



Photo Credit: City of Kelowna

MAPPING EQUITY IN KELOWNA'S BUILT ENVIRONMENT

FINAL REPORT

Created in partnership with: The City of Kelowna

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EXECUTIVE SUMMARY

The City of Kelowna has undertaken an equity analysis project to aid the adoption of equity in municipal policy and the creation of an inclusive city through equitable city-building. Community members have echoed the need for this type of work, as it is the hope “for the City to be a leader and break down systemic barriers” in order to create a welcoming, inclusionary city for all.

The equity analysis was predominantly spatial in nature, with the goal of identifying indicators to inform the equitable distribution of goods, infrastructure, amenities, services, and opportunities. This is supplemented with an interview and gap analysis describing potential directions and recommendations for future work. The following report offers an overview of the indicators, and a summary of the spatial and gap analysis findings.

Analytical Strategy

Three thematic areas for our analysis were identified, each subject to upstream planning interventions that primarily concern infrastructure, land acquisition, and capital investment.

- Transportation – Active transportation and public transit
- Civic spaces – Greenspace, and service-providing amenities including libraries and recreation centres
- Housing – Core housing need and proximity to amenities

Gap Analysis & Recommendations

In light of our analysis and its limitations, we share suggestions for future work that the City of Kelowna and the Advisory Committee may wish to take forward:

- Centering the lived experiences of equity-seeking groups
- Pursuing partnerships with communities harmed by systemic inequities
- Reviewing equity content in existing City documents
- Recognizing the capacity required for equity initiatives such as trainings, continuous learning, and dedicated staff

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PROJECT CONTEXT

PROJECT OVERVIEW

Recognizing the role that municipalities have in creating equitable communities where everyone's needs are met, the City of Kelowna is working towards adopting equity in their planning and policy-making processes. This was developed through the Imagine Kelowna engagement process in which almost 4,000 residents participated (City of Kelowna, 2018). This has sparked the City of Kelowna to revisit their policies and practices including their Official Community Plan (OCP) in order to create a thriving, equitable community.

This equity analysis provides a preliminary geographic picture of equities and inequities within Kelowna while taking an intersectional approach. We hope that this analysis will provide a foundation for integrating equity considerations in city-building at the municipal level. It is an important step toward data-driven and equity-centered policies and practices for the **built environment**.

This equity analysis is informed by **equity for city-building**. Our analysis is predominantly spatial in nature, with maps demonstrating how goods, infrastructure, amenities, services, and opportunities are distributed throughout the city. We supplemented the spatial analysis with additional indicators that were not suitable for mapping, one semi-structured interview and a gap analysis including our suggestions for future work.

Our studio project is informed by **intersectionality**, in which each person's unique identities will affect how people navigate the world and the degree to which they experience inequities (Crenshaw, 1989). We apply **planning for equity** to this, which acknowledges that municipal planning efforts can either serve to perpetuate inequities or create conditions to improve equity for all community members (PlanH, 2020). Recognizing that equity is multi-faceted, and experiences of equity and inequity can be different for people occupying different **social locations**, framing equity is a thread throughout our project and should continue to the City of Kelowna's future work.

PROJECT PURPOSE

Our intended goal is to develop a current state snapshot of equity in Kelowna through mapping upstream planning interventions, which are controlled by the City. This snapshot is important for the City of Kelowna to advance equity in their planning, policies and practices by having a geographical representation of where to take action next. This project contributes to broader equity efforts of the City of Kelowna Equity Advisory Committee.

To achieve this, our objectives are outlined on the next page.

Built environment:

Refers to the human-made or modified physical surroundings in which people live, work and play (PHSA, 2018)

Equity for city-building:

Includes thematic focus areas which are in the purview of municipal level planning and development such as transportation, housing and land use for civic spaces, among others (PHSA, 2018)



Photo Credit: City of Kelowna

OVERVIEW OF OBJECTIVES & PROJECT PHASES

Our project consisted of four phases with an engagement process that ran throughout the duration of the project.

Phase 1: Develop a guiding analytical strategy of equity with a feasible scope - Sep 8 - Dec 4 2020

In this phase we carried out a literature review of equity-related theories and best practices for equity data and mapping projects. We then reviewed equity frameworks and analytical strategies from other organizations to better understand the possible directions our project could take. Using the information from this research, we collaboratively selected guiding themes in partnership with the City of Kelowna staff. Part of this phase also included developing equity-responsive language as a subsequent deliverable for the City, which is in the glossary on page 50.

Phase 2: Select indicators and collect data focused on equity for city-building - Oct 27 - Dec 15, 2020

We developed criteria for and selected indicators which are relevant, granular, actionable, repeatable and cross-cutting. After receiving approval on our indicators from the City of Kelowna staff, we collected publicly available data and requested data from our partner organizations to be used in our spatial analysis.

Phase 3: Conduct a spatial analysis of thematic equity indicators including transportation, civic spaces, and housing - Dec 15, 2020 - Mar 2, 2021

After we met with City of Kelowna staff to finalize indicators, we developed a data analysis plan by reviewing analysis methodologies used in other studied equity analyses. We reviewed our data analysis plan with the City of Kelowna staff, made the necessary adjustments and carried out the analysis.

Phase 4: Synthesize results of spatial analysis and engagement session to suggest future directions for advancing equity-centered municipal planning, policy & practices - Feb 2 - Mar 30, 2021

In our final weeks of our project, we synthesized our findings into this report and accompanying project poster.

Engage with the community on their views of equity in the built environment and opportunities for improvement -

Sep 8, 2020 - Mar 30, 2021

Alongside our quantitative research, we had a parallel engagement process in order to get a more well-rounded, qualitative understanding of how well our research reflects the state of equity in Kelowna. We conducted one key informant interview with members of a local organization which serves equity-seeking groups.



Photo Credit: City of Kelowna

FRAMING EQUITY

HISTORY & STRUCTURES OF PLANNING

The history of planning is rooted in colonization, in which planning practices such as “surveying, naming, mapping and delimiting” were used to dispossess Indigenous peoples (Porter, 2017). Over time, planning as a “mechanism...[for] racial superiority has been given a spatial effect” for racialized people in which “land use, town layout and spatial arrangements” have become a way to express this power (Porter, 2017). Additionally, it is important to acknowledge that planning upholds systems of privilege for other **equity-seeking groups** including and not limited to gender, sexuality, ability and social class. Through naming this history, we can start to better understand how planners may work towards addressing these inequities and consider what it means to represent different interests in city-building by “making the invisible, visible” (Sandercock, 1998).

EQUITY FOR CITY-BUILDING

The context of equity for this analysis refers to **equity for city-building**, which includes thematic focus areas that are in the purview of municipal level planning and development including transportation, land use for civic spaces, housing, among others (PHSA, 2018).

In order to analyze equity for city-building indicators, we focused on **distributional equity** because this type of equity focuses on the physical distribution of goods, services and opportunities which can be demonstrated spatially on maps (Meerow et al., 2019). We achieved this by considering which distributional elements of equity for city-building could begin to tell Kelowna’s story of equity. We applied an **asset-based approach**, in order to consider how indicators depicted may speak to capacity and connectedness (NCCDH, 2015).

A distributional approach to equity highlights:

- Strengths and areas of improvement in different areas of the city
- How citizens may relate to the city by investing in the City’s equity goals and their own power as citizens to create change
- Potential planning and development decisions for equitable city-building in the future

SITUATING OURSELVES

It is important to be aware of potential risks and adverse effects our research and project outcomes could have on the groups we are trying to advocate for. Although our analysis focuses on distributional equity, we will strive to acknowledge the importance of equity in our own procedures. This is a valuable practice because it invites us and the readers of this report to reflect and unpack their own perspectives and assumptions related to equity in the built environment. Strong considerations of “how” and for “who” the built environment is constructed is at the forefront of our reflections, with the intention for this report to invite equity into planning so cities can be a place that are welcoming, inclusive and accessible to all people.



Photo Credit: City of Kelowna

Equity for city-building seeks to advance:

- Economic mobility and opportunity
- Residential, commercial and cultural inclusion
- Local cultural assets
- Transportation and connectivity
- Healthy and safe neighbourhoods
- Access to all neighbourhoods

(City of Kelowna, 2020)

ANALYTICAL STRATEGY

GUIDING THEMES & RATIONALE

After exploring various analytical strategies in our Interim Report, we created our own strategy focused on equity for city-building. Our rationale for developing and selecting this analytical strategy was based on the direction from the City of Kelowna to focus on **upstream planning interventions** that relate to distributional equity. This was important for the City as we selected thematic areas of equity that are influenced significantly by City policy and therefore the City can implement changes that will improve equity in these areas - these include **transportation, housing and civic spaces**.

Additionally, by addressing these planning interventions first, it lays the groundwork for downstream planning interventions to be addressed by the City and their partners in the future. While we cannot measure all aspects of equity, there will be many interlocking and important implications which will arise through this work such as health, education, social connections, among others.



Upstream

Primarily concerned with land acquisition and capital investment

Downstream

Primarily concerned with programming and service provision



Transportation



Civic Spaces



Housing

SPATIAL ANALYSIS

In this section we highlight the results from our spatial analysis, taking a deeper dive into the state of equity. First, we would like to acknowledge the people and land. Following that, we outline the guiding principles for each theme, and define the metrics associated with each chosen demographic and indicator. Rationale for the selection of each indicator is presented alongside key takeaways from the spatial analysis. Where relevant, we have commented on the relationships observed between indicators and demographics (for reference, see the correlation matrix in Appendix C).

SITUATING PEOPLE & PLACE

The city of Kelowna is the largest community in the Regional District of Central Okanagan and it is one of the fastest growing cities in Canada (City of Kelowna, n.d.). Kelowna is known for its scenery with Okanagan Lake and plentiful mountains, agriculture, and vineyards. The city emphasizes place, play and fun, with the city's natural features as a welcoming playground for residents and tourists to enjoy.

Kelowna is situated upon the traditional and unceded territories of the Syilx/Okanagan people, and as no treaty has been negotiated, the Syilx/Okanagan people still affirm that the land is theirs (Syilx/Okanagan Nation, n.d.).

Kelowna's rapid growth is due in part to increasing immigration (Statistics Canada, 2016). While previous patterns of immigration attracted newcomers from predominantly White and English-speaking countries, the demographic character of newcomers to Kelowna is becoming more diverse (Statistics Canada, 2016; Bahbahani, 2008; Bishop, 2013). This shift reinforces the need for Kelowna to become more welcoming of newcomers, and supportive of the needs of diverse communities (Teixeria, 2009).



Reference Map - Kelowna Neighbourhoods

This map includes neighbourhood names relative to the census tract boundaries for reference. Note that census tract boundaries do not necessarily align with neighbourhood boundaries.



Photo Credit: City of Kelowna

DEMOGRAPHICS



SOCIAL LOCATION AFFECTS PEOPLE'S EXPERIENCES OF EQUITY

We selected demographics which represent a few important aspects of a person's social location. For example, income and unemployment are dimensions of social class, and visible minority begins to provide some insight into ethnicity and race.

These pieces of one's social location is a launching point for understanding how people may be affected by equity in different ways based on their social locations. This has implications for equity for city-building because knowing where equity-seeking groups are situated within the city has the potential for creating change and directing resources into specific areas.

The Census was chosen as the source of demographic metrics because it is collected at regular intervals and reported at the census tract scale. Limitations of the Census as a data source are explained alongside relevant metrics and in the Gap Analysis section of the report. Future equity analyses might consider including additional demographics not captured in the Census to understand how other aspects of one's social location, such as gender identity, sexual orientation, factors of ability, mental health and others, relate to various dimensions of equity. Guidance on the collection of disaggregated data for anti-oppression work is provided in the BC's Office of the Human Rights Commission (BCOHRC) report (2020) titled "Disaggregated Demographic Data Collection in British Columbia: The Grandmother Perspective".



Photo Credit: City of Kelowna

"Powerful statements are made possible by disaggregated data. By making systemic inequalities in our society visible, data can lead to positive change. The same data, used or collected poorly, can reinforce stigmatization of communities, leading to individual and community harm."

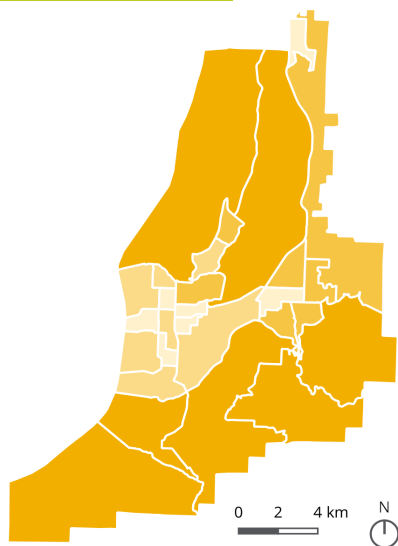
- BC Office of the Human Rights Commission

Table 1
Demographic metrics

Demographics	Metrics
INCOME	<ol style="list-style-type: none"> 1. Median household income (before tax, not adjusted for inflation) 2. Percentage of the population with a household income below \$20,000 (before tax, not adjusted for inflation)
UNEMPLOYMENT	<ol style="list-style-type: none"> 1. Unemployment rate
POST-SECONDARY ATTAINMENT	<ol style="list-style-type: none"> 1. Percentage of the population aged 25 to 64 that completed a post-secondary degree, diploma, certificate, or another form of post-secondary training
POPULATION AGE	<ol style="list-style-type: none"> 1. Median age
POPULATION DENSITY	<ol style="list-style-type: none"> 1. Number of persons per square kilometre
POPULATION IDENTIFYING AS A VISIBLE MINORITY	<ol style="list-style-type: none"> 1. Percentage of the population that identifies as a visible minority
POPULATION IDENTIFYING AS INDIGENOUS	<ol style="list-style-type: none"> 1. Percentage of the population that identifies as Indigenous

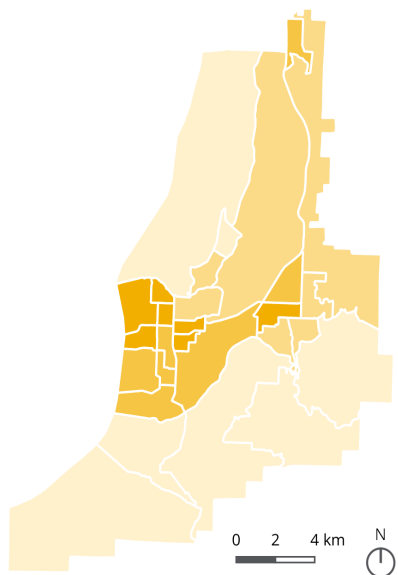
DEMOGRAPHICS

INCOME



MEDIAN HOUSEHOLD INCOME

- \$50,000 - \$65,000
- \$66,000 - \$76,000
- \$77,000 - \$101,000
- \$102,000 - \$160,000



HOUSEHOLD INCOME BELOW \$20,000

- 0.4 - 1.9 %
- 2.0 - 2.8 %
- 2.9 - 4.4 %
- 4.5 - 8.8 %

Metrics

- Median household income (before tax, not adjusted for inflation)
- Percentage of the population with a household income below \$20,000 (before tax, not adjusted for inflation)

Why use this metric?

We opted to examine median household income because it can provide insight into potential relationships between the average wealth of an area and the allocation of goods and services. We also opted to include the percentage of the population in the lowest household income bracket in order to understand the distribution of households in the most financial need.

What can this tell us?

