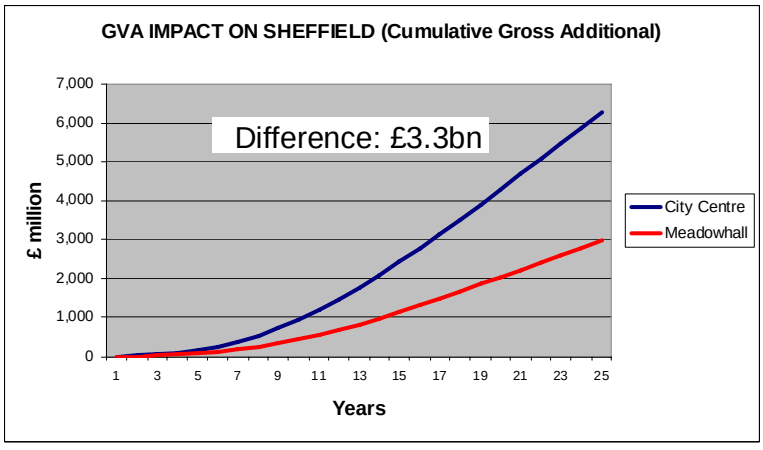
The tables and graphs set out below summarise the Gross Cumulative and NPV of the GVA impact for both Versions 1 and 2 at both station locations. This analysis identifies that an HS2 station at Victoria would generate additional GVA over and above locating at Meadowhall:

- Gross Cumulative additional GVA impact: between £1.3bn and £3.3bn; and
- NPV Cumulative additional GVA impact (before additionality): between £880m and £1.94bn

The following graphs have been prepared to illustrate the Gross Cumulative impact figures, and the two approaches to calculating this impact as follows:



Calculation Approach 1 - Decay factor, Persistence 10 Years (uses PwC methodology)



Calculation Approach 2 - Full GVA p.a impact over 25 year period

5.3 Quantifying *Net* Economic Impacts from HS2 in Sheffield

GENECON have further refined the gross GVA impact analysis outlined above to assess the net additional GVA impact of the two station locations. Principally this takes account of additionality factors namely displacement and multipliers, with both factors differing at the two station locations.

[22] In accordance with the methodology introduced by PwC (2008) *'National Report for RDA evaluation'*

The following summarises a narrative of the approach taken, with more detail provided at Annex 1.

Step 5: Displacement adjustment

GENECON has applied differential displacement assumptions to the S-curve development take-up profile applied at Step 4. This is based on the property product likely to be catalysed by the HS2 station and will be very different at the two station locations. There is a significant body of economic impact analysis and research that identifies HSR stations have the highest propensity attract high-value service sectors. Indeed, as set out in section 2.1.3 some research has pointed to an even greater impact where service sector activities already form a key function in the city.

The argument is therefore made here that as well as the gross additional impact differential highlighted in the Sift 3 report, there will be differential in additionality effects. The critical mass of service sector employment already established in Sheffield City Centre alongside other core city centre assets in place (e.g. universities, high quality public realm, conference and cultural facilities, hotels, restaurants and bars) means that the City Centre will have a higher propensity to attract businesses from outside the sub-region and as such will be much better able to afford to occupy Grade A office space.

By contrast, the development product at Meadowhall is much more likely to be constrained by the current rental level differential (£12.50/sq.ft for office space at Meadowhall compared with £20/sq.ft in the City Centre). As a result, the development product at Meadowhall is likely to remain lower quality, lower rise and therefore much more likely to attract the type of business occupier looking to expand and relocate within the city region - in economic terms simply displacing activity within the sub-region.

As such, GENECON considers that it is appropriate to apply different displacement assumptions in the two station locations. Our view is that displacement levels will compare as follows:

- ***Meadowhall:*** *50%-70%*
- ***Victoria, City Centre***: 35%-50%

Step 6: Multipliers

GENECON has then applied differential employment multipliers on a sectoral basis to the job projections outlined in Step 2. Multipliers have been drawn from the Scottish Government's work on Type 2 multipliers (taking account of direct, indirect and induced effects), to define distinct multipliers for different sectors of the economy.

❑ *Net Additional economic impact – Year 25 per annum GVA impact*

The outcome of Steps 5 and 6 (tabulated analysis is presented at Annex 1) is an assessment of net additional GVA impact resulting from these adjustments. As a result, this increases the per annum employment GVA figures as follows:

- HS2 station at Victoria: Net Additional per annum GVA impact at Year 25: £448m
- HS2 station at Meadowhall: Net Additional per annum GVA impact at Year 25: £120m

Outcome: this equates to an additional £256m Net Additional per annum GVA impact at Victoria.

