PEOPLE FIRST

An equity centered climate response for road reallocation

APRIL 2021

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Thank you!

- Anika, Dani & Lexi

WHO WE ARE

We would like to begin our work by acknowledging our positionality. Each team member lives on the traditional, stolen lands of the “xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh Úxwumixw (Squamish Nation) and səl̓ilwətaʔɬ (Tsleil-Waututh) peoples. Anika and Lexi are both white settlers and, Danielle, an uninvited visitor. We work on the lands and benefit from colonial dispossession that has, and still is happening here.

While we aim to apply an equity lens through out this project, we do not identify as part of an equity seeking group. Meaningful action towards equitable road realloaction in the City of New Westminster must engage a broader community of identities.

EXECUTIVE SUMMARY

In 2019, the City of New Westminster declared a climate emergency, committing to achieving greenhouse gas emission targets set out by the Intergovernmental Panel on Climate Change (IPCC). To achieve a zero carbon future by 2050, seven bold steps were endorsed by City Council. This project has created a guiding vision for bold step seven, which describes the reallocation of road space to create “a quality, people-centered public realm”.

Through an exploration of existing literature, case studies and New Westminster’s policy context and community’s needs, a conceptual framework was constructed for this project. We explored the role that greenspaces and low-impact-development interventions could play in road reallocation under a lens of climate resilience. Given the positive impacts that greenspaces have on both human and environmental health, new public gathering spaces resulting from road reallocation should be viewed as an extension of the city’s green network.

This report seeks to not only reimagine the use of grey, mundane, road space, but to also better understand how this reimagination can mediate the impacts of climate change. These impacts are not experienced equally by residents, making it essential to address this disparity when reallocating road space for the creation of new park spaces in the city.

While, equity is multifaceted, this project defined primarily equity as a measure of access. A park space classification and spatial analysis revealed access gaps in the existing park space network. Demographic data and topography were factored into the analysis, further refining our approach to determining access.

A spectrum of road reallocation was developed as an exploration of potential options to expand the city’s park space and green network. Options range from reallocations of a parking space to an entire block. Each option brings opportunities for quality, equitable, and climate resilient gathering space through the incorporation of infrastructure capable of mitigating the impacts of climate change.

This project provides neighbourhood level recommendations for road reallocation based on existing access gaps to ensure that relocation efforts are equitably distributed throughout the city. Through the opportunities identified in this report, this document provides guidance for the City staff and inspires action, making bold step 7 a reality in New Westminster.

CONTENTS

All photos in this report were taken by Anika Bursey unless stated otherwise.

When you enter a new public space, what do you notice?

Is it the rose bush? The empty park bench?
The sun-soaked willow tree with a shaded under story calling your name?

Maybe it's the sound of laughter? Maybe there are no sounds at all?

What makes you stay?

The smell of the bakery down the block? The light breeze that sweetly drifts across your face? The friend who you know you'll run into? That it's only a short walk from home?

These, almost indescribable, elements of spaces and what captures us within them are the essence of the city. A perfect combination of the planned and unplanned creates a sensory experience for us, the user. We feel at peace, for whatever reason, because of this unique melange of elements.

These quality public spaces are, at their core, spaces for spontaneous interactions between natural elements, the human and the non-human, facilitated by urban design.

1. INTRODUCING

The City of New Westminster, located on the traditional territory of the Coast Salish peoples and the Qayqayt First Nation, declared a climate emergency in 2019, committing to achieving greenhouse gas emission targets set out by the Intergovernmental Panel on Climate Change (IPCC). In response to this declaration, City Council endorsed the 2020 Climate Action Budgeting Framework as part of it's 2020 budget process. This framework introduced seven bold steps to "guide the process with the goal of moving New Westminster towards a zero carbon future by 2050" (City of New Westminster, 2019).

This document is an exploration of aspirations, implications and applications for bold step seven, a "quality people-centred public realm". This bold step envisions "a minimum of 10% of today's street space that currently only serves motor vehicles, excluding transit, will be reallocated for sustainable transportation or public gathering by 2030. The natural environment will be integrated with the public realm.".

While the full scope for road reallocation will include sustainable transportation, this report focuses specifically on the reallocation of road space for the creation of public gathering spaces, through the lens of equity and climate resilience. We envision the reallocation of road space to be an extension of the city's green network, given the positive impacts that greenspaces have on both human and environmental health.

These reallocations range from the transformation of a single parking stall to an entire block. Such flexibility, explored with good design and meaningful community consultation, can offer a range of activities and programming, serving the surrounding community well.

1.1 Project Objective

This project seeks to provide neighbourhood level recommendations for road reallocation based on existing access gaps to ensure that relocation efforts are equitably distributed throughout the city. Through the opportunities identified in this report, this document provides guidance for the City staff and inspires action, making bold step 7 a reality in New Westminster.

1.2 Our Approach

CONCEPTUAL FRAMEWORK

OCT/20

Initial investigation of literature, case studies and the City of New Westminster's context, focusing on understanding the main themes for the project, specificities of New Westminster, and the potential of road reallocation for creation of new park spaces as a climate response.

Products:
- *Definition of key terms*
- *Literature Review*
- *Case Studies*
- *New Westminster's policy context*
- *Summary of community consultation*

NOV/20

ANALYSIS

DEC/20

A thorough analysis involving demographic data and parks classification according to quality and infrastructure for climate resiliency.
Topography and neighbourhood access to high quality park spaces were also factored in.
The data collected in this phase allowed for the identification of gaps of access in the provision of high quality park space and climate resilient infrastructure.

Products:
- *Parks classification*
- *Acess gaps map for high quality park space*

CONSIDERATIONS

JAN/21

Unanswered challenges that are worth City's consideration and further investigation.

Products:
- *Green gentrification*
- *Barriers to access*

RECOMMENDATIONS

FEB/21

A spectrum of road reallocation was developed to illustrate the possiblities for New Westminster. Neighbourhood specific and city wide recommendations were provided to address quality and climate resilient park space access gaps across the city.

Products:
- *Spectrum of reallocation*
- *Priority neighbourhoods recommendations*
- *Secondary neighbourhoods recommendations*
- *City wide recommendations*

MAR/21

CONCLUSION

Issues to be explored in future studies to better understand the implications of this project.

APR/21

1.3 Key Terms

This glossary of terms identifies key themes to be considered when thinking about the implementation of bold step 7. It defines their meaning in the context of this report.

ACCESSIBLE

The easability for an individual to arrive at, and use a particular public space. In the context of our project, a person is said to have access to a space when: it is within a 5 minute walk from their place of residence, and the user is able to fully participate in the space, regardless of age, ability, gender, class, religion or sexual orientation. This 400m walking distance also incorporates slope and the existing street network to provide a more realistic analysis of travel patterns.

CANOPY COVER

Canopy cover, or the area covered by tree crowns as viewed from the air, can be used to measure the health of New Westminster's urban forest (New Westminster, 2016). The urban forest includes all vegetation, as well as the private and publicly owned trees in the city. Urban forests play an integral role in the health and wellbeing of city residents, human and non-human. Urban forests also sequester carbon and reduce the effects of extreme heat events by providing shade and evapo-transpirative cooling; an essential service for urban resilience (New Westminster, 2016).

CLIMATE RESILIENCE

The Intergovernmental Panel on Climate Change defines climate resilience as "the capacity of social, economic, and environmental systems to cope with a hazardous event, trend or disturbance." (IPCC, 2014)

EQUITY

Equity in this project is defined by providing access to park spaces. It refers to the ability for park spaces to be provided across the City in an equal and just way, regardless of socio-economic or demographic differences across populations. Equitable spatial distribution of these areas, eliminating access gaps and allowing every resident to access a park space in close proximity to their residence. This approach implies the City's prioritization of efforts and investments for road reallocation in under served neighbourhoods, acknowledging and addressing spatial inequities in New Westminster.

GREEN INFRASTRUCTURE

Green infrastructure refers to stormwater management tools that attempt to mimic the natural water cycles that have been impeded by impervious surfaces. Utilization of tools, such as bioswales, permeable paving, rain gardens, and constructed wetlands, improves the resilience of urban landscapes by increasing the ability of these areas to absorb rainfall. Climate change is expected to bring dryer summer and wetter winters to New Westminster. More intense rain events may surpass the peak capacity of the current stormwater system, as the design of these systems predated the predictions for more intense rainfall patterns as a result of climate change (New Westminster, 2017). To improve the resilience of New Westminster, the urban landscape must readily absorb and store more rainwater.

QUALITY

Quality, in terms of public space, is defined as the sentiment evoked by a place when it presents the user with a sense of protection, comfort and enjoyment in a well-maintained and visually appealing setting that is appropriate to the needs/desires of the community.

→ This concept of quality is based on Gehl Institute's "Twelve Quality Criteria" (Appendix III).

Protection refers to being away from harm from others and unpleasant sensory experiences, as well as from the effects of climate change. At the same time, comfort relates to possibilities for a range of activities, such as relaxation, walking, standing or seating, play, and socialization. Finally, enjoyment involves positive visual and sensorial complexity, aesthetic quality and maintenance of the space.

PARK SPACE

This project aims at increasing the space for public gathering. While park spaces and green space are often used synonymously, this report will use these terms independently, focusing primarily on the delivery of park space in the City of New Westminster. While both park space and green space offer opportunities for recreation, park space typically has infrastructure to better facilitate and prescribe a variety of uses, unlike green spaces which are left in a more natural, unmanicured state.

PERMEABLE SURFACES

Surface permeability is the primary mechanism that allows landscapes to absorb and store rainwater. Reallocating road space offers the opportunity to increase the permeability of urban landscapes. This is essential for rainwater filtration and groundwater recharge. Diverting rainwater from directly entering the stormwater systems, through the integration permeable surfaces, improves the resiliency of urban landscapes and surrounding natural areas. Permeable urban surfaces can include human interventions, such as sod, planting beds, and green infrastructure, as well as natural elements like wetlands.

PUBLIC GATHERING SPACE

This term refers to open and accessible spaces where people can congregate, stay and linger. It can provide opportunities for social encounters, new connections and community building. Although public gathering spaces can take on many forms, this project examines the outdoor gathering spaces which the City has the largest influence on - public parks and city streets. Public gathering space in the context of this project implies a destination within the public parks and street network, offering the opportunity for residents to congregate, stay, and linger.

PUBLIC REALM

The public realm is the network of publicly accessible buildings, streets, and open spaces, such as parks, squares, plazas, courtyards, and alleys that exist within a city. These spaces belong to every citizen, therefore they should be accessible by everyone.

2. LEARNING

This section introduces the conceptual framework that guides our approach for this project. We begin by exploring broader concepts and ideas through scholarly works and case studies, arriving at the city scale, gathering relevant information from policy and public consultations to inform this project throughout its development. The policy context analysis and summary of community consultation can be found in the Appendix I and Appendix II.

2.1 Literature Review

Climate change is perhaps the most complex and costly threat facing the global urban and rural landscape. While no country or region is immune to the forces of climate change, the natural landscape and weather patterns of a particular location, coupled with cultural and socio- economic factors create an uneven geography of climate risk. Based on these unique geographic relationships, in British Columbia the impacts of climate change are extensive and include: more intense and frequent heavy-rain storms, larger and frequent wildfires (and subsequent smoke events), warmer temperatures in all seasons, and sea level rise, among others (Government of BC, 2019).

The Intergovernmental Panel on Climate Change (IPCC) defines risk as the product of the relationship between; the hazard, the potential for a natural or human induced event causing damage or loss of life, livelihoods, infrastructure or natural environment; the exposure, the presence of economic, cultural or social assets in a place that could be affected; and the vulnerability, the predisposition to be affected, often contingent on specific local socio-economic factors (IPCC, 2014).