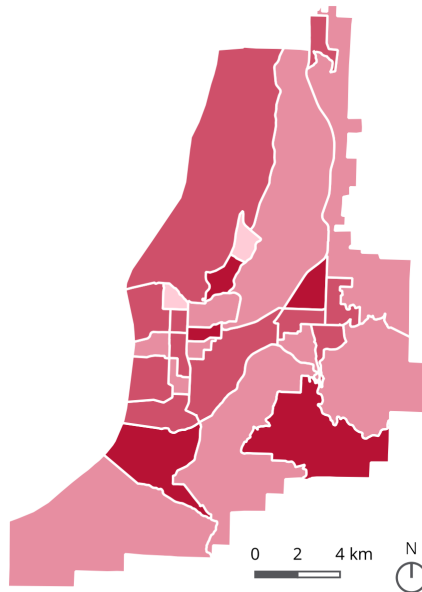
Median income is lowest around Downtown, South Central, and some parts of Rutland. This pattern is also similar for the proportion of households in the lowest income bracket. We did not compare average household sizes or composition, so some of this difference may be due to a higher number of single-person and/or single-income households in some areas. In future analyses, we suggest replacing the data on the population with a household income below \$20,000 with data on the Low Income Measure (LIM) from the census, which takes into account household size and composition when categorizing households as low income.

- The median income at the census tract level ranged from \$50,000 to \$160,000
- The median household income for the City of Kelowna is \$74,800 and \$70,000 for British Columbia in 2015 (Statistics Canada, 2016)
- The percentage of the population with a household income below \$20,000 ranges from 0.4% to 8.8%
- The percentages of households in this income category is 3.1% city-wide, and 10.8% province-wide (Statistics Canada, 2016)

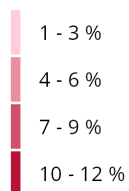
Source: Demographic data for Kelowna in 2020 obtained from Environics Analytics' DemoStats database. Province-wide 2015 statistics abtained from Statistics Canada's 2016 Census.

DEMOGRAPHICS

UNEMPLOYMENT



UNEMPLOYMENT RATE



Source: Demographic data for Kelowna in 2020 obtained from Environics Analytics' DemoStats database. Province-wide 2015 statistics abtained from Statistics Canada's 2016 Census.

Metrics

- Unemployment rate

Technical Definition

- “Unemployment rate refers to the unemployed expressed as a percentage of the labour force in the week of Sunday, May 1 to Saturday, May 7, 2016. Labour force is persons 15 years of age and over.” (Statistics Canada, 2017)

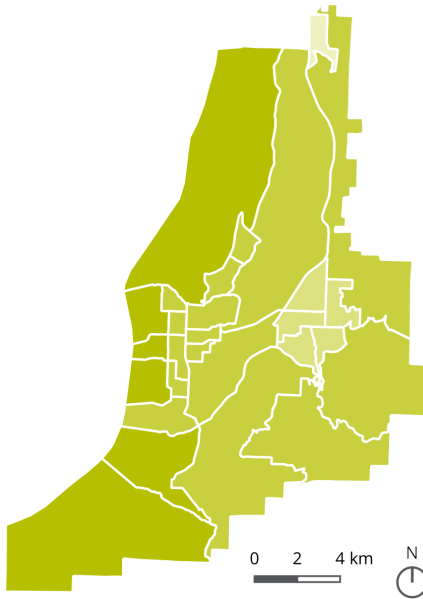
What can this tell us?

In contrast to some of the other variables, there does not seem to be a clear spatial pattern or cluster for unemployment rate.

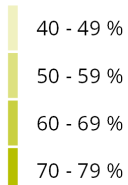
- The unemployment rate by census tract ranges from 1% to 11%
- The city-wide unemployment rate is 6.9%, compared to 6.7% province-wide (Statistics Canada, 2016)

DEMOGRAPHICS

POST-SECONDARY ATTAINMENT



POST-SECONDARY EDUCATION ATTAINMENT



Source: Demographic data for Kelowna in 2020 obtained from Environics Analytics' DemoStats database. Province-wide 2015 statistics obtained from Statistics Canada's 2016 Census.

Metrics

- Percentage of the population aged 25 to 64 that completed a post-secondary degree, diploma, certificate, or another form of post-secondary training

Why use this metric?

- We opted to focus on post-secondary educational attainment, because post-secondary programs often have high cost barriers and entry requirements which make them harder to access compared to primary and secondary education.

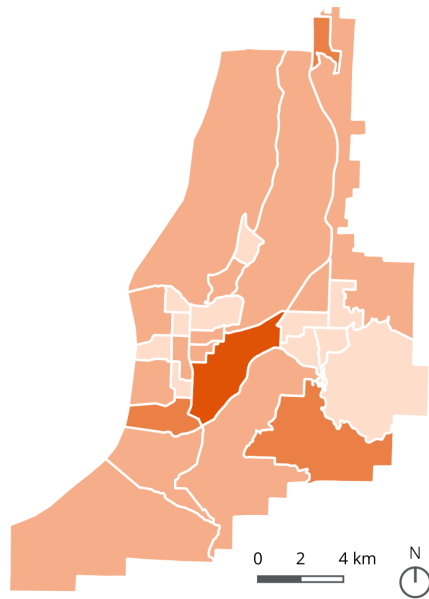
What can this tell us?

The rate of adults who have some post-secondary diploma, certificate or degree is higher in the west side of the City and lower in the northeast area of the City and Rutland.

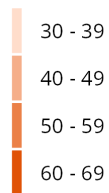
- The rate of post-secondary attainment by census tract ranges from 45% to 76%
- The rate of post-secondary attainment is 66% city-wide, contrasted with 64% province-wide (Statistics Canada, 2016)

DEMOGRAPHICS

POPULATION AGE



MEDIAN AGE



Source: Demographic data for Kelowna in 2020 obtained from Environics Analytics' DemoStats database. Province-wide 2015 statistics obtained from Statistics Canada's 2016 Census.

Metrics

- Median age

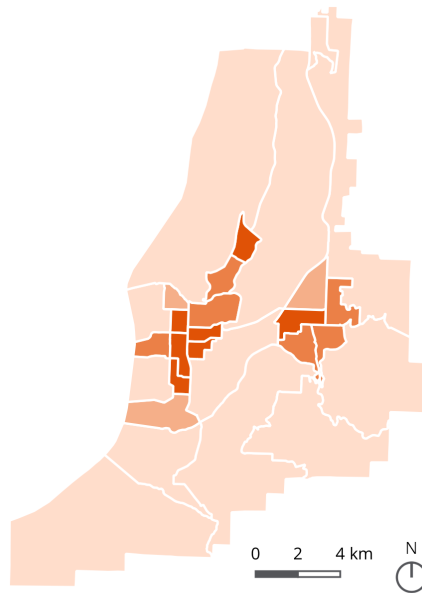
What can this tell us?

Median age varies across the City's census tracts. The census tracts in Rutland tend to have a younger median age in general, whereas Downtown and South Central have a mix of census tracts with both older and younger median age.

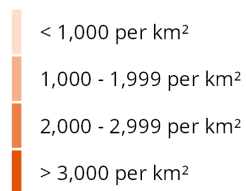
- The median age by census tract ranges from 38 to 65 years of age,
- The median age is 43 city-wide, and 43 province wide (Statistics Canada, 2016)

DEMOGRAPHICS

POPULATION DENSITY



POPULATION DENSITY



Source: Demographic data for Kelowna in 2020 obtained from Environics Analytics' DemoStats database. Province-wide 2015 statistics obtained from Statistics Canada's 2016 Census.

Metrics

- Number of persons per square kilometre

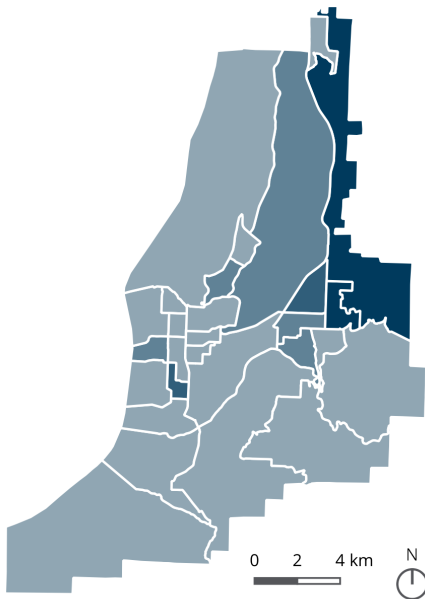
What can this tell us?

Population density tends to be highest in Downtown, South Central, Glenmore, and Rutland.

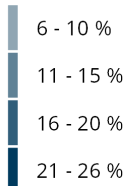
- The population density ranges greatly by census tract with the lowest being 79 persons per km² and the highest being 4455 per km²
- The city of Kelowna has a population density of 550 persons per km²

DEMOGRAPHICS

POPULATION IDENTIFYING AS A VISIBLE MINORITY



PERCENTAGE OF THE POPULATION THAT IDENTIFIES AS A VISIBLE MINORITY



Source: Demographic data for Kelowna in 2020 obtained from Environics Analytics’ DemoStats database. Province-wide 2015 statistics abtained from Statistics Canada’s 2016 Census.

Metrics

- Percentage of the population that identifies as a visible minority

Technical Definition

- “Visible minority” refers to whether a person belongs to a visible minority group as defined by the Employment Equity Act and, if so, the visible minority group to which the person belongs. The Employment Equity Act defines visible minorities as “persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour”. The visible minority population consists mainly of the following groups: South Asian, Chinese, Black, Filipino, Latin American, Arab, Southeast Asian, West Asian, Korean and Japanese.” (Statistics Canada, 2017)

Why use this metric?

We opted to include the percentage of the population identifying as a visible minority as a simple initial analysis on ethnicity data from the census. However, racial and ethnic identity is a complex topic, and although census data on visible minority identity provides some insight, it also misses many nuances. For instance, the concept “visible minority” depends on delineating people as white, non-white or Indigenous, but in many cases, this delineation changes by time and place (Song, 2020). This categorization can also obscure the differences in experience between various visible minority groups. Where available, we suggest including more detailed racial and ethnic data in future equity work.

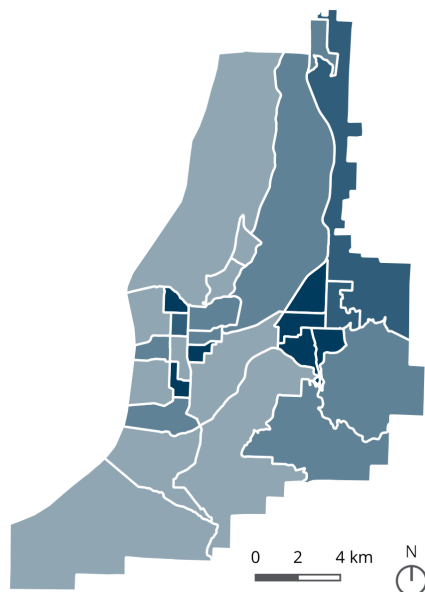
What can this tell us?

The visible minority population is highest in parts of Glenmore, South Central, Rutland, and the northeast portion of the City.

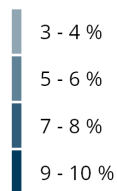
- The proportion of the population identifying as a visible minority ranges from 6% to 28%
- 11% of the population city-wide identifies as a visible minority, whereas the rate is 30% province-wide (Statistics Canada, 2016)

DEMOGRAPHICS

POPULATION IDENTIFYING AS INDIGENOUS



PERCENTAGE OF THE POPULATION THAT IDENTIFIES AS INDIGENOUS



Source: Demographic data for Kelowna in 2020 obtained from Environics Analytics' DemoStats database.

Metrics

- Percentage of the population that identifies as Indigenous

Technical Definition

- Referred to as “Aboriginal identity” in the Census.
- ““Aboriginal identity” refers to whether the person identified with the Aboriginal peoples of Canada. This includes those who are First Nations (North American Indian), Métis or Inuk (Inuit) and/or those who are Registered or Treaty Indians (that is, registered under the Indian Act of Canada), and/or those who have membership in a First Nation or Indian band. Aboriginal peoples of Canada are defined in the Constitution Act, 1982, Section 35 (2) as including the Indian, Inuit and Métis peoples of Canada.” (Statistics Canada, 2017)

Why use this metric?

Significant inequities in socioeconomic standards and health outcomes for Indigenous communities in Canada are well documented (BCOHRC, 2020). The evaluation of equity indicators on the bases of Indigeneity is an important element of revealing inequities for systemic change.

Note that the Canadian Census is not perfectly representative of Indigenous populations due to misclassification errors and non-response bias (Smylie & Firestone, 2015). There is a need for future work to ensure that disaggregated data on Indigeneity is collected in culturally safe ways, and that Indigenous data is held and led by Indigenous communities and institutions to self-determine interpretation (BCOHRC, 2020).

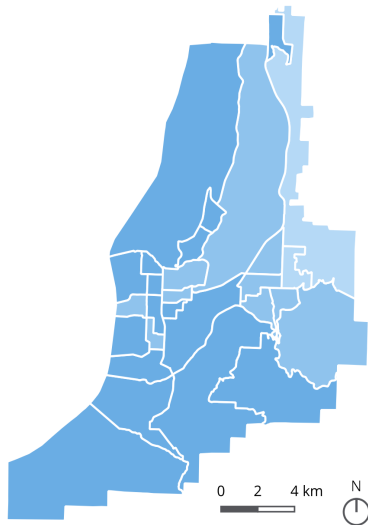
What can this tell us?

The population identifying as Indigenous is most concentrated in Rutland and the northeast portion of the city, as well as in pockets in Downtown and South Central.

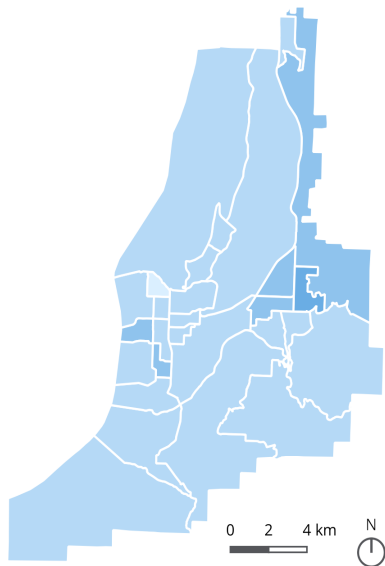
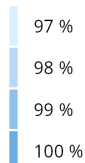
- The proportion of the population identifying as Indigenous ranges from 3% to 10%;
- 6% of people city-wide identify as Indigenous and 6% province-wide (Statistics Canada, 2016)

DEMOGRAPHICS

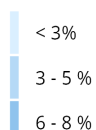
LANGUAGE



PERCENTAGE OF THE POPULATION WITH KNOWLEDGE OF ENGLISH



PERCENTAGE OF THE POPULATION THAT PRIMARILY SPEAKS A LANGUAGE OTHER THAN ENGLISH AT HOME



Metrics

- Percentage of the population with knowledge of English
- Percentage of the population that primarily speaks a language other than English at home

Technical Definition

- “Language primarily spoken at home” refers to the language the person speaks most often at home at the time of data collection. A person can report more than one language as “spoken most often at home” if the languages are spoken equally often” (Statistics Canada, 2017)

Why use this metric?

We opted to include two factors related to language. Knowledge of English, while it does not cover the possible range in language proficiency, can provide some insight into populations which may require language or translation support for services and outreach. Data on language spoken most often at home can provide some sense of populations which may experience linguistic discrimination, such as negative attitudes directed at foreign-accented speakers of English (Munro, 2003).

What can this tell us?

Knowledge of English tends to be lowest in parts of Rutland and the northeast portion of the City, as well as in some pockets Downtown and in South Central. Speaking a language other than English most often at home is most common in the eastern portion of the City, as well as some parts of Rutland and South Central, while it tends to be lowest Downtown.

- The percentage of the population with knowledge of English ranges from 97.8% to 100%
- The rate of knowledge of English is 99.4% city-wide and 96.6% province-wide (Statistics Canada, 2016)
- The percentage of the population that primarily speaks a language other than English at home ranges from 1% to 11%
- The percentage that primarily speaks a language other than English at home is 5% city-wide and 16% province-wide (Statistics Canada, 2016)

Source: Demographic data for Kelowna in 2020 obtained from Environics Analytics’ DemoStats database. Province-wide 2015 statistics abtained from Statistics Canada’s 2016 Census.

