





Rotherham Rail Connectivity Study

Final Report

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Rotherham Rail Connectivity Study

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Contents

0	EXECUTIVE SUMMARY	1
1	INTRODUCTION	4
	Rotherham Central	4
	Summary of Current Conditions	7
	Report Structure	7
2	ROTHERHAM'S CONNECTIVITY NEEDS	8
	Rail Benchmarking	9
	Benchmarking Findings	9
	Economic linkages.....	12
	Existing Rail Demand	14
	Where should Rotherham be connected to?	15
	Summary of Findings.....	17
3	RAIL SERVICE SPECIFICATION	19
	Summary	23
4	ENHANCING SERVICES THROUGH ROTHERHAM	24
	Operational and Infrastructure Issues	24
	Commercial Issues	26
	The Options	26
	Conclusions	32
5	ENHANCING ROTHERHAM'S RAIL SERVICE – AN ALTERNATIVE APPROACH	33
	Station Location	33
	Service Levels	35
	Generating New Demand.....	35
	Abstraction.....	36
	The Potential for Development & Regeneration.....	36
	High Level Business Case.....	37
	The Wider Economic Impact of the Options.....	38
	The Impact of HS2.....	39
	The Role of Rotherham Central.....	39
	Summary	39
6	SUMMARY AND CONCLUSION.....	40
	Next steps.....	41

Tables and Figures

Table 2.1 Comparison of Destination Station Served	10
Table 2.2 Trip Rates from benchmarked stations (rail trips per year per 000 population).....	11
Table 2.3 Key work locations for Rotherham residents	13
Table 2.4 Modal splits from Rotherham to selected destinations for trips to work.....	13
Table 2.5 Destinations accessed by rail from Rotherham (travel to work)	13
Table 2.6 Origins of inward trips to Rotherham	14
Table 2.7 Top 10 Rail flows within South Yorkshire (Source: Arup 2007)	14
Table 2.8 Top 10 Rail flows outside South Yorkshire (Source Arup 2007).....	15
Table 2.9 Estimated Agglomeration Benefits from 20% Generalised Cost Reduction	16
Table 2.10 Estimated Agglomeration Benefits of service groups	17
Table 3.1 Rail Service Specification.....	19
Table 3.2 Summary of Modelled Agglomeration Benefits for the RSS Corridors	23
Table 4.1 Business Case for Additional Service (annual costs and benefits).....	28
Table 4.2 Business Case for Doubling Holmes Chord (Present Value)	29
Table 4.3 Business Case for Realignment (Present Value).....	32
Table 5.1 Comparison of Agglomeration Benefits	38
Figure 1.1 Recently Rebuilt Rotherham Central Station	4
Figure 1.2 Location Plan	5
Figure 1.3 Freight and local passenger services at Rotherham Central.....	6
Figure 2.1 Developing the Rail Service Specification	8
Figure 2.2 Trains per hour (one way) from Benchmarked Locations.....	10
Figure 4.1 Track Layout around Rotherham	24
Figure 4.2 Current Line Speeds	31
Figure 4.3 Required line speeds and notional realignment.....	31

0 Executive Summary

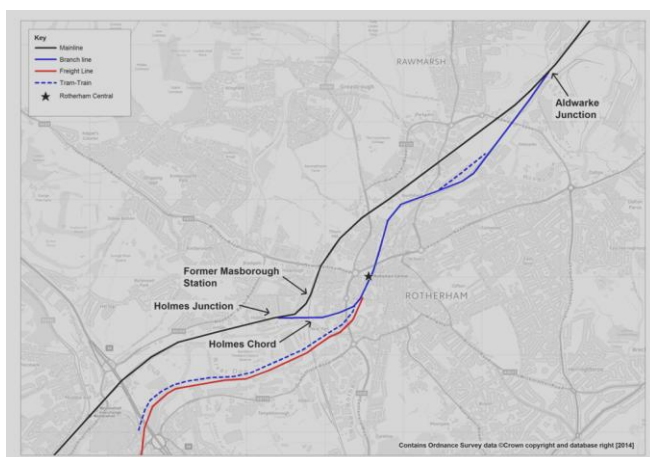
Background

SYPTE, Rotherham Metropolitan Borough Council and their local stakeholders have long held aspirations to improve the rail service at Rotherham. The town's station, Rotherham Central, has been recently refurbished and it now provides an attractive and convenient gateway that is



particularly convenient for the town centre. But with three relatively slow and unevenly-spaced trains per hour to a limited range of destinations the service on offer at the station is considered by stakeholders to be inadequate for a town of over 200,000 people that is pursuing an active regeneration agenda.

While its proximity to Sheffield provides interchange opportunities to a wider range of towns and cities there is a feeling that the lack of connectivity by direct rail service is constraining Rotherham's economic potential.



As with many rail services in Britain, there are also infrastructure constraints, arising from a combination of the original Victorian layout and the legacy of cost reduction exercises from the 1960's to 1980's. Located on a branch from the mainline, services to and from Rotherham encounter station capacity limitations, multiple junctions over a short stretch of line and a section of single track at Holmes Chord, all of which combine to limit the ability to enhance service levels. There have

been several studies into how best to address these issues but none have asked the more fundamental question of: what type of rail service does Rotherham require to help it deliver on its economic regeneration and growth agenda?

The aim of this report therefore is to answer this question and then identify the necessary works to achieve it and establish a way forward.

Approach

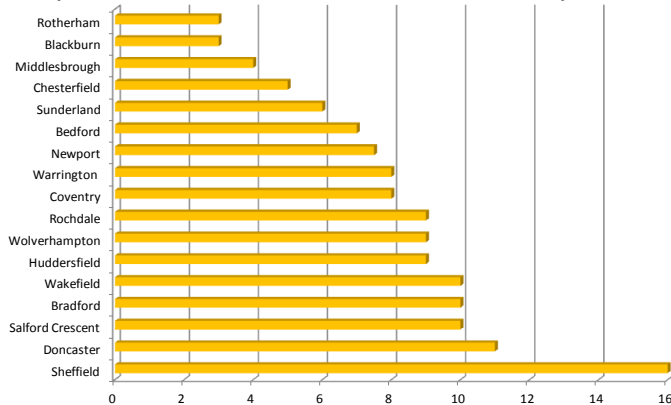
The study has been conducted in three stages:

- Stage A was designed to identify the level of rail connectivity needed to support Rotherham's economic growth agenda and develop this into a Rail Service Specification (RSS) for the town;
- Stage B of the work was to establish if the RSS could be delivered within the existing rail infrastructure and what its business case would be;

- and if it couldn't be delivered within the current infrastructure, Stage C was designed to establish what else would be required, and whether a business case for its delivery could be identified

Main Findings

Stage A has identified that existing services from Rotherham are considerably limited when compared to a number of its most obvious comparator towns and their rail services.



Indeed Rotherham was found to have the poorest level of rail connectivity based on a number of measures including the total number of services, the range of destinations served and type of services operated, with services being entirely characterised by urban services providing local links to Doncaster, Sheffield and Leeds.

Trains per hour (one way) from Benchmarked Locations

Economic modelling demonstrated that there would be significant benefits to the economy from improving services to a number of key locations including Leeds, the Midlands, Manchester and Doncaster. Based on this a Rail Service Specification was developed that proposed the following services, additional to the existing services in the town.

Destination	Journey Time	Frequency
Leeds	35 minutes	Hourly
Birmingham	1h 30 min	Hourly
Doncaster	20 minutes	20 min (including existing services)
Manchester Airport	1 hour 30 min (1 hour 5 min to Manchester)	Hourly
Sheffield	10-25 min	10 minute

Rail Service Specification

Having identified the optimum service level required to help Rotherham deliver on its economic regeneration and growth agenda in the Rail Service Specification the Stage B analysis demonstrated that it would not be possible to deliver this by operating additional services through Rotherham Central within the constraints of the existing infrastructure.

Attention was then given in Stage C to the potential infrastructure improvements required to deliver the Rail Service Specification. It was found that the upgrades required to deliver the service specification via Rotherham Central would be unaffordable, with a requirement to realign the Holmes Chord alongside further significant works at Aldwarke junction and would deliver poor value for money, with a benefit cost ratio of below 1. The option of doubling Holmes Chord was also found to address neither operational nor commercial issues.

An alternative and cost effective way of delivering the service specification was found to be to open an additional station for Rotherham located on the mainline. An outline assessment of possible

locations for the station identified that a station near the Parkgate retail park showed the most promise.

	<i>Masborough</i>	<i>Parkgate</i>
<i>Space for 10 car platforms</i>	✓	✓
<i>Ample parking</i>	✗	✓
<i>Good accessibility by car, bus, and active modes</i>	✗	✓
<i>Facilitate economic development</i>	✗	✓

Station location options

This would deliver the service specification at a significantly lower cost than the option of upgrading the route via Rotherham Central. The option would also bring additional benefits by improving rail access for the north of Rotherham, developing a Parkway station suitable for access by car users, and helping to stimulate development and regeneration of a number of areas surrounding the station site. In addition the development of a station on the mainline would be the most direct way of delivering the potential wider economic benefits of service improvements.

Rotherham Central in the meantime would continue to serve its local travel markets, including the crucial Rotherham to Sheffield market – a role that will be further enhanced by the development of the Tram-Train scheme.

Next Steps

The study recommended the following steps are proposed for consideration by the client group:

- to incorporate the findings of the study into The Yorkshire Rail Network Strategy and North of England Route Study;*
- to engage with key stakeholders at an early stage of option development - in this instance key stakeholders include DfT, South Yorkshire partners including the LEP, further engagement with Network Rail including operational managers, and train operating companies;*
- to prepare detailed timetable and performance analysis of the route - this is critical in terms of any future proposals gaining credibility with operators;*
- to prepare detailed option analysis on station location to gain a greater understanding of potential station locations, including consideration of any land issues and potential for incorporation into masterplanning;*
- to prepare detailed passenger demand forecasting to feed into a commercial case to train operators and;*
- prepare a detailed appraisal of the new station location.*

1 Introduction

- 1.1 In September 2014 South Yorkshire Passenger Transport Executive (SYPTTE) commissioned JMP Consultants with SLC Rail to prepare a study that can inform stakeholders on the level of rail service required to support Rotherham's economic and transport needs and advise on how improved rail connectivity can facilitate economic growth.

Rotherham Central

- 1.2 Rotherham Central underwent extensive redevelopment in 2012. The station has much improved customer facilities and now provides an attractive gateway to the town with a striking design, new lighting, CCTV, a new waiting room and passenger information screen.

Figure 1.1 Recently Rebuilt Rotherham Central Station



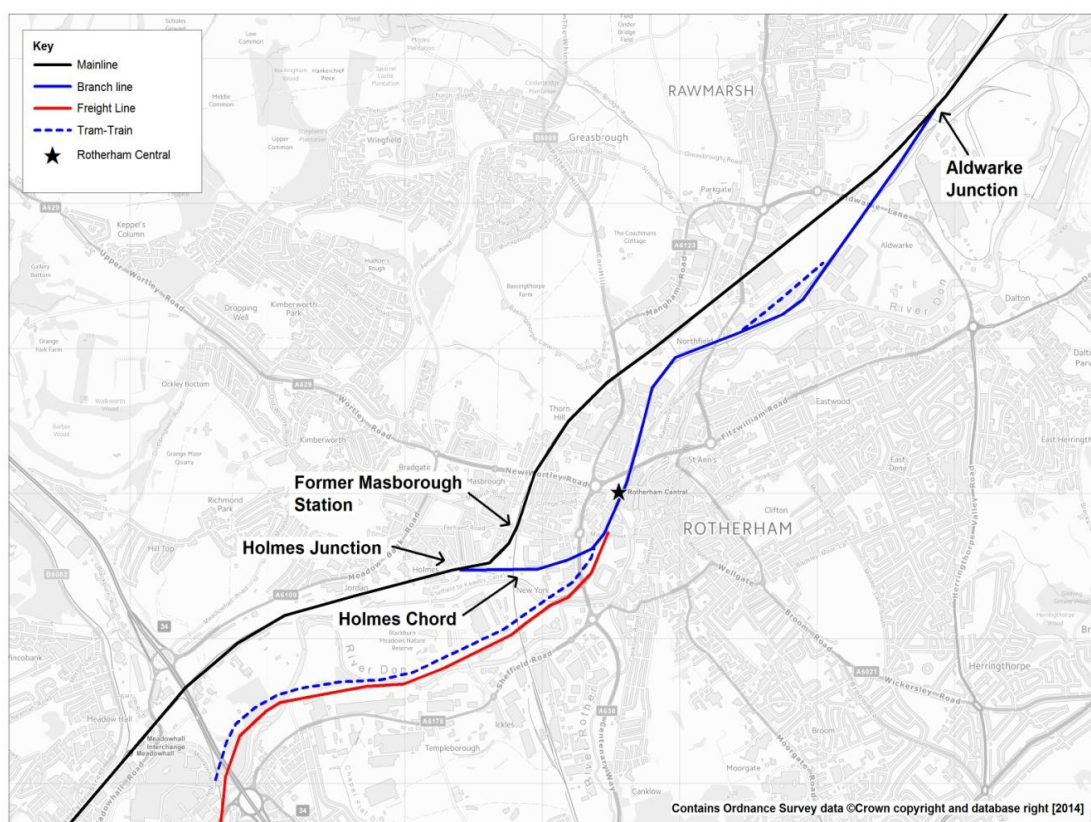
- 1.3 However, while the station is an attractive facility the services that call at it are relatively limited for a town of its size. There are no regional or long distance services and the local stopping services that do call at it are limited to two trains per hour between Sheffield and Doncaster and one service between Sheffield and Leeds. Part of the reason for this is that the station is located on a branch off the main Sheffield – Leeds/Doncaster line, (see Figure 1.1 overleaf), imposing a journey time penalty on services which use it. In addition, part of the branch is a single track which further limits capacity.