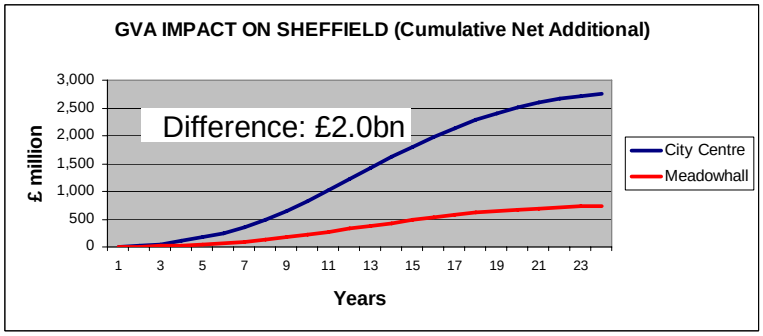
❑ *Net Additional economic impact – cumulative GVA impact over 25 years*

The tables and graphs below summarise the Net Additional cumulative and net present value of the GVA impact for both Versions 1 and 2 at the two station locations.

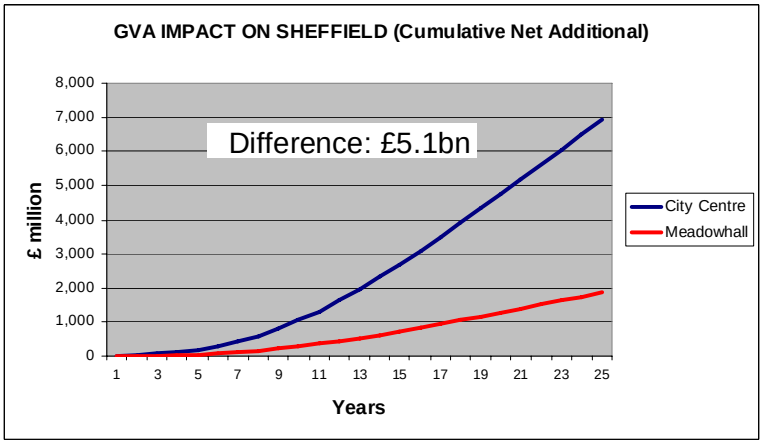
GENECON's view is that these should be presented as a range and indicate that a station at Victoria would generate additional GVA over and above its location at Meadowhall as follows:

- Net Additional Cumulative GVA impact (gross): between £2.0bn and £5.1bn; and
- Net Additional NPV Cumulative GVA impact: between £1.35bn and £3.0bn.

The following graphs illustrate the Net Additional Cumulative impact figures based on the two approaches to calculating impact:



Calculation Approach 1 - Decay factor, Persistence 10 Years (uses PwC methodology)



Calculation Approach 2 - Full GVA p.a impact over 25 year period

Step 7: Sensitivity analysis

GENECON has run sensitivity checks at the upper and lower displacement level boundaries. The resulting sensitivity figures are shown at the end of Annex 1. For the two calculation approaches this identifies that the additional GVA impact of the HS2 station located at Victoria would lie in a range between £1.8bn to £5.4bn, when compared against a station located at Meadowhall.

6 Conclusions

High Speed Rail presents a real opportunity for the UK's cities, offering a modern, world class, efficient and dynamic transport system that will assist in spreading prosperity and productivity across the UK, enabling cities to remain competitive in an international marketplace and contribute to the rebalancing of the UK economy by serving the regions outside of London. HSR will provide cities with a major opportunity to accelerate economic growth and business development, creating major new development gateways and contributing to brand and image.

For cities that form part of the HSR network, a key issue in terms of maximising impact and economic benefit relates to the location of the station. For Sheffield and the wider city region, the issue of the station location will have important ramifications in terms of the city's ability to maximise economic effects in particular through service sector growth and agglomeration. Evidence from other locations confirms the propensity for service sector businesses to cluster around HSR stations. On this basis, to maximise economic benefits from HSR investment, stations should be located where they offer greatest prospects for attracting and growing service sector activities.

