1. **Objective**

The objective of this work is to show how the Buckinghamshire population is likely to change taking into account assumptions around future house builds and nationally-produced expected future demographic trends.

2. **Key Findings**

- In the short term the population is expected to rise by 4% to 536,454 by 2018, an increase of 20,358 from the latest 2013 mid-year estimate (516,096).
- An extra 4,100 young people (0-19 years) are expected in Buckinghamshire by 2018, an increase of 3% since 2013.
- The number of 0-4 years is projected to increase marginally whilst the number of primary school age children (5-10 years) is expected to increase by 10% representing an extra 4,000 children by 2018.
- The number of secondary school age children (11-16 years) is projected to increase by 2.5% representing an additional 1,000 children by 2018. The number of 16-17 year olds is projected to decrease by 2018.
- An increase of 12,200 people aged 65+ years is projected in the next 5 years (from 2013), of which 5,200 are aged 65-74 years and 7,000 aged 75+ years. This is a 13% change from 2013.
- Adults (20-64 years) are projected to increase by 1.4% adding an extra 4,100 people to the population by 2018.
- Births are expected to remain fairly stable, increasing in the short term to 2018 then decreasing slightly in the longer term. This is mainly due to the corresponding increase and decrease in women aged 26-36 in the county.
- The number of deaths is expected to increase mainly due to an increase in the number of older people in the county.
- Household size is falling and projected to decrease further.
- Migration levels are projected to increase in the short term due to the planned level of housing to 2018.
- Changes in total fertility rate and future house build numbers can have a large effect on the population numbers in Buckinghamshire.

3. **Principles**

The following principles are set out below and shape the content of this analysis.

i. To create county and district-wide projections.

ii. To base projections on the Office for National Statistics (ONS) nationally-produced standard demographic and population information recorded for statistical purposes.

iii. To use the latest available short-term planned housing figures available by district and as specifically requested by Wycombe District Council to focus the projections on this time period (to 2018). Projection figures after this time are still provided to 2026 but on the understanding that the corresponding housing figures post 2018 are uncertain.

iv. To understand the components of population change (births, deaths, migration), creating a transparent and clear approach for users.

v. To provide the actual population projection numbers in Excel.

vi. To provide different scenarios such as high/low fertility rate and higher housing figures to show their impact on the projections.

vii. To provide transparent documentation of the assumptions around the inputs for the projections in a technical appendix.
4. Projection Limitations

The output figures are projections, therefore by their nature they are estimates designed to give a rough impression of potential future population change, based on a number of assumptions. They are not designed to produce exact measures of future population. Population trends at district and county level cannot be uniformly applied to towns and villages in the county as the changes at a local level can be very different.

Projections are estimates of what the future population is likely to be and fluctuations in fertility rates and house build numbers can dramatically alter the result. Future house build numbers are used as an input however the size of dwellings being built is not reflected in the projected population that can ‘fit’ into the dwellings. Future house builds are more certain until 2018 thereafter they are less certain.

Past figures show that the number of children generally varies considerably over time (mainly driven by the number of females, fertility rates and migration) which makes it difficult to forecast future numbers of children. The population projections are therefore not suitable for assessing education infrastructure requirements which use more localised data. Due to the uncertain housing figures these projections cannot be used for long term infrastructure planning.

5. Method

The projections have been created by the Buckinghamshire County Council Research Team using the POPGROUP model\(^1\). This model uses a standard cohort component forecasting method to produce projections. The input data consists of nationally-produced district-level data e.g. birth, death and migration rates, and locally-produced data (planned house builds in dwelling-led projections). The interpretation of the results has been undertaken by the Research Team at Buckinghamshire County Council.

District-specific rates and differentials for the components of change have been taken from the 2012 ONS sub-national population projections (2012 SNPP) and counts have been entered when known e.g. current and previous population figures. Future house build figures have been provided by each District Council. Different scenarios have been run to demonstrate possible alternative population projections. 2012 population, births, deaths and migration figures have been used to form an accurate base for the projections. 2013 mid-year population estimates have also been used to constrain the figures given these are the most up-to-date information available.

\(^1\)More information available at [https://www.local.gov.uk/our-support/research/software-and-tools/popgroup](https://www.local.gov.uk/our-support/research/software-and-tools/popgroup)
6. Sources

Table 1 shows the sources of information used in the projections.

More detail around the assumptions used in the model can be found in the Appendix. This includes an annual breakdown of dwellings by district and an analysis of the underlying assumptions behind ONS sub-national population projections (SNPP).

