



2019 Transit Service Performance Review SkyTrain and West Coast Express

Data Definitions & Assumptions

We develop the Transit Service Performance Review (TSPR) using several data sources. The data definitions will help in understanding the key performance indicators (KPIs) in the dashboard. This document outlines the definitions, assumptions, and calculations used in the SkyTrain and West Coast Express (WCE) dashboard at: <https://public.tableau.com/profile/translink#!/>

General Definitions

Boarding

A boarding represents each time a customer enters a fare paid zone using Compass fare media or other proof of payment. Transfers are counted as additional boardings. If a customer transfers between two vehicles (including different modes) to reach a destination, then that customer would generate two boardings. We use boardings to indicate ridership on our services.

Transfers between the same mode within stations do not count as additional boardings. For example, this occurs at Bridgeport, Commercial-Broadway, Columbia, and Lougheed because customers do not need to tap in and tap out of fare gates to change trains.

Journey

A journey represents a complete trip from origin to destination using one or more transit modes. One journey can have multiple boardings if transfers are made between transit services. Journeys are currently only available as a system total and not by mode, since customers transfer between modes like bus to SkyTrain.

Practical Capacity

The practical capacity is the maximum number of passengers that can be carried on SkyTrain under typical conditions. Practical capacity considers customer behaviour and preferences, such as standing location and personal space. It also considers other factors like backpacks, luggage, bicycles, strollers and wheelchairs. As passenger volume reaches and exceeds the practical capacity, customers may experience pass-ups or other effects associated with crowding. This typically occurs during the peak periods or after special events.

The practical capacity of each SkyTrain car is as follows:

Vehicle type	Total Capacity
Expo & Millennium Lines MKI	68 passengers
Expo & Millennium Lines MKII	108 passengers
Expo & Millennium Lines MKIII	113 passengers
Canada Line	144 passengers

Each SkyTrain train is made up of two to six cars.

Rail Line Indicators

Note that the Expo and Millennium Lines are presented together.

Key Characteristics

Line Length (km)

The one-way distance of the rail line, including any branches. For example, the length of the Canada Line includes both the branch to YVR-Airport and the branch to Richmond-Brighouse in the total length.

Year Opened

The year when the rail line first began operating.

Number of Stations

The number of stations along the rail line.

Population/Employment Station Buffer

The number of people who live or work within 800m from the rail stations along the line (i.e. approx. 10-minute walk). The indicator uses Census data by MapInfo and is adjusted for census undercounts.

We updated this methodology in 2018 to improve accuracy from line buffers. Station buffers do not double count population or employment in areas where buffers overlap.

Average Speed (km/h)

Average speed is calculated by dividing the line length by the average end-to-end travel time and presented in kilometres per hour.

Historical Service Changes

Comments on all service changes implemented in the last five years. These changes may have an affect on KPIs reported for the line, so they should be considered when interpreting trends.

Ridership

Annual Station Boardings

The total number of entries to any station over the year, where the customer uses the train.

Station boardings do not include instances when someone enters and exits a station without using the transit service. For example, employees working inside Broadway-City Hall Station enter and exit the station for their shifts.

We also do not include transfers between different platforms at the same station. For example, transfers at Commercial-Broadway, Lougheed Town Centre, Production Way-University, Columbia, and Bridgeport Stations are not counted as additional station boardings.

Transfers between the Canada Line and Expo Line at Waterfront Station are counted as additional station boardings because customers must tap out from one fare paid zone and into another fare paid zone to transfer.

Average Daily Station Boardings

Average daily station boardings for the given line are calculated by dividing annual station boardings for the given calendar year by the number of days per year organized by day type. The day types include weekday (Monday to Friday), Saturday, and Sunday/Holiday.

Service

Capacity-Kilometre

A unit we use to measure the supply of rail transit service provided.

Capacity-kilometres are measured by multiplying the trip distance by available vehicle spaces.

*= Avg. Rail Car Passenger Capacity * Annual Service Car-Kilometres*

It captures the capacity along the entire route (i.e. sitting and standing spaces for passengers). Because vehicle capacities vary by vehicle type, measuring transit service at the capacity-kilometre allows for standardization across all modes.

Service Car-Hour

The main unit we use to measure the supply of rail transit service provided.

One service car-hour is equal to one rail car in operation for one hour. Because train lengths vary (i.e. a train consists of two or more cars), measuring rail transit supply at the car-hour allows for standardization across all trains.

For Expo/Millennium Line and West Coast Express (WCE) these hours include both revenue and non-revenue hours (i.e. deadhead when the trains are “not in service”). For Canada Line these hours include only revenue hours (i.e. when the train is in service) because it is operated under a different agreement.

