

# Metro Vancouver Growth Projections Methodology Report

June 2021



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# 1.0 INTRODUCTION

## 1.1. Background

Providing long range population, dwelling unit and employment projections is a core service for Metro Vancouver's Regional Planning Division, and these long range projections support planning throughout the region. They are provided to TransLink and Metro Vancouver utilities to support capital infrastructure planning and to member jurisdictions and other regional stakeholders to support transportation, housing, and community planning. They are also a core part of supporting work towards achieving strategies and policies in the regional growth strategy.

Projection modeling is intended to promote collaboration and consistency among provincial, regional, and municipal planning agencies and establish a common basis of information, assumptions, and growth and policy implementation methods. Metro Vancouver prepares projections applicable to the following work to ensure an appropriate integration among critical regional infrastructure planning and implementation:

- Supporting regional water service and liquid waste utilities demand planning
- Assisting TransLink's transportation demand modelling
- A reference for local Official Community Plans (OCP)
- Fundamental inputs to Metro Vancouver's regional land-use model

Given the potential resource demand, Metro Vancouver attempts to combine available staff knowledge and resources from regional and municipal agencies with commissioned studies to provide reasonable assumptions and estimates of future growth. All projections are established in four steps:

1. Prepare a draft of municipal population, dwelling unit, and employment projections
2. Engage with member jurisdictions on proposed draft projections
3. Calibrate and reconcile municipal projections to develop finalized estimates
4. Aggregate of agreed local projections to sub-regional and regional levels

All projections are explicitly or implicitly scenario-based. This document provides an overview of the methods and assumptions applied in long-range projections of a medium-growth scenario, which is the baseline scenario. This baseline scenario generally assumes that the existing regional growth policy framework remains in place and that a variety of external factors potentially affecting the region (i.e., the global and national economies) will remain consistent and stable on average over the long term, using 2016 as the benchmark. Based on this established medium-growth scenario, a +/-15% growth range<sup>1</sup> is incorporated regarding factors influencing regional growth.

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<sup>1</sup> For a given year, +15% and -15% of the total growth accumulated since 2016 is applied to calculate projection ranges (named high-growth and low-growth scenarios, respectively).

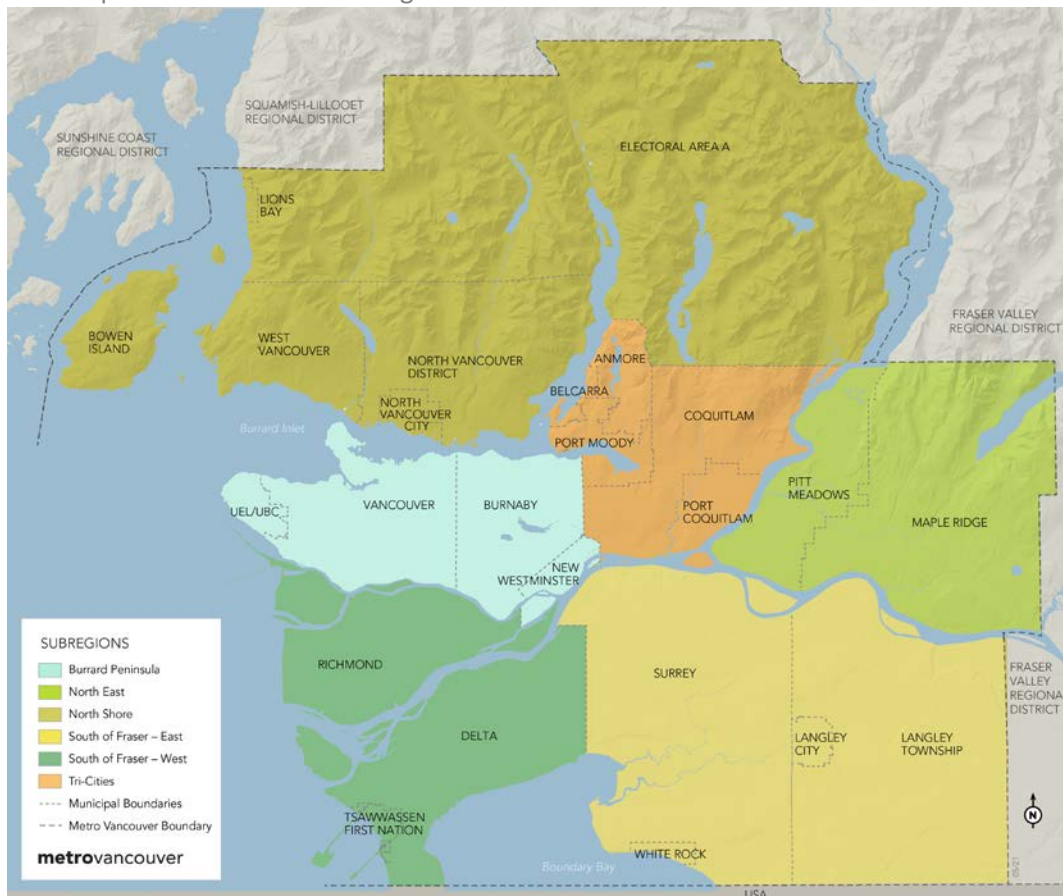
## 1.2. Geographical Coverage

*Metro 2040* reported projections by member jurisdiction<sup>2</sup>. Each municipal projection includes the totals for any First Nation communities located geographically within or directly adjacent to the respective municipal boundary. The 2016 Census indicated approximately 6,500 people were living in Indian Reserves (IRs) in the region of Metro Vancouver.

*Metro 2050* separates IRs from municipalities so that they can be treated independently. Because IRs' population size is relatively small and there are no demographic components of sufficient quality at that level, the approach to forecasting IRs' future growth differs from those of municipalities'. Projection models assume a linear growth by extrapolating historical growth trends over past Census periods for IRs.

**FIGURE 1** represents six sub-regions within Metro Vancouver, corresponding to **TABLE 4** in Appendix B. Regional or sub-regional projections in *Metro 2050* are an aggregate of municipal and IRs' projections based on Census subdivisions (CSDs)<sup>3</sup>. Projection methodologies described hereafter do not apply to IRs.

**FIGURE 1** A Map of Metro Vancouver Region



<sup>22</sup> [Metro Vancouver](#) is a partnership of 21 municipalities, one Electoral Area and one Treaty First Nation, see **TABLE 4**. Metro Vancouver projections include Bowen Island (**TABLE 4** and **FIGURE 4**)

<sup>3</sup> A reference [map](#) for Vancouver Census Metropolitan Area (CMA) developed by Statistics Canada (Year of 2016).