While the relationship between these three variables that influence the risk of climate change impacts is complex, there are some important interactions to point out. As risk is a function of hazard, vulnerability, and exposure, by manipulating one of the variables (decreasing vulnerability, for example) you will decrease the overall risk (assuming no changes to the other variables). While the ability to control the hazard is, for the most part dependent on climate variability and long term mitigation efforts, there are a number of socio- economic processes that are commonly used to manipulate exposure and vulnerability. In short, these variables can be addressed by increasing “the capacity of social, economic, and environmental systems to cope with a hazardous event, trend or disturbance.” (IPCC, 2014). This process is often called, increasing resilience.

Indeed, these rapid changes to our environment are cause for concern and demand attention. However, while we rethink the structure of our urban fabric to increase resilience to the climate crisis, we have a unique opportunity to address long standing social and racial inequities in our cities along the way (Schock et al, 2015). The research on climate equity is robust and extensive; the outcomes of the climate crisis are not equal. Islam and Winkle (2017) highlight three notable equity-aggravating effects of climate change; "(i) increased exposure of dis-advantaged groups to climate hazards, (ii) increased susceptibility to damage caused by climate hazards, and (iii) decreased ability to cope with and recover from the damage" (p. 24).

Additionally, these inequalities that exist may be exacerbated by climate change policies that maintain or ignore them (Barnett, 2006). Of particular importance in the North American context is the role that Indigenous Peoples play throughout this discussion of climate injustice. Indigenous folks living on their traditional lands have virtually no responsibility for the consequences of climate change. Yet, given their deep connection to the Earth, and the systemic vulnerabilities these peoples experience as a result of centuries of colonial oppression, they are likely to suffer dramatically from direct and indirect climate change (Green and Raygorodetsky, 2010). These examples provide us with clear evidence that underscores the importance of approaching climate resilience planning with an equity lens (Leichenko, 2011; Steele, 2012).

Re-imagining urban space

Supporting equitable community-specific adaptive capacity efforts is no easy task and is largely outside the scope of this project. However, we are interested in positioning the role of the public realm, particularly parks and public gathering space, as an intervention to achieving climate adaptation while supporting an increase in adaptive capacity. Research shows that increased access to urban greenspaces is largely correlated with higher education and income (Nesbitt et al, 2019). This is fundamentally an equity concern given the impacts that natural spaces within the city have on our mental and physical wellbeing. Public health benefits of greenspaces include stress reduction, enhanced physical activity, and improved social cohesion. Additionally, the ecosystem benefits of greenspaces provide a refuge by reducing noise exposure, air pollution and excessive heat (Braubach et al, 2017; WHO, 2016) while also increasing the percentage of pervious surfaces, providing positive benefits for storm water runoff quality and flood control. Considering the lens of climate resiliency and increasing adaptive capacity, it becomes clear then that park spaces offer an opportunity for both. Providing equitable access to park spaces then not only becomes an important health policy, but a climate adaptation one as well.

Road Reallocation: Reimagining Streets as an Extension of the City's Park Space
The seven bold steps are illustrative of the values held by the City of New Westminster. The reallocation of road space for sustainable transportation or public gathering, provides tangible action, in an effort to reclaim space for people. This reallocation also indicates that the City is reframing the services that are to be provided by city streets, moving away from exclusively transportation services, and prioritizing public gathering and the natural environment. Envisioning streets as amenity areas, which provide many of the human health and ecosystem services afforded by parks, invites the opportunity for a park-like network that permeates all areas of the city.

Parks for Human Health
Parks and greenspaces not only serve as spaces for civic enjoyment; they have also been attributed to having positive implications for the health of city residents. These positive health implications further underscore the importance of equitably distributing these spaces and their associated health benefits. Vulnerable communities may not have the same access to healthcare and other services that improve overall well-being. While these spaces do not lessen the necessity for quality health care for all, the integration of parks and greenspaces in community could help to reduce environment related health risks. In the context of climate change related hazards, these spaces are not simply amenities. Parks provide important environmental benefits to their users through the reduction of noise exposure, air pollution and excessive heat. These health benefits are a part of broader ecosystem services that are inherently integrated with natural areas.

Parks and Ecosystem Services
Ecosystems services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth (Millennium Ecosystem Assessment, 2005). As ecosystems within the urban context, parks and greenspaces offer a number of ecologically based benefits that provide services and provisions for urban residents.

These services have been recognized as potential mitigation and adaptation strategies to remediate the impacts of climate change in urban areas. Approaches to development which incorporate green infrastructure, a high portion of permeable surfaces, and a robust urban forest utilize the inherent benefits derived from natural systems (University of Arkansas Community Design Centre, 2010). Put simply, by replacing pavement with plants, urban spaces can offer a number of services that

are essential to addressing climate change, while improving the well-being of urban residents. When considering the increasing frequency and severity of river flooding, extreme heat events, wildfire smoke events, and their ability to lessen potential exposure, the importance of ecosystem services offered by urban greening and park space is magnified (Government of BC, 2019).

The ecosystem benefits of greenspace and parks for human health and climate change mitigation culminates to a compelling argument for the reallocation of road space - not to mention the enjoyment these spaces provide. By reimagining our urban fabric as more than a means of transport, but rather a network that provides health benefits, climate change mitigation, and an inclusive place to gather, we may understand how to provide a people oriented public realm.

Ultimately, this project envisions road spaces to be reallocated for people as an extension of the city's park network.

2.2 Case Studies

The case studies presented here were chosen based on themes explored throughout this report. They represent a reimagination of the city's street network through road reallocation. These spaces can be viewed as an extension of the city's green network and have the potential to alleviate climate change's effect and build community resilience through fostering social cohesion and community involvement. Moreover, the examples provide relevant lessons that can be translated to the context of New Westminster.

Richmond Terrace Pocket Park | 2014

Yarra, Australia

Source: Hansen Partnership

←

Partners:

City of Yarra + Hanser Partnership Planning and Design.

THE PROJECT

The city of Yarra is an Australian metropolitan municipality part of Greater Melbourne, with a population of about 94,000 people. Since 2009, the City has provided new open spaces by using existing traffic infrastructure, such as council-owned car parks and sections of roads through the Open Space Strategy.

Richmond Terrace Pocket Park is one of the parks created after the launch of Converting Roads to Parks program, whose objectives were to provide more park space and to reduce car use, improving environmental sustainability. It is located in the corner formed by the road closure at the intersection of Docker Street and Richmond Terrace. It provides green open space in a densely-populated area where access to parkspace in close proximity to residents was scarce.

The park is a result from a community campaign for such a space. Residents

were consulted and provided input about the concept plan for the site, which was later approved by City councillors and the community. Impervious road surfaces were transformed into grassed terraces for community gathering, seating spaces and walls to recline on. It retained existing mature trees and new native species were planted to optimize the microclimate experience.

Cultural context is communicated through the pavement utilized. It connects with the history of the site, by resembling stained-glass windows found in nearby historic buildings. Because buildings adjoining the space still have vehicular access, the pavement also makes the distinction between routes for vehicles and for pedestrians and bicycles without the use of regulatory signage and bollards.

Source: Hansen Partnership

For more information on this project, please visit:

https://www.hansenpartnership.com.au/projects/richmond-terrace/

https://landezine-award.com/richmond-terrace-park/

CONSIDERATIONS FOR NEW WESTMINSTER

- New Westminster can do it! This example shows how feasible it is to convert road space into a public gathering space
- Ask residents. Community involvement and input are key elements for the success of a project like this one
- The funding can come from Community Amenity Contributions (CACs). A similar tool was used to finance this project
- Hire a good landscape architect. Good and mindful design can provide unique place-based solutions. How cultural context was communicated in this case study is a great example

S.E.A Street (Street Edge Alternatives) | 2001

Seattle, USA

Partners:

Seattle's Public Utilities (SPU) + local community groups.

Source: Seattle Public Utilities

THE PROJECT

The Street Edge Alternatives (S.E.A.) project refers to a complete redesign and reconstruction of the 2nd Avenue NW in Seattle. S.E.A. was conceived to provide a drainage system that is similar to the natural landscape. This natural drainage system increases the amount of soil and plants in an interlinked network of swales and cascades, resulting in reduced impervious surfaces.

These features together with sidewalks made of a porous concrete mixture allow for stormwater to be absorbed into the ground, runoff pollution is filtered by vegetation and by releasing the stormwater slowly into water bodies, it also prevents flooding and soil erosion. Landscape elements included native and salmon-friendly plantings and served for the management of rainfall, as well as to restore the evaporation and transpiration in the area.

The narrow driving lane and meandering shape of the road after the completion of the project help slow traffic and make the street safer for pedestrians and cyclists. The street has become a common destination for nearby residents because of the appealing landscape and also because of additional gathering spaces created by mailboxes clusters. This new design and also the maintenance agreement between residents and Seattle Public Utilities encourage neighbours to get to know each other while they take care of the plants in their shared right-of-way garden.

CONSIDERATIONS FOR NEW WESTMINSTER

- It is cheaper! It costs 25% less than traditional roadside stormwater systems
- Nature-based solutions are a creative way to provide additional greenspace for the community
- By preventing erosion and floods, this stormwater management system helps with climate adaptation
- Consider residents' involvement. The shared task of maintaining the gardens supports social integration, community cohesion and therefore, community resilience

→

For more information on this project, please visit:

https://www.seattle.gov/utilities/neighborhood-projects/street-edge-

Photo by Chiu, S.

OASIS Schoolyards | 2018

Paris, France

Source: CAUE de Paris

Partners:

City of Paris + ESIEE and LIEPP (Higher Education and Research Institutes) + Urban Innovative Actions Initiative.

The courtyard after the project.

THE PROJECT

Paris is one the European cities where the proportion of accessible greenspaces is below the average, the city's overbuilt heart makes it susceptible to floods and heat waves. With this in mind and considering that every parisien lives within a radius of 250 m from a public school, the City's solution was to use impervious schoolyards to provide small parks for residents, integrating shading and nature-based storm-water management.

The priorities of the project were to address the contribution of the urban heat island and flood risk, protecting the most vulnerable population by providing sustainable refresh to dense urban space and smart stormwater management. OASIS's innovations in terms of design comprehend innovative materials to create cool islands, rainwater recovery systems and nature-based solutions, furniture from local manufacturing, water games and fountains. In terms of methodology, children co-designed spaces and neighbours of all ages were invited to contribute with ideas to define and manage facilities.

The brilliant aspect of the project is that the City understands that it is essential to provide concrete solutions, but they will not achieve desired outcomes without raising awareness and engaging citizens in the design and management of their urban environment. Social cohesion was also identified as a key factor for

community resilience, if residents know each other well and have social bonds, they are more likely to help each other in an hazardous event. Considering that Paris has an aging population and strong migratory rates, it was crucial to work to strengthen social cohesion as part of the project as well.

The project happened in 2018 and 2019. Due to COVID-19, it has been postponed, but Paris aims to standardize the process of transforming asphalt-covered schoolyards into resilient, green, playful and welcoming neighbourhood shared spaces for residents of all ages.

CONSIDERATIONS FOR NEW WESTMINSTER

- Co-design spaces with residents. There is an opportunity to use the implementation of road reallocation to foster social cohesion through citizen engagement
- Community involvement in the design and maintenance of public spaces can increase adaptive capacity and resilience
- Get kids excited and involved. They can be good allies to begin a process of consciousness awareness about climate change and its effects with their families

Source: CAUE de Paris

The courtyard before the project.

