# FOUNDATIONAL RESEARCH BULLETIN

SUSTAINABILITY BY DESIGN A Design Vision for a Sustainable Region of 4 Million

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# **Growing a Greater Vancouver Region: Population Scenarios for a Region of 4 Million People**

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#### I. Introduction

In the last 20 years Greater Vancouver has experienced a population growth of nearly 60%, from 1.2 million people in 1981 to almost 2 million in 2001<sup>1</sup>. Similar rates of growth are expected for the future.

Projecting future population and demographic change is a crucial tool for long-range planning, particularly for land-use decisions that will shape transportation, employment and housing choices for many decades to come. In planning for the long-term sustainability of the Greater Vancouver area, we need to understand projections for future population, demographics and the distribution of future generations within the region.

Several population projections have been developed for the region for the next 20, 30, and 40 years. The Greater Vancouver Regional District has projections for the region and municipalities up to 2031, expecting a total population of 2.6 million by 2021 and nearly 3 million by 2031<sup>2</sup>. Many municipalities have used the 2021 projection in the development of their Official Community Plans. Urban Futures, a Vancouver-based demographics consultancy firm, has population projections for the region up to 2050, considering natural increase, trended rates and migration. Their projected population for 2050 is of 3.7 million<sup>3</sup>.

This bulletin compiles population projections showing a regional population of four million, over a 50 year timeframe. We provide three different scenarios of how this population growth could take place. In each case, we assume preservation of existing Green Zone and Agricultural Land Reserve lands.

### II. When: A Region of 4 million by 2056

This compilation of population projections is based on current growth rates. Considering the population growth that has taken place in the GVRD in the twenty year period, from 1981 to  $2001^4$ , and projecting it over time, the population of Greater Vancouver is expected to be almost 4 million 50 years from now, by 2056.

In Figure 2-1, the dark blue line shows projected population growth in the region up to 2056. This 50-year projection adheres very closely to Urban Futures' projections [green line].



1986 1991 1996 2001 2006 2011 2016 2021 2026 2031 2036 2041 2046 2051 2056

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Figure 2-1: 2056 Projected

Population Growth in the GVRD

#### III. How: Three Scenarios for 2056

Three scenarios about how this population growth could take place in the region are shown. The result is three distinct pictures of how population densities will be distributed over the next 50 years. As part of our *Sustainability by Design* initiative, we have organized all of our base data in the framework of a five kilometre mosaic grid - the Greater Vancouver Regional District and its 21 member municipalities [except for Bowen Island, Lions Bay and part of Electoral Area]. The population projections and all resulting data are related to the 5km by 5km mosaic cell scale. This approach allowed us to look at the entire Vancouver region as one entity, overcoming municipal boundaries.

For our methodology, population density has been calculated over all land not in the Green Zone [developed and undeveloped], since all scenarios [except for a few cells in scenario #1] assume no growth in the Green Zone. The data regarding 2056 population, population growth [absolute and percentage growth] and density [persons per hectare] for each individual mosaic cell may be found in the appendix.

#### Scenario #1: Following Current Growth Trends

Scenario #1 has been developed projecting population growth rates by census tracts from the 1981-2001 period to 2056, assuming the growth will continue to take place within the same area [census tract]. Figure 2-6 shows 2001-2056 projected population growth by mosaic cell in absolute value [people]. This will result in an increase in population density [see Figure 2-3].

#### Scenario #2: From Current Growth Trends to the LRSP

Scenario #2 shifts current growth trends towards the Livable Region Strategic Plan [current trend does not meet this criteria], most importantly the objective of protecting the Green Zone and achieving a compact metropolitan region.

Taking Scenario#1 as a basis, a redistribution of population growth has been made following the LRSP Map<sup>5</sup>. The projected population from those cells completely on the Green Zone has been transferred towards the closest regional or municipal town centres established in the LRSP Map. The same process has been applied to a part of the projected population growth on some of the cells that have experienced a great growth in the last twenty years but are not regional or municipal town centres established by the LRSP. Figure 2-7 shows graphically this redistribution of projected population growth in the region.

#### Scenario #3: A tighter Growth Concentration Area

In both Scenarios #1 and #2, the growth in the Vancouver – Burnaby – New Westminster area had been close to 30% of the total growth in the region, and 20% for northwest Surrey. Scenario #3 takes a different perspective. It suggests a tighter growth concentration area in the Vancouver – Burnaby – New Westminster - Northwest Surrey area.

