

# West Yorkshire Transport Strategy Evidence Base

July 2016

## Contents

|           |  |           |
|-----------|--|-----------|
| <b>1.</b> | <b>Introduction .....</b>                                      | <b>1</b>  |
| <b>2.</b> | <b>Travel Trends in West Yorkshire .....</b>                   | <b>2</b>  |
| 2.1.      | <i>Travel to Work .....</i>                                    | <i>2</i>  |
| 2.2.      | <i>Travel into Urban Centres .....</i>                         | <i>3</i>  |
| 2.3.      | <i>Predominant modes: user profile in West Yorkshire .....</i> | <i>4</i>  |
| 2.4.      | <i>Access to Employment Centres .....</i>                      | <i>5</i>  |
| 2.5.      | <i>Travel to Work Distance .....</i>                           | <i>7</i>  |
| 2.6.      | <i>Commuting in the West Yorkshire districts.....</i>          | <i>7</i>  |
| 2.7.      | <i>City Centre Living .....</i>                                | <i>10</i> |
| <b>3.</b> | <b>Rail .....</b>  | <b>11</b> |
| 3.1.      | <i>Recent Trends .....</i>                                     | <i>11</i> |
| 3.2.      | <i>Rail Performance Score.....</i>                             | <i>14</i> |
| <b>4.</b> | <b>Bus.....</b>  | <b>15</b> |
| 4.1.      | <i>Long Term Trend .....</i>                                   | <i>15</i> |
| 4.2.      | <i>Recent Trends .....</i>                                     | <i>15</i> |
| 4.3.      | <i>Bus Operator Market Shares .....</i>                        | <i>16</i> |
| 4.4.      | <i>Park and Ride.....</i>                                      | <i>17</i> |
| <b>5.</b> | <b>Road .....</b>  | <b>19</b> |
| 5.1.      | <i>West Yorkshire Road Network.....</i>                        | <i>19</i> |
| 5.2.      | <i>West Yorkshire Key Route Network (WYKRN) .....</i>          | <i>20</i> |
| 5.3.      | <i>Long Term Trends.....</i>                                   | <i>21</i> |
| 5.4.      | <i>Recent Trends .....</i>                                     | <i>22</i> |
| 5.5.      | <i>Congestion .....</i>  | <i>23</i> |
| 5.6.      | <i>Road Traffic Accidents.....</i>                             | <i>24</i> |
| 5.7.      | <i>Vulnerable Road Users .....</i>                             | <i>25</i> |
| <b>6.</b> | <b>Walking and cycling.....</b>                                | <b>27</b> |
| 6.1.      | <i>Long Term Trends.....</i>                                   | <i>27</i> |
| 6.2.      | <i>Recent Trends .....</i>                                     | <i>27</i> |
| <b>7.</b> | <b>Freight .....</b>   | <b>28</b> |
| <b>8.</b> | <b>Leeds Bradford Airport .....</b>                            | <b>29</b> |
| <b>9.</b> | <b>Vehicle Emissions and Air Quality .....</b>                 | <b>31</b> |
| 9.1.      | <i>Greenhouse Gases.....</i>                                   | <i>31</i> |

|              |   |           |
|--------------|---|-----------|
| <b>9.2.</b>  | <b><i>Air Pollutants</i></b> .....                  | <b>33</b> |
| <b>10.</b>   | <b>Transport and Health in West Yorkshire</b> ..... | <b>36</b> |
| <b>10.1.</b> | <b><i>Active travel</i></b> .....                   | <b>36</b> |
| <b>10.2.</b> | <b><i>Air quality</i></b> .....                     | <b>36</b> |
| <b>10.3.</b> | <b><i>Traffic safety</i></b> .....                  | <b>37</b> |
| <b>10.4.</b> | <b><i>Access to green space</i></b> .....           | <b>37</b> |
| <b>10.5.</b> | <b><i>Noise levels</i></b> .....                    | <b>37</b> |
| <b>10.6.</b> | <b><i>Connecting people</i></b> .....               | <b>37</b> |
| <b>10.7.</b> | <b><i>Climate Change</i></b> .....                  | <b>38</b> |
| <b>11.</b>   | <b>Satisfaction with Public Transport</b> .....     | <b>39</b> |
| <b>11.1.</b> | <b><i>WYCA Tracker Survey</i></b> .....             | <b>39</b> |
| <b>11.2.</b> | <b><i>Customer Feedback Data</i></b> .....          | <b>41</b> |
| <b>12.</b>   | <b>Cost of Public Transport</b> .....               | <b>42</b> |

## List of figures

|   |    |
|---|----|
| Figure 1: Census travel to work by mode. West Yorkshire residents, 2001/2011.....   | 2  |
| Figure 2: Census 2011 Travel to work by mode: car/van. West Yorkshire residents, by district.....                               | 3  |
| Figure 3: Census 2011 Travel to work by mode: bus/walk/train/bicycle. West Yorkshire residents, by district.....                | 3  |
| Figure 4: Mode share for am peak travel into main West Yorkshire urban centres (main radial corridors) .....                    | 4  |
| Figure 5: Average distance travelled to work 2001/2011 (km) .....   | 7  |
| Figure 6: Commuting trips to/from West Yorkshire districts, by area of origin/destination, 2011 .....                           | 8  |
| Figure 7: Total commuting from the WY districts, 2011 .....   | 8  |
| Figure 8: Total commuting to the WY districts, 2011 .....   | 9  |
| Figure 9: Net commuting by district, West Yorkshire .....   | 9  |
| Figure 10: Rail patronage in West Yorkshire 2004/05 to 2014/15 .....  | 11 |
| Figure 11: Rail journeys (millions) to/from other regions.....  | 11 |
| Figure 12: Passengers in excess of capacity (PiXC) in the am peak (07:00 - 09:59). Main cities in England and Wales (2014)..... | 12 |
| Figure 13: Rail passengers standing on trains in the am peak (07:00 - 09:59). Main cities in England and Wales (2014).....      | 13 |
| Figure 14: Passengers in excess of capacity by train operator. Leeds, am peak (07:00 – 09:59), 2014 .....                       | 13 |
| Figure 15: Passengers in excess of capacity by train operator. Leeds, pm peak (16:00 – 18:59), 2014 .....                       | 13 |
| Figure 16: PPM North and West Yorkshire (Northern Rail) 2010-2015 .....   | 14 |
| Figure 17: West Yorkshire bus patronage 1995-2015 .....   | 15 |
| Figure 18: Bus operators' predominance in West Yorkshire.....   | 16 |
| Figure 19: West Yorkshire Road Network.....   | 20 |
| Figure 20: West Yorkshire Key Route Network.....  | 21 |
| Figure 21: West Yorkshire annual car traffic, since 1993 (all roads) .....  | 22 |
| Figure 22: Comparison of bus and car use in West Yorkshire (Indexed to 1997 base) .....   | 23 |
| Figure 23: West Yorkshire KSI 2009-2014 .....   | 24 |
| Figure 24: Reported road deaths in West Yorkshire 2010-2014 .....   | 25 |
| Figure 25: Reported KSI casualties by user type in West Yorkshire, 2010-2014. Car and vulnerable users.....                     | 26 |
| Figure 26: Reported KSI casualties by user type. West Yorkshire, 2014 .....   | 26 |
| Figure 27: Travel to work by mode: walk (district residents, 2001/2011) .....   | 28 |
| Figure 28: Travel to work by mode: bicycle (district residents, 2001/2011) .....  | 28 |
| Figure 29: Leeds Bradford Airport annual passengers (millions). Period: 2004 - 2015.....  | 30 |
| Figure 30: West Yorkshire transport emissions (kt CO <sub>2</sub> ) 2005-2013: Road & diesel rail contribution.....             | 32 |
| Figure 31: Total transport emissions by district (kt CO <sub>2</sub> ) 2005 vs 2013.....  | 32 |
| Figure 32: Transport contribution to West Yorkshire total CO <sub>2</sub> emissions, 2005-2013 (kt CO <sub>2</sub> ).....       | 33 |
| Figure 33: Intensity of PM <sub>10</sub> emissions (2005).....  | 34 |
| Figure 34: Percentage of PM <sub>10</sub> emissions from road transport (2005) .....  | 35 |
| Figure 35: Tracker items with a higher discrepancy between importance and rating .....  | 40 |
| Figure 36: Top ten issues by number of complaints.....  | 41 |
| Figure 37: Average adult fare in West Yorkshire (£).....  | 42 |
| Figure 38: Average adult fares in West Yorkshire (Index 2011=100).....  | 42 |

## **List of tables**

|  |    |
|--|----|
| <i>Table 1. User characteristics by mode</i> .....   | 5  |
| <i>Table 2: Access to employment*, by district</i> .....   | 6  |
| <i>Table 3. Location of usual residence and place of work. West Yorkshire districts, 2011.</i> .....                 | 8  |
| <i>Table 4. Percentage commuting into districts' urban centres, by mode</i> .....                                    | 10 |
| <i>Table 5. City centre living in main West Yorkshire districts</i> .....  | 10 |
| <i>Table 6: Average annual PPM by line</i> .....   | 14 |
| <i>Table 7. Rail-served park and ride average usage (2013)</i> .....   | 17 |
| <i>Table 8. Length of West Yorkshire motorway network by local authority/type</i> .....                              | 19 |
| <i>Table 9. Length of West Yorkshire "A" road network by local authority/type</i> .....                              | 19 |
| <i>Table 10. Length of West Yorkshire minor road network, by local authority/type</i> .....                          | 20 |
| <i>Table 11. KSI accidents by district</i> .....   | 24 |
| <i>Table 12. Reported road deaths in West Yorkshire, by district</i> .....   | 25 |
| <i>Table 13. Annual road traffic emissions of NOx across WY A Road network (tonnes per year).</i> .....              | 33 |
| <i>Table 14. Annual road traffic emissions of PM<sub>10</sub> across WY highway network (tonnes per year).</i> ..... | 34 |
| <i>Table 15: West Yorkshire Tracker Survey scores</i> .....  | 39 |
| <i>Table 16: Rail users - Service ratings over time</i> .....  | 39 |
| <i>Table 17: Bus Service Punctuality</i> .....   | 41 |

## 1. Introduction

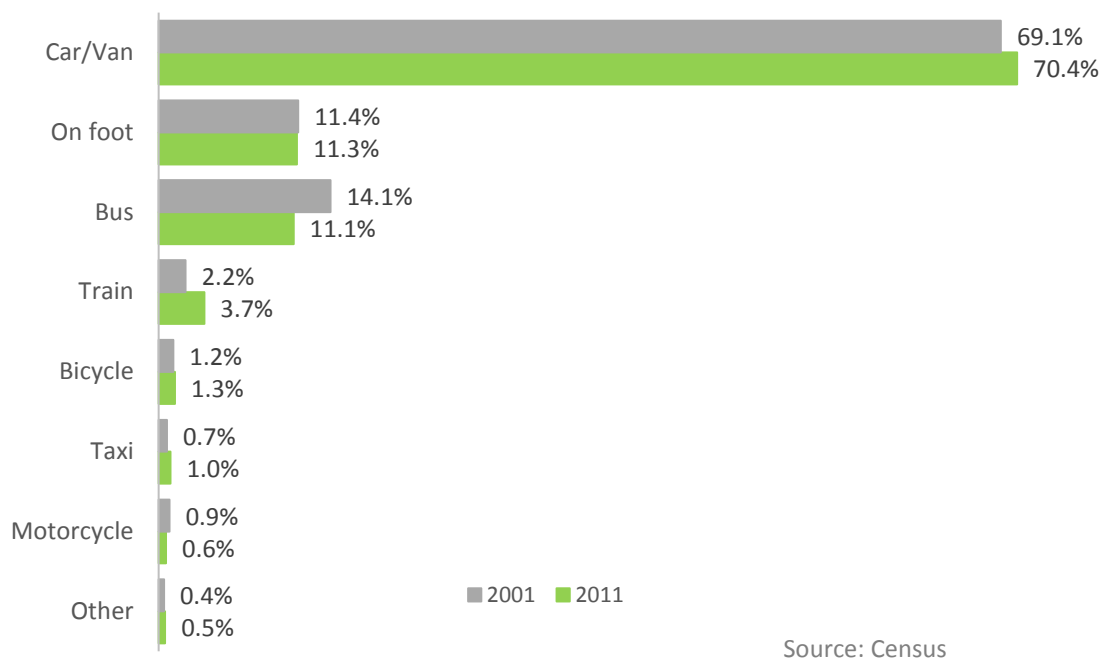
- This Evidence Base was produced in preparation for the draft West Yorkshire Transport Strategy 2016-2036.
- The objective of the document is to set the context for the new West Yorkshire Transport Strategy by providing detail on the main transport patterns and transport issues that determined the approach and draft policies adopted.
- The geographical area covered by this document is the West Yorkshire region. A breakdown by district has been provided where possible.
- When the data series allow, both long-term trends (10-20 years) and short-term trends (5-10 years) are analysed. The data sources are identified throughout the document.
- The document is structured into the following sections:
  - Section 2 describes general transport patterns and demographic changes within West Yorkshire.
  - Sections 3 to 8 provide a breakdown of usage, trends and relevant issues by mode.
  - Sections 9 and 10 present local evidence on cross cutting themes of air quality and the relation between transport and health.
  - Sections 11 and 12 focus on the customers' perspective, providing a snapshot of perceptions to current public transport in West Yorkshire (WY).

## 2. Travel Trends in West Yorkshire

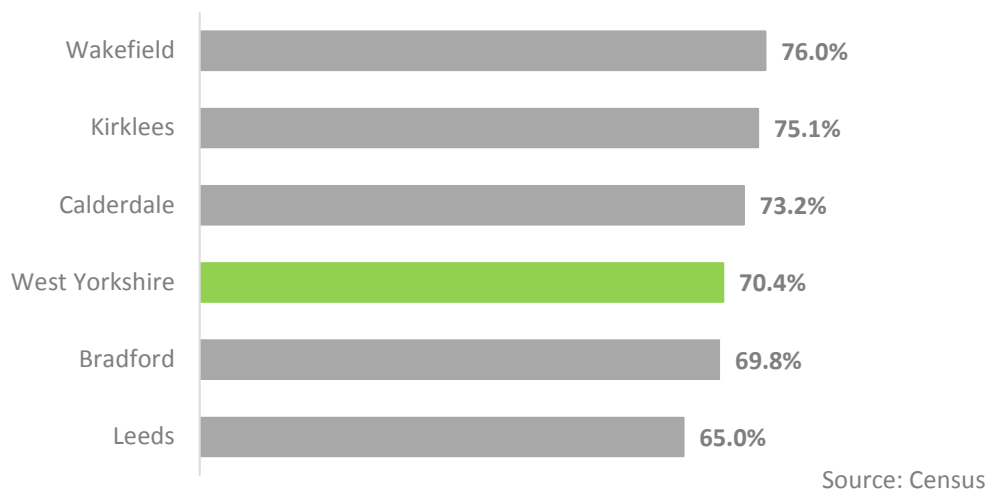
### 2.1. Travel to Work

- Census Travel to Work statistics provide estimates on the main modes of transport used by West Yorkshire residents during their trips to work, and are useful to determine long-term commuting trends.
- Figure 1 indicates that car/van continues to be the dominant mode for trips to work in 2011, with similar levels to 2001 (around 70%). Whilst train has experienced an increase of 1.5% in the same time period, bus has seen its share reduced by 3% since 2001.