In Sheffield, two alternative station options have been proposed by HS2 following a multi-stage station short-listing process. These two alternative locations offer very different opportunities in spatial and economic terms. Victoria is located close to the city centre in the heart of a recognised regeneration area, with a focus on creating a new office and mixed-use quarter seamlessly linked to the city centre core. Meadowhall is located 4 miles east of the city centre in the Lower Don Valley, the city's industrial heartland where the focus is on developing advanced manufacturing activities. As gateways to Sheffield, the two alternatives present very different propositions, with the Victoria context offering greater potential for the HS2 station to influence and accelerate development outcomes.

There is a continued drive within city and city-region economic policy to build the assets needed to support growth, develop competitive economic sectors and create an exemplar balanced economy. The focus for the city centre is to be a key driver for the city region, a focus for service activities and new office, leisure and retail development. In contrast, the focus for Meadowhall and the Lower Don Valley is on developing advanced manufacturing and engineering, with this role reinforced by the designation of this area as part of the Sheffield City Region Enterprise Zone as a Modern Manufacturing and Technology Growth Area.

The quantitative assessment of economic impacts presented have refined HS2 Ltd's Sift 3 analysis of development and employment capacity, to provide a comparison of the net additional employment and Gross Value Added (GVA) projected from the alternative station locations. Overall, this identifies the potential to generate between £2bn and £5bn net additional economic value over 25 years if the Victoria station option be selected.

The location of the HS2 station is crucial to the future of Sheffield. The Victoria option would reinforce the existing strategy focus on the city centre, stimulating new quality development opportunities and investment in line with the City Region's economic ambitions.

Annex I

Direct and Indirect Economic Impact Analysis

INTRODUCTION

The following narrative walks step by step through the approach GENECON has taken to developing the assessment of Gross and Net Additional GVA impact of the two HS2 station locations building from the Sift 3 draft report produced for HS" Ltd by Drivers Jonas Deloitte and SKM Colin Buchanan (December 2011).

The Net impact assessment considers the Net Additional impact after taking into account displacement and multiplier effects.

GENECON's analysis assesses the potential to generate an additional £2bn-£5bn of Net Additional cumulative GVA impact over the 25 years from the point the location decision is taken, in favour of the HS2 station being located at Victoria compared with locating the station at Meadowhall.

Approach to Quantifying Gross Economic Impacts from HS2 in Sheffield

Step 1: GENECON has drawn on the projected gross additional impact of HS2 as set out in the work undertaken by Drivers Jonas Deloitte and SKM Colin Buchanan in the SIFT 3 draft document (12th December 2011). This set out the following gross economic outputs:

- Victoria – Office and Commercial (162,400 sqm) = 9,400 jobs; Residential (54,000 sqm) = 900 units
- Meadowhall – Office and Commercial (115,600 sqm) = 5,200 jobs; Residential (23,000 sqm) = 384 units

GENECON has not had access to the SIFT 3 jobs allocation, so this has been estimated as follows:

SIFT 3 - Victoria						
	TOTAL floorspace (sq.m)	Sift 3 Gross additional (sq.m) (i.e. after deducting space likely to come forward without HS2)	Density basis	GIA/NIA	Sq.m / job	Job estimates for allocation
Retail	64,528	16,349	NIA	0.7	19	600
Leisure	26,434	-2,398	GIA	1	50	
Education	27,148	12,635	GIA	1	30	400
Office	285,280	111,075	GIA	1	16	6900
Other	60,650	24,875	GIA	1	16	1500
						9400
TOTAL	464,040	162,536				
Residential	185,910	53,974				

SIFT 3 - Meadowhall						
	TOTAL sq.m	Gross additional sqm				Jobs
Retail	46,834	9,483	NIA	0.7	19	350
Leisure	57,468	9,097	GIA	1	50	200
Education	0	-4,940	GIA	1	30	
Office	73,651	33,631	GIA	1	16	2100
Other	86,118	68,320	GIA	1	27	2550
						5200
TOTAL	264,071	115,591				
Residential	122,434	23,289				

Step 2: GENECON has then further refined this Gross Jobs analysis, apportioning the estimated gross jobs across sectors. The basis for this has been apportionment in accordance with the existing job profiles across the City Centre and Meadowhall.

This analysis considers those sectors with the greatest propensity to benefit from HSR (Services – finance, business and professional services; accommodation and food service activities; Some Retail and some Education activities).

Step 3: GENECON has then drawn on recognised sectoral GVA data, based on the Yorkshire & Humber Regional Econometric Model. The approach is to apply a GVA per job output for each gross additional job split by identified sectors.