TRANSPORTATION



EASE OF NAVIGATION & MOBILITY IMPACTS ACCESS TO THE CITY

Land use and transportation planning decisions impact how people choose to navigate the City and how easily they can access the City’s amenities. Equitable transportation networks are safe, affordable, and accessible for diverse transportation modes. Prioritizing walking, cycling, rolling, and the use of public transit and encouraging the mobility of all people can improve health outcomes and improve social well-being (PHSA, 2018).

This theme concerns transportation mode options with an emphasis on:

- Active transportation
- Public transit

Guiding Principles

- Enable mobility for all ages and abilities
- Make active transportation convenient and safe
- Prioritize safety for all
- Encourage use of public transit

(PHSA, 2018)



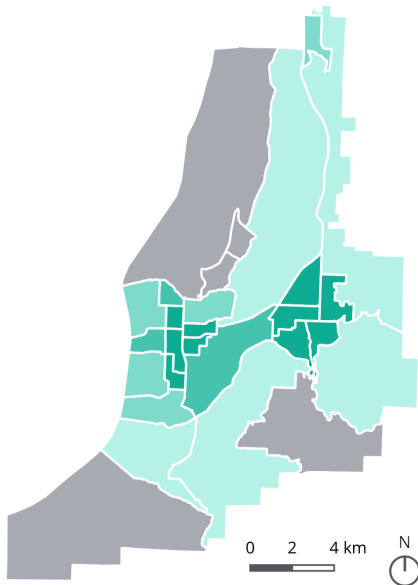
Photo Credit: City of Kelowna

Table 2
Transportation theme indicators

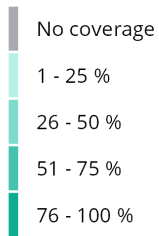
Indicators	Metrics
TRANSIT NETWORK COVERAGE	1. Percentage of the census tract area covered by rapid and frequent transit stop service areas (within 10-minute walking distance of transit stops)
ACTIVE TRANSPORTATION INFRASTRUCTURE	1. Ratio of pedestrian facility length to road length 2. Ratio of bike facility length to road length
MOTOR VEHICLE COLLISIONS	1. Annual pedestrian-involved motor vehicle collisions 2. Annual cyclist-involved motor vehicle collisions

TRANSPORTATION

TRANSIT NETWORK COVERAGE



PERCENTAGE OF CENSUS TRACT AREA COVERED BY RAPID & FREQUENT TRANSIT SERVICE AREAS



Source: Transit stop locations for transit stops in the rapid and frequent transit network (including Routes 1, 5, 8, 10, 11, 23, and 97) obtained from BC Transit. The OpenRouteService plugin for QGIS was used to calculate service areas.

Metrics

- Percentage of the census tract area covered by rapid and frequent transit stop service areas (within 10-minute walking distance of transit stops)

Technical Definition

- Rapid and frequent transit routes in Kelowna include Routes 1, 5, 8, 10, 11, 23, and 97. Transit stop service areas represent a 10-minute walking distance at 5 km/h from each transit stop in the rapid and frequent transit network (see Figure A1 in Appendix A).

Why measure this?

Proximity to transit is an important indicator for sustainability and healthy cities strategies (City of Victoria, 2020). With more granular population counts, this metric can be improved by evaluating the percentage of the population falling within walking distance of the transit network.

Note that this indicator does not capture the frequency of transit service at each stop. Residents are less likely to choose public transit if the bus at the stop near their home arrives there only every hour (City of Victoria, 2020). Therefore we propose evaluating proximity to transit stops in the rapid and frequent bus network.

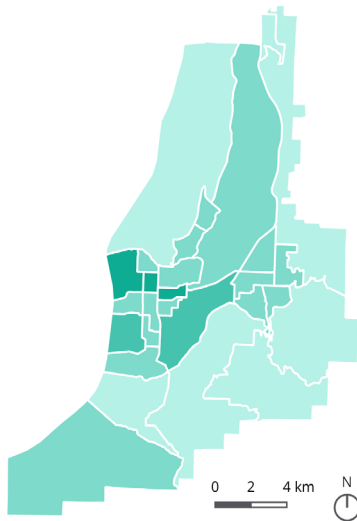
What can this tell us?

- As of 2021, 16% of the total area of Kelowna is within a 10-minute walk of rapid and frequent transit stops
- Traffic network coverage is greatest in Rutland, and in Downtown and South Central Kelowna

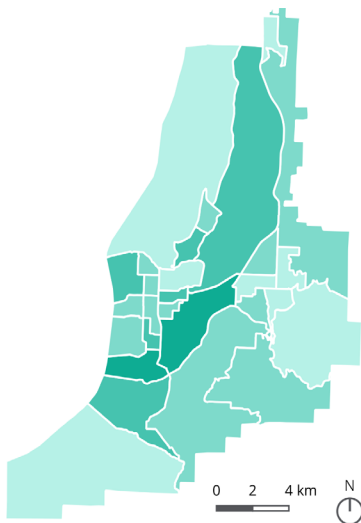
It is notable that rapid transit coverage was correlated with low-income households as these households may benefit from having access to affordable, efficient transportation options. This is a promising pattern, although there are many other factors to consider in terms of equity in public transportation, such as accessibility for persons with disabilities, or factors such as whether the bus is frequently full by the time it gets to a particular bus stop. Additionally, obtaining census data with custom geographic boundaries for the area inside and outside of the rapid and frequent transit service area would provide a more precise way to understand the demographic profile of those who have easy access to public transportation and those who do not.

TRANSPORTATION

ACTIVE TRANSPORTATION INFRASTRUCTURE



RATIO OF PEDESTRIAN FACILITY LENGTH TO ROAD LENGTH



RATIO OF BIKE FACILITY LENGTH TO ROAD LENGTH



Source: Active Transportation and Road network map layers were obtained from the City of Kelowna open data portal.

Metrics

- Ratio of pedestrian facility length to road length
- Ratio of bike facility length to road length

Technical Definition

Active transportation infrastructure is composed of pedestrian and bike networks. Pedestrian facilities include those designated as shared-use pathways (paved and unpaved) and sidewalks. Bike facilities include those designated as cycle tracks, bike lanes, and shared-use pathways (paved and unpaved).

The ratio of active transportation facilities to road length is 0 where there is a lack of pedestrian/bike facilities along either side of the road. The ratio is 2 where there are bike/pedestrian facilities along both sides of the road. Note that this ratio increases where off-street facilities (i.e. shared-use pathways) are present.

Why measure this?

It is important to collect data on bike and pedestrian infrastructure that supports active transportation in the community (PHSA, 2018). By standardizing the length of active transportation facilities by road length, one can develop a sense for whether walking and biking are viable means of transportation throughout the city.

The annual change in this indicator can be used to determine if new active transportation infrastructure is being built in areas of low income or in communities with high populations of equity-seeking groups.

What can this tell us?

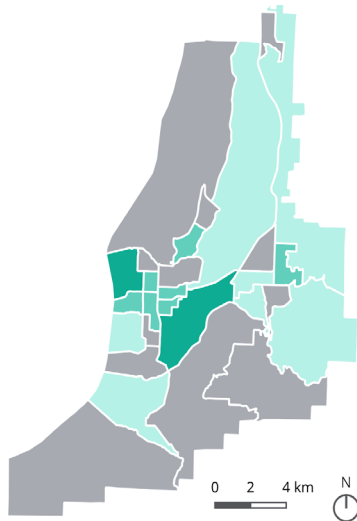
- As of 2021, Kelowna has 546 km of pedestrian facilities and 410 km of bike facilities
- City-wide, the ratio of pedestrian facility length to road length is 0.63, and the ratio of bike facility length to road length is 0.48
- At the census tract-level, the ratio of pedestrian facility length to road length ranges from 0.04 to 1.79. The ratio of bike facility length to road length varies from 0.15 to 1.10

The length of pedestrian facilities relative to road length is greatest in downtown Kelowna. The relative length of bike facilities is greatest in the census tract containing Mission Creek Regional Park.

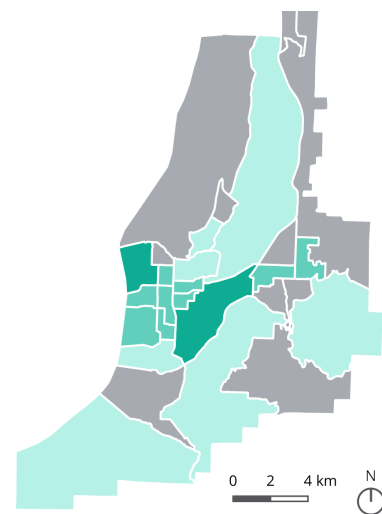
The length of pedestrian facilities relative to the road network is highest in census tracts with high population density and large portions of the population with a household income below \$20,000 (see correlation matrix in Appendix C).

TRANSPORTATION

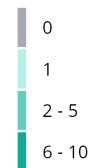
MOTOR VEHICLE COLLISIONS



**PEDESTRIAN-INVOLVED
MOTOR VEHICLE COLLISIONS**



**CYCLIST-INVOLVED
MOTOR VEHICLE COLLISIONS**



Metrics

- Annual pedestrian-involved motor vehicle collisions
- Annual cyclist-involved motor vehicle collisions

Technical Definition

The motor vehicle collision dataset includes only those that were reported to the Insurance Bureau of BC (ICBC) in 2019. Unreported collisions are not represented here. For maps depicting the location of pedestrian- and cyclist-involved motor vehicle collisions, refer to Figures A2 and A3 in Appendix A.

Why measure this?

Road traffic injuries are an important measure to guide the development of transportation networks that are safe for all residents. Road traffic injuries should be assessed alongside new and existing active transportation infrastructure to determine whether active transportation facilities are safe. Safety is especially important to consider in relation to populations which may experience more barriers to navigating transportation networks, such as children, seniors, and persons with diverse abilities (PSHA, 2018).

What can this tell us?

- Pedestrian-involved motor vehicle collisions by census tract ranges from 0 to 10
- The City of Kelowna had 41 total pedestrian-involved motor vehicle collisions, which averages to 28 per 100,000 population
- Cyclist-involved motor vehicle collisions by census tract ranges from 0 to 8
- The City of Kelowna had 51 total cyclist-involved motor vehicle collisions, averaging to 35 per 100,000 population

The length of pedestrian facilities relative to road length is greatest in downtown Kelowna. The relative length of bike facilities is greatest in the census tract containing Mission Creek Regional Park.

There was a positive correlation between cyclist-involved motor vehicle collisions and proportion of the population with a household income under \$20,000 (see correlation matrix in Appendix C). However, a lack of meaningful correlation between pedestrian- and cyclist-involved motor vehicle collisions and active transportation infrastructure at the census tract-level suggests the need for a more granular analysis of the safety of these facilities.

Source: The locations of reported pedestrian- and cyclist-involved motor vehicle collisions for 2019 were obtained from the ICBC.

CIVIC SPACES



PROVIDES LOW-BARRIER OPPORTUNITIES FOR PUBLIC BENEFIT

This theme concerns the topic of land use, namely as it relates to acquisition and capital investments for civic spaces. This theme is in alignment with the City’s goal of incorporating equity in land-use planning decisions and resource allocation (City of Kelowna, 2020).

We focused on civic spaces: parks and greenspace, and service-providing sites such as community centres. These civic spaces have important equity implications because they are a low-barrier community asset which serves various social locations such as and not limited to age, levels of ability and gender. These spaces offer benefits and “opportunities for socializing, recreation, relaxation, play, and learning as well as providing an opportunity to connect with nature” (City of Victoria, 2020).

We believe that insights gleaned from a focused spatial analysis of civic spaces would provide actionable information for the City. Other elements of land use require further consideration as to what measures could yield meaningful understanding of equity.

Guiding Principles

- Ensure that everyone has access to greenspace within walking distance, either on their own property or in the form of a public park
- Maximize access to low-barrier public amenities including community centres and libraries that act as gathering places and conduits for service provision for the people who need it the most

(City of Victoria, 2020)



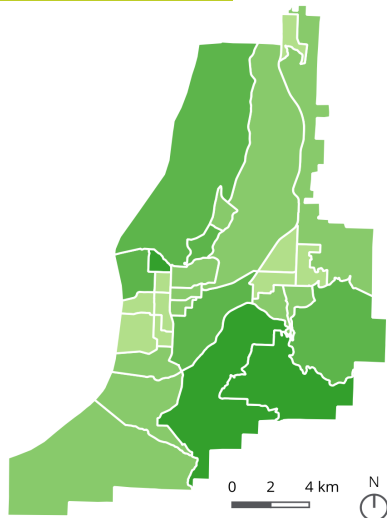
Photo Credit: City of Kelowna

Table 3
Civic spaces theme indicators

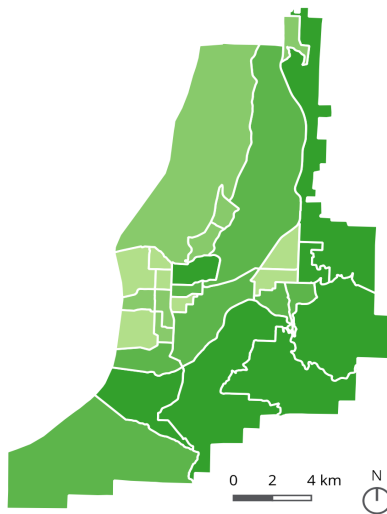
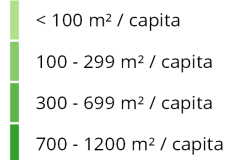
Indicators	Metrics
ACCESS TO GREENSPACE	<ol style="list-style-type: none"> 1. Public park area per capita 2. Normalized Difference Vegetation Index (NDVI)
SERVICE-PROVIDING SITES	<ol style="list-style-type: none"> 1. Percentage of the census tract area covered by library service areas (within 10-minute walking distance of libraries) 2. Percentage of the census tract area covered by recreation centre service areas (within 10-minute walking distance of recreation centres)

CIVIC SPACES

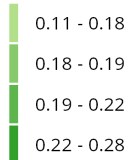
ACCESS TO GREENSPACE



PUBLIC PARK AREA PER CAPITA



MEAN NORMALIZED DIFFERENCE VEGETATION INDEX (NDVI) AS A MEASURE OF VEGETATION COVER



Metrics

- Public park area per capita
- Normalized Difference Vegetation Index (NDVI)

Technical Definition

Public park area per capita at the census tract-level was calculated from the total area of parks within 800 meters of each census tract (approximately 10-minutes walking distance at 5 km/h).

NDVI is a measure of the state of plant health based on how plants reflect light at certain frequencies (USGS, n.d.-a). NDVI values vary from -1 to 1, where higher values correspond to greater vegetation density. Areas devoid of vegetation such as barren rock, sand, or snow usually show low NDVI values of 0.1 or less. Sparse vegetation such as shrubs or grasslands in urban areas may result in moderate NDVI values around 0.2 to 0.5 (USGS, n.d.-b).

Why measure this?

Parks provide low-barrier opportunities for recreation and connecting with nature. Our indicators for equitable access to greenspace are adapted from the chapter on equity in the provision of greenspace from the City of Vancouver’s “VanPlay” report (City of Vancouver, 2019). In their analysis, they overlaid areas with low park provision, low tree canopy cover, and high recreation voucher usage to show areas where there was a high demand for low-barrier recreation but low amounts of greenspace.

We suggest using NDVI in place of tree canopy cover because it is based on publicly available data collected and published multiple times per year, and therefore more easily tracked annually (USGS, n.d.-a). Data regarding the location of recreation opportunity coupons distributed by the City of Kelowna is not yet being collected. Future analysis of the equitable provision of greenspace should include this data should it become available in the future.

Continued on the next page...

Source: The public parks map layer was obtained from the City of Kelowna open data portal. Population counts for Kelowna in 2020 obtained from Environics Analytics’ DemoStats database. NDVI was calculated from Landsat 8 imagery obtained from the United States Geological Survey (collected on August 16, 2020).