For more information on this project, please visit:

https://www.uia-initiative.eu/en/uia-cities/paris-

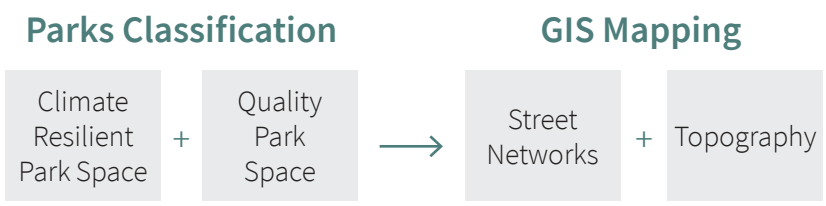
3. ANALYSING

The reallocation of road space offers an opportunity for the City of New Westminster to engage in an empathetic response to climate change, addressing inequities that manifest spatially. By investing in a people-centred public realm, New Westminster can better provide services to residents who are under served by public amenities due to their unequal spatial distribution. As an extension of the city's parks, an analysis of the characteristics and spatial distribution of current park space is essential. This spatial inventory and analysis seeks to understand the current role that New Westminster parks play in a quality, climate-resilient public realm and how deficiencies may be addressed through road reallocation.

A city-wide parks classification and park access analysis allowed us to understand and examine:

- Neighbourhood access to high quality parks
- The distribution of climate-resilient park characteristics
- Neighbourhood demographics and socioeconomic factors as to better serve the community through road reallocation
- Road reallocation priority areas
- Potential road reallocation methods which may be best suited to each neighbourhood

Analysis Methodology



3.1 Methodology

Parks Classification

To understand the landscape of public gathering space across the City, a neighbourhood level analysis of park space was conducted. A total of 1,138,610 m^2 of park space across 57 parks in 12 neighbourhoods was examined and coded through a combination of site visits and google earth imagery analysis (Appendix IV). Given that the project primarily focuses on quality, climate resilience and accessibility, we wanted to understand how these conditions exist in park space.

Quality Park Space

The existence of a park does not imply the surrounding community is adequately served. A deeper exploration of park quality is required to understand how if the needs of the surrounding community are being met. Quality encompasses a broad range of subjective factors, however, our coding scheme for quality (Appendix V) is based on the Gehl Institute's "Twelve Quality Criteria" which consists of three subcategories, enjoyment, protection and comfort from which public space can be analyzed. Considering the criteria of analysis for these three subcategories has accessibility embedded within, we have combined accessibility under the lens of criteria for this analysis. Each park was ranked (low, medium or high) in these three subcategories: enjoyment, protection and comfort resulting in an overall quality ranking.

Climate-Resilient Park Space

Understanding the climate resilient characteristics of parks on a neighbourhood basis indicates where immediate deficiencies may be and what road reallocation methods may be best suited to mitigate climate-based vulnerabilities. To understand the landscape of climate resiliency across park space, we used tree canopy as a proxy for heat mitigation and carbon sequestration, along with surface permeability and green infrastructure presence as a proxy for stormwater flooding mitigation. Like quality, these three indicators were given a rating of low, medium or high (Appendix IV). Finding the percentage of high quality park space, canopy cover, surface permeability and green infrastructure presence per current supply of park space allows us to assess how well served each neighbourhood is, providing guidance for road reallocation opportunities.

GIS Mapping

A GIS analysis allowed for a better understanding of park access, and therefore where road reallocation should be prioritized, by accounting for park quality, street networks, and topography. A technical explanation of the GIS mapping analysis can be found in Appendix VI.

Neighbourhood Access to high quality park space within a 5 minute walk - Appendix X

Park Quality

The spatial distribution of community amenities and services tells a story of development and investment for the City of New Westminster. All residents should have access to parks that offer a high level of comfort, protection, and enjoyment. High quality parks, determined from the parks classification (Appendix IV), were the focus of this analysis to understand the current spatial distribution patterns of investment and where road reallocation could help offset existing inequities.

Street Networks

The access area surrounding high quality parks was mapped using the street network to provide a more realistic investigation of park access. Traditional access analysis methods which often use a 400m radial distance as a measure of access do not account for the real route residents would travel to their local park. This analysis relied on the street network as a proxy for pedestrian routes, however it does not take into account pedestrian overpasses.

Topography

Park access analysis methods also often assume no change in elevation throughout the study area. This would be a major oversight when examining park access in New Westminster. The access areas created in this project accounted for topography by assigning a change in elevation for each segment of the street network. Simply put, this analysis uses a 5 minute walk as a measure of access, accounting for the increased time needed to walk up hill.

3.2 Neighbourhood Summaries

The following table summarizes findings from the park classification in terms of low, medium and high quality characteristics and infrastructure for climate resilience for all neighbourhoods in New Westminster.

	QUALITY CHARACTERISTICS		CLIMATE RESILIENCE		
NEIGHBOURHOOD	% High Quality	% Neighbourhood 5min walk	% Parks with high canopy cover	% Parks with high permeable surfaces	% Parks with green infrastructure
QUEENS PARK	None	72.18%	None	100%	75%
QUEENSBOROUGH + NORTH ARM	100%	53.80%	None	28%	79%
CONNAUGHT HEIGHTS	85%	62.84%	85%	100%	None
GLENBROOKE SOUTH	100%	89.12%	85%	20%	None
SAPPERTON	96%	68.10%	0.27%	86%	83%
MASSEY VICTORY	5%	23.12%	15%	14%	None
GLENBROOKE NORTH	None	18.16%	None	100%	None
UPTOWN	94%	65.25%	None	99%	94%
BROW OF THE HILL + NORTH ARM NORTH	48%	35.35%	51%	52%	None
KELVIN	79%	61.05%	None	20%	None
WEST END	100%	26.17%	None	None	None
DOWNTOWN	54%	87.65%	1.40%	45%	None

Table 1 - Neighbourhood Summaries

Low 0% - 30%

Medium 40% - 70%

High 80% - 100%

The “Percent of Neighbourhood within a 5 minute walk of a High Quality Park” was determined by:

- Measuring distance of each parks' access area (how far pedestrian can travel on a 5 minute walk from the park)
- Measuring the total distance of the street network for each neighbourhood
- Representing the area of access with a percentage

4. CONSIDERING

This section reflects on issues that are worth consideration for the implementation of bold step seven. A number of external forces and factors might have direct or indirect influence over the results of increasing park space in New Westminster. While this report seeks to address them, some challenges remain unanswered and deserve further investigation.

4.1 Green Gentrification

Despite best intentions to decrease citywide service and access gaps, the introduction of greenspace can be problematic. The introduction of greenspace has been closely linked to the displacement of residents, also known as green gentrification (Rigolon & Németh, 2019; Shokry et. al, 2019; Anguelovski, 2015). All City residents have an inherent right to access greenspace. When enacting bold step seven the City of New Westminster should closely examine what precautions are in place regarding housing policy to lessen this unintended effect of road reallocation.

Despite this risk, greenspaces are also linked to improved wellbeing of community residents, while acting as a joint response to climate change goals. These mental and physical benefits should be weighted with the risk displacement when planning road reallocation.

4.2 Barriers to Access

Public Realm

The reallocation of road space will expand the public realm in the city of New Westminster by increasing the space designated for public use, such as for recreation, exercise, socializing, and civic participation. However, the public realm is not necessarily accessible or inclusive for all members of the community. Given that this spatial analysis and supporting demographic information relies on data from 2016 Census data, the complexity of the intersecting identities of New Westminster's population cannot fully be captured. The interconnected nature of socio-economic factors such as race, class, and gender can magnify discrimination and disadvantages as a result of these intersecting identities. Therefore, the data does not fully illustrate the cumulative effects of discrimination as many residents idenitify with a number of these categorizations. The interwoven nature of identity causes individuals to

experience disadvantages and discrimination with differing intensities. The census is particularly problematic for those experiencing homelessness, as the census relates back to a fixed household address for each participant.

Although a space may be labelled as public, barriers to access as a result of gender, race, ethnicity, age or socio-economic status may prevent residents from utilizing public space despite close proximity. The City of New Westminster should seek to identify barriers to access that extend beyond physical distance. It's important to equip all community members with the means to contribute to this conversation to ensure the creation of a people centred, public realm. These socio-economic factors were selected based on a study completed by Nesbitt et al. (2019), which sought to identify who has access to urban vegetation.

The City must consider the different communities present in New Westminster and how each community is composed of individuals with overlapping identities - their lived experience can best answer what services they need.

Climate Change Hazard Exposures

Access gaps illustrate opportunities to better support the surrounding community by providing the same convenience and resources afforded by more privileged areas. However, some vulnerable populations may not only use parks for enjoyment, but as a means to withstand climate change related hazards. By better understanding access gaps and spatial distribution of parks and other greenspaces, the City of New Westminster can provide a more equitable response to climate change. By increasing access to parks and greenspace, an increased opportunity to take refuge in cases of extreme heat events for those who may not have the means is possible. For some residents, access to parks and greenspace is not a matter of lost recreational opportunity, but a matter of life or death.

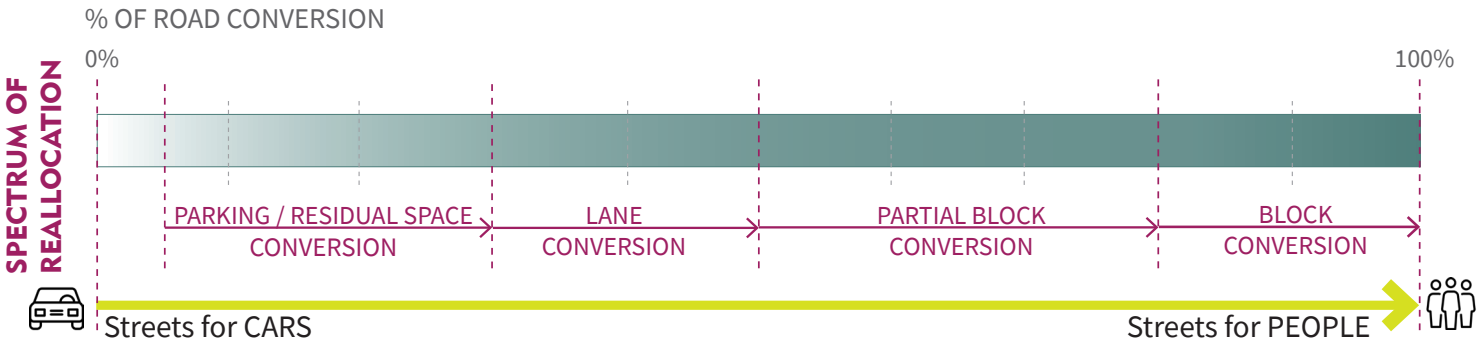
Due to a number of geophysical factors, heat exposure, wildfire smoke, and flooding occur unevenly across communities. Therefore, it's important to note which neighbourhoods of the City of New Westminster may experience more intense exposures to climate change related hazards.

5. RECOMMENDING

This section outlines a series of road reallocation options and their benefits for climate, quality and equity. Design schematics help to contextualize neighbourhood and city based recommendations for implementation.