## 2.0 METHODS AND ASSUMPTIONS

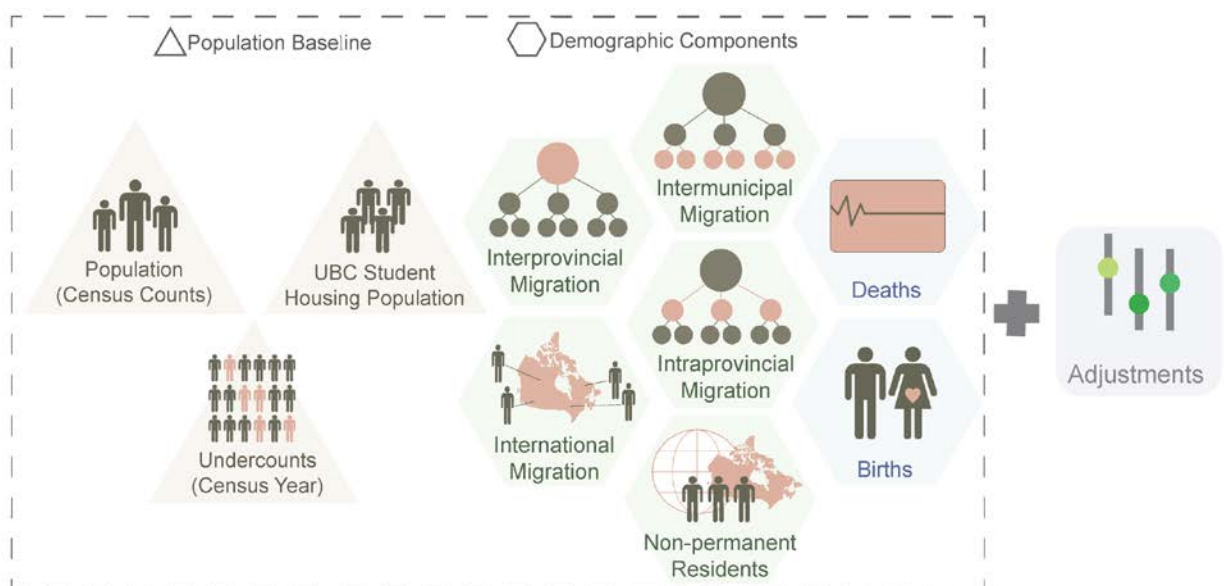
### 2.1. Population Projections

Population projections provide a foundation for projecting dwelling unit and employment projections. Metro Vancouver’s population projections are based on:

- Census data and annual population change estimates developed by Statistics Canada (StatCan)
- Estimates of national (StatCan), provincial (BC Stats) and municipal (if applicable) future growth
- Land capacity analysis and local development plans and policies
- Assumptions of indicators that may evolve in the future

A primary methodological tool in Metro Vancouver’s population projections is a Hybrid Cohort Projection Model that combines a standard age-cohort model with adjustments that account for municipal land capacity and policy framework, see **FIGURE 2**.

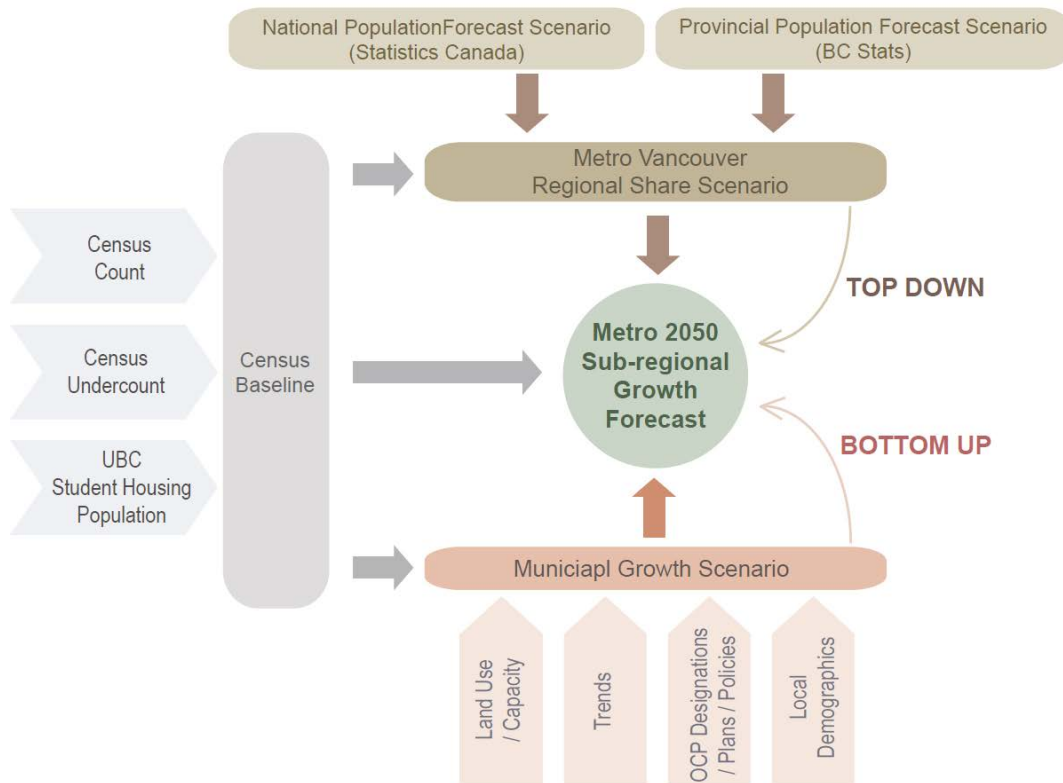
**FIGURE 2** An Age-Cohort Model and Population Growth Adjustments



Metro Vancouver staff apply a hybrid model combining both top-down and bottom-up approaches (**FIGURE 3**). The model itself is regional and uses trend projections for births, deaths, immigration, and migration between provinces and within the province. The top-down approach is based on the age-cohort model and produces draft projections as a base for consultation with member jurisdictions. Those draft projections have been vetted by municipal staff who provide municipal land capacity and local policy frameworks expertise that is incorporated into the model through refinements and adjustments.

The following subsections explain the approach in detail. The age-cohort model establishes population by gender and single year of age for a given base year. Then for every subsequent year, the population for that single year of age is predicted by estimating the change in natural increase and migration trends. Demographic components of population growth are expected to generally follow historical trends over the projection period. This approach is applied to individual municipal area except for IRs (see **TABLE 4** in Appendix B).

**FIGURE 3** An Illustration of Top-Down and Bottom-Up Approaches



## 2.1.1. Age-cohort Modeling Methods

### 2.1.1.1. Estimates of Population Baseline

The initial population or base population is the population at the beginning of a period used as a starting point for the estimation process. It is estimated from the Census counts in 2016, adjusted for undercount estimates<sup>4</sup> and on-campus student housing population, which is not generally captured in Census program. Census counts in 2016 are adjusted to include a 4.6% undercount rate estimated by StatCan for the region of Metro Vancouver and roughly 11,000 UBC (the University of British Columbia) on-campus students, resulting in a total of 2.59 million people in 2016.

<sup>4</sup> Undercounts refer to Census net undercoverage (CNU), a difference between undercoverage and overcoverage.



### 2.1.1.2. *Natural Increase*

Projecting natural increase involves estimating the difference between the number of births and deaths by age and gender within the population. Births are estimated by age-specific fertility rates in each member jurisdiction. Metro Vancouver acquired a custom tabulation of historical age-specific fertility rates from BC Stats. The fertility rates data are disaggregated by Local Health Areas (LHAs) and age from 15 to 49 years old. Deaths are estimated by an annual estimate of death probability between two ages (in single years) The death probability is characterized by age and gender at a provincial level and derived from life tables published by StatCan. Future patterns in births and deaths specified by age and gender are derived by following vital statistics and assumptions.