Scenario #3 explores what the region could look like if 80% of the region's projected population growth took place in a tighter growth concentration area: 50% in the Vancouver – Burnaby - New Westminster area and 30% in northwest Surrey. The remaining 20% of the region's projected growth has been distributed throughout the

rest of the cells out of the tighter Growth Concentration Area, according to their current growth rates [based on 1981-2001 period – Scenario #1]. This means each of these mosaic cells has been assigned around 40% of its projected growth in Scenario #1. Last, as in Scenario #2, no growth is projected in those cells completely on the Green Zone.

Figures 2-2 to 2-5: Population Density Maps [people/he]: Current situation [2001]; Scenario#1; Scenario #2; and Scenario #3. Density calculated over the developed and undeveloped land not in the Green Zone.

To graphically represent these three scenarios, population density maps overlaid with the Green Zone [Figures 2-2 to 2-5] are the ones which give a better graphical explanation to what the region could look like in the three different settings. Figures 2-6, 2-7, and 2-8, on the following page, show the three different projected population growth patterns [2001-2056] by mosaic cell in absolute value [people].



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*Figure 2-6: Scenario #1* 2001-2056 Population Growth







Figure 2-7: Scenario #2 2001-2056 Population Growth

Figure 2-8: Scenario #3 2001-2056 Population Growth

#### IV. Accommodating growth: Scenario #3 in the city of Vancouver

We turn to an examination of the potential capacity for the city of Vancouver to absorb the kinds of population increases suggested in scenario three. The premise is that through accepting more than the trend rate of growth, Vancouver could contribute to the preservation of distant green zone landscapes while reducing pressures to further develop suburban greenfield sites.

To do so, we applied scenario #3 to the City of Vancouver [approximately cells: 3B, 3C, 3D, 4B, 4C, 4D]. To explore this question we examined how much infill and redevelopment capacity resided in the two hundred plus kilometres of Vancouver arterial streets to place new population growth; only along *corridors* [first half block along both sides of corridors] and *nodes* [5 minute walking distance – a 400m radius - from major transportation nodes, identified as existing Expo and Millennium lines Skytrain stations and future Canada line stations]. In concentrating new population densities in those areas, we assume that the rest of the city neighbourhoods are left essentially unchanged while existing industrial and commercial lands are kept available for that purpose.

Under that premise, the area available for densification is estimated at 2,409 hectares,22% of the total area of the city. Corridors make up 17% of total city area, and nodes 6% of total city area.

Using Scenario #3 population growth and Vancouver's current household size average of 2.3 persons<sup>6</sup>, over 250,000 new dwelling units (252,741) can be accommodated in the corridor and nodes areas within the City of Vancouver. Using scenarios #1 and #2, the number of new dwelling units to house the population growth would be of 157,283 and 161,245 respectively.

The existing gross residential density in these areas with potential for densification has been estimated to be of 20 du/he [8 du/acre]. For corridors, we assume a building type of four storey buildings along a typical corridor's first half block, with apartments from 700 to 1100 square feet. With 60% of these buildings being mixed-use (commercial in the ground level and three storeys of residential above) and the remaining 40% as fully residential, a density potential is 137du/he [55dua] can be achieved.

In the node areas, the proposed density potential is higher, 225du/he [90dua]<sup>7</sup>, as typified in a mix of high-rise tower, and low-rises townhouses and three-to-four storey building, similar to the mix currently found at Skytrain Stations such as Joyce.

In conclusion, the corridor and node lands examined have the capacity to accept roughly 360,000 new dwelling units, 30% over even the most aggressive growth assumptions of Scenario #3. This is not to be taken as a policy recommendation, only as a means to reveal what is for some an unrecognized but robust capacity in the existing infrastructure of the city to accept new growth.

HOUSING CAPACITY O	F LAND WITH POTENTIAL	FOR DENSIFICATION	- CITY OF VANCOUVER

		area proposed density		existing	density	total po	tential	housing capacity				
		he	du/he	du/acre	du/he	du/acre	du/he	du/acre	dwelling units			
corridors	74%	1,906	137	55	20	8	117	47	223,358 du			
nodes	26%	672	225	90	20	8	205	82	137,760 du			
total	100%	2,578	160	64	20	8	140	56	361,118 du			



Figure 2-9: Accommodating Scenario #3 growth in the city of Vancouver along corridors and transit nodes – Skytrain and future RAV line Stations.



