

# **North Tyneside Local Plan**



Working in partnership with  
**CAPITA**

## **Demographic and Household Forecasts Update 2016**

Informed by 2014 based Sub-national population  
projections and household forecasts

**Edge Analytics**

North Tyneside Council

**22 September 2016**

## 1 Introduction

- 1.1 This note introduces the Demographic Projections Update 2016 prepared by Edge Analytics for North Tyneside Council during September 2016. This informs previous reports prepared in 2014 and 2015. The full Report prepared by Edge Analytics is available below after this summary note.
- 1.2 This updated projections evidence has been prepared to inform the Local Plan Examination in Public. It takes into consideration the potential changes upon forecasts for household and dwelling growth that arise as a result of the latest benchmark Sub-national Population Projections and household forecasts.
- 1.3 North Tyneside Council commissioned this update following publications of the 2014 Based Sub-national Population Projections by Office for National Statistics in February 2016 and 2014 Based Household Forecasts by DCLG in July 2016.

## 2 The 2016 update and Objectively Assessed Need

- 2.1 Table 1 outlines the core data from the demographic and household forecasts prepared by Edge Analytics for three key scenarios that have been identified as forming the Objectively Assessed Need for North Tyneside and the resultant average that has been proposed as the housing requirement within the submitted Local Plan Pre-submission Draft 2015.
- i) **SNPP** – The benchmark Sub-national Population Projection as replicated by Edge Analytics within their “Popgroup” modelling software.
  - ii) **PG-10yr** – This scenario is based on a longer period of analysis of migration and provides a local assessment of potential trend growth for North Tyneside.
  - iii) **Jobs Led Medium SENS3** – is one of several Jobs Led scenarios prepared. This is based upon the anticipated level of Job growth within North Tyneside as informed by trends in job growth investment potential over the plan period.

**Table 1: Key data comparison for selected scenarios**

SNPP benchmark		Change 2011–2032				Average per year	
Report	HH Model	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
2016 (SNPP-2014)	2014-based	17,305	8.6%	14,333	15.7%	620	707
2015 (SNPP-2012)	2012-based	21,449	10.7%	16,258	17.8%	718	802
2014 (SNPP-2012)	2011-based	21,449	10.7%	14,418	15.7%	718	711
	2008-based	21,449	10.7%	16,426	17.9%	718	810

PG-10yr		Change 2011–2032				Average per year	
Report	HH Model	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
2016	2014-based	19,732	9.8%	15,219	16.6%	721	750
2015	2012-based	23,655	11.8%	16,924	18.5%	786	834
2014	2011-based	23,655	11.8%	15,413	16.8%	786	760
	2008-based	23,655	11.8%	17,459	19.1%	786	861
Jobs-led (Medium) SENS3		Change 2011–2032				Average per year	
Report	HH Model	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
2016	2014-based	18,335	9.1%	14,686	16.1%	694	724
2015	2012-based	23,650	11.8%	17,202	18.8%	843	848
2014	2011-based	23,650	11.8%	15,264	16.7%	843	753
	2008-based	23,650	11.8%	17,330	18.9%	843	854

Source: Updating the Demographic Evidence 2016, Edge Analytics

2.2 It is apparent from the figures above that the latest demographic and household forecasts suggest annual requirements may be lower for the period 2011 to 2032 than identified in the 2015 Edge Analytics update.

2.3 A key change in the relationship between the three scenarios arises as the greatest annual dwelling need now arises under the PG-10 Year scenario rather than the Jobs Led Medium SENS 3 scenario. This reflects a small increase in the labour force as a proportion of the Borough's total population and as a result the subsequent population and households required. The forecast age profile of the Borough's population, updated economic activity rates, and unemployment data influence these figures and the subsequent household and dwelling forecasts.

### 3 Impact upon the Borough's Housing Requirement

3.1 As noted within Supporting Statement 6: Employment and Household Growth (NT03/6) the various publications of Sub-national Population Projections and Household Forecasts since 2008 have fluctuated both up and down notably as the effects of local delivery and the economy have influenced the factors informing projections. Planning Guidance establishes that Local Plans should be informed by the latest available evidence but recognises that housing assessments should not automatically be considered out of date with each time revised projections are prepared.

3.2 Table 2 illustrates the potential impact of the revised 2014 based household and population projections upon North Tyneside’s housing requirement. This is based upon the average between the range of growth between the Sub-national Population Projections and the Medium Jobs Led Sensitivity 3.

**Table 2: The potential impact upon North Tyneside’s housing requirement**

Edge Analytics Report Date	2015	2016
Population p.a. 2011-32	1,091	879
Labour force p.a. 2011-32	124	184
Households p.a. 2011-32	800	702
Dwellings p.a. 2011-32	828	727
Growth 2011 to 2032	17,388	15,269

# North Tyneside

Updating the demographic evidence

September 2016

For the attention of:  
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## Acknowledgements

Demographic statistics used in this report have been derived from data from the Office for National Statistics licensed under the Open Government Licence v.3.0.

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*The authors of this report do not accept liability for any costs or consequential loss involved following the use of the data and analysis referred to here; this is entirely the responsibility of the users of the information presented in this report.*

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# Introduction

## Context & Requirements

- 1.1 North Tyneside has previously commissioned arc4 to produce its Strategic Housing Market Assessment (SHMA). Edge Analytics produced a variety of demographic evidence to support the development of the 2015 SHMA. An initial report was completed in December 2014, with an update produced in June 2015 to include the 2012-based household projection model from the Department for Communities and Local Government (DCLG).
- 1.2 Since the completion of the demographic evidence for both the 2014 and 2015 reports, a number of new datasets have been published. In May 2016, the ONS 2014-based sub-national population projections (SNPP) was released, followed by the 2014-based DCLG household projection models in July 2016. Also available are three years of mid-year population estimates (2013, 2014 and 2015) for North Tyneside, providing an updated historical time frame for the trend scenarios.
- 1.3 North Tyneside has requested an update to the scenarios presented in the 2015 report, using the most recent demographic evidence. Forecasts are required for North Tyneside's 2011–2032 plan period.
- 1.4 Additionally, the Council has requested that Edge Analytics identify the differences between the scenarios that were developed previously (2014 and 2015 reports), with those produced in this 2016 update. A short comparative note is provided, presenting a summary of the previous data inputs, assumptions and outcomes for the following scenarios:
  - Official benchmark scenarios (comparing the 2012-based and the 2014-based SNPPs)
  - PG-10yr scenario
  - Jobs-led (Low) SENS3
  - Jobs-led (Medium) SENS3
  - Jobs-led (High) SENS3
  - Jobs-led (High +) SENS3



# Approach

## Official Guidelines

- 1.5 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)<sup>1</sup>, with practical advice on assessing the housing needs and establishing housing targets for an area.
- 1.6 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 Office for National Statistics (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).
- 1.7 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 employment 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

- 1.8 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 the 2011–2032 plan period.
- 1.9 The scenario analysis is prefaced with a ‘demographic profile’ of North Tyneside, illustrating its geographical context, its ‘components’ of population change (births, deaths, and migration) and its historical commuting and migration patterns (Section 2).
- 1.10 The starting point of the scenario analysis is the 2014-based SNPP and sub-national household projection for North Tyneside (Section 3). A number of alternative trend scenarios, using varying

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<sup>1</sup> <http://www.pas.gov.uk/documents/332612/6549918/OANupdatedadvisenote/f1bfb748-11fc-4d93-834c-a32c0d2c984d>

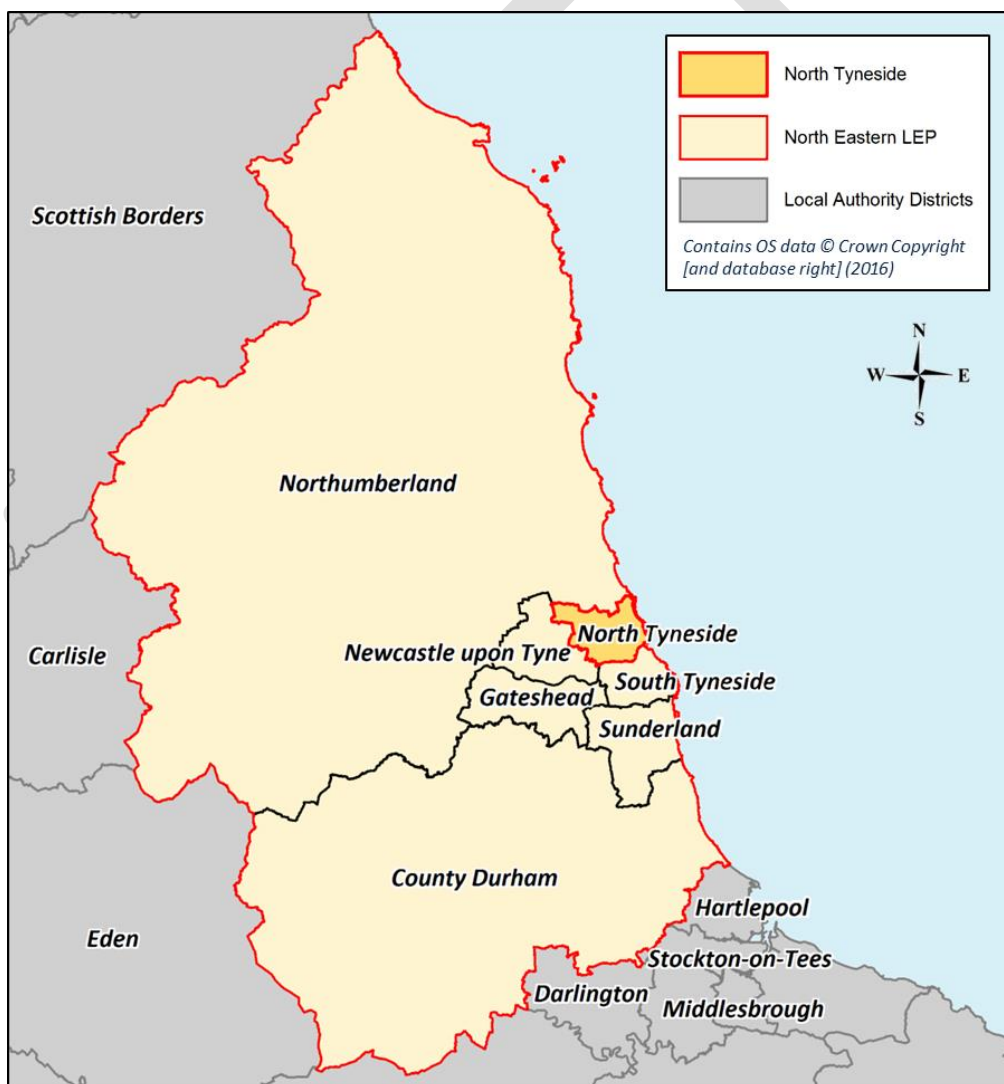
migration assumptions, have been developed and are compared to the 2014-based SNPP benchmark. Household and dwelling growth have been estimated using assumptions from the 2014-based DCLG household projection model for North Tyneside. The demographic scenario definitions and results are presented in Section 4.

- 1.11 Section 5 considers the effect on North Tyneside's labour force of its changing age structure, linking it to an estimated jobs growth requirement using assumptions on economic activity rates, unemployment and commuting. These are compared to jobs growth forecasts from the Employment Land Review (ELR) for North Tyneside, provided by Arup in 2014. Sensitivity scenarios examine the effect of a reducing commuting ratio upon growth outcomes.
- 1.12 Section 6 summarises the scenario evidence.
- 1.13 Appendices A and B provide a summary of the POPGROUP methodology and the scenario data inputs and assumptions.
- 1.14 Appendix C provides a comparison of the 2014, 2015 and 2016 reports, and a comparison of the requested scenario data inputs and assumptions.

# 2 Area Profile

## Geography

- 2.1 North Tyneside is a coastal borough located within Tyne and Wear, part of the North East Local Enterprise Partnership (LEP), bordered by the districts of Northumberland, Newcastle upon Tyne, South Tyneside and the North Sea (Figure 1).



## Population Growth Profile

2.2 The latest 2015 mid-year population estimate (MYE) for North Tyneside suggests a population of 202,494, an increase of 5.5% since 2001. North Tyneside’s rate of growth is higher than the county average of 3.3%, but considerably lower when compared to England in total (Table 1).

Table 1: North Tyneside population change comparison (source: ONS)

Area	Population			
	2001	2015	Change	% Change
North Tyneside	192,003	202,494	10,491	5.5%
North East	2,540,090	2,624,621	84,531	3.3%
England	49,449,746	54,786,327	5,336,581	10.8%

2.3 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.

2.4 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, the population of North Tyneside was 200,801, a 4.8% increase over the 2001–2011 decade. The 2011 Census population count proved to be *higher* than that suggested by the trajectory of growth from the previous MYEs. For this reason, an upward revision to previous mid-year population estimates was necessary (Figure 2).

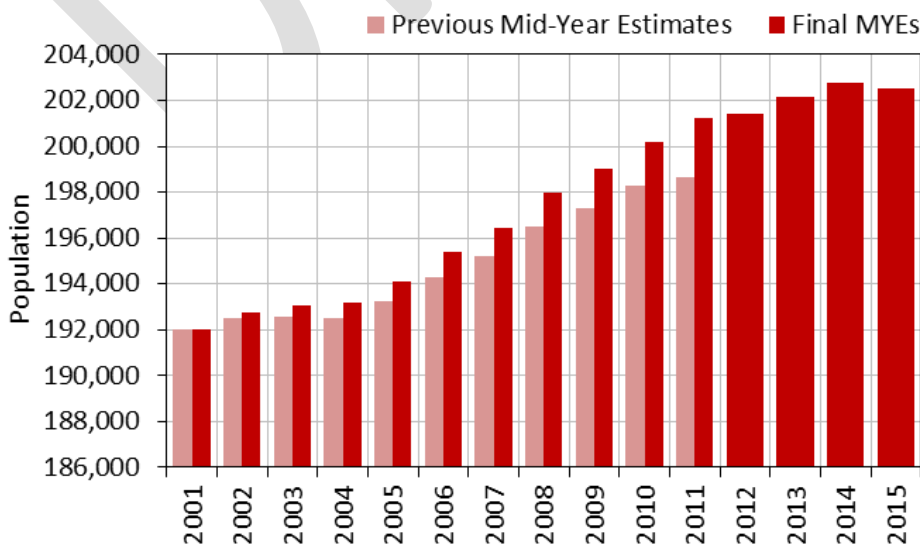


Figure 2: North Tyneside mid-year population estimates, 2001–2015

2.5 The rebasing of the mid-year estimates 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. In the case of North Tyneside, the impact of the UPC component was an uplift to each mid-year population, averaging 180 per year (Figure 3).