<table>
<thead>
<tr>
<th>Input Data</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base population - 2012 by county and district</td>
<td>ONS mid-year estimate (2012). The MYEs are based on 2011 Census data rolled forward.</td>
</tr>
<tr>
<td>Latest available population data 2013 by county and district</td>
<td>ONS mid-year estimate (2013)</td>
</tr>
<tr>
<td>2012 and 2013 births, deaths and migration</td>
<td>ONS mid-year estimate components of change tables (2012 and 2013)</td>
</tr>
<tr>
<td>Future birth, death and migration assumptions for county and district</td>
<td>ONS sub-national population projections (2012)</td>
</tr>
<tr>
<td>Future household size assumptions</td>
<td>2011-based CLG household forecasts which use 2011-based SNPP as the base population.</td>
</tr>
<tr>
<td>Conversion rate of housing to occupied households</td>
<td>2011 census</td>
</tr>
</tbody>
</table>
7. Results

**Overall Results**
The overall population in Buckinghamshire has increased 5.7% between 2001 and 2011 from 479,024 to 506,550. The increase in population for children and young people (age 0-19) and adults (age 20-64) has been similar (3.3% and 2.9% respectively). The increase in older people (age 65+) has been much greater (21.9%).

Over the same length of time it is predicted that if the ONS assumptions about birth, death and migration rates remain true and assumptions around future house building are included, the population in Buckinghamshire will increase 8% between 2011 and 2021 from 506,550 to 547,022.

In the next 5 years when house building figures are more certain, the population is expected to increase by 3.9% (20,358 people) between 2013 and 2018 from 516,096 to 536,454.

The greatest percentage increase will be in the older people’s population (13.3%). This will be most pronounced in Aylesbury Vale (projected 19.3% increase in older people). The children and young people’s population is likely to increase by 3.1% with the greatest increases in Aylesbury Vale (5.7%) and Wycombe (2.6%). It is projected that the adult population will grow slightly (1.4%) although by district Aylesbury Vale will account for most of this growth (4.6%), Wycombe will have only marginal growth (0.7%) and the other districts will experience declining adult populations.

**Graph 1: Projected Percentage Change in Age Groups in Buckinghamshire Between 2013 and 2018**

The population figures are affected by fertility rates which are difficult to state in the future due to past fluctuations and future housing assumptions e.g. new house builds or occupancy ratings. The number of older people is expected to rise substantially (by 13.3%) over the next 5 years from 91,814 (2013) to 103,991 (2018): 12,177 more people aged 65+.

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2 Source: ONS Mid-year Estimates 2001 and 2011
3 See Appendix of house builds assumed in the projection
4 2013 Mid-year Estimate (latest available official population figure)
5 See Appendix for numbers of people in each age group by district
The building of **new houses** mostly affects the younger and middle-aged population as it provides more accommodation for those migrating into the county and those moving within the county. It also has an effect on the number of births as migration affects the number of women in the population.

The population resulting from house building is also dependent on household size. Average **household size has been falling** (2.55 in 2001, 2.48 in 2011) and is projected to fall further to 2.45 in 2018 and to 2.41 by 2026. The number of children aged 0-10 is expected to increase due to the projected increase in women aged 26-36 years and births over the next 5 years. The increase in births over this five year period contributes to an overall increase by 2026 in the number of 0-19 year olds as these young children will age on and therefore increase the numbers of older children.

**Population Structure**

As the current population structure ages on, this will result in a greater number and proportion of older people in the county. The proportion of older people will also increase due to an increased life expectancy.


![Population Structure in Buckinghamshire](chart)

<table>
<thead>
<tr>
<th>Year</th>
<th>Age 0-19</th>
<th>Age 20-64</th>
<th>Age 65+</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>26%</td>
<td>50%</td>
<td>24%</td>
</tr>
<tr>
<td>2011</td>
<td>25%</td>
<td>58%</td>
<td>25%</td>
</tr>
<tr>
<td>2013</td>
<td>25%</td>
<td>57%</td>
<td>25%</td>
</tr>
<tr>
<td>2018 (projected)</td>
<td>25%</td>
<td>56%</td>
<td>24%</td>
</tr>
<tr>
<td>2026 (projected)</td>
<td>25%</td>
<td>53%</td>
<td>23%</td>
</tr>
</tbody>
</table>

Source: 2001, 2011 and 2013 ONS Mid-year Estimates; 2018 and 2026 BCC projections (December 2014)

**Births**

Fertility rates in the county have been rising for the past 10 years and are measured by the general fertility rate and the total fertility rate. The general fertility rate is the number of live births per 1,000 women of childbearing age. The total fertility rate is the average number of children born per woman based on current age specific fertility rates.
The 2011 Buckinghamshire total fertility rate (2.03) was higher than the rate for the South East and England (1.96 and 1.93 respectively). There were 6,133 births in Buckinghamshire in 2011; 12.3% more than in 2001 (5,463 births in 2001). Whilst it is difficult to state what the future fertility rates will be, assumptions can be made by looking at past trends and the current population age structure of females. Creating a population projection that incorporates assumptions used by ONS shows that the fertility rate in Buckinghamshire is expected to rise slightly and remain steady (at around 2.01) over the course of the projection (graph 3).

