Whitehorse Residential Land Demand Updated Forecast

FINAL REPORT

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Executive Summary

Methodology

We developed a demographic model to project the population, number of households, housing demand and the demand for single family residential lots in Whitehorse and the Whitehorse periphery. We used three different population growth scenarios with differing migration assumptions. Our assumptions for the three scenarios were:

- **Low**: net out-migration of about 200 people per year
- **Medium**: zero net migration
- **High**: net in-migration of 200 people per year

Results

The forecast demand for single family residential lots based on each of the three scenarios is:

Low growth scenario

- No new lots needed over the next ten years
- No demand for new lots from 2014 to 2023,

Medium growth scenario

- 350 lots over the next five years (70 lots per year)
- 300 lots between 2009 and 2013 (about 50 lots per year)
- 120 lots between 2014 and 2023 (about 10-12 lots per year).

High growth scenario

- 580 lots over the next five years (about 110 lots per year)
- 530 lots between 2009 and 2013 (100 lots per year)
- 530 lots between 2014 and 2023 (about 50-55 lots per year).

Table of Contents

List of Figures

List of Tables

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1.0 Introduction

This paper presents an update of the forecasts prepared in a previous study entitled *Whitehorse Land Demand: Analysis and Forecast* prepared in June 2000 for the Engineering and Development Branch of the Community and Transportation Services (Yukon Government). That work was based on the results of the 1996 Census and recommended updating the forecasts using 2001 Census data when it became available.

1.1 Study Area

This study deals with the Whitehorse residential land market. The boundaries of that market include the City of Whitehorse as well as the surrounding countryside where a large portion of the population commutes to Whitehorse. This includes the hamlets of Mount Lorne and Ibex Valley, and what Statistics Canada refers to as "Whitehorse Unorganized" in the 2001 Census. The boundaries of the study area (see Figure 1 below for a map) are:

- North: Two thirds of the way down Lake Laberge along the Klondike Highway (includes Fox Lake but not Braeburn)
- South: South of the Annie Lake Road and the area west of the Annie Lake Road down to the BC border (excludes Carcross and Tagish)
- East: Judas Creek on Marsh Lake
- West: The Western end of Ibex Valley Hamlet (to the Takhini River bridge)

For the purposes of this analysis, we obtained separate data on what we called the "Whitehorse Core" and the "Whitehorse Periphery". The "core" area includes those subdivisions where most of the dwellings are on serviced lots, including Downtown, Riverdale, Porter Creek, Takhini, Hillcrest, and the subdivisions along either side of Hamilton Boulevard. The periphery includes areas outside of the Whitehorse municipal boundaries as well as those parts of Whitehorse with country residential subdivisions.

In 2001, the Census counted 21,786 people living in the study area forming 8,400 households (i.e. inhabiting 8,400 dwelling units).[1] Table 1 presents the population and number of dwellings in the study

[1] There are two sources of population data for Whitehorse, the quinquennial Census held by Statistics Canada and Health Care statistics published by the Yukon Bureau of Statistics. The two are different and measure different things. In June 2001, the YBS counted 22,526 people with Whitehorse addresses compared to the 21,265 counted by the Census in May 2001. There are a number of reasons for the discrepancy. YBS counts all people who hold a valid Yukon Medicare card and have a Whitehorse postal address, while the Census counts the number of occupied private dwellings and people actually residing in them. The Census data is more useful for this forecast because it can be related to residents and housing while the YBS counts the number of people the Yukon government is responsible for. For example, students living Outside are counted in the YBS numbers but not in the Census. Also, the YBS and the Health Services Branch may take up to a year to remove individuals who have moved out. Nevertheless, the YBS numbers are very useful in tracking year-to-year population movements, unlike the Census, which is held only every five years.

area. Despite the population decline between 1996 and 2001, the number of dwellings increased. This was the result of two factors: the ageing of the population and the increased propensity of people (especially women) in every age group to form their own households.

There was a substantial increase in the number of single family dwellings over the five-year period between the two censuses: over 500 new single family houses or about 100 dwellings per year.

