



# West Yorkshire Connectivity Plan

Appraisal Handbook

August 2020



Mott MacDonald  
Floor 3  
1 Whitehall Riverside  
Leeds LS1 4BN  
United Kingdom

T +44 (0)113 394 6700  
F +44 (0)113 394 6701  
mottmac.com

West Yorkshire Combined  
Authority  
Wellington House  
40-50 Wellington Street  
Leeds  
LS1 2DE

# West Yorkshire Connectivity Plan

## Appraisal Handbook

August 2020



# Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
1					
2					
3					
4					

**Document reference:** 401619 | 01 | C

**Information class:** Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

<b>Purpose and structure of this document</b>	<b>1</b>
<b>1 Introduction to the Leeds City Region</b>	<b>3</b>
Some key facts	4
1.1 The need for the West Yorkshire Connectivity Plan	5
<b>2 Vision and objectives for the emerging Connectivity Plan</b>	<b>6</b>
2.1 Introduction	6
2.2 Regional priorities	6
2.3 Vision and objectives	6
<b>3 Issues and opportunities</b>	<b>8</b>
3.1 Increased employment in growing sectors	8
3.2 Share the benefits of growth through strategic connectivity	8
3.3 Put people first in town and city centres	11
3.4 Invest in skills and attracting business	12
3.5 Have a positive impact on the built and natural environment	13
3.6 Build on the Leeds-Bradford Powerhouse	15
<b>4 Defining the corridors</b>	<b>16</b>
4.1 Priority corridors	16
4.2 Refining the corridors	16
<b>5 Evidence Base</b>	<b>18</b>
5.1 Overview	18
5.2 Spatial analysis	18
5.2.1 Socio-economic data	18
5.2.2 Development data	21
5.2.3 Transport data	21
5.2.4 Environmental data	23
5.2.5 Other data	23
<b>6 Stakeholder Engagement</b>	<b>25</b>
6.1 Workshop workplan	25
6.1.1 Workshop structure	27
<b>7 Appraisal Parameters</b>	<b>28</b>
7.1 Option appraisal	28
7.2 Overview	28
7.3 Core objectives	29
7.4 Key themes	29
7.5 Corridor-specific aspirations	30

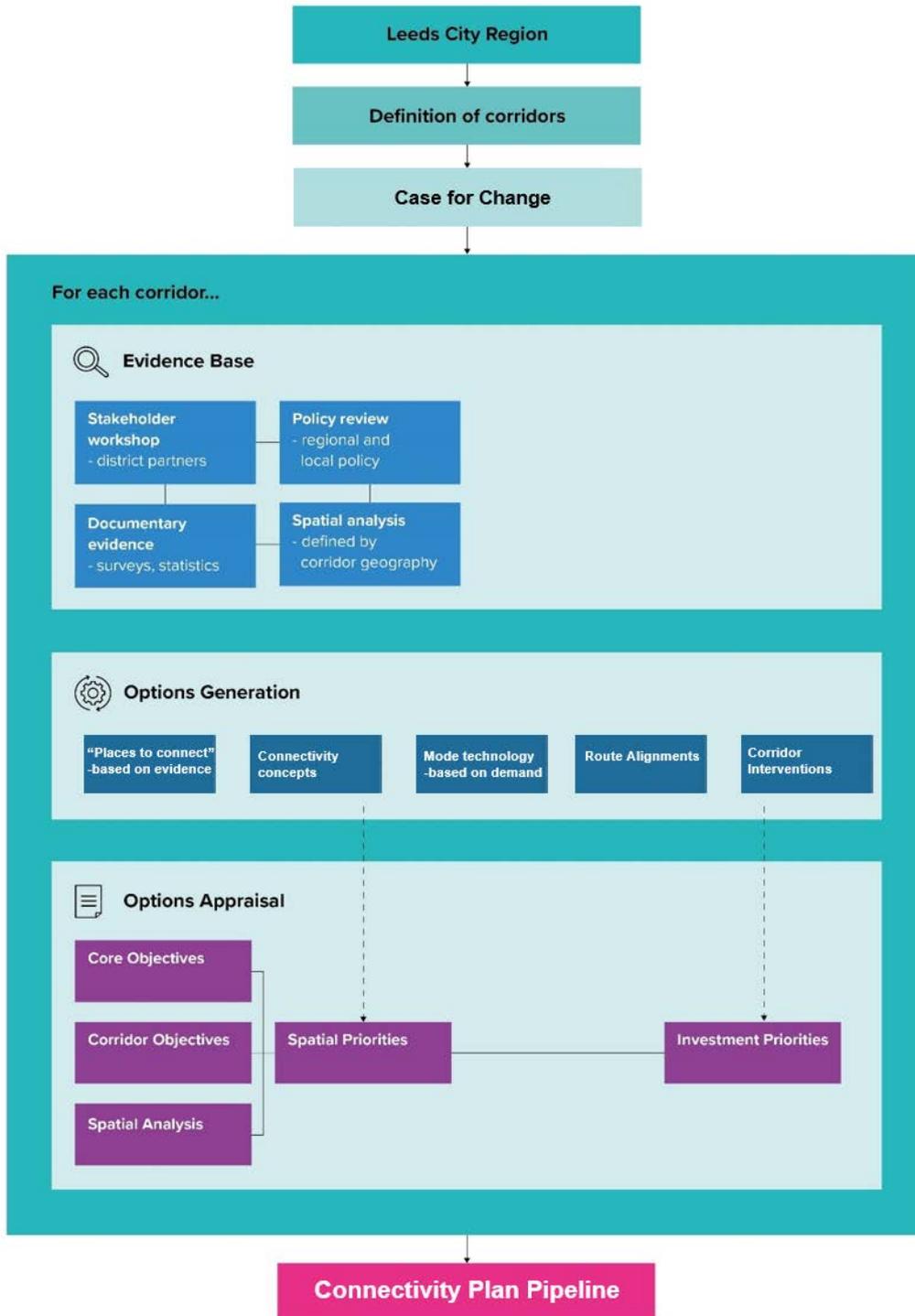
<b>8</b>	<b>Option Appraisal</b>	<b>31</b>
8.1	Sift 1 – Early sift	31
8.2	Sift 2 – Local fit	32
8.3	Sift 3 – Level of impact	32
8.4	Scoring	35
<b>9</b>	<b>Appraisal Outcomes</b>	<b>36</b>
9.1	Overview	36
9.2	Connectivity concepts	37
9.2.1	Spatial priorities	39
9.2.2	Demand	40
9.3	Route alignments	42
9.4	Interventions	44
9.4.1	Intervention profiles	46
9.4.2	Scheme priorities	46
9.5	Dealing with uncertainty	47
<b>10</b>	<b>Case for Change Reports</b>	<b>49</b>
10.1	Report index	49
10.2	Case for Change structure	50
10.2.1	Appendix	50
10.3	Report outcomes	50
10.4	West Yorkshire Connectivity Plan	51
	<b>Appendices</b>	<b>53</b>
<b>A.</b>	<b>Local policy context</b>	<b>54</b>
A.1	Leeds City Region Strategic Economic Plan 2016-2036	54
A.2	Leeds City Region HS2 Growth Strategy	55
A.3	Leeds City Region HS2 Connectivity Strategy	56
A.4	Leeds City Region Local Industrial Strategy	58
A.5	Digital Framework	58
A.6	Energy Strategy and Delivery Plan	58
A.7	Leeds City Region Green and Blue Infrastructure Strategy	59
A.8	Future Mobility Strategy	60
A.9	Transforming Cities Fund	60
A.10	West Yorkshire Transport Strategy 2040	60
A.11	West Yorkshire Transport Strategy 2040	61
A.12	Leeds Clean Air Zone	62

# Purpose and structure of this document

This document is the West Yorkshire Connectivity Plan Appraisal Handbook. It provides the detailed methodology that has been adopted for the corresponding suite of Case for Change reports for the West Yorkshire Connectivity Plan. It enables the reader of these reports to cross-reference for further information the processes adopted to identify the outcomes presented. This document is structured as follows:

- **Chapter 1: Introduction to the Leeds City Region** – introduces the Leeds City Region and the need for additional local investment that is required to ensure the wider City Region sees regeneration benefits and inclusive growth from the arrival of HS2 and other developments.
- **Chapter 2: Strategic Ambitions** – summarises the key strategic drivers for the development of a West Yorkshire Connectivity Plan.
- **Chapter 3: Issues and Opportunities** – a city-region-wide commentary on key issues and opportunities affecting the delivery of strategic connectivity.
- **Chapter 4: The Connectivity Plan** – a broad explanation of how the strategic vision and ambitions underpin the objectives for the study, as well as the role of the “Case for Change” in developing a pipeline of local and regional connectivity priorities to maximise the growth associated with HS2 and other developments.
- **Chapter 5: Defining the Corridors** – describes the priority corridors that have been identified for this piece of work to develop multi-modal connectivity concepts as the mechanism for developing a pipeline of interventions for the West Yorkshire Connectivity Plan.
- **Chapter 6: Evidence Base** – a quick reference guide showing the spatial analysis that provides the foundation for the evidence base, which is supplemented by stakeholder engagement, and a desktop review of policy and relevant documentary evidence. It also describes the linkages to other studies and workstreams in the Leeds City Region.
- **Chapter 7: Stakeholder Engagement** – outlines the approach taken to engage with key partners across the corridors, including a high-level work plan and indicative workshop structure.
- **Chapter 8: Appraisal Parameters** – a high-level summary of how the appraisal parameters have been established, the policy framework and evidence base that underpins them, and how they come together in an appraisal framework for the West Yorkshire Connectivity Plan.
- **Chapter 9: Option Appraisal** – explains the detailed workings of the option appraisal process, including its interface with various spatial datasets and use of Mott MacDonald’s Investment Sifting & Evaluation Tool (INSET) to “sift” the interventions in terms of how well they meet the objectives. It also explains how the schemes are scored.
- **Chapter 10: Appraisal Outcomes** – an overview of how interventions are identified, and the factors considered to profile them for the appraisal. It describes the key outcome of the Case for Change appraisals: namely, an option long-list, scored and profiled to enable consideration within different strategic contexts, and describes how “uncertainty” will be dealt with in the study.
- **Chapter 11: The Case for Change** – explains how the outputs from the corridor appraisals are reported, and how the findings will tie together in the wider West Yorkshire Connectivity Plan.

[Overall process chart](#)



# 1 Introduction to the Leeds City Region

As the largest city region outside London, the Leeds City Region generates 4% of the UK's output and is a key contributor to the Northern Powerhouse. The arrival of High Speed 2 (HS2) to Leeds presents a once-in-a-generation opportunity to transform the Leeds City Region's economy, and in the process, help to rebalance Britain. The West Yorkshire Connectivity Plan identifies what additional local investment is required to ensure that West Yorkshire and the wider City Region sees regeneration benefits and inclusive growth from the arrival of HS2 and other developments.



## Some key facts<sup>1</sup>

### Leeds City Region Connectivity Strategy



<sup>1</sup> Leeds City Region HS2 Growth Strategy – accessed via <https://www.westyorks-ca.gov.uk/media/2808/hs2-growth-strategy-20122017.pdf>

## 1.1 The need for the West Yorkshire Connectivity Plan

This sets the scene and demonstrates the rationale for this piece of work – namely, the development of a broader Connectivity Plan for West Yorkshire, which determines an accelerated programme of local and regional connectivity investments to maximise the growth associated with HS2.

West Yorkshire and the wider Leeds City Region must deliver a step change in connectivity to enable the transformative impact of HS2 to be realised across West Yorkshire, through improved links within and beyond the City Region<sup>2</sup>. Transport for the North (TfN) has identified several strategic development corridors that reflect economic links across the north which will contribute towards achieving transformational economic growth by connecting economic assets and clusters<sup>3</sup>. In addition, Northern Powerhouse Rail (NPR) will also help to transform connectivity between key economic centres across the north<sup>4</sup>. The West Yorkshire Connectivity Strategy presents a strong Case for Change, focused across a range of economic, social, environment, transport and capacity criteria, and demonstrates that “business as usual” for connectivity will not enable the social and economic constraints to be resolved or the economic opportunities to be achieved.



<sup>2</sup> Leeds City Region HS2 Connectivity Strategy – accessed via <https://www.westyorks-ca.gov.uk/media/3271/lcr-hs2-connectivity-strategy-may-2018-post-engagement-version.pdf>

<sup>3</sup> <https://transportforthenorth.com/onenor/h/>

<sup>4</sup> <https://transportforthenorth.com/northern-powerhouse-rail/>

## 2 Vision and objectives for the emerging Connectivity Plan

The arrival of HS2 to Leeds and other growth opportunities in the city region presents a once-in-a-generation opportunity to transform the economy, and in the process, contribute to rebalancing Britain. The West Yorkshire Connectivity Plan identifies what additional local investment is required to ensure the wider city region sees regeneration benefits and inclusive growth from any investment in the area, thus addressing the strategic ambitions and the issues and opportunities that are highlighted in Chapter 4.

### 2.1 Introduction

This section provides a broad explanation of how the key strategic vision and ambitions underpin the objectives for the study, as well as the role of the “Case for Change” in developing a pipeline of local and regional connectivity priorities to maximise the growth associated with HS2 and other area developments.

### 2.2 Regional priorities

The Connectivity Plan is formed around the four regional priorities for the region supported by transport strategy targets; these are shown below. The four priorities are front and centre in our appraisal framework and have led to the need for the development of a West Yorkshire Connectivity Plan.



### 2.3 Vision and objectives

Objectives have been developed to ensure that the West Yorkshire Connectivity Plan, through its development and appraisal process, supports the delivery of the long-term vision for the Leeds City Region – as identified in the Leeds City Region HS2 Growth Strategy – as well as the priorities and ambitions outlined in the Strategic Economic Plan (SEP), the Leeds City Region HS2 Connectivity Strategy, and the West Yorkshire Transport Strategy 2040. These

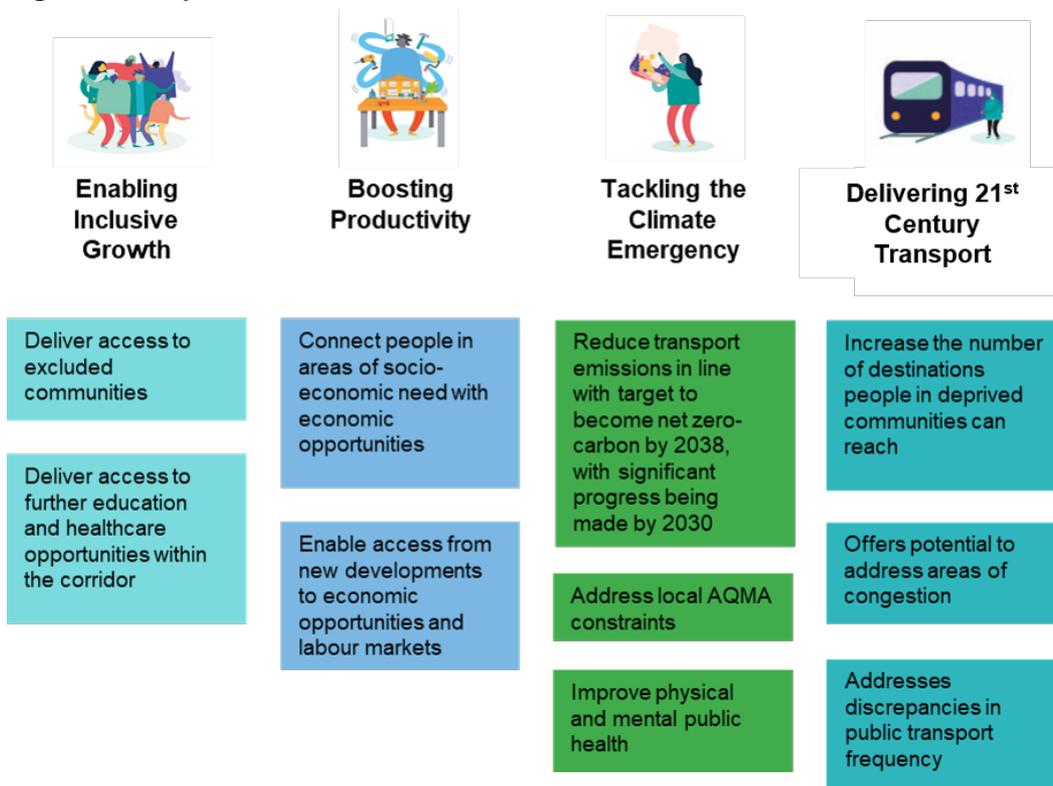
local policy documents that helped the Combined Authority to arrive at its four regional priorities are in Appendix A.

The objectives for the West Yorkshire Connectivity Plan are outlined below. These have been developed in consultation with the West Yorkshire Combined Authority client team and align with the regional priorities.

**West Yorkshire Connectivity Plan Objectives:**

- Connect people in areas of socio-economic need with economic opportunities
- Enable access from new developments to economic opportunities and labour markets
- Deliver access to further education and healthcare opportunities within the corridor
- Deliver access to excluded communities
- Increase the number of destinations people in deprived communities can reach
- Offer potential to address areas of congestion
- Address discrepancies in public transport frequency
- Reduce transport emissions in line with target to become net zero-carbon by 2038, with significant progress being made by 2030
- Address local AQMA constraints
- Improve physical and mental public health

**Figure 1: Alignment of the West Yorkshire Connectivity Plan objectives to the city region’s core priorities**



## 3 Issues and opportunities

This section provides a city-region wide commentary on key issues and opportunities, particularly the need to deliver inclusive growth for both people and place across the Leeds City Region and make the most of its economic strengths.

The purpose of this chapter is to present some of the relevant spatial context at the city region level and how these factors have been used to shape our objectives and appraisal framework. These start the focus for the Case for Change and have also been used as a steer at a local level when investigating the needs for individual corridors.

### 3.1 Increased employment in growing sectors

To build a successful and resilient economy, West Yorkshire will require investment in transport which supports the demand for sites in rapidly growing sectors, particularly in urban centres. Knowing and using such employment characteristics will help to inform where and what type of connectivity is needed within the different corridors, with a boosting productivity priority.

Around 16% of jobs in Leeds City Region are in the wholesale and retail sector and 13% are in health and social care which aligns with national averages, whereas manufacturing accounts for 10% of jobs compared with 8% nationally<sup>5</sup> and has a local quotient of 1.26 where national average is 1. This is driven by food and drink manufacturing in North Yorkshire and several subsectors in West Yorkshire, particularly textiles which is focussed in Kirklees. Programming and broadcasting activities have increased by 215% between 2015 and 2017 in Leeds City Region. There has also been growth in publishing activities, other professional, scientific and technical activities and activities of head offices. In absolute terms, activities of head offices have increased the most (+9,300 employees) followed by retail, employment activities and warehousing and support activities (+7000 employees)<sup>5</sup>. The sector with the largest number of businesses in Leeds City Region was the professional, scientific and technical sector in 2018<sup>6</sup>.

Over the past 5 years, Leeds and Selby's businesses have grown faster than the UK (+25.1% and (20.1%) respectively, compared to 19%), whereas Bradford and Wakefield have seen growth in line with the UK (19%)<sup>7</sup>.