Steps 2 and 3 are shown in detail in the tables overleaf, and the final column shows the per annum GVA impact assuming all development has been built out and jobs are in place (SIFT 3 suggests this would be around Year 25 from the point of station decision):

- HS2 station at Victoria: Gross per annum GVA impact at Year 25: £404m
- HS2 station at Meadowhall: Gross per annum GVA impact at Year 25: £192m

GVA Impact analysis - City Centre

	City Centre (1km zone)			Job Projections		
	Businesses (from ABI)	Employees (from ABI)	Section % of Total Services	Sift 3 job estimates allocated across sectors	GVA per job (source REM, 2011)	Sift 3 Gross additional GVA impact (£m)
Manufacturing					£41,528	
C : Manufacturing	376	7,400				
Total	376	7,400				
Retail						
G : Wholesale and retail trade; repair of motor vehicles and mo	548	5,835		600	£30,554	18
Total	548	5,835				
Services (likely to be impacted by HSR)					£39,516	
I : Accommodation and food service activities	160	2,128	6.3%	533	£22,650	12
J : Information and communication	127	2,077	6.2%	520	£60,181	31
K : Financial and insurance activities	114	5,971	17.8%	1,496	£75,876	113
L : Real estate activities	112	1,149	3.4%	288	£34,862	10
M : Professional, scientific and technical activities	370	6,707	20.0%	1,680	£34,862	59
N : Administrative and support service activities	225	7,989	23.8%	2,001	£34,862	70
O : Public administration and defence; compulsory social secu	48	5,552	16.6%	1,391	£42,873	60
R : Arts, entertainment and recreation	49	1,036	3.1%	259	£42,873	11
S : Other service activities	94	927	2.8%	232	£28,711	7
Total	1,299	33,536				
Others					£34,122	
A : Agriculture, forestry and fishing	3	40				
B : Mining and quarrying	4	1				
D : Electricity, gas, steam and air conditioning supply	2	170				
E : Water supply; sewerage, waste management and remediat	15	408				
F : Construction	145	1,944				
H : Transportation and storage	58	2,856				
P : Education	47	1,048		400	£33,728	13
Q : Human health and social work activities	119	1,752				
T : Activities of households as employers;undifferentiated good	0	0				
U : Activities of extraterritorial organisations and bodies	0	0				
Total	393	8,219				
Overall Total	**2,616**	**54,991**		**9,400**		**404**

GVA Impact analysis - Meadowhall

	Meadowhall (1km zone)			Job Projections		
	Businesses (from ABI)	Employees (from ABI)	Section % of Total Services	Sift 3 job estimates allocated across sectors	GVA per job (source REM, 2011)	Sift 3 Gross additional GVA impact (£m)
Manufacturing						
C : Manufacturing	55	1,212		1,275	£41,528	53
Total	55	1,212				
Retail						
G : Wholesale and retail trade; repair of motor vehicles and mo	331	6,763		350	£30,554	11
Total	331	6,763				
Services (likely to be impacted by HSR)					£39,516	
I : Accommodation and food service activities	43	861	30.7%	1,036	£22,650	23
J : Information and communication	10	117	4.2%	142	£60,181	9
K : Financial and insurance activities	22	235	8.4%	284	£75,876	22
L : Real estate activities	8	397	14.1%	476	£34,862	17
M : Professional, scientific and technical activities	19	188	6.7%	226	£34,862	8
N : Administrative and support service activities	39	850	30.3%	1,023	£34,862	36
O : Public administration and defence; compulsory social secu	1	47	1.7%	57	£42,873	2
R : Arts, entertainment and recreation	5	10		200	£42,873	9
S : Other service activities	16	111	4.0%	132	£28,711	4
Total	163	2,816				
Others					£34,122	
A : Agriculture, forestry and fishing	0	0				
B : Mining and quarrying	0	0				
D : Electricity, gas, steam and air conditioning supply	0	0				
E : Water supply; sewerage, waste management and remediat	3	62				
F : Construction	29	491				
H : Transportation and storage	26	319				
P : Education	11	207				
Q : Human health and social work activities	14	126				
T : Activities of households as employers;undifferentiated good	0	0				
U : Activities of extraterritorial organisations and bodies	0	0				
Total	83	1,205				
Overall Total	**632**	**11,990**		**5,200**		**192**

Step 4: To calculate cumulative GVA impact over the 25 year build-up period, as GENECON has not had access to the SIFT 3 build-up model, GENECON has applied a cautious take-up projection profiled out over the 25 year period, broadly following a standard S-curve approach over this period.