Recent History

- 1.4 In fact, the present station at Rotherham Central was only opened in 1987 on the site of an earlier station which had closed in 1950. Prior to 1987 services had used Rotherham Masborough station, located on the mainline from Sheffield to Doncaster/Leeds. Masborough was served by a mixture of local stopping trains and some longer distance services, including the predecessors of the existing Cross Country and Trans Pennine Express services.
- 1.5 However the station at Masborough was remote from the centre of Rotherham and it was identified that opening a station at Rotherham Central would provide better connectivity for the town and stimulate demand for the local stopping services. To achieve this, a new single-line chord (Holmes Chord) was opened, providing a link from the mainline at Holmes Junction to the new station at Rotherham Central, with services regaining the mainline at Aldwarke Junction some distance north. At the time that this development took place the more widespread decline in rail use meant that it was not possible to justify the operation of two stations in Rotherham and therefore Masborough station was closed. Whilst Rotherham lost its more strategic services at this point, the new station

provided much improved accessibility to and from the town by local rail services. At this time fewer rail services were operating than is the case now and therefore capacity was less of an issue, both on the branch via Rotherham and on the mainline.

Figure 1.2 Location Plan



1.6 As service levels have grown on the mainline in the intervening period the available capacity to allow further development of services to Rotherham Central has diminished and this has contributed, as we will show in Chapter 2, to Rotherham lagging behind other towns and cities in terms of its rail connectivity.

Current Service Provision

1.7 The existing services passing through Rotherham Central comprise three trains per hour in each direction. The routes that operate are as follows:

- Sheffield – Rotherham – Wakefield – Leeds
- Sheffield – Rotherham – Doncaster – Adwick
- Sheffield – Rotherham – Doncaster – Scunthorpe.

1.8 One of the two services between Doncaster and Sheffield originates and terminates at Lincoln Central in each hour, with the Adwick service operating in this way northbound and the Scunthorpe service southbound. This occurs to provide Lincoln line stations with a direct service to Meadowhall.

Figure 1.3 Freight and local passenger services at Rotherham Central



- 1.9 All three of these routes are local stopping services, calling at all intermediate stations en-route. This has the effect of providing a very poor journey time to final destinations to the north, especially Leeds which is reached in 1 hour 3 minutes for a journey of 32.5 miles, an average speed of only 31mph. A half hourly service is provided to and from Doncaster, and an hourly service to and from Leeds. The services to Sheffield provide three trains per hour, however this is on an uneven frequency which, in effect, means it is equivalent to a half hourly service.
- 1.10 These services are supplemented by a twice daily (in each direction) service between Sheffield and York, via the Dearne Valley and Pontefract Baghill. This service operates at off-peak times only and is essentially provided as a “parliamentary” service that is operated in order to avoid the cost of going through a formal statutory line closure process (although there are aspirations for the development of this service in the future).
- 1.11 At peak times a small number of services operate to or from Hull and Bridlington, and one service operates to Manchester. However these are simply adjustments to the timetable that are made for operational reasons and do not represent an increase in service frequency at these times. For similar reasons one Trans Pennine Express service calls at Rotherham in the late evening.
- 1.12 The service pattern that presently operates, with a core service of three trains in each direction, can be directly traced back to the service pattern introduced with the opening of Central station. Other than a few minor changes to the pattern of operation that were devised for operational (as opposed to passenger benefit) reasons there have been no significant changes for over 25 years.
- 1.13 The route through Rotherham Central also carries a moderate amount of freight traffic including steel and stone trains.

Future developments

- 1.14 Services between Rotherham and Sheffield are set to be improved with the development of a Tram-Train scheme which will provide a new link to Sheffield from Rotherham Parkgate, via Rotherham Central, before joining the Supertram network, serving Meadowhall and central Sheffield. This will further improve connectivity with Sheffield but will also present a potential constraint to the further development of services by utilising spare capacity on lines around Rotherham.

- 1.15 More broadly the development of the Network Rail Yorkshire Rail Network Study, looking at the future development of rail services across the region, and the activities of Transport for the North championing better connections within in the region, provide opportunities to promote improved connectivity from Rotherham.

Summary of Current Conditions

- 1.16 Although Rotherham Central is well located for the town centre and has been attractively refurbished the town is served by relatively few trains. In addition to a limited range of destinations that can be reached without a change of train, frequencies are poor and the timings of the services are not evenly spread across the hour, further reducing their attractiveness. There are a number of constraints to the operation of services and a lack of capacity to facilitate their expansion.
- 1.17 While the station meets local travel needs relatively satisfactorily it does not serve more strategic trips well. This study examines these issues and identifies the required improvements to services and infrastructure to provide Rotherham with a rail service that will help the town deliver on its economic regeneration and growth agenda.

Report Structure

- 1.18 The remainder of this report is divided into the following sections
- Chapter 2 – Understanding Rotherham’s connectivity needs
 - Chapter 3 – Identification of the Rail Service Specification (RSS) to meet these needs
 - Chapter 4 – Delivering the RSS via Rotherham Central
 - Chapter 5 – An alternative means of delivering the RSS
 - Chapter 6 – Summary and conclusions

2 Rotherham's Connectivity Needs

2.1 There are a number of different ways in which Rotherham's connectivity can be assessed. We can:

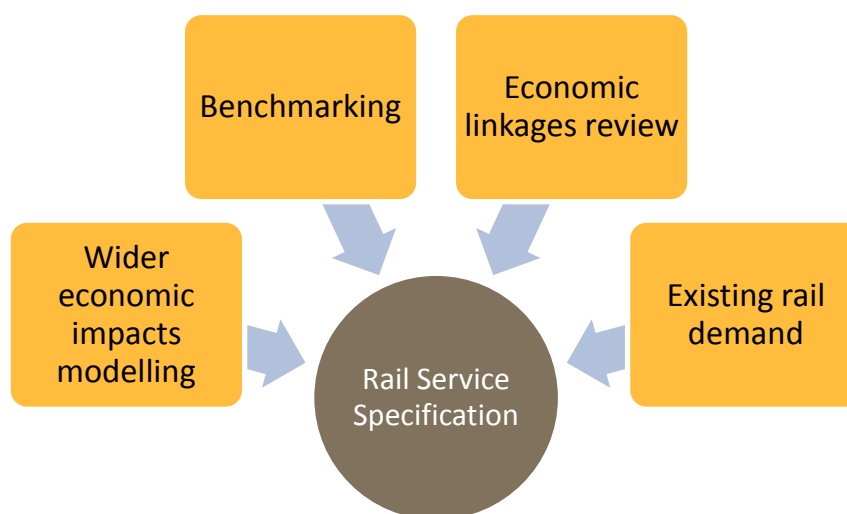
- look at where people currently travel to;
- examine the key economic linkages between the town and other economies;
- assess what scale of economic benefit might arise from improving connections, and;
- compare its level of rail service with that of other towns.

2.2 All of these approaches in isolation have some merit, and we have used all four of them to help us build up a picture of what linkages are likely to be important to Rotherham as it seeks to achieve its economic regeneration and growth ambitions:

- the service level at Rotherham has been benchmarked against a range of other comparable locations to provide an understanding as to whether the rail service that Rotherham receives is typical and appropriate for a town of its size and characteristics, and if it isn't, to understand what the deficiencies are;
- a review has been undertaken of key local documents such as the Economic plan for Rotherham 2020 and the Local Plan as well as evidence from the 2011 Census on commuting patterns in order to distil the key growth ambitions for Rotherham and identify the main economic linkages;
- an assessment has also been made of the existing rail demand from Rotherham, particularly the key flows to and from Rotherham Central, providing a useful insight into the flows beyond the stations already served directly from Rotherham, and;
- finally, we have modelled the wider economic impacts of improving services to and from Rotherham, estimating the value to the economy of improving services to key destinations across Yorkshire, the East and West Midlands and London.

2.3 Consideration of these four elements has led to the definition of the Rail Service Specification (RSS), which sets out the destinations, journey times and frequencies that Rotherham should seek to achieve (Chapter 3).

Figure 2.1 Developing the Rail Service Specification



Rail Benchmarking

2.4 We have already highlighted the relatively limited nature of services calling at the station. But is this untypical for a town of the size and in the position of Rotherham? By benchmarking Rotherham's rail service provision against other locations across the country it is possible to get a feel for whether Rotherham is under provided for in terms of the number and type of service it has. The benchmarking has compared Rotherham with 16 other locations across the country. The locations were chosen to represent a cross section of towns and cities across the UK, which were felt to be comparable with Rotherham, with the exception of Sheffield which was included due its proximity and importance to Rotherham. The towns and cities chosen were as follows:

- Doncaster
- Sheffield
- Wakefield (Westgate and Kirkgate stations)
- Huddersfield
- Chesterfield
- Rochdale
- Warrington (Bank Quay and Central stations)
- Bradford (Forster Square and Interchange Stations)
- Wolverhampton
- Sunderland
- Middlesbrough
- Coventry
- Newport
- Bedford
- Blackburn
- Salford Crescent

2.5 The stations represent a variety of locations on the rail network with varying geographies. For example some locations such as Wolverhampton and Coventry are located on mainlines and therefore have a high level of service, while other locations (such as Blackburn) are on secondary routes which is reflected in the range of destinations served and service frequency on core routes. More detail on the selected locations and their service levels is presented in Annex A.

Benchmarking Findings

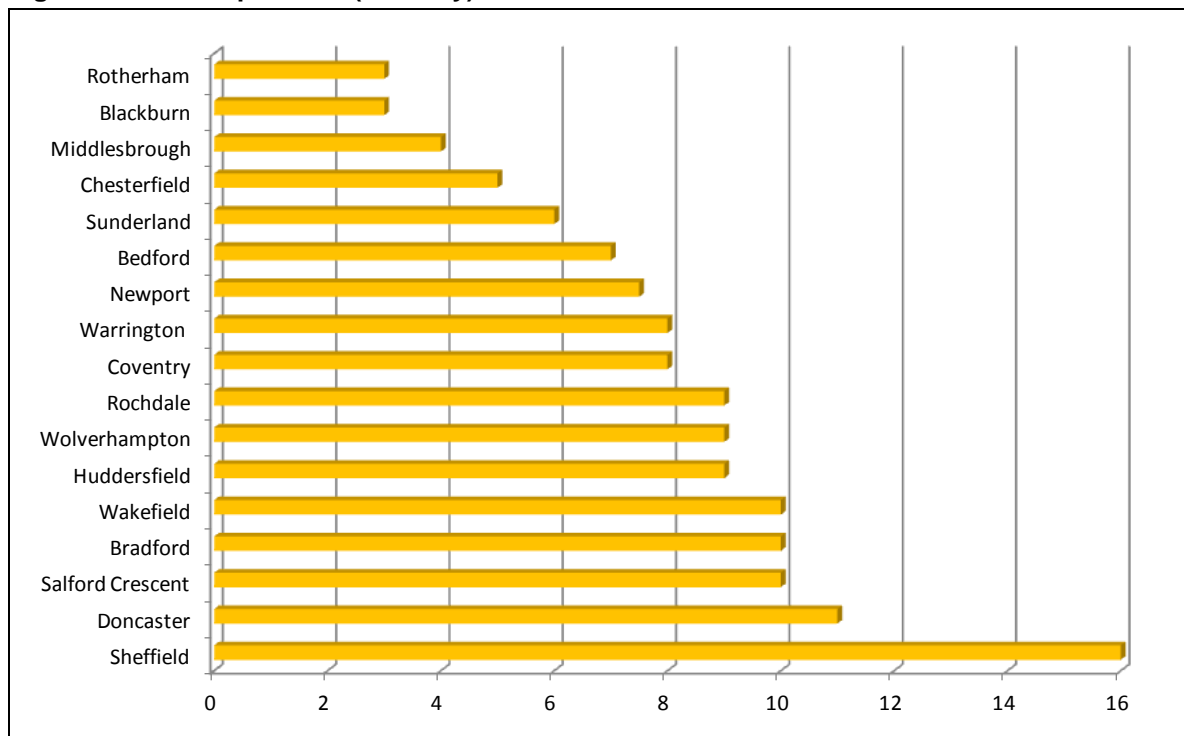
Service Level Provided

2.6 Of all the stations examined Rotherham has been identified as having the lowest overall number of services with only three trains in each direction per hour. This result was joint lowest with Blackburn, the average of the 17 locations was between seven and eight trains in each direction in each hour.