### 3.2 Share the benefits of growth through strategic connectivity

Connecting people to opportunities through better education, transport and employment is vital. Currently, many communities do not feel the benefits of economic growth, a more dynamic, socially mobile labour market helps to drive productivity and growth particularly when built around an effective education and skills system<sup>8</sup>. Lack of accessibility to economic opportunities strongly impacts lower educated, middle-aged and car-less groups; increasing public transport accessibility will help to unlock opportunities for these groups and enable inclusive growth<sup>9</sup>.

---

<sup>5</sup> Business Register and Employment Survey: open access (2017)

<sup>6</sup> UK Business Counts - NOMIS

<sup>7</sup> Draft Transforming Cities Fund Strategic Outline Case Submission for the Department for Transport – West Yorkshire Combined Authority (June 2019)

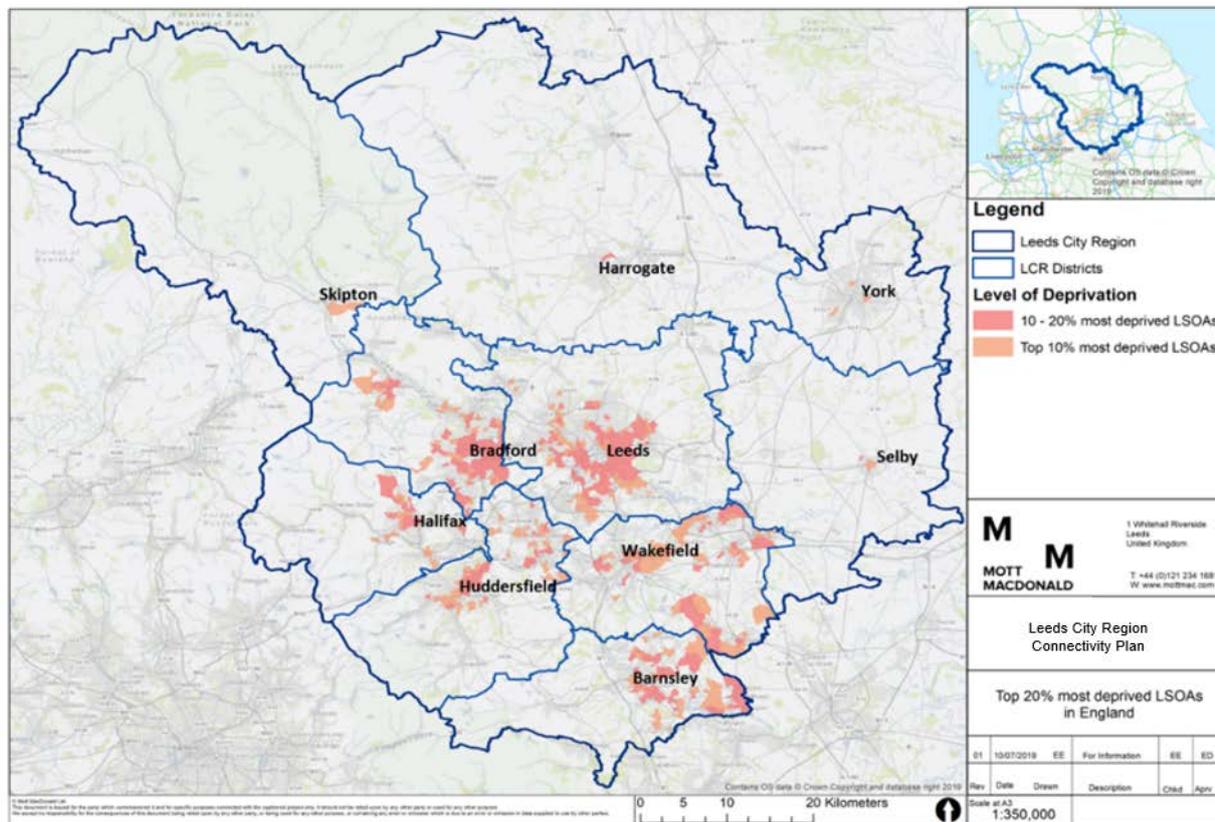
<sup>8</sup> What is inclusive growth and why does it matter? – Josh Stott (2017) accessed via: <https://www.jrf.org.uk/blog/what-inclusive-growth-and-why-does-it-matter>

<sup>9</sup> Youth Mobility and Access to Economic Opportunities a comparative study of West Yorkshire in the UK and the Randstad region in the Netherlands – Jeroen Bastiaanssen (2019)

Understanding the spatial extent of this will help to ensure that the appropriate opportunities are unlocked and developments are connecting the appropriate areas to enable inclusive growth.

Figure 2 shows areas that are within the top 20% most deprived in England and are therefore likely to disproportionately suffer from poor connectivity and fewer opportunities to access jobs and education. In Leeds City Region, 17% live in areas within the top 10% most deprived in England and 28% within the top 20%<sup>7</sup>. Communities in these areas rely on affordable, convenient and reliable transport to connect them with local centres of employment, amenities and services – therefore, transport can be a significant barrier to employment for many of these residents<sup>10</sup>. For growth in West Yorkshire to be truly inclusive, the benefits of new developments need to be shared across all communities and connect them with opportunities such as education facilities and employment growth sites, enabling as many people as possible to benefit from economic growth.

**Figure 2: Level of deprivation**



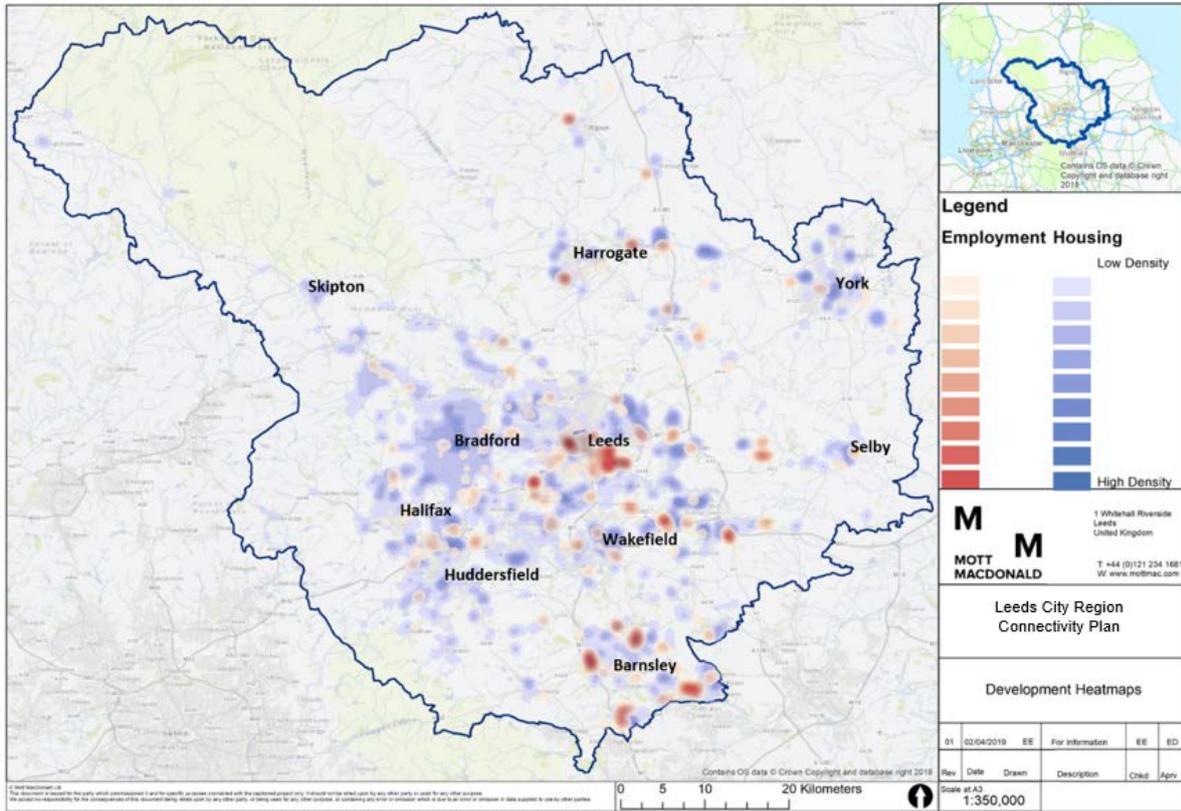
Source: Mott MacDonald

Figure 3 is a development heatmap, indicating the principal areas for future employment and housing growth. Without good connectivity, West Yorkshire risks losing out on the opportunity for these areas to thrive and grow the jobs and sectors that will give them a competitive

<sup>10</sup> Tackling transport-related barriers to employment in low-income neighbourhoods (2018) accessed via: <https://www.jrf.org.uk/report/tackling-transport-related-barriers-employment-low-income-neighbourhoods>

advantage. It is important to note that specific sites for Bradford's future housing development have not yet been defined by Bradford Council.

**Figure 3: Development**



Source: Mott MacDonald

### 3.3 Put people first in town and city centres

The key challenges facing town and city centres in West Yorkshire include prominent, widespread and large-scale highway infrastructure, significant traffic and noise and a relatively low quantity and quality of green space. For example, the heart of the City Region - Leeds - was described as the “Motorway City of the North”<sup>11</sup> in the 1970’s and since then, it has retained its love of the car. The city centre itself is heavily focused around vehicle travel and just over half of commuters drive to work<sup>11</sup>.

Frameworks have been developed to help our planners and decision makers address these challenges; local examples include the Leeds Our Spaces strategy, the Halifax Town Centre Masterplan, and the Huddersfield Blueprint. The Healthy Streets™<sup>12</sup> approach, developed by Lucy Saunders through her research into the health impacts of transport, public realm and urban planning is also a useful framework and has been incorporated into our appraisal framework, using the following 10 Healthy Streets™ indicators:

1. Everyone feels welcome
2. People choose to walk and cycle
3. People feel relaxed
4. Easy to cross
5. Clean air
6. Not too noisy
7. Places to stop and rest
8. People feel safe
9. Things to see and do
10. Shade and shelter

A key indicator of well-functioning and people-centred towns and cities is ensuring that spaces are inclusive and safe, resilient to climate change and provide a canvas for new investment<sup>13</sup>. Providing strong pedestrian links throughout towns and city centres is key to putting people first and creating healthy, safe and accessible streets<sup>13</sup>. The emerging Huddersfield Town Centre masterplan aims to create an attractive, safe, high quality, functional public realm, linked by active and vibrant streets and improved connections linking people and places through new pedestrian/cyclist friendly transport hubs<sup>14</sup>. The Leeds Transport Strategy identifies a vision for “A World Class City Centre”, highlighting the need to reduce traffic and improve walking and cycling in order to create more liveable and healthy streets throughout the city centre<sup>15</sup>. The West Yorkshire Connectivity Plan will strive to identify initiatives to put people first in our town and city centres across Leeds City Region. Creating places that are easy to access on foot, by



<sup>11</sup> Leeds Our Spaces (2019)

<sup>12</sup> Healthy Streets™ is an evidence-based approach for creating fairer, sustainable, attractive urban spaces. <https://healthystreets.com/>

<sup>13</sup> Halifax Town Centre Masterplan (2010)

<sup>14</sup> Huddersfield Blueprint: Our 10-year vision – Kirklees Council

<sup>15</sup> Leeds Transport Strategy: Interim December 2016 – Leeds city Council

bike and public transport has a positive impact on place-making and creates more vibrant and successful local centres, that have local economic benefits.

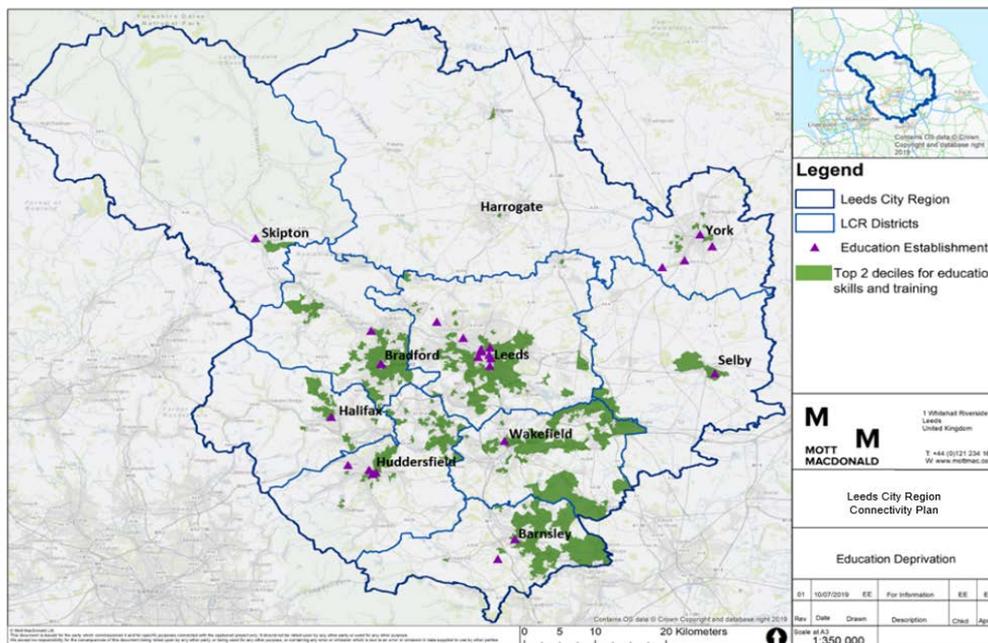
### 3.4 Invest in skills and attracting business

To retain and strengthen its competitive edge, West Yorkshire and the Leeds City Region must create the right environment to attract businesses and workers, who in turn, create higher value through higher level skills. Higher-level occupations are the main source of job growth; therefore, connecting people to these jobs is a key opportunity. However, the area suffers from skills deficit and being unable to access high skilled employees for these roles is a key constraint to business growth. Automation also poses a threat to a significant number of jobs in a range of industries, particularly for lower skilled workers<sup>16</sup>.

Figure 4 shows populations living within the top 20% most deprived in England for education, skills and training, as well as the location of education establishments throughout West Yorkshire. Figure 4 indicates that there is education, skills and training deprivation across West Yorkshire, particularly around Leeds, Bradford, Halifax, Wakefield and Barnsley. Lack of skills is one of the key factors that reinforces deprivation and therefore improving access to key education, training and employment opportunities is fundamental to reducing deprivation, increasing productivity and growing the economy. Understanding the spatial context of this within each corridor will help to support an appropriate connectivity plan and enable inclusive growth.

Enabling more people to access training in high level STEM occupations (Science, Technology, Engineering and Maths) and skilled trades, as well as upskilling existing staff will help to encourage inclusive growth throughout West Yorkshire.

**Figure 4: Education deprivation and establishments**



Source: Mott MacDonald

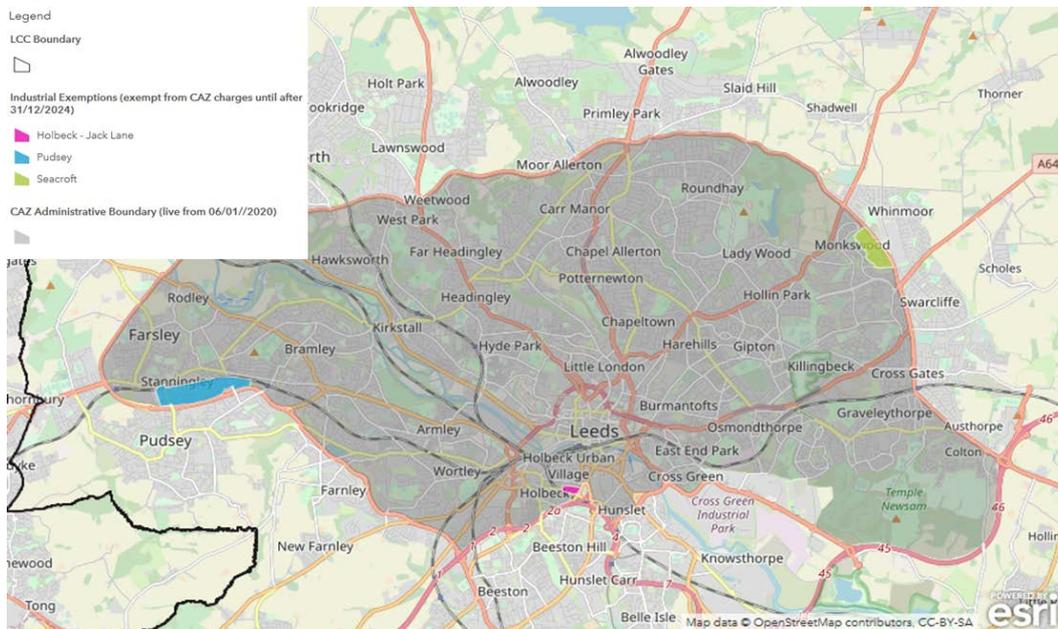
<sup>16</sup> Local Industrial Strategy - West Yorkshire Combined Authority

### 3.5 Have a positive impact on the built and natural environment

Air pollution, carbon emissions, and climate change are significant challenges facing West Yorkshire. Districts produce a Department for Environment, Food and Rural Affairs (Defra) air quality action plan which sets out how they will meet air quality objectives and identifies areas where air quality exceeds national air quality objectives. Figure 6 shows that there are large Air Quality Management Areas (AQMAs) around the M62 and A1 as well as surrounding Wakefield town centre to the east of the M1. It also shows that highway network congestion is felt across the key urban areas in the Leeds City Region but is particularly an issue on the M62 between junctions 24 and 26 as well as between junctions 27 and 29. Congestion on local roads is above average for England and Yorkshire and Humber and is continuing to worsen<sup>7</sup>. In 2017, Leeds City Region’s CO<sub>2</sub> emissions were 15,577 kt CO<sub>2</sub> which accounts for 5% of the England total. This is a decrease of 690 kt CO<sub>2</sub> since 2016<sup>17</sup>. Of the total for 2017, 38% of CO<sub>2</sub> emissions were produced as a result of transport emissions in Leeds City Region; therefore, improvements to public transport and reducing use of the private car and congestion is key to helping reduce carbon emissions.

The Leeds Clean Air Zone will be introduced in 2020 to help reduce air pollution and protect the health of everyone in Leeds. It aims to encourage businesses to transition to cleaner, less polluting vehicles that won’t be subject to charges. Charges will apply to heavy goods vehicles, buses, coaches, taxis and private hire vehicles that do not meet emissions standards. Figure 5 shows the Leeds Clean Air Zone boundary. This includes Leeds City Centre and to the north including Roundhay, Headingley, Farsley, Harehills, Cross Gates and Temple Newsam. In addition to the mandatory Leeds CAZ, it is also being considered if additional zones are necessary throughout the city region. In particular Bradford is developing proposals for a CAZ to address issues of air quality. It is proposed that the Bradford CAZ would extend to the outer ring road, and includes links to Shipley and Saltaire, to help reduce transport emissions.