2 approaches to calculating cumulative GVA have been followed:

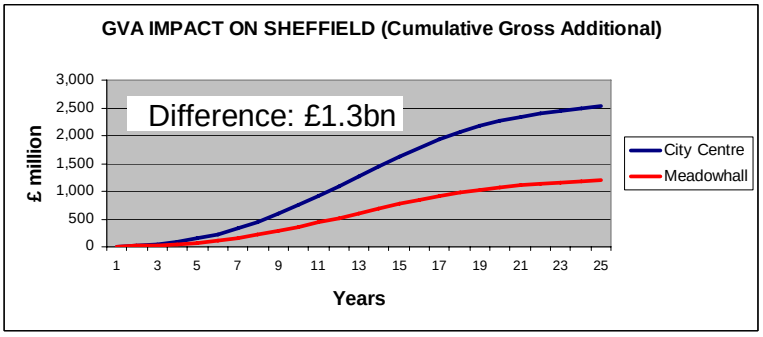
- Version 1: Cumulative GVA calculated from annual take-up projections and therefore jobs for each year according to the 25 year S-curve development profile, but with a 10 year persistence and 10% p.a decay assumptions applied to job impact profile in accordance with the methodology introduced by PwC in their National Report for RDA evaluation undertaken for DBERR in 2008 (i.e. GVA from jobs created in Year 1 assumed to last until Year 10); and
- Version 2: Cumulative GVA impact of jobs generated calculated over the full 25 year period, excluding persistence and decay assumptions.

The tables and graphs below summarise the Gross Cumulative and NPV of the GVA impact for both Versions 1 & 2 at both station locations. GENECON believes these should be presented as a range, and in summary show that a station at Victoria would generate additional GVA over and above its location at Meadowhall as follows:

- Gross Cumulative GVA impact: between £1.3bn and £3.3bn; and
- NPV Cumulative GVA impact (before additionality): between £880m and £1.94bn

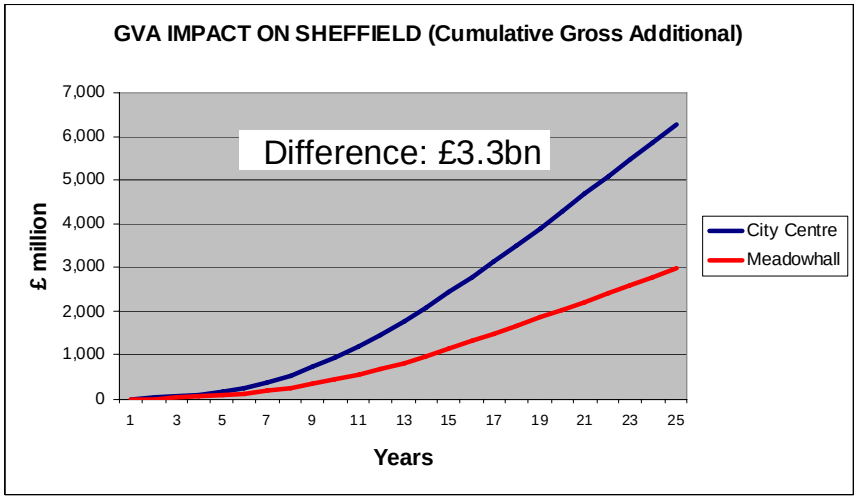
VERSION 1 - Decay factor, Persistence 10 Years

SIFT 3	Year 25 GVA p.a impact	Profiled over Years 1 - 25 from decision	
	Gross Additional (£m)	Gross Cumulative GVA impact	Gross NPV GVA Impact
CITY CENTRE	£404.5m	£2530m	£1670m
MEADOWHALL	£192m	£1200m	£790m
DIFFERENCE	**£212m**	**£1300m**	**£880m**



VERSION 2 - Full GVA p.a impact over 25 year period

CITY CENTRE	As above	£6270m	£3700m
MEADOWHALL	As above	£2980m	£1760m
DIFFERENCE	**As above**	**£3300m**	**£1940m**



Notes on calculating GVA impact and assumptions re. 'Persistence' and 'Decay'

1. Time horizon for calculating GVA impact

Taken as the 25 years from the decision taken on the location of the HS2 station, given that the SIFT 3 analysis has calculated job impact on this basis.

2. GVA calculation methodology

The latest thinking around calculation of GVA impact was set by PwC's work in 2008 on their National RDA Evaluation work for DBERR which was HM Treasury Green Book compliant. PwC calculated RDA impacts in terms of GVA, by applying an annual GVA per job ratio to net additional jobs created / safe-guarded. On its own, this method would underestimate actual GVA created since a job creates GVA for more than one year – in fact as long as the job exists.

