

Cathie Marsh Centre for Census and Survey Research

# Population projections for Derbyshire County Council

CCSR Working Paper 2005-05

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This document provides a report of population projections, summarising the main features of the projections and the differences between alternative projections for Derbyshire CC, its districts and Derby UA.

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# Population projections for Derbyshire County Council

Cathie Marsh Centre for Census and Survey Research, University of Manchester  
Ludi Simpson, 14<sup>th</sup> January 2005.

This document is 'Derbs pop report 14Jan2005.doc'.

To fulfil the first part of CCSR's commission for demographic projections for Derbyshire CC, its Districts and Derby UA, this document provides a report of population projections, summarising the main features of the projections and the differences between alternative projections.

Accompanying this document are:

- Excel files of all the input assumptions and output results, in POPGROUP software format. The inputs and outputs of the several projections that have been supplied are summarised in the file 'Summ\_ComparisonDerbsJan09.xls'.
- A technical report detailing the methods used and how to install the projections for Derbyshire County Council to replicate and extend the work in-house, using their copy of POPGROUP software ('Derbs pop technical 14Jan2005.doc').

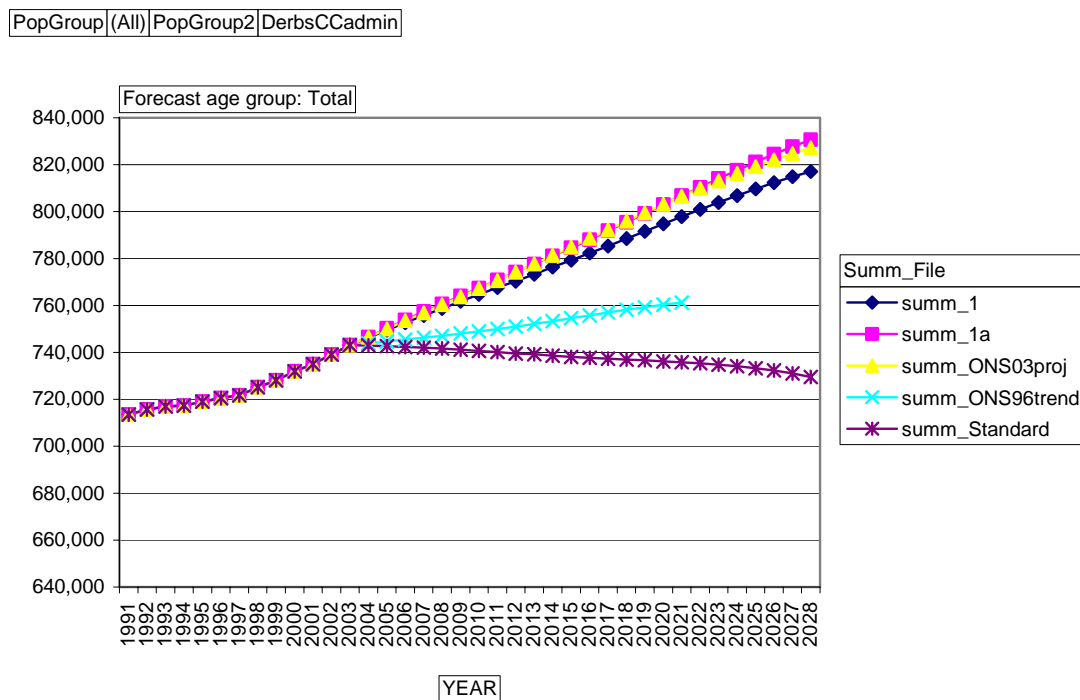
The remaining work will involve projections of population for electoral wards, and of the labour force and of households for Districts (the latter dependent on release by the Office of the Deputy Prime Minister of data consistent with their own 2003-based headship rate projections).

