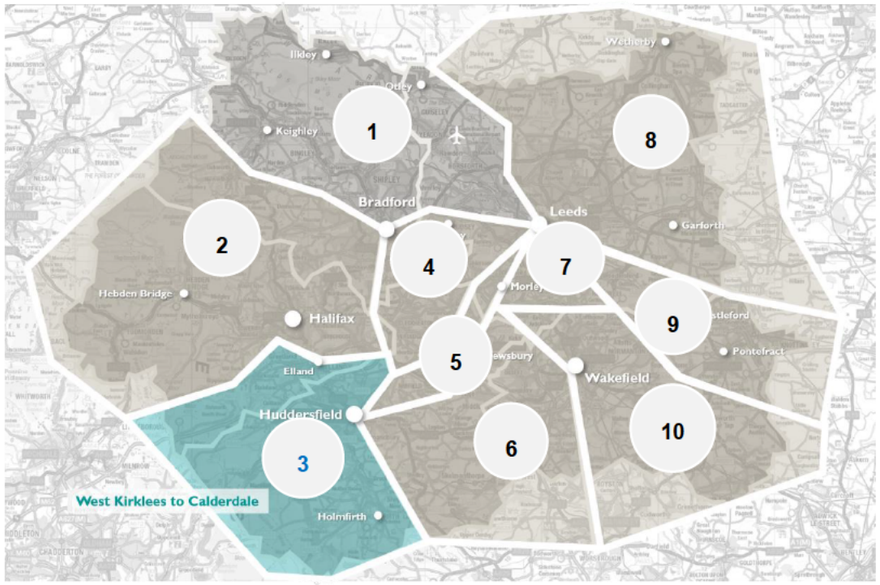
MOTT MACDONALD

West Yorkshire Combined Authority



West Yorkshire Connectivity Plan

West Kirklees to Calderdale: Case for Change

November 2020

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Contents

Introduction

1.1 The role of this Case for Change

This Case for Change report for West Kirklees to Calderdale provides an important first step, and part of the evidence, for identifying a connectivity pipeline of future transport investments for this part of the region.

This report provides analysis of transport and socio-economic data, to identify an initial longlist of potential transport investments aimed at improving connectivity. The approach takes the view that transport should not be a barrier to people accessing jobs, to businesses choosing to invest here and to improving the health of our residents and visitors. Improvements in transport should be a catalyst for change across all these objectives.

This report's outputs will be integrated with other Case for Change reports, and other workstreams, including proposals to decarbonise transport, Urban Mass Transit market testing, Bus Network Reviews, Rail Capacity Study, Local Cycling and Walking Infrastructure Plans and a Future Mobility Strategy, to produce a connectivity plan and long term investment programme for the whole of West Yorkshire, to the 2040's.

1.2 Background to the report

The West Yorkshire Combined Authority has adopted a Transport Strategy to 2040. The strategy was a collaboration between the Combined Authority and the West Yorkshire partner councils of Bradford, Calderdale, Kirklees, Leeds and Wakefield and covers the geography of West Yorkshire but recognises the importance of the wider Leeds City Region, and that people and goods travel longer distances across administrative boundaries. The strategy provides a framework of high-level transport policies aimed at delivering a world-class, modern, integrated transport system, that will play a key role in transforming the region's economy and delivering inclusive, sustainable growth.

A daughter document, the Leeds City Region HS2 Growth Strategy, set out the strategic case for change for building on the once-in-a-generation opportunity provided by the arrival of High Speed 2 (HS2) and Northern Powerhouse Rail (NPR) in the region, to transform the City Region's economy. The benefits of HS2 and NPR cannot however drive inclusive growth alone; a range of factors are essential to create more and better jobs, with a highly skilled workforce to sustain them - and a lack of transport capacity and infrastructure at the City Region and local level will inhibit growth. The HS2 Growth Strategy identified corridors and communities which are in economic need of improved connectivity.

Significant investments in transport are planned through the West Yorkshire Transport Fund, Connecting Leeds and Transforming Cities Fund programmes, and by the rail industry, which will provide the early years of the connectivity pipeline. However, there remains insufficient capacity and resilience in our transport system, particularly to key employment centres, which will constrain business and labour market catchments, and the ability to train and develop the next generation, by restricting access to colleges and universities. The National Infrastructure Commission identified that this is affecting many places across the North of England and will increasingly inhibit economic development and living standards.

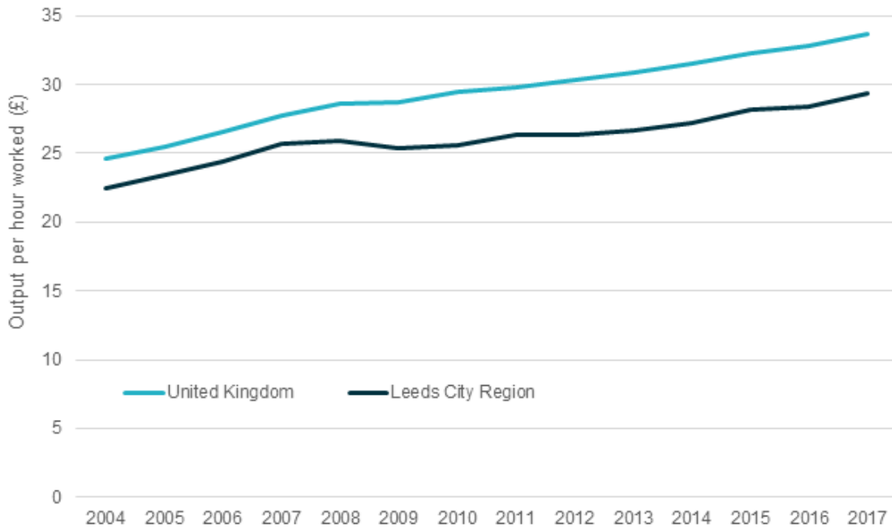
An important next step is to support the delivery of our strategies is to develop a plan and pipeline of longer-term investments, which address a full range of strategic and local connectivity needs.

Ten Case for Change reports have been produced with the input of the partner councils, which study corridors covering the geography of West Yorkshire and including parts of the wider City Region, to provide detailed evidence of connectivity needs. These Case for Change reports should be read in conjunction with the Connectivity Plan Appraisal Handbook for further detail on background and methodology.

1.3 West Yorkshire's priorities for growth

The emerging Industrial Strategy for West Yorkshire highlights a significant and widening productivity and innovation deficit, as shown in Figure 1. Living standards across the City Region have stalled with several communities facing persistent poverty.

Figure 1: Illustration of productivity gap in West Yorkshire



Source: Office for National Statistics, 2019

The West Yorkshire Transport Strategy recognises that our transport network currently constrains opportunities for growth and is a key factor in shaping experiences of poverty. Our network does not sufficiently support sustainable travel as the obvious choice for many. In the wake of the declaration of a "climate emergency" by all West Yorkshire districts, there is a growing need to de-carbonise our transport network; as the transport sector contributes 37% of both Wakefield's and Calderdale's total CO_2 emissions[1]. This needs immediate action as transport emissions are expected to grow, constraining West Yorkshire's ability to meet overall emissions targets.

We have four priorities for the region aimed at addressing our key challenges. These are summarised in Table 1.

Table 1: Leeds City Region's four priorities for growth

	**Enabling Inclusive Growth** – Ensuring that economic growth leads to opportunities for all who live and work in the region
	**Boosting Productivity** – Helping businesses grow and bringing new investment into the region to drive economic growth and create jobs
	**Tackling the Climate Emergency** - Growing our regional economy whilst cutting carbon dioxide emissions
	**Delivering 21st Century Transport** - Creating efficient transport infrastructure that makes it easier to get to work, do business and connect with each other

Source: West Yorkshire Combined Authority

[1] UK local authority and regional carbon dioxide emissions national statistics: 2005-2016

1.4 Defining the scope and study area

This section explains the process undertaken to define the corridor from the original scope to an economic area in which to focus the evidence base, develop key connectivity concepts and interventions.

The Leeds City Region HS2 Growth Strategy identified a network of communities and corridors that would benefit from inclusive growth. Table 2 shows a list of the corridors and the corresponding reports with their approximate extents illustrated in Figure 2. All the Case for Change corridors are shown in Figure 3 with the West Kirklees to Calderdale corridor highlighted in red.

Table 2: Reporting index

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

Source: Mott MacDonald

The corridor covers the area to the north and west of Huddersfield, and south of Elland and Brighouse, as well as more rural areas such as the Colne Valley and Holmfirth. The defined economic area is shown in the next chapter.

Figure 2: West Yorkshire Connectivity Plan: Reporting Map

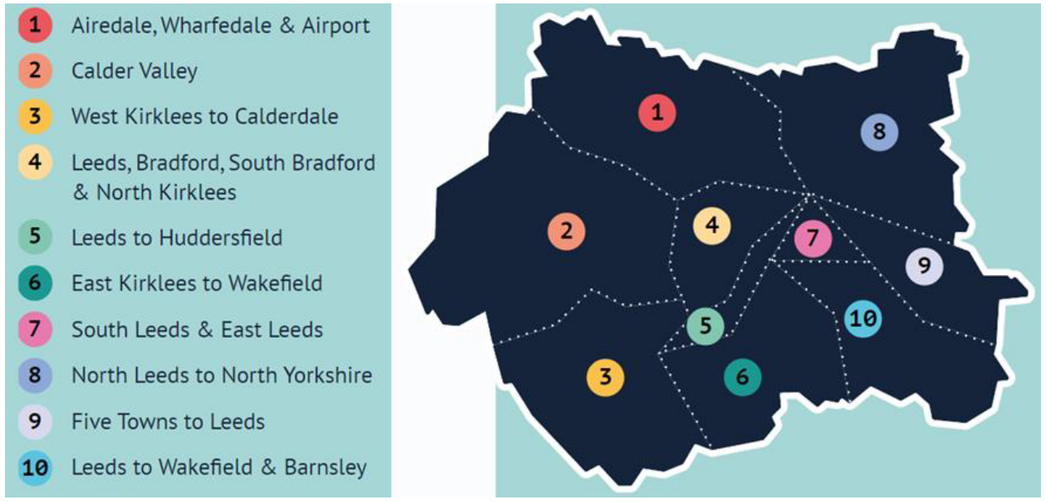
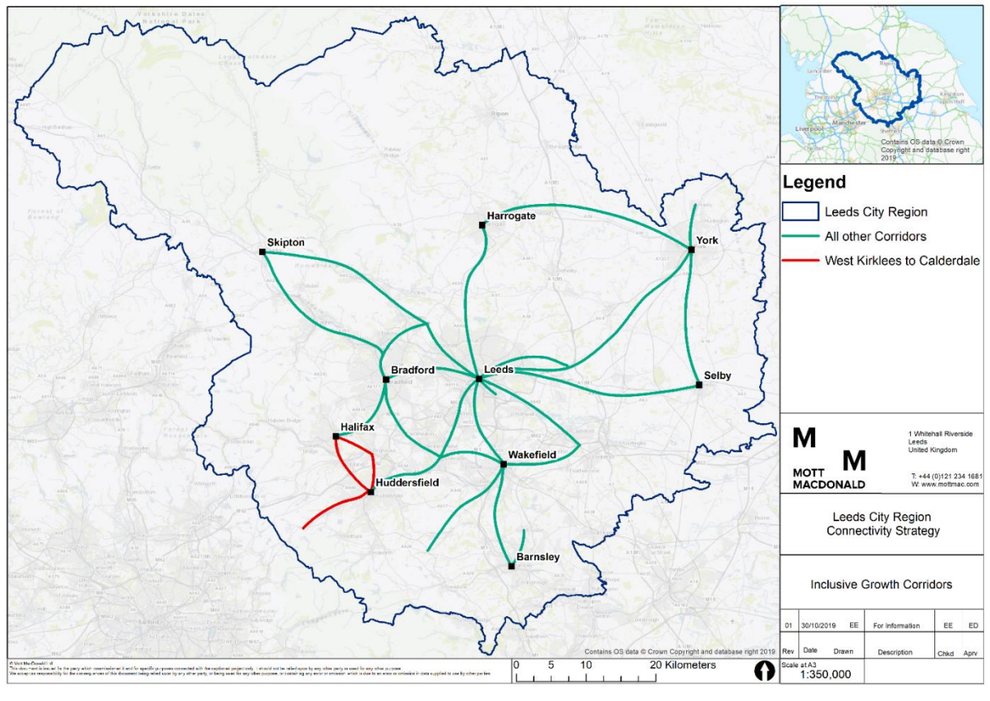


Figure 3: West Yorkshire Connectivity Plan: Corridor Map



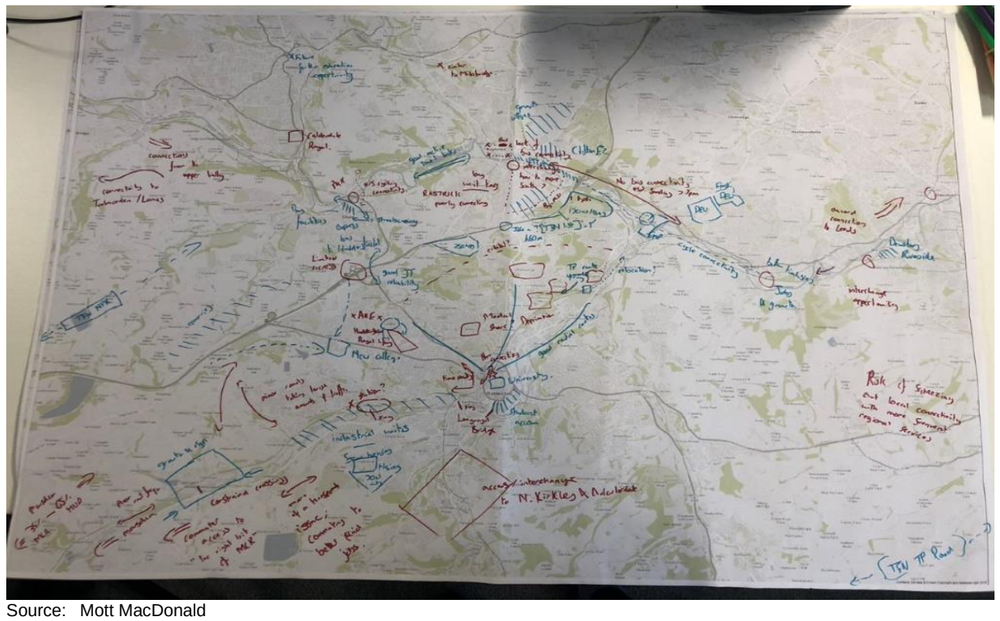
The corridor has been defined in consultation with officer representatives from Kirklees and Calderdale districts (these will now be referred to as partners). An initial workshop helped to identify and confirm the key "problems and opportunities" for the area. An example of the outputs from this is shown in Figure 4.

The findings were then used to define both the extent of the corridor or economic area, the main elements of the accompanying "story map" (which summarises the key issues and opportunities in the spatial context, and sits behind the Case for Change as the data repository and analysis tool) and to develop a set of corridor-specific aspirations.

1.5 West Kirklees to Calderdale: at a glance

The following two pages provide some highlights for this corridor – these cover the key socio-economic features of the geography as well as the connectivity challenges it faces and conclude with prioritised investment proposals to meet these challenges. The 2-page summary is designed as a double sided "lift out" of the key issues and conclusions. Further detail to underpin these summary points is provided in subsequent Chapters.

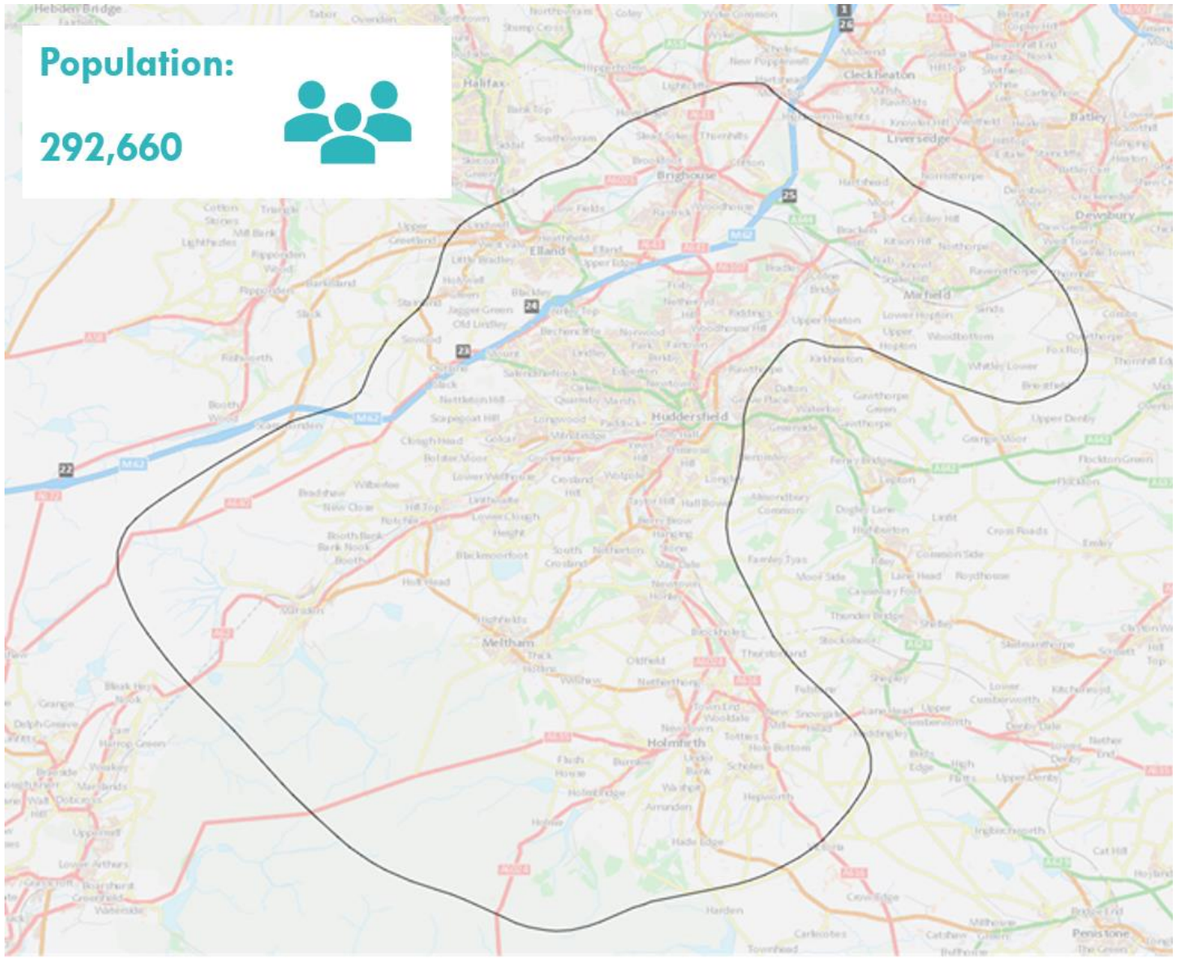
Figure 4: Example of issues identification and corridor definition from stakeholder workshop



Source: Mott MacDonald

West Kirklees to Calderdale: socio-economic profile

This inclusive growth corridor examines movements between West Kirklees and Calderdale. It covers densely populated urban areas concentrated in the valleys, bounded by steep hills. Average household income in the corridor is lower than both national and regional averages. There is a considerable amount of housing growth forecast throughout the corridor and connectivity to future growth sites is fundamental to enable inclusive growth throughout the Leeds City Region. Whilst the majority of headline issues affecting the corridor are concentrated in the north-east towards Mirfield and Ravensthorpe, rural connectivity to the south and west around Holmfirth and Marsden are also key factors to consider in this area.



Total jobs in the corridor:
Over
119,294

Employment sites forecast in the corridor
31

Housing sites forecast in the corridor
19,905

Average household income:
£36,000

Yorkshire and Humber **£36,526**

England and Wales **£41,642**

% in employment:
60%

Yorkshire and Humber **60%**

England and Wales **62%**

Places with challenges for:

Income:
Crosland Moor

Employment:
Deighton

Health:
Ravensthorpe

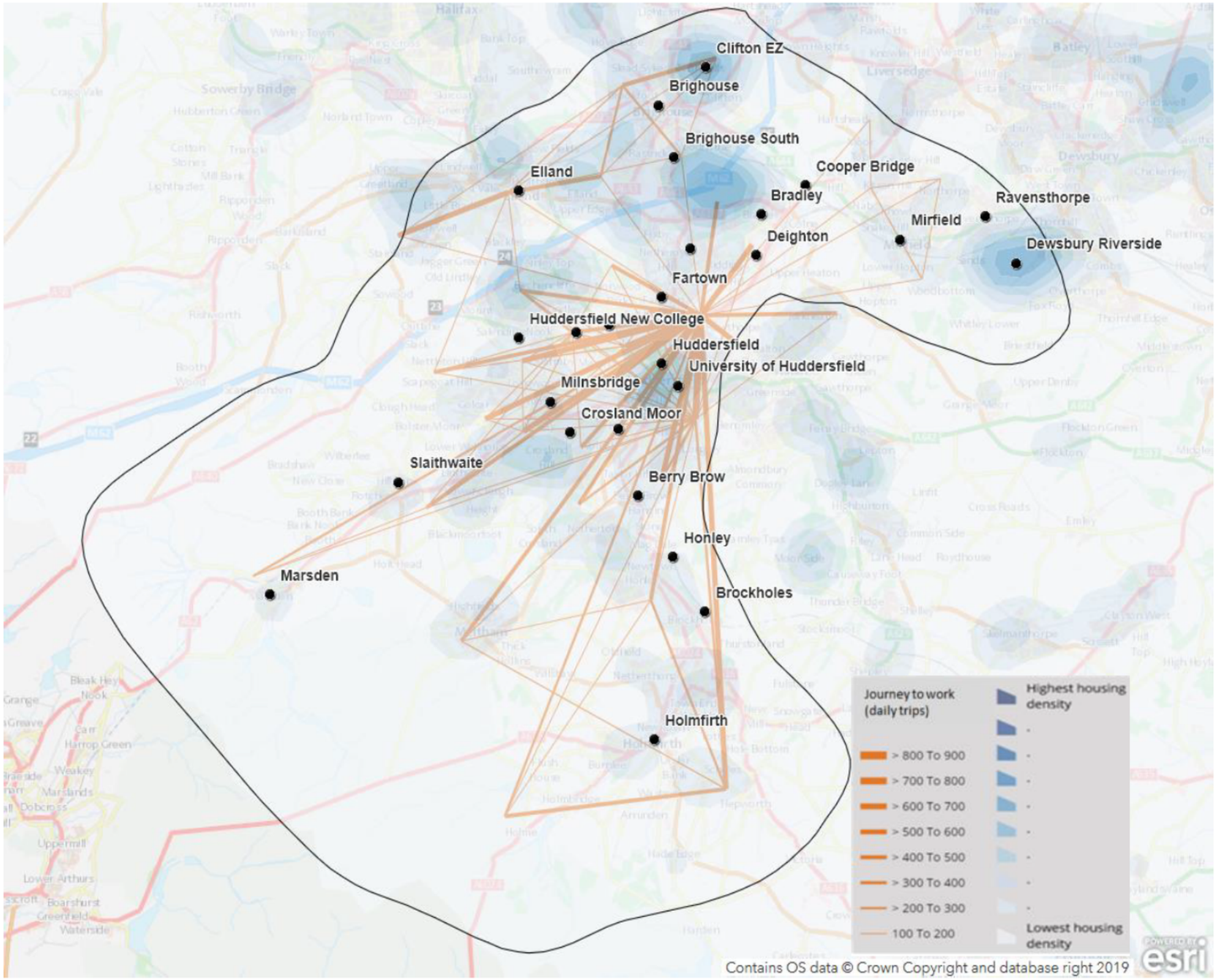
Places with opportunities for:

Connectivity:
Elland

Employment:
Cooper Bridge

Housing:
Dewsbury Riverside

West Kirklees to Calderdale – connectivity highlights



People in communities within the corridor, including in Deighton, Fartown and Elland experience low employment and skills prospects, low household income, and low car ownership, with several areas being within the top 10% of most deprived communities in the UK.