**Figure 5: Leeds Clean Air Zone**



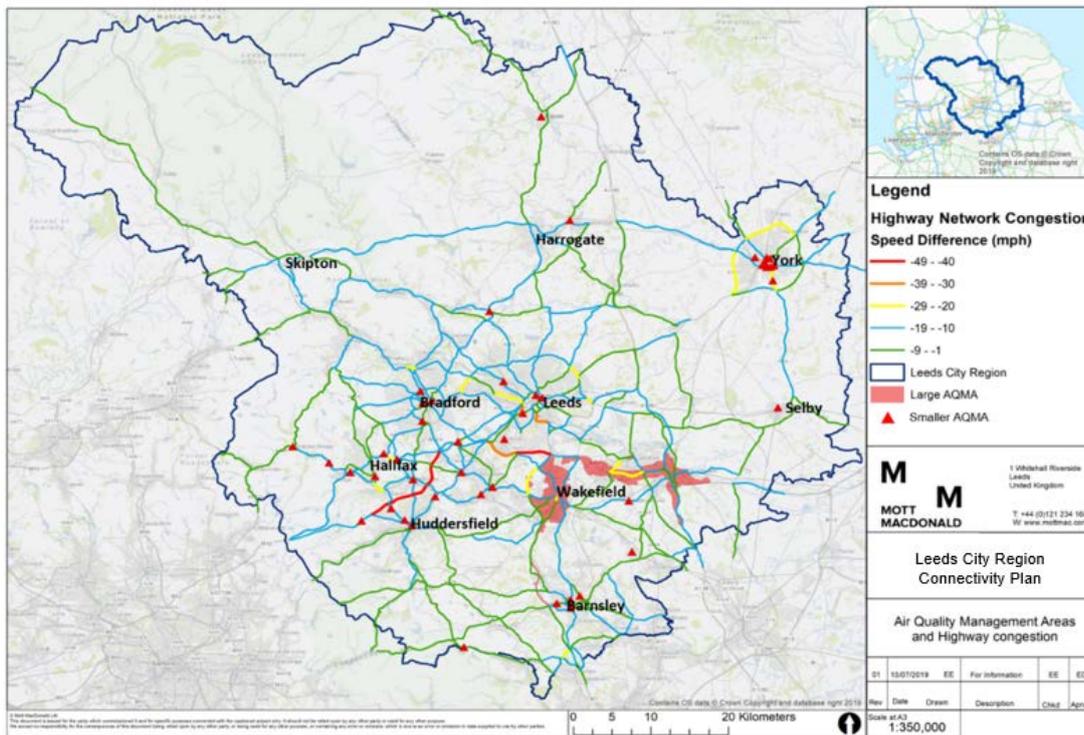
<sup>17</sup> Department for Business, Energy and Industrial Strategy (BEIS) - 2005 to 2017 UK local and regional CO<sub>2</sub> emissions – data tables

Source: ArcGIS Online – Leeds.gov.uk

95% of premises throughout the Leeds City Region have access to superfast broadband enabling download speeds up to 30 Mbits/s and 51% have access to ultrafast broadband with speeds above 100 Mbits/s<sup>18</sup>. Improving digital connectivity throughout the region enables people to access teleconferencing and cloud computing therefore provides people with the opportunity to work from home. Increasing the number of people home working has the potential to reduce vehicle traffic and therefore have a positive effect on the environment.

The West Yorkshire Combined Authority has set an ambition to become the UK’s first zero carbon city region<sup>34</sup> and formally declared a climate emergency along with seven of the 10 local authorities that make up Leeds City Region<sup>19</sup>. Transportation has a key role in helping to achieve this through measures such as introducing electric vehicle charging points and low emission buses. Investments which deliver inclusive economic growth (such as those that better manage traffic, alleviate congestion and promote an increase in public transport and active travel modes) will have a positive environmental impact and enhance people’s quality of life.

**Figure 6: Air Quality Management Areas and highway network congestion**



Source: Mott MacDonald

<sup>18</sup> Broadband Coverage and Speeds for UK Local Authorities and Regions - Think Broadband

<sup>19</sup> <https://www.westyorks-ca.gov.uk/all-news-and-blogs/combined-authority-declares-climate-emergency/>

### 3.6 Build on the Leeds-Bradford Powerhouse

Previous work completed on the Leeds Bradford Corridor<sup>20</sup> indicates that the two cities combined generate approximately 48% of the Leeds City Region's Gross Value Added (GVA) and employ 46% of the workforce; therefore, connectivity between these two cities is essential to building the Powerhouse of the Leeds City Region. The corridor is a critical commuter route between the two centres, approximately only 7 miles apart. However, this corridor currently suffers from high levels of road congestion as well as low frequency and unreliable public transport, with crowding and ageing stock. Estimates from work undertaken in developing the West Yorkshire Connectivity Plan indicate that there may be demand for more than 3,000 additional peak hour trips towards Leeds in this corridor by 2050<sup>20</sup>.

---

<sup>20</sup> Leeds to Bradford and South Bradford to Bradford – Options Assessment Report

## 4 Defining the corridors

This section explains how the Leeds City Region HS2 Connectivity Strategy “priority corridors”, have been used as a framework for this commission to develop multi-modal connectivity concepts, and to provide the basis for developing a pipeline of interventions for the West Yorkshire Connectivity Plan.

### 4.1 Priority corridors

These priority corridors were selected through careful analysis of a range of economic and transport indicators considered as part of the Case for Change (see Section A.3). It is important to note that the corridors are only intended to provide a framework for the identification of interventions where they are needed most. At the completion of the commission, these corridors as such will cease to exist as the schemes come together into a pipeline of interventions across the whole of West Yorkshire for the Connectivity Plan.

### 4.2 Refining the corridors

Mott MacDonald reviewed the corridors, and in consultation with the West Yorkshire Combined Authority and key partners, consolidated and reclassified them to identify a suitable programme for the development of the Case for Change (Figure 7).

It was agreed that the “priority corridors” should in fact represent the spine of “priority economic areas” – i.e. the study must not solely consider linear, and consequently narrow, transport corridors but must address wider spatial socio-economic geographies.

Table 1 shows the priority corridors and economic areas. These were taken forward as the spatial framework for the remainder of the study.

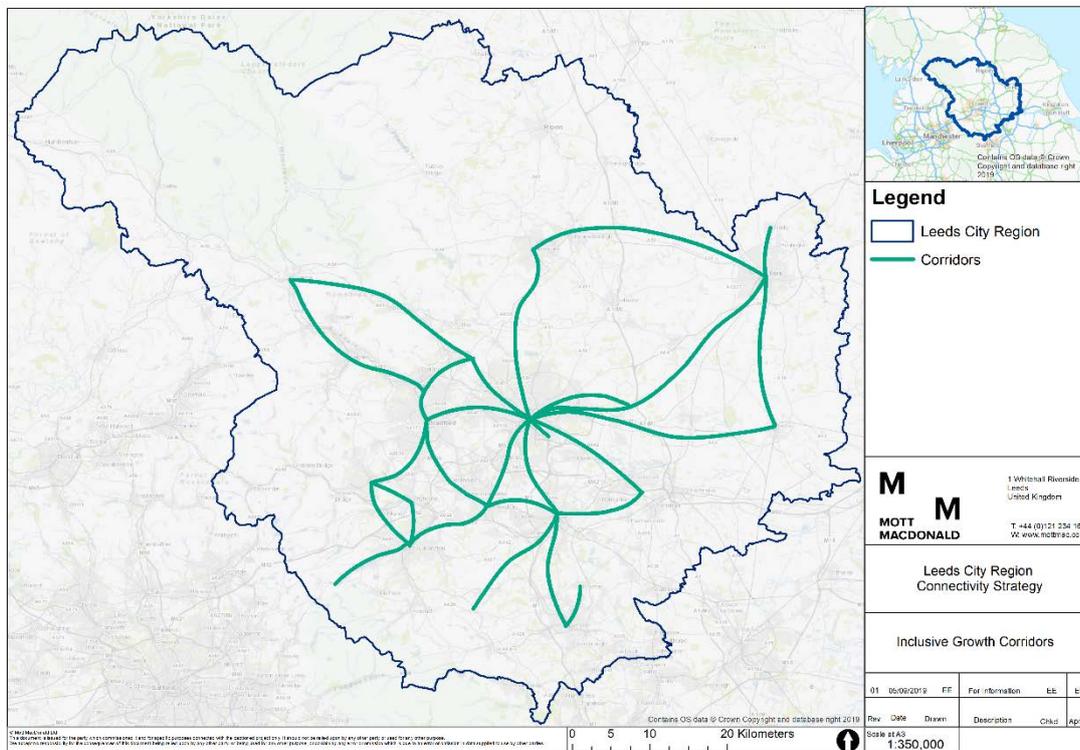
**Table 1: Corridor classification**

Ref.	Original corridor name
A	Five Towns to Leeds
B	Barnsley and Wakefield to Leeds
C	Leeds – Bradford – Halifax and the Calder Valley
D	Leeds Bradford cross connectivity
E	South Bradford and North Kirklees – Bradford
F	Extending the South Bank opportunity to the south of Leeds
G	Accelerating inclusive growth in the East of Leeds towards St James’ Hospital and the East Leeds extension
H	Dewsbury / Huddersfield to the HS2 Hub
I	Stimulating development from the city centre into North Bradford towards Shipley, Saltaire and the airport
J	Strengthening high value assets in the North West of Leeds, the University of Leeds, Kirkstall Forge and the airport
K	Skipton to Leeds
L	Dewsbury to Wakefield
M	East Kirklees (including Denby Dale) to Wakefield
N	Five Towns to Wakefield

O	North Barnsley to Barnsley
P	Huddersfield to Brighouse
Q	South West Kirklees (including Slaithwaite) to Brighouse
R	Huddersfield – Halifax
S	Halifax to Brighouse
T	Harrogate to Leeds
U	York to Leeds
V	Selby to Leeds
W	York to Harrogate (via Harrogate line and A59)
X	Selby to York (via Hull to York line)
Y	North York to York

Source: West Yorkshire Combined Authority

**Figure 7: West Yorkshire Connectivity Plan: Corridor Map**



Source: Mott MacDonald

## 5 Evidence Base

A wide range of data has been collected from various sources to be used as part of this study's evidence base; this has been used as a basis to develop the "story maps" of issues and opportunities for each corridor. The "story map" is a web-based GIS tool with a user-friendly interface and uses a combination of narrative, graphics and mapping to provide links between specific issues and opportunities and the evidence. This section provides a list of all the data within the evidence base, its source and where required, a description of its application.

### 5.1 Overview

Four strands of evidence are utilised to provide a baseline for the development of interventions to deliver inclusive growth within the corridors and wider economic areas, as shown below:



The primary strand of evidence is spatial analysis, using a range of datasets and use of Geographical Information Systems (GIS) to draw out key issues, opportunities, and scale of influence and impact. This remainder of this chapter provides a detailed explanation of datasets used.

The spatial analysis provided a wealth of information that was used to engage stakeholders in a series of workshops. The outputs from the spatial analysis were used as the basis for discussion and validation of key issues, opportunities and local priorities with local partners. More detail on the stakeholder engagement process is provided in Chapter 7.

The evidence from the spatial analysis and the workshops was supplemented by a desktop review of policy and other relevant documentary evidence.

### 5.2 Spatial analysis

#### 5.2.1 Socio-economic data

A range of socio-economic data has been collected using open data sources, namely NOMIS (official labour market statistics provided by the Office for National Statistics). These have been analysed and mapped at a middle super output area (MSOA) and lower super output area (LSOA) level, using GIS to display the required attributes. A list of socio-economic data is

provided in Table 2 below. Information about how the data has been used is included. For detail about the appraisal process see Chapters 8, 9 and 10.

**Table 2: Socio-economic data**

Data set	Source	Date	For information	For appraisal
Population density	NOMIS - 2011 Census data: KS101EW - Usual Resident Population	2011	✓	✗
Qualification levels	NOMIS - 2011 Census data - QS501EW - Highest level of qualification	2011	✓	✗
No qualifications %	NOMIS - 2011 Census data - QS502EW – Qualifications Gained	2011	✓	✗
Total Annual Household Income	Office of National Statistics: <a href="https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/smallareaincomeestimatesformiddlelayerssuperoutputareasenglandandwales">https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/smallareaincomeestimatesformiddlelayerssuperoutputareasenglandandwales</a>	2015/16	✓	✗
Home ownership	NOMIS - 2011 Census data: KS402EW - Tenure	2011	✓	✗
Economic activity	NOMIS - 2011 Census data: KS601EW to KS603EW - Economic activity by sex	2011	✓	✗
House prices median	Office of National Statistics: HPSSA Dataset 46 <a href="https://www.ons.gov.uk/peoplepopulationandcommunity/housing/datasets/medianpricepaidbylowerlayerssuperoutputareahpssadataset46">https://www.ons.gov.uk/peoplepopulationandcommunity/housing/datasets/medianpricepaidbylowerlayerssuperoutputareahpssadataset46</a>	Sept 2018	✓	✗
Occupation	NOMIS - 2011 Census data: DC6112EW - Occupation by sex by age	2011	✓	✗
Business Register and Employment Survey: open access	NOMIS -: Business Register and Employment Survey: open access	2017	✓	✓
Index of Multiple Deprivation	English indices of deprivation 2015: <a href="https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015">https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015</a>	2015	✓	✓
UK Business Counts	UK Business Counts - enterprises by industry and employment size band	2018	✓	✗
Community connectivity	See section 6.2.1.1 below		✓	✓

### 5.2.1.1 Community connectivity

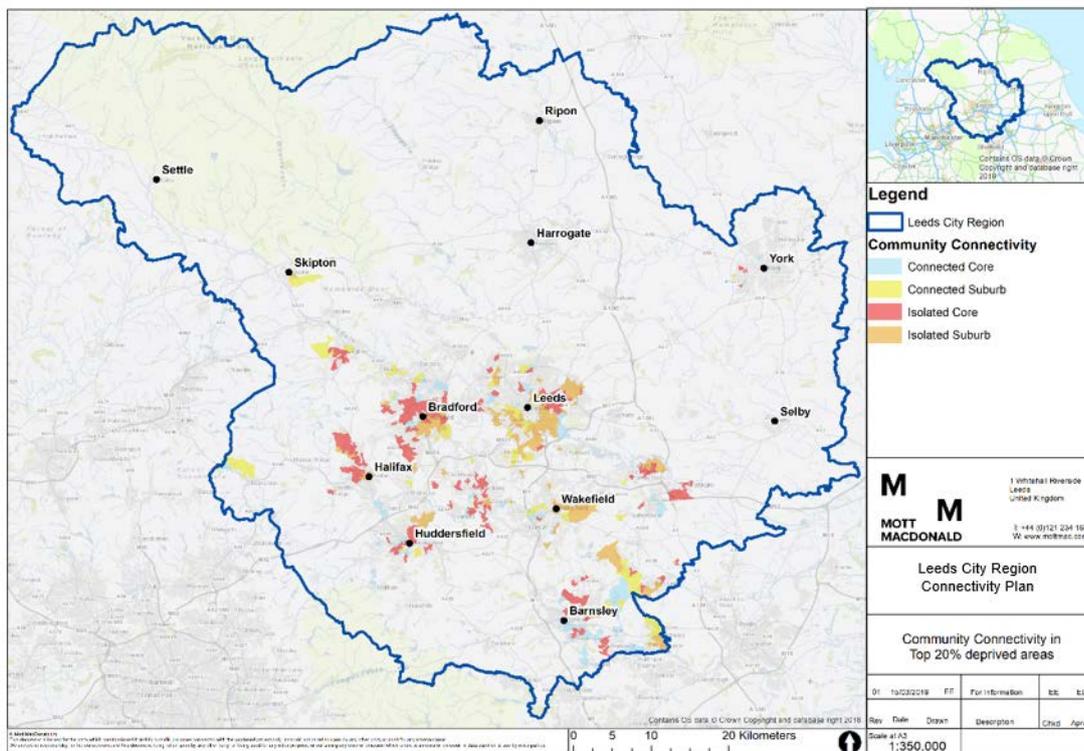
Indices of multiple deprivation data has been used to identify areas that are deprived and in need of improved connectivity to increase the level of opportunities available to residents. Figure 8 shows levels of community connectivity for areas within the top 20% most deprived areas in England. This uses the approach adopted for the Joseph Rowntree Foundation for “*Tackling transport-related barriers to employment in low-income neighbourhoods*” – Census data (distance travelled to work, and the average number of destinations people can reach for journeys to work across the Leeds City Region) has been used to define the following area-based levels of connectivity:

- Connected core
  - Above average number of employment destinations
  - High proportion of people travelling less than 5km to work
- Connected suburb
  - Above average number of employment destinations
  - Low proportion of people travelling less than 5km to work

- Isolated core
  - Below average number of employment destinations
  - High proportion of people travelling less than 5km to work
- Isolated suburb
  - Below average number of employment destinations,
  - Low proportion of people travelling less than 5km to work

Figure 8 shows that there are isolated communities in many areas throughout the Leeds City Region including around Bradford, east Leeds, east Wakefield, Barnsley, Huddersfield and west Halifax.

**Figure 8: Area based levels of connectivity**



Source: Mott MacDonald

### 5.2.1.2 Equality, Diversity and Inclusion (EDI)

Equality, Diversity and Inclusion (EDI) hotspots show the concentration of population, or proportions of people from protected characteristic groups within an area. Hotspot maps developed using Mott MacDonald’s Equality, Diversity and Inclusion Tool (EDIT) has ensured that equality requirements are integrated into this project. Various data sets have also been used to identify where there are high concentrations of people within protected characteristic groups. This data is outlined in Table 3 below.

**Table 3: EDI data**

Data set	Source	Date	For information	For appraisal
Maternity	NOMIS 2011 Census data: KS101EW - Age by single year	2011	✓	✗
Age	NOMIS 2011 Census data: KS101EW - Age by single year	2011	✓	✗
Religion	NOMIS 2011 Census data: KS209EW - Religion	2011	✓	✗
Disability	NOMIS 2011 Census data: QS303EW - Long term health problem or disability	2011	✓	✗
Ethnicity	NOMIS 2011 Census data: KS101EW - Ethnic Group	2011	✓	✗
EDI hotspots	Mott MacDonald	-	✓	✓

### 5.2.2 Development data

Development data has been provided by the Combined Authority to indicate future growth plans throughout the Leeds City Region. Datasets (received in October 2018) are presented in Table 4 below.

**Table 4: Development data**

Data set	Source	Date	For information	For appraisal
Housing site allocation	Provided by West Yorkshire Combined Authority	2018	✓	✓
Employment site allocation	Provided by West Yorkshire Combined Authority	2018	✓	✓
Housing heat maps	Provided by West Yorkshire Combined Authority	2018	✓	✗
Employment heat maps	Provided by West Yorkshire Combined Authority	2018	✓	✗
Transport fund schemes	Provided by West Yorkshire Combined Authority	2018	✓	✗
Spatial priority areas	Provided by West Yorkshire Combined Authority	2016	✓	✗

It is important to note that specific sites for Bradford's future housing development have not yet been defined by Bradford Council.

For information, Local Plan time horizons are presently:

- Leeds Local Plan: 2014–2028
- Wakefield Local Plan: 2009–2026
- Bradford Local Plan: 2017–2030
- Barnsley Local Plan: 2019–2033
- Calderdale Draft Local Plan: 2016–2032
- Kirklees Local Plan: 2013–2031
- Selby Local Plan: 2011–2027
- City of York Local Plan: 2017–2032/33

### 5.2.3 Transport data

Several transport datasets have been used including the current railway, cycle and bus network as well as mode share, car ownership and distance travelled to work. This data has also been analysed using mapping tools to display the relevant attributes.