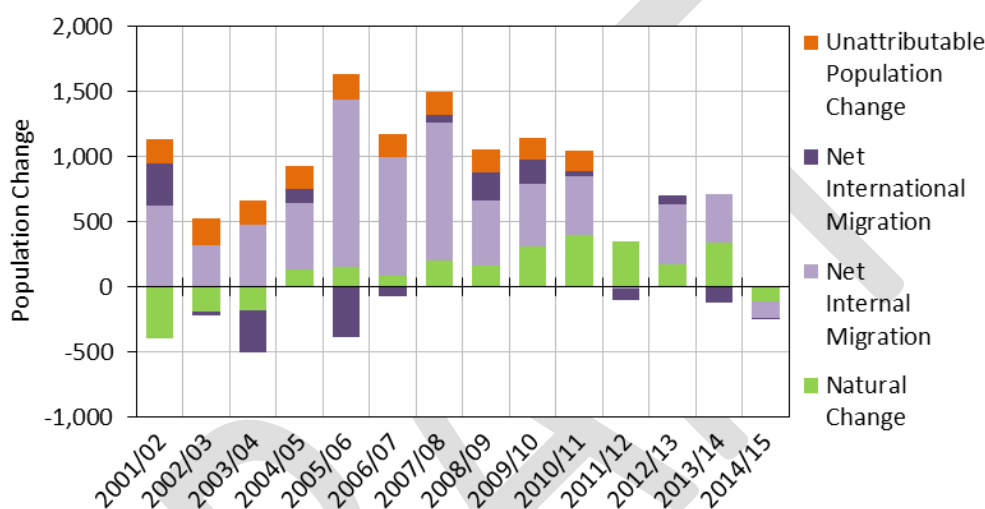


Figure 3: Mid-Year Population Estimates (source: ONS)

2.6 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.

2.7 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).

2.8 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 North Tyneside. Based on this assumption, and with the inclusion of statistics from the latest 2012–

2015 mid-year estimates from ONS, a fourteen-year profile of the 'components of change' is presented for North Tyneside (Figure 5).

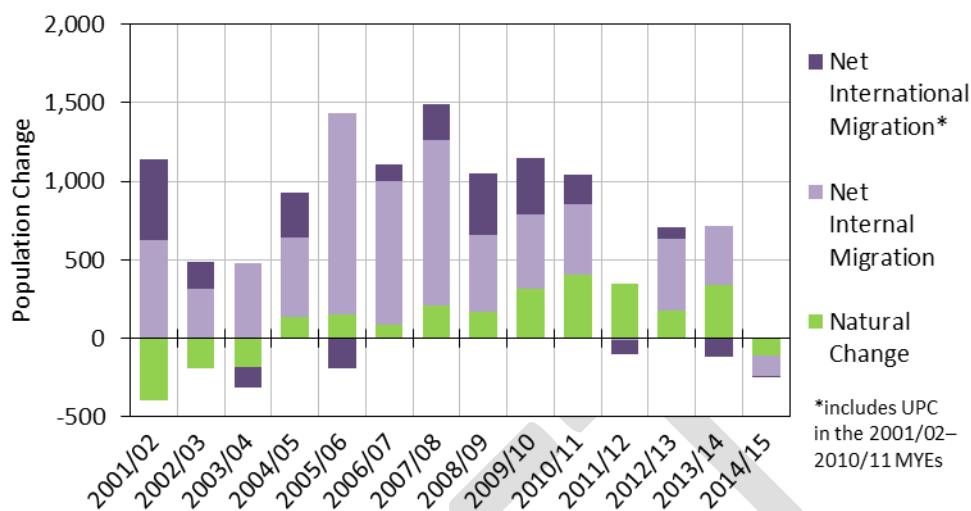


Figure 4: North Tyneside components of population change 2001/02 to 2014/15, including the UPC component in the 2001/02 to 2010/11 international migration component (source: ONS)

- 2.9 North Tyneside'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 contributed a relatively small amount to annual growth in population, with deaths exceeding births in the first three years and most recent year of the historical time period. Since 2004/05, its impact has been largely positive with the number of births exceeding the number of deaths.
- 2.10 Internal migration (i.e. the exchange of migrants between North Tyneside and other parts of the UK) has had the most significant impact on population growth, but with a significant fall in net internal migration in 2014/15. Internal migration has averaged +521 per year since 2001/02.
- 2.11 International migration is estimated to have had a less significant impact upon North Tyneside's population growth, contributing little to demographic change since 2011.

## Age-Structure

- 2.12 The changing age structure of North Tyneside's population is a key element when considering future housing needs and the evolution of its resident labour force. Using the 2014 base year of the latest ONS sub-national projections, North Tyneside's age profile is compared to its region

and to England in total (Figure 5). There is a smaller proportion of population in the younger labour-force (ages 20–39) compared to the older labour force age groups (ages 40–74).

2.13 North Tyneside has a similar older age profile to the North East region, and slightly older when compared to England in total, with 19% in the 65+ age-range, an old age dependency (OAD) ratio of 30 and a median age of 43.

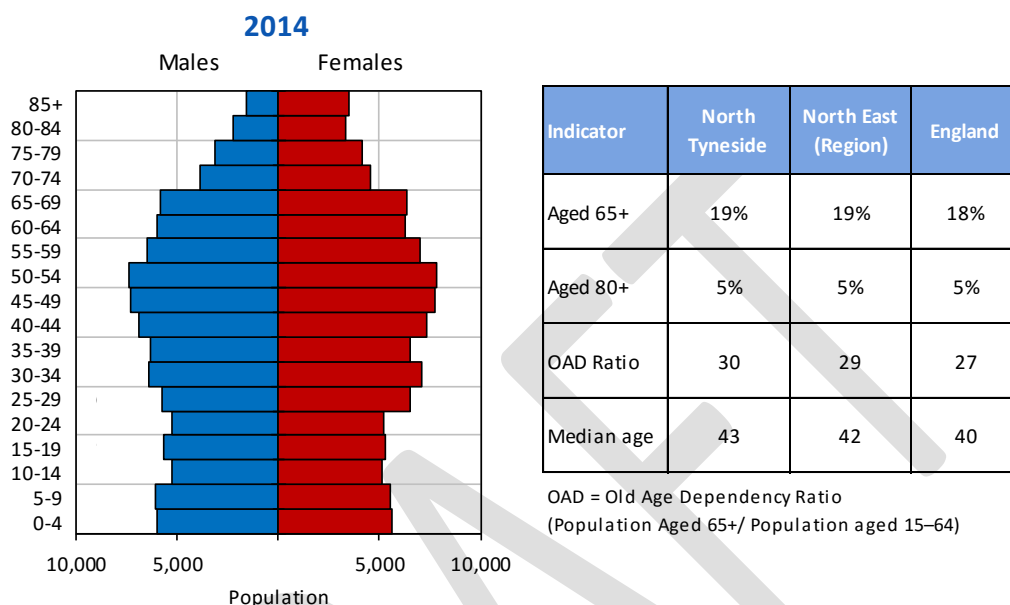


Figure 5: North Tyneside, population age structure (source: ONS)

## Internal Migration

2.14 Internal migration statistics measure the in- and out-flows of population to and from North Tyneside, from and to elsewhere in the UK. The average annual growth of North Tyneside’s population as a result of internal migration exchanges has been approximately +521 per year since 2001/02 (Figure 6). This illustration reflects the ‘components-of-change’ profile but presents the separate in-migration and out-migration flows that make up the net total.

2.15 During the 2001/02–2014/15 time period, internal in-migration has averaged 7,237 per year, with internal out-migration averaging 6,716 per year.

2.16 In terms of migration linkages between North Tyneside and surrounding areas, the largest positive net exchanges (i.e. a higher inflow than outflow) have been with Newcastle upon Tyne and Gateshead (Figure 7). For the net outflow exchange, the dominant flow has been between North Tyneside and Northumberland (Figure 7).

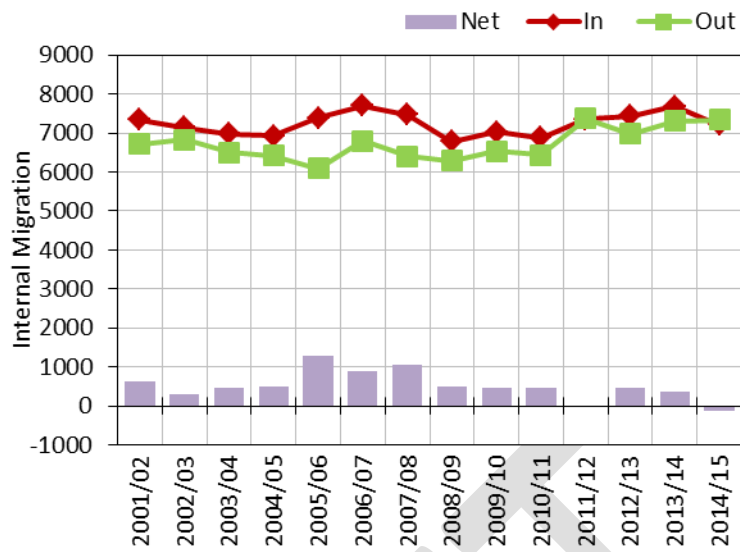


Figure 6: North Tyneside internal migration profile, 2001/02–2014/15 (source: ONS)

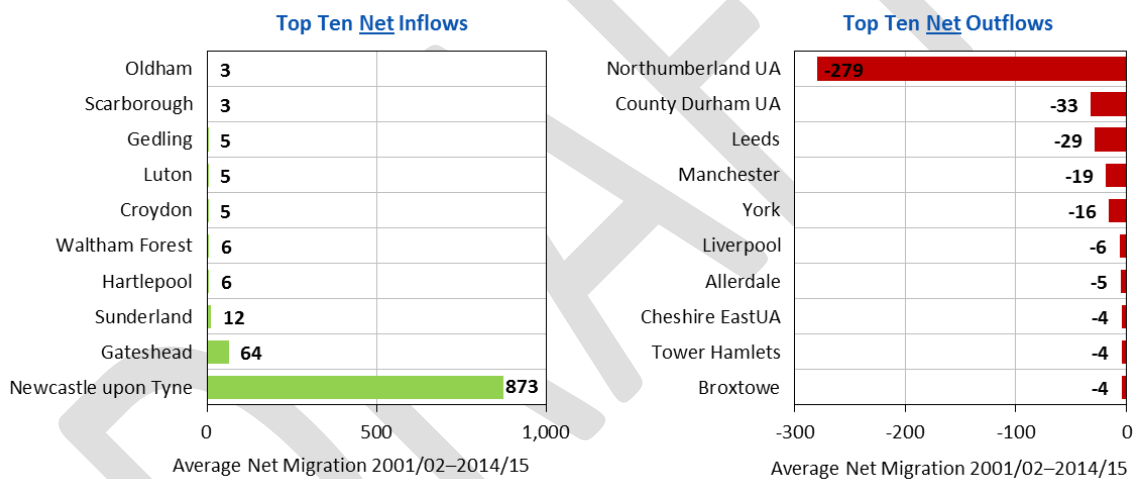


Figure 7: Top-10 internal migration net inflows & outflows, average 200102–2014/15 (Source: ONS)

2.17 The age profile of migration reveals that North Tyneside has experienced a net inflow in all age-groups with the exception of 15–19 year-olds and those aged 75+ (Figure 8). The net outflow in the 15–19 age-group reflects the student outflow at age 18. The chart illustrates the importance of the student migration exchange upon North Tyneside’s population but also the positive impact of migration growth in all other age-groups.



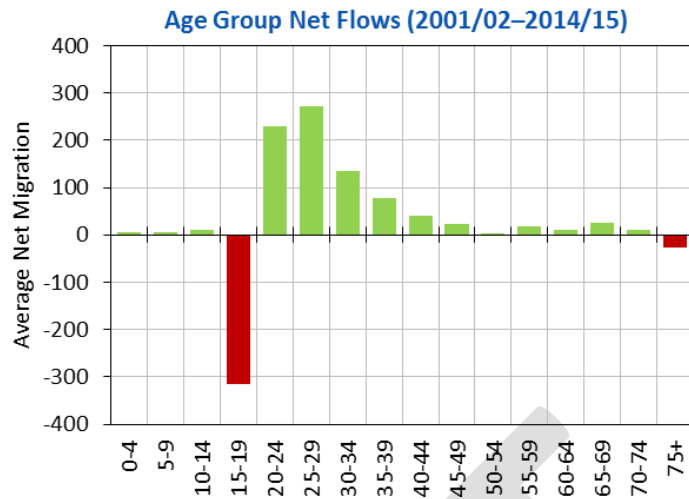
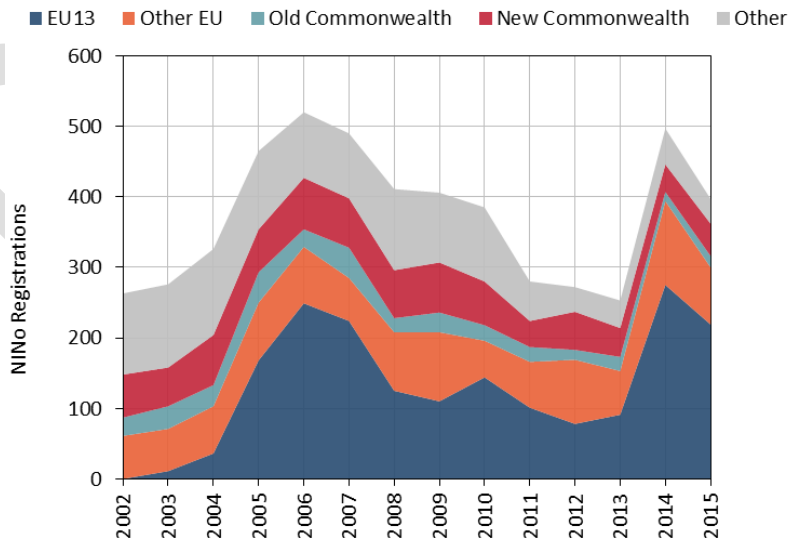


Figure 8: North Tyneside internal migration age profile 2001/02–2013/14 (source: ONS)

## International Migration

2.18 National Insurance Number (NINo) registrations provide an indication of the number of foreign nationals that have registered to work in North Tyneside since 2001 (Figure 9). The large majority of North Tyneside’s NINo-registrations have been associated with European migrants, with a rise in registrations in the latest years, following a 2013 low-point.



