East Lindsey

Demographic Forecasts Updating the Evidence

October 2016

For the attention of:
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Acknowledgements

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Introduction

Context & Requirements

1.1   East Lindsey District Council has commissioned Edge Analytics to provide updated demographic for its new Strategic Housing Market Assessment (SHMA). Original evidence was provided in 2013 to support East Lindsey's draft Core Strategy, with an update in 2015 following the release of new demographic evidence.

1.2   Since the 2015 East Lindsey demographic analysis was completed, a number of new datasets have been published. In May 2016, the Office for National Statistics (ONS) 2014-based Sub-National Population Projection (SNPP) was released, followed by the 2014-based Department for Communities and Local Government (DCLG) household projections in July 2016. Also available are two years of mid-year population statistics (2014 and 2015) for East Lindsey district[1], providing an updated historical time frame from which to draw trend-based assumptions.

1.3   To support the SHMA update, the Council has requested a range of demographic scenarios for East Lindsey and its 'Wet' and 'Dry' sub-district planning geographies, using the latest demographic statistics available. The 'Wet' area represents the flood hazard zone (yellow, orange and red areas in Appendix A) with the remainder being the low hazard, 'Dry' area of the district (green areas in Appendix A). This is consistent with the previous reports. Scenario forecasts are required for the East Lindsey plan period, 2016–2031.

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[1] Sub-district populations are only available to 2014 but the analysis will seek to make assumptions at a sub-district level to ensure consistency with the 2015 mid-year figure for East Lindsey district.

Approach

Official Guidelines

1.4   The development and presentation of demographic evidence to support local housing plans is subject to an increasing degree of public scrutiny. The NPPF and PPG provide guidance on the appropriate approach to the objective assessment of housing need. Guidance is also provided by the Planning Advisory Service (PAS)[2], with practical advice on assessing the housing needs and establishing housing targets for an area.

1.5   In the objective assessment of need, demographic evidence is a key input. The PPG states that the DCLG household projections should provide the *"starting point estimate of overall housing need"* (PPG paragraph 2a-015). Local circumstances, alternative assumptions and the most recent demographic evidence, including ONS population estimates, should also be considered (PPG paragraph 2a-017). Evidence that links demographic change to forecasts of economic growth should also be assessed (PPG paragraph 2a-018).

1.6   The choice of assumptions used for demographic forecasting has an important impact on scenario outcomes. This is particularly the case when trend projections are considered alongside jobs forecasts. The scrutiny of demographic assumptions is now a critical component of the public inspection process, providing much of the debate around the appropriateness of a particular objective assessment of housing need.

Edge Analytics' Approach

1.7   In accordance with the PPG, Edge Analytics has used POPGROUP (v.4) technology to develop a range of growth scenarios. In each of the scenarios, historical data is included for the 2001–2015 period, with scenario results presented for East Lindsey's designated plan period, 2016–2031.

1.8   The scenario analysis is prefaced with a 'demographic profile' of East Lindsey, illustrating its geographical context, its 'components' of population change (births, deaths, and migration) and its historical commuting and migration patterns. A sub-district perspective is included to illustrate how demographic change has varied for the 'Wet' and 'Dry' planning areas since 2001.

1.9   The starting point of the scenario analysis is the 2014-based SNPP and sub-national household

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[2] http://www.pas.gov.uk/documents/332612/6549918/OANupdatedadvicenote/f1bfb748-11fc-4d93-834c-a32c0d2c984d

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projection for East Lindsey. A number of alternative trend scenarios, using varying migration assumptions, have been developed and are compared to the 2014-based benchmark scenario. Additionally, the 2012-based SNPP scenario is presented for comparison.

1.10   Household and dwelling growth have been estimated using assumptions from the 2014-based DCLG household projection model for East Lindsey. Additionally, dwelling-led scenarios have been developed to evaluate the impact of a continuation of historical housing growth in East Lindsey. A comparison of household and dwelling growth implied by the earlier 2008-based and 2012-based DCLG household projection models is also included.

1.11   The analysis considers the effect of the changing population age structure on East Lindsey's labour force, linking the demographic scenarios to an estimated jobs growth requirement using assumptions on economic activity rates, unemployment and commuting.

1.12   A concluding section summarises the new scenario evidence, with the Appendix to this document providing a summary of the POPGROUP methodology and further detail on key data and assumptions used in the development of the forecasts.

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2 Area Profile

Geography

2.1 The focus of the demographic analysis and forecasts presented in this report is the local authority district area of East Lindsey (Figure 1). Given its position on the east coast of England, the district has a significant flood risk associated with its geography.
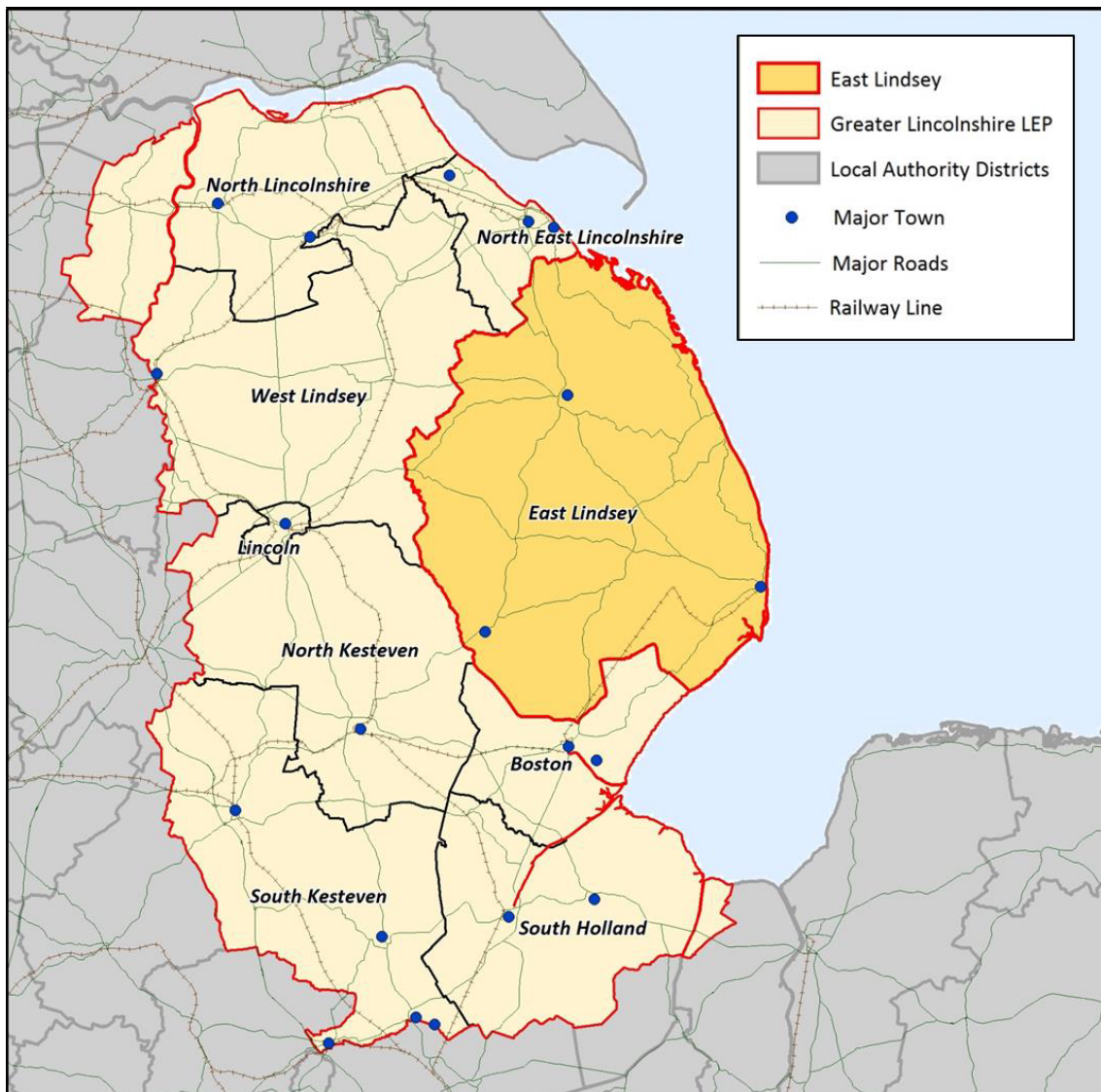

Figure 1: East Lindsey geographical definition

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2.2   The Environment Agency has developed detailed digital map overlays defining the extent of East Lindsey's flood hazard zones (Appendix A). With the exclusion of the lowest hazard (green) areas, the definition of the flood hazard zone is summarised in Figure 2 (a). It should be noted that the district boundary data used in Figure 2 (a) illustrates the 'extent of the realm' boundary, which extends to the mean low water/tide mark, encompassing coastal mud flats to the east of the flood hazard area.
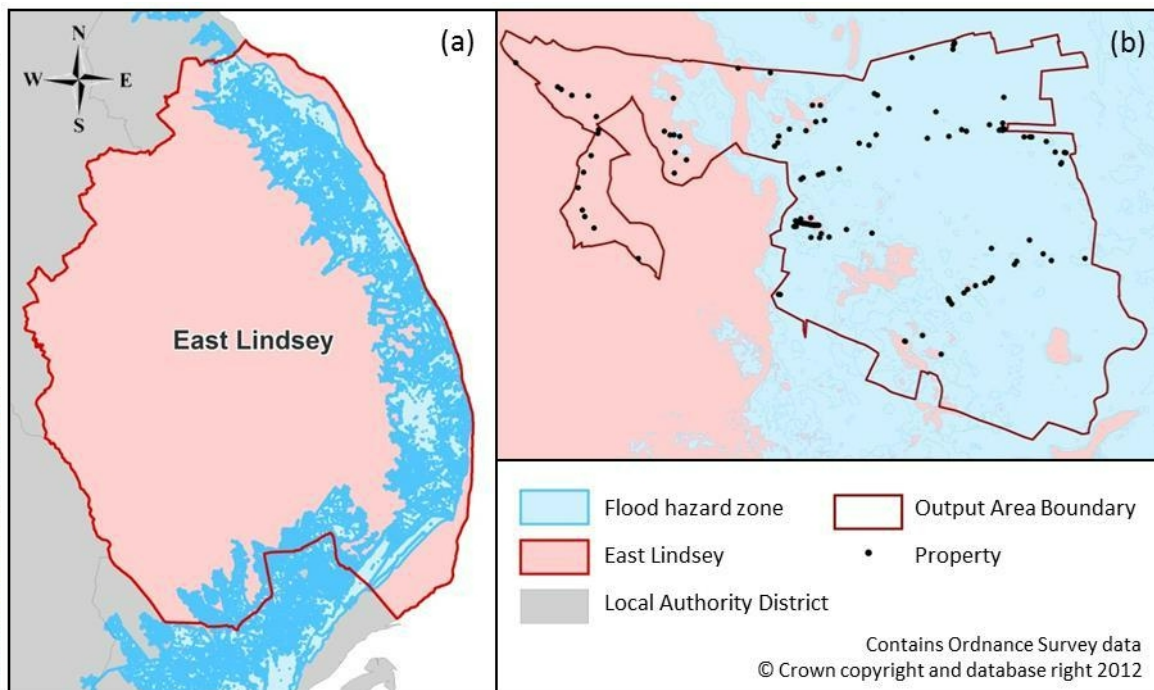

Figure 2: Flood hazard zone, output area boundaries and property points

2.3   In the analysis presented in this report, the area covered by the flood hazard zone has been labelled 'Wet', with the area outside of the flood hazard zone referred to as 'Dry'. These Wet and Dry zones provide the basis of the sub-district forecasting analysis presented here.

2.4   To enable demographic analysis of the sub-district geographies, it has been necessary to identify the precise geographical coverage of each of the Wet and Dry areas. This has been achieved using a combination of Census Output Area geography and property data from the National Land and Property Gazetteer (NLPG).

2.5   Output Areas (OAs) are the smallest geographical unit to which Census data are published. They nest directly into the administrative boundary of the district. East Lindsey contains 487 OAs, as defined by 2011 Census output.

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2.6   In defining Wet and Dry areas, only properties which are classified by the NLPG as being 'residential' (including dwellings and residential institutions) have been considered and each has been identified as being within or outside of the defined flood hazard zone.

2.7   The extent to which each individual OA is defined as Wet or Dry has been calculated on the basis of the number of properties which fall inside or outside of the flood hazard zone. This has been illustrated in Figure 2(b). In the example (OA 'UCHE0001') there are 150 property points contained within the NLPG, of which 85 are within the flood hazard zone and 65 outside. As a result, this OA is considered to have a Wet proportion of 0.57 and a Dry proportion of 0.43. This calculation has been repeated for all 487 OAs in the study area, providing the definition of Wet and Dry coverage across the district.

2.8   The resultant OA definition has been used as the basis for generating the historical demographic statistics, used to develop the sub-district forecasts presented within this report. The defined Wet area is home to 31% of East Lindsey's total population, whilst the Dry area accommodates 69% of the district's total population (Figure 3).
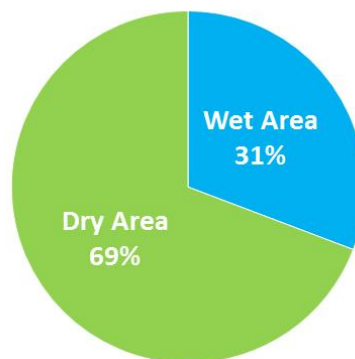

East Lindsey: 2014 Population

Figure 3: East Lindsey sub-districts' share of population in 2014 (Source: ONS)

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Population Growth Profile

2.9   The latest 2015 mid-year population estimate (MYE) for East Lindsey suggests a population of 137,887, a 5.5% increase since 2001. This rate of growth is substantially lower than the regional and England averages of 13.7% and 10.8% respectively (Table 1).

Table 1: East Lindsey population change comparison (source: ONS)

Area	Population			
	2001	2015	Change	% Change
East Lindsey	130,654	137,887	7,233	5.5%
Lincolnshire	647,640	736,665	89,025	13.7%
England	49,449,746	54,786,327	5,336,581	10.8%

2.10   Between Censuses, MYEs are derived by applying 'components of change' (i.e. counts of births and deaths and estimates of internal and international migration) to the previous year's MYE.

2.11   The MYEs from 2002–2010 were 'rebased' to align with the 2011 Census, ensuring the correct transition of the age profile of the population over the 2001–2011 decade. At the 2011 Census, East Lindsey's resident population was 136,401, a 4.6% increase from 2001. The 2011 Census population count proved to be *lower* than that suggested by the trajectory of growth from the previous MYEs. As a result, the revised, final MYEs are *lower* than the previous MYEs (Figure 4).
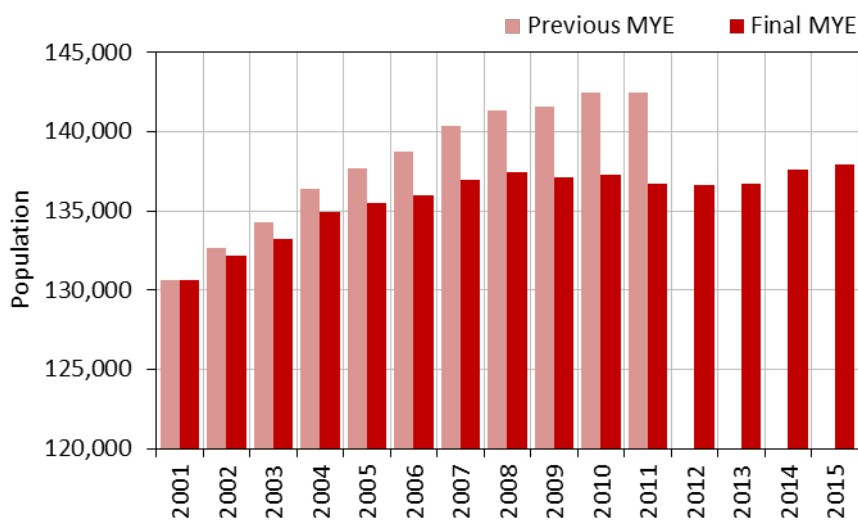

Figure 4: East Lindsey mid-year population estimates, 2001–2015

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2.12 The rebasing of the MYEs involved the recalibration of the components of change for 2001/02–2010/11. After methodological changes and errors in the components were accounted for, the remaining difference between the expected 2011 mid-year estimate and the 2011 Census-based mid-year estimate is referred to as 'unattributable population change' (UPC). The ONS has not attributed UPC to any one component-of-change, however, suggesting that it may be due to the Census estimates themselves, international migration estimation or internal migration counts.