CIVIC SPACES

ACCESS TO GREENSPACE



What can this tell us?

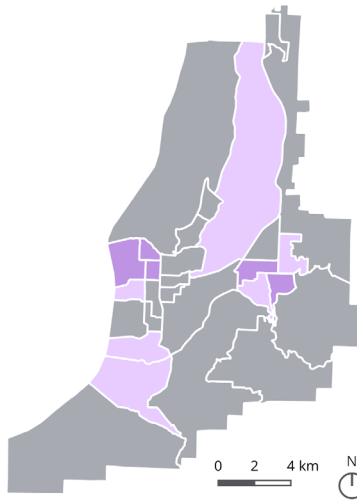
- The census tracts ranged from 0 - 1179 m² of park area per capita
- The City of Kelowna has 16.1 km² of park area city-wide, amounting to 112 m² of park area per capita
- Park area per capita has a positive correlation with median household income (see correlation matrix in Appendix C)
- The census tracts ranged from 0.11 - 0.28 NDVI
- The city-wide average was 0.22 average

The correlation between park area per capita and higher household incomes, as well as NDVI and higher household incomes, suggests that lower income households are less likely to have close access to a park or to live in a neighbourhood with more vegetation. Although more granular analysis is required to identify the nuances in equitable allocation of park space, this is worthy of attention when planning additional park space in the City.

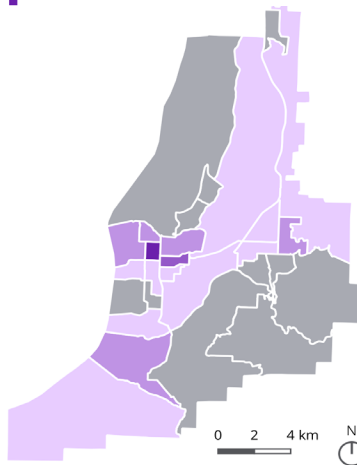
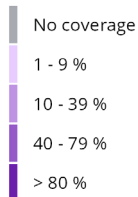
Because we lack data on a measure of demand for low-barrier recreation, such as recreation voucher usage, our analysis cannot directly speak to the demand for low-barrier recreation. However, our analysis in the housing section does consider the distribution of various forms of housing in relation to parks which can give some insight into park allocation in relation to households that may have more need for such spaces. Additionally, one key aspect of access to nature and recreation that NDVI cannot measure is access to bodies of water. Okanagan Lake is a great natural asset that the City has and it is important to consider the accessibility of the lake to all people of Kelowna, such as how much of the shoreline is private property.

CIVIC SPACES

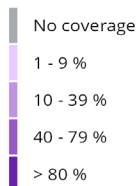
SERVICE-PROVIDING SITES



PERCENTAGE OF CENSUS TRACT AREA COVERED BY LIBRARY SERVICE AREAS



PERCENTAGE OF CENSUS TRACT AREA COVERED BY RECREATION CENTRE SERVICE AREAS



Source: Library locations were obtained from Okanagan Regional Library website. Public/non-profit recreation centre locations were obtained from the City of Kelowna website.

Metrics

- Percentage of the census tract area covered by library service areas (within 10-minute walking distance of libraries)
- Percentage of the census tract area covered by recreation centre service areas (within 10-minute walking distance of recreation centres)

Technical Definition

- Library service areas represent a 10-minute walking distance at 5 km/h from each library (see Figure B2 in Appendix B).
- Recreation centre service areas represent a 10-minute walking distance at 5 km/h from public and non-profit recreation centres (see Figure B3 in Appendix B).

Why measure this?

Recreation centres can offer affordable or free options for recreation, while libraries provide a reliable internet connection and a quiet place to enjoy a book or concentrate on work, among the many other services libraries offer. These services may be especially beneficial to individuals and households who would struggle to afford private recreation options and who may not have space or facilities for these activities in their own home, so it is important to consider the distribution of these helpful service-providing sites (City of Victoria, 2020).

What can this tell us?

- The percentage of census tract area covered by library service areas ranged from 0% to 33%
- There are 4 public libraries in the City of Kelowna in total; 1.8% of the area of the City of Kelowna is within a 10-minute walking distance of a library
- The percentage of census tract area covered by recreation centre service areas ranged from 0% to 95%
- There are 15 recreation centres in total in the City of Kelowna; 3.3% of the area of the City of Kelowna is within a 10-minute walking distance of a recreation centre

Overall it seems that while the public libraries are spread across the City, recreation centres are primarily clustered Downtown and in Mission. Given the large size of the census tracts, it is difficult to comment on the equity of the distribution of these service-providing sites; a custom-census order of the demographic profile inside and outside of these service areas may offer more insight into this topic.

In future analyses, it may be valuable to consider library and recreation centre service areas in combination with direct bus routes to these locations, as a short bus ride may also provide good access to these sites. In addition, as many libraries are now offering services online such as access to audiobooks and ebooks, this may become an important part of accessibility to consider in addition to physical library locations. Furthermore, future analyses should factor in the usable floor area and the types of facilities these sites have, as the different sites may be very different

HOUSING



HOUSING IS A BASIC HUMAN RIGHT

Housing is a basic human right, with wide-reaching impacts on quality of life and life expectancy. The quality, accessibility, and affordability of housing impact the health and well-being of those that live there. Safe, affordable, and secure housing for all supports healthy living and protects people from hazards inside and near the home (PHSA, 2018).

Guiding Principles

- Ensure that everyone has an affordable option that is safe and suitable for their household
- Prioritize housing for people that need it the most
- Encourage a diversity of housing tenure and built form to meet the needs of every household

(PHSA, 2018)



Photo Credit: City of Kelowna

Table 4
Housing theme indicators

Indicators	Metrics
CORE HOUSING NEED	<ol style="list-style-type: none"> 1. Percentage of renters in core housing need in Kelowna 2. Percentage of owners in core housing need in Kelowna <ul style="list-style-type: none"> • Indigenous households • Households with seniors • Households with children • Households with at least one member with an activity limitation
PROXIMITY TO TRANSIT	<ol style="list-style-type: none"> 1. Percentage of rental units within 10-minute walk of rapid and frequent transit stops 2. Percentage of missing middle units within 10-minute walk of rapid and frequent transit stops 3. Percentage of high-density units within 10-minute walk of rapid and frequent transit stops
PROXIMITY TO PUBLIC PARKS	<ol style="list-style-type: none"> 1. Percentage of rental units within 10-minute walk of a park 2. Percentage of missing middle units within 10-minute walk of a park 3. Percentage of high-density units within 10-minute walk of a park
PROXIMITY TO SERVICE-PROVIDING SITES	<ol style="list-style-type: none"> 1. Percentage of rental units within 10-minute walk of a library or recreation centre 2. Percentage of missing middle units within 10-minute walk of a library or recreation centre 3. Percentage of high-density units within 10-minute walk of a library or recreation centre

HOUSING



Photo Credit: City of Kelowna

A DIVERSE HOUSING SUPPLY FOR DIVERSE NEEDS

For the purpose of this report, we opted to examine purpose-built rental housing, missing middle housing, and high density housing.

Rental housing is important to consider because there are less barriers to renting compared to homeownership. This makes the supply of purpose-built rental housing vital for households who are unable to afford a down payment or qualify for a mortgage to purchase a home. Furthermore, renter households are more likely to be paying an unaffordable portion of their income to housing costs, and to live in an overcrowded home or a home which needs major repairs compared to ownership households (see section on Core Housing Need). Therefore, it is important to ensure good access to services and amenities near rental housing by considering the distribution of rental housing across the city.

Missing middle housing offers many of the characteristics of single detached homes which appeal to many families with children, such as a ground-oriented built form, at a more attainable price compared to detached homes (Silvester et al., 2017; Wegmann, 2020). This is an essential form of housing for many households that are unable to afford a detached home, and thus it is an important part of the housing supply. Furthermore, because these homes are generally more compact than detached homes, and because they are intended to be an affordable alternative to detached homes, the distribution of missing middle homes in relation to services and amenities is an important consideration.

High-density housing is generally even more compact than missing middle housing and households living in this type of housing often have less private greenspace compared to those living in ground-oriented homes. It is also generally more affordable than ground-oriented homes and often considered a point of entry into the housing market. Therefore, residents in high-density housing may also benefit from having amenities nearby to do activities that they may not have space for in their own home, as well as amenities and services which can help reduce household costs such as public transportation.

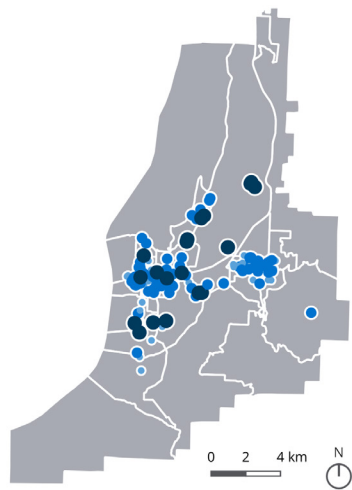
Purpose-built rental property data was obtained from the City of Kelowna's Rental Housing Inventory. For the purpose of this project, "missing middle" properties include ground-oriented forms that are designated as duplexes, triplexes, fourplexes, garden apartments, and row houses in the City of Kelowna's Model City database. "High density" properties include apartment blocks and high-rises in the Model City Database.

We examined the distribution of these key types of housing (see maps on the next page).

HOUSING

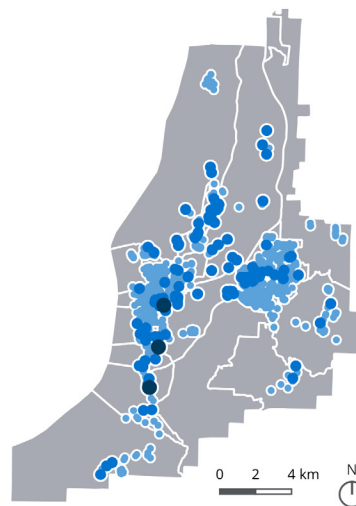


Purpose-built rental and high density properties are distributed similarly throughout Kelowna, with concentrations in Rutland, Glenmore, Downtown and South Central Kelowna, and the UBCO campus. While missing middle properties are distributed more evenly throughout the city, there are concentrations of missing middle housing around Rutland and Downtown and South Central Kelowna.



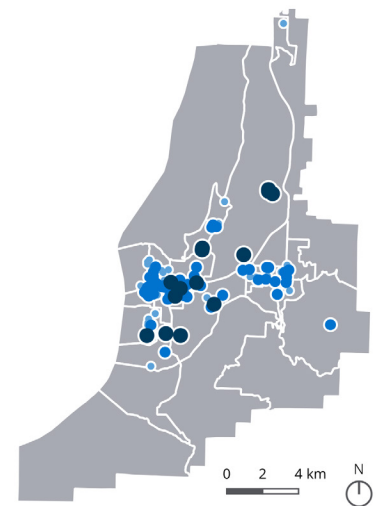
PURPOSE-BUILT RENTAL PROPERTIES

- < 20 units
- 21 - 100 units
- > 100 units



MISSING MIDDLE PROPERTIES

- < 20 units
- 21 - 100 units
- > 100 units



HIGH DENSITY PROPERTIES

- < 20 units
- 21 - 100 units
- > 100 units

Table 5
Summary of properties and dwelling units by housing form

Housing form	Number of properties	Number of units
PURPOSE-BUILT RENTAL	188	8,804
MISSING MIDDLE	1,754	9,583
HIGH DENSITY	159	6,527

HOUSING

CORE HOUSING NEED



Metrics

- Percentage of renters in core housing need in Kelowna
- Percentage of owners in core housing need in Kelowna
 - Indigenous households
 - Households with seniors
 - Households with children
 - Households with at least one member with an activity limitation

Technical Definition

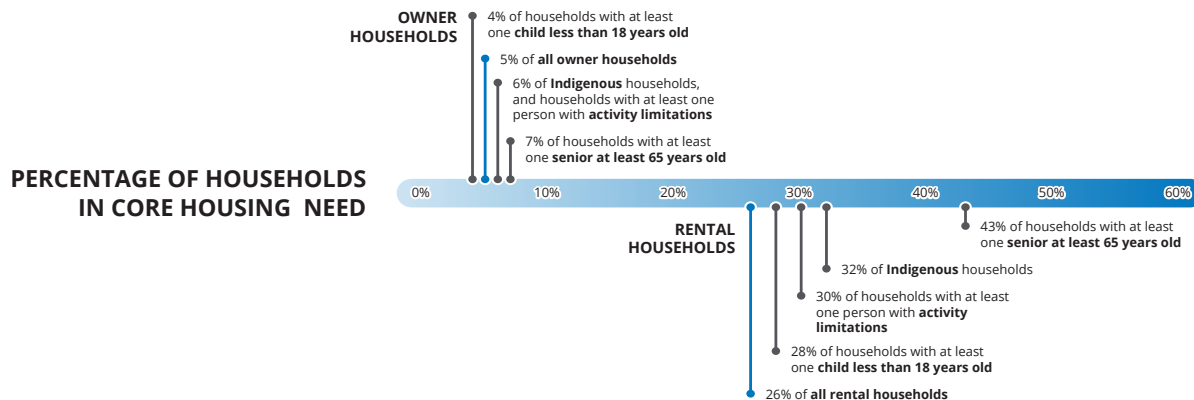
A household is said to be in **'core housing need'** if its housing falls below at least one of the adequacy, affordability or suitability standards and it would have to spend 30% or more of its total before-tax income to pay the median rent of alternative local housing that is acceptable (meets all three housing standards). Households with at least one primary household maintainer between ages 15 to 29 who are attending school are not considered to be in core housing need.

Core Housing Standards:

- **Adequacy:** Their housing does not require any major repairs
- **Affordability:** Their shelter costs equal to less than 30% of total before-tax household income
- **Suitability:** They have enough bedrooms for the size and composition of resident households according to National Occupancy Standard (NOS) requirements

Why measure this?

- Core housing need is a strong choice for a measure of housing outcomes because it goes beyond measures of affordability and also considers households that may live in substandard or overcrowded housing in order to afford their home. CMHC provides data on core housing need by tenure for select demographic groups. The sample sizes for these demographic groups were limited at the census tract level so we opted to collect this data at the Census Subdivision (city-wide) level.



Source: City-wide data on core housing need was obtained from the CMHC Data Portal.

HOUSING

CORE HOUSING NEED



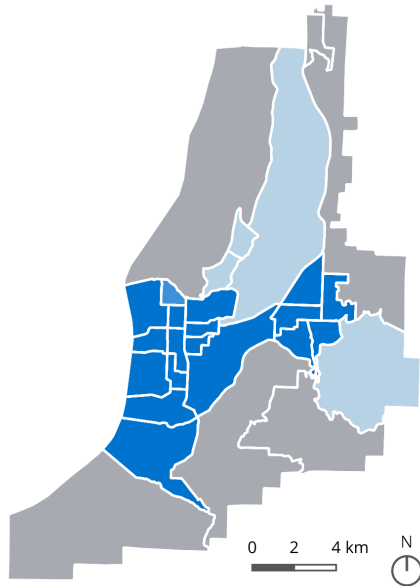
What can this tell us?

Although data on core housing need is not available for some equity-seeking groups, the available data suggests that members of equity seeking groups are more likely to be in core housing need than the general population. We were unable to obtain data on core housing need by housing built form to correspond to our analysis of missing middle and high density housing, although this may be possible through a custom census order.