Figure 2-10: Accommodating growth: Four storey low rises along the first half block of corridors, housing apartments from 700 to 1100 sq ft.

#### Notes

<sup>1</sup> Statistics Canada, 2001 Population and Dwelling Counts for Census Metropolitan Areas,

Census Agglomerations and Census Tracts, 2001 and 1996 Censuses [UBC Library]

<sup>2</sup> GVRD, <u>GVRD Population Projections by Local Health Areas</u>, Source: BC Stats, Projections - P.E.O.P.L.E. 30 (July 1): 2005-2031

http://www.gvrd.bc.ca/growth/keyfacts/popproj.htm

<sup>3</sup> Data provided by Urban Futures, May, 2006

<sup>4</sup> Statistics Canada, 1981, 1986, 1991, 1996, 2001 Population by Census Tracts

<sup>5</sup> GVRD 1996, LRSP Map, <u>Livable Region Strategic Plan</u>

http://www.gvrd.bc.ca/growth/lrsp.htm

<sup>6</sup> GVRD <u>GVRD Persons in Private Households and Average Number of Persons per</u>

Households, 1991-2001 Census, http://www.gvrd.bc.ca/growth/keyfacts/perinprivhhd.htm

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<sup>7</sup>Julie Campoli and Alex S. MacLean, 2002, <u>Visualizing Density, Higher Density Catalog</u> <u>Images, 9.1-134.5 upa</u>, Lincoln Institute of Land Policy Working Paper, case study of Tent City, Boston, MA.