2.13 In East Lindsey's case, the impact of the UPC component was a reduction to each mid-year population estimate, averaging -626 per year to 2011 (Figure 5).
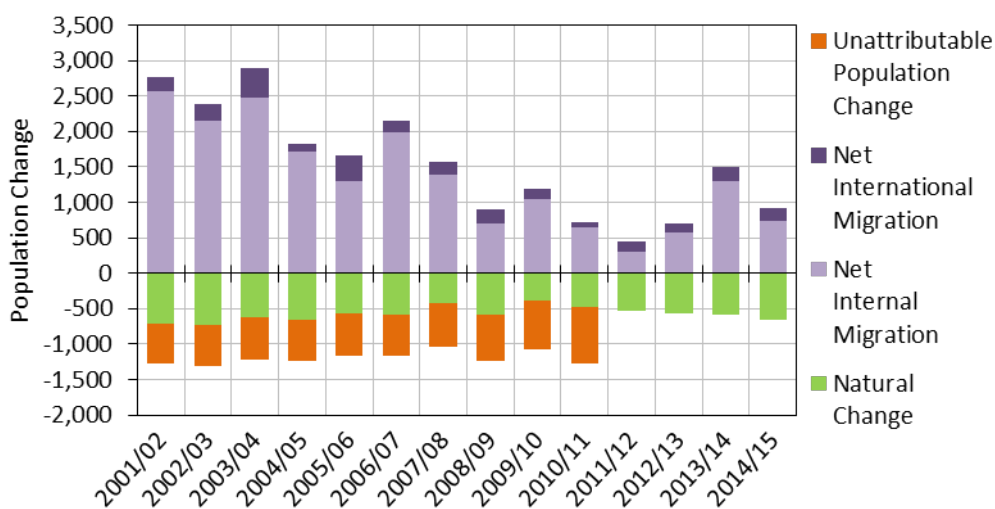

Figure 5: Mid-Year Population Estimates (Source: ONS)

2.14 Between Censuses, births and deaths are accurately recorded in vital statistics registers and provide a robust measure of 'natural change' (the difference between births and deaths) in a geographical area. Given that births and deaths are robustly recorded, and assuming that the 2001 Census provided a robust population count, the 'error' in the historical MYEs was most likely due to the difficulties associated with the estimation of migration.

2.15 Internal migration (i.e. migration flows to and from other areas in the UK) is adequately measured using data from the Patient Register (PR), the National Health Service Central Register (NHSCR) and Higher Education Statistics Agency (HESA), although data robustness may be lower where there is under-registration in certain age-groups (young males in particular).

2.16 It is most likely that the UPC component is associated with the mis-estimation of international migration, i.e. the balance between immigration and emigration flows to and from East Lindsey.

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Based on this assumption, a fourteen–year profile of the 'components of change' is presented for East Lindsey (Figure 5).
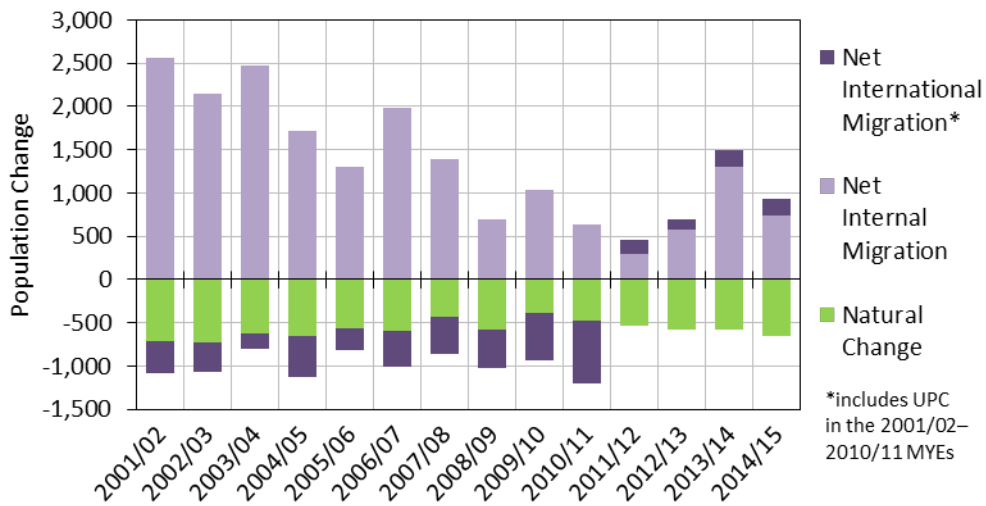

Figure 6: East Lindsey components of population change 2001/02 to 2014/15 including UPC in the 2001/02 to 2010/11 international migration component (source: ONS)

2.17   East Lindsey's population change since 2001/02 has been driven by a combination of natural change, internal and international migration. Natural change, the difference between births and deaths only, has historically resulted in a population decline (an excess of deaths over births) a reflection of East Lindsey's relatively old age profile.

2.18   Internal migration (i.e. the exchange of migrants between East Lindsey and other parts of the UK) has had the most significant impact on population growth, but with a significant fall in net migration in 2011/12. International migration is estimated to have had a negative impact on East Lindsey's population growth in the earlier part of the historical period, but with a small positive impact on the years following the 2011 Census.

Age-Structure

2.19   When considering future housing needs and the size and shape of the resident labour force, the age structure of East Lindsey's population is a key factor. Figure 7 compares East Lindsey's age profile to its region and England in total, using the 2014 base year of the latest ONS sub-national projections.

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2014

Males   Females

Indicator	East Lindsey	Lincolnshire	England
Aged 65+	28%	22%	18%
Aged 80+	7%	6%	5%
OAD Ratio	49	36	27
Median age	50	45	40

OAD = Old Age Dependency Ratio
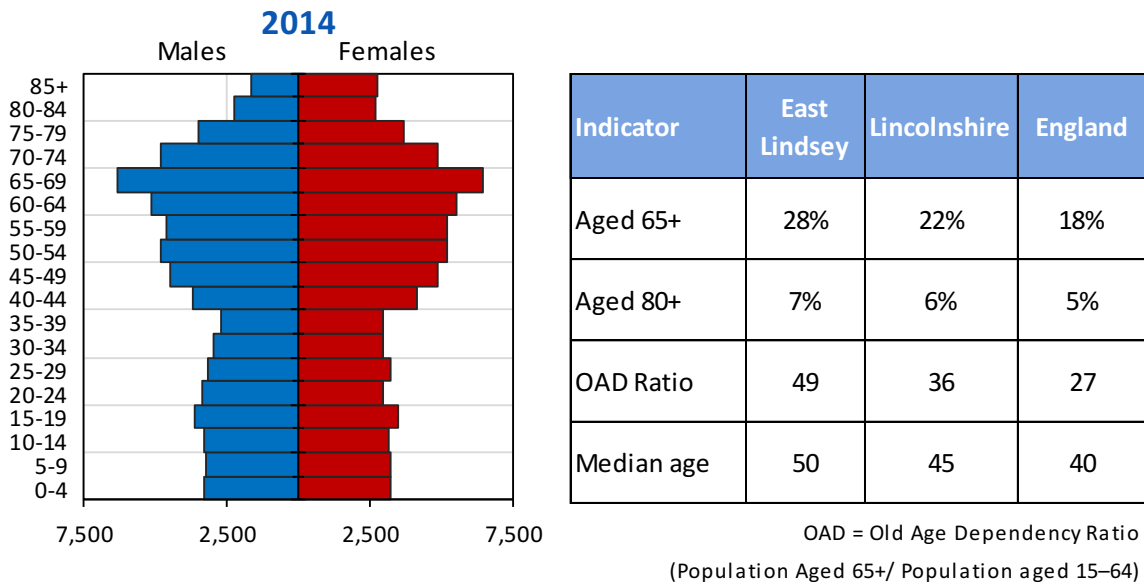(Population Aged 65+/ Population aged 15–64)

Figure 7: East Lindsey, population age structure (source: ONS)

2.20   Lincolnshire and East Lindsey in total have a substantially older age profile than England, with 22% and 28% respectively, in the 65+ age-range, and a median age of 45–50. East Lindsey has an Old Age Dependency ratio of 49, compared to a national average for England of 27. This means that the 65+ population of East Lindsey is equivalent to 49% of the 15–64 age-group population, compared to just 27% across England in aggregate.

Internal Migration

2.21   Internal migration statistics measure the in-flows and out-flows of population to and from East Lindsey, from and to elsewhere in the UK. The average annual growth of East Lindsey's population as a result of internal migration exchanges has been approximately +1,348 per year since 2001/02 (Figure 8). This illustration reflects the 'components-of-change' profile but also presents the separate in-migration and out-migration flows that make up the net total. During the 2001/02–2014/15 time period, internal in-migration averaged 7,728 per year, with internal out-migration averaging 6,380 people per year. Whilst out-migration has remained relatively stable during the last fifteen years, it was a sharp fall in the level of in-migration to East Lindsey that led to the drop in the net migration effect in 2007/08 and 2008/09. In 2013/14, the in-migration rose sharply and net migration has remained at a relatively high level compared to its 2011 low point.
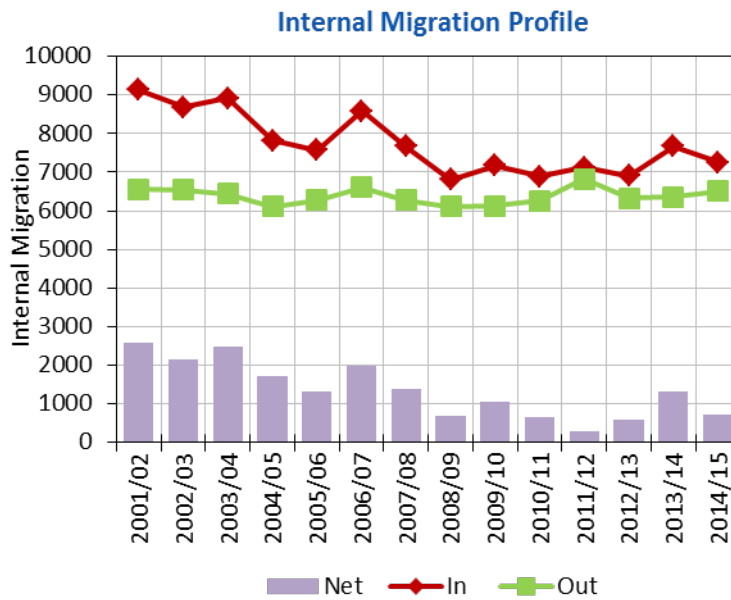
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Figure 8: East Lindsey internal migration profile, 2001/02–2014/15 (source: ONS)

2.22   In terms of migration linkages between East Lindsey and surrounding areas, the largest *positive* net exchanges (i.e. a higher inflow than outflow) have been with Nottingham, Sheffield and Leicester (Figure 9). For the net *outflow* exchange, the dominant flows have been to Lincoln, North Kesteven and West Lindsey (Figure 9).
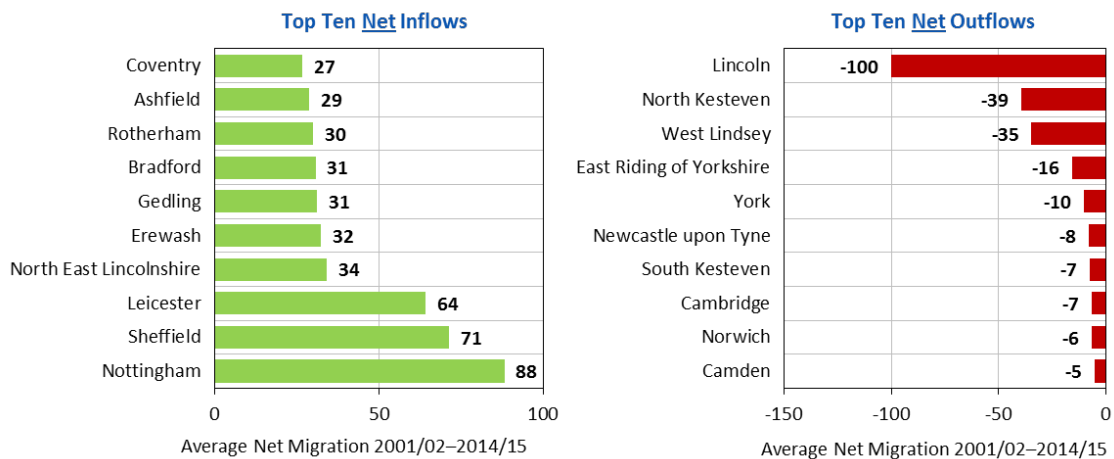
Figure 9: Top-10 internal migration net inflows & outflows, average 2001/02–2014/15 (source: ONS)

2.23   The 14-year age profile of migration reveals that East Lindsey has generally experienced a net inflow in all age-groups with the exception of the younger 15–19, 20–24 and 25–29 year-old age groups and the older 75+ age group (Figure 10). The large net outflow at age 15–19 will be associated with student moves to higher education at the age of 18.

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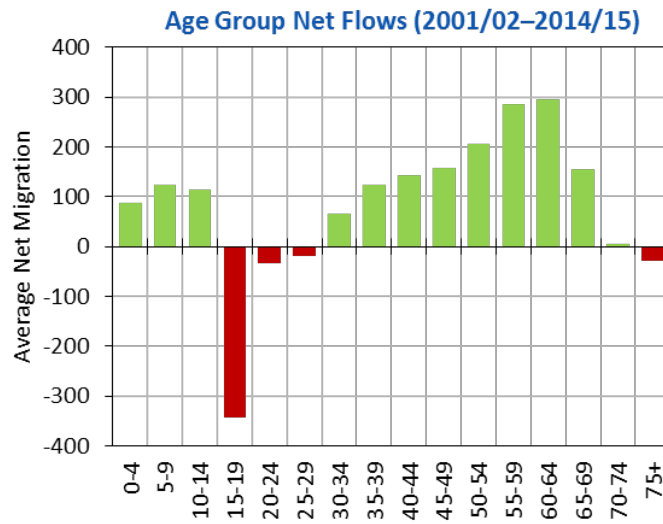
Figure 10: East Lindsey internal migration age profile, 2001/02–2013/14 (source: ONS)

International Migration

2.24   National Insurance Number (NINo) registrations provide an indication of the number of foreign nationals that have registered to work in East Lindsey since 2002 (Figure 11).
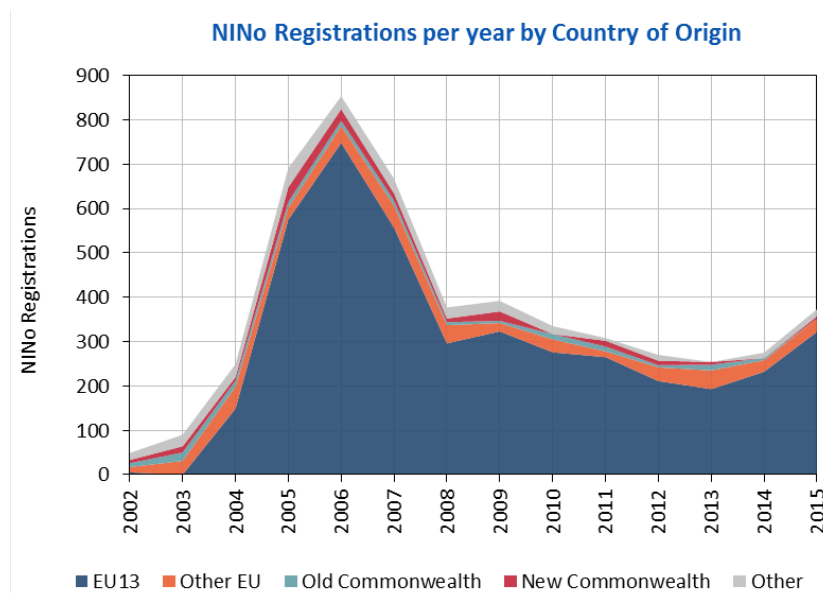
EU13 refers to countries that joined the European Union in 2004. Other EU refers to all other European Union countries

Figure 11: NINo Registrations in East Lindsey, 2002–2015 (Source: DWP)

2.25   These data do not align especially well with ONS components of change as they are a record of immigration only (there are no associated de-registration statistics); they only include those registering for work (excluding dependents) and do not provide any evidence on the 'length-of-

stay' of each migrant. However, they do provide a useful picture of the likely trend in immigration and an indication of the country-of-origin of migrants locating themselves in East Lindsey.

2.26   The large majority of East Lindsey's NINo-registrations have been associated with European migrants, particularly from the countries that have joined the EU since 2004. 2013 was a low-point for EU13 registrations, but numbers have increased since with higher totals associated with Romanian migrant workers.

Commuting Flows

2.27   With regards to travel-to-work patterns, the 2011 Census recorded 56,311 workers aged 16–74 living within East Lindsey (Table 2) and 51,754 workers aged 16–74 working within East Lindsey (Table 3).

Table 2: East Lindsey 2011 Census commuting flows: workers (ages 16–74)

Where do people who live in East Lindsey work?			Source: ONS
Live	Work	Number	%
East Lindsey	East Lindsey	43,370	77.0%
	North East Lincolnshire	3,319	5.9%
	Boston	3,255	5.8%
	Other	6,367	11.3%
	Workers	56,311	100.0%

Table 3: East Lindsey 2011 Census commuting flows: employment (ages 16–74)

Where do people who work in East Lindsey live?			Source: ONS
Live	Work	Number	%
East Lindsey	East Lindsey	43,370	83.8%
Boston		1,421	2.7%
North Kesteven		1,395	2.7%
Other		5,568	10.8%
	Jobs	51,754	100.0%

2.28   Approximately 77.0% of East Lindsey's labour force both lives and works within the district, with 5.9% commuting out to neighbouring North East Lincolnshire, 5.8% to Boston and the remaining 11.3% commuting elsewhere (Table 2). In terms of employment, the majority of East Lindsey's jobs are taken up by the local workforce (83.8%), with 2.7% of workers commuting from both

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Boston and North Kesteven, and a further 10.8% from elsewhere (Table 3).

2.29 The balance between the number of workers and jobs in East Lindsey changed over the 2001–2011 Census decade; with a smaller increase in the number of resident workers (+2,869) compared to jobs (+5,528) (Table 4). In 2011, East Lindsey had net outward commuting ratio of 1.09, compared to a higher net outward commuting ratio of 1.16 in 2001.