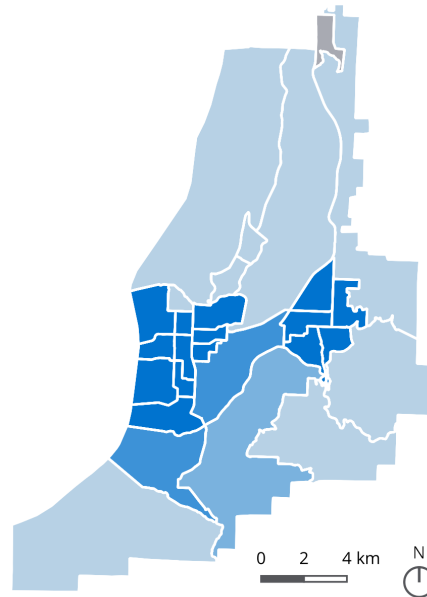
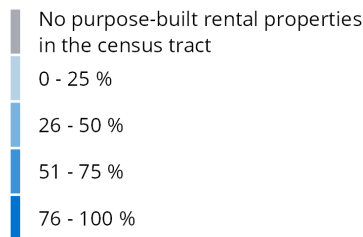
- Owner households with children under age 18 had the lowest likelihood of being in core housing need (4%)
- Renter households with at least one senior were the most likely to be in core housing need (45%)
- Renters are significantly more likely to be in core housing need, and the disparity between equity-seeking groups and the general population is larger among renters

HOUSING

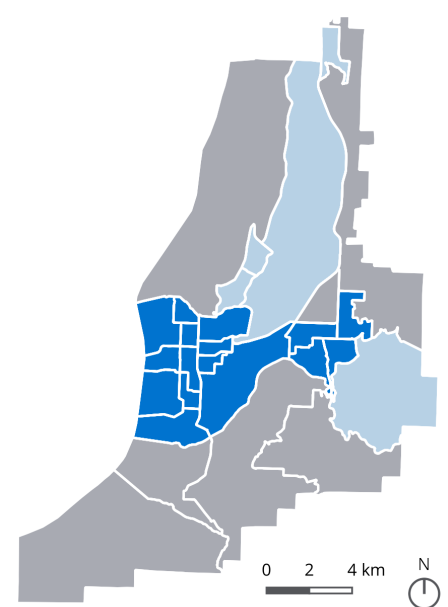
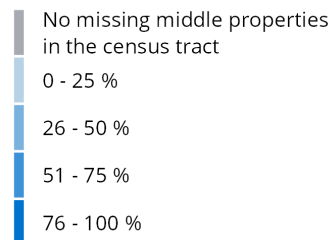
PROXIMITY TO TRANSIT



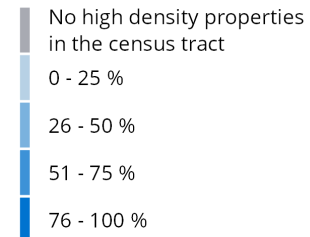
PERCENTAGE OF PURPOSE-BUILT RENTAL UNITS WITHIN RAPID & FREQUENT TRANSIT SERVICE AREAS



PERCENTAGE OF MISSING MIDDLE UNITS WITHIN RAPID & FREQUENT TRANSIT SERVICE AREAS



PERCENTAGE OF HIGH DENSITY UNITS WITHIN RAPID & FREQUENT TRANSIT SERVICE AREAS



Source: Purpose-built rental property data obtained from the City of Kelowna’s Rental Housing Inventory. Missing middle and high-density property data obtained from the City of Kelowna’s Model City database.

Transit stop locations for transit stops in the rapid and frequent transit network (including Routes 1, 5, 8, 10, 11, 23, and 97) obtained from BC Transit. The OpenRouteService plugin for QGIS was used to calculate service areas.

Metrics

- Percentage of rental units within 10-minute walk of rapid and frequent transit stops
- Percentage of missing middle units within 10-minute walk of rapid and frequent transit stops
- Percentage of high-density units within 10-minute walk of rapid and frequent transit stops

Technical Definition

- Calculated from the number of dwelling units located within rapid and frequent transit stop service areas. Rapid and frequent transit routes in Kelowna include Routes 1, 5, 8, 10, 11, 23, and 97. Transit stop service areas represent a 10-minute walking distance at 5 km/h from each transit stop in the rapid and frequent transit network (see Figure A1 in Appendix A).

Continued on the next page...

HOUSING

PROXIMITY TO TRANSIT



Why measure this?

Public transportation can provide an affordable transportation option, reducing household costs. Therefore, efficient public transportation is especially helpful for households who are more likely to have affordability challenges and compliments forms of housing which are intended to provide a more affordable option. Renter households and households living in more compact forms of housing may also have limited parking spaces. Thus, it is important to consider access to rapid transit in relation to purpose-built rental properties, high-density housing, and missing middle housing.

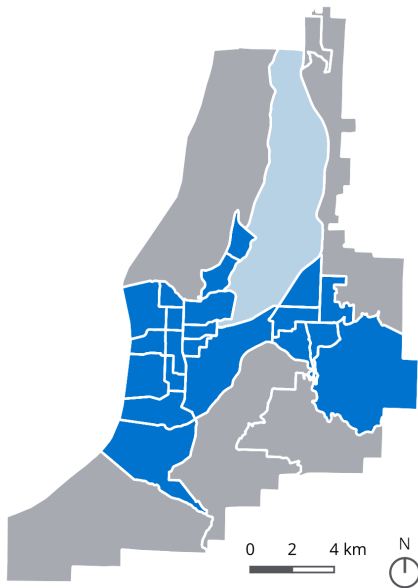
What can this tell us?

- 78% of rental units were located near rapid and frequent transit stops
- 69% of missing middle units were located near rapid and frequent transit
- 77% of high-density units were located near rapid and frequent transit

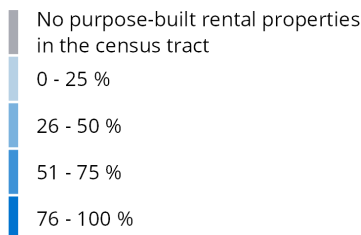
Most of the rental and high-density housing we examined was located near rapid and frequent transit stops, as those forms of housing are concentrated Downtown, and in South Central and Rutland where there is rapid transit. Missing middle housing is more spread out across the city, but a fair portion of it is still located close to rapid transit options. However, there are significant clusters of rental housing, as well as high-density and missing middle housing which is not within a 10-minute walk of any rapid and frequent transit stops in the Glenmore area, so this area in particular could benefit from adding a rapid transit option.

HOUSING

PROXIMITY TO PUBLIC PARKS

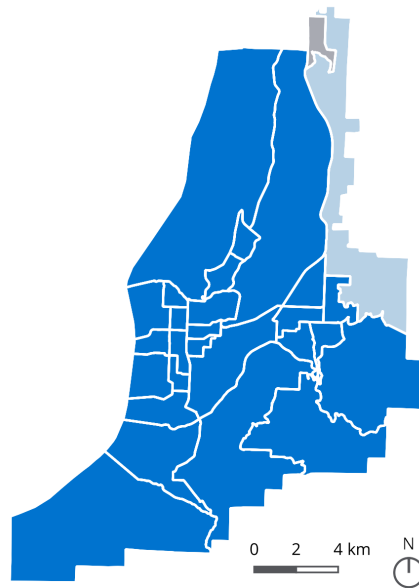


PERCENTAGE OF PURPOSE-BUILT RENTAL UNITS WITHIN PUBLIC PARK SERVICE AREAS

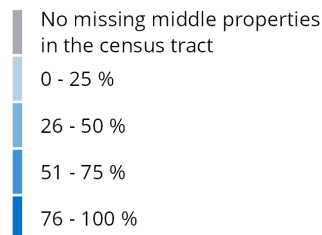


Source: Purpose-built rental property data obtained from the City of Kelowna’s Rental Housing Inventory. Missing middle and high-density property data obtained from the City of Kelowna’s Model City database.

The public parks map layer was obtained from the City of Kelowna open data portal.



PERCENTAGE OF MISSING MIDDLE UNITS WITHIN PUBLIC PARK SERVICE AREAS



Metrics

- Percentage of rental units within 10-minute walk of a park
- Percentage of missing middle units within 10-minute walk of a park
- Percentage of high-density units within 10-minute walk of a park

Technical Definition

- Calculated from the number of dwelling units located within 800 meters of a public park (approximately 10-minute walking distance at 5pkh; see Figure B1 in Appendix B).

Continued on the next page...

HOUSING

PROXIMITY TO PUBLIC PARKS



Why measure this?

Parks offer opportunities for low-barrier recreation and interaction with nature. This is particularly important to consider in relation to more compact forms of housing which are less likely to have private greenspace or adequate indoor space for many forms of recreation, such as high-density housing, missing middle housing, and rental housing.

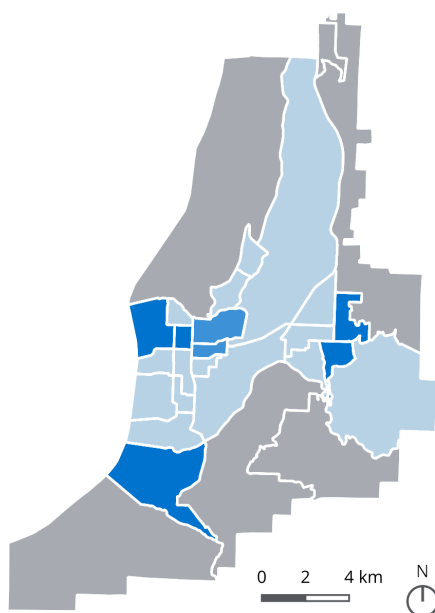
What can this tell us?

- 98% of rental units were located near parks
- Almost 100% of missing middle units were located near parks
- 98% of high-density units were located near parks

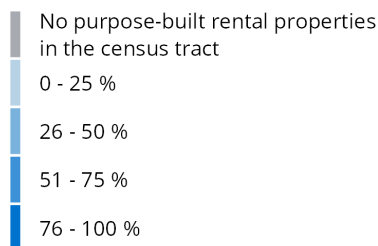
This data is highly suggestive that a majority of renters, as well as those living in missing middle and high density forms of housing, have access to a public park within a 10-minute walking distance. This is promising, and further analysis on other aspects of accessibility could be examined in addition to proximity to provide more well-rounded analysis in the future. For instance, future analysis could incorporate data on park facilities such as picnic benches, tennis courts, and playgrounds, as well as data on accessibility of park facilities for individuals with diverse abilities.

HOUSING

PROXIMITY TO SERVICE-PROVIDING SITES

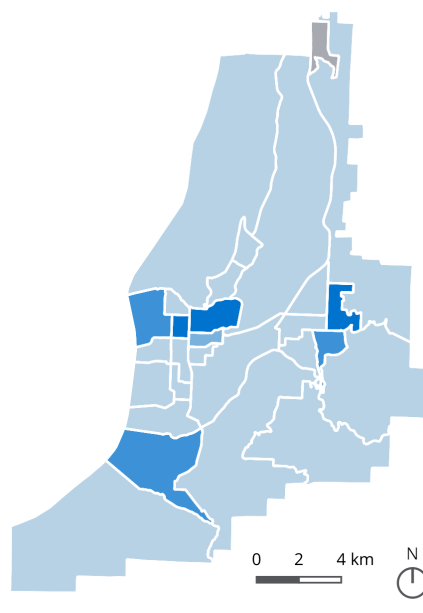


PERCENTAGE OF PURPOSE-BUILT RENTAL UNITS WITHIN LIBRARY & RECREATION CENTRE SERVICE AREAS

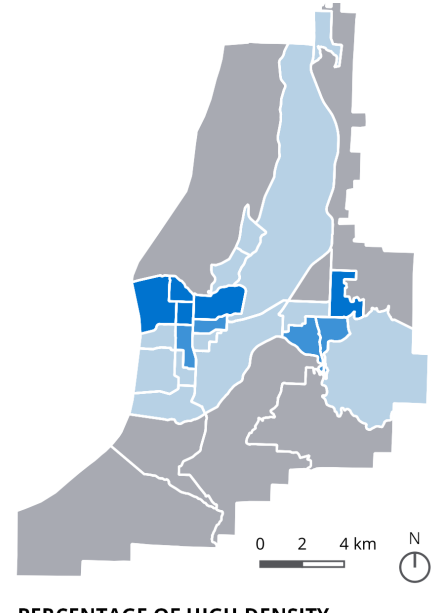
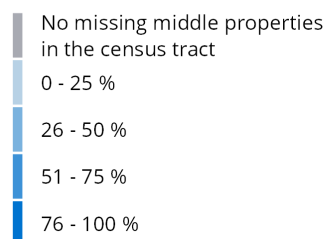


Source: Purpose-built rental property data obtained from the City of Kelowna’s Rental Housing Inventory. Missing middle and high-density property data obtained from the City of Kelowna’s Model City database.

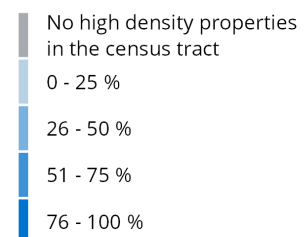
Library locations were obtained from Okanagan Regional Library website. Public/non-profit recreation centre locations were obtained from the City of Kelowna website.



PERCENTAGE OF MISSING MIDDLE UNITS WITHIN LIBRARY & RECREATION CENTRE SERVICE AREAS



PERCENTAGE OF HIGH DENSITY UNITS WITHIN LIBRARY & RECREATION CENTRE SERVICE AREAS



Metrics

- Percentage of rental units within 10-minute walk of a library or recreation centre
- Percentage of missing middle units within 10-minute walk of a library or recreation centre
- Percentage of high-density units within 10-minute walk of a library or recreation centre

Technical Definition

- Calculated from the number of dwelling units located within library or recreation centre service areas. Library and recreation centre service areas represent a 10-minute walking distance at 5 km/h from each library and public or non-profit recreation centre (see Figures B2 and B3 in Appendix B).

Continued on the next page...

HOUSING

PROXIMITY TO SERVICE-PROVIDING SITES



Why measure this?

Recreation centres and libraries can offer affordable or free options for recreation and quiet work spaces which may be especially valuable for those living in smaller homes. Thus, it is important to consider access to these sites for renters, who are more likely to struggle with housing affordability and overcrowding, as well as households living in more compact forms of housing such as high density and missing middle housing.

What can this tell us?

- 20% of rental units were located near a library or recreation centre
- 19% of missing middle units were located near a library or recreation centre
- 28% of high-density units were located near a library or recreation centre

Given the small number of service providing sites relative to spaces such as parks, it may be useful to do future analysis in this category with tiers in proximity, and perhaps include analysis on access by bus. One notable point from the present analysis is that the recreation centres and libraries on the west side of the City seem to be concentrated Downtown and in Mission, with less public amenities located between those two areas in South Central. South Central also has a significant amount of rental, high density, and missing middle properties, so further analysis to better understand ways to improve access to service-providing sites for this area may be especially valuable.

ENGAGEMENT PROCESS & INTERVIEW FINDINGS

“People that we work with are often already thinking about equity, but we also have to think about how to bring people along.”



Photo Credit: City of Kelowna

The interview process was designed to incorporate intersectional and local perspectives in the project. This phase of the research served two objectives:

- To identify limitations of the analytical strategy
- To illuminate directions for future work

We sought after an engagement process as best practice research for equity analyses highlight the importance of speaking with community members about the equity issues that matter most to them (PlanH, 2020). We arrived at an Engagement Strategy in December 2020 with the help of the City of Kelowna and the Advisory Committee. Due to time constraints of our project and challenges with capacity due to the COVID-19 Pandemic, our interview process ended up being limited. However, materials generated through the design phase of the Engagement Strategy may be re-purposed for future engagements.

In the next section, we outline a brief overview of our interview process and some key highlights from our conversation with staff members from a community group.

OVERVIEW OF INTERVIEW PROCESS

Potential participants were identified from a list of organizations operating in Kelowna that work with various local equity-seeking groups and were introduced to us by City of Kelowna staff. We reached out to nine organizations and received messages of interest from five groups, in the end we were only able to conduct one interview with one organization and two participants.

Questions were designed to elicit feedback on personal experiences living and working in Kelowna with respect to equity in the built environment, and obstacles to equity work in Kelowna as they relate to transportation, access to civic spaces and housing.

Continued on the next page...