- A custom tabulation of fertility rates developed by [BC Stats](#)
- Survivorship rates released by [StatCan](#)
- Variations in fertility and mortality rates according to a moderation of their historic annual changes

The fertility rate in the past 5 years declined in Metro Vancouver, especially for females under the age of 35. The survivorship rate of the elderly is assumed to gradually increase, whereas that of the rest of the population cohorts will remain relatively stable. With the overall aging of the population and a growing share of the population in the older age cohorts, the number of deaths in Metro Vancouver is expected to increase more rapidly than the number of births. Thus, the natural increase will continue to decrease and reach 0 in the early 2030s; deaths will continue to exceed births thereafter.

### 2.1.1.3. *Migration*

As shown in **FIGURE 2**, migration consists of 5 components: international migration (immigration), interprovincial migration, intra-provincial migration, inter-municipal migration, and flows of non-permanent residents (NPRs). Future migration trends are predicted by a net value reflecting in and outflows of migration. Trend data on migration flows for Metro Vancouver and its member jurisdictions are derived from a custom acquisition of Census mobility data (current Census residence and place of residence 5 years ago). This data is cross-referenced by gender, age, and municipality to produce a trend profile of migrants and municipal distribution patterns.

#### *International migration*

International migration represents population movement (a change in the usual place of residence) between Canada and a foreign country. It comprises immigrants, returning emigrants, and emigrants leaving the region to settle in other countries<sup>5</sup>. Net international migration or net immigration is the primary factor in projecting Metro Vancouver's population growth. Over the past 10 years (from 2009 to 2018), about 81% of BC's immigrants lived in the Metro Vancouver region (while Metro Vancouver comprises approximately 53% of the provinces population), which is 11% of Canada's total immigrant population. The following datasets and assumptions are applied to project future net international migration.

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<sup>5</sup> Net temporary emigration is not considered in Metro Vancouver's population projection model. Net non-permanent residents (NPRs) is discussed in another section.

- A custom tabulation of mobility status on the place of resident developed by StatCan
- Annual estimates of net international migration published by StatCan
- Assumptions of an annual growth rate of annual net international migration
- A gradual shift toward a more balanced distribution of immigrant settlement in relation to overall population growth capacity in each member jurisdiction
- Historical distribution of net international migration by gender and age group
- 2021-2023 Immigration Levels Plan released by Canada’s Ministry of Immigration, Refugees and Citizenship (IRCC)

The number of regional net immigrants is estimated annually by StatCan. In the short term, it is adjusted due to an update of the Federal’s Immigration Levels Plan, which considers the impacts of COVID-19 on permanent resident admissions. The number of immigrants coming to the Metro Vancouver region will increase by 6,000 every year from 2021 to 2023. Over the longer term, it is assumed to steadily increase at an annual growth rate. As a result, Metro Vancouver expects to gain 30,000 to 40,000 net immigrants per year through the projection period (ending 2050), accounting for almost 70% of regional population growth. Municipal allocation trends generally follow historical distribution of immigrant settlements observed within a 10-year term, resulting in 26% and 23% of regional immigrants settling in the City of Vancouver and the City of Surrey, respectively. It is assumed that immigrants' and emigrants' gender and age structure will stay relatively constant over time.

### *Interprovincial migration*

Interprovincial migration represents movement between Canadian provinces or territories. Interprovincial migration in Metro Vancouver refers to the movement by people from the region to another province or territory in Canada. Trends in the inter-provincial migration rates primarily relate to the comparative strength of the regional economy, employment opportunities, and lifestyle in Metro Vancouver versus other areas in Canada. Net interprovincial migration is measured by the following estimates and assumptions:

- National population projection developed by StatCan
- A custom tabulation of mobility status on the place of resident developed by StatCan
- Annual estimates of interprovincial in- and out-migration published by StatCan
- A relative consistent share of the national population moving from other provinces to the Metro Vancouver region
- A constant proportion of population leaving the Metro Vancouver region to other provinces or territories in Canada

In the next 30 years, the overall regional annual net interprovincial migration is expected to remain relatively minor in overall regional growth projections, generally averaging a net gain ranging from 2,000 to 4,000. It is expected to increase to a level of 4,000, which comprises of an inflow of 29,000 and an outflow of 25,000 by 2050. Historic interprovincial flow distributions by the municipality, age, and gender will remain relatively consistent. The City of Vancouver is projected to accommodate the region’s largest

share of regional interprovincial migrants (29%), followed by the City of Burnaby with a share of 13%, and the City of Surrey with a share of 12%.

### *Intraprovincial migration*

Intraprovincial migration or sub-provincial migration of Metro Vancouver involves movements between the region and the rest of British Columbia. It represents movements occurring within the same province. Historical patterns in intraprovincial migration are carried forward to estimate future trends. The annual intraprovincial migration outflow is expected to exceed that of inflow. Net intraprovincial migration is estimated by the following estimates and assumptions:

- Provincial population projection estimated by BC Stats
- A custom tabulation of mobility status on the place of resident developed by StatCan
- Annual estimates of intra-provincial in and out-migration published by StatCan
- A relative consistent share of BC provincial population moving from other regions in BC to the region of Metro Vancouver
- A constant proportion of regional population leaving from the region to another area in BC

Metro Vancouver will anticipate a net loss of an average of 9,900 people per year only because of intra-provincial movement activities. The intra-provincial flow dynamics vary among municipalities. The City of Surrey will have the highest share of the regional net flow (26%) over the projection period, followed by Langley Township (12%) and the City of Vancouver (11%).

### *Inter-municipal migration*

Inter-municipal migration represents regional residents moving among municipalities within the region of Metro Vancouver. In theory, the sum of net inter--municipal migration over all municipalities should be zero. Historic inter-municipal migration trends showed that Metro Vancouver's region involved 394,000 movements (between different municipalities) between 2006 and 2016. Trends in the inter-municipal migration rates typically relate to the particular lifestyle preference and choices for residents and the relative housing, employment, and amenity options and opportunities in each municipality. The projections of net inter-municipal migration are based on the following assumptions:

- A custom tabulation of mobility status on the place of resident published by StatCan
- A relative consistent share of Metro Vancouver residents will be moving among municipalities in the region in any given year
- A constant mover rate of inter-municipal inflow or outflow by municipality, gender, and age

A constant share of Metro Vancouver's residents is assumed to move within the region in any given year. This share is estimated by a ratio of inter-municipal movements to the total regional population in 2016. Future inter-municipal migration generally aligns with historical patterns. The City of Vancouver will experience 29% of the total outflow of regional inter-municipal migration among all municipalities, followed by the City of Burnaby at 13%, and the City of Richmond at 7%. On the contrary, the following three municipalities can anticipate a higher municipal share of regional inter-municipal inflow than the

rest of the region's municipalities: 12% of regional inter-municipal inflow migrants will move to the City of Surrey, 11% to Langley Township, and 9% to Maple Ridge.