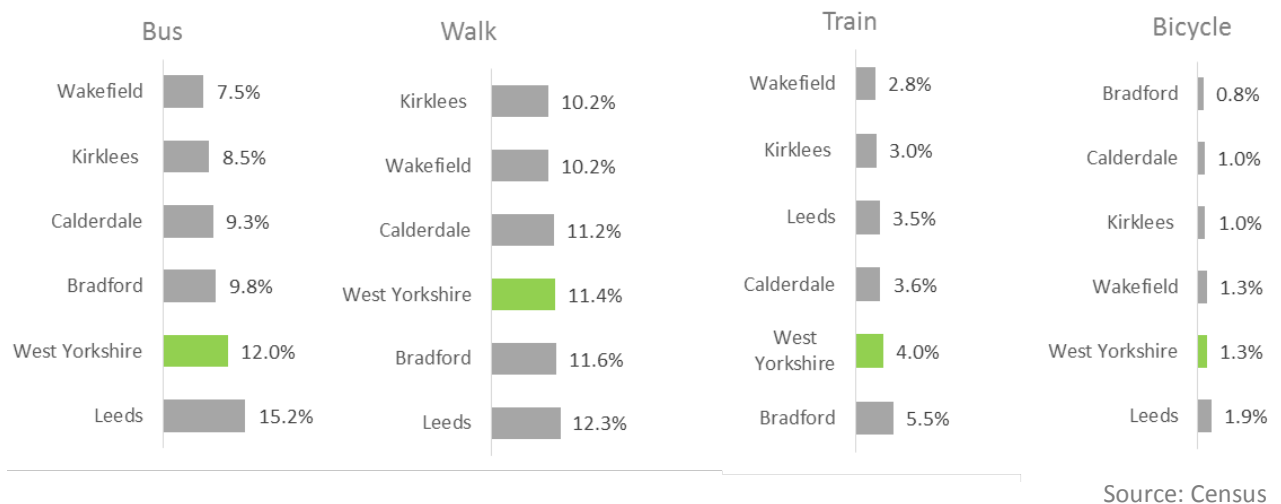
Figure 1: Census travel to work by mode. West Yorkshire residents, 2001/2011



**Figure 2: Census 2011 Travel to work by mode: car/van. West Yorkshire residents, by district.**



**Figure 3: Census 2011 Travel to work by mode: bus/walk/train/bicycle. West Yorkshire residents, by district.**



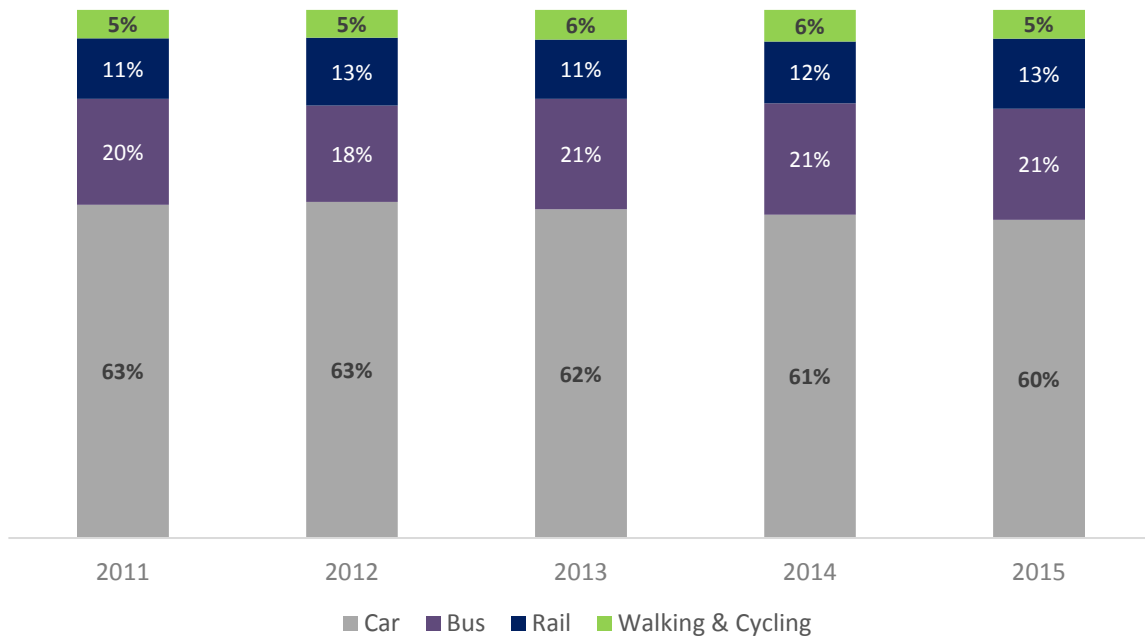
## 2.2. Travel into Urban Centres

- Since 1998 travel into the main West Yorkshire district centres<sup>1</sup> has been monitored through annual cordon counts on key radial corridors. The surveys are conducted annually and count the number of people crossing the cordons –inbound travel only– during the morning weekday peak period.
- These statistics provide detail on traffic flows and mode share on the most important local roads during the period of highest demand. Unlike Census Travel to Work data, they do not offer information on trip purpose or socio-economic characteristics.
- Figure 4 shows mode share on key radial corridors into all WY district centres from 2011 onwards during the AM peak monitoring hours of 7am - 9:30am.

<sup>1</sup> Including Bradford, Halifax, Huddersfield, Leeds and Wakefield.



**Figure 4: Mode share for am peak travel into main West Yorkshire urban centres (main radial corridors)**



Source: Annual District Surveys

- Car continues to be the predominant mode for inward trips in the morning peak. Although the cordon count figures show a small reduction in the car share from 2012, it remains to be seen whether this trend will continue in the coming years.
- Walking and cycling have demonstrated a consistent mode share of around 5%.
- Motorcycling (not shown in the figure) represents 0.5% of the inbound travel, as described earlier.

### 2.3. Predominant modes: user profile in West Yorkshire

- The main characteristics of bus, car and rail users in West Yorkshire are summarised in Table 1 on next page.

**Table 1. User characteristics by mode<sup>2</sup>**

| Characteristic  | Bus   | Car   | Train  |
|---|---|---|--|
| <b>Gender</b>   | Higher usage by females   | Males more likely to be drivers than females  | Males more likely to be train passengers than females  |
| <b>Age Ranges</b>                                     | Higher usage by 65+<br>(Followed by 16-24)  | Higher usage by 35-44<br>(Followed by 45-54)  | Higher usage by 16-24, with usage broadly reducing as age increases  |
| <b>Employment</b>                                     | Significantly higher usage by economically inactive   | Significantly higher usage by economically active   | Higher usage by economically active  |
| <b>Socioeconomic Group Classification<sup>3</sup></b> | AB socioeconomic groups least likely to use the bus   | Clear relationship with socioeconomic classification, with ABs more likely to drive compared with DEs                       | More ABC1s than C2DEs  |
| <b>Frequency of Use</b>                               | Approximately a quarter of bus use is infrequent, less than once a year.<br>Over half of bus users travel 1-3 times a month | Almost two thirds of drivers travel by car at least 4 days per week, while just over a quarter travel less than once a year | Over half of rail use is infrequent, less than once or twice a year.<br>Over a quarter of rail users travel 1-3 times a month or more. |
| <b>Car Availability</b>                               | Usage higher in households with no car access   | Usage is highest in households with two cars  | Usage is relatively consistent across car availability, although marginally higher in no car households                                |
| <b>Increased Usage</b>                                | Increased usage among 16-24 year olds and 65-74 year olds.<br>Increased usage by those in education.                        | Increased usage by 16-24 year olds and 25-34 year olds.   | Increased usage by 16-24 year olds. Increased usage by those in education.   |

## 2.4. Access to Employment Centres

- Access to employment has been a key indicator of the West Yorkshire Local Transport Plan since 2011. It is defined as the percentage of residents able to access key employment sites across West Yorkshire within 30 minutes, using the Core Public Transport Network (bus and rail).
- The indicator is modelled using TRACC software for trips from home to key employment centres, under the following assumptions:
  - The Core Bus Network accounts only for those services that have a combined frequency of 15 minutes or higher.

<sup>2</sup> Source: West Yorkshire Bus Strategy. The Evidence Base. WYCA, 2016.

<sup>3</sup> According to the ONS socio-economic classification, where: AB: Higher & intermediate managerial, administrative, professional occupations; C1: Supervisory, clerical & junior managerial, administrative, professional occupations; C2: Skilled manual occupations; DE: Semi-skilled & unskilled manual occupations, Unemployed and lowest grade occupations

- The Core Rail Network includes all rail services.
- Population figures correspond to updated Office for National Statistics (ONS) mid-year estimates and they are allocated to Lower Layer Super Output Areas (LSOAs) based on the recorded housing completions from Local Authorities.
- Key employment centres are defined as LSOAs with over 1000 employees, according to Nomis data.
- A map with the results of the modelling is provided in Appendix 1.
  - The green coloured areas show the zones with good levels of accessibility to key employment centres using the Core Public Transport Network.
  - The purple coloured areas represent those zones with poor accessibility.
- The map in Appendix 1 shows that approximately 76% of the population of West Yorkshire is able to access key employment centres within 30 minutes using the Core Public Transport Network.
- Table 2 shows that the WY value has remained constant in recent years. Access to employment areas has improved over time in Wakefield and Kirklees, but declined in Bradford.
- The 15% most deprived areas in the West Yorkshire (displayed with a blue coloured boundary) predominantly fall near city centres; consequently they are well located for accessing key employment sites across the region.

**Table 2: Access to employment\*, by district.**

| Geography             | Year 2011  | Year 2012  | Year 2013  | Year 2014  |
|-----------------------|------------|------------|------------|------------|
| Bradford              | 81%        | 81%        | 78%        | 75%        |
| Calderdale            | 73%        | 72%        | 69%        | 72%        |
| Kirklees              | 70%        | 71%        | 72%        | 76%        |
| Leeds                 | 81%        | 79%        | 81%        | 81%        |
| Wakefield             | 66%        | 66%        | 70%        | 71%        |
| <b>West Yorkshire</b> | <b>76%</b> | <b>75%</b> | <b>76%</b> | <b>76%</b> |

(\*) Defined as the percentage of working population able to access key employment centres within 30 minutes using the core public transport network (07:30 – 09:30)

Source: Wakefield MDC

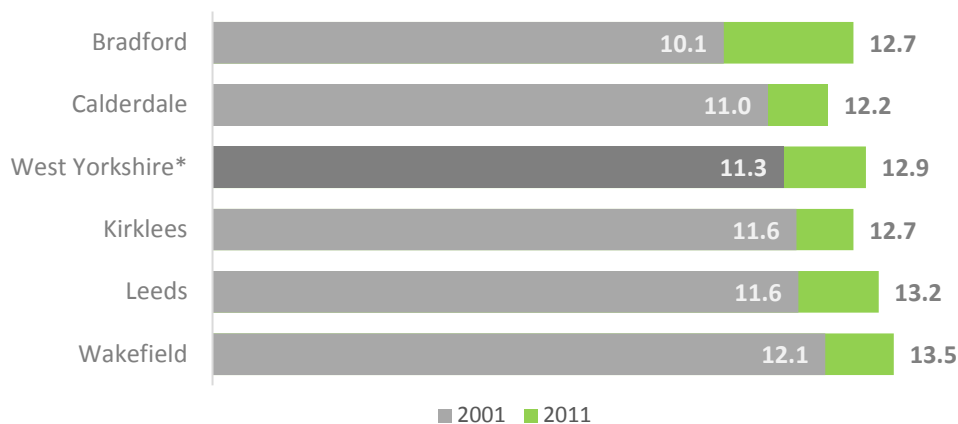
- When using this data to compare districts, it should be noted that the methodology described is a “one size fits all” approach and does not take into account the individual characteristics of a particular area.
- Because of the bus frequency threshold set, the modelling does not take into account services specifically designed to improve accessibility; e.g service 606 providing early morning links to the Euroway Industrial

Estate, or MetroLocal and minibus services that connect smaller communities.

## 2.5. Travel to Work Distance

- Travel to work distance has increased over time as a result of more people working outside their district of residence. Figure 5 shows that between 2001 and 2011, average travel distances rose by 14.4% for West Yorkshire residents (from 11.3 to 12.9 kilometres).

Figure 5: Average distance travelled to work 2001/2011 (km)



\* Districts' weighted average

Source: Census

## 2.6. Commuting in the West Yorkshire districts

- Commuting between West Yorkshire districts increased more than 15% between 2001 and 2011, from 152,028 to 178,242 (Figure 6). These flows represent 20% of all West Yorkshire commuting<sup>4</sup>.
- During the period 2001-2011 commuting to/from areas outside West Yorkshire grew faster than commuting between districts in the region, to the extent that in 2011 more people were commuting between West Yorkshire and the neighbouring regions than within the West Yorkshire boundaries (178,961 and 178,242 respectively). The highest increase was in outwards trips i.e. from West Yorkshire districts to other regions (32%); however, the region continues to receive more workers than it supplies to other regions.
- Commuting between districts is predominantly conducted by car (81%). This compares with 65% for commuting within a district<sup>4</sup>. There is no notable difference in the car mode share between trips within West Yorkshire and those from/to locations outside the county.
- Rail is the preferred public transport mode for inter-district commuting, with 71% of West Yorkshire rail commuting being cross boundary

<sup>4</sup> Excluding those with no fixed place of work

(28,900 out of 40,500). The corresponding bus figure is 19% (19,800 out of 102,200) excluding those working at/from home and with no fixed place of work.

**Table 3. Location of usual residence and place of work. West Yorkshire districts, 2011.**

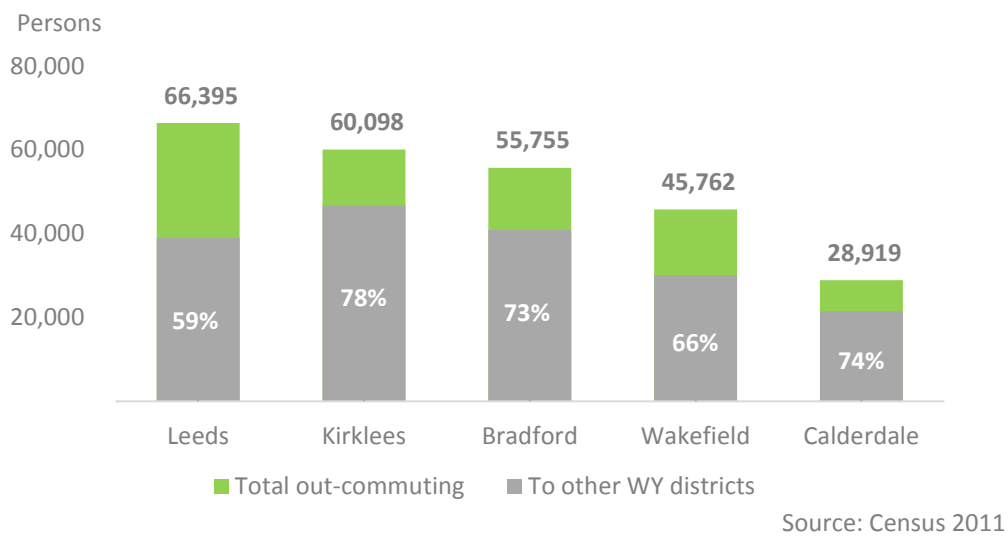
| (All modes of travel to work) | Area of work |            |          |         |           |
|-------------------------------|--------------|------------|----------|---------|-----------|
|                               | Bradford     | Calderdale | Kirklees | Leeds   | Wakefield |
| Bradford                      | 129,611      | 6,164      | 4,949    | 27,508  | 2,309     |
| Calderdale                    | 8,096        | 52,014     | 7,387    | 4,988   | 1,014     |
| Kirklees                      | 8,897        | 10,196     | 102,258  | 19,725  | 7,916     |
| Leeds                         | 16,957       | 2,401      | 6,950    | 236,326 | 12,682    |
| Wakefield                     | 1,832        | 681        | 6,022    | 21,568  | 84,977    |

Source: Census 2011

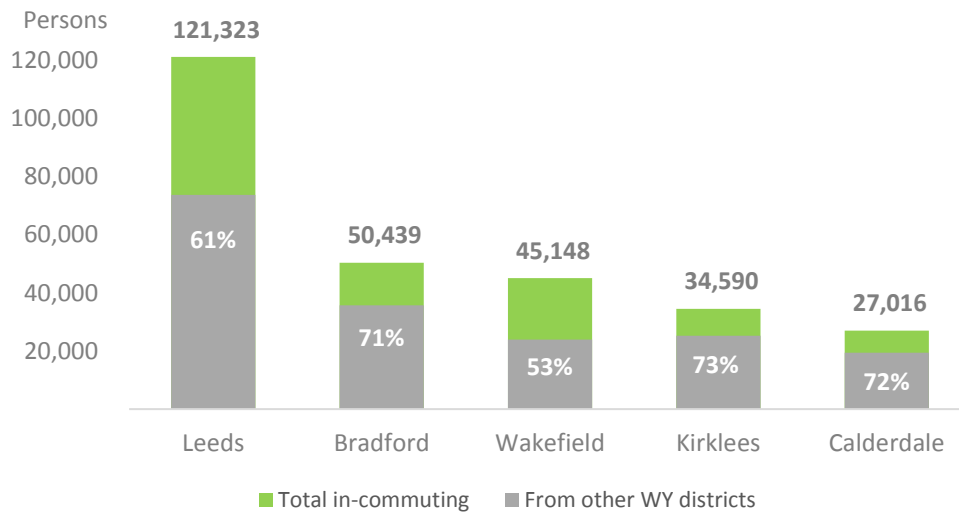
**Figure 6. Commuting trips to/from West Yorkshire districts, by area of origin/destination, 2011**



**Figure 7. Total commuting from the WY districts, 2011**

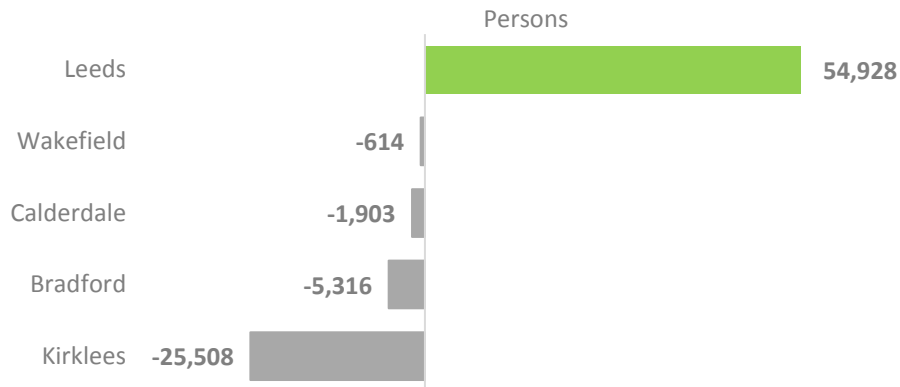


**Figure 8. Total commuting to the WY districts, 2011**



Source: Census 2011

**Figure 9: Net commuting<sup>5</sup> by district, West Yorkshire**



Source: Census 2011

- The dispersed nature of commuting is illustrated by the fact that in 2011 only 15% of origin-destination (OD) pairs exceeded 300 commuters (MSOA<sup>6</sup> level analysis), while 34% of OD pairs had 15 or fewer commuters.

<sup>5</sup> Net commuting: inward commuting minus outward commuting

<sup>6</sup> MSOA: Middle Layer Super Output Areas. Output areas (OA) are geographical divisions created for the reporting of Census data, and are the lowest geographical level at which statistics are provided. They were designed to have a similar population size and be as socially homogeneous as possible in terms of households and dwelling type.

Super output areas are aggregations of OA, based on population and number of households. Two layers are defined, Middle Layer Super Output Areas (MSOAs) and Lower Layer Super Output Areas (LSOAs), according to the following thresholds:

| Geography | Minimum population | Maximum population | Minimum number of households | Maximum number of households |
|-----------|--------------------|--------------------|------------------------------|------------------------------|
| LSOA      | 1,000              | 3,000              | 400                          | 1,200                        |
| MSOA      | 5,000              | 15,000             | 2,000                        | 6,000                        |

- In 2011 approximately 190,000 people worked in one of the five main West Yorkshire centres (Table 4). This represents 18% of the 1,036,000 people working in West Yorkshire.
- With the exception of Leeds (46%) car mode share for travel into the other centres<sup>7</sup> is relatively high (63%-71%). However, Leeds compares poorly with some of the other UK Core Cities.

