Oxfordshire Growth Needs Assessment

Phase 2 Report

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Introduction and Purpose

The Oxfordshire Councils[1] are working together to prepare the Oxfordshire Plan which will set out a development strategy for Oxfordshire to 2050.

To support the preparation of the Plan, the Oxfordshire Councils have commissioned Cambridge Econometrics and Iceni Projects to prepare the Oxfordshire Growth Needs Assessment (OGNA). The OGNA is intended to provide an integrated evidence base to help the Oxfordshire Councils identify the appropriate level and distributions of housing and employment over the period to 2050. The core objectives of the OGNA are:

- To identify a strategic level, long-term, robust and transparent methodology for assessing Oxfordshire's housing needs over the period to 2050

- To provide a detailed commentary (including the baseline position) on Oxfordshire's housing and employment market, including demographic and economic dynamics and any other key drivers of housing need and how this may change in the period to 2050.

- To identify a range of credible and robust housing need scenarios for Oxfordshire.

- To establish an informed understanding of the implications for sustainable housing growth in Oxfordshire, of the Oxford-Cambridge Arc and of any other strategically significant infrastructure and growth strategies, including proposals for strategic growth in other areas which are likely to have a significant impact in Oxfordshire.

- To identify an appropriate functional economic market area and provide an assessment of employment land requirements.

- To advise on how the Oxfordshire Plan should respond to the uncertainty associated with long-term planning for strategic housing and employment provision.

The methodology adopted, which considers scenarios for future growth in Oxfordshire, responds to this and in particular the strategic and long-term nature of the Oxfordshire Plan.

1.1　Context and nature of the Assessment

The Oxfordshire Plan will be a joint statutory spatial plan which covers a 30-year plan period from 2020 to 2050. The Plan is intended to be strategic, focusing on matters such as an overall spatial strategy for development, the integration of new development and investment in infrastructure, and how these can help to improve the quality of life for everyone.

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[1] The commissioning authorities comprise Cherwell District Council, Oxford City Council, South Oxfordshire District Council, Vale of White Horse District Council and West Oxfordshire District Council.

The Plan differs from those being prepared in many other areas across England, in particular:

- The Oxfordshire Plan is a strategic plan which is being prepared on a cross-boundary basis spanning the county of Oxfordshire;

- It is looking at a much longer timeframe – a 30-year period to 2050 - than many Local Plans which typically look 15-20 years into the future. This raises issues regarding the reliability of traditional approaches to assessing development needs in some instances;

- It considers the inter-relationship between the economy and spatial planning activities;

- Oxfordshire falls within the Oxford-Milton-Keynes-Cambridge Arc which has been identified by the National Infrastructure Commission and supported by Government. There is a need for the Oxfordshire Plan to consider the strategic context provided by this, including the emerging spatial framework for the Arc, along with other Government growth initiatives and policy. Preparation of the Oxfordshire Plan also provides the opportunity to influence the Arc and shape the future strategy for this strategic corridor.

In addition, one of the major advantages of looking long-term and strategically at the strategy for development and growth is the ability to properly coordinate new development and infrastructure investment and consider what strategic infrastructure might be needed to support growth in the long-term.

These particular circumstances provide a background to the OGNA to which the Assessment seeks to respond, and are explored in greater detail in the *Phase 1 Report*.

1.2   This report

To ensure the preparation and analysis of an integrated evidence base that effectively addresses the core objectives of the OGNA, the Assessment has been divided into three complementary reports, broadly corresponding to three phases of work.

The **Phase 1 Report** provides overall growth need figures for housing and employment in Oxfordshire to 2050. It profiles local housing market, demographic, economic and commercial property market dynamics, all within the strategic policy environment. These factors are then brought together to provide trajectories for future housing and employment land needs, and resultant high-level implications for commuting and affordability.

Following on from this, the **Phase 2 Report**, presented here, considers a range of high-level scenarios for the distribution of housing and employment across Oxfordshire. The purpose of this is to aid decision-makers in understanding of the implications of alternative spatial choices. It does not seek to identify specific options or priorities for development, but rather explores the potential scale and implications of different approaches.

Finally, to reflect the emergence of the Covid-19 pandemic during the development of the OGNA, a **Covid-19 Impacts Addendum** has been produced. The Addendum gauges the probable impact and legacy of the

pandemic on Oxfordshire, and the resultant implications for the evidence and observations presented in the OGNA (which largely predate the pandemic).

Therefore, it is recommended that the analysis presented in this report is read alongside the other supporting documentation of the OGNA, given their complementary coverage and interconnectedness.

In addition, a stand-alone **Executive Summary**, which highlights and brings together the key observations and messages from the three respective reports, has also been produced.

1.3   Report structure

Following on from the evidence and analysis presented in the *Phase 1 Report,* the second phase of the OGNA broadly comprises three stages of work:

- The first involves identifying and assessing the Oxfordshire Functional Economic Market Area (FEMA), including the definition of functionally meaningful sub-areas ('Zones'). This allows for more precise, in-depth exploration and illustration of employment and housing distributions to accompany the *Phase 1 Report* trajectories.

- The second stage has sought to provide this analysis, distributing the Oxfordshire-wide employment projections (derived and presented in the *Phase 1 Report*) by functional sub-area to 2050. For housing, five theoretical spatial scenarios, informed by the functional sub-areas, have also been developed and tested to distribute housing need from the *Phase 1 Report*.

- Finally, the third stage, bringing together the evidence and analysis of the previous stages, considers the implications for commuting and transport use (including differences in modal share and private vehicle trips) of the employment and housing distribution scenarios.

The remainder of this report is broadly structured around these three stages, starting with a definition and overview of the Oxfordshire FEMA and its functional sub-areas, followed by an exploration of the potential spatial distributions of economic and housing growth within the FEMA, before considering the potential implications for commuting and transport at a detailed spatial level. A summary conclusion and the accompanying appendices can be found at the end of the report.

2 The Oxfordshire Functional Economic Market Area

2.1 Introduction

Functional Economic Market Areas (FEMAs) are designed to capture the wider spatial level at which an economic market operates, given that economic activity typically extends beyond local administrative boundaries. A universal definition of FEMAs does not exist, as each local economy has different characteristics that are more relevant for inclusion in the definition of a functional economic geography.

Factors that could be considered and combined to define FEMAs include commuting patterns and the transport network; labour, housing and retail markets; supply chains; administrative areas; catchment areas of facilities providing cultural and social well-being.

This chapter presents the methodology used to define the Oxfordshire FEMA and describes the different spatial levels within it, followed by an overview of the main characteristics and trends of the FEMA. This provides a foundation for a more precise and in-depth exploration of potential spatial distributions of economic growth and housing need in Oxfordshire.

2.2 What is a Functional Economic Market Area (FEMA)?

When considering local and regional economies, one of the key features of interest is the spatial distribution of the economy, or the way in which different economic interactions are transacted at different spatial scales. There is an appetite within the economic and public policy spheres to define, measure and categorise these interactions as being associated with discrete spatial areas, and as such the notion of a *"Functional Economic Market Area"* or *"FEMA"*, originates.

The Government's Planning Practice Guidance (PPG) on FEMAs identifies no standard approach to defining a functional economic market area. However, the Department for Communities and Local Government (DCLG, now MHCLG) previously provided more complete guidance on identifying a Functional Economic Market Area[2], which they define in simple terms as being *"the area over which the local economy and its key markets operate"*.

Although this theoretical definition of a FEMA is clear, the pragmatic steps required to identify one empirically are ambiguous. As the DCLG guidance goes on to say (page 3):

> *"There is no universal approach to defining FEMAs. A city's labour market area and hospital catchment area, for example, are unlikely to have similar boundaries. Ideally, FEMAs would be defined on the basis of several markets or catchment areas which best reflect the drivers of the local economy."*

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[2] Department for Communities and Local Government. (2010). Functional Economic Market Areas: An economic note

DCLG goes on to propose four key markets that need to be considered:

- Labour Markets
- Housing Markets
- Service Markets
- Firm to Firm Supply Chains

Transport networks are also identified by the DCLG as a relevant consideration. Nevertheless, there is an argument that a transport network is not an economic market and to include it would be to introduce an element of double counting of its influence – as transport networks will influence the distribution of the four primary markets, rather than contributing directly to the local economy. These thematic areas also reflect those identified in the Planning Practice Guidance.

Any definition of a regional or city-scale FEMA must be understood both within the context of the presence of nationally significant tradable sectors within the economy and their position within larger national and international markets, and also to the extent that it will necessarily contain a series of smaller clusters of activity within which more localised transactions take place.

However, there is no single spatial scale around which this can be defined in a straightforward manner, but rather as a hierarchy of scales, over which the separate spatial patterns of transactions between workers, firms and consumers play out.

In order to construct an overall spatial definition of a FEMA, a judgement call is required as to the relative weightings of the four markets and their particular spatial characteristics. In reality, all local economic areas operate within multiple economic markets simultaneously, and any solid line drawn on a map must be understood as a useful approximation within this context.

Finally, the 2010 DCLG note recognises the importance of being able to approximate FEMAs to existing administrative boundaries where possible for reasons of strategy and policy design and implementation. A further consideration is data availability and quality, which are often if not exclusively produced along administrative boundaries.

2.3   Defining the Oxfordshire FEMA

Spatial areas within Oxfordshire

Definition of the FEMA starts by identifying the economic and residential centre of the county of Oxfordshire, which constitutes two concentric spatial areas, as shown in Figure 2.3.4:

- **Oxford City Centre**: the area with the highest concentration of economic activity, as well as central urban amenities.

- **Oxford City Fringe**: the area surrounding the City Centre, characterised by moderate employment and population density, a high degree of integration with and connectivity to the City Centre, and the presence of important urban fringe sites, such as science parks and large suburbs.

The remaining portion of the County is currently shown as the *Wider County*. This is characterised as the spatial area with stronger economic links to Oxford City Centre and City Fringe than to any other neighbouring settlement, for example Reading, Swindon or Milton Keynes. The following analysis

describes in more detail how the different spatial levels within Oxfordshire are defined.

Population and employment density in Oxfordshire

Figure 2.3.1 maps population and employment density by Lower Super Output Area (LSOA – broadly equivalent to a neighbourhood[3]) in Oxfordshire. It is evident that the Oxford local authority district (LAD) is the economic and residential centre of the county, while smaller settlements with (relatively) high concentrations of either/both economic and residential activity include:

- Bicester and Banbury in Cherwell
- Witney and Carterton in West Oxfordshire
- Abingdon in the Vale of White Horse
- Didcot in South Oxfordshire[4]

Figure 2.3.1 also shows that employment is more concentrated and less evenly distributed in Oxfordshire compared to population, with fewer high-density areas outside the Oxford LAD. These are also located primarily in or close to the main urban centres listed above.

Figure 2.3.1: Population and employment density by LSOA in Oxfordshire, 2018
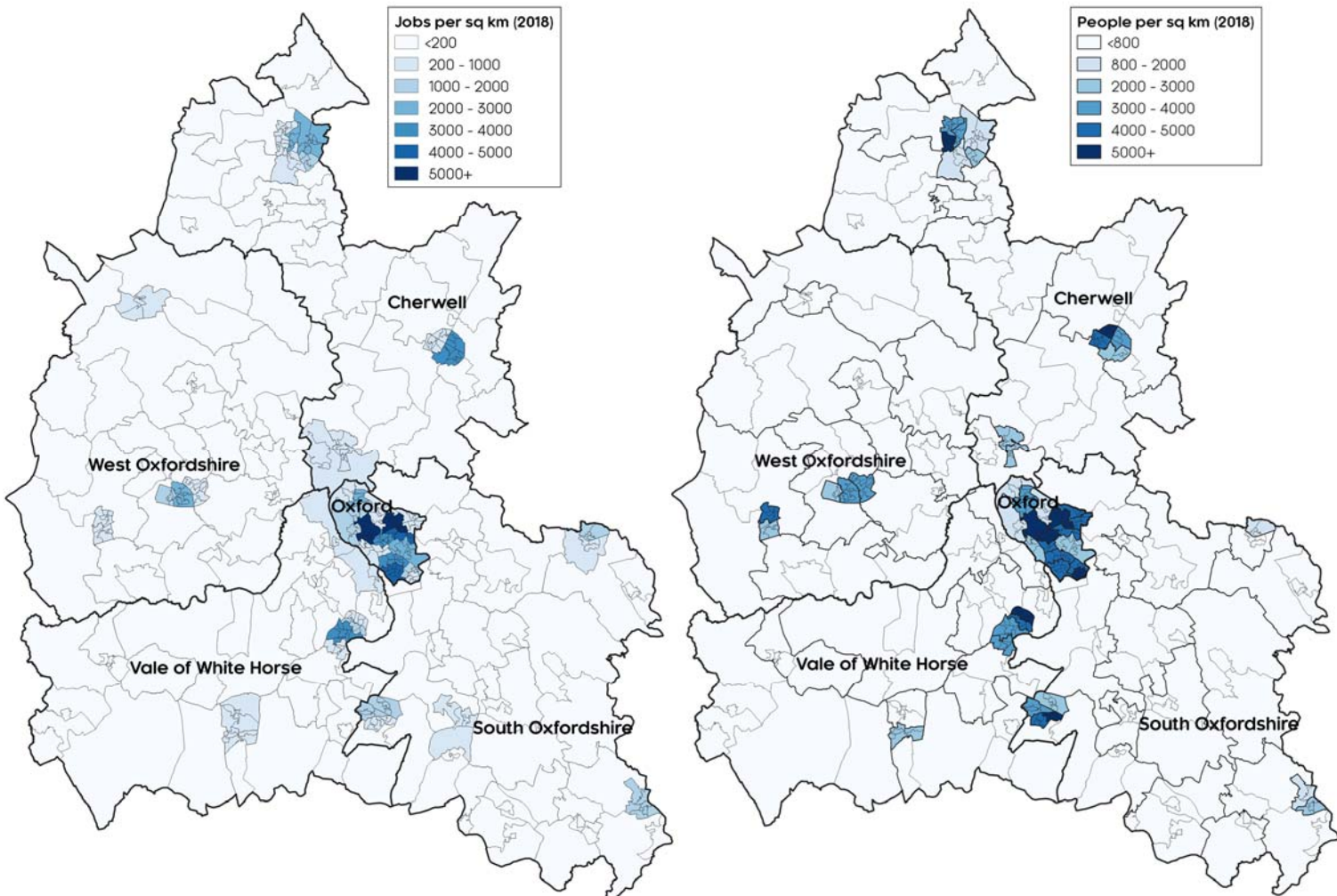
Source: ONS, Cambridge Econometrics.

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[3] For an overview of how these geographies are defined see: ONS Census geography

[4] Note that Didcot's main employment area, Milton Park, is located in Vale of White Horse

Definition of the City Centre

Based on the above analysis, the City Centre has been defined as the combination of contiguous LSOAs within the Oxford LAD with an employment density of at least 3,000 jobs per km^2. A map of the City Centre's extent is presented in Figure 2.3.4.

Definition of the City Fringe

Figure 2.3.2 shows the share of employed residents that work in the Oxford City Centre for each LSOA within Oxfordshire. This provides the baseline for defining the City Fringe, with areas of high connectivity to the City Centre – defined as LSOAs with at least 15% of employed residents commuting to the City Centre for work – providing the initial scope for the City. Note that Census 2011 data is the most recently available source of detailed origin-destination

Figure 2.3.2: Share of employed residents commuting to Oxford City Centre, 2011
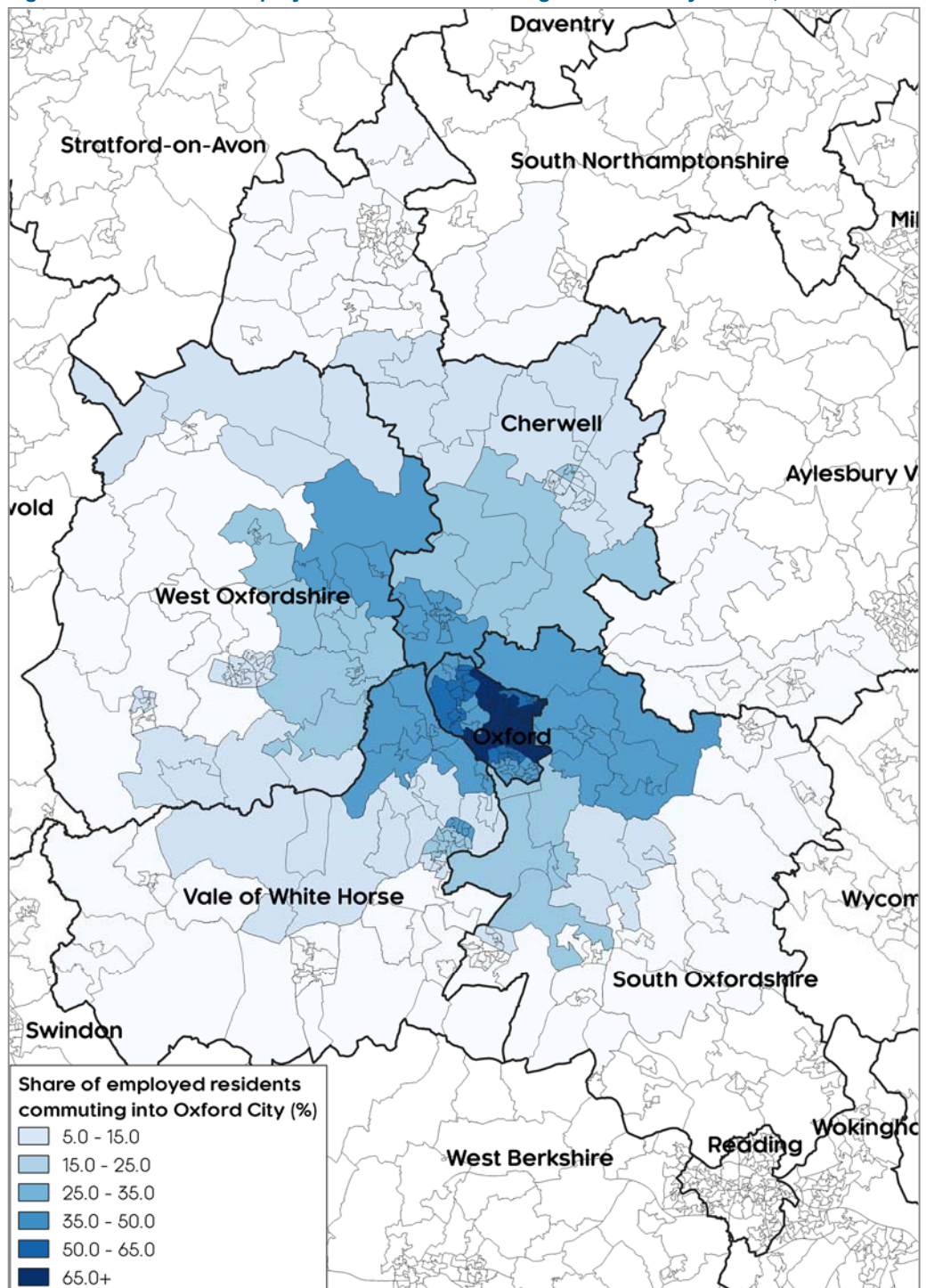
Source: ONS (Census 2011), Cambridge Econometrics.

commuting data, though significant jumps or changes in the data are rare between Census years.

In order to further enhance understanding of areas with high accessibility to the central market in Oxford, Figure 2.3.3 shows the areas that are within a radius of 30 minutes cycling from the City Centre. This is a simple proxy meant to capture areas that are intrinsically close to the City Centre, rather than well-connected to it.

Notably, this area within this radius stretches beyond the contiguous urban area to include some significant portions of green belt land, alongside several important urban assets in and around Oxford City Centre, including the:

- University of Oxford
- Oxford University Hospitals (notably John Radcliffe and Churchill)
- Westgate Oxford Shopping Centre
- Oxford Railway Station
- Oxford Parkway Station
- Oxford Brookes University
- Oxford Science Park
- Oxford Business Park
- MINI Manufacturing Plant
- Begbroke Science Park
- London-Oxford Airport

Figure 2.3.3: Area within 30 minutes cycling of the centre of Oxford
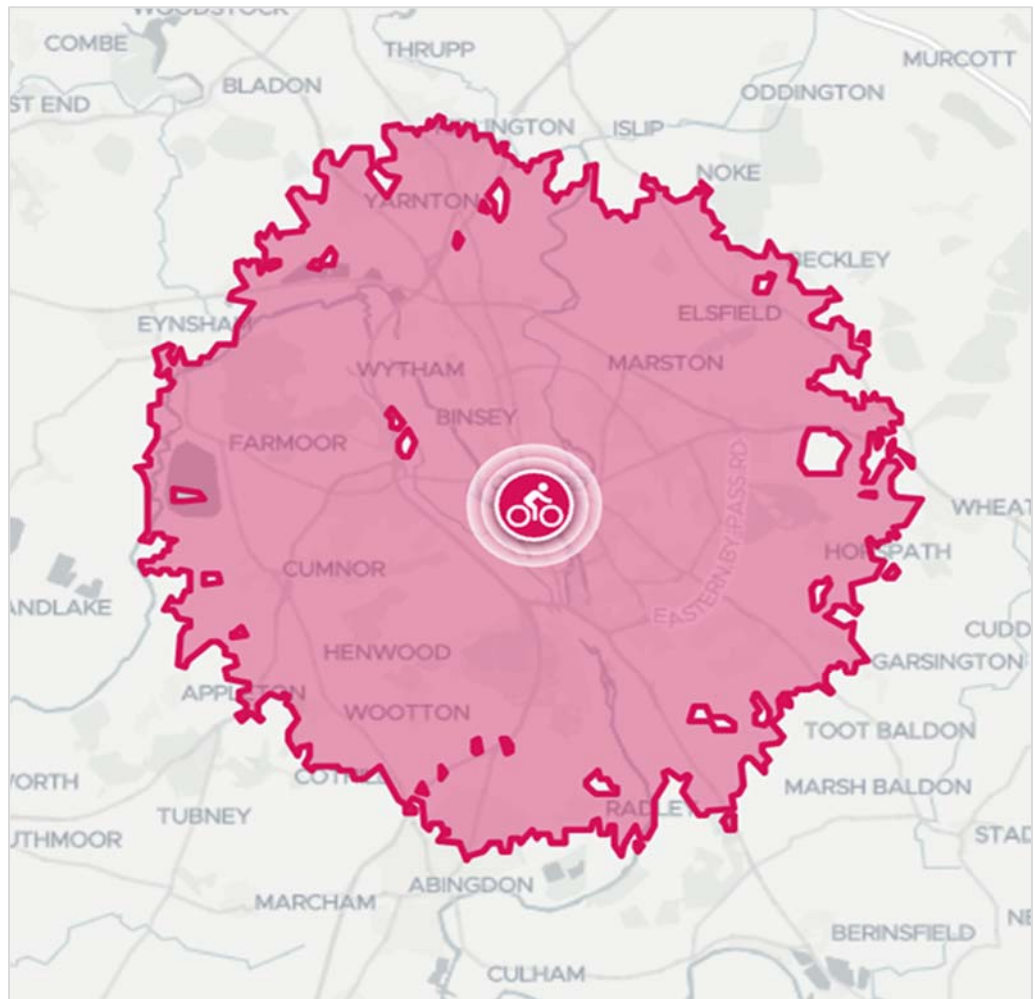
Source: Cambridge Econometrics, app.traveltimeplatform.com.

Based on Figure 2.3.3, the set of areas is expanded to include in the baseline City Fringe definition (informed by Figure 2.3.2) to include five LSOAs in the Vale of White Horse and one LSOAs in South Oxfordshire. This incorporates the wider functional urban area of the Oxford economy.

Figure 2.3.4 illustrates the primary spatial levels within Oxfordshire; the City Centre and City Fringe - as defined above - and the Wider County – encompassing the areas within Oxfordshire not included in the first two definitions. This broadly covers the dependent economic hinterland surrounding Oxford.

Figure 2.3.4: Primary spatial levels of the Oxfordshire FEMA
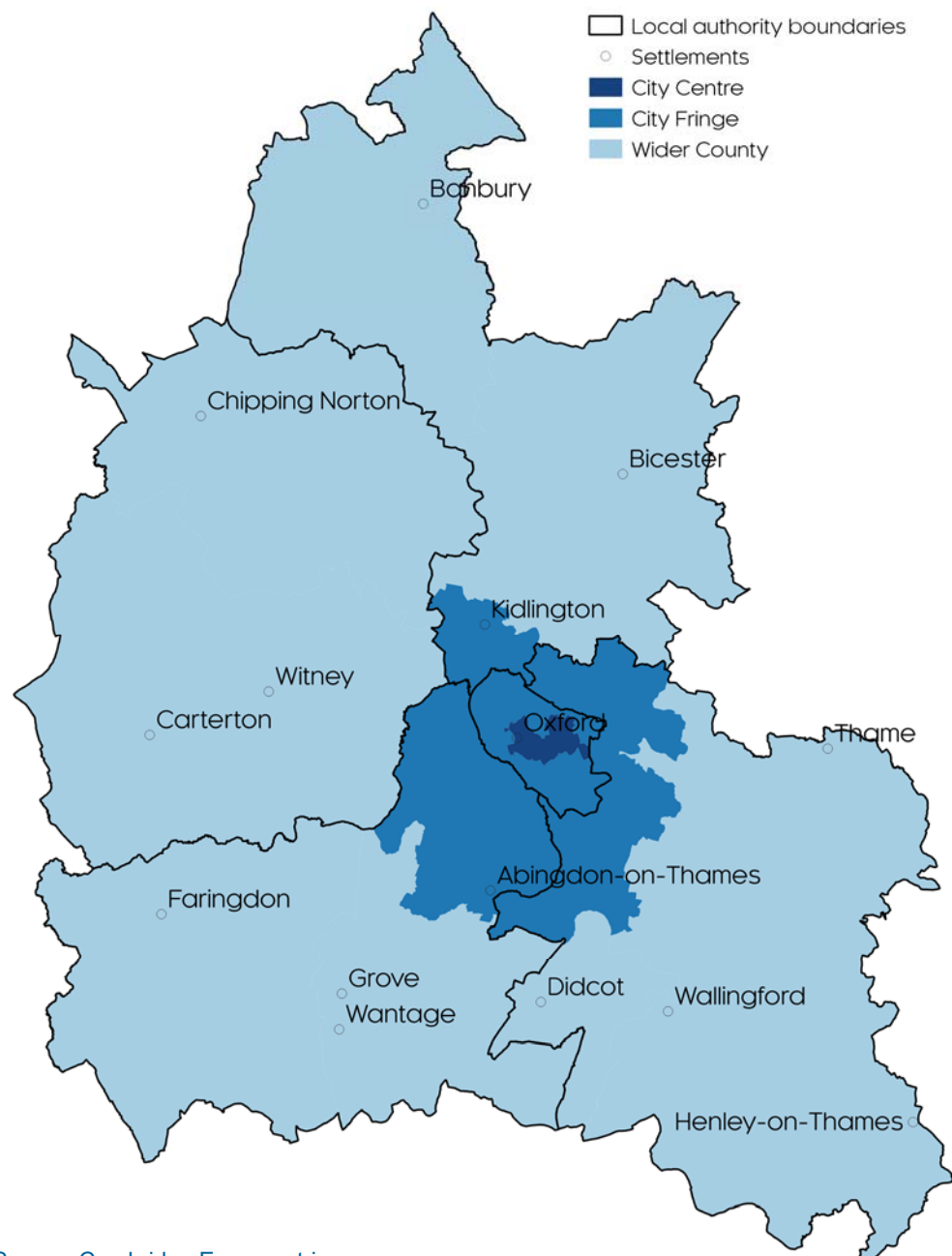
Source: Cambridge Econometrics.

Local markets analysis

Defining the Oxford City Centre and City Fringe has been the first step to identifying the Oxfordshire FEMA. The definition of the FEMA is also based on analysis of the local labour and housing markets, as well as the availability

and distribution of public services around Oxford City, which are explored in more detail below.

Labour market Obtaining a grasp of the extent of the local labour market is key when defining a FEMA. This can be achieved by analysing commuting flows of employees between different areas. A high level of commuting flows between areas is an indication that they belong to the same labour market.

Figure 2.3.2 illustrated commuting flows from each Oxfordshire LSOA into Oxford City. Apart from some LSOAs in the periphery parts of Oxfordshire, there is a significant degree of commuting into Oxford City from all around the county – for many areas outside the City Fringe, on average at least 1 in 10 residents commute into the City Centre. As expected, commuting numbers drop as the distance and travel time to Oxford City increases; however, the decline is quite smooth.

It is evident that most commuting to Oxford City occurs from within Oxfordshire, with few LSOAs having more than a 5% threshold outside the County. Hence, the Oxfordshire labour market seems to extend to most of Oxfordshire and few surrounding areas, providing an indication that the County could be a suitable approximation of the Oxfordshire FEMA.

Chapter 5 goes into greater detailed on commuting patterns within Oxfordshire, beyond that required to define the FEMA.

Housing market High levels of migratory movements between two adjacent LADs indicates that those districts have a particularly strong functional connection as part of the same overall housing market. To gauge the extent of the housing market, consideration has been given to internal migration patterns between LADs in Oxfordshire and neighbouring LADs for the period 2016-18 – the most recently available years of data, averaged over two years to smooth any outliers and fluctuations.

Figure 2.3.5: Internal migration flows between Local Authority Districts in Oxfordshire, 2018
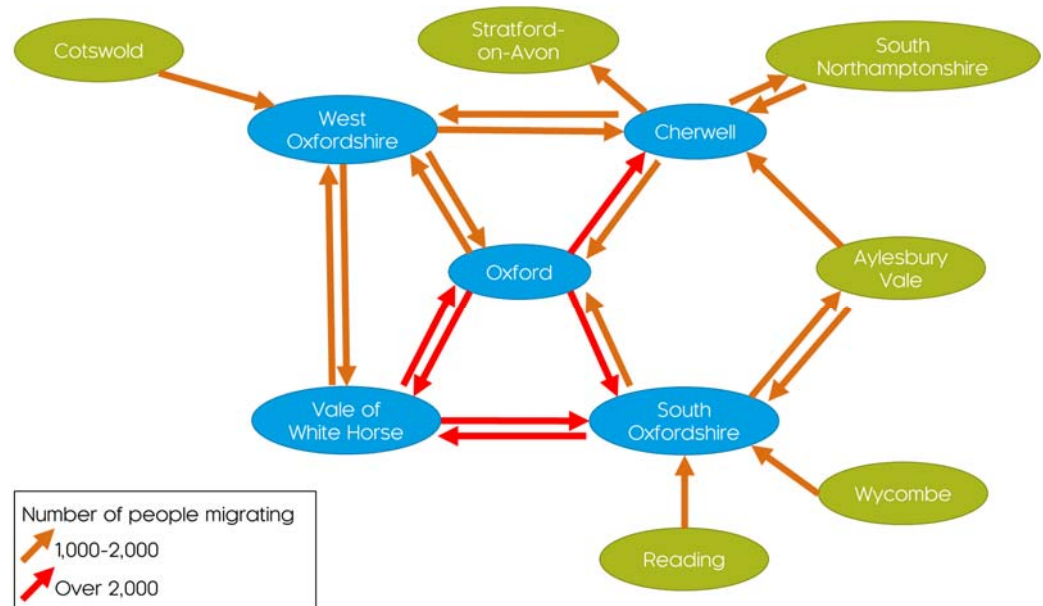
Source: ONS, Cambridge Econometrics.

These are depicted in Figure 2.3.5. The data shows flows (both inflows – entering Oxfordshire, and outflows – leaving Oxfordshire) between LADs within Oxfordshire are more frequent and larger in size compared to flows outside the County. This corroborates the findings from the *Phase 1 Report* migratory analysis and that of the labour market analysis, namely that a largely self-contained economic market operates within Oxfordshire.

Externally to Oxfordshire, flows of greater than 1,000 people per annum were found from Cotswold, Stratford-on-Avon, South Northamptonshire, Aylesbury Vale, Wycombe and Reading – areas which typically shared a contiguous border with Oxfordshire. Other areas nearby, such as Milton Keynes or Swindon, had flows of less than 1,000 people and hence are not shown on the schematic.

Public services   Access to public services is an important tool to identifying a FEMA. As the DCLG suggests: *"Although mobility rates have increased considerably, the principle that people access services at their nearest location still largely holds. This leads to the presence of a large number of frequently used services, and a smaller number of higher order services. On this basis FEMAs can be identified by analysing travel patterns to higher order services, which have a wider catchment area".*[5]

As a proxy for the location of higher-order services, consideration has been given to the location of hospitals with an Accident and Emergency (A&E) unit.

Figure 2.3.6: Location of hospitals with full A&E in Oxfordshire and surrounding areas
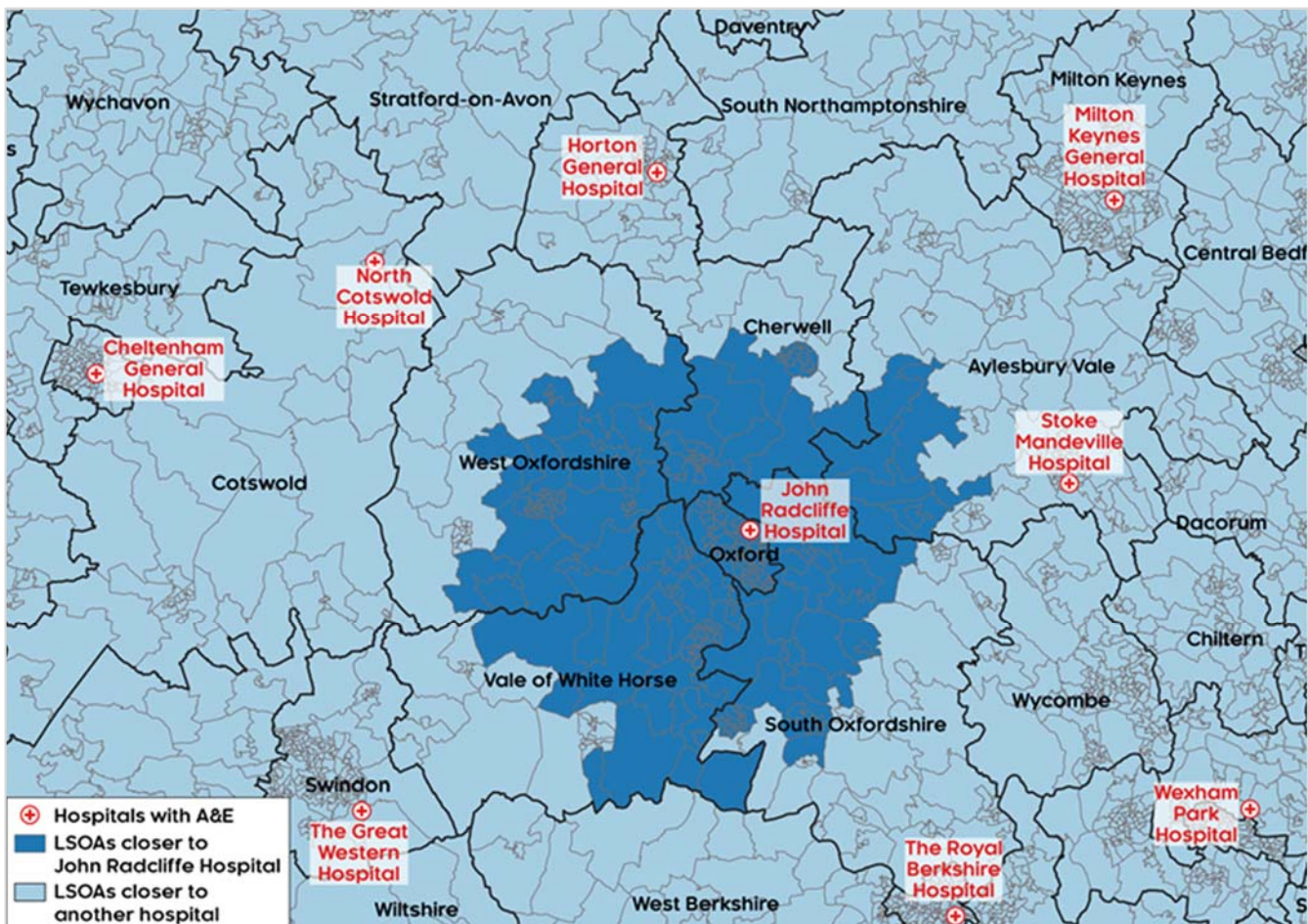
Source: Cambridge Econometrics.