2.7 Rotherham is also unusual in that it is not served by either long distance or inter-urban services, being served solely by services that have been defined as urban, effectively local stopping services. While it is not unusual for locations to not have any long distance "intercity" type services, since these are limited to a number of core routes, the lack of any inter urban services is more unusual with only Sunderland and Rochdale sharing this unwelcome distinction.

2.8 In both of those cases this is to some extent compensated for by alternative rail systems that operate in the area, the Tyne & Wear Metro in the case of Sunderland, and Metrolink in the case of Rochdale. This perhaps indicates something about the economic and transport geography of all three locations as Rotherham will soon have access to the Supertram in Sheffield via the Tram Train system presently being developed, emphasising the close economic relationship with Sheffield.

Figure 2.2 Trains per hour (one way) from Benchmarked Locations



Range of Destinations

2.9 A further indicator of service quality relates to the number of stations to which direct services operate, and the classification of those stations. Network Rail categorises stations into one of six types, with Category A being the largest stations and Category F being the smallest. Typically these categories reflect demand and the sizes of the settlements served, and are therefore a useful indicator of the level of connectivity from the benchmarked stations. The table below compares the types of station that can be reached directly from Rotherham with the average for the benchmarked locations.

Table 2.1 Comparison of Destination Station Served

Station Type:	A	B	C	D	E	F	Total
Rotherham No.	1	3	3	2	3	22	34
Average No.	5	7	9	6	9	20	56
Rotherham %	3%	9%	9%	6%	9%	65%	100%
Benchmarked stations %	8%	12%	15%	11%	16%	38%	100%

2.10 Rotherham has the third lowest number of stations served of all the benchmarked locations, with only Rochdale and Sunderland having poorer access. It can be seen that the results are significantly below the average. The only group where Rotherham is close to the average is in terms of the absolute number of Category F stations served (small unstaffed stations typically serving smaller towns and villages). However when the proportions of stations in different categories are assessed it can be seen that Rotherham is dominated by Category F stations with

65% of stations served being in this group compared to 38% across all the stations. Inevitably Rotherham has significantly less direct services to stations in other categories relative to the other benchmarked stations. These results serve to underline the limited nature of Rotherham's existing services, with existing services essentially providing local connections rather than more strategic services.

Airport Links

- 2.11 A significant number of the benchmarked locations had direct rail services to airports, with only six of the 17, including Rotherham, not having them. In part direct services tend to reflect proximity to airports and accidents of railway geography. The Yorkshire & Humber area tends not to be well served by airport links generally as two of the three airports in the region (Leeds/Bradford and Robin Hood Airport Doncaster Sheffield) do not have any rail access whilst the third (Humberside) has only a small number of flights and the railhead (Barnetby) is some distance from the airport. Other areas such as the West Midlands and North West tend to be better served as the main airports (Birmingham and Manchester) have direct rail services to a wide range of locations.

Rail Usage

- 2.12 The comparatively poor services described above are reflected in part in the level of usage of rail services within Rotherham compared to other locations. An estimate has been made of the number of rail journeys made per head of population from the main station in each of the settlements and also from all stations within that local authority area in order to provide an indication of the scale of use. The table below presents these 'trips rates' and the associated ranking.

Table 2.2 Trip Rates from benchmarked stations (rail trips per year per 000 population)

Station	Trip Rate (main station)	Rank	Trip Rate (all stations)	Rank
Bedford	21	1	22	2
Coventry	18	2	20	4
Wolverhampton	17	3	17	9
Sheffield	16	4	20	3
Newport	15	5	16	11
Chesterfield	14	6	14	12
Sunderland	14	7	17	8
Doncaster	13	8	17	6
Warrington	12	9	16	10
Huddersfield	11	10	19	5
Middlesbrough	10	11	10	16
Bradford	10	12	28	1
Blackburn	9	13	12	13
Wakefield	8	14	17	7
Rochdale	5	15	10	14
Salford	5	16	10	15
Rotherham	3	17	5	17

- 2.13 It can be seen that in both categories Rotherham has the lowest ranking with all locations, apart from Rochdale and Salford, having trip rates that are at least double those of Rotherham. This would appear to suggest that Rotherham has an exceptionally low level of rail usage by local residents.
- 2.14 One note of caution to the above is that the issue is complicated by the presence of Meadowhall station which has better services than Rotherham Central and is easily accessible from Rotherham, allowing it to act as a railhead for the area. As a consequence it will suppress the demand for services from stations within Rotherham. A similar issue also applies to Salford which lies close to Manchester and effectively utilises Manchester Piccadilly Station for long distance services. In the case of Rochdale, demand may be suppressed by the presence of Metrolink.

Economic linkages

- 2.15 Rotherham is a diverse district, comprising both urban and rural areas. It is highly integrated into the Sheffield City Region (SCR), with strong economic linkages between other neighbouring areas, particularly Sheffield.
- 2.16 The structure of the economy has changes significantly in Rotherham in recent years from being historically dominated by traditional manufacturing and mining to the expansion of advanced manufacturing, research, creative and digital industries and environmental and energy technologies. Rotherham has been exceptionally successful in attracting investment from advanced manufacturing, including two areas of Rotherham located within the Sheffield City Region enterprise zone (the Advanced Manufacturing Park in Catcliffe to the South of the town and Templeborough to the East). The area is home to an agglomeration of industrial sites, undertaking advanced manufacturing and research
- 2.17 Rotherham is home to a variety of international firms, many of which have strong national and international linkages. A number of these businesses have chosen Rotherham as the place to site their facilities in order to expand into European markets. Rotherham's success in attracting international companies has, however, impacted on the growth of indigenous businesses, which has grown at a slower rate than other areas. This is reflected in the economy of Rotherham being dominated by a small number of large companies, creating some issues with the long term resilience of the economy.
- 2.18 Poor transport links both within and beyond the SCR are recognised as barriers to growth (Economic Plan for Rotherham 2008-2020). Both Local and Region-wide strategies such as the Sheffield City Region (2014) report identify that enhanced links to airports such as Robin Hood would be beneficial, as would improved regional connections to the neighbouring City Regions of Manchester and Leeds.
- 2.19 More detail on the Economic Linkages review is presented in Annex C.

Travel patterns in Rotherham

- 2.20 Travel patterns within Rotherham still reflect the legacy of traditional industry with 55% of travel to work trips taking place wholly within the borough. There are also strong linkages to other places within the Sheffield City Region.
- 2.21 Table 2.3 highlights the importance of linkages within the Sheffield City Region.

Table 2.3 Key work locations for Rotherham residents

Work Destination	Percent
Rotherham	55%
Sheffield	23%
Doncaster	6%
Barnsley	3%
Bassetlaw	2%
Leeds	1%

2011 census

- 2.22 Car is the dominant mode of travel for journeys to work. Table 2.4 shows the shares by different modes between Rotherham and the Sheffield City Region and also Leeds. Rail is used for a small number of trips to work within South Yorkshire, with those areas connected with a direct link (Sheffield and Doncaster) having a marginally greater proportion. Rail is however shown to have a slightly higher share of longer-distance work trips to Leeds.

Table 2.4 Modal splits from Rotherham to selected destinations for trips to work

	Car Driver	Passenger	Bus	Train	Other
Within Rotherham	63.8%	8.3%	11.1%	0.3%	16.4%
Sheffield	75.7%	6.6%	10.3%	2.1%	5.2%
Barnsley	78.4%	7.0%	7.8%	1.1%	5.6%
Doncaster	80.2%	5.8%	7.1%	1.9%	4.9%
Leeds	82.2%	4.0%	3.5%	8.0%	2.2%

2011 census

- 2.23 Looking at those who travel to work by train (Table 2.5), Sheffield is the main destination, cited by 42% of respondents. The next three largest destinations are those accessible directly from Rotherham stations.

Table 2.5 Destinations accessed by rail from Rotherham (travel to work)

Destination	Percentage share
Sheffield	42%
Rotherham	14%
Doncaster	10%
Leeds	9%
Barnsley	3%
Manchester	2%
Wakefield	2%
Chesterfield	1%
York	1%
London	1%
Other	15%

2011 census

2.24 Rotherham is a significant destination for inward commuters. In terms of the total number of trips, Sheffield is the largest origin with 11,701 individuals travelling to Rotherham for work. The importance of Rotherham for the other neighbouring boroughs of Barnsley and Doncaster is demonstrated in the table below. Some 9% of work trips made from residents of Barnsley are to Rotherham, which is the same proportion as travel into Sheffield. For Doncaster residents, Rotherham represents an even greater attractor of trips than Sheffield, with 7% travelling to Rotherham and 4% to Sheffield. A sizeable number of trips to Rotherham also originate from Bassetlaw.

Table 2.6 Origins of inward trips to Rotherham

Origin	Total work journeys to Rotherham	% Journeys at Origin
Sheffield	11,701	6%
Barnsley	8,209	9%
Doncaster	7,469	7%
Bassetlaw	1,769	4%

2011 census

Existing Rail Demand

2.25 We can look in a little more detail at some of the current rail journeys to and from Rotherham. The information presented here is taken from an earlier study on Rail Access in Rotherham conducted by Arup in 2007, which although a few years old provides a helpful indication of the key patterns of demand across the area.

2.26 We have divided the assessment into South Yorkshire and non-South Yorkshire flows as there is a tendency for local links to dominate the results due in large part to the limited characteristics of the existing service. The table below presents the top 10 flows from Rotherham to stations within South Yorkshire

Table 2.7 Top 10 Rail flows within South Yorkshire (Source: Arup 2007)

Station	Journeys per annum
Sheffield	105,944
Doncaster	41,158
Meadowhall	22,960
Swinton	22,326
Mexborough	16,627
Bolton-upon-Dearne	12,551
Goldthorpe	7,751
Thurnscoe	6,893
Moorthorpe	5,841
Barnsley	5,698

2.27 It can be seen that within South Yorkshire the largest flows are unsurprisingly to Sheffield and Doncaster. The most interesting result is that Meadowhall and Swinton represent the third and fourth places. Meadowhall is an important destination within South Yorkshire, both as a major employer in the area, and also as a major destination for leisure trips. The station also has a Park & Ride function for parts of north Sheffield, although this is limited by the available parking. Trips to

and from Swinton may well represent strong commuter flows within the Rotherham Borough for jobs within Rotherham, but also to jobs at developments on Manvers Way close to Swinton station.

- 2.28 The table below presents the top 10 flows outside South Yorkshire. Whilst the absolute numbers are lower than for flows within South Yorkshire they are useful for identifying potential locations for the development of services in the future.

Table 2.8 Top 10 Rail flows outside South Yorkshire (Source Arup 2007)

Station	Journey per annum
Leeds	39,782
Manchester	11,120
London	11,180
York	10,435
Chesterfield	9,257
Wakefield	8,983
Nottingham	5,965
Derby	4,964
Cleethorpes	4,408
Birmingham	4,003

- 2.29 There are four destinations that attract in excess of 10,000 rail journey per annum, with Leeds in particular dominating the results.

Where should Rotherham be connected to?

- 2.30 In addition to using the information gathered on Rotherham's aspirations and economic linkages, we have undertaken some economic modelling to identify the relative merits of improving services to a range of potential locations.

- 2.31 This modelling has identified the agglomeration benefits (measured as an uplift in GDP) of improving services. Agglomeration benefits are the benefits that businesses derive from being able to interact with each other more effectively, increasing productivity and promoting competition. In order to model this JMP has adapted an approach developed by Network Rail for their 2013 Market Studies. JMP's adaption of the Network Rail model related to the incorporation of four distinct sectors of the economy into the model:

- Manufacturing
- Construction
- Consumer Services
- Producer Services

- 2.32 The incorporation of these sectors allows the modelling to reflect the composition of the local economy, giving a more realistic result.

- 2.33 The impact of improving services to a number of locations across the Yorkshire & Humber, the North West and the Midlands has been considered. To provide a consistent comparison across the

destinations we have simply looked at what increase in GDP would arise from a 20% improvement in accessibility by rail, (modelled as a 20% reduction in the “generalised cost¹” of rail journeys).

Understanding Agglomeration Impacts

The improvement of rail (or any transport) services between two locations can bring wider economic benefits to the economy. The scale of these benefits is linked to the journey time and cost between the two locations, and the size and composition of the economies. The benefits of this are known as the economics of agglomeration and reflect the fact that good transport links allow businesses to interact with each other more effectively, increasing productivity and promoting increased competition.

