

Household Analysis Review Group: 2004-based household projections

**The results presented in this paper are provisional.
They are likely to differ from the final household projections published.
Please treat these figures as 'restricted' until after publication in May.**

Purpose

1. GROS is planning to publish household projections for Scotland in May. This paper describes the methodology used, an analysis of the initial findings, and potential ways in which the methodology could be changed.

2. **HARG members are asked to note the initial findings and state whether they are satisfied with the approach used so far, or whether alternative methods or additional analysis may be required.**

A. Methodology used

3. Household projections for Scotland are based on the sub-national population projections published by GROS. The proportion of people living in communal establishments is subtracted from the overall population, and information on the number of households is projected forward from the 1991 and 2001 Censuses, to provide figures on the number of households by type of household and age of the head of household. The Annex contains a description of the processes involved, and the categories used.

Years covered by the projections

4. Over the next two years, we are planning to review the projections methodology. For the current set of projections, the main change that we are proposing is to **extend the projections period from 14 years to 20 years**. This will tie in with the period covered by the population projections, and is a more useful period for the purpose of compiling development plans. The further into the future the projections cover, the less accurate they are likely to be, and this will be emphasised in the publication. **HARG members are asked whether they are happy with the proposal to produce projections covering a 20-year period.**

Constraining the figures to the 2004 and 2005 household estimates

5. The household *projections* use the 2004-based population projections, applying projected headship rates from the 1991 and 2001 Censuses, to estimate the number of households. The household *estimates*, which are produced annually, are produced by a different method, based on the number of occupied dwellings recorded in Council Tax systems. This has the advantage that figures on the total number of households are updated each year, so they will reflect changes in trends since the last Census. Because the estimates and projections come from different sources, they would not be expected to be identical, so the household projections are constrained to the household estimates for 2004 and 2005.

Household projections for 2006 onwards are then altered by the same percentage as the 2005 figures.

6. Table 1 shows the difference between the 2004 and 2005 household estimates and projections. Overall, for Scotland, the match is very good, with a difference of around 0.1% overall (2-4,000 households). In most councils there is a difference of less than 2%, with Aberdeen City showing the highest percentage difference of 3-4%.

Constraining the figures to the total number of adults living in private households

7. As a validity check on the projected number of households, the minimum number of adults required to fill the households in each council area is compared to the population projections for those aged 16+. If there are not enough adults projected to fill the number of households projected, this could indicate a problem with the projections. Where this has occurred in the past, a different projection method has been tried, to try to produce a better fit, or else the number of households of each type has been adjusted (but not the total number of households).

8. This validity check has been carried out on the 2004-based projections, and every council area was found to have sufficient projected numbers of adults to fill the projected number of households, for each projection year. This is re-assuring, and means that the figures do not have to be adjusted.

B. Results of the provisional household projections

9. **Household projections for each council area:** Table 2 shows the household projections for each council area in Scotland, up to 2024, and Chart 1 presents this information graphically. There is an average projected increase of around 15,000 households per year. This ties in reasonably well, with the household estimates, which showed that the number of households has increased by between 11,500 and 22,000 a year since 1991, with an average increase of 16,000 households per year. This is greater than the 2002-based projections, which projected an average increase of 11,700 households per year.

10. **Comparison between current and previous household projections:** Chart 2 provides a comparison between the 2004-based household projections, and previous household projections. They show the total number of households projected each year, for Scotland as a whole. The 2004-based projections are higher than the 2002-based projections – the same projection methodology is used here, so the increase has been caused by the higher population projections. Chart 3 illustrates this further – the 2002- and 2004-based population and household projections were both higher than the 2002-based projections. Chart 4 shows the projected number of households in 2016, according to the 2002- and 2004-based household projections.

11. **Comparison between population and household projections:** Chart 5 shows the projected percentage change in population and households, for each council area, between 2004 and 2024. This illustrates the relationship between the two sets of figures – for each council, the household projections are higher than the population projections, because of changes in household formation, with more people living alone and in smaller households.

Orkney and Shetland stand out as having a greater increase in the number of households, relative to increase in the population, than most councils. Both of these areas showed particularly large increases in the proportion of small households between 1991 and 2001, which could explain this.

12. **Household projections by type and age of head of household:** Charts 6 and 7 show the 2004-based household projections, by type of household and age of the head of household. They show a continuation of the trends observed in the past – an increase in the number of people living alone or in small households, and a decrease in the number of larger households. The household projections by age of head of household reflect the changing age profiles observed in the population projections, with increasing numbers of households headed by older people.