**Graph 3: Total Fertility Rate in Buckinghamshire 2001 to 2025**

![Graph 3: Total Fertility Rate in Buckinghamshire 2001 to 2025](image)

The number of women of childbearing age will have an impact on the number of births in the county. The overall number of women aged between 15 and 44 has fallen since 2001 (see table 2). In Buckinghamshire women are more likely to have children when they are aged 26-36 years and this age group experienced an even greater decrease.

**Table 2: Number of Women of Childbearing Age in Buckinghamshire 2001 and 2011**

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2011</th>
<th>Change</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females aged 15-44</td>
<td>97,896</td>
<td>94,929</td>
<td>-2,967</td>
<td>-3.0%</td>
</tr>
<tr>
<td>Females aged 26-36</td>
<td>38,210</td>
<td>32,682</td>
<td>-5,528</td>
<td>-14.5%</td>
</tr>
</tbody>
</table>

Source: ONS mid-year population estimates, single year of age

Despite the fall in number of childbearing women, births increased between 2001 and 2011 (see table 3). This was due to the increased Total Fertility Rate which rose from 1.65 in 2001 to 2.03 in 2011 (i.e. on average more children per woman).

The projections show the number of women aged 26-36 years is projected to increase to 2019 and decline thereafter. The projected number of births mirrors the number of women aged 26-36 years, with a gradual small increase to 2019 and a decline thereafter (graph 4), with the Total Fertility Rate remaining stable.

The number of planned house builds affects migration; if the housing numbers change, the number of women and therefore births will change. The house builds used in the assumptions show a similar pattern as the births and women aged 26-36 years.
Graph 4 shows how the number of live births in Buckinghamshire has increased over the last ten years. Births are projected to rise until 2019 then fall gradually to just under current levels by 2026.

**Graph 4: Number of live births in Buckinghamshire 2001 – 2025/26**

![Graph showing number of live births in Buckinghamshire]


Table 3 shows the number of births for each district. The number of live births in Buckinghamshire increased 12.3% between 2001 and 2011. The 2013 mid-year estimate shows a slight decrease from the 2011 figure. From 2013 to 2018 the births are projected to increase to 6,111. Births increase again in 2019 but thereafter they are projected to fall to 5,914 births by 2026, a decrease of 3.2% between 2018 and 2026.

**Table 3: Births by District 2001, 2011, 2013, 2018 and 2026**

<table>
<thead>
<tr>
<th>Area</th>
<th>2001 Births</th>
<th>2011 Births</th>
<th>2013 Births</th>
<th>2018 Projected Births</th>
<th>2026 Projected Births</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aylesbury Vale</td>
<td>1,907</td>
<td>2,232</td>
<td>2,163</td>
<td>2,339</td>
<td>2,293</td>
</tr>
<tr>
<td>Chiltern</td>
<td>942</td>
<td>921</td>
<td>854</td>
<td>881</td>
<td>835</td>
</tr>
<tr>
<td>South Bucks</td>
<td>624</td>
<td>724</td>
<td>780</td>
<td>708</td>
<td>650</td>
</tr>
<tr>
<td>Wycombe</td>
<td>1,990</td>
<td>2,256</td>
<td>2,212</td>
<td>2,183</td>
<td>2,136</td>
</tr>
<tr>
<td><strong>Buckinghamshire</strong></td>
<td><strong>5,463</strong></td>
<td><strong>6,133</strong></td>
<td><strong>6,009</strong></td>
<td><strong>6,111</strong></td>
<td><strong>5,914</strong></td>
</tr>
</tbody>
</table>


Between 2013/14 and 2017/18 there are plans to build 10,500 houses across the county. A further 14,300 houses between 2018/19 and 2025/26 have also been assumed for the purpose of this projection. The building of new houses affects migration – if the housing number changes the number of women, and therefore number of births, will change. The following shows the impact of changes to the total fertility rate and the number of planned house builds, on the number of births:

- If the total fertility rate was higher and constant between 2013 and 2026 (2.1 for example) there would be 4,000 more births in total over this period.
- If the total fertility rate was lower (1.9 for example), there would be 3,800 fewer births overall between 2013 and 2026.