EU13 refers to countries that joined the European Union in 2004. Other EU refers to all other European Union countries.

Figure 9: NINo Registrations in North Tyneside, 2002–2015 (source: DWP)

2.19 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 trend in immigration and an indication of the country-of-origin of migrants locating themselves in North Tyneside.

## Commuting Flows

2.20 With regards to Travel-to-Work commuting flows, the 2011 Census recorded 96,026 workers aged 16–74 living within North Tyneside (Table 2) and 84,301 workers aged 16–74 working within North Tyneside (Table 3).

Table 2: North Tyneside 2011 Census commuting flows: workers (ages 16–74)

Where do people who <u>live</u> in North Tyneside work?		Source: ONS	
Live	Work	Number	%
North Tyneside	North Tyneside	51,854	54.0%
	Newcastle upon Tyne	24,863	25.9%
	Northumberland	6,241	6.5%
	Other	13,068	13.6%
<b>Workers</b>		<b>96,026</b>	<b>100.0%</b>

Table 3: North Tyneside 2011 Census commuting flows: workers ages (16–74)

Where do people who <u>work</u> in North Tyneside live?		Source: ONS	
Live	Work	Number	%
North Tyneside	North Tyneside	51,854	61.5%
Newcastle upon Tyne		10,823	12.8%
Northumberland		10,486	12.4%
Other		11,138	13.2%
<b>Jobs</b>		<b>84,301</b>	<b>100.0%</b>

2.21 Approximately 54% of North Tyneside's labour force both live and work within the district, with 25.9% commuting out to neighbouring Newcastle-upon-Tyne, 6.5% to Northumberland and 13.6% commuting elsewhere (Table 2). In terms of employment, the majority of North Tyneside's jobs are taken up by the local workforce (61.5%), with 12.8% of workers commuting in from

Newcastle-upon-Tyne, 12.4% from Northumberland and a further 13.2% from elsewhere (Table 3).

2.22 This balance between workers and jobs has changed over the 2001–2011 decade; with a slightly lower growth in the number of resident workers (+12,398) compared to jobs (+17,288) (Table 4). These differences have resulted in a reduced net out-commute in 2011 (1.14) compared to 2001 (1.25).

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

North Tyneside		2001 Census	2011 Census
<b>Workers</b>	<i>a</i>	83,628	96,026
<b>Jobs</b>	<i>b</i>	67,013	84,301
<b>Commuting Ratio</b>	<i>a/b</i>	<b>1.25</b>	<b>1.14</b>

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* .

# 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 10).

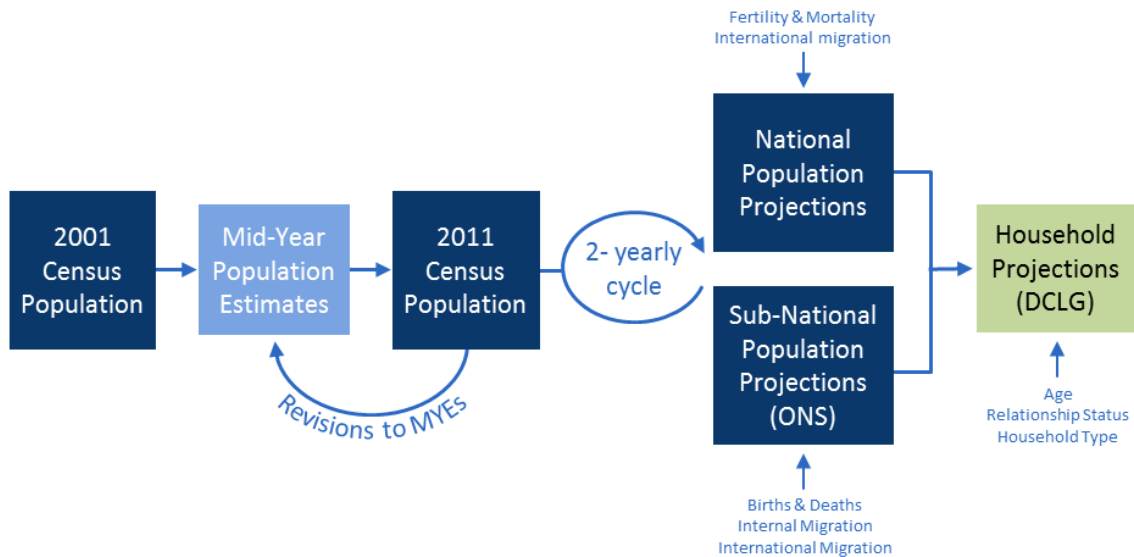


Figure 10: Official Statistics – population and households

3.3 Every two years, the Office for National Statistics (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<sup>2</sup>.

- 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 model for North Tyneside, 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<sup>3</sup>.
- 3.8 Figure 11 presents the ONS population projections for North Tyneside. Under the latest, 2014-based SNPP, the population of North Tyneside is expected to increase by 20,154 over the 25-year projection period (2014–2039), an increase of 9.9%. This rate of growth is lower than that estimated by the 2012-based outcome, which projected an increase of 12.2% over its 2012–2037 projection period.

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<sup>2</sup> <http://www.ons.gov.uk/ons/rel/npp/national-population-projections/2014-based-projections/index.html>

<sup>3</sup> <http://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/subnationalpopulationprojectionsforengland/2014basedprojections>

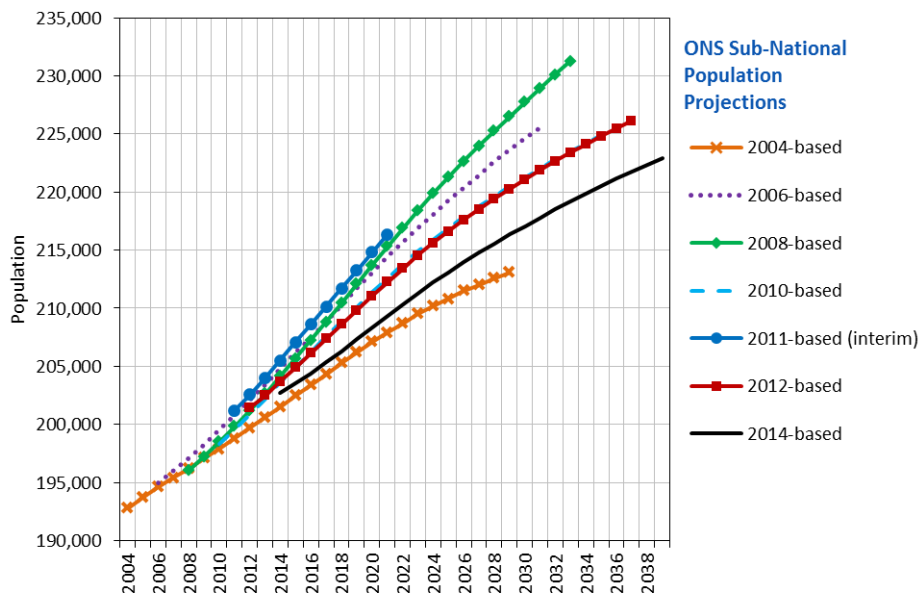


Figure 11: Official Projections for North Tyneside (Source: ONS)

3.9 The rate of population growth implied by the 2014-based SNPP for North Tyneside is *higher* than that estimated for the North East in total (Table 5). However, the North Tyneside rate of growth is substantially lower than that projected for England in total.

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

	2014	2039	Change	% Change
<b>North Tyneside</b>	202,744	222,898	20,154	9.9%
<b>North East England</b>	2,618,710	2,795,865	177,155	6.8%
<b>England</b>	54,316,618	63,281,522	8,964,904	16.5%

3.10 The components of population change that underpin the 2014-based projection for North Tyneside are presented in Figure 12, with the historical components of change for 2001/02 to 2013/14 included for comparison. As the population ages, natural change is projected to revert to an annual net loss of population by 2033. Internal migration is projected to remain consistently positive throughout the SNPP projection period, with international migration switching to an annual net loss from 2019 onward.

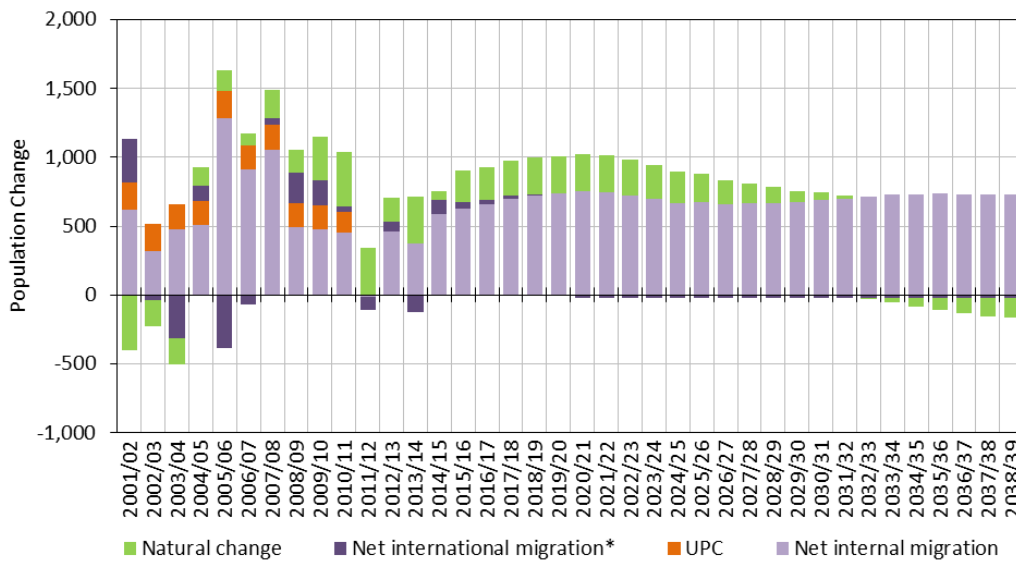


Figure 12: Historical and 2014-based SNPP components of change (Source: ONS)

3.11 To illustrate how the ONS assumptions on demographic change in North Tyneside compare with the historical evidence, the average annual natural change, net migration (internal and international) and population change for the 2014-based projection are compared to the historical short-term (6-year) and long-term (13-year) averages (Table 6).

Table 6: North Tyneside 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	290	118	113
Net Internal Migration	374	571	699
Net International Migration (+UPC)	133	137	-5
Net International Migration (-UPC)	50	-2	
Unattributable Population Change*	83	139	-
Net Migration (+UPC)	507	708	694
Net Migration (-UPC)	424	569	

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

3.12 The influence of natural change upon population growth is reflected in an SNPP average annual assumption that is relatively consistent with the longer-term 13-year average. The projected effect of internal migration in the 2014-based SNPP is estimated at a level that exceeds the average for both the six-year and thirteen-year periods preceding 2014, with an annual net inflow of +669 per year. International migration results in a small net emigration over the 25-year period, which is consistent with the historical evidence for the last 13-years, with the inclusion of the UPC adjustment.

## DCLG Household Projection

- 3.13 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.
- 3.14 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.
- 3.15 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.
- 3.16 The 2014-based DCLG household projection model for North Tyneside, underpinned by the 2014-based SNPP, estimates that the number of households will increase by 16,624 over the 2014–2039 projection period, equivalent to an additional 665 households per year, compared to 750 per year under the 2012-based model (Figure 13).

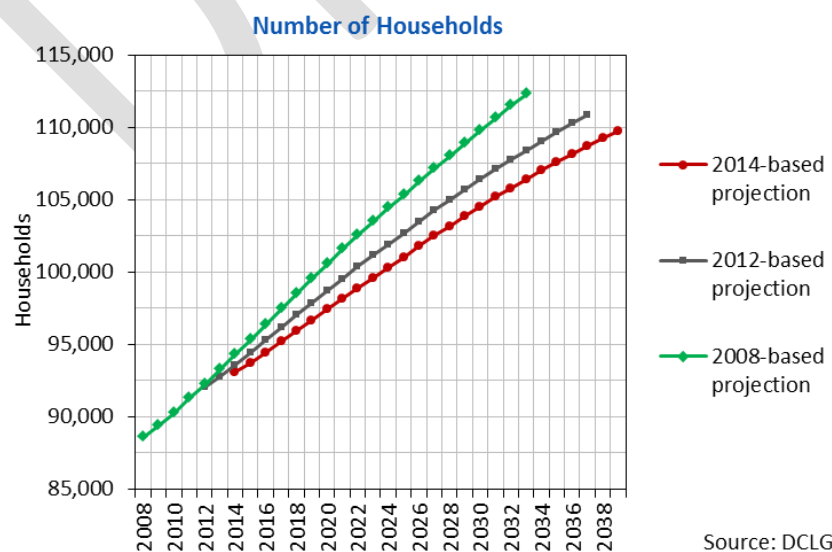


Figure 13: Household growth 2014 based DCLG household projections for North Tyneside



- 3.17 A significantly larger population growth expectation in the 2008-based household projection, coupled with household formation rates that suggest a more rapid reduction in average household size, resulted in an average annual household growth estimate of 949 per year under the 2008-based model.
- 3.18 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 the 2014–2032 projection period (i.e. the North Tyneside plan period *excluding* the historical years 2011–2013), the 2014-based household projection model suggests an increase of 12,712 households, approximately 706 per year. Over the same time period, the 2014-based SNPP projects an 8% growth in the population, equivalent to an additional 15,767 people (Table 7).