Many job opportunities, often in wholesale and retail trade and storage and distribution, rely on car access and are poorly served by other modes. To improve the prospects of these communities, and to boost productivity, they must be better connected to suitable employment opportunities by a range of transport options.

Key connectivity challenges:

- 36,800 people in the corridor live within an isolated community, approximately 15% of the population. Improving access to employment destinations will help to **boost productivity**
- Deighton and Fartown are in the top 10% deprived areas for education in England. Improving connectivity to education opportunities will ultimately help people to find better employment, helping to ensure **inclusive growth**
- 55,000 people (22%) within the West Yorkshire areas of the corridor have no access to a bus service outside of peak periods. Addressing poor levels of bus service will help to deliver a **21st century transport system**
- High levels of peak-time traffic and associated congestion particularly on the M62 and roads in and out of, Huddersfield, including the A640, A629, A641, A62 and A616 must be addressed to **tackle the climate emergency**

Investment is required in improved connectivity, particularly for trips to employment and education opportunities, including those at Crosland Moor, Elland, Cooper Bridge and in Huddersfield Town Centre. Schemes that will best address these connectivity challenges will be taken forward into a West Yorkshire pipeline of interventions to deliver inclusive and clean growth.

2 Spatial context

This chapter sets out the key spatial challenges for each of our four regional priorities in the corridor. It presents the key outputs from the "story map" for this corridor; this is a web-based Geographical Information System (GIS) data repository and analysis tool, which summarises the key issues and opportunities in the spatial context and sits behind the Case for Change. The story map was developed from a wide range of spatial datasets and the resulting narrative was shared with and shaped by feedback from key stakeholders on key issues, opportunities and local priorities. These are presented alongside the major priorities for the City Region.

Please refer to Chapter 6 of the Appraisal Handbook for a summary of the datasets which form part of the evidence base for the "story map" that supports the development of the Case for Change.

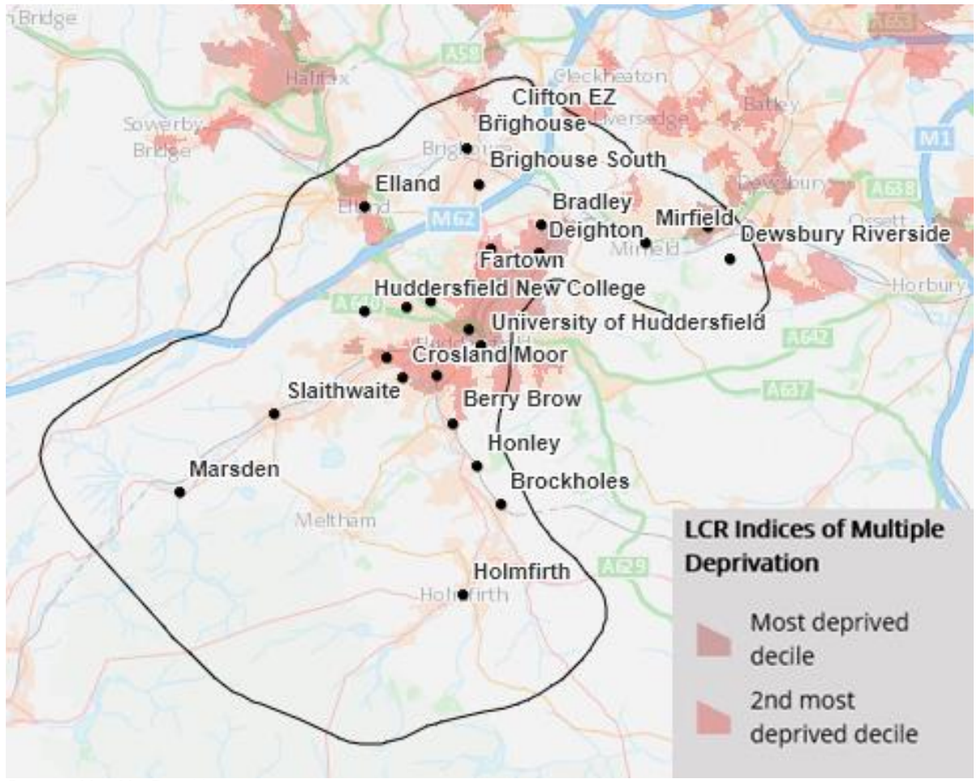
2.1 Enabling Inclusive Growth

2.1.1 Deprivation

Figure 5 shows areas that are within the top two deciles of the indices of multiple deprivation. Deciles are calculated by ranking the 32,844 Lower Super Output Areas (LSOA) in England from most deprived to least deprived and dividing them into 10 equal groups. LSOAs in decile 1 fall within the 10% most deprived LSOAs nationally, whilst LSOAs in decile 10 fall within the 10% least deprived of LSOAs nationally[2]. The index of multiple deprivation is an overall relative measure of deprivation constructed by combining seven domains of deprivation according to their respective weights.[3] These include:

- Income Deprivation
- Employment Deprivation
- Education, Skills and Training Deprivation
- Health Deprivation and Disability
- Crime
- Barriers to Housing and Services
- Living Environment Deprivation

Figure 5: Areas of high deprivation



Source: Mott MacDonald

Deprivation is concentrated within the urban areas of the West Kirklees to Calderdale corridor, particularly Elland and across Huddersfield including Lockwood, Fartown and Deighton. Deighton and Fartown are in the top 10% deprived areas for education in England. Communities including Ravensthorpe and Fartown are also in the top 10% deprived areas for health. **People in these areas are more likely to suffer from poor connectivity and fewer opportunities to access jobs and education and many will rely on convenient and reliable transport; connecting these areas is vital to enabling inclusive growth[4].**

[2] English Indices of Deprivation 2015 – Department for Communities and Local Government
[3] ibid

[4] 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

2.1.2 Isolated communities

Isolated communities have high levels of deprivation (are within the top 20% most deprived in England) and can access a lower than average number of employment destinations. Residents find that job opportunities are difficult to access because of public transport journey times, reliability (perceived as well as actual) and affordability[5].

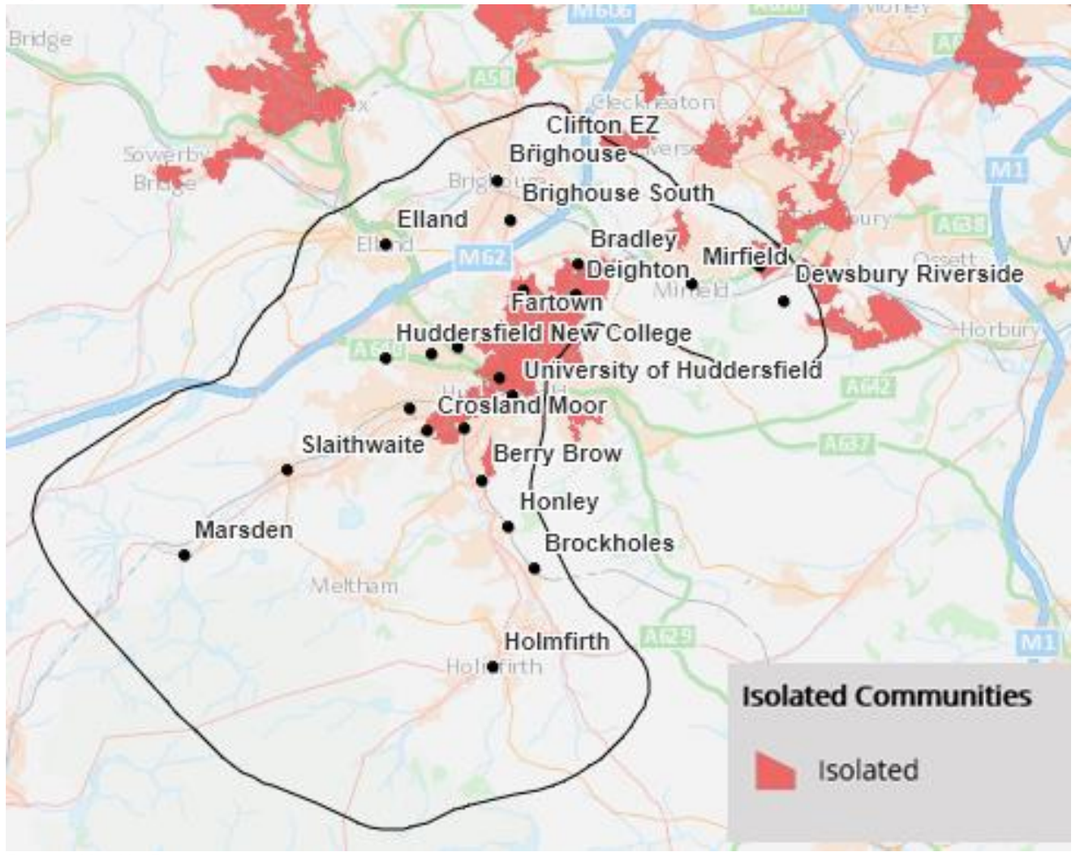
This uses the approach adopted for the Joseph Rowntree Foundation for *"Tackling transport related barriers to employment in low-income neighbourhoods"* – Census data (distance travelled to work, and the average number of destinations people can reach for journeys to work across the LCR).

There are several areas in the corridor that are defined as "isolated communities" (see Figure 6). This includes Ravensthorpe and communities surrounding Huddersfield such as Fartown, Deighton and Bradley. Despite the proximity of rail stations or Huddersfield town centre, issues with public transport reliability and affordability combined with the nature of low-waged or insecure work limits access to job opportunities for these communities.

Around 36,800 people in the corridor live within an isolated community, approximately 15% of the corridor.

Improving connectivity in these areas is fundamental to enabling inclusive growth. People within these communities are unable to access many destinations for work, therefore, limiting access to job opportunities. Many people in isolated communities also rely on affordable, convenient and reliable transport to access education and job opportunities. Ensuring that these areas are well connected by public transport to access employment and education is fundamental to achieving inclusive growth[6].

Figure 6: Isolated communities



Source: Mott MacDonald

[5] 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

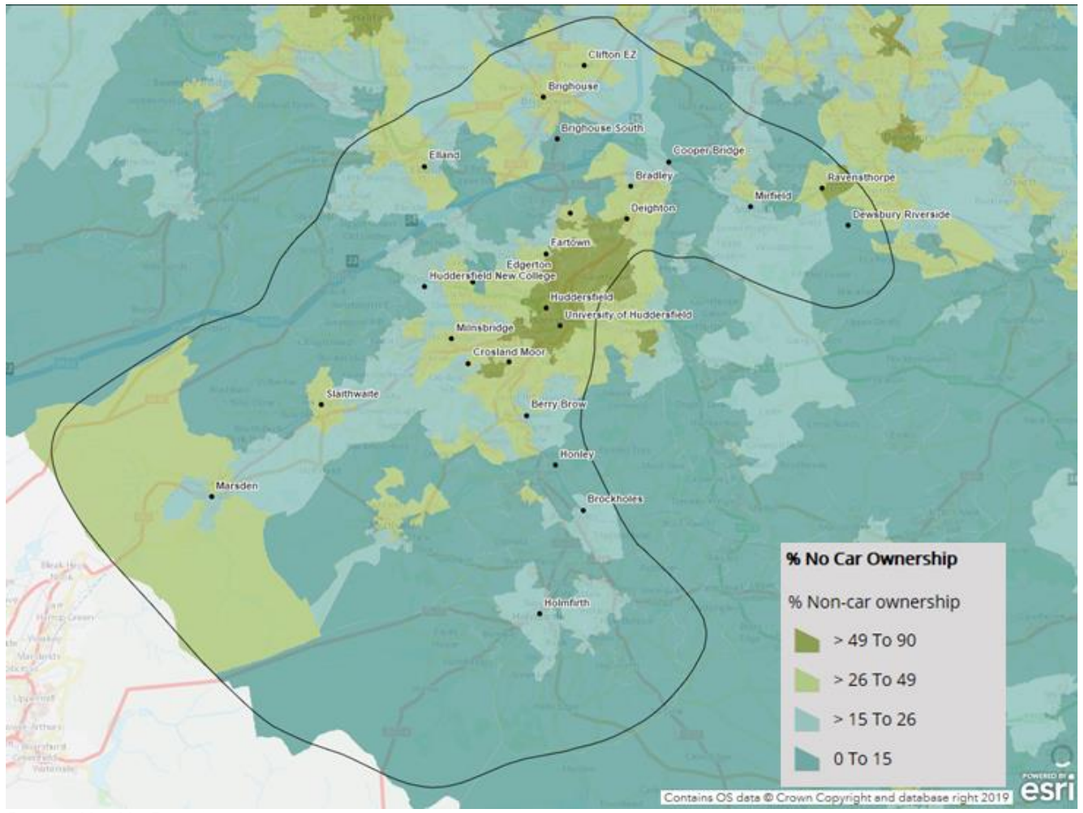
[6] Tackling transport-related barriers to employment in low-income neighbourhoods (2018) accessed via: https://www.jrf.org.uk/report/tackling-transport-related-barriers-employment-low-income-neighbourhoods

2.1.3 Car ownership

The motorway network ensures that some of these areas are reasonably well connected. However, car ownership varies throughout the corridor with high car ownership generally found in rural areas to the south. In contrast, areas **across Huddersfield are characterised by low car ownership** where more than 50% of households do not own a car (see Figure 7). In Brighouse, Elland and Slaithwaite 27-49% of households do not own a car. This restricts access to learning and employment opportunities that exist outside of immediate communities. Access to opportunities is further compounded for people living in isolated communities such as those in and around central Huddersfield. Whilst public transport options might exist residents are constrained by reliability and affordability[7].

Ensuring that key employment areas are connected by good public transport links in both peak and off-peak periods will enable people to access employment opportunities without private vehicle ownership. A high-quality integrated transport system will also encourage people to choose to travel by public transport rather than car which is key to meeting carbon reduction targets.

Figure 7: % No car ownership



Source: Mott MacDonald

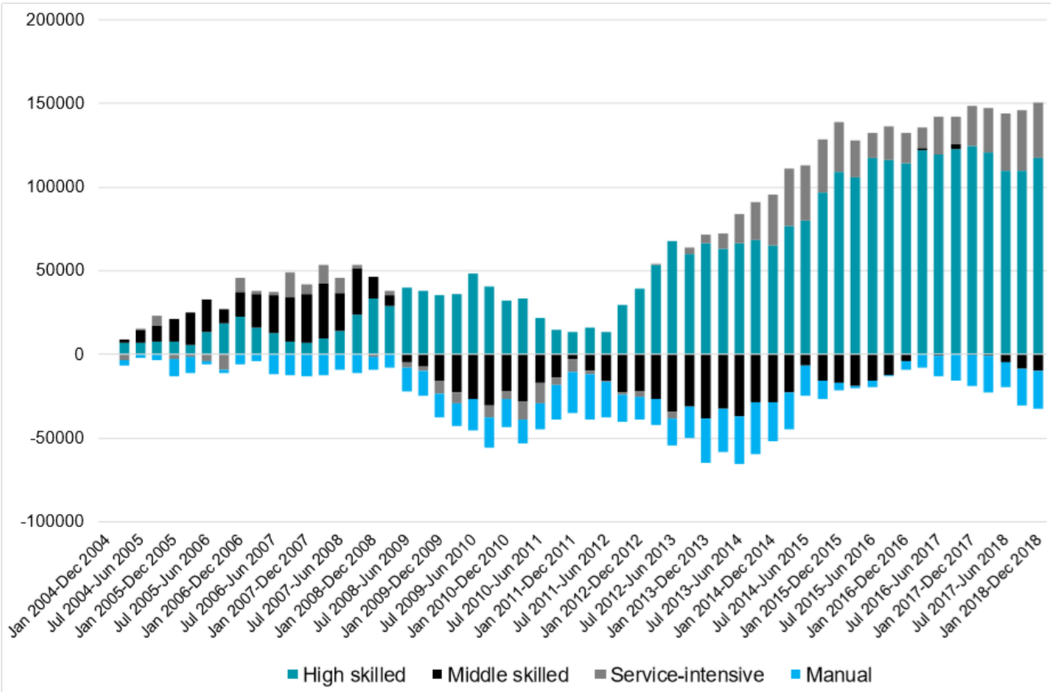
[7] Tackling transport-related barriers to employment in low-income neighbourhoods (2018) accessed via: https://www.jrf.org.uk/report/tackling-transport-related-barriers-employment-low-income-neighbourhoods

2.2 Boosting Productivity

2.2.1 Employment characteristics

The emerging Industrial Strategy for West Yorkshire highlights an increase in highly skilled employment in the City Region (see Figure 8). In this corridor, highly skilled engineers and trade professionals are vital to the manufacturing sector. This affects commuting flows as these workers often commute further and travel more. Having an effective and reliable transport system is paramount to maximise productivity in the region.

Figure 8: Occupational contribution to cumulative employment growth



Source: Emerging West Yorkshire Industrial Strategy

The West Kirklees to Calderdale corridor has some distinct employment characteristics and strengths.

The wholesale and retail trade is the largest employer in the corridor, employing 20,493[8] people. This sector operates shift patterns outside of the traditional timetables and schedules of current public transport routes. The manufacturing sector employs 18,202 people which is *twice the national average*. The transportation and storage sector employs 4,942 people, which is just below the national average. The motorway network provides an attractive environment for these businesses; there are several large warehousing, industry and distribution centres sited adjacent to the M62. The proposed introduction of Junction 24a is likely to make the area more appealing to this sector going forward.

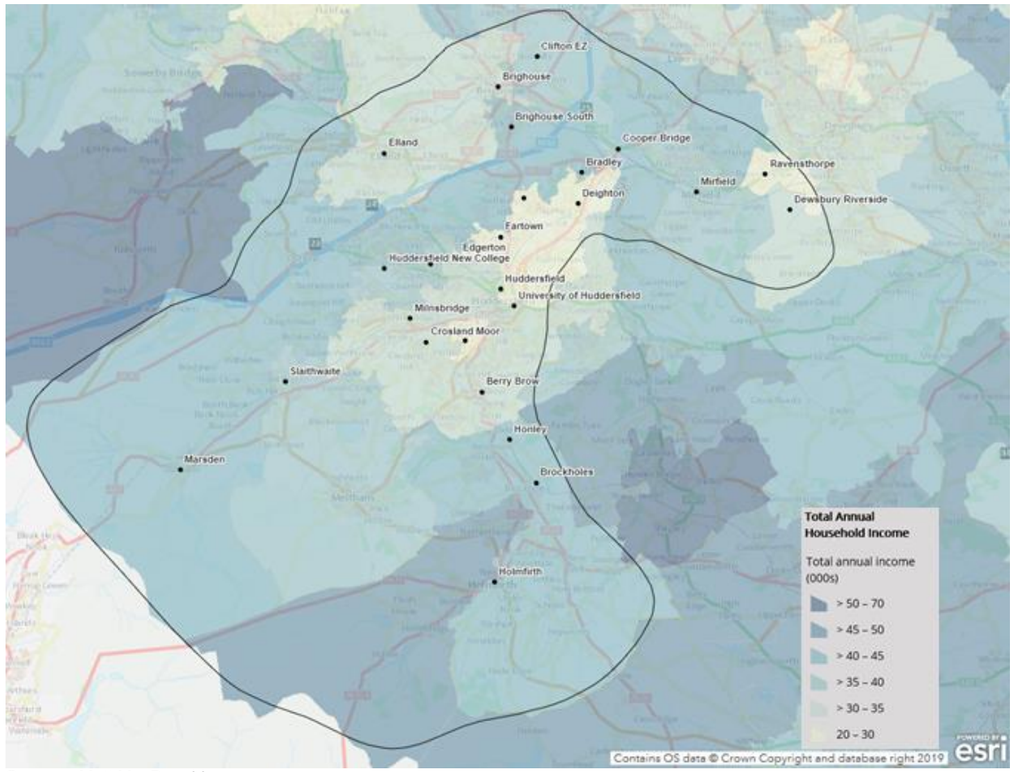
Connectivity to these specialisms is fundamental to boosting productivity.

[8] Business Register and Employment Survey: open access (2017)

2.2.2 Household income

Average total annual household income in the corridor (£35,714) is lower than the average for England and Wales (£41,642) and Yorkshire and Humber (£36,526). This is particularly low throughout central and northern parts of Huddersfield, including in Deighton (£27,700) and Fartown (£28,000) (shown in Figure 9). The gross value added per head (GVA) according to the West Yorkshire Combined Authority for Calderdale and Kirklees is 70% of the UK average and has seen an average growth rate of 2.9%. This general measure of prosperity shows the need for better connections in the area to create opportunities to help enhance the economy and to close the gap with national economic outputs.

Figure 9: Total annual household income



Source: Mott MacDonald

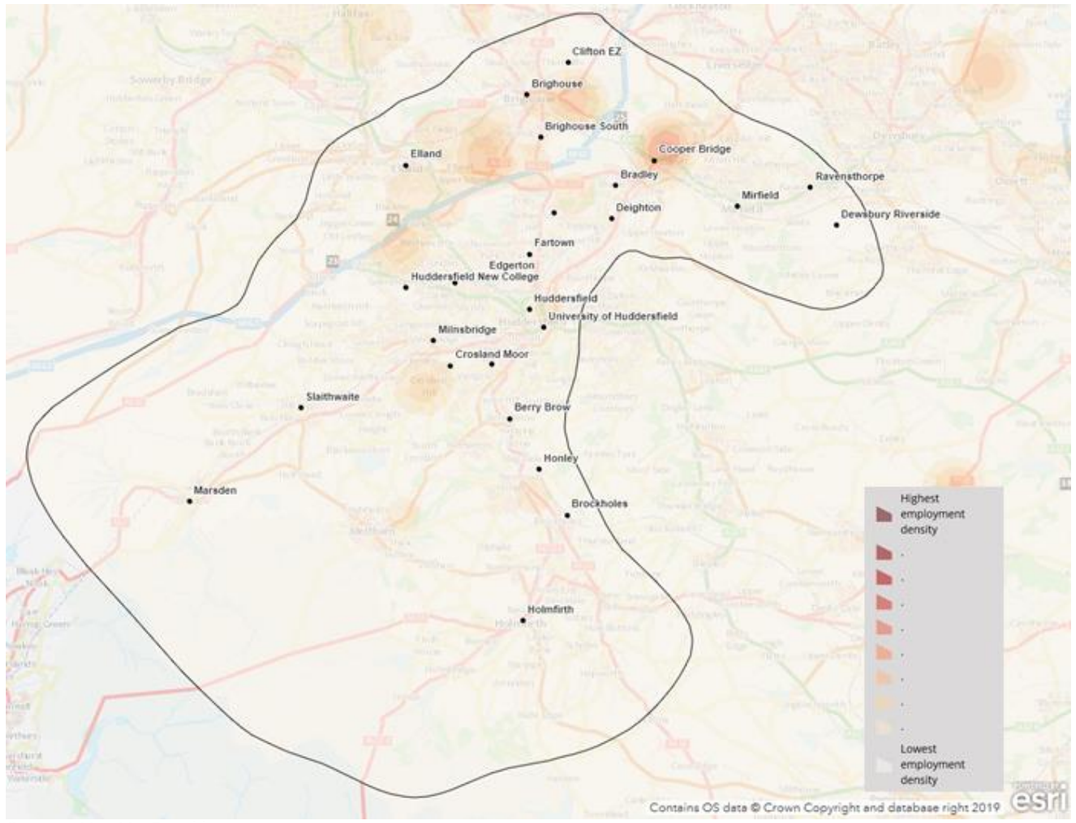
Connecting areas of deprivation and low annual household income is important to provide opportunities for people to access education and employment and in enabling inclusive growth throughout the corridor.

