Housing growth forecasts

Demographic analysis & forecasts

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edge analytics

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1. Introduction

Context

1.1 St Albans City & District Council is in the process of preparing its Strategic Local Plan (SLP), the purpose of which is to establish the Council's long term spatial planning strategy for delivering development and infrastructure from 2011 to 2028[1]. A key consideration of the SLP is the number of dwellings required to meet the District's future objectively assessed needs, as expected by the National Planning Policy Framework (NPPF).

Requirements

1.2 Housing Vision is working on behalf of St Albans City & District Council to produce a Strategic Housing Market Assessment (SHMA) and to inform the production of the SLP. To support this process the Council has commissioned Edge Analytics to provide evidence on likely demographic change and dwelling requirements for the next twenty years until 2031. This evidence needs to be consistent with guidance provided in the NPPF.

Report content

1.3 This report presents a suite of population, household and housing forecast scenarios, which Edge Analytics has developed using POPGROUP demographic modelling technology. The forecasts have been produced for a 2012-31 time period, with historical data provided for 2001-11.

1.4 The following key datasets have been used within the analysis:

- 2011 Census statistics on population and households (ONS).

- Revised mid-year population estimates for the period 2002-10 (ONS).

- 2011-based household projections for 2011-21 (CLG).

1.5 The following scenario forecasts (Table 1) are presented in this report:

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[1] St Albans city & District Council (2013). Spatial Planning & Design (Planning Policy).
http://www.stalbans.gov.uk/planning/Planningpolicy/

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Table 1: Scenario definition

| Scenario type	Scenario name	Scenario description
Official	'SNPP-2010'	A trend projection consistent with the ONS 2010-based sub-national population projection.
Trend	'Mig-led5yrs' 'Mig-led10yrs'	Alternative trend projections that use the latest evidence from the revised 2002-10 mid-year population estimates to set migration assumptions.
	'Mig-ledHighX' 'Mig-ledHigh' 'Mig-ledLow'	Further trend projections (defined by St Albans City & District Council) that use a range of assumptions to illustrate the implications of 'high' and 'low' migration assumptions
	'NetNil'	An alternative trend scenario that assumes a zero net migration balance.
Dwelling-led	'Dwell-led250' 'Dwell-led550'	Housing-led scenarios, with dwelling growth trajectories of 250 and 550 dwellings per year determining demographic change.

Report structure

1.6 The report is structured as follows:

- Section 2 provides a summary of the geographical context of St Albans District.

- Section 3 details the key data inputs, assumptions and model methodology that have been deployed in the development of the scenario forecasts.

- Section 4 describes the new demographic evidence available from the latest household projections (CLG) and the revised mid-year population estimates for 2002-10 (ONS).

- Section 5 provides a commentary on the suite of scenario alternatives developed to evaluate trend and policy growth trajectories.

- Section 6 summarises the outcomes of each of these scenarios, presenting growth in terms of population, households, dwellings, labour force and jobs impacts.

- Section 7 concludes with a summary of the evidence.

2. Area definition

2.1   In 2011 the District of St Albans had a population of approximately 141,000[2], with the main concentration located in its largest settlements, St Albans and Harpenden.

2.2   With its close proximity to Greater London the District is exposed to a diverse mix of economic linkages, commuting behaviours and migration dynamics. Its immediate neighbours are Central Bedfordshire and North Hertfordshire (to the north), Welwyn Hatfield (to the east), Hertsmere (to the south) and Three Rivers and Dacorum (to the west) (Figure 1).
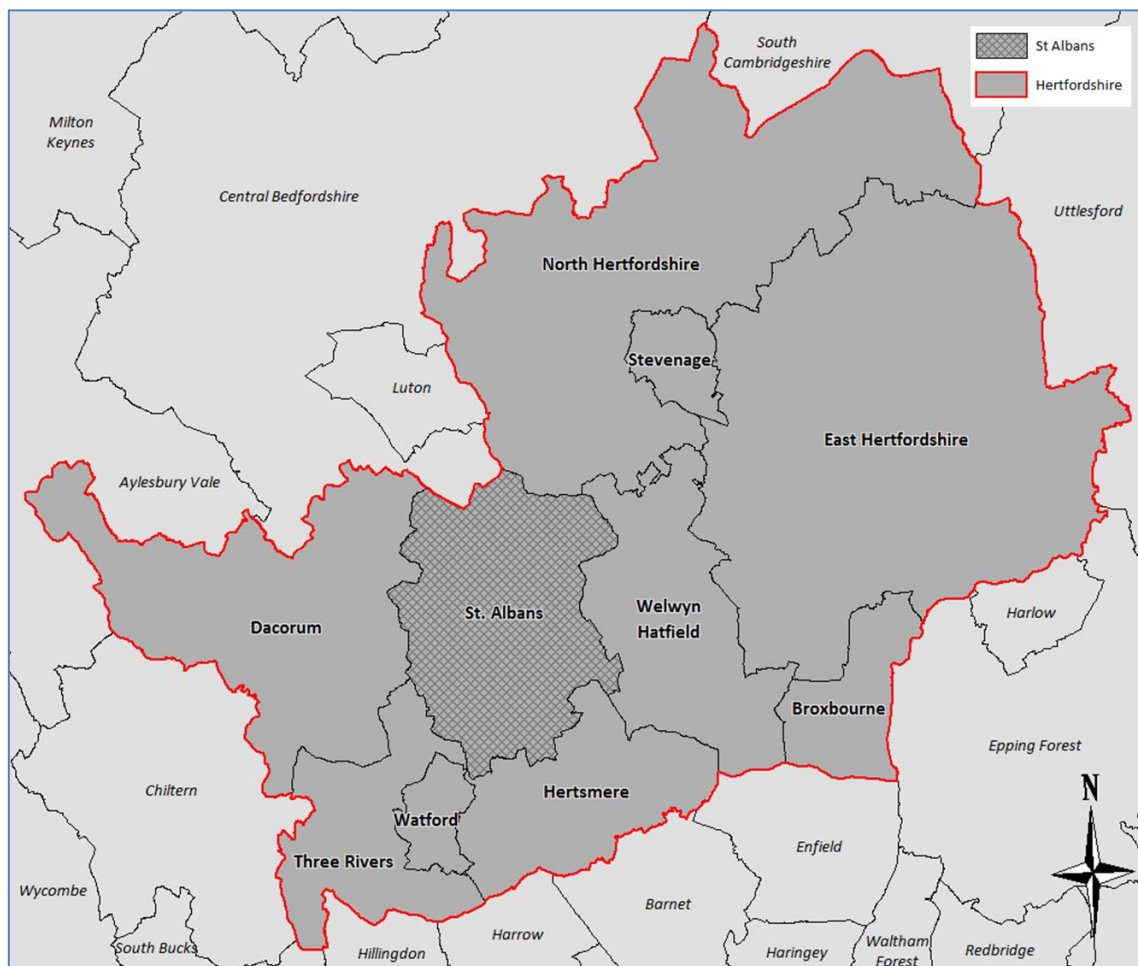
Contains Ordnance Survey data © Crown copyright and database right 2012

Figure 1: St Albans – geographical context

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3. Data inputs, assumptions & methodology

Summary

3.1 The development and evaluation of a suite of scenarios of demographic change is dependent on the collection of a range of data inputs and the derivation of a number of key assumptions. These provide an historical perspective on demographic change and the basis for the calculation of demographic parameters that determine future growth trajectories.

3.2 All data and assumptions are held within POPGROUP and Derived Forecast 'input' files, which are configured to enable the specific scenarios to be evaluated. To ensure transparency and to aid the interpretation of outputs the following sub-sections provide a summary of the population, household and labour force data inputs.

## Population, births, deaths and migration

Population

3.3 Historical population statistics are provided by the mid-year population estimates for 2001 to 2011, with all data recorded by single-year of age and sex. These data include the revised mid-year population estimates for 2002-10, which were released by the Office for National Statistics (ONS) in May 2013. The revised mid-year population estimates provide consistency in the measurement of the components of change (births, deaths, internal migration and international migration) between the 2001 and 2011 Censuses.

3.4 A summary analysis of the impact of the latest mid-year population estimate revisions upon the population of St Albans District and its components of change is provided in section 4.

Births and fertility

3.5 Historical mid-year to mid-year counts of births by sex from 2001-02 to 2010-11 have been sourced from ONS Vital Statistics (Figure 2).

3.6 A national age-specific fertility rate (ASFR) schedule, which measures the expected fertility rates by age and sex for England in 2011-12, is included in the POPGROUP model assumptions. A district-specific fertility differential has been derived from the total fertility rate (TFR) for St

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Albans District for the latest year for which data is available (2011). In combination with the population-at-risk this provides the basis for the calculation of births in each year of the forecast period.

3.7   Long-term assumptions on change in age-specific fertility rates are taken from ONS 2010-based national population projections.
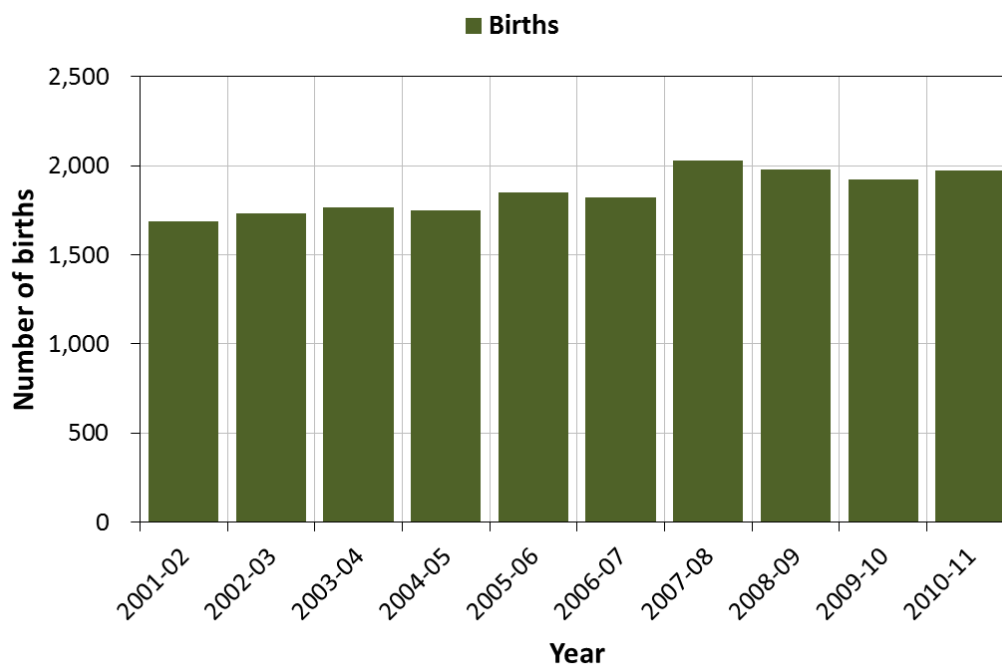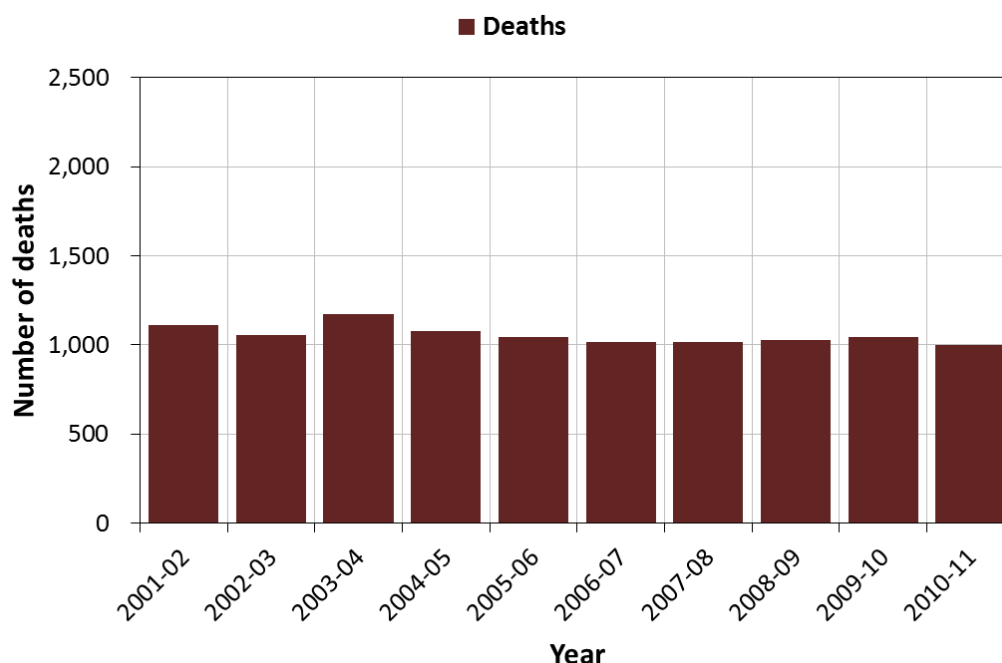