Table 7: North Tyneside 'starting point' estimates (source: ONS and DCLG)

	Variable	2014	2032	Change	% Change	Average (per year)
2014-based SNPP	Population	202,744	218,511	15,767	8%	876
2014-based DCLG Model	Households	93,098	105,810	12,712	14%	706
	Household Population	201,043	216,177	15,134	8%	841
	Average Household Size	2.16	2.04	-0.12	-5%	-0.01

- 3.19 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). Therefore, in the following sections, these 'official' projections are compared to a range of alternative growth scenarios.

# 4 Demographic Scenarios

## Introduction

- 4.1 There is no single definitive view on the likely level of growth expected in North Tyneside. Ultimately, a mix of economic, demographic and national/local policy issues determines 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 North Tyneside, 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. For comparison with this official benchmark, a number of 'alternative trend' scenarios have been developed, in which variant migration assumptions have been applied.
- 4.3 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). Therefore, in section 5 the labour force and job growth implications of the trend scenarios have also been estimated, through the application of key assumptions on North Tyneside's future economic activity rates, level of unemployment and balance of commuting between resident workers and local jobs. Additionally, jobs-led scenarios have been developed to assess the impact of jobs growth targets on the population and dwelling growth in North Tyneside.

## Demographic Scenario Definition

- 4.4 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 North Tyneside's housing growth analysis.
- 4.5 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<sup>4</sup>. 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 North Tyneside, it is appropriate to consider alternative time periods in the derivation of migration assumptions.
- 4.6 Three 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-10yr** scenario derives its internal migration rates and international migration flow assumptions from the historical period (2005/06–2014/15). A **PG-Full History** scenario derives its internal migration rates and international migration flow assumptions from a longer 14-year period (2001/02–2014/15). This makes use of the full historical time series for North Tyneside. Additionally, a **PG-Delayed Trend** developed for North Tyneside, derives its internal and international migration flow assumptions from the 2002/03–2011/12 historical period. This scenario makes use of the same historical period as presented in the PG-10yr trend-based scenarios presented in the previous reports (2014 and 2015).

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<sup>4</sup> <https://www.ons.gov.uk/populationandmigration/populationprojections/methodologies/>

## Demographic Scenario Results

- 4.7 Each of the scenarios has been run using historical MYEs for the 2001–2015 period. Scenario results are displayed for the 2011–2032 plan period (Figure 14 and Table 8). The plan period includes four years of historical data (2011/12, 2012/13, 2013/14 and 2014/15), with forecasts derived from a 2015 base year, except for the SNPP-2014 scenario, which retains its 2014 base year.
- 4.8 The **SNPP-2014** scenario estimates that North Tyneside’s population will increase by 8.6% between 2011 and 2032, resulting in an average annual dwelling requirement of +707 per year.
- 4.9 Population growth is higher under the trend-based scenarios, ranging from 9.8% to 11.0% population change.
- 4.10 The **PG-Delayed Trend** scenario results in the highest scenario growth outcome, driven by higher migration growth assumptions over the 2002/03–2011/12 period, and excluding the most recent historical years of lower migration. Dwelling growth under the **PG-Delayed Trend** scenario is an average of +791 dwellings per year.
- 4.11 The **PG-Full History** and **PG-10yr** scenarios result in lower population change (10.1% and 9.8% respectively). The lower population growth under these scenarios reflects the lower migration experienced in the most recent years. Population growth under the **PG-Full History** and **PG-10yr** scenario produces annual dwelling growth outcomes of +756 and +750 respectively.

### North Tyneside: Demographic Scenario Outcomes

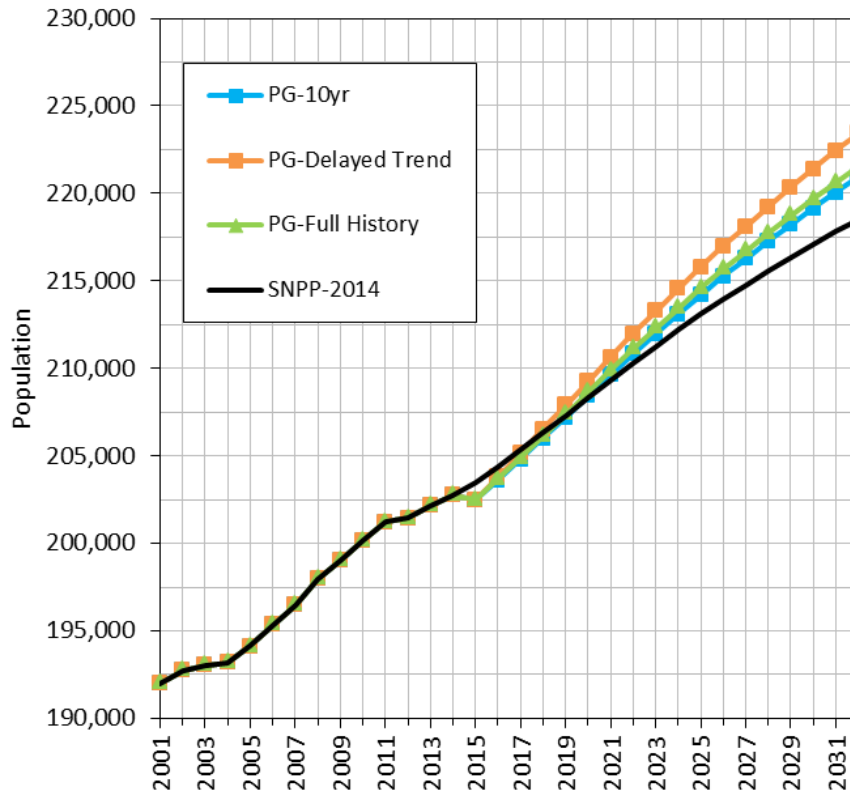


Figure 14: North Tyneside demographic scenario outcomes: population growth 2001–2032

Table 8: North Tyneside demographic scenario outcomes 2011–2032

Scenario	Change 2011–2032				Average per year	
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
PG-Delayed Trend	22,231	11.0%	16,034	17.5%	785	791
PG-Full History	20,324	10.1%	15,328	16.8%	732	756
PG-10yr	19,732	9.8%	15,219	16.6%	721	750
SNPP-2014	17,305	8.6%	14,333	15.7%	620	707

Note that household growth has been calculated using the 2014-based headship rates and dwelling growth estimated using a fixed 3.4% vacancy rate.



means that the 65+ population will be equivalent to 25% of those aged 16–64 by 2032, compared to 18% at the start of the plan period.

## Migration Sensitivities

- 4.15 To examine the potential effects of different migration outcomes, two additional scenarios have been developed. For consistency with the migration sensitivity scenarios presented in the previous 2014 and 2015 reports, the adjustments have been made to the **PG-10yr** scenario.
- 4.16 In the first migration sensitivity (**PG-10yr SENS1**), the internal *in*-migration flow has been *reduced* on the assumption that in-migration from Newcastle to North Tyneside will reduce in the future<sup>5</sup>.
- 4.17 In the second migration sensitivity (**PG-10yr SENS2**), both the internal *in*- and internal *out*-migration flows have been adjusted. This is on the assumption that in-migration to North Tyneside from Newcastle will *reduce* and out-migration from North Tyneside to Northumberland will *increase* in the future<sup>6</sup>.
- 4.18 The impact of reducing in-migration under the **PG-10yr SENS1** results in a lower population growth than that experienced under the **PG-10yr** scenario. Population growth of 3.9% under the **PG-10yr SENS1** scenario (compared to 9.8% under the **PG-10yr** scenario), results in an average annual dwelling requirement of 503 per year.
- 4.19 The **PG-10yr SENS2** scenario results in the lowest population growth, 1.9% over the 2011–2032 period, reflecting the impact of reducing both in- and out-migration flows from North Tyneside. This produces a dwelling requirement of +420 per year.

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<sup>5</sup> In **PG-10yr SENS 1**, the internal *in*-migration flow has been *reduced* by increasing intervals of 150 from 2016/17 (i.e. the in-flow has been *reduced* by 150 in year 1, by 300 in year 2, and so on until a reduction of 750 is achieved in 2020/21). From 2021, the in-migration *reduction* is fixed at -750 per year.

<sup>6</sup> In **PG-10yr SENS 2**, the internal *in*-flow has been adjusted in line with **PG-10yr SENS1**. The internal *out*-migration flow has been *increased* by 100 in 2015/16 and by increasing intervals of 50 from 2016/17 (i.e. the out-flow has been increased by 100 in year 1, by 150 in year 2, and so on until an increase of 350 is achieved in 2020/21). From 2021, the out-migration *increase* is fixed at +200 per year.

### North Tyneside: Migration Sensitivity Scenario Outcomes

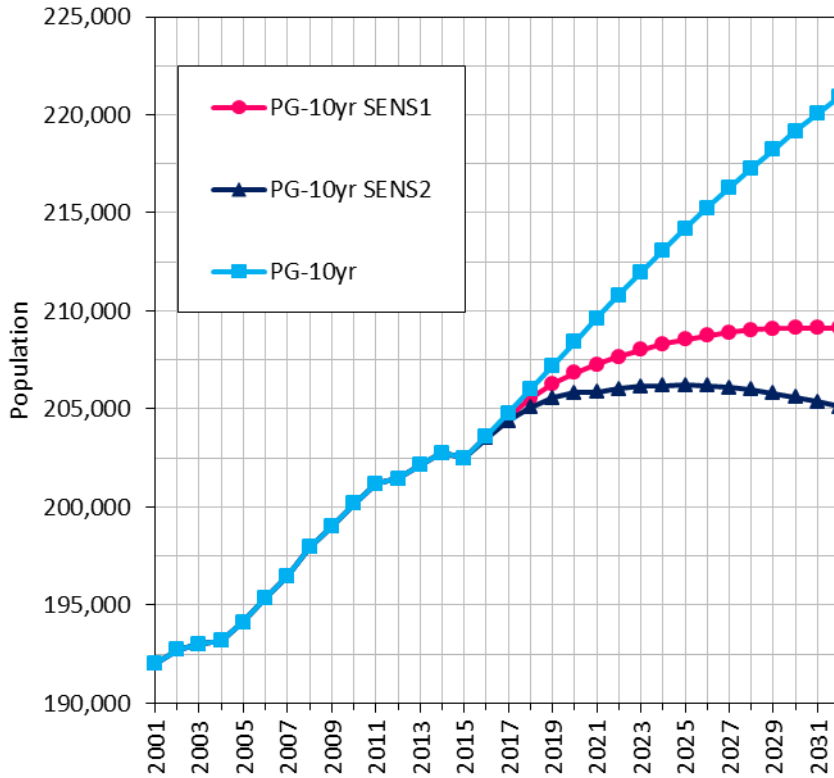


Figure 16: North Tyneside migration sensitivity scenario outcomes: population growth 2001–2032

Table 9: North Tyneside migration sensitivity scenario outcomes 2011–2032

Scenario	Change 2011–2032				Average per year	
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
<b>PG-10yr</b>	<b>19,732</b>	<b>9.8%</b>	<b>15,219</b>	<b>16.6%</b>	<b>721</b>	<b>750</b>
PG-10yr SENS1	7,913	3.9%	10,211	11.2%	221	503
PG-10yr SENS2	3,911	1.9%	8,522	9.3%	52	420



# 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 are presented. Additionally, four jobs-led scenarios have been developed, using jobs growth targets from the ELR from Arup (2014). In the jobs-led scenarios, population growth is determined by the growth in the number of jobs, in combination with economic activity rates, unemployment rate and commuting ratio assumptions. Jobs-led sensitivity scenarios have also been developed, altering the commuting ratio assumption.

## 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 North Tyneside increased in all but the youngest male age

group, and most notably in the older age groups (Figure 17). The increase in the economic activity rates has been more pronounced for females than for males.

- 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 maintaining the overall rate of employment. This is particularly the case in North Tyneside 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 ages.

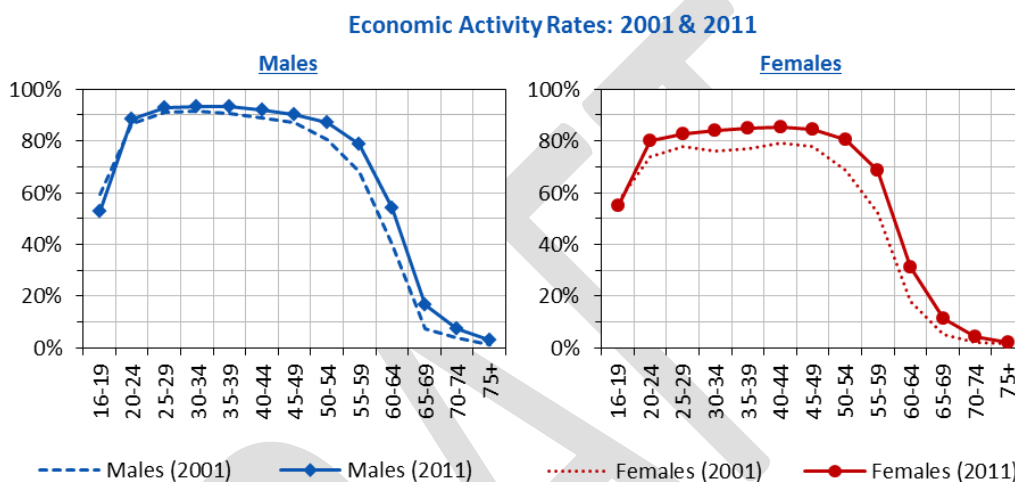


Figure 17: 2001 and 2011 Census economic activity rates for North Tyneside (source: ONS)

- 5.6 Whilst economic activity rates have increased historically (see Figure 17), 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 economic activity 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 an analysis of labour market trends in its 2014 Fiscal Sustainability Report<sup>7</sup>. Included within its analysis is a forecast of changing economic activity rates for males and females in the 16–75+ age groups, extending to a long-term, 2066 forecast horizon.

<sup>7</sup> <http://cdn.budgetresponsibility.org.uk/41298-OBR-accessible.pdf>

- 5.8 In the scenario analysis presented here, economic activity rates for ages 60–75+ in North Tyneside 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 (Figure 18).