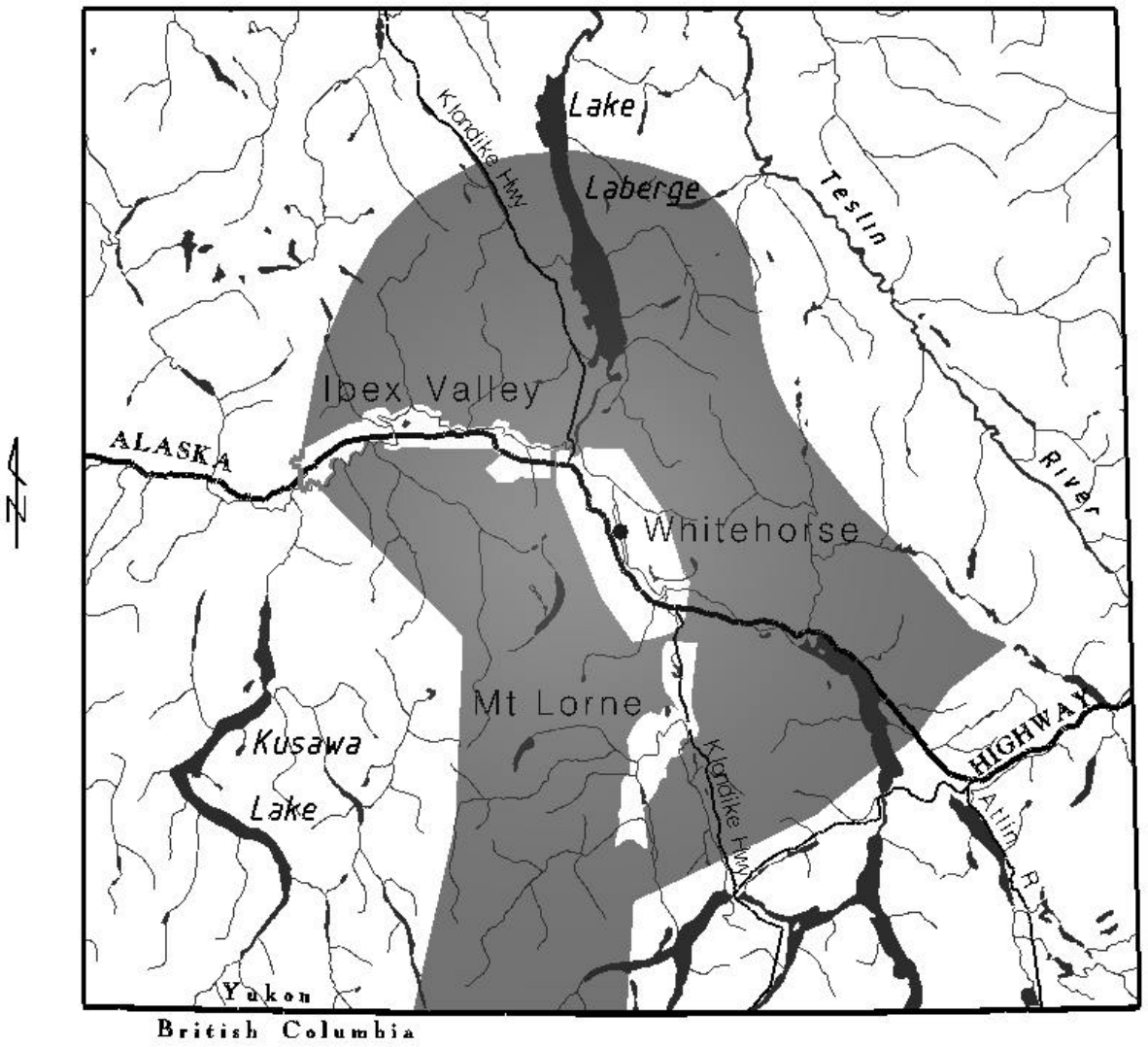
Table 1 Population and Households/Dwellings, Whitehorse Census Agglomeration, 1996 and 2001 Census

		Whitehorse Core	*Whitehorse Periphery*	*Total Whitehorse Agglomeration*
Population	1996	17,270	4,435	21,705
	2001	16,910	4,350	21,265
Dwellings	1996	6,430	1,690	8,120
	2001	6,700	1,700	8,400
Single Family Dwellings	1996	3,255	1,525	4,780
	2001	3,765	1,575	5,340

Note: The Whitehorse Census Agglomeration and the study area are synonymous.