Table 4: East Lindsey Census travel-to-work commuting ratios, ages 16–74 (source: ONS)

East Lindsey		2001 Census	2011 Census
Workers	*a*	53,442	56,311
Jobs	*b*	46,226	51,754
Commuting Ratio	*a/b*	**1.16**	**1.09**

Note: 2001 data from Census Table *T101 – UK Travel Flows* ; 2011 data from Census Table *WU02UK - Location of usual residence and place of work by age* .

Sub-district Growth Profile

2.30 East Lindsey's growth since 2001 has been a composite of different levels of population change across the two sub-district areas (Figure 12)[3].
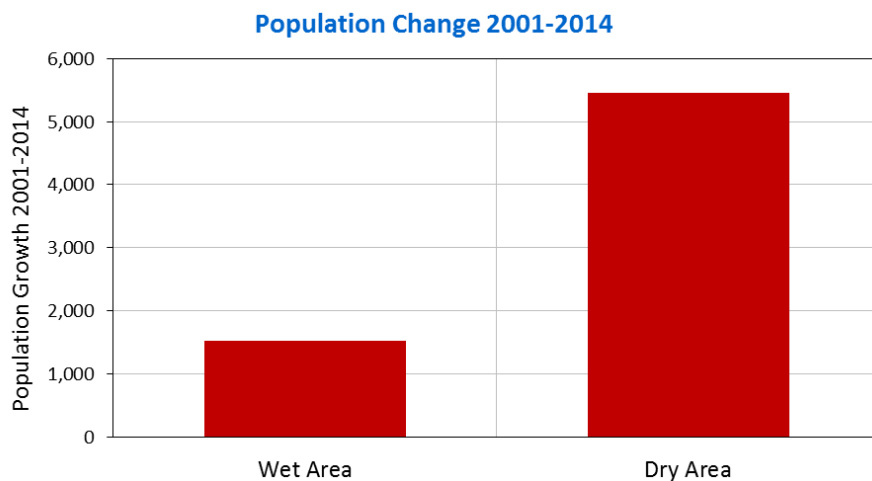

Figure 12: East Lindsey sub-district population change 2001–2014

2.31 With 69% of the district's population, the Dry area has seen the largest population growth, equivalent to a 6% increase over the 2001–2014 period. This compares with a 4% growth in the

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[3] At sub-district level, population estimates are available to mid-year 2014 only

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Wet area. A large proportion of the growth in both the Wet and Dry areas occurred before 2008 and in 2014, with the Wet area experiencing a notable reduction in growth over the 2008–2013 period (Figure 13).
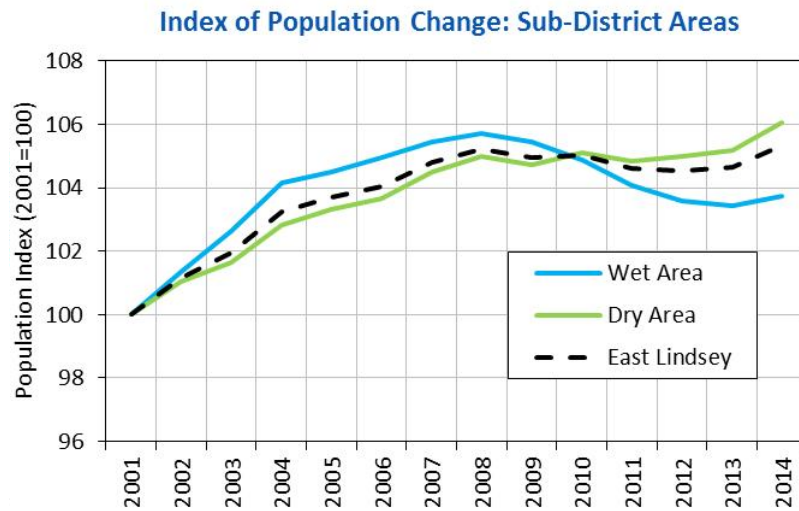
Figure 13: East Lindsey sub-districts: index of population change 2001–2014

2.32   The components of population change illustrate how net migration and natural change are estimated to have contributed to population growth in the two sub-district areas (Figure 12). Both areas have experience a net loss due to natural change, with an excess of deaths over births. Population change in both the Wet and Dry areas has been driven by net in-migration.
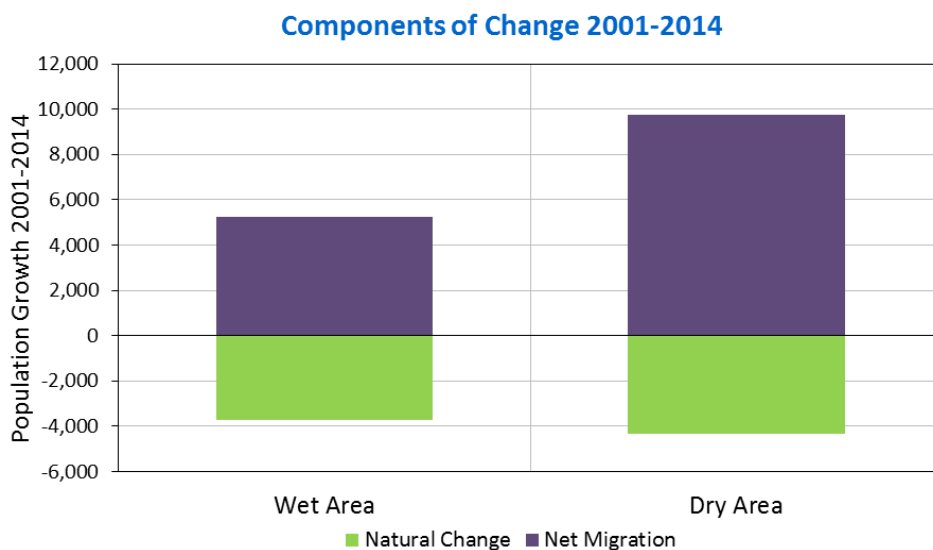
Figure 14: East Lindsey sub-district components of population change 2001–2014

2.33   It is important to consider the historical scale and pattern of housing completions against the pattern of migration change in East Lindsey. Housing completions have been assigned to Wet and

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Dry geographies and net migration has been estimated from historical population statistics (Figure 15).
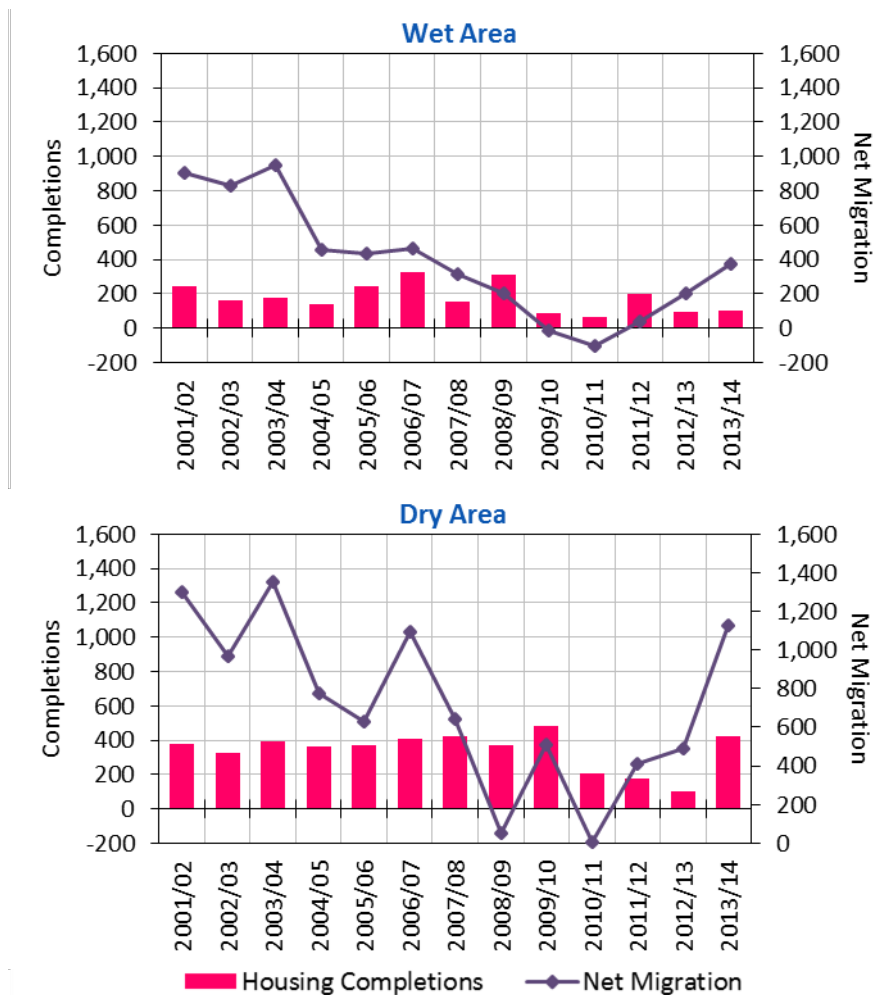
Figure 15: East Lindsey sub-district historical housing completions and net migration

2.34   The fall in net migration over the 2001/02–2010/11 period is emphasised in the Wet and Dry areas, however the impact is most pronounced in the Dry area. From 2011 onwards, both areas have experienced an increase in net migration, with the Dry area experiencing a sharp increase in 2013/14, in line with an increase in housing completions.

2.35   Housing completions for both areas has remained relatively consistent to 2010. The Dry area experienced lower housing completions over the 2010/11–2012/13 period, followed by a sharp increase in 2013/14. Average housing completions for the historical 2001/02–2013/14 period varies from approximately +177 in the Wet area to +340 in the Dry area.

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3 Official Projections

3.1   In this section, the latest population and household projections from the ONS and the DCLG are considered. Together with Section 2, this section presents the context for the development of a range of alternative growth scenarios, detailed in Section 4.

Official Statistics

3.2   In the absence of a population register, the UK continues to rely on the ten-yearly Census for a definitive count of population within its constituent local authority areas. Between Censuses, MYEs are calculated, using data on births, deaths, internal and international migration to quantify annual growth (Figure 16).
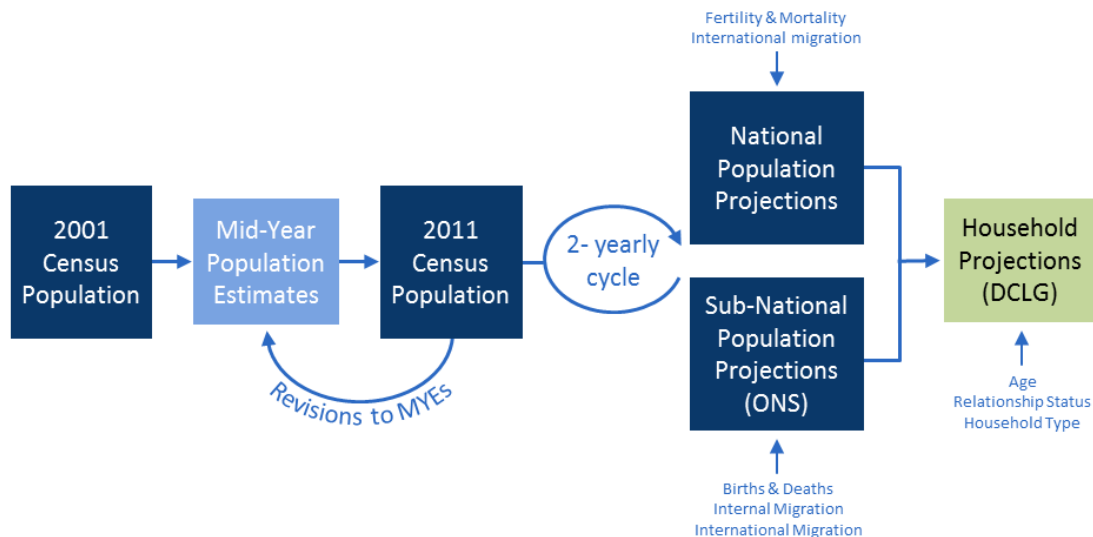
Figure 16: Official Statistics – population and households

3.3   Every two years ONS publishes its national population projections, setting key assumptions on the long-term effects of fertility, mortality and international migration to estimate population growth outcomes for England, Wales, Scotland and Northern Ireland. The 2014-based *national* projection was released in October 2015[4].

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[4] http://www.ons.gov.uk/ons/rel/npp/national-population-projections/2014-based-projections/index.html

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3.4   The national projection informs the sub-national population projections (SNPPs) for English local authorities, also published on a bi-yearly cycle. The latest, 2014-based SNPPs use a combination of national and local assumptions on births, deaths and migration to formulate a 25-year projection for each local authority area.

3.5   The SNPPs provide the key demographic input to the DCLG household projections. The latest 2014-based household projection model provides a 25-year projection of household growth in each of the English local authorities.

3.6   The PPG states that the DCLG household projections should provide the *"starting point estimate of overall housing need"* (PPG paragraph 2a-015). The remainder of this section considers the 2014-based SNPP and the 2014-based DCLG household projection for East Lindsey, providing the context for complementary scenario analysis in Section 4.

ONS Sub-national Population Projection

3.7   In the development and analysis of population forecasts, it is important to benchmark any growth alternatives against the latest 'official' population projection. The most recent official subnational population projection is the ONS 2014-based SNPP, released in July 2016. These projections use demographic assumptions derived from a pre-2014, 5–6 year historical period in combination with national assumptions on fertility, mortality and international migration[5].

3.8   Figure 17 presents the ONS population projections series for East Lindsey. Under the latest, 2014-based SNPP, the population of East Lindsey is expected to increase by 13,187 over the 25-year projection period (2014–2039), an increase of 9.6%.

3.9   This rate of growth is *lower* than that estimated by each of the previous projections. The 2010-based and 2012-based outcomes have higher rates of growth, whereas projections prior to 2008 have substantially higher growth rates, driven primarily by higher estimates of international migration that have now been superseded by new evidence.

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[5]http://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/subnationalpopulationprojectionsforengland/2014basedprojections
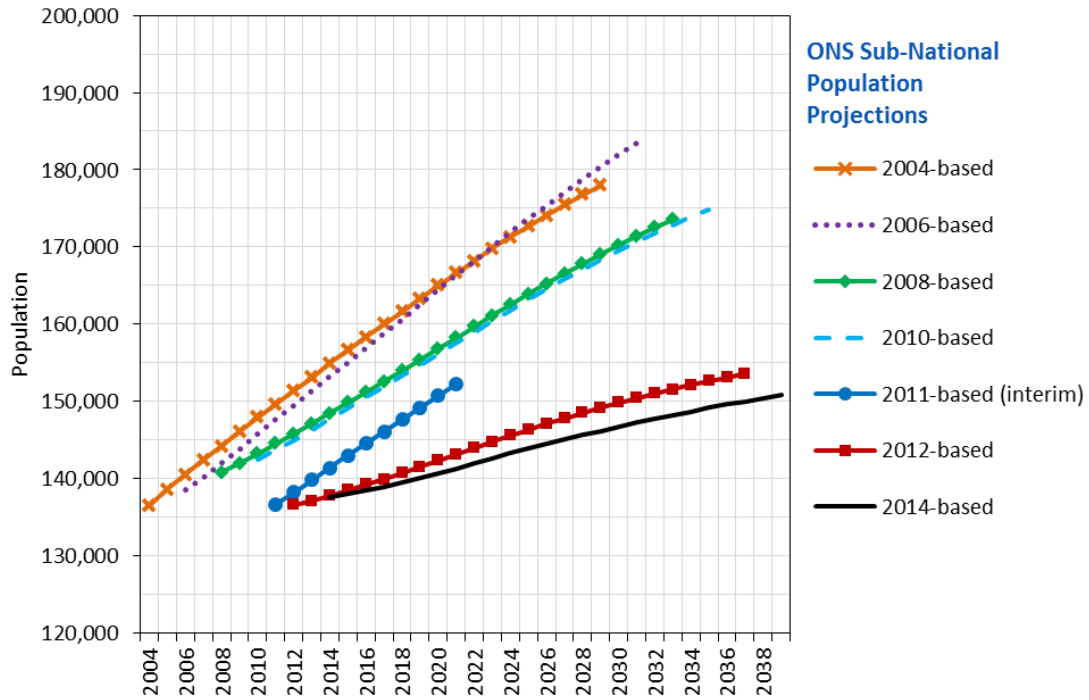
Figure 17: Official Projections for East Lindsey (Source: ONS)

3.10   The rate of population growth implied by the 2014-based SNPP for East Lindsey is significantly lower than that for the Lincolnshire region and England in total (Table 5).

Table 5: SNPP-2014 growth comparisons (Source: ONS)

Areas	Population			
	2014	2039	Change	% Change
East Lindsey	137,623	150,810	13,187	9.6%
Lincolnshire	731,516	834,656	103,140	14.1%
England	54,316,618	63,281,522	8,964,904	16.5%

3.11   The components of population change that underpin the 2014-based projection for East Lindsey are presented in Figure 18, with the historical components of change for 2001/02 to 2013/14 included for comparison. Internal migration is projected to be the dominant and increasing driver of population growth over the projection period. As the population ages, natural change is projected to have an increasingly negative impact on population growth throughout the SNPP projection period, with international migration contributing a small annual net gain.

