

This figure uses data current as of June 2022; †Census tracts which store high on an index of 7 indicators associated with high socio-economic need; ** Future Extreme Flood Areas" represents the overland flooding associated with the year 2100 100-yr return period rainfall. Flood depths less than 30 cm are not shown. These data are to be used at a planning scale only, flooded areas should not be used to indicate parcel-scale flooding; ** "High Consequence Flood Areas" are where Future Extreme Flood Areas overlap with high use areas (skytrain and bus stops, schools, libraries, bikeways, greenways), major roads, and critical facilities.

FALSE CREEK BASIN GESTALT MAP

False Creek is a heavily used waterfront and waterbody with many access locations for boating, rowing, paddling, and viewing the water.

Limited freshwater inputs and ongoing poor water quality. Previous Council direction to make False Creek swimmable as soon as possible.

High levels of metals and legacy contaminants due to the industrial

The basin's major conveyance infrastructure includes 11 pump stations, the Yukon Gate control structure, and major interceptors and sanitary

The combined system serves 42% of the basin, and 20% has separated sanitary flows directly connect to the MV interceptors

Creative Energy is the city's largest commercial potable water user, and steam condensate is discharged into city sewers. Peak discharges occur in fall/winter when demands on the sewer system are greatest.

Major developments:

• Senákw of the Squamish Nation will include over 6,000 rental units and is in early construction phases.

• The Broadway Plan (spans multiple basins): 50,000 new residents and 40,000 new jobs by 2050.

Cambie Corridor: 9,800 jobs, 2,800 new social housing units and 20 acres of new parks by 2050 (spans multiple basins)

The basin has a higher rent burden, a larger population of Indigenous people, and a larger population of seniors, relative to the city average.

The "median modelled afternoon temperature" is high in the denser Strathcona, Mount Pleasant, and Fairview neighbourhoods.

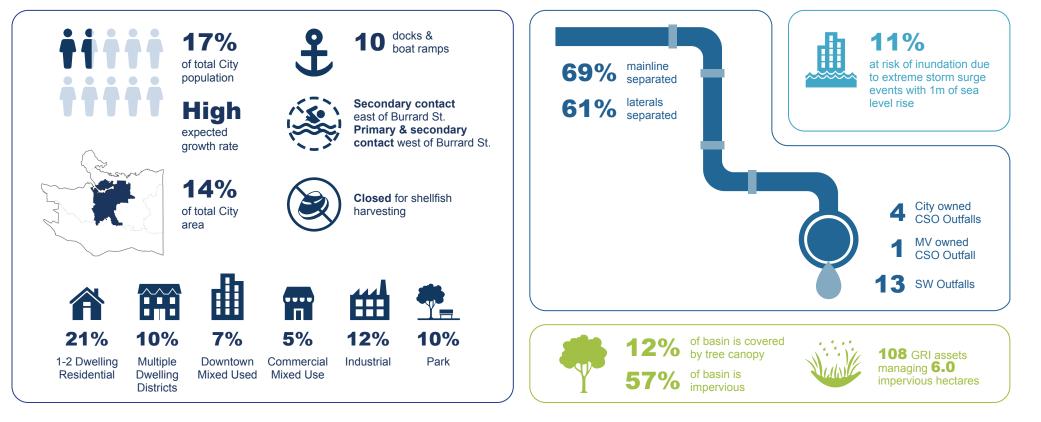
Overall, tree canopy cover is less dense as compared to other basins due to the density and urban characteristics of this basin.

The 2100, 1-metre projected sea level rise would impact 11% of the basin, primarily in the industrial areas, the Vancouver rail yard, and along the shoreline of False Creek.

• The basin has the highest percentage of 2100 sea level rise inundation as compared to all the other basins and overlaps with the Priority Equity Area (does not account for Port property in Inner Harbour Basin).

• Low-lying areas, land below 4.6 metres, include 13% of the Basin by False Creek's shoreline, within the Vancouver rail yards and Downtown.

FALSE CREEK BASIN **BY THE NUMBERS**



False Creek Separation Status

- Contains a former heavily industrialized area along the coastline. It is currently a mix of land uses including medium and high density residential, commercial, and highly impervious industrial
- Most of the former industrial area is fully separated (blue areas), meaning most untreated stormwater is directly discharged to False Creek. A portion of the stormwater runoff is treated where GRI has been implemented (such as within the Olympic Village neighbourhood).
- Some drainage corridors that historically drained into False Creek flow • into interceptors and are conveyed towards the Iona Island WWTP. This has greatly reduced the groundwater and stormwater flows into False Creek.
- · The highly impervious portion of the basin within downtown Vancouver is fully separated (blue areas) and discharges mostly untreated stormwater runoff to False Creek.
- Past separation efforts within several upland areas have allowed sanitary sewage from these areas to be directly sent to the interceptors (red areas), reducing the sewage concentration in the False Creek CSOs.
- The most upstream areas of the basin remain combined (white areas).

Water Quality Performance Summary

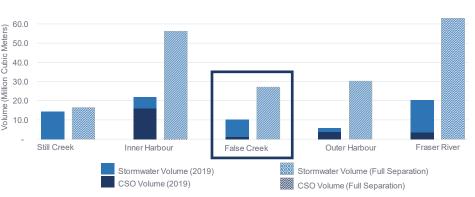
- Annual TSS discharge is about 131,000 kg, 9% of citywide TSS. 30% of False Creek TSS comes from CSOs, the rest is from stormwater discharges.
- Annual Fecal Coliform discharge is about 1,300 TCFU, 6% of citywide Fecal Coliform. 52% of False Creek Fecal Coliform comes from CSOs, the rest is from stormwater discharges.
- CSO discharge is about 1.2 million cubic meters per year, about 5% of citywide CSO volume.
- When full separation is achieved in 2075, total TSS loads would increase by 173% and total Fecal Coliform loads would increase by 92%.