Source: ONS Vital Statistics

Figure 2: St Albans District - births 2001-02 to 2010-11

Deaths and mortality

3.8   Historical mid-year to mid-year counts of deaths by age and sex from 2001-02 to 2010-11 have been sourced from ONS Vital Statistics (Figure 3).

3.9   A national age-specific mortality rate (ASMR) schedule, which measures the expected mortality rates by age and sex for England in 2011-12, is included in the POPGROUP model assumptions. A district-specific mortality differential has been derived from the standardised mortality ratio (SMR) for St Albans District for the latest year for which data is available (2011). In combination with the population-at-risk these provide the basis for the calculation of deaths in each year of the forecast period.

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3.10 Long-term assumptions on change in age-specific mortality rates are taken from ONS 2010-based national population projections.

Figure 3: St Albans District - deaths 2001-02 to 2010-11

Internal migration

3.11 The original source of internal migration statistics is the Patient Register Data Service (PRDS), which captures the movement of patients as they register with a GP. This data provides an accurate representation of inter-area flows, albeit with some issues with regard to potential under-registration in certain age-groups (young males in particular). Historical mid-year to mid-year counts of in- and out-migration by five year age-group and sex from 2002-03 to 2011-12 have been sourced from the 'components of change' files that underpin the ONS mid-year population estimates. Any 'adjustments' made to the mid-year population estimates to account for prisoner or armed forces movements are included in the internal migration balance.

3.12 For the 'SNPP-2010' scenario, age-specific migration rate (ASMigR) schedules for both in- and out-migration are drawn directly from the ONS 2010-based assumptions. The 'Net-Nil' scenario also uses its own age-specific migration rate schedules, which adjust the total outward flow of internal migrants (for each year in the forecast period) so that it equates with the total inward

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flow of internal migrants (for that year). For the 'Mig-led10yrs' scenario, the migration schedules are derived from historical data, using a ten year history to determine these assumptions. For the alternative 'trend' scenarios ('Mig-led5yrs', 'Mig-ledHighX', 'Mig-ledHigh' and 'Mig-ledLow') migration rate assumptions have been derived from historical data, using a five year history to determine these assumptions. In combination with the population-at-risk the age-specific migration rate schedules provide the basis for the calculation of internal migration flows in each year of the forecast period.

3.13 For the 'Mig-ledHigh' and 'Mig-ledHighX' scenarios, net internal migration flows are fixed at +435 in each year of the forecast period, based on a 20-year average of the ONS 2010-based assumptions (2011-31).

3.14 For the 'Mig-ledLow' scenario, net internal migration flows are fixed at +275 in each year of the forecast period, based on a 10-year average of the ONS revised mid-year estimates (2001-11).

3.15 The housing-led scenarios ('Dwell-led250' and 'Dwell-led550') calculate their own migration assumptions to ensure an appropriate balance between population, households and the labour force, given the housing growth assigned in each scenario.

International migration

3.16 Historical mid-year to mid-year counts of total immigration and emigration from 2002-03 to 2011-12 have been sourced from the 'components of change' files that underpin the ONS mid-year population estimates. Asylum cases are included in the international migration statistics.

3.17 For the 'SNPP-2010' scenario international migration counts are drawn directly from the ONS 2010-based assumptions. The 'Net-Nil' scenario also uses its own international migration counts, which adjust the total outward flow of international migrants (for each year in the forecast period) so that it equates with the total inward flow of international migrants (for that year). For the 'Mig-led10yrs' scenario, the migration counts are derived from historical data, using a ten year history to determine these assumptions. For the alternative'Mig-led5yrs' 'trend' scenario, migration count assumptions have been derived from historical data, using a five year history to determine these data.

3.18 For the 'Mig-ledHigh' scenario net international migration counts are fixed at +240 in each year of the forecast period, based on a 5-year average of the ONS revised mid-year estimates (2006-11). "Unattributable change" occurring between the 2001 and 2011 Censuses is ascribed to

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international migration (see paragraphs 4.13 to 4.17).

3.19   For the 'Mig-ledHighX' scenario net international migration counts are fixed at +143 in each year of the forecast period, based on a 10-year average of the ONS revised mid-year estimates (2001-11). "Unattributable change" occurring between the 2001 and 2011 Censuses is ascribed to international migration (see paragraphs 4.13 to 4.17).

3.20   Whilst the higher figure (+240, used in the 'Mig-ledHigh' scenario) is based on more recent years, the lower figure (+143, 'used in the 'Mig-ledHighX' scenario) is based on the whole period 2001-11, allowing for uncertainty over ONS' allocation of "unattributable change" to specific years (see paragraphs 4.13 to 4.17).

3.21   For the 'Mig-ledLow' scenario net international migration counts are fixed at -85 in each year of the forecast period, based on a 10-year average of the ONS revised mid-year estimates (2001-11). "Unattributable change" occurring between the 2001 and 2011 Censuses is not accounted for (see paragraphs 4.13 to 4.17).

3.22   The housing-led scenarios ('Dwell-led250' and 'Dwell-led550') calculate their own migration assumptions to ensure an appropriate balance between population, households and the labour force, given the 'constraints' on growth that are imposed in each scenario.

Households

3.23   Household statistics and assumptions have been taken from the 2001 and 2011 Censuses and from the 2008-based and 2011-based household projection models. In April 2013 CLG released its latest household projections for local authority districts in England. The latest projections incorporate household data from the 2011 Census and are underpinned by the 2011-based interim sub-national population projection.

3.24   A summary analysis of the impact of the latest household model upon projected rates of household formation in St Albans District is provided in section 4.

3.25   Household projections are derived through the application of household headship rates (also referred to as 'household representative rates') to an age-sex disaggregated population. The projected household headship rates used in the 2011 household model have been derived using 2011 Census data in combination with statistics from the Labour Force Survey. Household

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headship rates define the likelihood of a particular household type being formed in a particular year, given the age-sex profile of the population in that year. Household-types are modelled within a 17-fold classification (Table 2). Household projections take explicit account of the 'population-not-in-households'. For the 2011-based household model this data has been drawn directly from the 2011 Census.

3.26 The relationship between households and dwellings is modelled using a 'vacancy rate' based on the ratio between household spaces (occupied, second homes and vacant) and dwellings (shared and unshared) from the 2011 Census. A 'household space' is the accommodation used (or available for use) by an individual household. A 'dwelling' is a unit of accommodation which may comprise one or more household spaces. The calculated vacancy rate for St Albans District is 3.0%. This value remains constant throughout the forecast period. The vacancy rate was derived using the following calculation: total occupied household spaces / total dwellings.

Table 2: Household type classification

CLG code	DF label	Household type
OPM	OPMAL	One person households: Male
OPF	OPFEM	One person households: Female
OCZZP	FAMC0	One family and no others: Couple: No dependent children
OC1P	FAMC1	One family and no others: Couple: 1 dependent child
OC2P	FAMC2	One family and no others: Couple: 2 dependent children
OC3P	FAMC3	One family and no others: Couple: 3+ dependent children
OL1P	FAML1	One family and no others: Lone parent: 1 dependent child
OL2P	FAML2	One family and no others: Lone parent: 2 dependent children
OL3P	FAML3	One family and no others: Lone parent: 3+ dependent children
MCZDP	MIX C0	A couple and one or more other adults: No dependent children
MC1P	MIX C1	A couple and one or more other adults: 1 dependent child
MC2P	MIX C2	A couple and one or more other adults: 2 dependent children
MC3P	MIX C3	A couple and one or more other adults: 3+ dependent children
ML1P	MIX L1	A lone parent and one or more other adults: 1 dependent child
ML2P	MIX L2	A lone parent and one or more other adults: 2 dependent children
ML3P	MIX L3	A lone parent and one or more other adults: 3+ dependent children
OTAP	OTHHH	Other households
TOT	TOTHH	Total

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Employment & economic activity

3.27   Three key data items are required to derive labour-force projections: economic activity rates, a commuting ratio and an unemployment rate. Economic activity rates provide the basis for calculating the size of the labour force within the population. The commuting ratio and unemployment rate control the balance between the size of the labour force and the number of jobs available within an area.

Economic activity rates

3.28   Economic activity rates have been derived from a combination of 2001 Census statistics and the latest evidence from the Labour Force Survey (via NOMIS). NOMIS data provide an average economic activity rate for the period 2007-11 by broad age-group. Using the 2001 Census data these activity rates have been disaggregated to provide an economic activity rate by five year age-group and sex for all labour-force ages, to age 74 (Figure 4).
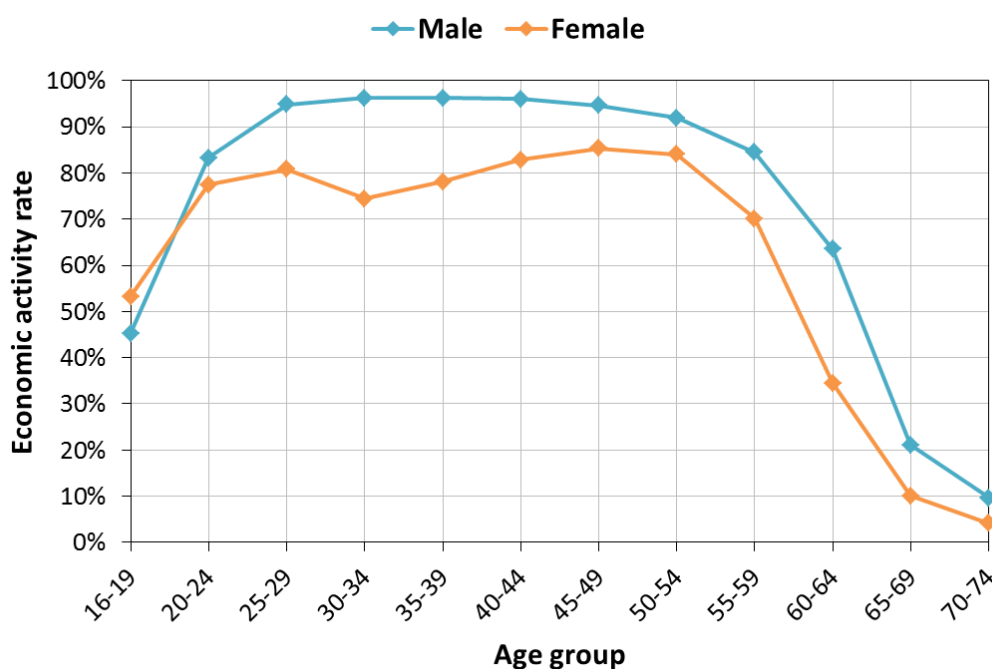
Source: NOMIS; ONS

Figure 4: Economic activity rates 2011 – St Albans District

3.29   To account for an expected increase in the rate of labour force participation in the older age groups (resulting from changes to stage pension age) economic activity rates have been increased in the following way:

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- Women aged 60-64: 40% increase by 2020.