### *Non-permanent residents (NPRs)*

A non-permanent resident or temporary resident is a foreign national legally authorized to enter Canada for temporary purposes, such as international students and temporary workers. NPRs in the region are projected to decrease from 6,500 in 2020 to 1,400 by 2050. Annual NPRs are modeled according to the following assumptions:

- Census NPRs estimates and annual estimates of net NPRs released by StatCan
- A scaling factor to develop a declining trend of regional net NPRs per year based on the assumption that temporary residents are very likely to transition into formal applications for permanent residency and become an immigrant in the future
- A constant share of regional NPRs by the municipality, gender, and age

## **2.1.2. Adjustments of Population Growth**

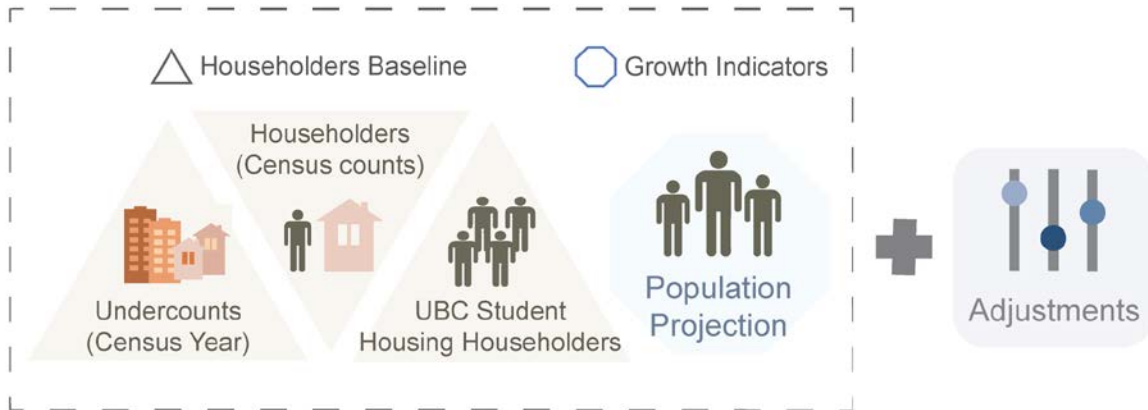
An adjustment of annual population growth is introduced to modify population projections due to the following two reasons. First, demographic projection methods do not consider the factors such as land capacity or high-level goals. Secondly, the adjustments should address the data gaps between Census counts and ground-proof data on population, employment, and housing in municipalities. During the consultation process with Tsawwassen First Nation (TFN) and UBC, it was determined that their population is higher than the enumerated number in the 2016 Census. Therefore, official Census data needed to be revisited with the data provided by member jurisdictions.

## **2.1. Dwelling Unit Projections**

Dwelling unit projections represent an estimate of dwelling units occupied by private households (PHHs). Vacant homes, collective dwellings, etc. are excluded from projections. Householders, or primary household maintainers, are the individuals identified in the Census as the primary person in a household. Each householder equals one household. The model assumes one householder equals to one dwelling unit, noting that a building (including a single detached house) can include multiple dwelling units. Metro Vancouver has explored the relationship between population and householders for each modeling area. Similar to population projection, dwelling units are estimated based on a bottom-up approach. Municipal projections are developed based on a householder rate model and an adjustment of units growth considering factors such as land capacity (see **FIGURE 4**).

The average household size, the typical number of persons occupying a dwelling unit, is one of the projection models' outputs. Average household size at regional, sub-regional, or municipal levels is estimated by dividing the projected population living in PHHs by the projected dwelling units in that defined area. The 2016 Census provides an estimate of the regional average household size of 2.53 without considering undercounts, or 2.55 including Census undercounts.

**FIGURE 4** A Householder Rate Model and Dwelling Unit Growth Adjustments



### 2.1.1. Householder Rate Modeling Methods

#### 2.1.1.1. Estimates of Dwelling Unit Baseline

Dwelling unit projections utilize projected population and a householder rate characterized by the municipality, age group, gender, and dwelling structure type (see Appendix B). For each population cohort specified by age group, municipality, and gender, the model assumes a constant population share of the total population to estimate the population in collective dwellings for that population cohort. Once the collective population is determined, the population in private dwelling units is estimated by subtracting the collective population from the total population. The 2016 Census indicates about 1.5% of the total regional population living in collective dwellings. Additionally, householders’ counts in 2016 are adjusted, including a 3.23% undercount rate estimated by StatCan and about 7,700 on-campus UBC student housing that is not generally captured in the Census program. The adjusted number of regional householders is estimated at nearly 1 million, indicating 39% of regional residents are identified as householders.

#### 2.1.1.2. Householder Rates

Total future occupancy demand, which reflects dynamic changes of household formation and demography, is determined by a householder rate model. The demographic characteristics of the householders (i.e., age, gender) associated with the dwelling structure type (i.e., single-detached house, townhouse, apartment, etc.), household type (i.e., single person, couple, family, etc.), and tenure characteristics. Metro Vancouver develops dwelling unit projection distinguished by age, gender, and dwelling structure type.

Future dwelling unit growth is a multiplication of projected population by householder rates. The householder rate, applied in dwelling unit projection, is specified by age cohort and gender to account for shifting demographics, and by the municipality to account for locational differences and preferences. Instead of applying a constant householder rate estimated in the 2016 Census through the projection period, Metro Vancouver modifies the rates to reflect factors such as housing affordability and personal preference for future living. This modification is based on extrapolation from historical trends in householders’ change by municipality and dwelling structure type from 2001 to 2016.

Results show that housing development throughout the region is distinctly trending toward increasingly dense multi-unit forms, with apartments comprising about 50% of new unit growth from 2016 to 2050. Correspondingly, regional average household size is estimated to decline slightly.

### 2.1.2. Adjustments of Dwelling Unit Growth

The dwelling unit projection model includes an annual adjustment of units’ growth. The municipal growth was adjusted to reflect potential growth by dwelling structure types and local land use plans.

## 2.2. Employment Projections

Metro Vancouver prepares employment growth by industry sector at municipal, sub-regional, and regional levels. Metro Vancouver assumes a steady growth in employment at a regional level and develops an allocation method to estimate municipal employment growth. The draft results of municipal projections are adjusted after discussing with member jurisdiction staff and iterated with consideration for existing local plans, policies and studies. After endorsement of municipal projection by municipal counterparts, municipal projections are aggregated to the sub-regional level. **FIGURE 5** illustrates components or indicators of future employment growth. Metro Vancouver establishes a base model by estimating a baseline of employment in the region and future growth by using projected population and land use information. The following sections present a detailed description of the employment estimation methodology.

**FIGURE 5** A Labour Force Model and Employment Growth Adjustments



### 2.2.1. Labour Force Modeling Methods

#### 2.2.1.1. Estimates of Employment Baseline

Metro Vancouver establishes a Census baseline for the labour force. The employed labour force was allocated by industry sector. Three components are considered to establish the baseline for the number of jobs by the municipality and industry sectors in 2016:

- Number of jobs with a usual workplace and home-based jobs reported in Census Place of Work Status (POW) tables
- Estimates of jobs with no-fixed workplace (NF) reported in Census Place of Residence (POR) tables
- An undercount rate of 4.6% to be consistent and comparable with population undercounts

The Census allocates jobs with no-fixed workplace address to the city where the worker resides rather than the city of the work activity. For example, a no-fixed job of a truck driver living in the City of Burnaby and working in the City of Vancouver would be allocated to the City of Burnaby's no-fixed jobs. Municipal NF jobs by industry sector are estimated by a regional allocation method. The municipal share of regional NF jobs depends on POW jobs in that municipality and its population size.