**Table 5: Transport data**

Data set	Source	Date	For information	For appraisal
Mode share	NOMIS 2011 Census data: QS701EW - Method of travel to work	2011	✓	✗
No car ownership	NOMIS - 2011 Census data: KS404EW - Car or van availability	2011	✓	✓
Commuting distance	NOMIS - 2011 Census data: QS702EW - Distance travelled to work	2011	✓	✗
Cycle City Ambition Grant Programme	Provided by West Yorkshire Combined Authority	2018	✓	✗
National Cycle Network	Provided by West Yorkshire Combined Authority	2018	✓	✗
WY National Cycle Lanes	Provided by West Yorkshire Combined Authority	2018	✓	✗
Bus network	Provided by West Yorkshire Combined Authority	2018	✓	✗
Bus level of service - On peak vs off peak	Provided by West Yorkshire Combined Authority	2018	✓	✓
Travel to Work desire lines	NOMIS - 2011 Census data: QS702EW - Distance travelled to work	2011	✓	✗
Rail lines	OS Open Data	-	✓	✗
Railway tunnels	OS Open Data	-	✓	✗
Rail stations	OS Open Data	-	✓	✗
Highway network - Peak vs off peak speed difference	TrafficMaster	2018	✓	✓

### 5.2.3.1 Travel to Work desire lines

Travel to work data has been used to identify trip making patterns (including origins, destinations and distance travelled to work) throughout Leeds City Region and transport demand desire lines have been created for each corridor to indicate the key employment destinations.

### 5.2.3.2 Bus level of service

Current levels of connectivity have been explored through analysis of the bus levels of service dataset. This identifies areas that have poor bus connectivity in peak periods, or a high level of difference in the provision of services in the peak and off-peak periods.

## 5.2.4 Environmental data

The environmental data used is outlined in Table 6 below:

**Table 6: Environmental data**

Data set	Source	Date	For information	For appraisal
Defra Air Quality Action Plan	Leeds – <a href="http://aqma.defra.gov.uk/action-plans/LeedsCC%20AQAP%202004.pdf">http://aqma.defra.gov.uk/action-plans/LeedsCC%20AQAP%202004.pdf</a>	2004	✓	✗
	Bradford - <a href="https://www.bradford.gov.uk/media/1386/airqualityactionplan.pdf">https://www.bradford.gov.uk/media/1386/airqualityactionplan.pdf</a>	2009		
	Wakefield - <a href="http://www.wakefield.gov.uk/Documents/bins-environment/environmental-health/pollution/air-quality-action-plan-2010.pdf">http://www.wakefield.gov.uk/Documents/bins-environment/environmental-health/pollution/air-quality-action-plan-2010.pdf</a>	2010		
	Calderdale - <a href="https://www.calderdale.gov.uk/v2/sites/default/files/Air-quality-action-plan-2017-draft.pdf">https://www.calderdale.gov.uk/v2/sites/default/files/Air-quality-action-plan-2017-draft.pdf</a>	2017		
	Kirklees - <a href="https://www.kirklees.gov.uk/beta/crime-and-safety/pdf/AQAP-draft-consultation.pdf">https://www.kirklees.gov.uk/beta/crime-and-safety/pdf/AQAP-draft-consultation.pdf</a>	2019		
	Se by - <a href="https://www.selby.gov.uk/sites/default/files/AQAP%20-%20Final%202019.pdf">https://www.selby.gov.uk/sites/default/files/AQAP%20-%20Final%202019.pdf</a>	2018		
	York - <a href="http://jorair.co.uk/wordpress/wp-content/uploads/2017/06/aqap3report.pdf">http://jorair.co.uk/wordpress/wp-content/uploads/2017/06/aqap3report.pdf</a>	2017		
	Craven - <a href="https://www.cravenc.gov.uk/media/6731/craven-asr-2018.pdf">https://www.cravenc.gov.uk/media/6731/craven-asr-2018.pdf</a>	2018		
	Barnsley - <a href="https://www.barnsley.gov.uk/media/5738/barnsley-abc-air-quality-action-plan-2017.pdf">https://www.barnsley.gov.uk/media/5738/barnsley-abc-air-quality-action-plan-2017.pdf</a>			
	Harrogate - <a href="https://www.harrogate.gov.uk/.../id/5186/2018_air_quality_action_plan.pdf">https://www.harrogate.gov.uk/.../id/5186/2018_air_quality_action_plan.pdf</a>			
Air Quality Management Areas (AQMA)	UK AQMA Jan2018 Final - <a href="https://uk-air.defra.gov.uk/aqma/maps">https://uk-air.defra.gov.uk/aqma/maps</a>	2018	✓	✓
Green Belt areas	West Yorkshire Combined Authority	2018	✓	✗
Sites of Special Scientific Interest	<a href="https://naturalengland-defra.opendata.arcgis.com/datasets/sites-of-special-scientific-interest-england">https://naturalengland-defra.opendata.arcgis.com/datasets/sites-of-special-scientific-interest-england</a>	-	✓	✗
Flood Zones 2 & 3	Data.gov.uk - Defra	2019	✓	✗
CO <sub>2</sub> emissions	Department for Business, Energy and Industrial Strategy (BEIS) - 2005 to 2017 UK local and regional CO <sub>2</sub> emissions – data tables	2017		✗

## 5.2.5 Other data

Other datasets have been obtained to highlight the location of key amenities and services.

**Table 7: Other data**

Data set	Source	Date	For information	For appraisal
Points of interest	Provided by West Yorkshire Combined Authority	-	✓	✓
Education establishments	<a href="https://get-information-schools.service.gov.uk/?SelectedTab=Establishments">https://get-information-schools.service.gov.uk/?SelectedTab=Establishments</a>	2018	✓	✓
Health services	Provided by West Yorkshire Combined Authority	2018	✓	✓
Broadband speed	Ofcom Connected Nations (previously called Infrastructure Report) - UK internet speeds and coverage: broadband, Wi-Fi and mobile (2018)	2018	✓	✗

Other studies and workstreams in development that the West Yorkshire Connectivity Study draws from:

- Leeds Public Transport Investment Programme (Connecting Leeds)
- West Yorkshire Plus Transport Fund (Growth Deal)
- City Connect (CCAG)
- Housing Infrastructure Fund
- Local Cycling and Walking Infrastructure Plans (LCWIP)
- West Yorkshire Strategic Bus Network Reviews
- Rail Infrastructure Study
- West Yorkshire Future Mobility Strategy

## 6 Stakeholder Engagement

### 6.1 Workshop workplan

The workshops were held between Autumn 2018 and Autumn 2019. Some corridors were grouped into “batches” for stakeholder engagement; namely, where it was considered beneficial to maximise coverage between corridors and to increase the efficiency of delivery against the workplan, and the inclusion of city regional priority corridors for important wider context for the local priority corridors.

**Table 8: Key attendees**

Ref	Original corridor name	Leeds City Council	Bradford Council	Wakefield Council	Barnsley Council	Calderdale Council	Kirklees Council	North Yorkshire County Council	Selby Council	City of York Council
A	Five Towns to the HS2 Hub	✓		✓					✓	
B	Wakefield/Barnsley to the HS2 Hub	✓		✓	✓					
C	HS2 Hub – Bradford – Halifax and the Calder Valley	✓	✓			✓				
D	Leeds Bradford cross connectivity									
E	Extending the South Bank opportunity to the south of Leeds									
F	South Bradford and North Kirklees – Bradford									
G	East Leeds									
H	Dewsbury / Huddersfield to the HS2 Hub									
I	Bradford to Airport	✓	✓							
J	Leeds to Airport	✓								
K	Skipton to HS2 Hub	✓	✓					✓		
L	Dewsbury to Wakefield			✓			✓			
M	East Kirklees			✓	✓		✓			
N	Five Towns to Wakefield			✓						
O	North Barnsley to Barnsley				✓					
P	Huddersfield to Brighouse					✓	✓			

Ref	Original corridor name										
		Leeds City Council	Bradford Council	Wakefield Council	Barnsley Council	Calderdale Council	Kirklees Council	North Yorkshire County Council	Selby Council	City of York Council	
Q	South West Kirklees						✓				
R	Huddersfield – Halifax					✓	✓				
S	Halifax to Brighouse					✓	✓				
T	Harrogate to the HS2 Hub	✓						✓			
U	York to Leeds	✓								✓	
V	Se by to the HS2 Hub	✓						✓			
W	York to Harrogate	✓						✓		✓	
X	Se by to York	✓						✓		✓	
Y	North York to York	✓						✓		✓	
Z	Keighley and Airedale to Bradford & HS2 Hub		✓								

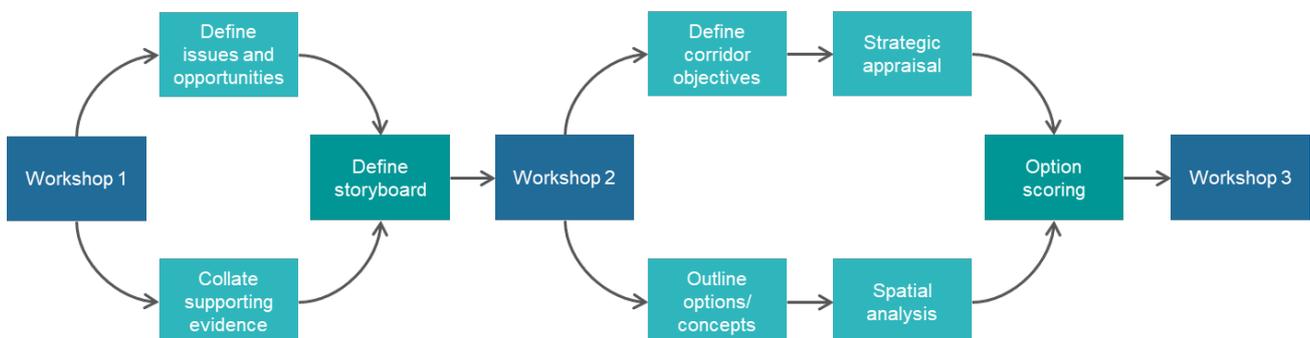
Source: Mott MacDonald

### 6.1.1 Workshop structure

Each corridor (or batch of corridors) was the subject of up to three workshops. The purpose of the workshops was to engage with key partners and ensure that they can provide valuable insight and information, and to shape the process and the outcomes of the study. Each workshop was typically around 2 hours in length.

The format of the workshops was typically a combination of presentations by Mott MacDonald staff and Combined Authority officers, with up to two breakout sessions for more in-depth discussion with the partners, broadly following the following topics and stages:

- **Workshop 1:** To identify and confirm the key “issues and opportunities” within the specific corridor/s under review, and discussion of how these could be translated into a set of corridor-specific aspirations.
- **Workshop 2:** To confirm the “story maps” and need for investment narrative, and to agree and refine the corridor-specific aspirations, validate the coverage of the economic area, illustrate initial “connectivity concepts” (namely, confirming the key places to connect – see 9.2 for more details), and collating suggestions for interventions that are considered to have potential to deliver the connectivity concept. On some occasions, where corridors were previously grouped for Workshop 1, they were separated again for Workshop 2, to enable adequate focus on one single corridor at any one time.
- **Workshop 3:** To ratify the connectivity concepts, allow partners to suggest final interventions for consideration, and ensure partners understand and support the initial option scoring and prioritisation outcomes.



# 7 Appraisal Parameters

This section provides a high-level summary of how the appraisal parameters have been established, what policy framework and evidence base underpins them, and how they come together in an appraisal framework for the West Yorkshire Connectivity Plan.

## 7.1 Option appraisal

This section provides a brief outline of the option appraisal processes; further details are provided in Chapters 8 and 9.

The option appraisal process is based in a Mott MacDonald-built Investment Sifting & Evaluation Tool (INSET). INSET is a WebTAG-compliant decision support process, based on multi-criteria decision analysis and is used to help manage information on investment options and evaluate them in a simple, flexible, replicable, and transparent manner.

INSET is based on the Department for Transport (DfT) Early Assessment and Sifting Tool (EAST) but has been built to surpass its capabilities – such as the ability to assess interventions across a full range of themes, including economic, social and environmental indicators, depending on local circumstances, and to reflect on multiple future scenarios.

INSET consists of three basic steps:

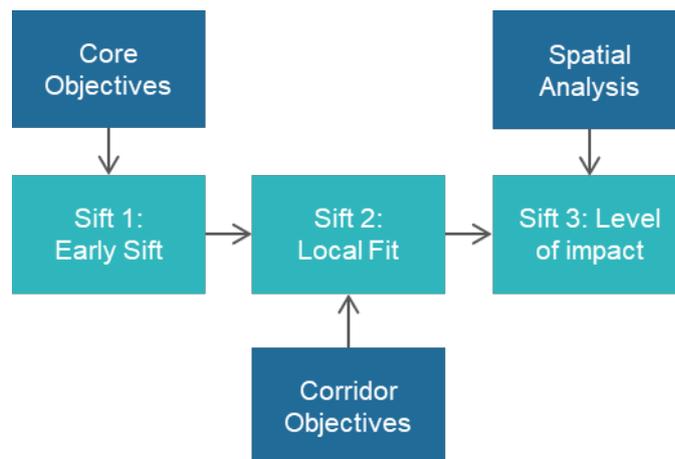
1. Multi-criteria assessment
2. Weighting / sensitivity testing
3. Prioritisation and packaging

In addition, interventions can be assessed individually relative to other Business Case factors such as deliverability.

INSET provides a process to identify a package of interventions that fulfil each corridor's vision and objectives of the West Yorkshire Connectivity Plan pipeline.

## 7.2 Overview

The West Yorkshire Connectivity Plan appraisal process is designed to support the delivery of the long-term vision for the Leeds City Region – as identified in the Strategic Economic Plan (SEP), the Leeds City Region HS2 Growth Strategy, the Leeds City Region HS2 Connectivity Strategy, and the West Yorkshire Transport Strategy 2040 – through a series of core and corridor-specific aspirations and spatial analysis, as shown in the following diagram. Further detail on the three “sifts” is described in Chapter 8.



### 7.3 Core objectives

The core objectives are to:

- Connect people in areas of socio-economic need with economic opportunities
- Enable access from new developments to economic opportunities and labour markets
- Deliver access to further education and healthcare opportunities within the corridor
- Deliver access to excluded communities
- Increase the number of destinations people in deprived communities can reach
- Offer potential to address areas of congestion
- Address discrepancies in public transport frequency
- Reduce transport emissions in line with target to become net zero-carbon by 2038, with significant progress being made by 2030
- Address local AQMA constraints
- Improve physical and mental public health

Please refer to Section 2.3 which demonstrates the derivation of the core objectives from relevant policy documents.

### 7.4 Key themes

The appraisal has been classified into four different themes, all linked to existing policy priorities. These are used to classify the Core Objectives, as well as to summarise and present the results from the appraisal process. This will enable policy makers and scheme promoters to sift the appraisal outcomes to identify interventions that will meet policy drivers (namely boosting productivity, enabling inclusive growth, tackling the climate emergency, delivering 21<sup>st</sup> century transport) enabling them to quickly respond to different funding opportunities as they come forward.

**Table 9: Key themes**

Core objective	Theme	Scoring notes
<ul style="list-style-type: none"> <li>Deliver access to further education and healthcare opportunities within the corridor</li> <li>Deliver access to excluded communities</li> </ul>	<b>Enabling Inclusive Growth</b> 	Based on the number of Equality, Diversity and Inclusion hotspots the intervention connects to as well as health and education sites. This theme helps to address the need to connect people including those in excluded communities to education and health facilities which links to the key objectives in the HS2 Connectivity Strategy.
<ul style="list-style-type: none"> <li>Connect people in areas of socio-economic need with economic opportunities</li> <li>Enable access from new developments to economic opportunities and labour markets</li> </ul>	<b>Boosting Productivity</b> 	Based on the number of housing and employment growth sites the intervention connects to, as well as the affected population for deprivation, low car ownership and the total number of jobs. This helps to identify interventions that best help to improve inclusive growth by connecting people to jobs who are living in areas of deprivation and low car ownership.
<ul style="list-style-type: none"> <li>Reduce transport emissions in line with target to become net zero-carbon by 2038, with significant progress being made by 2030</li> <li>Address local AQMA constraints</li> <li>Improve physical and mental public health</li> </ul>	<b>Tackling the Climate Emergency</b> 	<p>Based on how many Air Quality Management Areas and touchpoints with the National Cycle Network the intervention connects to, as well as their performance against the Healthy Streets<sup>TM21</sup> principles.</p> <p>At this stage, no quantifiable evidence on carbon emissions was available (pending release of West Yorkshire Combined Authority Emissions Reduction Pathway study) – therefore, it is assumed that all schemes would inherently contribute to the decarbonisation agenda, unless they are road schemes.</p>
<ul style="list-style-type: none"> <li>Increase the number of destinations people in deprived communities can reach</li> <li>Offers potential to address areas of congestion</li> <li>Addresses discrepancies in public transport frequency</li> </ul>	<b>Delivering 21st Century Transport</b> 	Based on how well the intervention connects areas with low levels of existing travel identified as isolated communities as well as areas with a large speed difference between on-peak and off-peak periods on the highway network and those with poor levels of bus service. As these are transportation schemes, a high number of interventions scored well for this theme.

Source: Mott MacDonald

## 7.5 Corridor-specific aspirations

West Yorkshire and the Leeds City Region is a diverse geography, with wide ranging socio-economic, environmental and network characteristics. To reflect this, and to ensure that the appraisal process provides due consideration of more localised issues and opportunities, a bespoke set of corridor-specific aspirations has been set for each corridor. These were identified and developed in partnership with the stakeholders during the workshops. An example set of corridor-specific aspirations is outlined below.

- Reduce car use and/or the need to travel
- Enable the right people to access the right employment and training opportunities
- Improve connections to current and future employment, housing and education sites
- Improve access for those working shift patterns
- Improve perception of access / increase travel horizons
- Improve public transport connectivity and access, to serve a greater number of origins and destinations with good service frequency and journey times
- Address capacity issues on the rail network
- Address congestion issues to improve growth potential and public transport journey reliability and attractiveness

<sup>21</sup> Pedestrians from all walks of life; Easy to cross; Shade and shelter; Places to stop and rest; Not too noisy; People choose to walk, Cycle and use public transport; People feel safe; Things to see and do; People feel relaxed; Clean air.

## 8 Option Appraisal

This section explains the detailed workings of the option appraisal process. In preparation for option appraisal, the location, scope and scale of each intervention is geocoded in a Geographical Information System (GIS), so its interface with various spatial characteristics can be determined (described in detail in Chapter 7). The outputs are then fed into the Mott MacDonald's Investment Sifting & Evaluation Tool (INSET) to enable the interventions to be assessed and "sifted" against specially defined and flexible parameters which determine how well the interventions meet the objectives and corridor-specific aspirations. This happens in three stages, described below.

### 8.1 Sift 1 – Early sift

The first sift is based on the potential for the intervention to address the Core Objectives identified in Section 7.3; this initial sift is simply scored using a Yes/No outcome against a series of sub-criteria, shown below. The Yes/No outcome is fully automated, directly relating back to the spatial data in GIS. For example, if the intervention connects with population within areas of deprivation (Top 20%) the intervention will score "Yes", if not it will score "No". These answers are then scored as "Yes" = 1 and "No" = 0 and averaged to gain an overall score which are categorised as explained below in Section 8.4. On its own, the early sift can be used to rule out interventions at a very high-level; i.e. if it does not address one or more of the four themes or policy priorities or does not meet a criteria or combination of criteria.