- Women aged 65-69: 20% increase by 2020.

- Men aged 60-64: 5% increase by 2020.

- Men aged 65-69: 10% increase by 2020.

3.30   From 2020 economic activity rates are kept constant.

Unemployment rate

3.31   An average unemployment rate of 4.0% (age groups 16+) has been calculated from unemployment statistics for St Albans District for the period 2004-12 (sourced from NOMIS). This unemployment rate remains constant throughout the projection period.

Commuting Ratio

3.32   Using 2001 Census statistics, a commuting ratio has been derived as the balance between the size of the resident labour force and the number of the jobs available in the District. The derived ratio of 1.19 for St Albans indicates that there is a net outflow of commuters. The commuting ratio is held constant throughout the projection period.

Forecasting methodology

3.33   Forecasts have been developed using POPGROUP technology. Population projections delivered using POPGROUP use a standard cohort component methodology (the methodology used by the UK statistical agencies). The household projections use a standard household headship rate as employed by CLG for its household projection statistics. A more detailed description of the population and household projection methodologies is available from the User Guide and Reference Manual on the POPGROUP website[3].

3.34   Figure 5 and Figure 6 provide a schematic illustration of the operation of the POPGROUP and Derived Forecast (household and labour force) methodologies.

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[3] CCSR (2013). Manuals. www.ccsr.ac.uk/popgroup/about/manuals.html.

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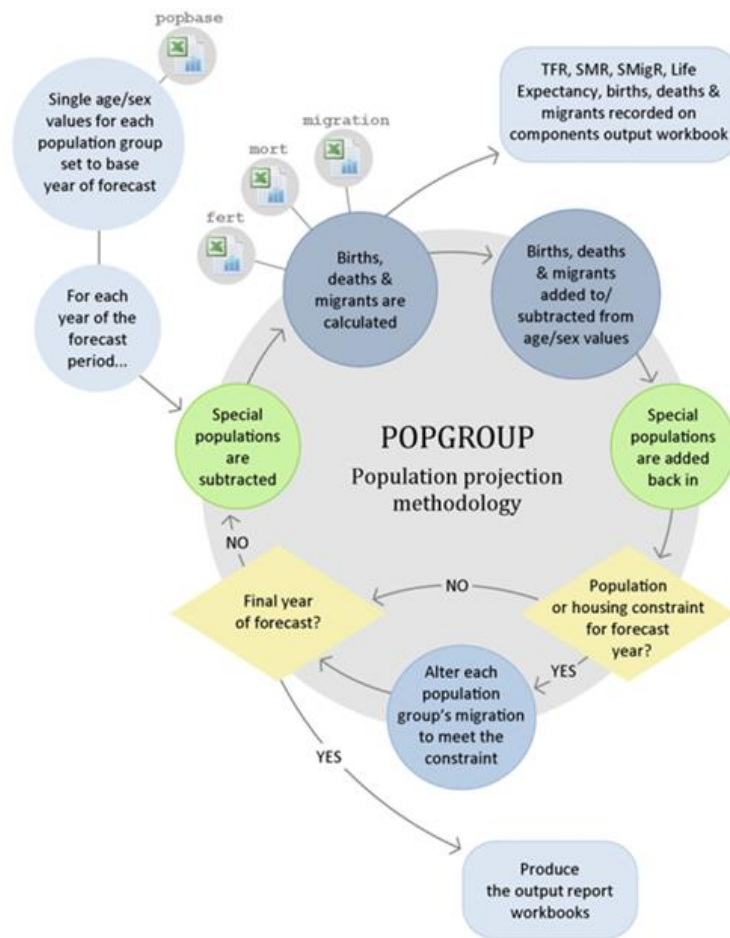
Figure 5: POPGROUP population projection methodology

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$$D_{a,s,u,y,d,g} = \frac{P_{a,s,u,y,g} \; R_{a,s,u,y,d,g}}{100}$$

D Derived Category Forecast
P Population 'at risk' Forecast
R Derived Category Rates
a Age-group
s Sex
u Sub-population
y Year
d Derived category
g Group (usually an area, but can be an ethnic group or social group)
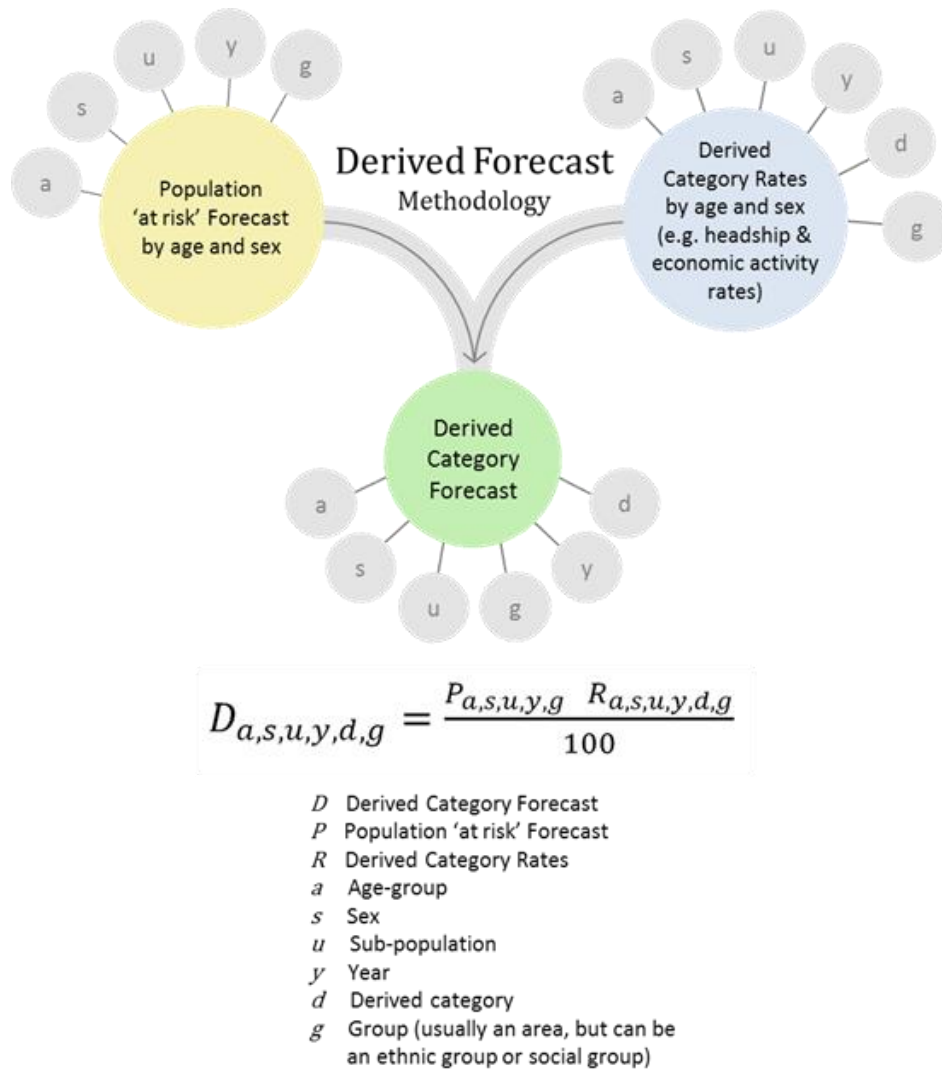
Figure 6: Derived Forecast Model: household and labour force projection methodology

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4. Summarising the latest evidence

New evidence

4.1   In April 2013 CLG released its new household projections for local authority districts in England. These household projections are underpinned by the 2011-based interim sub-national projections, which were published by ONS in September 2012[4][5][6].

4.2   Also in April 2013, ONS released its 'recalibrated' time-series of mid-year population estimates for the 2002-10 period[7]. These take account of the newly released 2011 Census statistics and have recalculated the components of change (specifically international migration) that have driven local population growth between the 2001 and 2011 Census dates.

4.3   This section summarises the impact of these data releases on the demographic profile of St Albans District, providing a context for the scenario development reported in sections 5 and 6.

Household projections

4.4   Household projections are derived through the application of household headship rates (also referred to as 'household representative rates' in the CLG documentation). Headship rates define the likelihood of a particular household type being formed in a particular year, given the age-sex profile of the population in that year. The projected household headship rates used in the 2011 household model have been derived using 2011 Census data in combination with statistics from the Labour Force Survey.

4.5   The new household projections replace the previous 2008-based household projections. They provide an update on likely household growth trajectories, taking account of the unprecedented economic conditions that have affected local communities since 2008.

4.6   The new CLG household model provides an important update to the evidence base, with the

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[4] CLG (2013a). Household interim projections (2011 to 2021) in England.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/182412/Stats_Release_2011FINALDRAFT.pdf.
[5] CLG (2013b). 2011-based interim household projections: quality report.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/182504/QualityFinalDraft_v3.pdf.
[6] CLG (2013c). Updating DCLG's household projections to a 2011 base: methodology.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/182417/MethodologyFinalDraft.pdf
[7] ONS (2013). Methods used to revise the SNPP estimates for mid-2002 to mid-2010. http://www.ons.gov.uk/ons/rel/pop-estimate/population-estimates-for-england-and-wales/mid-2002-to-mid-2010-revised--subnational-/index.html.

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general trend in the 2011-based projections suggesting a reduction in the rate of household growth from 2011-21, compared to the 2008-based projections.

4.7   Rates of household growth are determined by the profile and change in household headship rates (by household type, age and sex), as well as by the underlying rate of population growth.

4.8   The new CLG household model projections are underpinned by the interim 2011-based population projection (ONS). This projection uses 2011 Census statistics for its base period population, but uses assumptions from the 2010-based population projection to define its fertility, mortality and migration components of change. For this reason, the 2011-based population projections do not provide a suitably robust 'trend' projection of population growth.