Please note:

Quotes from our interview are included in the report - permission was granted to include quotes and the participants' identities will remain anonymous

ENGAGEMENT PROCESS & INTERVIEW FINDINGS

“The cultural makeup of City staff no longer matches that of the community.”

“I think something that everyone can be working on is making newcomers/immigrants feel safer in a new neighbourhood.”

“It’s more of a “how” than a “what.” It’s about engaging with diverse groups to identify what they would like to see. What would make a space accessible, engaging, welcome, and safe? For each group this will be a little bit different, so this input is really important.”

“We are trying to do the best we can... we’re finally making waves - people are becoming more aware of organizations doing equity work in the community. It’s a doing-and-learning process.”

TURNING THE CITY INTO A MODEL FOR EQUITY IN THE COMMUNITY

Participants identified a need for additional work on making Kelowna a more welcoming place for newcomers. They highlighted that Kelowna is experiencing an increase in immigration, especially among visible minority populations. In contrast to other immigration centres, diverse immigrant communities in the Central Okanagan are not necessarily large in population size. This can present a challenge for the provision of supportive resources. In light of reports of newcomers experiencing harassment on public transit, making people feel safe and welcome in a new neighbourhood should be a priority. Participants expressed that this demographic shift in Kelowna’s population should be reflected in the recruitment of City staff.

One participant remarked that in addition to determining objectives for future equity work, the question of “how” objectives are determined is equally important: What makes a space accessible, engaging, welcome, and safe will be different for different communities. Priorities for future equity work should be determined by engagement with affected communities, with reference to existing guidance like that of the “Truth and Reconciliation Commission of Canada’s Calls to Actions” (TRC, 2015).

Participants expressed that while they were unfamiliar with the City’s work to date, there is interest and opportunity to pursue partnerships for anti-oppression work. Referring to their own experience working with other agencies, participants advised the City to approach new partnerships with other organizations by recognizing existing knowledge gaps and emphasizing willingness to provide support. They highlighted that there is an opportunity for the City to identify and break down systemic barriers and become a leader in the equity space.



Photo Credit: City of Kelowna

GAP ANALYSIS & CONSIDERATIONS

When we started this project, we had many potential options for how we could spatially analyze equity. The City of Kelowna provided the City of Seattle's report on access to opportunities and risk of displacement as a launching point. However, upon digging further into this report, we realized that Seattle had identified displacement as a key equity issue through a lot of preexisting research and reports on equity, and there was not the same level of foundational knowledge of equity issues in Kelowna to know whether a displacement focus was ideal. This led us to explore alternative equity frameworks and analyses, and ultimately create our own analytical strategy in order to ensure the right scope and appropriate data sources were selected for the City of Kelowna. While our report is a first step towards analyzing the state of equity in Kelowna, we have both gaps and considerations for any future equity work following this report.

Our gap analysis will be composed of three sections:

- **Scope:** One equity analysis cannot tell you everything about equity
- **Data:** Limitations of our data and data sources in general
- **Future:** Considerations for City of Kelowna's next equity steps

SCOPE: One equity analysis cannot tell you everything about equity

In a collective brainstorming exercise with City of Kelowna staff, we outlined three approaches to equity including distributional, procedural and recognitional. Our report focused solely on distributional equity as related to upstream planning interventions, which was important because including all three aspects would have required a longer time frame. While the distributional equity focus was needed for scoping, we additionally had to cut down on the indicators related to distributional equity that were named as 'downstream' planning interventions. Moving forward, we recommend that some of the other potential thematic focus areas be explored in addition to any other distributional equity factors you think we have missed in this exercise.

A few examples of additional thematic focus areas could include:

- Health services
- Education and childcare
- Food systems
- Economic opportunities

When considering distributional equity, there are two main issues: resources/amenities and hazards. In an equitable city, hazards should not disproportionately affect equity-seeking groups, and resources and/or amenities should be accessible and meet the needs of diverse citizens (PlanH, 2020). Even though this is a mapping project, it is important to note that distance and distribution alone does not give you a fulsome picture of accessibility for a given resource or amenity. Affordability, suitability and availability are also important considerations.

For example:

A community centre within walking distance is a great community asset, but that does not tell you whether or not the space is tailored to your needs. Depending on someone's social location, they have different requirements for an accessible space - wheelchair access, culturally appropriate services, etc.

GAP ANALYSIS & CONSIDERATIONS

Lastly, with a focus on the physical presence of equity indicators, our conclusions are unable to report on a fulsome state of equity. We were unable to speak to the procedural piece which involves equitable inclusion in decision-making and the recognitional piece which includes acknowledgment and respect of different groups in the way they want to be represented (Meerow et al., 2019). We recommend that with any equity work moving forward that procedural and recognitional equity are at the forefront - equity work should center people and equity-seeking groups, and be grounded in their lived experiences in order to create meaningful change.

This could look like:

- Integrating engagement into any equity centered work
- Inviting stakeholders to join the Equity Advisory Committee
- Creating a City led statement of inclusion
- Making equity-based decisions with the people who are most affected by these interventions



Photo Credit: City of Kelowna

GAP ANALYSIS & CONSIDERATIONS

LIMITATIONS OF OUR DATA

Engagement Process

As discussed earlier, we conducted only one interview which was able to provide only one group's perspective. While, any and all perspectives are valuable, it would have been ideal to have had more voices speak on the topic. As three non-residents, this becomes more difficult because we lack the lived experiences and context for equity in Kelowna's built environment. Our engagement was intended to get at this piece and we will elaborate on this further in our suggestions for future work.

Data Gaps: General Overview

For our analysis, we primarily drew upon existing datasets from the City of Kelowna, census data, and data from the CMHC data portal. Drawing upon these pre-existing datasets came with some restrictions, and we hope by elaborating on some of the challenges we experienced because of it, that it can lead to ideas for exploring new data sources and acquiring or collecting custom datasets for future equity work.

The main challenge we had with the data was that all of the census data we had access to was only available at the census tract level. Census tracts are delineated to contain similar populations to one another, rather than to correspond to neighbourhood boundaries or other characteristics of a geographical area, so in some ways are an arbitrary geography. They also vary greatly in land area.

Being constrained to using this geography puts limits on the types of analysis we were able to conduct. For instance, we were unable to analyze demographic data directly against the access to rapid transportation maps to identify the demographics of those who live close to rapid transit stops. We were able to do loose analysis by comparing how much area of census tracts are covered by service areas for rapid transit, parks, recreation centres and libraries with the demographic profile of census tracts, but it is an imprecise analysis.

Another advantage of obtaining custom data is that there are more options for cross tabulations. For instance, with custom census orders it would be possible to conduct analysis of core housing need data across age groups at a similar income level. For future analyses we highly suggest dedicating time and budget to obtaining census data with custom boundaries and the ability to examine more cross tabulations.

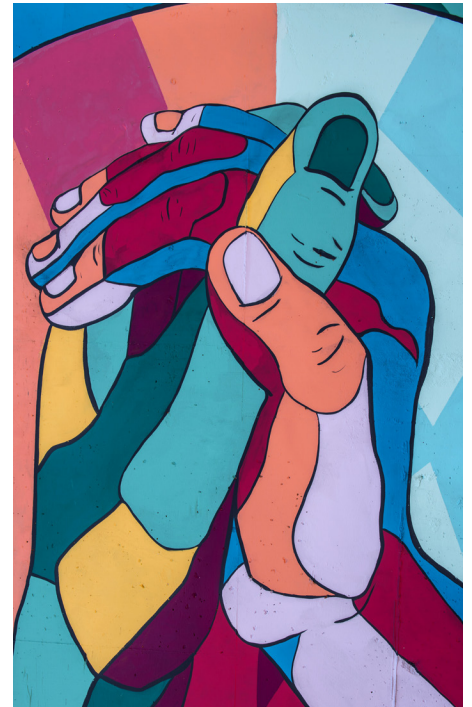


Photo Credit: Unsplash

GAP ANALYSIS & CONSIDERATIONS

Data Gaps: Demographics



The census is generally the most comprehensive source of demographic data, but it is not a perfect source of data for many equity-seeking groups. For instance:

- Data on LGBTQ2S+ identity is not included in the census.
- Data on persons with disabilities is not included in the Census. Statistics Canada started conducting a detailed survey on the experiences of persons with disabilities every 5 years on persons starting in 2017, but the smallest geography for the data that is publicly available is at the census metropolitan area (CMA) level (Statistics Canada, 2019).
- Visible minority data can be useful to get at questions of race but it fails to capture the many nuances in racial and ethnic identity. For example, the concept “visible minority” depends on categorizing people as white, non-white or Indigenous, but in many cases, the idea of who belongs to what racial category shifts across time and place (Song, 2020). This categorization can also obscure the differences in experience between various visible minority groups. Where available, we suggest including more detailed racial and ethnic data in future equity work.
- Data on people who identify as Indigenous is problematic due to issues with misclassification and non-response bias (Smylie & Firestone, 2015). It is important to seek out disaggregated data on Indigeneity that is collected in culturally safe ways, and to make room for Indigenous communities and institutions to self-determine interpretation (BCOHR, 2020).

There was also data which can be obtained from the census but which we didn’t have access to in the dataset we used. One key category that was not available to us was data on the Low-Income Measure (LIM). In the absence of this data point, we used median household income and percentage of households under \$20,000, the lowest income bracket. However, these figures do not account for household size which makes it difficult to definitively correlate these with financial need. Low Income Measure would be more suitable, because it takes the composition of the household into account in determining the low-income cut off. For future analyses, we suggest that this statistic be used instead as the primary measure of financial need.

Given how complex many aspects of social location are, and how available data is imperfect at capturing the nuances of equity-seeking groups, all three aspects of the Grandmother’s Perspective should be included: process, purpose and tool in order to achieve “equity benefits and mitigate risk” (BCORHC, 2020). The importance of relationship building throughout this data process cannot be underscored as “relationship change precipitates systems change” (BCORHC, 2020).



Photo Credit: City of Kelowna

GAP ANALYSIS & CONSIDERATIONS



Photo Credit: Unsplash

Data Gaps: Housing



With regards to the core housing need data, publicly available data via CMHC only allows for comparison of housing outcomes between select demographic groups by tenure. While useful, this data cannot control for income disparities across groups and there are many equity-seeking groups which are not represented in this data. Conducting a custom census order on core housing need would allow the City to get a broader picture of the housing outcomes of various demographic groups and better understand the interrelation between social location and income with regards to housing outcomes.

Additionally, we considered examining data on rental rates and vacancy to compliment our map of the distribution of purpose-built rental properties. However, data on vacancy rates, median rent for various categories of units, and rent cost of currently vacant units is poor at the census tract level due to the limited number of purpose-built rental units in many census tracts.

Data Gaps: Transportation



There were several areas for improvement in the City data on active transportation facilities. The data for sidewalks is compiled in a way that does not allow for an easy measure of sidewalk continuity because sidewalks do not connect across intersections in the data and there is no data on crosswalks. We were able to approximate sidewalk completeness by comparing the length of sidewalks to the length of roads, with the assumption that there should be twice the length of sidewalks to roads, assuming there is a sidewalk on each side of the road. However, if sidewalks were connected with crosswalks in the data then it would be easy to identify poorly connected sidewalks by singling out sidewalk segments that are shorter than a specified length. Additionally, there is currently no data on curb cuts, which are an important factor for making sidewalks accessible for people with diverse abilities.

Although there is various data on what transportation infrastructure exists in Kelowna (eg. bus routes, roads, active transportation network), there is less data readily available on how people in Kelowna choose a mode of transportation and how it affects them. Data on transportation mode and commute time from the census is limited to trips to and from work and excludes all other trips, meaning that many people are not represented at all in this data. Understanding travel times and transportation cost for a wide variety of demographic groups would help round out the analysis to give a better picture of the state of equity of transportation - namely, whether some groups are spending a disproportionate amount of time and/or money on transportation when this could be alleviated by more efficient public transportation options in their neighbourhood. An income-based measure similar to the housing affordability measure (households spending more than 30% of their gross income on housing) would be invaluable for transportation, although it seems that this data does not exist at the present time.

GAP ANALYSIS & CONSIDERATIONS

Data Gaps: Civic Spaces

The main challenge for getting data on civic spaces is finding data pertaining to behavioural or situational characteristics which make a public service or amenity particularly valuable. For instance:

- Data on exercise habits, affordable recreation voucher usage, and at-home exercise facilities could inform decisions about where to focus on creating low-barrier opportunities for exercise and recreation
- Data on rates of internet access at home could be valuable when considering access to libraries
- Data on average home size and overcrowding could inform priority areas for service-providing sites and parks, similar to the analysis in the housing section which looked at built form and tenure to look at distance to amenities for households that likely live in more compact homes

Additionally, research into private facilities may also be valuable because understanding assets that are not City owned could open up avenues for leveraging partnerships to increase access to amenities where there may be gaps in publicly owned facilities. For instance, if there is a large area which is far from public recreation centres, but the community has a private gym, then implementing a way of reducing cost barriers for low-income individuals to access the gym may be more practical than trying to open a new public facility.



Photo Credit: City of Kelowna

GAP ANALYSIS & CONSIDERATIONS

SUGGESTIONS FOR FUTURE WORK

After reflecting on our analysis and limitations, we would like to share some additional suggestions for future work that the City of Kelowna and the Advisory Committee may wish to take on moving forward.

Recommendation #1: Centering lived experiences of equity-seeking groups

In our initial project research, we found that equity analyses require some key components in order to ensure any data generated is reflective of the community and their needs.

This includes:

- A deep understanding of systemic inequities
- Adopting a context-specific approach
- Listening to insights of intersectional embodied experiences of equity-seeking individuals and groups
- Addressing community priorities

(PlanH, 2020)

With this in mind, we would like to see the City of Kelowna engage in further work with community members with the priority on centering the lived experiences of equity-seeking groups. This approach can help define priority equity issues which can become the center of more focused, context-specific analysis. We hope this listening and learning phase will be impactful for both community members and the City, as a way to build strong relationships.

Recommendation #2: Pursuing partnerships

While we were only able to conduct one interview, we had interest from five out of nine community groups that we contacted. This process illuminated that community serving groups and people were interested in talking about equity in Kelowna, which we think the City of Kelowna should continue to pursue. Moving forward, creating “early and meaningful partnerships with communities most harmed by systemic inequities, to ensure the needs and goals of all communities members are valued and met” will be a valuable step (PlanH, 2020). We would also like to see the City work through the appropriate channels to center local Indigenous peoples and nations - it would be very powerful to see a partnership grow and perhaps take on some joint projects.

As three non-community members, it is difficult to name specific groups to reach out to but more broadly, we believe partnerships with groups who have mandates to serve the community, advance equity and support equity-seeking groups should be centered.

This could include and is not limited to, organizations or identity groups such as:

- Indigenous peoples and nations - both on-reserve and urban Indigenous
- Newcomers and immigrants
- Racialized people
- Disability communities - physical health, mental health, chronic illness, etc.
- Gender and sexuality
- People experiencing homelessness
- People who use substances

GAP ANALYSIS & CONSIDERATIONS

Recommendation #3: Review equity content in pre-existing City documents

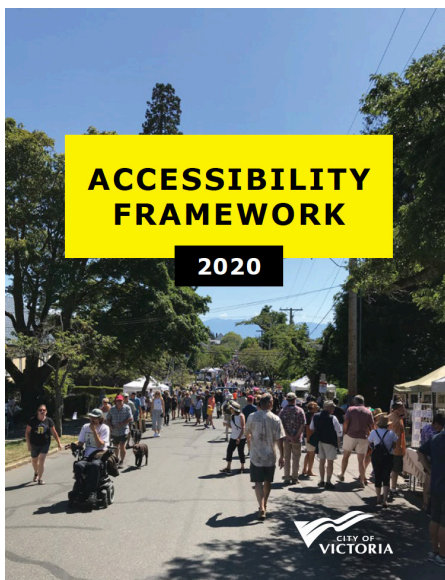
Municipalities have the decision making power and opportunity to alter the state of equity in the community through developing plans, policies and bylaws. We would like to recommend that the City of Kelowna undertake an audit of their pre-existing plans and policies to see how they address equity prior to making equity-related decisions (PlanH, 2020). This would help ensure that decisions are rooted in available data, and when data is unavailable, it should be found first.