Capital needs for 2075 planning horizon: \$1.9B - \$2.4B (2022 CAD)

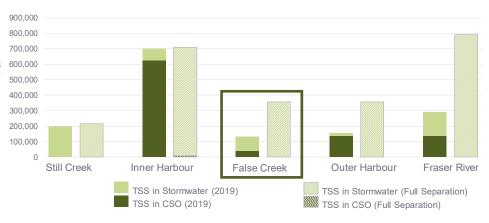
- A moderate population growth of 23% is expected.
- A total of 11 new stormwater pump stations and 10 sanitary pump stations are planned to be installed.
- 20% of new green infrastructure projects planned for the city will be in False Creek basin.

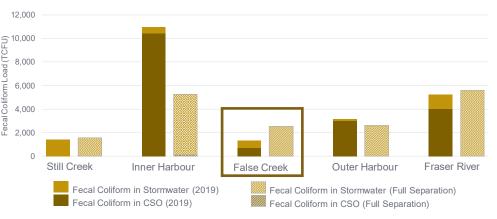
ALL BASINS CURRENT CONDITIONS vs. 2075 FULL SEPARATION

- contaminants
- 2. kg: Kilograms
- contamination







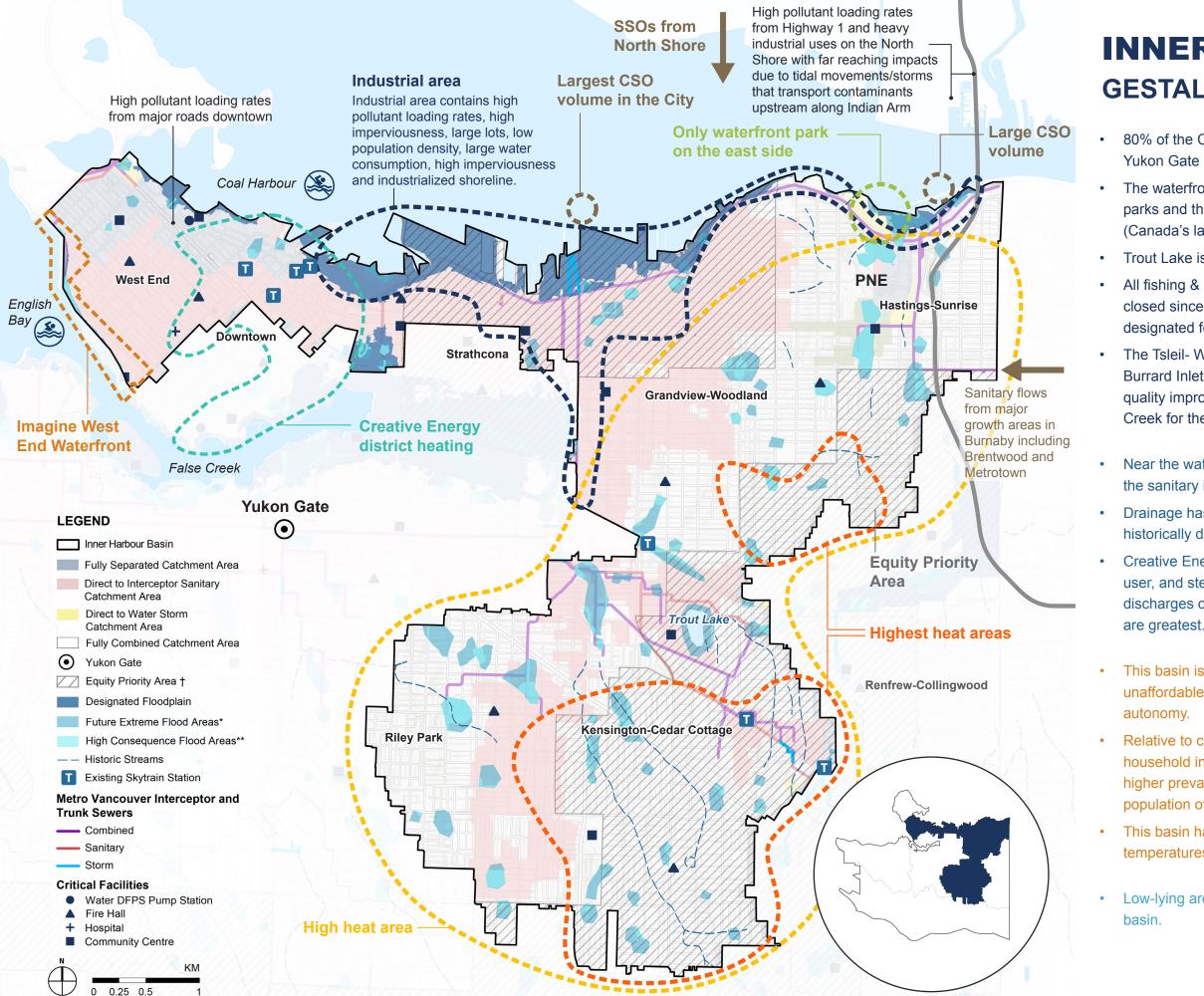


1. TSS: Total suspended solids. An indicator of sediment-bound

3. TCFU: Trillions of colony forming unit, an indicator of potential fecal

Discharge Volume

Total Suspended Solids (TSS) Load



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INNER HARBOUR BASIN GESTALT MAP

80% of the City's CSOs in 2020 occurred in this basin (due to how the Yukon Gate operates in protecting west side beaches)

The waterfront has diverse land uses including Downtown waterfront parks and the sea wall, while moving east is the Port of Vancouver (Canada's largest port) and heavy industrial uses.