#### *2.2.1.2. Regional and Municipal Employment Projections*

Projecting future employment growth is inter-related between the type and level of economic activity in the region, trends in employment demand, and the regional population labour force. To estimate future employment growth, Metro Vancouver has assessed land use and analyzed relationships between population and labour force. The employment projections are strongly associated with regional population growth projections and the following assumptions of sectoral employment trends:

- A marginal decrease in the overall regional employment-to-population ratio, with the component employment sectors generally shifting toward increases in service industries and modest changes in the share of employment within the individual sectors
- Economic growth and sectoral composition will be consistent with the current status and relatively stable in future years, with some trending projected among the component industry sector shares of employment activity

The estimated regional employment growth is distributed to municipal levels by industry sector. The municipal share of the regional total is based on the following factors:

- Projected municipal population growth
- Municipal employment characteristics by industry sector
- The likelihood that future employment will be location-dependent (e.g. ports, agriculture, education institutions) or population-serving (e.g. retail, food services)
- An assessment of available industrial and employment land for all municipalities to estimate location-based job growth such as employment in manufacturing and wholesale sectors

### **2.2.2. Adjustments of Employment Growth**

The municipal annual estimates determined by the above methods are adjusted according to the feedback received from the municipal staff, resulting in a change in the estimates of regional total employment.

### **3.0 CONCLUSIONS**

Metro Vancouver prepares regional long-range projections of population, dwelling unit, and employment for the next 30 years. Future growth is modeled according to historical growth trends and adjustment factors to reflect future municipal development plans and/or ongoing policies and long-range strategies. Metro Vancouver expects to have 3.8 million people, 1.6 million dwelling units, and 1.9 million jobs (the baseline scenario of projections) in the year 2050.

COVID-19 pandemic has had impacts in the short-term on regional population growth, households' spending and preferences, as well as the labour force. National and provincial immigration levels have been significantly impacted by COVID-19. Moreover, evidence has shown that the economy is rebounding since the initial shock. Metro Vancouver assumes this pandemic situation is a one-time disruptor that will not have a strong or significant impact on projections in the long term.

Metro Vancouver's projections are updated regularly as new data sources become available and as the Census is undertaken. The projections are not static but rather evolve over time. The projections are critical to utility, transportation, housing, and other forms of long-range planning in the region. Metro Vancouver continues to work closely with member jurisdictions, other regional agencies, and key stakeholders to provide and share data to build accurate and consistent population, dwelling units, and employment projections.



# APPENDICES

## Appendix A – Results of Projections

This section presents disaggregated information of projection results or outputs<sup>6</sup>.

- a) Population is projected annually by age, and gender at regional, sub-regional, municipal, and CSDs levels (see details in **TABLE 4**). Therefore, one can estimate population in a customized age group.

**TABLE 1** Disaggregated Groups of Projected Population

| Population           |   |   |                       |
|----------------------|---|---|-----------------------|
| Disaggregation Group | Area  | Single Year of Age  | Gender                |
| Classifications      | Region,<br>sub-region,<br>municipality,<br>or<br>CSDs areas | Under 1 year,<br>1 year old,<br>2 years old,<br>...<br>108 years old,<br>109 years old,<br>110 years old and over | Male<br>and<br>Female |

\* Source: Metro Vancouver

- b) Dwelling unit estimates are disaggregated by gender, age group, and dwelling structure type (see details in **TABLE 5**) at regional, sub-regional, municipal, and CSDs levels (see details in **TABLE 4**).

**TABLE 2** Disaggregated Groups of Projected Dwelling Units

| Dwelling Units       |   |  |                       |   |
|----------------------|---|--|-----------------------|---|
| Disaggregation Group | Area  | Age Group  | Gender                | Dwelling Structure Type   |
| Classifications      | Region,<br>sub-region,<br>municipality,<br>or<br>CSDs areas | 15 to 19,<br>20 to 24,<br>...<br>55 to 59,<br>60 to 64,<br>65 years old and over | Male<br>and<br>Female | 2 types of groups<br>represented in <b>TABLE 5</b> ,<br>the first 2 columns |

\* Source: Metro Vancouver

- c) Employment projections are available by industry sector (see details in **TABLE 6**) at regional, sub-regional, municipal, and CSDs levels (see details in **TABLE 4**).

**TABLE 3** Disaggregated Groups of Projected Employment

| Employment           |   |  |
|----------------------|---|--|
| Disaggregation Group | Area  | Industry Sector  |
| Classifications      | Region, sub-region, municipality, or CSDs areas | 2 types of groups represented in <b>TABLE 6</b> ,<br>the first 2 columns |

\* Source: Metro Vancouver

<sup>6</sup> Projections broken down into disaggregated groups are not available for Electoral Area A, Tsawwassen First Nation and Indian Reserves.

## Appendix B – Categorization

TABLE 4 Geographical Areas of Metro Vancouver Region, Sub-regions, Municipalities, and CSDs

| Geographical Areas in Models |                         |                             |                            |                           |  |
|------------------------------|-------------------------|-----------------------------|----------------------------|---------------------------|--|
| Region                       | Sub-regions             | Municipalities              | Areas                      | CSD Name                  | CSD Type                               |
| Metro Vancouver              | Burrard Peninsula       | Electoral Area A (EAA)      | UBC                        | Greater Vancouver A       | Regional district Electoral Area (RDA) |
|                              |                         |                             | University Endowment Lands | Greater Vancouver A       | RDA                                    |
|                              |                         |                             |                            | Musqueam 2                | Indian Reserve (IR)                    |
|                              |                         | City of New Westminster     | New Westminster            | New Westminster           | City                                   |
|                              |                         | City of Burnaby             | Burnaby                    | Burnaby                   | City                                   |
|                              | City of Vancouver       | Vancouver City              | Vancouver                  | City                      |  |
|                              |                         |                             | Kitsilano 6                | IR                        |  |
|                              | North East              | City of Pitt Meadows        | Pitt Meadows               | Pitt Meadows              | City                                   |
|                              |                         |                             |                            | Katzie 1                  | IR                                     |
|                              |                         | City of Maple Ridge         | Maple Ridge                | Maple Ridge               | City                                   |
|                              | North Shore             | Village of Lions Bay        | Lions Bay                  | Lions Bay                 | Village                                |
|                              |                         |                             |                            | Bowen Island Municipality | Bowen Island                           |
|                              |                         | District of West Vancouver  | West Vancouver             | West Vancouver            | District Municipality (DM)             |
|                              |                         |                             |                            | Capilano 5                | IR                                     |
|                              |                         | District of North Vancouver | North Vancouver District   | North Vancouver           | DM                                     |
|                              |                         |                             |                            | Seymour Creek 2           | IR                                     |
|                              |                         |                             |                            | Burrard Inlet 3           | IR                                     |
|                              | City of North Vancouver | North Vancouver City        | North Vancouver            | City                      |  |
|                              | EAA                     | EAA Rural (North)           | Greater Vancouver A        | RDA                       |  |
|                              | South of Fraser – East  | City of White Rock          | White Rock                 | White Rock                | City                                   |
|                              |                         |                             |                            | City of Langley           | Langley City                           |
|                              |                         | Township of Langley         | Langley Township           | Langley                   | DM                                     |
|                              |                         |                             |                            | Katzie 2                  | IR                                     |
|                              |                         |                             |                            | Matsqui 4                 | IR                                     |
|                              |                         | City of Surrey              | Surrey                     | Surrey                    | City                                   |
|                              |                         |                             |                            | Semiahmoo                 | IR                                     |
|                              | EAA                     | Barnston Island             | Greater Vancouver A        | RDA                       |  |
|                              | South of Fraser – West  | Tsawwassen First Nation     | TFN                        | Tsawwassen                | IR                                     |
|                              |                         | City of Delta               | Delta                      | Delta DM                  | DM                                     |
|                              |                         |                             |                            | Musqueam 4                | IR                                     |
|                              | City of Richmond        | Richmond                    | Richmond                   | City                      |  |
|                              | Tri-Cities              | Village of Belcarra         | Belcarra                   | Belcarra                  | Village                                |
| Village of Anmore            |                         | Anmore                      | Anmore                     | Village                   |  |
| City of Port Moody           |                         | Port Moody                  | Port Moody                 | City                      |  |
| City of Port Coquitlam       |                         | Port Coquitlam              | Port Coquitlam             | City                      |  |
|                              |                         |                             | Coquitlam 1                | IR                        |  |
| City of Coquitlam            | Coquitlam               | Coquitlam                   | City                       |                           |  |