## Projections prepared by CCSR

Five projections have been prepared. Each follows the population estimates prepared by the Office for National Statistics from 1991 to 2003. They differ in their subsequent development, as follows:

<i>Standard</i>	National fertility and mortality rates, with zero impact of migration.
<i>ONS96trend</i>	Births, deaths, and migration as projected by Government in their 1996-based projection for Derbyshire County, released in 1998.
<i>ONS03proj</i>	Births, deaths and migration as projected by Government in their 2003-based projection for Derbyshire County, released in 2004.
<i>1</i>	Fertility, mortality and migration rates computed by CCSR based on the average of the last five year's experience.
<i>1a</i>	Fertility, mortality and migration rates computed by CCSR based on the last five year's experience, with migration weighted towards the most recent experience which has been a higher net in-migration.

The chart below shows the total population projected by each of the five sets of assumptions (in this case excluding Derby UA). In the future, Derbyshire County Council will collect further data to develop their preferred population projection. Our recommendation is to develop forecast *1a*, through an understanding of the likely future trends of migration both with the rest of the UK and with overseas.



### Exploring the results for service implications

Each projection is made for single years of age. The output files and reporting facilities of POPGROUP allow Derbyshire County Council to examine the service implications of each projection. The output files and their functions are as follows:

- fore* Detailed projected population by sex and single year of age, each year since 1991.
- summ* Summary of population, births, deaths, UK and overseas migration, each year since 1991, suitable for printing on a single page.
- comp* Detail of population, births, deaths, UK and overseas migration, each year since 1991.
- fore-reports* Reporting facility allowing tabular display of results for specified age groups, time series charts, and population pyramids.

All output is on Excel sheets and can therefore be further manipulated and displayed by Derbyshire County Council, and copied to other software for reporting purposes.

Note that each District including Derby UA is included on all files, and the total is the Derbyshire geographic county. Tabular statistics for the Derbyshire County Council administrative area excluding Derby UA can be created with the Reporter, and by manipulating Excel in the Fore, Summ, and Comp files. The comparison of forecasts in 'Summ\_ComparisonDerbsJan09.xls' contains values for the County Council Area.

## Notes on each forecast

In addition to these notes, the 'Notes' sheet on each POPGROUP input workbook describes the source of each assumption made. The technical report reproduces this documentation.

*Standard* National fertility and mortality rates, with zero impact of migration.

National fertility and mortality rates are used, with no migration from mid-2003. Prior to mid-2003, the population is constrained to the ONS mid-year estimates.

Migration has a very significant impact on each of Derbyshire's District populations. Because Derbyshire's experience is quite different from the national, the standard forecast is only useful to highlight that local information is needed to monitor and project the local population.

*ONS96trend* Births, deaths, and migration as projected by Government in their 1996-based projection for Derbyshire, released in 1998.

Prior to mid-2003, the population is constrained to the ONS mid-year estimates. The data supplied by ONS have inconsistencies, in that their components of change each year do not match the total population change projected for the year. For that reason the trend in this projection is only an indication of the 1996-based population trend. This forecast is provided for background context and is not recommended for use.

*ONS03proj* Births, deaths and migration as projected by Government in their 2003-based projection for Derbyshire, released in 2004.

Prior to mid-2003, the population is constrained to the ONS mid-year estimates. This projection provides a comparison for the subsequent projections and those that can be developed in-house by Derbyshire County Council.

The replication of the ONS 2003-based projections is based on the births, deaths and migration flows provided by ONS. There is a slight discrepancy between those components each year and the resulting ONS population projections, amounting to 400 by the end of the projection in 2028. ONS suggest that this is due to rounding of individual components of change before release.