C. Potential changes that could be made to the household projections methodology

13. The analysis described above indicates that the draft household projections appear to be plausible, with no major discrepancies or unexplained phenomena. This suggests that it shouldn't be necessary to change the methodology greatly at this stage. However, if HARG members feel that alternatives should be considered, the possible ways of modifying the methodology are described below:

13.1 **Change the communal establishment (CE) figures:** Household projections involve removing the number of people living in CE from the total population. For the projections presented here, this was done by applying the CE proportions from the 2001 Census, to each year's population projections. However, it would be possible to use a more up-to-date source, or to project forward an assumed change in the CE population, such as a decrease in the proportion of elderly people living in care homes. This has been described in papers HARG 2006 (1) and (2).

13.2 **Change the method used to project the headship rates:** The figures presented here use a two-point exponential curve to project forward the headship rates from 1991 and 2001. All household projections since 1994 have been based on a two-point exponential curve (sometimes from different Censuses), though other types of curve have been tried. In addition, including data from a third Census has been considered, but it has proved difficult to obtain consistent data, mainly due to the way in which students have been treated in different Censuses. Because of this, and because the household projections presented here look plausible, we are not proposing to change this.

13.3 **Use different figures for headship rates:** The 'headship rate' is the proportion of people in each age group who head a household – this is equivalent to the number of households, and it is used as the basis for the projections. In the past, the headship rate has been based on the 'head of household' according to the Census form – in most cases, this is simply the first person named on the form (unless this person is aged under 16, or a visitor, for example). For the 2002-based projections, HARG considered using the 'Household Reference Person' instead. It is more sophisticated, and is based on the family relationships, age and economic status of the household members, as well as the order on the form. However, while this information is available for all households recorded in the 2001 Census,

it is only available for a 10% sample of households recorded in the 1991 Census. This means that because the sample size is smaller, this method gives less accurate results for smaller council areas. For this reason, HARG decided to keep using the Head of Household for the 2002-based projections, and we are proposing to do the same for the 2004-based projections.

13.4 Incorporate information from household surveys: A disadvantage of the household projections is that while the population projections and overall household estimates are updated regularly, the information on household *types* comes from the Census, and there is no information to update it between Censuses. GROS is proposing to try to use information from household surveys such as the Scottish Household Survey and Labour Force Survey, to update this information between Censuses. However, this will be a substantial piece of work, so we are planning to do this for the 2006-based household projections, but not the current, 2004-based household projections.

13.5 Change the household types and/or age groups used: The household types and age groups used in the household projections are shown in the Annex. It would be possible to change these, but we are planning to do so for the 2006-based projections, not the 2004-based projections. This is because we may be constrained by the figures available from household surveys (described above), and we may also want to tie-in more closely with figures for England and Wales (where they currently use different household types, including information on marital status), and Northern Ireland (where they include information on household size).

13.6 Produce projections for different geographic areas: Currently, we produce household projections for Scotland, each council area, and each Structure Plan Area. Due to changes in the planning system, we will have to produce population and household projections for different areas in the future, but these geographies have not yet been defined, so it will be something we will do for the 2006-based projections.

Next steps

GROS will continue carrying out checks on the provisional 2004-based household projections. Depending on the outcomes of this meeting, the communal establishment figures could change, or HARG members may suggest other approaches or analysis which could be carried out. GROS will then produce a draft household projections publication, which will be sent to HARG members for comment, before the final publication is produced.

GROS: Household estimates branch
February 2006

Annex: Brief description of the household projections methodology**Calculate private household population**

- Take population estimates and 2004-based population projections (for 1991 to 2024)
 - By gender and age group
- Subtract the proportion of people living in communal establishments
 - By gender and age group

Produce headship rates

- Take 'headship rates' from 1991 and 2001 Censuses (proportion of households of each type)
 - By household type and age group of head of household.
- Fit an modified 2-point exponential curve to project forward the figures for 2004 to 2024.

Produce household projections

- Apply each year's headship rate to the private household population to produce raw household projections
- Constrain the figures to the Scotland total
- Constrain the figures to the 2004 and 2005 household estimates
- If necessary, constrain the figures to the total number of adults, by adjusting the household types
- Produce figures for Structure Plan Areas (an aggregate of local authority areas)

Age groups and household types used for household projections

Age of head of household	Household types
16-24	1 adult: male
25-29	1 adult: female
30-34	2 adults
35-44	1 adult + 1 child
45-54	3+ adults
55-59	1 adult, 2+ children
60-64	2+ adults, 1+ children
65-74	
75-84	
85+	

Projections are produced for Scotland and each Council Area and Structure Plan Area.