### **Contact us**

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## Appendix

PROJECTIONS 2056 SCENARIOS #1, 2, 3

		55			POPULATION						DENSITY			
		Scenario #1			Scenario #2				Scenario #3	2001 Scen#1 Scen#2 Scen#3			Scen#3	
mosaic		2056	2056	2056	2056	2056	2056 %	2056	2056	2056	density	density	density	density
cell	2001 pop.	population	pop.growth	% growth	population	pop.growth	growth	population	pop.growth	% growth	[pers/he]	[pers/he]	[pers/he]	[pers/he]
GVRD	1,986,965	3,963,616	1,976,651	100%	3,963,616	1,976,651	100%	3,963,616	1,976,651	100%	25	50	50	21
mosaic	1,959,879	3,899,150	1,939,271	100%	3,899,150	1,939,271	100%	3,899,150	1,939,271	100%	23	46	46	46
1A 1P	10,188	8 500	2 137	34%	8 500	5,107	50% 24%	7 197	2,656	20% 12%	/	12	10	9
10	18 3/0	22,132	3,792	21%	18,719	2,137	34 /0 2%	19,819	1 /70	8%	17	20	17	7 18
1D	17 201	24,279	7,078	41%	17,201	3/ 3	2 %	19,961	2 760	16%	27	20 39	27	32
2A	189	315	126	67%	283	94	50%	238	49	26%	7	12	10	9
2B	8.323	11,563	3,240	39%	13,296	4.974	60%	9,586	1.263	15%	28	38	44	32
2C	24,988	38,568	13,580	54%	47,289	22,301	89%	30,284	5,296	21%	21	32	40	25
2D	62,701	95,311	32,610	52%	97,081	34,379	55%	75,419	12,718	20%	38	58	59	46
2E	20,311	42,736	22,425	110%	25,917	5,606	28%	29,057	8,746	43%	23	49	30	33
2F	10,280	18,987	8,707	85%	12,457	2,177	21%	13,676	3,396	33%	24	44	29	32
2G	10,122	26,694	16,572	164%	26,694	16,572	164%	16,585	6,463	64%	10	27	27	17
2H	15,247	51,201	35,954	236%	17,045	1,798	12%	29,269	14,022	92%	25	83	28	48
21	391	921	529	135%	921	529	135%	598	206	53%	2	6	6	4
3A	6,644	16,326	9,682	146%	8,580	1,936	29%	10,420	3,776	57%	14	34	18	22
3B	46,561	68,824	22,263	48%	/6,5/0	30,009	64%	102,219	55,658	120%	46	69	76	102
3C	151,720	279,099	127,379	84% E4%	228,147	76,427	50%	251,949	100,229	66%	84	154	126	139
3D	102,302	01 072	21 224	50%	102,994	80,692	/9%	223,390	121,295	119%	47	/3	84	102
3E ar	53,648	4,972	21 167	76%	55 405	48,143	90% 100%	95 838	112,092	209%	27	42	50	82
31	21,101	79 670	32 992	70%	86 861	27,098	100%	59 545	12 047	240%	23	40 50	45 E4	78
20	40,070	122,413	71.619	141%	142,188	40,103	00% 180%	78,725	12,007	20% 55%	30 26	52	30 73	39
311	11 405	27,050	15,644	137%	34,240	22 835	200%	17,507	6 101	53%	20 15	36	46	23
3.1	642	0	-642	-100%	0	-642	-100%	385	-257	-40%	13	0	40 0	1
3K	828	1,878	1,051	127%	1,878	1,051	127%	1,236	409	49%	2	5	5	3
3L	828	1,878	1,051	127%	1,878	1,051	127%	1,236	409	49%	2	5	5	3
4A	1,172	2,881	1,709	146%	1,514	342	29%	1,837	665	57%	17	42	22	27
4B	30,574	41,905	11,331	37%	56,009	25,436	83%	83,737	53,163	174%	32	44	58	87
4C	79,242	119,206	39,964	50%	155,000	75,757	96%	206,025	126,783	160%	35	52	68	90
4D	132,058	235,236	103,178	78%	214,600	82,543	63%	256,235	124,177	94%	59	105	96	114
4E	77,640	146,700	69,061	89%	146,700	69,061	89%	185,075	107,435	138%	40	76	76	95
4F	63,992	114,173	50,181	/8%	114,173	50,181	78%	164,664	100,672	157%	35	63	63	91
4G	29,917	55,433	25,516	85% 1740/	55,433	25,516	85%	39,868	9,951	33%	16	30	30	21
4H	25,020	30 562	43,373	17470	00,393 30 562	43,575	1/4%	42,014	16,994	68% 70%	23	64	64	39
41	29.051	61 343	33 292	119%	61 343	19,800	184%	41 034	1,122	12%	17	49	49	30 41
4J 4K	20,031	53,911	32,929	157%	53.911	33,272	117%	33.825	12,904	40% 61%	20 15	40	40	25
4L	5.582	13,544	7,962	143%	13,544	7.962	143%	8,687	3 105	56%	יים ר	12	+0 12	23
4M	2,170	4,526	2,356	109%	4,526	2.356	109%	3,089	919	42%	2	.2	.2	3
5B	16,264	41,019	24,754	152%	28,642	12,377	76%	25,919	9,654	59%	41	104	73	66
5C	45,042	113,361	68,320	152%	113,361	68,320	152%	71,686	26,645	59%	28	70	70	44
5D	5,656	15,718	10,062	178%	18,193	12,537	222%	9,580	3,924	69%	8	22	26	13
5E	7,813	18,926	11,113	142%	28,828	21,015	269%	12,136	4,323	55%	7	18	27	11
5F	40,194	85,779	45,584	113%	85,779	45,584	113%	135,492	95,297	237%	21	45	45	71
5G	67,124	134,509	67,385	100%	134,509	67,385	100%	180,278	113,153	169%	30	59	59	79
5H	53,078	154,212	101,134	191%	154,212	101,134	191%	158,124	105,046	198%	25	73	73	75
51	3,260	8,314	5,055	155%	19,597	16,338	501%	5,226	1,966	60%	2	6	15	4
5J	20,567	15 224	45,132	219%	31,850	11,283	55%	38,168	17,601	86%	20	64	31	37
5K	6,613	10,220	0,013	130% 50%	10,220	8,613	130%	9,903 2,220	3,351	51%	9	20	20	13
SL EM	1,8/3	2,015	500	49%	2,010	942	50%	1 220	366	20%	2	3	3	2
6B	1,031	63.099	22 523	56%	63.099	509 22 522	47% 54%	49.337	0 760	19%	2	3	3 55	2
6C	40,370 54 524	100.947	46.413	85%	77.740	22,023	30% //2%	72.588	18.055	22%	30 12	55	00 61	43
6D	1 202	3.675	2.282	164%	15.278	13 884	43% 907%	2.280	888	64%	43 2		22	37
6E	569	1,208	639	112%	13,664	13.095	2303%	817	249	44%	1	2	25	1
6F	47,051	81,351	34,300	73%	81,351	34,300	73%	125,537	78,486	167%	30	52	52	80