2.2.3 Growth areas

Figure 10 shows a heatmap of employment growth sites throughout the corridor area. Key employment growth sites include Crosland Moor (18ha). The Kirklees Local Plan[9] aims to enhance the number of jobs by expanding many of the sites adjacent to the M62 and along the A62 corridor, to the north east of Huddersfield. Employment sites to the north of the M62 in Calderdale around Elland (17ha) and Brighouse, including Clifton Enterprise Zone (25ha), overlap with the Calder Valley and Bradford corridor. There is also a large employment growth site at Cooper Bridge (46ha), which overlaps with the East Kirklees to Wakefield corridor.

To maximise the economic benefit and potential that these bring, their connectivity requirements must be considered carefully, and in the context of the existing socio-economic issues. The emerging Industrial Strategy for West Yorkshire highlights that over the past five years business base growth in Leeds has occurred faster than the UK. However, Calderdale's and Kirklees' business growth has been slower, at around 15% and 17%. This emphasises the need for good transport options connecting Calderdale and Kirklees businesses to potential employees and custom.

Figure 10: Employment growth sites heatmap

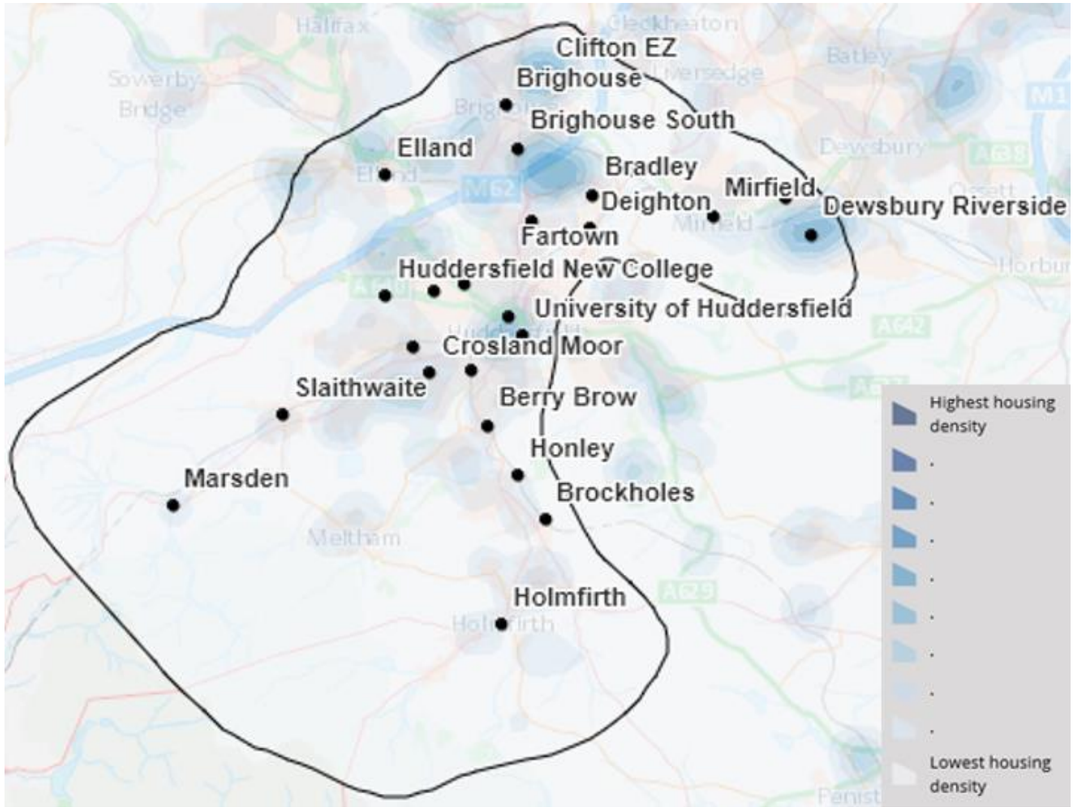


Source: Mott MacDonald

[9] Kirklees Local Plan Strategy and Policies – February 2019

Figure 11 shows a heatmap of housing growth sites in the corridor area. One of West Yorkshire's priority growth sites for housing is located within the North Kirklees Growth Zone. Additional housing is also proposed at Bradley (1900 dwellings), Mirfield (720 dwellings) and Huddersfield (1500 dwellings). Development sites at Brighouse (2000 dwellings) and Brighouse South (1260 dwellings), overlap with the Calder Valley and Bradford corridor. Dewsbury Riverside (2500 dwellings) overlaps with the East Kirklees to Wakefield corridor.

Figure 11: Housing growth sites heatmap



Source: Mott MacDonald

Further employment growth (particularly with some of it being focused in locations adjacent to the motorway), emphasises the need to improve public transport connectivity to these areas, both from existing communities and new housing growth sites, to enable access to employment opportunities for everyone.

2.3 Tackling the Climate Emergency

2.3.1 Carbon emissions

The West Yorkshire Transport Strategy recognises that our transport network currently constrains opportunities for growth and is a key factor in shaping experiences of poverty, but also that our networks do not sufficiently support sustainable travel as the obvious choice for many.

This is reflected in the evidence that the transport sector is the largest emitter of damaging carbon dioxide in the region, with transport contributing 4.9 $MtCO_2e$/year (millions of tonnes of carbon emissions per year). Transport sector emissions are dominated by emissions from road transport with 4.4 $MtCO_2e$/year being from road transport[10], representing roughly 40% of total CO_2 emissions in West Yorkshire (11.1 $MtCO_2e$/year)[11]. Road transport emissions are dominated by emissions from private cars, vans and lorries - with conventional petrol and diesel internal combustion engines the dominant technology across all vehicle types.

In June 2019 the Combined Authority, in line with all the West Yorkshire partner councils and most Leeds City Region local authorities, formally declared a Climate Emergency. This declaration signals the Combined Authority and partner councils' ambition for the region to become net zero-carbon by 2038, with significant progress being made by 2030. The 2038 target was determined following work by the Tyndall Centre for Climate Change Research, which was commissioned to create a science-based carbon budget for the Leeds City Region that is consistent with the objectives of the UN Paris Agreement on Climate Change (Paris Agreement) and the Intergovernmental Panel on Climate Change (IPCC)[12].

The Combined Authority published, in July 2020, the findings of a Carbon Emissions Reduction Pathways (CERP) study[13]. This report, produced for the Leeds City Region and York and North Yorkshire local enterprise partnerships, is the first step in identifying the actions needed to create a net zero carbon economy.

While three pathways have been identified through the CERP work, there are several common actions identified in all the pathways, including a series of measures on transport. These modelled pathways all recognise the need for further modal shift to achieve the scale of reduction in carbon emissions from transport required to meet the ambitious net zero target and timeline.

Transport is therefore a critical sector for carbon emissions reduction across West Yorkshire requiring ambitious action that goes beyond current national policy and targets. The CERP asserts that this will require a significant shift in behaviour change and the fast adoption of low carbon technology.

At the time of publication, no further specific evidence on carbon emissions was available (pending release of West Yorkshire Combined Authority Emissions Reduction Pathway study and other work on carbon emissions), however **these influences, once understood, will be critical in understanding and prioritising connectivity requirements in future**.

2.3.2 Air quality

Partners across West Yorkshire, including the Combined Authority, the five district councils, and Public Health England, have developed the West Yorkshire Low Emissions Strategy (2016). The focus of the strategy is "tackling transport emissions as pollution from transport causes most local air quality problems".

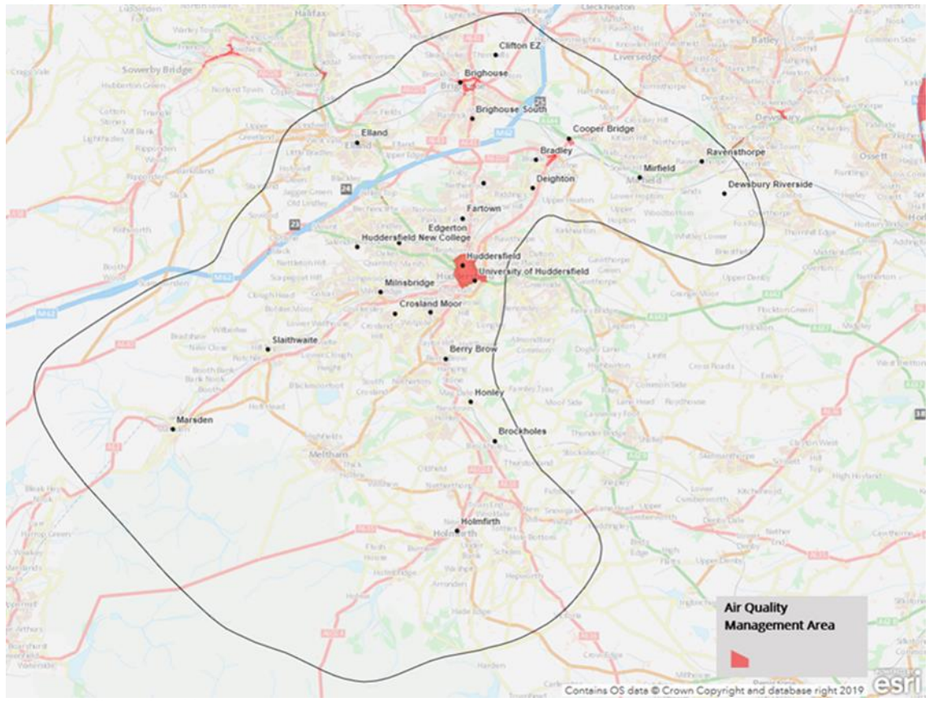
The strategy highlights that health effects associated with exposure to air pollution are significant; more deaths are caused by air pollution than preventable liver or respiratory disease. In West Yorkshire in 2013, 5.1% of all deaths (1 in 20 deaths) were caused by exposure to particulate air pollution with up to 6% in some local authority areas. Traffic in our urban centres and on busy roads results in levels of air pollution which have a significant impact on the health of the population, with those having underlying health conditions being most at risk. There are two pollutants of greatest concern: nitrogen dioxide (NO_2) and particulate matter (PM_n) which have an adverse impact on health and mainly result from emissions from traffic, particularly exhaust emissions from older diesel vehicles.

Nitrogen dioxide and particulate matter, together with other air pollutants, have been set an upper air quality limit value that the general population should not be exposed to that is legally binding in UK law. Since 1997 each local authority has been carrying out review and assessment of air quality in its area, and where it is found likely that national air quality objectives will not be achieved, an air quality management area must be declared[14].

Air quality management areas (AQMAs) are predominantly focused in the key urban areas of Huddersfield and Brighouse. Further AQMAs in the corridor are located on the A629, connecting Huddersfield to the M62 junction 24, and at Bradley and Cooper Bridge to the north east of Huddersfield. Figure 12 highlights the AQMAs within the corridor.

Facilitating sustainable modes of transport will reduce car use, enabling a consequent reduction in traffic congestion and the associated emissions that cause air pollution and poor air quality.

Figure 12: Air Quality Management Areas (AQMAs)



Source: Mott MacDonald

[10] West Yorkshire Combined Authority, 2020. West Yorkshire Carbon Emission Reduction Pathways Key Findings Report. Available at: https://westyorkshire.moderngov.co.uk/documents/s16572/Item%2011%20-%20Appendix%201.pdf

[11] ibid

[12] ibid

[13] ibid

[14] Department for Environment Food & Rural Affairs at https://uk-air.defra.gov.uk/aqma/ accessed in October 2020

2.4 Delivering 21st Century Transport

2.4.1 Active modes

The ability for people to cycle and walk more safely, and more often, has a significant role to play in the wider strategic transport network in West Yorkshire.

The off-highway network in the Calder Valley is of a relatively high standard, with improvements ongoing to the City Connect/ NCN 66 route between Brighouse and Todmorden. This includes the Rochdale Canal towpath between Todmorden and Sowerby Bridge, linking through Hebden Bridge and Mytholmroyd, and the Calder and Hebble Navigation towpath from Sowerby Bridge via Elland to Brighouse. A spur route along the Hebble Trail from Salterhebble provides a link towards Halifax.

Phase 4 of the West Yorkshire Plus Transport Fund A629 corridor scheme is developing proposals to provide a link from the Calder and Hebble towpath at Elland southwards via Ainley Top to Huddersfield. In Kirklees there remains a significant barrier to active travel at Cooper Bridge. The creation of a Bradley to Brighouse Greenway is under development through the CityConnect programme. The A62 into Huddersfield, which has some cycle lanes, is the subject of a West Yorkshire Transport Fund project to deliver a smart corridor, which will see some segregated provision, although junctions and vehicle capacity along the route may remain a barrier. A segregated cycle route runs parallel to the A62 between Dalton, Deighton and Fartown, although some stakeholders observed it is infrequently used. The Meltham Greenway also provides the opportunity for a traffic-free route between Meltham and Huddersfield through Netherton on the alignment of the disused railway line. Figure 13 identifies the absence of provision to the south of Huddersfield town centre to the Colne and Holme Valleys. Although some improvements have been made to the canal towpath between Milnsbridge and Huddersfield, with a 3.7km route created through the CityConnect programme, further up the valley between Milnsbridge to Marsden there is little provision, either on or off the highway. The canal towpath does provide an opportunity and is the subject of a feasibility study being developed by Sustrans.

Route 68, part of the National Cycle Network, does not provide a realistic route for many people by bike or on foot. The route is presently along rural roads and tracks, with challenging topography and the barrier of the M62.

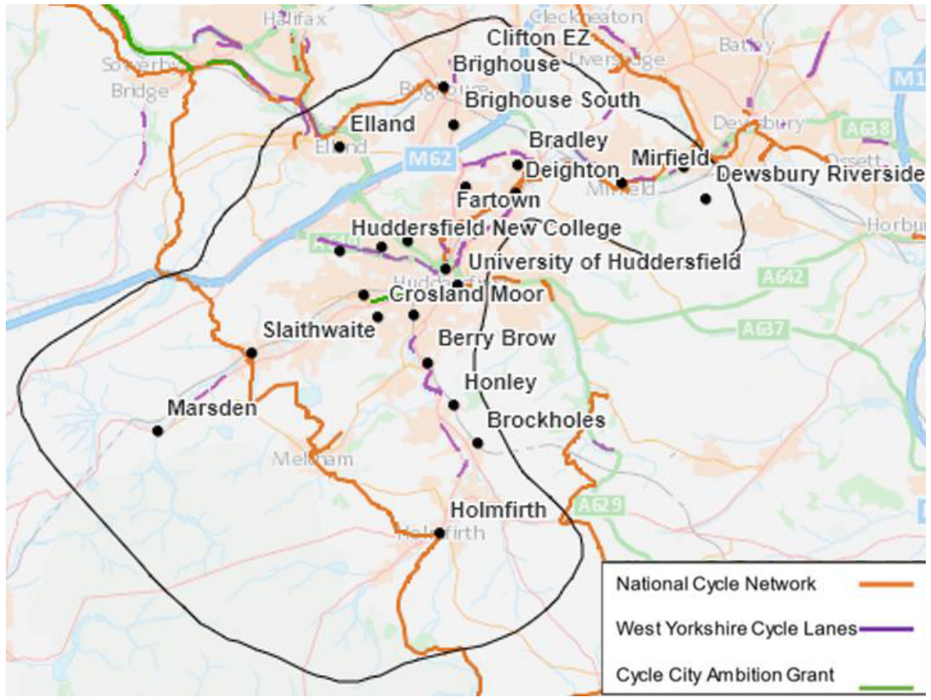
For travel from the Holme Valley there is little off or on-highway provision for travel by bike, and provision to the south of Huddersfield from outlying areas such as Waterloo and Lockwood also has an absence of on-highway facilities.

For people trying to travel by foot and to access the public transport network, the road network creates a significant barrier in this corridor. There is an absence of crossing points, particularly around the Huddersfield ring road, which create severance for communities to make local journeys by foot.

Nevertheless, the valleys in this area lend themselves to providing opportunity for people to travel by bike, and on foot. The popularity of travelling by bike for leisure is particularly strong throughout this corridor.

The area has good potential for an increase in the use of active travel modes. Investment in better infrastructure particularly around town centres will improve connectivity to current and future employment and education opportunities within the corridor.

Figure 13: Cycle network



Source: Mott MacDonald

2.4.2 Bus

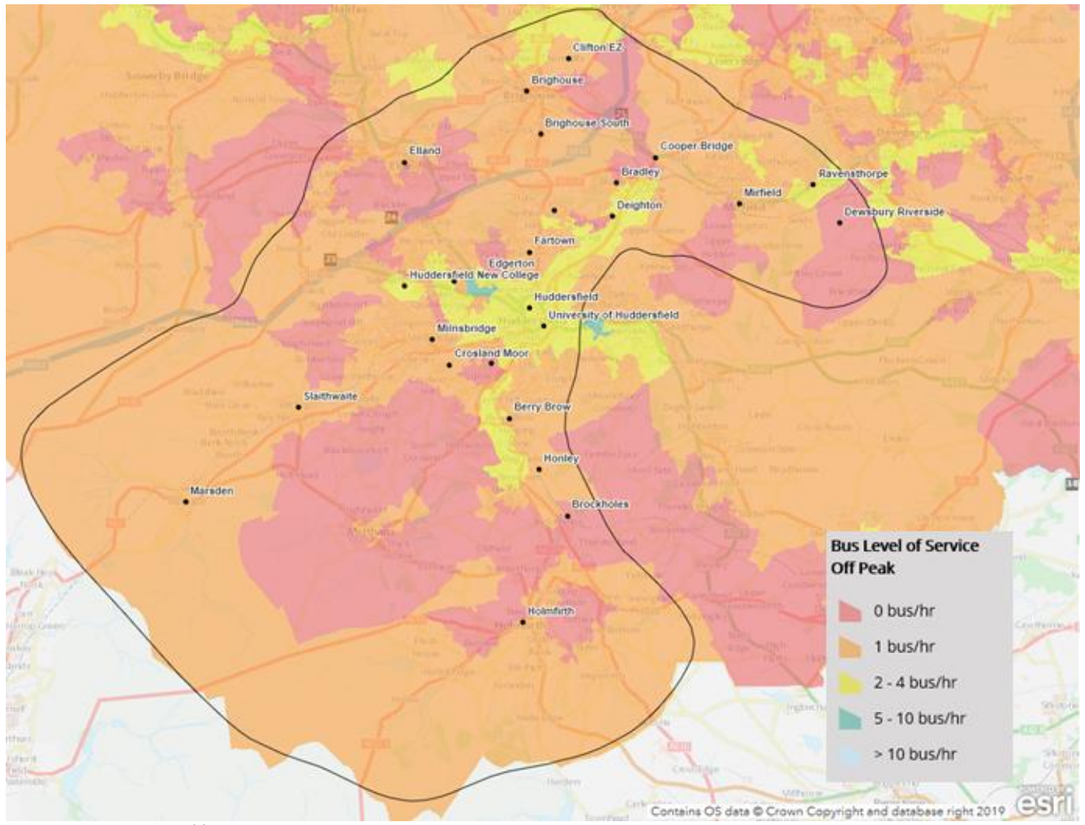
Figure 14 shows levels of bus service during the off-peak period in the corridor. This uses information about service frequencies across all routes at individual bus stops and calculates an average level of service across census output areas. This helps to characterise areas by their level of accessibility alongside comparable socio-economic characteristics outlined in earlier sections.

For the purposes of this study, bus service data was not collected for the South Yorkshire or Greater Manchester areas. Most of the corridor is served by just one bus per hour or less, as shown in the orange and red. This includes Elland and Cooper Bridge, which are both employment growth zones and the housing development sites at Brighouse, Brighouse South and Dewsbury Riverside. This pattern limits access to the manufacturing and wholesale and retail trade job opportunities, which are likely to operate irregular working hours and leaves limited opportunities to travel for people without access to a car, often to a restricted number of locations.

Excluding those outside West Yorkshire, around 55,000 people in the corridor (22%) have no access to a bus service outside of peak periods and 151,000 people (60%) have access to just one bus per hour.

There are areas with good bus services and connectivity in Huddersfield on some of the radial corridors from the town centre, such as the A616 and A62. However, journey times, reliability and affordability all impact on patronage (see Section 2.1.2).

Figure 14: Bus level of service – off-peak



Source: Mott MacDonald

2.4.3 Rail

The current passenger rail network (see Figure 15) consists of:

- The Huddersfield (Diggle) trans-Pennine main line: Leeds via Dewsbury to Huddersfield and Manchester
- A connection from Dewsbury and from Huddersfield to Brighouse and Elland, and on to Halifax or the upper Calder Valley line, with current services operating from Leeds via Dewsbury and Brighouse to the Upper Calder, plus from Huddersfield via Brighouse to Halifax and Bradford
- Limited services linking Bradford and Halifax via Mirfield to Wakefield and on to London; plus also a local Huddersfield – Wakefield Kirkgate – Castleford service
- The Penistone line, linking Huddersfield via Denby Dale, Penistone and Barnsley to Meadowhall and Sheffield.

Service levels are variable, with some stations on the main Diggle line receiving up to 6 trains per hour (for example, Huddersfield to Leeds), but very many stations (such as Brighouse, Deighton, Ravensthorpe, plus all of the Penistone line, as well as off-peak at Slaithwaite and Marsden) see only hourly services. The Huddersfield – Halifax/Bradford service is felt by partners to be particularly unsatisfactory in this respect. In general, fast services operate at high frequencies (with links through to the wider intercity network), with local services being less satisfactory. On Sundays the difference between intercity and local service levels is particularly marked, with no trains at all on the Leeds – Dewsbury – Brighouse – Calder Valley – Manchester route or between Huddersfield and Wakefield / Castleford.