**Table 4. Percentage commuting into districts' urban centres<sup>7</sup>, by mode**

| District   | All People | Train | Bus / coach | Taxi | Car/Van (passenger or driver) | Motorc. | Bicycle | On foot |
|------------|------------|-------|-------------|------|-------------------------------|---------|---------|---------|
| Bradford   | 26,539     | 8%    | 19%         | 1%   | 63%                           | 0%      | 1%      | 8%      |
| Calderdale | 22,930     | 4%    | 15%         | 1%   | 69%                           | 1%      | 1%      | 10%     |
| Kirklees   | 18,410     | 3%    | 17%         | 1%   | 64%                           | 1%      | 1%      | 10%     |
| Leeds      | 109,354    | 17%   | 21%         | 1%   | 46%                           | 1%      | 2%      | 11%     |
| Wakefield  | 15,361     | 3%    | 14%         | 1%   | 71%                           | 1%      | 1%      | 9%      |

## 2.7. City Centre Living

- The 2011 Census shows a growing trend for city centre living in all the five district centres.
- Table 5 shows this increase was particularly noticeable in Leeds, where city centre living practically doubled in the period 2001 to 2011, as well as in Bradford, where the number of residents in the city centre increased by 42%.
- This has implications for public transport; for example in Leeds the majority of these residents travel to work by sustainable modes – only 28% travel by car compared with 65% for all Leeds residents.

**Table 5. City centre living<sup>7</sup> in main West Yorkshire districts**

| District     | City centre population 2001 | City centre population 2011 |
|--------------|-----------------------------|-----------------------------|
| Bradford     | 9,565                       | 13,576                      |
| Halifax      | 7,244                       | 7,511                       |
| Huddersfield | 5,916                       | 6,550                       |
| Leeds        | 13,590                      | 26,650                      |
| Wakefield    | 6,051                       | 7,553                       |

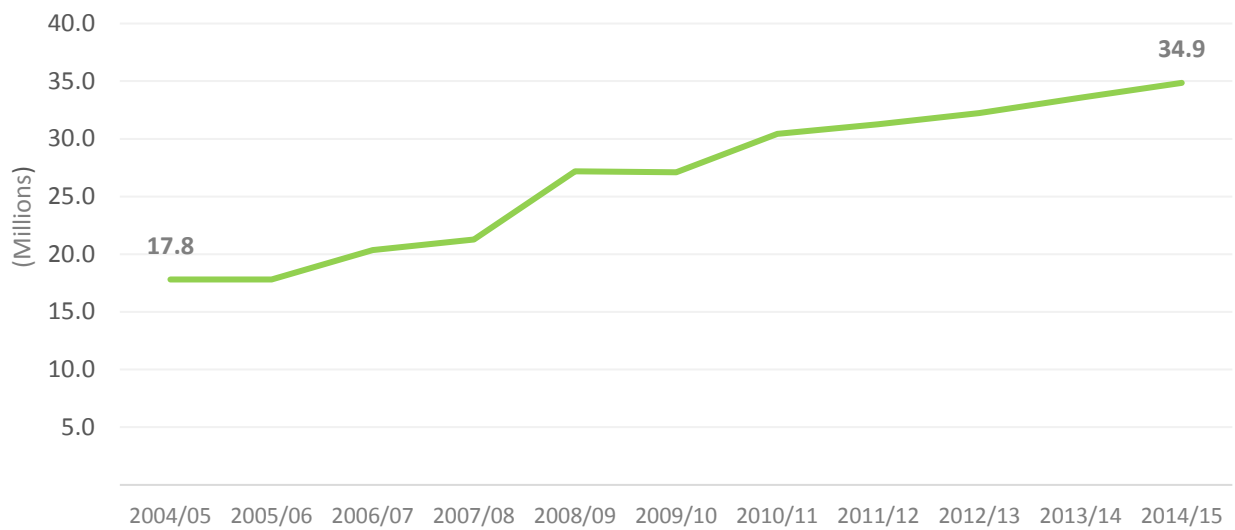
<sup>7</sup> Analysis of Census Travel to Work data, based on middle layer super output area (MSOA) geography, as defined by the 2011 Census. City centres correspond to the following MSOAs: Bradford 039, Calderdale 008, Kirklees 029, Leeds 063, Leeds 082, Leeds 111 and Wakefield 017. For consistency with the corresponding 2001 geography, lower layer super output areas (LSOA) Leeds 112D and Leeds 112E were also included.

### 3. Rail

#### 3.1. Recent Trends

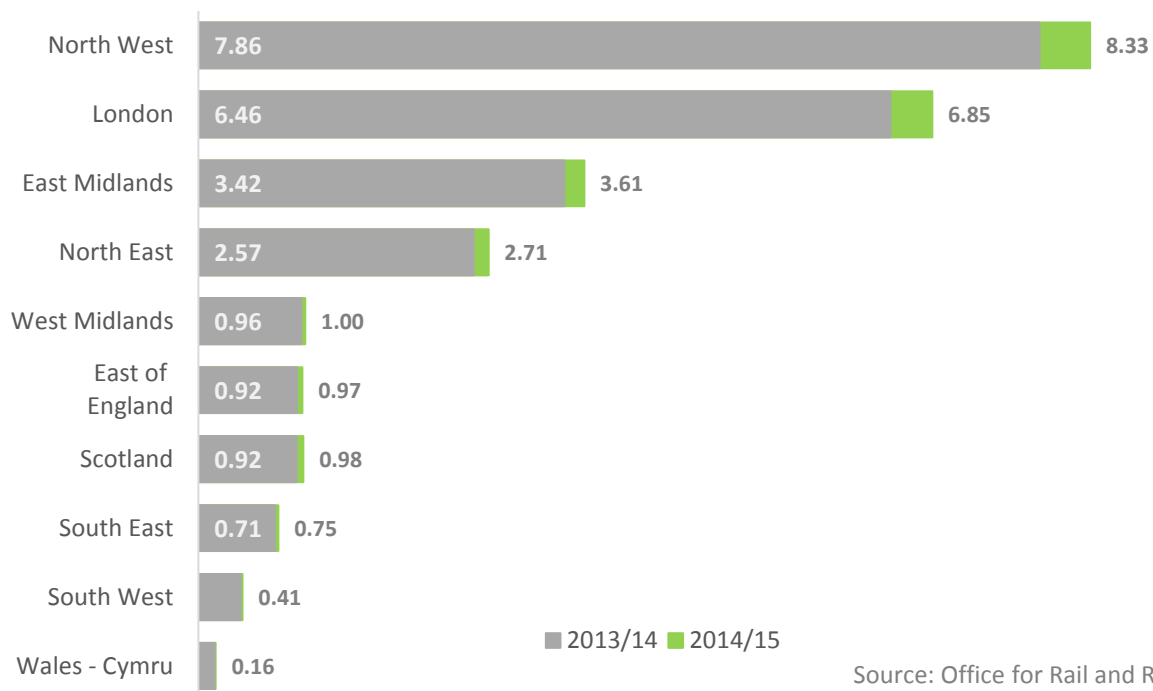
- Rail patronage in West Yorkshire has increased significantly over the last ten years, rising from 17.8m passenger journeys to 34.9m passenger journeys between 2004/05 and 2014/15 (a 96% increase).
- Main origins and destinations outside West Yorkshire are the North West (8.3m trips in 2014/15) and London (6.8m trips in 2014/15).

**Figure 10: Rail patronage in West Yorkshire 2004/05 to 2014/15**



Source: Office for Rail and Road

**Figure 11. Rail journeys (millions) to/from other regions**

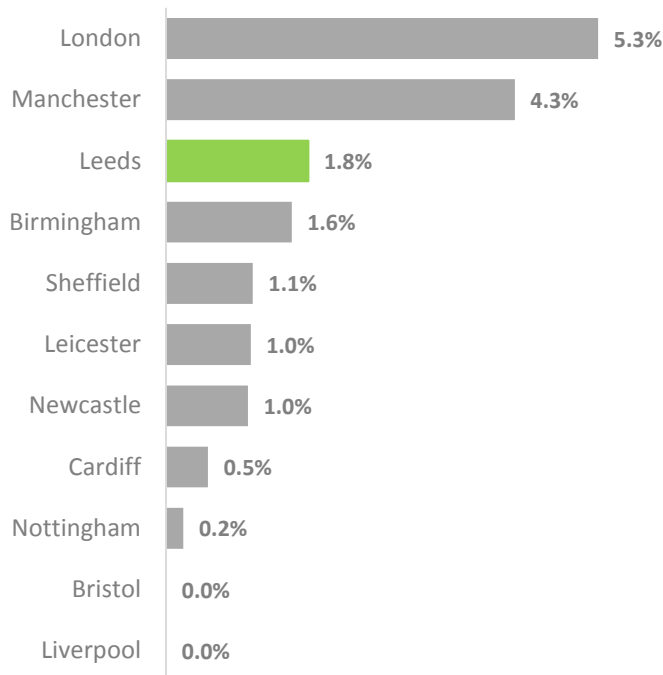


Source: Office for Rail and Road



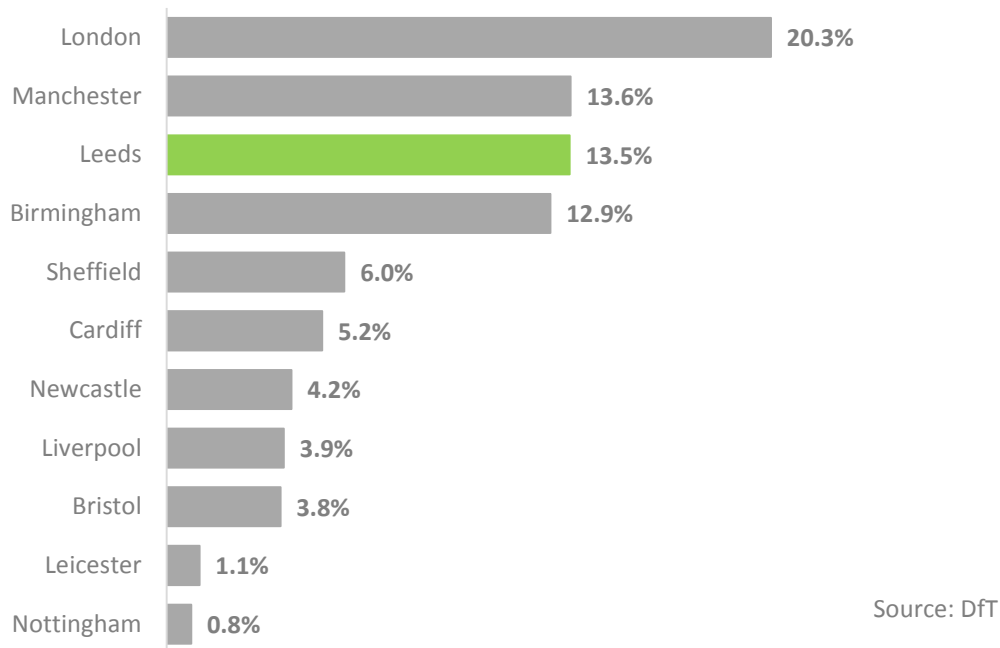
- Trains arriving in and departing from Leeds during the peak periods are the third most overcrowded in the country, after London and Manchester.
- The highest overcrowding is experienced on Northern Rail trains, with a percentage of Passengers in Excess of Capacity (PiXC) of 2.3% in the morning peak, and 1.7% in the evening peak.
- January 2016 saw the opening of Leeds Station Southern Entrance, expected to provide 20% of commuters with faster links to employment sites south of Leeds City Centre and to reduce crowding at the existing exit.

**Figure 12: Passengers in excess of capacity (PiXC) in the am peak (07:00 - 09:59). Main cities in England and Wales (2014)**

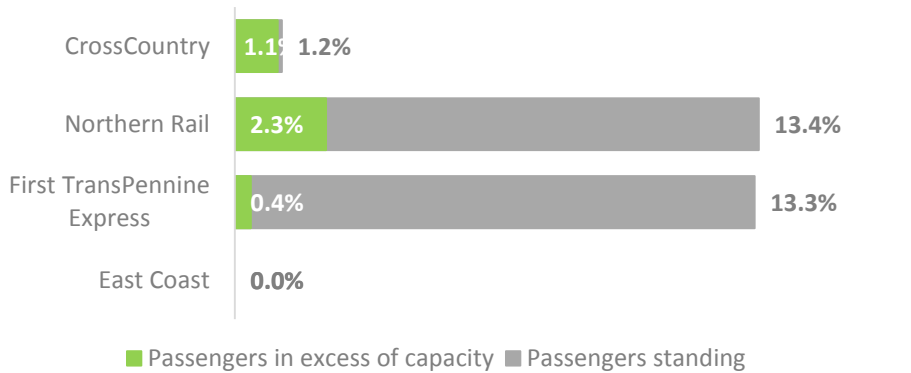


Source: DfT

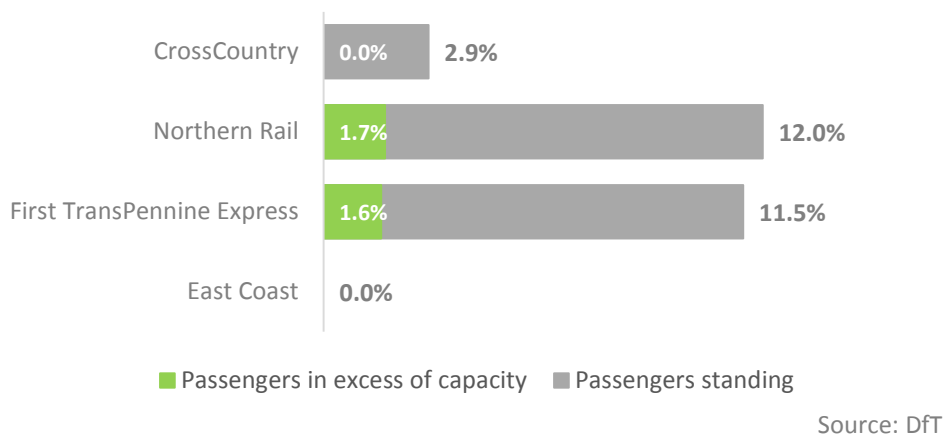
**Figure 13: Rail passengers standing on trains in the am peak (07:00 - 09:59). Main cities in England and Wales (2014)**



**Figure 14: Passengers in excess of capacity by train operator. Leeds, am peak (07:00 – 09:59), 2014**



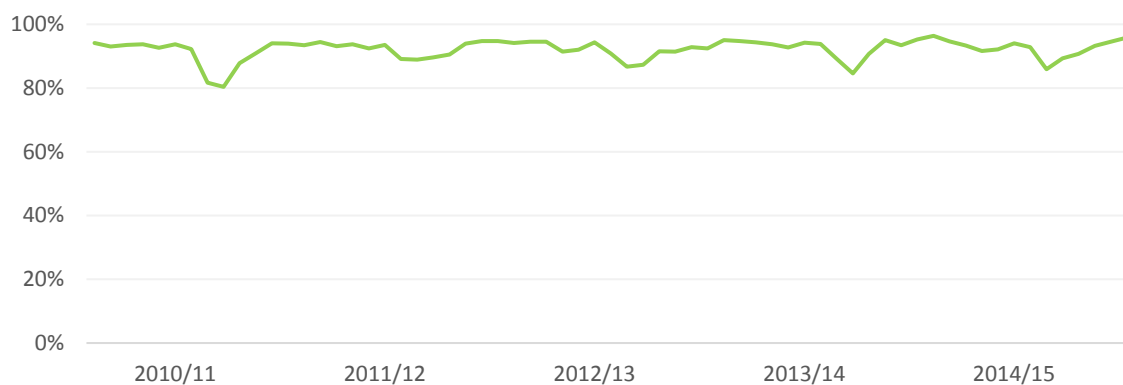
**Figure 15: Passengers in excess of capacity by train operator. Leeds, pm peak (16:00 – 18:59), 2014**



### 3.2. Rail Performance Score

- Public Performance Measure (PPM) is the main cross-industry measure of operational performance for all passenger services and is a key performance metric for evaluating the overall punctuality<sup>8</sup> and reliability of local rail franchises in West Yorkshire. The following figure and table show the PPM values for Northern Rail –the franchise operating regional services in West Yorkshire.