Trout Lake is one of Vancouver's few freshwater lakes.

All fishing & shellfish harvesting in the Inner Harbour have been closed since 1972 due to poor water quality and the basin is designated for secondary (boating) contact only east of Burrard St.

The Tsleil- Waututh Nation's Burrard Inlet Action Plan (2017), and the Burrard Inlet Water Quality Objectives (2020-2023) will steer water quality improvements in the Inner Harbour, Outer Harbour, and False Creek for the next 50 years.

Near the waterfront, there are fully separated areas and areas where the sanitary is connected directly to the interceptor system.

Drainage has been drastically altered and the southern portion historically drained to the original False Creek

Creative Energy is the city's largest commercial potable water user, and steam condensate is discharged into city sewers. Peak discharges occur in fall/winter when demands on the sewer system are greatest.

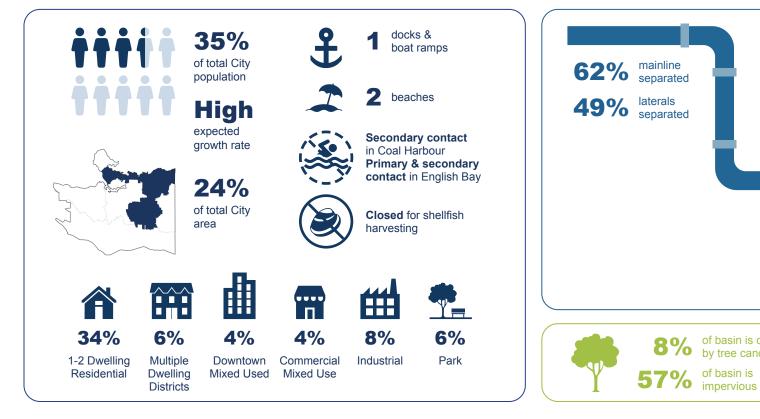
This basin is socially vulnerable due to low-income households facing unaffordable rental housing, low economic agency, and low individual

Relative to citywide average, the basin has higher rent burden, lower household income, higher prevalence of single parent households, higher prevalence of non-English speaking households, and larger population of seniors

This basin has the second highest median modelled afternoon temperatures (34.5°C) and second lowest tree canopy cover (8%).

Low-lying areas, land below 4.6 metres, include about 2% of the

INNER HARBOUR BASIN BY THE NUMBERS



Inner Harbour Separation Status

- Large portions of this basin are separated but with the storm sewer still acting as the combined sewer (red areas), prioritizing high strength sewage into the interceptors to be conveyed to Iona Island WWTP, discharging CSOs with decreased volumes of sanitary sewage.
- Some areas in downtown Vancouver, near the PNE, and in industrial • areas are fully separated (blue areas), sending mostly untreated stormwater discharges directly into Burrard Inlet.
- During wet weather, once the Yukon gate closes, all separated sanitary sewage from the Still Creek basin and parts of Burnaby, as well as sewage from the Inner Harbour basin is diverted to CSO outfalls in this basin. This is to minimize CSOs in False Creek and the Outer Harbour and to preserve the downstream capacity of the 8th Avenue Interceptor.
- The City's largest CSOs, both in volume and frequency, occur in this basin.

Water Quality Performance Summary

 Annual TSS discharge is about 690,000 kg, 47% of citywide TSS. 89% of Inner Harbour TSS comes from CSOs, the rest is from stormwater

discharges.

8%

 Annual Fecal Coliform discharge is about 11,000 TCFU, 60% of citywide Fecal Coliform. 95% of Inner Harbour Fecal Coliform comes from CSOs. the rest is from stormwater discharges.

of basin is covered

70 by tree canopy

4%

level rise

5

6

at risk of inundation due

to extreme storm surge

events with 1m of sea

City owned

MV owned

57 SW Outfalls

48 GRI assets

managing 2.3

impervious hectares

CSO Outfall

CSO Outfalls

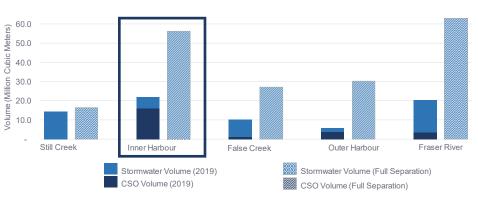
- CSO discharge is about 16 million cubic meters per year, 66% of citywide CSO volume.
- When full separation is achieved in 2075, total TSS loads would increase by 3% and total Fecal Coliform loads would decrease by 52%.

Capital needs for 2075 planning horizon: \$3B - \$3.7B (2022 CAD)

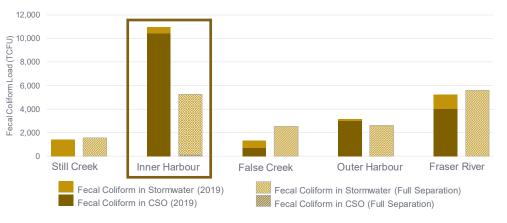
- A moderate population growth of 24% is expected.
- A total of 2 new stormwater pump stations and 2 sanitary pump stations are planned to be installed.
- 28% of new green infrastructure projects planned for the city will be in Inner Harbour basin.