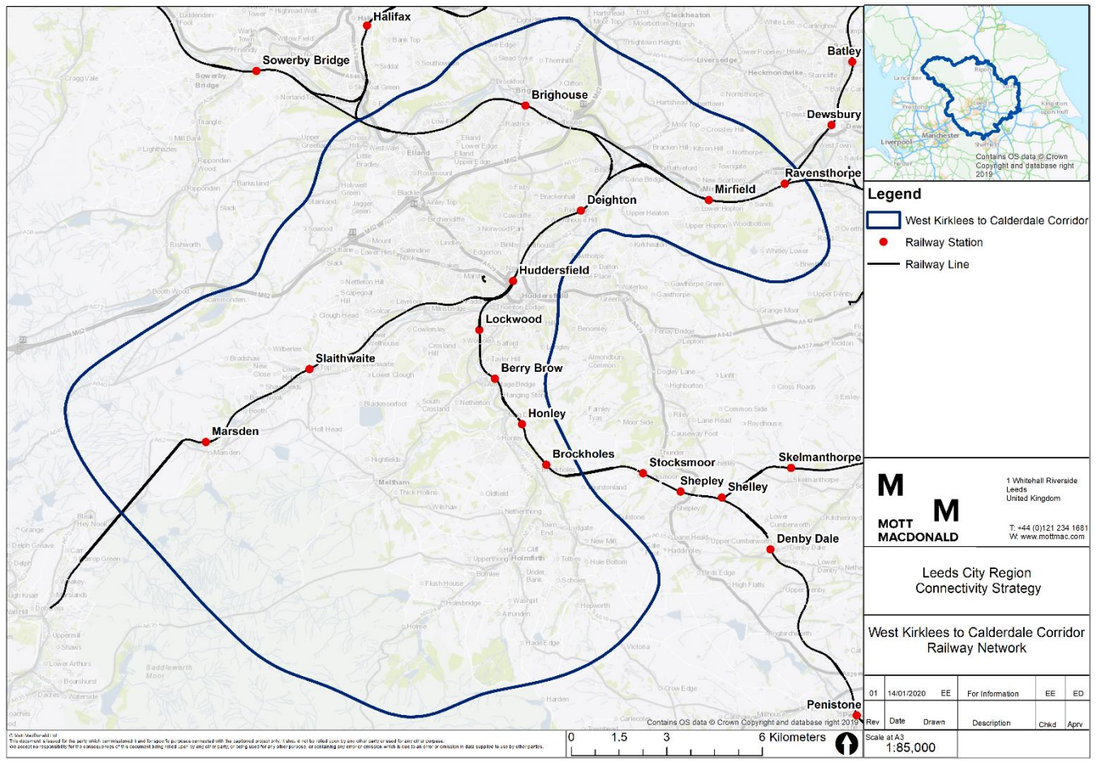
The main freight flows in the corridor at present operate to/from Manchester via the Calder Valley and Wakefield. Partners have highlighted that a lack of network capacity for additional freight across the Pennines is preventing more freight from operating by rail, which could otherwise reduce hauliers' reliance on the M62 motorway.

A connectivity gap identified by partners is that between Huddersfield and the Upper Calder Valley, where there are no direct rail services at present, and connections (via interchange at Brighouse or Halifax) are poor and/or unreliable. In addition, partners have flagged the possibility of new stations on the existing network such as at Bradley and Golcar/Milnsbridge.

Other challenges for rail services in the study area at present include severe overcrowding of trains on many routes[15]; poor journey times on the Penistone line; poor performance (reliability and punctuality) [16]; severe network capacity constraints; a total reliance on diesel traction in the absence of electrification; variable station facilities and accessibility[17]; in some cases poor access between stations and the communities they serve; and limited integration both between rail services and with buses. There is strong support for the proposed upgrade of the Trans-Pennine route, with a view that this must include full electrification, journey-time improvements, line capacity improvements, longer trains and provision for regular freight trains[18].

While this report makes recommendations that are directly or indirectly relevant to rail, most rail content will be picked up separately in WYCA's Rail Strategy work. That Rail Strategy sits alongside these Case for Change reports, informed by them and informing them, and this report should be read in conjunction with the WYCA Rail Strategy.

Figure 15: Current Rail Network



Source: Mott MacDonald

[15] WYCA passenger counts and surveys

[16] Office of Rail and Road Passenger Rail Performance

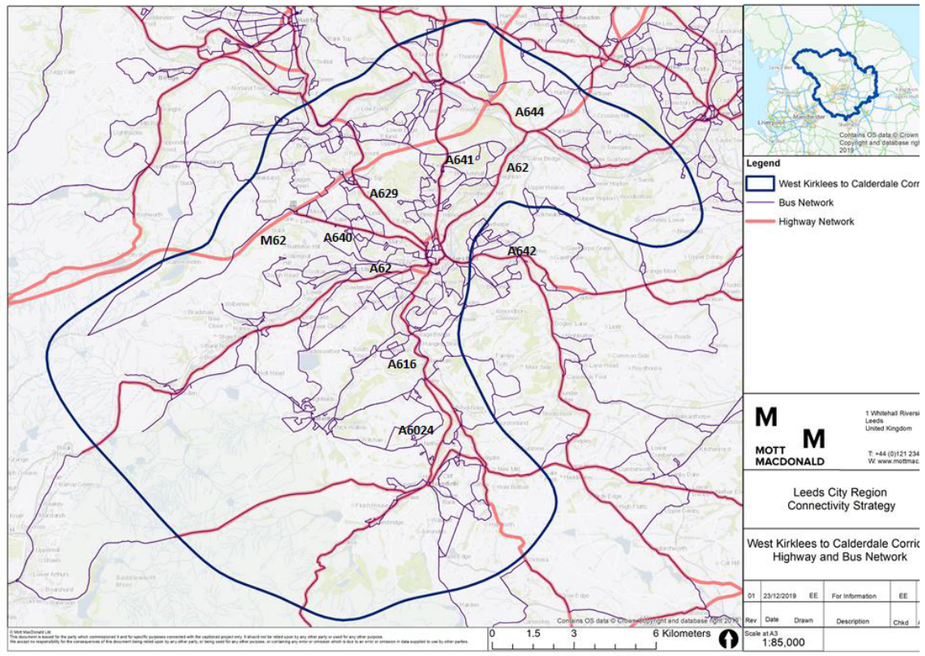
[17] National Rail Passenger Service ratings, partner (plus stakeholder, user and political) feedback

[18] Partner (plus stakeholder, user and political) feedback

2.4.4 Road

Figure 16 presents the road and bus networks throughout the corridor. The strategic road network includes the M62. The A62 runs south west-north east across the corridor. Other key roads provide north-south connectivity through the corridor including the A629, A641 and A6024/A616.

Figure 16: Current bus and highway network (A roads and motorway network)



Source: Mott MacDonald

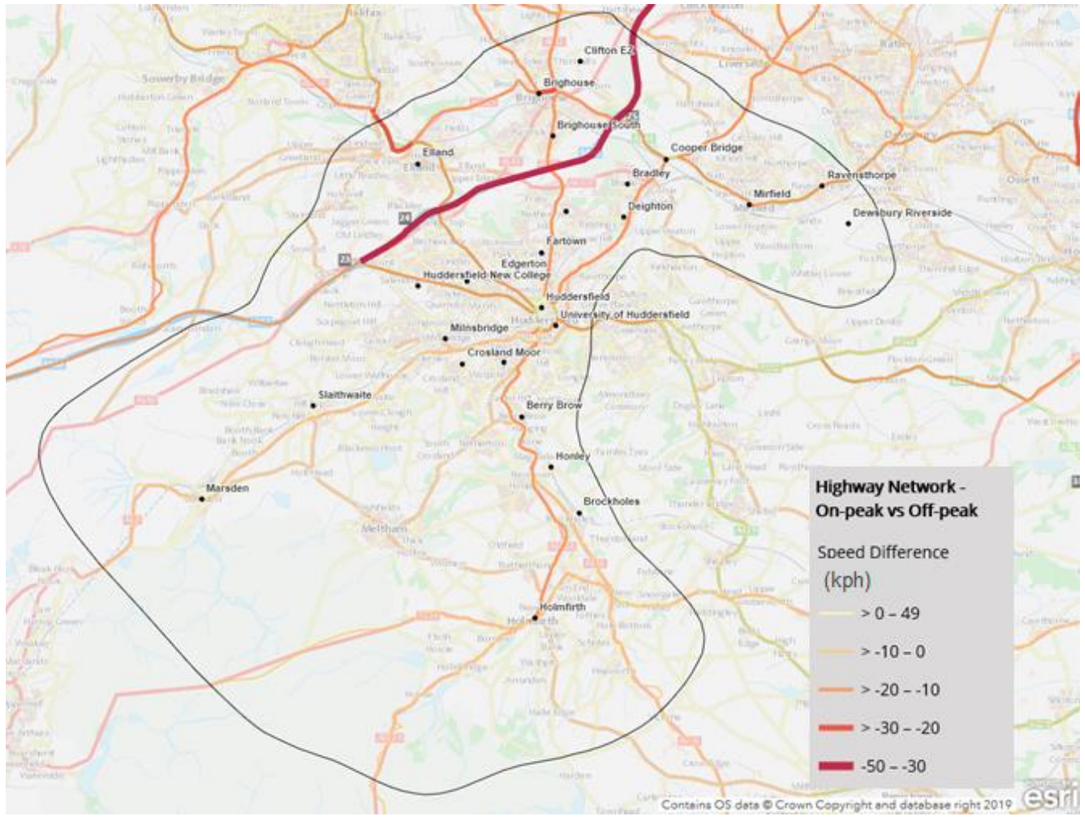
2.4.4.1 Highway network performance

Figure 17 shows the speed difference (kph) on the highway network between the peak and off-peak.

Capacity constraints on the motorway network and its junctions limits access to employment opportunities and further growth in areas adjacent to the M62. There is a large reduction in peak speed along the M62 (junction 23 to junction 26) as well as peak speed reductions on roads into Huddersfield including the A640, A629, A641, A62 and A616, slowing connections in and out of Huddersfield and impacting on the AQMA.

Introducing more opportunities to travel to these areas via public transport will help to reduce capacity constraints on the road network, reduce air pollution and enable inclusive growth.

Figure 17: Highway network on-peak vs off-peak speed difference



Source: Trafficmaster

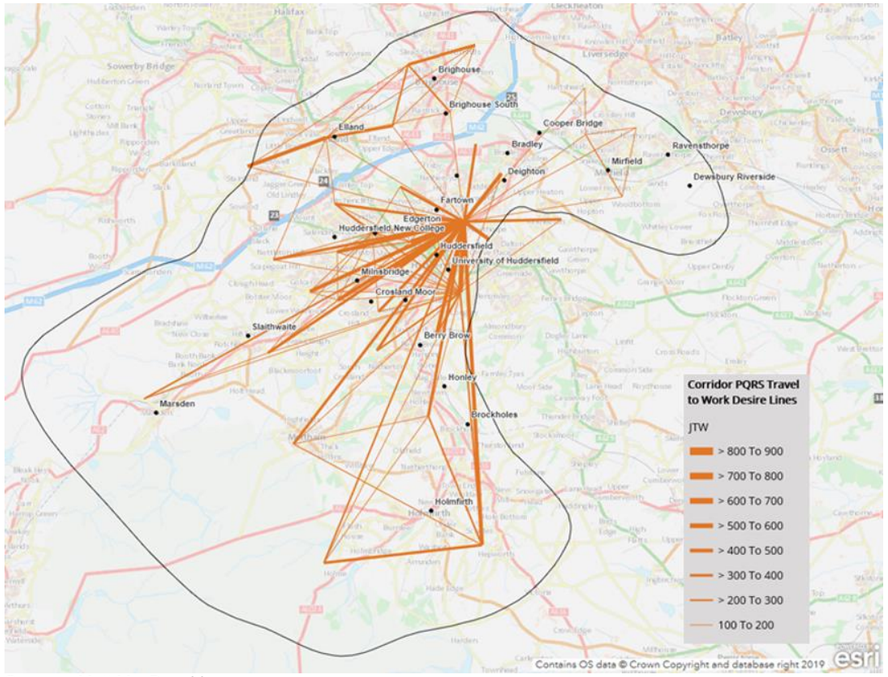
2.4.5 Patterns in transport demand

Figure 18 shows the key movements in the area (in the form of journey to work desire lines – person daily trips to work, Census 2011). These are focused on travel into Huddersfield Town Centre and some smaller movements into Elland and Brighouse. There is limited movement between Huddersfield and Elland or Brighouse.

Figure 19 and Figure 20 show new housing and employment sites, and the current travel to work patterns. Housing growth is focused at Bradley (1900 dwellings), Mirfield (720 dwellings) and Huddersfield (1500 dwellings). There are also development sites at Brighouse (2000 dwellings), Brighouse South (1260 dwellings), and Dewsbury Riverside (2500 dwellings). Key employment sites include Elland (17ha), Clifton Enterprise Zone (25ha) and Cooper Bridge (46ha). These sites are likely to have a significant effect on travel patterns; it is crucial to connect these places with a range of travel choices to ensure inclusive growth.

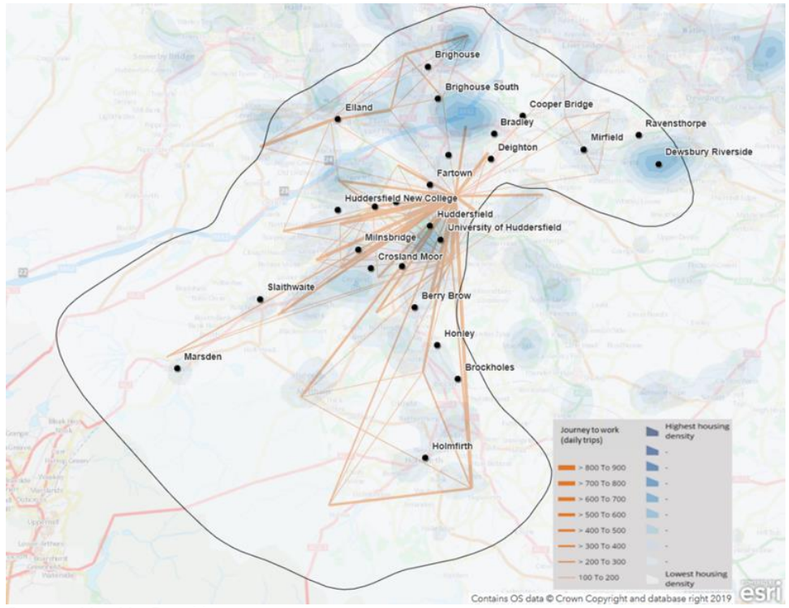
These figures illustrate that there is value in improving connectivity in this area, in order to broaden these limited travel horizons and ensure current and future residents and employees benefit from the growth opportunities that will become available. They also illustrate the potential for travel patterns to change, where demand is likely to increase, and where investment needs to be made in order to connect people to these new growth sites. This is explained in further detail in Chapter 4.

Figure 18: Journey to work desire lines



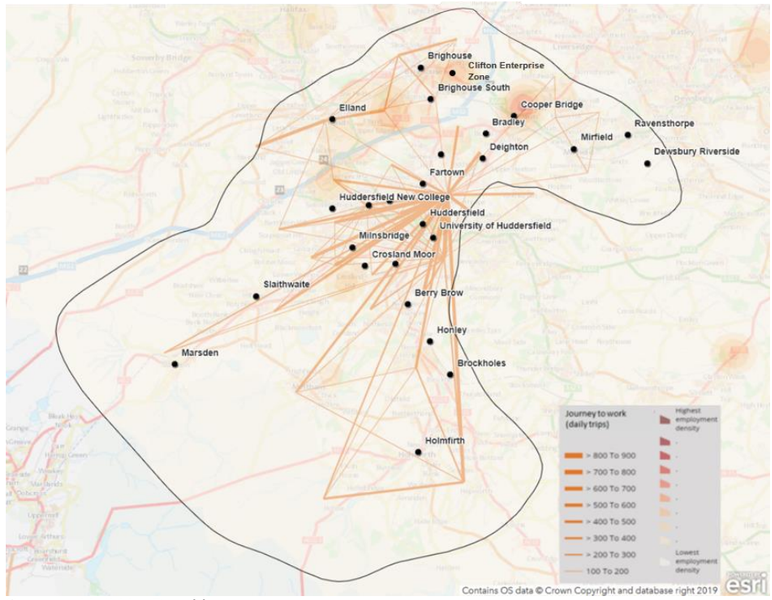
Source: Mott MacDonald

Figure 19: Future housing growth and current travel to work lines



Source: Mott MacDonald

Figure 20: Future employment growth and current travel to work lines



Source: Mott MacDonald

2.5 Summary

To enable **inclusive growth**, improved connectivity is needed to provide better access to work for people in communities within the corridor, including in Deighton, Fartown and Elland. These communities are characterised by low employment and skills prospects, low household income (up to 34% below national average) and low car ownership, with several areas being within the top 10% of most deprived communities in the UK.

Employment prospects in the area are focused on the wholesale and retail trade and storage and distribution sectors. The manufacturing sector also plays an important role. Many of these prospects rely heavily on car access, and yet, there are several communities that lie within the corridor which are characterised by low car ownership including central Huddersfield (more than 50% of households do not own a car), Brighouse and Elland (27-49% of households do not own a car).

There is therefore a disconnect between jobs located in places that have poor access for people without a car and communities with low car ownership. To improve the prospects of these communities, and to **boost productivity**, employment opportunities must be better connected to communities of the greatest economic need.

There is also a skills gap. Deighton and Fartown are in the top 10% deprived areas for education in England. Improving connectivity to education opportunities will help close this skills gap and help people to find better employment, contributing to opportunities for everyone in the area. Improving productivity through better connectivity to employment and skills will also help improve broader economic indicators.

Several areas suffer from poor air quality particularly in the urban areas of Huddersfield and Brighouse. To help **tackle the climate emergency** and achieve carbon emission targets, congestion and traffic levels on the strategic links into and around these centres must be addressed. Options for travel that has lower carbon emissions must be improved, both through cleaner public transport options and an expanded active travel network.

The Connectivity Plan for this area will focus upon **delivering 21st century transport** that connects the places of greatest economic need to employment and skills opportunities through greener modes of transport. Ensuring cleaner, greener modes are used will contribute to achieving a zero-carbon economy in the City Region.

The focus should be on:

- Strategic trips connecting employment and education opportunities to the rest of the corridor
- Strategic trips within and between West Kirklees and Calderdale
- Localised trips to key transport and employment hubs, such as Brighouse and Huddersfield.

Four summary maps have been created to summarise the spatial context highlights for each of the regional priorities. These are show in **Appendix A**.

3 Corridor aspirations

The following section outlines the processes through which the corridor aspirations have been defined, and how they link to the evidence base and local policy.

Please refer to Chapters 4 and 8 of the Appraisal Handbook for details of how the West Yorkshire Connectivity Plan core objectives have been derived from key policy drivers and how they and corridor-specific aspirations are used in the development of the Case for Change.

3.1 Defining objectives

The core objectives have been derived from strategic visions and ambitions from policy and have been agreed with the West Yorkshire Combined Authority. They ensure that the West Yorkshire Connectivity Plan supports the delivery of the long-term vision for the Leeds City Region – as identified in the LCR HS2 Growth Strategy – as well as the priorities and ambitions outlined in the Strategic Economic Plan (SEP), the LCR HS2 Connectivity Strategy, and the West Yorkshire Transport Strategy 2040. These objectives are applicable to all inclusive growth corridors.

Corridor-specific aspirations have been developed from the key issues, opportunities and priorities identified in the workshop with local officer representatives. These aspirations ensure that the interventions developed align with the priorities of Leeds City Region and its districts. Each intervention is assessed against both the core objectives and corridor-specific aspirations to ensure the best possible fit.

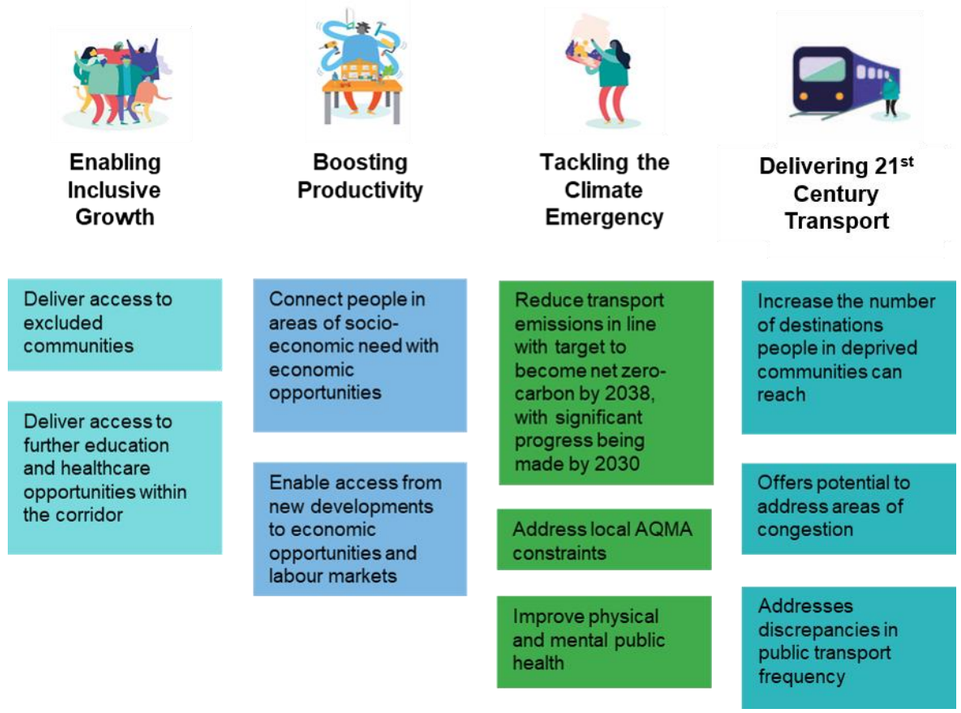
3.2 Core objectives

The West Yorkshire Connectivity Plan core objectives are aligned to the City Region's core priorities, as illustrated below:

The West Yorkshire Connectivity Plan 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

Figure 21: Alignment of the West Yorkshire Connectivity Plan core objectives to the City Region's core priorities



3.3 Corridor-specific aspirations

Drawing on the key issues and opportunities identified from the evidence base, corridor-specific aspirations have been agreed for West Kirklees to Calderdale, in consultation with stakeholders from Calderdale and Kirklees districts.

The West Kirklees to Calderdale Aspirations are to:

- Expand the walking and cycling network to improve opportunities to address public health challenges
- Ensure growth zones are fully integrated with the public transport network
- Ensure more deprived communities are connected to current and future job opportunities
- Improve connectivity to further education sites
- Reduce severance created by motorway/railway lines
- Address public transport frequency/capacity issues during the peak hours
- Improve public transport provision outside the peak hours
- Improve (generalised) journey times of interchanging passengers
- Improve the bus offering as a competitive mode of transport
- Improve access to the motorway network

These all align to current local policy documentation such as the Calderdale Transport Strategy (2016-2031) and Kirklees Local Plan (2019).

3.4 Measuring objectives

3.4.1 The appraisal process

The core objectives and corridor-specific aspirations provide the foundation of the West Yorkshire Connectivity Plan options appraisal process, alongside spatial analysis. Interventions are assessed against a set of criteria aligned with the objectives, and the spatial evidence base in a Geographical Information System (GIS) – such as whether the intervention connects to areas of deprivation and employment, housing and education sites. A description of the data that underpins this is detailed in Chapter 7 of the Appraisal Handbook.

The outputs are then fed into the Mott MacDonald's Investment Sifting & Evaluation Tool or "INSET" – this is a WebTAG-compliant decision support process, based on multi-criteria analysis. It enables 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.

INSET is like 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.

The appraisal is classified into four assessment themes, all linked to the core policy priorities. These are used to classify the core objectives and have specific scoring criteria – as shown in Table 3. The assessment themes also enable policy makers and scheme promoters to sift interventions that will meet specific policy drivers (e.g. economic growth, social, transport, environmental) enabling them to quickly respond to different funding opportunities as they come forward. Interventions can be assessed individually relative to other Business Case factors such as deliverability.

Table 3: Key themes for multi-criteria assessment

Core objective	Assessment theme	Scoring notes
• Deliver access to further education and healthcare opportunities within the corridor • Deliver access to excluded communities	**Enabling Inclusive Growth** 	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.
• Connect people in areas of socio-economic need with economic opportunities • Enable access from new developments to economic opportunities and labour markets	**Boosting Productivity** 	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.
• Reduce transport emissions in line with target to becomes net zero-carbon by 2038, with significant progress being made by 2030 • Address local AQMA constraints • Improve physical and mental public health	**Tackling the Climate Emergency** 	At the time of assessment, no quantifiable evidence on carbon emissions was available (pending release of West Yorkshire Combined Authority Emissions Reduction Pathway study and other work on carbon emissions) – therefore, based on the broad understanding that significant modal shift alongside fast adoption of low carbon technology will be required, it is assumed that all schemes would inherently contr bute to the decarbonisation agenda, unless they are road schemes. As a proxy, scoring was influenced by how many Air Quality Management Areas (where it can be reasonably assumed there will be action to tackle emissions from transport) and touchpoints with the National Cycle Network (which may positively influence mode shift to cleaner modes) the intervention connects to, as well as their performance against the Healthy Streets™[19] principles (again, an influence on positive mode shift to cleaner modes).
• Increase the number of destinations people in deprived communities can reach • Offers potential to address areas of congestion • Addresses discrepancies in public transport frequency	**Delivering 21st century transport** 	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

The multi-criteria analysis is done in three "sifts". These are summarised below and the sub-criteria and scoring approach for each is available in Chapter 8 of the Appraisal Handbook.