This could be achieved by:

- Searching for key equity related terms in the documents
- Examining how much of the consultation processes takes equity into consideration i.e. procedural equity

This type of equity audit has been done really well in the “Summary Report: Urban Indigenous Housing in BC: Municipal response through housing policies and plans”, in which the authors go through Official Community Plans and housing policies to explore if and how municipalities currently acknowledge or address urban Indigenous housing needs (Breton, 2020). This research could be translated more broadly to include other City documents and could offer an opportunity to reflect on what kind of equity content is actually written into reports.

Another great example to look into is the City of Victoria’s (2020) recent report, “Accessibility Framework”. This report is well scoped as it focuses primarily on accessibility, it also does a good job of covering the procedural and recognitional aspects of equity, which we think the City of Kelowna could integrate as a part of their larger commitment to integrating equity into city-building.



Credit: “Accessibility Framework” (City of Victoria, 2020)



Credit: “Summary Report: Urban Indigenous Housing in BC: Municipal response through housing policies and plans” (Breton, 2020)

GAP ANALYSIS & CONSIDERATIONS

Recommendation #4: Recognizing capacity required for equity initiatives

Dedicated staff for equity initiatives

If the City of Kelowna is planning to invest in equity, this requires having adequate staffing dedicated to this work. In our research, one source suggested that for a thorough equity analysis, it is prudent to dedicate at least two full-time staff members for 12 to 18 months (Finio et al., 2020). This is important to consider as you navigate how and to what scale you would like to integrate equity into the planning team at the City of Kelowna.

Other cities who are regarded in British Columbia for their social policy and equity work, have full departments with distinct topic areas and staff dedicated to advancing equity city-wide. For example, the City of Vancouver's Social Policy & Project Department covers topics such as and not limited to the healthy city strategy, anti-racism, and accessibility, with staff deployed to specific teams (City of Vancouver, n.d). Adopting a model like this may provide the City of Kelowna with greater capacity to tackle these issues internally at an achievable scale while simultaneously modelling for the community that it is possible to create an equitable environment.

Commitment to staff training & continuous learning

In addition to creating a team, there should be City training available for all staff on equity related issues (PlanH, 2020). Equity cannot live in a silo in one department, it should be a thread throughout all work produced and advertised by the city. Equity training should be ongoing, reflexive and led by content experts to ensure it is delivered appropriately and well-intentioned.

Equity, diversity and inclusion training could include topics such as and not limited to:

- Cultural competency, sensitivity and safety training
- Anti-racism workshops
- Access and inclusion

(PlanH, 2020)

Key considerations for developing an equity team:

- Hire staff who belong to equity-seeking groups
 - Ensure equity-seeking staff occupy leadership positions
 - Implement measures to support staff's wellbeing
 - Recognize staff's emotional labour
- (PlanH, 2020 & City of Victoria, 2020)



Photo Credit: Unsplash

CONCLUSION

This report offers an overview of indicators relevant to the equitable distribution of upstream planning interventions with the aim of informing future research undertaken by the City on the state of equity in Kelowna. In our synthesis of the best practice literature, case studies, and our own spatial analysis we have highlighted three principles for informative and actionable equity analyses:

- The development of priorities for equity work broadly must be determined by equity-seeking groups in accordance with the principle of “nothing about us, without us.” For an equity analysis, this will require the **centering of lived-experience** by taking direction from affected communities to define scope, data collection, and interpretation.
- Equity is an intensely multi-dimensional concept, and the advancement of equity in Kelowna will have wide-ranging implications for city planning. The dimensions of equity that are the subject of analysis must be **focused and well-defined** to ensure that themes can be explored in sufficient depth. For future equity analysis projects, research questions should be developed through a problem-definition phase that includes engagement with equity-seeking groups affected by the relevant policy.
- The measurable dimensions of equity must be understood as one piece of a large picture. Analytical equity research should be **integrated** into plan documents to ensure that the equity implications of policy decisions are meaningfully considered. The City’s adoption of equity as a lens for analysis presents an opportunity for leadership in data-driven policy.



Photo Credit: City of Kelowna

EQUITY GLOSSARY

The following terms and definitions are a combination of terms we used in the report and terms we found useful throughout our research that the City may want to adopt in their equity work.

Active transportation: any form of human-powered transportation, including walking, cycling, using a wheelchair, in-line skating or skateboarding. People often combine the use of active transportation with public transit as a complementary means of getting around (PHSA, 2018).

Anti-oppression practice: seeks to recognize the oppressions that exist in our society, and attempts to mitigate its affects and eventually equalize the power imbalance in our communities (Anti-Oppression Network, n.d).

Assets: individual, group and community characteristics and resources that contribute to health and well-being, and support resilience (NCCDH, 2015).

Asset-based approach: promotes capacity and connectedness by making visible and valuing the skills, knowledge, connections and potential in an individual, group or community (NCCDH, 2015).

Built environment: refers to the human-made or modified physical surroundings in which people live, work and play. These places and spaces include our homes, communities, schools, workplaces, parks and recreations areas, business areas and transportation systems, and vary in size from large-scale urban areas to smaller rural developments (PHSA, 2018).

Complete community: places where residents enjoy their choices of lifestyles, food, housing options, employment, services, retail and amenities, multi-modal transportation, and educational and recreational facilities and programs. Most importantly, complete neighbourhoods provide easy access to the daily life necessities for people of all ages, abilities and backgrounds in an engaging and adaptable urban environment (PHSA, 2018).

Colonialism: a practice of domination, which involves the subjugation of one people to another. Settler colonialism—such as in the case of Canada—is the unique process where the colonizing population does not leave the territory, asserts ongoing sovereignty to the land, and actively seeks to assimilate the Indigenous populations and extinguish their cultures, traditions and ties to the land (PlanH, 2020).

Core Housing Need: if its housing falls below at least one of the adequacy, affordability or suitability standards and it would have to spend 30% or more of its total before-tax income to pay the median rent of alternative local housing that is acceptable (meets all three housing standards) (Statistics Canada, 2017).

Cultural safety: an approach that considers how social and historical contexts, as well as structural and interpersonal power imbalances. This term is rooted in health care, however, it can be applied to other settings such as planning. Cultural safety is self-defined and requires self-reflective practitioners who acknowledge their power and role in decision-making (Ward et al., 2016).

Cultural sensitivity: an attitude that recognizes the differences between cultures and that these differences are important to acknowledge (Ward et al., 2016).

EQUITY GLOSSARY

Culturally appropriate: culturally appropriate community interventions are based on the target group or communities' values. The strategies that make up the intervention reflect the attitudes, expectations and norms of the community, as well as the behavioural preferences and expectations of the group's members in order to achieve inclusion (PlanH, 2020).

Discrimination: treating someone unfairly by either imposing a burden on them, or denying them a privilege, benefit or opportunity enjoyed by others, because of their race, citizenship, family status, disability, sex or other personal characteristics (PlanH, 2020) .

Distributional equity: the equitable distribution of goods and infrastructure, services, and environmental (dis)amenities (Meerow et al., 2019).

Equity: when people's race, gender, economic status or sexual orientation do not determine their economic, social or political opportunities. Equity means providing support and resources based on an individual's level of need, instead of providing everyone with the same level of support. Equity is a step towards social justice (PlanH, 2020).

Equity for city-building: areas of equity that are in the purview of municipal level planning and development including transportation, housing, land use, among others (PHSA, 2018).

Equity-seeking groups: Equity-seeking groups are those that identify barriers to equal access, opportunities and resources due to disadvantage and discrimination and actively seek social justice and reparation including: Indigenous, racialized, poverty, youth, women, seniors, newcomers, English-second language (ESL) speakers, disabilities, people experiencing homelessness, mental illness and substance use, LGBTQ2S+, and so on (PlanH, 2020).

Food security: a condition in which all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (PlanH, 2020).

Food sovereignty: food sovereignty is the right of peoples to healthy and culturally-appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems (PlanH, 2020).

Health: physical, spiritual, mental, emotional, environmental, social, cultural and economic wellness of the individual, family, and community (NCCDH, 2015).

Inclusion: a state of belonging, when persons of different backgrounds and identities are valued, integrated, and welcomed equitably as decision-makers and collaborators (PlanH, 2020).

Indigenous: The United Nations uses the term Indigenous to refer broadly to peoples of long settlement and connection to specific lands who have been adversely affected by incursions by industrial economies, displacement and settlement of their traditional territories by others. Some government policies and documents use the word 'Aboriginal', however, we have decided to not use that term wherever possible (PlanH, 2020).

EQUITY GLOSSARY

Inequity: the opposite of equity in which there is a difference in the distribution or allocation of a resource between groups. This may be on the basis of people's race, gender, economic status, sexual orientation and so on. Inequity is seen as unfair and unjust (Klein & Huang, 2010).

Intersectionality: acknowledges each person's unique identities and social locations overlap and will shape how people navigate the world, their lived experiences and the degree to which they experience inequities (PlanH, 2020).

LGBTQ2SIA+: a common abbreviation for Lesbian, Gay, Bisexual, Pansexual, Transgender, Genderqueer, Queer, Two-Spirited, Intersexed, Agender, Asexual, and Ally community (PlanH, 2020).

Marginalized populations: groups and communities that experience discrimination and exclusion (social, political and economic) because of unequal power relationships across economic, political, social and cultural dimensions (NCCDH, 2015).

Mixed land use: enables a variety of land uses including residential, commercial, and industrial to be co-located in an integrated way that supports sustainable forms of transport such as public transit, walking and cycling, and increases neighbourhood amenity (PHSA, 2018).

Racialized communities: encompasses all people that are non-Caucasian in race or nonwhite in colour (PlanH, 2020).

Racism: any individual action, or institutional practice which treats people differently because of their colour or ethnicity. This distinction is often used to justify discrimination (PlanH, 2020).

Planning for equity: contributes to the development of sustainable, resilient and healthy communities by more effectively and systematically addressing community well-being (PlanH, 2020).

Procedural equity: equitable participation in decision-making processes including plan development, governance and outreach (Meerow et al., 2019).

Recognitional equity: acknowledgment and respect of different groups, their histories and needs (Meerow et al., 2019).

Social inclusion/social exclusion: refer to the dynamic and multi-dimensional social process at all levels (individual, group and community) that is driven by unequal power relationships across economic, political, social and cultural dimensions (NCCDH, 2015).

Social location: different aspects of one's identities which interlock such as ethnicity, Indigenous identification, religion, gender, citizenship and so on, which produce a unique and distinct experience for that individual or group (Government of Ontario, 2017).

EQUITY GLOSSARY

Two-spirit: a term used within some Indigenous communities that encompasses cultural, spiritual, sexual and gender identity. “Two-Spirit” is to be used only by Indigenous people. However, not all Indigenous people who hold diverse sexual and gender identities consider themselves Two-Spirit; many identify as LGBTQ+ (PlanH, 2020).

Vulnerable populations: groups and communities at a higher risk for poor health as a result of the barriers they experience to social, economic, political and environmental resources, as well as limitations due to illness or disability (NCCDH, 2015).

Walkability: The extent to which the built environment supports and encourages walking by providing for pedestrian comfort and safety, connecting people with varied destinations within a reasonable amount of time and effort and offering visually interesting journeys throughout the network (PHSA, 2018).

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APPENDIX A: TRANSPORTATION REFERENCE MAPS



Figure A1. Rapid and frequent transit stop service areas (10-minute walking distance).

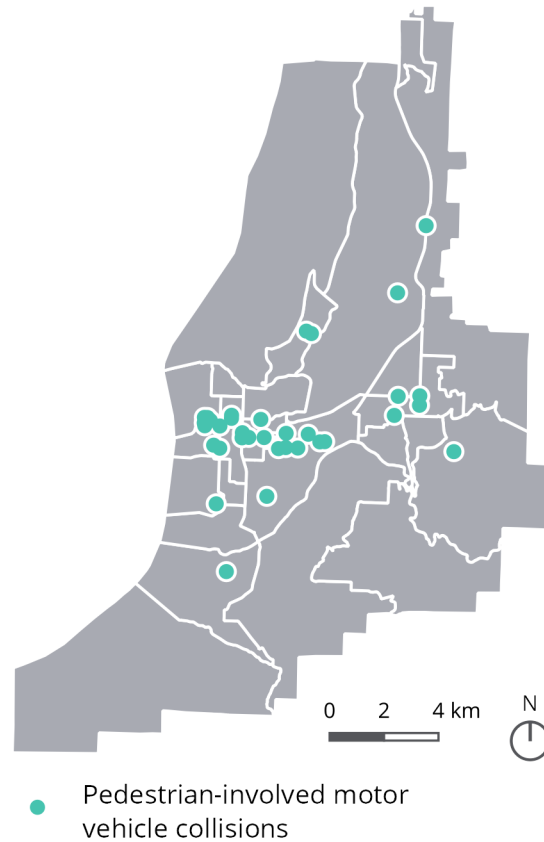


Figure A2. Pedestrian-involved motor vehicle collisions in 2019 reported to ICBC.

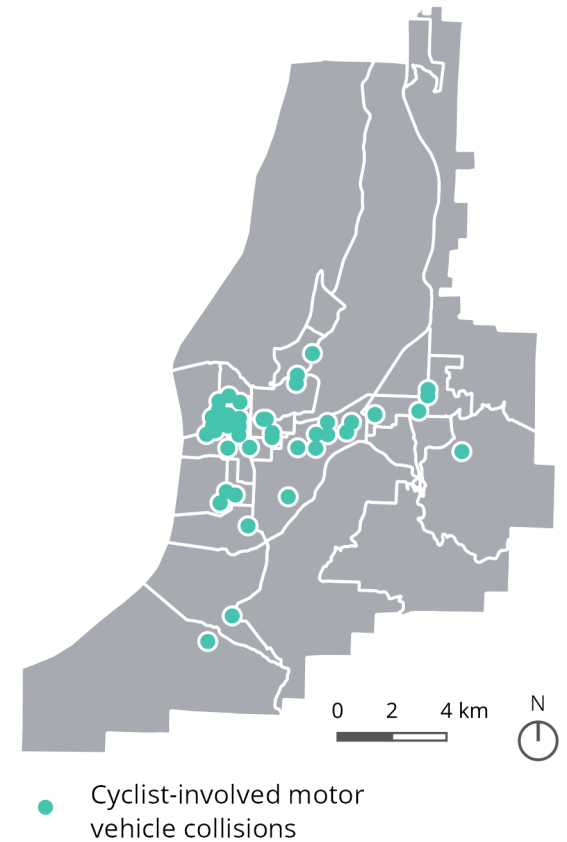


Figure A3. Cyclist-involved motor vehicle collisions in 2019 reported to ICBC.

APPENDIX B: CIVIC SPACES REFERENCE MAPS

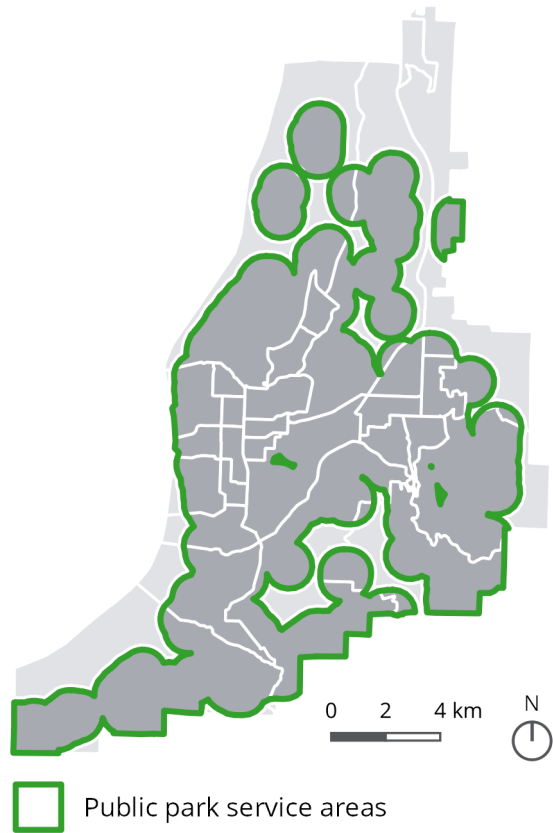


Figure B1. Public park service areas (10-minute walking distance).