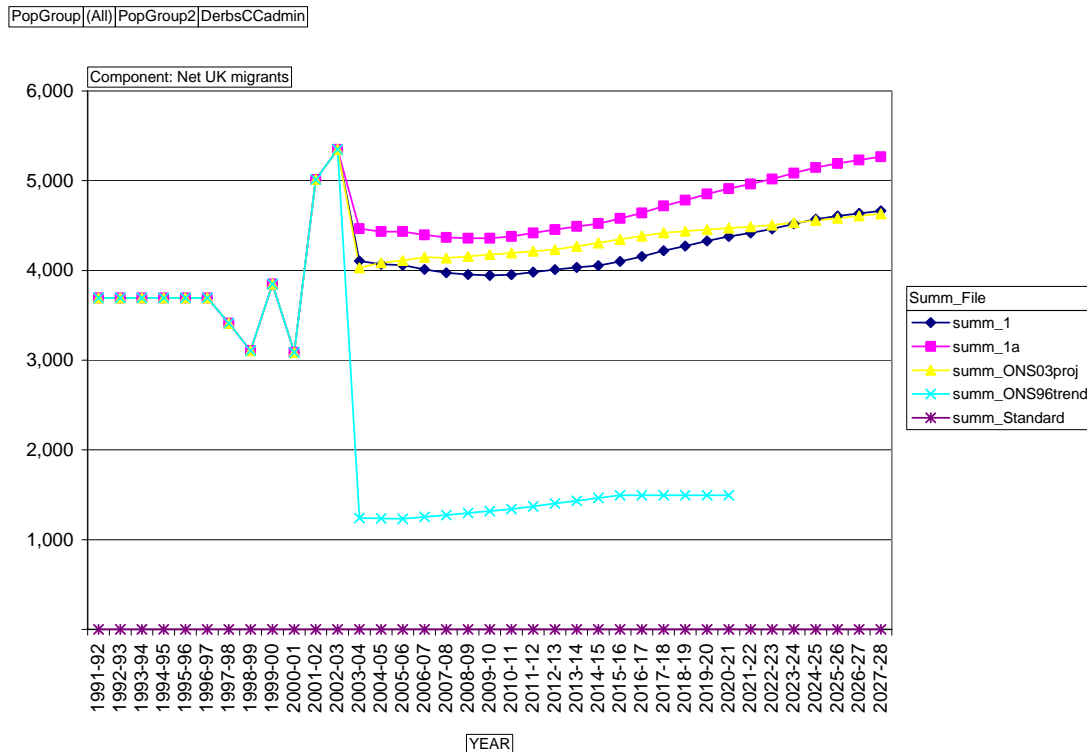
*1 and 1a* Fertility, mortality and migration rates computed by CCSR based on the average of the last five year's experience.

Forecasts *1* and *1a* are recommended for use and development by Derbyshire County Council. They differ only in their treatment of migration within the UK after 2003, for which Forecast *1a* gives more weight to recent experience of lower gain from migration within the UK.

- For years from 1991 up to the most recent ONS population estimates, mid-2003:
  - Consistency with the ONS estimate at each single year of age and sex.
  - Recorded values for births, deaths.
  - Recorded values of migrants within the UK from mid-1997.

- Estimated values of migrants within the UK before mid-1997, taken as the average of the years 1997-98 to 2001-02.
- Estimated values of overseas migration 1991-2003, based on the residual population change between ONS population estimates after births, deaths and UK migration. Note that the migration estimates are only accurate when taken together, ie in their net impact, which is determined by the ONS mid-year estimates.
- For the projection beyond the most recent ONS population estimate:
  - Fertility and mortality which follow the Government expected trends (by age and sex), but incorporate a local differential, based on the last five year's Total Fertility Rate and Standardised Mortality Ratios for each District, compared to England.
  - Migration with overseas implied by constant age-sex counts based on recent experience (1998-99 to 2002-03).
  - Migration within the UK implied by constant age-sex rates, based on the past five years (1998-99 to mid-2003).
    - Forecast *I*: five years equally weighted
    - Forecast *Ia*: weights as follows:
      - 1998-99 0.1
      - 1999-00 0.1
      - 2000-01 0.2
      - 2001-02 0.3
      - 2002-03 0.3

The chart below shows the UK net migration for the Derbyshire CC area estimated and projected by the forecasts, showing the change in the past five years and the difference in projected migration.



Further charts provided in file 'Summ\_ComparisonDerbsJan09.xls' compare the projections for a variety of demographic indicators.