Sift 1: Early sift. This is based on the potential for the intervention to address the Core Objectives – it is simply scored using a Yes / No outcome against a series of sub-criteria, linked to the spatial data in GIS. 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 criterion or combination of criteria.

[19] 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.

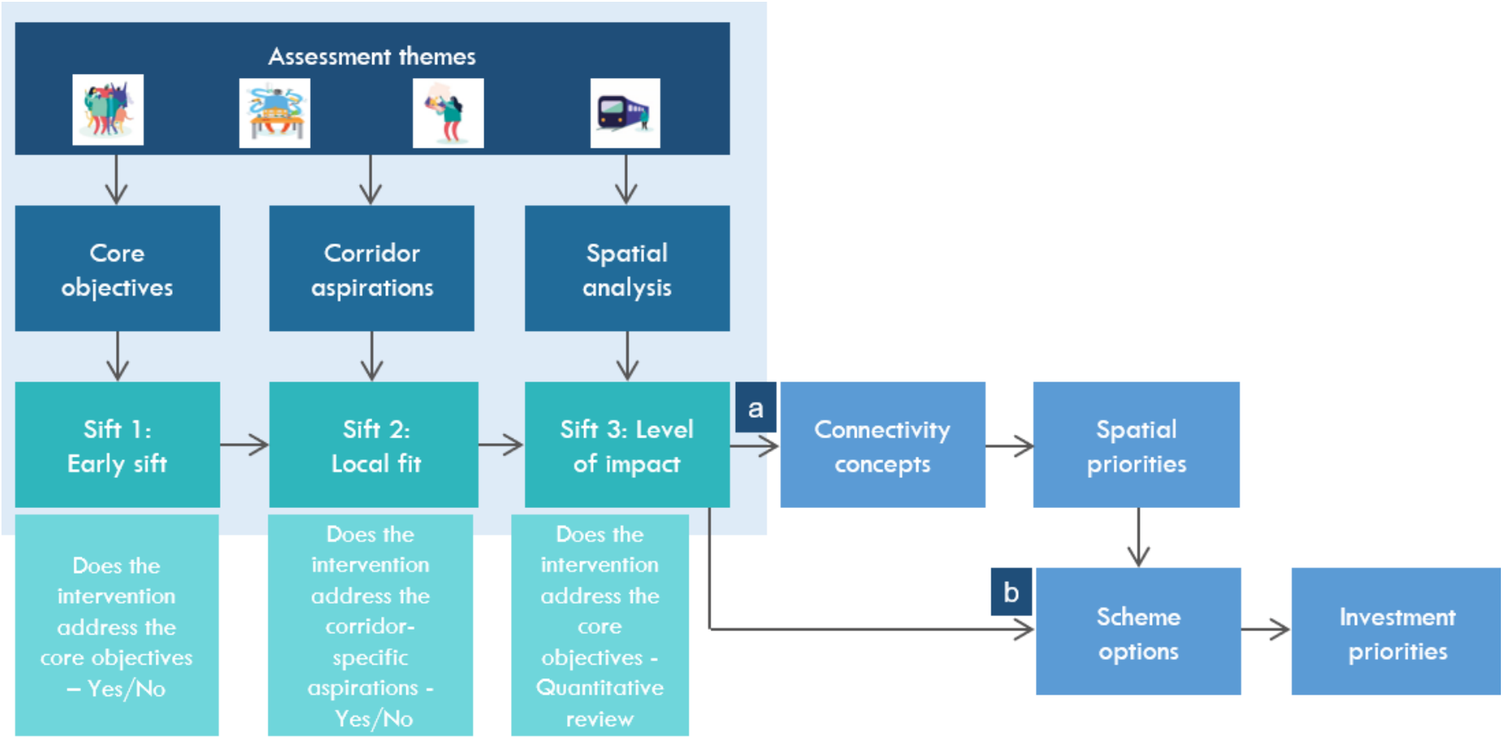
Sift 2: Local fit. This is based on the potential for the intervention to address the corridor-specific aspirations – again, it is simply scored using a Yes / No assessment by determining whether an intervention meets a certain criterion (or combination of criteria) and/or whether it is above or below a certain threshold for a given objective.

Sift 3: Level of impact. Like the first sift, this is based on the potential for the intervention to address the Core Objectives identified; 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.

The key outcomes from the appraisal are two-fold – (a) a set of spatial priorities determined from several "connectivity concepts" (mode agnostic connections between key places – described further in Chapter 4), and (b) investment priorities determined from several interventions.

The diagram below summarises the appraisal process:

Figure 22: Appraisal process



Source: Mott MacDonald

The core appraisal adopted for West Kirklees to Calderdale assumes that all assessment themes have equal weighting or 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.

Please refer to Chapters 8, 9 and 10 of the Appraisal Handbook for the detailed workings of option appraisal process and its outcomes.

4 Determining spatial priorities

In determining spatial priorities, the evidence base and stakeholder workshops enable identification of key **places to connect** and resulting connectivity requirements for the corridor's economic area. From this, **"connectivity concepts"** are defined. At this stage, connectivity concepts do not relate to a specific transport mode or a specific route alignment. However, they do 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 will allow further exploration of alignments, transport modes and specific interventions should they meet a series of key objectives.

4.1 Places to connect

Table 4 shows the key places to connect that have been identified, reflecting the inputs of partners and supported by the evidence base.

Key sections of the evidence base that have informed the identification of these places include:

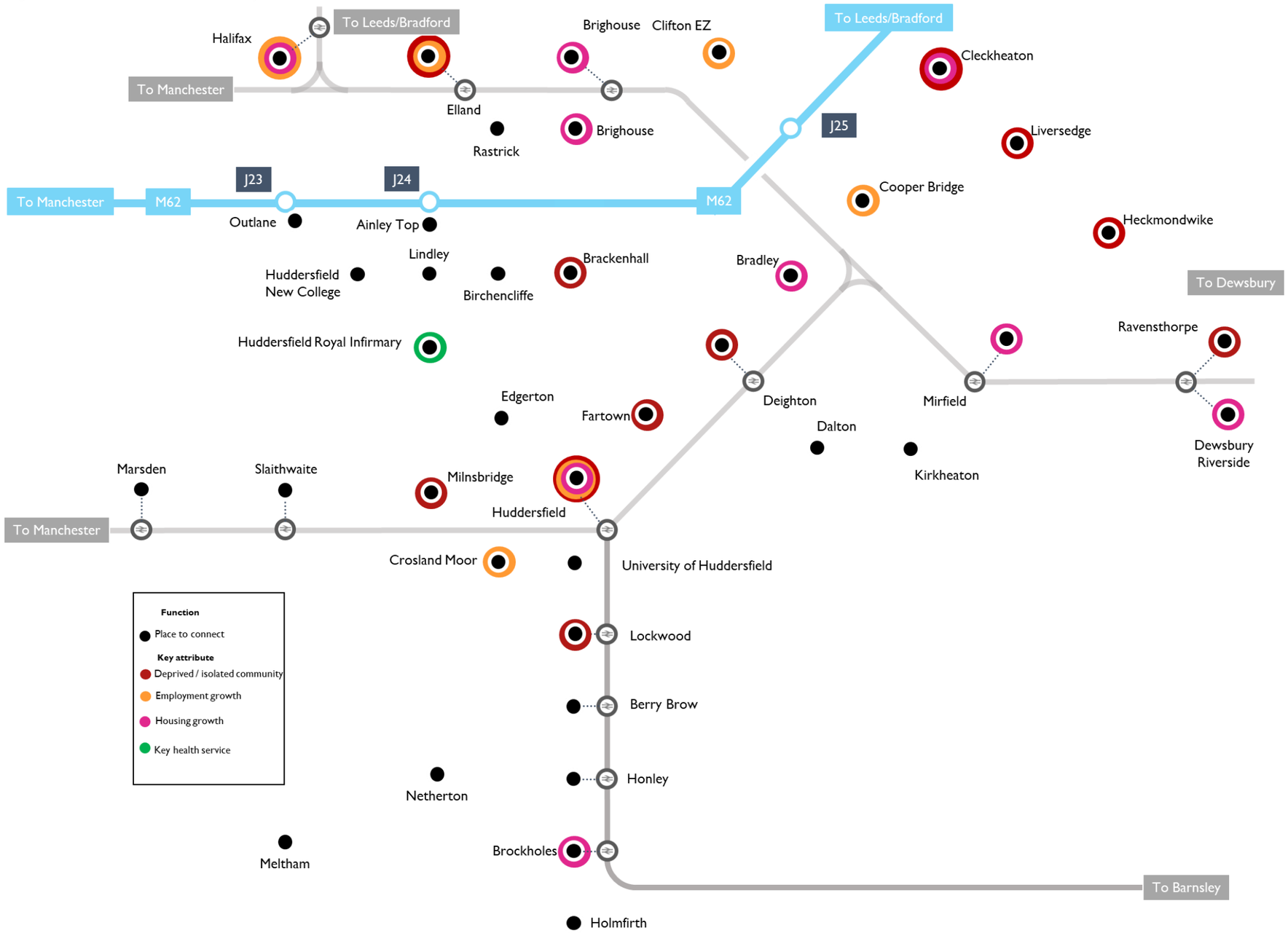
- Section 2.1.1: Deprivation
- Section 2.1.2: Isolated communities
- Section 2.2.1: Employment characteristics
- Section 2.2.2: Household income
- Section 2.2.3: Growth areas
- Section 2.4.3: Rail

The principal characteristic influencing the selection of each place to connect is also shown. Places include key settlements, transport hubs, housing and employment growth zones. These were identified on the "story map" for the West Kirklees to Calderdale corridor and are shown in Figure 23. There are low travel horizons north of Huddersfield. Improving connectivity between these places is fundamental to improving travel horizons throughout the corridor.

Table 4: Key places to connect

Key place	Characteristic	Scale / justification
Ainley Top	Bus network	Key settlement on bus network
Berry Brow	Rail station	Key settlement with a rail station
Birchencliffe	Bus network	Key settlement on bus network
Brackenhall	Area of deprivation	Within the top 20% deprived areas in England
Bradley	Housing growth zone	1,900 dwellings proposed at Bradley Golf Course as well as a further 50 dwellings throughout the settlement
Brighouse	Housing growth zone	Key settlement with a rail station. Approximately 2000 new dwellings allocated to the north east of Brighouse town centre (Thornhills Garden Village)
Brighouse South	Housing growth zone	Approximately 1260 new dwellings allocated (Woodhouse Garden Village)
Brockholes	Housing growth zone	Settlement with a rail station and 125 proposed new dwellings
Cleckheaton	Large housing growth zone and area of deprivation	Within the top 20% most deprived in England with over 100 units of housing growth
Clifton Enterprise Zone	Employment growth zone	Large employment area with 25ha of growth allocated
Cooper Bridge	Employment growth zone	Large employment area with 46ha of growth allocated
Crosland Moor	Employment growth zone	Employment area with 18ha of growth allocated
Dalton	Bus network	Key settlement on bus network
Deighton	Area of deprivation	Key settlement with a rail station. Within the top 10% most deprived in England
Dewsbury Riverside	Housing growth zone	Approximately 2500 new dwellings allocated, with further development including services and employment land
Edgerton	Key settlement	Key settlement within the corridor
Elland	Employment growth zone and area of deprivation	Settlement with a proposed rail station, approximately 17 hectares of employment land allocated and within top 20% most deprived in England.
Fartown	Area of deprivation	Within the top 10% most deprived in England and 44% of people are economically inactive in one area of Fartown
Halifax	Housing and employment growth zone	Key settlement with a rail station and 568 housing units across 8 sites
Heckmondw ke	Area of deprivation	Within the top 20% most deprived in England
Holmfirth	Key settlement	Key settlement within the corridor
Honley	Rail station	Key settlement with a rail station
Huddersfield	Principal town, housing and employment growth zone, area of deprivation	Key settlement with rail station. Approximately 1500 new dwellings and 4ha of employment land allocated within the town centre and within the top 20% deprived areas in England
Huddersfield New College	Educational establishment	Key education site within the corridor
Huddersfield Royal Infirmary	Health service	Key health service within the corridor
Kirkheaton	Bus network	Key settlement on bus network
Lindley	Bus network	Key settlement on bus network
Liversedge	Inclusive growth	Within the top 20% most deprived in England
Lockwood	Area of deprivation	Key settlement with a rail station. Within the 10% most deprived in England with a total annual household income of £27,800 within the MSOA
Marsden	Rail station	Key settlement with a rail station
Meltham	Bus network	Rural settlement connected to bus network
Milnsbridge	Area of deprivation	Within the top 20% most deprived in England
Mirfield	Housing growth zone	Key settlement with a rail station. Approximately 720 new dwellings
Netherton	Bus network	Rural settlement connected to bus network
Outlane	Bus network	Key settlement on bus network
Rastrick	Bus network	Key settlement on bus network
Ravensthorpe	Area of deprivation	Key settlement with a rail station. Within the top 10% most deprived with 45% of people having no qualifications in one area of Ravensthorpe
Slaithwaite	Rail station	Key settlement with a rail station
University of Huddersfield	Educational establishment	Key education site within the corridor

Figure 23: Places to connect – key attributes



Source: Mott MacDonald

4.2 Transport opportunities / existing connectivity improvements

There are several existing proposals scheduled for implementation within the corridor. Figure 24 presents a conceptual map showing the planned highway and active travel corridors and interventions as part of the West Yorkshire Plus Transport Fund (WYPTF) and "CityConnect" interventions funded by the Cycle City Ambition Grant (CCAG). These include several transport projects to improve connectivity on key routes as well as several proposals to enhance the appeal and access to rail, such as Huddersfield Station Gateway.

Figure 24 also shows the initial areas being included in the work to develop the Local Cycling and Walking Infrastructure Plan (LCWIP). LCWIP is a planning process and delivery is currently unfunded.

Table 5 provides a description of investment programmes currently scheduled to provide connectivity improvements throughout the corridor.

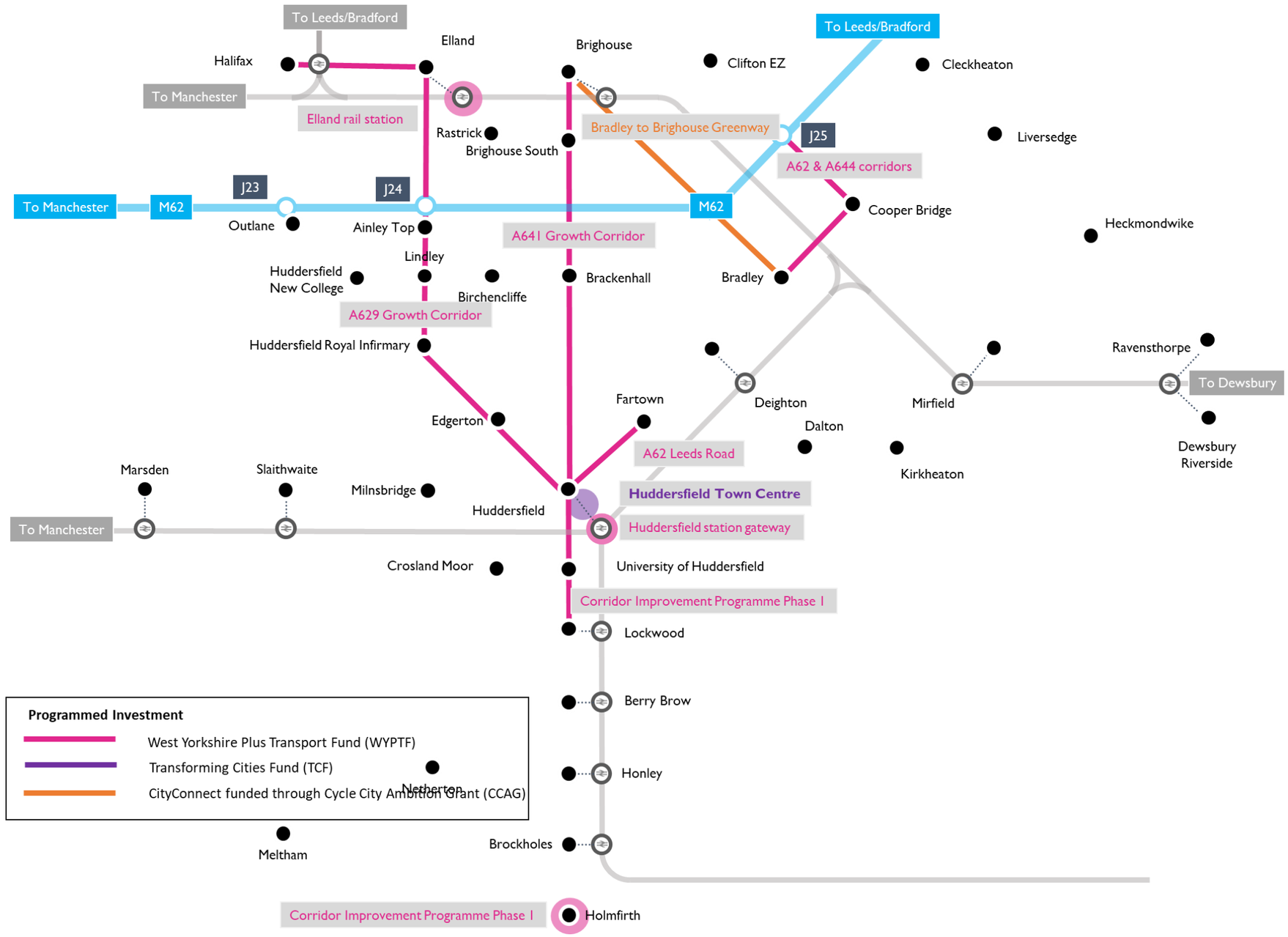
Table 5: Programmed investment

Programme	Scheme	Description
West Yorkshire Plus Transport Fund	A62 and A644 Corridors	Highway improvements and junction upgrades to relieve congestion in the Cooper Bridge area and additional capacity to unlock future housing and employment growth
West Yorkshire Plus Transport Fund	A62 Leeds Road	Upgrades to existing junctions between Huddersfield Town Centre and Old Fieldhouse Lane along with upgrades to the existing cycling provision and bus stop facilities
West Yorkshire Plus Transport Fund	A629 Growth Corridor	The A629 Halifax to Huddersfield Corridor Improvements is a £120.6m transport package comprising multi-modal interventions which will improve journey time reliability, through a combination of road space reallocation and targeted junction improvements
West Yorkshire Plus Transport Fund	A641 Growth Corridor	To improve efficiency and connectivity for all modes travelling along the corridor between Bradford, Brighouse and Huddersfield; enhancing accessibility to key growth sites, and facilitating economic development across Calderdale, Kirklees and Bradford
West Yorkshire Plus Transport Fund	Huddersfield Station Gateway	Regeneration of the rail station and its environs with works including additional Eastern entrances to provide better passenger access, improvements to the existing highway and the creation of a taxi hub off St George's Square, allowing public realm enhancements in the space vacated
West Yorkshire Plus Transport Fund	Elland Rail Station	New railway station; pedestrian, cycle and public realm improvements linking the station to Elland town centre; bus-rail interchange providing sustainable access to the station; dedicated station car park, associated highway access arrangements
West Yorkshire Plus Transport Fund	Corridor Improvement Programme	The Corridor Improvement Programme (CIP) is a three phased approach to delivering low to medium cost interventions on highway corridors on the key route network across West Yorkshire, to reduce congestion, improve journey times and unlock economic growth Identified CIP locations in the corridor (Phase 1) include: • Kirklees Southern Corridor – targeted interventions at Lockwood Bar, Longroyd Lane, Folly Hall and Queensgate to reduce congestion, improve air quality and improve conditions for cyclists and pedestrians • Holmfirth Town Access Plan – investment in improvements at key junctions which focus on reducing current and forecast congestion, improving journey time reliability and widening sustainable travel opportunities.
Cycle City Ambition Grant schemes	Bradley to Brighouse Greenway	The creation of a 6.5km cycling and walking route providing a strategic link between Bradley and Brighouse and to the National Cycle Network.
Transforming Cities Fund	Huddersfield Town Centre	Package of wa king, cycling and transport hub improvements to enhance access to the bus and train station.

Despite these already planned investments, there are further opportunities to better connect areas in Elland and Ravensthorpe to employment opportunities along the M62, ensuring that a wide range of prospects are available to these neighbourhoods.

Similarly, there are opportunities to better connect communities to the north of Huddersfield to local employment opportunities, as well as enhancing connectivity towards Calderdale.

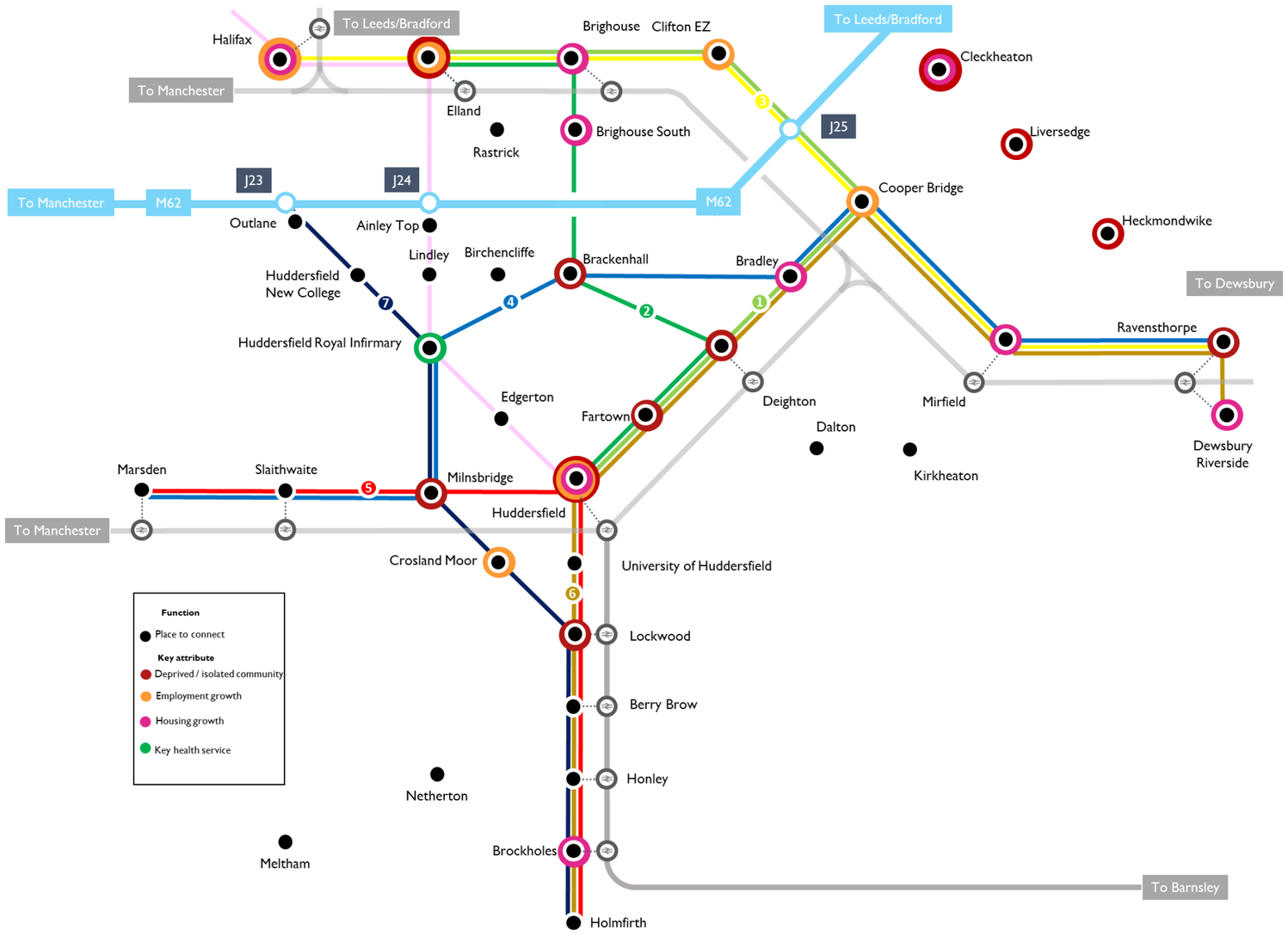
Figure 24: Programmed investment



4.3 Connectivity concepts

Based on the feedback from partners and the spatial analysis (which together provide an assessment of the current transport network and issues, future development plans and investment programmes), several "connectivity concepts" have been defined across the economic area, to demonstrate the need for improved connectivity between key places. At this stage, connectivity concepts do not relate to a specific transport mode or a specific route alignment. However, they do 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. Seven connectivity concepts have been defined for the West Kirklees to Calderdale corridor, plus one connectivity concept linking Halifax to Huddersfield that has been identified and analysed as part of the Calder Valley and Bradford corridor Case for Change Report. Some places not connected through the connectivity concept framework have been addressed in other strands of work such as the West Yorkshire Bus Network Review. The connectivity concepts identified are shown in Figure 25 with a brief narrative for each concept provided below.