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[5] DCLG (2010), p. 6.

As noted above, the area near a hospital with A&E responsibility is likely to be at a well-connected centre close to other services as well, such as leisure and entertainment facilities, retail markets and other public services (particularly 'blue light' services, which themselves are typically located close to the aforementioned assets).

Figure 2.3.6 above shows the location of hospitals with a full A&E unit in Oxfordshire and surrounding areas. The dark blue shaded area consists of the LSOAs that are closer to the John Radcliffe Hospital in Oxford City rather than any other hospital and represents the hospital's catchment area. This area covers both the Oxford City Centre and Fringe, as well as many LSOAs of the Wider County, while the outer edges of the county seem to be better served by other hospitals. Furthermore, except for two LSOAs in Aylesbury Vale, most of the catchment area is included within Oxfordshire.

What is the extent of the Oxfordshire FEMA?

As also pointed out by the DCLG in the same document, economic flows and markets often overlap administrative boundaries. Hence, the Oxfordshire FEMA could extend beyond the Oxfordshire County limits. Furthermore, a degree of overlap between FEMAs may exist, as certain areas within a FEMA could have significant connections to neighbouring FEMAs as well.

To address this, analysis has been undertaken looking at commuting patterns to/from neighbouring local authorities that contain important settlements and economic markets; namely Milton Keynes, Reading and Wokingham (combined, as they constitute a single labour market) and Swindon. These will function as proxies for the corresponding FEMAs.

Figure 2.3.7 below depicts LSOAs where the share of employed residents commuting to Oxford City is higher than the share commuting to the local authorities listed above. The vast majority of LSOAs within Oxfordshire have a higher share of their employed residents commuting into Oxford City rather than any of the neighbouring FEMAs, with the exceptions of five LSOAs in South Oxfordshire and one in the Vale of White Horse.

Furthermore, there are few LSOAs outside Oxfordshire that satisfy this condition and have at least 2% of their residents commuting into Oxford City, though the levels of commuting for these LSOAs are quite low (always less than 10%).

As Figure 2.3.7 reiterates, the local labour market of the Oxfordshire FEMA is therefore largely confined within the boundaries of the county of Oxfordshire. A small number of LSOAs strictly outside the FEMA may have more functional ties to Oxford (though this is marginal – with no more than 1 in 10 employed residents in these areas commuting into Oxford), but this is counterbalanced by a handful of LSOAs to the south of the county who overlap other FEMAs (though again, the commuting shares are marginal).

Figure 2.3.7: Areas with a higher share of employed residents commuting into Oxford City rather than neighbouring large cities, 2011
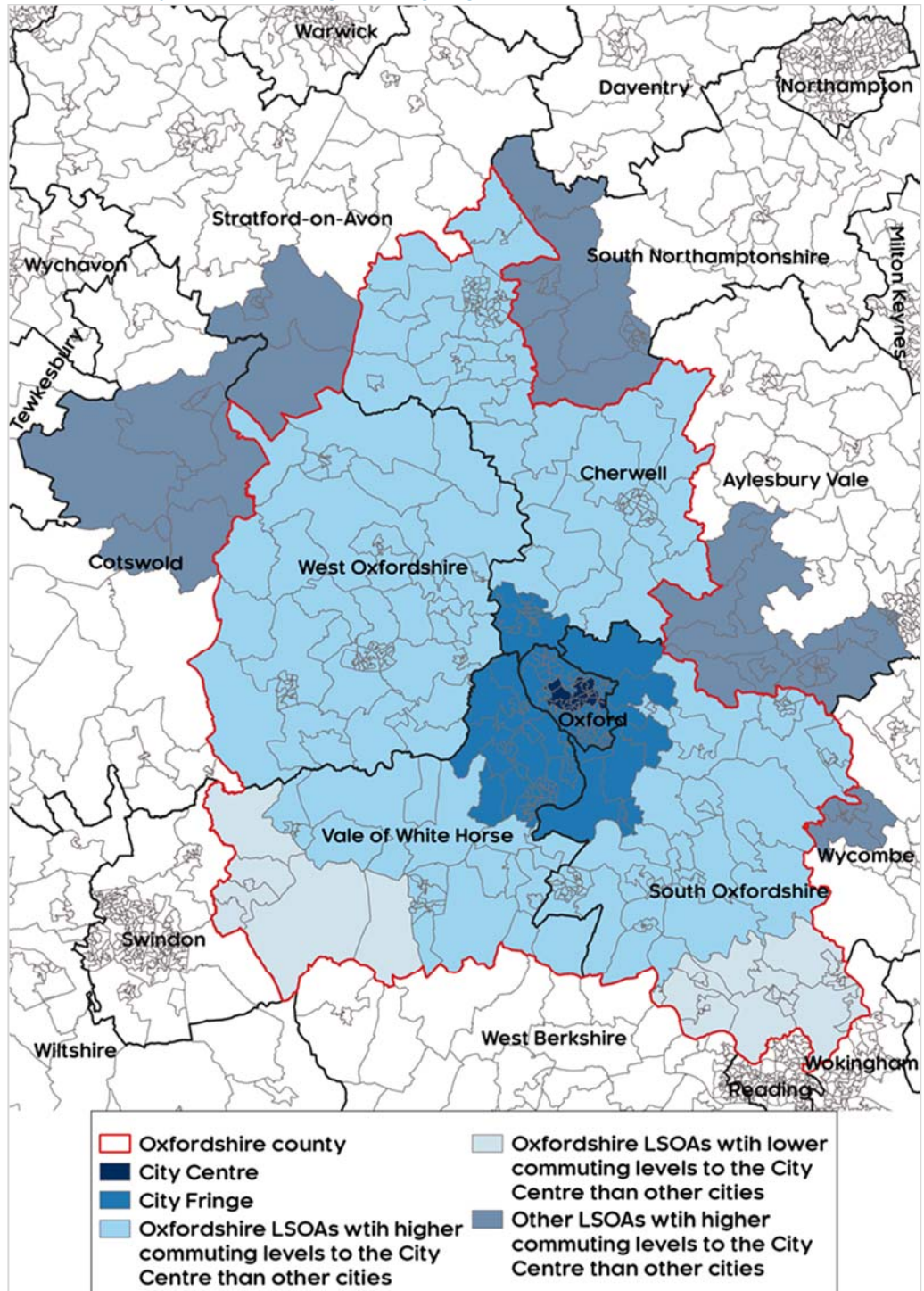
Source: ONS (Census 2011), Cambridge Econometrics.

Definition of the Oxfordshire FEMA

Based on the analysis in this chapter thus far, it can be determined that the county of Oxfordshire is an accurate proxy for the Oxfordshire FEMA. An added benefit of using this definition of the FEMA is ensuring data availability and quality for further analysis of the economic performance of the FEMA, as many indicators (critically, those relating to economic performance and welfare) are consistently available only at more aggregated spatial levels.

Functional Market areas tend to be relatively stable over time, expanding, stretching and contracting only as the result of changes in the relative growth

of different urban cores or significant infrastructure interventions. The growth of the Oxfordshire FEMA is constrained in several directions by neighbouring urban centres, and in others by a lack of infrastructural provision.

The full opening of East-West Rail could see the FEMA extend further to the east into the Aylesbury Vale district; however the overall shape and size of the FEMA is unlikely to shift significantly over the coming decades. Likewise, many of the aforementioned indicators used to infer FEMA scope remain relatively stable overtime.

2.4   Spatial levels of the Oxfordshire FEMA

The three main spatial levels of the Oxfordshire FEMA identified in *2.3 Defining the Oxfordshire FEMA* were Oxford City Centre, Oxford City Fringe and the Wider County (see Figure 2.3.4). In order to obtain a more refined spatial classification and to facilitate more-detailed analysis of the FEMA, additional subdivisions (or 'Zones') have been identified and defined.

The first of these is based on the presence of the *"Knowledge Spine"* within Oxfordshire, an area of high, globally recognised innovation and knowledge activity, identified in the Oxfordshire Local Industrial Strategy (LIS).[6] This *"Knowledge Spine"* runs through the centre of the FEMA, largely along the A34 corridor, incorporating Didcot, Abingdon, Oxford, Kidlington, and finally Bicester.

The LIS regards the area as one of strategic importance for the county, being *"home to several science, innovation, technology and business parks that form a spine of knowledge intensive economic activity."*[7] Figure 2.4.1, taken directly from the LIS, highlights the distribution of the *"Knowledge Spine"* within Oxfordshire and its key knowledge assets. Over two-thirds (63%) of the FEMA's total employment is located within this *"Knowledge Spine"*.

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[6] HM Government (2019), Oxfordshire Local Industrial Strategy

[7] Oxfordshire LIS (2018), Economic Baseline, p. 52

Figure 2.4.1: Knowledge activity and assets in Oxfordshire
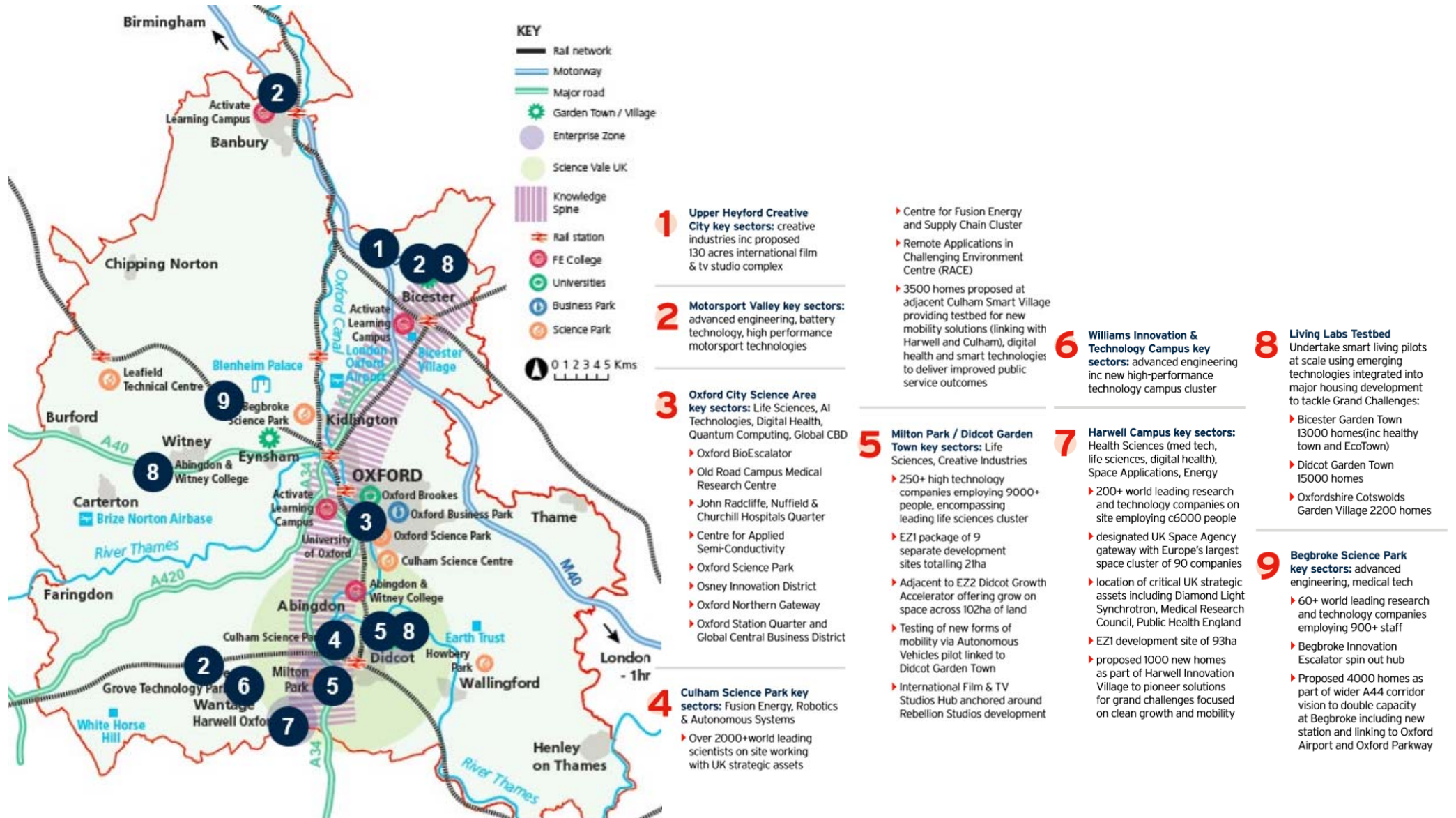
Given that the Knowledge Spine covers a large and diverse part of the FEMA, and crosses the previously defined City Centre and City Fringe spatial areas, additional subdivisions have been identified. This has been achieved by drawing on the distribution of activity in Figure 2.4.1 and additional LIS analysis[8] to differentiate between its characteristic parts:

- Oxford City Centre and Fringe: This part corresponds to the Oxford City Centre and the City Fringe, with Oxford and Abingdon-on-Thames the primary settlements. It has the highest concentration of innovation and knowledge assets, including the University of Oxford, Oxford Science Park, Begbroke Science Park, Culham Science Campus and the Oxford University Hospitals.

- Knowledge Spine North: The area to the north-northeast of Oxford City, with Bicester being the largest settlement, while the Bicester Innovation Centre and the Cherwell Innovation Centre are the main knowledge assets. A key connectivity hub in Oxfordshire, this area includes access to the M40, A34/A41 and East-West rail.

- Knowledge Spine South: This part of the Spine largely corresponds to the area identified as the *"Science Vale"* in strategic documents and commercial brochures (including Local Plans and the LIS), a *"grouping of internationally-recognised science and research facilities".[9]* Didcot and Wantage are the main settlements, and knowledge assets include Milton Park, the Harwell Innovation Centre, and Grove Technology Park.

To further aid the analysis of the Oxfordshire FEMA, the Wider County that remains outside both the Knowledge Spine and City Centre and Fringe has been split into three roughly equal parts ('Zones') of comparable employment levels and economic functionality, the latter of which has been derived from commuting flows and self-containment rates. Applying this analysis, the following areas have been derived:

- County East: comprising the farthest eastern and southern parts of the county. This area includes rural areas as well as the settlements of Thame, Henley, and parts of Wallingford.
- County North: incorporating the largely rural north west of the county, including the larger settlement of Banbury, and the market towns of Chipping Norton and Charlbury.
- County West: including the settlements along the A40 to the west, such as Witney, Carterton and Burford, and the rural south west of the county, around Faringdon.

Figure 2.4.2 illustrates the different Zones of the Oxfordshire FEMA, which have been based on the methodology and approach of the previous analysis. It should be emphasised that the designation of these subdivisions are not intended to suggest these areas are fundamentally dissimilar or unconnected in any way, nor that the characteristics upon which they are based are in any way fixed.

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[8] Notably *Section 5.2 The Spatial Vision* from the Oxfordshire LIS' Future State Assessment (2018)

[9] Oxfordshire LIS, Future State Assessment, p. 11

Because of this, administrative boundaries have not been taken into account (though are included in the figure for reference). It should be also be noted that these Zones are purely illustrative, to allow for a better spatial understanding of housing need in relation to economic trends, and they do not represent specific options or priorities for the distribution of development.

Figure 2.4.2: Spatial levels of the Oxfordshire FEMA
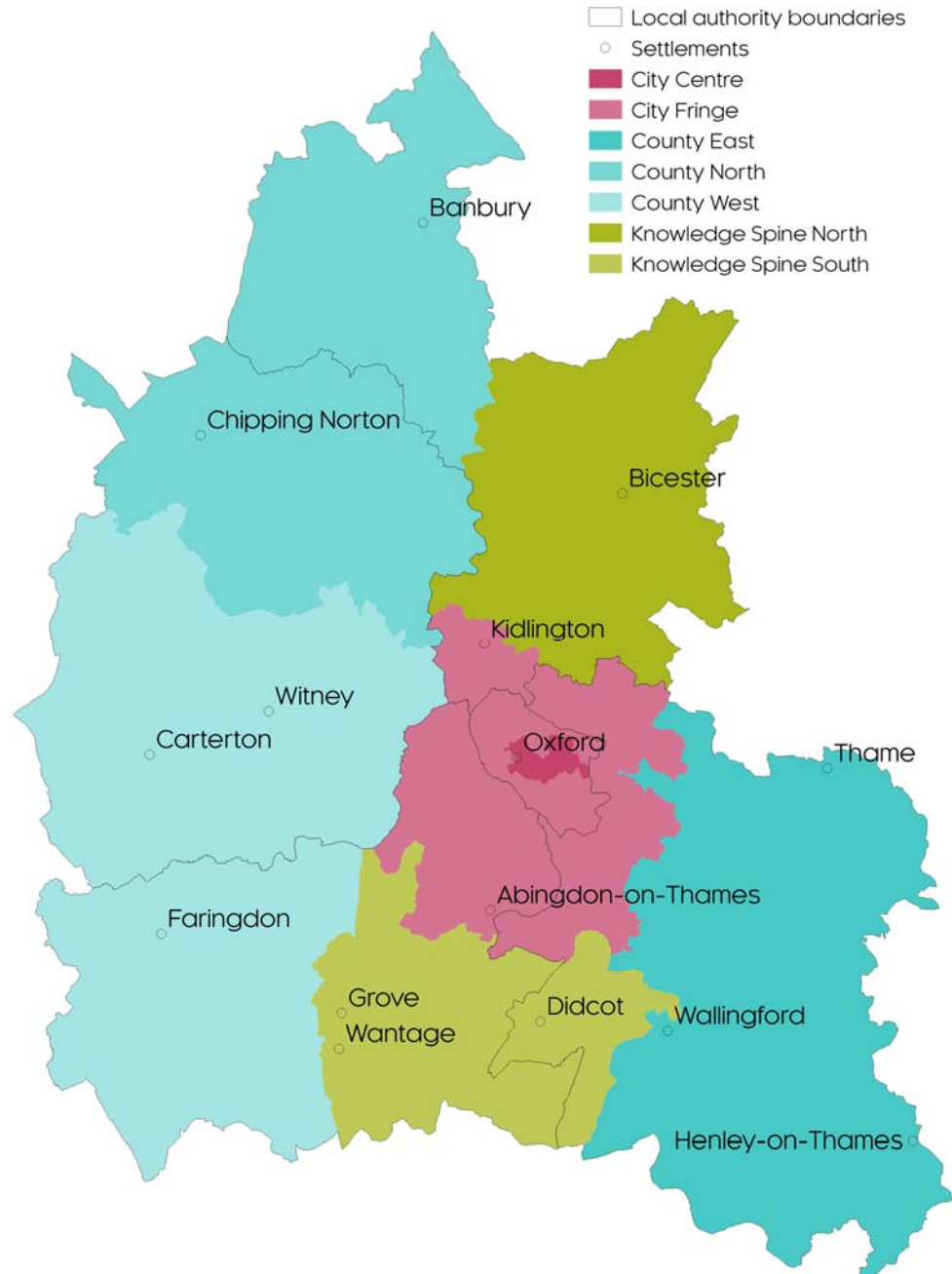
Source: Cambridge Econometrics.

2.5   Characteristics and trends within the Oxfordshire FEMA

The *Phase 1 Report* goes into extensive detail on the characteristics and recent performance of the Oxfordshire economy and housing market. This analysis is presented primarily at the county level, which corresponds to the definition of the Oxfordshire FEMA explored earlier in the chapter.

The following analysis therefore provides a summary, high-level overview of the corresponding trends at the Zonal level within the Oxfordshire FEMA - to complement the extensive higher-level analysis of the *Phase 1 Report* - looking specifically at the sectoral structure, employment trends, and housing growth within the FEMAs Zones.

Sectoral structure of the FEMA

Figure 2.5.1 provides an overview of the broad sectoral structure of employment (i.e. jobs) in the Oxfordshire FEMA in 2018 (the most recently available year of data), compared to that of both regional (the South East region) and national (UK) averages.

Figure 2.5.1: Sectoral structure of the Oxfordshire FEMA, and relative to peers, 2011
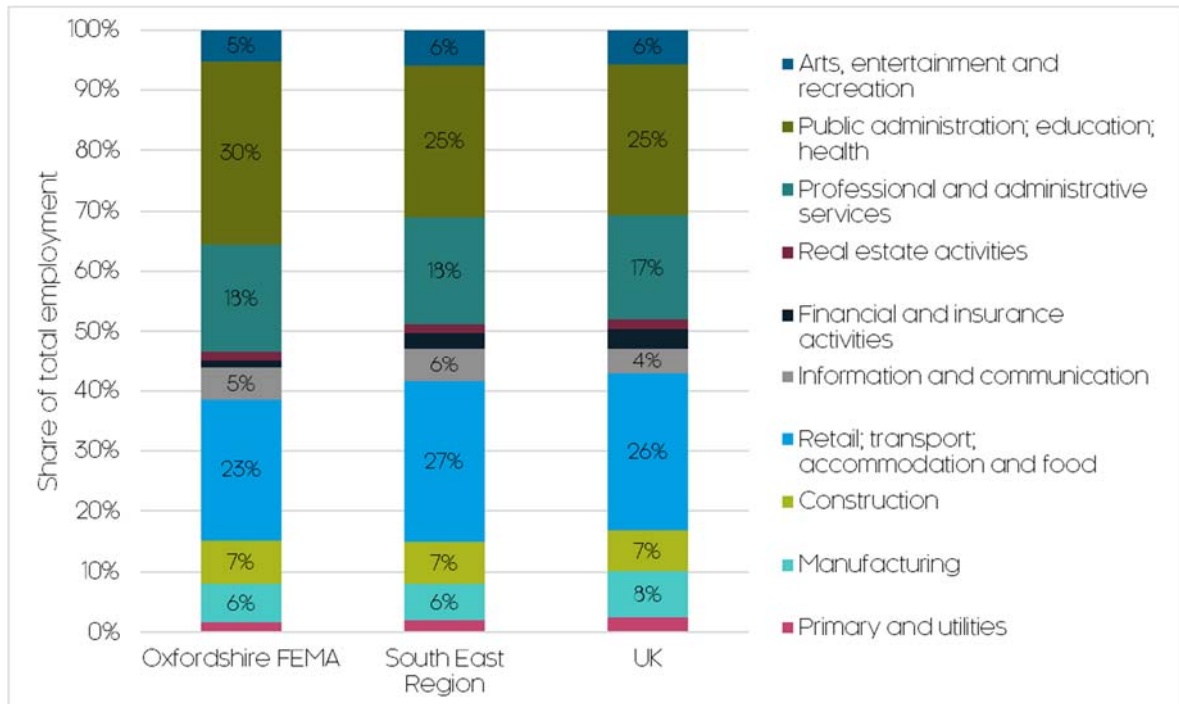
Source: ONS, Cambridge Econometrics.

Of the 410,000 jobs currently located in the Oxfordshire FEMA, the majority (over two-thirds) can be found in three of these broadly defined sectors - public administration; education; health (30% of total jobs), retail; transport; accommodation and food (23%), and professional and administrative services (18%).

Beyond these three activities, no other sector surpasses a greater than 10% share of employment, with the remaining shares ranging from 2% to 7%. The four smallest sectors in terms of employment, with shares below 2%, are primary and utilities (including agriculture), financial and insurance activities, and real estate activities.

It should be noted that these broad sectoral shares are not significantly dissimilar from regional and national averages. The Oxfordshire FEMA does deviate from these averages for some sectors though. Most notable is that of public administration; education; health, which has a significantly higher employment share than both the regional and national average.

Other overrepresented activities include knowledge-intensive services, such as professional and administrative services and information and communication, as well as construction. The remaining sectors are, relatively

speaking, underrepresented, with the largest shortfall within retail; transport; accommodation and food, broadly covering consumer services.

Analysis of sectoral employment trends within the Oxfordshire FEMA over the period 2011-18, presented in Table 2.5.1, show that:

- Three sectors experienced an employment decline, thereby decreasing their share of employment in the Oxfordshire FEMA. Notably, all three of these sectors declined at a faster rate than that of the regional (South East) average.

- Three sectors experienced positive employment growth, increasing their contribution to the FEMA, though this growth was slower than that of the regional average.

- Four sectors experienced further positive employment growth, increasing their contribution to the FEMA, and grew at a rate above that of the regional average.

Table 2.5.1: Changes in the sectoral structure of the Oxfordshire FEMA relative to the regional average, 2011-18

Share of FEMA employment	Change in employment (jobs)	Sector	Employment (jobs) growth rate (%)
Decreased	More than regional average	Primary and utilities	-10.4%
		Manufacturing	-2.0%
		Financial and insurance activities	-17.4%
	Less than regional average	None	-
Oxfordshire FEMA average			**10.4%**
Increased	Less than regional average	Retail; transport; accommodation and food	5.3%
		Professional and administrative services	13.9%
		Arts, entertainment and recreation	1.9%
	More than regional average	Construction	41.1%
		Information and communication	22.9%
		Real estate activities	12.4%
		Public administration; education; health	12.0%

Source: ONS, Cambridge Econometrics.

The *Phase 1 Report* goes into greater detail exploring the drivers and longer-term trends shaping Oxfordshire FEMAs changing structural structure. It also considers the future trajectory of the FEMA sectors and employment, and the potential implications for housing and employment land needs.

Sectoral structure of FEMA Zones

The analysis below replicates the previous headline analysis for each of the FEMAs respective Zones.[10] Figure 2.5.2 considers the relative Zonal sectoral structures within the FEMA, whilst Figure 2.5.3 compares the Zonal shares of

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[10] Zonal employment data has been primarily derived from ONS BRES employment estimates (which are available to LSOA/LSOA), but with an adjustment for self-employment, HM Armed Forces, and government supported trainees, to align with the FEMA-wide employment estimates presented in the *Phase 1 Report*.

the FEMAs sectoral and total employment. Here, local sectoral specialisms become apparent. The key characteristics for each Zone are:

- **City Centre:** is dominated by public administration; education; health, which accounts for almost three-quarters (71%) of total employment in the Zone. Retail; transport; accommodation and food, and professional and administrative services are the only other sectors with shares exceeding 2%. *19% of total FEMA employment (76,500 jobs) is located in this Zone.*

- **City Fringe:** has arguably the most diverse sectoral structure, with no sector accounting for more than a quarter of employment. Public administration; education; health (24%) and retail; transport; accommodation and food (20%) account for the highest shares. Professional and administrative services (25%) form part of the sizeable KIBS[11] sector in the Zone. It also has the largest information and communication share (9%) in the FEMA. *26% of total FEMA employment (108,000 jobs) is located in this Zone.*

- **County East:** two sectors account for almost half of total employment in this Zone – professional and administrative services (25%) and retail; transport; accommodation and food (24%). Forming part of its extensive KIBS sector, the Zone also has the highest share of finance and insurance activities (3%). *12% of total FEMA employment (47,500 jobs) is located in this Zone.*

- **County North:** has high employment shares for and retail; transport; accommodation and food (28%), and public administration; education; health (21%). Notably, within the FEMA this Zone has the highest shares of manufacturing activity (12%) and of the arts, entertainment, recreation and other services (9%).*13% of total FEMA employment (55,300 jobs) is located in this Zone.*

- **County West:** has a sectoral structure that deviates the least from the FEMA-average of all Zones. Retail; transport; accommodation and food (26%), and public administration; education; health (21%) are therefore its largest sectors. Manufacturing (10%) and construction (9%) remain sizeable, whilst it also has the joint-highest share of primary (agricultural) and utilities (3%). *12% of total FEMA employment (50,400 jobs) is located in this Zone.*

- **Knowledge Spine North:** as part of the Knowledge Spine, 20% of jobs are KIBS-based. Yet the highest employment share is for the sizeable retail; transport; accommodation and food sector (40%), which is centred around Bicester Village. The share for this sector is almost twice the FEMA average. *7% of total FEMA employment (30,100 jobs) is located in this Zone.*

- **Knowledge Spine South:** encompassing the Science Vale area, an impressive two-fifths of Zonal employment is in the KIBS sector. The largest of these is professional and administrative services (29% - twice the FEMA average), followed by information and communication

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[11] Knowledge Intensive Business Services. An aggregate of the *Professional, scientific and technical*, *Finance and insurance* and *Information and communication* sectors. Abbreviated as *KIBS*.

(8%). Retail; transport; accommodation and food remains significant (24%). *10% of total FEMA employment (42,300 jobs) is located in this Zone.*

Figure 2.5.2: Sectoral structure of the Oxfordshire FEMAs Zones, 2018
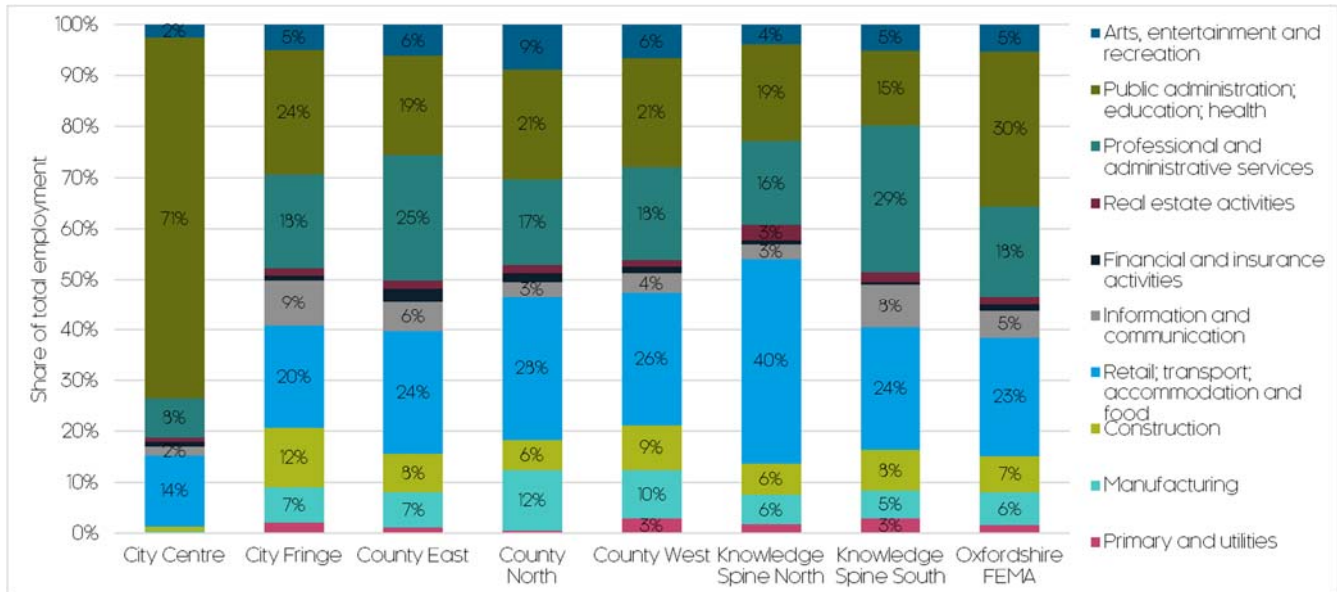
Source: ONS, Cambridge Econometrics.

Figure 2.5.3: Zonal shares of sectoral employment (jobs) in the Oxfordshire FEMA, 2018
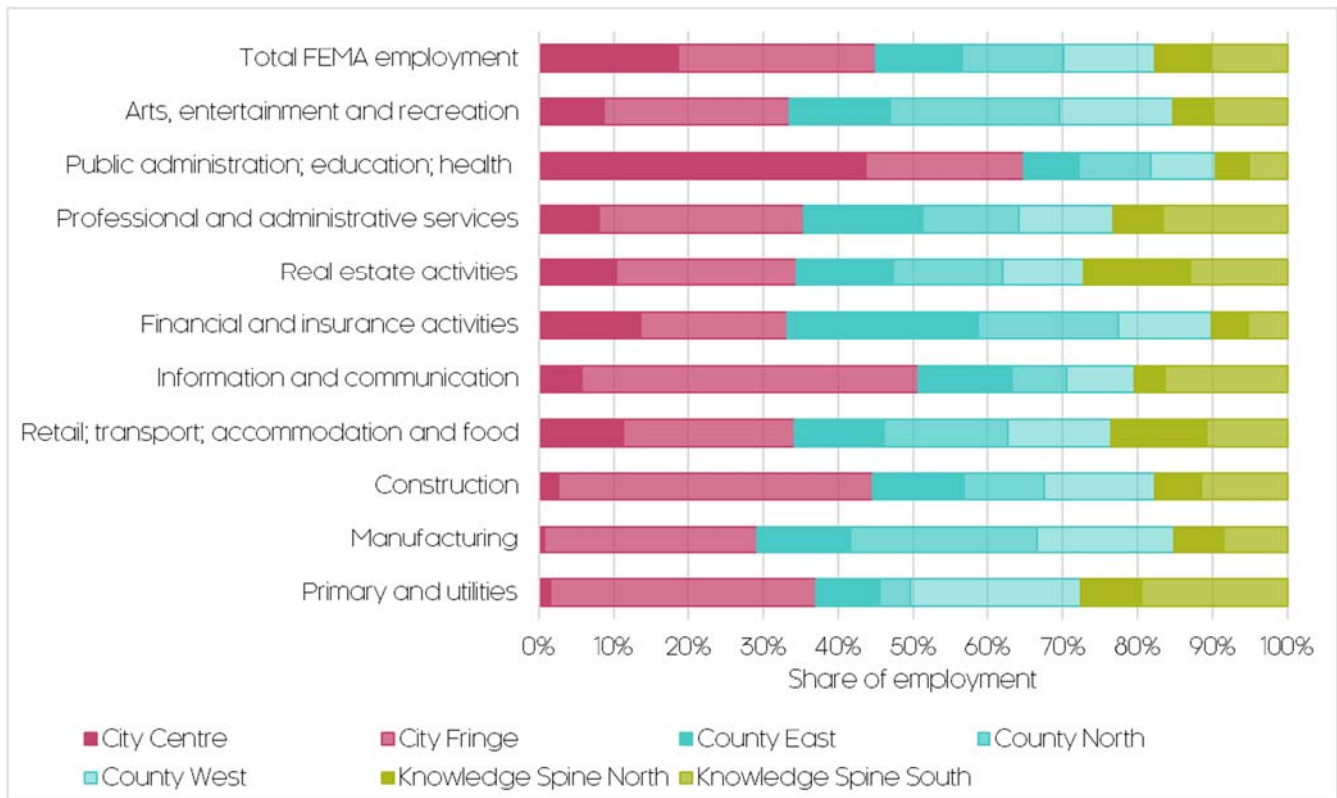
Source: ONS, Cambridge Econometrics.

Employment trends

Figure 2.5.4 illustrates the trend in employment (jobs) growth across the FEMAs Zones over the period 2011-18. As the *Phase 1 Report* notes, this has been a period of robust employment growth across the FEMA; since 2010, on average more jobs had been created in Oxfordshire than any other equivalent

period in the last 50 years (approximately 6,000 per annum), whilst (as of 2019) Oxfordshire currently has the highest employment rate out of 38 LEP areas, with some 82.8% of working age residents in active employment.

Within the FEMA, the City Fringe has driven the majority share of this robust employment growth, with a net additional 13,300 jobs created in the Zone between 2011-18. Yet the Knowledge Spine has been the fastest growing in percentage terms, with employment growth accelerating by over 20% in Knowledge Spine South. In total, a net additional 12,000 jobs were created in the two Knowledge Spine Zones.

This means that the Knowledge Spine as whole (including Oxford City Centre and Fringe) delivered some 31,000 jobs between 2011-18, the majority share of the FEMA's employment growth. County West and North saw similar levels and rates of employment growth, though both were below the FEMA average. Surprisingly, County East saw a marginal (-700) contraction in employment between 2011-18, in contrast to the wider FEMAs buoyant performance.