ALL BASINS

- contaminants 2. kg: Kilograms
- contamination



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	Still Creek	



CURRENT CONDITIONS vs. 2075 FULL SEPARATION

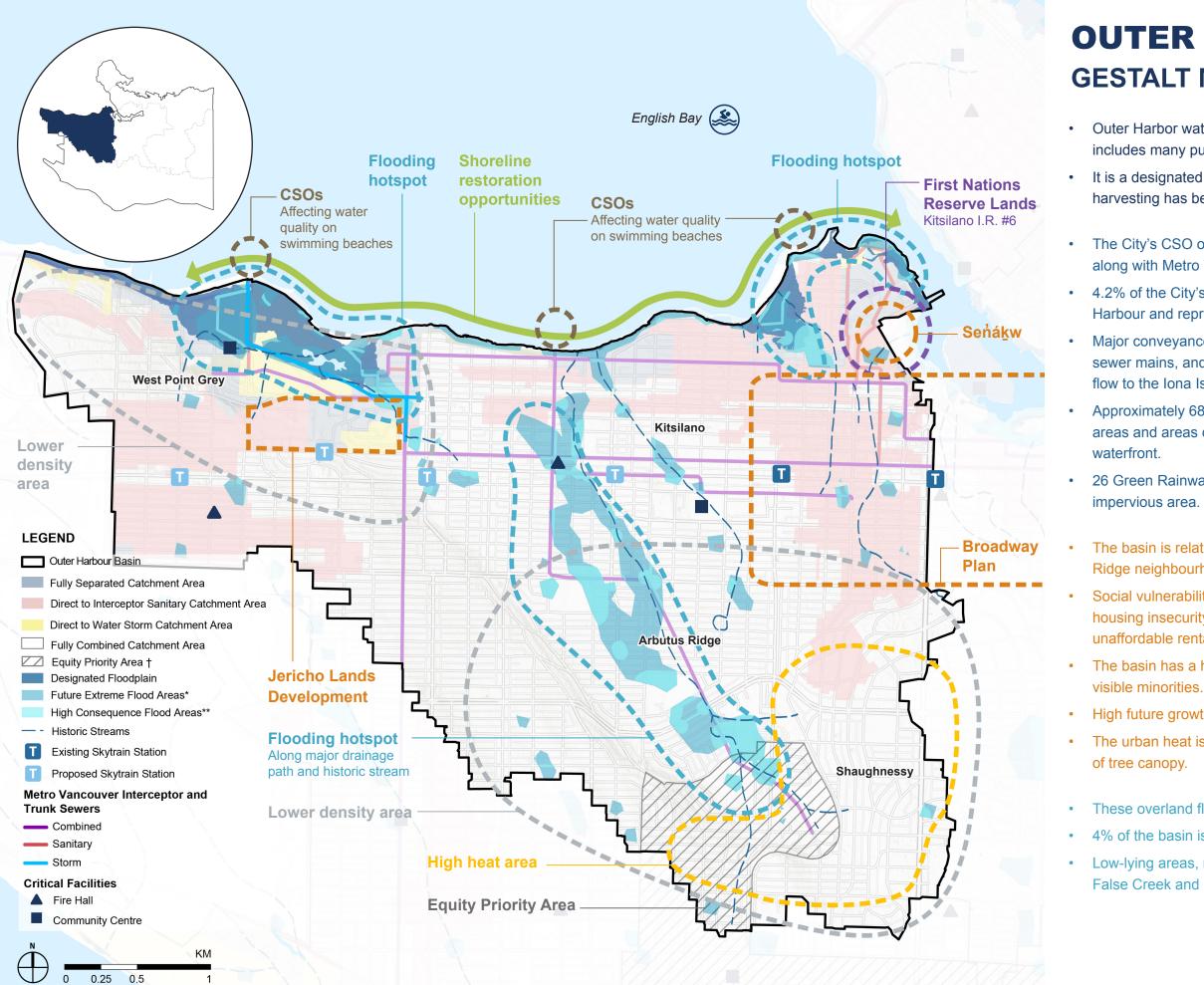
1. TSS: Total suspended solids. An indicator of sediment-bound

3. TCFU: Trillions of colony forming unit, an indicator of potential fecal

Discharge Volume

Total Suspended Solids (TSS) Load





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OUTER HARBOUR BASIN GESTALT MAP

• Outer Harbor waterfront is a mix of public beaches and soft edges and includes many public access points and parks.

• It is a designated primary (swimming) contact area. Shellfish harvesting has been closed since 1972 due to poor water quality.

• The City's CSO outfall and ten stormwater outfalls contribute flows along with Metro Vancouver's 3 CSOs along the waterfront.

• 4.2% of the City's 2020 CSO volume was discharged into Outer Harbour and represented 15% of the total CSO events.

Major conveyance infrastructure includes: 4 pump stations, large sewer mains, and the Highbury interceptor that conveys combined flow to the Iona Island WWTP.

Approximately 68% of the basin is combined with fully separated areas and areas discharging direct to interceptor system along the

26 Green Rainwater Infrastructure assets manage 1.6 hectares of impervious area.

The basin is relatively affluent with a priority equity are in the Arbutus Ridge neighbourhood.

Social vulnerability is characterized by low-income households facing housing insecurity, economic, social and housing insecurity, and unaffordable rental housing and relatively high individual autonomy.

The basin has a has relatively a higher rent burden, more seniors and visible minorities.

High future growth expected in the areas near downtown.

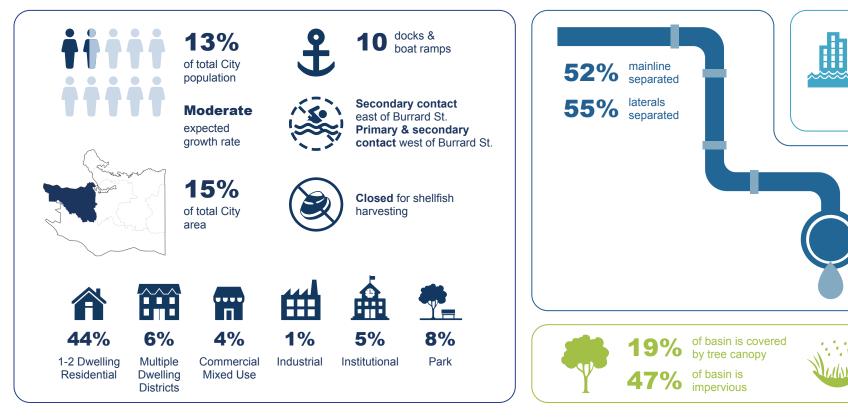
The urban heat is the lowest in the city and enjoys the highest density of tree canopy.