Figure 25 Connectivity Concepts West Kirklees to Calderdale



Source: Mott MacDonald

1 – The Light Green Concept (Huddersfield to Elland via Cooper Bridge)

Concept function	Provides *strategic* connectivity
Summary	This concept provides a strategic connection between Huddersfield and Elland. It connects deprived communities such as Fartown and Elland to the economic opportunities along the M62, whilst also connecting to housing and employment growth around Cooper Bridge. It draws on the existing road network and using sustainable modes will help to alleviate air quality issues along these congested routes.

Enabling **Inclusive Growth**	Boosting **Productivity**	Tackling the **Climate Emergency**	Delivering **21st Century Transport**
• Connects deprived communities in Elland and in the north east of Huddersfield	• Provides connectivity to large employment growth site at Cooper Bridge and Clifton Enterprise Zone	• Offers the potential to make use of existing infrastructure to connect key places in a more sustainable and/or innovative way • Intersects with 4 of the corridor's AQMAs	• Draws on the connectivity provided by the existing strategic road network (M62 J25) and A644 • Improves connectivity to Huddersfield, Deighton, Brighouse and Elland rail stations

Indicative mode	Mass Transit / Bus Rapid Transit

2 – The Dark Green Concept (Huddersfield to Elland via Brackenhall)

Concept function	Provides *strategic* connectivity
Summary	This concept provides a strategic connection between Huddersfield and Elland. It provides connection to the housing growth to the south of Brighouse, whilst also connecting deprived communities such as Deighton and Fartown. This tackles connections across the motorway network and would help to alleviate air quality issues.

Enabling **Inclusive Growth**	Boosting **Productivity**	Tackling the **Climate Emergency**	Delivering **21st Century Transport**
• Connects deprived communities in Elland and in the north east of Huddersfield	• Connects with several housing growth sites including Brighouse South (Woodhouse Garden Village) and sites to the north of Huddersfield Town Centre • Connects to employment growth sites near Elland and Huddersfield Town Centre	• Tackles connections across the motorway network between Brighouse and Huddersfield, which currently contribute towards poor air quality	• Improves connectivity to Huddersfield, Deighton, Brighouse and Elland rail stations

Indicative mode	Mass Transit / Bus Rapid Transit

3 – The Yellow Concept (Ravensthorpe to Halifax via Brighouse)

Concept function	Provides *strategic* connectivity
Summary	This concept provides a strategic connection between Ravensthorpe and Halifax. In doing so it connects deprived communities with large housing and employment growth sites at Cooper Bridge and Clifton Enterprise Zone.

Enabling **Inclusive Growth**	Boosting **Productivity**	Tackling the **Climate Emergency**	Delivering **21st Century Transport**
• Connects deprived communities in Elland and Ravensthorpe	• Connects to large employment growth sites including Clifton Enterprise Zone and Cooper Bridge as well as a large housing growth site near Clifton Brighouse (Thornhills Garden Village) and several near Mirfield	• Improves connectivity on routes where congestion is an issue, such as the M62, A629 and A644	• Improves connectivity to Elland, Brighouse, Mirfield and Ravensthorpe railway stations

Indicative mode	Bus Rapid Transit / Bus

4 – The Blue Concept (Marsden to Ravensthorpe via Brackenhall)

Concept function	Provides *strategic* connectivity
Summary	This concept provides a strategic east-west connection between Marsden and Ravensthorpe. It connects deprived communities such as Elland and Ravensthorpe to the future economic opportunities at Cooper Bridge, along with access to Huddersfield Royal Infirmary.

Enabling **Inclusive Growth**	Boosting **Productivity**	Tackling the **Climate Emergency**	Delivering **21st Century Transport**
• Improves connectivity for deprived communities in Milnsbridge, Brackenhall and Ravensthorpe • Provides connectivity to Huddersfield Royal Infirmary	• Connects with a large employment site at Cooper Bridge and housing growth at Mirfield	• Provides connections that offer alternatives to the congested motorway network	• Provides a strategic connection east-west across the corridor • Improves connectivity to Marsden, Milnsbridge, Slaithwaite, Mirfield and Ravensthorpe railway stations

Indicative mode	Bus

5 – The Red Concept (Marsden to Holmfirth via Huddersfield)

Concept function	Provides *local* connectivity
Summary	This concept provides a local connection between Marsden and Holmfirth. It improves connectivity to the towns to the south and west of Huddersfield where housing growth is forecast, with the economic opportunities in Huddersfield itself.

Enabling **Inclusive Growth**	Boosting **Productivity**	Tackling the **Climate Emergency**	Delivering **21st Century Transport**
• Connects areas of deprivation to the south west of Huddersfield including Lockwood	• Connects with housing growth site in Huddersfield • Connects with employment growth sites in Huddersfield Town Centre	• Improves connectivity on routes where congestion is an issue, such as the A62 and A616	• Improves connectivity to seven railway stations including Huddersfield and Marsden

Indicative mode	Bus / Active travel

6 – The Gold Concept (Holmfirth to Dewsbury Riverside via Huddersfield)

Concept function	Provides *strategic* connectivity
Summary	This concept provides a strategic connection between Holmfirth and Dewsbury Riverside. It connects deprived communities such as Fartown and Lockwood to the employment opportunities at Cooper Bridge and in Huddersfield Town Centre, whilst also connecting to the housing growth at Dewsbury Riverside.

Enabling **Inclusive Growth**	Boosting **Productivity**	Tackling the **Climate Emergency**	Delivering **21st Century Transport**
• Improves connectivity for several deprived communities including Ravensthorpe, Deighton, Fartown, and Lockwood • Connects with Huddersfield University, a key education establishment and place to connect within the corridor	• Connects with employment growth sites including a large site at Cooper Bridge and some around Huddersfield Town Centre • Connects with several housing growth sites including the large development at Dewsbury Riverside	• Intersects with 3 of the corridor's AQMAs	• Connects with eight railway stations including Mirfield and Huddersfield

Indicative mode	Bus Rapid Transit / Bus

7 – The Navy Concept (M62 J23 to Holmfirth via Milnsbridge)

Concept function	Provides *strategic* connectivity
Summary	This concept provides a strategic connection from Holmfirth to M62 J23 drawing on the existing road network. It connects deprived communities such as Milnsbridge and Lockwood along with improving connectivity to housing growth in Brockholes and to the west of Huddersfield.

Enabling **Inclusive Growth**	Boosting **Productivity**	Tackling the **Climate Emergency**	Delivering **21st Century Transport**
• Connects deprived communities in Milnsbridge and Lockwood • Improves connectivity to Huddersfield Royal Infirmary and New College	• Connects to housing growth sites in Brockholes and to the west of Huddersfield • Connects with employment growth site at Crosland Moor	• Accords with 4 Healthy Street Principles	• Provides connectivity to Lockwood, Berry Brow, Honley and Brockholes railway stations • Provides a strategic north south connection across the corridor and connection to the M62

Indicative mode	Bus / Active travel

4.4 Appraisal outcomes

Our appraisal process (summarised in 3.4.1) has been applied to the seven connectivity concepts to define spatial priorities in the West Kirklees to Calderdale corridor.

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 6: 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 outcome of the prioritisation for the connectivity concepts is summarised in Figure 26.

Figure 26: Appraisal outcomes for connectivity concepts – ranked

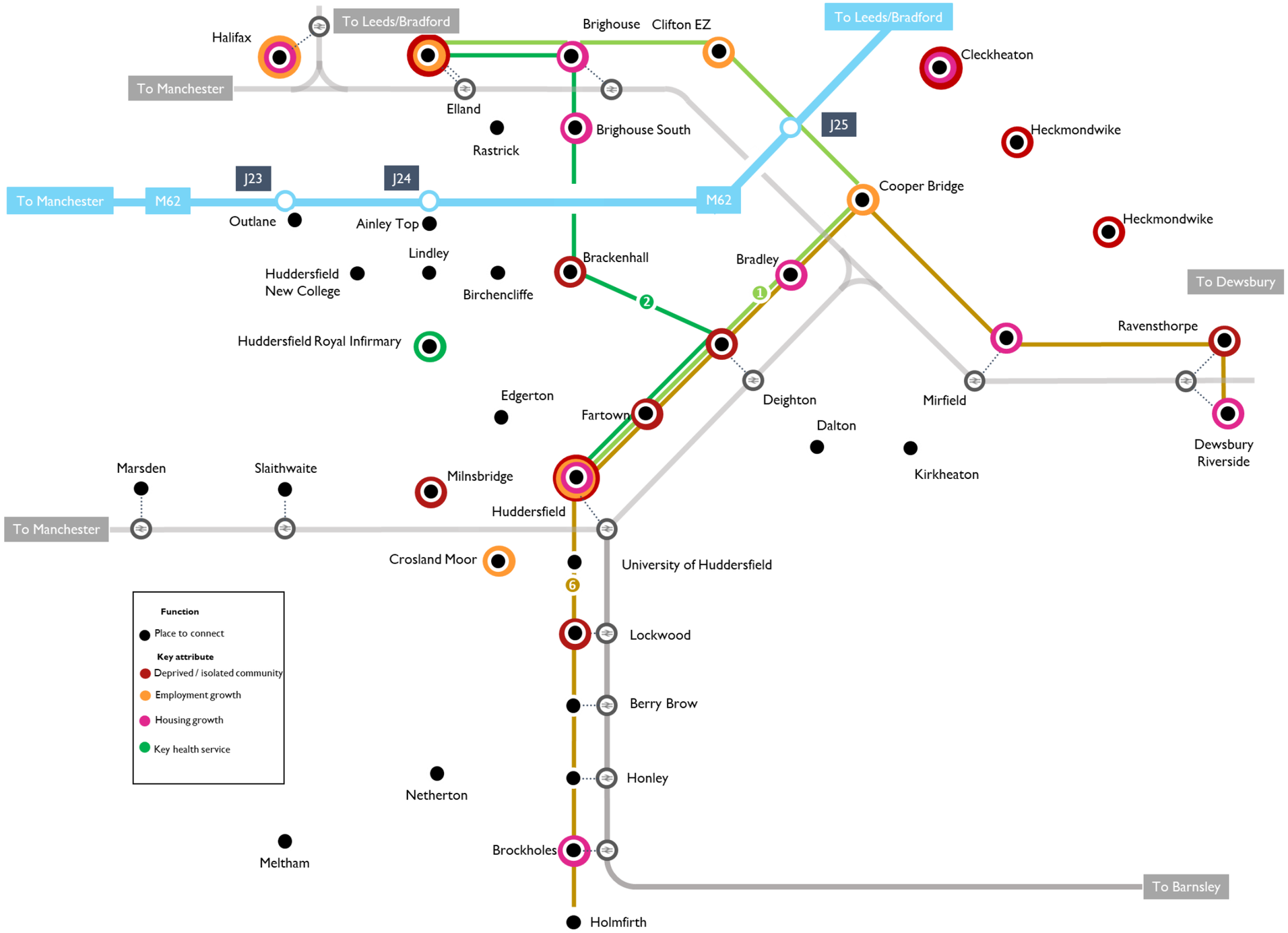
Rank	#	Connectivity concept	Sift 1: Early sift				Sift 1: Early sift Score	Sift 2: Local fit	Sift 3: Level of impact				Sift 3: Level of impact	Overall score
			Enabling Inclusive Growth	Boosting Productivity	Tackling the Climate Emergency	Delivering 21st Century Transport			Enabling Inclusive Growth	Boosting Productivity	Tackling the Climate Emergency	Delivering 21st Century Transport		
1	2	Dark Green Concept - Elland to Huddersfield via Brackenhall	Excellent	Excellent	Good	Excellent	Good	Good	Good	Fair	Good	Average	Average	Good
2	1	Light Green Concept - Elland to Huddersfield via Cooper Bridge	Excellent	Excellent	Good	Excellent	Good	Good	Good	Fair	Good	Average	Average	Good
3	6	Gold Concept - Holmfirth to Dewsbury Riverside via Huddersfield	Excellent	Excellent	Good	Excellent	Good	Good	Average	Fair	Good	Average	Average	Good
4	5	Red Concept – Marsden to Holmfirth via Huddersfield	Excellent	Excellent	Good	Excellent	Good	Good	Average	Fair	Average	Average	Average	Good
5	7	Navy Concept – M62 J23 to Holmfirth via Milnsbridge	Good	Excellent	Good	Average	Good	Good	Average	Fair	Good	Low	Fair	Average
6	3	Yellow Concept- Ravensthorpe to Halifax via Brighouse	Excellent	Average	Good	Excellent	Good	Average	Fair	Low	Good	Average	Average	Average
7	4	Blue Concept - Marsden to Ravensthorpe via Brackenhall	Excellent	Average	Good	Excellent	Good	Average	Fair	Low	Average	Fair	Fair	Average

Source: Mott MacDonald

Although many concepts were classified as "Good" overall, there is differentiation within the defined scoring range. Figure 26 highlights that the Dark Green, Light Green and Gold concepts demonstrated the best level of fit across all themes and sifts and therefore have the potential to produce the greatest benefit for interventions. Therefore, further analysis will focus on the **Dark Green**, **Light Green** and **Gold** concepts where additional infrastructure could be considered.

Overall, the Dark Green, Light Green and Gold connectivity concepts have been identified as the spatial priorities as they are the highest scoring concepts that address *connectivity requirements to and within the corridor*. These are shown in Figure 27. Delivering improved connectivity along these connectivity concepts will help to achieve inclusive growth across the Leeds City Region.

Figure 27: Prioritised connectivity concepts



4.5 Demand

An assessment has been undertaken using the Combined Authority's Urban Dynamic Model (UDM) to estimate the total peak hour trip demand along each of the prioritised connectivity concepts. This presents 2033 forecasts of demand using established assumptions of the development landscape.

A mode technology framework developed by the Combined Authority has then been used to identify what mode of transport might be appropriate based on having a suitable capacity per hour (see Table 7).

Please refer to Section 9.2.2 of the Appraisal Handbook for the detailed workings of demand estimation.

Table 7: Mode technology 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 centre/urban environments	
Demand Responsive Transport	5 - 12	800 -1,500 passengers	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 access bility needs – with very high density shopping patterns
Bus Rapid Transit	70 – 80	500 – 2,000 passengers	Limited stops outside of urban centres. 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:10-30 miles) with limited stops
Inter urban / national Heavy Rail	500 - 1000	Up to 12,000 passengers	Centre to centre fast and direct services

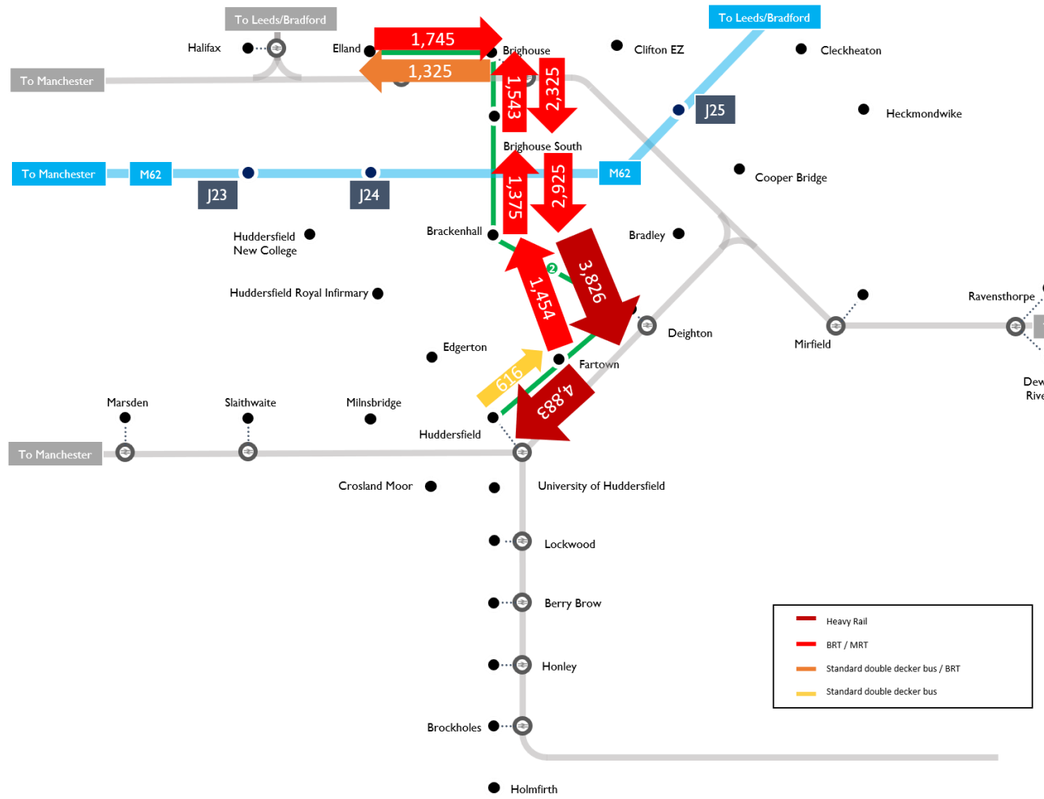
Source: West Yorkshire Combined Authority

The 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. The figures presented here illustrate

- Unconstrained demand that focuses on the potential of movement between places
- Aggregate flows between each place to connect within the connectivity concept
- Two-way flows to illustrate key attractors on the network
- Variations in demand between places to connect to demonstrate the range of services that could potentially be provided within each connectivity concept.

Figure 28 shows demand in 2033 along the highest scoring connectivity concept; Dark Green. This provides a strategic connection between Elland and Huddersfield. From Elland to Huddersfield, demand suggests the potential for mass transit modes including for example light rail or tram. Parts of this concept, between Fartown and Huddersfield, has demand high enough to support heavy rail. A rail service currently exists between Deighton and Huddersfield and so examining the potential for improved capacity here may be beneficial.

Figure 28: Dark Green Concept Option 2 – Demand 2033

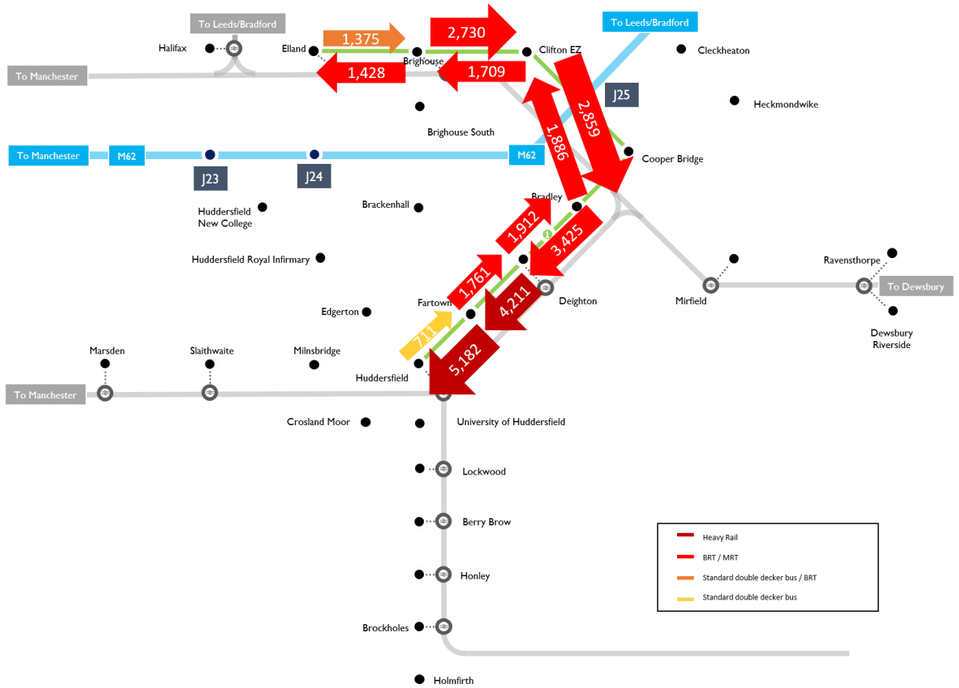


Source: Urban Dynamic Model (UDM)

Travelling northwards from Huddersfield to Elland, demand is on average slightly lower than southwards, suggesting the potential for Bus Rapid Transit (BRT). Demand is lowest when travelling from Huddersfield to Fartown indicating that a standard double decker bus may be more suitable.