Figure 2.5.4: Zonal employment (jobs) trends, 2011-18
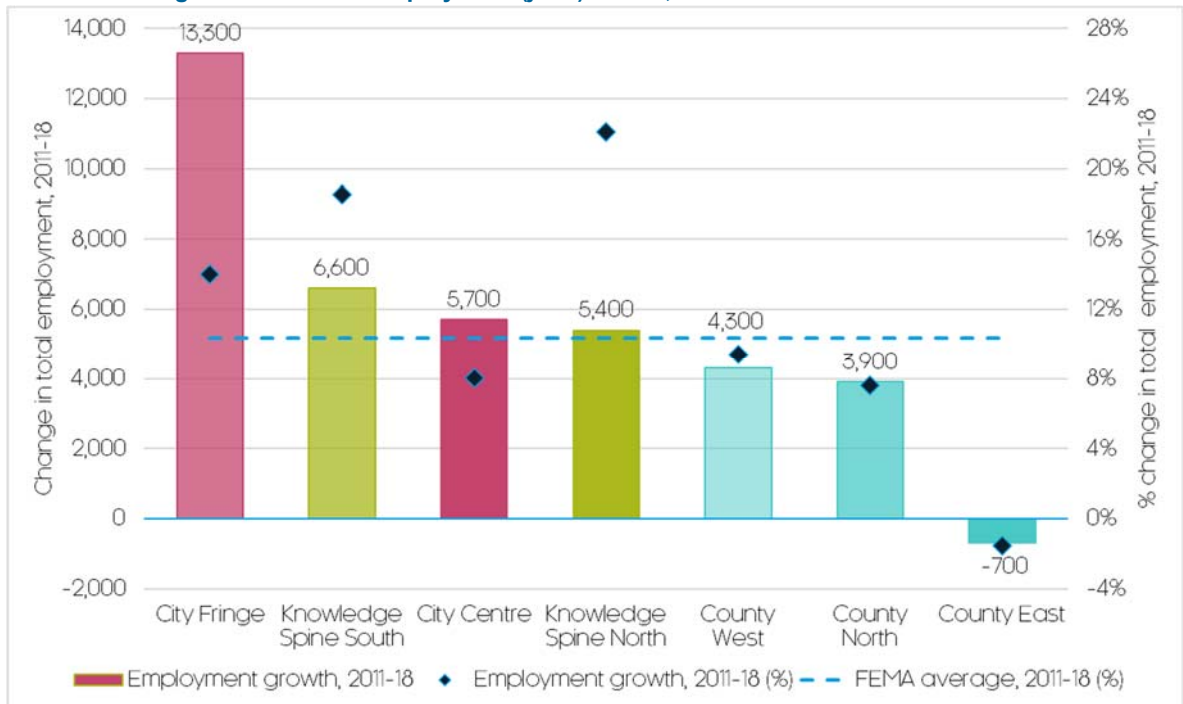
Source: ONS, Cambridge Econometrics.

Figure 2.5.5 looks at the sectoral composition and drivers of these trends. Employment growth in the City Fringe has been driven by KIBS (notably professional and administrative services), as well as construction-related activity, whilst manufacturing employment growth was the strongest in the FEMA. The City Centre's employment growth meanwhile was derived almost exclusively from its largest sector - public administration; education; health.

In Knowledge Spine South, like the City Fringe, growth was oriented around KIBS activity (information and communication particularly), alongside construction and public administration; education; health. Knowledge Spine North meanwhile saw a similar, if slightly lesser focus on KIBS activity, though it was the retail; transport; accommodation and food sector – centred on Bicester village - which drove the majority of growth.

County West and North saw similar patterns of growth, driven by professional and administrative services, and retail; transport; accommodation and food. County North also saw the FEMAs strongest growth in arts, entertainment, recreation and other services. County East did see growth in most sectors, though this was marginal beyond construction. A large drop in professional and administrative services dragged down its headline rate of employment growth, with such activity potentially shifting elsewhere in the FEMA.

Figure 2.5.5: Sectoral composition of employment (jobs) growth by Zone, 2011-18
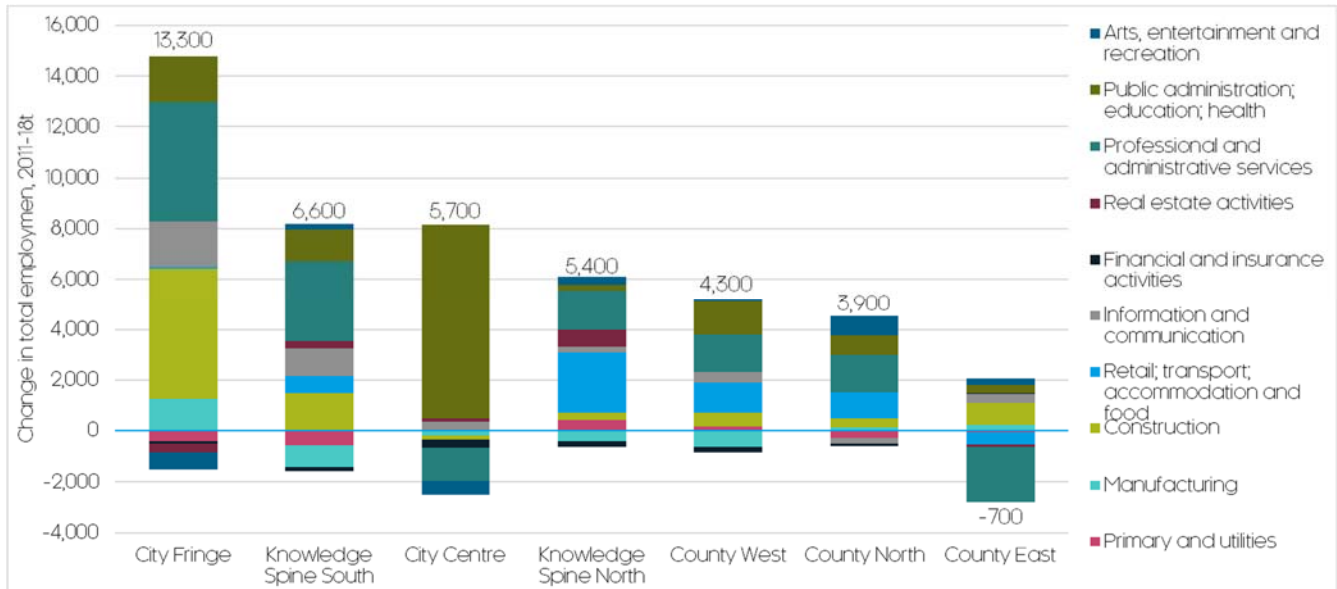
Source: ONS, Cambridge Econometrics.

Figure 2.5.6 provides a more spatially detailed overview (to LSOA level) of the employment growth within the Oxfordshire FEMA over 2011-18. Pockets of robust growth are particularly notable at either end of the Knowledge Spine, specifically around Didcot and its neighbouring science parks (comprising the *"Science Vale"*) in the south, and around Bicester to the north.

Growth has also been strong in and around Oxford, particularly at Oxford Science Park within the City Fringe. Rural and market towns have also seen pockets of strong growth, specifically in and around Banbury, Carterton and Chipping Norton in the north and west of the county. Slower or contractionary growth has however been evident around Henley and Thame in the east.

It should be noted that, at this detailed spatial level, the data – which are survey-based - can become increasingly 'noisy' and volatile, and less precise. Caution should therefore be urged when interpreting these trends.

Figure 2.5.6: Employment (jobs) trends within the Oxfordshire FEMA, 2011-18
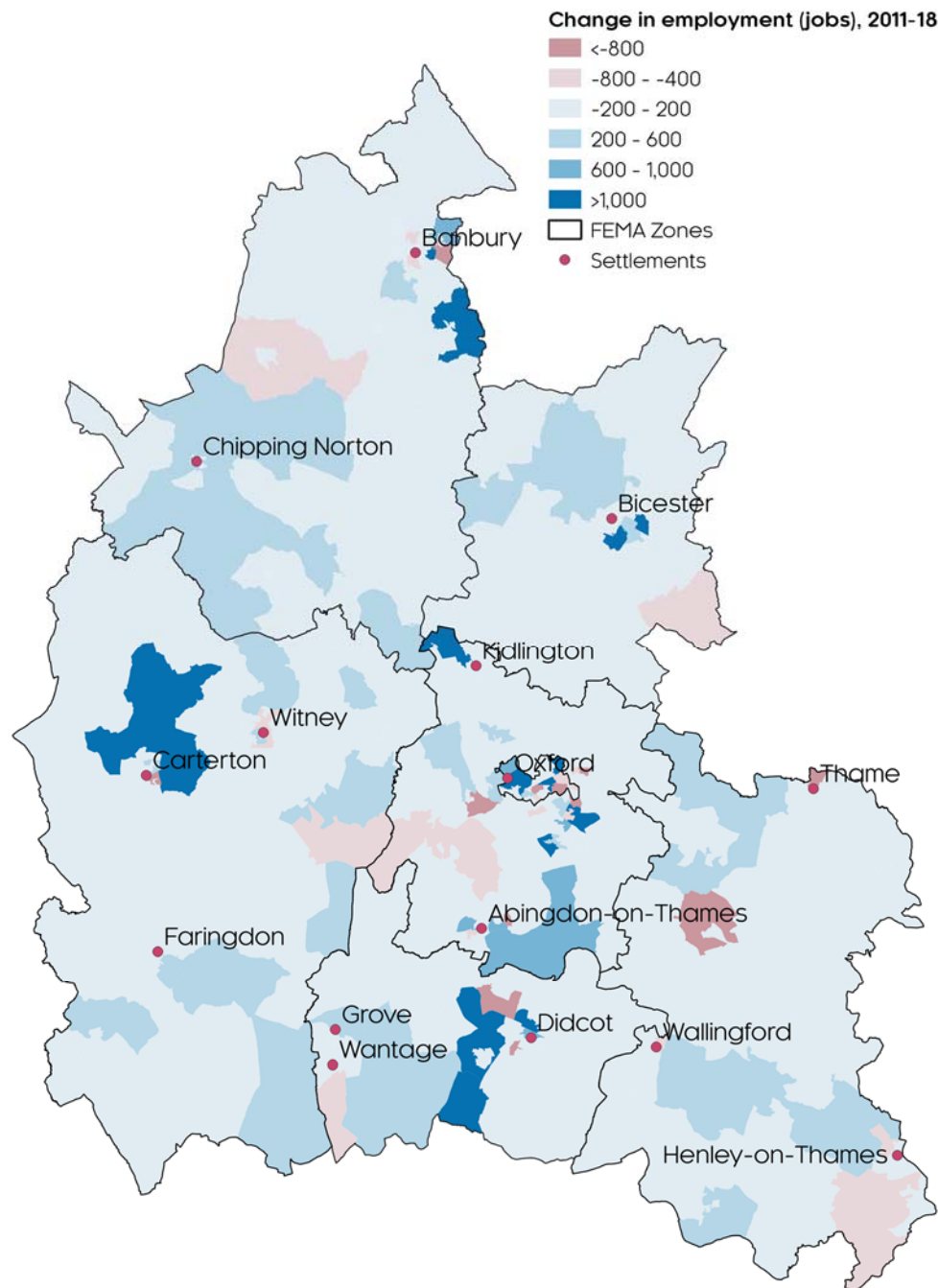
Source: ONS, Cambridge Econometrics.

Housing trends

Figure 2.5.7 illustrates the current (2020) distribution of housing across the Oxfordshire FEMA, and how this compares to the distribution of employment (in 2018). As with employment, the majority of Oxfordshire's 302,100 dwellings are located within the City Fringe (29% of total dwellings). Notably, the City Centre has a lower share of housing (5%) relative to jobs, reflecting high in-commuting. The Knowledge Spine has a similar housing share (19%) to that of employment, whilst the Wider County accounts for almost half (47%) of Oxfordshire's dwellings, higher than its share of employment, reflecting high out-commuting from these areas.

Figure 2.5.7: Zonal housing and employment (jobs) shares, 2018-20 (2020 for housing, 2018 for employment)

Source: VOA, MHCLG, ONS, Cambridge Econometrics.

Figure 2.5.8 explores the distribution of estimated housing growth within the FEMA over the 2011-20 period.[12] As the *Phase 1 Report* noted, housing completions within the Oxfordshire FEMA have increased rapidly recently, particularly since 2017. However, with the 2014 SHMA identifying a delivery for 5,000 homes per annum, only from 2018/19 onwards has this level of housing provision been achieved.

Within the FEMA, as with employment, the Knowledge Spine has seen accelerated delivery, with a combined 10,600 net completions over 2011-20, with both areas exceeding 20% growth. Knowledge Spine South has driven the majority share, with an estimated 6,500 net completions in the Zone between 2011-20, the highest in the FEMA.

This was closely followed by County West, with 5,900 net completions, whilst County North showed an almost identical rate of delivery (13% increase), with 5,300 net completions. Alongside County East 4,100 net completions, this means the Wider County accounted for a combined 15,300 net completions over the 2011-20 period. Rates of delivery in Oxford City, including the Centre (8%) and Fringe (7%), were below the FEMA average, though there was still a combined 6,700 completions over the period.

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[12] Zonal housing data has been primarily derived from the VOAs Council Tax: stock of properties housing estimates (which are available to LSOA/LSOA), but with an adjustment to align with MHCLGs Live tables on dwelling stock (including vacants), which are derived from local authority monitoring and returns (AMR's). This ensures Zonal estimates also align with the FEMA-wide housing estimates presented in the *Phase 1 Report*. Spatially detailed estimates may not precisely align with local authority AMR reporting, with deviations of 1-2% possible at the local authority level.

Figure 2.5.8: Zonal housing trends, 2011-20
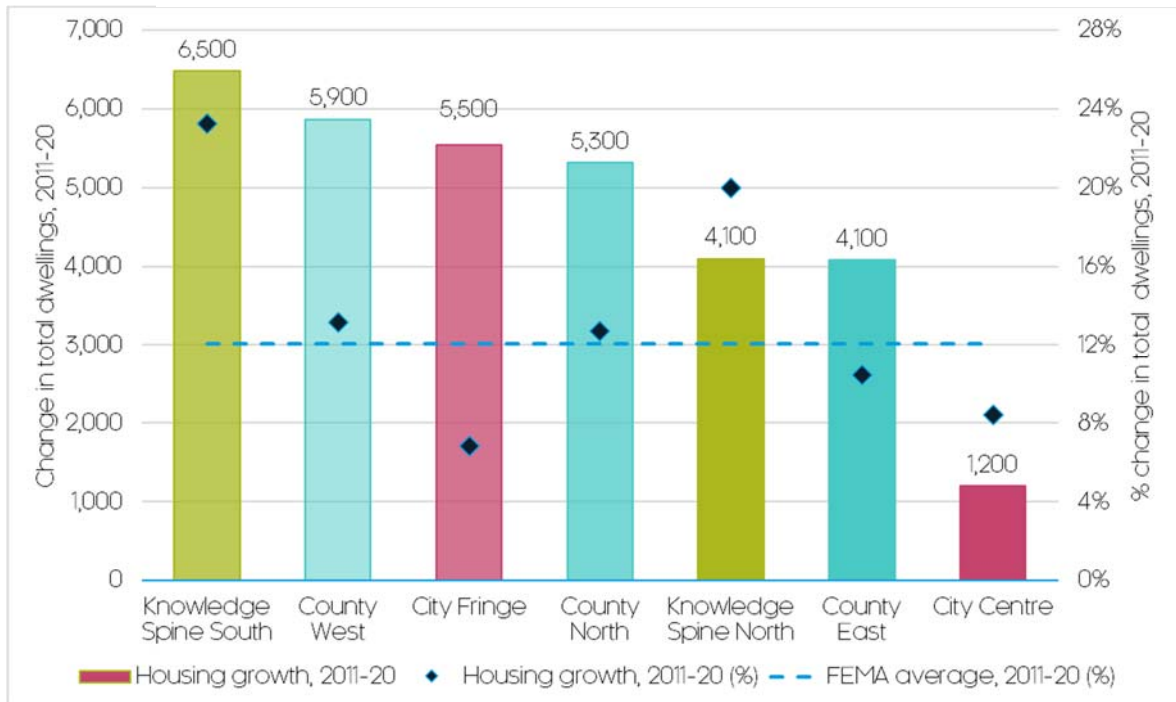
Source: VOA, MHCLG, Cambridge Econometrics.

Figure 2.5.9 provides a more spatially detailed overview (to LSOA level) of housing delivery within the Oxfordshire FEMA over the 2011-20 period. As with employment, delivery is particularly notable at either end of the Knowledge Spine, specifically around Didcot, Grove and Wantage to the south, and Bicester in the north.

Growth has also been strong within the Wider County, particularly in and around Banbury to the north, Faringdon to the west, as well as Wallingford and Thame to the east. Pockets of delivery are also evident within the City Fringe of Oxford, and to a lesser extent, the City Centre.

It should be noted that, at this detailed spatial level, the data – which are informed by the Council Tax register - can become increasingly 'noisy' and less precise. Caution should therefore be urged when interpreting these trends.

Figure 2.5.9: Housing trends within the Oxfordshire FEMA, 2011-20
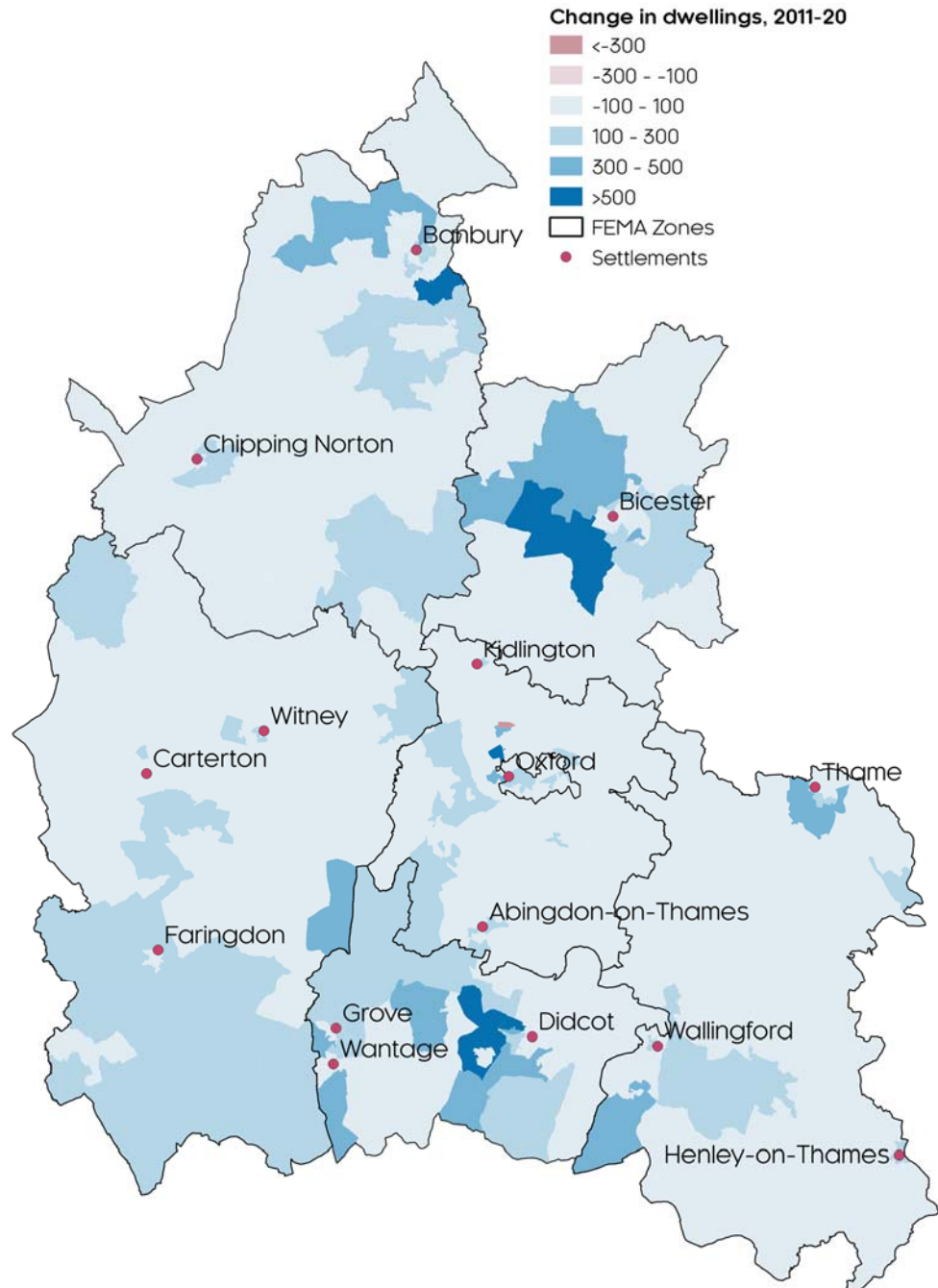
Source: VOA, MHCLG, Cambridge Econometrics.

2.6   Conclusions

Functional Economic Market Areas (FEMAs) are designed to capture the extent and spatial distribution of a local economic market more accurately than administrative boundaries, which rarely reflect the true scale and reach of local economic markets and accompanying economic flows.

The analysis of several economic, demographic and social markets and indicators shows that the county of Oxfordshire is a reasonable approximation for the Oxfordshire FEMA, with Oxford at its centre.

Further spatial levels ('Zones') have been identified within the FEMA, crossing administrative boundaries. These include Oxford City Centre and Fringe, the Knowledge Spine, and the Wider County. Analysis shows the distinct characteristics and economic attributes of these areas.

The definition and understanding of the Oxfordshire FEMA provides a strong foundation for a more precise and in-depth exploration of the spatial distribution of housing need in relation to economic trends, and the accompanying implications and trade-offs.

3 The Oxfordshire FEMA and Phase 1 Employment Trajectories

3.1 Introduction

Building on the definition and analysis of the Oxfordshire FEMA and its constituent Zones in the previous chapter, this chapter proceeds to consider the spatial distribution of the three FEMA-wide employment trajectories (to 2050) prepared and presented in the *Phase 1 Report*.

Specifically, it scales projected employment growth from the *Phase 1 Report* across the FEMA's seven constituent Zones. Understanding the potential spatial scale and pattern of employment growth is important for informing and testing potential housing distributions, and resultantly seeing how these impact factors such as commuting and transport use.

The following analysis starts with a recap of the Oxfordshire-wide employment projections, followed by an overview of the methodology used to distribute this to the Zones, before presenting and analysing the results.

3.2 Recap of the Phase 1 Report employment trajectories

Figure 3.2.1 and Table 3.2.1 provide a recap of the three Oxfordshire-wide employment (jobs) trajectories from 2018 (the baseline for the projections) to 2050, as prepared and presented in the *Phase 1 Report*. Reflecting the different levels of potential growth, each trajectory has been informed by a broad set of assumptions (these are explored in more detail in the *Phase 1 Report*):

- **Standard Method (adjusted) trajectory:** backwards calculated from the Standard Method calculation of housing need (which has been adjusted for a revised demographic baseline), by making a number of assumptions relating to economic activity rates, commuting, double jobbing and unemployment.

- **Business as usual trajectory:** this trajectory represents a continuation of Oxfordshire's recent economic performance, taking particular account of the growth delivered during the recovery from the 2008-09 recession. It represents a best approximation as to the future rate at which Oxfordshire will be able to deliver employment growth based on the latest trend data.

- **Transformational trajectory:** This trajectory is broadly the equivalent of the Oxfordshire Local Industrial Strategy 'go for growth' scenario, but updated and adjusted for 2020. Certain targeted sectors are assumed to see strong growth, others grow as a result of anticipated corresponding population growth and increased economic activity.

The three scenarios present alternative visions of how Oxfordshire's economy might perform. Potential growth ranges from 85,400 net additional jobs under the Standard Method (adjusted) trajectory over the period 2018-50, to 122,500 under the central business as usual trajectory, peaking at a potential 171,200 additional jobs under the LIS-related transformational trajectory.

Figure 3.2.1: Phase 1 employment (jobs) trajectories for Oxfordshire, 2018-50
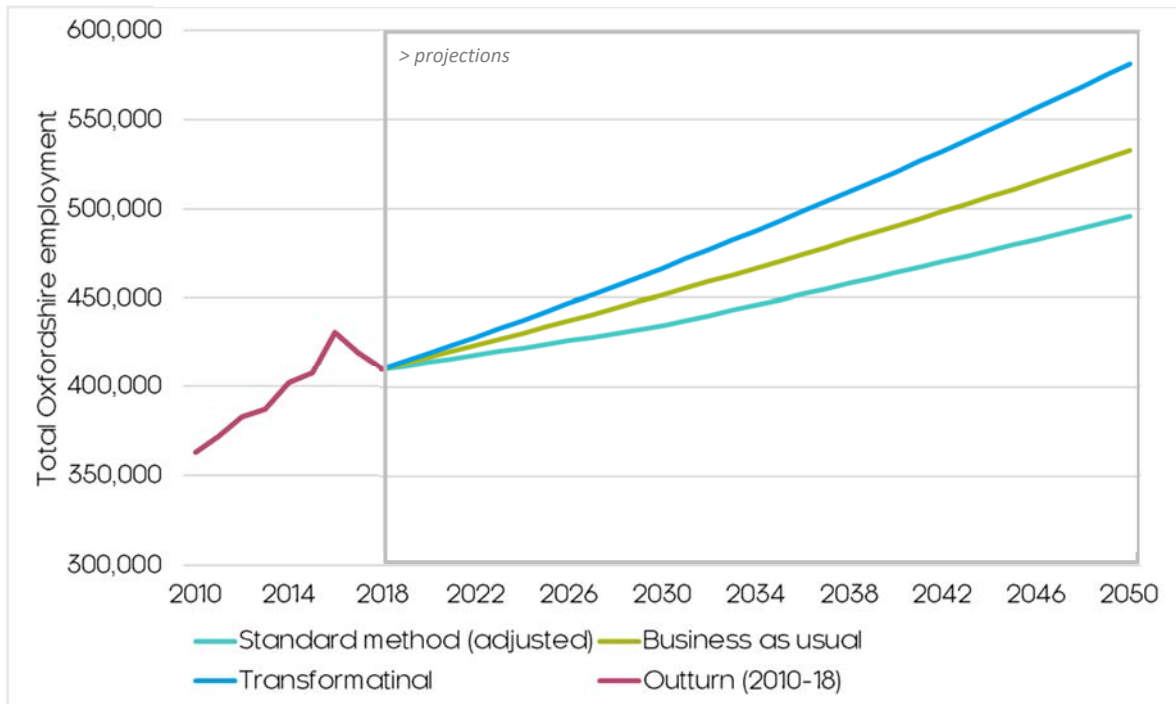
Table 3.2.1: Phase 1 Report employment (jobs) trajectories for Oxfordshire, 2018-50

	Employment (jobs) at 2018 (baseline)	Employment (jobs) at 2050	Employment (jobs) change, 2018-50	Employment (jobs) change p.a., 2018-50
Standard Method (adjusted)	410,100	495,600	85,500	2,700
Business as usual	410,100	532,500	122,500	3,800
Transformational	410,100	581,300	171,200	5,400

Source: ONS, Cambridge Econometrics.

Figure 3.2.2 revisits the sectoral composition of the employment trajectories. As remarked in the *Phase 1 Report*, the LIS specifically emphasises growth in *"breakthrough sectors"*, which are typically tradeable sectors such as manufacturing, professional services and information and communication.

Therefore, rather than being a constant proportion, sectoral employment growth varies across the respective trajectories, largely reflecting the realisation of LIS-related ambitions in the higher trajectories.

For instance, under baseline (Standard Method adjusted) projections, manufacturing employment is expected to decline, yet under the transformational trajectory, dependent on the realisation of LIS aspirations and interventions, manufacturing employment has the potential to grow.

This is important for the following analysis as areas with a higher concentration of such fast-growing, tradable industries (as explored in *2.5 Characteristics and trends within the Oxfordshire FEMA*) are likely to experience faster overall employment growth in the higher trajectories.

Figure 3.2.2: Sectoral composition of the employment (jobs) trajectories, 2018-50
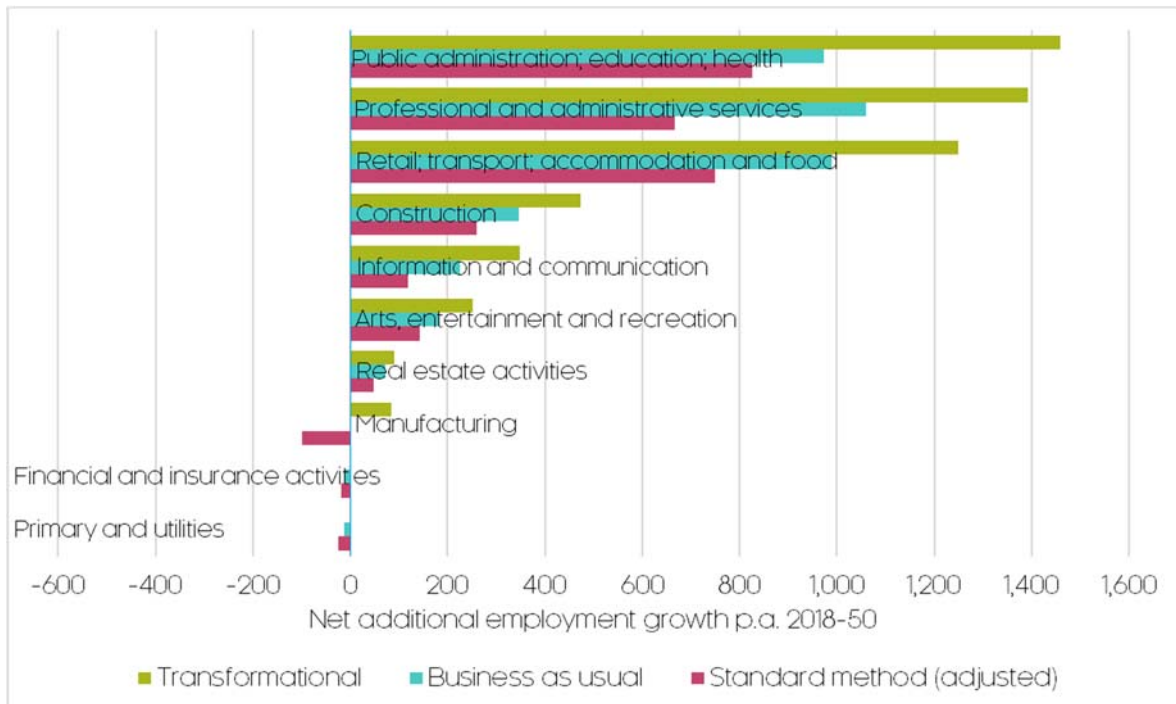
Source: Cambridge Econometrics, Iceni Projects, Justin Gardner Consulting.

3.3   Methodology overview

To estimate the Zonal distributions of jobs to 2050 for the three employment trajectories, the following steps were taken:

1. Firstly, LSOA-level (broadly equivalent to neighbourhood level) employee jobs data by sector (specifically, for the 10 sectors outlined in the *Phase 1 Report*) were extracted from BRES for the baseline years (2018 and 2011).

2. As BRES data excludes the self-employed (as well as HM armed forces and government supported trainees), a ratio (taken from CE's estimates of employee jobs and self-employed jobs at the county level, as used in the *Phase 1 Report*) was applied to the raw LSOA-level BRES data. This was undertaken on a sectoral basis.

3. Taking these converted and aligned employment values by LSOA and sector, these were scaled forward from 2018 to 2050 on a sectoral basis by taking sector growth rates from the FEMA-wide projections (for the three trajectories) and assuming these held for each LSOA area.

4. Therefore, the growth rate of the individual LSOA's between 2018-50 is reliant on its sectoral mix compared to the county as a whole under the respective scenarios. For the sake of simplicity, transparency, and neutrality, all sectors, regardless of Zone, are therefore assumed to grow at the same rate as the FEMA average.

5. These LSOA values are then checked to ensure they align with county wide totals, and were then summed to their respective economic Zones, which have been defined at the LSOA-level.

6. Applying these steps provides complete, aligned and annualized estimates of employment by Zone, from 2018 to 2050, for the three employment trajectories.

3.4 Spatial distribution of employment growth

Figure 3.4.1 provides an overview of the potential spatial distribution of employment growth under the three trajectories, shown as the Zones share of total additional jobs to 2050 (not to be confused with the percentage growth rates of the Zones themselves).

Figure 3.4.1: Spatial scenarios for Zonal distribution of employment (jobs) growth, 2011-18 and 2018-50
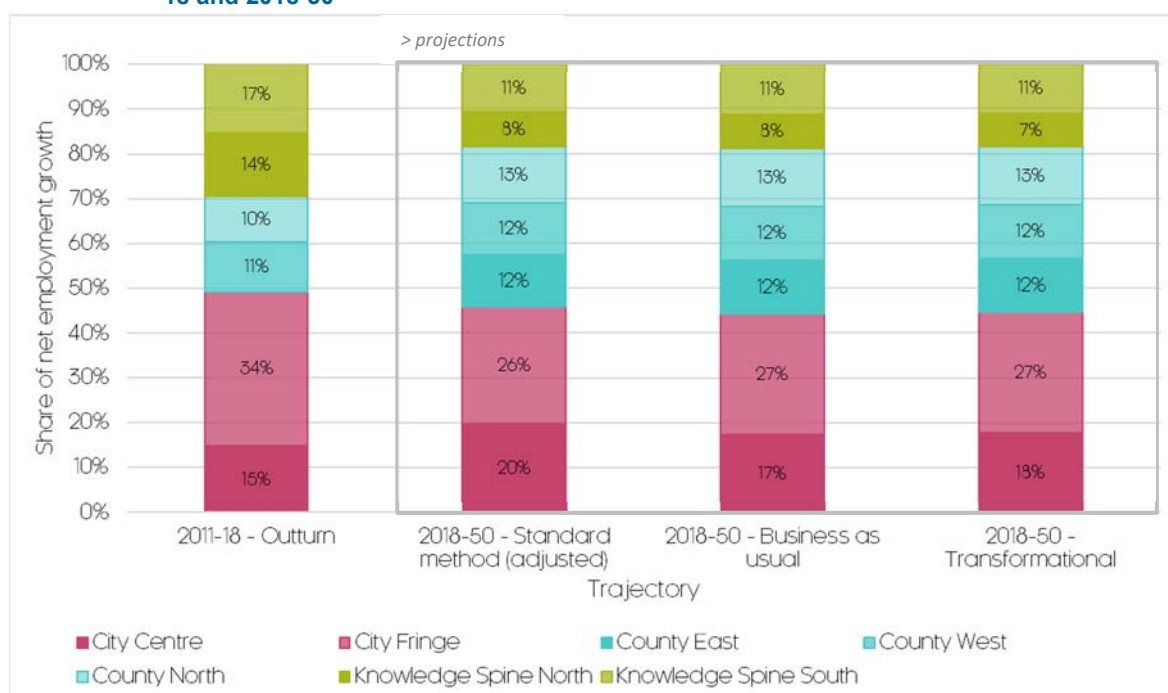
Source: ONS, Cambridge Econometrics. County East excluded from 2011-18 outturn due to negative employment growth.

The first thing to observe is the close similarity between the three different trajectories. This is a result of the FEMA-wide *Phase 1 Report* projections being scaled proportionally across existing Zonal sectoral employment shares (as explored in *3.3 Methodology overview*).

Secondly, there has been relatively spatially concentrated growth over recent years (2011-18), but assuming sectoral growth rates remain constant across the FEMA, this may not be the case over a longer timeframe, with a more spatially even pattern of growth potentially emerging.

It should be emphasised that the Zonal allocation of these trajectories does not reflect actual options or priorities for economic growth, and are hypothetical distributions. The following analysis proceeds to put absolute numbers against each of these three trajectories for the FEMA and its seven constituent Zones.