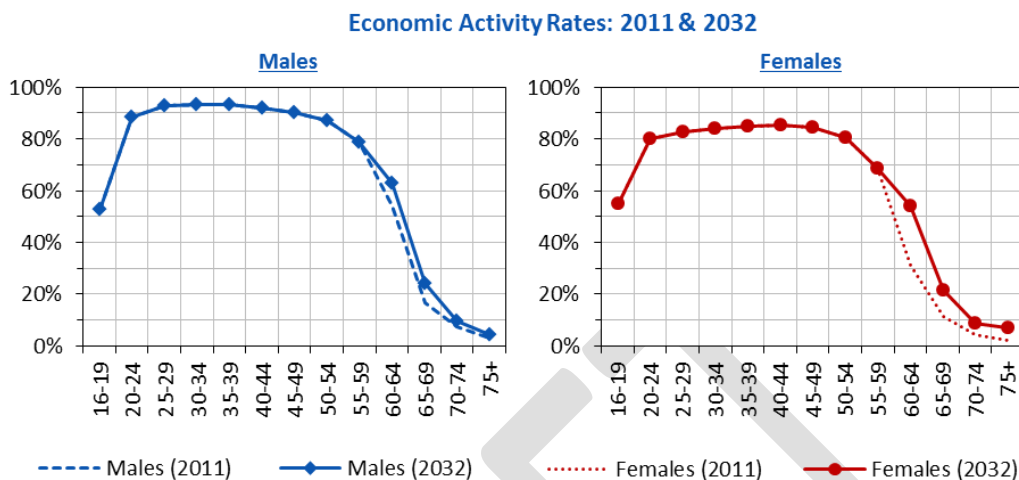


Figure 18: 2011 and 2032 OBR economic activity rates for North Tyneside (Source: OBR)

## 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 North Tyneside has been sourced from the ONS model-based estimates of unemployment. These figures provide a more robust statistics than corresponding APS unemployment data, which are subject to annual variation due to sample size issues<sup>8</sup>.
- 5.10 In the scenario modelling presented here, the unemployment rate has been reduced from its 2015 value of 6.4%, to a 'pre-recession' (2004–2007) average of 5.7% by 2020 (fixed thereafter).

## Commuting Ratio

- 5.11 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).

<sup>8</sup> <https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=127>

5.12 In all but the Jobs-led sensitivity scenarios, a fixed commuting ratio of 1.14 has been applied in scenarios presented here. This ratio is derived from the 2011 Census Travel to Work and indicates a net *out*-commute from North Tyneside. This is in contrast to 2001, when North Tyneside had a commuting ratio of 1.25, indicating a greater net out-commute (see Table 4 on page 12).

## Demographic Scenarios & Labour Force Change

5.13 For each of the North Tyneside demographic scenarios (including the two migration sensitivity scenarios), the 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.

5.14 These outcomes provide a forecast of labour force change and employment growth based upon the population change implied by each demographic scenario, in combination with the chosen economic assumptions (Table 10).

Table 10: Labour Force and jobs-growth outcomes 2011–2032

Scenario	Labour Force (16–75+)				Average Annual Employment Growth
	2011	2032	Change	% Change	
PG-Delayed Trend	104,718	111,357	6,640	6.3%	432
PG-Full History	104,718	109,864	5,146	4.9%	374
PG-10yr	104,718	109,187	4,470	4.3%	347
SNPP-2014	104,718	107,891	3,174	3.0%	296
<i>PG-10yr SENS1</i>	<i>104,718</i>	<i>102,379</i>	<i>-2,339</i>	<i>-2.2%</i>	<i>79</i>
<i>PG-10yr SENS2</i>	<i>104,718</i>	<i>100,130</i>	<i>-4,588</i>	<i>-4.4%</i>	<i>-10</i>

Note: Scenarios are ranked in order of population growth, migration sensitivity scenarios are highlighted in grey

5.15 The application of the economic assumptions to the **SNPP-2014** scenario estimates that the labour force size will increase (+3,174) over the 2011–2032 period, with estimated average

annual employment growth of +296 per year, linked to a declining unemployment rate but no change in the commuting balance.

- 5.16 With the exception of the migration sensitivity scenarios, the other trend-based demographic scenarios have higher migration growth assumptions. As a result, the change in the size of the labour force is greater and the level of employment that could be supported by the labour force (in combination with declining unemployment and a fixed commuting ratio) is higher.
- 5.17 The **PG-Delayed Trend** scenario has the highest growth assumptions for migration and results in the largest labour force change (+6,640), supporting an annual employment growth of 432 per year, to 2032.
- 5.18 The two migration sensitivity scenarios result in decline in the size of labour force over the 2011–2032 period, reflective of the reductions in net internal migration. Under the **PG-10yr SENS1** and **PG-10yr SENS2** scenarios, the employment growth supported ranges from 79 to -10.

## Arup Employment Forecasts

- 5.19 In the consideration of future jobs growth in an area, the PPG states that ‘economic forecasts’ should be considered (PPG paragraph 2a-018). Whilst the jobs growth estimates presented above are derived through the application of economic assumptions to scenarios of demographic change, economic forecasts of jobs growth are derived using a different methodology.
- 5.20 Economic forecasts combine a national and regional economic outlook, with data on the sectoral mix of businesses, to produce a forecast of jobs growth for a local area. Economic forecasting models will typically balance jobs and population growth through changes to economic activity and unemployment rates and, in some instances, the commuting ratio.
- 5.21 Employment forecasts for North Tyneside were initially provided for the 2014 report by Arup. These employment growth forecasts, providing four differing trajectories of annual jobs growth, have been used in the development of the jobs-led scenarios.

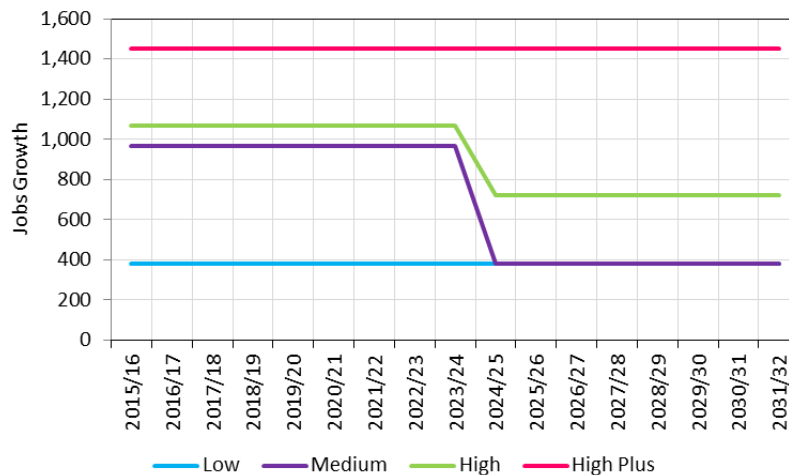


Figure 19: North Tyneside jobs-growth forecasts (Source: Arup, 2014)

- 5.22 Between 2015/16 and 2031/32 (i.e. over the forecast period of the scenarios presented in this report), the average annual level of jobs growth is higher under the “High Plus” scenario at +1,454 and lowest under the “Low” scenario (+380).

## Jobs-led Scenarios

- 5.23 In POPGROUP, the population, household and dwelling growth implications of the Arup forecasts can be evaluated using a ‘jobs-led’ configuration of the POPGROUP forecasting model. In a jobs-led scenario, population growth is linked directly to the change in employment within an area. POPGROUP evaluates the impact of a jobs growth trajectory by measuring the relationship between the level of employment in an area, the size of the resident labour force and the size of the resident population.
- 5.24 Internal migration is used to balance the relationship between the size of the labour force and the forecast number of jobs. A higher level of net in-migration will occur if there is insufficient resident population and labour force to meet the forecast number of jobs. A higher level of net in-migration will occur if the population is too high relative to the number of jobs.
- 5.25 Key to determining the level of population growth required to meet a defined jobs growth trajectory are the three assumptions on economic activity, unemployment and commuting. With an ageing population (together with a fixed commuting ratio), higher levels of net in-migration would be needed to support the level of jobs growth in the 2014 Arup employment forecasts.

However, if any of the key economic assumptions were to alter, for example if the commuting ratio were to decrease, or economic activity rates were to increase further, the required level of population growth needed to support this level of jobs growth would be reduced.

5.26 The population and dwelling growth outcomes of the **Jobs-led (Low)**, **Jobs-led (Medium)**, **Jobs-led (High)** and **Jobs-led (High+)** are presented alongside the demographic scenarios in Table 11. To support the level of jobs growth implied by the four jobs-led scenarios, a higher level of net migration is required, ranging from an average of +884 per year to +2,492. This results in higher levels of population growth, ranging from 18.3% under the **Jobs-led (Low)** scenario to 30.4% under the **Jobs-led (High+)** scenario. The average annual dwelling growth is higher under the jobs-led scenarios, ranging from +825 under the **Jobs-led (Low)** scenario to +1,630 under the **Jobs-led (High+)**.

Table 11: North Tyneside demographic and jobs-led scenarios (2011–2032)

Scenario	Change 2011–2032				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Jobs
<b>Jobs-led (High+)</b>	<b>61,236</b>	<b>30.4%</b>	<b>33,065</b>	<b>36.1%</b>	<b>2,492</b>	<b>1,630</b>	<b>1,298</b>
<b>Jobs-led (High)</b>	<b>42,027</b>	<b>20.9%</b>	<b>24,901</b>	<b>27.2%</b>	<b>1,670</b>	<b>1,228</b>	<b>854</b>
<b>Jobs-led (Medium)</b>	<b>34,670</b>	<b>17.2%</b>	<b>21,783</b>	<b>23.8%</b>	<b>1,350</b>	<b>1,074</b>	<b>682</b>
<b>Jobs-led (Low)</b>	<b>23,044</b>	<b>11.5%</b>	<b>16,734</b>	<b>18.3%</b>	<b>884</b>	<b>825</b>	<b>429</b>
PG-Delayed Trend	22,231	11.0%	16,034	17.5%	785	791	432
PG-Full History	20,324	10.1%	15,328	16.8%	732	756	374
PG-10yr	19,732	9.8%	15,219	16.6%	721	750	347
SNPP-2014	17,305	8.6%	14,333	15.7%	620	707	296
PG-10yr SENS1	7,913	3.9%	10,211	11.2%	221	503	79
PG-10yr SENS2	3,911	1.9%	8,522	9.3%	52	420	-10

Note that the 2014-based headship rates have been used in the assessment of household growth.

## Jobs-led Sensitivity Scenarios

5.27 In the range of scenarios presented for North Tyneside in 2014 and 2015, Edge Analytics produced sensitivity versions of the four jobs-led scenarios (**Jobs-led (Low)**, **Jobs-led (Medium)**,

**Jobs-led (High)** and **Jobs-led (High+)**). For consistency, this sensitivity analysis has been updated here in which the commuting ratio incrementally reduces from the 2011 Census value (1.15) in 2015 to 1.05 in 2023, fixed thereafter. The rate of change between 2015 and 2023 mirrors the change in the commuting ratio between the 2001 and 2011 Censuses.

5.28 The results of the jobs-led sensitivity scenarios (using the 2014-based headship rates) are summarised below in Table 12. With the reducing commuting ratio retaining labour force in North Tyneside, thus decreasing the need for migration, the level of population growth is lower under the sensitivity scenarios (**SENS3**) than under the corresponding 'core' jobs-led scenarios.

Table 12: North Tyneside jobs-led sensitivity scenarios (2011–2032)

Scenario	Change 2011–2032				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Jobs
Jobs-led (High+)	61,236	30.4%	33,065	36.1%	2,492	1,630	1,298
<b>Jobs-led (High+) SENS3</b>	<b>42,896</b>	<b>21.3%</b>	<b>25,146</b>	<b>27.5%</b>	<b>1,753</b>	<b>1,240</b>	<b>1,298</b>
Jobs-led (High)	42,027	20.9%	24,901	27.2%	1,670	1,228	854
<b>Jobs-led (High) SENS3</b>	<b>25,137</b>	<b>12.5%</b>	<b>17,577</b>	<b>19.2%</b>	<b>991</b>	<b>867</b>	<b>854</b>
Jobs-led (Medium)	34,670	17.2%	21,783	23.8%	1,350	1,074	682
<b>Jobs-led (Medium) SENS3</b>	<b>18,335</b>	<b>9.1%</b>	<b>14,686</b>	<b>16.1%</b>	<b>694</b>	<b>724</b>	<b>682</b>
Jobs-led (Low)	23,044	11.5%	16,734	18.3%	884	825	429
<b>Jobs-led (Low) SENS3</b>	<b>7,583</b>	<b>3.8%</b>	<b>9,994</b>	<b>10.9%</b>	<b>261</b>	<b>493</b>	<b>429</b>



# 6 Summary

## Approach

- 6.1 The objective of this report has been to provide a range of demographic evidence for North Tyneside. The analysis is an update on previous analysis, incorporating the latest statistical releases from ONS and DCLG and providing a range of growth scenarios for North Tyneside. All scenario analysis has been produced using POPGROUP technology.
- 6.2 The starting point of the scenario analysis is the 2014-based SNPP and the 2014-based DCLG household projection model for North Tyneside. A number of alternative trend scenarios, using variant migration assumptions, have been developed and are compared to the 2014-based SNPP benchmark.
- 6.3 Household and dwelling growth have been estimated using assumptions from the 2014-based DCLG household projection model for North Tyneside.
- 6.4 The analysis considers the effect of a changing age structure on North Tyneside's labour force, linking the demographic scenarios to employment growth requirement using assumptions on economic activity rates, unemployment and commuting. These are compared to the four jobs-led scenarios which use jobs-growth targets from Arup (2014) (consistent with the previous 2014 and 2015 reports). Additional sensitivity analysis has examined the effect of changing commuting balance upon growth outcomes.

## Growth Outcomes

- 6.5 For each scenario, dwelling growth outcomes have been calculated using assumptions from the DCLG's 2014-based household model (HH-14).