Figure 29 shows demand between Elland and Huddersfield, via Cooper Bridge (the Light Green concept) in 2033. Like the Dark Green concept, demand is highest when travelling into Huddersfield. Between Elland and Bradley, demand levels indicate the potential for BRT or other mass transit mode. From Deighton to Huddersfield, demand increases enough to suggest the potential for heavy rail or mass transit; again, examining the potential for improved capacity

Figure 29: Light Green Concept – Demand 2033



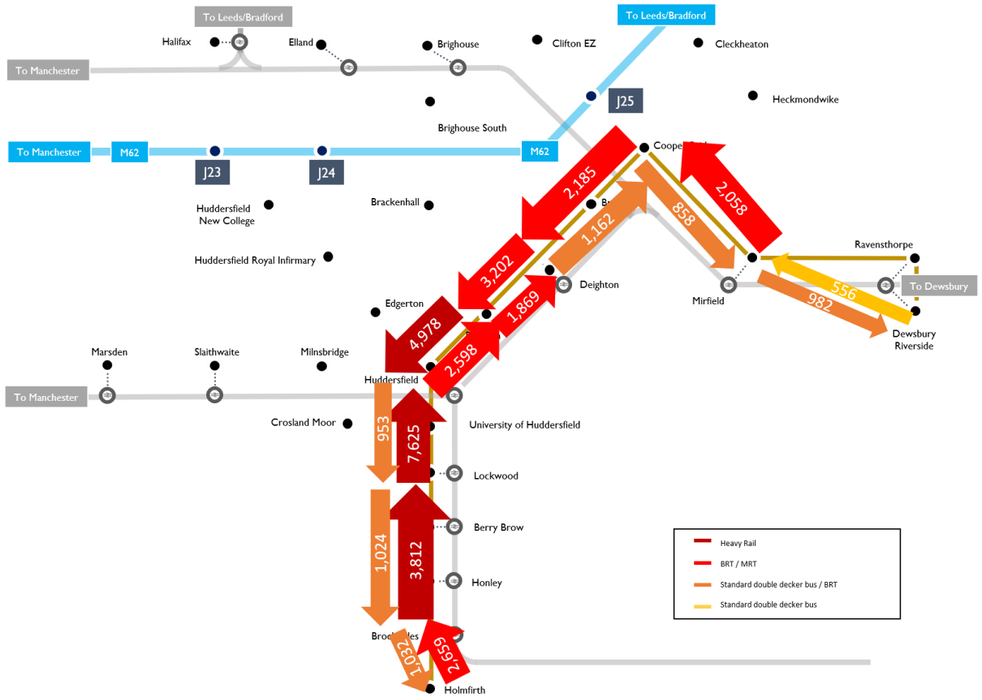
Source: Urban Dynamic Model (UDM)

here may be beneficial. The lowest demand element for the Light Green concept occurs from Huddersfield to Fartown, indicating that a standard double decker bus may be suitable.

Figure 30 shows demand between Holmfirth and Dewsbury Riverside (the Gold concept) in 2033. Demand is lowest between Dewsbury Riverside/Ravensthorpe and Mirfield, indicating that a standard double decker bus service may be suitable. Demand begins to increase from Mirfield to Huddersfield suggesting the potential for BRT or other mass transit mode. This spikes from Fartown to Huddersfield suggesting the potential for heavy rail, before dropping off from Huddersfield to Holmfirth with levels of demand suggesting the potential for BRT or standard double decker bus. Travelling northwards from Holmfirth into Huddersfield, demand is large enough to support heavy rail. Rail infrastructure already exists here so examining the potential for improved capacity here may be beneficial.

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 above.

Figure 30: Gold Concept– Demand 2033



Source: Urban Dynamic Model (UDM)

5 Conclusion: The need for intervention in West Kirklees to Calderdale

5.1 Introduction

This Case for Change presents the evidence and strategic narrative for investing in improved connectivity in the West Kirklees to Calderdale corridor.

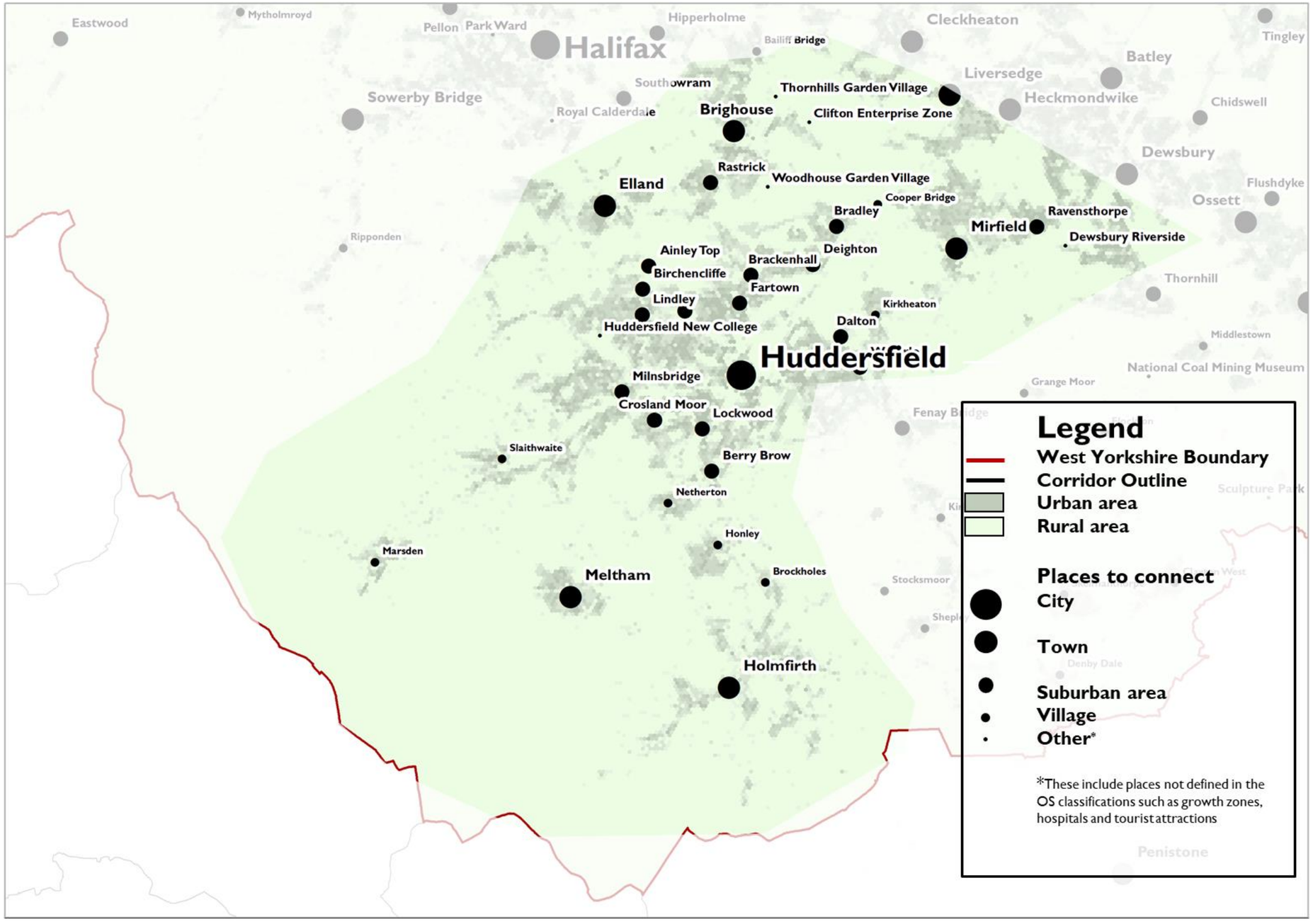
Through evidence review, and engagement from district partners, key places to connect have been identified, and a complementary series of connectivity concepts have been developed to show where there is greatest need to improve connections between people and places in the corridor. These places to connect have been used to support evidence gathering in other workstreams and are shown in Figure 31.

An appraisal of each of the concepts provides evidence to demonstrate which connectivity concepts have the greatest potential to enable inclusive growth, boost productivity, tackle the climate emergency, and deliver a 21st century transport system. The connectivity concepts prioritised through this process focus on making connections between communities across the corridor; including Lockwood, Fartown, Elland and Ravensthorpe and emerging economic opportunities in Calderdale such as the Clifton enterprise zone and Cooper Bridge. A high-level demand analysis has been also undertaken on these concepts to illustrate the potential for higher capacity modes of transport that might support improved connectivity between the key places to connect.

The Case for Change is one of several complementary sources that together, form a complex evidence base. Other evidence sources include:

- West Yorkshire Bus Network Review
- Leeds City Region Rail Vision and Capacity Study
- Leeds City Region Emissions Reduction Pathway
- West Yorkshire Walking and Cycling Strategy
- West Yorkshire Future Mobility Strategy
- West Yorkshire Urban Transit Study
- Ongoing engagement with district partners

Figure 31: Places to Connect Map



5.2 Connectivity network

This Case for Change report therefore brings together several strands of evidence that have been evaluated and will ultimately inform the development of a package of interventions across several modes.

The emerging multi-modal network on which future interventions will focus provides a framework to address the key connectivity issues and opportunities that have been highlighted through this study and other strands of evidence. This network for West Kirklees to Calderdale is illustrated in Figure 32. This will link with networks developed in other Case for Change reports within the Connectivity Plan to provide a full multi-modal network for West Yorkshire.

Figure 32: West Kirklees to Calderdale Connectivity Network

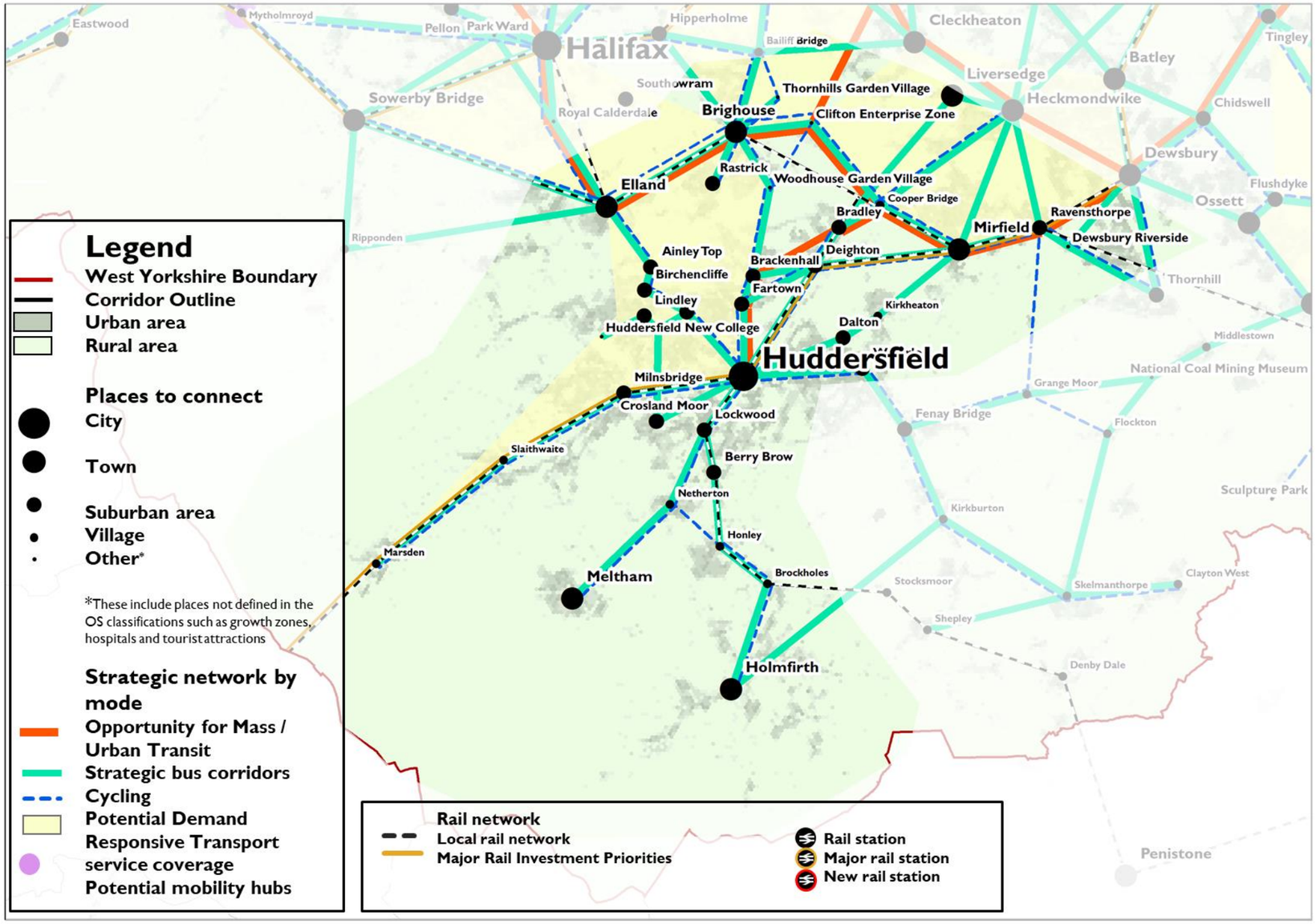
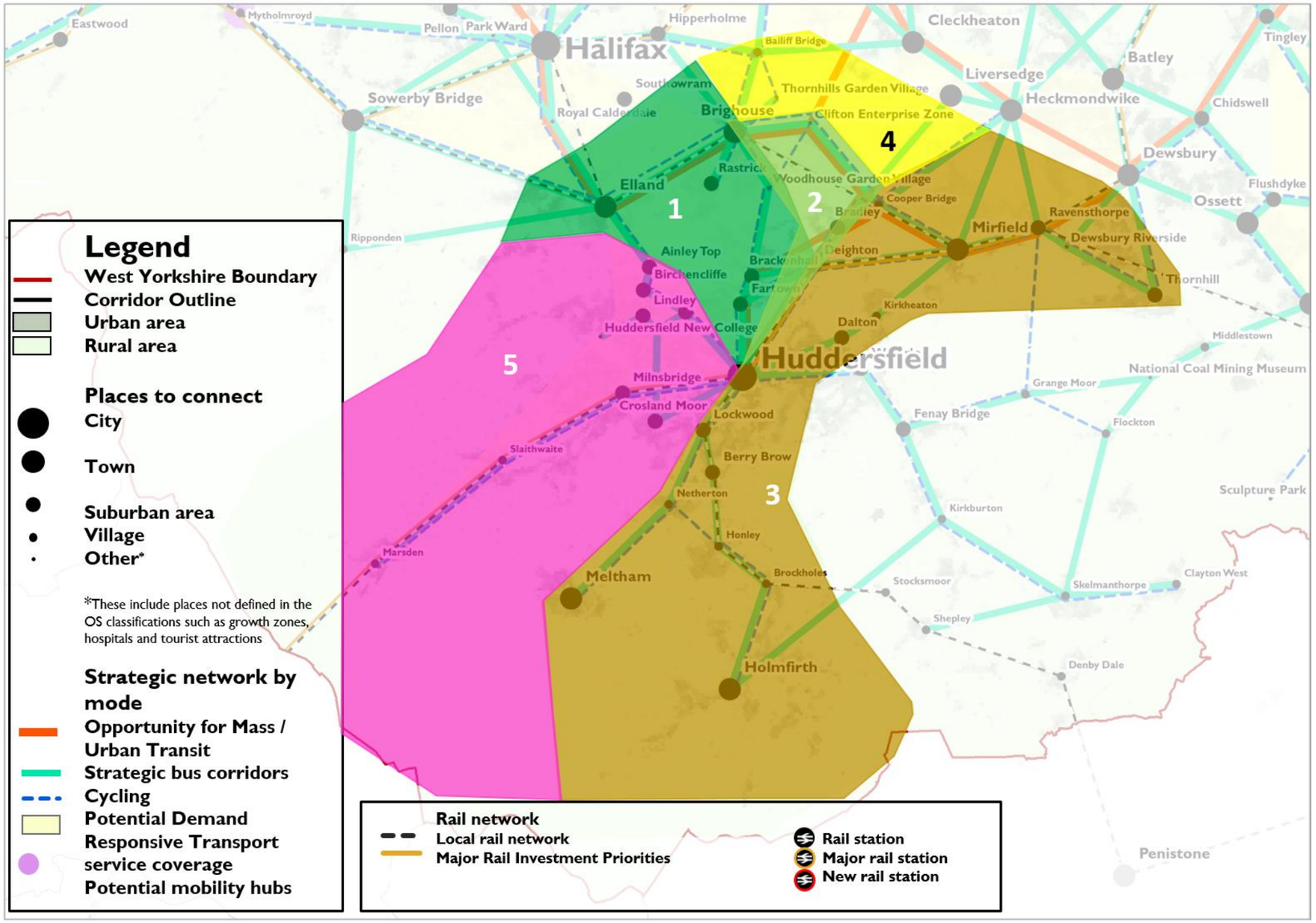


Figure 33 illustrates spatially how the various strands of evidence, including the prioritised connectivity concepts and subsequent demand analysis, provide a rationale for network interventions in West Kirklees to Calderdale. These strands of evidence are summarised alongside West Yorkshire's four strategic priorities in Table 8:

Table 8 Evidence rationale for network interventions

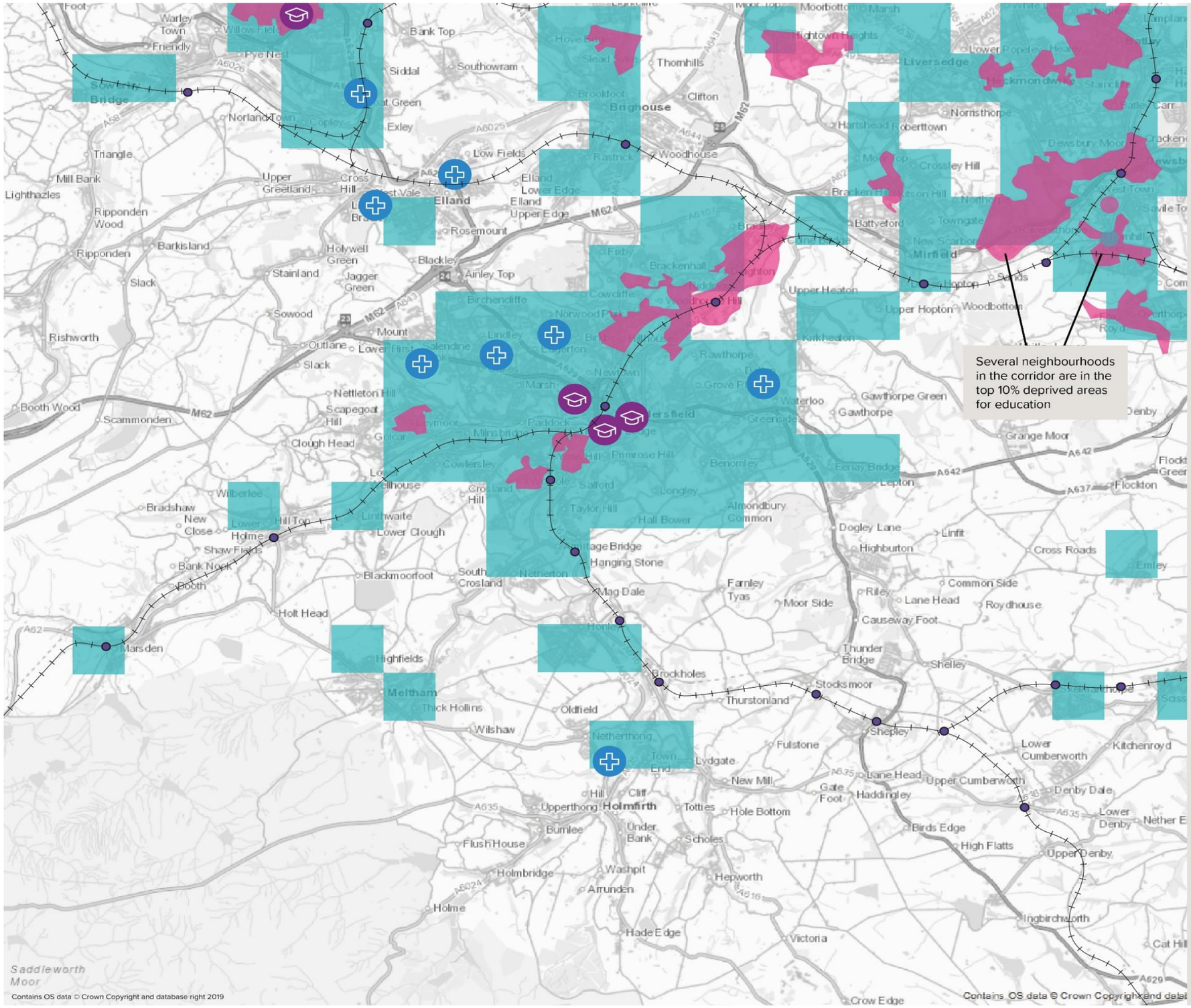
Network Area	Description	Rationale				Evidence Base
		Enabling Inclusive Growth 	Boosting Productivity 	Tackling the Climate Emergency 	Delivering 21st Century Transport 	
1	Dark Green Connectivity Concept	Connects deprived communities in Elland and in the north east of Huddersfield	Enhances connections between several housing growth sites including Woodhouse Garden Village at Brighouse South and sites to the north of Huddersfield Town Centre and employment areas near Elland and Huddersfield Town Centre	Tackles connections across the motorway network between Brighouse and Huddersfield, which currently contribute towards poor air quality	Demand analysis suggests that much of this concept could be served by mass transit, with bus linkages to communities to the north west of Huddersfield	West Kirklees to Calderdale Case for Change Report Calder Valley and Bradford Case for Change Report West Yorkshire Bus Network Review
2	Light Green Connectivity Concept	Provides connectivity for deprived communities in Elland and in the north east of Huddersfield towards employment opportunities in Cooper Bridge and Clifton Enterprise Zone	Enhances connectivity to current employment hubs near Elland, Huddersfield and Brighouse alongside future employment areas such as Cooper Bridge and Clifton Enterprise Zone	Intersects with 4 Air Quality Management Areas (AQMAs) and improves connectivity on the congested A641. The CityConnect Bradley to Brighouse Greenway offers opportunities for improving the physical and mental health of users	Demand analysis suggests much of this concept could be served by mass transit. The CityConnect Bradley to Brighouse Greenway will also provide a strategic link and connection to the National Cycle Network	West Kirklees to Calderdale Case for Change Report Calder Valley and Bradford Case for Change Report Urban Transit Study
3	Gold Connectivity Concept	Encompasses some of the most deprived communities in England, including; Ravensthorpe, Deighton and Fartown	Provides access to employment growth sites including a large site at Cooper Bridge and to new homes at Dewsbury Riverside	Intersects with several AQMAs and congestion on routes into and out of Huddersfield. High car dependency based on car ownership figures in the south, demonstrating a need to provide wider travel choices in order to encourage mode shift	Demand analysis suggests that north of Huddersfield this concept could be served by mass transit with bus linkages to communities in the south	West Kirklees to Calderdale Case for Change Report East Kirklees to Wakefield Case for Change Report Urban Transit Study West Yorkshire Bus Network Review
4	North West Kirklees	Provides connectivity to deprived communities in Deighton and Heckmondwike	Provides onward connections to the employment centres of Huddersfield and Leeds	Intersects with AQMAs in Cooper Bridge and Brighouse	Predominantly bus based interventions along existing corridors between Huddersfield and Leeds	Calder Valley and Bradford Case for Change Report Leeds to Huddersfield Case for Change West Kirklees to Calderdale Case for Change Report West Yorkshire Bus Network Review
5	South West Kirklees	Encompasses the deprived community of Milnsbridge	Provides access to the economic centre of Huddersfield	Improves connectivity on routes where congestion is an issue, such as the A62 and A616. Intersects with the large AQMA encompassing Huddersfield	Predominantly bus based interventions along existing corridors between Marsden and Huddersfield	West Kirklees to Calderdale Case for Change Report West Yorkshire Bus Network Review

Figure 33: Evidence map for network interventions



Appendices

A. Spatial context highlights across the regional priorities



Enabling inclusive growth

- Rail line
- Rail station
- Hospitals
- Higher education services
- Top 10% deprived areas for education in England
- Equality, Diversity and Inclusion (EDI) hotspots