**Table 10: Sift 1 criteria**

Theme	Core objective	Sub-criteria #1	Sub-criteria #2	Sub-criteria #3
Enabling Inclusive Growth 	Deliver access to further education and healthcare opportunities within the corridor	Intervention connects to key health facilities	Intervention connects to further education establishments	
	Deliver access to excluded communities	Intervention connects to Equality Diversity and Inclusion (EDI) hotspots		
Boosting Productivity 	Connect people in areas of socio-economic need with economic opportunities	Intervention connects to areas of deprivation (Top 20%)	Intervention connects areas of employment (over 1,000 employees)	Intervention connects areas with low levels of car ownership (>26% households without access to a car)
	Enable access from new developments to economic opportunities and labour markets	Intervention connects to housing growth sites	Intervention connects to employment growth sites	
Tackling the Climate Emergency 	Address local AQMA constraints	Intervention intersects with AQMA		
	Improve physical and mental public health	Intervention improves connectivity to cycling infrastructure	Intervention accords with Healthy Streets principles	
	Reduce transport emissions to meet the ambition of a zero-carbon economy	Intervention is public transport or active travel		
Delivering 21 <sup>st</sup> Century Transport	Increase the number of destinations people in deprived communities can reach	Intervention links areas with low levels of existing travel identified as isolated communities		
	Offers potential to address areas of congestion	Intervention intersects with areas of congestion		

Theme	Core objective	Sub-criteria #1	Sub-criteria #2	Sub-criteria #3
	Addresses discrepancies in public transport frequency	Intervention connects areas with poor levels of public transport service in peak times	Intervention connects areas with poor levels of public transport service in off-peak times	

Source: Mott MacDonald

## 8.2 Sift 2 – Local fit

The second sift is based on the potential for the intervention to address the corridor-specific aspirations identified in 7.5; again, this sift is simply scored using a Yes/No outcome and is identified as the “local fit” score. This sift scores interventions by determining whether an intervention meets a certain criterion (e.g. a combination of objectives) and/or whether an intervention is above or below a certain threshold for a given objective. This process is linked to the spatial evidence and is automated wherever possible.

- For example, the scoring will link back to the outcomes from Sift 1 f or spatially related data; however, some sub-objectives will require scoring to be done manually, using professional judgement. Clearly, due to the localised nature of the corridor-specific aspirations, the Sift 2 parameters will vary from corridor to corridor, but an example is shown below. If a corridor-specific aspiration is a duplicate of one of the Core Objectives, it should be removed from Sift 2, to avoid double-counting.

**Table 11: Sift 2 criteria (example for illustrative purposes)**

Corridor-specific aspiration	Scoring approach
Reduce car use and/or the need to travel	If the intervention is not a highways or road scheme, this can be scored as a "Yes"
Enable the right people to access the right employment and training opportunities	If deprived communities and employment sites (current + proposed) and/or educational establishments are all "Yes" in the Stage 1 Options Sift - score as "Yes"
Improve connections to current and future employment, housing and education sites	If the intervention improves access to employment, housing and education sites (current + proposed) and scored as "Yes" in the Stage 1 Options Sift - score as "Yes"
Improve access for those working shift patterns	If the intervention has the potential to be demand responsive or provides a bespoke service to offer access to an employment site that is likely to have shift patterns, this can be scored as "Yes"
Improve perception of access / increase travel horizons	If the intervention has the potential to be a cycling, placemaking or ticketing intervention, or improves the public transport availability and journey time (intersects a hub / station), this can be scored as "Yes"
Improve public transport connectivity and access, to serve a greater number of origins and destinations with good service frequency and journey times.	If the intervention has the potential to provide a new public transport service, this can be scored as "Yes"
Address capacity issues on the rail network	If the intervention has the potential to improve rail capacity, this can be scored as "Yes"
Address congestion issues to improve growth potential and public transport journey reliability and attractiveness	Congestion is addressed as part of the Core Objectives - therefore do not include in the scoring as part of Stage 2 Options Sift

## 8.3 Sift 3 – Level of impact

Like the first sift, the third sift is based on the potential for the intervention to address the Core Objectives identified in Section 7.3; however, ***the third sift has a quantitative element***, drawing on the spatial evidence from the datasets in GIS. It also introduces a degree of standardisation to mitigate against the scale of intervention, and ensure schemes are tested fairly in terms of their level of impact relative to their size and spatial scale. For each intervention, an 800-metre buffer is added and a 1km buffer around rail scheme interventions to produce a catchment area. The intervention’s “level of impact” is divided by the area (square

kilometres) of its catchment. This gives interventions with a small spatial scale the chance to be tested fairly against larger schemes with a wider reach or influence.

**Table 12: Sift 3 criteria**

Theme	Core objective	Sub-criteria	Scoring approach for Stage 3 Options Sift		
			Quantification of the likely impact of each intervention	Factored by the catchment area (sq km) of the intervention being assessed	Scoring
Enabling Inclusive Growth  	Deliver access to further education and healthcare opportunities within the corridor	Intervention connects to key health facilities	Count number of facilities (as %)	People per sq.km	Score assigned based on number of health facilities intervention connects to e.g. 1 health facility = score of 1
		Intervention connects to further education establishments	Count number of facilities (as %)	People per sq.km	Score assigned based on number of education establishments intervention connects to e.g. 1 establishment = score of 1 <sup>22</sup>
	Deliver access to excluded communities	Intervention connects to Equality Diversity and Inclusion (EDI) hotspots	Count number of hotspots covered (as % of overall corridor)	People per sq.km	Score assigned based on number of EDI hotspots intervention connects to e.g. 1 hotspot = score of 1 <sup>22</sup>
Boosting Productivity  	Connect people in areas of socio-economic need with economic opportunities	Intervention connects to areas of deprivation (Top 20%)	Count affected population (as percentage of all areas in corridor)	People per sq.km	Scored 1 - 4 based on quartiles of results for all interventions or scored 0 if result is 0
		Intervention connects areas of employment (over 1,000 employees)	Count total jobs (as percentage of all jobs in corridor)	People per sq.km	Scored 1 - 4 based on quartiles of results for all interventions or scored 0 if result is 0
		Intervention connects areas with low levels of car ownership (>26% households without access to a car)	Count affected households (as percentage of all households in corridor)	People per sq.km	Scored 1 - 4 based on quartiles of results for all interventions or scored 0 if result is 0
	Enable access from new developments to economic opportunities and labour markets	Intervention connects to housing growth sites	Count housing units (as percentage of total in corridor)	People per sq.km	Score assigned based on number of housing sites intervention connects to e.g. 1 housing site = score of 1 <sup>22</sup>
		Intervention connects to	Sum up total employment area (as percentage of whole corridor)	People per sq.km	Scored 1 - 4 based on quartiles of results for all interventions or

<sup>22</sup> If interventions exist within a corridor that connects with more than 4, a quartiles formula is used to assign a score instead. This is to avoid misrepresentation when data has a large range.

Theme	Core objective	Sub-criteria	Scoring approach for Stage 3 Options Sift		
			Quantification of the likely impact of each intervention	Factored by the catchment area (sq km) of the intervention being assessed	Scoring
		employment growth sites			scored 0 if result is 0
Tackling the Climate Emergency  	Address local AQMA constraints	Intervention intersects with AQMA	Count number of AQMAs (as % of all those in corridor)	People per sq.km	Number of AQMA's intersects with divided by the total number in the corridor as a % and scored 1 – 4 as below: 25% = 1 50% = 2 75% = 3 100% = 4
	Improve physical and mental public health	Intervention improves connectivity to cycling infrastructure	Count number of "touchpoints" with national cycle network	People per sq.km	Score assigned based on number of touchpoints e.g. 1 touchpoint = score of 1 <sup>22</sup>
		Intervention accords with Healthy Streets principles	Consider how many principles could be addressed	People per sq.km	Scored 1 – 4 based on number of healthy streets principles: 3 = score of 1 5 = score of 2 8 = score of 3 10 = score of 4
	Reduce transport emissions to meet the ambition of a zero-carbon economy	Intervention is public transport or active travel	Considers the potential to reduce transport emissions to meet the ambition of a zero-carbon economy	n/a	0 = highway intervention 1 = public transport or active travel intervention
Delivering 21 <sup>st</sup> Century Transport  	Increase the number of destinations people in deprived communities can reach	Intervention links areas with low levels of existing travel	Count number of people affected within "connected communities" layer (as %)	People per sq.km	
	Offers potential to address areas of congestion  Addresses discrepancies in public transport frequency	Intervention intersects with areas of congestion	Assess level of congestion based on GIS layer	People per sq.km	
		Intervention connects areas with poor levels of public transport service in peak times	What is the worst level of service affected by this improvement	People per sq.km	

Theme	Core objective	Sub-criteria	Scoring approach for Stage 3 Options Sift	
			Quantification of the likely impact of each intervention	Factored by the catchment area (sq km) of the intervention being assessed
		Intervention connects areas with poor levels of public transport service in off-peak times	What is the worst level of service affected by this improvement?	People per sq.km

Source: Mott MacDonald

Results and outcomes of Sift 3 can be found in Chapter 6.2 of the individual Inclusive Growth Corridor Plans.

## 8.4 Scoring

Each of the four assessment theme scores are averaged to provide an overall INSET score of between 0 and 1, where 1 represents a perfect correlation and anything else represents a degree of deviation from that perfect score. Typically, the total scheme scores lie somewhere between the two numbers with the following categories assigned:

**Table 13: Scoring ranges**

Scores	Ranges
Excellent	0.99 – 1.00
Good	0.75 – 0.99
Average	0.50 – 0.75
Fair	0.25 – 0.50
Low	<0.25

Source: Mott MacDonald

**The core appraisal adopted for each corridor assumes that all assessment themes have equal weighting and importance.** However, the application of the appraisal process is very flexible and can be used to adapt to different requirements (e.g. a change in funding or policy environment). Different weightings can be applied to the four assessment themes. For example, the user can “switch-off”, “switch-on” or change the weighting that is applied for the assessment themes and criteria to perform sensitivity tests or to simply enable interventions to be filtered for their suitability for future funding streams – such as how they score against specific policy levers, and their readiness or timescales for delivery (e.g. Transforming Cities). Corridor specific objectives can also be “switched-off” to enable a more Leeds City Region focused list of priorities. The appraisal process can also be used to better understand the relative strength or weakness of different interventions and can highlight opportunities to “repackage” schemes for future funding streams.

## 9 Appraisal Outcomes

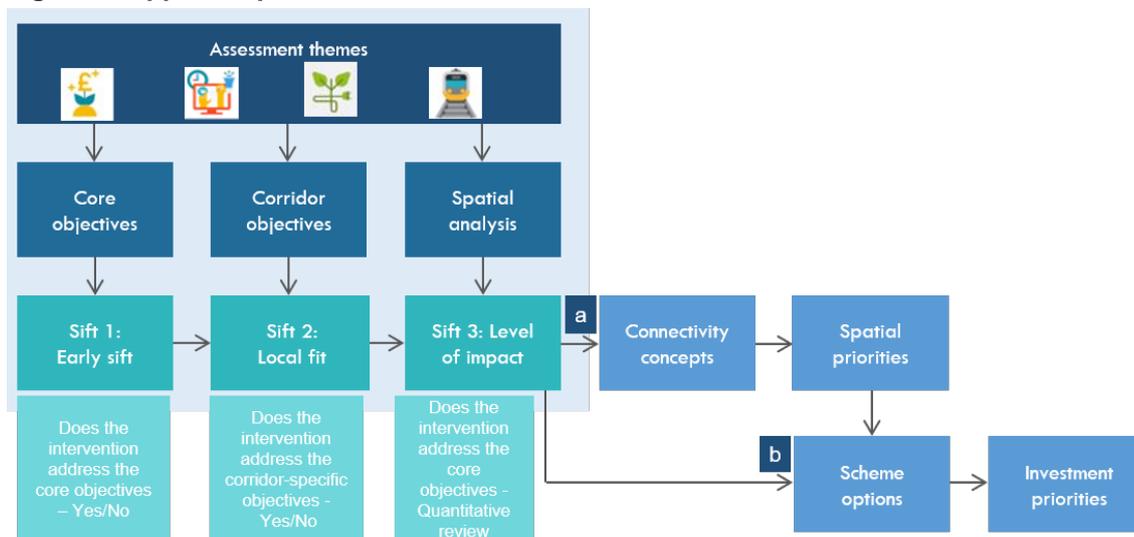
The key outcome of the Case for Change appraisal is an option long-list, scored and profiled to enable consideration within different strategic contexts or other Business Case factors such as deliverability. The interventions from the individual connectivity concepts will be brought together into a broader assessment for the selection and packaging of schemes for a Leeds City Region pipeline of interventions that will maximise the growth associated with HS2 and other economic developments. This section explains the process of identifying interventions and what factors are considered to profile them for the appraisal.

### 9.1 Overview

The key outcomes from the appraisal is a series of (a) connectivity concepts to define the spatial priorities on individual corridors and (b) scheme options to define investment priorities. These are scored against the four assessment themes and sift criteria to determine level of priority in different scenarios.

The following diagram summarises the option appraisal process and provides further insight on how concepts and interventions are taken from identification and definition, through to scoring, sifting, and finally prioritisation.

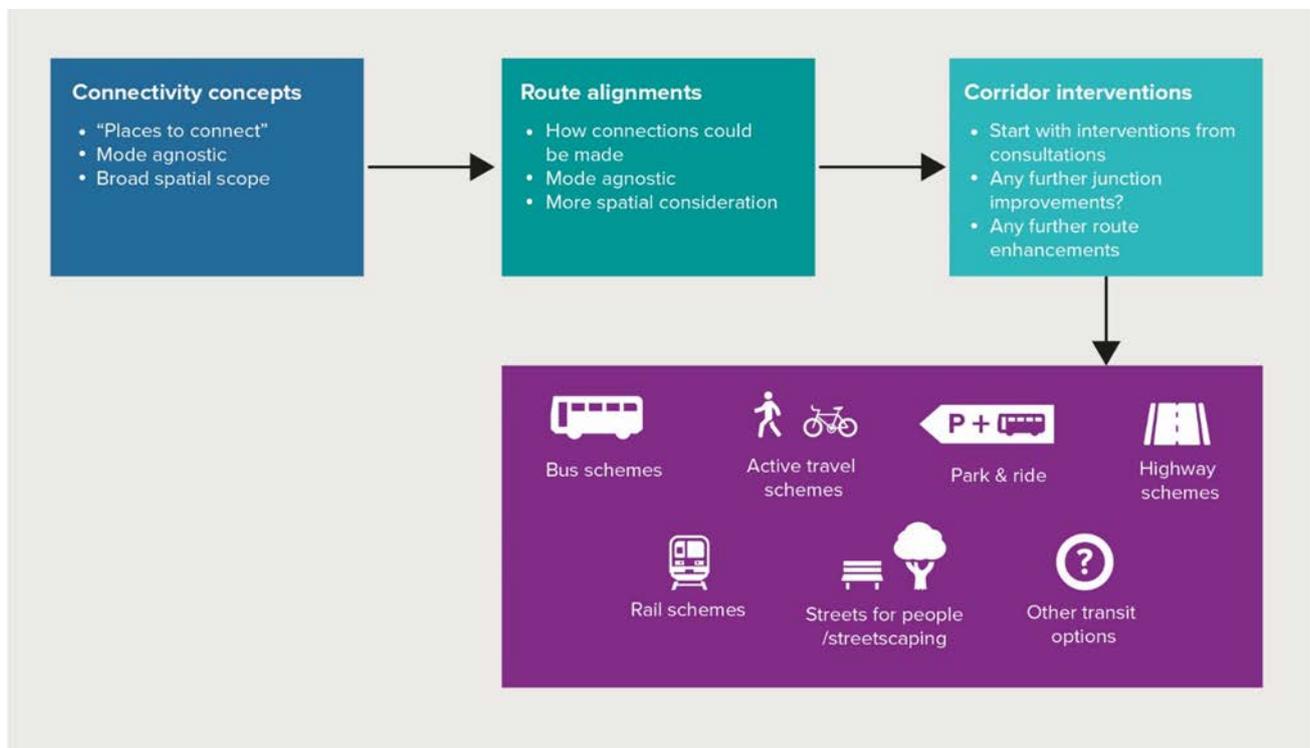
**Figure 9: Appraisal process**



The key outcome of the Case for Change is an **option long-list**, scored and profiled to enable consideration within different strategic contexts (such as Enabling Inclusive Growth, Boosting Productivity, Tackling the Climate Emergency, Delivering 21<sup>st</sup> Century Transport) or other Business Case factors such as deliverability.

The following diagram provides an overview of how interventions are identified. First, the evidence bases from the spatial analysis, and stakeholder engagement are used to identify key “places to connect” within the corridor and economic area which are translated into “connectivity concepts” (which are mode agnostic and have broad spatial scope); these are used as the framework for intervention development.

Where additional scheme information is required (e.g. for a Transforming Cities Fund application) potential route alignments are also explored as ways to provide the linkages identified in the “connectivity concepts” (again, mode agnostic), which are then considered in further detail to identify interventions for mode-specific interventions. These ideas are drawn from stakeholder feedback, consideration of previous feasibility studies and a desktop gap analysis, considering existing transport provision and networks (both current and disused) and the current pipeline of works in the corridor – e.g. West Yorkshire Plus Transport Fund, Cycle City Ambition Grant, Local Cycling and Walking Infrastructure Plans, Leeds Public Transport Investment Programme. The following sections explain these steps in more detail.



## 9.2 Places to Connect

Places to connect are the key nodes on the wider city region network. They reflect the inputs of partners and are supported by the evidence base, including key settlements, transport hubs, employment areas and future development sites.

Places to connect have been organised into a hierarchy based on Ordnance Survey classifications to include:

- Cities
- Towns
- Suburban area
- Villages

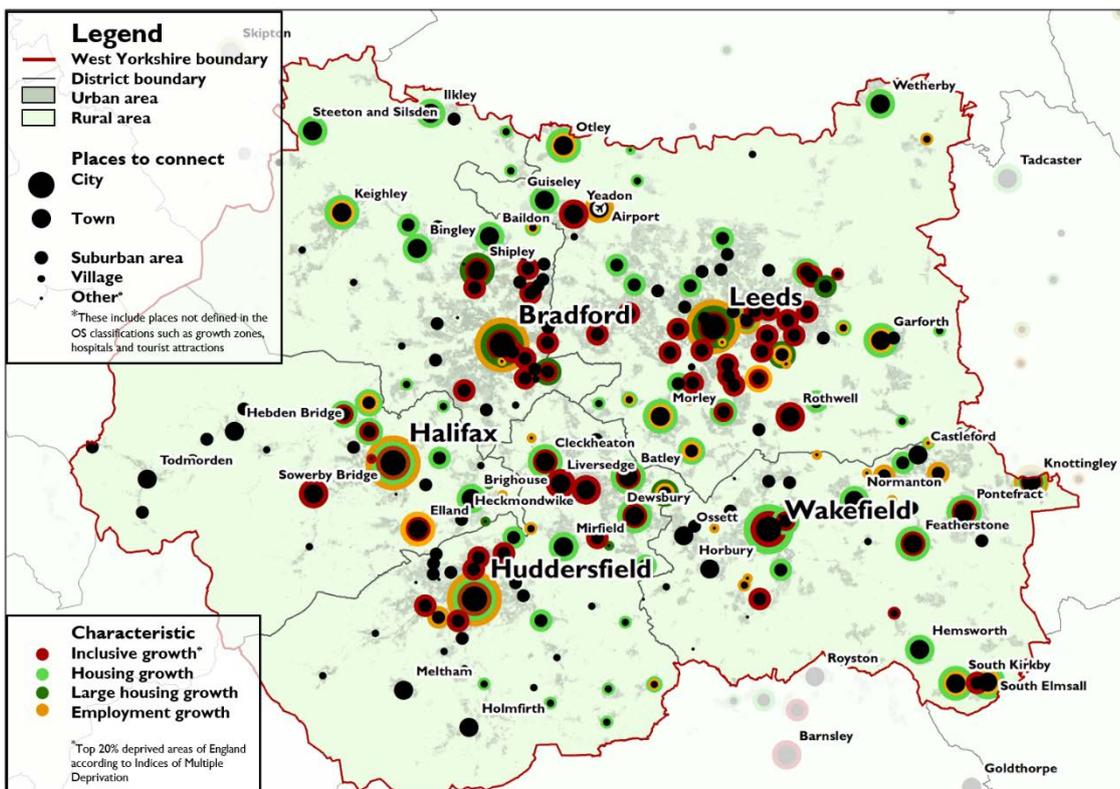
- Other (employment centres or development sites that don't have an equivalent classification)

Based on information from partners and the evidence base, additional characteristics have been assigned to further describe each place to connect. These include:

- Inclusive growth (area of deprivation or isolation based on evidence base)
- Housing growth (based on local plan information)
- Large housing growth (over 100 dwellings per place – based on local plan information)
- Employment growth (based on local plan information)

Figure 10 illustrates the location of all places to connect in West Yorkshire. These are defined and mapped at a local level in each of the Case for Change reports.