4.9   In order to present a test of the sensitivity of the new household headship rates upon future household growth, the ONS 2010-based sub-national population projection has been used in conjunction with 2008-based and 2011-based household headship rates. The population projection is scaled to match 2011 Census totals, following the 2010-based growth trend thereafter. The impact of the 2011 headship rates is to reduce the scale of household growth in St Albans District over the 2011-21 period (Figure 7).
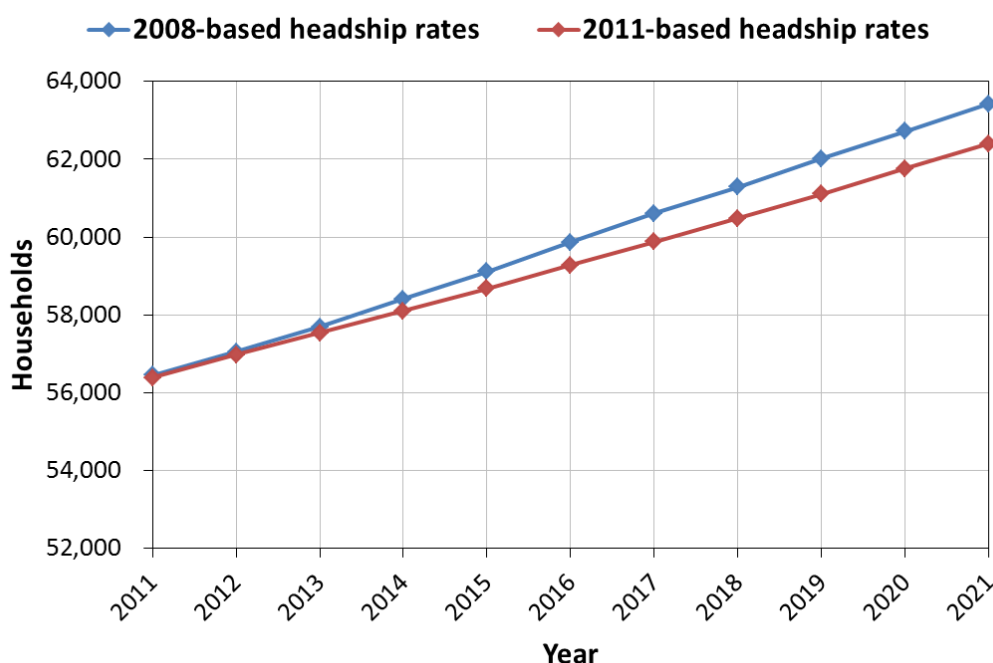
Source: CLG; Edge Analytics. Using 'SNPP-2010' population projection

Figure 7: Impact of the 2011 headship rates on the scale of household growth (2011-21)

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4.10 Using the 2010-based population projection, scaled to the 2011 Census total, the number of households is projected to increase by just 10.6% using the 2011-based headship rates, compared to 12.4% with the 2008-based headship rates (Table 3).

Table 3: Change in the number of household 2011-21 using 2008-based and 2011-based headship rates

	Households			Change 2011-21	
	2011	2016	2021	Total	%
2008-based headship rates	56,449	59,862	63,421	6,972	12.4%
2011-based headship rates	56,391	59,281	62,395	6,003	10.6%

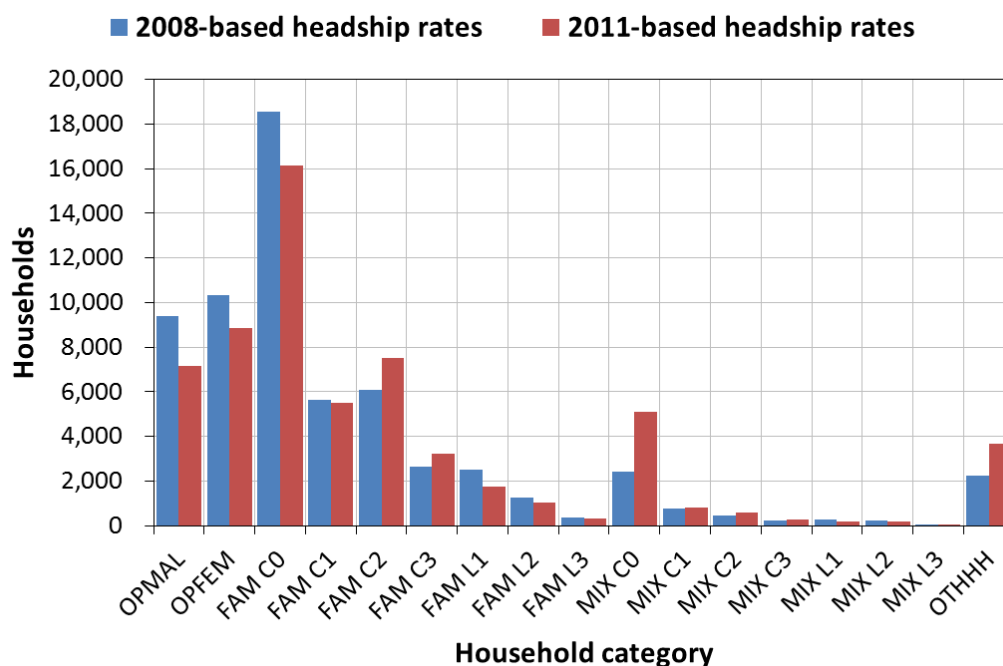*Source: CLG; Edge Analytics. Using 'SNPP-2010' population projection*

4.11 With a reduction in the projected rate of household formation, a higher average household size is maintained when applying the 2011-based headship rates; the same population is associated with a smaller number of households, meaning the average household comprises a larger number of people. By 2021 the average household size in St Albans District using the 2008-based headship rates is 2.44 compared to 2.48 when using the 2011-based headship rates (Table 4).

Table 4: Change in average household size 2011-21 using 2008-based and 2011-based headship rates

	Population / households		
	2011	2016	2021
2008-based headship rates	2.47	2.46	2.44
2011-based headship rates	2.48	2.48	2.48

Source: CLG; Edge Analytics. Using 'SNPP-2010' population projection

4.12 The revised 2011-based headship rates have had the most significant impact upon single-person households (OPMAL, OPFEM) and family households with no children (FAMC0). This has been offset by increases in households comprising a couple and one or more other adults with no dependent children (MIXC0), family households with two or more children (FAMC2 and FAMC3) and the miscellaneous 'Other' classification (Figure 8).

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Source: CLG; Edge Analytics. Using 'SNPP-2010' population projection

Figure 8: Impact of the 2011 headship rates on the scale of household growth (2011-21)
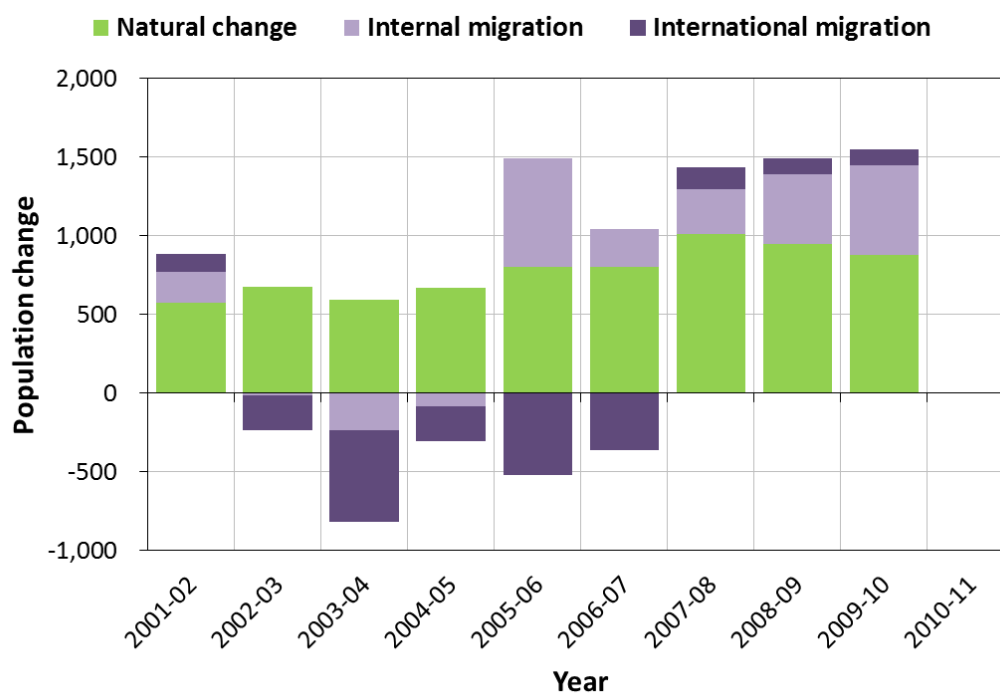
Mid-year population estimates

4.13   In May 2013 ONS published a revised back-series of mid-year population estimates, which align the 2002-10 populations with the latest 2011 data. These new data have recalibrated the 'components of change' to ensure the correct transition of the age profile of the population over the 2001-11 decade, taking into account births, deaths and internal and international migration.

4.14   For St Albans the 2011 Census population statistics proved to be higher than previous mid-year population estimates, suggesting that the previous mid-year population estimates for the District resulted in an under-estimation of the ten-year growth trajectory (Figure 9).

4.15   Between successive censuses, births and deaths are accurately recorded in vital statistics registers and provide the most robust measure of 'natural change' (the difference between births and deaths) in a geographical area. Internal migration data are derived from GP registers, providing an accurate representation of inter-area flows, albeit with some issues with regard to potential under-registration in certain age-groups (young males in particular). International migration is the most difficult component to estimate with confidence.

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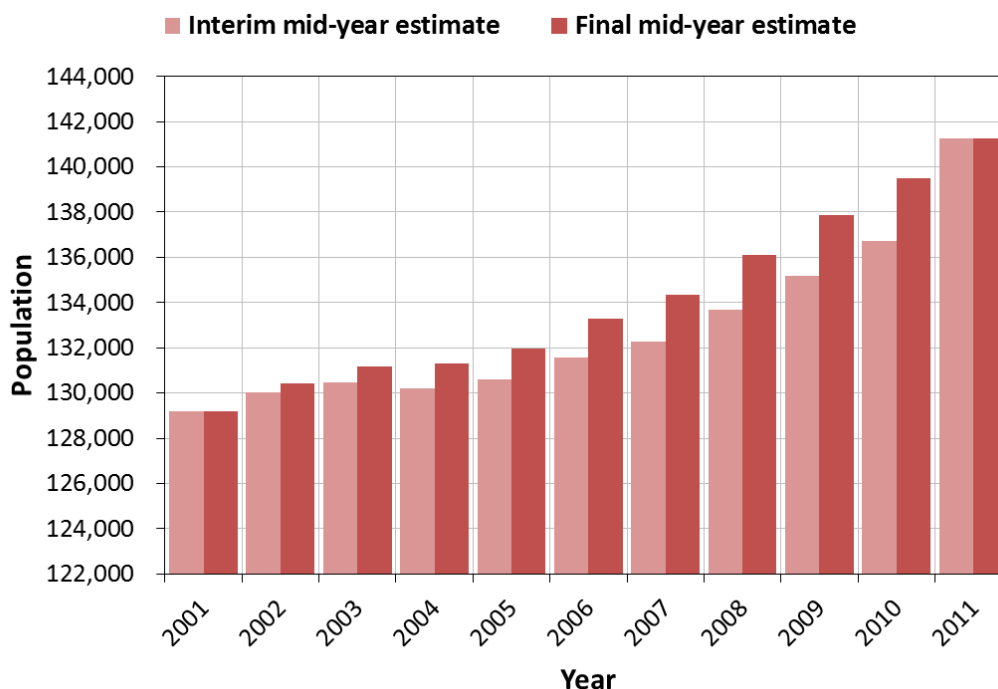
Source: ONS

Figure 9: St Albans District - mid-year population estimate revisions

4.16   On the assumption that births, deaths and internal migration have been robustly measured (and that the 2001 Census provided a robust population count for St Albans District), the 'adjustment' that resulted from the mid-year population estimate revisions (to account for the so-called "unattributable change") is predominantly associated with the mis-estimation of international migration: the balance between immigration and emigration flows to and from the District.