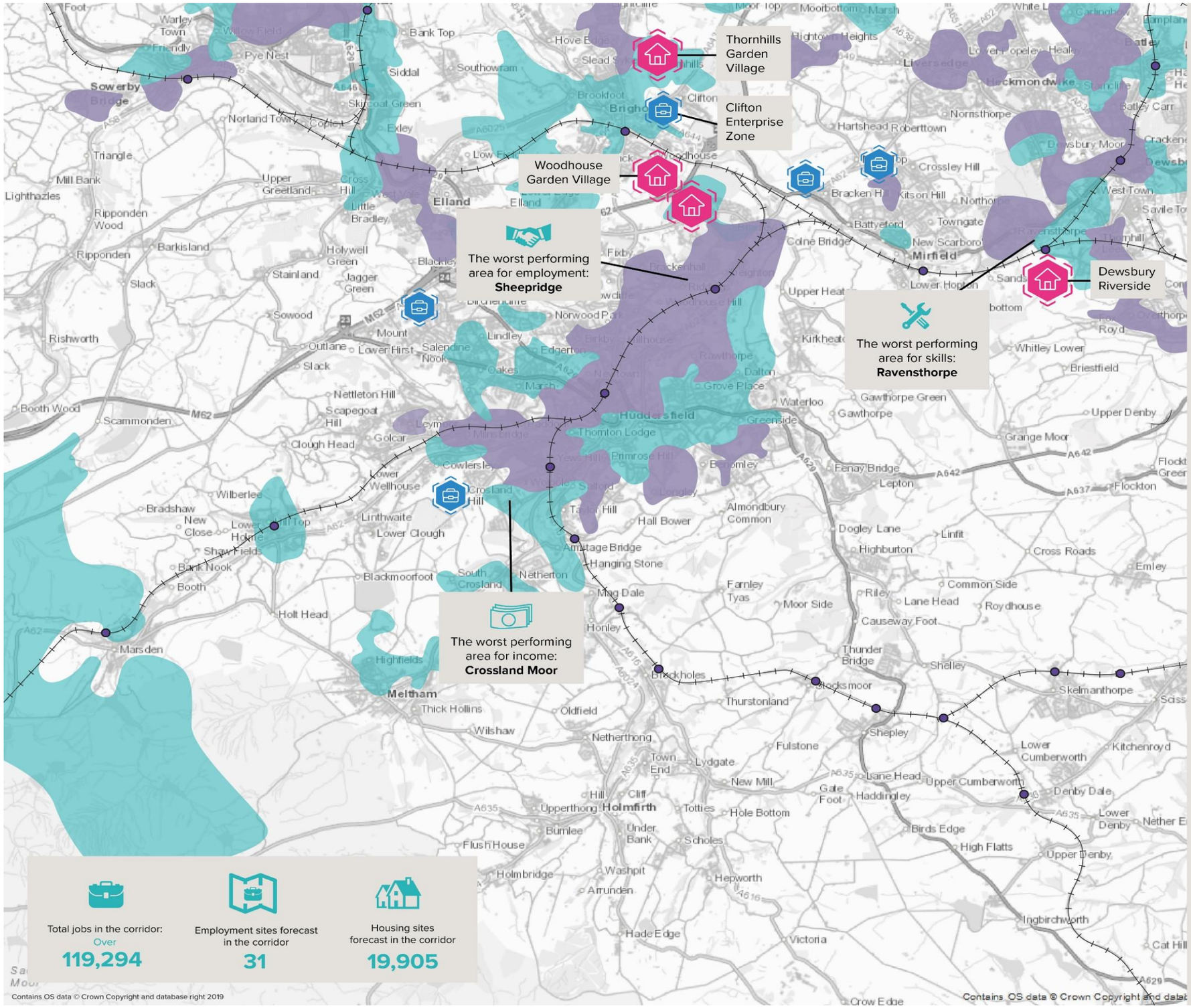
These areas show high concentrations of population, people from "protected characteristic groups" (as defined by the Equality Act 2010, including age, disability, gender reassignment, marriage or civil partnership, pregnancy and maternity, race, religion or belief, sex, sexual orientation), and trip attractor destinations such as schools, hospitals, religious buildings and care homes.

This map shows the inclusivity indicators within the corridor, including education and health services and the spread of Equality, Diversion and Inclusion (EDI) hotspots.

There is a concentration of health and education services in Huddersfield and to the south of Halifax, and connecting these to other areas within the corridor will be essential to enabling inclusive growth.

EDI hotspots in the corridor are concentrated in Huddersfield and Brighouse where there are many communities with protected characteristics and specific needs. Considerations of these must be made when improving transport services to ensure growth is felt by all and does not discriminate or divide access between groups of people.

MOTT MACDONALD



Boosting productivity

Future Growth Sites

- Housing
- Employment
- Rail line
- Rail station
- >26% no car ownership
- Top 20% most deprived in England and >26% no car ownership

This map shows employment and housing growth opportunities and other economic characteristics to understand the corridor's productivity gap.

High concentrations of employment growth are located along the M62 near Brighouse and north east of Huddersfield (Cooper Bridge). The majority of future employment sites found here are B2 (general industrial) and B8 (storage and distribution). Providing access to such sites by public transport and active modes of travel outside of peak hours will help to improve employment opportunities for those in deprived areas. Similarly, housing growth is prominent in some key areas – including south of Brighouse, at Woodhouse Garden Village and at Dewsbury Riverside.

High levels of deprivation are concentrated in northern areas of the corridor, in south west and north east Huddersfield and Elland along with high levels of no car ownership. Therefore, ensuring these communities are connected to growth opportunities will be an important consideration in boosting productivity.

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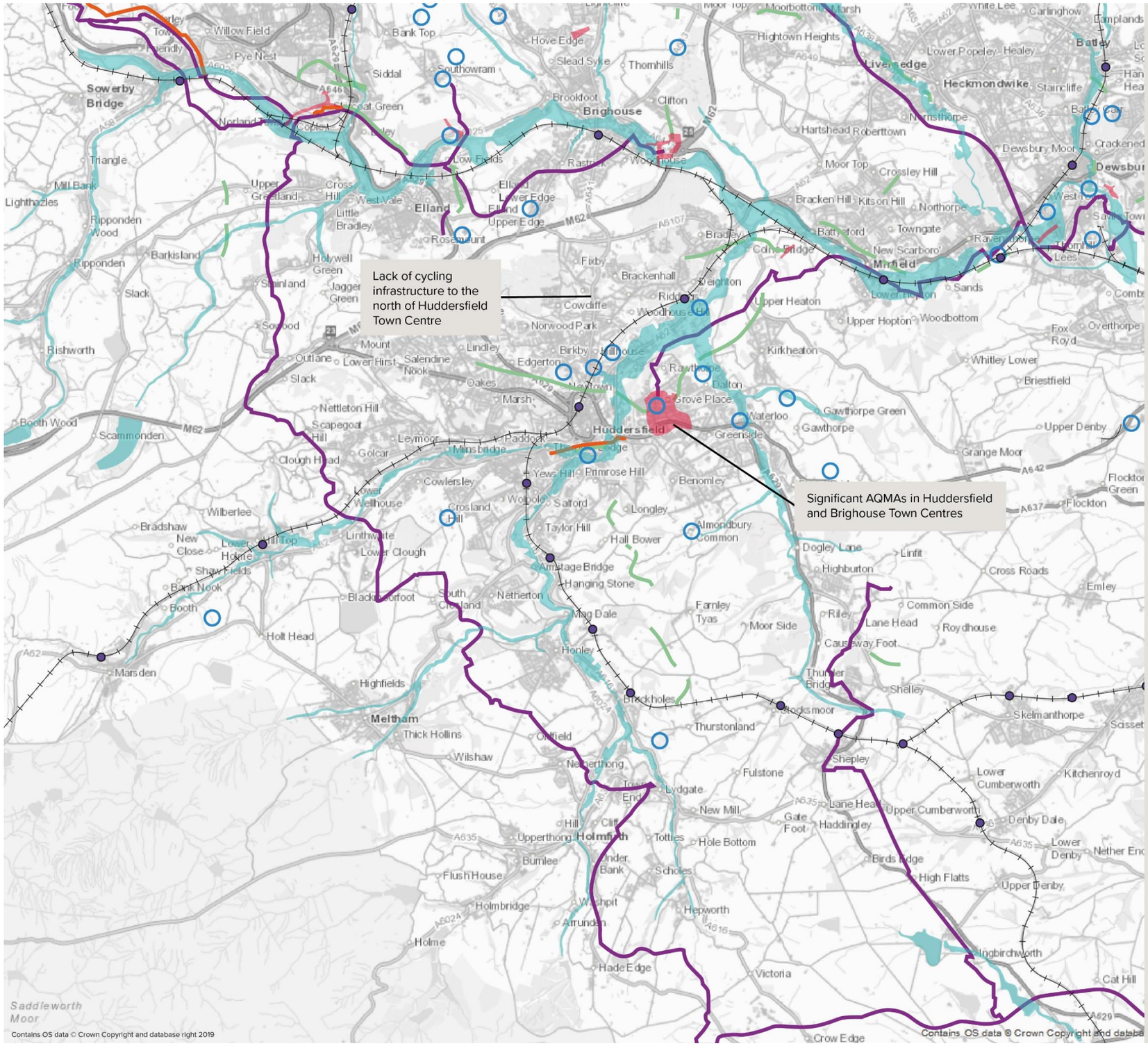

Tackling the climate emergency

- Rail line
- Rail station
- National Cycle Network
- Cycle City Ambition Grant
- West Yorkshire National Cycle Lanes
- Points of interest
- Air Quality Management Area
- Flood Zone 3

These areas are assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), as set out in the National Planning Policy Guidance.

This map shows how the corridor currently stands in relation to delivering clean growth, particularly looking at the active travel network and the air quality management areas (AQMAs). The geography of the corridor means that some areas are of high flood vulnerability, which any interventions will need to take into consideration.

AQMAs cover Huddersfield and Brighouse Town Centres, and much smaller AQMAs are located on the A629, connecting Huddersfield to the M62 junction 24, and at Bradley and Cooper Bridge to the north east of Huddersfield.

The active travel network is relatively good throughout the corridor particularly between Holmfirth and Sowerby Bridge to the north west via the National Cycle Network, and from Huddersfield to Dewsbury. However, there is a lack of infrastructure in some places; for example, between Huddersfield and Elland, presenting a barrier to active travel in these communities.

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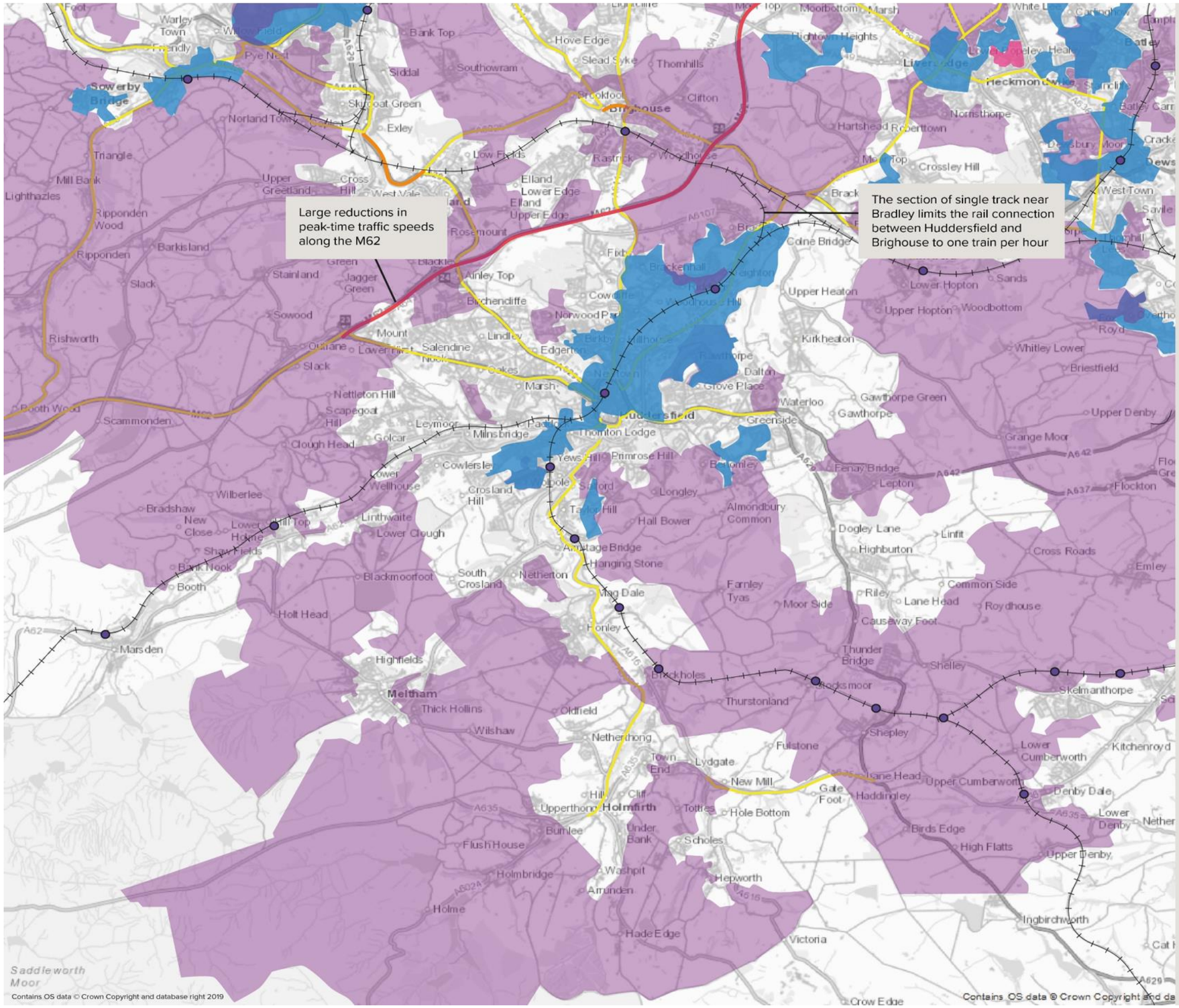


Delivering 21st century transport

Rail line

Rail station

Isolated communities

These are areas where the distance travelled to work and the average number of destinations people can reach for journeys to work across the Leeds City Region, are lower than the national average. This is based on the approach adopted for the Joseph Rowntree Foundation for "Tackling transport related barriers to employment in low-income neighbourhoods".

Bus service provision (in the morning peak)

Poor (1 bus per hour)

Non-existent (0 buses per hour)

Congestion: Speed reduction due to peak-time congestion

Over 30 kmph

Between 20 – 29 kmph

Between 10 – 19 kmph

This map shows the existing transport network including rail lines and stations, highway congestion performance and the bus service provision.

There is congestion on the M62, slowing connections to and from other areas in the city region. Radial routes to and from Huddersfield experience significant peak time congestion, hindering connectivity to key employment and education sites in Huddersfield.

The rail network and stations are extensive in the corridor with Huddersfield attracting interchanging passengers. However, interchanging is not catered for in the timetables and the connection between Huddersfield and Brighouse is poor due to part of the network being single track.

Bus level of service during the peak hours is generally good in the corridor with most settlements being served by at least two buses per hour. However, this changes during the off-peak with most of the corridor served by just one bus per hour or less. This demonstrates how people will struggle to access job opportunities via public transport that may be out of peak times.

MOTT MACDONALD

B. West Kirklees to Calderdale: Investment Case

The highest scoring "connectivity concepts" represent the corridor's spatial priorities. For this corridor these are the Dark Green, Light Green and Gold concepts representing the best performing concepts for connectivity *to and within* the West Kirklees to Calderdale corridor. These connectivity concepts are used as the framework for developing interventions that will address the Leeds City Region's future connectivity requirements and improve travel horizons throughout the corridor.

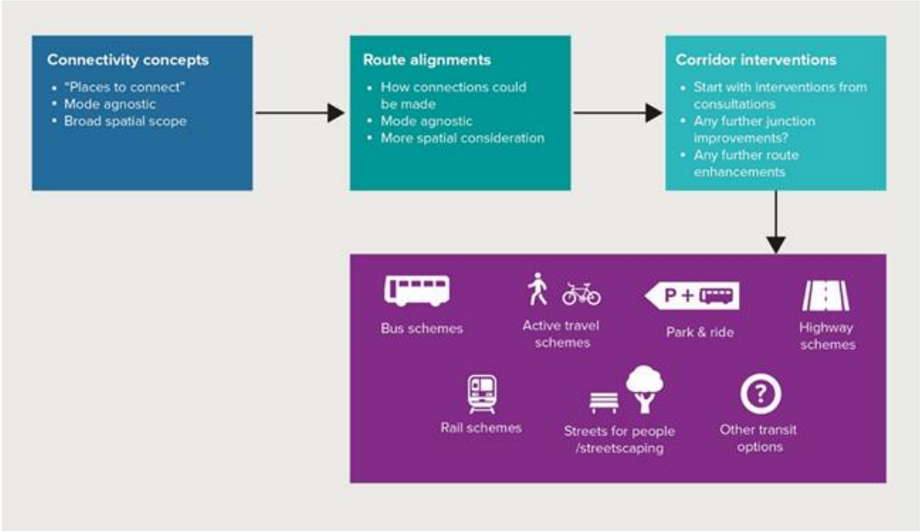
B.1 Developing interventions

Potential route alignments are identified as ways to provide the connections identified within the "connectivity concepts". For example, potential route alignments could be road corridors, disused railway lines, canal towpaths, watercourses or public rights of way. The route alignments remain conceptual and mode agnostic, but as they are considered in further detail, can become more mode specific as interventions.

Interventions are identified from stakeholder feedback, consideration of previous feasibility studies, and a detailed desktop gap analysis. The latter looks at existing (current and disused) transport provision and networks and the current pipeline of works in the corridor[20] to identify new interventions that will provide the required connectivity opportunities for the future by giving greater breadth and opportunity to travel and increasing travel horizons. Scheme types include: active travel – walking and cycling (both on and off road), bus corridor treatment (bus priority measures and/or road space reallocation), bus service, masterplanning and "Streets for People[21]", Park & Ride, rail, highways and transit concepts (e.g. BRT, tram-train etc.).

The longlist excludes schemes that have been developed as part of other workstreams, although it is possible there will be some overlap if options have been identified independently in both this report and other specific studies (e.g. LCWIP). Some of these schemes have also been accelerated as part of West Yorkshire's Transforming Cities Fund programme.

The following diagram summarises the process for developing interventions.



All interventions have been assigned a scheme type, a high-level deliverability and timescale attribute, as follows:

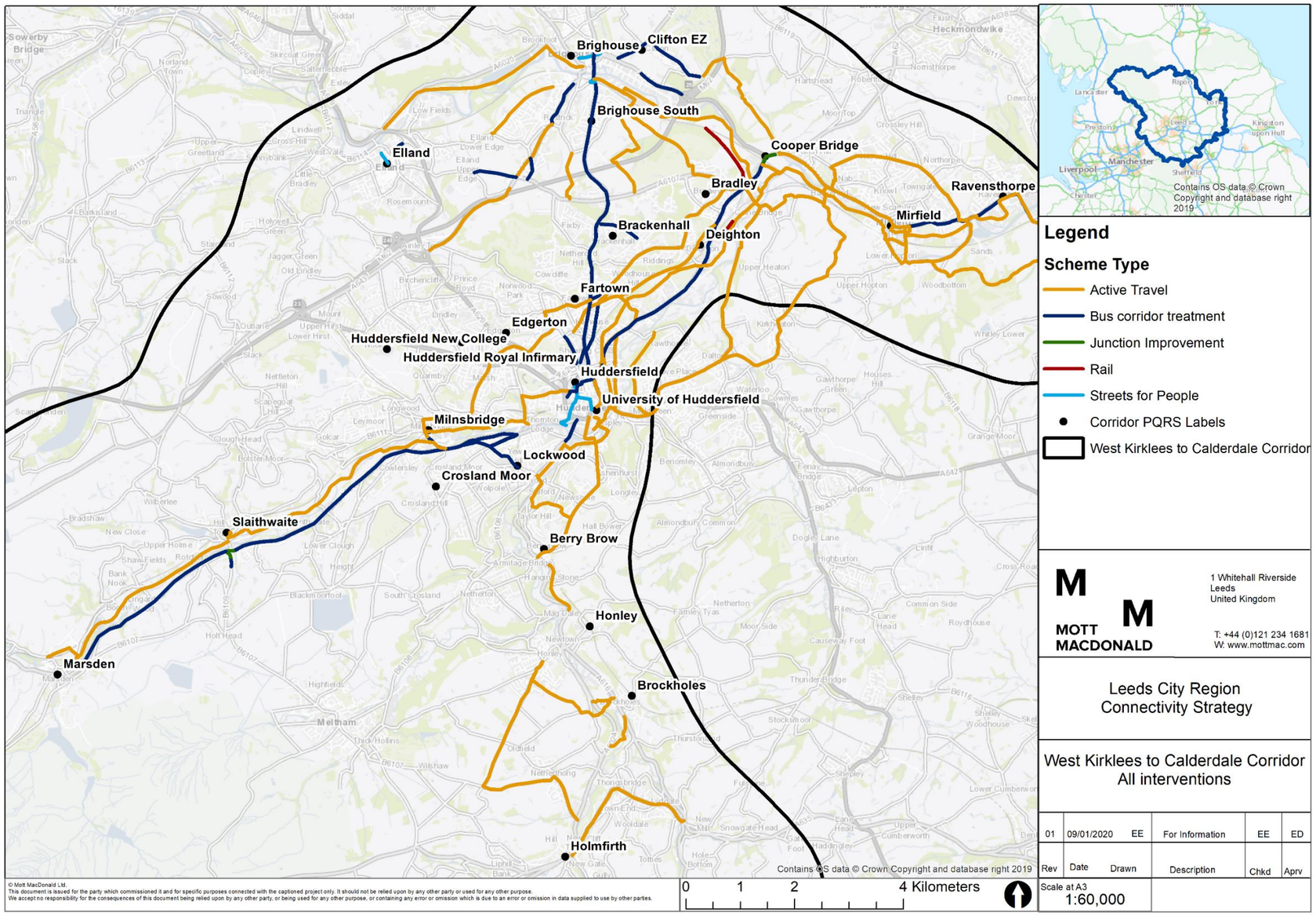
- Scheme types
  - Active travel (on and off-road walking and cycling)
  - Bus corridor treatment (bus priority measures and/or road space reallocation)
  - Bus service
  - Masterplanning / Streets for People - Improved urban realm and accessibility for pedestrians and cyclists
  - Park & Ride
  - Rail
  - Highways
  - Transit concepts (e.g. BRT, tram train etc.)
- Delivery timescales: short, medium, long term.
- Technical complexity: low, medium, high.
- Connectivity concept: identifies the connectivity concept each scheme aligns to

The result of the process above is a long list of 82 interventions for the West Kirklees to Calderdale corridor. The alignments for these are mapped in Figure 34.

[20] e.g. West Yorkshire Transport Fund, Cycle City Ambition Grant, Leeds Public Transport Investment Programme and the West Yorkshire Local Cycling and Walking Investment Plan

[21] Streets for People is a West Yorkshire-led series of design principles that focuses on creating safe and healthy places that take into consideration a number of factors, including traffic management, reducing air pollu ion, creating places which help people to interact and encouraging sustainable methods of transport such as cycling, walking and public transportation.

Figure 34: West Kirklees to Calderdale corridor – alignments for all interventions in the long list



B.2 Interventions

The initial long-list of options for transport connectivity improvements has been produced by Mott MacDonald consultants. These proposals have been identified through high-level assessment of the evidence. Feasibility work will be required to develop deliverable schemes that best provide the connectivity required. The list has been collated with the long-list outputs of other Case for Change reports and the outputs of aligned workstreams such as the Leeds City Region Rail Vision and Capacity study and the Leeds City Region Emissions Reduction Pathway study to inform the West Yorkshire Connectivity Investment Plan and pipeline. The consolidated initial long-list can be found in Appendix 2 to the WY Connectivity Plan. Programme C - Options for delivery between 2026 – 2040.