Table 1: Difference between population-based household projections for 2004 and 2005, and Council Tax-based household estimates

Council area	Population-based		Council Tax-based		Difference			
	2004	2005	2004	2005	2004	2005	2004	2005
Aberdeen City	95,784	95,520	98,635	99,269	2,851	3,749	3%	4%
Aberdeenshire	95,174	96,700	95,597	97,401	423	701	0%	1%
Angus	47,801	48,269	48,122	48,625	321	356	1%	1%
Argyll & Bute	39,665	40,015	40,220	40,769	555	754	1%	2%
Clackmannanshire	21,253	21,568	21,296	21,610	43	42	0%	0%
Dumfries & Galloway	65,341	65,946	65,703	66,465	362	518	1%	1%
Dundee City	66,312	66,173	67,726	67,747	1,414	1,574	2%	2%
East Ayrshire	50,833	51,080	51,282	51,459	449	379	1%	1%
East Dunbartonshire	42,427	42,535	42,399	42,592	-28	57	0%	0%
East Lothian	39,327	39,643	39,356	39,749	29	106	0%	0%
East Renfrewshire	35,415	35,580	35,431	35,512	16	-68	0%	0%
Edinburgh, City of	210,792	214,200	209,094	211,731	-1,698	-2,469	-1%	-1%
Eilean Siar	11,477	11,594	11,381	11,486	-95	-109	-1%	-1%
Falkirk	64,731	65,612	65,391	65,879	660	268	1%	0%
Fife	155,451	157,369	154,072	155,890	-1,379	-1,480	-1%	-1%
Glasgow City	277,808	279,880	273,262	274,678	-4,546	-5,202	-2%	-2%
Highland	92,811	94,113	93,211	94,941	400	829	0%	1%
Inverclyde	36,637	36,599	36,692	36,692	55	93	0%	0%
Midlothian	32,927	33,028	33,282	33,422	356	394	1%	1%
Moray	36,784	37,152	36,980	37,484	195	332	1%	1%
North Ayrshire	60,002	60,382	59,419	60,321	-583	-61	-1%	0%
North Lanarkshire	136,012	137,211	137,672	139,343	1,660	2,132	1%	2%
Orkney Islands	8,679	8,822	8,640	8,790	-39	-31	0%	0%
Perth & Kinross	60,655	61,417	60,804	61,613	150	196	0%	0%
Renfrewshire	76,115	76,352	76,751	77,012	635	660	1%	1%
Scottish Borders	49,133	49,742	49,067	49,534	-66	-208	0%	0%
Shetland Islands	9,411	9,515	9,276	9,376	-135	-138	-1%	-1%
South Ayrshire	49,525	49,782	49,881	50,311	356	529	1%	1%
South Lanarkshire	130,276	131,905	129,620	131,065	-656	-840	-1%	-1%
Stirling	36,193	36,409	36,658	36,958	465	549	1%	2%
West Dunbartonshire	40,955	41,024	40,529	40,835	-426	-189	-1%	0%
West Lothian	67,925	69,014	68,259	69,309	334	296	0%	0%
Scotland	2,243,630	2,264,152	2,245,707	2,267,869	2,078	3,717	0%	0%

To adjust for these differences, the household projections are adjusted to match the household estimates for 2004 and 2005. Household projections for 2005 onwards are adjusted by the same percentage as the 2005 figures.

Table 2: Provisional 2004-based household projections, 2004 to 2024

Council area	2004	2014	2024	Change 2004-2024	
				Number	%
Aberdeen City	98,640	96,170	87,820	-10,820	-11%
Aberdeenshire	95,600	107,130	115,910	20,310	21%
Angus	48,120	50,600	51,160	3,040	6%
Argyll & Bute	40,220	42,930	45,440	5,220	13%
Clackmannanshire	21,300	23,030	23,920	2,620	12%
Dumfries & Galloway	65,700	70,010	72,000	6,300	10%
Dundee City	67,730	66,530	63,520	-4,210	-6%
East Ayrshire	51,280	53,380	54,630	3,350	7%
East Dunbartonshire	42,400	43,520	43,590	1,190	3%
East Lothian	39,360	43,330	49,030	9,670	25%
East Renfrewshire	35,430	37,810	40,050	4,620	13%
Edinburgh, City of	209,090	234,720	256,640	47,550	23%
Eilean Siar	11,380	11,680	11,430	50	0%
Falkirk	65,390	71,760	77,710	12,320	19%
Fife	154,070	171,220	186,200	32,130	21%
Glasgow City	273,260	290,980	303,870	30,610	11%
Highland	93,210	102,440	111,540	18,330	20%
Inverclyde	36,690	36,770	36,140	-550	-1%
Midlothian	33,280	34,590	35,660	2,380	7%
Moray	36,980	39,550	41,390	4,410	12%
North Ayrshire	59,420	63,310	65,060	5,640	9%
North Lanarkshire	137,670	148,990	156,950	19,280	14%
Orkney Islands	8,640	9,690	10,280	1,640	19%
Perth & Kinross	60,800	66,690	71,010	10,210	17%
Renfrewshire	76,750	78,370	78,040	1,290	2%
Scottish Borders	49,070	54,600	60,030	10,960	22%
Shetland Islands	9,280	9,950	10,210	930	10%
South Ayrshire	49,880	52,180	53,330	3,450	7%
South Lanarkshire	129,620	142,230	151,710	22,090	17%
Stirling	36,660	39,870	42,810	6,150	17%
West Dunbartonshire	40,530	42,190	42,750	2,220	5%
West Lothian	68,260	79,730	91,170	22,910	34%
Scotland	2,245,710	2,416,600	2,542,420	296,710	13%