The tables overleaf summarise the forecasts ONS03PROJ and 1a, and are taken from the output 'summ' file of each forecast.

### **Note on comparisons between ONS03PROJ and 1a**

The Council may wish to explore some of the differences between the projections, in order to come to its own favoured assumptions. The methods used by ONS have not been released in detail, and thus reasons for differences are not always available.

Fertility is higher in the ONS projections, for each District, than past figures would indicate. Projection 1a uses the mean of the past five years' experience.

The number of very elderly is lower in the ONS projections. This may be due to slightly different age structures of mortality or of migration. Projection 1a uses one District differential for mortality applied to all ages and both sexes.

Projection 1a suggests a more divergent experience for the Districts than does ONS. South Derbyshire, the fastest growing District in both projections, is expected to grow from 85 thousand to 122 thousand in projection 1a and to 111 thousand by ONS. North East Derbyshire, showing the least growth in both projections, is expected to fall slightly in total population by the end of projection 1a.

Neither of the projections takes explicit account of the impact of planned house-building. Both contain an implicit assumption that the past impact of housing developments will continue in the future. When ODPM provide updated projections of household headship rates, the implications of planned land release and house-building can be explored with the POPGROUP and HOUSEGROUP software.

Scenario *Ia*

## Population Estimates and Forecasts Derbyshire

## Derbyshire County Total (geographic)

Estimated and Forecast Population										Components of Change						
YEAR	0-4	5-10	11-15	16-17	retired -		75-84	85+	Total	YEAR	Births	Deaths	Net UK migrants	Net Overseas migrants	TFR	SMR
					18 - retired	74										
1991	60,850	69,500	55,300	23,750	550,000	112,800	50,900	13,350	936,400	1991-92	12,574	-10,709	+3,108	-1,604	1.9	128
1992	61,650	69,900	55,850	22,500	551,950	113,150	50,800	13,950	939,800	1992-93	12,074	-10,844	+3,108	-1,915	1.8	126
1993	61,700	70,750	56,950	21,350	553,150	113,700	50,000	14,650	942,200	1993-94	12,082	-11,145	+3,108	-2,298	1.8	128
1994	61,800	71,500	57,750	20,750	553,750	114,000	49,350	15,050	943,950	1994-95	11,639	-10,790	+3,108	-1,313	1.7	122
1995	61,250	72,600	57,700	21,950	554,000	112,250	51,250	15,600	946,600	1995-96	11,105	-10,741	+3,108	-316	1.7	120
1996	59,700	73,800	57,850	23,450	555,200	110,650	53,050	16,050	949,750	1996-97	11,518	-10,725	+3,108	-1,526	1.7	118
1997	58,600	74,700	58,150	23,500	556,750	109,650	54,550	16,300	952,150	1997-98	11,052	-10,464	+2,858	+520	1.7	114
1998	57,700	75,200	58,750	23,000	560,000	109,300	55,300	16,900	956,100	1998-99	11,165	-10,777	+2,802	+82	1.7	115
1999	57,200	75,400	60,750	22,600	561,400	108,750	55,850	17,400	959,350	1999-00	10,588	-10,615	+2,885	+469	1.6	112
2000	56,350	75,600	61,600	23,000	563,100	108,550	56,500	17,950	962,700	2000-01	10,258	-9,987	+2,400	+252	1.6	104
2001	55,000	74,850	62,450	24,050	564,750	108,350	57,700	18,450	965,600	2001-02	9,957	-10,357	+4,597	+1,503	1.6	106
2002	53,800	73,850	64,000	24,450	569,250	108,750	58,500	18,700	971,300	2002-03	10,190	-10,563	+5,039	+232	1.6	106