Figure 3.4.2: Stylized overview of employment (jobs) growth under the Standard Method (adjusted) trajectory

Legend:
- Local authority boundaries
- Settlements
- City Centre
- City Fringe
- County East
- County North
- County West
- Knowledge Spine North
- Knowledge Spine South

= doughnut fill represents Zonal proportion of total FEMA jobs growth 2018-50. A fully shaded Doughnut would equate to a 100% share
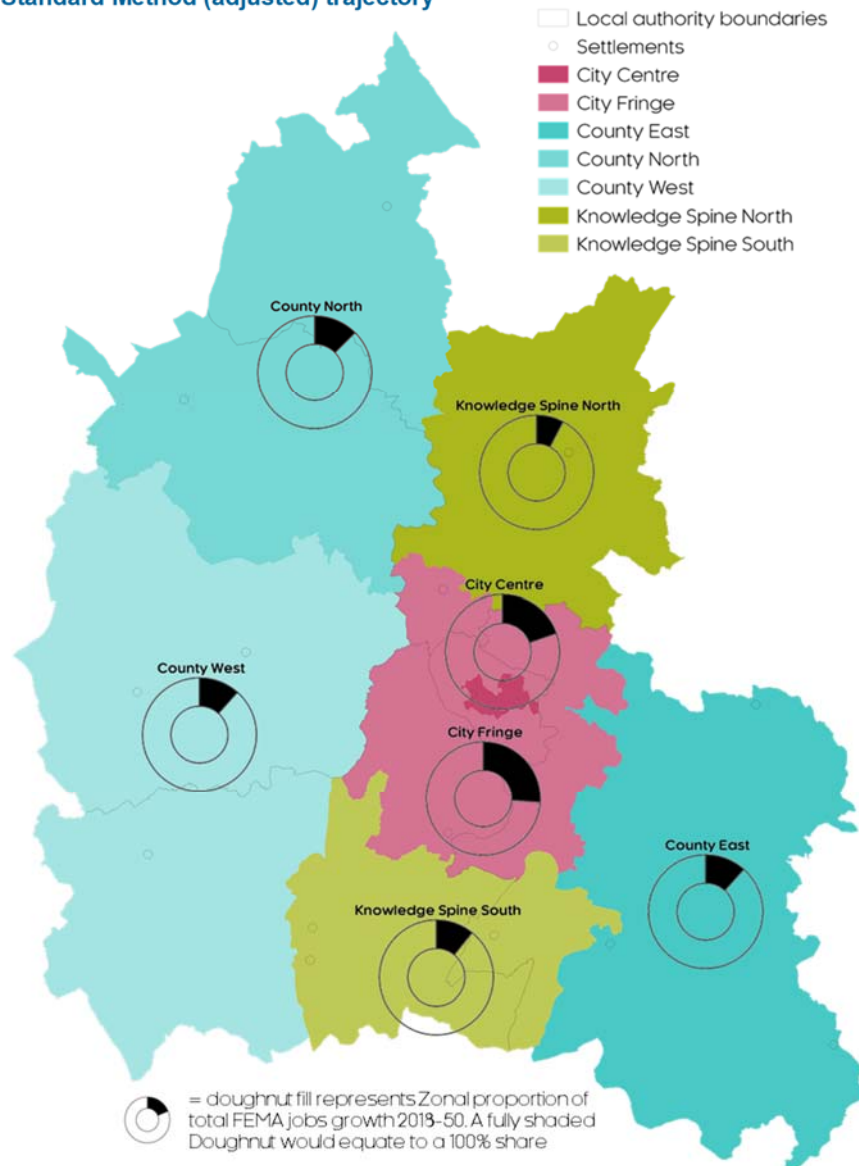
Standard Method (adjusted) trajectory

The adjacent Figure 3.4.2 and Table 3.4.1 provide a spatial overview of Oxfordshire's employment growth under the Standard Method (adjusted) trajectory, where some 81,600 net additional jobs are expected to be created between 2018-50.

Over the timeframe of this trajectory, a more balanced growth picture emerges, with Zonal growth rates only showing minor deviations from the FEMA average. Stronger growth is still expected along the Knowledge Spine (including Oxford City and Fringe), reflecting its favourable sectoral mix and high baseline employment shares, though it is unlikely this will be maintained at the pace of 2011-18.

Growth is expected to be more apparent in the Wider County, particularly in and around market towns such as Banbury, Witney and Wallingford. The City and its Fringe is expected to remain the main driver of employment growth though, accounting for almost half (46%) of net new employment between 2018 and 2050.

Table 3.4.1: Overview of employment growth under the Standard Method (adjusted) trajectory

	Change in employment, 2018-50	Change in employment per annum, 2018-50	% share of FEMA change in employment, 2018-50
City Centre	16,800	500	19.7%
City Fringe	22,300	700	26.1%
Oxford City and Fringe	**39,200**	**1,200**	**45.8%**
County East	9,900	300	11.6%
County North	10,700	300	12.5%
County West	9,900	300	11.6%
Wider County	**30,500**	**1,000**	**35.7%**
Knowledge Spine North	6,600	200	7.7%
Knowledge Spine South	9,200	300	10.8%
Knowledge Spine	**15,800**	**500**	**18.4%**
FEMA Total	**85,500**	**2,700**	**-**

Source: Cambridge Econometrics. Note: FEMA totals may not sum due to rounding.

Figure 3.4.3: Stylized overview of employment (jobs) growth under the business as usual trajectory
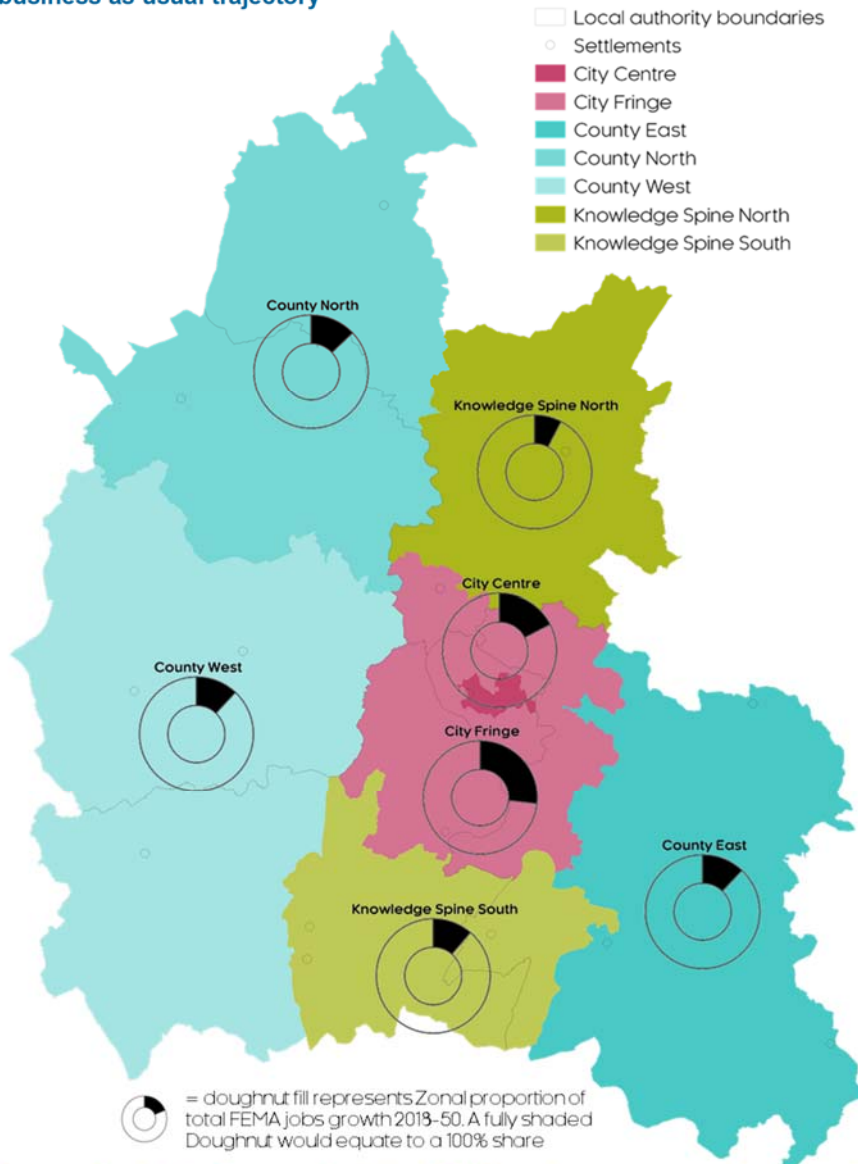
Business as usual trajectory

The adjacent Figure 3.4.3 and Table 3.4.2 provide a spatial overview of Oxfordshire's employment growth under the business as usual trajectory, where some 115,800 net additional jobs are expected to be created between 2018-50.

Under this central trajectory, the spatial pattern of growth remains broadly similar to Standard Method (adjusted) trajectory, though the Wider County and Knowledge Spine (particularly Knowledge Spine South) close the gap with the City and Fringe in terms of the expected share of employment growth.

This is largely due to comparatively slower employment growth in the City Centre, which – dominated by industries such as education, public admin and retail – has a lower incidence of LIS high-growth sectors, which are more prevalent in the City Fringe, Knowledge Spine and parts of the Wider County.

Table 3.4.2: Overview of employment growth under the business as usual trajectory

	Change in employment, 2018-50	Change in employment per annum, 2018-50	% share of FEMA change in employment, 2018-50
City Centre	21,300	700	17.4%
City Fringe	32,800	1,000	26.8%
Oxford City and Fringe	**54,100**	**1,700**	**44.2%**
County East	14,700	500	12.0%
County North	15,800	500	12.9%
County West	14,700	500	12.0%
Wider County	**45,200**	**1,400**	**36.9%**
Knowledge Spine North	9,300	300	7.6%
Knowledge Spine South	13,800	400	11.3%
Knowledge Spine	**23,200**	**700**	**18.9%**
FEMA Total	**122,500**	**3,800**	**-**

Source: Cambridge Econometrics. Note: FEMA totals may not sum due to rounding.

Figure 3.4.4: Stylized overview of employment (jobs) growth under the transformational trajectory
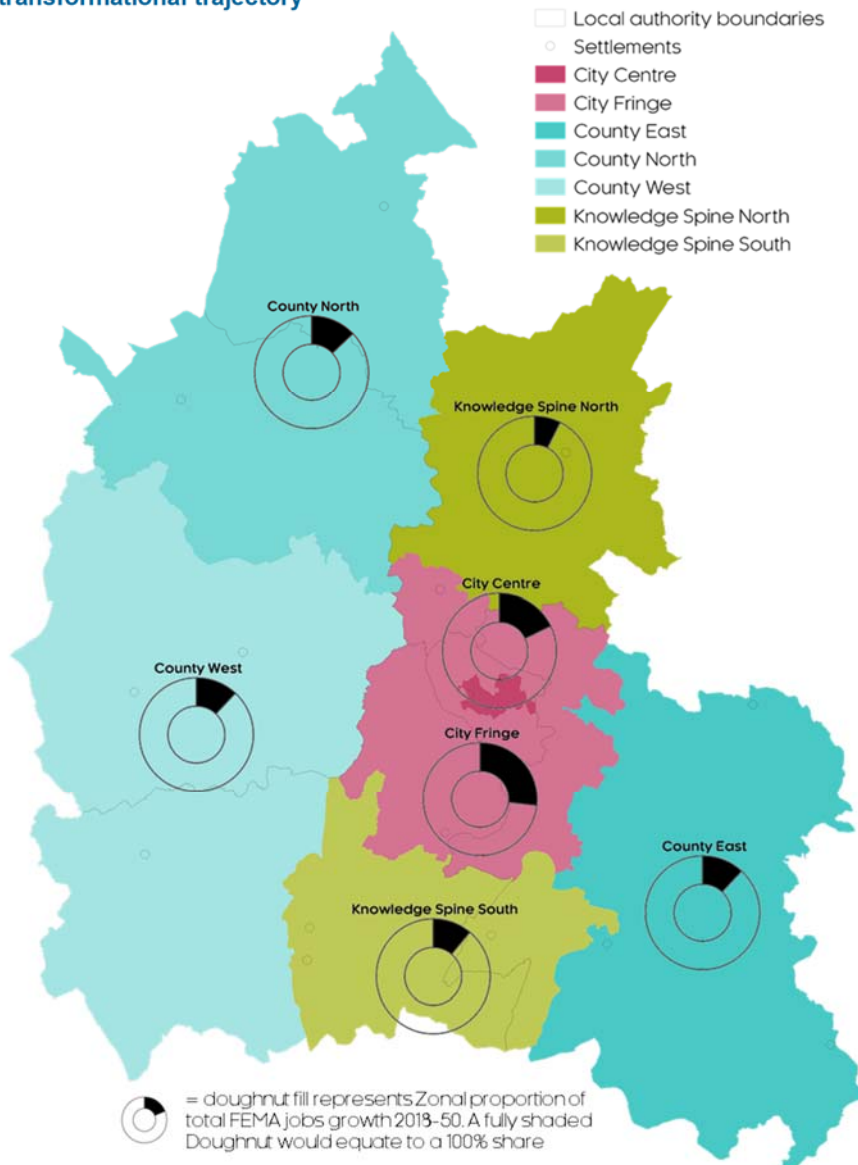
Transformational trajectory

The adjacent Figure 3.4.4 and Table 3.4.3 provide a spatial overview of Oxfordshire's employment growth under the transformational trajectory, where some 162,300 net additional jobs are expected to be created between 2018-50.

The emphasis on faster growth in LIS-oriented (typically tradeable) sectors sees the Wider County retain a high share of total employment growth, given the concentration of such activities in these Zones. Under this trajectory, County North sees the largest employment share outside of Oxford City and Fringe.

The Knowledge Spine (including Oxford City and Fringe) – ranging from Didcot to Bicester – is expected to remain the significant employment generator though, accounting for over two-thirds of all net additional employment growth under this aspirational scenario, reflecting its favourable overall sectoral mix and high baseline employment shares.

Table 3.4.3: Overview of employment growth under the transformational trajectory

	Change in employment, 2018-50	Change in employment per annum, 2018-50	% share of FEMA change in employment, 2018-50
City Centre	30,500	1,000	17.8%
City Fringe	46,000	1,400	26.9%
Oxford City and Fringe	**76,500**	**2,400**	**44.7%**
County East	20,400	600	11.9%
County North	22,100	700	12.9%
County West	20,500	600	12.0%
Wider County	**63,000**	**2,000**	**36.8%**
Knowledge Spine North	12,700	400	7.4%
Knowledge Spine South	19,000	600	11.1%
Knowledge Spine	**31,600**	**1,000**	**18.5%**
FEMA Total	**171,200**	**5,300**	**-**

Source: Cambridge Econometrics. Note: FEMA totals may not sum due to rounding.

3.5   Conclusions

This chapter has sought to consider the spatial scale and pattern of projected employment growth within the Oxfordshire FEMA, across its seven constituent Zones. Over the longer timeframe of the *Phase 1* employment trajectories (to 2050), there is the potential for a more spatially balanced growth picture to emerge compared to recent (2011-18) trends.

Central Oxfordshire, encompassing the Knowledge Spine (including Oxford City and Fringe), is expected to remain a significant driver of economic activity though, accounting for a potential two-thirds of net additional employment growth in the FEMA to 2050.

Understanding the potential spatial scale and pattern of employment growth is important for informing, testing and illustrating housing distributions and their implications, which are considered further in the next chapter.

4 The Oxfordshire FEMA and Phase 1 Housing Need

4.1 Introduction

Having explored the spatial scale and pattern of potential employment growth within the Oxfordshire FEMA, this chapter considers a range of potential spatial distribution scenarios for the three FEMA-wide projections of housing need to 2050, as prepared and presented in the *Phase 1 Report.*

As with the previous chapter, it scales projected housing need from the *Phase 1 Report* across the Oxfordshire FEMA, utilising the seven Zones defined and analysed in *Chapter 2*. By taking the opportunity to quantify and test a range of contrasting housing distributions, the potential implications and trade-offs of different development choices can be identified and contrasted at a high-level.

The following analysis begins with a recap of the FEMA-wide housing need from the *Phase 1 Report*, followed by an overview of the methodology and assumptions used to distribute this to Zones, before presenting and analysing the results.

4.2 Recap of the Phase 1 Report housing need

Figure 4.2.1 and Table 4.2.1 provide a recap of the housing need prepared and presented in the *Phase 1 Report* (relative to the three accompanying economic trajectories). As with employment growth, the trajectories have been informed by a broad set of individual assumptions and methodologies, resulting in their contrasting levels of need.

Figure 4.2.1: Phase 1 Report housing need for Oxfordshire, 2020-50
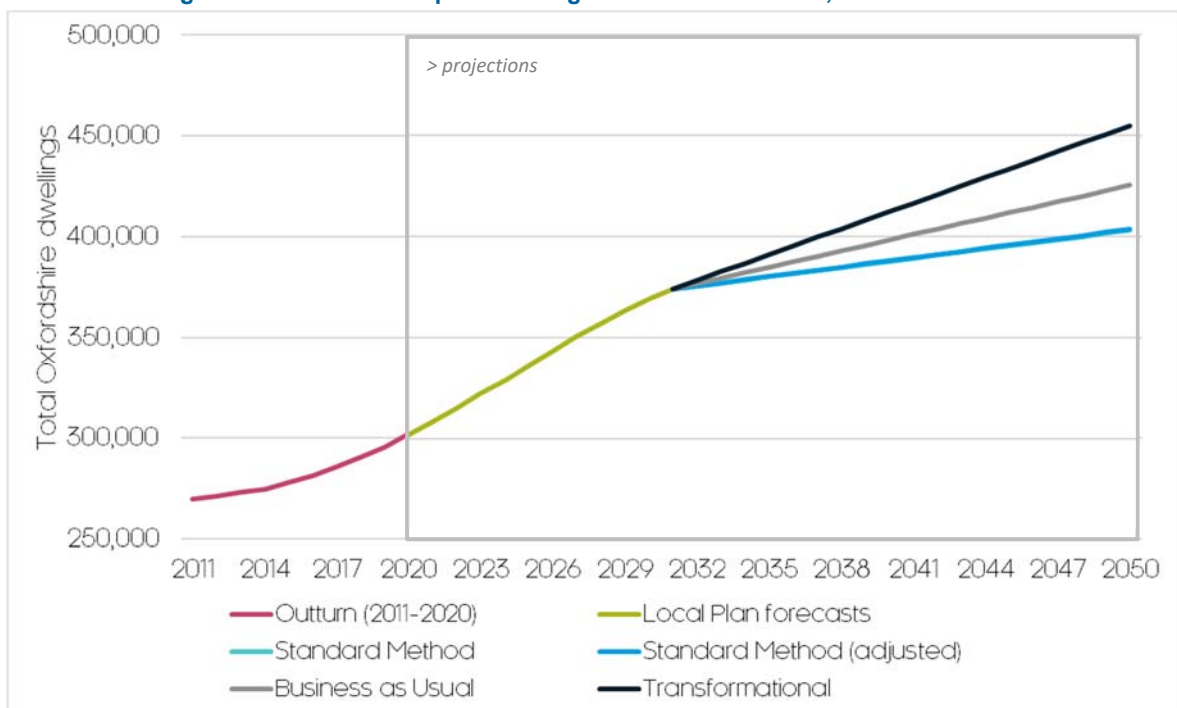
Table 4.2.1: Phase 1 housing need for Oxfordshire, 2020-50

	Oxfordshire homes (dwellings) at 2020	Oxfordshire homes (dwellings) needed at 2050	Oxfordshire homes (dwellings) needed, 2020-50	Oxfordshire homes (dwellings) needed p.a., 2020-50
Standard Method	302,100	403,100	101,500	3,400
Standard Method (adjusted)	302,100	403,600	101,600	3,400
Business as usual	302,100	425,400	123,400	4,100
Transformational	302,100	454,800	152,800	5,100

Source: MHCLG, Cambridge Econometrics, Iceni Projects, Justin Gardner Consulting.

The Standard Method is based on National Planning Policy Framework (NPPF) methodology and is intended to provide a minimum level of housing need *"a minimum baseline"* for the county. The adjusted Standard Method maintains this minimum need but applies a small adjustment to account for a revised demographic baseline.

The business as usual and transformational projections have been informed by demographic and economic forecasts, considering recent growth trends and the ambitions of the Oxfordshire LIS with a series of assumptions around commuting, employment rates and job/worker ratios. A full, stage-by-stage methodology for each trajectory is available in the *Phase 1 Report.*

The analysis shows that to meet the Standard Method (adjusted) level of need over 2020-50, Oxfordshire would require around 3,400 dwellings each year; with the business as usual level of growth this increases to 4,100 dwellings per annum, with a transformational figure approaching 5,100 dwellings per annum, dependent on the realisation of LIS-related ambitions.

These figures can be compared with the Standard Method housing need (unadjusted, across the whole of Oxfordshire) of 3,400 dwellings per annum over the period 2020-50.

Note that until 2031, all of the projections are assumed to follow the same path, that of Local Plan forecast net completions, which have been sourced directly from the respective Oxfordshire local authorities. These forecasts are available across the FEMA in a consistent format (and derived using the same methodology and sources) over the 2020-31 period. After 2031 the projections follow an annualised rate of remaining forecast need.

4.3　Methodology and scenario overview

To estimate the Zonal distributions of housing need, and thus need, to 2050 for the three aforementioned economic trajectories, the following steps were taken:

1. Firstly, dwellings data at LSOA level for 2020 were scaled up to their respective Zones, to provide corresponding baseline (2020) totals of the current number of dwellings in each Zone.

2. By attributing Local Plan forecast net completions to the individual Zones (see Table 4.3.1 for an overview of this process), Zonal-level projections of need have been estimated, per annum, to 2031. These

have been applied to the baseline (2020) totals to provide annualized 2020-2031 need by Zone. As mentioned previously, these Local Plan forecasts are fixed across the three projections up to 2031. This means that the need rates and the Zonal distribution assumptions 2020-2031 are based on planned development, whereas the rate of growth for the rest of the plan period 2031 to 2050 is simply an annualised rate of the remaining forecast need. The forecast net completions were sourced directly from the respective Oxfordshire local authorities, who input to a proforma coordinated by Iceni Projects.

3. For the 2031-2050 period, Zonal level trajectories are then estimated for each trajectory (Standard Method adjusted, business as usual and transformational) by **five intentionally-contrasting housing scenarios** which explore how need and need might be distributed between Zones. These scenarios and accompanying assumptions, which test different distributions over the 2031-2050 period *only*, are as follows:

    i.   **Evenly dispersed scenario** – the same % per annum growth rate is applied to all Zones from 2031 to 2050. This means housing need is allocated at an even *percentage* rate (not quantity) across the FEMA.

    ii. **Continued trends scenario** – relative Zonal growth rates from 2031-2050 are matched to 2020-2031 relative growth rates (i.e. the scenario mirrors current concentrations of forecast net completions in Local Plans, extrapolating them from 2031 to 2050).

    iii. **Employment-led scenario** – relative Zonal growth rates from 2031-2050 are matched to the distribution of projected Zonal employment growth, including growth in LIS-outlined key employment locations.

    iv. **County-focussed scenario** – need across the Knowledge Spine is the same as the employment-led scenario. Need across Oxford City and Fringe is the same as the continued trends scenario. The remainder is allocated to the Wider County. This results in the highest proportion of need allocated to the Wider County.

    v.   **Centralised scenario** – need across the Knowledge Spine is the same as the continued trends scenario, Oxford City and Fringe is the same as employment-led scenario. The remainder is allocated to the Wider County. This results in the lowest proportion of need allocated to the Wider County.

4. Applying these steps provides complete, aligned and annualized estimates of housing need by Zone, from 2020 to 2050. These are available for the three higher level projections (Standard Method adjusted, business as usual, transformational) and a further five Zonal-specific scenarios, resulting in fifteen Zonal level projections in total.

Table 4.3.1 below provides an overview of the Local Plan-Zonal attribution process. With forecast net completions available across built up areas (BUA's) in Oxfordshire over 2020-31 (which are provided in *Appendix B: Local Plan Forecast Completions)*, the table outlines how these have been attributed to their relative Zone. In some cases, BUA's overlap Zones, so additional adjustments have been made to the attributions (outlined in red, see table footnote for additional details).

Table 4.3.1: Attributing forecast net completions from Local Plans to the FEMA Zones

Local Plan	Built up Area (BUA)/locality	Reference Zone(s) – if BUA/locality is in more than one Zone, values are attributed according to current share of dwellings*			
Oxford City	Oxford City	*City Fringe*	*City Centre*		
		75%	*25%*		
Cherwell	Banbury BUA	*County North*			
	Bicester BUA	*Knowledge Spine North*			
	Former RAF Upper Heyford	*Knowledge Spine North*			
	CDC Partial Review Sites (Kidlington, Begbroke, Gosford and Water Eaton and Yarnton)	*City Fringe*			
	Other Cherwell (e.g. Rural)	*County North*	*Knowledge Spine North*	*City Fringe*	
		50%	*35%*	*15%*	
West Oxfordshire	Carterton BUA	*County West*			
	Witney BUA	*County West*			
	Eynsham SDA/ Cotswold Garden Village	*County West*			
	Other West (e.g. Rural)	*County West*	*County North*		
		75%	*25%*		
Vale of White Horse	Abingdon BUA	*City Fringe*			
	Faringdon BUA	*County West*			
	Wantage & Grove BUA	*Knowledge Spine South*			
	Botley (adjoins Oxford)	*City Fringe*			
South Oxfordshire	Didcot BUA	*Knowledge Spine South*			
	Henley-on-Thames BUA	*County East*			
	Thame BUA	*County East*			
	Wallingford BUA	*County East*			

Other South and Vale Rural	County East	Knowledge Spine South	County West	City Fringe
	35%	30%	25%	10%

Source: Cambridge Econometrics, Iceni Projects, Oxford City Council, Cherwell District Council, West Oxfordshire District Council, Vale of White Horse District Council, South Oxfordshire District Council.

*For BUA's that cover more than one Zone (e.g. Oxford City BUA), forecast completions to 2031 are attributed according to the approximate share of current dwelling stock (i.e. if 75% of dwellings in the Oxford City BUA area are currently located in the City Fringe, it is expected that 75% of Local Plan completions for the Oxford City BUA will also be in the City Fringe).

4.4   Spatial distribution of housing need

Figure 4.4.1 presents distributions of the *Phase 1* housing need, and thus dwellings, across the Oxfordshire FEMA, based on the five spatial scenarios defined in *4.3 Methodology and scenario overview.* These are shown as the Zones share of total housing need to 2050 (not to be confused with the percentage growth rates of the Zones themselves).

Note that these do not reflect actual options or priorities for need, but are rather hypothetical distributions to better understand the implications and trade-offs of different development choices at a high level.

Figure 4.4.1: Spatial scenarios for Zonal distribution of housing need, 2011-20 and 2020-50
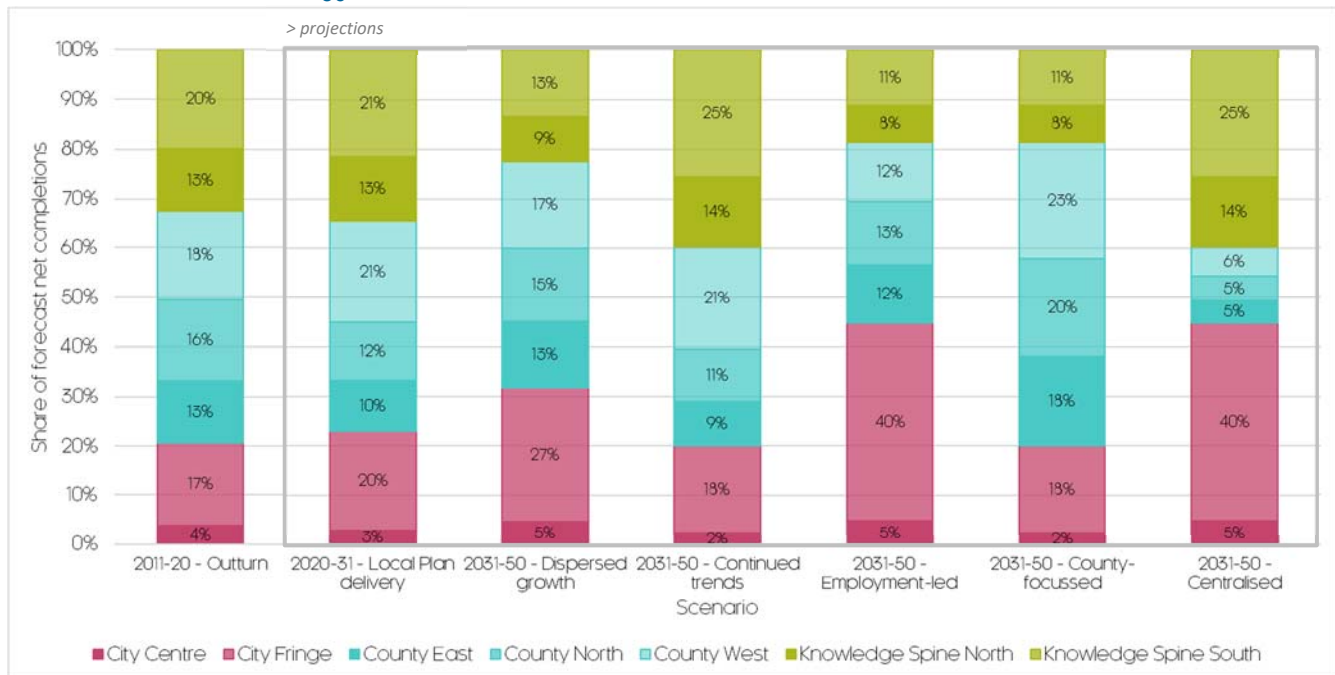
Source: MHCLG, Cambridge Econometrics. Note: percentage shares for 2031-50 are an average of distributions across the three employment trajectories.

The 2011-2020 outturn (as explored in *2.5 Characteristics and trends within the Oxfordshire FEMA*), showed relatively high rates of delivery within the Knowledge Spine (31% of additional dwellings) and Wider County (49%). The City Centre and Fringe saw comparatively lower growth, accounting for 21% of additional dwellings over 2011-20.

Local Plan forecasts for completions over 2020-31 show a broadly similar pattern to the 2011-20 outturn, but with a slightly higher emphasis on the

Knowledge Spine (including the City Centre and Fringe), which together account for almost two-thirds of forecast completions over the 2020-31 period.

Looking further ahead to 2050, the main differentiating factor between the housing scenarios is the way 2031-2050 housing need (i.e. post Local Plan forecasts) is allocated across the three main groups of Zones. Up until 2031, the scenarios share the same Local Plan forecasts.

As it allocates housing growth rates equally across Zones, the **evenly dispersed** scenario sees housing distributed the most evenly between the Zones post-2031. The Wider County still has the highest absolute level of growth, as it starts with the highest number of initial dwellings at 2031.

The **continued trends** scenario, extrapolating 2020-31 Local Plan forecasts to 2050, sees significantly greater distribution to the Knowledge Spine, and marginally less allocated to the Wider County and City Centre and Fringe.

The **employment-led** scenario sees much greater distribution to Oxford City (specifically the City Fringe), and comparatively lower levels allocated to the Wider County and Knowledge Spine.

The **County-focussed** scenario combines the low City Centre and Fringe distribution from the *continued trends* scenario with the low distribution to Knowledge Spine from the *employment led* scenario. This scenario results in a very high relative allocation to the Wider County.

The **centralised** scenario reverses this process, with the high City Centre and Fringe distribution from the *employment-led* scenario paired with the high Knowledge Spine allocation from the *continued trends* scenario. This scenario results in a very low relative distribution to the Wider County.

As emphasised previously, these scenarios do not reflect actual options or priorities for need, but are purely hypothetical distributions. It should also be noted that these scenarios are intended to be high level only, and do not take into account specific site constraints, phased need, or development sites outside of the Local Plan period (2020-31).

The following analysis proceeds to put absolute numbers against each of these five scenarios under the three economic trajectories, resulting in fifteen Zonal housing distributions in total. To aid with the analysis and interpretation, stylized maps have been produced to indicate proportional Zonal distributions for the three 2050 employment trajectories.

Figure 4.4.2: Stylized overview of housing need under Local Plan forecasts
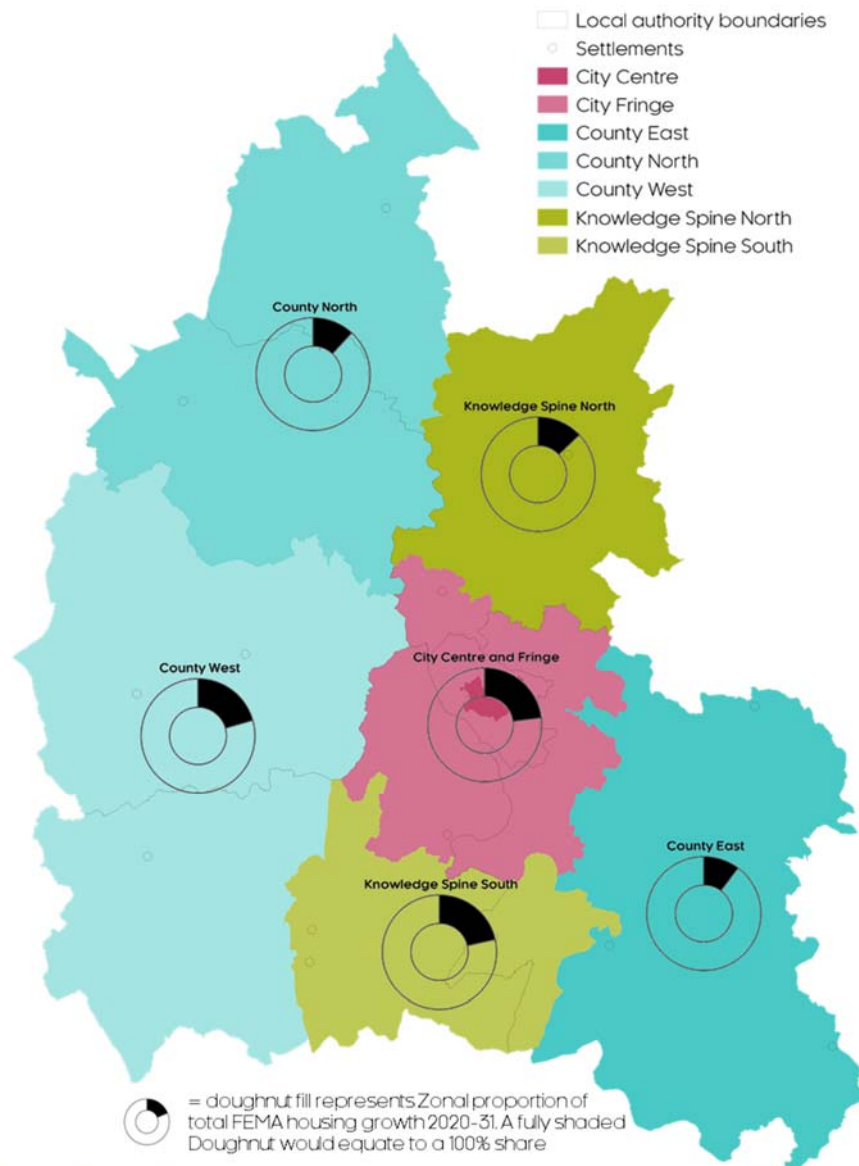
Local Plan forecasts

The adjacent Figure 4.4.2 and Table 4.4.1 provide a spatial overview of the forecast net completions outlined in local authority Local Plans, with 72,100 net completions forecast across Oxfordshire between 2020-31.

During this time, there is expected to be an emphasis on central Oxfordshire, particularly within the City Fringe (including Abingdon) and Knowledge Spine South (notably Didcot). In fact, the Knowledge Spine, including Oxford City Centre and Fringe, is expected to account for over two-thirds of the FEMAs completions over this Local Plan period.