These overland flow paths align with buried historic creek paths.

4% of the basin is at risk of sea level rise.

Low-lying areas, make up about 4% of the basin, on the shoreline of False Creek and English Bay

OUTER HARBOUR BASIN BY THE NUMBERS



Outer Harbour Separation Status

- This basin contains large waterfront parks that direct discharge mostly untreated stormwater directly into the receiving water (yellow areas).
- · Large portions of this basin are separated, but with the storm sewer still acting as the combined sewer (red areas), prioritizing high strength sewage into interceptors to be conveyed to Iona Island WWTP, discharging CSOs with decreased volumes of sanitary sewage.
- During wet weather, the interceptor system can become overwhelmed from combined sewer flows, resulting in CSOs being discharged into the Balaclava and Jericho outfalls. High flows in the Highbury Interceptor trigger the Yukon Gate to close, resulting in upstream overflows in the Inner Harbour basin.
- Some regions adjacent to the shoreline are fully separated (blue areas), • sending untreated stormwater directly to the Outer Harbour.
- Some storm mains have separators at the bottom of the basin (blue and red areas). These are intended to collect the dirtiest stormwater (e.g. the first flush of a storm is the dirtiest) and any remaining connected laterals. The first flush of these areas is directed to the interceptor and treated at Iona WWTP.

Water Quality Performance Summary

- Annual TSS discharge is about 152,000 kg, 10% of citywide TSS. 88% of Outer Harbour TSS comes from CSOs, the rest is from stormwater discharges.
- Annual Fecal Coliform discharge is about 3,50 TCFU, 14% of citywide Fecal Coliform. 95% of Outer Harbour Fecal Coliform comes from CSOs, the rest is from stormwater discharges.
- CSO discharge is about 3.7 million cubic meters per year, 15% of citywide CSO volume.
- When full separation is achieved in 2075, total TSS loads would increase by 134% and total Fecal Coliform loads would decrease by 17%.

Capital needs for 2075 planning horizon: \$1.9B - \$2.4B (2022 CAD)

- A moderate population growth of 21% is expected.
- A total of 3 new stormwater pump stations and 3 sanitary pump stations are planned to be installed.
- 14% of new green infrastructure projects planned for the city will be in Outer Harbour basin.