2003	52,950	72,700	65,150	24,550	572,650	110,250	59,300	18,600	976,200	2003-04	10,095	-10,376	+3,990	+508	1.6	103
2004	52,100	72,000	65,550	24,650	575,050	112,150	59,950	18,950	980,450	2004-05	10,022	-10,325	+3,969	+508	1.6	100
2005	51,600	71,050	65,900	24,700	577,300	114,100	59,750	20,200	984,600	2005-06	9,946	-10,285	+3,986	+508	1.6	98
2006	51,450	69,800	65,450	25,200	579,900	115,800	59,650	21,500	988,750	2006-07	9,882	-10,253	+3,960	+508	1.6	96
2007	51,300	68,600	64,350	26,350	580,700	119,250	59,750	22,550	992,850	2007-08	9,838	-10,237	+3,947	+508	1.6	94
2008	50,950	67,450	63,550	26,650	581,900	123,150	60,050	23,200	996,900	2008-09	9,817	-10,226	+3,939	+508	1.7	92
2009	50,650	66,550	62,900	26,050	583,550	127,000	60,350	23,850	1,000,950	2009-10	9,813	-10,224	+3,935	+508	1.7	90
2010	50,450	65,600	62,400	25,400	585,050	130,650	60,850	24,600	1,005,000	2010-11	9,824	-10,239	+3,939	+508	1.7	88
2011	50,350	65,000	61,550	25,100	586,700	133,650	61,300	25,350	1,009,000	2011-12	9,848	-10,268	+3,964	+508	1.7	87
2012	50,300	64,750	60,400	24,850	587,050	137,600	62,050	26,100	1,013,050	2012-13	9,886	-10,308	+3,985	+508	1.7	85
2013	50,350	64,600	59,050	24,800	587,750	140,650	63,100	26,750	1,017,150	2013-14	9,938	-10,352	+4,009	+508	1.7	84
2014	50,450	64,200	58,250	24,600	588,700	143,450	64,200	27,400	1,021,250	2014-15	10,006	-10,398	+4,034	+508	1.7	82
2015	50,650	63,900	57,350	24,250	589,900	146,050	65,200	28,050	1,025,400	2015-16	10,082	-10,444	+4,086	+508	1.7	81
2016	50,950	63,700	56,850	23,750	591,000	148,550	65,950	28,900	1,029,600	2016-17	10,157	-10,507	+4,142	+508	1.7	80
2017	51,250	63,550	56,700	22,900	592,000	150,600	67,250	29,700	1,033,900	2017-18	10,224	-10,588	+4,201	+508	1.7	78
2018	51,600	63,550	56,600	22,350	592,250	151,900	69,650	30,400	1,038,250	2018-19	10,280	-10,684	+4,256	+508	1.7	77
2019	51,950	63,650	56,150	22,450	591,900	152,550	72,800	31,100	1,042,600	2019-20	10,328	-10,788	+4,318	+508	1.7	76
2020	52,300	63,850	55,850	22,600	591,500	153,000	75,900	32,000	1,047,000	2020-21	10,366	-10,900	+4,377	+508	1.7	75
2021	52,600	64,150	55,600	22,400	590,750	154,250	78,700	32,900	1,051,350	2021-22	10,386	-11,028	+4,431	+508	1.7	74
2022	52,850	64,500	55,450	22,250	589,500	153,650	83,500	33,950	1,055,650	2022-23	10,387	-11,169	+4,493	+508	1.7	73
2023	53,000	64,900	55,400	22,100	587,600	154,350	87,300	35,150	1,059,850	2023-24	10,370	-11,321	+4,561	+508	1.7	72
2024	53,100	65,350	55,450	21,950	585,400	156,250	90,100	36,300	1,063,950	2024-25	10,341	-11,481	+4,623	+508	1.7	71
2025	53,150	65,800	55,600	21,900	582,950	158,550	92,600	37,450	1,067,950	2025-26	10,302	-11,654	+4,671	+508	1.7	71
2026	53,050	66,200	55,800	21,850	579,950	162,000	94,550	38,400	1,071,800	2026-27	10,251	-11,836	+4,715	+508	1.7	70
2027	52,950	66,500	56,100	21,900	576,900	165,600	95,800	39,700	1,075,450	2027-28	10,189	-12,153	+4,757	+508	1.7	70
2028	52,750	66,800	56,450	21,900	573,600	169,400	96,250	41,600	1,078,750							

'Retired' refers to age 60 for females and age 65 for males

All population figures have been rounded independently to the nearest 50. 0 signifies less than 25

TFR: Total fertility rate, the average completed family size

SMR: Standardised Mortality Ratio (100 = Standard, ASMR: The values are for 2003-2004 taken from the 2002-based GAD projections.)