\* Source: Metro Vancouver, Statistics Canada

**TABLE 5** Classification of Dwelling Structure Type

| Dwelling Structure Type  |                          |  |  |
|--------------------------|--------------------------|--|--|
| Categories in Models (1) | Categories in Models (2) | Population in private households, Census <sup>7</sup>    | Primary household maintainers, Census                    |
| Ground-oriented housing  | Single-detached house    | Single-detached house                                    | Single-detached house                                    |
|                          |                          | Movable dwelling   | Mobile home<br>Other movable dwelling                    |
|                          | Multi-attached house     | Semi-detached house                                      | Semi-detached house                                      |
|                          |                          | Apartment or flat in a duplex                            | Apartment or flat in a duplex                            |
|                          |                          | Other single-attached house                              | Other single-attached house                              |
|                          | Row house                | Row house  | Row house  |
| Apartment                | Apartment                | Apartment in a building that has five or more storeys    | Apartment in a building that has five or more storeys    |
|                          |                          | Apartment in a building that has fewer than five storeys | Apartment in a building that has fewer than five storeys |

\* Source: Metro Vancouver, Statistics Canada

**TABLE 6** Classification of Industry Sector

| Industry Sector               |   |   |
|-------------------------------|---|---|
| Categories in Models (1)      | Categories in Models (2)                                  | North American Industry Classification System (NAICS) 2012, Census <sup>8</sup> |
| Primary                       | Primary   | 11 Agriculture, forestry, fishing and hunting                                   |
|                               |   | 21 Mining, quarrying, and oil and gas extraction                                |
| Industry                      | Transportation and warehousing                            | 48-49 Transportation and warehousing  |
|                               | Construction  | 23 Construction   |
|                               | Manufacturing   | 31-33 Manufacturing   |
|                               | Wholesale   | 41 Wholesale trade  |
| Commercial Service            | Retail  | 44-45 Retail trade  |
|                               | FIRE  | 52 Finance and insurance  |
|                               |   | 53 Real estate and rental and leasing   |
|                               | Mgmt Admin Other Services OR Business Commercial Services | 55 Management of companies and enterprises                                      |
|                               |   | 56 Administrative and support, waste management and remediation services        |
|                               |   | 81 Other services (except public administration)                                |
|                               | Information and Cultural Industries                       | 51 Information and cultural industries  |
|                               |   | 71 Arts, entertainment and recreation   |
| Professional Technical        | 54 Professional, scientific and technical services        |   |
| Accommodation Food            | 72 Accommodation and food services                        |   |
| Public Administration Service | Education   | 61 Educational services   |
|                               | Health and Welfare  | 62 Health care and social assistance  |
|                               | Public Admin  | 22 Utilities  |
| 91 Public administration      |   |   |

\* Source: Metro Vancouver, Statistics Canada

<sup>7</sup> Definitions of Census [dwelling structure type](#) developed by Statistics Canada

<sup>8</sup> [2-digit code of NAICS](#) developed by Statistics Canada

**TABLE 7** Classification of Occupation

| Occupation  |   |
|---|---|
| Categories in Models  | National Occupational Classification (NOC) 2016, Census <sup>9</sup>          |
| Management  | 0 Management occupations  |
| Business, finance and administration                        | 1 Business, finance and administration occupations                            |
| Natural and applied sciences and related                    | 2 Natural and applied sciences and related occupations                        |
| Health  | 3 Health occupations  |
| Social science, education, government services and religion | 4 Occupations in education, law and social, community and government services |
| Art, culture, recreation and sport                          | 5 Occupations in art, culture, recreation and sport                           |
| Sales and service   | 6 Sales and service occupations   |
| Trades, transport and equipment operators and related       | 7 Trades, transport and equipment operators and related occupations           |
| Natural resources, agriculture and related production       | 8 Natural resources, agriculture and related production occupations           |
| Manufacturing and utilities                                 | 9 Occupations in manufacturing and utilities                                  |

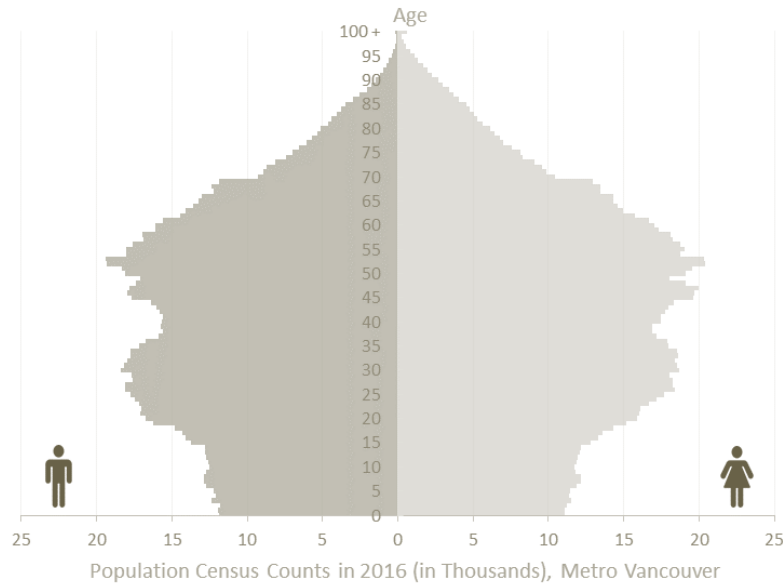
\* Source: Statistics Canada, Rennie & Associates Realty Ltd.