**Figure 10 Key places to connect - West Yorkshire**



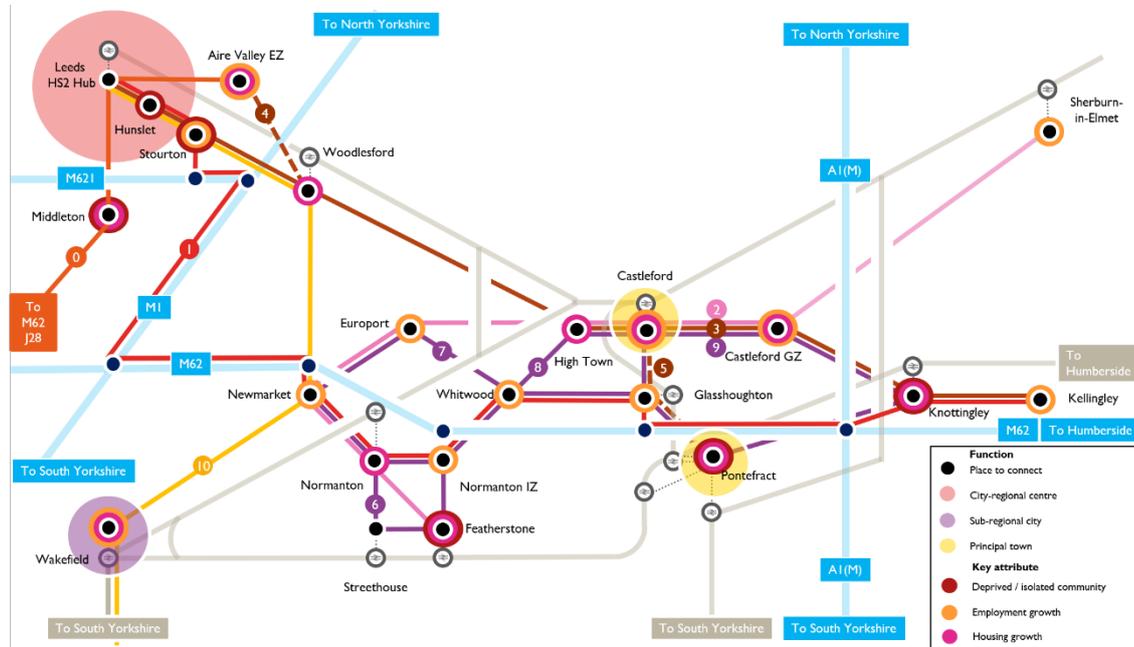
### 9.3 Connectivity concepts

Based on the feedback from partners and the spatial analysis (which together provide an understanding of the current transport network and issues, future development plans and investment programmes) several “connectivity concepts” have been defined across each corridor area, to demonstrate the need for improved connectivity between key places.

A **connectivity concept** is a potential linkage between several places to connect identified within a corridor or economic area. Connectivity concepts do not relate to a specific transport mode or a specific route alignment. Instead, they enable a strategic appraisal of whether there is merit in connecting people and places, as well as helping to define spatial priorities within the area. Connectivity concepts provide the framework that allow further exploration of alignments, transport modes and specific interventions should they meet a series of key objectives.

These are shown relative to the rail and motorway networks for illustrative purposes. An example is shown in Figure 11.

**Figure 11: Illustrative connectivity concepts map (reflecting the Five Towns to Leeds corridor)**



Source: Mott MacDonald

### 9.3.1 Spatial priorities

The appraisal process is then used to produce scores or rankings for the “connectivity concepts” to determine which perform best against the objectives and assessment criteria. This process identifies which “connectivity concept” should be given the greater level of spatial priority and indicates where schemes should be identified to provide the greatest benefit – an example is shown overleaf. This highlights that the Brown, Red and Purple concepts demonstrated the best level of fit across all themes and sifts and therefore are considered to have the potential to produce the greatest benefit for interventions.

**Figure 12: Example of sifting for “connectivity concepts” to determine spatial priority**

(taken from the Five Towns to Leeds corridor)

Rank	#	Connectivity concept	Sift 1: Early sift				Sift 1: Early sift Score	Sift 2: Local fit	Sift 3: Level of impact				Sift 3: Level of impact	Overall score
			Enabling Inclusive Growth	Boosting Productivity	Delivering Clean Growth	Creating a 21 <sup>st</sup> Century Transport System			Enabling Inclusive Growth	Boosting Productivity	Delivering Clean Growth	Creating a 21 <sup>st</sup> Century Transport System		
1	3	Brown Route Option 1 - Kellingley to Leeds via Castleford	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Fair	Good	Average	Good	Average	Good
2	5	Brown Route Option 3 - Pontefract extension	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Fair	Good	Average	Average	Average	Good
3	1	Red Route - Kellingley to Leeds via Glasshoughton & Normanton	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Fair	Average	Average	Good	Average	Good
4	4	Brown Route Option 2 - Kellingley to Aire Valley Enterprise Zone via Castleford	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Fair	Average	Average	Good	Average	Good
5		Purple Route Combined	Average	Excellent	Excellent	Excellent	Good	Good	Low	Fair	Average	Average	Fair	Good
6	2	Pink Route - Featherstone to Sherburn	Average	Excellent	Excellent	Excellent	Good	Good	Low	Fair	Average	Good	Fair	Average
7	9	Purple Route 9	Average	Excellent	Average	Excellent	Good	Good	Low	Average	Fair	Good	Fair	Average
8	8	Purple Route 8	Fair	Excellent	Excellent	Excellent	Good	Good	Low	Average	Low	Good	Fair	Average
9	7	Purple Route 7	Fair	Excellent	Excellent	Excellent	Good	Good	Low	Fair	Low	Average	Fair	Average
10	6	Purple Route 6	Fair	Excellent	Average	Excellent	Good	Good	Low	Fair	Low	Average	Fair	Average

Source: Mott MacDonald

### 9.3.2 Demand

An assessment has been undertaken using the Combined Authority’s Urban Dynamic Model (UDM) to extract the total forecast peak hour demand along each of the prioritised connectivity concepts. This would inform an initial assessment of which modes of transport could best accommodate the forecast level of demand.

Previous work<sup>23</sup> undertaken on the Leeds to Bradford corridor for the West Yorkshire Connectivity Plan outlines a “mode technology choice framework”, providing typical capacities required per hour for different modes of transport. This is presented in Figure 12.

The demand analysis provides indicative evidence in identifying the potential for future modes along the connectivity concepts. Lower capacity modes could also be considered elsewhere in the hierarchy to provide a range of integrated transport services that could address these forecast levels of demand.

<sup>23</sup> Leeds to Bradford Corridor, Option Assessment Report (Arup, 2018)

**Figure 13: Mode technology choice framework**

Mode	Capacity per service	Typical capacity per hour	Potential role
 Walking and Cycling	1	Greatest potential for shorter distance journeys, particularly across congested city centres/urban environments	
 Mobility as a Service (MaaS) / Demand Responsive Transport	5 - 12	Most suited to low demand areas or periods where a scheduled service would be inefficient with regard to cost and use.	
 Standard Double Decker Bus	70 - 80	Less than 1,000 passengers	Flexible services which meet local accessibility needs – with very high density stopping patterns
 Bus Rapid Transit (BRT)	70 - 80	500 - 2,000 passengers	Limited stops outside of urban centre. Moves large volumes of people relatively short distances within an urban / city centre environment.
 Light Rail / Tram / Mass Transit	100 - 200	1,000 - 4,000 passengers	BRT is often typically implemented where there is less demand or as a precursor to Mass Transit.
 Suburban Heavy Rail	500 - 700	2,000 – 6,000 passengers	Move large volumes of people over longer distances (eg: 10-30miles) with limited stops
 Inter urban / national Heavy Rail	500 - 1000	Up to 12,000 passengers	Centre to centre fast and direct services

Source: West Yorkshire Combined Authority

The UDM is formed of a series of zones that generate demand to other zones. The relevant “places to connect” were paired with their corresponding UDM zone and the relevant UDM zone pairs were used to produce a demand matrix. In some cases, two or more places to connect were located within the same UDM zone; for display purposes, a single place to connect has been associated with each UDM zone and only inter-zonal trips are accounted for. A series of factors from the National Travel Survey<sup>24</sup> and Department for Transport<sup>25</sup> were used to convert daily UDM demand into peak hour demand.

These figures have been aggregated along the length of each connectivity concept to understand how demand could be concentrated around key destinations. An example is shown in Figure 14. Evidence from other workstreams will inform how a multi-modal transport offer could be provided in these corridors, alongside the indicative high-capacity modes identified in the demand analysis.

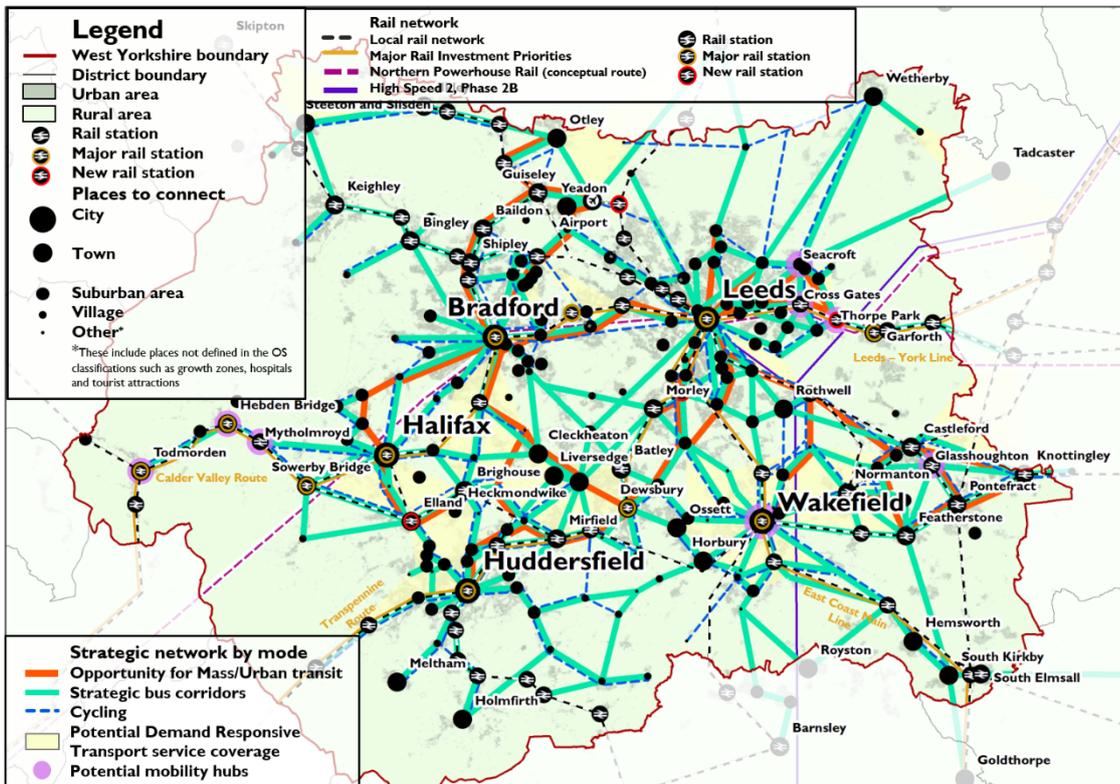
<sup>24</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/823068/national-travel-survey-2018.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/823068/national-travel-survey-2018.pdf)

<sup>25</sup> <https://www.gov.uk/government/statistical-data-sets/nts05-trips> - NTS0503



An example of how this network could look across West Yorkshire is provided in Figure 15.

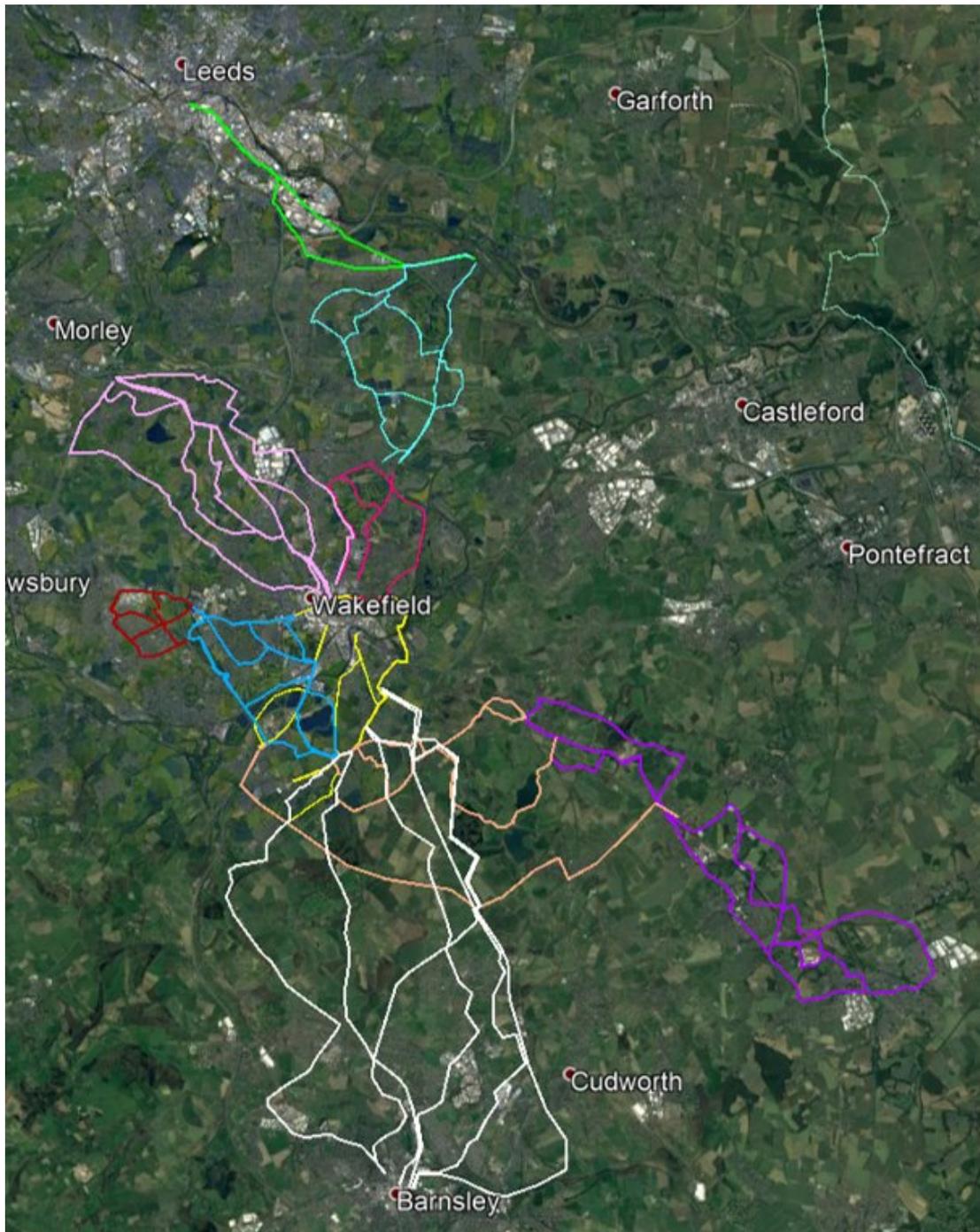
**Figure 15 West Yorkshire Connectivity Network**



## 9.4 Route alignments

Potential route alignments are then explored as ways to provide the connections identified in the prioritised “connectivity concepts”. The route alignments are conceptual and mode agnostic at first, but as they are considered in further detail, become more mode-specific. For example, potential route alignments could be road corridors, disused railway lines, canal towpaths, watercourses or public rights of way.

**Figure 16: Illustrative route alignments (Leeds, Wakefield and Barnsley)**



## 9.5 Interventions

From closer examination of the potential route alignments, mode-specific interventions are then identified. Interventions are drawn from the stakeholder feedback, consideration of previous feasibility studies and a desktop gap analysis. The latter considers existing transport provision and networks (both current and disused) and the current pipeline of works in the corridor – e.g. West Yorkshire Plus Transport Fund, Cycle City Ambition Grant, Local Cycling and Walking

Infrastructure Plans, Leeds Public Transport Investment Programme, to identify interventions for deliverable infrastructure schemes.

These are broadly categorised – e.g. streetscaping and placemaking, bus priority and road space allocation, walking and cycling infrastructure, junction improvements, bus servicing, and other transit interventions (such as Bus Rapid Transit, tram train etc.) – and mapped. An example is shown below.

**Figure 17: Illustrative interventions (Leeds & Wakefield example)**



No.	Intervention	No.	Intervention
Aa	Cross Green cycle path	Ba	Aire Valley Enterprise Zone safeguarding
Ab	Tingley cycle path	Bb	A639 Bus Corridor
Ac	East Ardsley cycle route	Bc	A642 Road Space Reallocation
Ad	Newmarket cycle access	Bd	A650 Road Space Reallocation
Ae	Lindale Lane cycle path	Be	Rook's Nest Road Space Reallocation
Af	Normanton Golf Club cycle path	Bf	Stanley Road Space Reallocation
Ag	Eastmoor cycle path	Ca	Wakefield City Centre Masterplanning

### 9.5.1 Intervention profiles

All interventions are then assigned a scheme type and a high-level deliverability, technical complexity and timescale attribute, allowing them to be assessed and filtered at a high level. Interventions are profiled using the following categories:

#### Type:

- Connectivity concept – a potential linkage between several places identified within a corridor or economic area.
- Active travel scheme (on and off-road walking and cycling)
- Bus corridor treatment (bus priority / road re-allocation)
- Bus service
- Placemaking - Improved urban realm and accessibility for pedestrians and cyclists
- Park & Ride
- Rail scheme
- Highway scheme
- Transit concept (e.g. BRT, tram train etc)

#### Delivery timescales:

- Now / Short-term: Next Five Years (up to 2024)
- Next / Medium-term: Next Ten Years (up to 2030)
- Future / Long-term: Beyond the next Ten Years (2030–2040+)

#### Technical complexity:

At this stage, the assessment for technical complexity is made at an indicative or high-level, considering factors such as engineering complexity, possible land take, likely level of public support, planning requirements and environmental considerations.