Chart 1: Projected change in households: 2004 to 2024

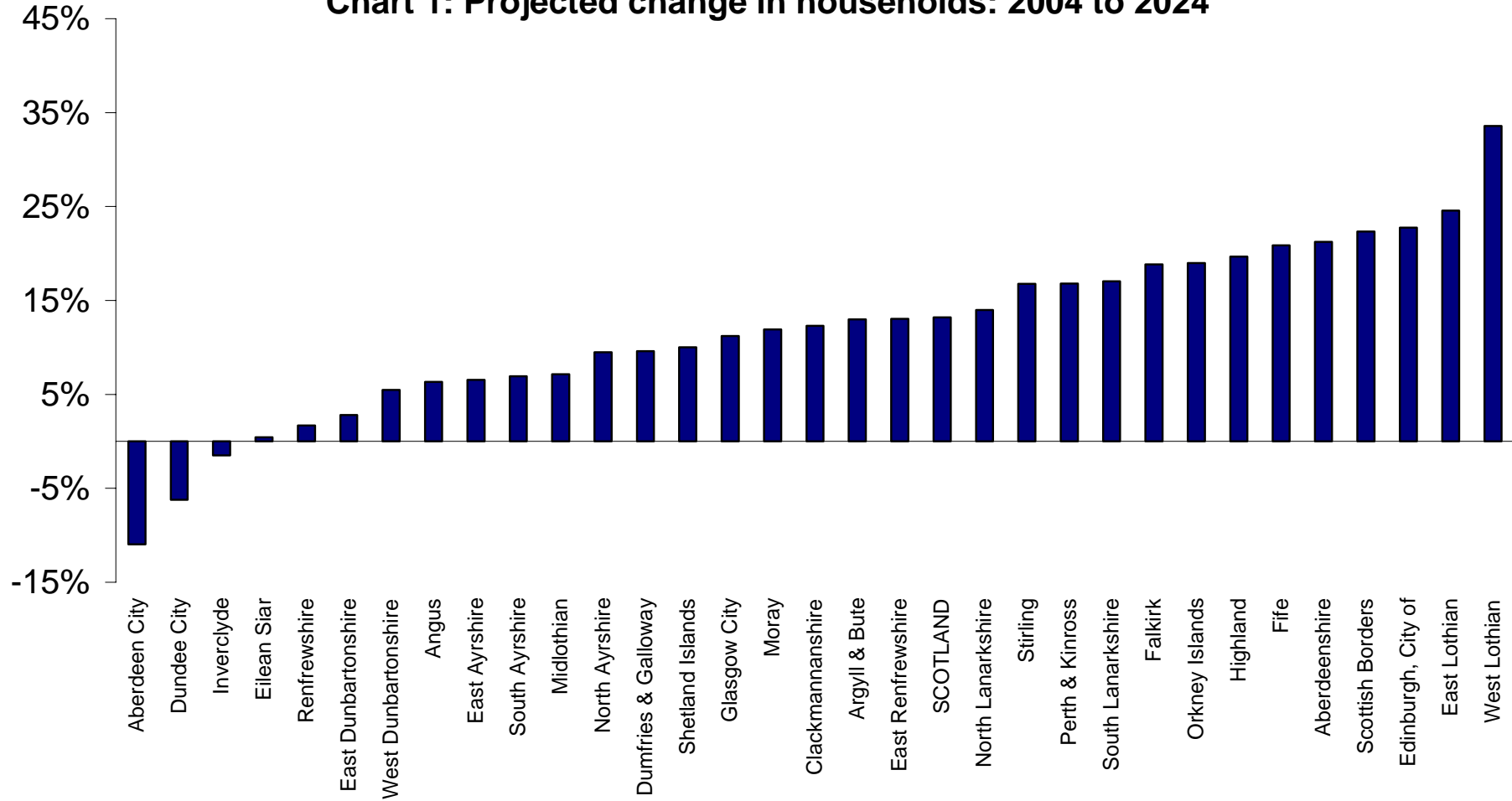


Chart 2: Household projections (1996-, 1998-, 2000-, 2002- and 2004-based)