At their broadest level, agglomeration economies occur when individuals benefit from being “near” to other individuals, and exist when the spatial concentration of economic activity gives rise to increasing returns in production. Transport and communications play a crucial role because, in most contexts, speed and low costs in transportation and communication provide a direct substitute for physical proximity.

- 2.36 The table below summarises the results of the economic modelling, with the results expressed in terms of additional £m GDP generated per annum.

Table 2.9 Estimated Agglomeration Benefits from 20% Generalised Cost Reduction

Destination	Additional GDP (£m pa)
London	£16.43
Leeds	£6.12
Birmingham	£4.20
Doncaster	£2.80
Wakefield	£2.80
Manchester	£2.24
Nottingham	£2.04
Leicester	£1.90
Derby	£1.52
Scunthorpe	£1.14
Hull	£1.08
Manchester Airport	£1.02
York	£0.83
Chesterfield	£0.82
Grimsby	£0.76

- 2.37 The results are wide ranging, reflecting the size and composition of the economies at the destination locations, as well as their proximity to Rotherham. Inevitably due to the size of its economy London provides the highest absolute increase in GDP. The next two largest benefits would be from improvements in services to Leeds and Birmingham, reflecting their status as regional centres. These are then followed by Doncaster and Wakefield, which are both a similar distance from Rotherham and with comparable economies.

¹ Generalised Cost is an expression of both the monetary and time costs of a particular journey.

2.38 An alternative way of expressing the results is to group the destinations based on route geography and service options, the following groupings have been applied, based on radial routes from Rotherham

- Leeds: Wakefield and Leeds
- York: Doncaster and York
- Hull: Doncaster and Hull
- Grimsby: Doncaster, Scunthorpe and Grimsby
- Nottingham: Chesterfield and Nottingham
- London: Chesterfield, Derby, Leicester and London
- Birmingham: Chesterfield, Derby, Birmingham
- Manchester: Manchester and Manchester Airport

2.39 The results of these groupings are presented in the table below.

Table 2.10 Estimated Agglomeration Benefits of service groups

Destination	Additional GDP (£m pa)
Leeds	£8.92
York	£3.63
Hull	£3.88
Grimsby	£4.70
Nottingham	£2.86
London	£20.67
Birmingham	£6.54
Manchester	£3.26

2.40 Aside from the distortions arising from the dominance of the London economy it can be seen that the two most valuable radial links would be to Leeds and Birmingham. This is followed by a compact group including links to York, Hull and Grimsby/Cleethorpes. The single largest component in all three of these results is the improvement in the service to Doncaster, rather than the benefits of extending services to these other destinations. The next best service group is that to Manchester, (noting that this figure could well be underestimated as Manchester acts as an interchange for a range of other destinations in the North West from which further benefits could be obtained). The weakest overall result is that to Nottingham.

2.41 The delivery of direct services from Rotherham on all of these radial axis could be delivered based on the diversion of existing services, with the exception of a service to Nottingham and a service to London which would require either the development of a wholly new service or the extension of an existing service requiring additional resources, which would significantly offset the benefits.

Summary of Findings

2.42 The benchmarking process has identified a number of features about rail services to Rotherham that indicate that Rotherham is underprovided for in terms of connectivity for a town of its size and

characteristics. This includes the limited frequency of services, the low level of strategic connectivity in terms of destinations available and quality of service, and the comparatively low level of use of the services that are in place, compared to the benchmarked locations.

2.43 Based on this it is appropriate to consider options for the development of services particularly examining the following:

- development of inter urban or long distance services;
- a greater range of destinations of strategic importance;
- potential for a direct link to an airport

2.44 The results of the economic modelling to identify the relative merits of improving services to a range of potential locations are wide ranging reflecting the size and composition of the economies at the destination locations, as well as their proximity to Rotherham. After London the two largest benefits would arise from improvements in services to Leeds and Birmingham, reflecting their status as regional centres. These are then followed by Doncaster and Wakefield.

2.45 By expressing the destinations as radial routes from Rotherham the two most valuable links would be to Leeds and Birmingham. This is followed by links to York, Hull and Grimsby/Cleethorpes. The delivery of direct services from Rotherham on all of these radial axis could be delivered based on the diversion of existing services, with the exception of a service to Nottingham and a service to London. This would help to realise the potential of Rotherham which is well located for access the major cities of the north and midlands.

3 Rail Service Specification

3.1 Having examined the potential benefits of improvements in the service to a range of destinations it is possible to develop a Rail Service Specification (RSS) setting out destinations, frequencies and journey time requirements. The specification is designed to realise the maximum level of benefits identified in the previous sections, and to try and address some of the issues with services to Rotherham identified within the benchmarking process.

3.2 The table below sets out the rail service specification; (note this includes services which are **additional** to the existing service provision).

Table 3.1 Rail Service Specification

Destination	Key Intermediate Stops	Service Type	Journey Time	Frequency
Leeds	Wakefield	Inter Urban	35 minutes	Hourly
Birmingham	Sheffield, Chesterfield, Derby	Long Distance/Inter Urban	1h 30 min	Hourly
London	N/A	Improved service via Interchange		
Doncaster	None	Urban/Inter-Urban	20 minutes	20 min (including existing services)
Manchester Airport	Sheffield, Stockport, Manchester	Inter Urban	1 hour 30 min (1 hour 5 min to Manchester)	Hourly
Sheffield	N/A	Urban/ Tram-Train	10-25 min	10 minute

3.3 The rationale for each of the services is described below.

3.4 Whilst the rail service specification identifies specific final destinations the full implications of developing the links along rail corridors including a number of additional benefits. Having identified the key locations to be served it is possible to expand the modelling of agglomeration benefits to include other locations that would either be served directly by the service or where it is likely there would be a significant increase in connectivity.

The West Yorkshire Corridor

3.5 Improvements in services towards West Yorkshire have the potential to bring some the greatest benefits from improving connectivity to Rotherham. Agglomeration modelling using an assumption of a 20% reduction in generalised cost and including services to Wakefield, Leeds and Bradford (the latter served by interchange at Leeds), brings agglomeration benefits of £10.53M per annum, approaching 40% of the total agglomeration benefits forecast for the rail service specification.

3.6 There is a strong case for improving services to Leeds from Rotherham. Despite the present very poor service with a journey time of around an hour for a journey of 32 miles, Leeds is the third most popular destination from Rotherham, potentially indicating substantial suppressed demand, especially as the combination of both poor journey time and frequency are a major disincentive to travel by rail. Wakefield is presently the 12th most popular destination, again in spite of the existing poor service.

- 3.7 The city of Leeds is also one of the country's major regional centres and one of the largest economies in the north. The city is one of the major financial centres of the country and has the seventh largest proportion of knowledge intensive jobs in the country. Links to Leeds are therefore important for helping to develop knowledge intensive sectors.
- 3.8 Improving access to Leeds also has a significant impact on broader connectivity from Rotherham through the range of destinations available via interchange. As an example of this Bradford has been included in the modelling. This is already one of the top 25 flows from Rotherham. Other key locations to which access would be improved include Huddersfield, Halifax and Harrogate.
- 3.9 A broader transport benefit would arise by improving services to and from Leeds as it is likely that a significant proportion of new passengers would be abstracted from the M1 motorway, helping to relieve congestion on this busy part of the strategic road network and contributing to improvements in air quality and reduction in carbon emissions.
- 3.10 Overall it can be seen that there are substantial benefits to be gained from significantly improving services towards Leeds, including wider economic impacts, the potential to increase passenger numbers, improve connectivity to a wide range of destinations, reduce road congestion and have a positive impact on environmental issues.

The North East – Midlands – South East Corridor

- 3.11 Improving services towards Birmingham would bring substantial benefits to the Rotherham area. Based on an assumption of a 20% reduction in generalised cost, improving links from Rotherham to Birmingham would bring around £4.2M of agglomeration benefits. A journey time of around 1 hour 20 minutes would place Rotherham comfortably within the two journey time threshold which is important for business travel, and make the journey quicker than car. The link to Birmingham would however be strengthened by the benefits accruing from the places served on route. Chesterfield and Derby, which would bring around £2.07M of agglomeration benefits. The link to Derby would be particularly important due to the synergies between the economies of Rotherham and Derby based around advanced manufacturing.
- 3.12 Improving links to Birmingham, the country's second city, would further enhance links to economies with large numbers of high value jobs both within advanced manufacturing and knowledge based service sector jobs. Looking to the future development of the economy of Rotherham such links would help complement initiatives to regenerate the local economy. Direct links to Birmingham also open up a broad range of destinations via interchange at Birmingham New Street including South and Mid Wales, the Black Country and the South West.
- 3.13 Looking beyond the immediate requirements of the RSS to provide a service to Birmingham, Derby and the Midlands, the delivery of the service by stopping the existing Reading – Newcastle service helps to deliver a greater swathe of benefits through the introduction of direct links to both Newcastle and the Thames Valley. Again assuming a 20% reduction in generalised cost the additional of direct services to Newcastle, York, Oxford and Reading, would bring around £2.8M of agglomeration benefits per annum. Links to the North East would, like the East Midlands be complementary to Rotherham's development of advanced manufacturing, whilst links to the Thames Valley opens up further access to centres of research and development.
- 3.14 Overall the total agglomeration benefits of developing the North East – Midlands – South East corridor would be around £11.2M per annum, based on achieving a 20% reduction in generalised cost. This is slightly higher than the value of the Leeds service described above, although the number of stations served is greater.

East Coast to North West Corridor

- 3.15 The development of direct service to Manchester would place Rotherham within an hour of Manchester, the largest economy in the north. In addition the potential delivery of this link through calls by the existing Cleethorpes – Manchester Airport service opens up potential links to the East Coast which go beyond the level of connectivity identified within the RSS.
- 3.16 Again based on a reduction in generalised cost of 20% a direct link to Manchester and Manchester Airport would bring around £3.2M of agglomeration benefits. Further un-quantified benefits would however be gained through the benefits of interchanges to frequent services from Manchester to other locations including, Liverpool, Preston, Stoke, and North Wales. A direct service would also build on existing demand between Rotherham and Manchester which is the 8th largest passenger flow from Rotherham.
- 3.17 Serving Rotherham with the Cleethorpes – Manchester Airport service would provide Rotherham with direct access to the largest airport outside the London area, which serves short and long haul destinations worldwide. Direct linkages to an international airport could be an important attraction to businesses in Rotherham which carry out trade internationally.
- 3.18 A further benefit of the Cleethorpes – Manchester Airport service which goes beyond the RSS is the benefit of direct links to the South Humber Bank. A conservative estimate of the benefits of improved links between these areas suggests that they would be around £0.75M per annum.
- 3.19 Overall the development of the East Coast to North West corridor would bring agglomeration benefits of around £4.05M per annum, and provide direct connectivity to an international airport, as well as more broadly improving connectivity and building on existing strong passenger flows from Rotherham.

Linkages to Doncaster

- 3.20 The RSS identifies that Doncaster and Rotherham should be linked by a service of three trains per hour with a target journey time of 20 minutes. In practise through the delivery of services that fulfil other parts of the RSS there is the potential for this to be exceeded. In addition to existing stopping services the RSS would deliver two fast trains per hour between Rotherham and Doncaster, with journey times below 20 minutes. This would represent a significant change in the level of rail connectivity between the two settlements. Whilst this would potentially bring agglomeration benefits of around £2.8M per annum if generalised cost were reduced by 20% it would also provide a much more attractive service for local rail users, and potentially open up the labour markets between the two towns to a greater extent helping to expand the available pool of labour to both settlements.

Services to Sheffield

- 3.21 The service specification for Rotherham to Sheffield has identified that there should be six services per hour to Sheffield. This is the level of service that will be delivered when the Tram-Train service is developed. However the service specification envisages that the service would operate at even intervals giving a 10 minute frequency. There would be a difference in journey time between the Tram-Train and the conventional rail service, with the Tram-Train taking longer. Offsetting this, the Tram-Train would provide direct access to the centre of Sheffield as it follows the Supertram tracks into the heart of the city centre.
- 3.22 The delivery of the full rail service specification to other destinations would in fact build on the requirements of the RSS in relation to Sheffield. The operation of services to Leeds, Birmingham and Manchester would also provide additional services between Rotherham and Sheffield, which in

combination with the existing services, and the Tram-Train service would deliver nine opportunities to travel per hour.