- Low
- Medium
- High

### 9.5.2 Scheme priorities

Each connectivity concept and intervention will then receive a score in INSET, as described in Chapter 8. The appraisal process produces average scores or rankings for a series of interventions (including active travel schemes, bus schemes, rail schemes, highway improvements, Park & Ride schemes, Placemaking schemes, road-space reallocation schemes etc.), to identify scheme priorities which offer the greatest benefit against chosen objectives and assessment criteria. An example is shown overleaf, which presents a ranked list of the top 20 scoring interventions for Corridor A – these demonstrate the best level of fit across all themes and sifts. This shows that the highest scoring intervention was the Tram-train from Five Towns to Leeds.

**Figure 18: Example of the top 10 scoring interventions for a corridor  
(taken from the Five Towns to Leeds corridor)**

Rank	#	Scheme	Sift 1: Early sift				Sift 1: Early sift score	Sift2: Local fit	Sift 3: Level of impact				Sift 3: Level of impact	Overall score
			Enabling Inclusive Growth	Boosting Productivity	Delivering Clean Growth	Creating a 21 <sup>st</sup> Century System			Enabling Inclusive Growth	Boosting Productivity	Delivering Clean Growth	Creating a 21 <sup>st</sup> Century System		
1	62	Tram-train from Five Towns to Leeds	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Average	Average	Average	Good	Average	Good
2	64	Bus service along Purple Connectivity Concept	Average	Excellent	Average	Excellent	Good	Good	Low	Average	Fair	Good	Fair	Average
3	27	Express bus service - SE Leeds to Sherburn	Average	Excellent	Average	Excellent	Good	Good	Low	Average	Average	Good	Average	Average
4	63	Five Towns to East Leeds Quality Bus Corridor (QBC)	Average	Excellent	Excellent	Excellent	Good	Average	Low	Average	Fair	Good	Average	Average
5	51	Local upgrade to Transpennine Cycle Route	Average	Excellent	Excellent	Good	Good	Average	Low	Good	Fair	Average	Fair	Average
6	70	A6032 Road space reallocation (Whitwood Mere - Castleford)	Fair	Excellent	Excellent	Excellent	Good	Average	Low	Good	Low	Good	Fair	Average
7	71	Castleford - Hightown - Whitwood road space re-allocation	Fair	Excellent	Excellent	Excellent	Good	Average	Low	Good	Low	Good	Fair	Average
8	68	Castleford centre road placemaking	Fair	Excellent	Excellent	Good	Good	Average	Low	Good	Fair	Good	Fair	Average
9	91	A639 Woodlesford - Castleford road re-allocation	Average	Excellent	Average	Excellent	Good	Average	Low	Fair	Fair	Average	Fair	Average
10	31	Transit link between the H52 Parkway at Hemsworth and the Five Towns	Average	Excellent	Average	Excellent	Good	Average	Low	Fair	Fair	Good	Fair	Average

Source: Mott MacDonald

The application of the appraisal process is very flexible and can be used to adapt to different requirements (e.g. a change in funding or policy environment). For example, the user can “switch-off” or “switch-on” assessment themes and criteria to enable interventions to be filtered for their suitability for future funding streams, depending on how they score against specific policy levers, and their readiness or timescales for delivery (e.g. Transforming Cities). The appraisal process can also be used to better understand the relative strength or weakness of different interventions and can highlight opportunities to “repackage” schemes for future funding streams.

The results and outcomes of the appraisal and its application can be found in Chapter 6 of the Case for Change.

## 9.6 Dealing with uncertainty<sup>26</sup>

We currently face uncertainty about how the future of mobility will develop due to changing trends and innovation in infrastructure, technology and behaviours. Exploring different futures using scenarios can help deal with uncertainty and mitigate any potential problems with future transport solutions. Policy-makers are then able to make more resilient decisions for the future and use scenarios to test current policy, develop new policies and identify the right kind of future for transport.

Four qualitative scenarios have been developed by the DfT, demonstrating divergent possible futures:

- **Trends Unmodified** – The benefits of new technologies in transport is limited. There is uneven use of technology and transport sharing is limited to narrow demographic groups. There are gaps in electric railways, automation uptake is limited, ride-hailing apps reduce public transport use in urban areas and there is a high car dependence.

<sup>26</sup> A time of unprecedented change in the transport system – Government Office for Science (Jan 2019)

- **Individual Freedoms** – The public demands control over transport and become concerned over data privacy. Collection and use of data become tightly regulated and non-data-driven technologies thrive. Active travel increases however congestion worsens due to limited automation and use of private electric vehicles grows along with charging infrastructure.
- **Greener Communities** – Society priorities social and environmental aspects of mobility. Transport becomes decarbonised and transport sharing is widespread as private car ownership falls and road charging is introduced leading to reduced congestion. Active travel significantly increases and Mobility-as-a-service (MaaS) is successful and adopted across demographic groups. However, energy prices become high and environmental regulations slow growth in productivity and the trade deficit widens.
- **Technology Unleashed** – Deregulation in transport and technological progress is dominated by the private sector. Data is widely shared which drives new transport technologies replacing private cars with autonomous vehicles once available. Active travel decreases however e-bikes grow in importance. Social equity challenges exist due to the expense of new technologies and therefore many do not experience the advantages.

These scenarios show that the future of transport faces many uncertainties and therefore testing policy against these scenarios is important in understanding the benefits and disadvantages each may bring. This will be considered later in the process to test options based on various future scenarios.

## 10 Case for Change Reports

This section provides an outline of how the outputs from the corridor appraisals are reported, and how the findings will tie together in the wider West Yorkshire Connectivity Plan.

### 10.1 Report index

A suite of Cases for Change has been produced, which present the findings from the analysis and the outcomes from the appraisal described in preceding sections. The following table provides a list of the corridors and the corresponding report. As with stakeholder engagement, some corridors have been grouped together for reporting purposes. Corridors excluded from the reporting list are either located entirely outside the West Yorkshire Combined Authority (such as Corridors 11) or have already been assessed and reported as part of the previous phase of work (such as Corridors 4, 5 & 7).

**Table 14: Reporting index**

Ref.	Original corridor name	Report name
1	Keighley and Airedale to Bradford & HS2 Hub	Airport, Airedale and Wharfedale: Case for Change
1	Stimulating development from the city centre into North Bradford towards Shipley, Saltaire and the airport	Airport, Airedale and Wharfedale: Case for Change
1	Strengthening high value assets in the North West of Leeds, the University of Leeds, Kirkstall Forge and the airport	
1	Skipton to Leeds	
2	The Calder Valley and Bradford to Leeds	The Calder Valley and Bradford to Leeds: Case for Change
3	Huddersfield to Brighouse	West Kirklees to Calderdale: Case for Change
3	South West Kirklees (including Slaithwaite) to Brighouse	
3	Huddersfield – Halifax	
3	Halifax to Brighouse	
4	Leeds Bradford cross connectivity	n/a
4	Extending the South Bank opportunity to the south of Leeds	n/a
5	Dewsbury / Huddersfield to the HS2 Hub	n/a
6	Dewsbury to Wakefield	East Kirklees to Wakefield: Case for Change
6	East Kirklees (including Denby Dale) to Wakefield	
6	Five Towns to Wakefield	Five Towns to Leeds: Case for Change
7	South Bradford and North Kirklees – Bradford	n/a
7	Accelerating inclusive growth in the East of Leeds towards St James' Hospital and the East Leeds extension	n/a
8	Harrogate to the HS2 Hub	North Yorkshire to Leeds: Case for Change
8	York to Leeds	
8	Selby to the HS2 Hub	
9	Five Towns to Leeds	Five Towns to Leeds: Case for Change
10	Barnsley and Wakefield to Leeds	Barnsley and Wakefield to Leeds: Case for Change

Ref.	Original corridor name	Report name
10	North Barnsley to Barnsley	Barnsley and Wakefield to Leeds: Case for Change
11	York to Harrogate	n/a
11	Selby to York	n/a
11	North York to York	n/a

Source: Mott MacDonald

## 10.2 Case for Change structure

Each of the Cases for Change will be structured as follows:

1. Introduction – explains the role of the Inclusive Growth Corridor Plan and defines the scope and study area. It also provides a socio-economic profile, and a summary of the key connectivity challenges.
2. Spatial context – presents the evidence from the data analysis and the stakeholder workshops as a “story map” showing economic baseline, growth zones and transport characteristics.
3. Corridor aspirations – demonstrates the process through which the corridor aspirations have been defined and how they link to the evidence base and local policy and the appraisal process.
4. Determining spatial priorities – describes the process that has informed the development of the “connectivity concepts” and presents the outcome of the appraisal to define the corridor’s spatial priorities.

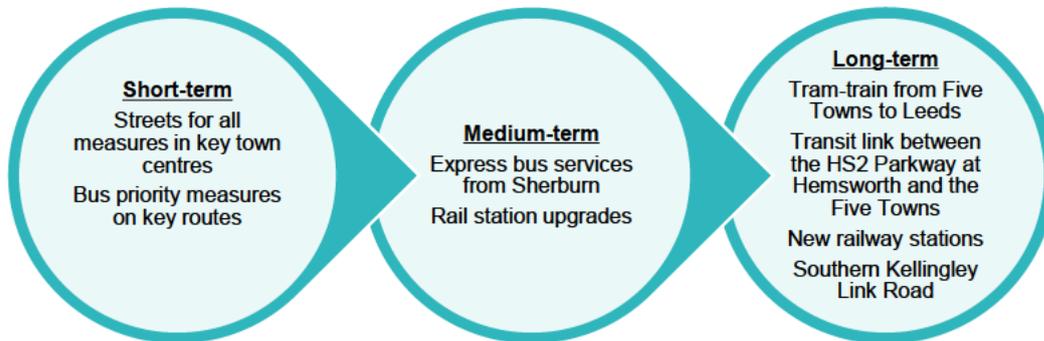
### 10.2.1 Appendix

- A. Spatial context highlights – summaries section 2 of the report across the regional priorities.
- B. Investment case - summarises the process that has informed the development of interventions and presents the outcomes of the appraisal to identify the investment priorities for the corridor.

## 10.3 Report outcomes

Each Case for Change will profile the top five scoring interventions against the overall strategic fit (all four themes), as well as for each individual theme that makes up the strategic fit, as well as against the high-level deliverability timescales – categories and an example of the top scoring interventions against the strategic fit and deliverability timescales are shown below.

**Figure 19: Illustrative delivery strategy for a single corridor**  
(taken from the Five Towns to Leeds corridor)



**Strategic Fit / Themes**

- Enabling Inclusive Growth
- Boosting Productivity
- Tackling the Climate Emergency
- Delivering 21<sup>st</sup> Century Transport

**Intervention Deliverability and Timescales**

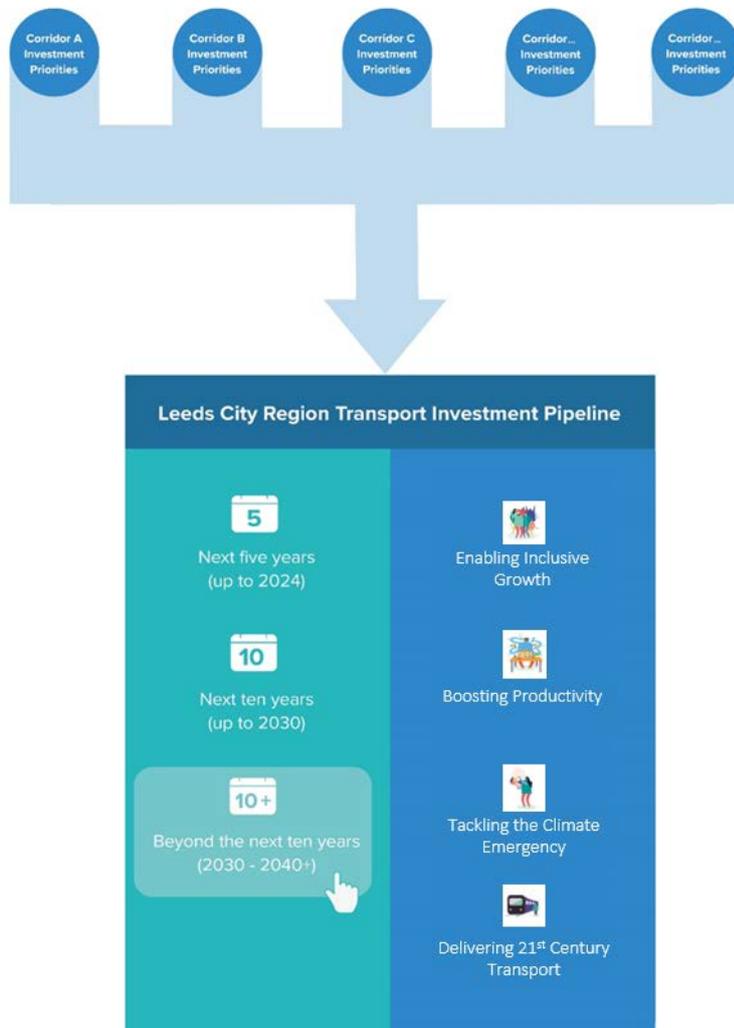
- Now / Short-term: Next Five Years (up to 2024)
- Next / Medium-term: Next Ten Years (up to 2030)
- Future / Long-term: Beyond the next Ten Years (2030–2040+)

**10.4 West Yorkshire Connectivity Plan**

The top scoring interventions (for each deliverability timescale and the various themes and policy drivers outlined in the preceding section) for each Case for Change will be brought forward into the overall Leeds City Region transport investment pipeline as part of the wider Connectivity Plan, as depicted in the following diagram.

This profiling will enable interventions to be filtered for their suitability for future funding streams, depending on how they score against specific policy levers, and their readiness or timescales for delivery.

**Figure 20: Illustration of Connectivity Plan pipeline development**



Source: Mott MacDonald

# Appendices

A.	Local policy context	54
----	----------------------	----

## A. Local policy context

The following policy documents precede the four regional priorities that shape and inform the Connectivity Plan.

### A.1 Leeds City Region Strategic Economic Plan 2016-2036

The Leeds City Region Strategic Economic Plan (SEP)<sup>27</sup> sets the vision for the region to unlock its economic potential and achieve good growth for all. The vision for the SEP is:

***“To be a globally recognised economy where good growth delivers high levels of prosperity, jobs and quality of life for everyone”.***

By achieving this the Leeds City Region will:

- Deliver 35,000 additional jobs (by 2036);
- Deliver £3.7 billion in additional annual economic output (by 2036);
- Become an above average contributor to the UK economy;
- Exceed national average on high level skilled jobs, and;
- Contribute towards overall growth, productivity, employment, earnings, skills and environmental sustainability targets for the region.

To achieve this, the SEP has set four key priorities:

1. Growing business
2. Skilled people, better jobs
3. Clean energy and environmental resilience
4. Infrastructure for growth

Under “Clean energy and environmental resilience” the SEP sets out the aim to become a zero-carbon energy economy by 2036 underpinned by high quality green infrastructure. The role of transport comes under “Infrastructure for growth” and aims to see future transport investments deliver an integrated transport network that connects people to employment opportunities and unlocks development to support economic growth. This would include a fully integrated ‘metro style’ City Region public transport network and integrated bus network that takes advantage of new and ‘smart’ technologies and provides a transport system that services all communities to support inclusive growth.

An integrated set of spatial priority areas has been identified which includes urban growth areas, employment growth areas and housing growth areas. The Combined Authority and Leeds City Region Enterprise Partnership (LEP) will work to develop these areas in ways that support growth and will include consideration of digital infrastructure requirements and design in green infrastructure, flood resilience and good practice on low carbon and environmental standards. There will also be a focus on ensuring there are good transport links and services between where people live and where they work, including those without access to a car.

Efficient inter and intra City Region transport, along with international connectivity is essential to support economic growth. Improved connectivity across the Leeds City Region should include

---

<sup>27</sup> Leeds City Region Strategic Economic Plan 2016-2036 – accessed via <http://www.the-lep.com/LEP/media/New/SEP%20documents/SEP-2016-2036-FINAL.pdf>

radial improvements, ring road improvements, transformation, improved motorway access and improvements between major centres.

The SEP resulted in a 1 billion growth deal between the Government and the LEP to bring together local, national and private funding to invest in projects to help achieve three priority areas identified in the SEP<sup>28</sup>:

5. Improving transport connectivity, accelerating housing growth and town centre regeneration
6. Developing a skilled and flexible workforce
7. Supporting growing business and promoting resource efficiency

## A.2 Leeds City Region HS2 Growth Strategy

The vision of the Leeds City Region HS2 Growth Strategy<sup>29</sup> is for:

***“HS2 to be the catalyst for accelerating and elevating the Leeds City Region’s position as an internationally recognised place of vitality, connecting the North and creating an inclusive, dynamic economy, accessible to all.”***

The Leeds City Region Growth Strategy sets out six key principles that aim to help maximise the benefits of HS2 and other growth opportunities throughout the Leeds City Region:



<sup>28</sup> Leeds City Region Growth Deal - [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/398863/20\\_Leeds\\_City\\_Region\\_Growth\\_Deal.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/398863/20_Leeds_City_Region_Growth_Deal.pdf)

<sup>29</sup> Leeds City Region HS2 Growth Strategy – accessed via <https://www.westyorks-ca.gov.uk/media/2808/hs2-growth-strategy-20122017.pdf>

Maximising the benefits that HS2 can provide (such as greater capacity and faster journey times) will bring increased productivity, growth, jobs, skills development and innovation to the Leeds City Region. Developing a gateway to Leeds through a new integrated station will help to connect HS2 to the heart of Leeds; however, the economic opportunities in Leeds created by HS2 (including the planned doubling of city centres through the Leeds Southbank) and other growth opportunities, create a major capacity challenge through the additional trips they will generate on the local and regional transport network. Unlocking development by delivering improvements around transport hubs and within urban centres is also needed to ensure the wider Leeds City Region sees regeneration benefits and growth from the arrival of HS2 and other growth opportunities.

### A.3 Leeds City Region HS2 Connectivity Strategy<sup>30</sup>

This document sets out a strong Case for Change and the strategy for delivering the step change in connectivity required to enable the transformative impact of HS2 to be realised across Leeds City Region, through improved links within and beyond the region. It is therefore the key input into this piece of work – the development of a broader Connectivity Plan for West Yorkshire, which determines the local and regional connectivity priorities to maximise the growth associated with HS2.

The **Case for Change** demonstrates that “business as usual” for connectivity will not enable the Leeds City Region’s social and economic constraints to be resolved or the economic ambitions and opportunities to be achieved. These are summarised below.

#### **Economic and social: An economy that is not performing to its potential, with long term inequality.**

- Productivity per employee in the Leeds City Region is 15% below the national average and 5% below the Northern Powerhouse.
- There is a need to increase skills to attract business and innovation.
- Industrial changes necessitate the retraining of some people with new skills.
- Despite being a wealthy and successful economic region, there are longstanding deprived areas in the Leeds City Region, with low skill levels and low levels of accessibility.
- Fast growing sectors, such as knowledge intensive business services and technical services are changing development patterns, and demand for better public realm, vibrancy and active transport options in city centres.