			Scenario #1		Scenario #2				Scenario #3	2001	Scen#1	Scen#2	Scen#3	
mosaic		2056	2056	2056	2056	2056	2056 %	2056	2056	2056	density	density	density	density
cell	2001 pop.	population	pop.growth	% growth	population	pop.growth	growth	population	pop.growth	% growth	[pers/he]	[pers/he]	[pers/he]	[pers/he]
6H	23,341	68,409	45,068	193%	68,409	45,068	193%	92,278	68,936	295%	17	49	49	67
61	13,380	36,472	23,092	173%	36,472	23,092	173%	22,363	8,983	67%	10	26	26	16
6J	10,647	33,286	22,639	213%	44,569	33,922	319%	19,454	8,806	83%	7	22	30	13
6K	3,230	5,299	2,069	64%	5,299	2,069	64%	4,035	805	25%	6	9	9	7
6L	1,633	2,527	894	55%	1,633	0	0%	1,633	0	0%	1	1	1	1
6M	327	505	179	55%	327	0	0%	327	0	0%	1	1	1	1
7C	3,430	5,370	1,940	57%	6,868	3,438	100%	4,184	755	22%	31	48	61	37
7D	18,290	38,173	19,883	109%	45,086	26,796	147%	26,024	7,734	42%	28	58	68	39
7E	758	1,611	853	112%	758	0	0%	758	0	0%	0	1	0	0
7F	4,927	12,098	7,172	146%	8,513	3,586	73%	7,717	2,790	57%	28	68	48	44
7G	11,620	31,164	19,544	168%	34,750	23,130	199%	19,223	7,603	65%	12	32	36	20
7H	5,164	10,667	5,504	107%	10,667	5,504	107%	7,305	2,141	41%	8	17	17	11
71	13,663	34,708	21,045	154%	34,708	21,045	154%	21,849	8,186	60%	10	26	26	17
7J	40,542	91,618	51,076	126%	102,901	62,359	154%	60,410	19,868	49%	26	59	67	39
7K	5,592	10,585	4,993	89%	10,585	4,993	89%	7,534	1,942	35%	6	11	11	8
7L	2,909	3,418	509	17%	4,312	1,403	48%	3,107	198	7%	9	11	14	10
7M	323	364	41	13%	543	220	68%	339	16	5%	2	2	3	2
8C	662	1,328	665	100%	1,328	665	100%	921	259	39%	3	5	5	4
8D	5,107	9,634	4,527	89%	6,239	1,132	22%	6,868	1,761	34%	20	38	25	27
8G	30,295	77,155	46,860	155%	65,440	35,145	116%	48,524	18,228	60%	17	42	36	27
8H	25,369	52,846	27,477	108%	67,666	42,297	167%	36,058	10,689	42%	11	23	30	16
81	3,832	7,559	3,727	97%	7,559	3,727	97%	5,282	1,450	38%	3	5	5	4
8J	5,356	4,010	-1,346	-25%	4,010	-1,346	-25%	4,818	-539	-10%	6	5	5	6
8K	1,887	2,587	/00	37%	1,887	0	0%	1,887	0	0%	1	1	1	1
8L	9,682	21,255	11,573	120%	22,654	12,972	134%	14,184	4,502	46%	19	42	45	28
8M	2,886	6,339	3,453	120%	6,456	3,570	124%	4,230	1,343	47%	14	31	31	21
9C	2,863	3,352	488	17%	2,985	122	4%	3,053	190	7%	24	28	25	25
9D	13,285	19,484	6,199	47%	14,835	1,550	12%	15,697	2,411	18%	29	42	32	34
9H	9,453	21,872	12,420	131%	18,767	9,315	99%	14,284	4,831	51%	19	44	38	29
91	2,050	3,973	1,923	94%	3,973	1,923	94%	2,198	748	36%	5	9	9	6
9J	1,123	1 202	-1,123	-100%	0	-1,123	-100%	6/4	-449	-40%	12	0	0	7
9K	944	1,293	350	37%	944	0	0%	944	0	0%	1	1	1	1
9L	944	1,293	350	3/%	944	0	0%	944	0	0%	1	1	1	1
9M	315	431	117	37%	315	0	0%	315	0	0%	1	2	1	1
Deuton	2 057	6 225	2 270	11/10/	6 325	2 2 7 0	1140/	6 225	2 270	11.40/				
Bowen I.	2,957	0,335	3,378	114%	0,335	3,378	114%	0,335	3,378	114%				
LIONS B.	3,514	8,424	4,910	140%	8,424	4,910	140%	8,424	4,910	140%				

and part of Electoral area A.