London

- 3.23 Our analysis has identified that there would be significant economic benefit arising from improved access to London. We have considered how best to achieve this – whether through the provision of a direct service to London or alternatively building upon the good levels of connectivity already available from Rotherham to London via Sheffield and Doncaster through cross-platform interchange.
- 3.24 The case for the operation of regular direct services to London would be difficult to justify as they would require significant additional resources and would present operational problems in starting and terminating services around Rotherham. Furthermore, operating services towards London would not bring significant additional benefits in terms of connectivity to locations along the route. For example it was identified that the wider economic impact of a direct link to Leicester would be limited, whilst other more economically valuable linkages such as Derby and Chesterfield can be served via a service to Birmingham. Finally it is likely that if such a service was operated via the Midland Mainline it would be an extension of the slower of the two services to London from Sheffield. It is possible that as timetables change over time the differential between this and the faster service will increase proportionately and therefore interchanging might well provide a quicker overall journey time.
- 3.25 An examination of existing linkages to London from Rotherham indicates:
- the 6.28 service from Rotherham to Doncaster provides a good connection to the 7.12 Kings Cross service, arriving in London before 9am, with a total journey time of 2hours 22 minutes;
 - connections can also be made via Sheffield station with a total journey time of 2 hours 29 minutes;
 - good connections are currently available four times per hour in peak periods and twice an hour between these peaks, with interchange times of between 10 and 16 minutes.
- 3.26 Our conclusion is that focusing upon improved connections (cross-platform transfers and services times to facilitate interchange) are more effective ways of achieving the economic benefits of better accessibility to London. Improved interchange enables passengers from Rotherham Central to benefit from the ongoing improvements in services on both the Midland Mainline via Sheffield and the East Coast Mainline via Doncaster while improvements in service quality between Sheffield and Doncaster via Rotherham will indirectly help to improve connectivity to London, for example through improvements in rolling stock quality.
- 3.27 Delivering the other requirements of the RSS particularly Cleethorpes – Manchester, and Reading – Newcastle services would contribute to improving interchange opportunities at Sheffield and Doncaster. In the case of Doncaster with three to four trains per hour operating to London and up to five trains per hour operating from Rotherham to Doncaster there would potentially be the opportunity to minimise the impact of interchange at Doncaster through the high frequencies available.

Summary

- 3.28 The Rail Service Specification has set out a desired level of service based around the evidence described in the previous chapter which identified the severe weaknesses in inter urban and long distance connectivity by rail to/from Rotherham. The specification therefore sets out new inter urban and long distance links with the Midlands, North West, Leeds and Doncaster.
- 3.29 The rail service specification takes advantage of the relatively central position of Rotherham on the rail network to significantly increase the level of connectivity available from the town. It will be seen later in the report that much of this connectivity can be delivered through amendments to existing services that operate in the area, without resorting to the introduction of new services that would increase operating costs and reduce available capacity, potentially impacting on service reliability.
- 3.30 The delivery of the RSS in full would, if a 20% reduction in generalised cost were achieved, bring agglomeration benefits of around £27.1M. Of this, around £4M of benefit are from locations additional to the RSS but which are served as part of the mechanism for delivering the RSS. The RSS would also give Rotherham direct links to five of the top ten largest cities (by population)² in the UK, and significantly improve some existing links, especially to Leeds. The table below summarises the modelled agglomeration benefits for the three main corridors where services would be improved.

Table 3.2 Summary of Modelled Agglomeration Benefits for the RSS Corridors

Corridor	Modelled 20% GC Reduction
Sheffield – Leeds	£10.53M
Reading – Birmingham – Newcastle	£11.2M
Manchester Airport – Cleethorpes	£5.4M
Total	£27.13M

- 3.31 The following chapter identifies ways of delivering the specification and the potential issues surrounding this.

² Centre for Cities 2013 Population estimates, based on NOMIS Mid-year population estimates

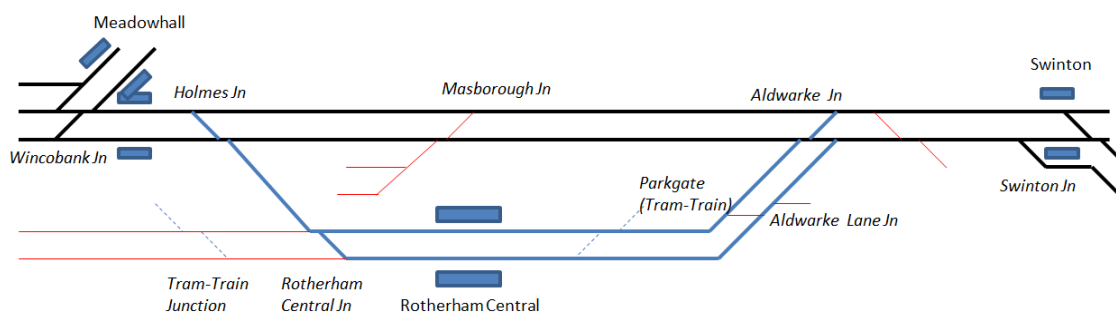
4 Enhancing Services through Rotherham

- 4.1 In developing the case for enhancing services through Rotherham there are a wide range of issues and constraints that have to be considered. This section of the report identifies them, assesses what can be achieved within the constraints and goes on to identify a preferred option for developing the service specification.

Operational and Infrastructure Issues

- 4.2 The existing operation of services via Rotherham Central is complex and this complexity constrains their development. In general terms the key issue is that there are 6 junctions over a distance of 8 miles. The presence of so many junctions makes train planning complicated as there is a need to avoid conflicting movements between trains crossing the junctions. The total number of trains already in operation is a further constraint with relatively little capacity left for new services, especially on the section between Sheffield and Meadowhall stations.
- 4.3 A further issue specific to Rotherham is the impact of the Holmes Chord, the single track section between Holmes Junction on the Sheffield – Doncaster/Leeds mainline and Rotherham Central station. This has long been cited as an issue that constrains the development of additional services, but its importance may be overstated when combined with the other constraints described below. Figure 4.1 illustrates the local infrastructure.

Figure 4.1 Track Layout around Rotherham



Flat Junctions

- 4.4 Between Sheffield station and Swinton where the lines to Doncaster and Leeds divide there are six flat junctions. These absorb capacity by constraining the ability to plan trains due to the potential for conflicting movements at junctions. Services to Rotherham are particularly constrained by this issue as northbound services are required to use two of the junctions, in both cases conflicting with southbound services. Firstly a conflicting movement takes place at Holmes Junction where services leave the mainline to access Rotherham, this is followed by a further conflicting movement at Aldwarke junction where services regain the mainline. These movements consume both the capacity of the rail network as a whole and the journey time of individual trains as the speed of movements over the junctions is very low.
- 4.5 The specific issues relating to Aldwarke Junction and Holmes Junction, in combination with the other key junctions at Meadowhall, (junction for the Barnsley line), and Swinton, make the diversion of services via Rotherham unattractive to Network Rail and Train Operators alike.

Service Frequency

- 4.6 While Rotherham only receives three trains per hour in each direction the mainline is significantly busier. The section of line between Meadowhall and Swinton typically sees seven passenger trains in each direction each hour. After the line from Barnsley joins the mainline at Meadowhall the number of trains each hour increases to 11 in each direction. The result of this is that there is very little capacity for the introduction of new services. The minimum interval between which trains can run is three minutes. This minimum interval is used at various times through each hour in the timetable. Putting aside the challenges associated with conflicting movements at junctions the present timetable would only allow Rotherham Central a theoretical maximum of four additional trains per hour to be included in the timetable. These would then be likely to conflict with southbound trains at the various junctions. This leads us to the conclusion that the *only viable option for delivering new services to Rotherham Central would be through the diversion of existing services to call at Rotherham.*

Holmes Chord

- 4.7 Holmes Chord, opened by British Rail in 1987 and linking the mainline from Sheffield to Doncaster/Leeds with Rotherham Central, has often been thought of as the key capacity constraint. The chord is only single track and has a low maximum speed due to its curvature. These factors limit the capacity of the chord, as significantly fewer numbers of services can operate than if the chord were double track. The theoretical maximum capacity of the chord is four trains in each direction per hour assuming trains alternate by direction of travel; however in practise this is limited by the number of conflicting movements at Holmes Junction with the mainline. This particular issue would be relieved but not entirely mitigated by the conversion of the chord to double track.
- 4.8 A further complication relating to Holmes Chord is a legal agreement affecting its use. The agreement was put in place between British Rail and the surrounding land owners when the Chord was built and limits the number of trains operated over the chord to three trains in each direction per hour. This was put in place to mitigate the impact of delays to road traffic around the Brinsworth Street level crossing. Were Holmes Chord to be converted to double track, this improvement would require a Transport and Works Act Order, or similar, which would provide an opportunity to resolve any conflict with the existing legal agreement at the same time.

Rotherham Central Station

- 4.9 The length of platforms at Rotherham Central station means that it can only accommodate four car trains. However, the Rail Service Specification will require diversion of existing services and it is likely that at least one of the services will be operated by the Cross Country franchise which uses trains that vary in length between four and ten coaches. It is therefore unlikely that they could be accommodated within the platforms without significant extension work. This is complicated further by the fact that the Tram-Train service will require platforms of a different height, which would add further to the requirement to lengthen platforms.

Tram-Train

- 4.10 The Tram-Train proposal presents the opportunity to address the need for improved local connectivity between Rotherham and Sheffield. A service of three Tram-Trains per hour, in addition to the existing heavy rail service, will represent a high quality of service between the two centres and, through the additional stops on the Tram-Train route, significantly improve local connectivity within north Sheffield and Rotherham. The link to Parkgate will also help to integrate the Parkgate area with central Rotherham to the benefit of both. However the Tram-Train will add to the difficulty in planning services through Rotherham Central, especially as an additional junction at Parkgate

will be developed as part of the scheme to enable the Tram-Train service to divert into the Parkgate Retail centre where it will terminate.

Service Mix

- 4.11 A further complication is the extremely diverse mixture of services that operate. The section of line between Sheffield and Swinton has regular services with a range of origins and destinations as far apart as Plymouth, Reading, Manchester and Edinburgh. The planning of these services is dictated not just by issues around Sheffield but by the need to plan these services at critical junctions across the country. This makes altering the timing of services, especially those operated by Cross Country and Trans Pennine Express, particularly complex. This also has implications for the operation of any additional services as absorbing more capacity introduces the potential for reliability risks that can impact over a wide area.

Commercial Issues

- 4.12 As identified earlier the present timetable would only allow a theoretical maximum of four trains per hour to be included in the timetable, but as these would be likely to conflict with southbound trains at the various junctions the better option for delivering new services to Rotherham would be through the diversion of existing services to call at Rotherham.
- 4.13 This introduces a number of commercial considerations associated with diverting services via Rotherham Central station. Whilst a greater diversity of destinations and reduced journey times will have the effect of stimulating demand for services to/from Rotherham there will be an adverse impact on the users of any services that might be diverted.
- 4.14 In calculating the value of making an additional call at a station the rail industry compares the revenue generated from the stop with the revenue lost through the additional journey time to existing passengers created by the stopping of the service. Normally as the additional journey time is usually small, often around two minutes, the percentage impact on demand is low (1% to 2% of demand). However, the loss of revenue is often quite large, especially if long distance services are involved, where revenue per passenger is high, or where there are large volumes of passengers. In the case of the section of line between Sheffield and Swinton both of these are issues are relevant, with long distance services operated by Cross Country, and significant volumes of shorter distance movements carried by all operators.
- 4.15 When looking at diverting services via Rotherham Central the problem is exacerbated as the journey time penalty of the extended journey via the Holmes Chord, Rotherham Central, and Aldwarke Junction would be between 4.5 and 6 minutes. Initial modelling suggests that the impact on demand would be between 4% and 7%. The impact of this would be to significantly worsen the case for making additional calls at Rotherham from a train operator's perspective.
- 4.16 This issue also has an impact on potential infrastructure upgrades. For example the option of doubling Holmes Chord would increase capacity but not reduce the journey time penalty as speeds on this section of the route are impacted by the curvature of the line not the capacity. Consequently, as demonstrated below, this improvement would not address the commercial issues associated with operating services via Rotherham Central.

The Options

- 4.17 So, can these constraints to improving services through Rotherham be addressed?

4.18 A number of options have been examined to understand if the RSS could be delivered by routing services via Rotherham Central. These fall into two groups, the first group examines what could be delivered via the existing single track Holmes Chord, the second group looks at what could be delivered via Rotherham Central with a range of infrastructure interventions including the following:

- Doubling of existing Holmes Chord
- Development of scheme at alternative location to mitigate journey time penalty of serving Rotherham
- Major infrastructure scheme to realign Holmes Chord to remove journey time penalty and reroute the mainline via Rotherham Central

4.19 The first option we have looked at is to see what could be operated *within* the existing infrastructure capacity. Then we have looked at the options for developing the infrastructure to fully meet the requirements of the Rail Service Specification.

Developing a New Service Within the Existing Infrastructure

4.20 For the reasons described in the section above it has been concluded that there is little scope for operating more services via Rotherham Central. It has been found that it is not feasible to divert any of the existing services that operate directly between Sheffield and Swinton via Rotherham. There are various reasons for this, including timetabling problems on the Holmes Chord and issues with planning services around Aldwarke Junction and Swinton. There is also an issue relating to diverting Cross Country services via Rotherham as the station is unable to accommodate trains longer than four cars and would therefore be unable to accommodate five car Voyager trains.