Completions are comparatively lower in the Wider County compared with recent (2011-20) trends, though County West accounts for roughly a fifth – a higher share than 2011-20 - with a notable emphasis on Witney and Carterton.

Table 4.4.1: Overview of 2020-31 Local Plan forecast net completions

	Current homes (dwellings), 2020	As a % of FEMA total, 2020	Local Plan forecast completions, 2020-31	As a % of FEMA total forecast completions, 2020-31
City Centre	15,400	5.1%	2,100	2.9%
City Fringe	86,800	28.7%	14,500	20.1%
Oxford City and Fringe	**102,200**	**33.8%**	**16,600**	**23.0%**
County East	43,100	14.3%	7,400	10.3%
County North	47,200	15.6%	8,500	11.8%
County West	50,400	16.7%	14,900	20.7%
Wider County	**140,700**	**46.6%**	**30,800**	**42.7%**
Knowledge Spine North	24,800	8.2%	9,300	12.9%
Knowledge Spine South	34,400	11.4%	15,500	21.5%
Knowledge Spine	**59,200**	**19.6%**	**24,800**	**34.4%**
FEMA Total	**302,100**	**-**	**72,100**	**-**

Source: Cambridge Econometrics, Oxfordshire local authorities. Note: FEMA totals may not sum due to rounding. City Centre merged with City Fringe in Figure due to comparatively low number of expected completions in the former.

Figure 4.4.3: Stylized overview of housing need under the evenly dispersed scenario

Local authority boundaries
Settlements
City Centre
City Fringe
County East
County North
County West
Knowledge Spine North
Knowledge Spine South

County North

Knowledge Spine North

County West

City Centre and Fringe

County East

Knowledge Spine South

= doughnut fill represents Zonal proportion of total FEMA housing growth 2031-50. A fully shaded Doughnut would equate to a 100% share
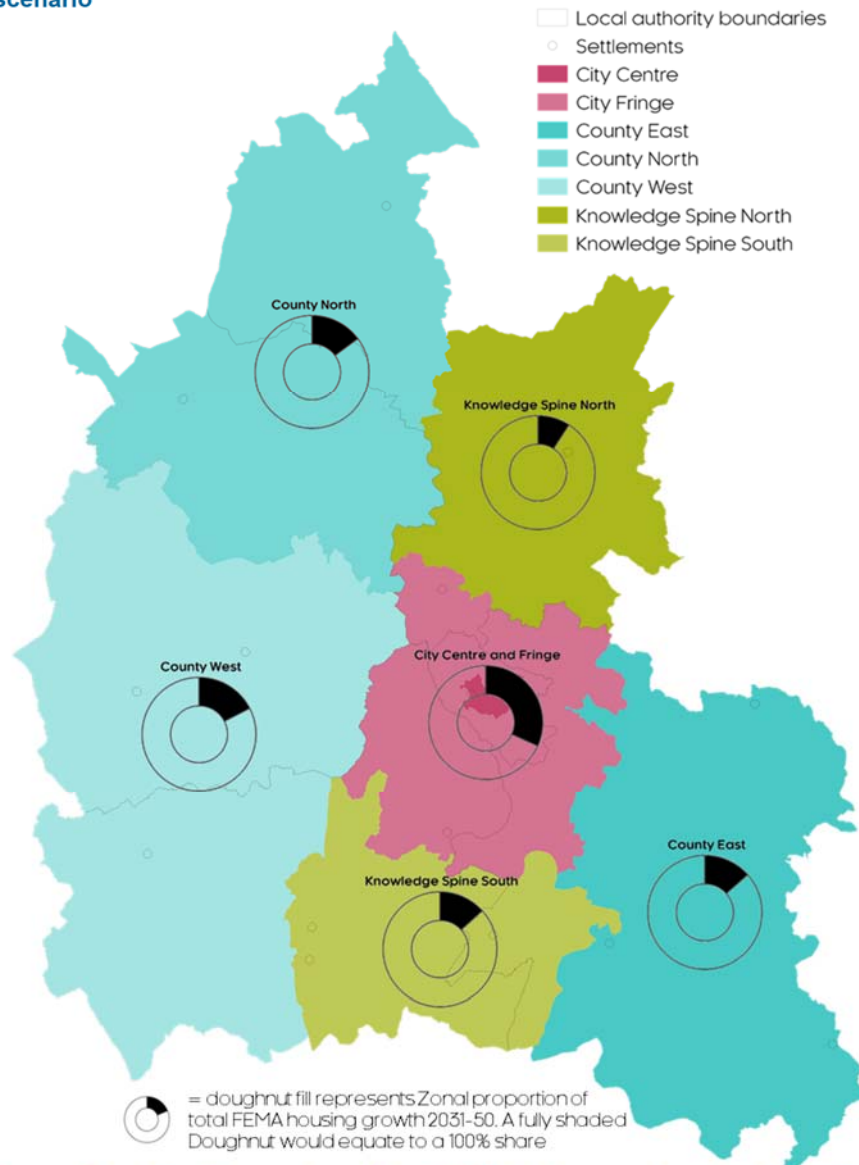
Evenly dispersed scenario

The adjacent Figure 4.4.3 and Table 4.4.2 provide a spatial overview of Oxfordshire's housing need under the evenly dispersed scenario 2031-50, for each of the three economic trajectories.

Under the evenly dispersed scenario, housing need grows at a proportionately even rate across the FEMA from 2031-onwards. Therefore the Wider County, which is expected to account for the majority share of total dwellings in the FEMA by 2031, will also account for the majority share of housing need 2031-50.

Oxford City, particularly the City Fringe, sees an increase in need - particularly relative to 2011-20 - due to the same reason. The Knowledge Spine, despite having the lowest share of dwellings in the FEMA, maintains a robust share of total housing need 2031-50.

Table 4.4.2: Overview of 2031-50 housing need under the evenly dispersed scenario

	Standard Method (adjusted), 2031-50 (and as % of FEMA total)		Business as usual, 2031-50 (and as % of FEMA total)		Transformational, 2031-50 (and as % of FEMA total)	
City Centre	1,400	4.7%	2,400	4.7%	3,800	4.7%
City Fringe	8,000	27.1%	13,900	27.1%	21,800	27.0%
Oxford City and Fringe	**9,400**	**31.9%**	**16,300**	**31.8%**	**25,600**	**31.7%**
County East	4,000	13.6%	6,900	13.5%	10,900	13.5%
County North	4,400	14.9%	7,600	14.8%	12,000	14.9%
County West	5,100	17.3%	8,900	17.3%	14,100	17.5%
Wider County	**13,500**	**45.8%**	**23,400**	**45.6%**	**37,000**	**45.8%**
Knowledge Spine North	2,700	9.2%	4,700	9.2%	7,400	9.2%
Knowledge Spine South	3,900	13.2%	6,800	13.3%	10,700	13.3%
Knowledge Spine	**6,600**	**22.4%**	**11,500**	**22.4%**	**18,100**	**22.4%**
FEMA Total	**29,500**	**-**	**51,300**	**-**	**80,700**	**-**

Source: Cambridge Econometrics. Note: FEMA totals may not sum due to rounding. City Centre merged with City Fringe in Figure due to comparatively low need in the former. Figure proportions are an average across the three employment trajectories.

Figure 4.4.4: Stylized overview of housing need under the continued trends scenario
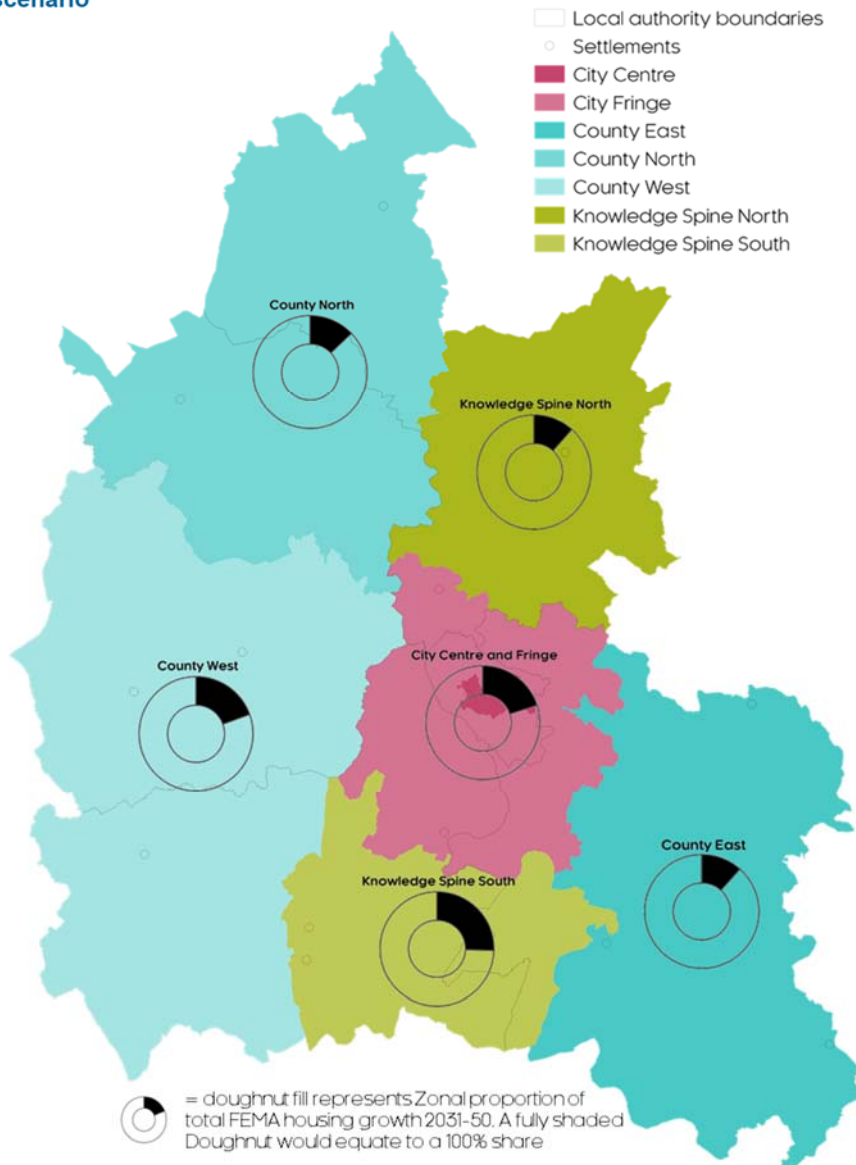
Continued trends scenario

The adjacent Figure 4.4.4 and Table 4.4.3 provide a spatial overview of Oxfordshire's housing need under the continued trends scenario 2031-50, for each of the three economic trajectories.

The continued trends scenario sees housing need distributed in line with 2020-2031 Local Plan forecasts, maintaining this rate of need to 2050. This sees a notable increase in housing need attributed to the Knowledge Spine, particularly the South, reflecting the emphasis on the Science Vale area in Local Plans.

Housing need in the Wider County is resultantly lower but also less uniform, with the County West still expected to maintain high levels of need. Oxford City, specifically the City Fringe, sees an increase compared with recent (2011-20) trends, though still lower than some other scenarios.

Table 4.4.3: Overview of 2031-50 housing need under the continued trends scenario

	Standard Method (adjusted), 2031-50 (and as % of FEMA total)		Business as usual, 2031-50 (and as % of FEMA total)		Transformational, 2031-50 (and as % of FEMA total)	
City Centre	700	2.4%	1,300	2.5%	2,000	2.5%
City Fringe	5,200	17.6%	9,000	17.5%	14,100	17.5%
Oxford City and Fringe	**5,900**	**20.0%**	**10,300**	**20.1%**	**16,100**	**20.0%**
County East	2,600	8.8%	4,600	9.0%	7,200	8.9%
County North	3,100	10.5%	5,400	10.5%	8,500	10.5%
County West	6,100	20.7%	10,700	20.9%	16,800	20.8%
Wider County	**11,800**	**40.0%**	**20,700**	**40.4%**	**32,500**	**40.3%**
Knowledge Spine North	4,200	14.2%	7,300	14.2%	11,500	14.3%
Knowledge Spine South	7,500	25.4%	13,100	25.5%	20,500	25.4%
Knowledge Spine	**11,700**	**39.7%**	**20,400**	**39.8%**	**32,000**	**39.7%**
FEMA Total	**29,500**	**-**	**51,300**	**-**	**80,700**	**-**

Source: Cambridge Econometrics. Note: FEMA totals may not sum due to rounding. City Centre merged with City Fringe in Figure due to comparatively low need in the former. Figure proportions are an average across the three employment trajectories.

Figure 4.4.5: Stylized overview of housing need under the employment-led scenario
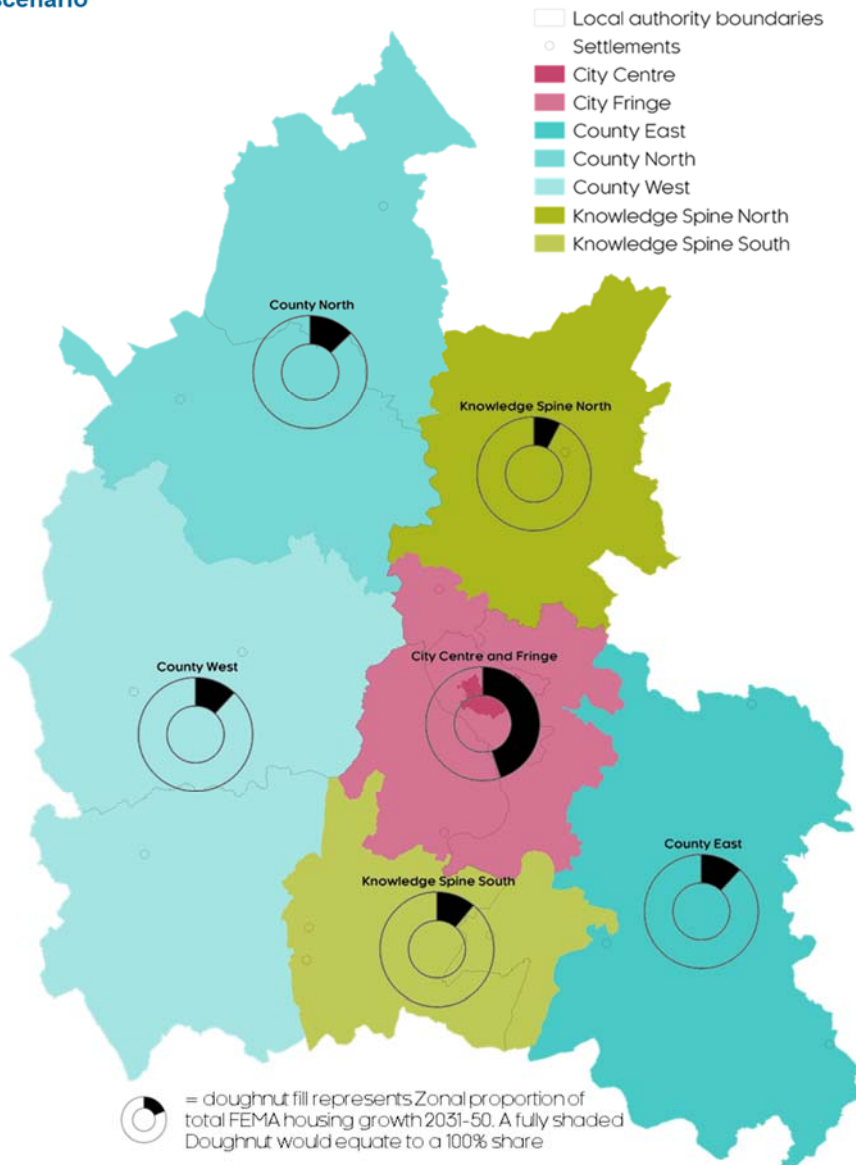
Employment-led scenario

The adjacent Figure 4.4.5 and Table 4.4.4 provide a spatial overview of Oxfordshire's housing growth under the employment-led scenario 2031-50, for each of the three economic trajectories.

Under the employment-led scenario, housing need 2031-onwards is assumed to correlate with projected Zonal employment growth, including growth in LIS-outlined key employment locations. Resultantly, this sees a substantial increase in housing need attributed to Oxford City Centre and Fringe.

Resultantly, comparatively lower levels of housing need are expected in the Wider County, though it is still expected to account for the majority share. The Knowledge Spine also sees a slight reduction, slightly less so in the South given the potential for LIS-related employment growth in the Science Vale.

Table 4.4.4: Overview of 2031-50 housing need under the employment-led scenario

	Standard Method (adjusted), 2031-50 (and as % of FEMA total)		Business as usual, 2031-50 (and as % of FEMA total)		Transformational, 2031-50 (and as % of FEMA total)	
City Centre	1,400	4.7%	2,500	4.9%	3,900	4.8%
City Fringe	12,100	41.0%	20,100	39.2%	32,200	39.9%
Oxford City and Fringe	**13,500**	**45.8%**	**22,600**	**44.1%**	**36,100**	**44.7%**
County East	3,400	11.5%	6,200	12.1%	9,600	11.9%
County North	3,700	12.5%	6,600	12.9%	10,400	12.9%
County West	3,400	11.5%	6,100	11.9%	9,700	12.0%
Wider County	**10,500**	**35.6%**	**18,900**	**36.8%**	**29,700**	**36.8%**
Knowledge Spine North	2,300	7.8%	3,900	7.6%	6,000	7.4%
Knowledge Spine South	3,200	10.8%	5,800	11.3%	8,900	11.0%
Knowledge Spine	**5,500**	**18.6%**	**9,700**	**18.9%**	**14,900**	**18.5%**
FEMA Total	**29,500**	**-**	**51,300**	**-**	**80,700**	**-**

Source: Cambridge Econometrics. Note: FEMA totals may not sum due to rounding. City Centre merged with City Fringe in Figure due to comparatively low need in the former. Figure proportions are an average across the three employment trajectories.

Figure 4.4.6: Stylized overview of housing need under the County-focussed scenario
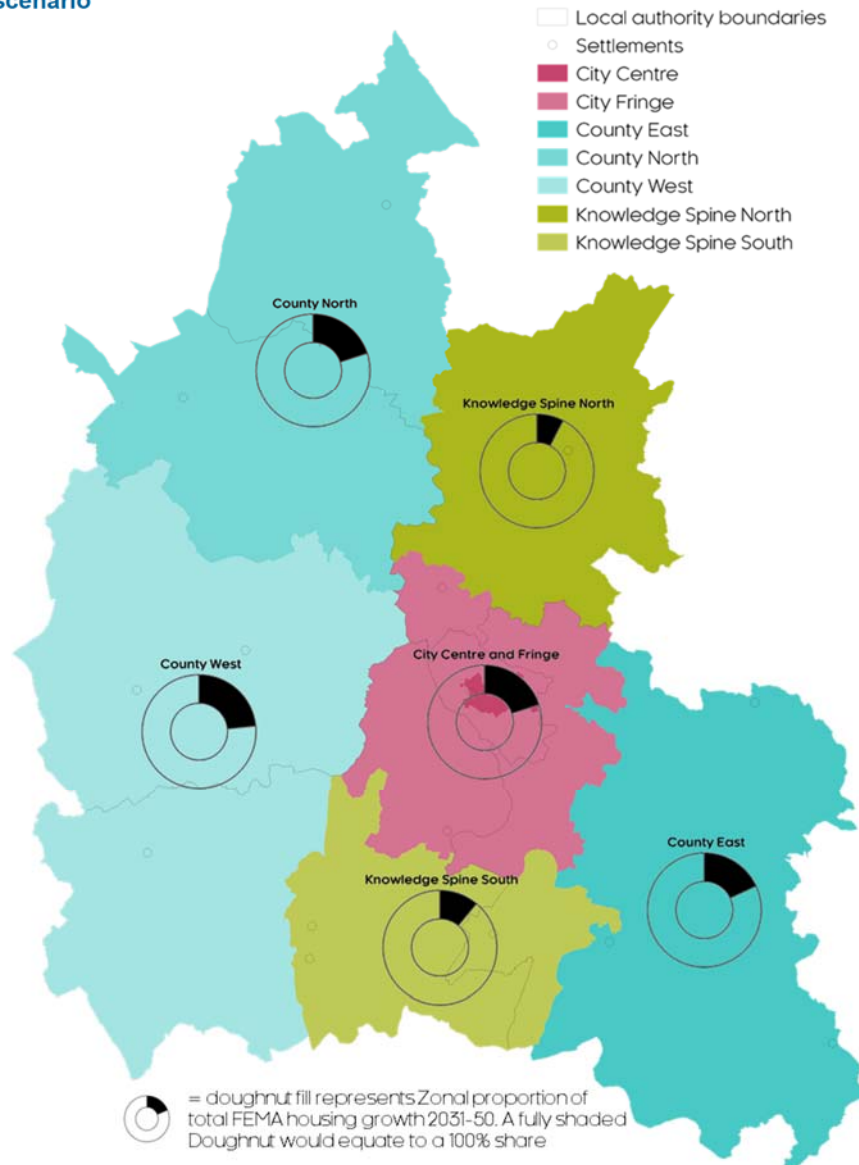
County-focussed scenario

The adjacent Figure 4.4.6 and Table 4.4.5 provide a spatial overview of Oxfordshire's housing growth under the County-focussed scenario 2031-50, for each of the three economic trajectories.

As the name suggests, this scenario sees a greater focus and emphasis on housing need in the Wider County. Resultantly, of the five scenarios this sees the highest share attributed to the Wider County, which under this scenario could account for over half of all need in the FEMA to 2050.

Remaining need is largely balanced between Oxford City Fringe and the Knowledge Spine, though this is the only scenario where the Knowledge Spine (including the City Centre and Fringe) does not account for the majority of need.

Table 4.4.5: Overview of 2031-50 housing need under the County-focussed scenario

	Standard Method (adjusted), 2031-50 (and as % of FEMA total)		Business as usual, 2031-50 (and as % of FEMA total)		Transformational, 2031-50 (and as % of FEMA total)	
City Centre	700	2.4%	1,300	2.5%	2,000	2.5%
City Fringe	5,200	17.6%	9,000	17.5%	14,100	17.5%
Oxford City and Fringe	**5,900**	**20.0%**	**10,300**	**20.1%**	**16,100**	**20.0%**
County East	5,300	18.0%	9,200	17.9%	14,600	18.1%
County North	5,900	20.0%	10,200	19.9%	16,100	20.0%
County West	6,900	23.4%	11,900	23.2%	18,900	23.4%
Wider County	**18,100**	**61.4%**	**31,300**	**61.0%**	**49,600**	**61.5%**
Knowledge Spine North	2,300	7.8%	3,900	7.6%	6,000	7.4%
Knowledge Spine South	3,200	10.8%	5,800	11.3%	8,900	11.0%
Knowledge Spine	**5,500**	**18.6%**	**9,700**	**18.9%**	**14,900**	**18.5%**
FEMA Total	**29,500**	**-**	**51,300**	**-**	**80,700**	**-**

Source: Cambridge Econometrics. Note: FEMA totals may not sum due to rounding. City Centre merged with City Fringe in Figure due to comparatively low need in the former. Figure proportions are an average across the three employment trajectories.

Figure 4.4.7: Stylized overview of housing need under the centralised scenario
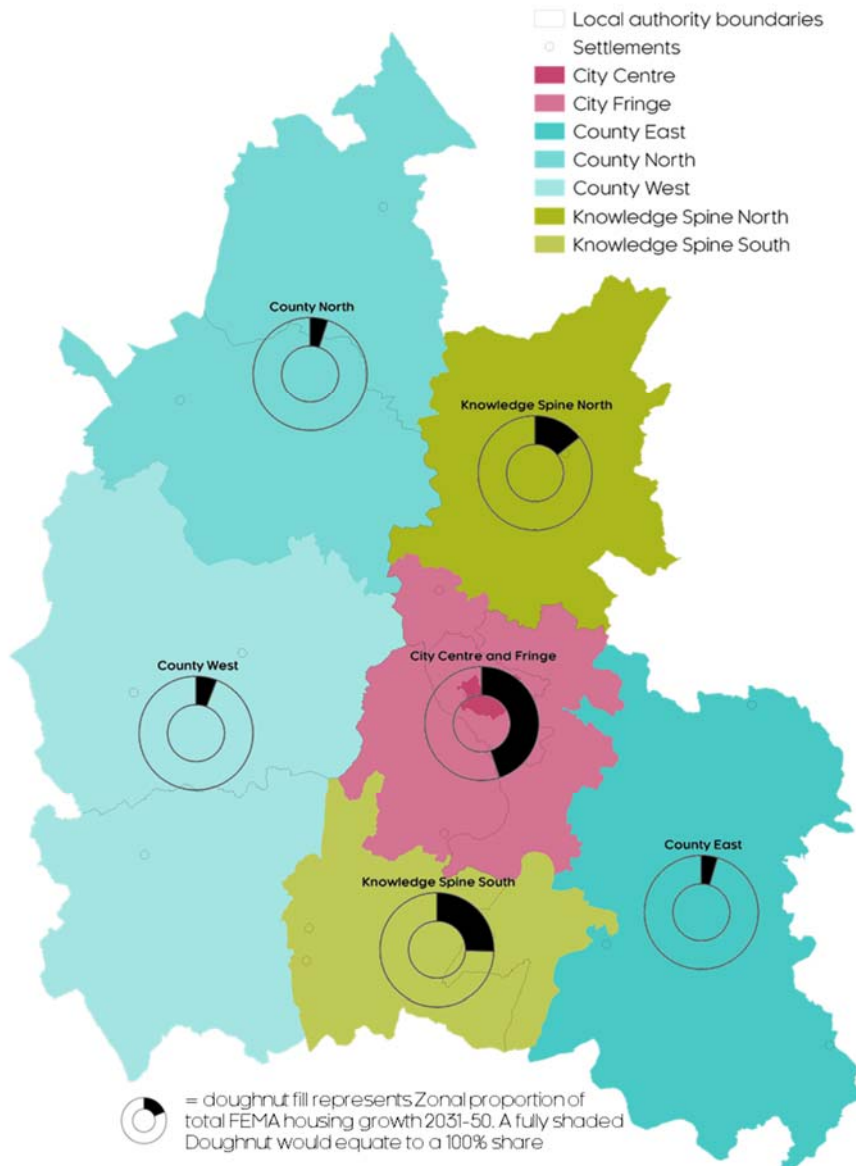
Centralised scenario

The adjacent Figure 4.4.7 and Table 4.4.6 provide a spatial overview of Oxfordshire's housing growth under the centralised scenario 2031-50, for each of the three economic trajectories.

The centralised scenario sees a significant focus and emphasis on housing need throughout central Oxfordshire, covering the Knowledge Spine, City Centre and Fringe. This results in a very low relative allocation to the Wider County, with need almost half that of the County-focussed scenario.

Oxford City (specifically the City Fringe) and the Knowledge Spine (particularly the South) meanwhile see a substantial increase in housing need, well above recent trends and other scenarios. Over three-quarters of housing need in the FEMA could be located along this central 'spine' under this scenario.

Table 4.4.6: Overview of 2031-50 housing need under the centralised scenario

	Standard Method (adjusted), 2031-50 (and as % of FEMA total)		Business as usual, 2031-50 (and as % of FEMA total)		Transformational, 2031-50 (and as % of FEMA total)	
City Centre	1,400	4.7%	2,500	4.9%	3,900	4.8%
City Fringe	12,100	41.0%	20,100	39.2%	32,200	39.9%
Oxford City and Fringe	**13,500**	**45.8%**	**22,600**	**44.1%**	**36,100**	**44.7%**
County East	1,300	4.4%	2,400	4.7%	3,700	4.6%
County North	1,400	4.7%	2,700	5.3%	4,100	5.1%
County West	1,600	5.4%	3,200	6.2%	4,800	5.9%
Wider County	**4,300**	**14.6%**	**8,300**	**16.2%**	**12,600**	**15.6%**
Knowledge Spine North	4,200	14.2%	7,300	14.2%	11,500	14.3%
Knowledge Spine South	7,500	25.4%	13,100	25.5%	20,500	25.4%
Knowledge Spine	**11,700**	**39.7%**	**20,400**	**39.8%**	**32,000**	**39.7%**
FEMA Total	**29,500**	**-**	**51,300**	**-**	**80,700**	**-**

Source: Cambridge Econometrics. Note: FEMA totals may not sum due to rounding. City Centre merged with City Fringe in Figure due to comparatively low need in the former. Figure proportions are an average across the three employment trajectories.

4.5   Conclusions

Informed by a set of robust and varied scenarios, this chapter has sought to quantify, test and illustrate a range of different housing distributions for the Oxfordshire FEMA, allocating the three county-wide trajectories for housing need to 2050 from the *Phase 1 Report*.

The distribution scenarios cover a variety of contrasting development choices, ranging from an economic-led focus on distribution in central Oxfordshire (Oxford and the Knowledge Spine), to a more evenly dispersed approach across the county, to an emphasis on market towns in Wider County areas.

By taking the opportunity to quantify and test a range of different housing distributions, potential implications and trade-offs can be identified and contrasted. This is considered in the next chapter, which proceeds to look at the commuting and transport implications of the respective housing distributions.

5 Commuting Trends Within the Oxfordshire FEMA

5.1 Introduction

Having explored the potential scale and pattern of both economic growth and housing distribution within the Oxfordshire FEMA, this chapter brings the two together to consider the possible implications for commuting and transport use.

This has been undertaken at the Zonal level, aided by the development of an inter-Zonal commuting matrix for the FEMA, which is able to estimate the incremental commuting impacts of different housing and employment distributions. As before, the work considers the three alternative levels of FEMA-wide housing and employment growth laid out in the *Phase 1 Report*.

Given the increasing pressure on Oxfordshire's transport network and the associated externalities (notably, environmental effects), it is important to understand the potential implications for commuting and transport from particular distribution scenarios and growth trajectories.

The following analysis begins with an overview of the relationship between employment, housing and commuting in Oxfordshire, followed by a methodology overview before presenting and analysing the results.

5.2 The relationship between employment, housing and commuting in Oxfordshire

Employment (i.e. jobs) and housing growth can act as relative push and pull factors for commuting by facilitating potential change in the number of employed persons working (workplace employed) and living (employed residents) in an area. Within commuting analysis, it is important to distinguish the difference between these employment identities:

- *Workplace employed:* refers to employed persons by the location of their workplace, regardless of the location of their residence (e.g. someone working in Oxford but living in Reading). This measure is closely related to the number of jobs in an area, but is typically lower because a person can have more than one job (*"double-jobbing"*).

- *Employed residents:* refers to employed persons by the location of their residence, regardless of the location of their work (e.g. someone living in Bicester but working in London). When reflected as the proportion of the population, this is known as the employment rate.

Generally, the number of workplace employed in an area is informed by the amount and concentration of economic activity in that area (which will correspond to the number of businesses and jobs in an area). The number of employed residents meanwhile will be shaped by the availability of housing and other labour market and demographic factors (e.g. labour market activity/inactivity rates).

At the intersection of these two variables is the concept of net commuting, which is simply:

$$net\ commuting = workplace\ employed - employed\ residents$$

Therefore, areas with a higher number of workplace employed relative to employed residents will experience net in-commuting (i.e. a positive net commuting value); consider for instance areas with town/city centres, business parks and other large employment sites.

Meanwhile, areas with a higher number of employed residents relative to workplace employed will experience net out-commuting (i.e. a negative net commuting value); consider for instance suburban estates, villages/dormitory settlements and other housing-led settlements.

Table 5.2.1: Current and potential net commuting flows in Oxfordshire

			Employed residents (linked to housing growth)				
			2011	2018	2050 - SMa	2050 - BAU	2050 - Trans
Workplace employed (linked to employment growth)		-	336,900	361,700	449,600	483,700	527,900
	2011	345,900	**9,000**	-	-	-	-
	2018	382,200	-	**20,500**	-	-	-
	2050 – SMa	461,600	-	-	**12,000**	-22,100	-66,300*
	2050 – BAU	496,600	-	-	47,000	**12,900**	-31,300
	2050 – Trans	541,900	-	-	92,300*	58,300	**14,100**

Source: ONS, Cambridge Econometrics. Note: * denotes unlikely combinations.

As Table 5.2.1 shows[13], the Oxfordshire FEMA currently (2018) has a net commuting inflow of 20,500 people (that is, 20,500 additional people commute into the FEMA for work relative to residents that commute out of the FEMA for work). This reflects the strength and attractiveness of Oxfordshire's labour market and its high employment density (particularly in Oxford).

As noted in the *Phase 1 Report*, this number has rapidly increased over recent years (from only 9,000 in 2011) to a record high, as people reporting to work in the county continues to exceed the number of employed residents (due to jobs growing faster than the number of new homes delivered, as discussed in *Phase 1 Report*).

Over 2011-18 for instance, the number of people working in the FEMA is estimated to have increased by 36,100, whilst the number of employed residents increased by only 25,200. With some 82.8% of working age residents in active employment (the highest employment rate in the country), Oxfordshire's already tight labour market has been reliant on workers residing outside the FEMA to sustain its economic growth.

Resultantly, net in-commuting has more than doubled over this timeframe. Within the FEMA, the future of commuting in the FEMA will be shaped by how the Oxfordshire economy grows in future, and how housing supply responds to this growth. Even an alignment between housing and jobs growth at the

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[13] 'Standard Method adjusted' = 'SMa', 'business as usual' = 'BAU', and 'transformational' = 'Trans'

county level can result in drastic changes to commuting patterns at a detailed spatial level, given the spatial distribution of such growth.

The following analysis looks in more detail at the relationship at this spatial level, considering firstly recent commuting trends within the Oxfordshire FEMA, before estimating how these might change over the respective trajectories and scenarios, and what impact this might have on modal shares and private vehicle trips. This supports extensive analysis in the *Phase 1 Report* which looks at the future relationship between housing, employment and commuting in Oxfordshire.

5.3   Recent FEMA commuting trends

2011 Census baseline

Figure 5.3.1 summarises commuting patterns within the Oxfordshire FEMA according to data from the 2011 Census, the baseline for the inter-Zonal commuting analysis (as it is the most recently available source of reliable commuting data with detailed origin-destination flows i.e. where a commuting trip starts and ends).