<sup>9</sup> [1-digit code of NOC](#) developed by Statistics Canada

## Appendix C – Facts from 2016 Census

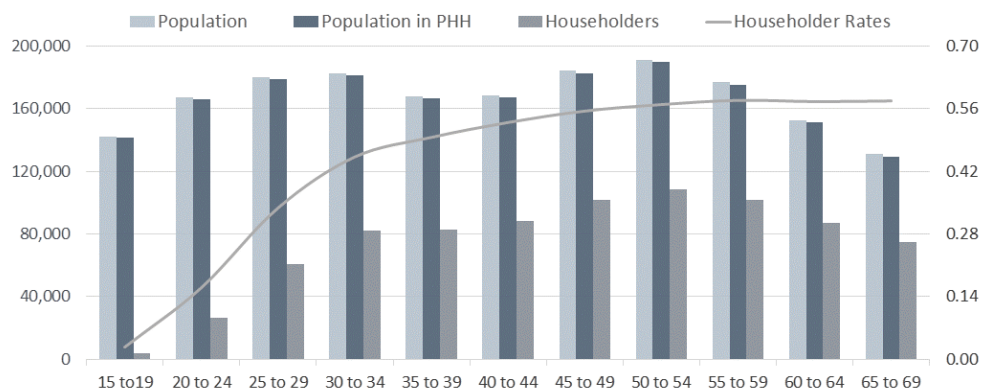
Metro Vancouver’s population was nearly 2.5 million (excluding undercount estimates or on-campus student housing population) in 2016. **FIGURE 6** represents the regional population disaggregated by age and gender extracted from 2016 Census counts (excluding undercount estimates or UBC on-campus student housing population). The share of children under 15 years and seniors aged 65 years and over were 14.7% and 15.7%, respectively. The regional sex ratio was 95 males to 100 females.

**FIGURE 6** Metro Vancouver's Population Counts by Age and Gender, 2016 Census



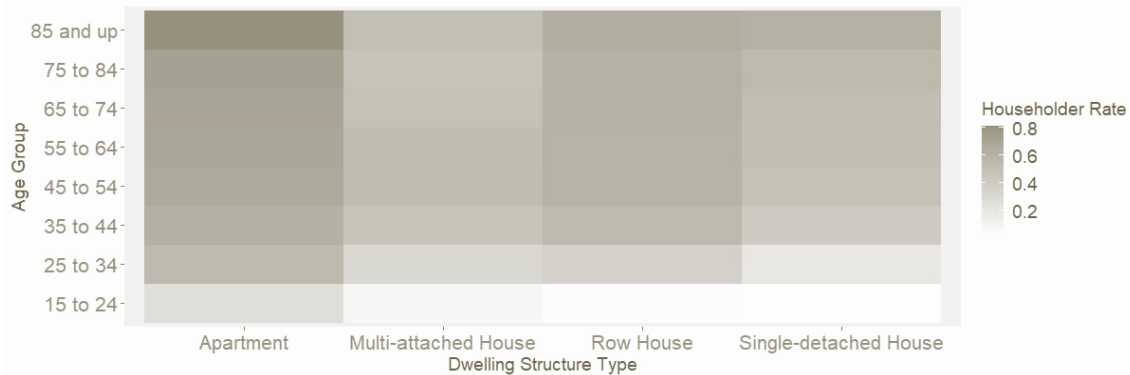
2016 Census reported 961,000 primary household maintainers living in occupied private dwellings for Metro Vancouver (without undercounts or UBC student housings estimates). Metro Vancouver collected Census housing data and explored household composition by age group and structure type. As of 2016, approximately 98% of regional residents lived in occupied private dwellings, representing an overall householder rate of 0.4 or an average household size of 2.53. Homeownership is strongly related to age and dwelling structure type.

**FIGURE 7** Metro Vancouver's Population, Population Living in Private Dwellings, and Primary Household Maintainers by Age Groups, 2016 Census



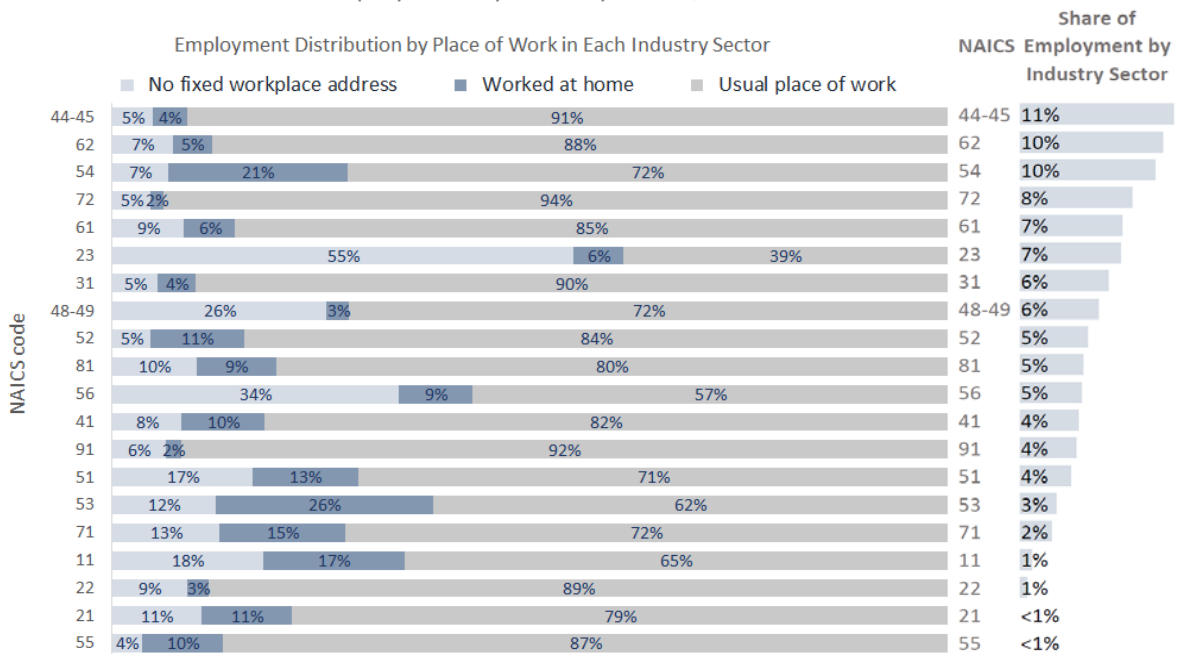
According to **FIGURE 7**, householder rates increased from the age group of 15 to 19 until stabilizing around the early-40s. The age cohort of 50 to 54 accounted for the largest share in terms of population size or number of population in private households (PHH). Although this cohort consumed the most housing units across the region, the 55 to 59 age cohort had the highest householder rate among age groups. **FIGURE 8** illustrates householder rates differentiated by age group and dwelling structure type at a regional level. Persons aged 45 to 54 had the highest householder rates for a multi-attachment house, whereas the householder rates of people aged 85 and up were highest for the other dwelling 3 structure types. Householder rates of apartments were higher than those of other dwelling structure types.

**FIGURE 8** Metro Vancouver's Estimated Householder Rates by Age Group and Dwelling Structure Type, 2016 Census



There was a regional total of 1.28 million jobs estimated in 2016 (without undercount estimates). Of those jobs, 1,007,000 were in a fixed location, 105,000 worked at home, and 169,000 had no fixed location (estimates rounded). The employment-to-population ratio was 0.52. **FIGURE 9** summarizes regional jobs by industry sector (see **TABLE 6**).