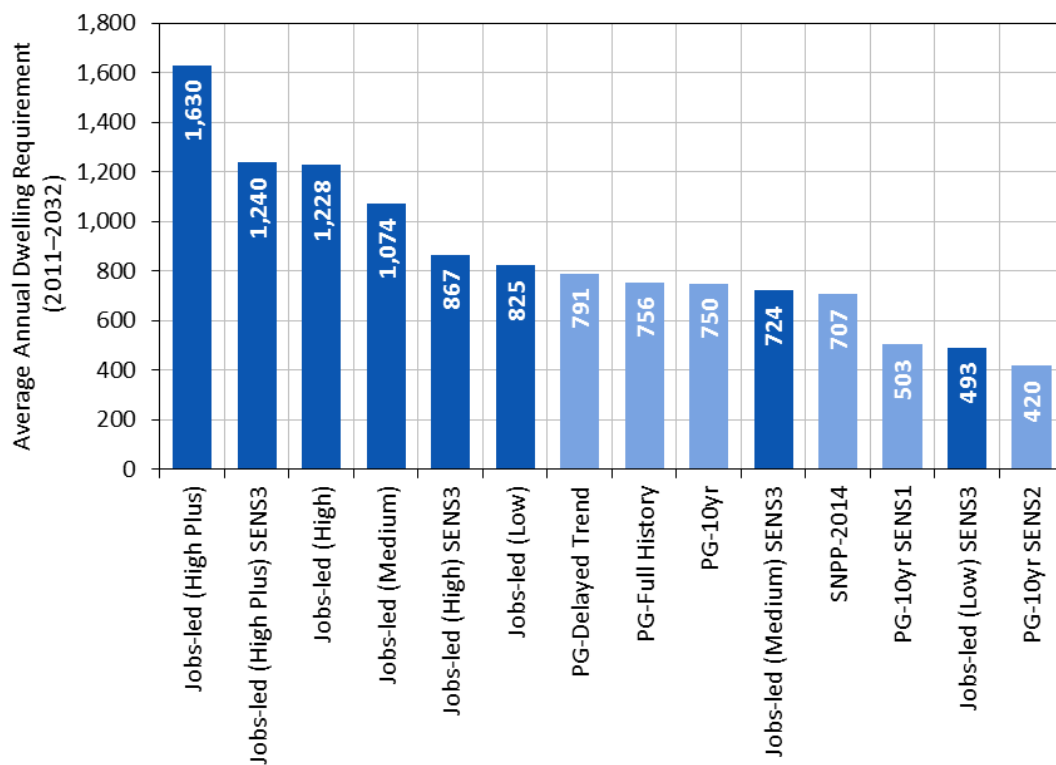


Figure 20: Dwelling growth outcomes for North Tyneside 2011–2032

- 6.6 The **SNPP-2014** scenario estimates that North Tyneside’s population will increase by 8.6% during the 2011–2032 plan period, resulting in an average annual dwelling requirement of 707 per year. These growth estimates are lower than the ‘core’ trend based and jobs-led scenarios.
- 6.7 Migration to North Tyneside has decreased in the most recent historical years. As a result, the **PG-10yr** scenario results in the lowest growth outcome, driven by the lower migration assumptions in the latter years of the historical period. Under the **PG-10yr** scenario, the average annual dwelling growth is 750. Adjustments to the internal migration under the **PG-10yr SENS1** and **PG-10yr SENS2** scenarios result in lower population growth, producing a dwelling requirement of 503 and 420 respectively.
- 6.8 The labour force and jobs growth implications of the demographic scenarios have been assessed through the application of economic activity rates, unemployment and commuting ratio assumptions. Published statistics on unemployment and commuting have been used, together with complementary analysis from the OBR on future economic participation rates. The jobs growth outcomes (excluding the migration sensitivity scenarios) ranges from 296–432 per year over the 2011–2032 plan period; the **PG-Delayed Trend** scenario produces the highest jobs

growth outcome as it assumes a much higher annual growth through migration, supporting a larger resident labour force.

- 6.9 Additionally, four jobs-led scenarios have been developed to assess the demographic implications of the jobs growth trajectories implied by the 2014 Arup employment forecasts. Annual jobs-growth targets under the Jobs-led scenarios (**Jobs-led (Low)**, **Jobs-led (Medium)**, **Jobs-led (High)** and **Jobs-led (High+)**), result in a *higher* levels of population growth than under the demographic scenarios, ranging from 11.5% under the Jobs-led (Low) scenario to 30.4% under the Jobs-led (High+) scenario. This suggests that, with the unemployment, commuting and economic assumptions used here, a higher level of population growth (than under the demographic scenarios) would be required to support the level of jobs growth implied by the Arup forecasts.
- 6.10 The alignment of demographic scenarios with output derived from economic forecasting models presents a particular challenge when seeking to provide evidence for the assessment of long-term housing need. As highlighted by the Jobs-led 'sensitivity' scenarios, alterations to the commuting balance of North Tyneside would reduce the level of net migration needed to sustain employment growth. Increased levels of economic participation (economic activity) and reducing unemployment rates would also increase the capacity of the resident labour force to support employment growth.

## Appendix A

# POPGROUP Methodology

## Forecasting Methodology

- A.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.
- A.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 21) is a cohort component model, which enables the development of population forecasts based on births, deaths and migration inputs and assumptions.
- A.3 The Derived Forecast (DF) model (Figure 22) sits alongside the population model, providing a headship rate model for household projections and an economic activity rate model for labour-force projections.
- A.4 For further information on POPGROUP, please refer to the Edge Analytics website: (<http://www.edgeanalytics.co.uk/>).

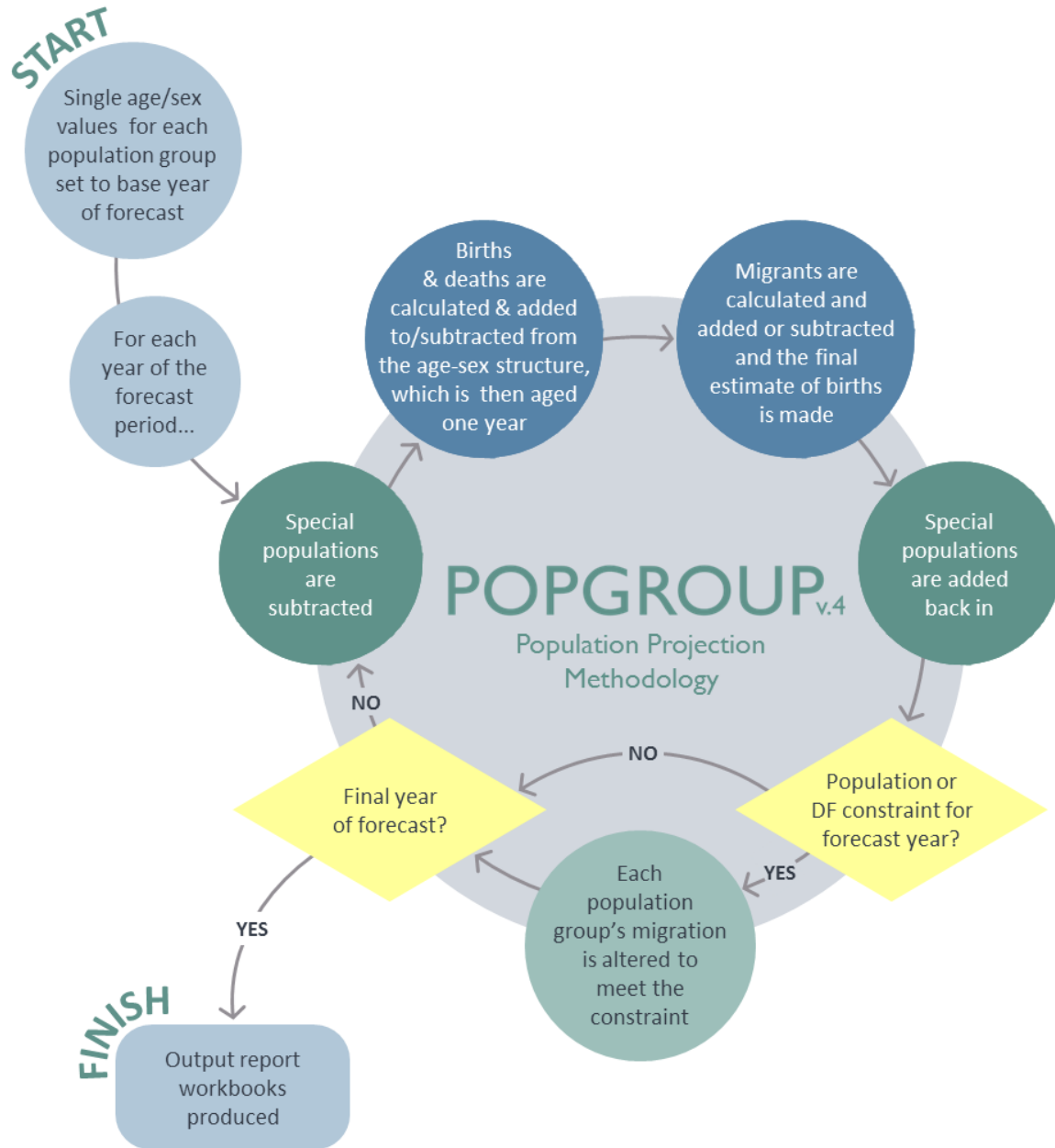


Figure 21: POPGROUP population projection methodology

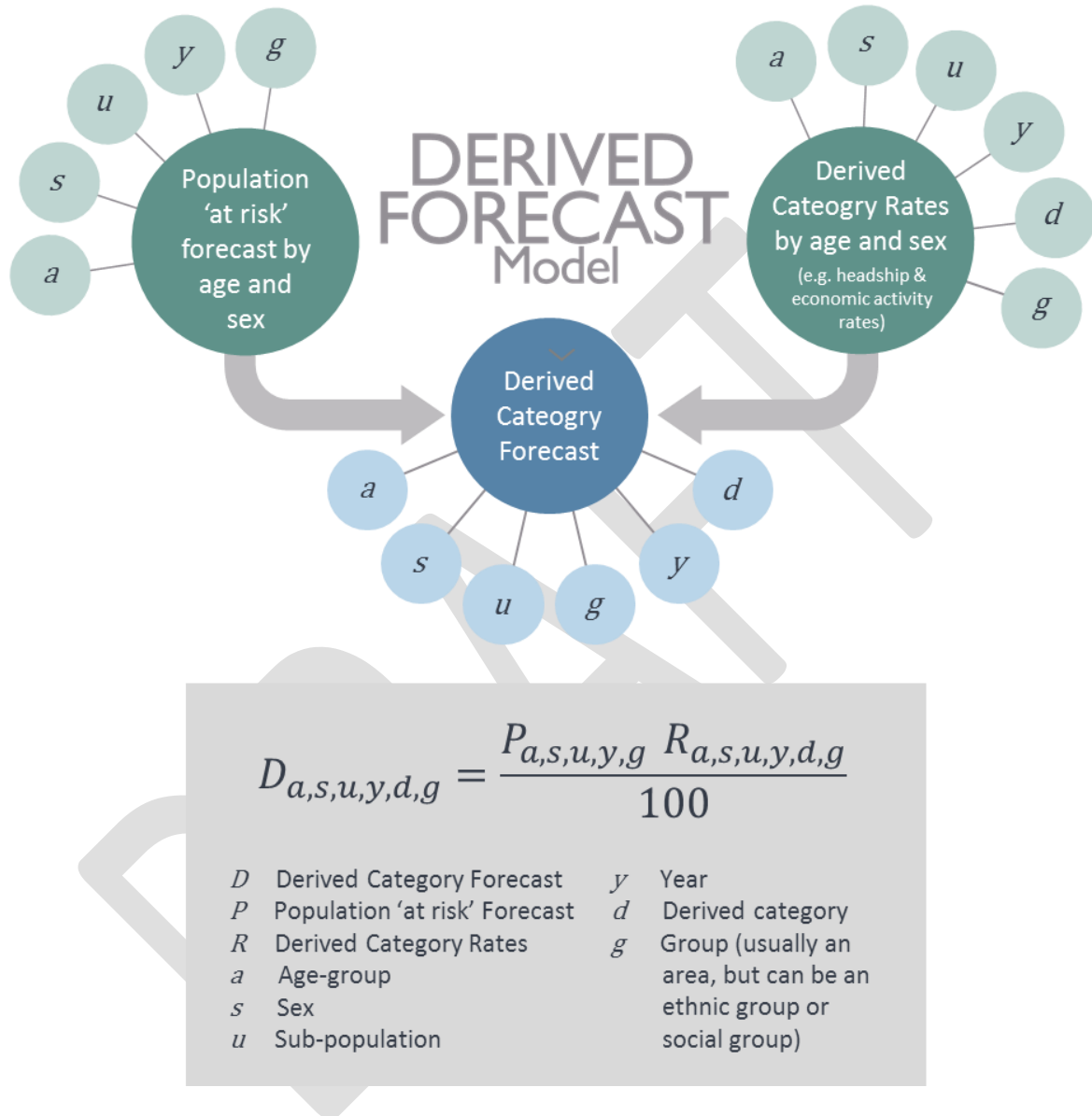


Figure 22: Derived Forecast (DF) methodology

## Appendix B

# Data Inputs & Assumptions

## Introduction

B.1 Edge Analytics has developed a suite of demographic scenarios for North Tyneside using POPGROUP v.4 and the Derived Forecast model. The POPGROUP suite of demographic models draw 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 the ONS sub-national population projections and the DCLG household projections, a series of assumptions have been derived which drive the scenario forecasts.

B.2 The following scenarios have been produced:

- SNPP-2014
- PG-10yr
- PG-Delayed Trend
- PG-Full History
- Jobs-led (Low)
- Jobs-led (Medium)
- Jobs-led (High)
- Jobs-led (High+)

6.12 Additionally, the following sensitivity scenarios have been produced:

- PG-10yr SENS1
- PG-10yr SENS2
- Jobs-led (Low) SENS3
- Jobs-led (Medium) SENS3
- Jobs-led (High) SENS3

- Jobs-led (High+) SENS3

B.3 In the following sections, a narrative on the data inputs and assumptions underpinning the scenarios is presented.

## Population, Births & Deaths

### Population

B.4 In each scenario, historical population statistics are provided by the 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.

B.5 In the **SNPP-2014** scenario, historical MYEs are used 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.

B.6 In the remaining scenarios, the historical MYEs are used to 2015.

### Births & Fertility

B.7 In each scenario, historical mid-year to mid-year counts of births by sex have been sourced from the ONS MYEs.

B.8 In the **SNPP-2014** scenario, historical birth statistics have been used for 2001/02 to 2013/14. From 2014/15, future counts of births are specified, to ensure consistency with the 2014-based official projection.