**Figure 16: PPM North and West Yorkshire (Northern Rail) 2010-2015**



Source: Office for Rail and Road

**Table 6: Average annual PPM by line**

| Line           | Trend | 2013 | 2014 | 2015 |
|----------------|-------|------|------|------|
| Airedale       |       | 92.2 | 94.0 | 94.0 |
| Calder Valley  |       | 87.8 | 87.6 | 86.6 |
| Hallam         |       | 90.0 | 90.8 | 92.4 |
| Harrogate      |       | 92.3 | 91.1 | 90.1 |
| Huddersfield   |       | 86.4 | 90.4 | 92.2 |
| Peninstone     |       | 87.6 | 91.1 | 91.1 |
| Pontefract     |       | 95.3 | 95.6 | 96.4 |
| Wakefield      |       | 88.6 | 89.5 | 90.7 |
| Wharfedale     |       | 96.0 | 96.3 | 96.3 |
| York and Selby |       | 87.4 | 87.0 | 86.0 |

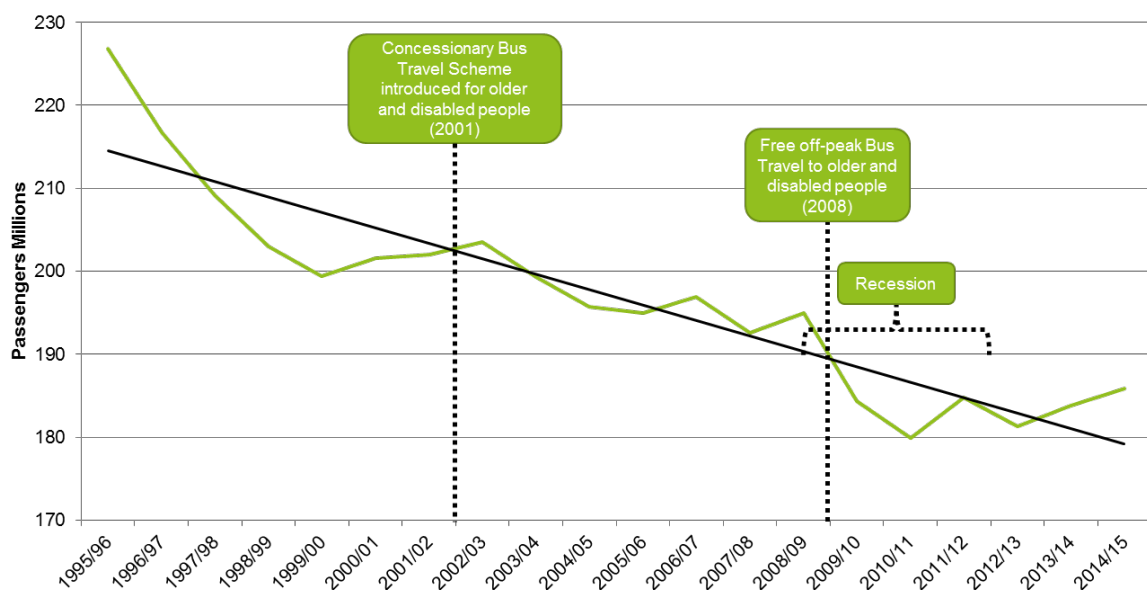
<sup>8</sup> Public performance measure (PPM): A train is defined as on time if it arrives within five minutes of the planned destination arrival time for regional operators, or ten minutes for long distance operators.

## 4. Bus

### 4.1. Long Term Trend

- Bus use outside London has been in decline since bus deregulation in 1986. During this time bus patronage in the English Metropolitan Areas has halved while in London it has more than doubled<sup>9</sup>.
- In West Yorkshire, bus patronage has fallen by 41 million (18%) between 1995 and 2015. Approximately two thirds of this decline occurred between 1995 and 2000. Since 2000, patronage has declined by approximately 14 million.

Figure 17: West Yorkshire bus patronage 1995-2015



Source: West Yorkshire Bus Strategy

### 4.2. Recent Trends

- Bus patronage in West Yorkshire fell by around 10 million passengers between 2005 and 2015. The greatest decline occurred between 2008 and 2013, coinciding with the economic downturn. During this period the number of passengers fell from 192.6m to a low of 179.9m.
- The introduction of free concessionary travel in April 2008 for senior citizens and the disabled across England resulted in a rise in off-peak travel, while non-concessionary travel continued to decline. Census Travel to Work data also indicate that during the period 2001 to 2011 bus lost its attractiveness for commuting trips, with the number of West Yorkshire residents commuting by bus falling by 16,052 (13.5% fall).

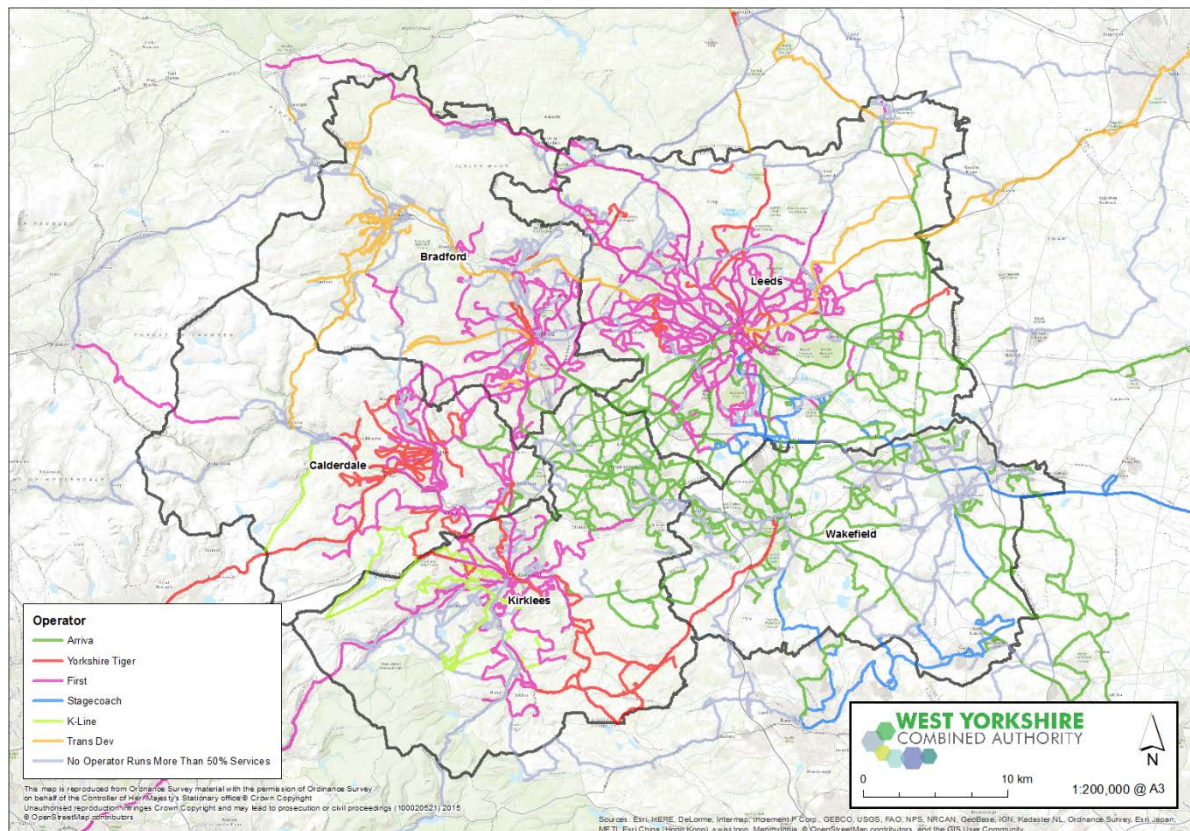
<sup>9</sup> Source: West Yorkshire Bus Strategy

- However, since 2010 concessionary travel has decreased and non-concessionary travel has increased, resulting in an overall rise in patronage.
- Average inbound bus speeds during the morning peak period on radial routes in West Yorkshire were below 12 mph in 2014<sup>10</sup>, the latest year with data available.

### 4.3. Bus Operator Market Shares

- There were 36 bus operators in West Yorkshire in 2014/15, together operating 58.1 million vehicle miles.
- A number of smaller operators focus on the market for tendered services.
- First West Yorkshire (a local subsidiary of First Group plc) is the largest operator, with circa 57.6% of the market.
- Arriva (owned by the German Deutsche Bahn) has 23.7% of the market.
- Keighley & District (part of the French group Transdev) has 5.4% of the market and also owns Yorkshire Coastliner and Harrogate & District, both of which operate services into Leeds.

Figure 18: Bus operators' predominance in West Yorkshire



From Bus Strategy Facts & Figures

<sup>10</sup> LTP Monitoring of core bus routes using Automatic Vehicle Location (AVL) data.

- In 2011/12, the Competition Commission undertook an investigation into local bus services, concluding that the local deregulated bus market in West Yorkshire was highly concentrated, with little on-street competition. It also reported that:
  - On average 48.5% of routes in West Yorkshire are highly likely to suffer from Adverse Effect on Competition (AEC);
  - Over 50% of routes in Leeds, Bradford and Halifax are highly likely to be subject to AEC;
  - On average only 2.3% of routes in West Yorkshire are categorised as not being subject to AEC.
- Estimates suggests that the impact of AEC costs over £25 million per annum across West Yorkshire.

#### 4.4. Park and Ride

- There are approximately 2,800 parking spaces at West Yorkshire rail stations which can be used for park and ride (excluding rail station parking spaces within the five main urban centres).
- Surveys commissioned by WYCA in 2013 at two key rail park and ride sites (Garforth and New Pudsey) estimated the levels of usage at each:

**Table 7. Rail-served park and ride average usage (2013)**

|                               | Garforth | New Pudsey |
|-------------------------------|----------|------------|
| Car park spaces               | 267      | 283        |
| Average daily usage (entries) | 417      | 505        |

- The main destination of respondents parking at Garforth and New Pudsey was Leeds City Centre (66% in Garforth<sup>11</sup>, 70% in New Pudsey<sup>12</sup>).
- The majority of these respondents indicated that they used the park and ride site to commute to their usual place of work (73% in Garforth, 61% in New Pudsey).
- Between 21% and 24% of interviewees revealed they would have travelled by car if the park and ride site had not been available.
- A new bus-served park and ride site opened at Elland Road in 2014, offering a ten-minute service frequency and a ten-minute journey time into Leeds. Surveys show that more than 80% of users that previously travelled by car have shifted to bus for their trips into Leeds centre. Feedback reveals that 99.5% of the service users would recommend using the Elland Road park and ride site.
- Originally opened with 400 surfaced spaces, the site is currently being expanded to create an additional 400 spaces.

<sup>11</sup> Over a sample of 228 interviews conducted in Garforth

<sup>12</sup> Over a sample of 254 interviews conducted in New Pudsey

- The bus park and ride site at King Lane (Leeds) has a total of 151 car park spaces, and it is used by an average of 125 cars daily.

## 5. Road

### 5.1. West Yorkshire Road Network

- In 2015 the West Yorkshire Road Network had a length of 5,970 miles<sup>13</sup>. There were:
  - 95 miles of motorway
  - 596 miles of “A” road, of which 590 were principal “A” roads
  - 231 miles of “B” road
  - 398 miles of “C” road
  - 4,650 miles of “U” road
- Further details on the length of the West Yorkshire road network by type of road and local authority are given in Tables 6 to 8 below.

**Table 8. Length of West Yorkshire motorway network by local authority/type<sup>13</sup>**

| Local Authority/Region | Trunk motorways | Principal motorways | All motorways |
|------------------------|-----------------|---------------------|---------------|
| Bradford               | 1.7             | 0.0                 | 1.7           |
| Calderdale             | 7.6             | 0.0                 | 7.6           |
| Kirklees               | 14.4            | 0.0                 | 14.4          |
| Leeds                  | 46.3            | 2.2                 | 48.5          |
| Wakefield              | 22.5            | 0.0                 | 22.5          |
| <b>West Yorkshire</b>  | <b>92.5</b>     | <b>2.2</b>          | <b>94.6</b>   |

**Table 9. Length of West Yorkshire “A” road network by local authority/type<sup>13</sup>**

| Local authority/Region | Trunk rural 'A' | Trunk urban 'A' | Principal rural 'A' | Principal urban 'A' | All 'A' roads |
|------------------------|-----------------|-----------------|---------------------|---------------------|---------------|
| Bradford               | 0.0             | 0.0             | 35.5                | 58.9                | 94.5          |
| Calderdale             | 0.0             | 0.0             | 32.1                | 52.3                | 84.3          |
| Kirklees               | 0.0             | 0.0             | 49.8                | 80.4                | 130.2         |
| Leeds                  | 0.0             | 0.0             | 64.9                | 118.2               | 183.1         |
| Wakefield              | 6.1             | 0.0             | 51.6                | 46.7                | 104.3         |
| <b>West Yorkshire</b>  | <b>6.1</b>      | <b>0.0</b>      | <b>233.9</b>        | <b>356.4</b>        | <b>596.4</b>  |

<sup>13</sup> Source: Department for Transport Statistics. Table RDL0102a

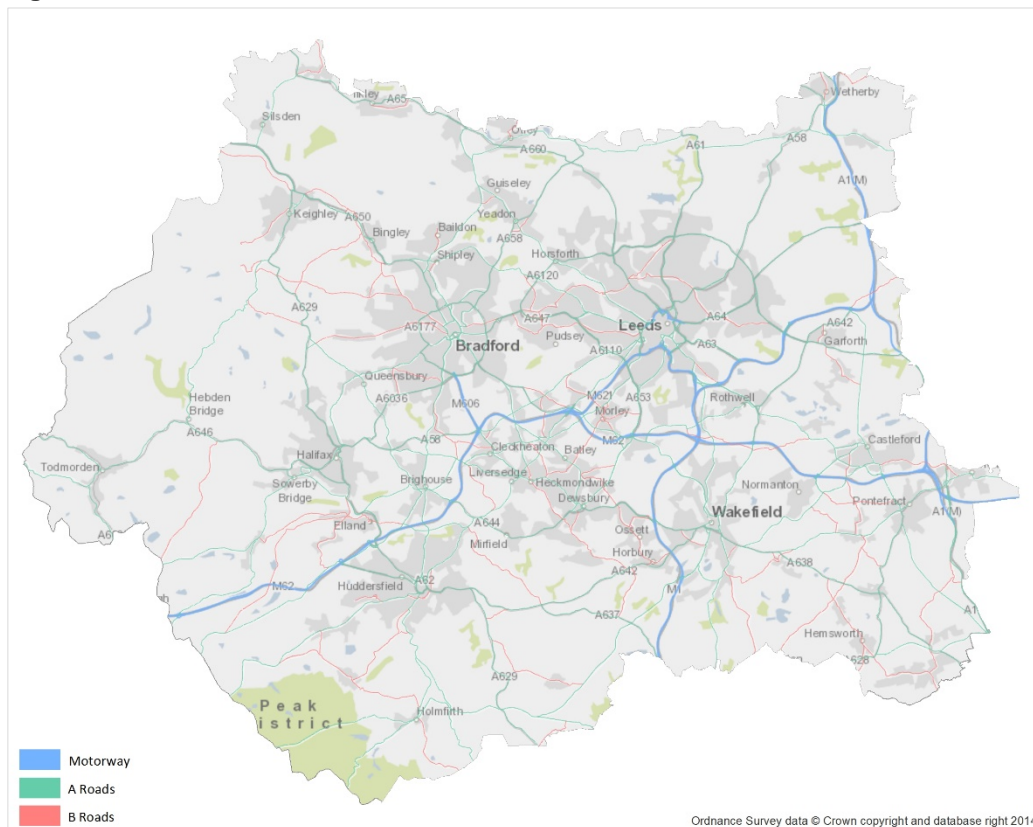


**Table 10. Length of West Yorkshire minor road network, by local authority/type<sup>13</sup>**

| Local authority/Region | Rural 'B'    | Urban 'B'    | Rural 'C'    | Urban 'C'    | Rural 'U'      | Urban 'U'      | All minor roads |
|------------------------|--------------|--------------|--------------|--------------|----------------|----------------|-----------------|
| Bradford               | 18.7         | 29.6         | 28.7         | 44.8         | 230.6          | 759.6          | 1,111.9         |
| Calderdale             | 16.0         | 6.5          | 22.1         | 29.9         | 260.9          | 294.7          | 630.2           |
| Kirklees               | 31.3         | 24.7         | 39.5         | 53.2         | 284.1          | 614.3          | 1,047.2         |
| Leeds                  | 11.0         | 38.1         | 57.7         | 41.9         | 247.1          | 1,255.7        | 1,651.4         |
| Wakefield              | 35.8         | 19.3         | 57.1         | 23.2         | 196.5          | 506.5          | 838.4           |
| <b>West Yorkshire</b>  | <b>112.8</b> | <b>118.2</b> | <b>205.1</b> | <b>193.0</b> | <b>1,219.2</b> | <b>3,430.8</b> | <b>5,279.1</b>  |

- Figure 19 below shows the extension of the West Yorkshire road network, by type of road.

**Figure 19. West Yorkshire Road Network**

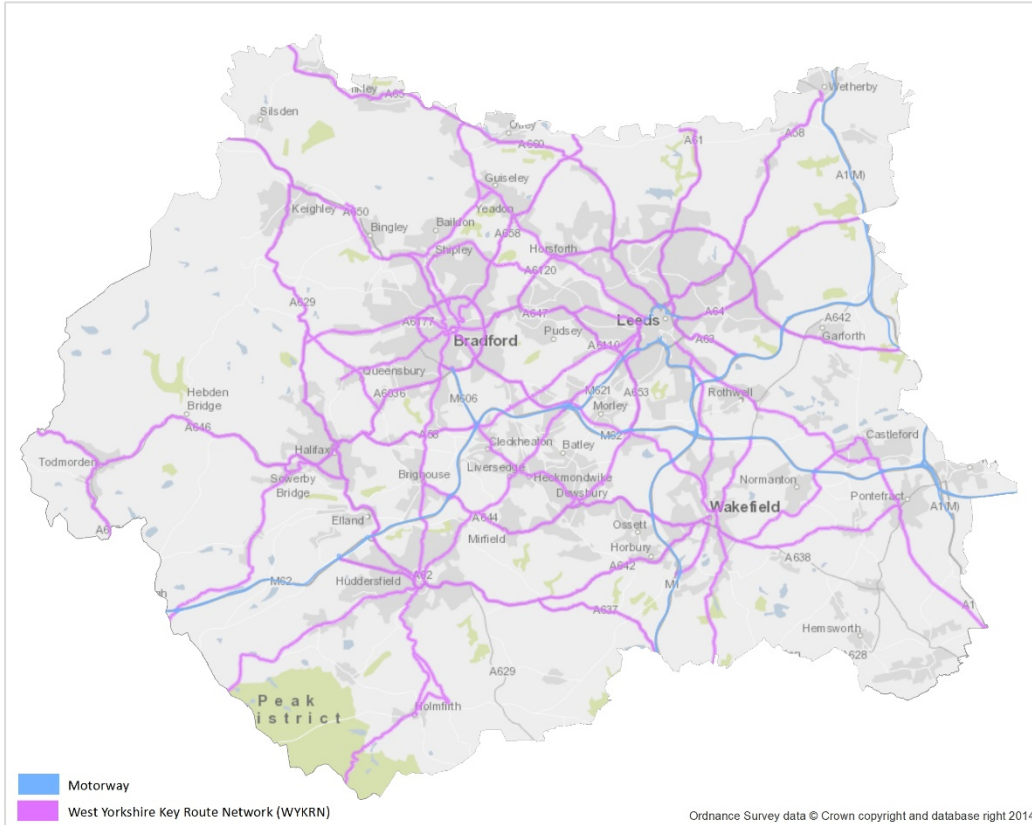


## 5.2. West Yorkshire Key Route Network (WYKRN)

- West Yorkshire Key Route Network is made up of a number of roads that are identified as being of strategic importance based on the following criteria:
  - the core network - where traffic flows exceed 20,000 vehicles per day
  - roads that perform strategic functions

- The proposed Key Route Network (shown in Figure 20) includes over 411 miles of predominately A roads – about 7% of all West Yorkshire roads.