This report was compiled from a forecast produced on 09/01/2005 using POPGROUP software developed by Bradford Council, the University of Manchester and Andelin Associates

Scenario *ONS03proj*

## Population Estimates and Forecasts Derbyshire

## Derbyshire County Total (geographic)

Estimated and Forecast Population										Components of Change						
YEAR	0-4	5-10	11-15	16-17	retired -		75-84	85+	Total	YEAR	Births	Deaths	Net UK migrants	Net Overseas migrants	TFR	SMR
					18 - retired	74										
1991	60,850	69,500	55,300	23,750	550,000	112,800	50,900	13,350	936,400	1991-92	12,574	-10,709	+3,108	-1,604	1.9	128
1992	61,650	69,900	55,850	22,500	551,950	113,150	50,800	13,950	939,800	1992-93	12,074	-10,844	+3,108	-1,915	1.8	126
1993	61,700	70,750	56,950	21,350	553,150	113,700	50,000	14,650	942,200	1993-94	12,082	-11,145	+3,108	-2,298	1.8	128
1994	61,800	71,500	57,750	20,750	553,750	114,000	49,350	15,050	943,950	1994-95	11,639	-10,790	+3,108	-1,313	1.7	122
1995	61,250	72,600	57,700	21,950	554,000	112,250	51,250	15,600	946,600	1995-96	11,105	-10,741	+3,108	-316	1.7	120
1996	59,700	73,800	57,850	23,450	555,200	110,650	53,050	16,050	949,750	1996-97	11,518	-10,725	+3,108	-1,526	1.7	118
1997	58,600	74,700	58,150	23,500	556,750	109,650	54,550	16,300	952,150	1997-98	11,052	-10,464	+2,858	+520	1.7	114
1998	57,700	75,200	58,750	23,000	560,000	109,300	55,300	16,900	956,100	1998-99	11,165	-10,777	+2,802	+82	1.7	115
1999	57,200	75,400	60,750	22,600	561,400	108,750	55,850	17,400	959,350	1999-00	10,588	-10,615	+2,885	+469	1.6	112
2000	56,350	75,600	61,600	23,000	563,100	108,550	56,500	17,950	962,700	2000-01	10,258	-9,987	+2,400	+252	1.6	104
2001	55,000	74,850	62,450	24,050	564,750	108,350	57,700	18,450	965,600	2001-02	9,957	-10,357	+4,597	+1,503	1.6	106
2002	53,800	73,850	64,000	24,450	569,250	108,750	58,500	18,700	971,300	2002-03	10,190	-10,563	+5,039	+232	1.6	106
2003	52,950	72,700	65,150	24,550	572,650	110,250	59,300	18,600	976,200	2003-04	10,668	-10,439	+3,445	+188	1.7	103
2004	52,600	71,850	65,400	24,650	574,800	112,350	59,950	18,500	980,050	2004-05	10,565	-10,375	+3,579	+188	1.7	102
2005	52,600	70,800	65,550	24,600	576,950	114,450	59,900	19,200	984,050	2005-06	10,366	-10,316	+3,687	+188	1.7	100
2006	52,850	69,450	64,950	25,050	579,500	116,250	59,950	20,000	987,950	2006-07	10,231	-10,270	+3,805	+188	1.7	99
2007	53,100	68,100	63,700	26,150	580,300	119,750	60,250	20,550	991,900	2007-08	10,155	-10,232	+3,848	+188	1.7	97
2008	53,050	66,900	62,750	26,400	581,650	123,650	60,700	20,800	995,850	2008-09	10,135	-10,185	+3,878	+188	1.7	95
2009	52,550	66,500	61,950	25,700	583,500	127,500	61,150	21,100	999,900	2009-10	10,161	-10,174	+3,908	+188	1.7	94