The following map shows the Whitehorse Census Agglomeration (Whitehorse CA) as defined by Statistics Canada.

Figure 1 - Map of Whitehorse Census Agglomeration



2.0 Methodology and Assumptions

For this study we have used the demographic projection model developed for the original study done in 2000. The model is used to estimate three different scenarios for population growth, household formation and total housing demand for different housing types. The existing housing stock is subtracted from the estimated total demand to estimate the number of new lots required over 5, 10 and 20 years.

2.1 Assumptions

The model is a five-year cohort (age group) population projection model. A demographic projection model requires a number of assumptions about birth rates, death rates and migration. After the population is forecast, the number of households, and the number of dwellings by type are forecast. This also requires assumptions about household formation and the dwelling types chosen by different households.

Because of the difficulty in forecasting migration, three different scenarios are developed using different migration assumptions.

2.1.1 Births and Deaths

The birth rate assumption we use is the 2001 Yukon average fertility rate for each 5-year cohort of women. Birth rates are forecast to decline by 10% over the next 10 years in the low and medium scenario and to remain constant in the high scenario.[2] Note that, as Table 2 shows, birth rates have declined considerably since the mid 1990s. Birth rate data from 1996 to 2000 for the Yukon has not been published by Statistics Canada.

Table 2 Age Specific Fertility Rates, 1991-95 Average and 2001, Yukon

	Annual Births per 1000 women	
Age of mother	1991-1995 Average	2001
15-19	41.2	25.3
20-24	127.4	86.2
25-29	121.3	81.6
30-34	79.6	79.6
35-39	36.7	29.3
40-44	7.1	9.5
45-49	0.3	0

Source: 1991-95 data Statistics Canada #84-210-XIB
2001 data Statistics Canada #84F0210XPB

Death rates are the average 1992-2002 Yukon death rate for each five-year age group and are assumed to remain constant in all scenarios. Death rates for 1996 to 1999 are not available, so the average is actually for 1992-1995 and 2000 and 2001. The average was used instead of the more recent data because of the large fluctuations observed between 2000 and 2001. Large fluctuations in death rates can be expected for two reasons: the very small number of deaths in the younger age groups and the small number of people

[2] This is the same assumption used by the Yukon Bureau of Statistics in its low growth population projections. (YBS, *Population Projections to 2013*, Information sheet #66.07-2003.09)

in the older age groups. So normal year-to-year fluctuations in the number of deaths can result in large swings in death rates.

Table 3 Age-Specific Annual Death Rates per 1,000, 1992-95 and 2000-01 Average, Yukon

	Males	*Females*
<1	8.6	3.8
1-4	1.0	0.3
5-9	0.3	0.3
10-14	0.3	0.2
15-19	1.3	0.0
20-24	1.7	0.3
25-29	2.3	1.0
30-34	2.2	0.6
35-39	2.7	1.3
40-44	2.3	1.8
45-49	4.6	2.3
50-54	6.1	3.5
55-59	14.6	5.7
60-64	14.2	10.4
65-69	20.6	15.2
70-74	46.6	33.7
75-79	68.4	63.3
80-84	147.9	103.8
85-89	162.7	91.1
90+	168.0	213.7

Source: Statistics Canada #84-210-XIB Table 4.5 for 1992 to 1995 and Statistics Canada CANSIM Table 102-0504 for 2000 and 2001

2.1.2 Net Migration

As part of this study, we estimated net migration in Whitehorse for 1986 to 2003. (Published data is available only for the Yukon as a whole). Using annual Health Care population data by age and sex, we calculated the expected annual change in the population for each 5-year age cohort by assuming that one-fifth of each age group would move on to the next cohort in the subsequent year and by applying the appropriate birth and death rates. Table 4 below presents the estimated net migration for Whitehorse from 1986 to 2003.