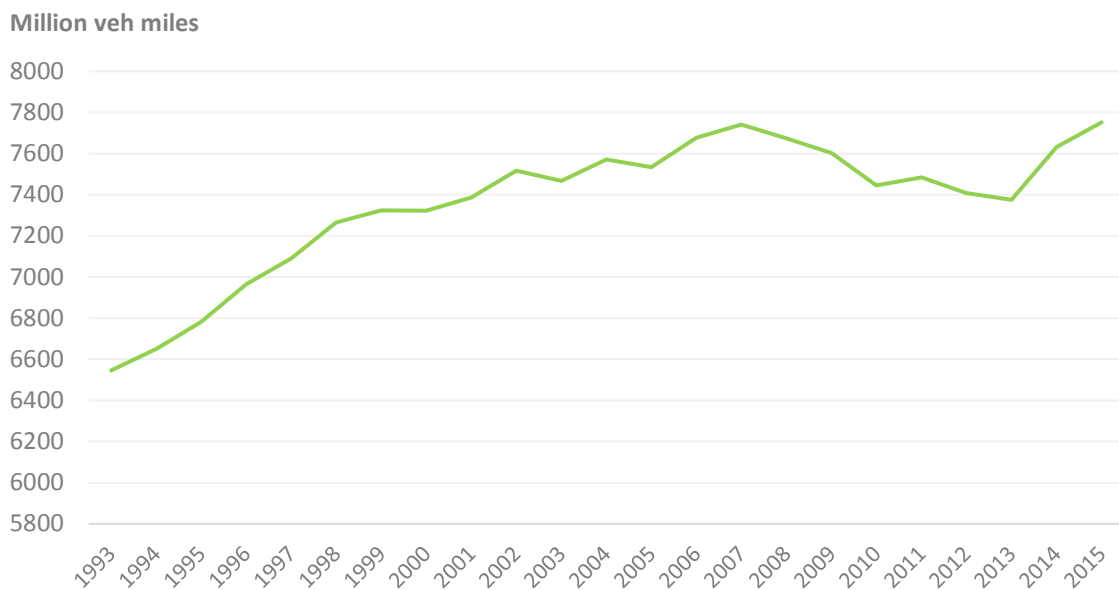
**Figure 20. West Yorkshire Key Route Network**



### 5.3. Long Term Trends

- The decline in bus usage in West Yorkshire contrasts against, and perhaps is in part explained by, the long term increase in car travel shown in figure 21. Car vehicle miles, which represent around 80% of all traffic in the region, increased from 6.5 billion in 1993 to 7.7 billion in 2015, with most of this growth occurring during the first part of the period.

**Figure 21: West Yorkshire annual car traffic, since 1993 (all roads)**

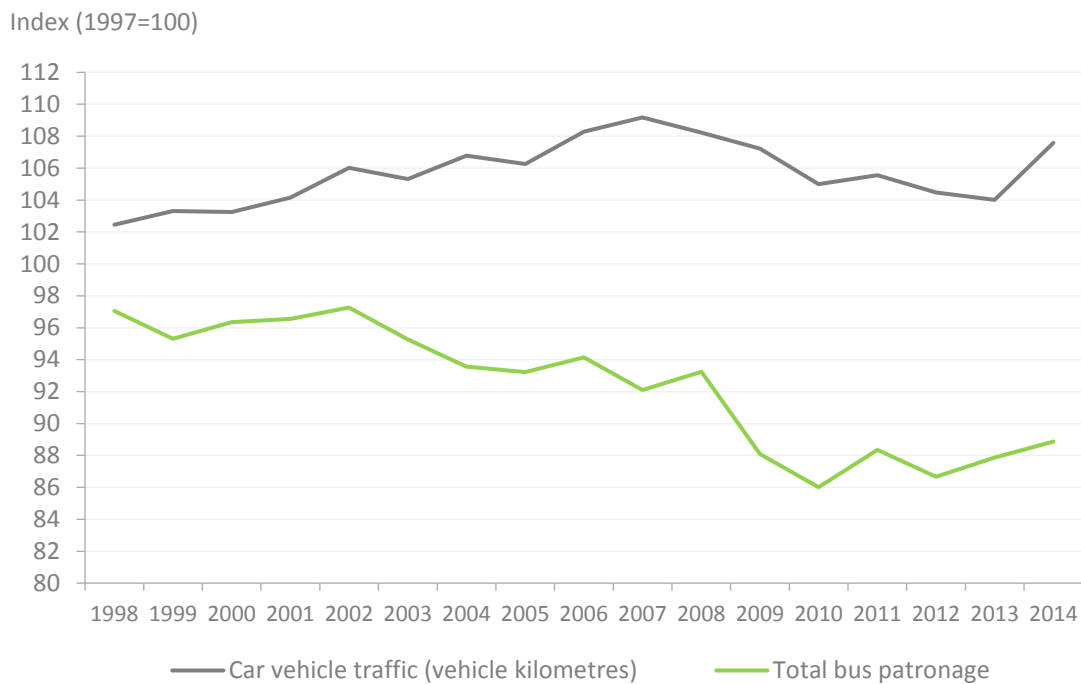


Source: DfT, Table TRA8902

#### **5.4. Recent Trends**

- During the 2000s, the growth of car traffic slowed, and after reaching a peak in 2007, it fell for several years, coinciding with the economic downturn. Recent figures indicate that car traffic has returned to pre-recession levels with 7.7 billion vehicle miles reached in 2015.
- A comparison of the trends in car vehicle miles and bus patronage shows a number of similarities since 2007; both were in decline between 2008 and 2010, coinciding with the economic crisis, and experienced a brief increase during 2011. Since then, both car and bus travel has returned to approximately 2009 levels.

**Figure 22: Comparison of bus and car use in West Yorkshire (Indexed to 1997 base)**



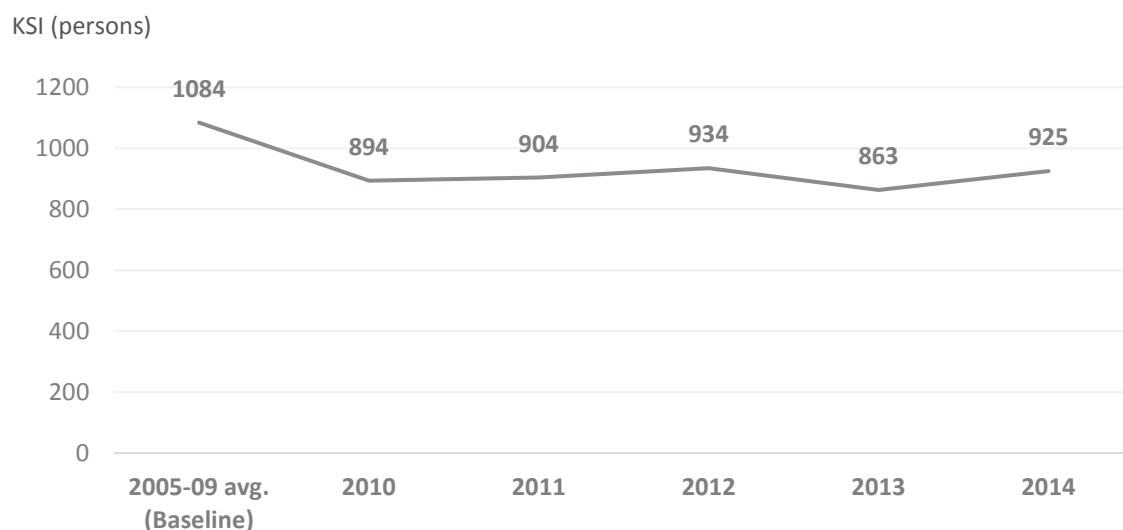
### 5.5. Congestion

- Average delay on local ‘A’ roads has been introduced by the Department for Transport as an indicator of relative congestion. This is calculated based on the difference between derived “free flow” travel times and observed travel times, applying traffic flow weightings to reflect differences in traffic volumes on the roads.
- Values of the average delay on local ‘A’ roads for the year 2014 (the latest available) show low levels of delay in Leeds and Wakefield, although Bradford, Calderdale and Kirklees present values slightly above the national average, estimated at 42.3 seconds per vehicle per mile. Leeds compares well with other UK Core Cities.

## 5.6. Road Traffic Accidents

- After an overall downward trend between 2009 and 2013, the number of KSI (Killed or Seriously Injured) in reported road traffic accidents in West Yorkshire increased by 7% to 925 in 2014 (Figure 23).
- Analysis by district in Table 11 shows that the greatest increase occurred in Kirklees, with 20% more KSI casualties in 2014 compared to 2013. In contrast, Wakefield registered a reduction of 20% in the number of KSI casualties in the same period.
- Data for 2014 reflect that most KSI accidents (75%) occurred on urban roads and of these, 61% were on minor roads. Rural roads accounted for 22% of the KSI accidents and motorways for 3%.
- There were 49 road deaths in West Yorkshire in 2014, the second highest number recorded since 2010.

**Figure 23. West Yorkshire KSI 2009-2014**



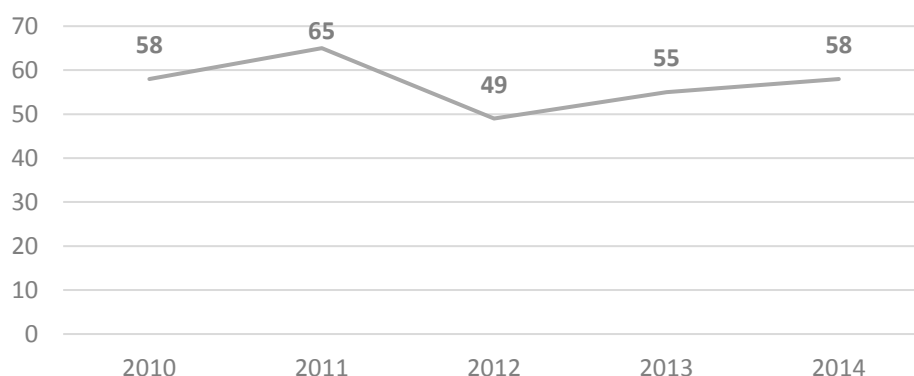
Source: Leeds City Council

**Table 11. KSI accidents by district**

|                 | Year 2005-09 avg.(baseline) | Year 2010  | Year 2011  | Year 2012  | Year 2013  | Year 2014  |
|-----------------|-----------------------------|------------|------------|------------|------------|------------|
| Bradford        | 248                         | 208        | 216        | 221        | 190        | 204        |
| Calderdale      | 112                         | 81         | 90         | 96         | 90         | 99         |
| Kirklees        | 200                         | 137        | 160        | 151        | 139        | 168        |
| Leeds           | 357                         | 304        | 297        | 303        | 294        | 334        |
| Wakefield       | 167                         | 164        | 141        | 163        | 150        | 120        |
| <b>WY Total</b> | <b>1084</b>                 | <b>894</b> | <b>904</b> | <b>934</b> | <b>863</b> | <b>925</b> |

Source: Leeds City Council

**Figure 24. Reported road deaths in West Yorkshire 2010-2014**



Source: DfT

**Table 12. Reported road deaths in West Yorkshire, by district**

| Year            | 2010      | 2011      | 2012      | 2013      | 2014      |
|-----------------|-----------|-----------|-----------|-----------|-----------|
| Bradford        | 10        | 12        | 15        | 13        | 14        |
| Calderdale      | 3         | 7         | 2         | 4         | 6         |
| Kirklees        | 9         | 5         | 7         | 13        | 9         |
| Leeds           | 19        | 26        | 15        | 15        | 21        |
| Wakefield       | 17        | 15        | 10        | 10        | 8         |
| <b>WY Total</b> | <b>58</b> | <b>65</b> | <b>49</b> | <b>55</b> | <b>58</b> |

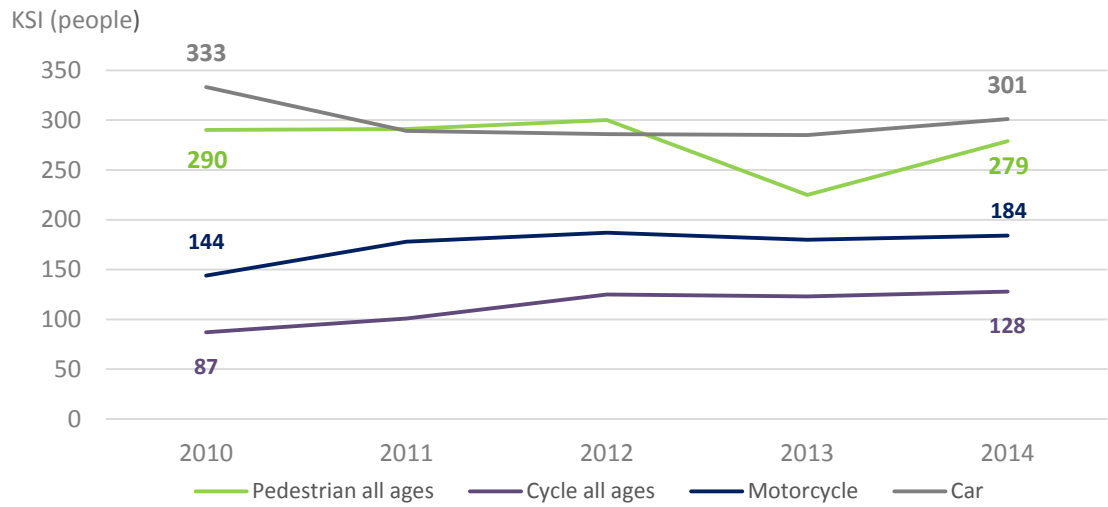
Source: DfT

## 5.7. Vulnerable Road Users

- Vulnerable users (pedestrians, cyclists and motorcyclists) represent two thirds of the KSI in West Yorkshire. Figure 25 shows that the two latter are particularly vulnerable; together, motorcycling and cycling represent less than 1.3% of the total number of trips in West Yorkshire<sup>14</sup> but they account for 34% of all the KSI casualties.
- The increase in cycling in recent years has been paired with an increase in the number of cyclists KSI in the region. The number of cyclists KSI increased by 4% between 2013 and 2014, and by 47% between 2010 and 2014.
- The number of motorcyclists KSI increased by 2% between 2013 and 2014 and by 28% since 2010.
- Motorcyclists are also overrepresented when looking at fatal casualty numbers; in 2014 they accounted for 11% of the total road deaths in West Yorkshire.

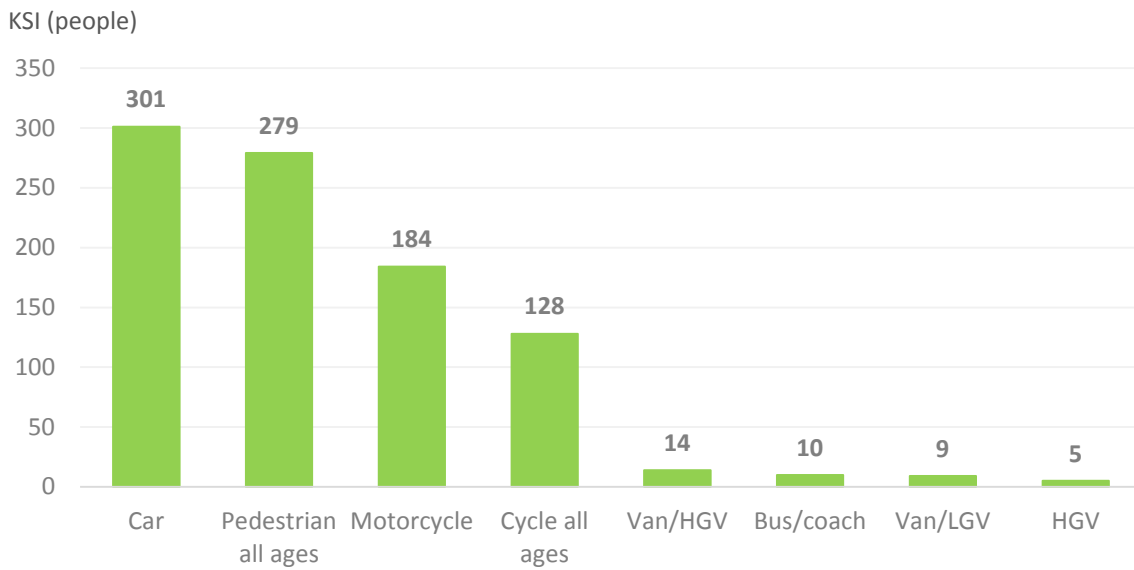
<sup>14</sup> Source: Leeds City Council

**Figure 25. Reported KSI casualties by user type in West Yorkshire, 2010-2014. Car and vulnerable users.**



Source: DfT

**Figure 26. Reported KSI casualties by user type. West Yorkshire, 2014**



Source: DfT

## 6. Walking and cycling

### 6.1. Long Term Trends

- Census Travel to Work data show that walking to work declined between 1971 and 1991, and remained fairly static from 1991 to 2011.
- Equally, cycle commuting fell 14% between 1971 and 1991, but has grown since - in 2011 it was 23% higher than in 1971. This applies to four out of the five West Yorkshire districts, with the exception of Wakefield, where it has continued to fall until being half the 1971 level.