2010	52,150	66,100	61,300	25,000	585,100	131,050	61,800	21,450	1,003,950	2010-11	10,193	-10,168	+3,937	+188	1.7	92
2011	51,950	65,950	60,350	24,650	586,850	134,050	62,400	21,900	1,008,100	2011-12	10,233	-10,180	+3,967	+188	1.7	91
2012	52,000	66,100	59,150	24,300	587,250	137,850	63,350	22,300	1,012,350	2012-13	10,276	-10,196	+3,997	+188	1.7	89
2013	52,100	66,350	57,700	24,200	588,050	140,900	64,600	22,700	1,016,600	2013-14	10,327	-10,231	+4,042	+188	1.7	88
2014	52,300	66,300	56,900	23,950	589,000	143,650	65,750	23,100	1,020,900	2014-15	10,374	-10,268	+4,087	+188	1.7	87
2015	52,550	65,800	56,600	23,550	590,150	146,200	66,800	23,600	1,025,300	2015-16	10,423	-10,319	+4,131	+188	1.7	85
2016	52,800	65,450	56,650	23,050	591,250	148,750	67,550	24,250	1,029,700	2016-17	10,462	-10,388	+4,176	+188	1.7	84
2017	53,050	65,350	56,950	22,150	592,200	150,800	68,750	24,900	1,034,150	2017-18	10,489	-10,462	+4,221	+188	1.7	83
2018	53,250	65,400	57,250	21,600	592,400	152,200	71,000	25,450	1,038,600	2018-19	10,504	-10,554	+4,253	+188	1.7	82
2019	53,450	65,600	57,250	21,750	592,000	152,900	74,000	26,000	1,043,000	2019-20	10,505	-10,662	+4,285	+188	1.7	81
2020	53,600	65,900	56,750	22,450	591,600	153,350	76,900	26,750	1,047,300	2020-21	10,496	-10,769	+4,316	+188	1.7	80
2021	53,650	66,150	56,350	22,850	590,900	154,550	79,550	27,500	1,051,550	2021-22	10,481	-10,892	+4,348	+188	1.7	79
2022	53,700	66,450	56,200	22,550	590,250	153,900	84,200	28,450	1,055,650	2022-23	10,458	-11,031	+4,380	+188	1.7	78
2023	53,650	66,750	56,250	22,250	589,000	154,450	87,850	29,450	1,059,650	2023-24	10,424	-11,173	+4,412	+188	1.7	77
2024	53,600	67,000	56,400	22,050	587,350	156,150	90,600	30,350	1,063,500	2024-25	10,379	-11,327	+4,444	+188	1.7	76
2025	53,450	67,200	56,600	21,950	585,400	158,200	93,150	31,200	1,067,200	2025-26	10,326	-11,495	+4,477	+188	1.7	75
2026	53,300	67,350	56,850	22,000	582,900	161,300	95,150	31,800	1,070,700	2026-27	10,266	-11,667	+4,509	+188	1.7	75
2027	53,100	67,450	57,150	22,050	580,450	164,550	96,600	32,650	1,074,000	2027-28	10,203	-11,854	+4,541	+188	1.7	74
2028	52,850	67,450	57,400	22,150	577,850	168,000	97,300	34,100	1,077,050							

'Retired' refers to age 60 for females and age 65 for males

All population figures have been rounded independently to the nearest 50. 0 signifies less than 25

TFR: Total fertility rate, the average completed family size

SMR: Standardised Mortality Ratio (100 = Standard, ASMR: The values are for 2003-2004 taken from the 2002-based GAD projections.)

This report was compiled from a forecast produced on 03/01/2005 using POPGROUP software developed by Bradford Council, the University of Manchester and Andelin Associates