Table 4 Estimated Net Migration, Whitehorse, 1986-2003

	Males	*Females*	*Total both sexes*
1986/87	306	336	643
1987/88	552	287	839
1988/89	-68	-41	-108
1989/90	-167	82	-85
1990/91	257	259	517
1991/92	368	225	593

1992/93	234	327	561
1993/94	-392	-206	-598
1994/95	-17	-94	-110
1995/96	170	251	421
1996/97	186	101	287
1997/98	-604	-364	-967
1998/99	-324	-171	-495
1999/00	-254	-80	-335
2000/01	-349	-89	-438
2001/02	-128	-219	-347
2002/03	-237	44	-194

Three different migration assumptions form the basis for the different scenarios. The high scenario is based on the migration patterns in high positive net in-migration years (1987, 1988, 1991, 1992, 1993 1996), the medium on the mid-range years (1989, 1990, 1995 and 1997) while the low scenario is based on the high net out-migration years (1994, 1998, 1999, 2000, 2001, and 2003). The net migration patterns by age group for those years is shown in Table 5 below.

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Table 5 Average Estimated Net Migration Patterns by Age Group, Whitehorse, 1986-2003

Age Group	*Overall Average 1987-2003 (numbers)*	*Average high out-migration years (percentage of net migration)*	*Average medium years (numbers)*	*Average high in-migration years (percentage of net migration)*
0-4	-22	12.4%	10	5.5%
5-9	11	6.6%	10	11.4%
10-14	15	-0.4%	10	9.5%
15-19	15	-3.5%	-10	2.8%
20-24	-28	23.5%	-20	11.1%
25-29	31	11.7%	45	20.4%
30-34	28	8.2%	30	18.4%
35-39	24	7.4%	20	15.8%
40-44	23	3.0%	40	8.8%
45-49	3	3.9%	0	6.3%
50-54	-23	5.2%	-25	-2.4%
55-59	-20	7.5%	-30	-2.6%
60-64	-25	7.6%	-40	-1.8%
65+	-23	6.9%	-40	-3.1%
Total	11	100.0%	0	100.0%

In high out-migration years, there is net out-migration in practically all age groups, and it is particularly high in the 20-24 cohort. In medium years, out-migration in the younger and older age groups is offset by in-migration in the middle-aged cohorts (25-44). Even in high in-migration years, people in older age groups (over 50 years old) tend to move out, while there is a positive migration in all other groups, with especially strong in-migration by the 25-29 cohort.

The low scenario assumes a net annual out-migration of about 200 individuals per year. This migration is distributed according to percentages derived from the average of the high net out-migration years.

The medium scenario has zero net migration. Out-migration in the older age groups is offset by in-migration in the younger age groups.

The high scenario assumes a net in-migration of 200 people per year, distributed in the same age-group pattern as was experienced in the Yukon during the high net in-migration years. The 200 total was selected to match the high-growth YBS population projections for the Yukon with its net in-migration assumption of 300. (It is assumed that two-thirds of the net migration will settle in Whitehorse, roughly matching the city's percentage share of the Yukon population.)

2.1.3 Household Formation

The 2001 Census provides the data needed to calculate the "household headship rate" of each 5-year age-sex cohort. . Household headship rates are the percentages of the population in each age-sex group who are the primary household maintainer.

For the low scenario, household formation is assumed to stay the same as revealed by the 2001 Census. Dwelling and tenure choice are also assumed to remain consistent with the 2001 rates. Table 6 below shows the household headship rates as well as the proportion of households who live in single family dwellings.