Figure 5.3.1: Stylized overview of commuting flows in the Oxfordshire FEMA, 2011
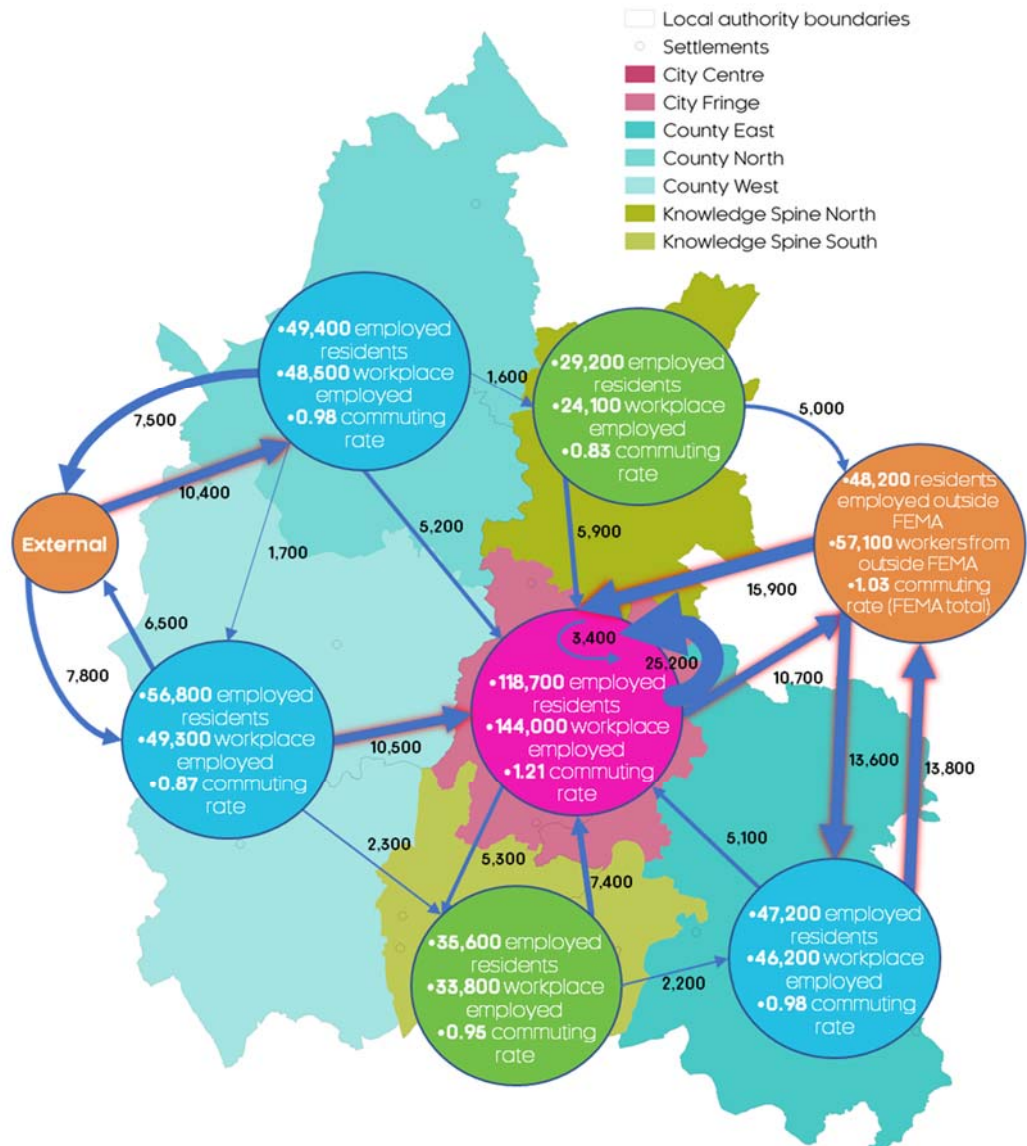
Source: ONS (Census 2011), Cambridge Econometrics.

The map summarises key Zone characteristics (employed residents, workplace employed, and commuting rates[14]) and highlights significant inter-Zonal flows (flows exceeding 1,000 people, with flows over 10,000 shaded red) in the FEMA, which are highlighted using interconnected arrows[15].

Flows are presented between the seven Zones alongside an External area – this captures all permanent residences and workplaces outside of the seven FEMA Zones (i.e. outside Oxfordshire).The accompanying origin-destination matrices, which provide Zone-by-Zone origin-destination flows, can be found in *Appendix A: Inter-Zonal Commuting Matrices*.

Census data showed the Oxfordshire FEMA displayed relatively high levels of self-containment, with 86% of residents working within the FEMA, and 83% of workers resident within the FEMA, giving an overall self-containment rate of 85%, well above the ONS self-containment threshold of 75% (and further highlighting the robustness of the FEMA-definition outlined in *Chapter 2*).

The proportion of residents working within the FEMA varies by Zone though, ranging from a high of 91% in the City Fringe to 71% in County East (the latter reflecting the greater commuting potential to and from the Thames Valley and Greater London labour markets). On average, almost two-thirds of FEMA residents worked within the Zone they resided in, though this ranged from a low of 53% (Knowledge Spine South) to a high of 67% (County North).

Unsurprisingly, inter-Zonal flows were largely focussed on Oxford (City Centre and Fringe), with the most significant flow being the 25,200 who made the short journey from the City Fringe to the City Centre. In terms of External commuting flows, these are greatest in County East, where a third of residents worked outside the FEMA and a third of workers resided outside the FEMA. Long distance commuting into Oxford (City Centre and Fringe) is relatively low, with only 11% of workers travelling from outside the FEMA.

Table 5.3.1 looks at the origin and destination of External flows to and from the FEMA in 2011, which were largely focussed on County East and North, and the City Fringe (together, these three Zones accounted for over two-thirds of External inflows and outflows respectively). Neighbouring Aylesbury Vale, South Northamptonshire and Swindon were the most popular origins, followed by Reading, West Berkshire and Wycombe to the east. The same areas also featured highly in terms of outflows, though central London was the most popular destination for those commuting out of the FEMA for work.

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[14] [14] The commuting rate is simply the ratio of workplace employed relative to employed residents; for instance, an area with 30,000 workplace employed and 28,000 employed residents would have a commuting rate of 1.07 (30,000 / 28,000 = 1.07).

[15] With the arrow tip highlighting the destination and the arrow base the origin. Arrow width/boldness relates to the *proportionate* size of the flow within the FEMA.

Table 5.3.1: Origin and destination of External commuter flows in the Oxfordshire FEMA, 2011

Origin of external workers in Oxfordshire FEMA		Destination of Oxfordshire FEMA residents working externally	
Local Authority area	Inflow	Local Authority area	Outflow
Aylesbury Vale	6,700	Westminster and City of London	3,900
South Northamptonshire	5,400	Aylesbury Vale	3,900
Swindon	4,300	Reading	3,600
Reading	3,700	Wycombe	3,400
West Berkshire	3,100	West Berkshire	2,900
Wycombe	2,600	South Northamptonshire	2,600
Stratford-on-Avon	2,000	Swindon	2,200
Cotswold	1,900	Wokingham	1,600
Wokingham	1,900	Stratford-on-Avon	1,300
Wiltshire	1,300	Hillingdon	1,100

Source: ONS (Census 2011), Cambridge Econometrics.

In total, the FEMA had a net commuting inflow of 9,000 people (that is, 9,000 additional people were commuting into the FEMA for work relative to employed residents commuting out). This equated to an overall commuting rate of 1.03 (that is, there were 1.03 workplace employed relative to employed residents).

This was high compared to neighbouring areas of a similar size, such as Swindon and Wiltshire (0.94), Northamptonshire (0.94) and Buckinghamshire (0.88), reflecting both the high self-containment within the Oxfordshire FEMA, and the relative success and attractiveness of its labour market.

Naturally, this rate varied by Zone. Oxford City (Centre and Fringe) was the highest, with a commuting rate of 1.21. This was due to a higher number of workplace employed (i.e. jobs, given the agglomeration of the Oxford economy) relative to employed residents, resulting in high in-commuting.

Every other Zone had a commuting rate below 1.00, as a result of lower numbers of workplace employed (i.e. jobs) relative to employed residents. The lowest was County West, which resultantly was reliant on high levels of out-commuting (particularly to Oxford City Centre and Fringe).

Recent trends (to 2018)

Figure 5.3.2 presents estimates of Oxfordshire's inter-Zonal commuting patterns for 2018, derived by applying and scaling Zonal employment and housing growth to the original Census estimates. The accompanying origin-destination matrices, which provide Zone-by-Zone origin-destination flows, can be found in *Appendix A: Inter-Zonal Commuting Matrices*.

**Figure 5.3.2: Stylized overview of commuting flows in the Oxfordshire FEMA, 2018**
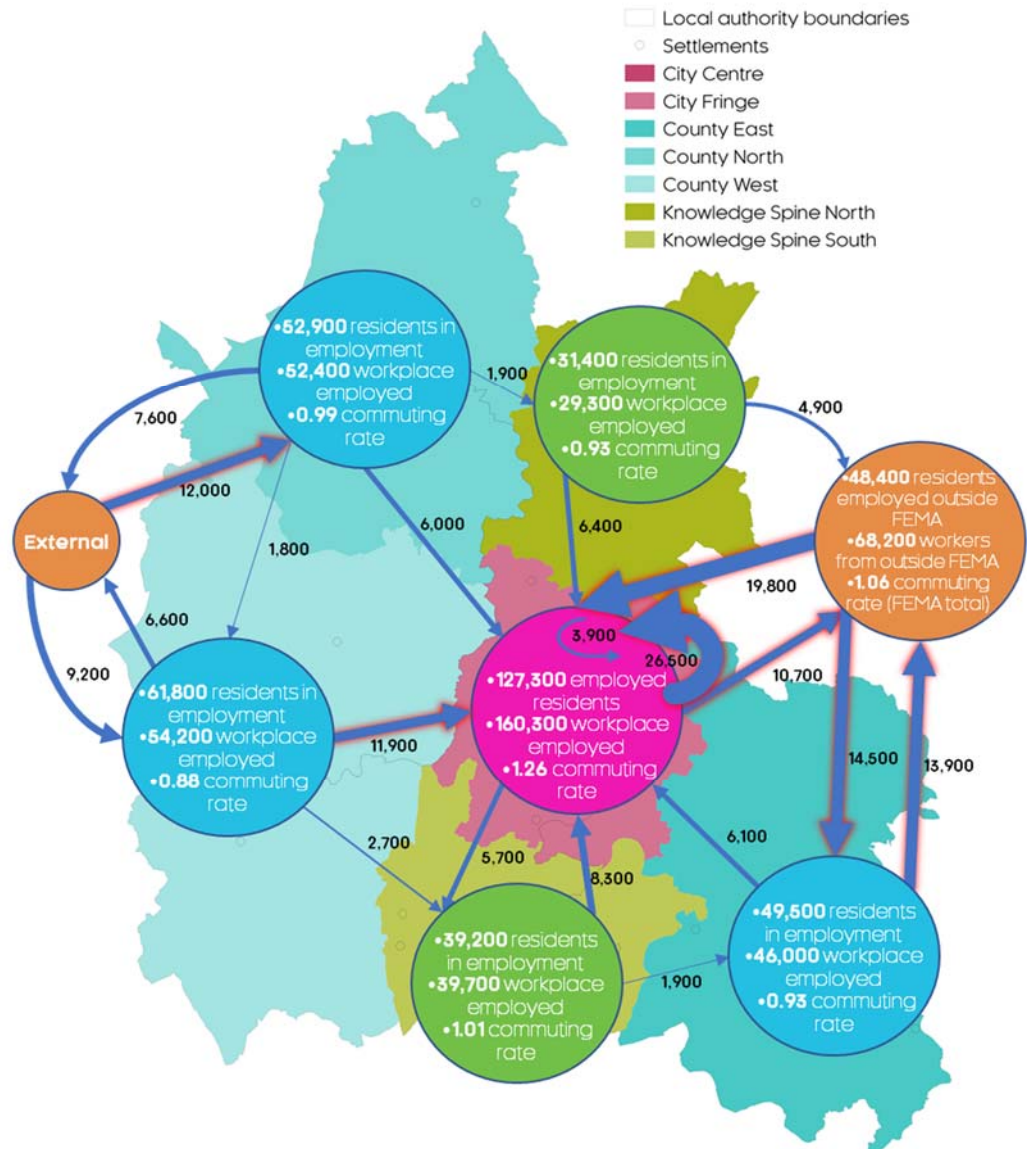
Source: ONS, Cambridge Econometrics.

Most notable from these updated estimates is the significant increase in External inflows across all Zones over 2011-18. Previously, Census data showed Oxfordshire had a net commuting inflow of 9,000 people; between 2011-18, this is estimated to have more than doubled to a net inflow of 20,500 people (that is, 20,500 additional people were commuting into the Oxfordshire FEMA relative to those commuting out for work). This is the highest commuting rate (1.06) for the FEMA since comparable records began (the 1981 Census).

This was due to a particularly large increase in people residing outside the FEMA ('External' residents) commuting into the county for work (+11,100 since 2011). This trend has been corroborated by alternative labour market

data, as noted in the *Phase 1 Report*, and the pattern plays out relatively consistently at the Zonal level, with the majority of Zones experiencing faster growth in workplace employment (i.e. jobs) than growth in employed residents (i.e. people to fill those jobs), as Figure 5.3.3 shows.

Figure 5.3.3: Change in workplace employment and residents in employment by Zone, 2011-18
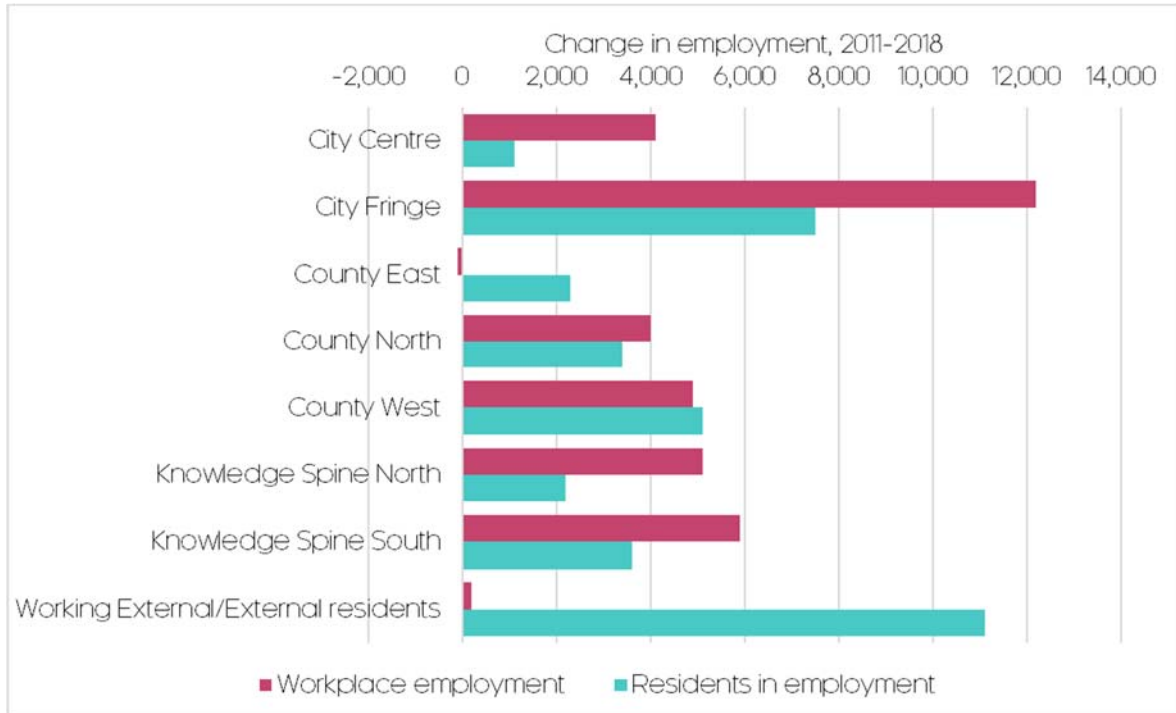
Source: ONS, Cambridge Econometrics.

Oxford City Centre experienced the largest discrepancy between the two, with workplace employment increasing 3.7 times that of the of the increase in employed residents, highlighting the increased agglomeration of jobs in the centre of Oxford relative to residents. Resultantly, all other Zones saw in increase in outflows to the City Centre.

Oxford's City Fringe experienced the largest increase in Externally-based workers, with +2,800 additional people commuting into the Zone from outside the FEMA. County East continues to have the highest dependency on External labour (approximately 14,500 External residents work in the Zone), though it actually saw a decline across all inflows from elsewhere in the FEMA, as total workplace employment in the Zone marginally contracted (the only in the FEMA to do so).

Other notable trends at the Zonal level include an increase in people both living and working within County North and West respectively, indicating reasonable alignment between housing and economic needs in these areas. The Knowledge Spine (particularly South) also saw a significant increase in workplace employed, some from outside the FEMA. The flow between the City Fringe and Centre saw the largest increase out of all inter-Zonal flows, with an additional 1,300 residents undertaking the journey since 2011.

Taking these results and findings, the following analysis details the process and results of inter-Zonal commuting estimates updated for 2050, to estimate the commuting impacts of the three employment and fifteen housing (three

economic trajectories, each with five contrasting spatial scenarios) trajectories within the Oxfordshire FEMA.

5.4   Methodology overview

Inter-Zonal commuting matrices, detailing the origin and destination of commuting flows in the FEMA, have been estimated for the three Zonal employment trajectories and five housing scenarios in 2050. These matrices have been achieved by:

1. Firstly, applying Zonal growth rates from official employment data (such as BRES, accounting for double-jobbing etc.) to the Census 2011 totals of Zonal workplace employment (the destination) and Zonal residential employment (the origin) to estimate 2018 totals.

2. Extrapolating Zonal workplace employment (the destination) to 2050, by applying Zonal growth rates from the three economic trajectories (accounting for double-jobbing etc.) to the 2018 baseline of Zonal workplace employment.

3. Extrapolating zonal residential employment (the origin) to 2050 and beyond, by converting zonal estimates of housing need (for the 15 trajectory/scenario combinations) to Zonal residents in employment using population-dwelling ratios, economic activity and employment rates. These residential economic trajectories are aligned with the required commuting rate outlined in the *Phase 1 Report* (which is assumed to return to the 'normal' levels of 2011).

4. These estimates of residence employment and workplace employment by zone for 2018 and 2050 (aligned to *Phase 1 Report* Oxfordshire totals) are then entered into the Census 2011 inter-Zonal commuting matrix. A double-adjustment calculation is performed in which 2011 commuting shares are adjusted to reflect the effects of Zonal growth in residence in the origin, and workplace employment in the destination.

5. Once this double-adjustment is applied, the result is internally-consistent inter-zonal commuting predictions for 2018 and each trajectory/scenario combination for 2050. These estimates align with the headline projections of employment and dwellings growth presented in the *Phase 1 Report*.

6. Modal estimates have been estimated by entering 2011 shares into an origin-destination commuting matrix, where a double-adjustment calculation is performed in which 2011 modal shares are adjusted to reflect the effects of Zonal growth in residence in the origin, and workplace employment in the destination. Resultantly, modal shares will only change given the composition of residential and workplace employment (and the existing modal share of flows between these areas), and not because of exogenous factors such as behavioural change and infrastructure improvements.

7. Private vehicle commuting trips have then be calculated from these values, using Department for Transport trip rates data and matching commuting flows to Google Maps distance data. As with modal share, private vehicle commuting trips will only change given the composition of residential and workplace employment (and these existing trips rates

between these areas), and not because of exogenous factors such as behavioural change and infrastructure improvements.

5.5   Implications of the trajectories and scenarios for commuting

The following pages summarise the inter-Zonal commuting implications for the three Zonal employment and fifteen housing (three trajectories, each with five contrasting spatial scenarios) projections to 2050. These are presented for each housing scenario, to highlight the expected changes from the 2018 baseline and the differences between scenarios.

To aid with the analysis and interpretation, stylized maps have been produced. They include Zonal commuting rates (averaged across the three respective trajectories) and highlight proportionate commuting flows. The accompanying origin-destination matrices, which provide Zone-by-Zone origin-destination flows, can be found in *Appendix A: Inter-Zonal Commuting Matrices*.

It should be emphasised that these **scenarios were informed by and developed using trends and data predating the Covid-19 pandemic**. The substantial rise in homeworking during the pandemic, and its likely durability over the timeframe of the OGNA (to 2050), will likely impact some upon some of the following observations.

Though increased homeworking potential is accounted for in CE's econometric forecasting (based on changing occupational structure, and its amenability to homeworking), this may not reflect the extent of the Covid-19 induced change. The potential impacts of the pandemic on commuting, transport use and the OOGNA's wider observations are explored in greater detail in the *Covid-19 Impacts Addendum* accompanying this report.

Evenly dispersed scenario

Figure 5.5.1: Stylized commuting flows, 2050, under the evenly dispersed scenario
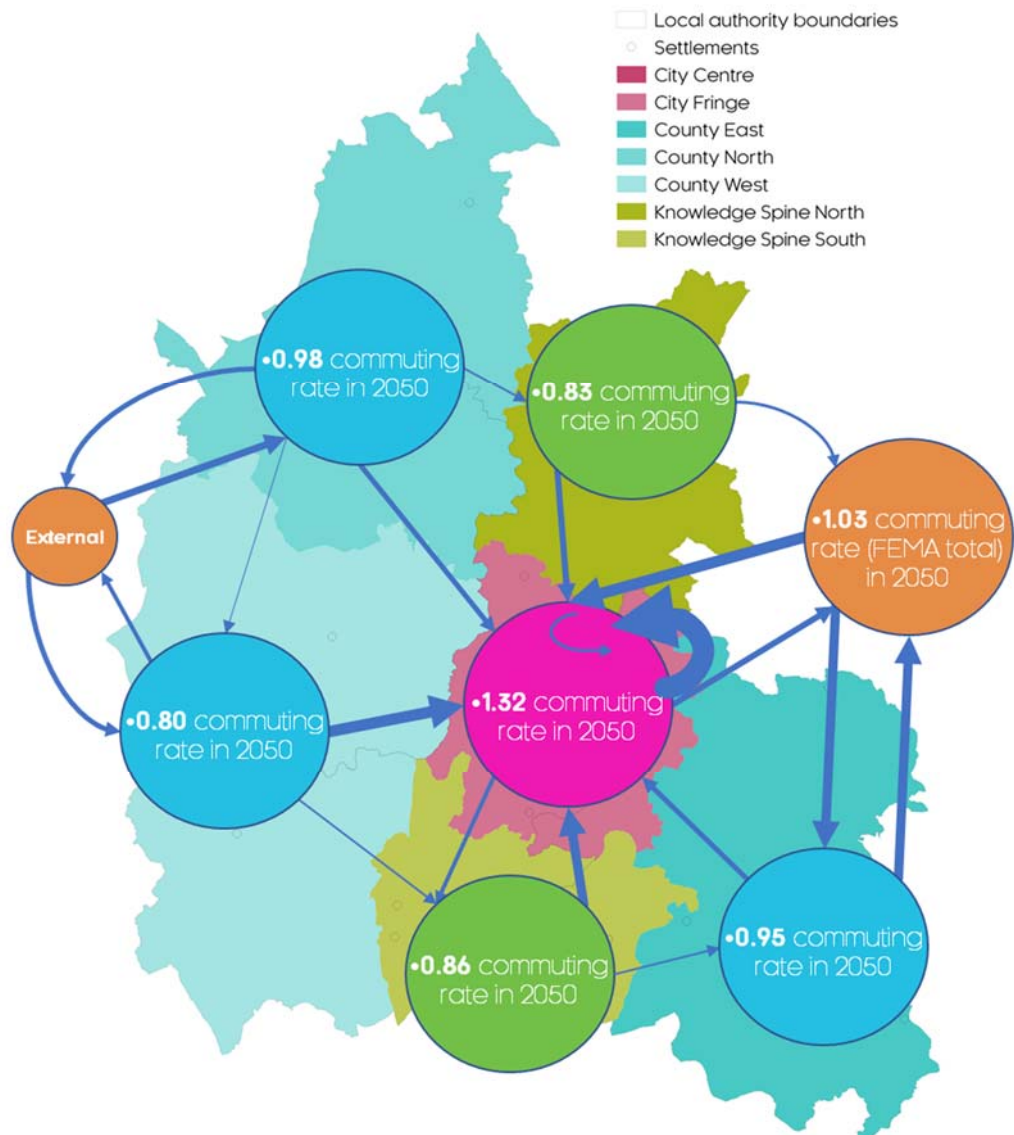
Source: Cambridge Econometrics.

Figure 5.5.1 presents stylized estimates of Oxfordshire's inter-Zonal commuting patterns for 2050 under the evenly dispersed housing scenario. Given that this scenario sees housing delivered at a proportionately even rate across the FEMA (regardless of the location of employment growth), there is an increase in most inter-Zonal flows.

These additional flows largely focus on the Oxford (City Centre and Fringe), where the highest proportion of the FEMAs employment growth to 2050 (on average, 45%) is expected, increasing its commuting rate to 1.32. Flows originating from County West and Knowledge Spine South see particularly notable increases, decreasing the commuting rate in these areas.

Despite this, the scenario remains relatively self-contained with most additional residents working in the Zone they reside in, though this rate varies; for instance, in Knowledge Spine South, only half of new residents are expected to also work in the Zone, whilst in County North this increases to three-quarters.

Both the City Centre and Fringe see a large increase in residents both living and working in the Zone. External flows continue to focus on Oxford and County East. As the FEMAs net commuting rate returns to normal levels, there is a noticeable decline in external flows, particularly inflows.

Continued trends scenario

Figure 5.5.2: Stylized commuting flows, 2050, under the continued trends scenario
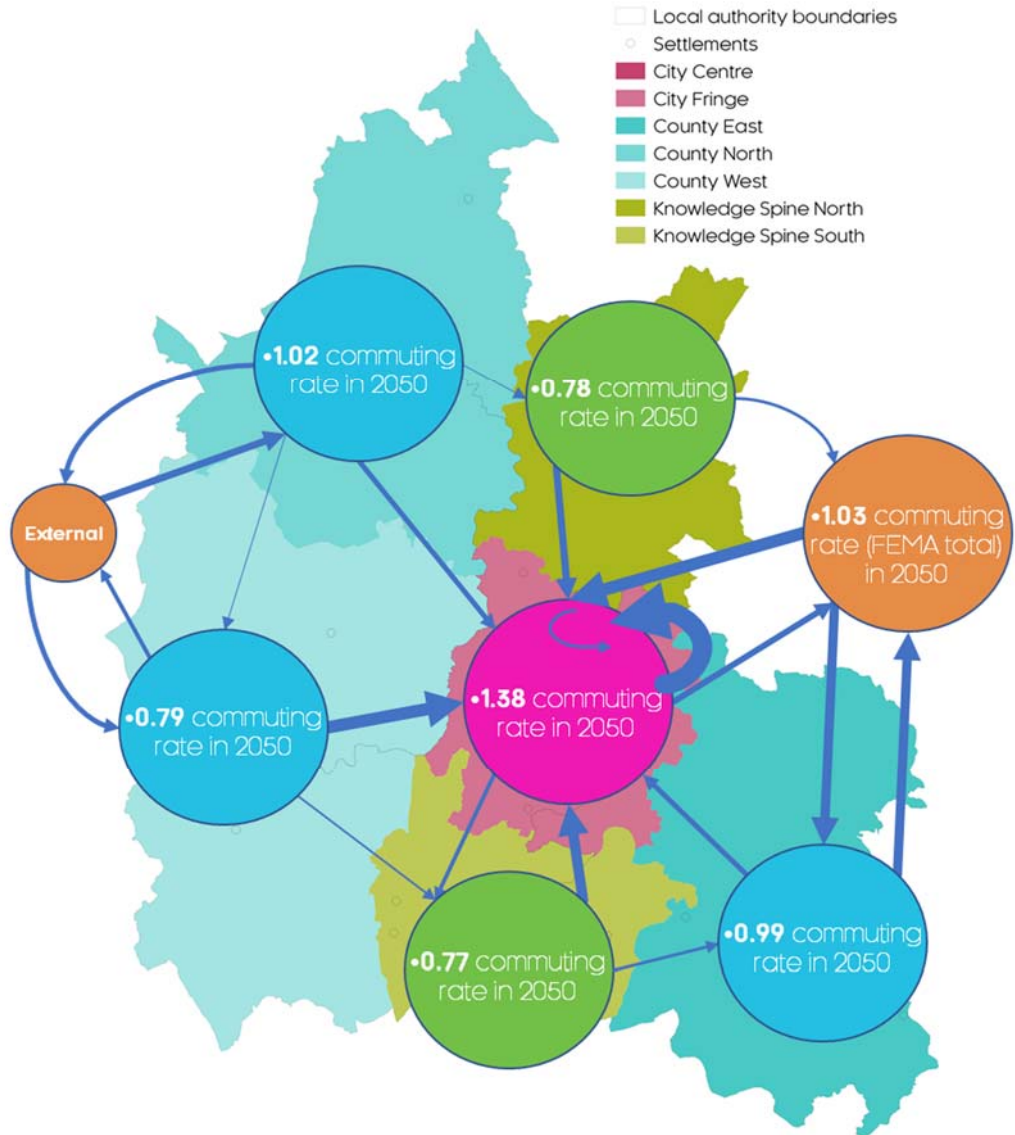
Source: Cambridge Econometrics.

Figure 5.5.2 presents stylized estimates of Oxfordshire's inter-Zonal commuting patterns for 2050 under the continued trends housing scenario. This scenario sees housing delivered at a rate in line with 2020-2031 Local Plan forecasts up to 2050. This sees an increase in commuting flows from the County West and Knowledge Spine, where greater housing growth (and thus growth in employed residents) is expected, particularly relative to their workplace employment growth.

This drives down commuting rates in these areas, and increases the rate further in Oxford (to 1.38). Resultantly, continued trends is one of the less self-contained scenarios; on average, it is expected less than half of additional

residents in the County West and Knowledge Spine will work within their Zone, with the remainder largely commuting into Oxford area for work.

As with the other scenarios, as the FEMAs net commuting rate returns to normal levels, there is a noticeable decline in external flows, particularly inflows.

Employment-led scenario

Figure 5.5.3: Stylized commuting flows, 2050, under the employment-led scenario
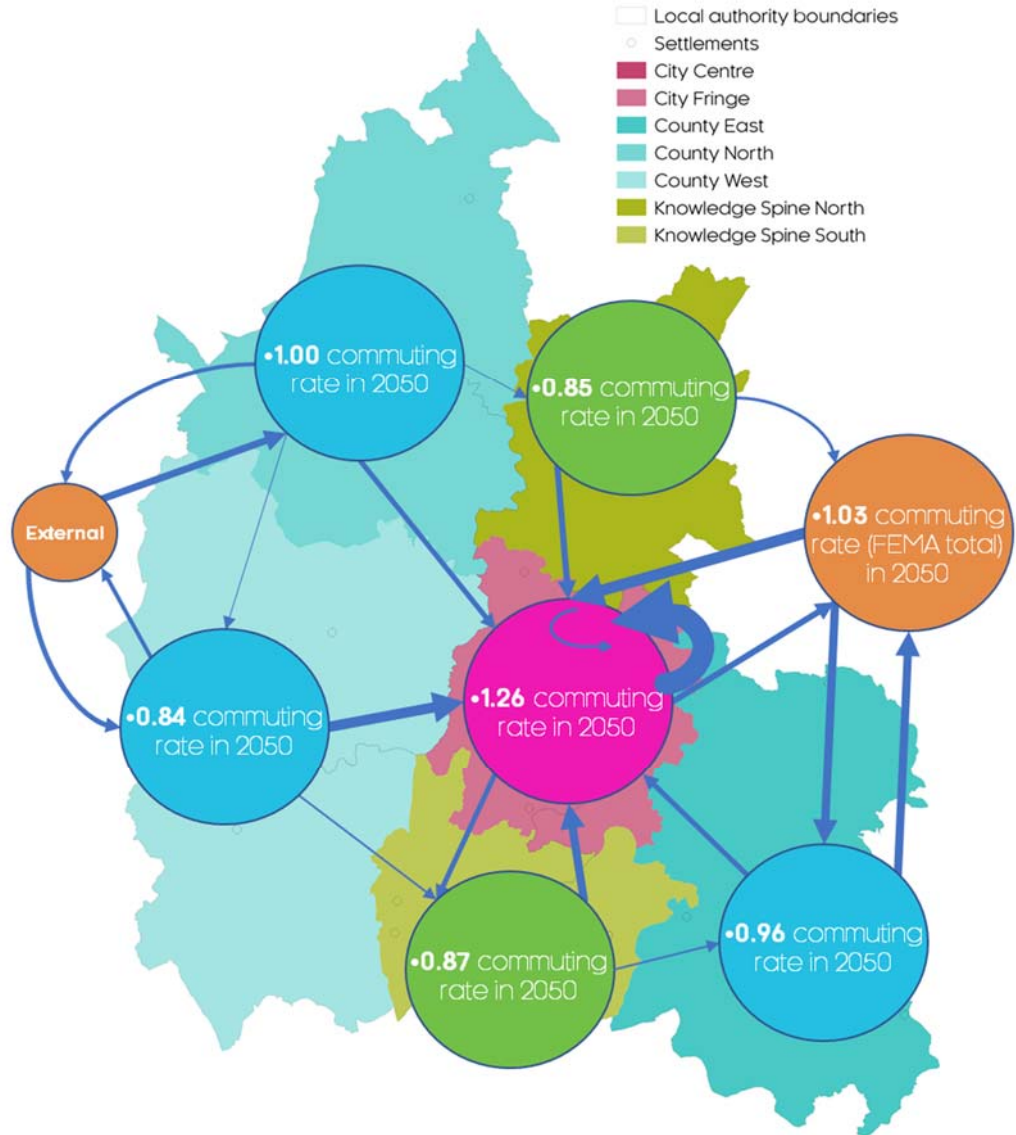
Source: Cambridge Econometrics.

Figure 5.5.3 presents stylized estimates of Oxfordshire's inter-Zonal commuting patterns for 2050 under the employment-led housing scenario. Under this scenario housing need is assumed to correlate with the distribution of projected Zonal employment growth, including growth in LIS-outlined key employment locations.

Given the stronger alignment between employment and housing growth, inter-Zonal commuting – particularly into Oxford - increases at a much lower rate than alternative scenarios, with the majority of residents working in the Zone that they reside.

Lower relative flows into Oxford can be attributed to greater resident employment growth in this area, satisfying the higher levels of employment demand (thus a lower commuting rate – 1.26 – compared to other scenarios).

In fact, the greater emphasis on dwellings growth in Oxford even leads to an increase in flows out of the city, particularly into the Knowledge Spine, as the additional residents pursue employment opportunities outside Oxford. This increases the commuting rate in Wider County and Knowledge Spine Zones.

As with the other scenarios, as the FEMAs net commuting rate returns to normal levels, there is a noticeable decline in external flows, particularly inflows.

County-focussed scenario

Figure 5.5.4: Stylized commuting flows, 2050, under the County-focussed scenario
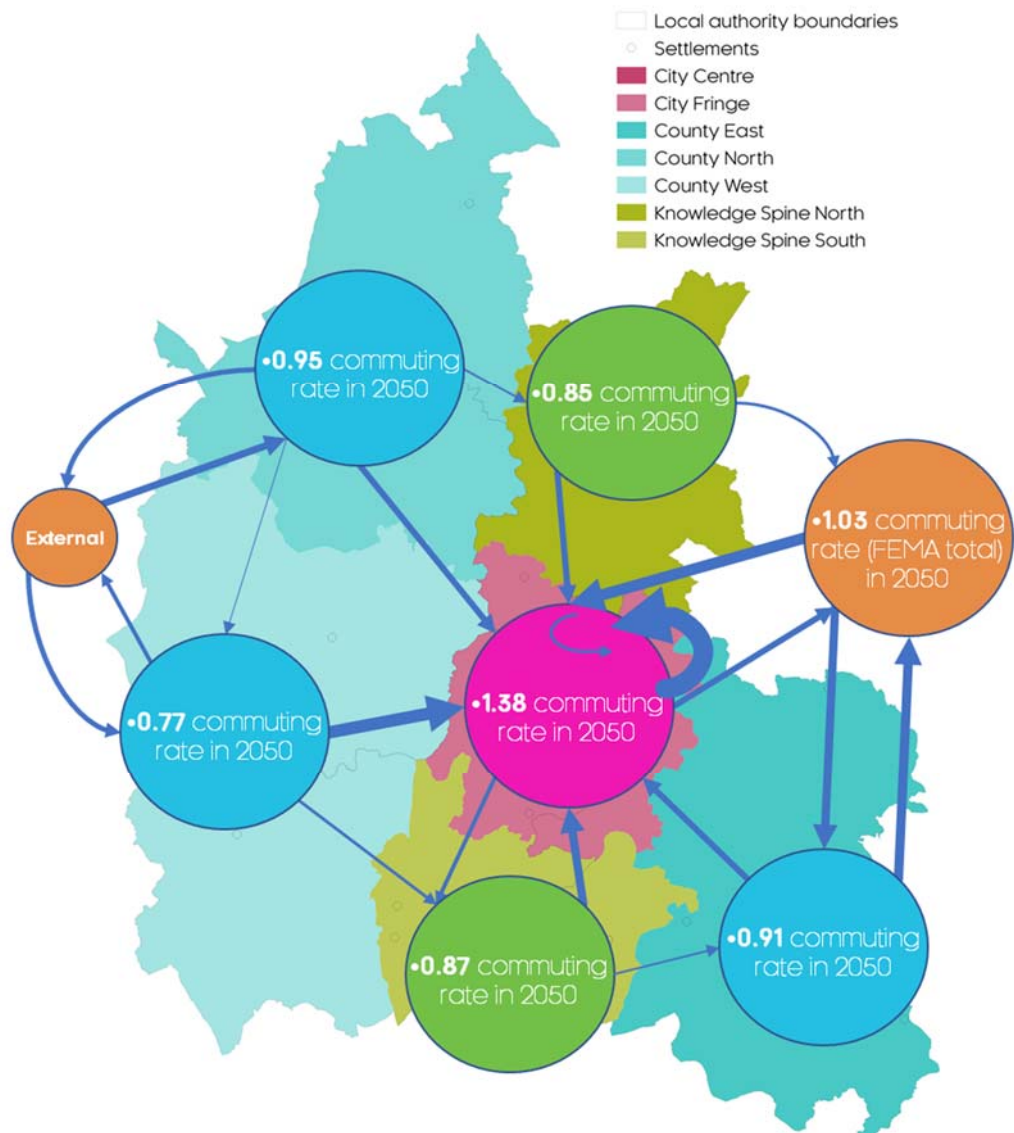
Source: Cambridge Econometrics.