4.17   Figure 10 and Figure 11 show that in the case of St Albans District the natural change and internal migration components of change for the old and new mid-year population estimates remain relatively unchanged. The international migration component of change has been modified with an overall net increase of approximately +2,873 applied over the 2001-02 to 2010-11 period to account for the under-estimation of population growth.

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Source: ONS

Figure 10: Components of change - old mid-year population estimates
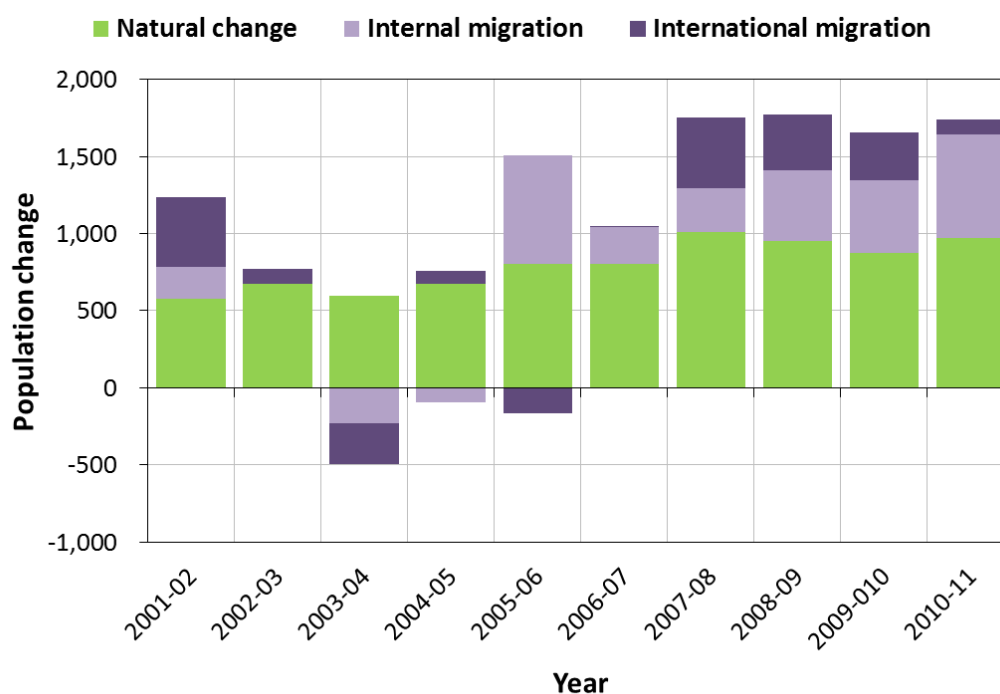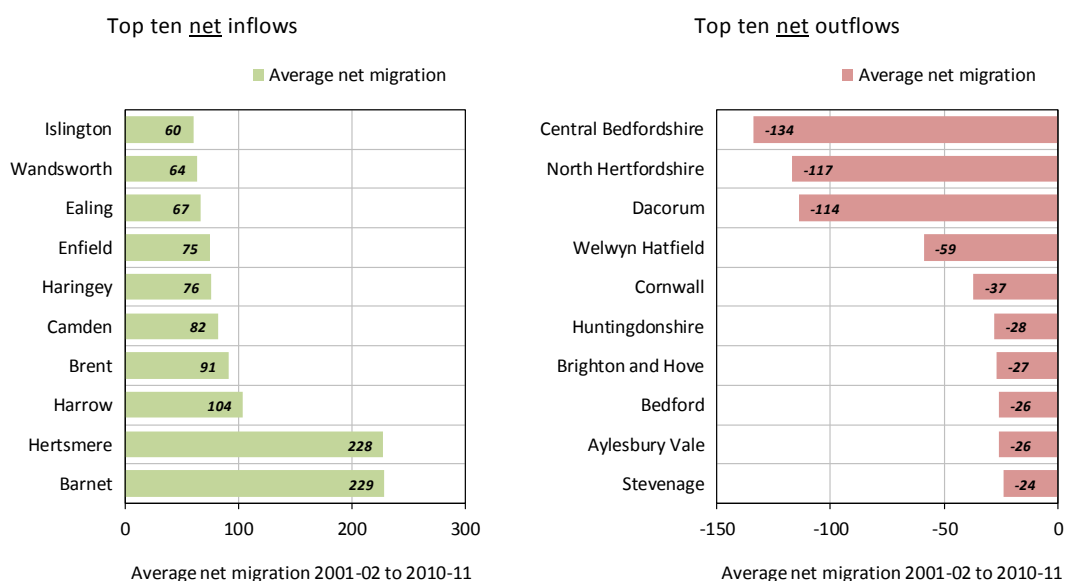

Source: ONS

Figure 11: Components of change - new mid-year population estimates

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Internal migration dynamics

4.18   The primary source of data on internal (within UK) migration statistics is the PRDS, which captures the movement of patients as they register with a GP. This data is used by the ONS in its mid-year population estimates and forms the basis for estimating migrant flows between local authority areas.

4.19   The GP registration statistics can be used to summarise spatial variations in the inflow, outflow and netflow of migrants between St Albans and other districts in England and Wales for the period 2001-02 to 2010-11 (Figure 12).

4.20   During this period the largest inflows to St Albans district came from neighbouring districts and nearby London Boroughs. In contrast, the largest outflows from the District were also mostly to neighbouring districts but with an absence of movement to the London Boroughs (Figure 12a).

4.21   As a result, the net gain through migration (where netflow = inflow - outflow) has been greatest between St Albans District and the nearby London Boroughs of Barnet (averaging +229 migrants per year), Harrow (averaging +104 migrants per year) and Brent (averaging +91 migrants per year), as well as between St Albans District and neighbouring Hertsmere (averaging +228 migrants per year). The most pronounced net outflows were from St Albans District to neighbouring Central Bedfordshire (averaging -134 migrants per year), North Hertfordshire (averaging -117 migrants per year) and Dacorum (averaging -114 migrants per year) (Figure 12b).

4.22   Between 2001-02 to 2010-11 the age profile of net migration to and from St Albans District was dominated by the net loss of population in the 15-19 age-group (i.e. the movement of students to higher education elsewhere in the UK). The net gain through internal migration was most pronounced in the 0-4 and 20-39 age-groups, implying that the majority of net inflow to the District was of returning students and economically active migrants. A net outflow has been evident in all adult age-groups over the age of 44 (Figure 12c).

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Top ten inflows		Top ten outflows	
	Average 2001-02 to 2010-11		Average 2001-02 to 2010-11
Hertsmere	406	Welwyn Hatfield	456
Welwyn Hatfield	397	Dacorum	437
Dacorum	323	Central Bedfordshire	376
Barnet	313	North Hertfordshire	248
Luton	252	Luton	235
Central Bedfordshire	242	Hertsmere	178
Watford	205	Watford	153
Camden	163	East Hertfordshire	99
Harrow	146	Leeds	98
North Hertfordshire	131	Three Rivers	91

a) Inflows and outflows

b) Net flows - migrant exchange
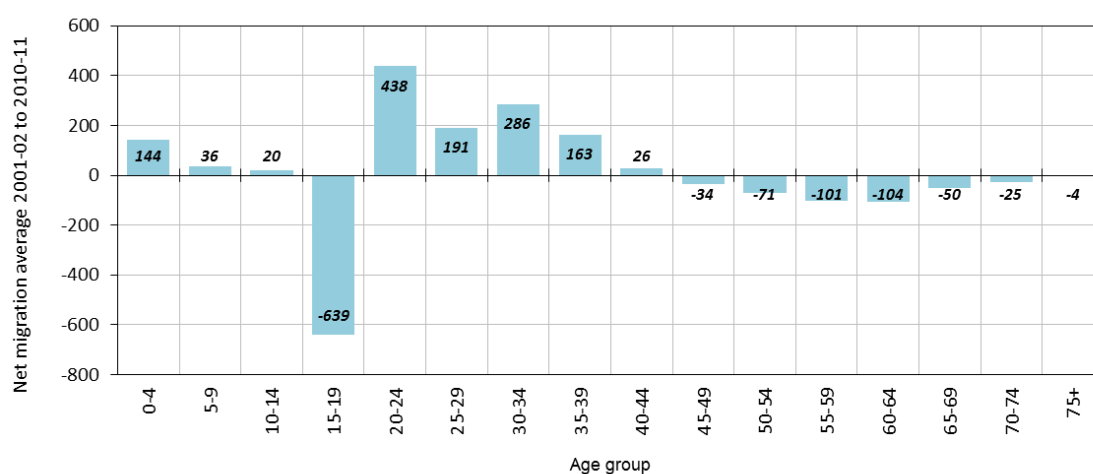
c) Age profile

Source: PRDS

Figure 12: St Albans District, internal migration dynamics 2001-11

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5. Scenario development

Scenario context

5.1   The NPPF provides guidance on the development of a robust evidence base to support the preparation of Local Development Plans. The guidance makes it clear that data inputs, assumptions and methodology should be robust and should consider future growth potential from a number of perspectives.

5.2   There is no single, definitive view on the likely level of growth expected in St Albans District, with a mix of economic, demographic and national/local policy issues ultimately determining the speed and scale of change. For local planning purposes it is necessary to evaluate a range of growth alternatives to establish the most 'appropriate' basis for determining future housing (and other service) provision.

5.3   The development of Local Plans is made considerably more challenging by the dynamic nature of key data inputs. Economic and demographic factors, coupled with the continuous release of new statistics, often undermine the robustness of underpinning evidence. This has been a particular issue during 2013, with the release of new 2011 Census statistics, updated household projections and revisions to historical population estimates.

5.4   Evidence presented in Local Plans 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 (POPGROUP), which incorporates an industry-standard methodology (cohort component model), removes this obstacle and enables a focus on assumptions and output, rather than methods.

5.5   Transparency is an important component of any forecasting analysis. It is necessary to ensure that all data inputs and assumptions are clearly documented and that outcomes are benchmarked against the latest 'official' forecasts, wherever possible.

5.6   The remainder of this section provides a summary of the alternative growth scenarios that have been tested for St Albans District. These scenarios have been developed using POPGROUP technology, they use the latest available statistics from both ONS and CLG, they evaluate trend, policy and economic considerations, they are accompanied by a transparent definition of key

assumptions and they are presented in a consistent format that contrasts the impact of scenario assumptions upon changes to population, households, dwellings, labour force and jobs. All scenarios are run from a 2012 base year, with a 2031 horizon. For context, historical data are included for 2001-11.