### 6.2. Recent Trends

- Census travel to work data indicates between 2001 and 2011 the number of residents in Leeds cycling to work grew by 49%. Calderdale and Bradford also experienced notable increases (24% and 13% respectively) (Figure 28).
- In spite of this, the share of cycling for trips to work continues to be low. In Leeds, which has the highest rate in West Yorkshire, this is 1.1%, and 0.5% in Bradford.
- The number of people walking to work increased by more than 18% in Leeds and by 12% in Bradford, reflecting the growth in city centre living (Figure 27).
- Nevertheless, only 48% of West Yorkshire residents walk for 10 minutes or more five times a week, a similar figure to the average for England and Wales<sup>15</sup>.
- West Yorkshire residents undertake around 470 million walking trips annually, a figure that has remained fairly constant over the last decade<sup>16</sup>.

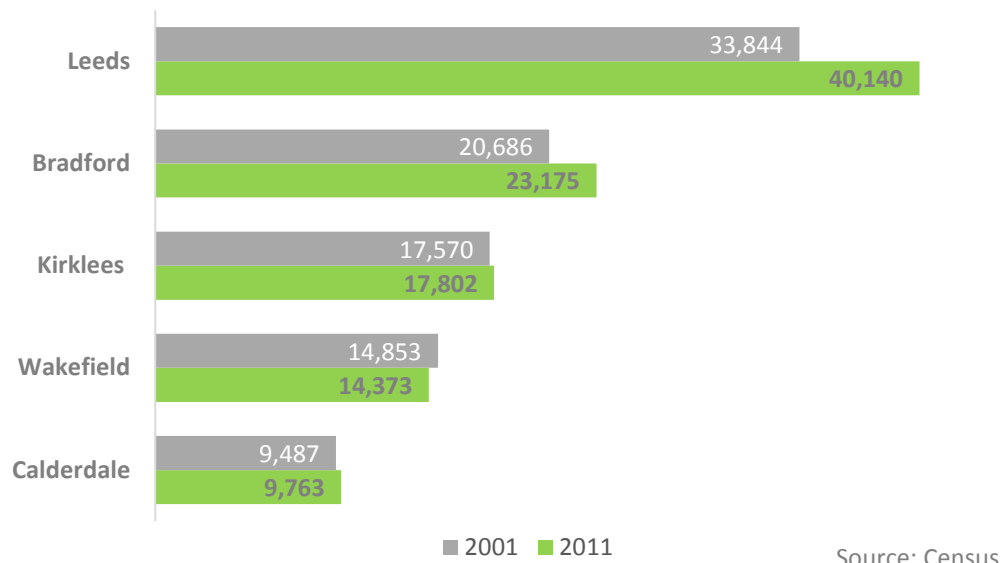
---

<sup>15</sup> DfT / Sport England Active People Survey

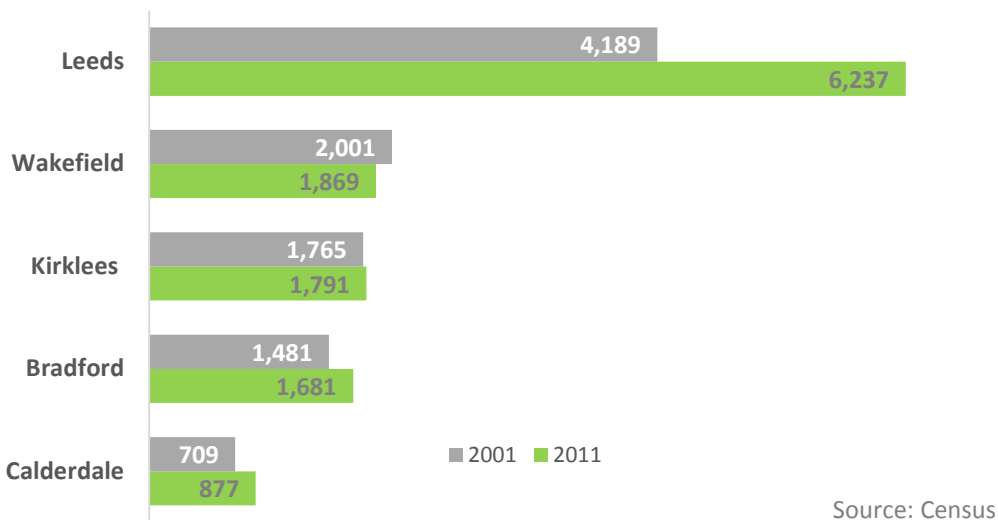
<sup>16</sup> DfT National Travel Survey bespoke West Yorkshire subset



**Figure 27. Travel to work by mode: walk (district residents, 2001/2011)**



**Figure 28. Travel to work by mode: bicycle (district residents, 2001/2011)**



## 7. Freight

- West Yorkshire is the destination of 61 million tonnes and the origin of over 54 million tonnes of freight annually. 93% of this freight is transported by road, and 7% by rail.<sup>17</sup>
- HGV (Heavy Goods Vehicles) movements are concentrated on the strategic road network (motorways and trunk roads), which handles 66% of all HGV traffic but only 33% of all road traffic<sup>18</sup>.
- The Region is served by two intermodal rail freight terminals at Wakefield Europort and Stourton (Leeds). The Wakefield site gained consent as an integrated terminal and warehousing site, but is not operated as a single entity.

<sup>17</sup> Source: Freight in the City Regions, Final Report. PTEG (2013)

<sup>18</sup> Source: Department for Transport. Strategic Road Network statistics (2015). Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/448276/strategic-road-network-statistics.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/448276/strategic-road-network-statistics.pdf)

- Two corridors in West Yorkshire, the M1/A1 (M) and M62, present some of the greatest concentrations of freight traffic by road in the country<sup>19 17</sup>.
- HGVs continue to be over represented in accidents involving pedestrian and cyclist fatalities. Data from 2013 show that while accounting for 5% of traffic in Great Britain, they were involved in 15% of pedestrian KSI casualties<sup>20</sup> and 23% of cyclists' road deaths nationally<sup>21</sup>.
- Similarly, while HGVs account for just 5% of traffic, they are the source of 21% of CO<sub>2</sub> emissions nationally<sup>22</sup> and are responsible for between 30% and 45% of air pollution from road transport in the City Regions<sup>23</sup>.

- 

## 8. Leeds Bradford Airport

- Leeds Bradford Airport (LBA) is located 11km from Leeds city centre. It takes 30 minutes on average to reach by car and 45 minutes by bus<sup>24</sup>.
- Passenger surveys for the Civil Aviation Authority show the airport is currently used predominantly for leisure travel (business travel accounted for 10% of those surveyed).
- 88% of almost 2,900 passengers surveyed had travelled to the airport by private vehicle whilst only 12% used public transport.
- The majority (86%) of passengers using LBA come from the Yorkshire and Humber region. Of those:
  - 60% come from West Yorkshire;
  - 25% from North Yorkshire;
  - Approximately 7% from both the East Riding of Yorkshire and South Yorkshire.
- The second highest proportion of passengers comes from the North East region, accounting for 8% of total passengers. Passengers from the North West region account for 4% of the overall use of the airport.

---

<sup>19</sup> Source: Transport for the North Freight and Logistics Strategy. Phase 1 Baseline Report (2016)

<sup>20</sup> Source: DfT, Facts on Pedestrian Casualties. June 2015. Available at [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/448036/pedestrian-casualties-2013-data.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/448036/pedestrian-casualties-2013-data.pdf)

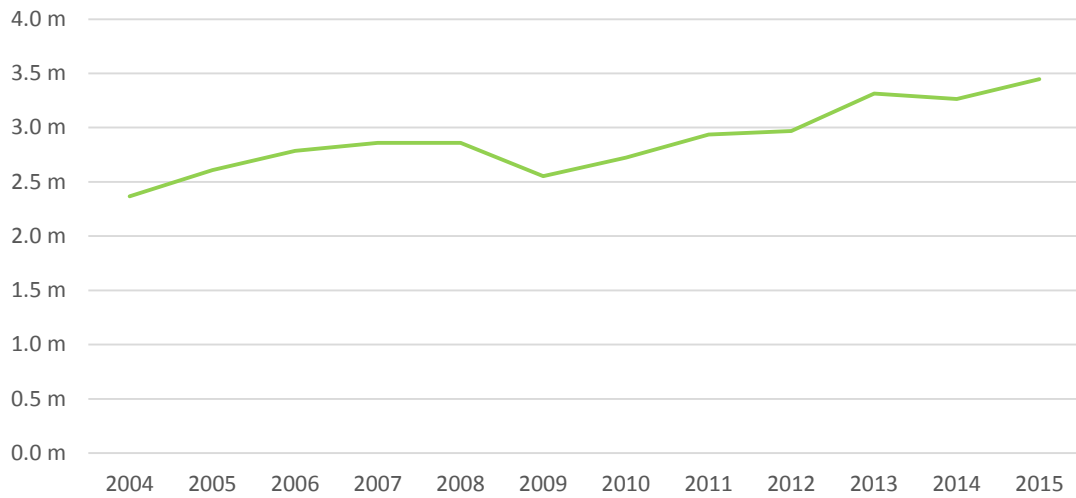
<sup>21</sup> DfT. Facts on Pedal Cyclists. June 2015. Available at [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/447674/pedal-cyclists-2013-data.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/447674/pedal-cyclists-2013-data.pdf)

<sup>22</sup> Source: DfT Transport Statistics table TRA0101 (2011); DfT Transport Statistics table ENV0202.

<sup>23</sup> TTR/TRL (2014) Air Quality in the City Regions: A Transport Toolkit

<sup>24</sup> Source: Connectivity to Leeds-Bradford International Airport. Outline Option Appraisal. WSP/Parsons Brinckerhoff (2016). Estimate of standard journey times comparisons for current journeys based on average times for a selection of online route planners.

**Figure 29: Leeds Bradford Airport annual passengers (millions). Period: 2004 - 2015**



Source: Civil Aviation Authority

- With patronage at 3.5m passengers per year, the airport has seen a 22% growth in passenger numbers since 2009, making it one of the UK's fastest growing regional airports. DfT projections show LBA more than doubling in use to 7.1m by 2030.

## 9. Vehicle Emissions and Air Quality

- In the context of vehicles, emissions fall into two categories, greenhouse gas emissions, mainly carbon dioxide (CO<sub>2</sub>), and air pollutants affecting air quality, including oxides of nitrogen (NO<sub>x</sub>) and particulate matter (PM<sub>n</sub>).
- The urban areas of West Yorkshire have been identified as having some of the highest levels of air pollution in the UK, with only London showing higher levels at a regional level<sup>25</sup>. Nitrogen dioxide concentration exceeds National and EU Limit Values. Data for 2012 show that 4.9% of premature deaths in West Yorkshire are attributable to exposure to fine particulate matter (PM<sub>2.5</sub>), through heart and lung disease and respiratory illnesses such as asthma and bronchitis<sup>26</sup>.

### 9.1. Greenhouse Gases

- Transport CO<sub>2</sub> emissions account approximately for a quarter of total emissions in West Yorkshire. Between 2005 and 2007, CO<sub>2</sub> emissions attributable to transport have fallen by 12.5%. However, the reduction in transport CO<sub>2</sub> emissions seems to be occurring at a slower rate than for other sectors –in the same period, the percentage reduction for all sectors was approximately 16%.
- Since 2007 there has been a sustained decline in road CO<sub>2</sub> emissions in West Yorkshire of 12%. This reduction is related to newer vehicles being more efficient in general<sup>27</sup>, and also to lower petrol consumption due to the increase in diesel fuelled cars –diesel cars were 48.6 per cent of the fleet in 2015, compared to 31.7 per cent in 2008. More recently, some increase in hybrid and electric cars may also have had a contribution.

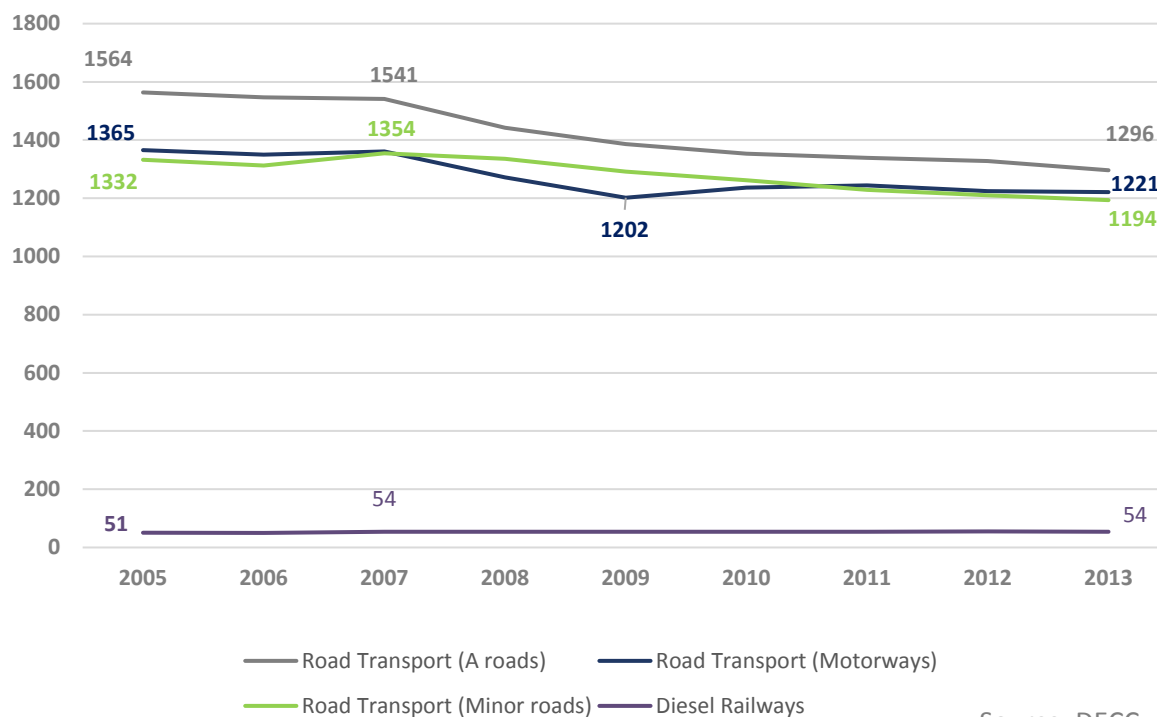
---

<sup>25</sup> Source: Air Pollution in the UK, Defra September 2014

<sup>26</sup> Source: West Yorkshire Low Emissions Strategy 2010-2021 (Consultation Version). Available at [http://www.calderdale.gov.uk/environment/pollution/air-quality/wyles/WYLES\\_consultation%20version\\_V4\\_14Oct2016.pdf](http://www.calderdale.gov.uk/environment/pollution/air-quality/wyles/WYLES_consultation%20version_V4_14Oct2016.pdf)

<sup>27</sup> Source: DfT Transport Statistics Table VEH0206 (2016)

**Figure 30: West Yorkshire transport emissions (kt CO<sub>2</sub>) 2005-2013: Road & diesel rail contribution**



**Figure 31: Total transport emissions by district (kt CO<sub>2</sub>) 2005 vs 2013**

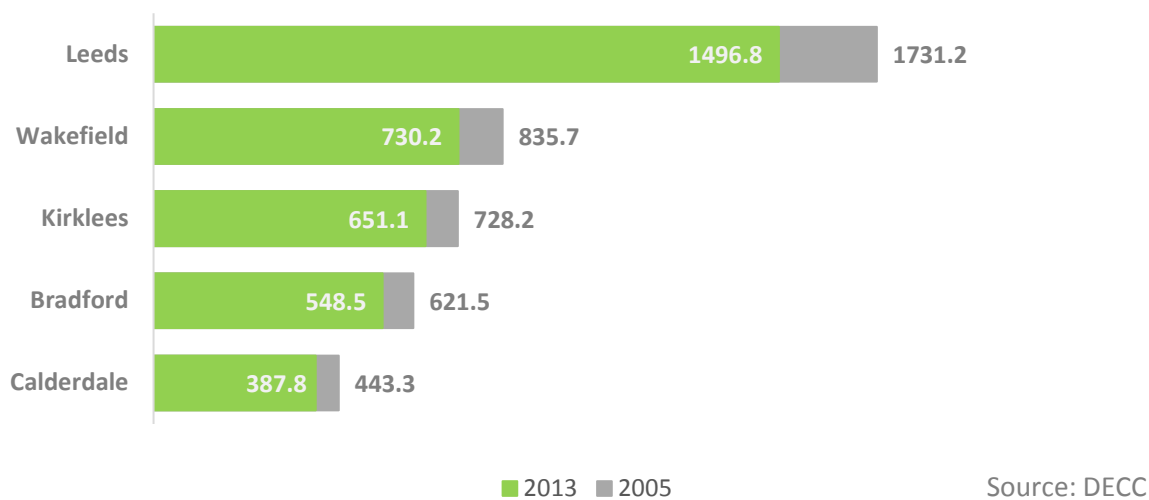
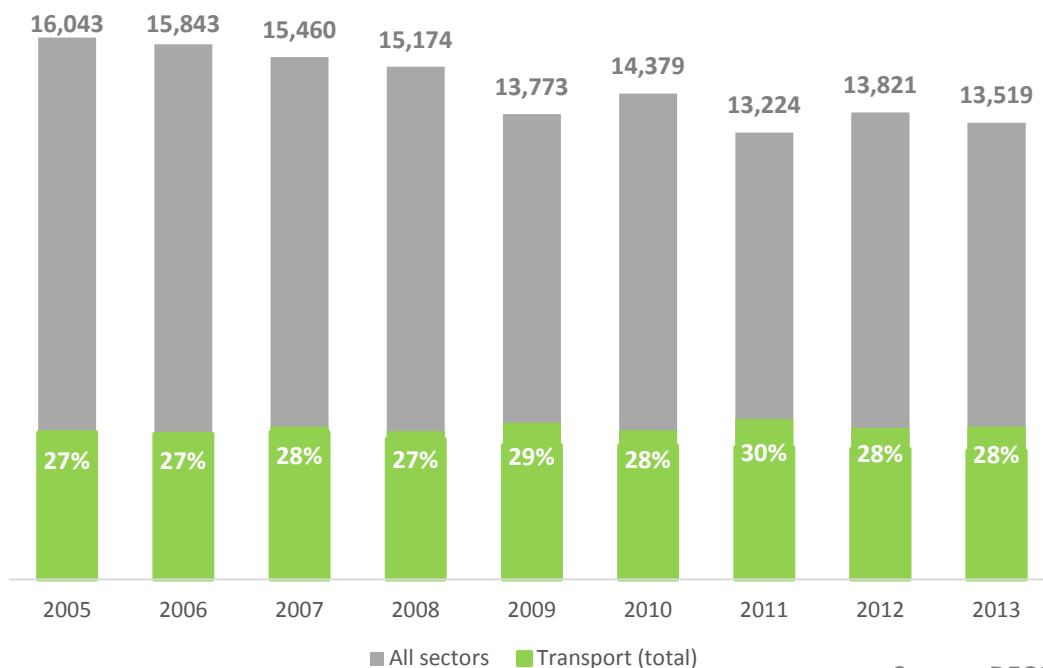


Figure 32. Transport contribution to West Yorkshire total CO2 emissions, 2005-2013 (kt CO2)



## 9.2. Air Pollutants

- Parts of West Yorkshire continue to exceed the current National Air Quality objective for NO<sub>x</sub> of 40µg<sub>m</sub><sup>-3</sup> set for 2005. Some of these areas are highly unlikely to meet this target until after 2030.