4.21 The only way of accommodating further services at Rotherham Central is to develop an entirely new service. Our analysis has concluded that it would theoretically be possible to operate a new service between Sheffield and Leeds via Rotherham calling at Meadowhall, Rotherham Central, Wakefield Westgate and Leeds. However there are a number of issues with this proposal:

- the timing of the service is extremely tight in relation to the existing services running on the minimum accepted headways leaving, little opportunity to absorb delays and is thus not considered to be robust;
- the timing of the train is unattractive for passengers from Sheffield to Leeds. The reason for this is that the additional journey time involved in diverting via Rotherham Central would place the train's path very close to the existing Cross Country service which would be more attractive to passengers. The Sheffield to Leeds passengers are important to supporting the commercial case for the service.

4.22 When the service is considered within the context of the proposed introduction of Tram-Train to Rotherham the viability of the service becomes more questionable, as the service would be likely to clash with Tram-Train services between Rotherham Central and Parkgate.

4.23 The cost of introducing such a service would be high, with a conservative estimate of around £1.6m per annum. An indicative breakdown of the costs is provided in Annex F. The service would be unlikely to generate sufficient revenue to cover its costs as Rotherham would be the only station to benefit from the service, as the other stations served have alternative (and better) services linking them. The table below presents the results of an outline business case for the service, and demonstrates that the service represents poor value for money.

Table 4.1 Business Case for Additional Service (annual costs and benefits)

Additional Operating Costs	£1.687 million
Benefits (Revenue and Transport Benefits)	£0.376 million
Benefit Cost Ratio	0.22

4.24 From this it can be seen that within the limitations of the existing infrastructure and the demands of the existing timetable the scope for improving services through Rotherham is very limited. The rail service connectivity required to help Rotherham deliver on its economic regeneration and growth agenda, as identified in the Rail Service Specification cannot be delivered within the existing infrastructure.

Doubling Holmes Chord

4.25 Having identified that it is not feasible to deliver the RSS via the existing Holmes Chord the next stage is to assess the opportunities provided by doubling the Holmes Chord – a proposal that is often cited as being a potential solution to the capacity challenges of serving Rotherham. To deliver such an enhancement would require a significant infrastructure investment, but would only serve to increase line capacity, and would not address issues relating to the journey time penalty imposed by serving Rotherham. A high level estimate of the cost of the scheme is around £40M, based on the following assumptions:

- Existing speed profile of Holmes Chord maintained
- Installation of a double lead junction at Holmes Junction and Rotherham Station Junction
- Some land take required to accommodate second line
- Legal issues relating to Brinsworth Street Level Crossing resolved by Transport & Works Act
- Junction speeds at Holmes, Rotherham Station, and Aldwarke junctions remain as present
- Platform extensions at Rotherham Central to at least six car length and potentially ten car.

4.26 An assessment was made of the potential improvements that could be made to the timetable based around the present pattern of services and the additional Sheffield – Leeds service described above. The findings of this assessment were that the only service that could be operated in both directions was the proposed Sheffield – Rotherham – Leeds service (and then only with considerable performance risk). It would not be possible to operate the following services in both directions:

- Sheffield – Hull
- Cleethorpes – Manchester Airport
- Reading – Newcastle

4.27 No attempt was made to divert the Plymouth – Edinburgh service as this service already suffers from overcrowding issues and in any case the timetable operates by allowing the Plymouth – Edinburgh service to run direct, whilst the Sheffield – Leeds stopping service occupies Rotherham Central station. Without this manoeuvre it would be necessary to significantly extend the journey time of either the Plymouth – Edinburgh or Sheffield – Leeds service. The doubling of Holmes Chord does not provide a significant increase in flexibility as it does not resolve conflicting movements at Holmes and Aldwarke Junctions, and has the effect of elongating the journey time of

any services routed via Rotherham which serves to *move* the locations of timetabling problems rather than *resolve* them.

- 4.28 A further issue relates to the introduction of Tram-Train which would absorb capacity and introduce a range of additional conflicting movements.
- 4.29 As well as this operational assessment a value for money assessment was also carried out, to identify whether a viable business case could be constructed (if the timetabling issues could be resolved). Two assessments have been made, the first examines the business case based solely on the operation of the new Sheffield - Rotherham – Leeds service, and the second assumes that the Cleethorpes – Manchester and Hull – Sheffield service could also be diverted. The following table presents the results of this high level assessment.

Table 4.2 Business Case for Doubling Holmes Chord (Present Value)

Option	Sheffield – Leeds Service Only	Sheffield – Leeds, Cleethorpes – Manchester, Sheffield - Hull
Present Value of Costs	£32.26M	£32.26M
Present Value of Benefits	£9.17M	£3.2M
Net Present Value	-£23.09M	-£29.06M
Benefit Cost Ratio	0.28	0.10

- 4.30 It can be seen that the option of doubling Homes Chord does not represent value for money. Of the two scenarios assessed the operation of a service to Leeds only provides the better result. However it does not represent value for money. It has been assumed that there would be no operating costs associated with the operation of this service as the service would be provided by other means. However as a new service it has no negative impact on demand affecting existing rail users.
- 4.31 The option of diverting other services via a doubled Holmes Chord provides a significantly worse result; this is due largely to the negative impact on existing passengers who would have as a minimum a four minute journey time penalty imposed on them, with a resulting impact on demand. This offsets the benefit to Rotherham of the services making the additional calls.
- 4.32 The only potential option for developing this scheme would be as a performance enhancement scheme to improve reliability and increase capacity for mainline flows, however this would be unlikely to help improve the service via Rotherham, instead it would assist the development of direct services.
- 4.33 Overall it can be seen that the doubling of the Holmes Chord would not represent value for money, and in any case operationally it cannot deliver the required level of service.

Investing at an Alternative Location

- 4.34 It is clear from the sections above that one of the key constraints to operating additional services via Rotherham Central is the impact that the additional journey time incurred by operating via Rotherham Central has on users of existing rail services. Whilst other options examine the case for dealing with this through interventions in the Rotherham area, an alternative approach is to examine the case for an intervention elsewhere on the rail network that brings a journey time saving to services which in turn can be used to reduce the impact on users of operating services via Rotherham.

4.35 A quantified value for money assessment of this approach has been carried out and is presented in more detail in Annex F. There are however a number of issues with this approach that mean that whilst it may be possible to implement such a scheme in theory it may not deliver the desired results in practice. The main reasons for this are:

- It is unlikely that such a scheme could be located on a route where all of the services specified in the RSS could benefit
- Due to the size of the potential market at Rotherham the TOC's would find it preferable to use the journey time saving to develop their existing markets rather than benefiting Rotherham
- In the long term it would not be possible to lock in the benefits as it would be possible in the long term to reroute any service diverted via Rotherham Central to again run via the mainline route
- The proposed journey time savings would not resolve any of the timetabling issues linked to serving Rotherham Central, in particular it would not deal with problems with conflicting movements at Holmes Junction and Aldwarke Junction.

From this it can be concluded that this option would not be a viable solution to delivering the rail service specification as it would not resolve operational problems and would not lock in benefits in the long term.

Realignment of the Railway: Holmes Junction – Aldwarke Junction via Rotherham

4.36 The next option for analysis is to examine the infrastructure required to deliver the Rail Service Specification to Rotherham Central.

4.37 To deliver an enhancement in service levels via Rotherham Central would involve lifting the present level of capacity to physically accommodate the number of trains required. Then to ensure the commercial viability of services routing via Rotherham Central it is necessary to improve the infrastructure to remove the journey time penalty arising from the line speeds and junctions associated with serving Rotherham Central. Without these speed improvements it will be difficult to develop a commercially attractive business case since most of the diverted services will be busy long distance services.

4.38 To achieve an appropriate alignment the level of investment required around Rotherham Central would include the following:

- extension of platforms to accommodate 10 car trains,
- doubling of Holmes Chord and construction of new alignment to facilitate 90mph running³,
- upgrading of route from Rotherham Central to Aldwarke Junction to facilitate 100mph running,
- Upgrade of Aldwarke Junction to allow movements to and from Rotherham Central at 100mph.

4.39 The line speed issue is further illustrated in the plans below which compares the line speed achievable within the existing infrastructure with the line speeds (and indicative track realignment) required to deliver a journey time that eliminates the 'penalty' of routing via Rotherham Central.

³ As we have already shown an upgrading of Holmes Chord to double track would not in itself be sufficient as the journey time penalty of operating via Rotherham Central as relatively low speeds would still apply.

Figure 4.2 Current Line Speeds

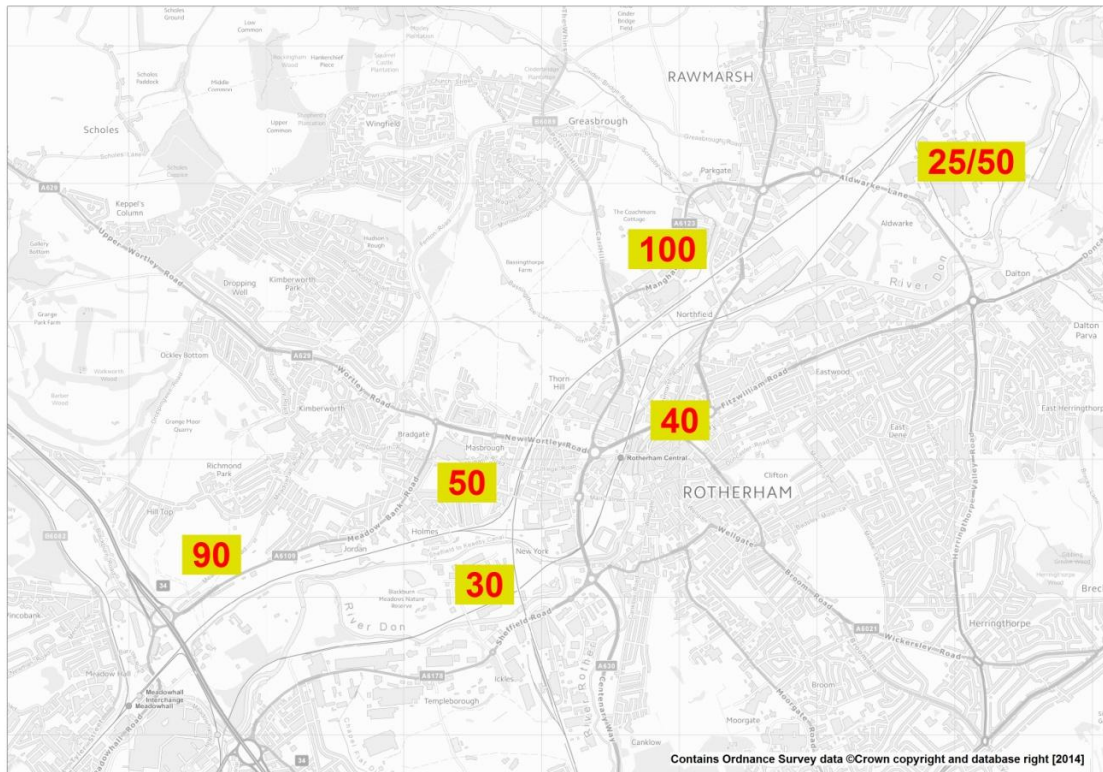
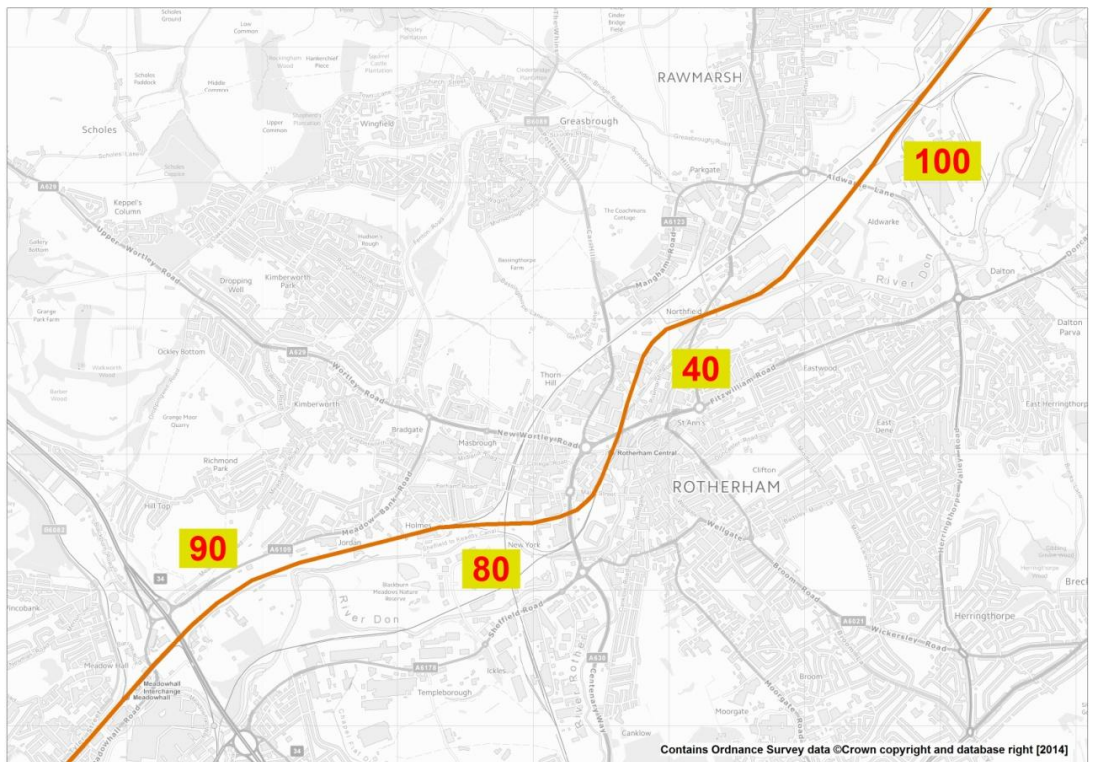