East Lindsey: 2014-based SNPP Components of Change
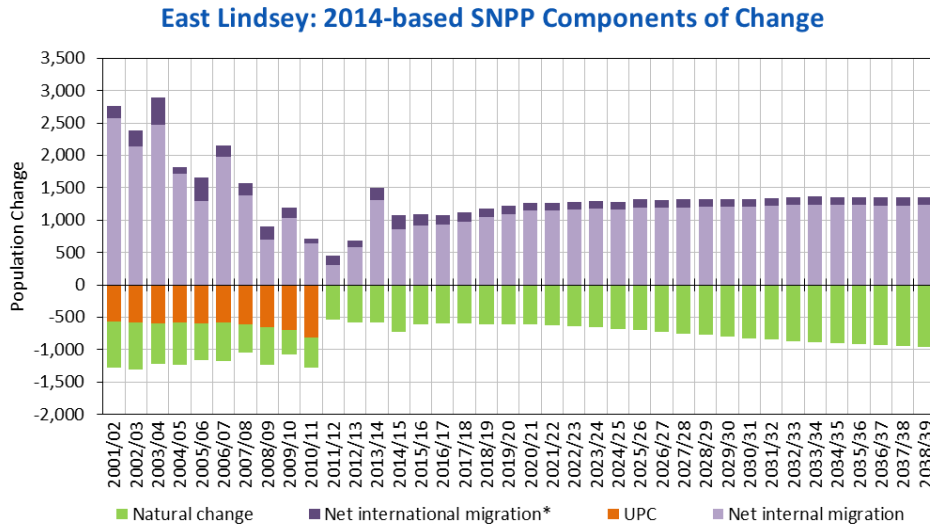
Figure 18: Historical and 2014-based SNPP components of change (Source: ONS)

3.12   To illustrate how the ONS assumptions on demographic change in East Lindsey compare with the historical evidence, the annual average natural change, plus net internal and international migration change for the 2014-based projection are compared to 6-year and 13-year historical averages (Table 6).

Table 6: East Lindsey 2014-based SNPP components comparison (Source: ONS)

Component of Change	Historical		Projected
	6-year average (2008/09–2013/14)	13-year average (2001/02–2013/14)	2014-based SNPP average (2014/15–2038/39)
Natural Change	-524	-574	-750
Net Internal Migration	760	1,395	1,147
Net International Migration	-210	-285	131
Total Net Migration	551	1,110	1,278
UPC*	-359	-481	-

*UPC is only applicable to the years 2001/02 to 2010/11

3.13   The negative influence of natural change upon population growth is reflected in an SNPP average annual assumption that is higher than both the short-term 6-year average and longer-term 13-year average. The projected effect of internal migration in the 2014-based SNPP is estimated at a level that exceeds the historical 6-year average, however is lower than the 13-year historical average period preceding 2014, with an annual net inflow of +1,147 per year. International migration is projected to be positive over the 25-year period, a trend that is reflected in the historical evidence if the UPC were not considered.

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DCLG Household Projection

3.14   In the evaluation of housing need, the PPG states that the DCLG household projections *"should provide the starting point estimate of overall housing need"* (PPG paragraph 2a-015). The 2014-based household projection model, which is underpinned by the 2014-based SNPP, was released by the DCLG in July 2016, superseding the 2012-based household projection model.

3.15   The methodological basis of the new 2014-based model is consistent with that employed in the previous 2008-based and 2012-based household projections. A 'two-stage' methodology has been used by DCLG. 'Stage One' produces the national and local projections for the total number of households by age-group and relationship status group over the projection period. 'Stage Two' provides the detailed household type breakdown by age.

3.16   The 2014-based household headship rates (also referred to as household representative rates) have changed little from the 2012-based model, with only small adjustments made to account for new evidence arising from the latest Labour Force Survey (LFS) extracts. As a result, the 2014-based household projections differ from the 2012-based versions primarily on the basis of a different underpinning population projection.

3.17   The 2014-based DCLG household projection model for East Lindsey, underpinned by the 2014-based SNPP, estimates that the number of households will increase by 8,335 over the 2014–2039 projection period, equivalent to an additional 333 households per year, compared to 399 per year under the 2012-based model (Figure 19).
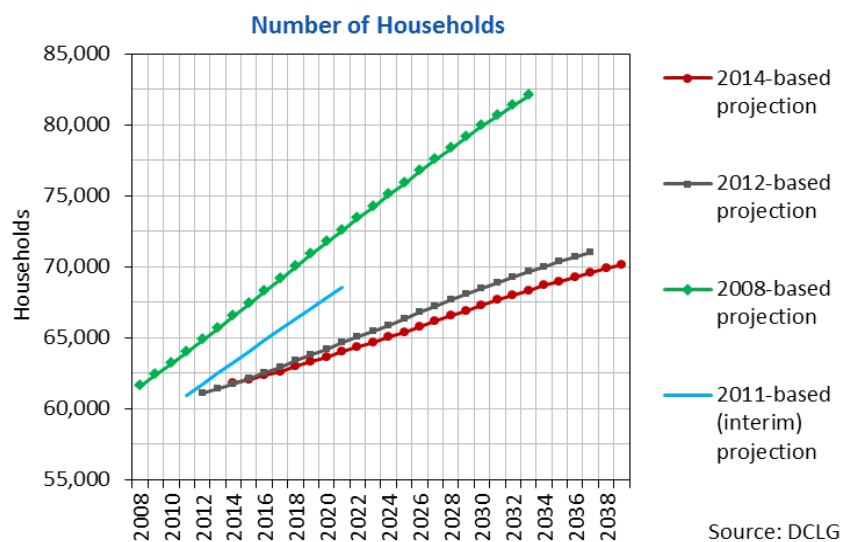
Figure 19: Household growth 2014 based DCLG household projections for East Lindsey

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3.18   A significantly larger population growth expectation in the 2008-based household projection, coupled with household formation rates that suggested a more rapid reduction in average household size, resulted in an average annual household growth estimate of 817 per year under the 2008-based model alternative.

3.19   The DCLG household projection, underpinned by the latest ONS population projection, provides the 'starting point' in the assessment of housing need (PPG paragraph 2a-015). For East Lindsey's 2016–2031 plan period, the 2014-based household projection model suggests an increase of 5,342 households, approximately 356 per year. Over the same time period, the 2014-based SNPP projects a 6.3% growth in the population, equivalent to an additional 8,756 people (Table 7).

Table 7: East Lindsey 'starting point' estimates (source: ONS and DCLG)

	Variable	2016	2031	Change	% Change	Average (per year)
2014-based SNPP	Population	138,472	147,237	8,765	6.3%	584
2014-based DCLG Model	Households	62,345	67,687	5,342	8.6%	356
	Household Population	135,394	143,462	8,068	6.0%	538
	Average Household Size	2.17	2.12	0	-2.4%	-0.003

3.20   As outlined in the PPG, it is appropriate to consider "*alternative assumptions in relation to the underlying demographic projections and household formation rates*" of the local area (PPG Paragraph 2a-017). In the following sections, these 'official' projections are compared to a range of alternative growth scenarios, considering both demographic and economic evidence.

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4 District Level Scenarios

Introduction

4.1   There is no single definitive view on the likely level of growth expected in East Lindsey. Ultimately, a mix of economic, demographic and national/local policy issues will determine the speed and scale of change. Whilst the official 2014-based ONS population and DCLG household projections form the 'starting point' of the assessment of housing need, the PPG states that it is appropriate to consider *"alternative assumptions in relation to the underlying demographic projections and household formation rates"* of the local area (PPG Paragraph 2a-017).

4.2   In line with the PPG, Edge Analytics has developed a range of alternative demographic scenarios for East Lindsey, using POPGROUP technology. The 2014-based population projection from ONS is presented as the official 'benchmark' scenario, with household growth estimated using household headship rate assumptions from the 2014-based DCLG household projection model.

4.3   For comparison with this official benchmark, a number of 'alternative trend' scenarios have been developed, in which variant migration and household assumptions have been applied. Additionally, a dwelling led scenario has been developed to consider the impact of dwelling growth targets on population change in East Lindsey.

4.4   The PPG states that the likely change in the number of jobs in an area should be considered, as should the size and structure of the labour force (PPG paragraph 2a-018). Section 5 compares the labour force and job growth implications of the trend scenarios at district level, considering key assumptions on East Lindsey's future economic activity rates, level of unemployment and balance of commuting between resident workers and local jobs.

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Demographic Scenario Definition

4.5 The **SNPP-2014** scenario replicates the 2014-based population projection from ONS. With the application of the household growth assumptions from the 2014-based DCLG household projection model, this provides the 'starting point estimate' for East Lindsey's housing growth analysis. An **SNPP-2012** scenario is included to illustrate how the latest ONS projection evidence compares to the previous output.

4.6 The PPG recommends, as part of the assessment of housing need, that the most recent demographic statistics from ONS and alternative demographic projections should be considered (PPG Paragraph 2a-017). The 2014-based SNPP from ONS is a trend-based projection that uses demographic assumptions based on up to six years historical evidence preceding 2014[6]. Given the unprecedented economic changes that have occurred since 2008, and the differences between the projected 2014-based SNPP data and the historical evidence on population change in East Lindsey, it is appropriate to consider alternative time periods in the derivation of migration assumptions.

4.7 Two alternative trend scenarios have been developed which make more explicit use of historical evidence from a period prior to the latest (2015) mid-year population estimates. A **PG 5yr**[7] scenario derives its internal migration rates and international migration flow assumptions from the five year historical period 2010/11–2014/15. The **PG 10yr** scenario derives its internal migration rates and international flow assumptions from a ten year historical period (2005/06–2014/15).

4.8 An additional **10yr Dwelling Completions** scenario is presented, in which the impact of a continuation of the historical ten year average housing completions rates is considered. Housing completion rates have been derived from the most recent historical 10-year period (2006/07–2015/16), and allocated to Wet and Dry sub-district areas based on a proportional split of historical completions from Parish statistics.

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[6] https://www.ons.gov.uk/populationandmigration/populationprojections/methodologies/
[7] Note that PG refers to POPGROUP, the demographic forecasting software used to develop the scenario forecasts.

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Scenario Results: East Lindsey District

4.9   Each of the scenarios has been run using historical MYEs for the 2001–2015 period. Scenario
        results are displayed for East Lindsey's plan period 2016–2031 (Figure 20 and Table 8). The
        forecasts are derived from a 2015 base year, except for the **SNPP-2012** and **SNPP-2014** scenarios,
        which retain their 2012 and 2014 base years respectively.

4.10   Under the **SNPP-2014** scenario, East Lindsey's population is projected to increase by 6.3%
        between 2016 and 2031, resulting in an average annual dwelling requirement of +381 per year.
        Under the assumptions set by the **SNPP-2012** scenario, slightly higher population growth of 8.1%
        was projected, implying an average annual dwelling requirement of +453 per year. The
        PG 10yr scenario produces a similar growth outcome to the **SNPP-2014** scenario, with a dwelling
        growth requirement of +425 per year.

4.11   Under the **PG** scenarios, population growth ranges from 4.5% under the **PG 5yr** scenario to 6.8%
        under the **PG 10yr** scenario. The higher population growth under the **PG 10yr** scenario reflects
        higher migration captured in the historical ten year period (2005/06–2014/15). Dwelling growth
        under the **PG 10yr** scenario averages at +425 per year. Conversely, lower migration growth
        assumptions in the latter years of the historical period are reflected in the **PG 5yr** scenario, in
        which population and dwelling growth is lowest. The 4.5% population growth under the **PG 5yr**
        scenario produces an average annual dwelling outcome of 334.

4.12   The **10yr Dwelling Completion** scenario (in which the ten year average historical housing
        completion are applied in each year of the forecast period), indicate that population growth will
        increase by 8.6% over the 2016–2031 plan period. This is largely driven by the increase in net
        migration needed to fill the annual dwelling growth targets in each year of the forecast period,
        resulting in the highest population growth.

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East Lindsey: District Scenario Results
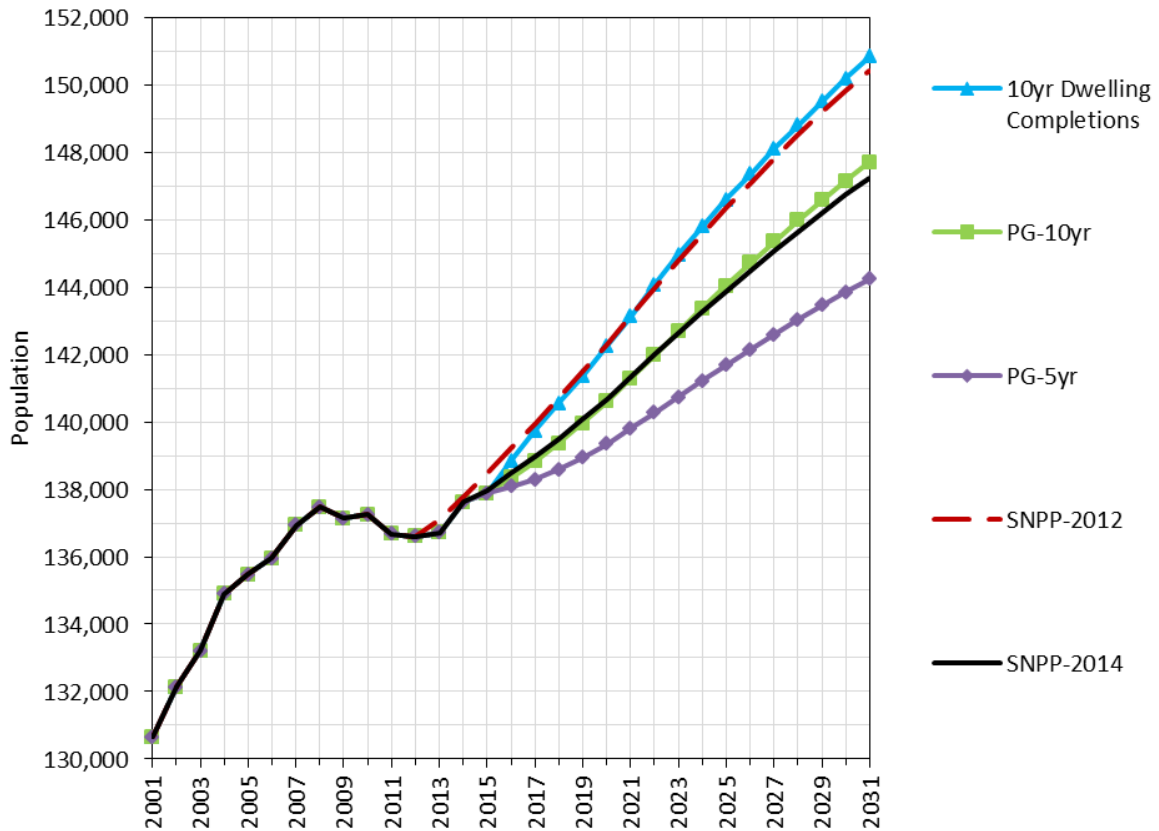
Figure 20: East Lindsey district demographic scenario outcomes: population growth 2001–2032

Table 8: East Lindsey district demographic scenario outcomes 2016–2031

Scenario	Change 2016–2031				Average per year	
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
10yr Dwelling Completions	11,994	8.6%	6,649	10.6%	1,475	474
SNPP-2012	11,210	8.1%	6,349	10.1%	1,318	453
PG-10yr	9,349	6.8%	5,965	9.6%	1,296	425
SNPP-2014	8,765	6.3%	5,345	8.6%	1,263	381
PG-5yr	6,163	4.5%	4,688	7.5%	1,124	334

Note that household growth has been calculated using the 2014-based headship rates and dwelling growth estimated using a fixed 6.5% vacancy rate.

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Headship Rate Sensitivity

4.13 In the district level scenarios detailed above, the 2014-based DCLG headship rates (HH-14) have been applied, in line with the PPG recommendation to use the latest available household projection assumptions. However, as stated in the PPG, it is appropriate to consider *"alternative assumptions in relation to the underlying demographic projections and household formation rates"* of the local area (PPG Paragraph 2a-017).

4.14 For comparison, each of the demographic scenarios has been run using the headship rates from the earlier 2008-based (HH-08) and 2012-based (HH-12) DCLG household models (Table 9).

Table 9: Dwelling growth outcomes using variant headship rates, 2016–2031

Scenario	Average Annual Dwelling Requirement 2016–2031		
	HH-08	HH-12	HH-14
10yr Dwelling Completions	474	474	474
SNPP-2012	492	453	453
PG-10yr	466	425	425
SNPP-2014	425	381	381
PG-5yr	378	334	334

Note: Scenarios are ranked in order of average annual dwelling growth under the 2014-based headship rates (HH-14)

4.15 There is no difference between the dwelling growth outcomes associated with the 2014-based household assumptions and the 2012-based outcomes, reflecting the very minor amendments made by DCLG in its 2014-based model update. In contrast, the 2008-based household assumptions, which assume a faster rate of household formation and a more rapid decline in average household size, result in higher dwelling growth, than that estimated by the 2012-based and 2014-based outcomes.

Age Profile

4.16 The changing age structure of East Lindsey's population is an important element when considering future housing needs, and the progression of its labour force. The change in the age profile depends very much on the history of population change, particularly the relative size of

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successive birth cohorts and continued improvements in life expectancy. The large birth cohorts of the 1940s, 1950s and 1960s are set to have a substantial effect upon local population profiles and this is reflected in the East Lindsey data. The term 'ageing population' generally refers to an increase over time in the share of the population in the older age-groups, specifically 65+.