ALL BASINS

- contaminants
- 2. kg: Kilograms

<1%

level rise

3

at risk of inundation due

to extreme storm surge

events with 1m of sea

City owned

MV owned

SW Outfalls

26 GRI assets

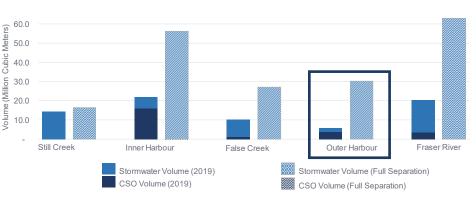
managing 1.6

impervious hectares

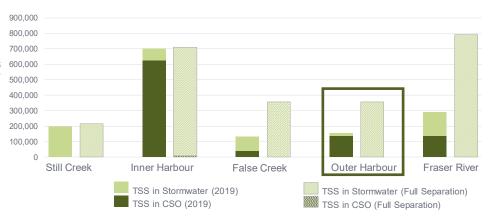
CSO Outfall

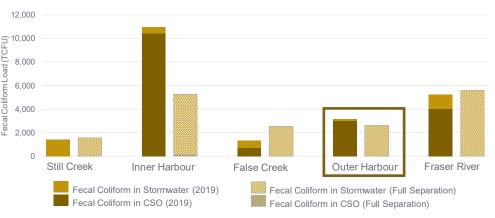
CSO Outfalls

- contamination









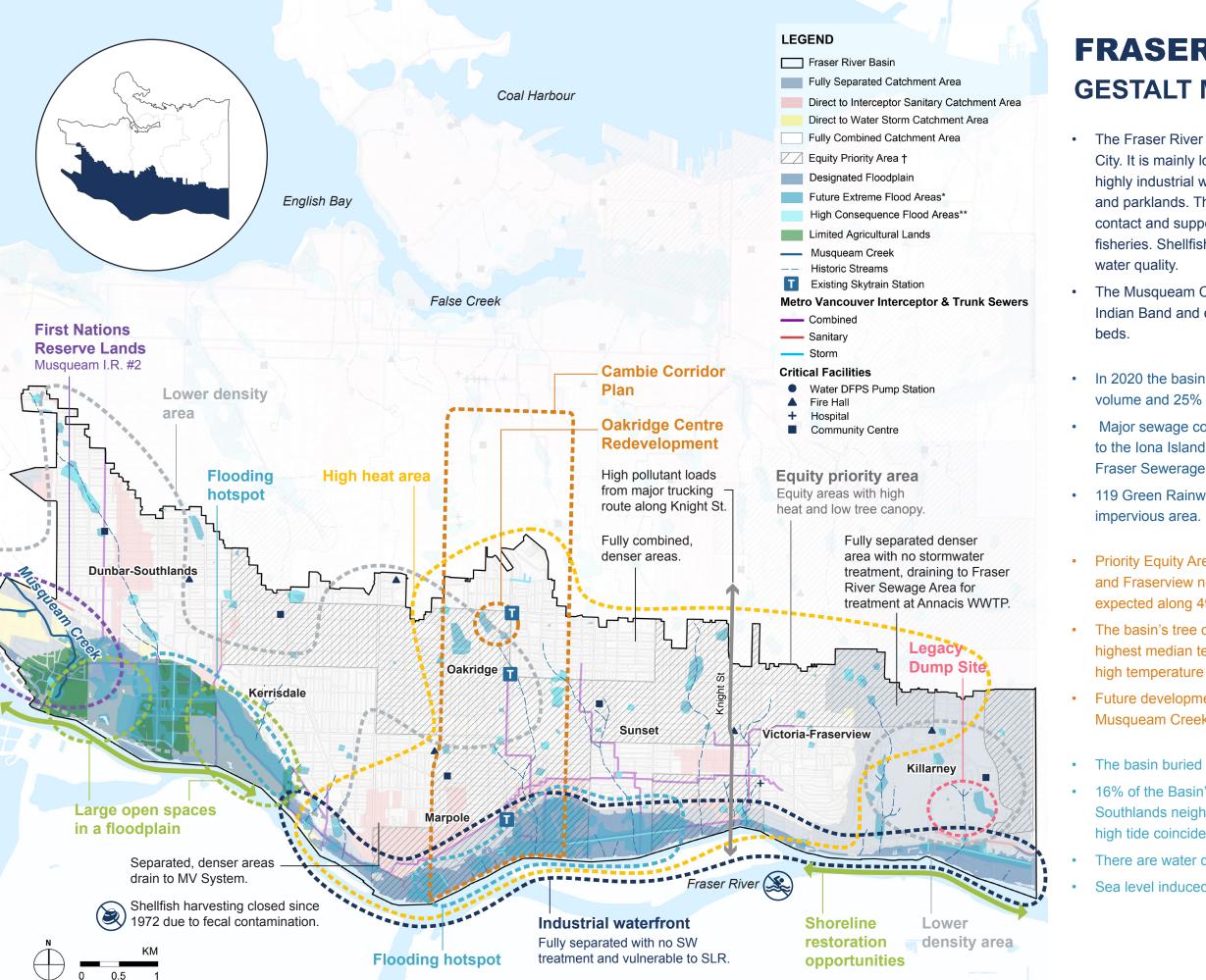
CURRENT CONDITIONS vs. 2075 FULL SEPARATION

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Discharge Volume

Total Suspended Solids (TSS) Load



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FRASER RIVER BASIN GESTALT MAP

 The Fraser River basin is the city's largest and covers 36% of the City. It is mainly low-density residential neighbourhoods with a highly industrial waterfront with a mix of commercial, residential, and parklands. The River is designated for secondary (boating) contact and supports significant recreational and commercial salmon fisheries. Shellfish harvesting has been closed since 1972 due to poor water quality.

The Musqueam Creek has special significance for the Musqueam Indian Band and experiences low baseflows and summer dry creek

In 2020 the basin's CSOs discharged 14% of the City's CSO total volume and 25% of the total events.

Major sewage conveyance infrastructure conveys combined flow to the Iona Island WWTP but the Champlain sewershed flows to the Fraser Sewerage Area and the Annacis Island WWTP.

119 Green Rainwater Infrastructure assets manager 5.2 hectares of impervious area.

Priority Equity Areas include Oakridge, Sunset, Kensington, Victoria, and Fraserview neighbourhoods. Moderate and high future growth is expected along 49th St. and between Granville St. and Boundary Rd.

The basin's tree canopy of 17% and it experiences the City's second highest median temperatures. Several equity areas are also at risk of high temperature

Future development plans for residential development within the Musqueam Creek Basin will add impervious cover.

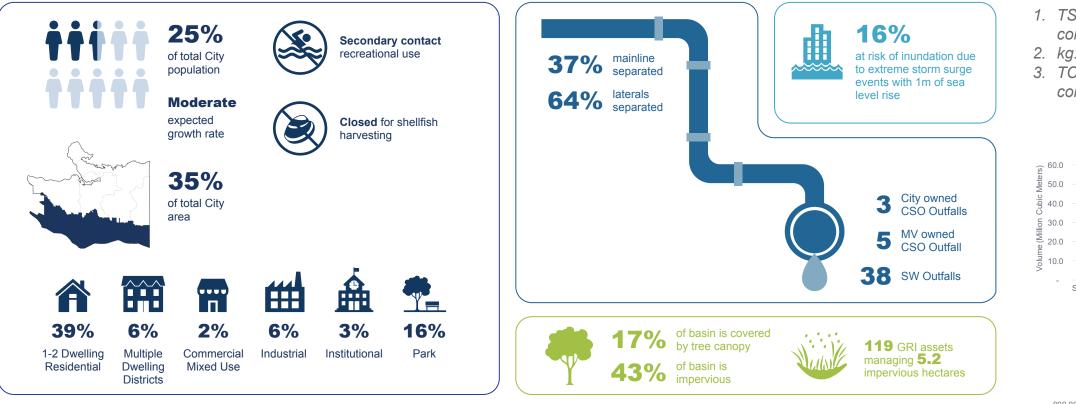
The basin buried historic creeks align with flood risk areas.

16% of the Basin's floodplain is at risk of flooding within the Southlands neighbourhood and the Musqueam Creek floods when high tide coincides with heavy rainfall.

There are water quality concerns in Vivian Creek.

Sea level induced flooding is anticipated along the River dike.

FRASER RIVER BASIN **BY THE NUMBERS**



Fraser River Separation Status

- This basin has had very little upland mainline separation (white areas). Separation efforts have been focused on the lowland areas to avoid flooding and pump station bypasses.
- Areas that discharge mostly untreated stormwater directly into the Fraser River are typically large green open spaces (yellow areas).
- The basin has fully separated areas (blue areas) including the Champlain neighbourhood, which was developed as a separate system with mostly untreated stormwater being directly discharged to the Fraser River. The sanitary sewage from this area is directed to the Annacis Island WWTP.