B.9 In all other scenarios, historical birth statistics have been used for 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.



- B.10** 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

- B.11** 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.
- B.12** In the **SNPP-2014** scenario, historical death statistics have been used for 2001/02 to 2013/14. From 2014/15, future counts of deaths are specified, to ensure consistency with the 2014-based official projection.
- B.13** In all other scenarios, historical death statistics have been used for 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.
- B.14** 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).

## Migration

### Internal Migration

- B.15** 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).
- B.16** In the **SNPP-2014** scenario, historical counts of internal in and out-migration are used for 2001/02 to 2013/14. From 2014/15, future counts of migrants are specified, to ensure consistency with the 2012-based official projection.

- B.17** In the **PG** scenarios, historical counts of internal in and out-migration are used for 2001/02 to 2014/15. From 2015/16, future internal migration flows are based on the area-specific historical migration data. In the **PG-10yr** scenario, a ten year internal migration history is used (2005/06–2014/15). In the **PG-Delayed Trend** scenario, a ten year internal migration history is used, in line with the previous 2014 and 2015 reports (2002/03–2011/12). In the **PG-Full History** scenario, a fourteen year history is used (2001/02–2014/15).
- B.18** The relevant historical time period is used in the **PG** scenarios to derive the age-specific migration rate (ASMigR) schedules, which are then used to determine the future number of internal in- and out-migrants from 2015/16. In the case of internal in-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 out-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 North Tyneside, the reference population comprises all districts which cumulatively contributed 70% of migrants to the North Eastern Local Enterprise Partnerships (LEP) over the 2008/09–2014/15 period.
- B.19** In the **PG-10yr SENS1** and **PG-10yr SENS2** migration sensitivity scenarios, future counts of internal migrants are specified in each year of the forecast period. In the **PG-10yr SENS1** scenario, internal in-migration has been reduced by increasing intervals of 150 per year from 2016/17 to 2020/21. From 2021 onwards, internal in-migration is reduced by 750 per year. Internal out-migration flows remain unaltered, remaining consistent with the **PG-10yr** scenario.
- B.20** In the **PG-10yr SENS2** scenario, internal in-migration has been reduced as in the **PG-10yr SENS1** scenario (see paragraph above). Internal out-migration has been increased by increasing intervals of 50 per year from 2015/16 to 2020/21, with the first adjustment starting at 100 in 2015/16. From 2021 onwards, internal out-migration is increased by 200 per year.
- B.21** In the **Jobs-led** scenarios (including **Jobs-led SENS3** scenarios), historical counts of internal in and out-migrants are used from 2001/02–2014/15. 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 jobs that is defined in each year of the forecast period. A higher level of net internal migration will occur if there is insufficient

population and resident labour force to meet the forecast number of jobs. In the jobs-led scenarios, the profile of internal migrants is defined by the ASMigR schedule, derived from the ONS 2014-based SNPP.

## International Migration

- B.22** 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.
- B.23** In all scenarios, future international migrant counts are specified.
- B.24** In the **SNPP-2014** scenario, historical counts of migration are used for 2001/02 to 2013/14. From 2014/15, the international in- and out-migration counts are drawn directly from the 2014-based official projection.
- B.25** In the **PG** scenarios, historical counts of international in- and out-migration are used for 2001/02 to 2014/15. From 2015/16, future international migration counts are based on the area-specific historical migration data. In the **PG-10yr** scenario, a ten year international migration history is used (2005/06–2014/15). In the **PG-Delayed Trend** scenario, a ten year international migration history is used, in line with the 2014 and 2015 reports (2002/03–2011/12). In the **PG-Full History** scenario, the fourteen years of historical international migration is used (2001/02–2014/15).
- B.26** In the **PG-10yr SENS1** and **PG-10yr SENS2** scenarios, international migration assumptions are aligned with the **PG-10yr** scenario.
- B.27** 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.
- B.28** In the **Jobs-led** scenarios (including **Jobs-led SENS3** scenarios), 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

B.29 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.”*

B.30 In POPGROUP, a dwelling is defined as a unit of accommodation which can either be occupied by one household or vacant.

## Household Headship Rates

B.31 A household headship rate (also known as a household representative rate) is the *“probability of anyone in a particular demographic group being classified as being a household representative”*<sup>9</sup>.

B.32 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 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.

B.33 In POPGROUP, the Stage Two headship rates have been applied by 10-year age group in an 8-fold household type classification (Table 13).

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<sup>9</sup> Household Projections 2014-based: Methodological Report. Department for Communities and Local Government (July 2016). <https://www.gov.uk/government/statistics/2014-based-household-projections-methodology>

Table 13: 2014-based 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

- B.34** 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.
- B.35** 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 recorded. Therefore, the population not-in-households for ages 75–85+ varies across the forecast period depending upon the size of the population.

## Vacancy Rate

- B.36** The relationship between households and dwellings is modelled using a 'vacancy rate', sourced from the 2011 Census<sup>10</sup>. The vacancy rate is calculated using statistics on households (occupied household spaces) and dwellings (shared and unshared).
- B.37** A vacancy rate of 3.4% for North Tyneside has been applied, fixed throughout the forecast period. Using the vacancy rate, the 'dwelling requirement' of each household growth trajectory has been evaluated.

<sup>10</sup> Census Table KS401EW: Dwellings, household spaces and accommodation type

## Labour Force & Jobs

- B.38 The labour force and jobs implications of each 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

- B.39 The level of labour force participation is estimated by the economic activity rates. Economic activity rates by five year age group (ages 16–75+) and sex have been derived from Census statistics.
- B.40 Between the 2001 and 2011 Censuses, rates of economic activity increased, most notably for females in all but the youngest age-group and for both males and females in the older age groups (Figure 23).

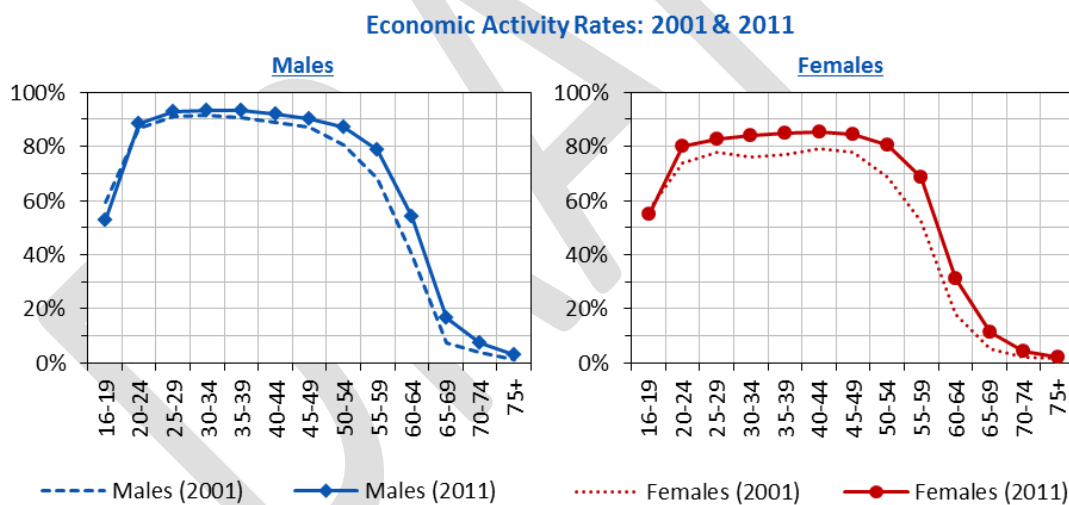


Figure 23: North Tyneside Economic activity rates: 2001 and 2011 Census comparison (source: ONS)

### OBR Rates

- B.41 The OBR has undertaken an analysis of labour market trends in its 2014 Fiscal Sustainability Report<sup>11</sup>. 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 alternative set of economic activity rates for North Tyneside.

<sup>11</sup> <http://cdn.budgetresponsibility.org.uk/41298-OBR-accessible.pdf>

B.42 Adjustments have been made over a 21-year (2011–2032) period, for the older age groups only (60–75+) (Table 14). The economic activity rate profiles are summarised in Figure 24.

Table 14: OBR Economic Activity Rate adjustments

OBR Economic Activity Rates			
2011–2032 Change			
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	16%	60-64	72%
65-69	44%	65-69	89%
70-74	26%	70-74	103%
75+	51%	75+	250%

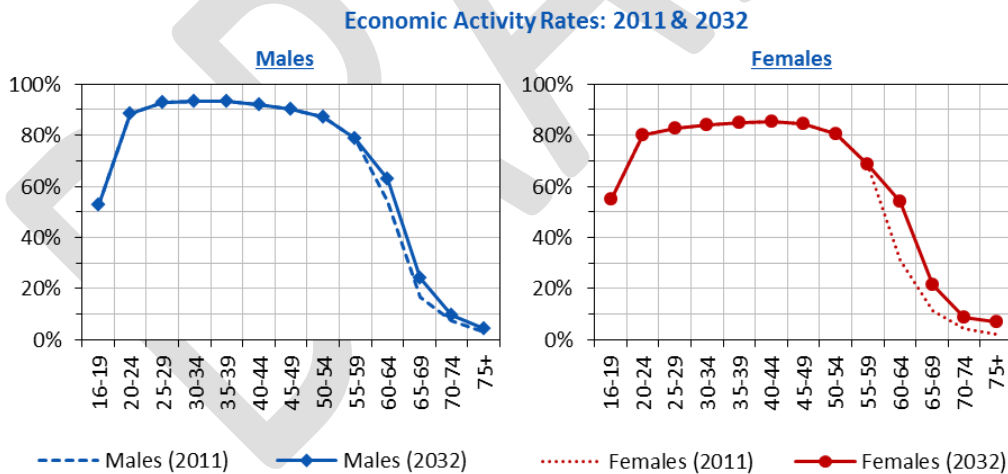


Figure 24: OBR economic activity rate profile for North Tyneside

## Commuting Ratio

B.43 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.

- B.44 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.
- B.45 From the 2011 Census 'Travel to Work' statistics, published by ONS in July 2014, commuting ratios have been derived for North Tyneside. This is compared to the 2001 Census value in Table 15.

Table 15: Commuting Ratio Comparison

North Tyneside		2001 Census	2011 Census
Workers	<i>a</i>	83,628	96,026
Jobs	<i>b</i>	67,013	84,301
Commuting Ratio	<i>a/b</i>	<b>1.25</b>	<b>1.14</b>

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 .

- B.46 In all but the **Jobs-led SENS3** scenarios, the 2011 Census commuting ratio has been applied, fixed throughout the forecast period. In the **Jobs-led SENS3** scenarios, the commuting ratio has been incrementally adjusted over the 2015–2023 period, from the 2011 Census value (1.14) to 1.05. These changes mirror the rate of change between the 2001 and 2011 commuting ratios. From 2023 onwards, the commuting ratio has been fixed at 1.05.

## Unemployment Rate

- B.47 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. In all scenarios, historical unemployment rates are defined up to 2015. From 2015, the unemployment rate reduces to a pre-recession average of 5.7% by 2020 (Table 16).

Table 16: Historical unemployment rates 2004–2015

Area	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average Pre-Recession (2004-07)
North Tyneside	5.2	5.5	6.4	5.7	6.7	8.3	8.7	9.6	9.7	8.3	6.9	6.4	5.7

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



## Appendix C

# Scenario Assumptions Comparison

- C.1 A comparison of the data assumptions behind scenarios developed in the 2014, 2015 and 2016 Edge Analytics reports are presented in this appendix. In each report, a range of demographic scenarios was developed using POPGROUP v.4 technology.
- C.2 A short summary the scenarios presented in each report is provided below, with summary tables presenting a comparison of the scenario inputs for the following three scenarios: the **SNPP** benchmark, **PG-10yr** and the jobs-led sensitivity (**Jobs-led SENS3**) scenarios. For further information on the data inputs and assumptions of the 2014 and 2015 scenarios, refer to the relevant reports.

### 2014 Report

- C.3 In the 2014 report, the 2012-based SNPP (**SNPP-2012**) was presented as the official benchmark projection, with the earlier **SNPP-2010** included for comparison. Three 'alternative trend' scenarios were also developed, together with four 'jobs-led' scenarios. These scenarios formed the 'core' range of demographic scenarios. A range of migration and jobs-led 'sensitivity' scenarios were also developed for comparison.
- C.4 All scenarios included historical for the 2001/02–2011/12 period, with 2012/2013 as the start year of the forecast period (i.e. all scenarios had a 2012 base-year). Scenario outcomes were presented for the 2011–2032 plan period.
- C.5 In all scenarios, household growth was assessed using headship rates from both the 2011-based and 2008-based DCLG household projection models. A 2011 Census dwelling vacancy rate of 3.4% was used to convert between households and dwellings. The dwelling growth outcomes using these headship rate assumptions were averaged to provide a 'mid-point' dwelling growth figure for each scenario.
- C.6 The range of 'core' scenarios included the following. The **SNPP-2012** scenario was presented as the official 'benchmark' projection, replicating the ONS 2012-based SNPP for North Tyneside. The

**SNPP-2010** scenario (replicating the 2010-based SNPP for North Tyneside), was presented for comparison. Three 'alternative trend' scenarios were presented: **Natural Change**, **PG-5yr** and **PG-10yr**. In the **PG-5yr** and **PG-10yr** scenarios, future internal and international migration assumptions were based on (at the time) the latest historical migration statistics; for the **PG-5yr**, a 5-year reference period was used (2007/08–2011/12) and for the **PG-10yr**, a 10-year period (2002/03–2011/12). The **Natural Change** scenario considered population growth in the absence of migration (i.e. births and deaths only).