4.17   Using a 2016 base year for comparison, East Lindsey's projected age profile change under the **SNPP-2014** scenario has been calculated for the plan period 2016–2031 (Figure 21). The red bars indicate where the population at the end of the plan period is *lower* than the 2014 base year. The blue bars indicate where the population is *higher* than the base year.

East Lindsey Population Age Profile: 2016–2031

Red indicates an excess in **start year**, **blue** an excess in **end year**
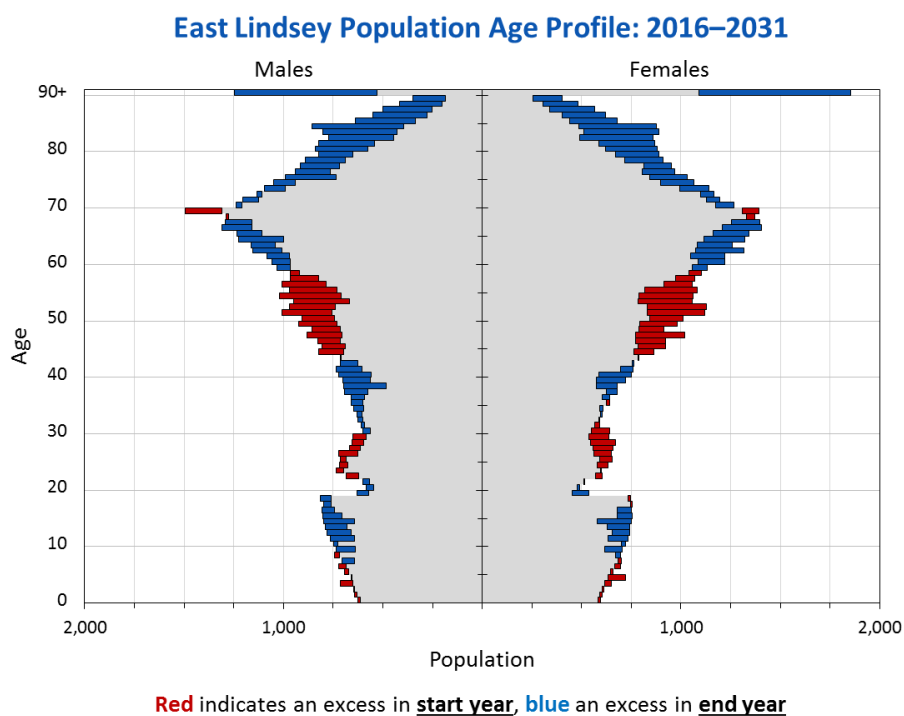
Figure 21: East Lindsey population age profile, 2016–2031 (Source: ONS, POPGROUP)

4.18   By 2031, it is estimated that there will have been a significant shift in the shape of the age profile, with those born in the 1940s, 1950s and 1960s moving into the oldest age groups, creating an increased imbalance between those aged 65+ and those in the younger age-groups. This is reflected in the Old Age Dependency (OAD) ratio, which is projected to increase from 51.5 in 2016 to 67.2 by 2031. This means that the 65+ population will be equivalent to 67.2% of those aged 16–64 by 2031, compared to 51.5% at the start of the plan period.

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5 Labour Force & Employment

Introduction

5.1   In the assessment of housing need, the PPG states that *"plan makers should make an assessment of the likely change in job numbers based on past trends and/or economic forecasts as appropriate and also having regard to the growth of the working age population in the housing market area"* (PPG paragraph 2a-018).

5.2   In POPGROUP, it is possible to derive the size and structure of the labour force and the level of employment that an implied level of population growth could support, through the application of: (1) economic activity rates; (2) unemployment rates; (3) a commuting ratio.

5.3   In this section, the labour force and employment growth implications of the demographic scenarios developed at district level are presented.

Economic Assumptions

Economic Activity Rates

5.4   The **Economic Activity Rates** determine the proportion of the working-age population (aged 16–75+) that are economically active (i.e. the labour force). The labour force includes those who are in work (i.e. 'workers') and those who are unemployed. Between the 2001 and 2011 Censuses, economic activity rates in East Lindsey increased in all but the youngest age groups, and most notably in the older age groups (Figure 22). The increase in the economic activity rates has been more pronounced for females than for males. For males, 2011 Census economic activity rates were also lower for the 30–34 and 35–39 age groups.

5.5   In the face of unprecedented demographic change due to population ageing, changes to economic activity rates are critical in maintaining an adequately sized local labour force and for

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maintaining the overall rate of employment. This is particularly the case in East Lindsey where the population is projected to age over the next 25 years, with a larger proportion of the population in the older age-groups compared to the younger, labour-force ages.
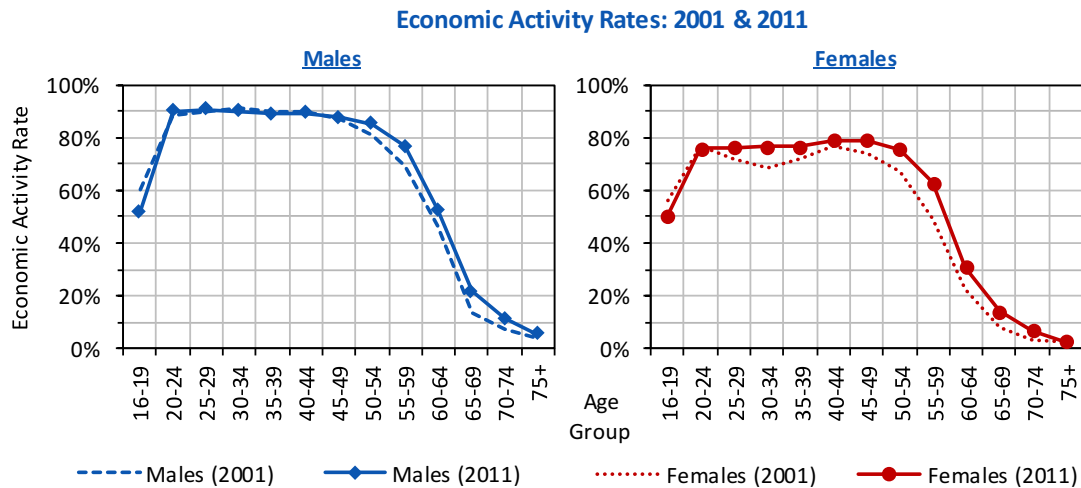
Economic Activity Rates: 2001 & 2011

Figure 22: 2001 and 2011 Census economic activity rates for East Lindsey (Source: ONS)

5.6   Whilst economic activity rates have increased historically, forecasting changes to future economic activity rates is challenging. In reality, it is highly unlikely that future rates of economic activity will remain static. The ageing of the population profile of most local authorities means that the older age-groups increasingly make up a larger proportion of the population. Furthermore, with increased life expectancies and changes to the State Pension Age (SPA), people are remaining in the labour force for longer, resulting in increased participation rates in the older age groups. To at least maintain the current level of *overall* economic activity requires higher economic activity rates generally, but most importantly in the older age-groups.

5.7   The Office for Budget Responsibility (OBR) has undertaken analysis of labour market trends in its 2014 Fiscal Sustainability Report[8]. Included within its analysis is a forecast of changing economic activity rates for males and females in the 16–75+ year-old age groups, extending to a long-term, 2066 forecast horizon.

5.8   In the scenario analysis presented here, economic activity rates for the 60–75+ East Lindsey age groups have been adjusted in line with the OBR forecasts. Economic activity rates for the 16–59 age-range remain fixed at their 2011 Census values. The resulting age-specific economic activity

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[8] http://cdn.budgetresponsibility.org.uk/41298-OBR-accessible.pdf

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rates applied to the East Lindsey scenarios are illustrated in Figure 23 and in the Appendix to this document.
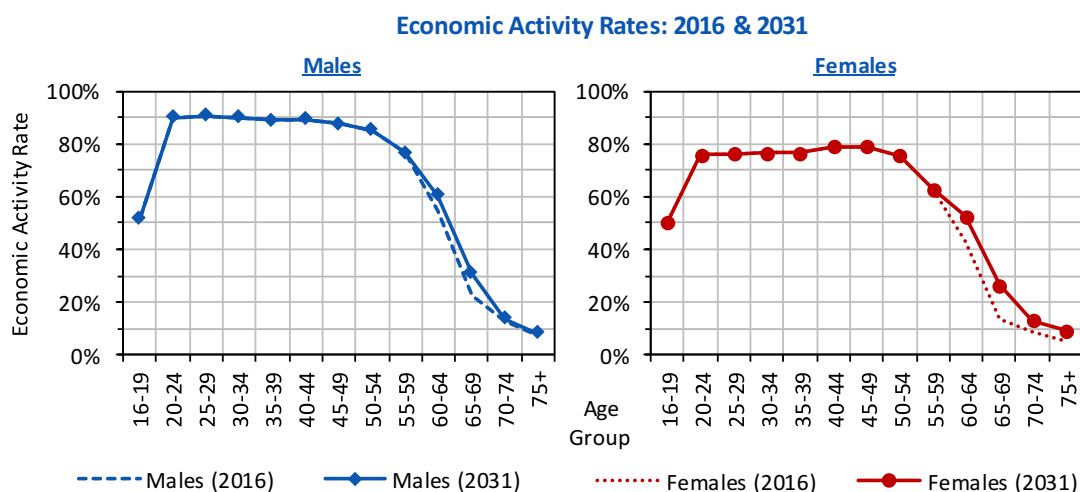

Figure 23: 2016 and 2031 OBR economic activity rates for East Lindsey (Source: OBR)

Unemployment Rate

5.9 The **Unemployment Rate** determines the proportion of the labour force that is unemployed (and as a result, the proportion that is employed). The historical unemployment rate profile for East Lindsey has been sourced from the ONS model-based estimates of unemployment. In the scenario modelling presented here, the unemployment rate tracks historical data to 2015, reducing to a 'pre-recession' (2004–2007) average of 4.3% by 2020 (fixed thereafter).

Commuting Ratio

5.10 The **Commuting Ratio** determines the balance between the resident number of 'workers' (i.e. the employed labour force) and the number of jobs in an area. A commuting ratio greater than 1.0 indicates a net *out*-commute (i.e. the number of resident workers in an area is greater than the number of jobs). A commuting ratio less than 1.0 indicates a small net *in*-commute (i.e. the number of jobs is greater than the number of workers).

5.11 A fixed commuting ratio of 1.09 has been applied in scenarios presented here. This ratio is derived from the 2011 Census Travel to Work and indicates a small net *out*-commute from East Lindsey. This contrasts to 2001, when East Lindsey had a commuting ratio of 1.16, indicating a larger net *out*-commute (see Table 4 on page 14).

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Demographic Scenarios & Labour Force Change

5.12   For each of the East Lindsey district level demographic scenarios presented in section 4, economic activity rate, unemployment rate and commuting ratio assumptions have been applied to derive an estimate of the changing size of the labour force that the population growth implies, and the level of employment growth that could be supported under these assumptions (Table 10).

Table 10: Labour Force and jobs-growth outcomes 2016–2031

Scenario	Labour Force (16–75+)				Average Annual Employment Growth
	2016	2031	Change	% Change	
10yr Dwelling Completions	61,644	64,441	2,797	4.5%	179
SNPP-2012	61,690	63,975	2,285	3.7%	149
PG-10yr	61,431	63,282	1,851	3.0%	124
SNPP-2014	61,474	62,796	1,323	2.2%	93
PG-5yr	61,268	61,406	138	0.2%	23

5.13   The application of the economic assumptions to the **SNPP-2014** scenario results in an increase in the labour force size (+1,323) over the 2016–2031 period, with an estimated average annual employment growth of +93 per year. Labour force growth is higher under **SNPP-2012** scenario.

5.14   The **PG 10yr** scenario has higher growth assumptions for migration than the **PG 5yr** scenario, resulting in larger labour force change (+1,851) and supporting an estimated annual employment growth of 124 jobs per year, 2016–2031.

5.15   These demographic-led employment growth outcomes compare favourably with East Lindsey's 2016 Economic Baseline[9], with its growth outlook of +6,000 jobs over a 25-year horizon, equivalent to approximately +240 jobs per year. Higher economic activity rates, lower unemployment and a higher net in-commute could all contribute to a higher employment growth implied by the demographic scenarios.

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[9] http://www.e-lindsey.gov.uk/CHttpHandler.ashx?id=5659&p=0

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6 Sub-District Scenarios

Scenario Definition

6.1   At sub-district level, the official projection scenarios (**SNPP-2014** and **SNPP-2012**), trend based scenarios (**PG 10yr** and **PG 5yr**) and dwelling-led (**10yr Dwelling Completions**) scenario have been developed, consistent with the scenario development at district level (as outlined on p24).

6.2   For the Wet sub-district area, two additional scenarios have been developed; **Zero Population Growth** and **Zero Dwelling Growth**, consistent with previous reports.

6.3   Under the **Zero Population Growth** scenario, the total population remains the same throughout the forecast period, with only the age structure altering. Births, deaths and migration still occurs, however net migration is adjusted to offset any natural change.

6.4   The **Zero Dwelling Growth** scenario assumes there is no change in the number of dwellings over the forecast period.

6.5   The following charts (Figure 24 and Figure 25) present population growth for the 2001–2031 period for the two Wet and Dry sub-district areas of East Lindsey. The tables (Table 11 and Table 12) present population and household change for the 2016–2031 period, plus the average annual net migration and the estimated average annual dwelling requirement. Scenarios are ranked in order of population change.

6.6   The scenarios have been run using household growth assumptions from the 2014-based DCLG household model.

6.7   Although the population growth estimates for the sum of the two sub-district areas are equivalent to those generated for East Lindsey as a whole (excluding the dwelling-led scenario), there are differences in the household and dwelling totals produced by the sub-district analysis. These small discrepancies are the result of using different population, migration and headship-rate combinations at sub-district level.

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Scenario Results

Dry Area

6.8 The **SNPP-2014** benchmark scenario suggests a population growth of 7.1% for the Dry Area over the 2016–2031 forecast period. This produces a dwelling requirement of +278 per year. Under the **SNPP-2012** scenario, population growth is higher (8.8%), resulting in a higher average annual dwelling requirement of +331.

6.9 Population growth under the **PG 10yr** scenario is relatively similar to the **SNPP-2014**, with an expected growth of 7.5% over the 2016–2031 plan period. This population growth results in a dwelling requirement of +308 per year.

6.10 The **PG 5yr** scenario considers a shorter migration history, and reflects the lower levels of migration in the most recent years. Subsequently, this results in the lowest population growth of 6.3%, resulting in a dwelling growth of +267 per year.

6.11 The **10yr Dwelling Completions** scenario, in which population growth is driven by the annual dwelling growth targets in the area, results in the highest population growth of 9.7% over the 2016–2031 plan period. Under this scenario, net migration is increased to meet the average annual +311 dwelling growth target in the area. The age-sex profile of migrants under the **10yr Dwelling Completions** scenario, in combination with natural change, results in lower net migration whilst maintaining a higher population growth than that experienced under the **SNPP-2012** scenario.

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East Lindsey: Dry Area

Figure 24: East Lindsey Dry Area scenarios: population growth 2001–2031

Table 11: East Lindsey Dry Area scenarios 2016–2031

Scenario	Change 2016–2031				Average per year	
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
10yr Dwelling Completions	9,413	9.7%	4,401	10.3%	957	311
SNPP-2012	8,496	8.8%	4,678	11.0%	1,008	331
PG-10yr	7,207	7.5%	4,352	10.2%	907	308
SNPP-2014	6,854	7.1%	3,932	9.2%	887	278
PG-5yr	5,991	6.3%	3,781	8.9%	848	267

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Wet Area

6.12   Under the **SNPP-2014** scenario, population growth of 4.5% results in an average annual dwelling growth of +102 per year over the 2016–2031 period. As with the district level and Dry area, the **SNPP-2012** scenario for the Wet area results in population and dwelling growth higher than under the **SNPP-2014** scenario. Under the **SNPP-2012**, population change of 6.3% results in a dwelling growth of +128 per year.

6.13   Under the trend-based scenarios, population growth is lower under the **PG 5yr** scenario (0.4%) compared to the **PG 10yr** scenario (5.0%). This results in a dwelling growth range of 63–116 per year under the **PG 5yr** and **PG 10yr** scenarios respectively.

6.14   The dwelling growth targets under the **10yr Dwelling Completions** scenario results in the highest population growth of 11.2% over the 2016–2031 period.

6.15   The zero growth scenarios result in the lowest population and dwelling growth. Under the **Zero Population Growth** scenario, in which the total population of the Wet area remains the same throughout the 2016–2031 period, an average annual dwelling requirement of +42 is produced. This is largely driven by the net migration needed in order to meet the total population target.

6.16   The **Zero Dwelling Growth** scenario, in which there is no change in the number of dwellings over the 2016–2031 period, results in a negative impact on population growth (-1.5%). Net migration remains positive at an average of +242 per year, with population decline resulting largely as an impact of natural change (i.e. higher number of deaths than births).