Table 6 Household Headship Rates and Percentage in Single Family Dwellings (SFD), Whitehorse Census Agglomeration, 2001

	Male		*Female*	
Age Group	Household headship rate	Per cent in SFD	Household headship rate	Per cent in SFD
15-19	2.2%	50.0%	1.7%	66.7%
20-24	14.3%	27.8%	31.7%	15.0%
25-29	47.5%	44.6%	43.7%	46.8%
30-34	59.6%	56.3%	42.9%	56.9%
35-39	67.6%	70.6%	55.2%	66.7%
40-44	68.9%	65.3%	52.7%	64.0%
45-49	68.4%	73.1%	48.6%	66.7%
50-54	70.3%	82.1%	50.3%	72.1%
55-59	73.8%	80.0%	53.6%	65.4%
60-64	73.0%	59.3%	49.2%	48.4%
65+	71.8%	59.5%	53.3%	52.3%

It should be noted that headship rates increased considerably for women between 1996 and 2001, accounting for the bulk of the increase in the demand for housing in that period. This is due in part to increased rates of marital break-ups which result in the formation of more households headed by women.

For the medium and high scenarios, it is assumed that the headship rates of women will continue to increase over the next 10 years while those of men will remain constant. Female household headship is assumed to grow at 1% per year for the next 10 years. This compares with a growth of 2% per year between 1996 and 2001.

3.0 Demographic Growth and Projected Land Demand

Table 7 presents the results produced by the demographic projection model for the three scenarios. These projections do not take into account economic conditions. However, economic conditions are assumed to underlie the different migration assumptions. These projections also do not take into account land prices. With higher prices, fewer lots will be demanded. These projections implicitly assume that land will be priced at levels similar to the past. Thus the same proportion of people will be willing and able to buy land as they did in the past.

Table 7 Population, Housing Demand and Lot Demand Forecast, 2003-2023

	2003	*2008*	*2013*	*2023*
Low Growth Scenario				
Total Population	20,873	20,252	19,377	16,758
Total Households	8,243	8,295	8,200	7,347
New housing needed		52	(95)	(853)
SFD required	5,268	5,251	5,121	4,501
New Lots needed		(17)	(130)	(621)
Medium Growth Scenario				
Total Population	21,424	21,893	22,228	22,353
Total Households	8,383	8,988	9,529	9,737
New housing needed		605	541	208
SFD required	5,347	5,681	5,982	6,103
New Lots needed		335	301	121
High Growth Scenario				
Total Population	21,826	23,331	24,704	26,769
Total Households	8,556	9,595	10,544	11,438
New housing needed		1,039	949	894
SFD required	5,447	6,028	6,560	7,090
New Lots needed		581	532	530

In the low growth scenario, there will be a slight decrease in population in the next five years, with the natural increase offsetting most of the out-migration. After 2008, population will start to decline considerably. However, the changing age structure of the population will nevertheless result in a slight increase in housing demand for the next 5 years although there will not be a need for new lots. This is a result of the ageing of the baby boomers and household formation by the "baby boom echo." Under this scenario (of about 200 net out-migrants per year), there no demand for new lots — indeed there is negative demand — as the existing housing can accommodate the changes in the population.

The medium growth scenario, despite zero net migration, will result in a small population increase over the next ten years mainly because of the net in-migration of women in childbearing years (25-40). Over the following 10 years (2014-2023) the population will effectively remain constant as the baby boom ages and the baby boom "echo" reaches early middle age. Despite the relatively stagnant population, demand for housing will increase, but at a declining rate. About 350 lots will be needed over the next five years (70 lots per year), 300 lots (60 per year) over the subsequent five years (2009-2013), tailing off to 12 lots per year from 2014 to 2023.

The high growth scenario, which would require a boom caused by the construction of a pipeline or the opening of a major mine, will result in a fairly large population increase and in housing demand. One can expect a demand of over 100 new lots per year over the next decade, declining to about 50 in the following decade.

Our projections are for new building lots. The demand for new housing will be greater than that for new residential building lots. The demand for housing not met through new single family lots will be met through increased density such as construction of new apartments, basement suites, and duplexes.