Over the National evaluation as a whole, PwC therefore introduced the ideas of 'persistence' and 'decay' in terms of how long the benefits generated by an intervention are expected to last, and they varied these by type of intervention. PwC's analysis of

these concepts was built up from beneficiary survey information from individual project evaluations, but of course these were not always perfect or consistent in their approach, and in some cases at an early stage of implementation, and therefore reliant on somewhat limited evidence of how long some benefits will last.

As such persistence and decay as concepts and GVA adjustment factors are relatively new to evaluation and appraisal methodology and no doubt will continue to be better defined over time. They have however been carried forward into legacy thinking such as that set out in the document prepared by SWRDA 'Getting to GVA', which itself has drawn on principles set out in the Green Book, and the approach to 'gross-to-net' GVA impact evaluation developed through guidance contained in the DTI Occasional Paper no 2 - *Evaluating the Impact of England's RDAs: Developing a Methodology and Evaluation Framework* (Dec 2009), and BIS *RDA Evaluation: Practical Guidance on implementing the Impact Evaluation Framework*.

Re. the two approaches (Version 1 and Version 2) outlined above, we would advise sticking with the 'with' and 'without' persistence and decay approaches to give you a range of GVA impact which we feel is the more robust way of presenting the potential impact.

3. Persistence and decay - definition

The following definitions are included within PwC's National Evaluation Report:

- ***the persistence of the benefits***: how many years the stream of benefits is expected to persist;
- ***the rate at which the benefits decay over time***: this is the proportion of annual benefits which are expected to be lost from one year to the next as a result of changes in the underlying social and economic conditions (e.g. as beneficiaries change jobs and businesses relocate or make other investment decisions).

PwC acknowledged that few (if any) of the RDAs' interventions have been in place long enough to be able to observe these key assumptions. To overcome this lack of evidence, PwC made their own judgements based upon what evidence was available and also drawing on work elsewhere. They summarised their assumptions in the Table below (extracted from the National Report):

Table 53: Key assumptions underpinning estimates of impact on GVA

Intervention type	Time to deliver (years)	Period over which benefits build (years)	Persistence of benefits (years)	Decay (% per annum)	Net present value of benefit stream
Individual enterprise level support	1	1	3	10	2.45
Sector/ cluster support	1	1	3	10	2.45
Promotion and development of science, R&D and innovation infrastructure	1	3	3	10	3.20
Inward investment promotion	1	1	5	10	3.60
Bringing land back into use	5	3	10	10	5.18
Public realm	3	2	10	10	5.30
Image, events and tourism	1	1	2	10	1.75
Skills and workforce development	1	1	3	10	2.45
Matching people to jobs	1	1	1	0	0.93
Supporting the development of educational infrastructure	5	1	10	10	4.70
Other – place	2	2	2	10	2.08
Cross cutting theme evaluations - place	5	3	10	10	5.18

Source: PwC: National RDA Evaluation report, 2008

Quantifying *Net* Economic Impacts from HS2 in Sheffield

GENECON has refined the Gross GVA impact analysis outlined on Slide 7 to get to Net Additional GVA impact, principally by accounting for the additionality factors of displacement and multipliers. The following provides a narrative of the approach taken.

The principle of net additionality

Additionality is a core principle enshrined in HM Treasury Green Book options appraisal methodology. In overview, it incorporates the following components:

- ***Deadweight***: the proportion of benefits that would have occurred without the intervention. In the case of the HS2 benefits case, it is the proportion of development that could have been expected to have come forward without HS2. The Sift 3.0 analysis presents gross additional floorspace and jobs figures (i.e. after netting off the proportion that would have come through anyway);
- ***Displacement***: the extent that economic activity in the target area replaces economic activity elsewhere in other parts of the sub-region. For the HS2 analysis, the concern will be that regeneration activity catalysed around the HS2 station will displace activity, i.e. businesses from other parts of the South Yorkshire sub-region. Displacement is occupier driven, and therefore an option that is better at stimulating demand for space from occupiers relocating or investing from outside the sub-region will have a lower corresponding displacement level; and
- ***Multipliers***: measures the degree to which intervention increases output and employment in an economy through further spending generated by increased demand (direct impact), supply chain orders (indirect) and employee spending (induced). The Scottish Government has undertaken significant research identifying what it refers to as Type I (direct and indirect) and Type II multipliers (the latter also including further rounds of spending through induced effects). This work has also included detailed sectoral work defining distinct multipliers for different sectors of the economy.