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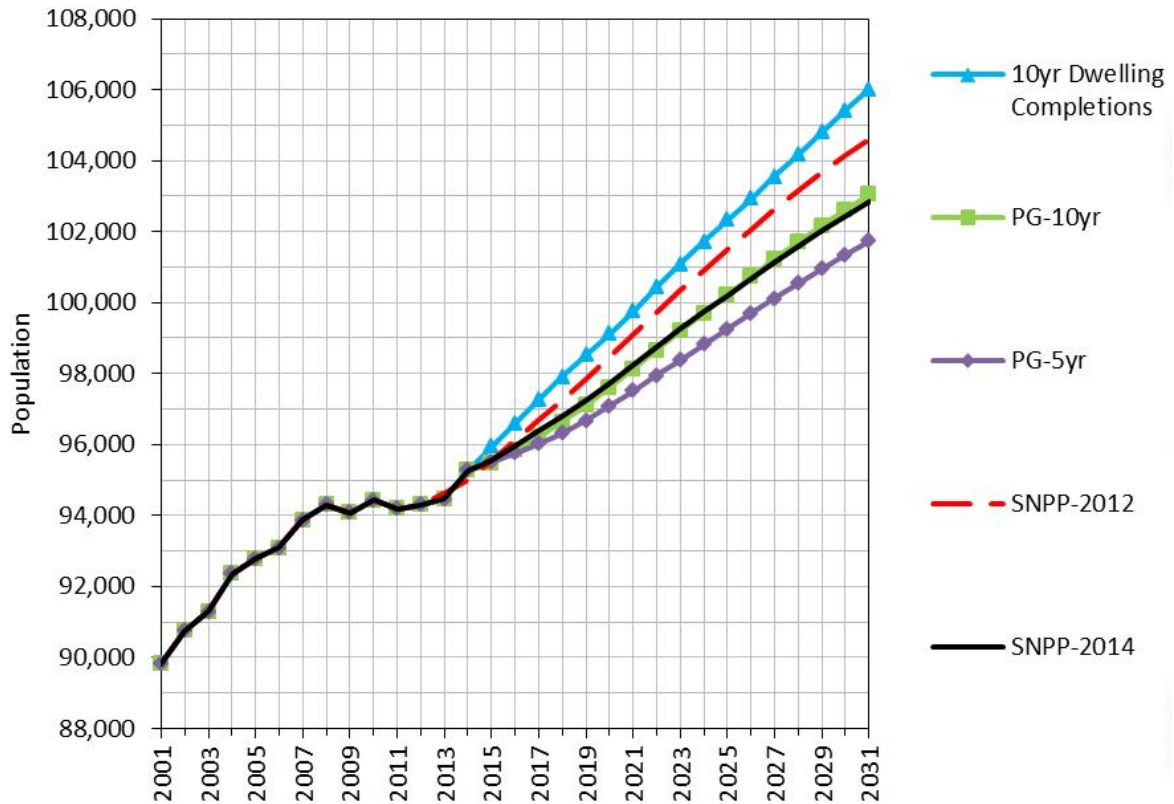
East Lindsey: Wet Area
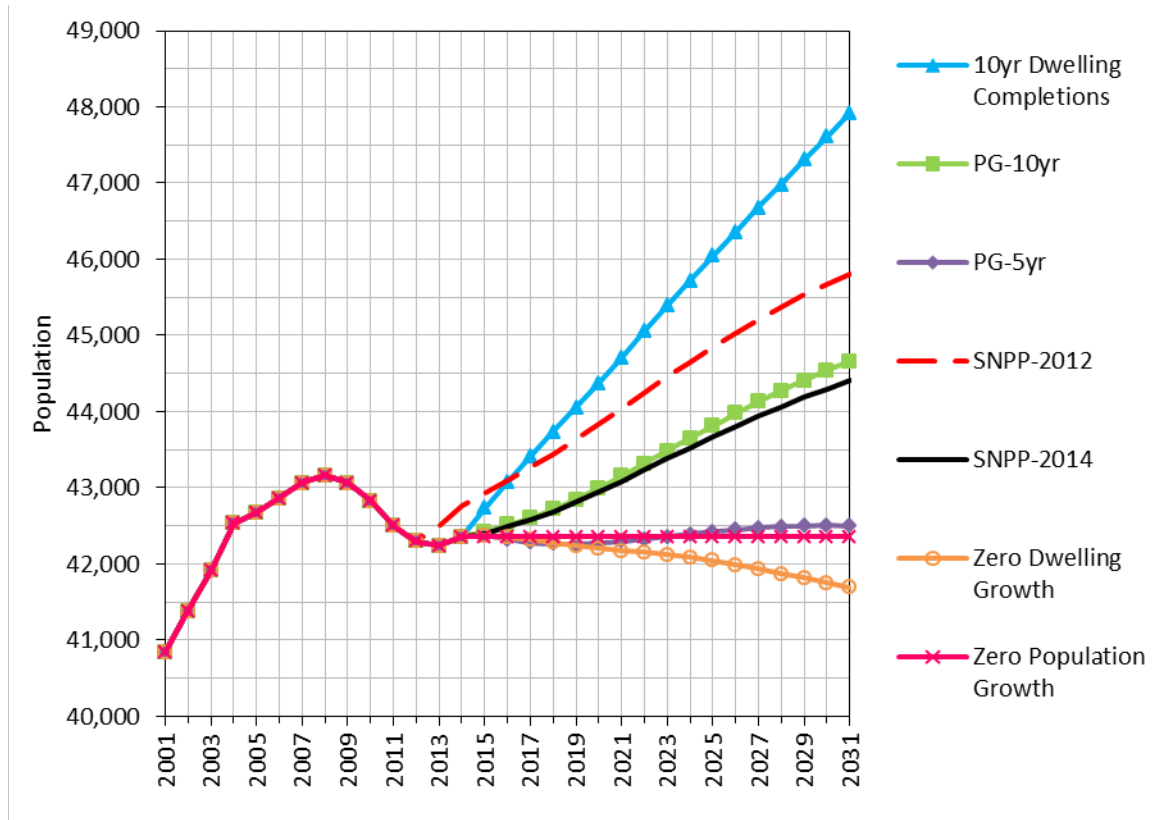
Figure 25: East Lindsey Wet Area scenarios: population growth 2001–2031

Table 12: East Lindsey Wet Area scenarios 2016–2031

Scenario	Change 2016–2031				Average per year	
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
10yr Dwelling Completions	4,841	11.2%	2,245	11.2%	579	163
SNPP-2012	2,713	6.3%	1,761	8.8%	535	128
PG-10yr	2,142	5.0%	1,596	8.0%	470	116
SNPP-2014	1,911	4.5%	1,409	7.1%	456	102
PG-5yr	173	0.4%	869	4.4%	361	63
Zero Population Growth	0	0.0%	585	3.0%	360	42
Zero Dwelling Growth	-655	-1.5%	0	0.0%	242	0

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Sub-District Headship Rate Sensitivities

6.17   The sub-district scenarios have been run using headship rate assumptions from the 2008-based and 2012-based DCLG household projection models. Table 13 and Table 14 present the associated average annual dwelling outcomes under each of the scenarios for the Dry and Wet areas respectively.

Table 13: East Lindsey Dry Area Headship Rate Sensitivities

Scenario	Average Annual Dwelling Requirement		
	HH-08	HH-12	HH-14
SNPP-2012	356	331	331
PG-10Yr	332	308	308
10yr Dwelling Completions	311	311	311
SNPP-2014	305	278	278
PG-5Yr	293	267	267

Note: Scenarios ranked in order of average annual dwelling growth under HH-14 rates

Table 14: East Lindsey Wet Area Headship Rate Sensitivities

Scenario	Average Annual Dwelling Requirement		
	HH-08	HH-12	HH-14
10yr Dwelling Completions	163	163	163
SNPP-2012	141	128	128
PG-10Yr	132	116	116
SNPP-2014	119	102	102
PG-5Yr	80	63	63
Zero Population Growth	59	42	42
Zero Dwelling Growth	0	0	0

Note: Scenarios ranked in order of average annual dwelling growth under HH-14 rates

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6.18   In line with the dwelling outcomes under the district level scenarios (Table 9), there is little difference between the HH-12 and HH-14 outcomes for both the Wet and Dry sub-district areas. Under all scenarios (excluding the **10yr Dwelling Completions** scenario), dwelling growth outcomes are higher under the 2008-based headship rates (HH-08) than under the most recent 2014-based headship rate assumptions (HH-14). This is linked to the higher rates of household formation under the 2008-based household projection model.

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7 Summary

Approach

7.1   The objective of this report has been to provide a range of demographic evidence to support the update of East Lindsey's SHMA. The evidence is an update on previous analysis, incorporating the latest statistical releases from ONS and DCLG and providing a range of growth scenarios for East Lindsey district and for its Wet and Dry planning areas. All scenario analysis has been produced using POPGROUP technology.

7.2   The starting point of the scenario analysis is the 2014-based SNPP and the 2014-based DCLG household projection model for East Lindsey. A number of alternative trend scenarios using variant migration assumptions and dwelling-led scenarios have been developed and are compared to the 2014-based SNPP benchmark.

7.3   Household and dwelling growth have been estimated using assumptions from the 2014-based DCLG household projection model for East Lindsey. An estimate of household and dwelling growth implied by the earlier 2008-based and 2012-based DCLG household projection models has been included for comparison.

7.4   At district level, the analysis considers the effect of a changing age structure upon East Lindsey's labour force, linking the demographic scenarios to an estimated employment growth requirement using assumptions on economic activity rates, unemployment and commuting.

Historical Growth Profile

7.5   East Lindsey's population was subject to relatively high growth pre-2008, followed by a period of much slower growth following the financial crisis. Since 2013, East Lindsey has begun to experience an uplift in its population growth.

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7.6   There are distinctive differences between the historical growth profiles of the Wet and Dry areas. The Wet area has experienced a consistent population decline since 2008, whilst the Dry area population has remained relatively stable, recovering sharply in the most recent years for which population estimates are available.

7.7   Natural change has historically contributed to population decline, a reflection of East Lindsey's relatively old age profile. Internal migration has had the most significant but fluctuating impact on population growth, with high net in-migration pre-2008, falling to a low-point in 2011/12, recovering thereafter. Whilst the overall level of out-migration has remained relatively stable since 2001, it is the fluctuation in the level of in-migration to East Lindsey that has driven the changes to its net-flow balance.

7.8   International migration is estimated to have had a negative impact on East Lindsey's population growth in the earlier part of the historical period, although the interpretation of its real effect is complicated by the uncertainty associated with the UPC adjustment following the 2011 Census. The small positive impact of international migration in the latest years is likely to provide a more realistic interpretation of the effect of immigration and emigration upon East Lindsey's growth profile.

7.9   East Lindsey's population is ageing due to the progression of the larger birth cohorts of the 1950s and 1960s through the population. In addition, the district has experienced a continuing annual net outflow of young adults, with the most significant net inflow associated with those aged 50+. In terms of the directional flow of migration, data for the 2001-2015 time period reveals that the largest net inflows are associated with the cities of Leicester, Sheffield and Nottingham, with the largest net outflow exchange with Lincoln, North Kesteven and West Lindsey.

7.10   In terms of its commuting balance, East Lindsey has a net outflow of commuters, with a smaller number of jobs relative to the size of the resident workforce. However, this balance has changed over time, with a reduced net out-commute associated with a higher rate of growth in the level of employment since 2001.

7.11   Housing completions remained fairly stable in both Wet and Dry areas to 2010, averaging approximately 200 per year in the Wet Area and 400 per year in the Dry Area. The recessionary effect of lower completions had an impact upon migration driven population growth in East Lindsey, with a recent recovery in the number of new completions in the Dry area prompting an uplift in population growth.

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Growth Outcomes

7.12   A summary of the dwelling growth outcomes associated with each scenario is provided in Figure 26, illustrating results associated with the 2008-based (HH-08) and 2014-based (HH-14) household growth assumptions (the 2012-based outcomes have been disregarded due to their similarity with the 2014-based results).
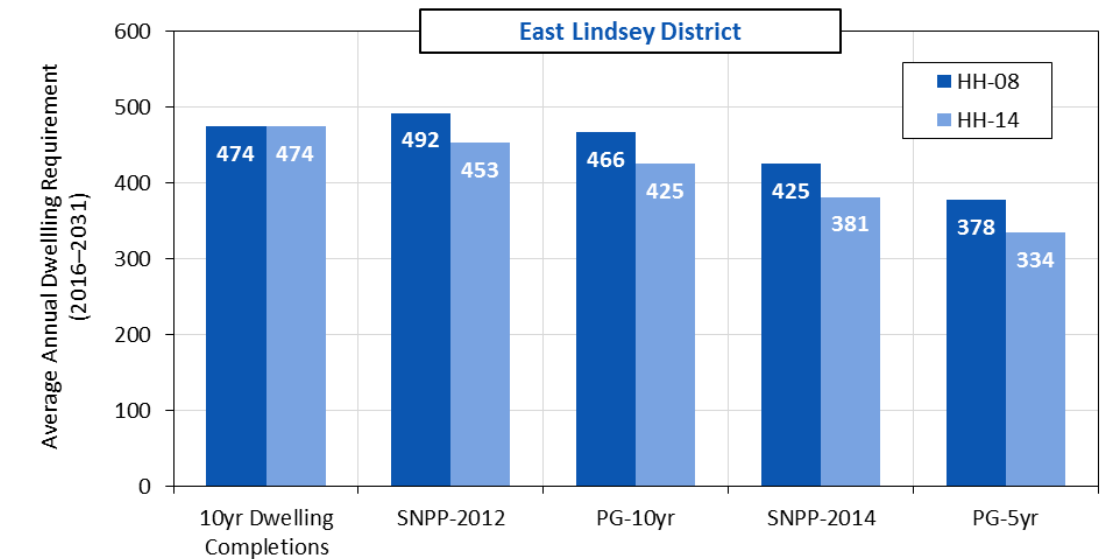

Figure 26: Dwelling growth outcomes for East Lindsey District 2016–2031

7.13   A similar summary of scenario results is presented for the Dry and Wet planning areas (Figure 27 and Figure 28 respectively).
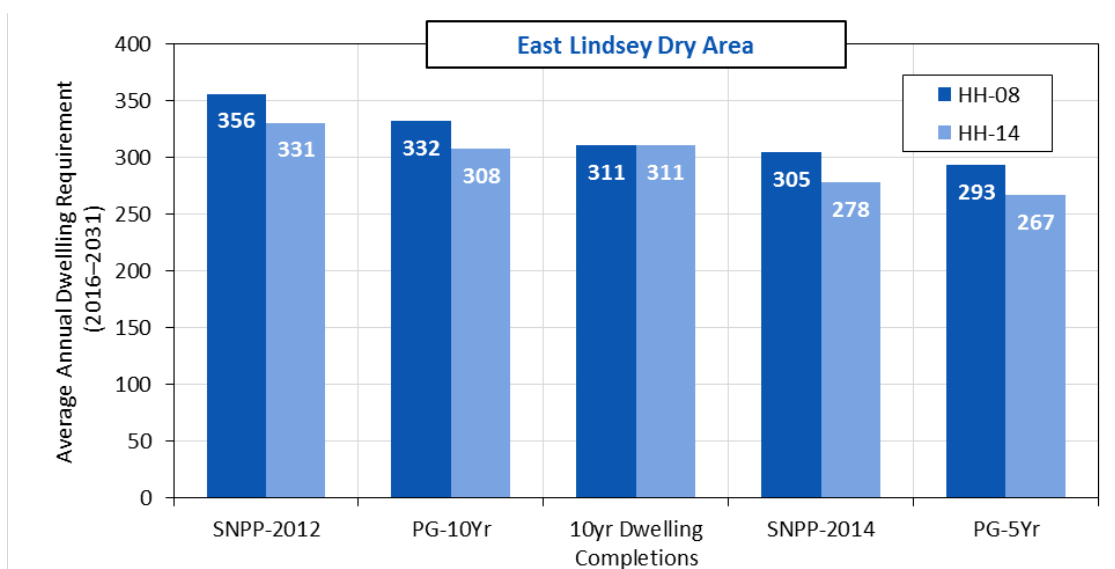

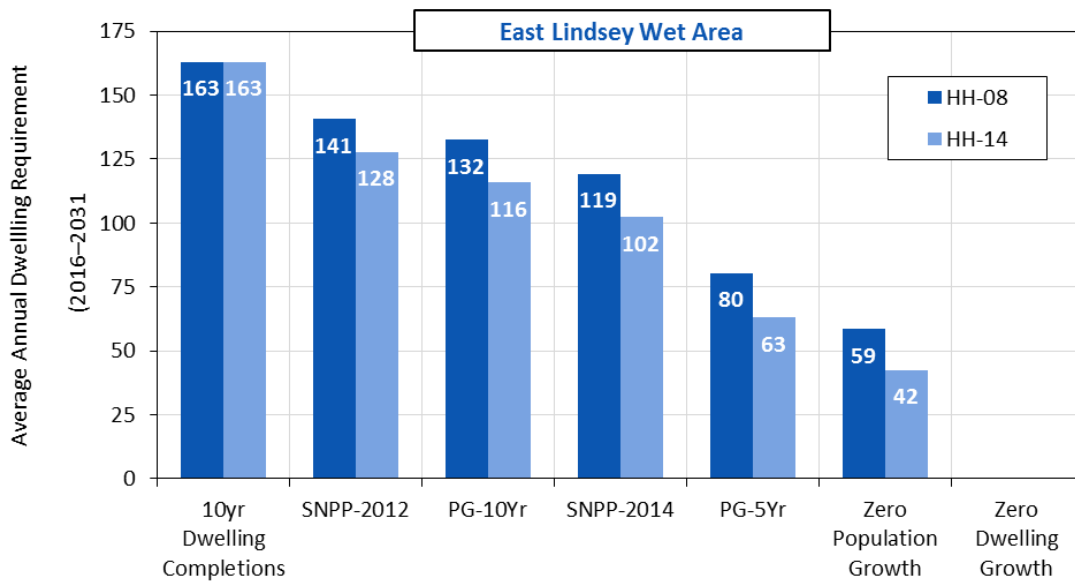Figure 27: Dwelling growth outcomes for East Lindsey Dry Area 2016–2031

Figure 28: Dwelling growth outcomes for East Lindsey Wet Area 2016–2031

7.14   Note that the sub-district dwelling growth figures (presented in the charts) do not sum exactly to the district-level results presented elsewhere in this report. This is the cumulative result of different population, migration and headship-rate combinations that apply at the sub-district level.