Official projections (ONS)

5.7   In all scenario analysis it is important to benchmark any growth alternatives against the latest official population projection. Although ONS has released an 'interim' 2011-based population projection, this projection has used assumptions from the 2010-based population projection to define its fertility, mortality and migration components of change. As such, the 2011-based population projections do not provide a suitably robust benchmark trend projection.

5.8   The 2010-based sub-national projection ('SNPP-2010') from ONS is used in this analysis as the trend benchmark. This scenario has been developed using historical evidence from the period 2006-10 and incorporates long-term assumptions on fertility, mortality and international migration that were defined in the 2010-based national projection for England.

5.9   The 'SNPP-2010' scenario is scaled to ensure consistency with the 2011 Census population, following its designated growth trend thereafter.

Alternative trend scenarios

5.10   During 2012-13 ONS has released detailed statistics from the 2011 Census and has followed this with a release of the revised mid-year population estimates for 2002-10. These new data provide the basis for the derivation of a number of alternative 'trend' scenarios to complement the most recent official projection ('SNPP-2010').

5.11   In determining the migration assumptions for a new '2012-based' trend projection historical data on the components of demographic change during the 2002-03 to 2011-12 time period are a key consideration. Since 2002-03, the population of St Albans District has increased from 131,180 to reach 141,899 in 2011-12, an 8.2% change over the ten year period (Figure 13).

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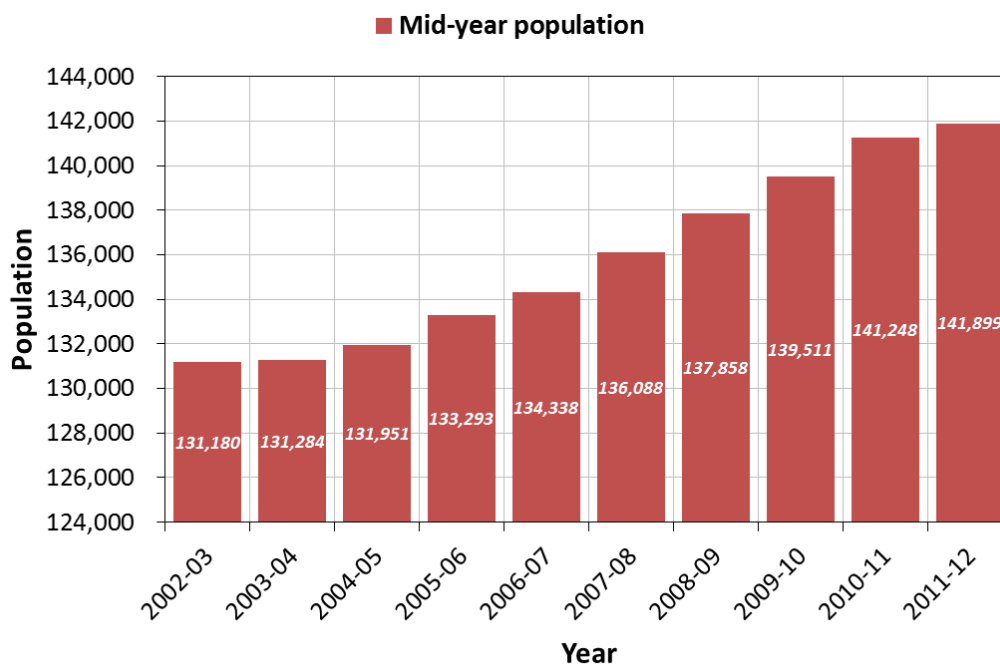
Source: ONS (2013)

Figure 13: St Albans District, population change 2002-03-2011-12

5.12 This population change has been driven by a mixture of natural change (the difference between the number of births and deaths), net internal migration (the difference between in-migration and out-migration from and to other locations within the UK) and net international migration (the difference between immigration and emigration). There has been variation in the relative importance of these components over the 2002-03 to 2011-12 decade (Figure 14).

5.13 A five year historical period is a typical time-frame from which migration 'trend' assumptions are derived (this is consistent with the ONS official methodology). However, given the unprecedented economic change that has occurred since 2008, it is important to give due consideration to an extended historical time period for assumption derivation.

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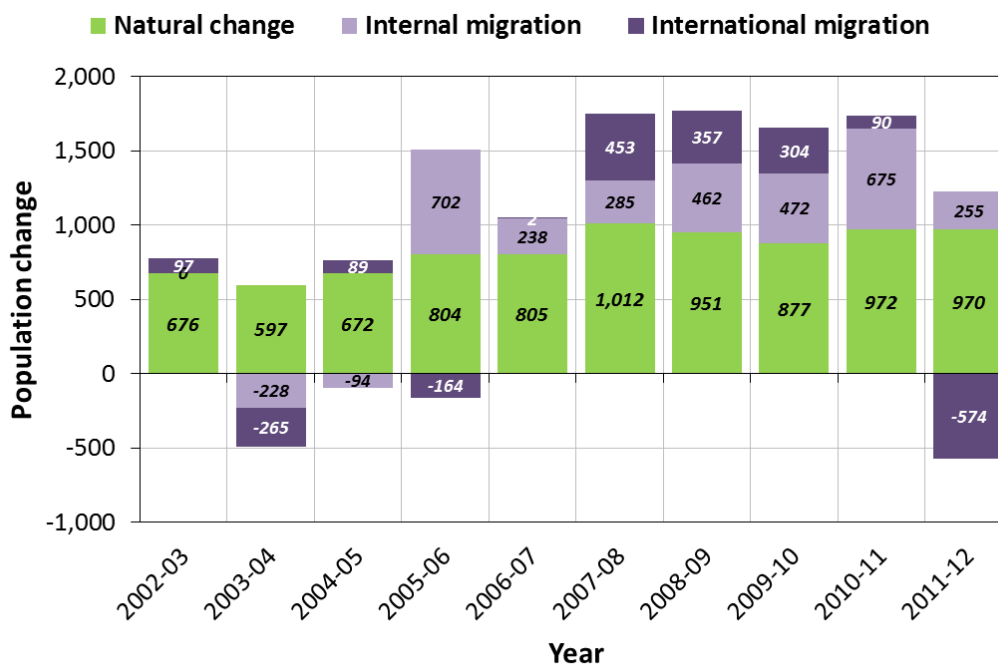
Source: ONS (2013)

Figure 14: St Albans District, components of population change 2002-03 to 2011-12

5.14 A range of 'migration-led' scenario alternatives have been developed and tested. The 'core' trend scenarios based upon the latest demographic evidence are as follows:

- 'Mig-led5yrs': internal and international migration assumptions are based on the last five years of historical evidence (2007-08 to 2011-12).

- 'Mig-led10yrs': internal and international migration assumptions are based on the last 10 years of historical evidence (2002-03 to 2011-12).

- 'NetNil': in-migration, out-migration, immigration and emigration are maintained, but the net migration balance is set at zero.

5.15 Three additional scenarios have tested alternative assumptions on future migration impacts:

- 'Mig-ledHighX': internal migration is based on a 20-year average of the ONS 2010-based assumptions (2011-31). International migration is based on a 10-year average of the ONS revised mid-year estimates (2001-11).

- 'Mig-ledHigh': internal migration is based on a 20-year average of the ONS 2010-based assumptions (2011-31). International migration is based on a 5-year average of the ONS revised mid-year estimates (2006-11).

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- 'Mig-ledLow': internal migration is based on a 10-year average of the ONS revised mid-year estimates (2001-11). International migration is based on a 10-year average of the ONS revised mid-year estimates (2001-11).

Dwelling-led scenarios

5.16 The impact of an anticipated growth in housing numbers can be evaluated using a 'dwelling-led' formulation of the model, which uses in- and out-migration to balance the relationship between population size and housing provision.

5.17 For the purposes of this report the impacts of two planning policy dwelling provision constraints have been evaluated with the following 'dwelling-led' scenarios:

- 'Dwell-led250': population growth in St Albans District is consistent with a dwelling completion rate of 250 dwellings per year (Figure 15).

- 'Dwell-led550': population growth in St Albans District is consistent with a dwelling completion rate of 550 dwellings per year (Figure 15).
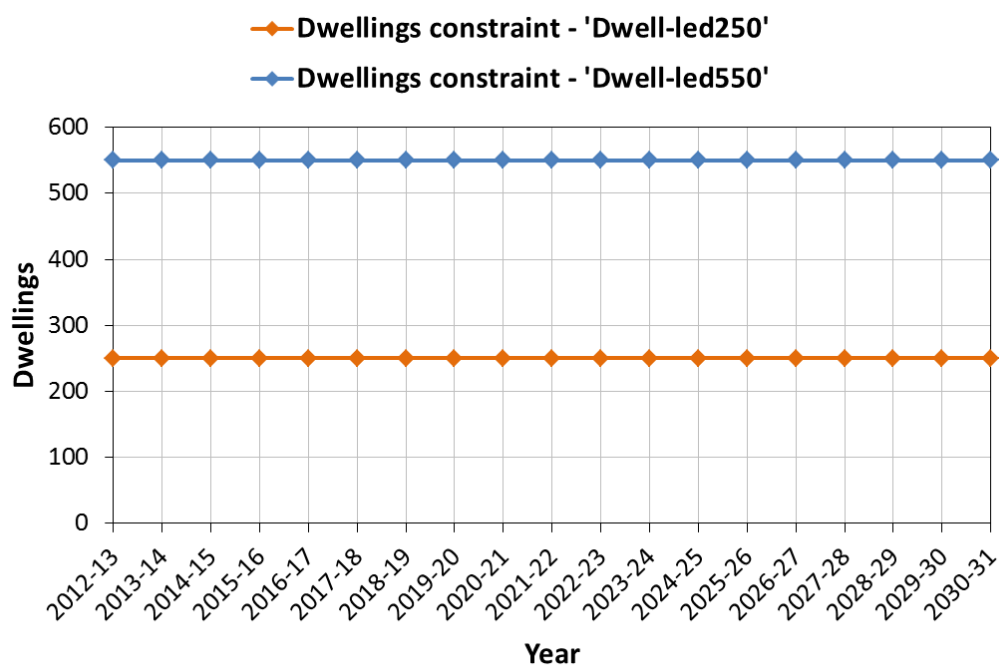
Figure 15: St Albans District, dwelling constraints used in the dwelling-led scenarios

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5.18 POPGROUP is able to evaluate the impact of a particular dwelling trajectory by measuring the relationship between the number of homes in an area, the number of households and the size of the resident population. If there is an 'imbalance' between the 'target' number of new homes and the resident population, then migration is used to redress the imbalance. A higher level of net in-migration will occur if there is insufficient population to meet dwelling targets. A higher level of net out-migration will occur if the population is too high relative to dwelling targets.

Household forecasts

5.19 Section 4 provided a summary of the impact of CLG's latest household projection model. Using evidence from the 2011 Census this has introduced new headship rates, which determine the scale and profile of future household formation.

5.20 For the analysis presented in this report two alternative headship rate assumptions are used, reflecting the uncertainty associated with future rates of household formation and accommodating the fact that the latest 2011-based data only run to 2021.

- Option A: CLG 2011-based headship rates, with the 2011-21 trend continued after 2021.

- Option B: CLG 2008-based headship rates, scaled to be consistent with the 2011 Census but following the original trend thereafter.