Figure 4.3 Required line speeds and notional realignment



- 4.40 The investment presented above would be transformational in terms of the level of service that could be delivered, as it would effectively divert the existing mainline via Rotherham Central. However the cost of achieving this would be extremely high with an initial estimate placing the cost at around £200m. An indicative breakdown of costs is provided in Annex F. It is also possible that there would still be significant operational issues when this option was complete. The Tram-Train service will operate through Rotherham Central and this will require three paths per hour, and include conflicting movements at the proposed junction at Parkgate where the Tram-Train would terminate. Resolving this issue would require additional platforms on new lines at Rotherham Central, and potentially grade separation of the junction at Parkgate, adding further to the cost, as it may not otherwise be possible to divert all of the required services via Rotherham Central.
- 4.41 A high level value for money assessment has been conducted, looking at the impact on demand from Rotherham for the new services, and a range of transport benefits that arise from this, for example, decongestion as a result of mode shift to rail. It is acknowledged that this assessment is only partial as it has not been possible to obtain information on all flows from Rotherham, However the value for money assessment indicates that the scheme would represent poor value for money due to the substantial costs associated with the upgrading of the route. A Benefit Cost Ratio of well below 1 indicates that the scheme would not generate enough benefits to cover its own costs.

Table 4.3 Business Case for Realignment (Present Value)

Present Value of Costs	£161.340 million
Present Value of Benefits	£76.227 million.
Net Present Value	-£85.112 million
Benefit Cost Ratio	0.47

- 4.42 From this it can be seen that significant investment in new infrastructure is required to deliver the Rail Service Specification and hence the rail service connectivity required to assist Rotherham in delivering its economic regeneration and growth agenda. The summary business case for this improvement indicates a poor value for money. It would be difficult therefore to build a case justifying the required improvements.
- 4.43 Consideration has also been given to the delivery programme for such a schedule of works. Given the scale of the works an implementation within Control Period 6 or 7 (2019 – 29) would be realistic.

Conclusions

- 4.44 This chapter has examined the diverse range of issues that act as constraints to the development of services at Rotherham and the implementation of the Rail Service Specification presented in Chapter 3.
- 4.45 It has been seen that capacity and line speed limitations prevent the diversion of existing services via Rotherham Central, while the option of developing a new service to Leeds is neither commercially attractive, nor felt to be operationally robust. Alternative options involving upgrading the infrastructure via Rotherham Central have also been examined; however the extremely high cost of achieving this relative to the benefits that it would bring mean that the scheme represents poor value for money.

5 Enhancing Rotherham's Rail Service – An Alternative Approach

5.1 The rationale for this study was to identify what type of rail service Rotherham requires to deliver on its economic regeneration and growth agenda and to identify how best to do this.

5.2 It is clear that there is a strong economic rationale for improving services but we have been unable to identify a commercially or economically attractive means of doing it via the alignment to and from Rotherham Central.

New Station Site

5.3 An alternative option for delivering the Rail Service Specification is to take a step back and consider the issue of station location. Ironically it is Rotherham Central's location on a separate branch - something that has been key to serving the centre of Rotherham and the key linkages between the Borough and Sheffield - that is also the impediment to growing the inter urban and longer distance services.

5.4 This begs the question as to whether a station on the mainline would be a better way of achieving these aims. A station located on the mainline route would facilitate these inter-urban and long distance stops without the need for either a substantial journey time penalty for existing users or the need for major engineering works. Such a station would complement Rotherham Central Station by enabling Central to focus on providing localised connections within the sub-region through existing heavy rail connections and development of tram train at this location, while a station on the mainline would provide inter urban and long distance connections. The cost of developing a new station would be relatively modest compared to upgrading the infrastructure to serve the existing Rotherham Central site. In addition the option could have a range of additional benefits to the wider Rotherham area.

5.5 The development of a new station on the mainline between Sheffield and Swinton would allow the requirements of the Rail Service Specification to be addressed and would potentially go further than this in terms of the services that could stop. In addition it would provide improved accessibility to rail for parts of Rotherham that have been identified within the Local Plan and present the opportunity to develop a Parkway station for the whole town, with the potential to deliver an interchange facility which meets modern passenger demands. Such a station would be additional and complementary to the existing station, with the two stations serving distinct markets, and potentially contributing directly to addressing the economic development opportunities within Rotherham.

Station Location

5.6 The location of a new station for Rotherham would lie on the Sheffield – Doncaster/Leeds mainline between Holmes Junction to the south and Aldwarke Junction to the north. The key requirements for the station would be:

- Sufficient space for 10 car platforms;
- Good access by car, bus and active modes;
- Sufficient space for the development of a large car park.

5.7 Looking at the locations available within the area specified there are two locations that would seem to be viable:

- Former Masborough Station, Midland Road;
- Beale Way, off Great Eastern Way, Parkgate.

Figure 5.1 Potential new station locations

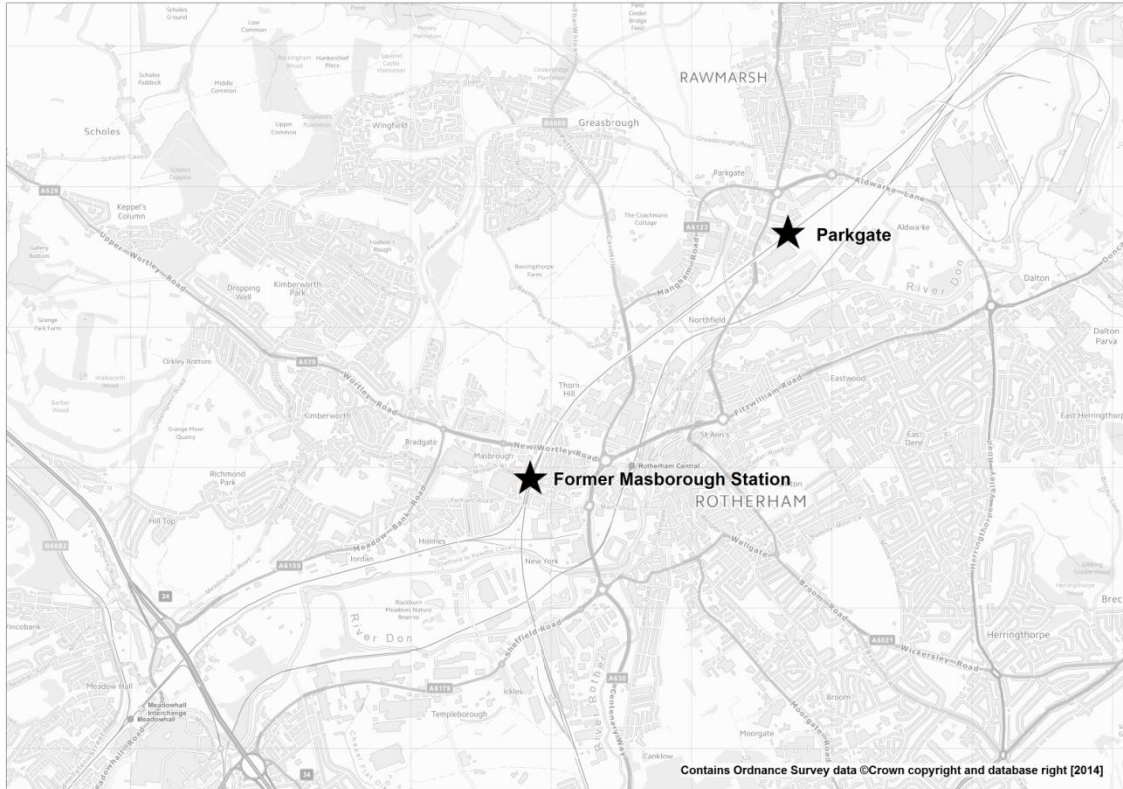


Table 5.1 Summary assessment of potential new station locations

	Masborough	Parkgate
Space for 10 car platforms	✓	✓
Ample parking	✗	✓
Good accessibility by car, bus, and active modes	✗	✓
Facilitate economic development	✗	✓

5.8 The former station site at Masborough, while still in existence, and having the remains of platforms in place, is not well suited to modern requirements, platform lengthening is likely to be required while there is little or no room for the development of a car park, and the road access to the site is relatively poor. A further issue with the Masborough site is its relative proximity to Meadowhall, which detracts from its attractiveness further.

5.9 The site at Parkgate, in contrast, addresses all of the requirements identified above. An initial assessment would suggest that there is scope for the construction of 10 car platforms within the existing Network Rail boundary, while there is sufficient space to develop a car park on adjacent land either off Beale Way or on development land to the east of the site. Finally the road access to

the area is good with access to the north, east and west of Rotherham and the potential to integrate with the Tram-Train service terminus.

- 5.10 For the purpose of this study Parkgate has been assumed as the preferred location on the basis of this high level assessment, although it is acknowledged that further detailed option analysis on station location would be required if this option were to be pursued.

Service Levels

- 5.11 The construction of a new station on the mainline would make achievement of the rail service specification far more deliverable. An indicative assessment, based around the existing timetable indicates that the following services would be able to stop at a Rotherham Parkgate station. Confirmation of this, through a more detailed train planning exercise would form part of a the next phase of work.
- 1 train per hour Cleethorpes – Manchester Airport
 - 1 train per hour Hull – Sheffield
 - 1 train per hour Newcastle – Reading
- 5.12 From the above it can be seen that the new station delivers more direct travel options than identified within the Rail Service Specification, with direct connectivity to Cleethorpes, Hull, York, and Newcastle and Reading being additional to the specification. However it has not been possible to identify a service that can serve Leeds. The only option is to stop the Plymouth – Edinburgh Cross Country service. However, this train is presently overcrowded, has reliability issues, and lacks sufficient scope in the timetable to allow a stop at Rotherham. Furthermore it has been shown that the journey time penalty from stopping this train would lose more revenue from its current passengers than would be generated from the newly attracted Rotherham passengers, reflecting the strategic importance of this service. If a more detailed assessment were to confirm that it is not possible or desirable to stop the Plymouth – Edinburgh service it is proposed that a new Sheffield – Leeds service be developed.
- 5.13 Unlike the Sheffield – Leeds service via Rotherham Central considered in Chapter 4, this option would not be constrained by either the additional journey time via Rotherham Central or the need (in the northbound direction) to undertake two conflicting movements, at Holmes Junction and Aldwarke Junction. Assuming that the timing of such a service could be planned to be complementary to the Cross Country service from Sheffield to Leeds such a service would generate substantial demand as an alternative fast service from Sheffield to Leeds, in addition to the demand and revenue generated from Rotherham. The desirability of such a service has been identified within the 2012 Yorkshire Rail Network Study. The delivery of the service would complete the realisation of the full Rail Service Specification. In the long term it might well be possible that a timetable recast would facilitate the operation of an improved service to Leeds.

Generating New Demand

- 5.14 The development of a new parkway station would have the potential to significantly increase rail use in the Rotherham area, beyond that which could be achieved from simply improving services at Rotherham Central. The present station at Rotherham Central, while located close to the centre of the town provides relatively poor access by car; compounded by the lack of space at the station for substantial parking facilities. In contrast Parkgate is relatively well connected by road and there would be sufficient space to develop substantial parking facilities. This could encourage greater

use of rail services through improved access, which would be additional to forecast demand uplifted from existing users of Rotherham Central.