Figure 5.5.4 presents stylized estimates of Oxfordshire's inter-Zonal commuting patterns for 2050 under the County-focussed housing scenario. With this scenario there is a greater focus and emphasis on dwellings growth in the Wider County. Resultantly, this sees a significant increase in commuting flows out of the Wider County, mostly into Oxford, but also with reasonable

flows into the Knowledge Spine and External (out of FEMA). This sees lower commuting rates for Wider County areas.

North-South commuting from the Knowledge Spine into Oxford is also noticeably lower, reflecting lower growth in employed residents. Under this scenario, it is estimated only two-thirds of additional Wider County residents will work in the Zone that they reside in, lower than the three-quarters in the employment-led scenario.

Compared with other scenarios, there are also noticeably lower levels of employed residents within Oxford, requiring higher in-commuting to satisfy employer demand (hence a very high net commuting rate of 1.38). There is also less commuting into the Wider County given the saturation of employed residents in these Zones.

As with the other scenarios, as the FEMAs net commuting rate returns to normal levels, there is a noticeable decline in external flows, particularly inflows.

Centralised scenario

Figure 5.5.5: Stylized commuting flows, 2050, under the centralised scenario

Source: Cambridge Econometrics.

Figure 5.5.5 presents stylized estimates of Oxfordshire's inter-Zonal commuting patterns for 2050 under the centralised housing scenario. With this scenario a greater focus and emphasis is placed on dwellings growth throughout central Oxfordshire, covering the Knowledge Spine, City Centre and Fringe.

In terms of the commuting, this results in a sharp increase in North-South flows (from the Knowledge Spine) into Oxford and only a negligible change in East-West flows (from the Wider County) into the Knowledge Spine and Oxford.

Given lower relative employed residents in the Wider County, these areas become more self-contained compared with other scenarios, thus increasing their commuting rates.

The Knowledge Spine is expected to see a large increase in employed residents, less than half of whom will work in the Zone they reside, with many commuting into Oxford. The City Centre and Fringe also see a large increase in residents, though many will continue to work where they reside. Some seek employment opportunities further afield, particularly in the Wider County.

As with the other scenarios, as the FEMAs net commuting rate returns to normal levels, there is a noticeable decline in external flows, particularly inflows.

5.6   Implications for modal share

Alongside estimates of overall commuting flows to 2050, accompanying modal shares (that is, the mode of transport used by commuters) have also been calculated. To aid with the analysis and ensure maximal data quality at the required spatial level, modal shares have been aggregated by the following, based on Census mode of travel definitions:

- **Active travel**: this includes employed persons who work mainly at or from home, or travel to work by bicycle or on foot.

- **Private travel**: this includes employed persons who travel to work by car or van (driver or passenger), motorcycle, scooter or moped, or by taxi.

- **Public travel**: this includes employed persons who travel to work by Bus, minibus or coach, train, underground, metro, light rail or tram, or by another method of travel to work.

Figure 5.6.1 shows the modal share for employed residents across Oxfordshire and its constituent Zones, according to the Census (2011) baseline.

Figure 5.6.1: Modal share of employed residents in Oxfordshire, 2011

Source: ONS, Cambridge Econometrics.

Compared with regional and national averages, the FEMA had a greater share of employed residents commuting by active travel, with 3 in 10 residents opting for this mode of travel (compared to 2 in 10 elsewhere in the South East). Resultantly, reliance on private and public transport (the former in particular) is comparatively lower.

Naturally, this rate varied across the FEMA. Unsurprisingly given its urban density, active and public travel was most widespread in the Oxford (City Centre and Fringe) area, whilst employed residents in the Knowledge Spine had some of the highest reliance on private travel within the FEMA, at rates in line or exceeding the regional average.

Across all Zones in the FEMA though, active travel remained above the regional average. In contrast, public transport use was only above average within Oxford (City Centre and Fringe, and even then, this was somewhat marginal). Public travel was particularly low in Wider County.

Employed residents from outside the FEMA (External) commuting into Oxfordshire for work were the most likely to utilise private travel though, with 9 out of 10 External residents doing so.

Figure 5.6.2 shows the modal composition of the FEMAs most significant inter-Zonal commuting flows from the Census. There was a relatively even split in the preferred mode of transport for the 25,200 employed residents undertaking the short journey from the City Fringe to City Centre, with a small majority prioritising active travel.

Figure 5.6.2: Modal composition of significant inter-Zonal commuting flows, 2011
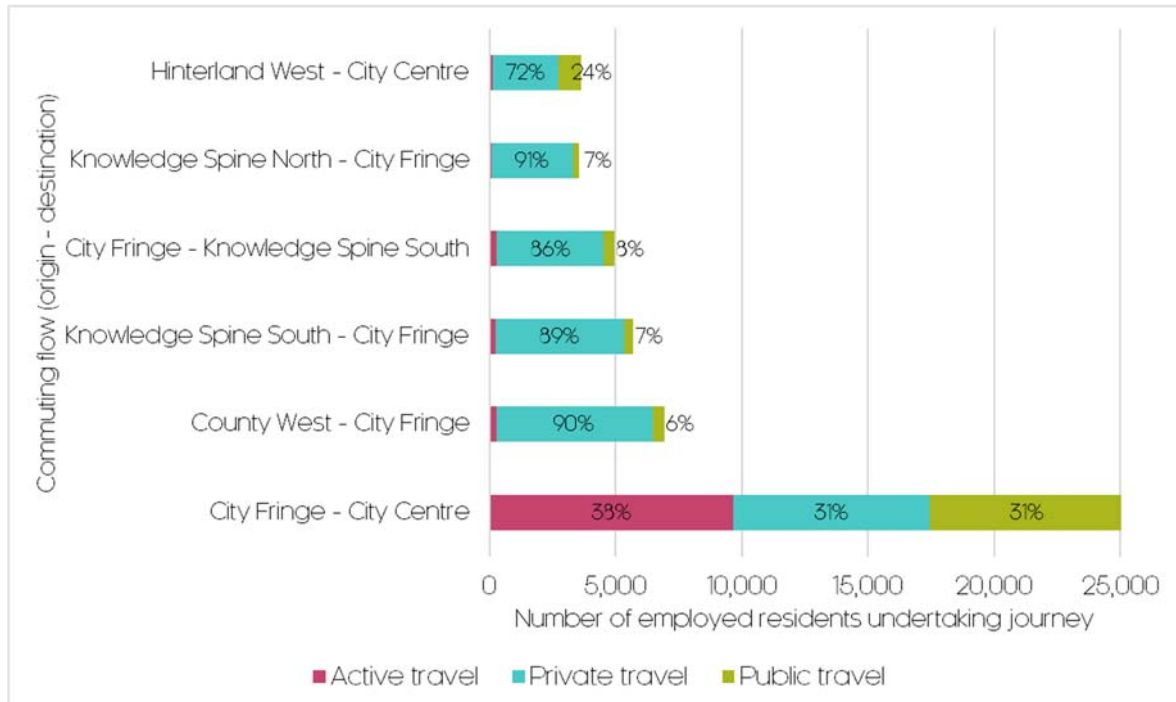
Source: ONS, Cambridge Econometrics.

The remaining flows, largely from the adjacent Wider County and Knowledge Spine, saw a much higher reliance on private travel, with fewer than 1 in 10 employed residents making these journeys opting to use public transport. Interestingly, the flow from the County West to the City Centre was an exception, with almost a quarter of the 3,600 commuters utilising public transport.

Looking ahead to 2050, Figure 5.6.3 highlights the potential change in absolute modal choice under the three economic trajectories for Oxfordshire. It should be emphasised that this has been taken using an **unconstrained / 'policy neutral' approach**, assuming that behavioural or infrastructure change is fixed.

Broadly speaking, this means current trends and patterns are extrapolated forward against future employment and housing growth without any major policy or infrastructure interventions. So greater housing growth in an area with currently high private travel reliance will resultantly be assumed to see an increase in private travel flows.

Taking such an approach, Figure 5.6.3 shows there could be an additional 49,000 employed residents utilising active travel means by 2050, under the transformational scenario, though twice this amount – 102,000 additional employed residents – could still be reliant on private travel means.

In fact, though all modes of transport are expected to see an increase in use in absolute terms, when looking at the proportion of this use (i.e. the actual modal share) there is much greater variability.

Figure 5.6.3: Potential modal choice in Oxfordshire under the three employment trajectories, 2011-50
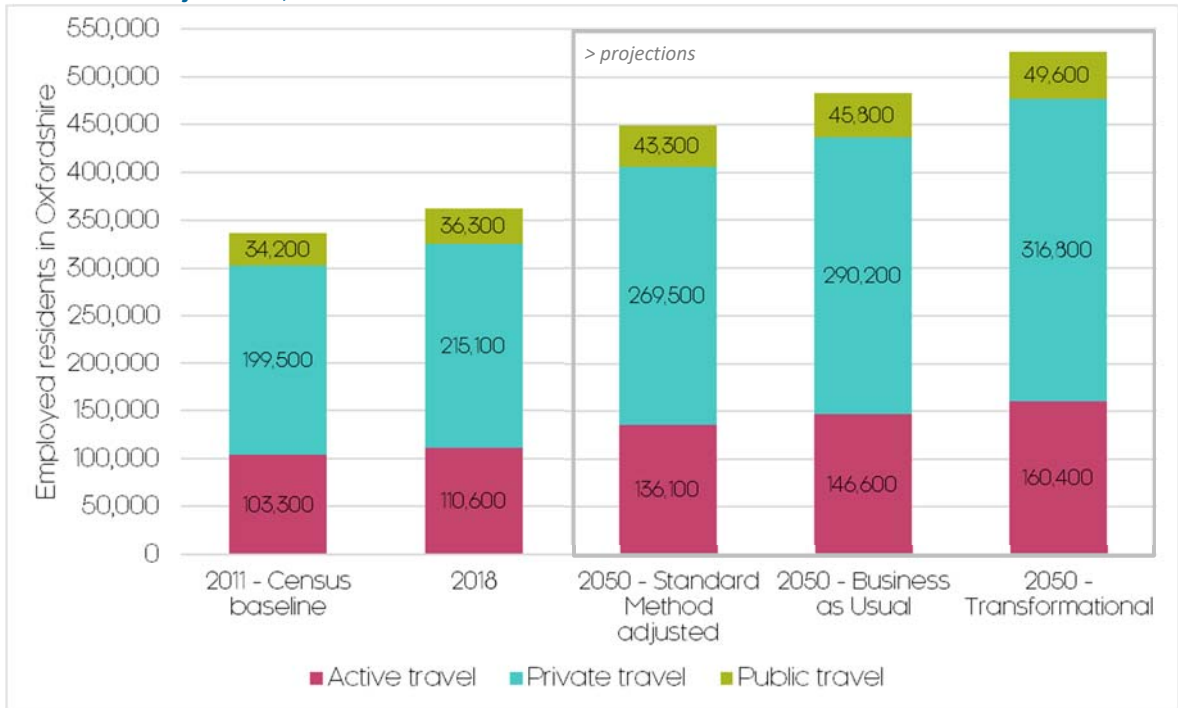
Source: ONS, Cambridge Econometrics.

For instance, Figure 5.6.4 considers the impact of the previously considered spatial scenarios on modal choice. This is presented in terms of the proportional difference for each scenario relative to their modal share under the evenly dispersed scenario.

This is because the evenly dispersed scenario, which sees housing delivered at a proportionately even rate across Zones, maintains existing modal shares

Figure 5.6.4: Potential impact on modal shares in Oxfordshire of the 2050 housing scenarios (averaged across the three employment trajectories)
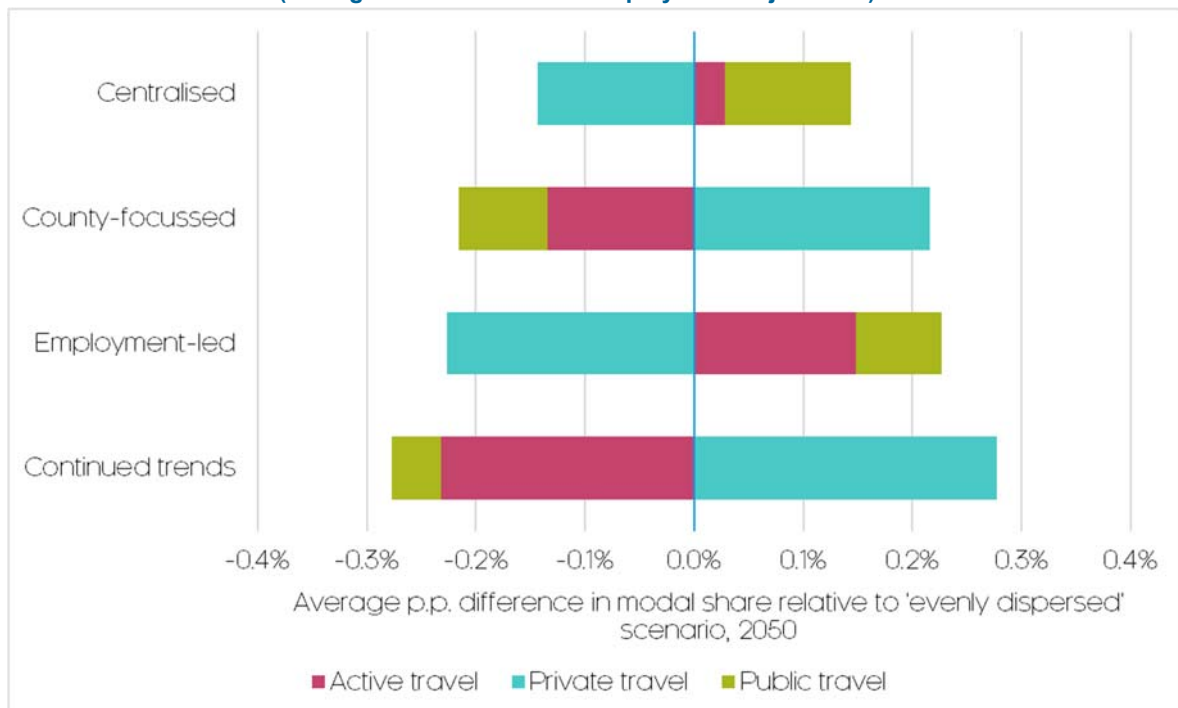
Source: Cambridge Econometrics.

(i.e. they are held constant to 2050). The evenly dispersed scenario can therefore be seen as a neutral baseline for modal share in 2050.

The **continued trends** scenario, aligning with 2020-31 Local Plan need, sees the biggest shift in modal shares relative to the neutral evenly dispersed baseline, with a large increase in the proportion of employed residents using private travel, reflecting the greater housing growth and thus flows from private travel reliant areas such as the Knowledge Spine.

The **employment-led** scenario, which aligns housing growth with employment growth, sees the largest decline in private travel out of all scenarios, and a modest increase in active and public travel, largely reflecting the increase in intra-Oxford flows. Resultantly, active and public travel are expected to increase.

The **County-focussed** scenario, which emphasises housing growth in the private travel reliant Wider County, unsurprisingly sees a shift to employed residents using private travel, whilst public travel – which fewer than 1 in 10 Wider County residents use - declines.

The **centralised** scenario, allocating high housing growth to the Knowledge Spine and City Centre and Fringe, sees a small decline in the proportion of employed residents using private travel, despite the Knowledge Spines high private travel use, with a marginal shift to active and public travel.

As emphasised previously, these scenarios are 'policy-neutral', and as such only reflect the continuation of past trends. It is likely modal shift away from private travel, for instance, could be even higher, particularly within areas with a high potential for public and active travel - such as the City Fringe and Knowledge Spine - which may not be captured in the previous analysis.

5.7   Implications for private vehicle trips

Given that the proportion of employed residents in the FEMA utilising private travel is expected to increase across almost all projections and scenarios, it is important to consider the potential impact on private vehicle trips – in terms of both their frequency and distance travelled - given this is what actually contributes to final infrastructure demand, and associated pressures and strains such as congestion and emissions.

As with modal share projections, it should be emphasised that future trip projections have been estimated using an **unconstrained / 'policy neutral' approach**, and therefore assume that behavioural or infrastructure change is fixed

Broadly speaking, current trends and patterns are extrapolated forward against future employment and housing growth. So greater housing growth in an area with currently high private vehicle reliance will resultantly see an increase in private vehicle trips originating in this location.

Figure 5.7.1 highlights the potential impact on private vehicle commuting trips starting and ending in the Oxfordshire FEMA, as well as the average distance of these trips. During 2018, there was estimated to be approximately 72.7 million private vehicle commuting trips starting in the Oxfordshire FEMA and 79.9 million ending in the FEMA.

Figure 5.7.1: Total private vehicle trips (left hand side axis) and average trip distance (right hand side axis) in the Oxfordshire FEMA under the three employment trajectories, 2011-50
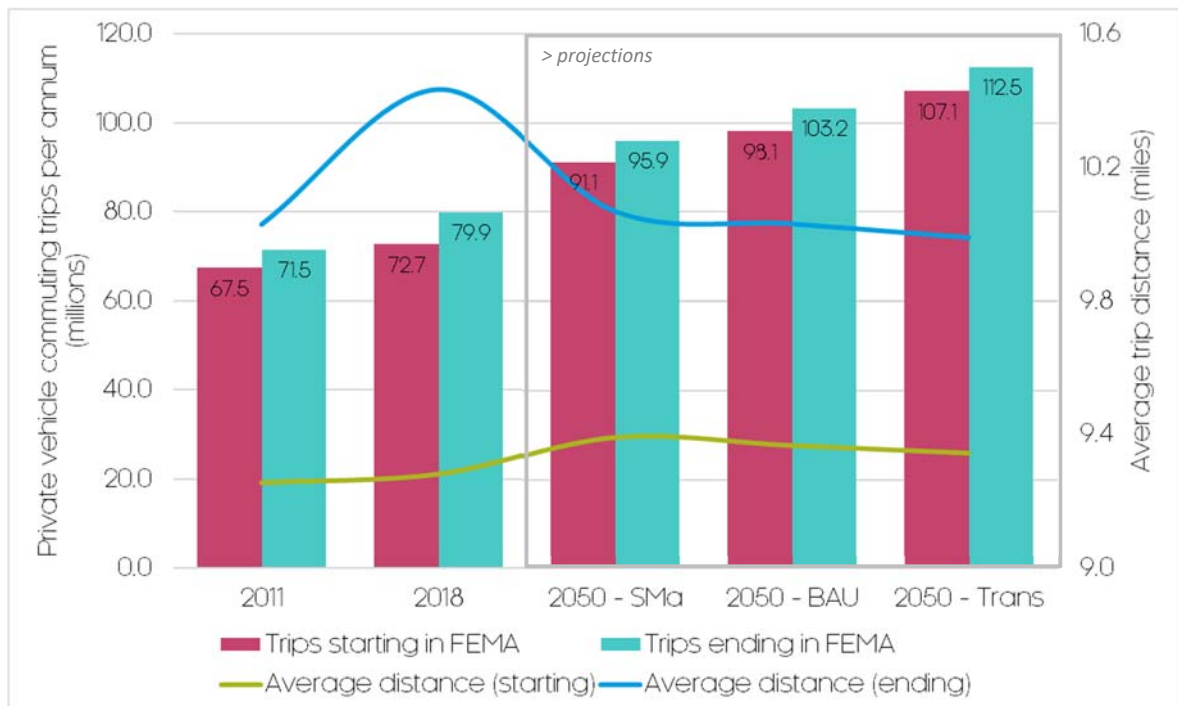
Source: DfT, Google Maps, Cambridge Econometrics.

The number of trips ending was higher due to the positive rates of net commuting into the FEMA (that is, more people commute into the FEMA for work than those that commute out). Since 2011, the number of private vehicle commuting tips starting and ending in the FEMA has increased, though the former only by 8% whilst the latter has increased by 12%.

This larger increase for trips ending in the FEMA reflects the greater number of External residents commuting into Oxfordshire for work, which has increased substantially since 2011 (as observed in Figure 5.6.1). For 9 out of 10 External residents, private travel is the preferred mode of transport into the FEMA, driving this increase in private vehicle trips.

Over the timeframe to 2050, there is expected to be a continued steady increase in trips starting and ending in the FEMA, which could total an estimated 107.1 - 112.5 million respectively (per annum) under the transformational trajectory in 2050.

Notably, the proportional difference between trips starting or ending in Oxfordshire decreases and returns to 2011 levels, given the assumed decline in net commuting relative to 2018, as outlined previously and in the *Phase 1 Report*.

In terms of average distance, trips ending in the FEMA are usually longer; as of 2018, the average trip ending in Oxfordshire covered approximately 10.4 miles relative to the 9.3 miles for those starting in the FEMA.

Again, this reflects the positive rates of net commuting into the FEMA and the high and increasing number of External residents commuting into the county for work, particularly relative to FEMA residents commuting out.

And as with total trips, since 2011 the average distance of trips ending in Oxfordshire has increased substantially, indicating not only are more trips being made from outside the FEMA, they are also being made over an increasingly longer distance. For trips starting in the FEMA, the average distance travelled has remained largely unchanged.

Looking ahead to 2050, the average distance of private vehicle trips ending in Oxfordshire is expected to decline, potentially below 2011 levels, largely reflecting the assumed decline in net commuting (and thus long-distance commuting by External residents) relative to 2018. For trips starting in Oxfordshire though, there is expected to be a gentle increase, as residents increase their reliance private travel over longer distances.

Of course, this pattern varies greatly when considering the impact of the aforementioned spatial scenarios, as shown in Figure 5.7.2. As with modal share, this is presented relative to the neutral evenly dispersed scenario, which assume a proportionately even increase in trips and distance across the FEMA.

Figure 5.7.2: Potential impact on average trip distance in Oxfordshire of the 2050 housing scenarios (averaged across the three employment trajectories)
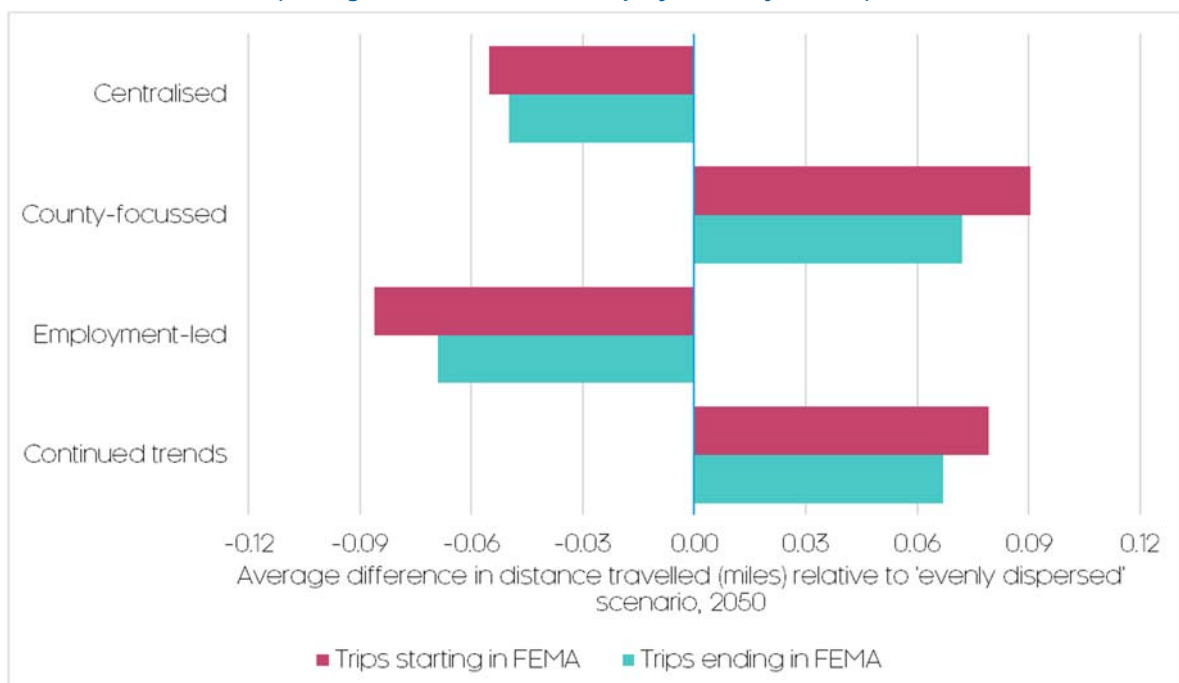
Source: Google Maps, Cambridge Econometrics.

It should be emphasised that despite the differences in Figure 5.6. appearing marginal (as they reflect the average for each individual trip), at an aggregated, FEMA-wide level the impact can be substantial; for instance, a 0.1 decrease in the average trip length ending in the FEMA could reduce total vehicle miles travelled that year by 11.3 million.

Relative to the evenly dispersed baseline, the **continued trends** scenario, which sees the biggest modal shift towards private travel, results in a large increase in average trip distance, though this is slightly less than the County-focussed scenario, reflecting the proximity of the Knowledge Spine to Oxford.

The **employment-led** scenario, which aligns housing and employment growth and resultantly has the largest drop in private travel out of all scenarios, could actually result in a decline in average trip distance, below both 2011 and 2018 benchmarks.

The **County-focussed** scenario meanwhile, which emphasises housing growth in the private travel reliant Wider County, unsurprisingly sees the largest increase in average distance travelled out of all scenarios, regardless of whether the trips starts or ends in Oxfordshire.

Finally, the **centralised** scenario, allocating high housing growth to the Knowledge Spine and Oxford (City Centre and Fringe), also sees a decline in average trip distance, though not to the extent of the employment-led scenario.

5.8   Conclusions

This chapter has undertaken an extensive appraisal of commuting trends in the Oxfordshire FEMA, with a particular focus on understanding the implications for commuting trips, modal share and private vehicle miles within the FEMA as a result of the contrasting employment and housing distributions explored in previous chapters.

Analysis of recent trends has shown that, as a result of employment growth accelerating relative to the supply of housing, commuting into the Oxfordshire FEMA has more than doubled over the past decade. This means more people are commuting – and commuting further, typically using private transport - to work in the FEMA, exacerbating congestion and environmental impacts.

Though the scale of potential employment and housing growth in Oxfordshire will increase the absolute number of commuting trips within the FEMA, given certain development choices there is the potential for the length of these trips to decrease, for modal share to shift towards greener, more sustainable forms of transport, and for millions of private vehicles miles to be taken off Oxfordshire's roads by 2050.

Such outcomes are increasingly desirable given the growing pressure on Oxfordshire's transport network, associated externalities (notably, environmental and emissions effects), and the desire to attain net zero, and should therefore be considered in the appraisal of any future spatial development options for the FEMA.

6 Conclusions

This conclusion chapter seeks to highlight and draw out the key findings and observations presented in the Phase 2 Report, particularly those regarding the definition and characteristics of the Oxfordshire FEMA, the scenarios for the distribution of housing and employment growth, and their resultant implications for commuting and transport use.

The Oxfordshire Functional Economic Market Area (FEMA)

Functional Economic Market Areas (FEMAs) are designed to capture the extent and spatial distribution of a local economic market more accurately than administrative boundaries, which rarely reflect the true scale and reach of local economic markets and accompanying economic flows.

Figure 5.8.1: Spatial levels of the Oxfordshire FEMA

Source: Cambridge Econometrics.

This report has sought to identify the extent and characteristics of the Oxfordshire FEMA, to enable a more precise and in-depth exploration of potential spatial distributions of economic growth and housing need in Oxfordshire.

The analysis of several economic, demographic, and social markets and indicators showed that the county of Oxfordshire is a reasonable approximation for the Oxfordshire FEMA, with Oxford at its centre. Further spatial levels ('Zones') have also been identified within the FEMA, each with their own distinct characteristics and economic attributes. Presented in Figure 5.8.1 above, these include:

- **Oxford City Centre**: the area with the highest concentration of economic activity, as well as central urban amenities, with a strong and growing services-led economy.

- **Oxford City Fringe**: the area surrounding the City Centre, characterised by a high degree of integration with and connectivity to the City Centre, and the presence of important urban fringe sites, such as science parks and large suburb, as well as the undeveloped Green Belt. An area of diverse and fast-growing economic activity.

- **The Knowledge Spine**: an area of globally-recognised knowledge activity that runs through the centre of the FEMA, largely along the A34 corridor. Straddling the City and Centre and Fringe, it comprises a **Northern** and a **Southern** part. Both areas have seen robust economic and housing growth of late.

- **The Wider County**: areas that remain outside both the Knowledge Spine and City Centre and Fringe. They comprise three roughly equal parts of comparable economic activity and functionality: **County East**, **County West** and **County North**. Pockets of high economic and housing growth can be found within these predominantly rural areas.

As emphasised in the report, these Zones are purely hypothetical, to allow for a better spatial understanding of housing need in relation to economic trends, and they should not be regarded as specific options or priorities for the distribution of development.

Employment and housing need distributions to 2050

Understanding the potential spatial scale and pattern of employment growth is important for informing, testing and illustrating contrasting distributions for housing need. Drawing on the definition of the Oxfordshire FEMA and its constituent spatial levels ('Zones'), this report has explored the potential spatial distribution of the three Oxfordshire-wide employment trajectories to 2050 (as prepared and presented in the *Phase 1 Report*).

The distributions for employment growth are summarised in Figure 5.8.2 below. Over the longer timeframe of the *Phase 1* employment trajectories (to 2050), there is the potential for a more spatially balanced growth picture to emerge compared to recent (2011-18) trends.

Central Oxfordshire, encompassing the Knowledge Spine (including Oxford City and Fringe), is expected to remain a significant driver of economic activity, accounting for a potential two-thirds of net additional jobs in the FEMA to 2050.

Figure 5.8.2: Spatial scenarios for Zonal distribution of employment (jobs) growth, 2011-18 and 2018-50

Source: ONS, Cambridge Econometrics. County East excluded from 2011-18 outturn due to negative employment growth. . Percentage shares relate to Zones proportion of FEMA-wide jobs growth to 2050.

Having considered the scale and pattern of potential economic growth within the Oxfordshire FEMA, this report then proceeds to illustrate a range of spatial distribution scenarios for the FEMA-wide housing need to 2050 (as prepared and presented in the *Phase 1 Report*.)

By taking the opportunity to quantify and test a range of different scenarios for housing distribution, the potential implications and trade-offs of different development choices can be identified and contrasted at a high-level.

The distributions of housing need have been informed by a set of robust and contrasting housing scenarios, with the results presented in Figure 5.8.3 below. The scenarios cover a variety of contrasting development choices for need after the 2020-31 period of Local Plan forecast completions. The scenarios include:

1. **An evenly dispersed scenario** – which sees housing need, and thus need, allocated at an even *percentage rate* (not quantity) across the FEMA.

2. **A continued trends scenario** – mirrors current concentrations of forecast net completions in Local Plans (which cover 202-31), extrapolating them over the additional 2031-50 period.

3. **An employment-led scenario** – sees need matched to the distribution of projected Zonal employment growth, including growth in LIS-outlined key employment locations.

4. **A County-focussed scenario** – focuses need on the Wider County, resulting in the lowest proportion of need allocated to Oxford City Centre and Fringe and the Knowledge Spine.

5. **A centralised scenario** – focuses need on central Oxfordshire, incorporating Oxford City Centre and Fringe and the Knowledge Spine. This results in the lowest proportion of need allocated to the Wider County.

Figure 5.8.3: Spatial scenarios for Zonal distribution of housing need, 2011-20 and 2020-50
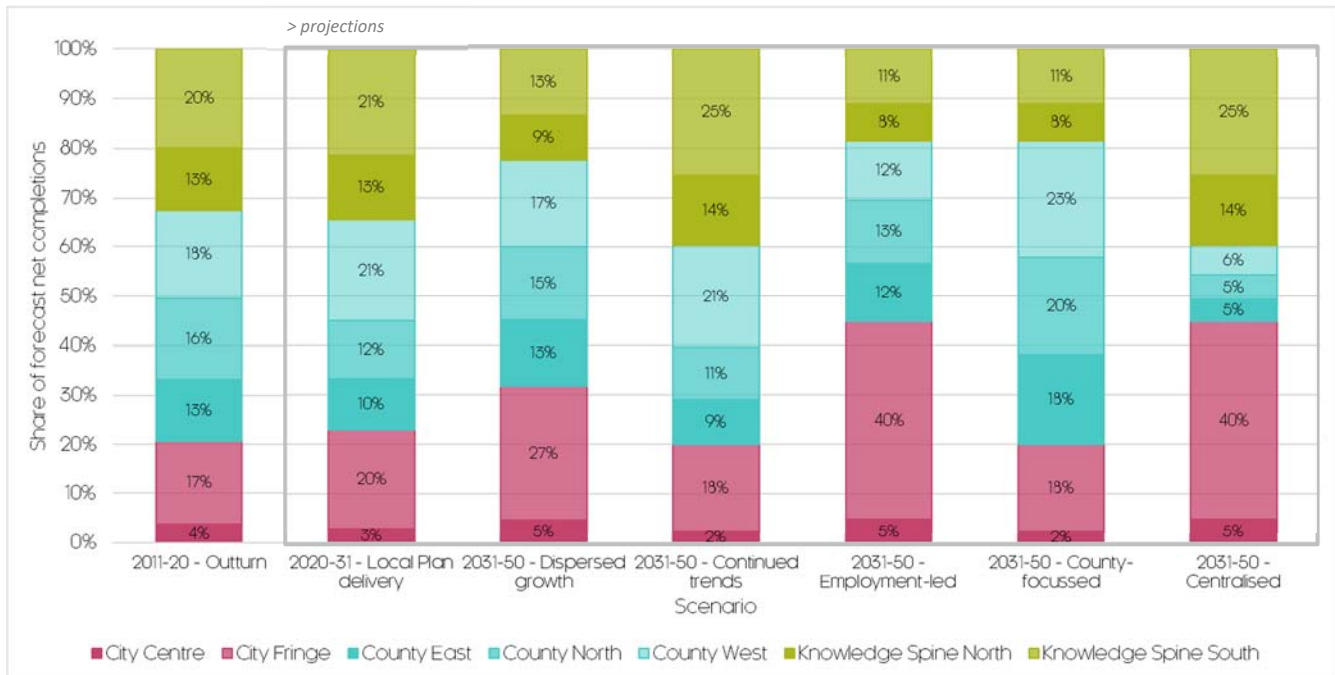
Source: MHCLG, Cambridge Econometrics. Note: percentage shares are an average of distributions across the three employment trajectories. Percentage shares relate to Zones proportion of FEMA-wide housing need to 2050.

As Figure 5.8.3 shows, the distribution scenarios cover a variety of contrasting development choices, ranging from an economic-led focus on distribution in central Oxfordshire (Oxford and the Knowledge Spine), to a more evenly dispersed approach across the county, to an emphasis on market towns in Wider County areas.

As it allocates housing growth rates equally across Zones, the **evenly dispersed** scenario sees housing distributed the most evenly between the Zones post-2031. The Wider County still has the highest absolute level of growth, as it starts with the highest number of initial dwellings at 2031.