#### **Transport: A network that cannot accommodate good growth**

- The Leeds City Region’s rail network is already full at peak times, and even with planned investment, crowding will worsen.
- There is a historic dominance of the car and plans to divert through-traffic away from Leeds city centre will reduce road space in the city centre.
- HS2 and Northern Powerhouse Rail (NPR) will create significant new demand for travel, and significant plans for growth will require more capacity.
- A congested corridor between Bradford and Leeds, the largest economic centres.
- Severance caused by large and busy roads.
- Poor integration between modes and a lack of integrated door-to-door connectivity limits access to opportunities.

---

<sup>30</sup> Leeds City Region HS2 Connectivity Strategy – accessed via <https://www.westyorks-ca.gov.uk/media/3271/lcr-hs2-connectivity-strategy-may-2018-post-engagement-version.pdf>

- An underused bus network in parts that is difficult to navigate.
- The cost of travel is a barrier to people to take-up opportunities.
- Mode share for sustainable and active modes is low.
- Poor air quality in city centres and low physical activity levels across Leeds City Region.

### The capacity challenges

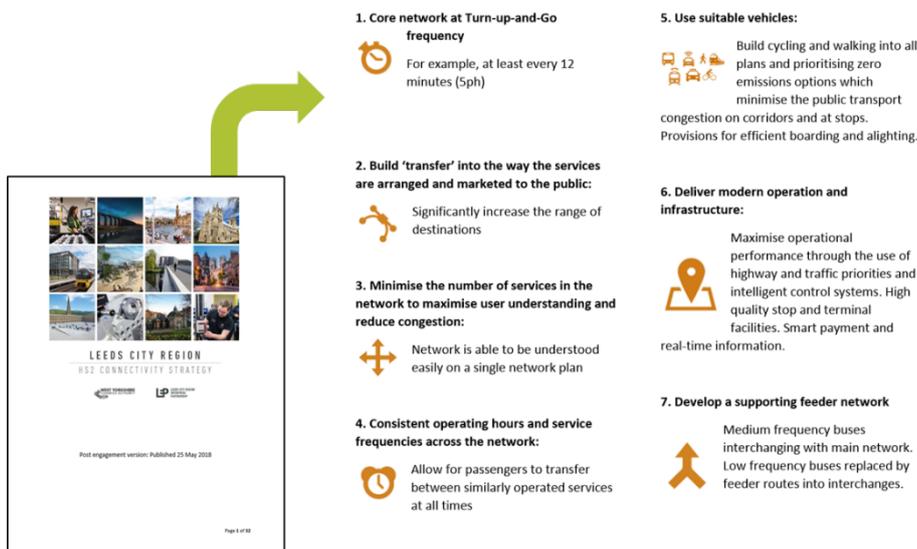
- The economic opportunities in Leeds created by HS2 (including the planned doubling of the city centre through the development of Leeds South Bank) create a major capacity challenge through the additional trips they will generate on the local and regional transport network.
- Leeds city centre will see 40% growth in jobs by 2043 and will be a focus for this capacity challenge – an additional 25,000 trips are expected in the morning peak in 2033, which increases with the full build out of South Bank and the arrival of NPR.
- The highway and rail networks as currently planned do not have the capacity to enable people to access the business, leisure or employment opportunities within the city centre that will result from HS2 and the economic development that will be brought forward.

## Therefore, an accelerated programme of regional and local investment in connectivity is a prerequisite to achieve the economic growth potential of the Leeds City Region.

To support this, the HS2 Connectivity Strategy offers the following objectives:

- Put people first in towns and city centres
- Invest in skills and attracting business
- Increase employment in growing sectors
- Build on the Leeds-Bradford Powerhouse
- Share the benefits of growth through strategic connectivity

The aim is to bring new and more productive jobs closer to people, create new markets for businesses, bring new talent for employers, and encourage new knowledge and investment into the region. Seven connectivity principles are required to deliver a sustainable, frequent and modern public transport network to meet travel needs.



## A.4 Leeds City Region Local Industrial Strategy<sup>31</sup>

All Local Enterprise Partnerships in England have been asked to produce a Local Industrial Strategy (LIS): a long-term plan for business, jobs and skills, based on evidence about the local area, that will focus on bold steps aimed at driving inclusive growth, boosting productivity and improving living standards for a post-2030 economy. Four challenges have been set by the Government to put the UK at the forefront of future industries, ensuring that we take advantage of major global changes, improve people's lives and increase productivity:

1. Clean energy
2. Ageing society
3. Artificial intelligence and data
4. Future of mobility

The emerging Local Industrial Strategy (LIS) for the Leeds City Region is focussed around the themes of ideas, people, infrastructure, business environment and place. It brings together evidence and data about the region, looking at its strengths and weaknesses – for example:

*Leeds City Region has a strong presence in manufacturing, food and drink, textiles, digital technology, healthcare, and financial, professional and legal services, with a growing strength in broadcasting and production services. However, on key measures like skills, education and jobs, Leeds City Region is below national levels. There are skills shortages in science, technology, engineering and maths (STEM) occupations and management capabilities<sup>32</sup>.*

The LIS will identify ways to create more and better-paid jobs, and help people get the skills they need to get these jobs.

## A.5 Digital Framework<sup>33</sup>

The West Yorkshire Combined Authority has also developed a digital framework for the Leeds City Region in order to ensure maximum economic and social benefit from digital technologies. It focusses on five inter-connected outcomes to enable public, private and community partners to achieve one core aim: lives transformed by digital tech. These include:

1. Digital for all businesses
2. Digital skills for all
3. A strong digital sector to enable the rest
4. World-class digital infrastructure
5. Tech for good

## A.6 Energy Strategy and Delivery Plan<sup>34</sup>

Following a commitment by the Combined Authority and the Leeds City Region Enterprise Partnership (the LEP) to become the UK's first zero carbon city region and declarations of

<sup>31</sup> <https://www.westyorks-ca.gov.uk/projects/local-industrial-strategy/>

<sup>32</sup> <https://www.westyorks-ca.gov.uk/media/2780/lis-evidence-online.pdf>

<sup>33</sup> <https://www.yourvoice.westyorks-ca.gov.uk/digital/photos/818>

<sup>34</sup> Towards a zero-carbon Leeds City Region – Energy Delivery Plan (2018)

climate emergencies by all councils within West Yorkshire, a climate emergency has been formally declared by the West Yorkshire Combined Authority<sup>35</sup>.

Five strategic priority areas have been identified, setting out the role of energy in supporting economic growth across the city region:

1. Resource efficient business and industry
2. New energy generation
3. Energy efficiency and empowering consumers
4. Smart grid systems integration
5. Efficient and integrated transport

An overarching principle is to ensure that people feature in all the above priorities; the energy strategy needs to work for its people, communities and businesses.

Measures to deliver this include supporting businesses to reduce waste, water and energy bills improving the efficiency of homes, investing in local, low carbon energy schemes and *introducing electric vehicle charging points and low emission buses*<sup>35</sup>.

Achieving the spatial priority “Efficient and integrated transport” requires a holistic ‘whole system’ planning approach balancing transport priorities and funding. Key interventions under this priority include *“promoting a better, more integrated transport system, which is clean and efficient, addresses air quality issues, and promotes alternative transportation through cycling, walking and public transport”* and *“support the deployment of cleaner transport technologies, including electric vehicles and ultra-low emission vehicles, hydrogen fuel cell EVs and a network of charging infrastructure”*.

## A.7 Leeds City Region Green and Blue Infrastructure Strategy<sup>36</sup>

This strategy aims to ensure that everyone in the Leeds City Region has easy access to a high-quality, safe and well-used network of footpaths, cycleways, green spaces, waterways and wildlife habitats. This will contribute towards a strong economy, a sustainable environment and outstanding quality of life. It will also contribute to achieving the goal set out in the Strategic Economic Plan, of making Leeds City Region a zero-carbon economy. To achieve this there will be focus on seven priority action areas:

1. Effective water management and flood risk reduction – developing natural flood management programmes and drainage solutions.
2. Build green and blue infrastructure into physical development and housing – creating vibrant, healthy and inspiring places where people want to live, work and invest.
3. Enhance green and blue corridors and networks – integrating green and blue infrastructure within the transport routes that link our towns, cities and rural areas.
4. Improve community access to and enjoyment of green and blue infrastructure – building healthier, more environmentally sustainable communities.
5. Plant and manage more trees and woodlands – improving air quality, reducing carbon emissions and creating a greener, even more attractive region.

---

<sup>35</sup> <https://www.westyorks-ca.gov.uk/all-news-and-blogs/combined-authority-declares-climate-emergency/>

<sup>36</sup> Leeds City Region Green and Blue Infrastructure Strategy Executive summary - <https://westyorkshire.moderngov.co.uk/documents/s12616/Item%209a%20-%20GBl%20Strategy%20Delivery%20Plan%20Update%20-%20Appendix%201.pdf>

6. Restore the uplands and manage them sustainably – improving natural flood management, carbon storage and providing an agricultural system that works for the region.
7. Business growth, jobs, skills and education – demonstrating the economic benefits of investing in green and blue infrastructure and developing skills and job opportunities in green occupations such as land management, agriculture, forestry, parks and gardens.

## A.8 Future Mobility Strategy

The emerging Leeds City Region Future Mobility Strategy will maximise the benefits of transport innovation through technological advancements to allow physical connectivity by offering a variety of inclusive modes such as demand responsive services (DRS). Such services are ideal ways of connecting people in areas of typically low passenger demand and can also be used to connect employment hubs with commuter patterns outside of peak times. Encouraging digital connectivity will help to reduce the need for travel by improving digital services and communication channels.

## A.9 Transforming Cities Fund<sup>37</sup>

The Department for Transport's £840m Transforming Cities Fund (TCF) will help to improve transport links and promote local growth within city regions. The Combined Authority has received confirmation that it will receive a share of this funding and is developing detailed proposals to improve public transport along four key routes in the Leeds City Region and upgrade connections to eight rail stations. Together these interventions will help to improve access to jobs, services and education.

## A.10 West Yorkshire Transport Strategy 2040

There are three objectives highlighted in the West Yorkshire Transport Strategy 2040<sup>38</sup>:



The strategy aims to put in place the right transport conditions – building on the Leeds City Region's strengths and tackling underlying issues – meeting increasing demand for travel in a sustainable way while also realising the ambitions for inclusive growth contained in the SEP and district local plans. The strategy's ambitions and policies are framed within six core themes:

<sup>37</sup> <https://www.westyorks-ca.gov.uk/all-news-and-blogs/news-archive/success-in-bid-for-transport-investment/#>

<sup>38</sup> West Yorkshire Transport Strategy 2040 – accessed via <https://www.westyorks-ca.gov.uk/media/2664/transport-strategy-2040.pdf>

1. Inclusive growth, environment, health and wellbeing – connecting people to better living standards, improving health and wellbeing and use of a near-to-zero emissions bus fleet.
2. Road network – provide an efficient, safe and reliable road network for all users, that creates new opportunities for jobs and housing.
3. Places to live and work – improve gateway rail and bus stations to improve access and offer the best possible experience for local people, businesses and visitors.
4. One system public transport – world class public transport system that connects different modes of transport into one comprehensive easy-to-use network and puts the customer first.
5. Smart futures – make best use of enhancements in technology across all transport networks.
6. Asset management and resilience – make the best use of our existing and future transport assets.

The Strategy identifies some mid-term targets (for the first 10 years), to grow the number of journeys made by sustainable transport, namely:

- **25% more trips made by bus by 2027**
- **75% more trips made by rail by 2027**
- **300% more trips made by bicycle by 2027**
- **10% more trips made by foot by 2027**
- **-3.5% reduction in car trips by 2027**

### A.11 West Yorkshire Transport Strategy 2040

There are three objectives highlighted in the West Yorkshire Transport Strategy 2040<sup>39</sup>:



The strategy aims to put in place the right transport conditions – building on the Leeds City Region’s strengths and tackling underlying issues – meeting increasing demand for travel in a sustainable way while also realising the ambitions for inclusive growth contained in the SEP and district local plans. The strategy’s ambitions and policies are framed within six core themes:

7. Inclusive growth, environment, health and wellbeing – connecting people to better living standards, improving health and wellbeing and use of a near-to-zero emissions bus fleet.
8. Road network – provide an efficient, safe and reliable road network for all users, that creates new opportunities for jobs and housing.

<sup>39</sup> West Yorkshire Transport Strategy 2040 – accessed via <https://www.westyorks-ca.gov.uk/media/2664/transport-strategy-2040.pdf>

9. Places to live and work – improve gateway rail and bus stations to improve access and offer the best possible experience for local people, businesses and visitors.
10. One system public transport – world class public transport system that connects different modes of transport into one comprehensive easy-to-use network and puts the customer first.
11. Smart futures – make best use of enhancements in technology across all transport networks.
12. Asset management and resilience – make the best use of our existing and future transport assets.

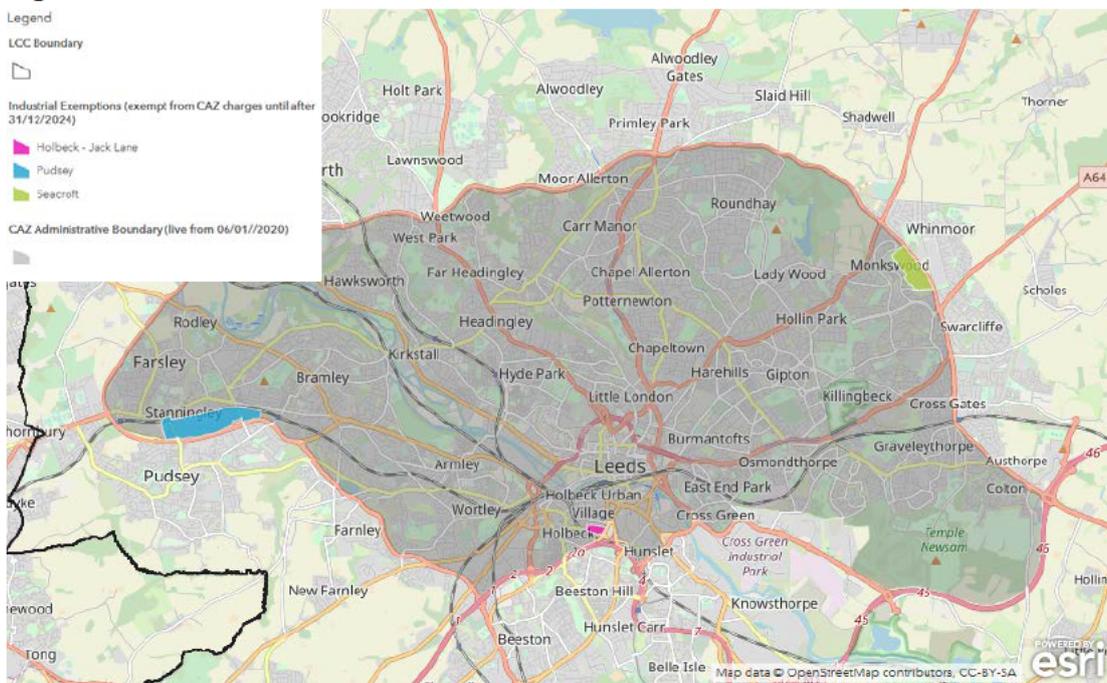
The Strategy identifies some mid-term targets (for the first 10 years), to grow the number of journeys made by sustainable transport, namely:

- 25% more trips made by bus by 2027
- 75% more trips made by rail by 2027
- 300% more trips made by bicycle by 2027
- 10% more trips made by foot by 2027
- -3.5% reduction in car trips by 2027

### A.12 Leeds Clean Air Zone<sup>40</sup>

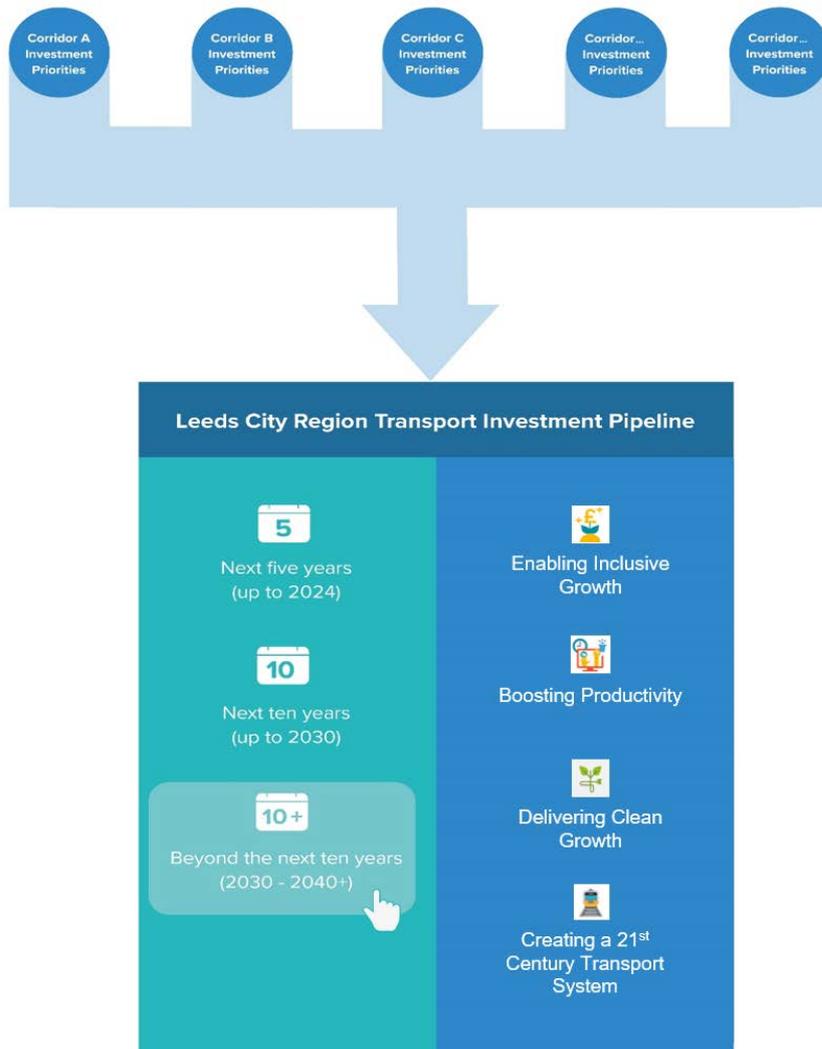
The Leeds Clean Air Zone will be introduced to help reduce air pollution and protect the health of everyone in Leeds. It aims to encourage businesses to transition to cleaner, less polluting vehicles that won't be subject to charges. Charges will apply to heavy goods vehicles, buses, coaches, taxis and private hire vehicles that do not meet emissions standards. Figure 21 shows the Leeds Clean Air Zone boundary. This includes Leeds City Centre and to the north including Roundhay, Headingley, Farsley, Harehills, Cross Gates and Temple Newsam.

**Figure 21: Leeds Clean Air Zone**



<sup>40</sup> <https://www.leeds.gov.uk/business/environmental-health-for-business/air-quality>

**Figure 18: Illustration of Connectivity Plan pipeline development**



Source: Mott MacDonald