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6 See Appendix for specific house building assumptions
If the number of planned house builds is increased by 20%, an additional 1,750 births overall can be anticipated between 2013 and 2026. This would be due to more women of child bearing age moving into the county.

**Deaths**

The numbers of deaths in Buckinghamshire and the South East have reduced by a similar rate since 2001 (-5.9% and -5.6% respectively between 2001 and 2010). There has been a greater reduction in England & Wales (-7.4% between 2001 and 2010).

Incorporating ONS assumptions about future death rates into local population projections show that between 2011 and 2026 it is projected the number of deaths in the county will increase by 18.8% (from 3,815 to 4,533), even though ONS assumptions show that people will be living longer. This is due to the expected increase in the number of older people.

**Migration**

Migration has fluctuated in the last 10 years and is difficult to predict. The last 5 years have seen Buckinghamshire gain on average 1,700 persons per year as more people are moving into the county than are leaving.

Migration is comprised of within-UK migration and overseas migration. Around 20% of Buckinghamshire’s annual net migration comes from overseas migration with the majority, 80%, from people moving into the county from elsewhere in the UK.

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7 Based on the average of the past 5 years of net migration data; 2008/9 to 2012/13 ONS Mid-Year Population Estimates
In the future annual net migration is projected to increase from 2013/14 until 2016/17 to almost 3,700 people by 2016/17. By 2018/19 the annual net migration figure is projected to have fallen to 1,700 people (Graph 6).

**Graph 6: Number of Annual Net Migrants in Buckinghamshire 2013/14 – 2025/26**

The pattern of migration to 2017/18 is similar to the annual house builds (Graph 7).

**Graph 7: Number of Annual House Builds in Buckinghamshire 2013/14 – 2025/26**

Source: Buckinghamshire County Council Projections (Dec 2014)

Source: District Annual Monitoring Reports, see appendix for details
8. Comparisons

Population projections are based on data and trends that are available today and seek to project the current picture forward. To understand the impact of dynamic variables such as the total fertility rate, a number of alternative projection scenarios have been created.

- **Higher Fertility Rate (2.1)**
  This scenario has the same set of assumptions as the standard dwelling-led scenario with the exception of a higher fertility rate. It assumes a total fertility rate of 2.1 during the course of the projection. (NB The standard projection has a total fertility rate of 2.01).

- **Lower Fertility Rate (1.9)**
  This scenario has the same set of assumptions as the standard dwelling-led scenario with the exception of a lower fertility rate. It assumes a total fertility rate of 1.9 during the course of the projection.

- **Increased Housing (+20%)**
  This scenario has the same set of assumptions as the standard dwelling-led scenario with the exception of increased housing. The annual dwelling inputs were increased by 20%. Between 2013/14 and 2017/18 the housing inputs were increased from 10,506 to 12,607 dwellings. Between 2018/19 and 2025/26 the housing inputs were increased from 14,327 to 17,192 dwellings. In total the dwellings increased from 24,833 in the standard scenario to 29,800 (2013-2026).

- **ONS 2012-based SNPP**
  This scenario shows the official sub-national population projections (SNPP) from ONS. These are trend based projections that use the most recent information on population numbers and assumptions around factors that influence population change i.e. births, deaths and migration. The ONS projections do not factor in the impact of housing.

All scenarios with the exception of ONS SNPP are constrained to the 2013 mid-year population estimate and therefore 2014 is the first year of the projection for these scenarios. For the ONS SNPP scenario, the population figure in 2013 is not constrained the 2013 mid-year estimate which therefore shows a different population for this year from the other scenarios as it is a projected figure.
Graph 8: Comparison of Different Projection Scenarios in Buckinghamshire

Source: Buckinghamshire population projections (December 2014) and ONS 2012 SNPP. First year of projections 2014, except for ONS SNPP where projection 2013 figure is not constrained to the 2013 mid-year population estimates.

If the planned house build numbers in the county were increased by 20% this would result in the largest Buckinghamshire population. The standard dwelling-led scenario produces projections that are similar to the ONS sub-national population projections (SNPP) in the short term, are slightly higher in the medium term and slightly lower than the SNPP in the longer term.

If the dwelling-led projections included a total fertility rate that was increased and remained at 2.1 this would produce a larger population. If the total fertility rate was reduced to 1.9 during the course of the dwelling-led projection this would result in a smaller Buckinghamshire population.