Step 5: Displacement adjustment

GENECON has applied differential displacement assumptions to the S-curve development take-up profile on the basis that the development product likely to be catalysed by the HS2 station will be very different at the two station locations. There is a significant body of academic and other practitioner research evidence that High Speed Rail has the highest propensity for use by the high value service sectors (Greenguage 21, Dan

Graham). The argument is therefore to be made that this coupled with the critical mass of service sector employment already established in Sheffield City Centre and the other city centre assets already in place (e.g. universities, high quality public realm, conference venue, hotels, restaurants and bars) will mean that the City Centre will have a higher propensity to attract businesses from outside the sub-region, and much better able to afford to occupy Grade A office space.

By contrast, the development product at Meadowhall is much more likely to be constrained by the current rental level differential (£12.50/sq.ft for office space at Meadowhall compared with £18-£20/sq.ft in the City Centre). As a result, the development product is likely to remain lower quality, lower rise, and therefore much more likely to attract the type of occupier business looking to expand and relocate within the South Yorkshire sub-region - in economic terms simply displacing their activity within the sub-region. As such, GENECON believes that it is appropriate to apply different displacement assumptions to the development which is likely to be catalysed around the two station locations. It is likely that displacement levels will compare as follows:

- ***Meadowhall:*** *50%-70%*
- ***Victoria, City Centre***: 35%-50%

Step 6: Multipliers

GENECON has applied differential employment multipliers on a sectoral basis drawn from the Scottish Government's work on Type 2 multipliers.

Steps 5 and 6 are summarised in the tables below, the final column showing the per annum net additional GVA impact which as a result of the adjustments increases the per annum figures as follows:

- HS2 station at Victoria: Net Additional per annum GVA impact at Year 25: £448m
- HS2 station at Meadowhall: Gross per annum GVA impact at Year 25: £120m

i.e. an additional £256m Net Additional per annum GVA impact at Victoria

GVA Impact analysis - City Centre						
	Gross Jobs	Displacement - mid-points assumed (%)	Net jobs before multiplier	Type II Employment Multiplier	Net Additional jobs	Sift 3 Net additional GVA impact (£m)
Manufacturing						
C : Manufacturing						
Total						
Retail						
G : Wholesale and retail trade; repair of motor vehicles and motorcycles	600	43%	345	1.48	511	16
Total						
Services (likely to be impacted by HSR)						
I : Accommodation and food service activities	533	43%	306	1.24	380	9
J : Information and communication	520	43%	299	2.02	604	36
K : Financial and insurance activities	1,496	43%	860	2.81	2,417	183
L : Real estate activities	288	43%	165	1.33	220	8
M : Professional, scientific and technical activities	1,680	43%	966	1.46	1,410	49
N : Administrative and support service activities	2,001	43%	1,151	1.43	1,645	57
O : Public administration and defence; compulsory social security	1,391	43%	800	1.72	1,375	59
R : Arts, entertainment and recreation	259	43%	149	2.24	334	14
S : Other service activities	232	43%	134	1.47	196	6
Total						
Others						
A : Agriculture, forestry and fishing						
B : Mining and quarrying						
D : Electricity, gas, steam and air conditioning supply						
E : Water supply; sewerage, waste management and remediation activities						
F : Construction						
H : Transportation and storage						
P : Education	400	43%	230	1.42	327	11
Q : Human health and social work activities						
T : Activities of households as employers;undifferentiated goods-and services-producing activities of households for own use						
U : Activities of extraterritorial organisations and bodies						
Total						
Overall Total	**9,400**		**5,405**		**9,420**	**448**