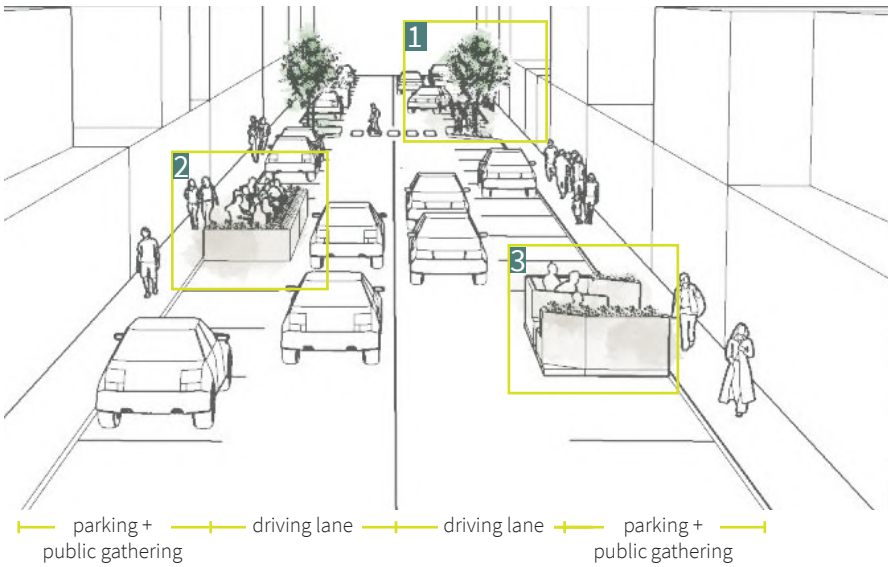
5.1 Spectrum of Road Reallocation

Road reallocation can take on many different forms depending on the desires of the community and surrounding context. The following diagrams illustrate the potential for road reallocation by visualizing the spectrum of options that range from shared streets to full road conversion. These road reallocation options draw from and seek to align with options outlined in the New Westminster Uptown Streetscape Vision, as well as in the Downtown Building and Public Realm Design Guidelines and Master Plan.



Parking Conversion

Public gathering space is increased by reclaiming single or multiple parking stalls.
Examples: Curb bulb, Parklets



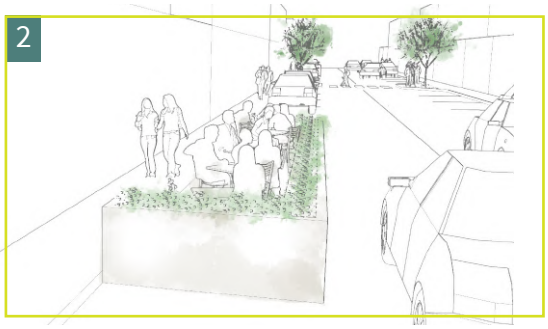
CONSIDERATIONS

- Avoid implementation in streets with high traffic speeds or volumes
- Avoid slopes greater than 5%
- Ensure the parklet is clearly delineated from roadway and other parking stalls
- Limited user capacity
- Parklets are often associated with the adjacent business which may cause some users to feel unwelcome

OPPORTUNITIES

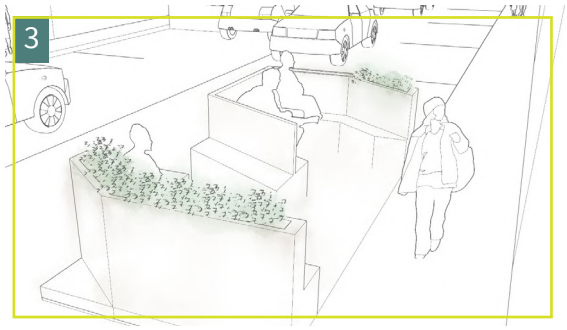
CLIMATE RESILIENCE

- Small scale interventions such as temporary landscaping up to more intensive solutions like bioswales and rain gardens, can reduce the heat island effect and improve stormwater management



QUALITY GATHERING SPACE

- Landscape and structural buffers mitigate unpleasant sensory experiences from nearby roadway or parking lane
- Site amenities such as seating, bike parking, and landscaping create a destination for surrounding neighbourhood
- Small size and compact elements quickly integrates human scale and animate existing streetscape



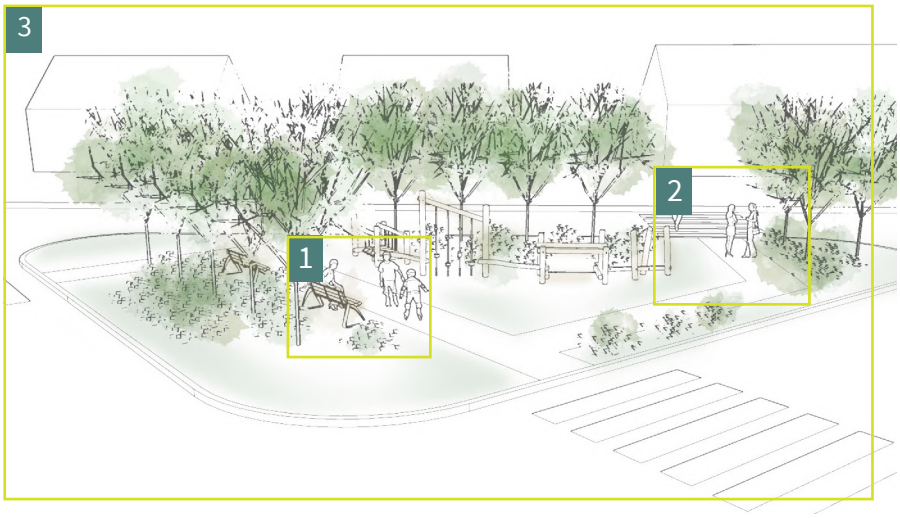
EQUITY

- Ensure the space feels accessible to non-patrons of adjacent businesses
- Ensure parklet structures are accessible to those with all levels of mobility
- Quickly implementable form of road reallocation can temporarily mitigate public gathering space access gaps

Residual Space Conversion

Public gathering space is increased by repurposing underutilized space such as traffic islands, traffic triangles, or parking lots.

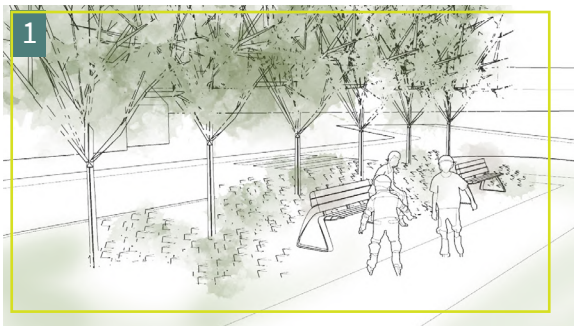
Examples: Pocket Park, Corner Plaza



CONSIDERATIONS

- Integration with sustainable transportation modes such as public transit and bicycle traffic
- Vehicle traffic volumes
- Pedestrian crossings - ensure these spaces allow users of all mobilities access
- These spaces will typically allow for increased landscaping and canopy cover, but size can limit the ability of these spaces to offset major climate-resilient parkspace deficiencies

OPPORTUNITIES



CLIMATE RESILIENCE

- Opportunity to increase canopy cover and integrate small scale green stormwater infrastructure
- Direct stormwater from streetscape to permeable landscapes

QUALITY GATHERING SPACE

- Landscape and structural buffers mitigate unpleasant sensory experiences from nearby roadway or parking lane
- Reallocation area may incorporate landscaping, wayfinding elements, art, or gateways, to improve the legibility of the streetscape
- Create meeting spaces at street intersections
- Activate street corners or other underutilized areas that would otherwise be void of stimulation

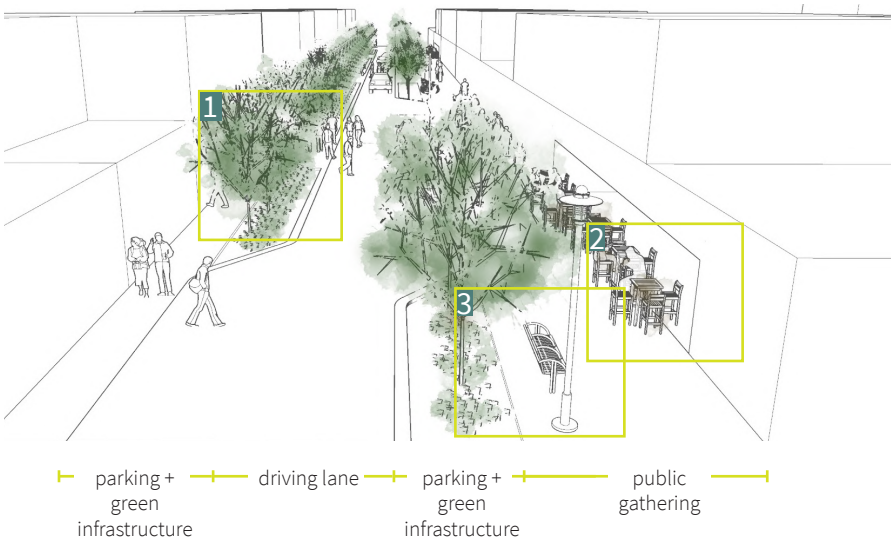
EQUITY

- The park environment that is created in these areas helps to ensure that quality, climate resilient public gathering spaces are distributed throughout the city

Lane Conversion

Public gathering space is increased by reclaiming a travel lane.

Examples: Sidewalk Extension, Boulevard Rooms, Chicane, Social/Eco Medians



CONSIDERATIONS

- Integration with sustainable transportation modes such as public transit and bicycle traffic
- Vehicle traffic volumes

OPPORTUNITIES

CLIMATE RESILIENCE

- Creates a climate-resilient corridors with continuous canopy cover and green stormwater management infrastructure

QUALITY GATHERING SPACE

- Corridor boulevard landscaping creates a linear destination with pleasant microclimates
- Wider pedestrian areas may incorporate seating, landscaping, bus stops, wayfinding elements, art, or gateways, without becoming an impedance to pedestrian traffic
- Extended pedestrian zone provides more space in the streetscape for larger groups to congregate or travel to their destination without congestion

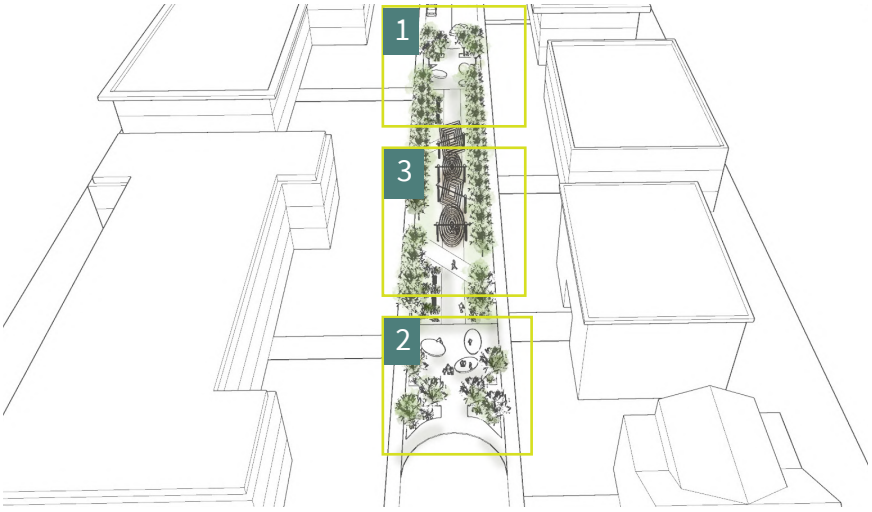
EQUITY

- Wider pedestrian area improves access for all levels of mobility
- Increased number of seating areas throughout community
- Create consistency throughout streetscape to improve legibility (curb ramp design, surface treatments, travel distances to reach accessible entrances)

Partial Block Conversion

Public gathering space is increased by reclamaining a section of the roadway.