- C.7 Four **Jobs-led** core scenarios were developed using the 'Low', 'Medium', 'High' and 'High+' employment growth trajectories from the 2014 ELR, provided by Arup. In these scenarios, annual jobs-growth targets were applied from 2014/15 onwards.
- C.8 In each of the core scenarios, the following economic assumptions were applied to (a) derive the labour force and jobs growth implications of the demographic scenarios, and (b) to derive the level of population growth implied by the Jobs-led scenarios:
- 2011 Census economic activity rates were applied to determine the proportion of the population included within the labour force, with adjustments to the State Pension Age (SPA) 60–69 age groups over the 2011–2020 period.
  - The unemployment rate decreased from a recession average (2008–2012) of 9.4% in 2012 to a pre-recession average (2004–2007) of 6.0% by 2021.
  - The commuting ratio was fixed at its 2011 Census value of 1.15 (derived from a 'workday population' proxy).
- C.9 As well as the range of 'core' scenarios, a range of 'sensitivity' scenarios were also developed. This included two migration sensitivity scenarios (**PG-10yr SENS1** and **PG-10yr SENS2**), in which adjustments were made to the internal migration flows of the **PG-10yr** scenario. These scenarios evaluated the impact that a reduced *inflow* from Newcastle and an increased *outflow* to Northumberland might have on population growth in North Tyneside.
- C.10 A third sensitivity examined the impact of a decreased net out-commute on the jobs-led scenarios (**Jobs-led SENS3** scenarios). In these scenarios, only the commuting ratio assumptions were adjusted, decreased from the 2011 Census value of 1.15 in 2014 to 1.05 by 2023, fixed thereafter.

## 2015 Report

- C.11 The 2015 report provided a 'headship rate update' to the 2014 report. Each of the scenarios was re-produced using household growth assumptions from the 2012-based household projection model. The DCLG household projection methodology 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.12 For the 2015 update, only the Stage One headship rates were available (these were released in February/March 2015). Household growth was therefore assessed by age, sex and relationship status. The 2012-based (Stage One) household and dwelling growth outcomes were presented and compared to the previous 2011-based and 2008-based outcomes.
- C.13 All other assumptions remained consistent with the 2014 report. As previously, scenario results were presented for the 2011–2032 plan period.

## 2016 Report

- C.14 In this 2016 report, the 2014-based SNPP (**SNPP-2014**) has been presented as the official benchmark projection. Three 'alternative trend' scenarios have been developed, together with four 'jobs-led' scenarios. A range of migration and jobs-led 'sensitivity' scenarios have also been developed, using an approach consistent with that taken in the earlier 2014 and 2015 reports.
- C.15 The **SNPP-2014** scenario replicates the ONS 2014-based SNPP for North Tyneside (i.e. with a base year of 2014). The **SNPP-2012** scenario, which replicates the 2012-based SNPP for North Tyneside and has a base year of 2012, has been included for comparison.
- C.16 All other scenarios include historical for the 2001/02–2014/15 period, with 2015/2016 as the start year of the forecast period (i.e. a 2015 base-year). As previously, scenario outcomes have been presented for the 2011–2032 plan period.
- C.17 In all scenarios, household growth has been assessed using Stage Two headship rates from the 2012-based DCLG household projection model (i.e. by age and household type). A 2011 Census dwelling vacancy rate of 3.4% has been used to convert between households and dwellings.

- 6.13** Three 'alternative trend' scenarios have been presented: **PG-10yr**, **PG-Full History**, **PG-Delayed Trend**. In the **PG-10yr** scenario, future internal and international migration assumptions have been based on the latest 10-year historical period (2005/06–2014/15). The **PG-Full History** scenario considers the full historical migration history (2001/02–2014/15) and the **PG-Delayed Trend** scenario considers the 2002/03–2011/12 historical migration period.
- C.18** For consistency with the previous reports, the **Jobs-led** scenarios presented here use the same employment growth trajectories from the 2014 Arup ELR. However, jobs-growth targets have been applied from 2015/16 onwards (rather than from 2014/15 onwards as previously).
- C.19** In each of the above scenarios, the following economic assumptions were applied to (a) derive the labour force and jobs growth implications of the demographic scenarios, and (b) to derive the level of population growth implied by the Jobs-led scenarios:
- 2011 Census economic activity rates with adjustments made to 60–75+ age groups based on the OBR economic activity rate forecasts.
  - The unemployment rate decreases from its 2015 value (6.4%) to a pre-recession average (2004–2007) of 5.7% by 2020.
  - The commuting ratio has been fixed at its 2011 Census value of 1.14 (derived from Travel to Work statistics).
- C.20** In line with the previous reports, the sensitivity scenario approach has been replicated for this updated. Two migration sensitivity scenarios (**PG-10yr SENS1** and **PG-10yr SENS2**) have been developed, with internal migration adjustments similar to those used previously (although out-migration adjustments in **SENS2** are applied from different years).
- C.21** In the **Jobs-led** sensitivity scenarios, the commuting ratio assumptions have again been adjusted, decreasing from the 2011 Census value of 1.14 (derived from Travel to Work statistics) in 2015 to 1.05 by 2023, fixed thereafter.

## SNPP Benchmark Scenarios

- C.22 In the 2014 and 2015 reports, the **SNPP-2012** scenario was presented as the benchmark scenario. In this 2016 report, the most recent 2014-based official projection has been used (**SNPP-2014**).

Table 17: **SNPP** benchmark scenario assumptions

Scenario Name: SNPP benchmark			
Assumption	2014 Report	2015 Report	2016 Report
<i>Scenario Name</i>	SNPP-2012		SNPP-2014
<i>Historical Data</i>	2001/02–2011/12 MYEs		2001/02–2013/14 MYEs
<i>Fertility</i>	Fertility counts from the 2012-based official projection.		Fertility counts from the 2014-based official projection
<i>Mortality</i>	Mortality counts from the 2012-based official projection.		Mortality counts from the 2014-based official projection.
<i>Migration</i>	Internal and international migration counts from the 2012-based SNPP.		Internal and international migration counts from the 2014-based SNPP.
<i>Household Growth</i>	Assumptions from the 2008-based and 2011-based household projection models and an average of the two	Assumptions from the 2008-based, 2011-based and 2012-based household projection models	Assumptions from the 2014-based household projection model
<i>Dwelling Growth</i>	2011 Census vacancy rate of 3.4%		
<i>Economic Activity</i>	2011 Census economic activity rates with SPA adjustments to the 60–69 age groups		OBR adjustments to the 2011 Census economic activity rates for age groups 60–75+ age groups. Adjustments made over the forecast period.
<i>Unemployment Rate</i>	Reducing from recession average (2008–2012) of 9.4% in 2012 to a pre-recession average (2004–2007) of 6.0% by 2021.		Reducing from 2015 ONS unemployment rate of 6.4% to a pre-recession average (2004–2007) of 5.7% by 2020
<i>Commuting Ratio</i>	Fixed at 1.15 (Workday population proxy)		Fixed at 1.14 (2011 Census TTW flows)

## PG-10yr Scenarios

- C.23 In the 2014 and 2015 reports, the **PG-10yr** scenarios based their migration assumptions on the 2002/03–2011/12 historical period. In this 2016 report, the **PG-10yr** scenario bases internal and international migration assumptions on the most recent historical ten year period (2005/06–2014/15).

Table 18: **PG-10yr** scenario assumptions

Scenario Name: PG-10yr			
Assumption	2014 Report	2015 Report	2016 Report
<i>Scenario Name</i>	<i>PG-10yr</i>	<i>PG-10yr</i>	<i>PG-10yr</i>
<b>Historical Data</b>	2001/02–2011/12 MYEs		2001/02–2014/15 MYEs
<b>Fertility</b>	Fertility rates from the ONS 2012-based SNPP.		Fertility rates from the ONS 2014-based SNPP
<b>Mortality</b>	Mortality rates from the ONS 2012-based SNPP.		Mortality rates from the ONS 2014-based SNPP.
<b>Migration</b>	Internal and international migration assumptions are based on 10-years of historical evidence (2002/03–2011/12).		Internal and international migration assumptions are based on the last 10-years of historical evidence (2005/06–2014/15).
<b>Household Growth</b>	Assumptions from the 2008-based and 2011-based household projection models and an average of the two	Assumptions from the 2008-based, 2011-based and 2012-based household projection models	Assumptions from the 2014-based household projection model
<b>Dwelling Growth</b>	2011 Census vacancy rate of 3.4%		
<b>Economic Activity</b>	2011 Census economic activity rates with SPA adjustments to the 60–69 age groups		OBR adjustments to the 2011 Census economic activity rates for age groups 60–75+ age groups. Adjustments made over the forecast period.
<b>Unemployment Rate</b>	Reducing from recession average (2008–2012) of 9.4% in 2012 to a pre-recession average (2004–2007) of 6.0% by 2021.		Reducing from 2015 ONS unemployment rate of 6.4% to a pre-recession average (2004–2007) of 5.7% by 2020
<b>Commuting Ratio</b>	Fixed at 1.15 (Workday population proxy)		Fixed at 1.14 (2011 Census TTW flows)

## Jobs-led SENS3 Scenarios

- C.24 The jobs-led sensitivity scenarios in each report use employment growth trajectories from the 2014 Arup ELR. The 2016 report uses different economic activity rate assumptions, and slightly altered unemployment rate and commuting ratio profiles.

Table 19: **Jobs-led SENS3** scenario assumptions

Scenario Name: Jobs-led SENS3			
Assumption	2014 Report	2015 Report	2016 Report
<i>Scenario Name</i>	<i>Jobs-led SENS3</i>	<i>Jobs-led SENS3</i>	<i>Jobs-led SENS3</i>
<b>Historical Data</b>	2001/02–2011/12 MYEs		2001/02–2014/15 MYEs
<b>Jobs Growth Targets</b>	Applied from 2014/15		Applied from 2015/16
<b>Fertility</b>	Fertility rates from the ONS 2012-based SNPP.		Fertility rates from the ONS 2014-based SNPP
<b>Mortality</b>	Mortality rates from the ONS 2012-based SNPP.		Mortality rates from the ONS 2014-based SNPP.
<b>Migration</b>	Internal migration rates and international migration counts from the ONS 2012-based SNPP.		Internal migration rates and international migration counts from the ONS 2014-based SNPP.
<b>Household Growth</b>	Assumptions from the 2008-based and 2011-based household projection models and an average of the two	Assumptions from the 2008-based, 2011-based and 2012-based household projection models	Assumptions from the 2014-based household projection model
<b>Dwelling Growth</b>	2011 Census vacancy rate of 3.4%		
<b>Economic Activity</b>	2011 Census economic activity rates with SPA adjustments to the 60–69 age groups		OBR adjustments to the 2011 Census economic activity rates for age groups 60–75+ age groups. Adjustments made over the forecast period.
<b>Unemployment Rate</b>	Reducing from recession average (2008–2012) of 9.4% in 2012 to a pre-recession average (2004–2007) of 6.0% by 2021.		Reducing from 2015 ONS unemployment rate of 6.4% to a pre-recession average (2004–2007) of 5.7% by 2020

Scenario Name: Jobs-led SENS3			
Assumption	2014 Report	2015 Report	2016 Report
<b>Commuting Ratio</b>	<p>Incrementally reduced from 2011 Census value (1.15) in 2014 to 1.05 by 2023, fixed thereafter.</p> <p>The rate of change between 2014 and 2023 mirrors the change between 2001 and 2011 Census commuting ratios. 2011 Census commuting ratio derived using workday population as a proxy</p>		<p>Incrementally reduced from 2011 Census value (1.14) in 2015 to 1.05 by 2023, fixed thereafter.</p> <p>The rate of change between 2015 and 2023 mirrors the change between 2001 and 2011 Census commuting ratios. 2011 Census commuting ratio from TTW flow data.</p>



## Scenario Outcome Comparison

C.25 A comparison of the **SNPP** benchmark, **PG-10yr** and **Jobs-led SENS3** scenario outcomes from the 2014, 2015 and 2016 reports are presented in the following tables.

Table 20: SNPP benchmark scenario outcome (2011–2032)

SNPP benchmark		Change 2011–2032				Average per year	
Report	HH Model	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
2016 (SNPP-2014)	2014-based	17,305	8.6%	14,333	15.7%	620	707
2015 (SNPP-2012)	2012-based	21,449	10.7%	16,258	17.8%	718	802
2014 (SNPP-2012)	2011-based	21,449	10.7%	14,418	15.7%	718	711
	2008-based	21,449	10.7%	16,426	17.9%	718	810

Table 21: PG-10yr scenario outcome (2011–2032)

PG-10yr		Change 2011–2032				Average per year	
Report	HH Model	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
2016	2014-based	19,732	9.8%	15,219	16.6%	721	750
2015	2012-based	23,655	11.8%	16,924	18.5%	786	834
2014	2011-based	23,655	11.8%	15,413	16.8%	786	760
	2008-based	23,655	11.8%	17,459	19.1%	786	861

Table 22: Jobs-led (Low) SENS3 scenario outcome (2011–2032)

Jobs-led (Low) SENS3		Change 2011–2032				Average per year	
Report	HH Model	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
2016	2014-based	7,583	3.8%	9,994	10.9%	261	493
2015	2012-based	11,556	5.7%	11,931	13.0%	359	588
2014	2011-based	11,556	5.7%	10,044	11.0%	359	495
	2008-based	11,556	5.7%	11,967	13.1%	359	590

Table 23: Jobs-led (Medium) SENS3 (2011–2032)

Jobs-led (Medium) SENS3		Change 2011–2032				Average per year	
Report	HH Model	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
2016	2014-based	18,335	9.1%	14,686	16.1%	694	724
2015	2012-based	23,650	11.8%	17,202	18.8%	843	848
2014	2011-based	23,650	11.8%	15,264	16.7%	843	753
	2008-based	23,650	11.8%	17,330	18.9%	843	854

Table 24: Jobs-led (High) SENS3 (2011–2032)

Jobs-led (High) SENS3		Change 2011–2032				Average per year	
Report	HH Model	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
2016	2014-based	25,137	12.5%	17,577	19.2%	991	867
2015	2012-based	30,722	15.3%	20,267	22.2%	1,150	999
2014	2011-based	30,722	15.3%	18,242	19.9%	1,150	899
	2008-based	30,722	15.3%	20,410	22.3%	1,150	1,006

Table 25: Jobs-led (High Plus) SENS3 (2011–2032)

Jobs-led (High Plus) SENS3		Change 2011–2032				Average per year	
Report	HH Model	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
2016	2014-based	42,896	21.3%	25,146	27.5%	1,753	1,240
2015	2012-based	49,456	24.6%	28,376	31.0%	1,950	1,399
2014	2011-based	49,456	24.6%	26,158	28.6%	1,950	1,290
	2008-based	49,456	24.6%	28,590	31.2%	1,950	1,410