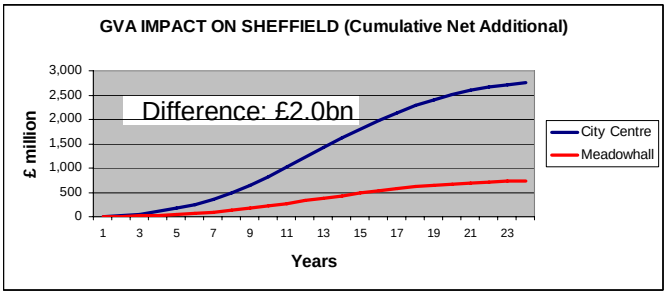
GVA Impact analysis - Meadowhall						
	Gross Jobs	Displacement - mid-points assumed (%)	Net jobs before multiplier	Type II Employment Multiplier	Net Additional jobs	Sift 3 Net additional GVA impact (£m)
Manufacturing						
C : Manufacturing	1,275	63%	478	1.60	765	32
Total						
Retail						
G : Wholesale and retail trade; repair of motor vehicles and motorcycles	350	63%	131	1.48	194	6
Total						
Services (likely to be impacted by HSR)						
I : Accommodation and food service activities	1,036	63%	389	1.24	482	11
J : Information and communication	142	63%	53	2.02	107	6
K : Financial and insurance activities	284	63%	106	2.81	299	23
L : Real estate activities	476	63%	178	1.33	237	8
M : Professional, scientific and technical activities	226	63%	85	1.46	124	4
N : Administrative and support service activities	1,023	63%	383	1.43	548	19
O : Public administration and defence; compulsory social security	57	63%	22	1.72	37	2
R : Arts, entertainment and recreation	200	63%	75	2.24	168	7
S : Other service activities	132	63%	50	1.47	73	2
Total						
Others						
A : Agriculture, forestry and fishing						
B : Mining and quarrying						
D : Electricity, gas, steam and air conditioning supply						
E : Water supply; sewerage, waste management and remediation activities						
F : Construction						
H : Transportation and storage						
P : Education						
Q : Human health and social work activities						
T : Activities of households as employers;undifferentiated goods-and services-producing activities of households for own use						
U : Activities of extraterritorial organisations and bodies						
Total						
Overall Total	**5,200**		**1,950**		**3,034**	**120**

The tables and graphs below summarise the Net Additional Cumulative and NPV of the GVA impact for both Versions 1 & 2 at both station locations. GENECON believes these should be presented as a range, and in summary show that a station at Victoria would generate
additional GVA over and above its location at Meadowhall as follows:

- Net Additional Cumulative GVA impact (gross): between £2.0bn and £5.1bn; and
- Net Additional NPV Cumulative GVA impact: between £1.35bn and £3.0bn

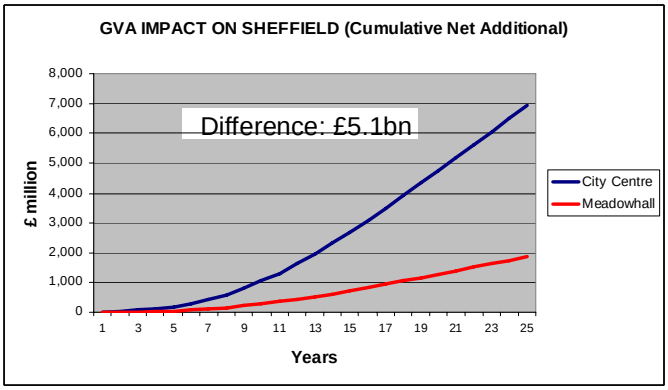
VERSION 1 - Decay factor, Persistence 10 Years

SIFT 3	Year 25 GVA p.a impact Net Additional (£m)	Profiled over Years 1 - 25 from decision Net Additional Cumulative GVA impact	 Net Additional NPV GVA Impact
CITY CENTRE	£448m	£2800m	£1850m
MEADOWHALL	£120m	£750m	£500m
DIFFERENCE	**£256m**	**£2050m**	**£1350m**



VERSION 2 - Full GVA p.a impact over 25 year period

CITY CENTRE	As above	£6950m	£4100m
MEADOWHALL	As above	£1870m	£1100m
DIFFERENCE	**As above**	**£5100m**	**£3000m**



Step 7: Sensitivity analysis

GENECON has run sensitivity checks at the upper and lower displacement level boundaries. The table below presents the sensitivity summary showing the Net Additional GVA impact for Versions 1 and 2, suggesting that the additional GVA impact of the HS2 station located at Victoria lies in the range £1.8bn to £5.4bn compared with Meadowhall.

	POSITIVE ADDITIONAL GVA IMPACT (Net additional cumulative position) **City Centre V. Meadowhall**	
	V1: 10% Decay factor, 10 year persistence impact	V2: Full p.a GVA impact over 25 years
Mid-point displacement level Meadowhall: 62.5% City centre: 42.5%	**£2050m**	**£5100m**
Upper bound displacement level Meadowhall: 70% City centre: 50%	**£1840m**	**£4600m**
Lower bound displacement level Meadowhall: 50% City centre: 35%	**£2170m**	**£5400m**