Examples: Plaza, Pocket Park



CONSIDERATIONS

- Not appropriate for arterial roadways
- Emergency access and access for neighbours who depend on vehicle transport

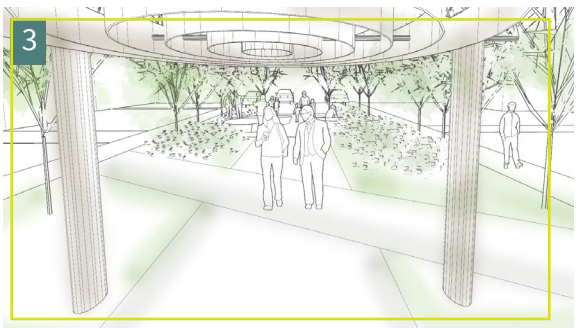
OPPORTUNITIES

CLIMATE RESILIENCE

- Site size offers an opportunity to integrate permeable surfaces
- Substantial area to integrate landscaping to reduce urban heat island effect
- Integrate large-scale stormwater management infrastructure

QUALITY GATHERING SPACE

- Users distance from vehicles is substantially increased
- Site size is suitable for uses that require more space such as urban agriculture, performance areas, large art installations, play spaces, as well as basic site amenities
- Park like environment creates a pleasant atmosphere and destination for the community

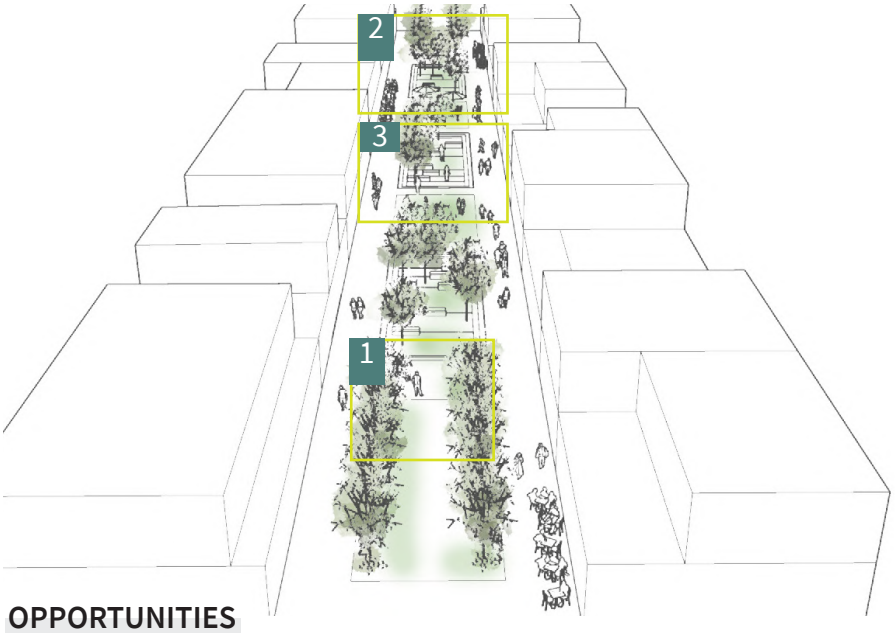


EQUITY

- Road reallocation at this scale allows for neighbourhood park and greenspace deficiencies to be addressed

Block Conversion

Public gathering space is increased by reclamaining the roadway for the length of a block.
Examples: Public Square, Park



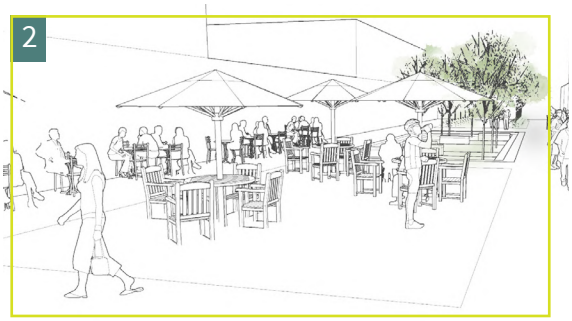
CONSIDERATIONS

- Avoid arterial streets
- Avoid transit routes
- Emergency access and access for neighbours who depend on vehicle transport

OPPORTUNITIES

CLIMATE RESILIENCE

- Site size offers an opportunity to integrate green stormwater infrastructure and permeable surfaces into the streetscape
- Substantial area to integrate landscaping and canopy cover to reduce urban heat island effect



QUALITY GATHERING SPACE

- Removal of cars from streetscape creates a destination with a variety of amenities, activities, pleasant sensory experiences, and improved safety for public space users
- Provide an expansive space for public gathering

EQUITY

- The park environment that is created in these areas helps to ensure that quality, climate resilient public gathering spaces are distributed throughout the city
- Size offers the opportunity to meet a variety of needs for the surrounding community

5.2 Priority Neighbourhood Reallocation Recommendations

Priority neighbourhoods and recommendations have been established by examining park qualities, climate resiliency features, high quality access gaps, the location of vulnerable populations, and the projected exposures of climate change hazards. By overlaying this data, we are better able to define what areas of the city may experience the effects of climate change disproportionately as a result of existing and potential inequities in the public realm.

The following recommendations begin the discussion about which areas may be considered the highest priority when reallocating road space and potential reallocation methods. However, there are knowledge gaps present that a spatial analysis cannot account for. Further engagement with the community is required in consideration with the following recommendations:

1. Given the low rates of both high quality park space and climate resilient park features, risk of heat and smoke exposure in **BROW OF THE HILL AND NORTH ARM NORTH**, neighbourhoods with a lower median after tax income than the city average and the second highest in density, it is recommended that:

- → The City prioritize more robust reallocation options such as a block conversion, a partial block conversion;
- → The City prioritize increasinging permeable surfaces and canopy cover through this reallocation option.

2. When examining the physical access gaps across neighbourhoods, it's clear that the **WEST END** is underserved. While the neighbourhood has a high rate of high quality park space (100%), the geographical placement of this park along the southwest corner of the neighbourhood results in a large swath of folks without access to quality park space. Although this park space is high quality, it does not incorporate climate resilient features. For the reasons mentioned, it is recommended that:

- → The City prioritize a block conversion and partial block conversion;
- → The City implement options that increase canopy cover, permeable surfaces, and green stormwater infrastructure strategies.

3. **GLENBROOK NORTH** is deprived of high quality park space within its neighbourhood boundaries and is exposed to a high risk of heat. Additionally, park spaces in this area have low canopy cover and no climate resiliency infrastructure. Road reallocation should focus on addressing the extensive quality gap in terms of park space, at the same time as increasing canopy cover and implementing green stormwater infrastructure. Topography should also be determinant in defining options for road relocation considering that folks without access to quality parks are situated in the steepest area of the neighbourhood. It is recommended that:

- → The City prioritize a block conversion and partial block conversion;
- → The City implement options that address the quality gap, increase canopy cover, and implement green stormwater infrastructure strategies.

4. Approximately half of **MASSEY VICTORY HEIGHTS**' population is situated in a gap zone of quality park spaces and high risk of heat exposure. Additionally, this neighbourhood has only one small high quality park serving the community, resulting in the second lowest high quality park space per capita in the city. In reallocating road space it is recommended that:

- → The City prioritize a block conversion and partial block conversation;
- → The City prioritize options that address all current deficiencies, providing permeable surfaces, canopy cover, and climate resiliency infrastructure.

5. Given the population density and large access gaps uncovered from the spatial analysis, road reallocation in **UPTOWN** should focus on the central area of the neighbourhood, where the high quality park space gap is evident. Given the high vehicular traffic needed to support the high density of businesses along 6th Street and 6th Ave and the high population of seniors and low-income residents in this area, it is recommended that:

- → The City prioritize partial block conversions in residential areas increasing canopy cover;
- → The City prioritize lane conversion in commercial areas.

5.3 Secondary Neighbourhood Reallocation Recommendations

SAPPERTON could benefit from increasing its park's canopy cover, despite being an area well served by high quality parks, permeable surfaces and green infrastructure.

The high percentage of seniors in **GLENBROOKE SOUTH** is noteworthy considering the heat climate risk and low rates of permeable surface in existing parks. Although this portion of the city is well-served by high quality parks, future road reallocations in this area should focus on climate resilience and adaptation, increasing high canopy cover, permeable surfaces and implementing green stormwater infrastructure strategies.

DOWNTOWN's residents have easy access to parks both in their area and in adjacent neighbourhoods. Due to the high risk of flooding and heat waves, future initiatives in this area should consider the implementation of green stormwater management infrastructure along with increasing canopy cover, focusing on risk mitigation.

KELVIN is well served by high quality park space, but if the City decides to reallocate road space in this neighbourhood, the ideal option should increase canopy cover, permeable surfaces and implement climate resiliency infrastructure.

QUEENSBOROUGH AND SOUTH ARM neighbourhood would benefit from road reallocation options that incorporate high canopy cover and permeable surfaces. Green stormwater infrastructure should also be considered in road relocation options because of the neighbourhood's geophysical conditions given its placement along the Fraser River. The neighbourhood's elevation, along with estimated flood projections create a highly hazardous area subject to increased flooding under climate change conditions (Appendix VII).

Road reallocation in **CONNAUGHT HEIGHTS** should consider incorporating green stormwater infrastructure due to the lack of it in the neighbourhood.

Although there is no high quality park space within **QUEENS PARK** boundaries, options in adjacent neighbourhoods are plentiful and easily accessible by all. Should City staff be interested in expanding infrastructure in this area, increasing the neighbourhood canopy cover would be favourable.

5.4 City Wide Recommendations

A number of “medium” and “low” quality parks could benefit from improvements, better serving the surrounding community - a more effective use of funds may focus on improving these areas opposed to expanding the existing park network.

Transit networks should be considered and, if possible, reallocations should occur in access gaps along popular walking, rolling, and cycling routes to create a connected network of public spaces.

Prioritize implementation of block conversions and partial block conversions in neighbourhoods deficient in quality, climate resilient park space - opposed to other reallocation methods which offer less robust opportunities to remediate these deficiencies.

Each of road reallocation options may be implemented on a temporary basis to:

- Garner public support
- Explore feasibility
- Adapt to seasonal traffic
- Minimize costs

Unique paving treatments and traffic calming mechanisms utilized in tandem with road reallocation areas may cause traffic to slow and act as a transition zone, increasing user safety and sense of place.

When identifying possible locations and options for road reallocation, topography and routes of access need to be taken into consideration, attempting to eliminate access barriers, especially for communities with different mobility needs.

Residents should always be consulted in the process of defining where and how new road reallocations will take place, in the interest of capturing and addressing cultural nuances and particular needs of certain communities.

6. CONCLUDING

6.1 Future Studies

Together our spatial analysis and wide range of recommendations, neighbourhood specific and city wide, provide the City of New Westminster with a robust array of opportunities and directions to initiate the implementation of bold step seven. Despite there being some areas of the city with limited access to high quality park space, this report helps to advocate for these underserved neighbourhoods, offering an empathetic approach to climate change that is underscored by equity.

Due to limited time, not all the challenges presented with the conversion of road space could be addressed by this project. Community engagement and involvement in the implementation of this project should be prioritized before neighbourhood specific reallocation design and planning begins. The effects of green gentrification deserve further investigation to ensure the equitable intentions of this project are not diluted.

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7. APPENDIX

I - New Westminster Policy Context

This guiding vision is meant to be used in tandem with existing guiding documents and policies from the City of New Westminster as a tool to help prioritize actions.
Many of City's documents speak to the need for a quality public realm, as well as connections with nature in public spaces and actions as a response for the climate emergency. These themes fully intersect with the approach of this project for the implementation of bold step seven. Thus, it represents a tangible move towards the achievement of multiple goals spread across many City's policies.

Through a brief analysis of New Westminster's policy context we were able to identify common themes that intersect with the objectives for the implementation of bold step seven:

Climate Response
An holistic approach to tackle climate change by considering actions that encompass road relocation, prioritization of sustainable modes of transportation, and creative strategies to mitigate climate change effects as well as to increase adaptive capacity in the community. The City is also cautious in operating the City's services in a manner that protects the environment, incorporating stormwater management into the design of buildings and public spaces.