Table 13. Annual road traffic emissions of NO<sub>x</sub> across WY A Road network (tonnes per year).

| Geography      | 2009  | 2012  | 2013  | 2014  | Trend 2012-14 |
|----------------|-------|-------|-------|-------|---------------|
| Bradford       | 775   | 616   | 719   | 621   |               |
| Calderdale     | 410   | 378   | 400   | 378   |               |
| Kirklees       | 583   | 530   | 557   | 545   |               |
| Leeds          | 1,392 | 1,143 | 1,178 | 1,125 |               |
| Wakefield      | 561   | 456   | 469   | 461   |               |
| West Yorkshire | 3,721 | 3,123 | 3,323 | 3,130 |               |

Leeds City Council analysis using DEFRA Emissions Factor Toolkit

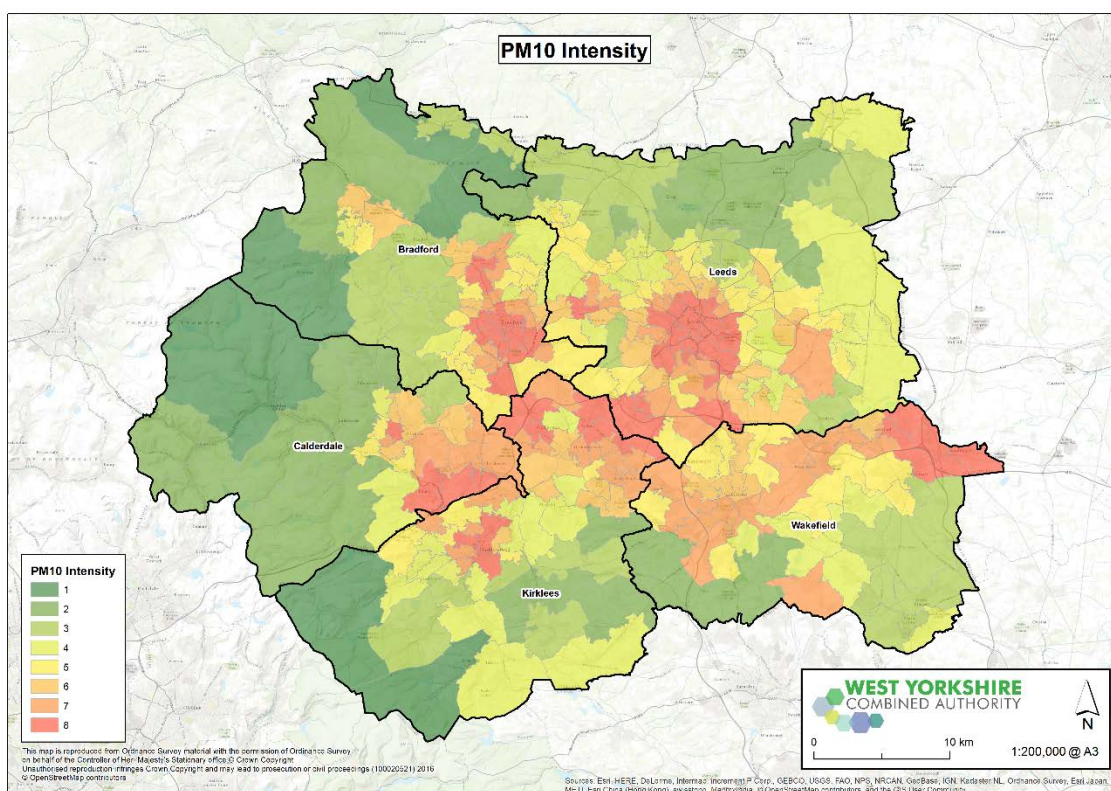
Table 14. Annual road traffic emissions of PM<sub>10</sub> across WY highway network (tonnes per year).

| Geography      | 2009  | 2012  | 2013  | 2014  | Trend 2012-14 |
|----------------|-------|-------|-------|-------|---------------|
| Bradford       | 775   | 616   | 719   | 621   |               |
| Calderdale     | 410   | 378   | 400   | 378   |               |
| Kirklees       | 583   | 530   | 557   | 545   |               |
| Leeds          | 1,392 | 1,143 | 1,178 | 1,125 |               |
| Wakefield      | 561   | 456   | 469   | 461   |               |
| West Yorkshire | 3,721 | 3,123 | 3,323 | 3,130 |               |

Leeds City Council analysis using DEFRA Emissions Factor Toolkit

- National source apportionment work published by DEFRA in 2012 indicated that road transport emissions are the largest single source of fine particulates within urban areas.
- The UK 1km<sup>2</sup> background source apportionment data<sup>28</sup> suggests much of this manifests itself as secondary or re-suspended sources. Approximately 50% of the emissions attributed directly to road traffic are estimated to be from tyre and brake abrasion, with the remaining 50% being from the exhaust<sup>29</sup>

Figure 33. Intensity of PM<sub>10</sub> emissions (2005)

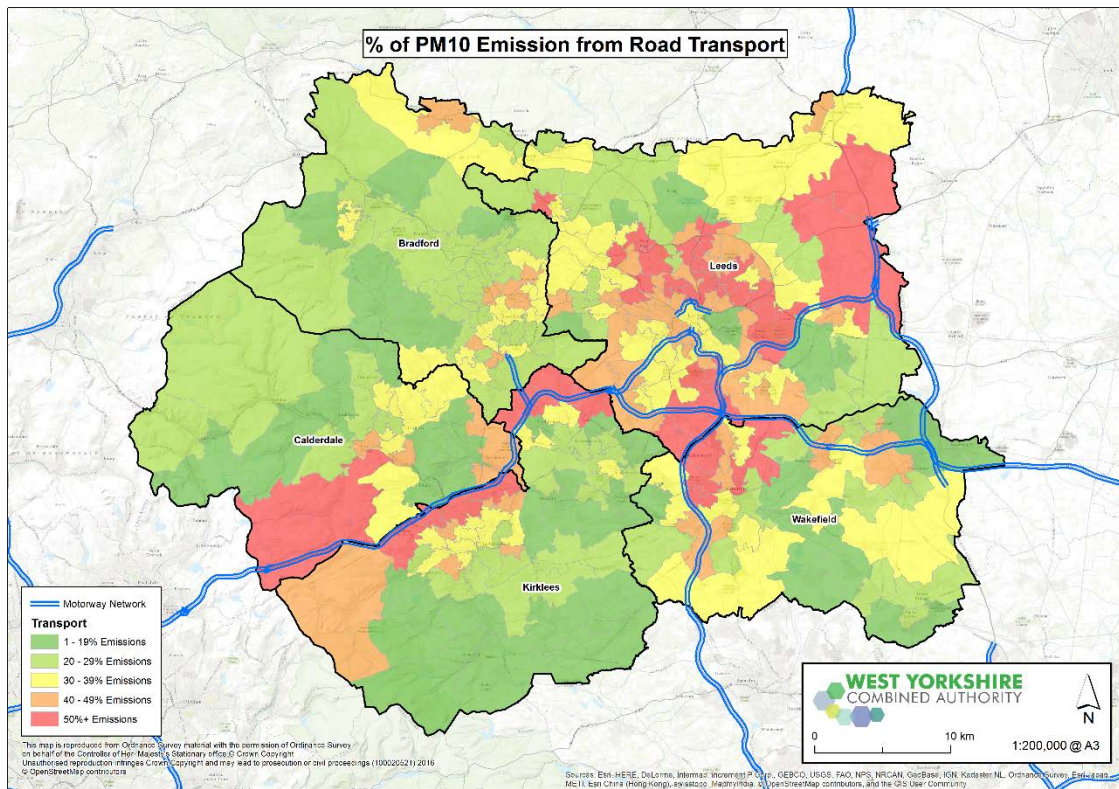


<sup>28</sup> The background pollutant concentration maps are presented in 1km x 1km grid

<sup>29</sup> Estimated Background Air Pollution Maps (base year 2011). Available at <http://uk-air.defra.gov.uk/data/laqm-background-home>



Figure 34. Percentage of PM<sub>10</sub> emissions from road transport (2005)





## 10. Transport and Health in West Yorkshire

- Life expectancy across West Yorkshire ranges from 0.6-1.9 years shorter than the national average, with the most deprived people living between 6.7-11 years shorter than the wealthiest people<sup>30</sup>.

### 10.1. Active travel

- In the UK physical inactivity contributes to 17% of all premature deaths (in persons aged under 75 years), 18% of breast cancers and colon cancers, 13% of type two diabetes, and 10% of cardiovascular disease<sup>31</sup>.
- In West Yorkshire:
  - 38% of people are considered inactive
  - Only 3% of distance travelled and 21% of trips are made by walking or cycling
  - More than one in three Year 6 school children are overweight or obese<sup>30</sup>.
- Deaths and diseases in West Yorkshire related to inactivity are higher than national average rates:
  - For every 100,000 people living in West Yorkshire 182 to 215 will die every year from causes considered to be preventable;
  - There are as many as 162 deaths from cancer, 104 deaths from cardiovascular disease and 50 deaths from respiratory disease per 100,000 persons, which are considered premature in persons under the age of 75 years<sup>32</sup>.

### 10.2. Air quality

- Traffic is the biggest contributor to air pollution affecting health in the UK. Nitrogen dioxide and particulate matter (which is largely invisible) are known to increase the risk of early death, lung cancer, asthma and cardiovascular disease. Evidence is now suggesting links with other cancers, stroke<sup>33</sup>, low birth weight babies and neurodevelopmental problems in children.
- High levels of pollution in West Yorkshire has the following impacts:
  - One in twenty deaths in West Yorkshire are attributable to air pollution, which equates to over 1,000 deaths per year;

---

<sup>31</sup> Source: BHF, 2013. Making the case for physical activity, British Heart Foundation National Centre for Physical Activity and Health.

<sup>32</sup> Source: Public Health Outcomes Framework Data Tool. Available at :

<http://www.phoutcomes.info/search/tb#gid/1/pat/6/ati/102/page/0/par/E12000003/are/E08000032>

<sup>33</sup> Source: West Yorkshire Low Emission Strategy 2016-21: Consultation, West Yorkshire Combined Authority, Public Health England, Bradford MDC, Calderdale MBC, Kirklees MDC, Leeds CC, Wakefield MDC.

- Asthma results in 6,000 hospital admissions across the region (a high proportion of these are children), and around 2.5 years of life are lost due to asthma mortality<sup>34</sup> –well above the national average.

### 10.3. Traffic safety

- Road traffic accidents are the single major avoidable cause of death in children aged over 5 years<sup>35</sup>. Those most at risk of serious injury are vulnerable road users –pedestrians, cyclists and motor cyclists<sup>36</sup>.
- On average 45.1 per 100,000 population are being killed or seriously injured each year on roads across Yorkshire versus 39.3 nationally, and the gap has grown between 2009-11 and 2012-14<sup>37</sup>.

### 10.4. Access to green space

- There is significant evidence that access to green space can improve mental health and wellbeing, reduce the risk of obesity and increase life expectancy. However, access to it across England is poor and is worst for the most deprived people in society<sup>38</sup>.
- Only 7-18% of West Yorkshire’s population report accessing green space for health and exercise<sup>37</sup>.

### 10.5. Noise levels

- Exposure to noise pollution is linked to mental health problems, poor performance at school and work, and an increased risk of cardiovascular disease<sup>39</sup>.
- Noise levels above 55 dB are known to increase blood pressure and the risk of heart attack. The World Health Organisation recommend that average levels at night should not exceed 40 dB<sup>40</sup>. Nearly one in ten people in West Yorkshire (6.7-9.2% of the population) are exposed to road, rail and air transport noise of more than 55 dB overnight.

### 10.6. Connecting people

- “Individuals who are socially isolated are between two and five times more likely than those who have strong social ties to die prematurely”<sup>41</sup>.

<sup>34</sup> Source: Asthma: Regional Summary, Yorkshire and Humber Public Health Observatory, NHS Yorkshire and Humber.

<sup>35</sup> Marmot, M., 2010. *Fair Society, Healthy Lives: Strategic Review of Health Inequalities in England Post-2010*, UCL Institute of Health Equity.

<sup>36</sup> Reported Road Casualties in Great Britain: Main Results 2014, Department for Transport.

<sup>37</sup> PHE, Public Health Outcomes Framework Data Tool. Available at:

[www.phoutcomes.info/search/tb#gid/1/pat/6/ati/102/page/0/par/E12000003/are/E08000032](http://www.phoutcomes.info/search/tb#gid/1/pat/6/ati/102/page/0/par/E12000003/are/E08000032)

<sup>38</sup> Local action on health inequalities: Improving access to green spaces, Public Health England, UCL Institute of Health Inequalities.

<sup>39</sup> Healthy transport = Healthy lives, Board of Science of the British Medical Association.

<sup>40</sup> Night noise guidelines for Europe. *World Health Organisation Regional Office for Europe*. Available at: [www.euro.who.int/en/health-topics/environment-and-health/noise](http://www.euro.who.int/en/health-topics/environment-and-health/noise)

<sup>41</sup> Marmot, M., 2010. *Fair Society, Healthy Lives: Strategic Review of Health Inequalities in England Post-2010*, UCL Institute of Health Equity.

- People living on streets with high traffic volume are more at risk of injury and exposure to air and noise pollution, and have on average less than one quarter the number of friends and social interactions than people living on streets with low traffic volumes<sup>42</sup>.
- Across Yorkshire and Humber only 44% of people who use social care services report having as much social interaction as they would like (PHE 2013).

## 10.7. Climate Change

- In West Yorkshire:
  - 25% of carbon emissions are from transport;
  - Central estimates<sup>43</sup> of average winter precipitation are projected to increase by 20% in the 2080s<sup>44</sup> in a medium emissions scenario.
  - Summer temperatures are projected to increase by 3-4°C over the same time period.
  - As a result the health and wellbeing of the population are likely to be challenged by more extreme weather.

---

<sup>42</sup> Appleyard, D., 1981. *Liveable Streets*. Berkeley University of California Press. Hart, J. & Parkhurst, G., 2011. Driven To Excess: Impacts of Motor Vehicles on the Quality of Life of Residents of Three Streets in Bristol UK. [\*World Transport Policy & Practice\*, 17\(2\), pp.12–30.](#)

<sup>43</sup> A central estimate is defined as a projected change that has an equal probability of being exceeded or not exceeded.

<sup>44</sup> Adapting to Climate Change. UK Climate Projections (2009). Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69257/pb13274-uk-climate-projections-090617.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69257/pb13274-uk-climate-projections-090617.pdf)

## 11. Satisfaction with Public Transport

### 11.1. WYCA Tracker Survey

- Between 2003 and 2010 Metro undertook a regular tracking survey which monitored public satisfaction, usage and marketing performance in relation to local bus and rail services.
- The survey programme consisted of an in-home benchmark survey, and subsequent tracker surveys carried out by telephone – initially at six-month intervals and annually from 2007.
- In 2011 the tracking survey was extended to cover all forms of local travel.
- The 2015 survey involved 1,503 respondents aged 16 and over from across West Yorkshire, with age, gender and ethnicity quotas based on 2011 Census and ONS mid-year population estimates.
- Satisfaction with transport is one of the indicators used to monitor the West Yorkshire Local Transport Plan 3 (LTP3); Table 7 below summarises the scores given to the set of indicators monitored.