Key considerations

7.15   The benchmark **SNPP-2014** scenario assumes a lower growth outlook than the previous **SNPP-2012** scenario, resulting in a lower annual dwelling growth. Under the **SNPP-2014** scenario, dwelling growth is estimated to be +381 per year, compared to +453 per year under the **SNPP-2012** scenario.

7.16   In considering the Wet-Dry areas individually, a continuation of **10yr Dwelling Completions** would exceed the **SNPP-2014** demographic requirements for dwelling growth in both the Wet and Dry areas. The Wet Area has historically absorbed around one third of total in-migration to the district. Future constraints on growth in the coastal area would require higher growth in the Dry area to accommodate demographic change. Alternatively, there may be consideration of a required dwelling growth that is shared with adjacent local authorities.

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7.17   The district of East Lindsey has an internal migration profile characterised by a net outflow of young adults but a net inflow of older age migrants, particularly in the 50+ age-range. Whilst the migration exchange between adjacent local authorities is a key characteristic, the net inflow from Leicester, Sheffield and Nottingham has been an important element of population growth in East Lindsey. Population ageing and the retention of young adults is a key issue for East Lindsey. The next 20 years will see a natural reduction in the size of the resident labour force as the larger birth cohorts of the 1950s and 1960s move beyond retirement.

7.18   The alignment of economic and demographic forecasts is a challenging proposition in the consideration of future housing requirements. The district-level scenarios presented here have applied changes to future rates of economic activity that are in line with the OBR's analysis of older-age economic participation. These changes, in combination with a declining unemployment rate and no change to East Lindsey's commuting balance, estimate annual employment growth of 93 per under the **SNPP-2014**.

7.19   The inevitable shift towards an older age profile for East Lindsey implies that higher rates of economic activity within older age-groups (and overall) could help to maintain a larger local labour force; increasing the local capacity for jobs growth whilst reducing the requirement for more significant growth through net in-migration. Employment growth across the wider region could have an additional effect upon the commuting balance of East Lindsey, altering the relationship between the resident labour force and the number of jobs within the district.

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Appendix A Lincolnshire Coastal Study

Principle 1

A.1 Development will be guided by the level of flood hazard. With respect to the red, orange and yellow zones identified in the following map:

- Major development will be employment or business related only;
- Exceptionally, development to meet local housing needs may continue subject to the mitigation of flood risk through flood resilient design and emergency planning;
- It will not be appropriate for housing development in the red, orange and yellow zones to contribute to meeting the Region's strategic housing requirements. Rather, any new housing development should be of a level and type designed to keep the population in these zones broadly stable.

A.2 With respect to the green zone:

- Exceptionally, major development may be possible so long as flood risk is mitigated through flood resilient design and emergency planning.

A.3 With respect to all flood hazard zones:

- New and replacement community buildings may be permitted subject to flood risk being mitigated through flood resilient design and emergency planning;
- New caravan sites or extensions to existing sites may be allowed for short-let tourist use between the months of April and September subject to the mitigation of flood risk through flood resilient design and emergency planning;
- Development of buildings and infrastructure explicitly for use in emergencies may be permitted subject to flood risk being mitigated through flood resilient design.

A.4 Note: The definition of flood hazard zones used here follows that used by Defra and the Environment Agency. The classification is split into four categories (green, yellow, orange, red), defined by the depth and velocity of flood waters and the related ability of people to evacuate the area once a flood occurs.
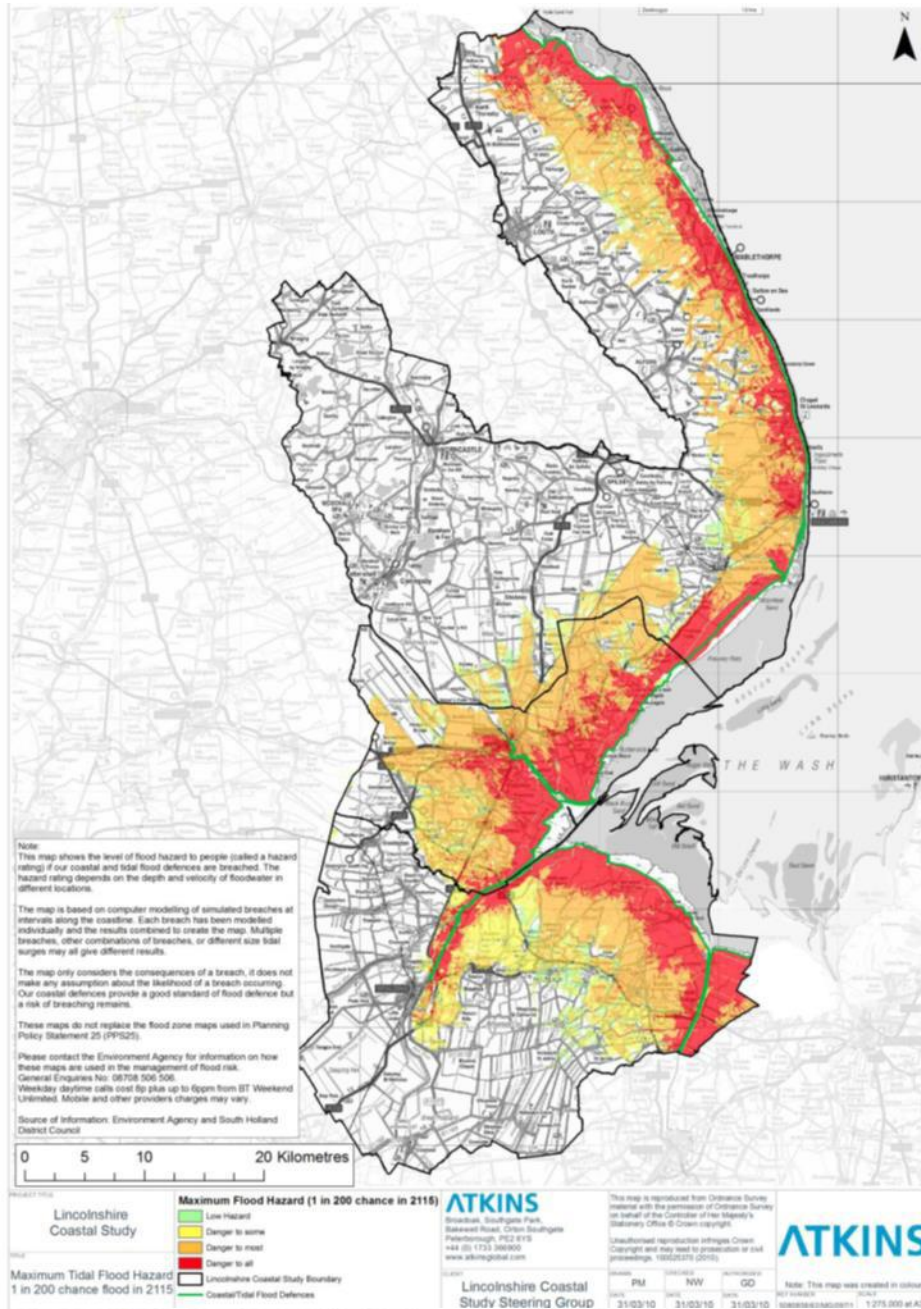
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Figure 29: Flood hazard map for the Lincolnshire Coastal Study Area

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Table 15: Flood hazard classification used in the Lincolnshire Coastal Study

Degree of Coastal Flood Hazard	Hazard Rating	Colour on mapping	Description of flood water	Description of hazard
None	Little or no hazard	White	Outside of flood extent produced by model	Little or no hazard (from coastal flooding)
Low	Low Hazard	Green	Shallow flowing or deep standing water	Caution, low risk to people
Moderate	Danger to some	Yellow	Fast flowing or deep standing water	Risk to the vulnerable, such as children, the elderly and the infirm
Significant	Danger for most	Orange	Fast flowing and deep water with some debris	Risk to most, including the general public
Extreme	Danger for all	Red	Fast flowing deep water with significant debris	Extreme hazard, danger to all, including the emergency services

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Appendix B

POPGROUP Methodology

Forecasting Methodology

B.1   Evidence is often challenged on the basis of the appropriateness of the methodology that has been employed to develop growth forecasts. The use of a recognised forecasting product which incorporates an industry-standard methodology removes this obstacle and enables a focus on assumptions and output, rather than methods.

B.2   Demographic forecasts have been developed using the POPGROUP suite of products. POPGROUP is a family of demographic models that enables forecasts to be derived for population, households and the labour force, for areas and social groups. The main POPGROUP model (Figure 30) is a cohort component model, which enables the development of population forecasts based on births, deaths and migration inputs and assumptions.

B.3   The Derived Forecast (DF) model (Figure 31) sits alongside the population model, providing a headship rate model for household projections and an economic activity rate model for labour-force projections.

B.4   For further information on POPGROUP, please refer to the Edge Analytics website: http://www.edgeanalytics.co.uk/.

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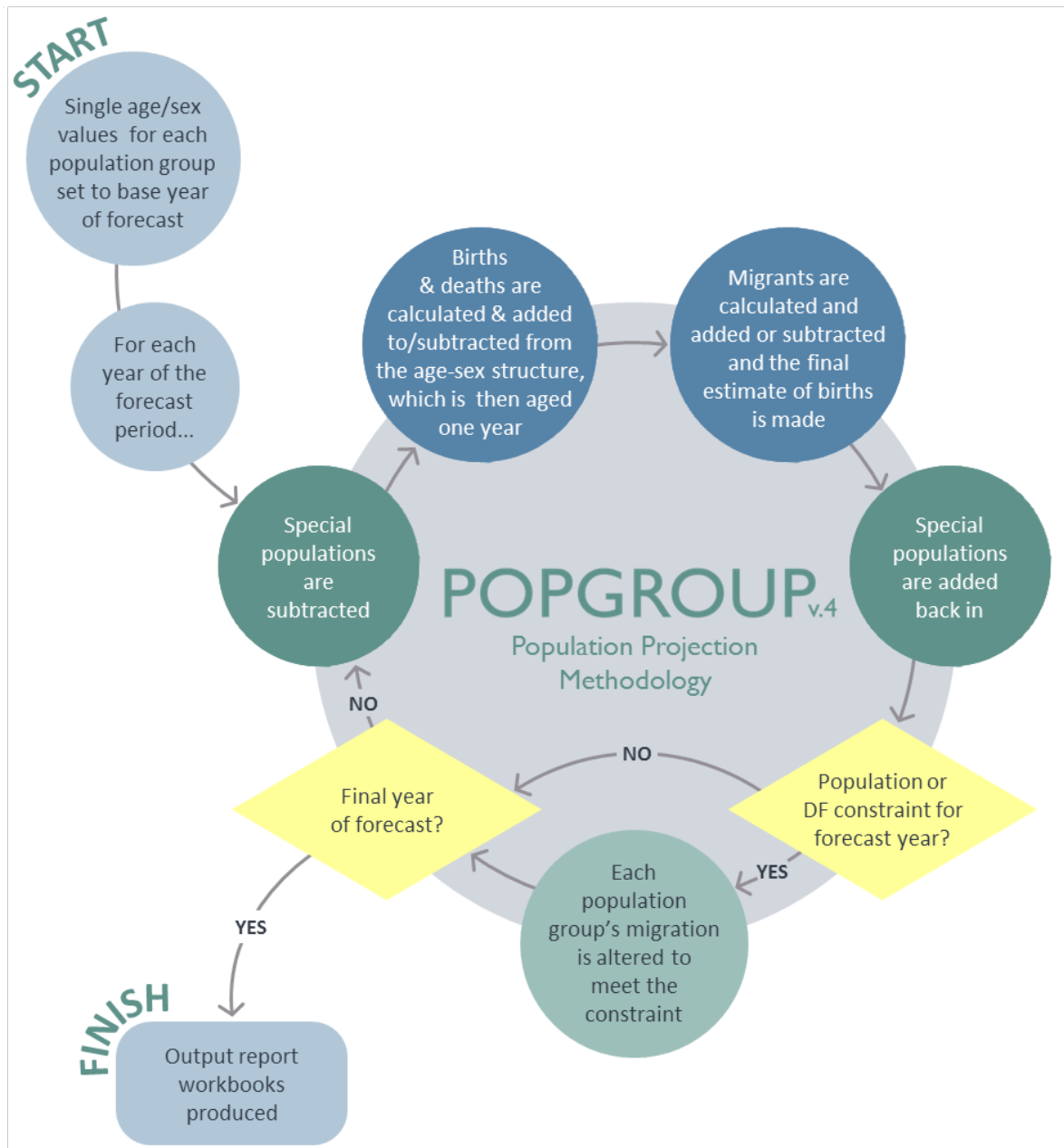
Figure 30: POPGROUP population projection methodology
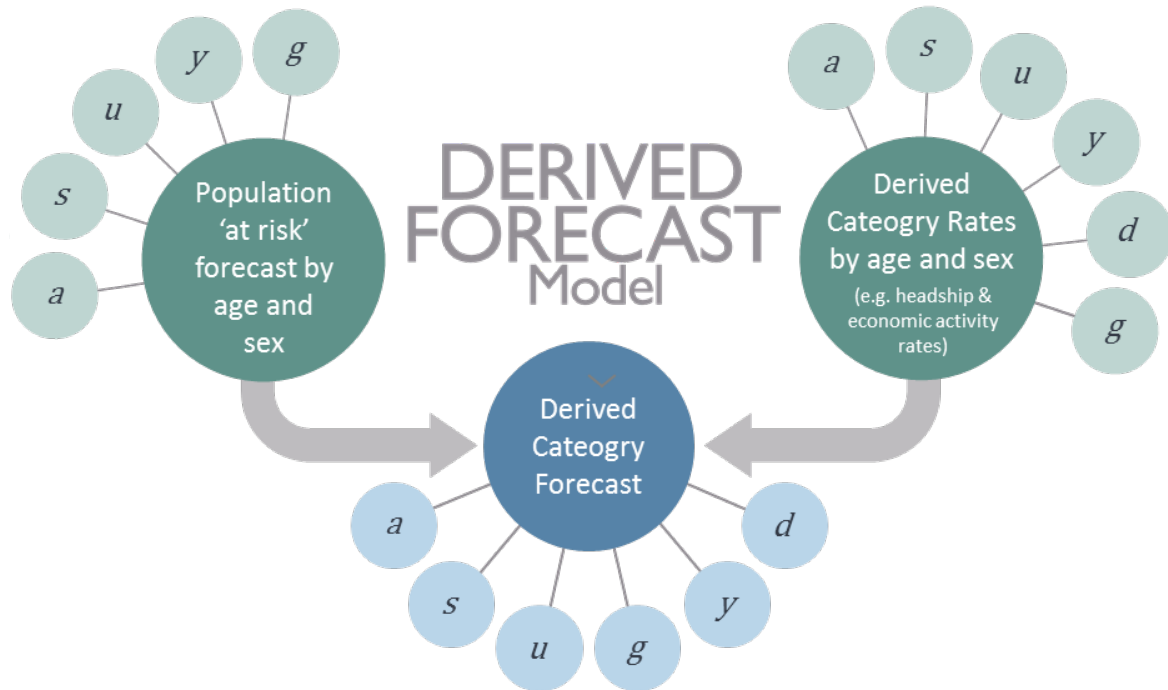
$$D_{a,s,u,y,d,g} = \frac{P_{a,s,u,y,g}\ R_{a,s,u,y,d,g}}{100}$$

D	Derived Category Forecast	y	Year
P	Population 'at risk' Forecast	d	Derived category
R	Derived Category Rates	g	Group (usually an
a	Age-group		area, but can be an
s	Sex		ethnic group or
u	Sub-population		social group)

Figure 31: Derived Forecast (DF) methodology

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Appendix C

Data Inputs & Assumptions

Introduction

C.1 Edge Analytics has developed a suite of demographic scenarios for East Lindsey using POPGROUP v.4 and the Derived Forecast model. The POPGROUP suite of demographic models draws data from a number of sources, building an historical picture of population, households, fertility, mortality and migration on which to base its scenario forecasts. Using historical data evidence for 2001–2015, in conjunction with information from ONS sub-national population projections (SNPPs) and DCLG household projections, a series of assumptions have been derived which drive the scenario forecasts.

Model Configuration

C.2 In developing the demographic forecasts, scenarios have been configured for East Lindsey district, in aggregate. Wet and Dry sub-district area forecasts have been similarly configured using a combination of Census Output Area (OA) data to derive population and components-of-change statistics. Sub-district assumptions on fertility, mortality, migration and household formation have been used to disaggregate the district-level population growth to each of the four sub-district areas, thereby ensuring consistency with the district-level population total.

C.3 The following scenarios have been produced for East Lindsey at district and sub-district level:

- SNPP-2014
- SNPP-2012
- PG 5yr

- PG 10yr
- 10yr Dwelling Completions

Two additional scenarios have been produced for the Wet area sub-district;

- Zero Population Growth
- Zero Dwelling Growth

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In the following sections, a narrative on the data inputs and assumptions underpinning the scenarios is presented.