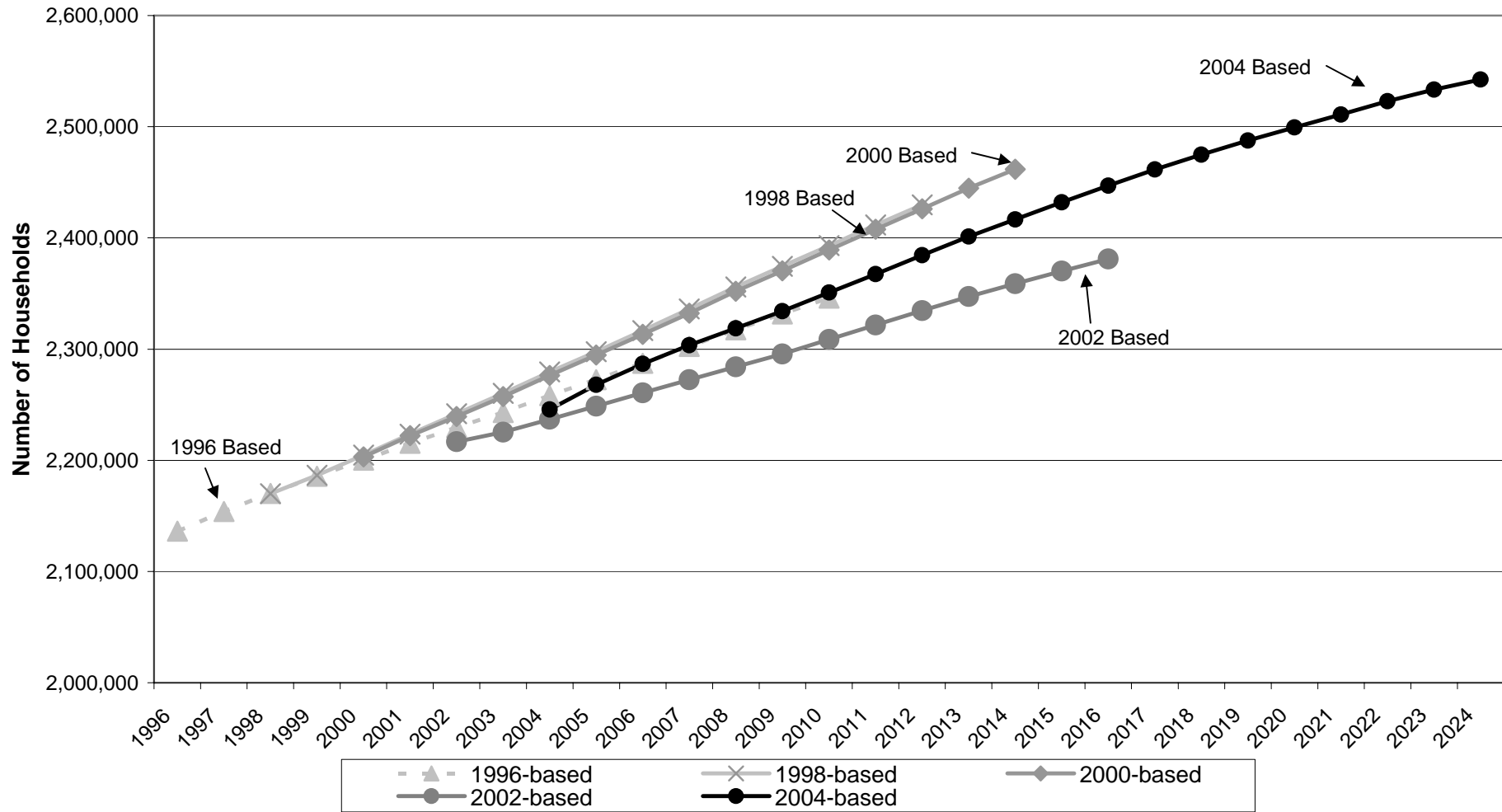