The **continued trends** scenario, extrapolating 2020-31 Local Plan forecasts to 2050, sees significantly greater distribution to the Knowledge Spine, and marginally less allocated to the Wider County and City Centre and Fringe.

The **employment-led** scenario sees much greater distribution to Oxford City (specifically the City Fringe), and comparatively lower levels allocated to the Wider County and Knowledge Spine.

The **County-focussed** scenario combines the low City Centre and Fringe distribution from the *continued trends* scenario with the low distribution to

Knowledge Spine from the *employment led* scenario. This scenario results in a very high relative allocation to the Wider County.

The **centralised** scenario reverses this process, with the high City Centre and Fringe distribution from the *employment-led* scenario paired with the high Knowledge Spine allocation from the *continued trends* scenario. This scenario results in a very low relative distribution to the Wider County.

It should be emphasised that these scenarios do not reflect preferred options or priorities for economic growth or housing delivery, but are rather hypothetical distributions to better understand the implications and trade-offs of different development choices at a high level. It should also be noted that these scenarios do not take into account specific site constraints, phased need, or development sites outside of the Local Plan period (2020-31).

Implications for commuting

By taking the opportunity to quantify and test a range of different economic and housing distributions, potential implications and trade-offs can be identified and contrasted. For the purpose of this report, this report has specifically focussed on understanding the consequences for commuting trips, modal share and private vehicle miles within the FEMA, particularly given their important role in attaining net zero ambitions for the county.

Analysis of recent trends has shown that, as a result of employment growth accelerating relative to the supply of housing, commuting into the Oxfordshire FEMA has more than doubled over the past decade. This means more people are commuting – and commuting further, typically using private transport - to work in the FEMA, exacerbating congestion and environmental effects.

Though the scale of potential employment and housing growth in Oxfordshire will increase the absolute number of commuting trips within the FEMA, the report finds that, given certain development choices, there is the potential for the length of these trips to decrease, for modal share to shift towards greener, more sustainable forms of transport, and for millions of private vehicles miles to be taken off Oxfordshire's roads by 2050.

Such outcomes are increasingly desirable given the growing pressure on Oxfordshire's transport network, associated externalities (notably, environmental and emissions effects), and the desire to attain net zero, and should therefore be considered in the appraisal of any future spatial development options for the FEMA.

Links to other OGNA work

As referenced throughout, this report is directly informed by and relates to the extensive evidence prepared and analysed in the OGNA's *Phase 1 Report*. The *Phase 1 Report* addresses housing need, economic growth and employment land requirements for Oxfordshire – at the county-wide level - and appraises the accompanying high-level commuting and affordability implications

The development of the Phase 2 Report coincided with the Covid-19 pandemic of 2020 and 2021. It is clear that the pandemic and some of its long-lasting effects have the potential to impact upon the findings of this report, not least those relating to commuting. As such additional consideration has been given to this question. This analysis can be found in the **Covid-19 Impacts Addendum** that accompanies this report.

7   References

DCLG (now MHCLG, 2010). Functional Economic Market Areas: An economic note. (Link)

HM Government (2019). Oxfordshire Local Industrial Strategy. (Link)

National Infrastructure Commission (2017). Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc. (Link)

Oxfordshire LEP (2018). 2018 Economic Review: Baseline. (Link)

Oxfordshire LEP (2018). 2018 Future State Assessment. (Link)

Appendix A: Inter-Zonal Commuting Matrices

The following tables comprise the detailed origin-destination inter-Zonal commuting matrices referenced during the analysis of *Chapter 5 Commuting Trends Within the Oxfordshire FEMA.*

To read the matrices; columns represent the location of the FEMAs employee's residence, whilst rows the location of the FEMA employee's workplace. Flows are presented between the seven Zones alongside an External region. Cells are shaded according to the size (i.e. significance) of that flow.

For 2018 onwards, the matrices include additional cells (which are accordingly shaded) showing the weighted percentage change in inter-Zonal flows relative to the 2011 or 2018 baseline. Cells are shaded between blue, which indicates a significant increase, or red, for a significant decrease.

2011 Census baseline

Table 5.8.1: Inter-Zonal commuting matrix, 2011

| | | Location of residence | | | | | | | |
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of work	City Centre	11,000	25,200	1,800	2,000	3,600	2,300	1,700	5,000
	City Fringe	3,400	54,400	3,300	3,200	6,900	3,600	5,700	10,900
	County East	300	2,600	26,200	200	500	500	2,200	13,600
	County North	200	1,400	100	33,000	1,700	1,500	100	10,400
	County West	200	2,600	200	1,700	34,700	500	1,600	7,800
	Knowledge Spine North	100	1,300	300	1,600	500	15,500	200	4,700
	Knowledge Spine South	300	5,000	1,500	300	2,300	300	19,400	4,700
	External	1,800	8,900	13,800	7,500	6,500	5,000	4,700	-

Source: ONS (Census 2011), Cambridge Econometrics

2018

Table 5.8.2: Inter-Zonal commuting matrix, 2018

| | | Location of residence | | | | | | | |
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of work	City Centre	11,300	26,500	2,200	2,300	3,900	2,500	1,900	6,100
	City Fringe	3,900	60,100	3,900	3,700	8,000	3,900	6,400	13,700
	County East	100	2,500	26,200	100	400	300	1,900	14,500
	County North	200	1,400	300	34,900	1,900	1,500	200	12,000
	County West	300	2,700	500	1,800	37,500	500	1,700	9,200

	City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Knowledge Spine North	300	1,600	600	1,900	800	17,300	400	6,400
Knowledge Spine South	500	5,200	1,900	600	2,700	500	22,000	6,300
External	1,800	8,900	13,900	7,600	6,600	4,900	4,700	-

		Weighted % change 2011-18						
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Weighted % change 2011-18	City Centre	0.1%	0.4%	0.1%	0.1%	0.1%	0.1%	0.1%	0.3%
	City Fringe	0.1%	1.7%	0.2%	0.1%	0.3%	0.1%	0.2%	0.8%
	County East	-0.1%	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%	0.3%
	County North	0.0%	0.0%	0.1%	0.6%	0.1%	0.0%	0.0%	0.5%
	County West	0.0%	0.0%	0.1%	0.0%	0.8%	0.0%	0.0%	0.4%
	Knowledge Spine North	0.1%	0.1%	0.1%	0.1%	0.1%	0.5%	0.1%	0.5%
	Knowledge Spine South	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.8%	0.5%
	External	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-

Source: ONS, Cambridge Econometrics

2050 – evenly dispersed scenario

Table 5.8.3: Inter-Zonal commuting matrix, 2050 under the Standard Method (adjusted): evenly dispersed scenario

		Location of residence							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of work	City Centre	13,400	31,600	2,800	2,800	5,800	3,700	3,500	5,300
	City Fringe	4,600	71,000	5,200	4,900	11,000	6,000	10,000	12,600
	County East	300	2,800	31,800	600	1,100	900	3,500	13,800
	County North	300	1,700	700	42,300	3,000	2,300	1,000	10,800
	County West	200	2,700	700	2,000	47,700	800	2,700	8,000
	Knowledge Spine North	200	1,600	900	2,300	1,400	23,200	1,100	5,000
	Knowledge Spine South	400	5,600	2,100	700	3,700	800	30,400	5,000
	External	1,500	8,800	14,000	7,600	6,700	5,100	5,200	-

		Weighted % change 2018-50							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Weighted % change 2018-50	City Centre	0.6%	1.5%	0.2%	0.2%	0.6%	0.4%	0.4%	-0.3%
	City Fringe	0.2%	3.2%	0.4%	0.4%	1.1%	0.6%	1.1%	-0.4%
	County East	0.1%	0.1%	1.6%	0.1%	0.2%	0.2%	0.5%	-0.4%
	County North	0.1%	0.1%	0.1%	2.2%	0.4%	0.2%	0.2%	-0.5%
	County West	-0.1%	-0.1%	0.0%	-0.1%	2.0%	0.0%	0.2%	-0.9%
	Knowledge Spine North	0.0%	0.0%	0.1%	0.1%	0.2%	1.7%	0.2%	-0.5%
	Knowledge Spine South	0.0%	0.1%	0.1%	0.0%	0.4%	0.1%	2.4%	-0.5%
	External	-0.2%	-0.2%	-0.1%	-0.1%	0.0%	-0.1%	0.0%	-

Table 5.8.4: Inter-Zonal commuting matrix, 2050 under the business as usual: evenly dispersed scenario

		Location of residence							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of work	City Centre	14,200	33,600	2,900	2,900	6,100	3,800	3,600	5,300
	City Fringe	5,000	76,800	5,800	5,400	12,000	6,600	10,900	13,000
	County East	400	3,100	34,600	800	1,300	1,100	4,000	14,200
	County North	400	1,800	800	45,700	3,300	2,700	1,100	11,100
	County West	300	2,900	800	2,100	51,500	900	3,000	8,000
	Knowledge Spine North	300	1,800	900	2,500	1,600	25,100	1,200	5,000
	Knowledge Spine South	400	6,400	2,500	800	4,200	800	33,000	5,000
	External	1,500	8,900	14,200	7,600	6,700	5,100	5,000	-

		Weighted % change 2018-50							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Weighted % change 2018-50	City Centre	0.9%	2.0%	0.2%	0.2%	0.7%	0.4%	0.5%	-0.3%
	City Fringe	0.3%	4.8%	0.6%	0.5%	1.4%	0.8%	1.3%	-0.3%
	County East	0.1%	0.2%	2.4%	0.2%	0.3%	0.2%	0.6%	-0.2%
	County North	0.1%	0.1%	0.2%	3.1%	0.5%	0.4%	0.3%	-0.4%
	County West	-0.1%	-0.1%	0.0%	-0.1%	3.1%	0.0%	0.2%	-0.9%
	Knowledge Spine North	0.0%	0.1%	0.1%	0.2%	0.3%	2.2%	0.2%	-0.5%
	Knowledge Spine South	0.0%	0.3%	0.2%	0.1%	0.5%	0.1%	3.1%	-0.5%
	External	-0.2%	-0.1%	-0.1%	-0.1%	0.0%	-0.1%	0.0%	-

Table 5.8.5: Inter-Zonal commuting matrix, 2050 under the transformational: evenly dispersed scenario

		Location of residence							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of work	City Centre	15,500	36,900	3,300	3,300	6,700	4,300	4,000	5,300
	City Fringe	5,600	84,100	6,500	6,100	13,200	7,300	11,900	13,500
	County East	500	3,200	38,000	900	1,600	1,200	4,500	14,800
	County North	400	2,000	900	50,000	3,700	3,000	1,300	11,400
	County West	400	3,100	1,000	2,500	56,300	1,100	3,400	8,100
	Knowledge Spine North	300	1,900	1,100	2,900	1,800	27,300	1,400	5,000
	Knowledge Spine South	400	7,200	2,900	900	4,600	900	36,100	5,000
	External	1,400	9,000	14,600	7,600	6,700	5,100	4,900	-

		Weighted % change 2018-50							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Weighted	City Centre	1.2%	2.9%	0.3%	0.3%	0.9%	0.5%	0.6%	-0.3%
	City Fringe	0.5%	6.8%	0.7%	0.7%	1.7%	1.0%	1.6%	-0.2%

	City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
County East	0.1%	0.2%	3.3%	0.2%	0.4%	0.2%	0.7%	-0.1%
County North	0.1%	0.2%	0.2%	4.3%	0.6%	0.4%	0.3%	-0.3%
County West	-0.1%	0.0%	0.1%	0.1%	4.4%	0.1%	0.4%	-0.9%
Knowledge Spine North	0.0%	0.1%	0.2%	0.3%	0.4%	2.8%	0.3%	-0.5%
Knowledge Spine South	0.0%	0.6%	0.3%	0.1%	0.6%	0.1%	4.0%	-0.5%
External	-0.2%	-0.1%	0.1%	-0.1%	0.0%	-0.1%	-0.1%	-

Source: Cambridge Econometrics

2050 – continued trends scenario

Table 5.8.6: Inter-Zonal commuting matrix, 2050 under the Standard Method (adjusted): continued trends scenario

		Location of residence							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of work	City Centre	13,200	31,000	2,700	2,700	6,000	4,000	4,000	5,400
	City Fringe	4,500	69,800	5,100	4,800	11,300	6,300	10,700	12,700
	County East	300	2,700	31,300	600	1,200	1,000	4,000	13,800
	County North	300	1,500	600	41,800	3,100	2,600	1,300	10,800
	County West	100	2,600	600	1,900	48,000	800	2,900	7,900
	Knowledge Spine North	200	1,500	700	2,000	1,400	23,700	1,300	5,000
	Knowledge Spine South	300	5,000	2,000	600	3,700	800	31,500	4,900
	External	1,400	8,700	13,900	7,500	6,800	5,100	5,600	-

		Weighted % change 2018-50							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Weighted % change 2018-50	City Centre	0.6%	1.3%	0.2%	0.1%	0.7%	0.4%	0.6%	-0.3%
	City Fringe	0.2%	2.9%	0.4%	0.3%	1.2%	0.7%	1.3%	-0.4%
	County East	0.1%	0.1%	1.5%	0.1%	0.2%	0.2%	0.6%	-0.4%
	County North	0.1%	0.0%	0.1%	2.0%	0.4%	0.3%	0.3%	-0.5%
	County West	-0.1%	-0.1%	-0.1%	-0.1%	2.1%	0.0%	0.2%	-1.0%
	Knowledge Spine North	0.0%	0.0%	0.1%	0.1%	0.2%	1.8%	0.2%	-0.5%
	Knowledge Spine South	-0.1%	-0.1%	0.1%	0.0%	0.4%	0.1%	2.7%	-0.5%
	External	-0.2%	-0.2%	-0.1%	-0.1%	0.0%	-0.1%	0.1%	-

Table 5.8.7: Inter-Zonal commuting matrix, 2050 under the business as usual: continued trends scenario

		Location of residence							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of	City Centre	13,800	32,500	2,800	2,800	6,400	4,400	4,400	5,300
	City Fringe	5,000	74,800	5,600	5,300	12,400	7,200	12,000	13,100
	County East	300	2,800	33,800	700	1,500	1,300	4,700	14,300

	City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
County North	300	1,600	700	44,800	3,500	3,100	1,700	11,100
County West	100	2,600	700	1,900	52,100	900	3,400	7,900
Knowledge Spine North	100	1,500	800	2,100	1,500	26,000	1,500	4,900
Knowledge Spine South	300	5,400	2,000	600	4,100	900	35,000	4,900
External	1,300	8,600	13,800	7,400	6,900	5,100	5,900	-

	Weighted % change 2018-50							
	City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
City Centre	0.7%	1.7%	0.2%	0.2%	0.8%	0.6%	0.7%	-0.3%
City Fringe	0.3%	4.2%	0.5%	0.5%	1.5%	0.9%	1.6%	-0.3%
County East	0.1%	0.1%	2.1%	0.2%	0.3%	0.3%	0.8%	-0.2%
County North	0.1%	0.1%	0.1%	2.9%	0.6%	0.5%	0.4%	-0.4%
County West	-0.1%	-0.1%	0.0%	-0.1%	3.2%	0.0%	0.4%	-1.0%
Knowledge Spine North	-0.1%	0.0%	0.1%	0.1%	0.3%	2.5%	0.3%	-0.5%
Knowledge Spine South	-0.1%	0.1%	0.1%	0.0%	0.5%	0.1%	3.7%	-0.5%
External	-0.2%	-0.2%	-0.2%	-0.1%	0.1%	-0.1%	0.2%	-

Table 5.8.8: Inter-Zonal commuting matrix, 2050 under the transformational: continued trends scenario

		Location of residence							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of work	City Centre	14,900	35,100	3,100	3,100	7,300	5,200	5,200	5,300
	City Fringe	5,500	80,900	6,300	5,800	13,800	8,300	13,800	13,700
	County East	300	2,900	36,600	700	1,900	1,800	5,600	14,800
	County North	300	1,600	800	48,500	4,100	3,700	2,200	11,500
	County West	100	2,700	800	2,000	57,200	1,100	4,100	7,900
	Knowledge Spine North	100	1,500	800	2,200	1,700	28,800	1,800	4,900
	Knowledge Spine South	200	5,600	2,100	600	4,500	900	39,300	4,800
	External	1,200	8,500	13,800	7,300	7,000	5,300	6,300	-

		Weighted % change 2018-50							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Weighted % change 2018-50	City Centre	1.0%	2.4%	0.3%	0.2%	1.0%	0.8%	0.9%	-0.3%
	City Fringe	0.5%	5.9%	0.7%	0.6%	1.8%	1.2%	2.1%	-0.1%
	County East	0.1%	0.1%	2.9%	0.2%	0.4%	0.4%	1.0%	-0.1%
	County North	0.1%	0.1%	0.2%	3.9%	0.7%	0.6%	0.6%	-0.3%
	County West	-0.1%	-0.1%	0.0%	-0.1%	4.6%	0.1%	0.6%	-1.0%
	Knowledge Spine North	-0.1%	0.0%	0.1%	0.1%	0.3%	3.3%	0.4%	-0.5%
	Knowledge Spine South	-0.1%	0.1%	0.1%	0.0%	0.6%	0.1%	4.9%	-0.5%
	External	-0.2%	-0.2%	-0.2%	-0.2%	0.1%	0.0%	0.3%	-

Source: Cambridge Econometrics

2050 – employment-led scenario

Table 5.8.9: Inter-Zonal commuting matrix, 2050 under the Standard Method (adjusted): employment-led scenario

		Location of residence							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of work	City Centre	13,400	32,600	2,600	2,600	5,500	3,600	3,400	5,300
	City Fringe	4,500	72,600	5,000	4,700	10,600	5,800	9,700	12,500
	County East	300	3,100	31,600	600	1,000	900	3,500	13,800
	County North	300	1,900	700	42,100	2,800	2,300	1,000	10,900
	County West	200	3,000	700	2,000	47,000	900	2,700	8,000
	Knowledge Spine North	300	1,900	900	2,200	1,300	23,100	1,100	5,000
	Knowledge Spine South	400	6,300	2,100	700	3,500	700	30,100	5,000
	External	1,500	9,000	14,000	7,500	6,700	5,100	5,100	-

		Weighted % change 2018-50							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Weighted % change 2018-50	City Centre	0.6%	1.7%	0.1%	0.1%	0.5%	0.3%	0.4%	-0.3%
	City Fringe	0.2%	3.6%	0.3%	0.3%	1.0%	0.6%	1.0%	-0.5%
	County East	0.1%	0.2%	1.5%	0.1%	0.2%	0.2%	0.5%	-0.4%
	County North	0.1%	0.1%	0.1%	2.1%	0.4%	0.2%	0.2%	-0.4%
	County West	-0.1%	0.0%	0.0%	-0.1%	1.8%	0.0%	0.2%	-0.9%
	Knowledge Spine North	0.0%	0.1%	0.1%	0.1%	0.2%	1.7%	0.2%	-0.5%
	Knowledge Spine South	0.0%	0.3%	0.1%	0.0%	0.3%	0.1%	2.3%	-0.5%
	External	-0.2%	-0.1%	-0.1%	-0.1%	0.0%	-0.1%	0.0%	-

Table 5.8.10: Inter-Zonal commuting matrix, 2050 under the business as usual: employment-led scenario

		Location of residence							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of work	City Centre	14,100	35,100	2,700	2,700	5,600	3,600	3,400	5,300
	City Fringe	4,900	79,200	5,500	5,100	11,300	6,200	10,400	12,900
	County East	400	3,500	34,400	700	1,100	1,000	3,900	14,400
	County North	400	2,100	800	45,400	3,100	2,600	1,100	11,200
	County West	400	3,500	900	2,100	50,400	1,000	3,100	8,200
	Knowledge Spine North	300	2,200	1,000	2,500	1,300	24,800	1,200	5,100
	Knowledge Spine South	400	7,300	2,400	700	3,800	800	32,600	5,000
	External	1,500	9,200	14,100	7,600	6,700	5,100	5,000	-

		Weighted % change 2018-50							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Wei	City Centre	0.8%	2.4%	0.2%	0.1%	0.6%	0.3%	0.4%	-0.3%

	City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
City Fringe	0.3%	5.5%	0.5%	0.4%	1.2%	0.7%	1.2%	-0.4%
County East	0.1%	0.3%	2.3%	0.2%	0.2%	0.2%	0.6%	-0.2%
County North	0.1%	0.2%	0.2%	3.0%	0.4%	0.3%	0.3%	-0.4%
County West	-0.1%	0.1%	0.0%	-0.1%	2.8%	0.1%	0.3%	-0.9%
Knowledge Spine North	0.0%	0.2%	0.1%	0.2%	0.2%	2.1%	0.2%	-0.5%
Knowledge Spine South	0.0%	0.6%	0.2%	0.0%	0.4%	0.1%	3.0%	-0.5%
External	-0.2%	-0.1%	-0.1%	-0.1%	0.0%	-0.1%	0.0%	-

Table 5.8.11: Inter-Zonal commuting matrix, 2050 under the transformational: employment-led scenario

		Location of residence							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of work	City Centre	15,500	39,200	3,000	2,900	5,900	3,900	3,600	5,300
	City Fringe	5,300	88,000	6,000	5,500	12,100	6,700	11,300	13,300
	County East	500	4,400	37,600	800	1,200	1,100	4,300	14,900
	County North	500	2,800	900	49,400	3,300	3,000	1,300	11,600
	County West	400	4,400	1,000	2,500	54,500	1,100	3,500	8,200
	Knowledge Spine North	400	2,800	1,000	2,800	1,400	26,800	1,300	5,100
	Knowledge Spine South	400	8,500	2,800	800	4,100	900	35,400	5,100
	External	1,500	9,200	14,500	7,600	6,600	5,100	4,900	-
		Weighted % change 2018-50							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Weighted % change 2018-50	City Centre	1.2%	3.6%	0.2%	0.2%	0.6%	0.4%	0.5%	-0.3%
	City Fringe	0.4%	7.9%	0.6%	0.5%	1.4%	0.8%	1.4%	-0.2%
	County East	0.1%	0.6%	3.2%	0.2%	0.2%	0.2%	0.7%	-0.1%
	County North	0.1%	0.4%	0.2%	4.1%	0.5%	0.4%	0.3%	-0.2%
	County West	-0.1%	0.4%	0.1%	0.1%	3.9%	0.1%	0.4%	-0.9%
	Knowledge Spine North	0.0%	0.3%	0.1%	0.3%	0.2%	2.7%	0.2%	-0.5%
	Knowledge Spine South	0.0%	0.9%	0.3%	0.1%	0.5%	0.1%	3.8%	-0.4%
	External	-0.2%	-0.1%	0.0%	-0.1%	0.0%	-0.1%	-0.1%	-

Source: Cambridge Econometrics

2050 – County-focussed scenario

Table 5.8.12: Inter-Zonal commuting matrix, 2050 under the Standard Method (adjusted): County-focussed scenario

		Location of residence							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of	City Centre	13,200	31,000	3,000	3,100	6,100	3,700	3,500	5,400
	City Fringe	4,500	69,900	5,500	5,200	11,400	6,000	10,000	12,700
	County East	200	2,700	32,300	600	1,100	900	3,400	13,800

	City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
County North	200	1,500	700	42,900	3,000	2,200	800	10,700
County West	100	2,500	700	2,000	48,300	700	2,500	7,900
Knowledge Spine North	200	1,500	900	2,400	1,600	23,000	1,100	5,000
Knowledge Spine South	300	5,300	2,300	800	4,000	800	30,200	5,000
External	1,400	8,700	14,200	7,600	6,900	5,100	5,000	-

	Weighted % change 2018-50							
	City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
City Centre	0.6%	1.3%	0.2%	0.2%	0.7%	0.4%	0.4%	-0.3%
City Fringe	0.2%	2.9%	0.5%	0.4%	1.2%	0.6%	1.1%	-0.4%
County East	0.0%	0.1%	1.7%	0.1%	0.2%	0.2%	0.4%	-0.4%
County North	0.0%	0.0%	0.1%	2.3%	0.4%	0.2%	0.2%	-0.5%
County West	-0.1%	-0.2%	0.0%	-0.1%	2.2%	0.0%	0.1%	-1.0%
Knowledge Spine North	0.0%	0.0%	0.1%	0.2%	0.3%	1.7%	0.2%	-0.5%
Knowledge Spine South	-0.1%	0.0%	0.1%	0.1%	0.5%	0.1%	2.4%	-0.5%
External	-0.2%	-0.2%	-0.1%	-0.1%	0.1%	-0.1%	0.0%	-

Table 5.8.13: Inter-Zonal commuting matrix, 2050 under the business as usual: County-focussed scenario

		Location of residence							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of work	City Centre	13,800	32,400	3,300	3,400	6,600	3,900	3,700	5,300
	City Fringe	5,000	74,800	6,300	6,000	12,600	6,600	10,900	13,200
	County East	300	2,800	35,400	800	1,400	1,000	3,800	14,100
	County North	200	1,500	800	46,800	3,400	2,400	900	10,900
	County West	100	2,600	800	2,200	52,600	800	2,700	8,000
	Knowledge Spine North	200	1,500	1,100	2,900	1,800	24,700	1,200	5,000
	Knowledge Spine South	400	5,700	2,800	900	4,600	800	32,700	5,000
	External	1,300	8,600	14,700	7,600	7,000	5,000	4,900	-

		Weighted % change 2018-50							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Weighted % change 2018-50	City Centre	0.7%	1.7%	0.3%	0.3%	0.8%	0.4%	0.5%	-0.3%
	City Fringe	0.3%	4.2%	0.7%	0.7%	1.5%	0.8%	1.3%	-0.3%
	County East	0.1%	0.1%	2.6%	0.2%	0.3%	0.2%	0.6%	-0.3%
	County North	0.0%	0.0%	0.2%	3.4%	0.5%	0.3%	0.2%	-0.4%
	County West	-0.1%	-0.1%	0.0%	0.0%	3.4%	0.0%	0.2%	-0.9%
	Knowledge Spine North	0.0%	0.0%	0.2%	0.3%	0.4%	2.1%	0.2%	-0.5%
	Knowledge Spine South	0.0%	0.1%	0.3%	0.1%	0.6%	0.1%	3.1%	-0.5%
	External	-0.2%	-0.2%	0.1%	-0.1%	0.1%	-0.1%	-0.1%	-

Table 5.8.14: Inter-Zonal commuting matrix, 2050 under the transformational: County-focussed scenario

		Location of residence							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of work	City Centre	14,900	35,000	4,000	4,100	7,500	4,300	4,100	5,300
	City Fringe	5,500	81,000	7,300	7,000	14,200	7,300	12,000	13,800
	County East	300	2,800	39,300	900	1,800	1,000	4,100	14,600
	County North	200	1,500	900	51,700	3,900	2,600	900	11,100
	County West	100	2,600	900	2,600	58,100	900	2,900	8,000
	Knowledge Spine North	200	1,500	1,400	3,400	2,200	26,800	1,300	5,000
	Knowledge Spine South	400	6,100	3,400	1,100	5,300	900	35,600	5,100
	External	1,200	8,400	15,400	7,600	7,200	4,900	4,700	-

		Weighted % change 2018-50							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Weighted % change 2018-50	City Centre	1.0%	2.4%	0.5%	0.5%	1.1%	0.5%	0.6%	-0.3%
	City Fringe	0.5%	6.0%	1.0%	0.9%	2.0%	1.0%	1.6%	-0.1%
	County East	0.1%	0.1%	3.7%	0.2%	0.4%	0.2%	0.6%	-0.1%
	County North	0.0%	0.0%	0.2%	4.8%	0.7%	0.3%	0.2%	-0.4%
	County West	-0.1%	-0.1%	0.0%	0.1%	4.9%	0.0%	0.2%	-0.9%
	Knowledge Spine North	0.0%	0.0%	0.2%	0.4%	0.5%	2.7%	0.2%	-0.5%
	Knowledge Spine South	0.0%	0.2%	0.4%	0.1%	0.8%	0.1%	3.9%	-0.4%
	External	-0.2%	-0.3%	0.3%	-0.1%	0.1%	-0.1%	-0.1%	-

Source: Cambridge Econometrics

2050 – centralised scenario

Table 5.8.15: Inter-Zonal commuting matrix, 2050 under the Standard Method (adjusted): centralised scenario

		Location of residence							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of work	City Centre	13,400	32,700	2,400	2,400	5,300	3,900	3,800	5,300
	City Fringe	4,500	72,600	4,600	4,300	10,300	6,100	10,400	12,500
	County East	400	3,100	30,800	600	1,100	1,100	4,000	13,900
	County North	400	1,900	600	41,100	2,800	2,800	1,400	11,000
	County West	300	3,000	700	1,900	46,300	1,000	3,300	8,100
	Knowledge Spine North	200	1,800	700	1,900	1,000	23,800	1,300	5,000
	Knowledge Spine South	300	6,100	1,900	500	3,100	800	31,500	4,900
	External	1,500	9,000	13,800	7,400	6,600	5,100	5,700	-

		Weighted % change 2018-50							

		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Weighted % change 2018-50	City Centre	0.6%	1.8%	0.1%	0.1%	0.5%	0.4%	0.5%	-0.3%
	City Fringe	0.2%	3.6%	0.2%	0.2%	0.9%	0.6%	1.2%	-0.5%
	County East	0.1%	0.2%	1.3%	0.1%	0.2%	0.2%	0.6%	-0.3%
	County North	0.1%	0.1%	0.1%	1.8%	0.4%	0.4%	0.4%	-0.4%
	County West	-0.1%	0.0%	0.0%	-0.1%	1.6%	0.1%	0.3%	-0.9%
	Knowledge Spine North	0.0%	0.1%	0.1%	0.0%	0.1%	1.9%	0.2%	-0.5%
	Knowledge Spine South	-0.1%	0.2%	0.0%	0.0%	0.2%	0.1%	2.7%	-0.5%
	External	-0.2%	-0.1%	-0.2%	-0.1%	0.0%	-0.1%	0.2%	-

Table 5.8.16: Inter-Zonal commuting matrix, 2050 under the business as usual: centralised scenario

		Location of residence							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of work	City Centre	14,100	35,100	2,300	2,300	5,200	4,100	4,100	5,200
	City Fringe	4,900	79,200	4,900	4,500	10,800	6,800	11,600	12,800
	County East	500	3,700	32,900	600	1,100	1,400	4,800	14,400
	County North	500	2,400	700	43,700	2,900	3,300	1,900	11,400
	County West	400	3,700	800	2,000	49,200	1,300	4,000	8,100
	Knowledge Spine North	300	2,000	700	1,900	1,000	26,000	1,500	5,000
	Knowledge Spine South	300	6,900	1,900	500	3,100	800	34,900	4,800
	External	1,500	9,100	13,700	7,300	6,500	5,200	6,000	-

		Weighted % change 2018-50							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Weighted % change 2018-50	City Centre	0.8%	2.4%	0.1%	0.0%	0.4%	0.5%	0.6%	-0.4%
	City Fringe	0.3%	5.5%	0.3%	0.2%	1.0%	0.8%	1.5%	-0.4%
	County East	0.1%	0.4%	1.9%	0.1%	0.2%	0.3%	0.8%	-0.2%
	County North	0.1%	0.3%	0.1%	2.6%	0.4%	0.5%	0.5%	-0.3%
	County West	-0.1%	0.2%	0.0%	-0.1%	2.4%	0.1%	0.5%	-0.9%
	Knowledge Spine North	0.0%	0.1%	0.1%	0.0%	0.1%	2.5%	0.3%	-0.5%
	Knowledge Spine South	-0.1%	0.5%	0.0%	0.0%	0.2%	0.1%	3.7%	-0.5%
	External	-0.2%	-0.1%	-0.2%	-0.2%	-0.1%	0.0%	0.2%	-

Table 5.8.17: Inter-Zonal commuting matrix, 2050 under the transformational: centralised scenario

		Location of residence							
		City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
Location of	City Centre	15,500	39,200	2,400	2,300	5,300	4,700	4,700	5,200
	City Fringe	5,300	88,000	5,100	4,600	11,200	7,600	13,100	13,100
	County East	500	4,600	35,300	600	1,100	1,900	5,700	15,000

Source: Cambridge Econometrics

	City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
County North	500	3,200	800	46,700	3,100	4,000	2,500	11,800
County West	500	4,700	800	2,100	52,500	1,800	4,900	8,300
Knowledge Spine North	300	2,500	700	1,800	1,000	28,800	1,800	4,900
Knowledge Spine South	300	7,900	1,900	400	3,000	800	39,200	4,800
External	1,400	9,200	13,700	7,200	6,400	5,300	6,400	-

Weighted % change 2018-50								
	City Centre	City Fringe	County East	County North	County West	Knowledge Spine North	Knowledge Spine South	External
City Centre	1.2%	3.6%	0.1%	0.0%	0.5%	0.6%	0.8%	-0.4%
City Fringe	0.4%	7.9%	0.4%	0.3%	1.1%	1.0%	1.9%	-0.3%
County East	0.1%	0.6%	2.6%	0.1%	0.2%	0.4%	1.1%	0.0%
County North	0.1%	0.5%	0.2%	3.4%	0.4%	0.7%	0.7%	-0.2%
County West	0.0%	0.4%	0.0%	-0.1%	3.3%	0.3%	0.8%	-0.9%
Knowledge Spine North	0.0%	0.2%	0.1%	0.0%	0.1%	3.3%	0.4%	-0.5%
Knowledge Spine South	-0.1%	0.7%	0.0%	-0.1%	0.2%	0.1%	4.9%	-0.5%
External	-0.2%	-0.1%	-0.2%	-0.2%	-0.1%	0.0%	0.4%	-

Weighted % change 2018-50 (left-axis label)

Appendix B: Local Plan Forecast Completions

Table 5.8.1 below shows forecast net completions by built up area (BUA's) in Oxfordshire over the 2020-31 period, derived from local authorities Local Plans. Note that these estimates were sourced directly from the respective Oxfordshire local authorities, who input to a proforma coordinated by Iceni Projects during the development of this report. These forecasts have been used to inform Zonal distributions of housing need, as explored in *Chapter 4*.

Table 5.8.1: Forecast net completions from Oxfordshire local authority Local Plans, 2020-31

Local Plan	Built up Area (BUA)/locality	Forecast net completions - current pipeline										
		2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Oxford City	Oxford City	777	544	689	627	851	1191	1252	759	766	490	574
Cherwell	Banbury BUA	498	615	925	749	538	367	337	342	278	142	117
	Bicester BUA	681	529	550	485	577	613	540	481	479	479	379
	Former RAF Upper Heyford	150	130	150	150	150	150	150	150	150	150	150
	CDC Partial Review Sites (Kidlington, Begbroke, Gosford and Water Eaton and Yarnton)	0	105	255	475	505	540	590	575	515	485	355
	Other Cherwell (e.g. Rural)	261	292	452	606	535	570	620	605	545	515	385
West Oxfordshire	Carterton BUA	164	176	276	245	178	178	78	32	13	13	13
	Witney BUA	351	405	383	336	290	315	265	215	215	190	115
	Eynsham SDA/ Cotswold Garden Village	80	80	77	370	370	370	370	370	370	370	295
	Other West (e.g. Rural)	770	582	624	293	348	298	298	273	236	48	0
Vale of White Horse	Abingdon BUA	55	205	168	193	193	178	150	100	0	0	0
	Faringdon BUA	105	145	92	89	89	64	46	46	46	46	4
	Wantage & Grove BUA	521	497	410	325	398	398	311	242	220	220	320
	Botley (adjoins Oxford)	137	0	0	0	0	0	0	0	0	0	0
South Oxfordshire	Didcot BUA	505	582	579	635	882	982	971	632	577	562	279
	Henley-on-Thames BUA	55	32	0	0	134	78	0	0	0	0	0
	Thame BUA	73	70	10	0	60	60	15	0	0	0	0
	Wallingford BUA	180	387	310	127	199	186	172	55	0	0	0
	Other South and Vale Rural	1251	1351	1159	988	919	765	853	1451	2031	2016	1966

Source: Oxford City Council, Cherwell District Council, West Oxfordshire District Council, Vale of White Horse District Council, South Oxfordshire District Council.