Water Quality Performance Summary

- Annual TSS discharge is about 288,000 kg, 20% of citywide TSS. 46% of Fraser River TSS comes from CSOs, the rest is from stormwater discharges.
- Annual Fecal Coliform discharge is about 5,200 TCFU, 24% of citywide Fecal Coliform. 77% of Fraser River Fecal Coliform comes from CSOs, the rest is from stormwater discharges.
- CSO discharge is about 3.5 million cubic meters per year, 14% of citywide CSO volume.
- When full separation is achieved in 2075, total TSS loads would increase

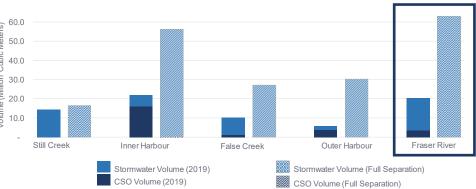
by 175% and total Fecal Coliform loads would increase by 7%.

Capital needs for 2075 planning horizon: \$4.3B - \$5.3B (2022 CAD)

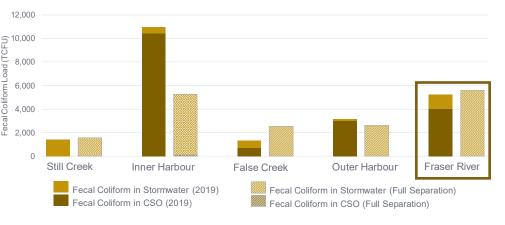
- A moderate population growth of 27% is expected.
- A total of 6 new stormwater pump stations and 1 sanitary pump stations are planned to be installed.
- 25% of new green infrastructure projects planned for the city will be in Fraser River basin.

ALL BASINS

- contaminants
- 2. kg: Kilograms
- contamination



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	0	
		Still Creek



CURRENT CONDITIONS vs. 2075 FULL SEPARATION

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3. TCFU: Trillions of colony forming unit, an indicator of potential fecal

Discharge Volume

Total Suspended Solids (TSS) Load





Still Creek Basin Fully Separated Catchment Area Direct to Interceptor **Catchment Area** Direct to Water Storm Catchment Area Fully Combined Catchment Area Z Equity Priority Area † Designated Floodplain Future Extreme Flood Areas* High Consequence Flood Areas** Peat Soil - Still Creek Open Channel **High heat area** - Historic Streams T Existing Skytrain Station Metro Vancouver Interceptor and **Trunk Sewers** Combined Sanitary Storm **Critical Facilities** Peat soil with subsidence and Fire Hall flooding issues Community Centre

0.25

0.5

Rupert and Renfrew Station Area Plan

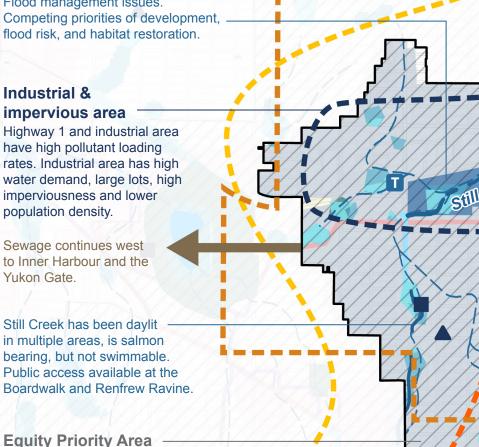
Flood management issues. Competing priorities of development flood risk, and habitat restoration

Industrial &

Highway 1 and industrial area have high pollutant loading rates. Industrial area has high water demand, large lots, high imperviousness and lower population density.

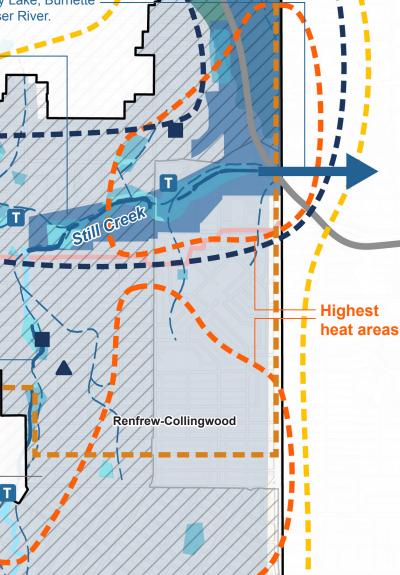
Sewage continues west to Inner Harbour and the Yukon Gate.

LEGEND



79% of basin is a Priority Equity Area with the lowest tree canopy and highest heat when compared to the rest of the City.

Cross jurisdictional watershed health: Still Creek continues east to Burnaby Lake, Burnette River, and Fraser River.



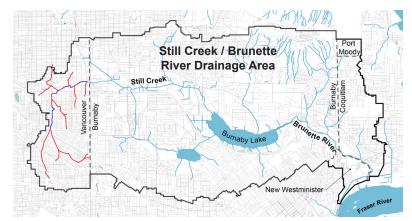
Т

Highway 1

STILL CREEK BASIN GESTALT MAP

- Area.
- Fraser River.

- Sewers.



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• The basin is primarily single family residential with a commercial area along Grandview Highway and E. Broadway and industrial/ employment lands in the Grandview Boundary Mixed Employment

Vancouver's Still Creek Basin is a small portion of a much larger watershed that includes a large land area to the east and drains to the

Sections of the creek are daylit in the northern portion of the catchment, but most of the creek within Vancouver's jurisdiction has been covered and piped.

There are no CSO outfalls, but there are 22 stormwater outfalls discharging to Still Creek.