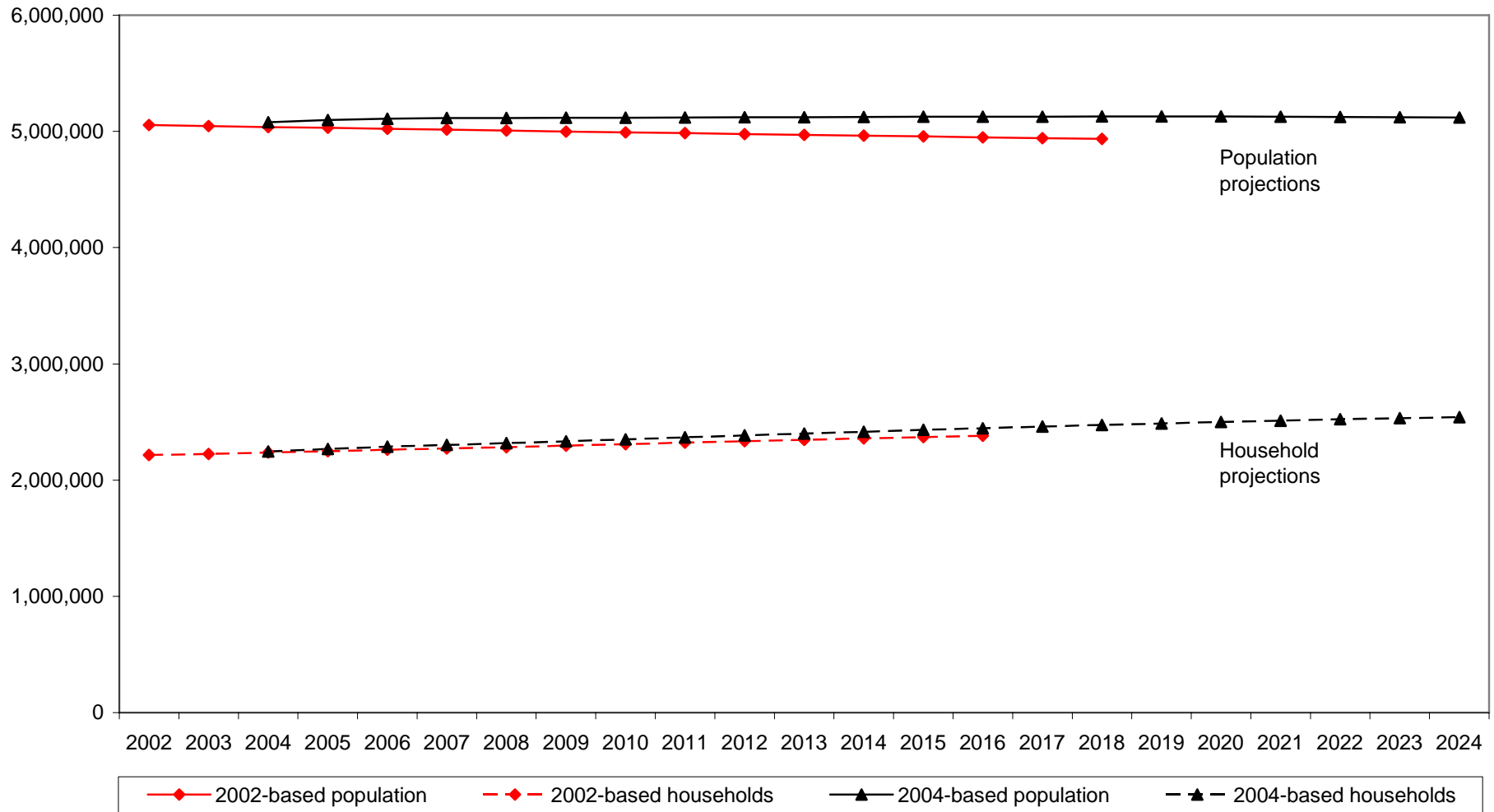