**Table 15: West Yorkshire Tracker Survey scores**

| Composite Score                    | 2011 | 2012 | 2013 | 2014 | 2015 |
|------------------------------------|------|------|------|------|------|
| Overall satisfaction <sup>45</sup> | 6.6  | 6.8  | 6.6  | 6.4  | 6.5  |
| Good local bus services            | 7.1  | 6.9  | 6.8  | 6.7  | 6.7  |
| Good local train services          | 6.9  | 7.0  | 7.1  | 6.9  | 6.8  |
| Good condition of roads            | 5.1  | 5.5  | 4.8  | 4.9  | 4.8  |
| Low levels of congestion           | 5.4  | 5.9  | 5.6  | 5.4  | 5.3  |
| Affordability of public transport  | 6.2  | 6.7  | 6.7  | 6.0  | 6.2  |
| Affordability of motoring          | 4.2  | 4.9  | 4.7  | 4.9  | 5.3  |
| Information (Composite indicator)  | 7.8  | 8.1  | 8.0  | 7.9  | 7.9  |

**Table 16: Rail users - Service ratings over time<sup>46</sup>**

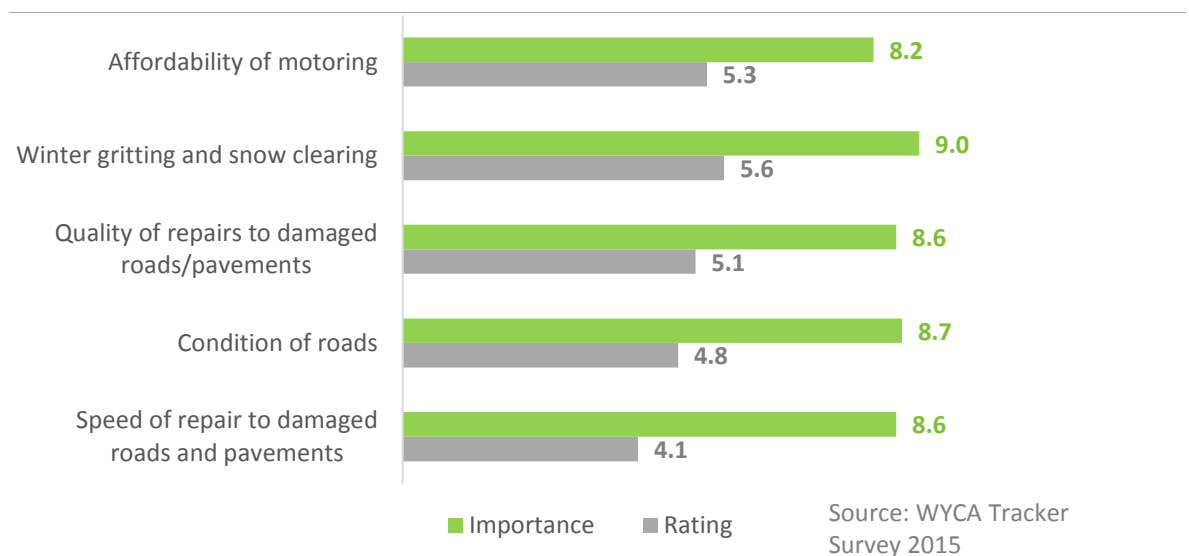
|                      | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|----------------------|------|------|------|------|------|------|
| Reliability          | 7.8  | 7.7  | 7.2  | 7.7  | 7.6  | 7.6  |
| Frequency            | 7.9  | 7.9  | 6.8  | 7.5  | 7.5  | 7.6  |
| Safety               | 8.3  | 8.3  | 7.8  | 7.9  | 7.7  | 7.8  |
| Ease of alighting    | 7.4  | 8.8  | 8.6  | 8.2  | 8.2  | 8.1  |
| Helpfulness of Staff | 7.9  | 7.6  | 7.1  | 7.6  | 7.4  | 7.4  |

<sup>45</sup> The indicator combines satisfaction scores across modes (car, bus, rail, cycle, walk) and assets (bus stops, stations, rail stations, pavements, road conditions). Scored out of 10.

<sup>46</sup> Source: West Yorkshire Tracker Survey 2015

- Some of the lowest scores are typically related to highway infrastructure, including speed of repair to roads (4.1), condition of roads (4.8) condition of cycle routes and facilities (5.0) and affordability of motoring (5.3).
- The 2015 Tracker Survey results show a high level of satisfaction with electronic real-time displays (8.6), timetables at bus stops (8.1) and with the Yournextbus website (8.1).
- As well as rating their satisfaction, respondents are asked how important they feel elements of the transport provision in West Yorkshire are; a discrepancy between the two can indicate a perceived weaknesses in provision. Issues related to roads tended to have a higher difference between importance and ranking (Figure 35).

**Figure 35. Tracker items with a higher discrepancy between importance and rating**

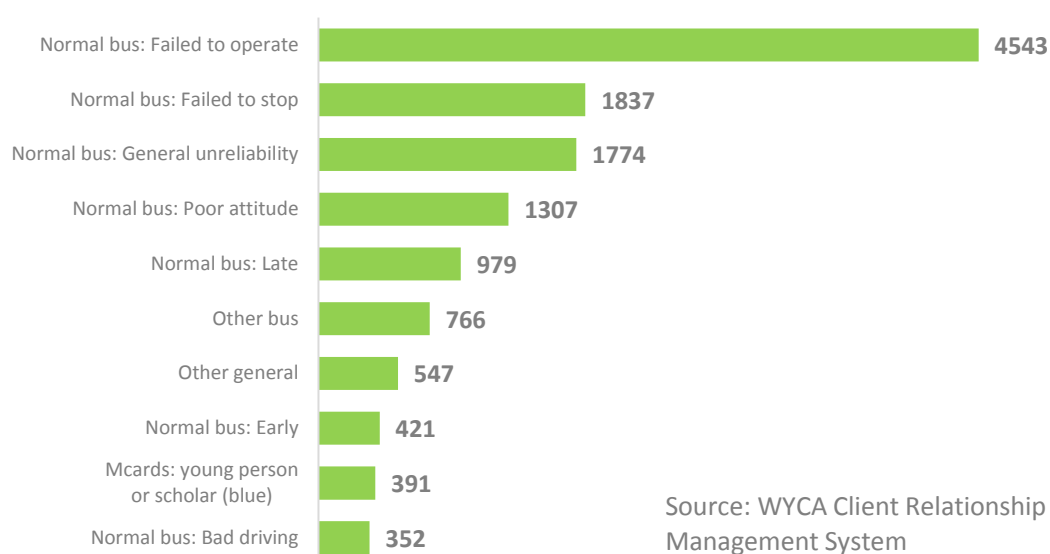


- The Tracker Survey helps identify changes in travel behaviour in West Yorkshire that may be missed by census or cordon count data. The 2015 Tracker Survey for example showed a 5% rise in the use of taxis, possibly attributed to the arrival of Uber in Leeds, Huddersfield and Wakefield.
- The demographic data from the Tracker Survey helps better understand attitudes to public transport across different groups; for example, those aged over 65 (and therefore receiving a free concessionary pass) tend to give more positive scores to public transport affordability, while those aged 25-44 are least satisfied.
- In addition respondents with disabilities were most negative about local bus stations (6.8) and local train services (6.6). Unemployed respondents were most negative about affordability (5.4).
- The key longer-term tracker indicators relate to overall service satisfaction for bus and rail – followed by specific bus and rail analysis. In terms of the former, overall satisfaction is slightly down for bus services and for bus stations. The slight drop-off in 2014 in terms of rail service satisfaction and rail station satisfaction was effectively recovered in 2015 to previous levels.

## 11.2. Customer Feedback Data

- In 2015 WYCA received 17,413 pieces of customer feedback online, at Bus Station Travel Centres and via MetroLine. The great majority of them (81.70%) were about aspects related to bus services and operation.
- Buses failing to operate, or operating unreliably were the core issues, accounting for almost half of the complaints received (43.8%).
- Lack of punctuality of buses (buses arriving early or late) was another issue for users, representing 8% of the total number of complaints.

Figure 36. Top ten issues by number of complaints.



- Analysis of Automatic Vehicle Location (AVL) data shows that punctuality<sup>47</sup> of buses in West Yorkshire has remained at a level of 88% since 2010. By district, the poorest measure of punctuality during the period 2014/15 was registered in Wakefield (84.9%), and the highest in Bradford (90.6%).

Table 17: Bus Service Punctuality<sup>48</sup>

| District              | 2010/11     | 2011/12     | 2012/13     | 2013/14     | 2014/15     |
|-----------------------|-------------|-------------|-------------|-------------|-------------|
| Bradford              | 91.0        | 91.8        | 90.7        | 91.6        | 90.6        |
| Calderdale            | 89.2        | 90.2        | 89.2        | 90.6        | 89.9        |
| Kirklees              | 89.0        | 88.0        | 86.0        | 88.9        | 88.6        |
| Leeds                 | 86.1        | 87.1        | 86.0        | 88.5        | 86.9        |
| Wakefield             | 87.1        | 86.5        | 84.8        | 86.6        | 84.9        |
| <b>West Yorkshire</b> | <b>88.0</b> | <b>88.5</b> | <b>87.1</b> | <b>89.1</b> | <b>88.1</b> |

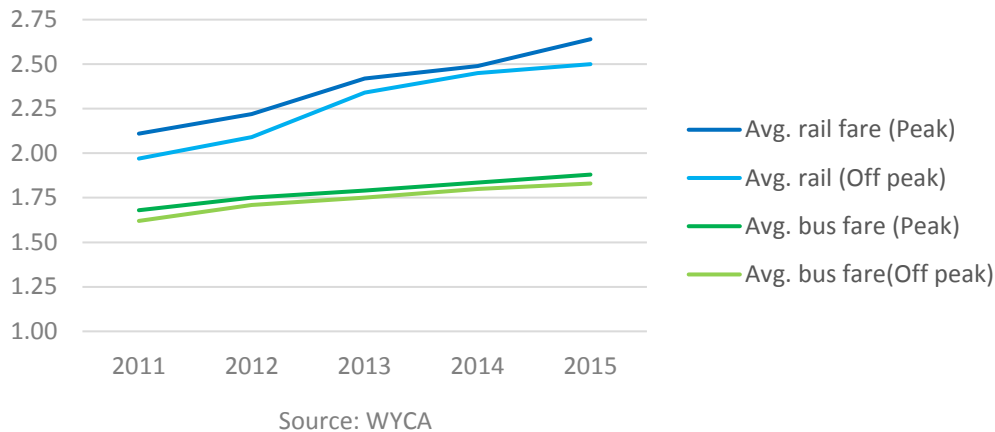
<sup>47</sup> Defined as percentage of scheduled services arriving less than one minute early and no more than five minutes late.

<sup>48</sup> Source: WYCA Real Time Analysis. Buses arriving on time is defined at between one minute early and five minutes late.

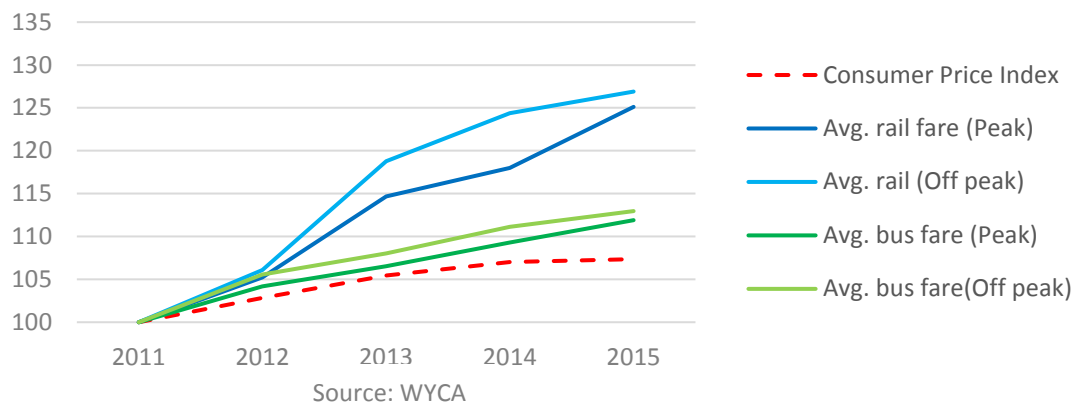
## 12. Cost of Public Transport

- Average public transport fares in West Yorkshire have increased by 26% for rail and 12% for bus between 2011 and 2015. This increase was higher than the Consumer Price Index growth during the same period, which was 7.4%.

**Figure 37: Average adult fare in West Yorkshire (£)**



**Figure 38: Average adult fares in West Yorkshire (Index 2011=100)**

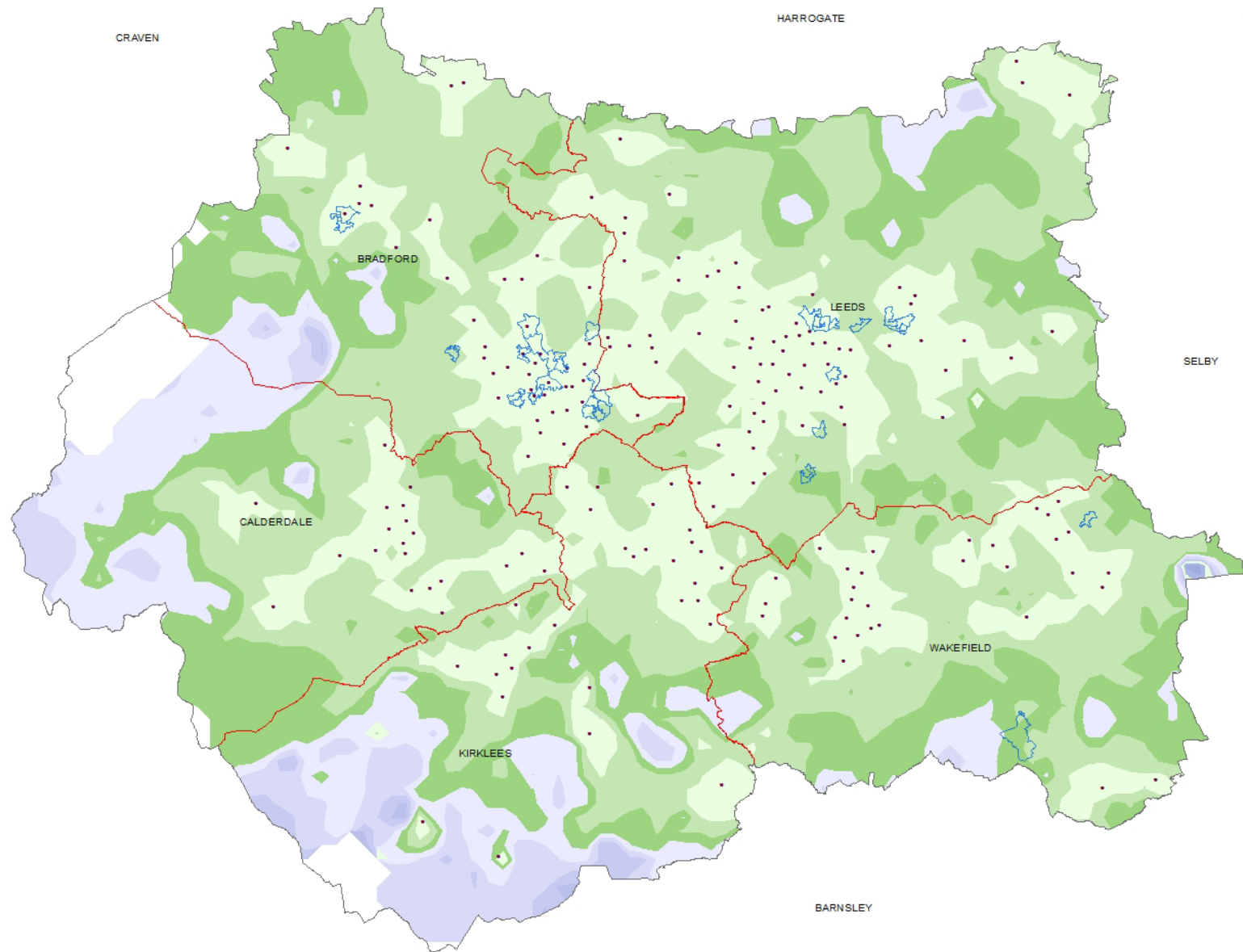


- High transport costs may be a barrier to employment, as was highlighted by Passenger Transport Executive Group (now Urban Transport Group) in their 2013 report *Making the Connections: Final Report on Transport and Social Exclusion*, which found:
  - Almost 40 per cent of jobseekers said that transport costs had been a barrier in their job search.
  - 14 per cent of unemployed lone parents said they couldn't afford the cost of transport to work;
  - 13 per cent of people said that transport problems had been an obstacle to them to apply for a particular job (the figure rising to 18 per cent for people living in low income areas)

- Data from the 2015 Annual Tracker Survey conducted by WYCA indicated that cost is a barrier to public transport use for at least 10% of respondents.
- WYCA Tracker Survey 2015 also showed that affordability of public transport is important for the public, which gave this item the highest public score rating in terms of importance (8.2 in a scale of 1-10). However, satisfaction with affordability of public transport has fallen in recent years, from 6.7 in 2013 to 6.2 in 2015 (the lowest of the public transport items scores). It has to be noticed that although in principle this rating would be reasonable, it may be affected by the fact that concessionary travellers rated affordability very high in comparison with the rest of respondents.
- Another issue in relation to cost is the lack of confidence about obtaining the best value for money when buying train or bus tickets. This is supported by data from the 2015 Annual Travel Survey which show that 25.2% of rail users and 13.1% of bus users are either *not very confident* or *not at all confident* about obtaining the best price when buying their tickets.



## Appendix 1 Accessibility Mapping



Notes  
Public transport journey time - AM Peak

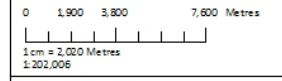
**Journey Time (Minutes)**

- 10
- 20
- 30
- 40
- 50
- 60
- 70
- 80
- 90
- 100
- 110
- 120

□ 15% Most Deprived Output Areas (by IMD rank) in the LCR area.

• West Yorkshire Employment areas - 1000+ employees

User: MLong  
Date Saved: 01/06/2016 13:56:41



West Yorkshire Combined Authority  
Wellington House  
40-50 Wellington Street  
LEEDS  
LS1 2BE