5.21 The household impact of the population growth scenarios is modelled using each of the two headship rate alternatives. Option A and Option B outcomes are presented for each scenario.

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Scenario definition summary

5.22   To summarise, the following suite of scenarios has been evaluated as part of this analysis:

Table 5: Scenario definition summary

|	Household headship rates	
Scenario type	**Option 'A' - CLG 2011**	**Option 'B' - CLG 2008**
Official	SNPP-2010_A	SNPP-2010_B
Trend	Mig-led5yrs_A Mig-led10yrs_A Mig-ledHighX_A Mig-ledHigh_A Mig-ledLow_A NetNil_A	Mig-led5yrs_B Mig-led10yrs_B Mig-ledHighX_B Mig-ledHigh_B Mig-ledLow_B NetNil_B
Dwelling-led	Dwell-led250_A Dwell-led550_A	Dwell-led250_B Dwell-led550_B

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6. Scenario forecasts

Scenario summary

6.1   A summary of the results of each scenario is provided in the form of a chart and an accompanying table of statistics. The chart illustrates the trajectory of population change resulting from each scenario. The table summarises the change in population and household numbers from 2011-31 that results from each scenario. The scenarios are 'ranked' (high to low) according to the expected average annual dwelling growth throughout 2011-31, based on the assumptions used in each scenario. The table also shows the estimated level of population change throughout 2011-31, the average annual net migration associated with the population change plus the expected average annual jobs growth. An additional table, which 'splits' the averages from 2011-21 and 2021-31, is included in the Appendix, along with a table that provides further details about the change in dwellings and households throughout 2011-31.

6.2   Scenario results are presented in two separate illustrations, each one relating to the application of different household headship rates. Each set of scenario alternatives is discussed in turn:

- Option 'A': CLG 2011-based headship rates, with the 2011-21 trend after 2021.

- Option 'B': CLG 2008-based headship rates, scaled to be consistent with the 2011 Census but following the original trend thereafter.

Scenario outcomes ('A')

6.3   This first set of scenarios ('A') has been run using CLG's 2011-based household headship rates, trended after 2021. The scenario outcomes suggest a range of growth trajectories depending on the key assumptions that have been applied. Population growth ranges from +6.0 to +20.4%, with estimated dwelling growth from +250 to +661 units per year (Figure 16).

6.4   All scenarios, with the exception of 'SNPP-2010', use the same historical data to generate a forecast. The 'SNPP-2010' projection was developed by ONS using the now out-dated mid-year population estimates. It does not include any 2011 Census information, although the forecast presented here has rescaled the 2010 trajectory to the 2011 Census population total, continuing its trend thereafter.

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Option 'A' - CLG 2011-based headship rates
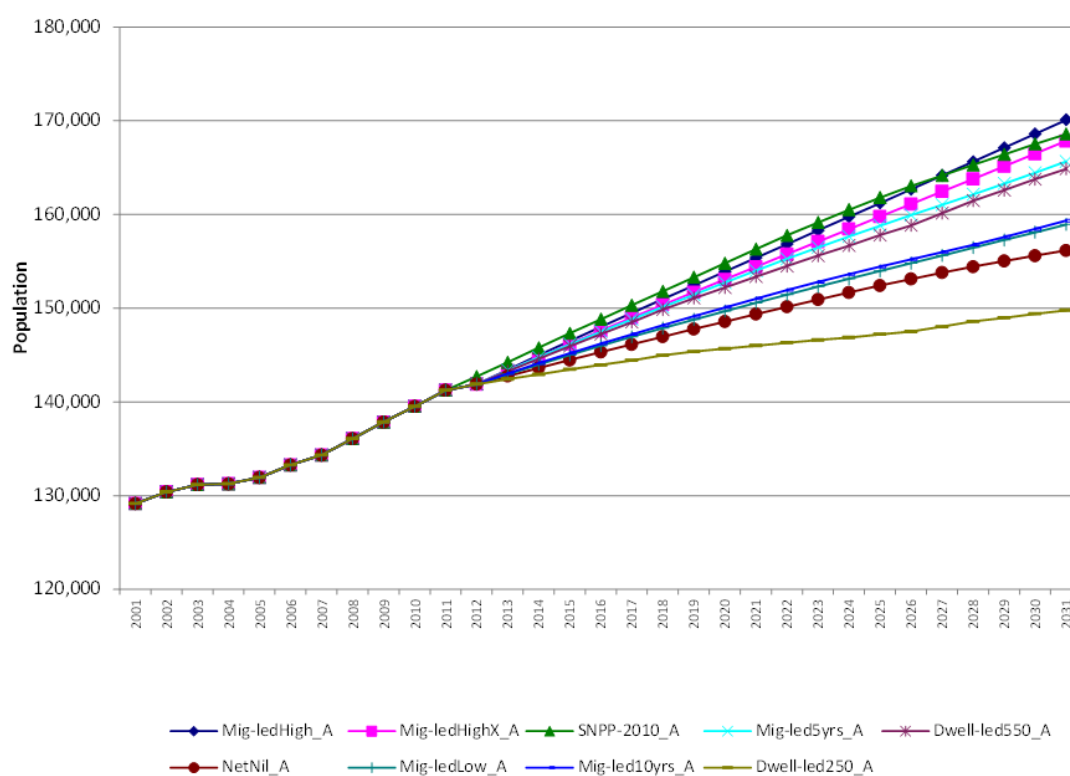
Scenario	Change 2011 - 2031				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Jobs
Mig-ledHigh_A	28,838	20.4%	12,821	22.8%	625	661	426
Mig-ledHighX_A	26,602	18.8%	12,099	21.5%	533	624	378
SNPP-2010_A	27,329	19.3%	12,005	21.3%	397	619	412
Mig-led5yrs_A	24,398	17.3%	11,329	20.1%	437	584	325
Dwell-led550_A	23,614	16.7%	10,550	18.7%	375	550	320
NetNil_A	14,911	10.6%	9,098	16.1%	0	469	216
Mig-ledLow_A	17,680	12.5%	9,068	16.1%	165	468	179
Mig-led10yrs_A	18,093	12.8%	8,452	15.0%	142	436	200
Dwell-led250_A	8,531	6.0%	5,023	8.9%	-238	250	-28

('A') CLG 2011-based headship rates, with the 2011-21 trend continued after 2021

Figure 16: St Albans District, scenario forecasts 2011-31 ('A')

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6.5 As it uses 'old' data the age profile of the 'SNPP-2010' scenario will differ from that of the other scenarios (all of which are based on the latest mid-year population estimates but more importantly on the 2011 Census single year population age profile for St Albans District). This has important implications for the interpretation of scenario output.

6.6 The 'SNPP-2010' scenario suggests a +19.3% increase in population between 2011-31, which is higher than all but one of the alternative scenarios ('Mig-ledHigh'). The different age profile of the population for the 'SNPP-2010' scenario also results in a relatively high household growth figure (+21.3%) and annual dwelling requirement (+619 per year).

6.7 Of the six trend scenarios tested, the highest growth trajectory is suggested by the 'Mig-ledHigh' scenario, which results in a +20.4% increase in population between 2011-31, a 22.8% increase in households, an average annual dwelling growth expectation of +661 units and an estimated job requirement of +426.

6.8 The 'Mig-ledHighX' scenario also suggests relatively high levels of population growth (+18.8%) and household growth (+21.5%). Dwelling growth expectations are +624 per year and jobs change expectation is estimated at +378 per year over the projection period.

6.9 Conversely, the 'Mig-ledLow' scenario results in relatively low levels of population growth (+12.5%), household growth (+16.1%) and average annual dwelling growth expectations (+468 units).

6.10 In the case of the 'Mig-led5yrs' trend scenario, taking a five year history for the development of both internal and international migration assumptions results in an annual net migration expectation of +437 per year. Dwelling growth expectations are +584 units per year, with jobs at +325 per year.

6.11 An alternative trend scenario, 'Mig-led10yrs', has been tested, taking a ten year history for the development of both internal and international migration assumptions. This reduces estimated population growth to +12.8%, household growth to +15.0% and the annual dwelling requirement to +436 units per year.

6.12 The 'NetNil' scenario suggests that, in the absence of growth through migration, population change would be approximately +10.6% between 2011-31. When modelling the 'Net-Nil' scenario, POPGROUP adjust the total outward flow of internal and international migrants (for each year in the forecast period) so that it equates with the total inward flow of migrants (for

that year). The 'NetNil' constraints on this scenario results in a very different age profile to the population; resulting household growth is +16.1% with an annual dwelling requirement of +469 units per year.

6.13 The dwelling-led projections ('Dwell-led250' and 'Dwell-led550') suggest 250 and 550 as the target for housing growth over the 2011-31 period. The 'Dwell-led250' scenario suggests a +6.0% increase in population between 2011-31, with a decline in job requirements estimated at -28 per year. The 'Dwell-led550' scenario suggests a +16.7% increase in population between 2011-31, with jobs growth estimated at +320 per year.

Scenario outcomes ('B')

6.14 The second set of scenarios ('B') has been run using CLG's 2008-based household headship rates. The rates have been scaled to ensure that they reproduce the 2011 Census household totals but follow their original trend for the remainder of the projection period.

6.15 Section 5 provided context to the alternative use of 2011-based and 2008-based headship rates. The latter have higher rates of household formation for single-person and two-person-no-children households, resulting in a sharper decline in average household size. With the exception of the dwelling-led scenarios ('Dwell-led250' and 'Dwell-led550'), this is reflected in the 'B' scenario outcomes that generate the higher household growth forecasts than the 'A' alternatives.

6.16 Headship rate differences again affect the relationship between the +250 and +550 annual dwelling constraints and the population growth associated with the two dwelling-led scenarios. Population growth is lower in the 'B' scenarios due to the headship rate trajectory resulting in a lower average household size: the same number of dwellings is associated with a smaller population size. With a more significant reduction in average household occupancy, population growth associated with the dwelling-led scenarios reduces to 4.0% (compared to 6.0%) in the case of the 'Dwell-led250' scenario and to 13.8% (compared to 16.7%) in the case of the 'Dwell-led550' scenario. In both cases the same number of dwellings is accommodating a smaller population given the effect of the 2008-based headship rates.