Chart 3: 2002- and 2004-based population and household projections



**Chart 4: Comparison of 2002-based and 2004-based household projections:
Projected number of households in 2016**

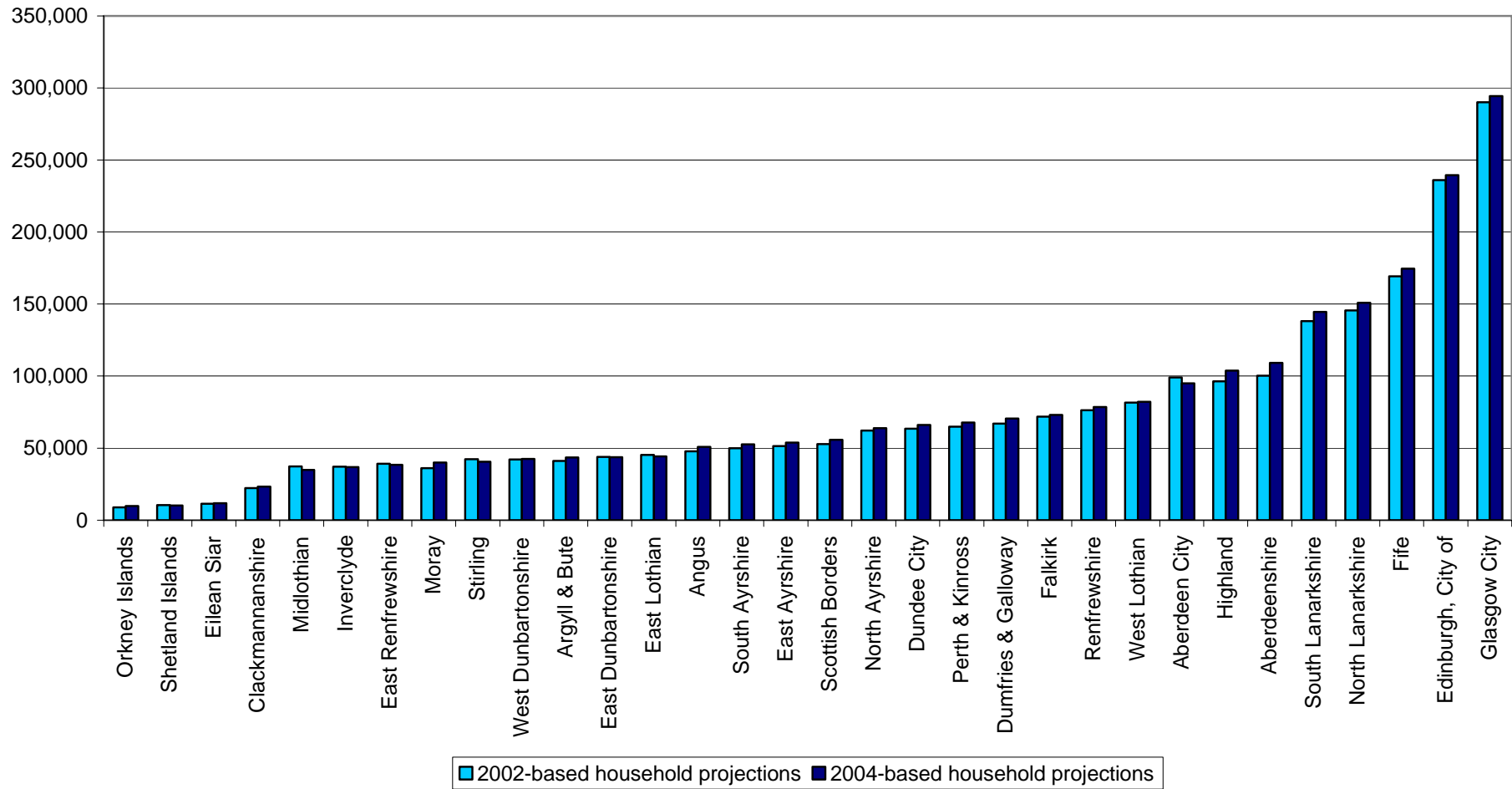


Chart 5: Projected change in population and households, 2004-2024