**FIGURE 9** Metro Vancouver's Employment by Industry Sector, 2016 Census



## Appendix D – Glossary<sup>10</sup>

### Population

- Age

Age as of July 1.

- Average Age

The average age of a population is the average age of all its members.

- Baby Boomers

People born between 1946 and 1965. A period following World War II, marked by an important increase in fertility rates and in the absolute number of births.

- Base Population

The beginning population upon which population projections are based on. Base populations are generally taken from the last full Census year population.

- Census Net Undercoverage (CNU)

Difference between undercoverage and overcoverage.

- Census Overcoverage

Number of persons or families who were counted more than once in the Census.

- Census Undercoverage

Number of persons or families who were intended to have been enumerated in a Census but were not enumerated.

- Census Year

The Census Program provides a statistical portrait of the country every five years such as the year 2016, 2011, etc.

- Immigrant

An immigrant, also known as landed immigrant or permanent resident, refers to a person who is or has ever been a landed immigrant and who has been granted the right to live in Canada permanently by immigration authorities. Emigrants references to a Canadian citizen or immigrant who has left Canada to establish a residence in another country, involving a change in usual place of residence. Emigration may be either temporary or permanent.

- Intermunicipal Migration

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<sup>10</sup> An alphabetical list grouped by topics of population, dwelling units, and employment.

Net intermunicipal migration refers to the difference between in-migrants and out-migrants in a given municipality which can be defined as a Census subdivision. It equals 0 at the regional level.

- Labour Force

The population between the ages of 15 to 64.

- Natural Increase

Natural increase is the variation in the population size over a given period as a result of the difference between the numbers of births and deaths.

- Net International Migration

Net international migration basically refers to the total number of moves between Canada and abroad that result in a change in the usual place of residence. It is calculated by adding immigrants and returning emigrants, then subtracting emigrants and net temporary emigration.

- Net Interprovincial Migration

Net interprovincial migration represents the difference between in-migrant and out-migrants for a given province or territory involving a change in the usual place of residence. It equals 0 at the national level.

- Net Intraprovincial Migration

Net intraprovincial migration represents the difference between in-migrants and out-migrants in a given region. A region can be defined as a Census agglomeration or a Census metropolitan area. It equals 0 at the provincial level.

- Net Migration

Net migration is the difference between in-migration and out-migration, comprising variations in international, interprovincial, intraprovincial, intermunicipal migration.

- Net Non-permanent Residents

Net non-permanent residents represents the variation in the number of non-permanent residents between two dates. A non-permanent resident is a person who is lawfully in Canada on a temporary basis under the authority of a valid document (work permit, study permit, Minister's permit or refugee) issued for that person along with members of his family living with them. This group also includes individuals who seek refugee status upon or after their arrival in Canada and remain in the country pending the outcome of processes relative to their claim. Note that Citizenship and Immigration Canada uses the term temporary resident rather than non-permanent resident.

- Population

Estimated population and population according to the Census are both defined as being the number of Canadians whose usual place of residence is within that area, regardless of where they happened to be on Census Day. Also included are any Canadians staying in a dwelling in that area on Census Day and having no usual place of residence elsewhere in Canada, as well as those considered non-permanent residents.



- Population Growth

Population growth is the variation of population size between two dates. It can be positive or negative.

- School Age Population

The population between the ages of 5 to 18.

- Seniors

The population ages 65 and above.

- Sex Ratio

The ratio of the number of men to the number of females. This ratio is usually expressed as an index, with the number of females taken to be a base of 100.

- Year

Unless otherwise specified, the term “year” refers to the period beginning July 1 of a given year and ending June 30 of the following year.

## **Dwelling Units**

- Apartment

An apartment in a high-rise building that has five or more storeys or a low-rise building that has fewer than five storeys.

- Collective Dwelling

Refers to a dwelling of a commercial, institutional or communal nature. For example, hotels, tourist establishments, nursing homes, hospitals, staff residences, military bases, work camps, jails, group homes, and so on.

- Dwelling

A dwelling is defined as a set of living quarters. Two types of dwellings are identified in the Census, collective dwellings and private dwellings.

- Ground-oriented Housing

Refers to the structural characteristics and/or dwelling configuration published by Census program, including the categories of a single-detached house, a semi-detached house, a row house, a mobile home, and other non-apartment dwellings.

- Household

Refers to a person or a group of persons who occupy the same dwelling and do not have a usual place of residence elsewhere in Canada. It may consist of a family group with or without other persons, of two or more families sharing a dwelling, of a group of unrelated persons, or of one person living alone.

- Household Growth

The difference of householder counts between two dates. It can be positive or negative.

- Household Size

The number of persons in a private household. Average household size for each dwelling type is estimated total number of persons living in private occupied dwellings by dwelling unit type dividing by the total number of private occupied dwelling units for the corresponding dwelling types.

- Occupied Private Dwellings

Occupied dwellings (occupied by usual residents) is the one of 3 classifications under private dwellings. Marginal dwellings are classified as occupied solely by foreign residents and/or by temporarily present persons and unoccupied dwellings.

- Primary Household Maintainer Rate

Primary household maintainer rate or householder rate refers to a ratio of 1 to the number of persons per household. The product of household size and primary household maintainer rate is 1.

- Primary Household Maintainers

Primary household maintainer or householder is the first person in the household identified as someone who pays the rent, or the mortgage, or the taxes, or the electricity or other services or utilities for the dwelling. When more than one member of the household contributes to the payments, the first person listed is chosen as the primary household maintainer. If no person in the household is identified as making any such payments, the first person listed is selected by default. A primary household maintainer must be 15 years of age or older.

Where a number of people may contribute to the payments, more than one person in the household may be identified as a household maintainer. Up to five household maintainers can be identified. If no person in the household is identified as making such payments, the reference person is identified by default.

- Private Dwelling

Refers to a separate set of living quarters with a private entrance either from outside the building or from a common hall, lobby, vestibule or stairway inside the building. The entrance to the dwelling must be one that can be used without passing through the living quarters of some other person or group of persons.

## Employment

- Employment Growth

The difference of number of jobs between two dates. It can be positive or negative.

- Employment to Population Ratio

Employment to population ratio, also known as employment-population ratio, equals to the number of persons employed (typically population aged 15 to 64) divided by total population.

- Industry Sector

Categorization based on North American Industry Classification System (NAICS) 2012 developed by [Statistics Canada](#). Primary sector includes agriculture, forestry, fishing and hunting, as well as mining, quarrying, etc. Industry includes sectors of transportation, warehousing, construction, manufacturing, and wholesale trade. Public Administration Service includes educational services, health care, utilities and public administration sectors. Other sectors are regarded as a group of Commercial Service, such as retail trade, professional services, etc.

- Employment-to-population Ratio

The number of persons employed divided by total population, represented as a number with two decimal digits.

- No fixed workplace address

Persons who do not go from home to the same workplace location at the beginning of each shift. Such persons include building and landscape contractors, travelling salespersons, independent truck drivers, etc.