• The basin is 100% fully separated, about 1% is sanitary direct to the interceptor, and 100% of stormwater is direct to waterbody.

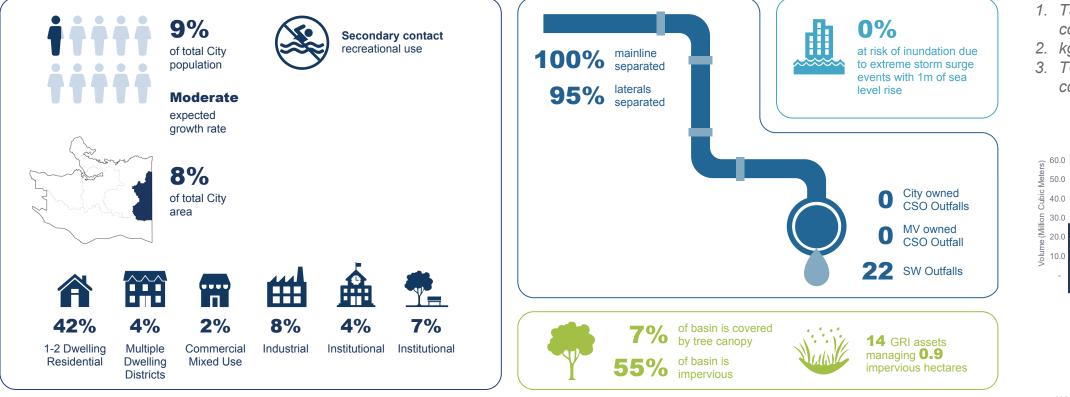
 High concentrations of pathogens and other contaminants continue to be measured in the creek pointing to chronic issues with pollution, source controls, cross-connections (wrongly connected combined and separated pipes) and urban runoff.

 The basin's sanitary sewage travels west towards the lona treatment plant. The major sanitary sewer conveyance infrastructure includes three pump stations and the Collingwood and Copley Sanitary Trunk

Social vulnerability is characterized by low-income newcomers facing economic, social and housing insecurity and low individual autonomy.

Relative to citywide average, this basin has a lower household income, a higher prevalence of single parent households, a higher prevalence of non-English speaking households, a larger population of visible minorities, and a larger population of Indigenous people

STILL CREEK BASIN **BY THE NUMBERS**



Still Creek Separation Status

- Lands in this basin were developed later than other areas of the City, and were constructed with mainline sewers fully separated. Mostly untreated stormwater drains directly to Still Creek in separated storm pipes.
- Still Creek has suspected fecal contamination from untreated sanitary sewage. While extensive investigative work has identified and eliminated a number of cross connections, further investigative work is required to identify and remedy any cross connections that may still exist.
- Still Creek is an important fish bearing creek that feeds the downstream Burnaby Lake and Brunette River water systems with high recreational values. It is a tributary to the Fraser River.
- The Vancouver portion of Still Creek is a small portion of a very large watershed going through three cities: Burnaby, Coquitlam, and New Westminster. An Integrated Stormwater Watershed Plan for the basin focuses on flooding mitigation and reducing pollution going into the creek.
- Community members have voiced concerns about the need to protect riparian areas and water quality.
- Because this basin's sewer mains are separated, future work could focus on stormwater management practices to lessen flooding, improve water quality and any remaining improper cross connections to align with the Integrated Stormwater Management Plan.

- Rainfall dependent infiltration is a large challenge in the separated sanitary sewer, which reduces capacity in downstream combined sewer systems, including at the Yukon Gate.
- This area discharges to 8th Avenue Interceptor upstream of Yukon Gate. Whenever the Yukon Gate closes, all separated sewage from Still Creek is discharged to Inner Harbour.

Water Quality Performance Summary

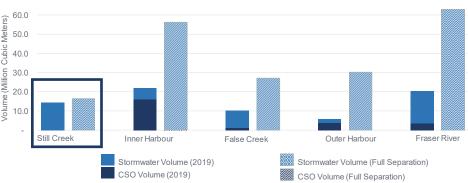
- Annual TSS discharge is about 200,000 kg, 14% of citywide TSS. 100% of Still Creek TSS comes from stormwater discharges.
- Annual Fecal Coliform discharge is about 1,400 TCFU, 6% of citywide Fecal Coliform. 100% of Still Creek Fecal Coliform comes from stormwater discharges.
- CSO discharge is 0, but stormwater discharge is 14 million cubic meters per year, 30% of citywide stormwater volume.
- When full separation is achieved in 2075, total TSS loads would increase by 10% and total Fecal Coliform loads would increase by 12%.

Capital needs for 2075 planning horizon: \$922M - \$1.3B (2022 CAD)

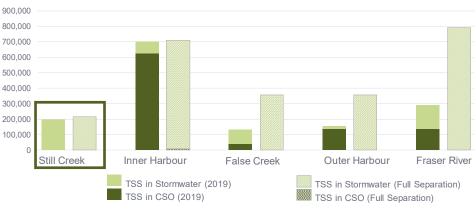
- A small population growth of 5% is expected.
- A total of 3 new sanitary pump stations are planned to be installed.
- 13% of new GRI projects planned for the city will be in Still Creek basin.

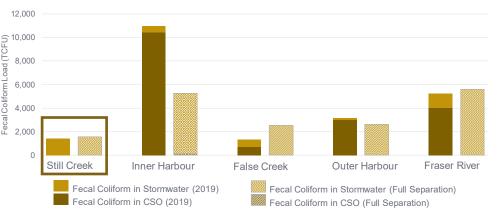
ALL BASINS CURRENT CONDITIONS vs. 2075 FULL SEPARATION

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Discharge Volume

Total Suspended Solids (TSS) Load