- 5.15 The station would also serve a function in providing a local station close to residential areas surrounding Parkgate such as Rawmarsh, helping to improve the connectivity of the area. This would be likely to include substantially new demand as Rawmarsh is not presently well served by rail, with the nearest stations being Swinton and Rotherham Central.
- 5.16 As a Parkway station it is possible that the station would abstract some Park & Ride traffic from Meadowhall station, however it is likely that issues of suppressed demand exist at Meadowhall due to the high demand for parking at this location and the diversion of some passengers to a Rotherham Parkgate station would be likely to be a net generator of passengers overall.
- 5.17 Finally, the station has the potential to act as an attractor of passengers due to the proximity of the Parkgate Retail Park which is home to a broad range of retailers and therefore a potential source of further new rail demand.

Abstraction

- 5.18 One possible concern relating to Parkgate station is the potential for abstraction from Rotherham Central and the impact this would have on future operations at Central. To some extent this issue will be mitigated by the development of the Tram-Train operation which will have a significant impact on demand at Central as it becomes a focus for local trips to and from Sheffield with a high frequency service.
- 5.19 Due to the stopping pattern of the trains that would use Rotherham Parkgate the scope for abstraction of local trips is relatively limited. The main impact would be on long distance trips. At the present time it is thought that around 107,000 long distance trips per year would transfer from Rotherham Central to Parkgate, around 16% of the present users at Rotherham Central. However the significant increase in usage of Rotherham Central that will accompany the Tram-Train scheme is likely to offset this transfer.

The Potential for Development & Regeneration

- 5.20 In addition to helping Rotherham realise its economic aspirations through providing improved connectivity to a wide range of destinations the development of the station would also help aid specific development and regeneration issues in the Parkgate area. Adjacent to the Parkgate site is a substantial area of development land. The opening of a station in this location would be likely to stimulate the development of the land by making it more attractive for investors. A comparable example of this is happening at Kirkstall Forge near Leeds where the development of a new station is linked to the re-development of adjacent former industrial land. The improved accessibility to the area would potentially enhance Parkgate's attraction as a location to invest in.
- 5.21 Finally, the station would also have the potential to assist in the delivery of Local Plan development, providing improved connectivity to sites identified within the plan. This is particularly relevant to the development of a strategic housing site at Bassingthorpe forecast to deliver 2,500 homes close to the site of the proposed station, and the employment site identified adjacent to Parkgate.

High Level Business Case

- 5.22 A high level business case for the station has been developed. Given the early stages of the development of the scheme the business case has not been able to account for all of the potential benefits of the station. However based on the information available to us for modelling purposes we estimate that the scheme would deliver a Benefit Cost Ratio in excess of 2. This is based on the uplift in demand relative to the existing services from Rotherham Central and the transport benefits associated with this, plus an assessment of demand generated from the local area as a result of the station opening. The Benefit Cost Ratio includes the cost of operating the additional service from Sheffield to Leeds, with an assumption about the level of demand for this service that would be generated from Sheffield and Meadowhall. If the cost of operating this service were not wholly allocated to the station the case would improve further.
- 5.23 The capital cost of the station has been estimated at £15m with a further cost of £1.6m per annum to operate the additional service and £100k of station operating costs each year, an indicative breakdown of costs is provided in Annex F. The table presents the results of the summary business case, noting that this includes the ongoing cost of operating a new service to Leeds.

Table 5.2 Business Case for Parkway Station (Present Value)

Present Value of Costs	£53.167 million
Present Value of Benefits	£108.63 million
Net Present Value	£55.46 million
Benefit Cost Ratio	2.04

- 5.24 At over 2.0 the Benefit Cost Ratio would represent high value for money and there are reasons for suggesting that this is quite a conservative assessment. In addition to the whole cost of the new Leeds – Sheffield service being allocated to the station there are a number of other benefits that have not been included that could add to the case. These include:
- Potential new demand for the station as a strategic Parkway station for the borough;
 - Detailed assessment of demand for access to the Parkgate Retail Centre.
- 5.25 Consideration has also been given to the delivery programme for a new station and it is estimated that a case could be developed with a view to opening by 2019. This programme would depend on the speed of decision making and a commitment to develop the scheme being made in the first half of 2015.
- 5.26 Sensitivity tests have also been carried out which examine a number of potential scenarios relating to the provision of the Leeds service. These tests are:
- An assumption that a new Sheffield – Leeds fast service via the Dearne Valley would operate, irrespective of the opening of a station at Parkgate
 - A test where it is not possible to operate any Leeds service from Parkgate at the time of the station opening.
- 5.27 The table below presents the impact of these tests.

Table 5.3 Business Case for Parkgate Sensitivity Tests

Option	No Leeds Service Costs	No Leeds Services from Parkgate
Present Value of Costs	£14.08 million	£14.08 million
Present Value of Benefits	£64.80 million	£36.79 million
Net Present Value	£50.72 million	£22.71 million
Benefit Cost Ratio	4.60	2.61

5.28 It can be seen in both cases that the removal of the costs associated with operating the Leeds service has a positive impact on the business case, even though it also removes the benefits accruing to newly generated through-passengers between Sheffield and Leeds. Where the Leeds service is maintained but the costs are not allocated to the Parkgate scheme it can be seen that there is very strong positive impact on the business case, with a BCR representing very high value for money. With the loss of Leeds services entirely the BCR drops back to 2.61 which is still in excess of the central case BCR. This does however illustrate the importance of access to Leeds. The results would suggest that the overall case for the station is strong and that the business case is relatively robust at this stage.

The Wider Economic Impact of the Options

5.29 Earlier in this report the Rail Service Specification was evidenced based around modelling of the wider economic impacts of service improvements, using a test of a 20% reduction in generalised costs. Having examined all of the available options for delivering the RSS it is possible to return to this modelling and compare the timetables that could be delivered by the options with the original modelled changes that defined the RSS. The table below presents the following options:

- 20% generalised cost reduction – the modelling that was used in the RSS specification
- The implementation of a Sheffield – Rotherham – Leeds service - identified as being the only theoretically operable additional service within the existing infrastructure
- The operation of all services via a realigned route through Rotherham Central
- The Parkgate station option

Table 5.1 Comparison of Agglomeration Benefits

Service Corridor	20% GC Reduction	Sheffield – Leeds service	Realignment of Mainline	Parkgate Station
West Yorkshire	£10.53M	£10.57M	£11.14M	£11.84M
North East – Midlands – South East	£11.25M	-	£8.66M	£8.97M
East Coast – North West	£5.42M	-	£5.05M	£5.31M
Total	£27.21M	£10.57M	£24.86M	£26.12M

5.30 It can be seen that the Parkgate station option comes closest to delivering the 20% reduction in generalised cost across all services. The realignment of the mainline comes close to this; however this option was identified earlier as having a very poor value for money case. It can also be seen that whilst the timetable for the North East – South East corridor and East Coast – North West

corridor falls short of achieving the equivalent GDP uplift as the 20% generalised cost reduction test the West Yorkshire corridor exceeds it by over £1M per annum, emphasising the potential gains from improving this service.

- 5.31 ***It is clear that the only way to realise these benefits is through the option of opening a station on the mainline,*** as the possibilities for delivering the services required via Rotherham Central have been exhausted.

The Impact of HS2

- 5.32 A longer term consideration of the planning of many rail schemes is the impact that the development of HS2 may have on their viability. This is especially acute in areas such as Rotherham where HS2 will run nearby at either Meadowhall or Sheffield Victoria. It is possible that the impact of HS2 will be to change the pattern of operation of existing services and also change travel patterns more generally. In the case of the proposed parkway station it is likely that there would be sufficient local benefits from the station to sustain it in the long term. Although this might mean that service patterns change it is likely that the station would still retain an important function in the local transport network. Also in terms of the timescales involved a new station can be delivered late within Control Period 5 or early within Control Period 6, meaning that 10 years of benefit could potentially be derived from the new station ahead of HS2 being delivered and still provide a very real function once HS2 has arrived, including as a feeder station to HS2.

The Role of Rotherham Central

- 5.33 The development of a parkway station would provide a complementary function to the existing station at Rotherham Central. Rotherham Central will be providing greatly increased levels of local connectivity through the introduction and continued development of Tram-Train services while a parkway station focuses on inter urban and long distance connections, serving a wider catchment with the ability to provide improved integration with car potentially stimulating mode switch to rail.
- 5.34 As demand continues to grow in the future the development of services at Parkgate would help to provide additional capacity for growth at Rotherham Central. In the long term if the Tram-Train network were to be developed northwards (as has been proposed), it would be possible to develop a more intensive Tram-Train service within Rotherham with the conversion of the remaining heavy rail services.

Summary

- 5.35 This section has examined the case for addressing the rail service specification through the development of a new station located on the Sheffield – Doncaster/Leeds mainline. In addition to having the potential to fully address the Rail Service Specification, and in some respects exceed it, the station would also bring other benefits through providing improved rail accessibility from north Rotherham and provide a more attractive station site for park and ride users than the existing site at Rotherham Central.
- 5.36 The case for the station improves significantly when the costs associated with the additional Leeds service are removed, indeed the impact of this is such that even in a scenario where both the costs and benefits of the Leeds service are removed the case for the station improves relative to the situation where the costs of the Leeds service are included. ***Importantly it has also been shown that opening a new station on the mainline can deliver almost fully the agglomeration benefits estimated at the beginning of the report when the RSS was defined.***

6 Summary and Conclusion

- 6.1 This report has examined a range of issues relating to rail connectivity at Rotherham Central. The initial stages have indicated that Rotherham is significantly underprovided for both in terms of a town of its size and characteristics and in terms of the economic regeneration and growth plans for the area.
- 6.2 The study has examined the existing level of service from the town and benchmarked this against other locations whilst also examining the economic impact of improving services from Rotherham to a range of locations.
- 6.3 It was shown that existing services from Rotherham are considerably limited in comparison to the identified benchmark locations. Indeed Rotherham was found to have the poorest level of rail connectivity based on a number of measures including the total number of services, the range of destinations served and type of services operated, with services being entirely characterised by urban services providing local links to Doncaster, Sheffield and Leeds.
- 6.4 Economic modelling demonstrated that there would be significant benefits to the economy from improving services to a number of key locations including Leeds, Birmingham, Manchester and Doncaster. Based on this a Rail Service Specification was developed that proposed the following services, additional to existing services:
- 1 train per hour to Leeds calling at Wakefield with a journey time of 35 minutes
 - 1 train per hour to Doncaster with a journey time of 20 minutes
 - 1 train per hour to Birmingham with a journey time of 90 minutes
 - 1 train per hour to Manchester (1 hour 5 min) and Manchester Airport (1 hour 30 min)
- 6.5 Having identified the optimum service level required to help Rotherham deliver on its economic regeneration and growth agenda in the rail service specification. It was concluded that it would not be possible to deliver this by operating additional services through Rotherham Central within the constraints of the existing infrastructure.
- 6.6 Attention was then given to the potential infrastructure improvements required to deliver the service specification. An option of doubling Holmes Chord was found to bring little benefit as it neither relieves the most critical operating constraints nor addresses the issues relating to journey time penalties.
- 6.7 The only option that could deliver the service specification and address the journey time penalty issues while continuing to use Rotherham Central, by realigning the Holmes Chord and undertaking further significant works at Aldwarke junction, was found to be unaffordable, delivering poor value for money, with a benefit cost ratio of well below 1.
- 6.8 An alternative way of delivering the service specification was found to be to open a new station located on the mainline at Parkgate. This would deliver the service specification at a significantly lower cost than the option of upgrading the route via Rotherham Central. Furthermore it would also bring additional benefits by improving rail access for the north of Rotherham, developing a Parkway facility that is accessible by car as well as pedestrians, cyclists and public transport users, and helping to stimulate development and regeneration of a number of areas surrounding the station site. This option was found to have a strong business case and also have the potential to deliver the wider economic impacts that were identified during the definition of the service specification.

- 6.9 There is a need for further work on the case to fully examine the potential station locations, identify the costs and benefits in more detail and allow a fuller appraisal to be conducted.
- 6.10 The conclusion of the study is therefore that the development of a new station at Rotherham Parkgate would not just deliver an improved rail service for Rotherham, in line with the requirements of the Rail Service Specification, but would also contribute to the broader regeneration and development of the area in a direct way.

Next steps

- 6.11 The following steps are proposed for consideration by the client group:
- incorporate the findings of the study into the Yorkshire Rail Network Study, and the North of England Route Study;
 - engage with key stakeholders at an early stage of option development - in this instance key stakeholders include DfT, South Yorkshire partners including the LEP, further engagement with Network Rail including operational managers, and train operating companies;
 - detailed timetable and performance analysis of the route to establish if what we have concluded in indicative terms in terms of the ability to accommodate station stops is deliverable - this is critical in terms of any future proposals gaining credibility with operators;
 - detailed option analysis on station location to gain a greater understanding of potential station locations, including consideration of any land issues and potential for incorporation into masterplanning;
 - detailed passenger demand forecasting to feed into a commercial case to train operators;
 - detailed appraisal of new station location.