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Option 'B' - CLG 2008-based headship rates
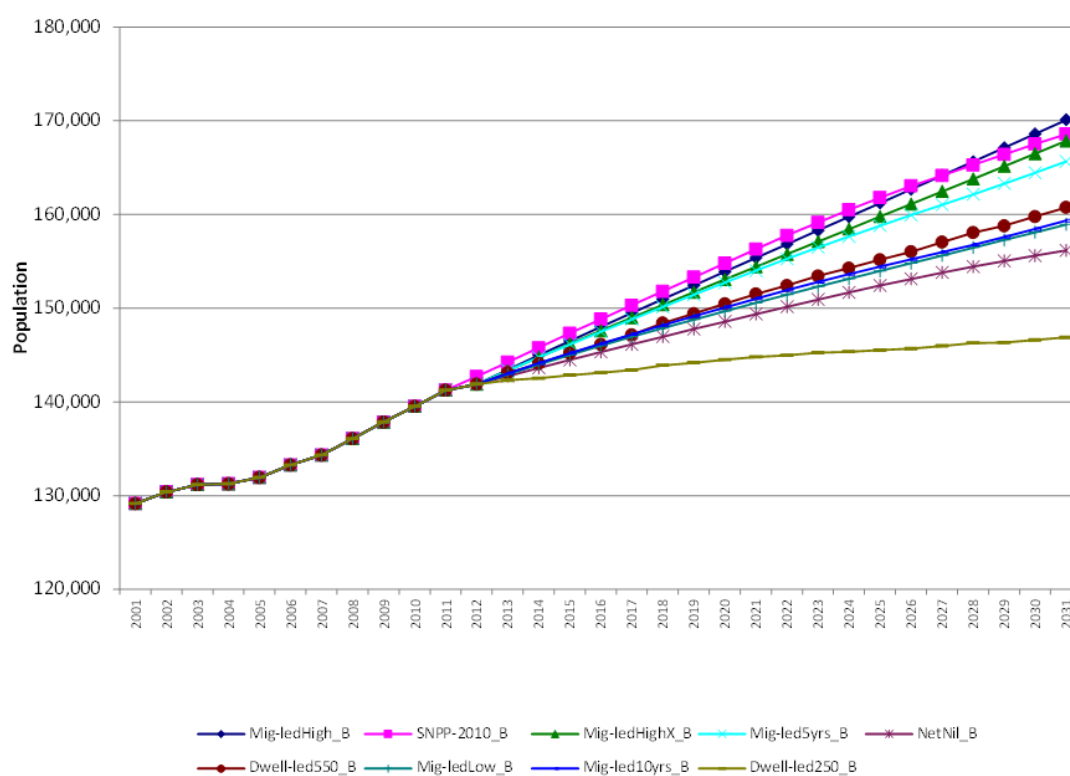
	Change 2011 - 2031				Average per year		
Scenario	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Jobs
Mig-ledHigh_B	28,838	20.4%	14,494	25.7%	625	747	426
SNPP-2010_B	27,329	19.3%	13,710	24.3%	397	707	412
Mig-ledHighX_B	26,602	18.8%	13,695	24.3%	533	706	378
Mig-led5yrs_B	24,398	17.3%	12,834	22.8%	437	662	325
NetNil_B	14,911	10.6%	10,772	19.1%	0	555	216
Dwell-led550_B	19,503	13.8%	10,526	18.7%	207	550	224
Mig-ledLow_B	17,680	12.5%	10,370	18.4%	165	535	179
Mig-led10yrs_B	18,093	12.8%	9,960	17.7%	142	514	200
Dwell-led250_B	5,646	4.0%	4,999	8.9%	-358	250	-96

('B') CLG 2008-based headship rates, scaled to be consistent with the 2011 Census but following the original trend thereafter

Figure 17: St Albans District, scenario forecasts 2011-31 ('B')

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7. Summary

7.1 In order to inform the preparation of St Albans City & District Council's housing plans, Edge Analytics has developed a suite of population, household and housing forecasts for St Albans District.

7.2 The forecasts have incorporated the latest evidence from:

- 2011 Census statistics on population and households (ONS).

- Revised mid-year population estimates for the period 2002-10 (ONS).

- 2011-based household projections for 2011-21 (CLG).

7.3 This report has presented the suite of alternative growth scenarios using POPGROUP technology, the scenarios evaluate trend, policy and economic considerations, they are accompanied by a transparent definition of key assumptions and they are presented in a consistent format that contrasts the impact of scenario assumptions upon changes to population, households, dwellings, labour force and jobs. All scenarios have been run from a 2012 base year, with a 2031 horizon, with historical data included for 2001-10.

7.4 To summarise the evidence, dwelling growth expectations associated with each of the scenarios are displayed in Table 6. Outcomes for both the option 'A' and option 'B' headship rates are presented, together with an 'average' of the two. In the absence of a definitive view on future rates of household formation, the 'average' provides an appropriate perspective from which to objectively review future dwelling requirements. An additional table, which splits the outcomes for both the option 'A' and option 'B' headship rates from 2011-21 and 2021-31, is included in the Appendix.

Table 6: Scenario dwelling growth summary

Scenario	Estimated dwellings per year		
	2011-31		
	Option 'A' - CLG 2011	Option 'B' - CLG 2008	Average
Mig-ledHigh	661	747	704
Mig-ledHighX	624	706	665
SNPP-2010	619	707	663
Mig-led5yrs	584	662	623
Dwell-led550	550	550	550
NetNil	469	555	512
Mig-ledLow	468	535	501
Mig-led10yrs	436	514	475
Dwell-led250	250	250	250

(A) CLG 2011-based headship rates, with the 2011-21 trend continued after 2021

(B) CLG 2008-based headship rates, scaled to be consistent with the 2011 Census but following the original trend thereafter

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Appendix

St Albans District - average annual net migration, average annual net new dwellings and average annual net new jobs: 2011-21, 2021-31 and 2011-31 ('A' and 'B')

Scenario	Average annual net migration			Average annual net new dwellings			Average annual net new jobs		
	2011-21	2021-31	2011-31	2011-21	2021-31	2011-31	2011-21	2021-31	2011-31
Mig-ledHigh_A	576	675	625	631	691	661	388	464	426
Mig-ledHighX_A	488	578	533	601	647	624	343	412	378
SNPP-2010_A	513	281	397	619	619	619	481	343	412
Mig-led5yrs_A	450	424	437	586	582	584	323	328	325
Dwell-led550_A	378	373	375	550	550	550	302	338	320
NetNil_A	0	0	0	445	494	469	201	231	216
Mig-ledLow_A	139	190	165	469	466	468	159	200	179
Mig-led10yrs_A	170	114	142	449	423	436	196	203	200
Dwell-led250_A	-279	-197	-238	250	250	250	-61	4	-28
Mig-ledHigh_B	576	675	625	704	791	747	388	464	426
Mig-ledHighX_B	488	578	533	670	742	706	343	412	378
SNPP-2010_B	513	281	397	719	695	707	481	343	412
Mig-led5yrs_B	450	424	437	655	669	662	323	328	325
Dwell-led550_B	216	198	207	550	550	550	212	236	224
NetNil_B	0	0	0	542	569	555	201	231	216
Mig-ledLow_B	139	190	165	528	541	535	159	200	179
Mig-led10yrs_B	170	114	142	515	512	514	196	203	200
Dwell-led250_B	-383	-333	-358	250	250	250	-118	-74	-96

(A) CLG 2011-based headship rates, with the 2011-21 trend continued after 2021

(B) CLG 2008-based headship rates, scaled to be consistent with the 2011 Census but following the original trend thereafter

St Albans District - dwelling stock and total households: 2011, 2021 and 2031 ('A' and 'B')

Scenario	Dwellings					Households				
	Dwelling stock			Change	Change (%)	Total households			Change	Change (%)
	2011	2021	2031	2011-31	2011-31	2011	2021	2031	2011-31	2011-31
Mig-ledHigh_A	58,108	64,421	71,329	13,221	22.8%	56,350	62,473	69,171	12,821	22.8%
Mig-ledHighX_A	58,108	64,113	70,584	12,476	21.5%	56,350	62,174	68,449	12,099	21.5%
SNPP-2010_A	58,150	64,341	70,530	12,379	21.3%	56,391	62,395	68,396	12,005	21.3%
Mig-led5yrs_A	58,108	63,970	69,790	11,682	20.1%	56,350	62,036	67,679	11,329	20.1%
Dwell-led550_A	58,108	63,487	68,987	10,879	18.7%	56,350	61,567	66,900	10,550	18.7%
NetNil_A	58,108	62,553	67,490	9,382	16.1%	56,350	60,661	65,448	9,098	16.1%
Mig-ledLow_A	58,108	62,801	67,459	9,351	16.1%	56,350	60,902	65,418	9,068	16.1%
Mig-led10yrs_A	58,108	62,597	66,824	8,716	15.0%	56,350	60,704	64,803	8,452	15.0%
Dwell-led250_A	58,108	60,787	63,287	5,179	8.9%	56,350	58,948	61,373	5,023	8.9%
Mig-ledHigh_B	58,117	65,152	73,063	14,946	25.7%	56,359	63,182	70,853	14,494	25.7%
Mig-ledHighX_B	58,117	64,819	72,239	14,122	24.3%	56,359	62,859	70,054	13,695	24.3%
SNPP-2010_B	58,210	65,399	72,348	14,138	24.3%	56,449	63,421	70,160	13,710	24.3%
Mig-led5yrs_B	58,117	64,664	71,352	13,235	22.8%	56,359	62,708	69,193	12,834	22.8%
Dwell-led550_B	58,117	63,472	68,972	10,855	18.7%	56,359	61,552	66,885	10,526	18.7%
NetNil_B	58,117	63,533	69,225	11,108	19.1%	56,359	61,612	67,131	10,772	19.1%
Mig-ledLow_B	58,117	63,397	68,810	10,693	18.4%	56,359	61,479	66,729	10,370	18.4%
Mig-led10yrs_B	58,117	63,271	68,388	10,271	17.7%	56,359	61,357	66,319	9,960	17.7%
Dwell-led250_B	58,117	60,772	63,272	5,155	8.9%	56,359	58,933	61,358	4,999	8.9%

(A) CLG 2011-based headship rates, with the 2011-21 trend continued after 2021

(B) CLG 2008-based headship rates, scaled to be consistent with the 2011 Census but following the original trend thereafter

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St Albans District - scenario dwelling growth summary

| Scenario | Estimated dwellings per year | | | | | |
| | 2011-21 | | | 2021-31 | | |
	Option 'A' - CLG 2011	Option 'B' - CLG 2008	Average	Option 'A' - CLG 2011	Option 'B' - CLG 2008	Average
Mig-ledHigh	631	704	667	691	791	741
Mig-ledHighX	601	670	635	647	742	695
SNPP-2010	619	719	669	619	695	657
Mig-led5yrs	586	655	620	582	669	625
Dwell-led550	550	550	550	550	550	550
NetNil	445	542	493	494	569	531
Mig-ledLow	469	528	499	466	541	504
Mig-led10yrs	449	515	482	423	512	467
Dwell-led250	250	250	250	250	250	250

(A) CLG 2011-based headship rates, with the 2011-21 trend continued after 2021

(B) CLG 2008-based headship rates, scaled to be consistent with the 2011 Census but following the original trend thereafter

Glossary

Abbreviation	Definition
ASFR	Age-specific fertility rate
ASMigR	Age-specific migration rate
ASMR	Age-specific mortality rate
CCSR	Centre for Census and Survey Research
CLG	Department for Communities and Local Government
NPPF	National Planning Policy Framework
ONS	Office for National Statistics
PRDS	Patient Register Data Service
SMR	Standardised Mortality Ratio
SNPP	Sub-national population projections
TFR	Total Fertility Rate

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Credentials

Edge Analytics provides expertise in geographical modelling and research with a specialism in scenario forecasting. This expertise is based upon 20 years' experience in the application of modelling methods to support investment, planning and policy development in the public and private sector, both in the UK and internationally.

Edge Analytics is contracted by the Local Government Association (LGA) to support and develop the POPGROUP suite of forecasting models used by over 100 local planners across the UK. During 2010-12, Edge Analytics has successfully developed POPGROUP to be the 'industry standard' for demographic analysis and forecasting in the UK. On-site training, a telephone and email help-line plus a wide range of data and methodological guidelines are provided by Edge Analytics to ensure expert support for planners and analysts engaged in the development of a variety of forecasts.

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