Population, Births & Deaths

Population

C.4   In each scenario, historical population statistics are provided by the mid-year population estimates (MYEs), with all data recorded by single-year of age and sex. These data include the revised MYEs for 2002–2010, which were released by the ONS in May 2013. The revised MYEs provide consistency in the measurement of the components of change (i.e. births, deaths, internal migration and international migration) between the 2001 and 2011 Censuses.

C.5   In the **SNPP-2012** scenario, the historical MYEs are used up to 2012. From 2012, future population counts are provided by single-year of age and sex to ensure consistency with the trajectory of the ONS 2012-based SNPP.

C.6   In the **SNPP-2014** scenario, the historical MYEs are used up to 2014. From 2014, future population counts are provided by single-year of age and sex to ensure consistency with the trajectory of the ONS 2014-based SNPP.

C.7   In the other scenarios, the historical MYEs are used up to 2015.

Births & Fertility

C.8   In each scenario, historical mid-year to mid-year counts of births by sex have been sourced from the ONS MYEs.

C.9   In the **SNPP-2012** scenario, historical births are used from 2001/02 to 2011/12. From 2012/13, future counts of births are specified, to ensure consistency with the 2012-based official projection.

C.10   In the **SNPP-2014** scenario, historical births are used from 2001/02 to 2013/14. From 2014/15, future counts of births are specified, to ensure consistency with the 2014-based official projection.

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C.11   In all other scenarios, historical births are used from 2001/02 to 2014/15. From 2015/16, an area-specific age-specific rate (ASFR) schedule, derived from the ONS 2014-based SNPP, is included in the POPGROUP model assumptions. Long-term assumptions on changes in age-specific fertility rates are taken from the ONS 2014-based SNPP.

C.12   In combination with the 'population-at-risk' (i.e. all women between the ages of 15–49), the area-specific ASFR and future fertility rate assumptions provide the basis for the calculation of births in each year of the forecast period (i.e. from 2015 onwards).

Deaths & Mortality

C.13   In each scenario, historical mid-year to mid-year counts of deaths by 5-year age group and sex have been sourced from the ONS MYEs.

C.14   In the **SNPP-2012** scenario, historical deaths are used from 2001/02 to 2011/12. From 2012/13, future counts of deaths are specified, to ensure consistency with the 2012-based official projection.

C.15   In the **SNPP-2014** scenario, historical deaths are used from 2001/02 to 2013/14. From 2014/15, future counts of deaths are specified, to ensure consistency with the 2014-based official projection.

C.16   In all other scenarios, historical deaths are used from 2001/02 to 2014/15. From 2015/16, an area-specific age-specific mortality rate (ASMR) schedule, derived from the ONS 2014-based SNPP, is included in the POPGROUP model assumptions. Long-term assumptions on changes in age-specific mortality rates are taken from the ONS 2014-based SNPP.

C.17   In combination with the 'population-at-risk' (i.e. the whole population), the area-specific ASMR and future mortality rate assumptions provide the basis for the calculation of deaths in each year of the forecast period (i.e. from 2015 onwards).

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Migration

Internal Migration

C.18   In each scenario, historical mid-year to mid-year estimates of internal in- and out-migration by 5-year age group and sex have been sourced from the 'components of population change' files that underpin the ONS MYEs. These internal migration flows are estimated using data from the Patient Register (PR), the National Health Service Central Register (NHSCR) and the Higher Education Statistics Agency (HESA).

C.19   In the **SNPP-2012** scenario, historical counts of internal in and out-migrants are used from 2001/02 to 2011/12. From 2012/13, future counts of migrants are specified, to ensure consistency with the 2012-based official projection.

C.20   In the **SNPP-2014** scenario, historical counts of internal in and out-migrants are used from 2001/02 to 2013/14. From 2014/15, future counts of migrants are specified, to ensure consistency with the 2014-based official projection.

C.21   In the **PG** scenarios, historical counts of internal in and out-migrants are used from 2001/02 to 2014/15. From 2015/16, future internal migration flows are based on the area-specific historical migration data. In the **PG-5yr** scenario, a *five* year internal migration history is used (2010/11–2014/15). In the **PG-10yr** scenario a *ten* year internal migration history is used (2005/06–2014/15).

C.22   In the case of internal <u>in</u>-migration, the ASMigR schedules are applied to an external 'reference' population (i.e. the population 'at-risk' of migrating into the area). This is different to the other components (i.e. births, deaths, internal <u>out</u>-migration), where the schedule of rates is applied to the area-specific population (i.e. the population 'at-risk' of migrating out of the area). The reference population is defined by considering the areas which have historically contributed the majority of migrants into the area. In the case of East Lindsey, it comprises all districts which cumulatively contributed 70% of migrants into the Greater Lincolnshire LEP over the 2008/09–2014/15 period.

C.23   In the **10yr Dwelling Completions** scenario, historical counts of internal in and out-migrants are used from 2001/02 to 2014/15. From 2015/16, these scenarios then calculate their own internal

migration assumptions to ensure an appropriate balance between the population and the targeted increase in the number of dwellings that is defined in each year of the forecast period. A higher level of net internal migration will occur if there is insufficient population to support the defined level of housing growth. In the **10yr Dwelling Completions** scenario, the profile of internal migrants is defined by an ASMigR schedule, derived from the ONS 2014-based SNPP.

International Migration

C.24   Historical mid-year to mid-year counts of immigration and emigration by 5-year age group and sex have been sourced from the 'components of population change' files that underpin the ONS MYEs. Any 'adjustments' made to the MYEs to account for asylum cases are included in the international migration balance.

C.25   In all scenarios, future international migrant counts are specified.

C.26   In the **SNPP-2012** scenario, historical counts of migrants are used from 2001/02 to 2011/12. From 2012/13, the international in- and out-migration counts are drawn directly from the 2012-based official projection.

C.27   In the **SNPP-2014** scenario, historical counts of migrants are used from 2001/02 to 2013/14. From 2014/15, the international in- and out-migration counts are drawn directly from the 2014-based official projection.

C.28   In the **PG** scenarios, historical counts of international in and out-migrants are used from 2001/02 to 2014/15. From 2015/16, future international migration counts are based on the area-specific historical migration data. The **PG 5yr** scenario uses a *five* year migration history (2010/11–2014/15), whilst the **PG 10yr** scenario uses a *ten* year migration history (2005/06–2014/15). In all **PG** scenarios, an ASMigR schedule of rates is derived from the relevant migration history and is used to distribute future counts by single year of age.

C.29   Implied within the international migration component of change in the **PG** scenarios is an 'unattributable population change' (UPC) figure, which ONS identified within its latest mid-year estimate revisions. The POPGROUP model has assigned the UPC to international migration as it is the component with the greatest uncertainty associated with its estimation.

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C.30 In the **10yr Dwelling Completions** scenario, historical counts of international in and out-migrants are used from 2001/02 to 2014/15. From 2015/16, international migration counts are taken from the ONS 2014-based SNPP (i.e. counts are consistent with the **SNPP-2014** scenario). An ASMigR schedule of rates from the ONS 2014-based SNPP is used to distribute future counts by single year of age.

Households & Dwellings

C.31 The 2011 Census defines a household as:

"one person living alone, or a group of people (not necessarily related) living at the same address who share cooking facilities and share a living room or sitting room or dining area."

C.32 In POPGROUP, a dwelling is defined as a unit of accommodation which can either be occupied by one household or vacant.

C.33 The household and dwelling growth implications of each population growth trajectory have been evaluated through the application of headship rate statistics, communal population statistics and a dwelling vacancy rate. These data assumptions have been sourced from the 2001 and 2011 Censuses and the 2008-based, 2012-based and 2014-based household projection model from the DCLG. The 2014-based model was released by the DCLG in July 2016, and is underpinned by the 2014-based SNPP from ONS.

Household Headship Rates

C.34 A household headship rate (also known as household representative rate) is the *"probability of anyone in a particular demographic group being classified as being a household representative"*[10].

C.35 The household headship rates used in the POPGROUP modelling have been taken from the latest DCLG 2014-based household projection model, which is underpinned by the ONS 2014-based SNPP. The DCLG household projections are derived through the application of projected headship

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[10] Household Projections 2012-based: Methodological Report. Department for Communities and Local Government ([February] 2015). https://www.gov.uk/government/statistics/2012-based-household-projections-methodology

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rates to a projection of the private household population. The methodology used by DCLG in its household projection models consists of two distinct stages:

- **Stage One** produces the national and local authority projections for the total number of households by sex, age-group and relationship-status group over the projection period.

- **Stage Two** provides the detailed 'household-type' projection by age-group, controlled to the previous Stage One totals.

C.36   In POPGROUP, the Stage Two headship rates have been applied by 10-year age group in an 8-fold household type classification (Table 16). The following scenario identifiers have been applied:

- **HH-08**: 2008-based DCLG headship rates, scaled to the 2011 DCLG household total, following the original trend thereafter (to ensure a consistent starting point).
- **HH-12**: 2012-based DCLG headship rates.
- **HH-14**: 2014-based DCLG headship rates.

Table 16: DCLG Stage Two headship rate classification household type classification

DCLG Category	Description
One person male	One person households: Male
One person female	One person: Female
Couple no child	One family and no others: Couple households: No dependent children
Cple+adlts no child	A couple and one or more other adults: No dependent children
One child	Households with one dependent child
Two children	Households with two dependent children
Three+ children	Households with three or more dependent children
Other households	Other households with two or more adults

Communal Population Statistics

C.37   Household projections in POPGROUP exclude the population 'not-in-households' (i.e. the communal/institutional population). These data are drawn from the DCLG 2014-based household projections, which use statistics from the 2011 Census. Examples of communal establishments include prisons, residential care homes and student halls of residence.

C.38   For ages 0–74, the number of people in each age group not-in-households is fixed throughout the forecast period. For ages 75–85+, the proportion of the population not-in-households is

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recorded. Therefore, the population not-in-households for ages 75–85+ varies across the forecast period depending on the size of the population.

Vacancy Rate

C.39   The relationship between households and dwellings is modelled using a 'vacancy rate', sourced from the 2011 Census[11]. The vacancy rate is calculated using statistics on households (occupied household spaces) and dwellings (shared and unshared).

C.40   A vacancy rate of 6.5% for East Lindsey has been applied, fixed throughout the forecast period. Using the vacancy rate, the 'dwelling requirement' of each household growth trajectory has been evaluated. For each of the Wet and Dry sub-district areas, the following vacancy rates have been applied:

- Wet Area: 8.2%
- Dry Area: 5.7%

Labour Force & Jobs

C.41   In all district level scenarios, the labour force and jobs implications of the population growth trajectory are evaluated through the application of three key data items: economic activity rates, an unemployment rate and a commuting ratio.

Economic Activity Rates

C.42   The level of labour force participation is recorded in the economic activity rates. Economic activity rates by five year age group (ages 16-75+) and sex have been derived from Census statistics. Between the 2001 and 2011 Censuses, rates of economic activity increased, most notably for females, and males in the older age groups (Figure 32).

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[11] Census Table KS401EW: Dwellings, household spaces and accommodation type

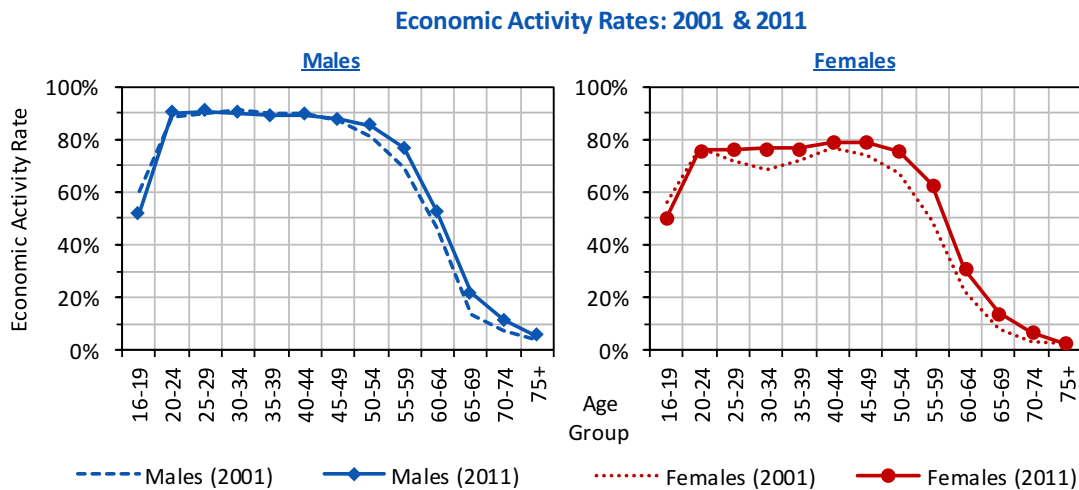edge analytics

Economic Activity Rates: 2001 & 2011

Figure 32: East Lindsey's economic activity rates: 2001 and 2011 Census comparison (source: ONS)

C.43 The Office for Budget Responsibility (OBR) has undertaken analysis of labour market trends in its 2014 Fiscal Sustainability Report[12]. Included within its analysis is a forecast of changing economic activity rates for males and females, extending to a long-term 2066 forecast horizon. This forecast has been used to generate an adjusted set of 2011 Census economic activity rates for East Lindsey. Adjustments have been made over a 15-year period, for the older 60–75+ age groups (Table 17 and Figure 33).

Table 17: OBR Economic Activity Rate adjustments

OBR1 Economic Activity Rates Change 2011–2032			
Males		**Females**	
16–19	0%	16–19	0%
20–24	0%	20–24	0%
25–29	0%	25–29	0%
30–34	0%	30–34	0%
35–39	0%	35–39	0%
40–44	0%	40–44	0%
45–49	0%	45–49	0%
50–54	0%	50–54	0%
55–59	0%	55–59	0%
60–64	10%	60–64	22%
65–69	39%	65–69	90%
70–74	5%	70–74	54%
75+	17%	75+	81%

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[12] http://cdn.budgetresponsibility.org.uk/41298-OBR-accessible.pdf

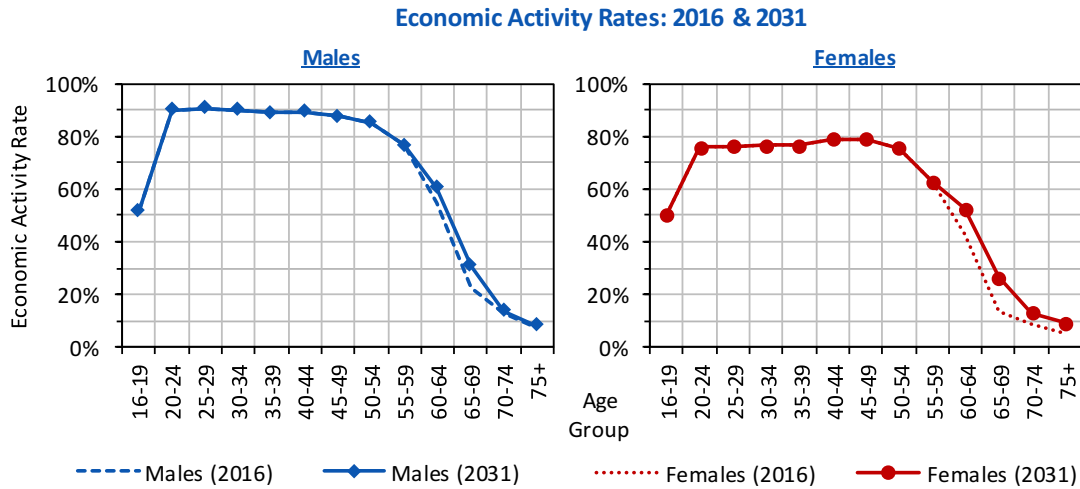edge analytics

Economic Activity Rates: 2016 & 2031

Figure 33: OBR economic activity rate profile for East Lindsey

Commuting Ratio

C.44   The commuting ratio, together with the unemployment rate, controls the balance between the number of workers living in a district (i.e. the resident labour force) and the number of jobs available in the district. A commuting ratio greater than 1.00 indicates that the size of the resident workforce exceeds the number of jobs available in the district, resulting in a net out-commute. A commuting ratio less than 1.00 indicates that the number of jobs in the district exceeds the size of the labour force, resulting in a net in-commute.

C.45   From the 2011 Census 'Travel to Work' statistics, published by ONS in July 2014, a commuting ratio of 1.09 has been derived for East Lindsey. This is compared to the 2001 Census value in Table 18.

Table 18: Commuting Ratio Comparison

East Lindsey		2001 Census	2011 Census
Workers	*a*	53,442	56,311
Jobs	*b*	46,226	51,754
Commuting Ratio	*a/b*	**1.16**	**1.09**

Note: 2001 data from Census Table *T101 – UK Travel Flows* ; 2011 data from Census Table *WU02UK - Location of usual residence and place of work by age* .

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Unemployment Rate

C.46   The unemployment rate, together with the commuting ratio, controls the balance between the size of the labour force and the number of jobs available within an area.

C.47   In all scenarios for East Lindsey, historical unemployment rates are defined up to 2015. From 2015, the unemployment rate to a 2001–2007 average of 4.3% by 2020 (Table 19), and is fixed thereafter.

Table 19: Historical unemployment rates 2001–2015

Area	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average (2001-07)
East Lindsey	3.9	3.9	3.9	3.9	4.0	5.3	5.3	5.1	5.9	6.7	7.5	7.4	7.6	6.1	4.8	4.3

Source: ONS model-based estimates of unemployment, from NOMIS

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