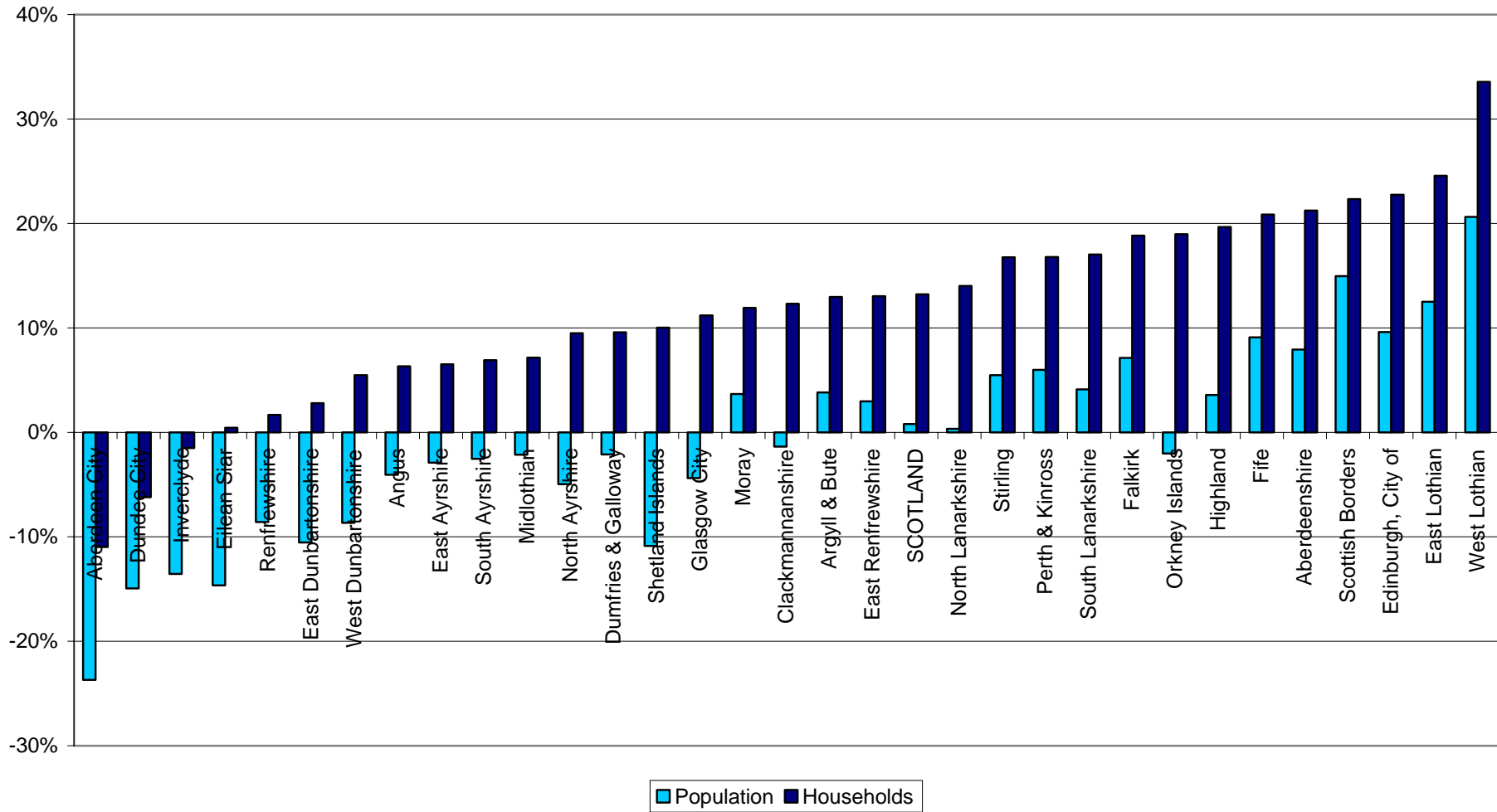


Chart 6: projected changes in each household type, 2004 to 2024

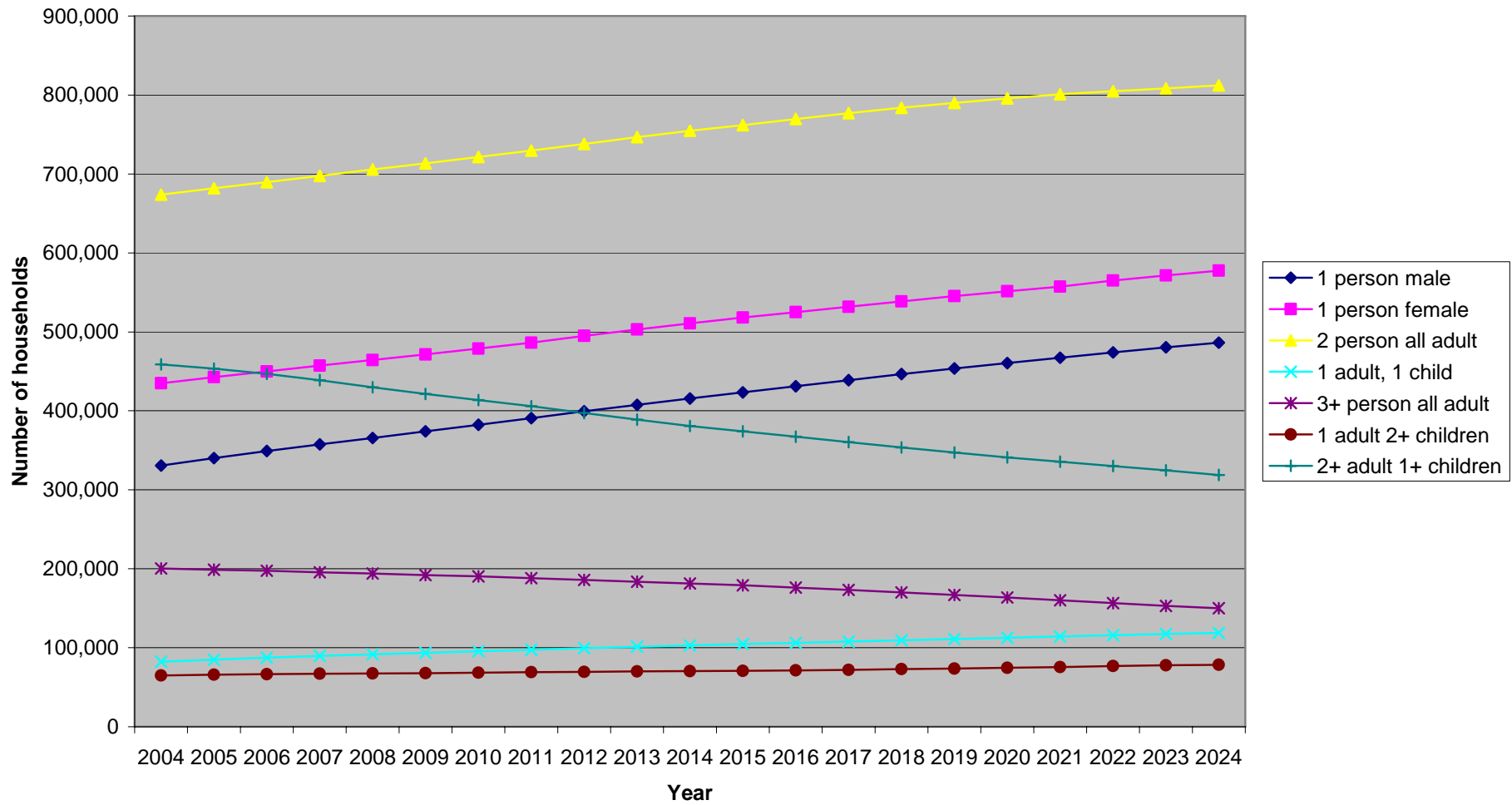


Chart 7: projected changes households by age of head of household, 2004 to 2024