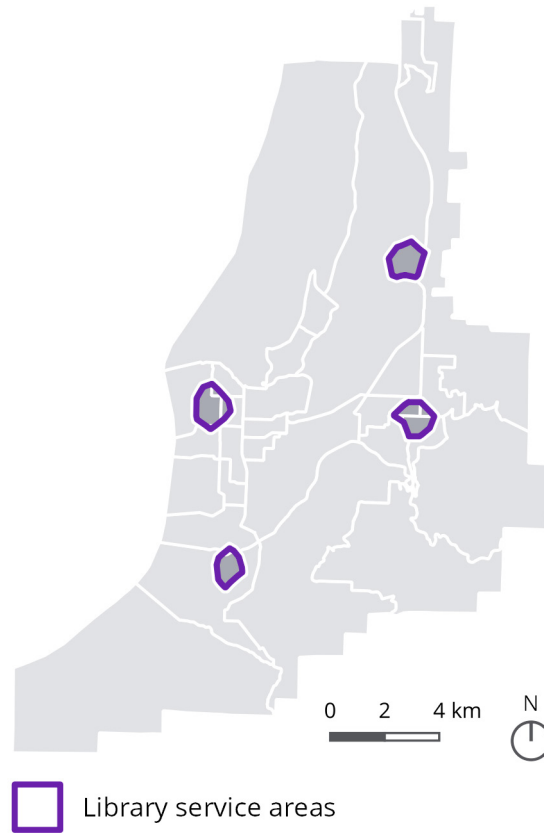


Figure B2. Library service areas (10-minute walking distance).

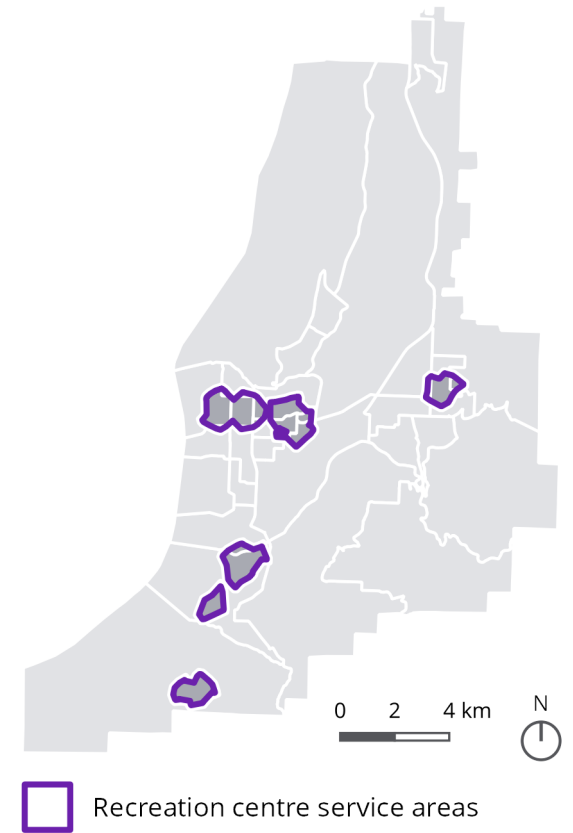


Figure B3. Recreation centre service areas (10-minute walking distance).

APPENDIX C: CORRELATION MATRIX

The following matrix contains correlation coefficients between metrics for each demographic and indicator. Spearman's Rank Correlation was used to detect non-linear relationships between metrics.

Correlation coefficients vary between -1 and 1, where -1 corresponds to an inverse relationship (i.e. one variable decreases as the other variable increases), and 1 corresponds to a positive relationship (i.e. one variable increases as the other increases). A correlation coefficient of 0 indicates that there is no relationship between the two variables.

Because only 28 census tracts are included in the analysis, correlations are rarely statistically significant. These correlation coefficients should be interpreted as a means to identify relationships that may be worthy of further investigation.

	DEMOGRAPHICS										TRANSPORTATION					CIVIC SPACES				HOUSING								
	Median household income (before tax, not adjusted for inflation)	Percentage of the population with a household income below \$20,000 (before tax, not adjusted for inflation)	Unemployment rate	Percentage of the population aged 25 to 64 that completed a post-secondary degree, diploma, certificate, or another form of post-secondary training	Median age	Number of persons per square kilometre	Percentage of the population that identifies as a visible minority	Percentage of the population that identifies as Indigenous	Percentage of the population with knowledge of English	Percentage of the population that primarily speaks a language other than English at home	Percentage of the census tract area covered by rapid and frequent transit stop service areas (within 10-minute walking distance of transit stops)	Ratio of pedestrian facility length to road length	Ratio of bike facility length to road length	Annual pedestrian-involved motor vehicle collisions	Annual cyclist-involved motor vehicle collisions	Public park area per capita	Normalized Difference Vegetation Index (NDVI)	Percentage of the census tract area covered by library service areas (within 10-minute walking distance of libraries)	Percentage of the census tract area covered by recreation centre service areas (within 10-minute walking distance of recreation centres)	Percentage of rental units within 10-minute walk of rapid and frequent transit stops	Percentage of rental units within 10-minute walk of a park	Percentage of rental units within 10-minute walk of a library or recreation centre	Percentage of missing middle units within 10-minute walk of rapid and frequent transit stops	Percentage of missing middle units within 10-minute walk of a park	Percentage of missing middle units within 10-minute walk of a library or recreation centre	Percentage of high-density units within 10-minute walk of rapid and frequent transit stops	Percentage of high-density units within 10-minute walk of a park	Percentage of high-density units within 10-minute walk of a library or recreation centre
Median household income (before tax, not adjusted for inflation)	-	-0.9	-0.1	0.2	0.0	-0.7	0.0	-0.3	0.1	0.1	-0.8	-0.7	-0.3	-0.5	-0.6	0.6	0.7	-0.1	-0.3	-0.6	-0.5	-0.3	-0.6	-0.1	-0.1	-0.7	-0.6	-0.4
Percentage of the population with a household income below \$20,000 (before tax, not adjusted for inflation)	-0.9	-	0.1	-0.1	-0.1	0.7	0.0	0.3	0.0	-0.1	0.7	0.7	0.3	0.5	0.6	-0.5	-0.7	0.2	0.4	0.6	0.5	0.3	0.6	0.2	0.1	0.7	0.6	0.4
Unemployment rate	-0.1	0.1	-	-0.3	0.4	0.0	0.0	-0.2	0.0	-0.1	0.1	0.0	0.1	0.2	0.1	-0.1	0.0	0.0	0.2	0.1	0.0	0.3	0.1	-0.1	0.3	-0.1	-0.2	0.0
Percentage of the population aged 25 to 64 that completed a post-secondary degree, diploma, certificate, or another form of post-secondary training	0.2	-0.1	-0.3	-	0.1	-0.3	-0.3	-0.6	0.4	-0.2	-0.4	0.2	0.4	-0.1	0.1	0.3	-0.1	-0.1	0.1	-0.1	-0.1	0.0	-0.2	0.3	-0.1	-0.1	-0.1	-0.2
Median age	0.0	-0.1	0.4	0.1	-	-0.4	-0.3	-0.5	0.3	-0.3	-0.3	-0.1	0.4	0.2	0.1	0.3	0.2	-0.3	0.0	-0.2	-0.4	-0.2	-0.3	-0.4	-0.4	-0.3	-0.4	-0.4
Number of persons per square kilometre	-0.7	0.7	0.0	-0.3	-0.4	-	0.1	0.4	-0.1	0.1	0.7	0.6	0.1	0.3	0.4	-0.6	-0.5	0.1	0.3	0.6	0.7	0.3	0.6	0.5	0.3	0.6	0.7	0.4
Percentage of the population that identifies as a visible minority	0.0	0.0	0.0	-0.3	-0.3	0.1	-	0.4	-0.7	0.7	0.2	-0.1	-0.1	0.1	0.1	-0.2	0.0	0.2	-0.1	0.1	0.1	0.0	0.3	0.0	0.1	0.0	0.0	0.1
Percentage of the population that identifies as Indigenous	-0.3	0.3	-0.2	-0.6	-0.5	0.4	0.4	-	-0.4	0.2	0.6	0.0	-0.3	-0.2	-0.1	-0.3	-0.2	0.4	0.0	0.3	0.2	-0.1	0.5	-0.1	0.1	0.4	0.3	0.2
Percentage of the population with knowledge of English	0.1	0.0	0.0	0.4	0.3	-0.1	-0.7	-0.4	-	-0.7	-0.3	0.2	0.3	-0.1	0.0	0.2	-0.1	-0.1	0.0	-0.1	0.0	-0.1	-0.3	0.1	-0.2	0.0	0.0	-0.1
Percentage of the population that primarily speaks a language other than English at home	0.1	-0.1	-0.1	-0.2	-0.3	0.1	0.7	0.2	-0.7	-	0.1	-0.2	-0.2	0.1	0.1	-0.2	0.2	0.0	-0.2	0.1	0.1	0.0	0.3	0.2	0.0	-0.1	0.0	-0.1
Percentage of the census tract area covered by rapid and frequent transit stop service areas (within 10-minute walking distance of transit stops)	-0.8	0.7	0.1	-0.4	-0.3	0.7	0.2	0.6	-0.3	0.1	-	0.5	0.0	0.3	0.4	-0.6	-0.4	0.3	0.4	0.8	0.5	0.4	0.8	0.3	0.4	0.7	0.5	0.6
Ratio of pedestrian facility length to road length	-0.7	0.7	0.0	0.2	-0.1	0.6	-0.1	0.0	0.2	-0.2	0.5	-	0.6	0.5	0.7	-0.3	-0.6	0.2	0.5	0.6	0.7	0.4	0.5	0.5	0.3	0.7	0.7	0.5
Ratio of bike facility length to road length	-0.3	0.3	0.1	0.4	0.4	0.1	-0.1	-0.3	0.3	-0.2	0.0	0.6	-	0.3	0.4	0.1	-0.2	0.0	0.2	0.2	0.3	0.0	0.2	0.1	-0.2	0.2	0.2	-0.1
Annual pedestrian-involved motor vehicle collisions	-0.5	0.5	0.2	-0.1	0.2	0.3	0.1	-0.2	-0.1	0.1	0.3	0.5	0.3	-	0.7	-0.2	-0.2	0.2	0.4	0.4	0.4	0.5	0.3	0.2	0.2	0.4	0.5	0.3
Annual cyclist-involved motor vehicle collisions	-0.6	0.6	0.1	0.1	0.1	0.4	0.1	-0.1	0.0	0.1	0.4	0.7	0.4	0.7	-	-0.3	-0.3	0.0	0.5	0.5	0.4	0.4	0.5	0.4	0.3	0.6	0.6	0.4
Public park area per capita	0.6	-0.5	-0.1	0.3	0.3	-0.6	-0.2	-0.3	0.2	-0.2	-0.6	-0.3	0.1	-0.2	-0.3	-	0.3	0.0	-0.1	-0.5	-0.3	-0.2	-0.6	-0.1	-0.2	-0.4	-0.3	-0.1
Normalized Difference Vegetation Index (NDVI)	0.7	-0.7	0.0	-0.1	0.2	-0.5	0.0	-0.2	-0.1	0.2	-0.4	-0.6	-0.2	-0.3	-0.3	0.3	-	-0.2	-0.1	-0.3	-0.4	0.0	-0.3	-0.3	0.1	-0.4	-0.4	-0.2
Percentage of the census tract area covered by library service areas (within 10-minute walking distance of libraries)	-0.1	0.2	0.0	-0.1	-0.3	0.1	0.2	0.4	-0.1	0.0	0.3	0.2	0.0	0.2	0.0	0.0	-0.2	-	0.3	0.3	0.3	0.5	0.3	0.1	0.5	0.4	0.2	0.6
Percentage of the census tract area covered by recreation centre service areas (within 10-minute walking distance of recreation centres)	-0.3	0.4	0.2	0.1	0.0	0.3	-0.1	0.0	0.0	-0.2	0.4	0.5	0.2	0.4	0.5	-0.1	-0.1	0.3	-	0.5	0.4	0.6	0.4	0.3	0.6	0.5	0.2	0.6
Percentage of rental units within 10-minute walk of rapid and frequent transit stops	-0.6	0.6	0.1	-0.1	-0.2	0.6	0.1	0.3	-0.1	0.1	0.8	0.6	0.2	0.4	0.5	-0.5	-0.3	0.3	0.5	-	0.7	0.6	0.9	0.5	0.6	0.8	0.6	0.5
Percentage of rental units within 10-minute walk of a park	-0.5	0.5	0.0	-0.1	-0.4	0.7	0.1	0.2	0.0	0.1	0.5	0.7	0.3	0.4	0.4	-0.3	-0.4	0.3	0.4	0.7	-	0.4	0.6	0.7	0.4	0.7	0.8	0.5
Percentage of rental units within 10-minute walk of a library or recreation centre	-0.3	0.3	0.3	0.0	-0.2	0.3	0.0	-0.1	-0.1	0.0	0.4	0.4	0.0	0.5	0.4	-0.2	0.0	0.5	0.6	0.6	0.4	-	0.4	0.3	0.8	0.5	0.3	0.7
Percentage of missing middle units within 10-minute walk of rapid and frequent transit stops	-0.6	0.6	0.1	-0.2	-0.3	0.6	0.3	0.5	-0.3	0.3	0.8	0.5	0.2	0.3	0.5	-0.6	-0.3	0.3	0.4	0.9	0.6	0.4	-	0.5	0.4	0.8	0.5	0.5
Percentage of missing middle units within 10-minute walk of a park	-0.1	0.2	-0.1	0.3	-0.4	0.5	0.0	-0.1	0.1	0.2	0.3	0.5	0.1	0.2	0.4	-0.1	-0.3	0.1	0.3	0.5	0.7	0.3	0.5	-	0.4	0.5	0.6	0.3
Percentage of missing middle units within 10-minute walk of a library or recreation centre	-0.1	0.1	0.3	-0.1	-0.4	0.3	0.1	0.1	-0.2	0.0	0.4	0.3	-0.2	0.2	0.3	-0.2	0.1	0.5	0.6	0.6	0.4	0.8	0.4	0.4	-	0.4	0.2	0.7
Percentage of high-density units within 10-minute walk of rapid and frequent transit stops	-0.7	0.7	-0.1	-0.1	-0.3	0.6	0.0	0.4	0.0	-0.1	0.7	0.7	0.2	0.4	0.6	-0.4	-0.4	0.4	0.5	0.8	0.7	0.5	0.8	0.5	0.4	-	0.8	0.7
Percentage of high-density units within 10-minute walk of a park	-0.6	0.6	-0.2	-0.1	-0.4	0.7	0.0	0.3	0.0	0.0	0.5	0.7	0.2	0.5	0.6	-0.3	-0.4	0.2	0.2	0.6	0.8	0.3	0.5	0.6	0.2	0.8	-	0.6
Percentage of high-density units within 10-minute walk of a library or recreation centre	-0.4	0.4	0.0	-0.2	-0.4	0.4	0.1	0.2	-0.1	-0.1	0.6	0.5	-0.1	0.3	0.4	-0.1	-0.2	0.6	0.6	0.5	0.5	0.7	0.5	0.3	0.7	0.7	0.6	-