This principle is supported by:
Official Community Plan;
Environmental Strategy & Action Plan;
Urban Forest Management Strategy;
Integrated Stormwater Management Plan;
Parks & Recreation Comprehensive Plan;
Envision 2032;
Downtown Transportation Plan;
Master Transportation Plan.

Reimagining urban space
Social and physical accessibility to civic amenities, infrastructure and services is key to achieving community and individual well-being. The City is looking for creative ways of providing well-designed parks and open spaces that accommodate and respond to the needs of a diverse and growing community. As championed by bold step seven, the relocation of road space is one possible creative approach to providing more open spaces.

This principle is supported by:
Official Community Plan;
Parks & Recreation Comprehensive Plan;
Uptown Streetscape Vision;
Downtown Building and Public Realm Guidelines and Master Plan.

Equity
Community and individual well-being are important to create a livable city. The City understands that every resident should be able to live in an equitable city, where they can meet their basic needs. The offer of new public open spaces should be based on equitable access and every resident should be able to have access to a greenspace of quality in close proximity with their residence. Furthermore, the space must be tailored by the needs of every community and equity seeking groups.

This principle is supported by:
Official Community Plan;
Parks & Recreation Comprehensive Plan;
Envision 2032;
Public Engagement Strategy and Action Plan;
Age-Friendly Community Strategy;
Community Poverty Strategy.

Greenspace
Access to open space, more specifically to green open space, has been proven to improve overall mental and physical health. The reallocation of road space into new public space can help enhance the existing green infrastructure of New Westminster, allowing for connections with nature and the water, and improving the network of parks and greenspaces to foster new recreational opportunities and community cohesion.

This principle is supported by:
Official Community Plan;
Environmental Strategy & Action Plan;
Integrated Stormwater Management Plan;
Urban Forest Management Strategy;
Parks & Recreation Comprehensive Plan;
Envision 2032;
Community Poverty Strategy.

II - Summary of Public Engagement

Equity is an important piece of the approach for the implementation of bold step seven. It relates not only with the spatial distribution of new public spaces, but also to how these spaces will address the specific and diverse communities needs and desires. To be able to identify gaps, opportunities and provide recommendations, it is important to capture residents' perspectives and perceptions about bold step seven and deficiencies in terms of park spaces. For this reason, we made use of past community consultation events and their main takeaways to inform this project.

However, the implementation of bold step seven involves a different set of actions that the City will have to take in the future and past consultations did not address. In consequence, it is essential that new community consultation events are planned as part of the implementation process, giving people opportunities to express themselves, fostering the equity component of this project.

Official Community Plan Consultation

In 2014 the City of New Westminster Council endorsed a general scope and resources for the Official Community Plan (OCP) review process. The reviewed document aims at providing a vision for New Westminster to the year 2041 and an extensive community engagement process was held before the final document was adopted in 2017.
During the consultation process, the City was able to capture resident's perceived needs and desires for their neighbourhoods. We provide here a brief summary of the information that is relevant for this project.

Residents value public space as instruments for community social cohesion. During the OUR CITY Neighbourhood Visioning Process, residents indicated parks, plazas and gathering places as places they love in their neighbourhoods.

The city needs more public spaces. During the Love Our City Workshop there was a shared sentiment that there are not enough public spaces. The need for connection and contact with nature and access to the river and waterfront were also mentioned.

The following table below summarizes some of the perceived needs relevant for this project:

NEIGHBOURHOOD	WHAT IS MISSING
Connaught Heights, West End	Park spaces; Public spaces; Trees; Connection to the river.
Moody Park, Glenbrooke North, Brow of the Hill, Queen's Park	Prioritization of pedestrians and bikes; Community spaces; Community gardens, outside living rooms.
Quayside, Downtown	Public open space; City square; Pocket parks; Community gardens.
Massey Victory Heights, McBride Sapperton	Open spaces (places to stop and rest in the public Pop up parks; Access to the waterfront.
Queensborough	Diversified activities at parks; Completed perimeter trail.

Table 2 - Summary of perceived needs by neighbourhood

Growth might increase the need for greenspaces. New Westminster is expected to accommodate 3.25% of Metro Vancouver's population growth. The Official Community Plan indicates that a significant share of residential development will be absorbed in Downtown and Queensborough. Outside of these areas, growth will be located within the Frequent Transit Development Areas. Some of these regions have been indicated as places where park space and connection with nature is lacking. New growth can result in overuse of existing parks spaces.

Residents want a social cohesive city and connections with nature. Thinking ambitiously for the next 26 years, residents asked for new open spaces and pop-up parks, more green streets, and safe and pleasant routes for pedestrians and cyclists.

Budget Consultation and Bold Step Seven

Every year the City has to update and approve its budget for the upcoming 5 year period. It includes the approval of expenditures and identification of funding sources for City operations and capital projects.
With the declaration of climate emergency in 2019, the City created a budget framework that prioritizes investment supporting the City's Climate Action Seven Bold Steps. The community was consulted and the main takeaways from the budget consultation presented below helped to inform the development of this project, highlighting what should be the priorities according to the community's perception.

The main takeaways from the online survey in relation to bold step seven are:

- Residents support more public spaces, green areas and tree planting.
- There is a feeling of lack of investment from the City in Queensborough and Brow of the Hill while too much investment has been done in Downtown and Uptown.
- There is a need for spaces for families and teenagers.
- Bold step seven as a climate response action is unclear.
- Community supports better transit and a network of sustainable modes of transportation connecting different greenspaces within the City.

So…
New Westminster's population could reach close to 104,000 people by the year of 2041 and the regions where most of this growth will be accommodated had been indicated as places where parks, open spaces and connection with nature have been missing already. New growth in these areas can lead to overuse of existing park spaces and public spaces, but it can also bring new opportunities to have additional park spaces provided through new developments.
Some of the initiatives championed by the Seven Bold Steps for Climate Action encounter residents' support, such as sustainable modes of transportation and connections with nature, the relevance of bold step seven to alleviate climate change effects needs to be better communicated.

III - Gehl's Institute Twelve Quality Criteria

TWELVE URBAN QUALITY CRITERIA

LOCATION:

3 = YES
2 = IN BETWEEN
1 = NO

Protection	**Protection against traffic and accidents.** Do groups across age and ability experience traffic safety in the public space? Can one safely bike and walk without fear of being hit by a driver?	**Protection against harm by others.** Is the public space perceived to be safe both day and night? Are there people and activities at all hours of the day because the area has, for example, both residents and offices? Does the lighting provide safety at night as well as a good atmosphere?	**Protection against unpleasant sensory experience.** Are there noises, dust, smells, or other pollution? Does the public space function well when it's windy? Is there shelter from strong sun, rain, or minor flooding?
Comfort	**Options for mobility.** Is this space accessible? Are there physical elements that might limit or enhance personal mobility in the forms of walking, using of a wheelchair, or pushing a stroller? Is it evident how to move through the space without having to take an illogical detour?	**Options to stand and linger.** Does the place have features you can stay and lean on, like a façade that invites one to spend time next to it, a bus stop, a bench, a tree, or a small ledge or niche?	**Options for sitting.** Are there good primary seating options such as benches or chairs? Or is there only secondary seating such as a stair, seat wall, or the edge of a fountain? Are there adequate non-commercial seating options so that sitting does not require spending money?
	Options for seeing. Are seating options placed so there are interesting things to look at?	**Options for talking and listening/ hearing.** Is it possible to have a conversation here? Is it evident that you have the option to sit together and have a conversation?	**Options for play, exercise, and activities.** Are there options to be active at multiple times of the day and year?
Enjoyment	**Scale.** Is the public space and the building that surrounds it at a human scale? If people are at the edges of the space, can we still relate to them as people or are they lost in their surroundings?	**Opportunities to enjoy the positive aspects of climate.** Are local climatic aspects such as wind and sun taken into account? Are there varied conditions for spending time in public spaces at different times of year? With this in mind, where are the seating options placed? Are they located entirely in the shadows or the sun? And how are they oriented/ placed in relation to wind? Are they protected?	**Experience of aesthetic qualities and positive sensory experiences.** Is the public space beautiful? Is it evident that there is good design both in terms of how things are shaped, as well as their durability?

3

For more information:

https://gehlinstitute.org/wp-content/uploads/2017/08/QUALITY-CRITERIA-FINAL.pdf

IV- Parks Classification

Name	Category	Neighbourhood	Zone_Category	Owner	Site_Area (m2)	Parks and Open Space Quality				Climate Related Infrastructure		
						Protection	Comfort	Enjoyment	FINAL	Canopy Cover	Permeable Surface	Green Infrastructure
Queens Park	City Park	Glenbrooke South	Single Detached	City of New Westminster	307767.3438	H	H	H	H	H	M	Y
Hume Park	Community Park	Sapperton	Single Detached	City of New Westminster	128366.29	H	H	H	H	M	H	Y
Moody Park	Community Park	Kelvin	Institutional	City of New Westminster	96270.67969	H	H	H	H	M	M	N
Ryall Park/Queensborough Community Centre	Community Park	Queensborough	Institutional	City of New Westminster	91022.68177	H	H	H	H	M	M	Y
Glenbrook Ravine	Community Park	Glenbrooke South	Institutional	City of New Westminster	54158.85156	M	H	H	H	H	H	Y
Westminster Pier Park	City Park	Downtown	Commercial	City of New Westminster	38438.62891	H	H	H	H	L	M	N
Muni Evers Park (future site)	Neighbourhood Park	Downtown	Mixed	City of New Westminster	38330.03125	L	L	L	L	L	H	N
Sapperton Landing Park	Regional Park	Glenbrooke South	Single Detached	City of New Westminster	35183.59033	H	H	H	H	M	M	Y
City Hall / Friendship Gardens	Community Park	Uptown	Commercial	City of New Westminster	34332.69141	H	H	H	H	M	H	Y
Grimston Park	Community Park	West End	Single Detached	City of New Westminster	26506.91016	H	H	M	H	L	M	N
Waterfront Esplanade	Community Park	Downtown	Apartment (High Rise)	City of New Westminster	26399.97986	H	H	H	H	L	M	N
Westburnco Reservoir Sports Courts	Neighbourhood Park	Massey Victory Heights	Single Detached	Greater Vancouver Water District	25280.96104	M	M	L	M	L	L	N
Mercer Park	Community Park	Kelvin	Institutional	City of New Westminster	24571.92969	M	M	M	M	L	H	N
The Great Lawn	Neighbourhood Park	Glenbrooke South	Institutional	City of New Westminster	24199.93945	H	M	H	H	L	H	N
Tipperary Park	Neighbourhood Park	Queens Park	Single Detached	City of New Westminster	20619.08984	H	M	M	M	M	H	Y
Terry Hughes	Community Park	Glenbrooke North	Institutional	City of New Westminster	20604.94392	M	L	M	M	L	H	N
Sapperton Park	Community Park	Sapperton	Single Detached	City of New Westminster	20164.41992	H	H	H	H	L	M	N
Albert Crescent Park	Neighbourhood Park	Downtown	Single Detached	City of New Westminster	18209.26953	M	M	H	M	M	H	N
Port Royal Park	Neighbourhood Park	Queensborough	Institutional	City of New Westminster	13669.94043	H	H	H	H	L	H	N
Simcoe Park	Neighbourhood Park	Brow of the Hill	Institutional	City of New Westminster	12990.4502	H	H	M	H	L	M	N
Old School House Park	Neighbourhood Park	Queensborough	Institutional	City of New Westminster	12500.00977	H	H	H	H	L	H	Y
Port Royal Riverfront Walk (Dyke Trail)	Neighbourhood Park	Queensborough	Institutional	City of New Westminster	10180	H	H	H	H	M	M	Y
Thompson's Landing Park	Neighbourhood Park	Queensborough	Institutional	City of New Westminster	9969.980469	H	M	H	H	L	H	N
Riverside Adventure Park	Neighbourhood Park	Brow of the Hill	Single Detached/Duplex	City of New Westminster	7384.677105	M	M	H	M	H	H	N
Victoria Hill Park	Neighbourhood Park	Glenbrooke South	Institutional	Onni Development (Victoria Hill) Corp	6850.02002	H	H	H	H	H	H	Y
Connaught Heights Park	Neighbourhood Park	Connaught Heights	Single Detached	City of New Westminster	6346.859863	H	H	H	H	H	H	N
Waterfront Esplanade	Community Park	Downtown	Apartment (High Rise)	City of New Westminster	5292.779785	H	H	H	H	L	L	N
Port Royal Community Gardens	Neighbourhood Park	Queensborough	Institutional	City of New Westminster	4729.970215	H	H	M	H	L	H	N
Gateway Park (Sapperton Triangle)	Neighbourhood Park	Sapperton	Single Detached	City of New Westminster	4010.439941	M	L	L	L	L	H	N
Glenbrook Community Centre	Community Park	Glenbrooke South	Institutional	Glenbrook Park Amenities Centre Ltd	3651.370117	H	H	M	H	L	M	N
Clinton Place Park	Neighbourhood Park	Queens Park		City of New Westminster	3618.046811	M	L	L	L	M	H	N
Sullivan Park	Neighbourhood Park	Queens Park	SINGLE DETACHED	City of New Westminster	3347.850098	M	H	M	M	L	H	N
Lookout Park	Neighbourhood Park	Brow of the Hill	Duplex	City of New Westminster	3132.22998	L	M	L	L	H	H	N
Saint Mary's Park	Neighbourhood Park	Downtown	Institutional	City of New Westminster	2461.840088	H	M	H	H	M	H	N
Simcoe Park	Neighbourhood Park	Brow of the Hill	Institutional	City of New Westminster	2339.110107	H	M	M	M	H	H	N
Mott Crescent Triangle	Neighbourhood Park	Massey Victory Heights	Single Detached	City of New Westminster	2187.48999	L	M	L	L	H	H	N
Toronto Place Park	Neighbourhood Park	Uptown	Single Detached	City of New Westminster	2023.430054	M	M	M	M	M	H	N
Redboat Park	Neighbourhood Park	Queensborough	Institutional	City of New Westminster	1932.099976	H	H	H	H	L	M	N
Begbie Square	Neighbourhood Park	Downtown		City of New Westminster	1819.346397	M	L	M	M	H	L	N
Victory Heights Park	Neighbourhood Park	Massey Victory Heights	Single Detached	City of New Westminster	1578.23999	H	H	H	H	H	M	N
Dunwood Place Park	Neighbourhood Park	Glenbrooke North	Single Detached	City of New Westminster	1336.130005	L	L	L	L	L	H	N
Sinclair Park	Neighbourhood Park	Glenbrooke North	Single Detached	City of New Westminster	1295.060059	M	M	M	M	L	H	N
Jackson Crescent Triangle	Neighbourhood Park	Massey Victory Heights	Single Detached	City of New Westminster	1294.97998	H	L	M	M	M	H	N
Hyack Square	Neighbourhood Park	Downtown	Commercial	City of New Westminster	1214.060059	M	M	M	M	L	L	N
Connaught Village Green	Neighbourhood Park	Connaught Heights	Single Detached	City of New Westminster	1113.809998	L	L	L	L	L	H	N
Sangster Place Triangle	Neighbourhood Park	Massey Victory Heights	Single Detached	City of New Westminster	1058.540039	L	M	L	L	H	H	N
Stewardson Thirteenth St Triangle	Neighbourhood Park	Brow of the Hill	Industrial	City of New Westminster	1052.959961	L	L	L	L	H	H	N
Sukh Sagar Park	Neighbourhood Park	Queensborough	Institutional	City of New Westminster	892.23999	H	H	H	H	M	M	Y
Eleventh Street Triangle	Neighbourhood Park	Downtown	Commercial	City of New Westminster	814.299988	L	L	L	L	M	H	N
Knox Plaza (Sapperton Plaza)	Neighbourhood Park	Sapperton	Commercial	City of New Westminster	802.400024	H	H	H	H	L	L	N
Quayside Park	Neighbourhood Park	Downtown	Apartment (High Rise)	City of New Westminster	787.228453	H	M	H	H	M	M	N
Sunset Park	Neighbourhood Park	Sapperton		City of New Westminster	417.658215	M	M	M	M	H	H	N
Sunset Park	Neighbourhood Park	Sapperton		City of New Westminster	271.653936	M	L	L	L	L	H	N
Stewardson Sixteenth St Triangle	Neighbourhood Park	Brow of the Hill	Single Detached	City of New Westminster	158.490005	L	L	L	L	L	H	N
Belamont Street Parklet	Parklet	Uptown			112	M	H	M	M	L	L	N
7th Street and 4th Ave Parklet	Parklet	Uptown			27	L	M	L	L	L	M	N
Columbia Street Parklet	Parklet	Sapperton		City of New Westminster	21.090996	H	M	M	M	M	L	N

V- Codebook

Park Space Quality

COMFORT

Definition:
A comfortable space provides options for mobility, without physical elements that limit personal ability to walk, use a wheelchair or push a stroller. It offers options to stand, linger and sit, with primary sitting options such as benches and chairs and/or secondary options such as seat wall, the edge of a fountain. A comfortable space also provides interesting things to look at, it allows for conversations to happen and it offers options for play, exercise and other activities.

LEVEL	CODE	EXAMPLE
LOW	CL	• Space is inaccessible by some groups • No sitting infrastructure • Space is too loud and has no interesting views • Lack of options for play and/or exercise • Poor maintenance
MED	CM	• Space is accessible for most groups • Limited sitting infrastructure • Space allows for conversations and has somewhat interesting views • Few options for play and/or exercise • Some maintenance
HIGH	CH	• Space is accessible for most groups • Specific infrastructure for group sitting • sitting options are placed so there are interesting things to look at • Space is calm and allows for conversations • Variety of options for play and/or exercise • Space is well maintained

ENJOYMENT

Definition:
A space that is sensory and visually appealing, with durable features shaped by good design. The space is well-designed, its surroundings and the space itself are at human-scale. Its features are shaped to be beautiful, durable and the space offers opportunities to enjoy various environmental conditions at different times of the year.

LEVEL	CODE	EXAMPLE
LOW	EL	• Space is monotonous, with no positive sensory experiences • The scale of the space and its surroundings is not appropriate

		• sitting options located entirely in the sun, no shadows, no protection from wind, rain or snow.
MED	EM	• Space has limited features that increase sensory and visual appeal
HIGH	EH	• High sensory and visual appeal (vegetation, flowers, public art, ponds) • The space and its surroundings are at human-scale • sitting options allow for spending time in the space in varied weather conditions

PROTECTION

Definition: protection refers to a space that provides safety from traffic and accidents for groups of different ages and abilities. It is perceived as safe from harm by others both day and night due to its features and the range of activities happening within and around it. The space offers protection against unpleasant sensory experiences and offers shelter from various climate conditions.

LEVEL	CODE	EXAMPLE
LOW	PL	• High levels of noise, dust, pollution, smells • Space's boundaries are not clear/defined • Few users, no activities or flow of people within and around the space • Lack of infrastructure of lighting, sitting and shelter from sun, rain, wind
MED	PM	• Protection against a few unpleasant sensory experience • Space's boundaries are defined, and it is perceived as safe by most groups • There are moderate activities or flow people within and around the space • Limited infrastructure of lighting, sitting and shelter from sun, rain, wind
HIGH	PH	• Protections against most unpleasant sensory experiences • Space's boundaries are defined, and it is perceived as safe by all groups • There are various activities or high flow people within and around the space • Specific infrastructure of lighting, sitting and shelter from sun, rain, wind

Climate Related Infrastructure (natural elements)

CANOPY COVER	CODE	EXAMPLE
LOW	CCL	• Few trees • Few shading options • Canopy covers about 1/3 of the site
MED	CCM	• Good number of trees • Some shading options • Canopy covers about 50% of the site
HIGH	CCH	• Mass of trees • High shading options • Canopy covers more than 50% of the site

PERMEABLE SURFACE	CODE	EXAMPLE
LOW	PSL	• Abundance of impervious surfaces • Grass/vegetation cover less or about 1/3 of the site
MED	PSM	• Good balance between impervious and permeable surfaces • Grass/vegetation cover about 50% of the site
HIGH	PSH	• Abundance of permeable surfaces • Grass/vegetation cover more than 50% of the site

GREEN INFRASTRUCTURE

Definition:
Design solutions which utilize or mimic the natural processes derived by the presence of soils, trees, and vegetation to provide ecosystem services. These services may include flood prevention, improved air quality, and water filtration. Although broader scale systems like parks and urban forests can be considered green infrastructure, this definition will pertain to site scale interventions.

LEVEL	CODE	EXAMPLE
YES	Y	Green infrastructure such as rain gardens, stormwater detention ponds, permeable paving is present.
NO	N	Green infrastructure is not present.

VI - Access Map Methodoloy

City of New Westminster Open Data files “Street Network”, “Contours”, and “Parks” were used to run a service network analysis that factored in topography by:

1. Mapping “high quality parks” determined by the parks classification
2. Assigning a points feature every 5m on the perimeter of “high quality parks” to allow QGIS to perform a service network analysis - these points serve as park entrances for this analysis
3. Spatially joining the elevation data to the road network (Street Network) so that each street segment has an associated elevation
    a. Contour data was spatially joined to the street network using “join attributes by location” with maximum and minimum elevation values defined where contour data intersect each segment
    b. The associated elevation for each line segment was defined as total elevation gain determined by maximum and minimum elevation values
4. Translating the slope or elevation gain into a speed which creates a "walking speed limit" adjusted for slope - an impedence the service network analysis factors in

Access Map Assumptions:

- A 5km walking speed was assumed for flat surface
- Therefore travel times primarily account for the able bodied
- It would take 0.08 hours or (roughly 5 minutes) to walk 400m at 5km/hr
- Naismith's Rule for Hiking was used to account for topography; travel speed times increase as elevations increase:
- For every 1m rise in elevation, 0.51 minutes is added to the travel time
- Example: a 34m elevation change would increase travel time by 17.34 minutes

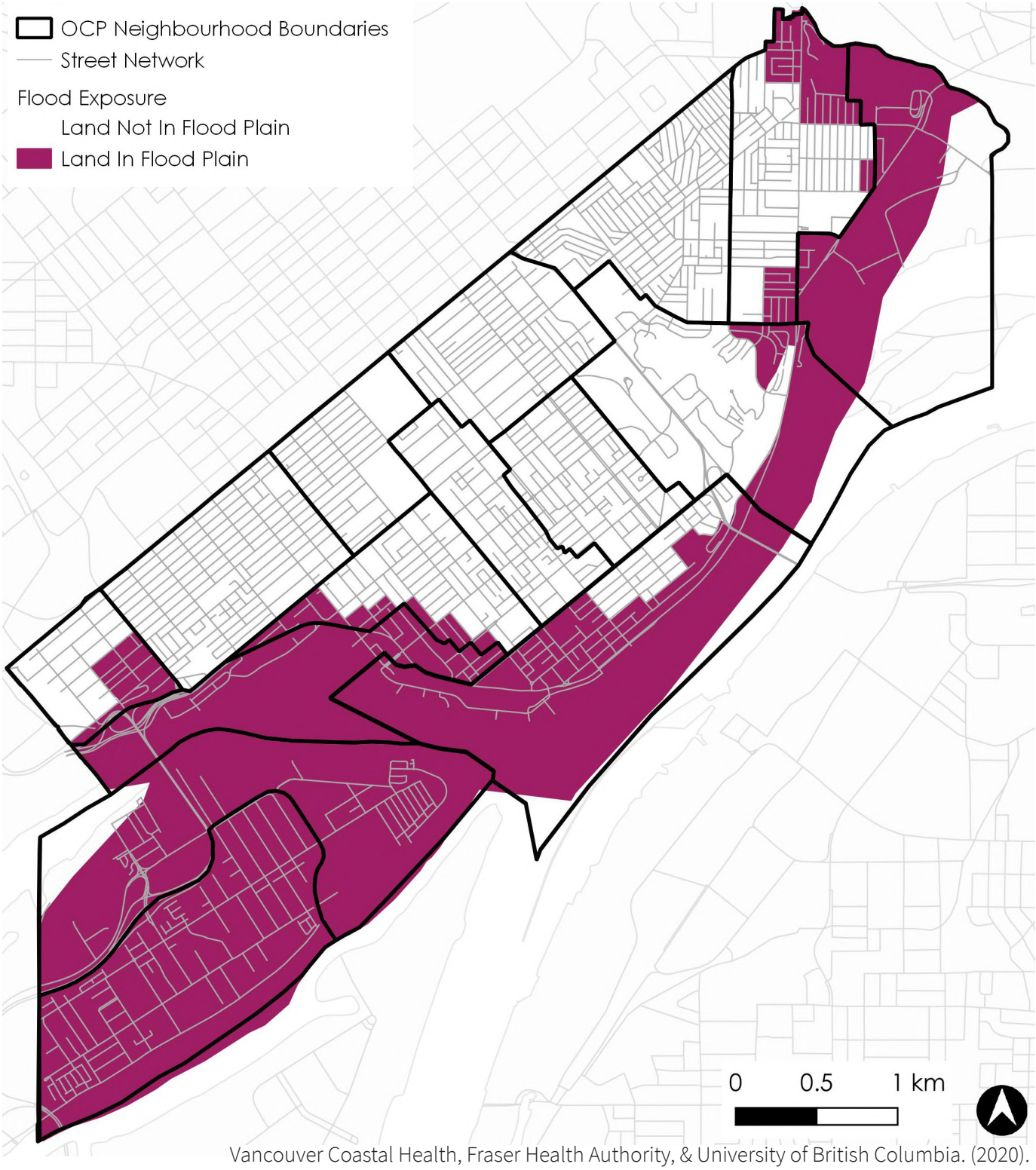
Attribute Table Notes:

“Speed_imp” is time gained in minutes as a result of elevation increase
“Speed_imp2” is % of an hour is that gained over 5 km as elevation increases
“Speed_imp3” is the time travel in hours required to walk 5 km
“speed _imp4” is the distance travelled over time as a result of increasing elevation

VII - Flood Exposure Map

PREDICTED SEA-LEVEL RISE FROM WATERWAYS/RIVERS IN 2100

Unit of Analysis - Land in Flood Plain

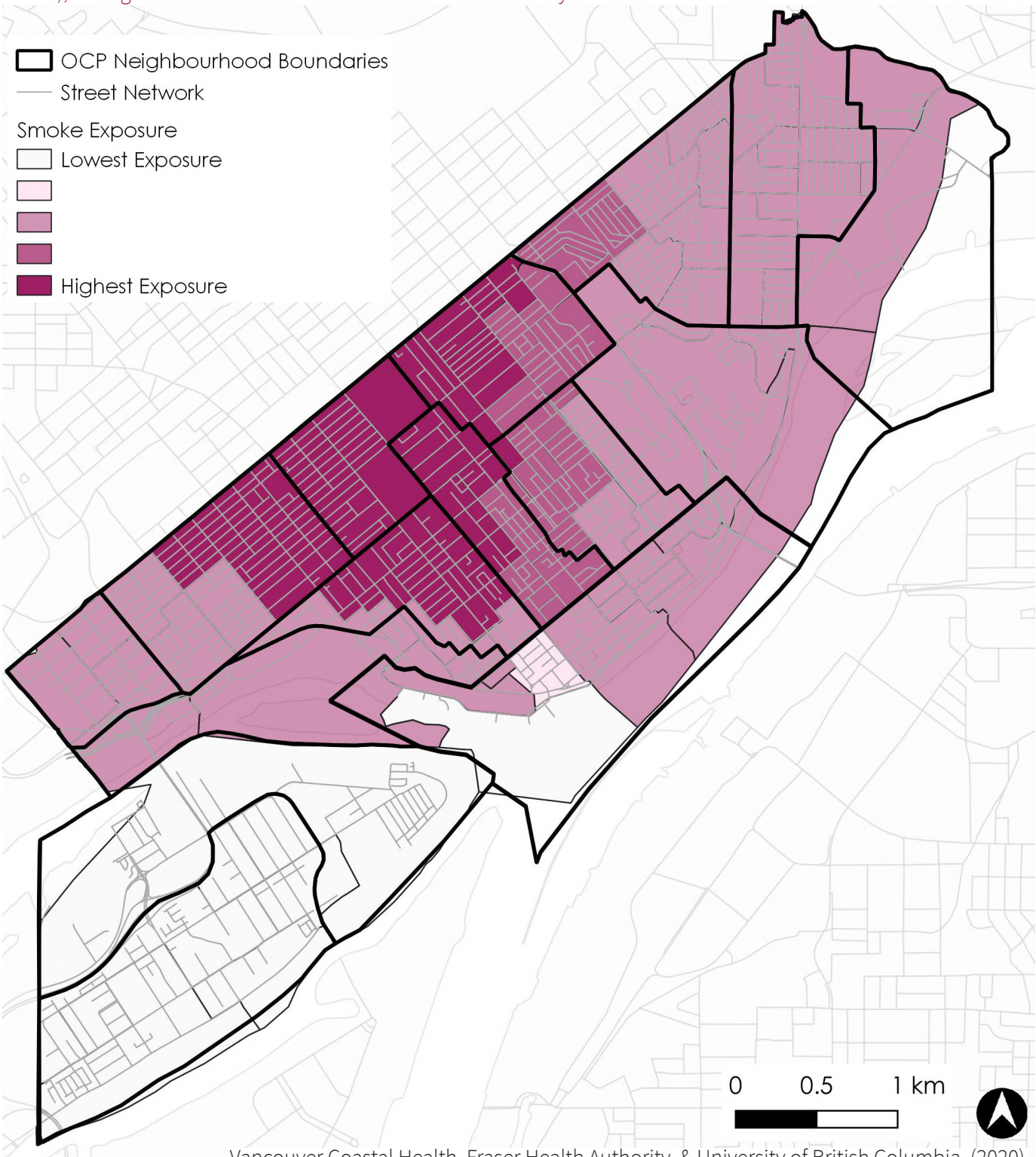


Vancouver Coastal Health, Fraser Health Authority, & University of British Columbia. (2020).

VIII - Smoke Exposure Map

PREDICTED WILDFIRE SMOKE EXPOSURE

Unit of Analysis - Percentage of days when daily average PM2.5 concentration is >= 25ug/m3 (microgram per cubic meter), during the five most intense fire seasons in the last ten years

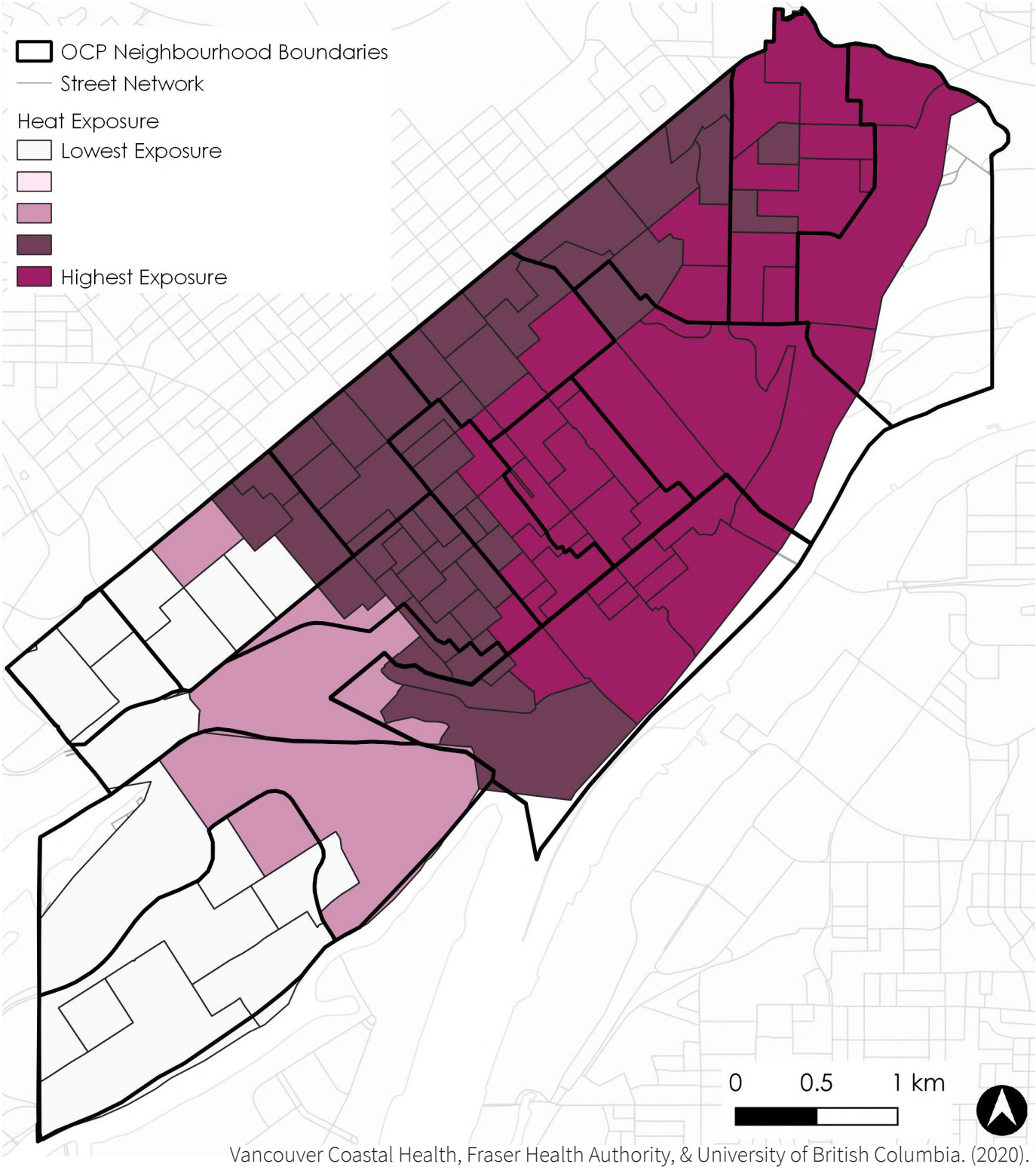


Vancouver Coastal Health, Fraser Health Authority, & University of British Columbia. (2020).

IX - Heat Exposure Map

PREDICTED NEIGHBOURHOOD EXPOSURE TO HOTTER TEMPERATURES

Unit of Analysis - Daily Max Temperature - Annual average of daily maximum temperature (> 25 degrees Celsius) recorded in each area between 2001 and 2010



Vancouver Coastal Health, Fraser Health Authority, & University of British Columbia. (2020).

X - Park Access Map

NEIGHBOURHOOD ACCESS TO HIGH QUALITY PARK SPACE WITHIN A 5 MINUTE WALK