Service Car-Kilometre

Another unit we use to measure the supply of rail transit service provided.

One service car-kilometre is equal to one rail car traveling one kilometre. Because train lengths and average operating speeds vary, measuring rail transit supply at the service car-kilometre allows for standardization across all trains.

Utilization

Boardings per Car-Hour

An industry standard to measure the service demand compared to transit supply.

$= \text{Annual Boardings} / \text{Annual Service Car-Hours}$

Boardings per Car-Kilometre

An industry standard to measure the service demand compared to transit supply.

$= \text{Annual Boardings} / \text{Annual Service Car-km}$

SkyTrain Passenger Volumes

Average Daily Passenger Volumes by Segment

The number of people on board the train by segment (between two stations) per day by direction.

This indicator shows where the most people are on board and helps identify overcrowded sections of the SkyTrain system. The graphs can be filtered by year, line, and day of the week.

Rolling Hour Passenger Volume by Segment

The number of people on board between stations is also measured for hour-long periods. These 60-minute windows are made up of four consecutive 15-minute intervals.

For example, the rolling hour passenger volume by segment starting at 8:15 is calculated by adding up the amount of passengers who travelled in a single direction in that segment from 8:15 to 9:15. It includes all passengers who rode through that segment in that hour.

This method of calculating passenger volume for an hour better reflects actual usage and service delivery patterns than measuring usage every hour on the hour. The graph shows rolling 60-min passenger volumes for the segment selected on the map by direction.

Busiest Segment

For a given day-type and line, this metric identifies the segment of track, direction of travel, and start time with the highest rolling hour passenger volume.

The segment names are written using station two-letter codes (XX-XX). They correspond with the Average Daily Passenger Volume graph and the full station names can be seen by hovering over the map.

Rail Station Indicators

Key Characteristics

Station ID

The ID is a two-letter station abbreviation. It is also used on rail line segment charts.

Sub-Region

Metro Vancouver is divided into seven sub-regions and has rail stations in the following six sub-regions:

- Burnaby/New Westminster
- Maple Ridge/Pitt Meadows (WCE only)
- Northeast Sector (Tri-Cities/Anmore/Belcarra)
- Southeast (North Delta/Surrey/Langleys/ White Rock)
- Southwest (Richmond/South Delta /Tsawwassen First Nation)
- Vancouver/UBC

(There is one WCE station in Mission, which is outside of the Metro Vancouver region.)

We also use these sub-regions in our Area Transport Planning process to recognize regional differences and align local plans with transit planning. Dividing Metro Vancouver into sub-regions allows for enhanced local involvement in transit planning addressing land use, transit supply, and supporting infrastructure within local contexts.

Municipality

TransLink has rail stations in the following municipalities:

- Burnaby
- Coquitlam
- Maple Ridge (WCE only)
- Mission (WCE only)
- New Westminister
- Pitt Meadows (WCE only)
- Port Coquitlam (WCE only)
- Port Moody
- Richmond
- Surrey
- Vancouver

Population/Employment Station Buffer

The number of people who live or work within 800m from the rail stations along the line (i.e. approx. 10-minute walk). The indicator uses Census data by MapInfo and is adjusted for census undercounts.

We updated this methodology in 2018 to improve accuracy from line buffers. Station buffers do not double count population or employment in areas where buffers overlap.

Year Opened

The year operations began at the rail station.

Platform Level

This indicator describes where the platform is relative to street level, including:

- Below ground
- At ground level
- Elevated

Platform Type

This indicator describes where the platforms are inside of the station, including:

- **Centre:** one common platform, between two tracks, serving trains in both directions
- **Side:** two separate platforms, each serving one track with trains in one direction
 - Some stations have platforms on separate levels (stacked) or only one platform (single)

Number of Fare Gates

The number of fare gates customers can use to tap in and out of the rail station. The fare gates may be located at multiple entrances.

Connecting Routes

Nearby bus routes, including exchange or on-street stops, that offer customers the opportunity to transfer between rail and bus service. Connecting bus routes are a key contributor to ridership at the rail station.

Historical Station Changes

Comments on all service changes implemented since 2011. These changes may have an affect on KPIs reported for the station, so they should be considered when interpreting trends.

Station Rankings

Each key performance indicator is ranked for all stations. A station with a rank of 1 had the best performance in the system, while a rank equal to the "Out of" column is the worst performance in the system.

The "Out of" column refers to the total number of stations that had a value for this metric and were eligible for ranking.

If two stations tie for the same rank, then they will both acquire the same ranking for that indicator and no stations will acquire the next rank.

Performance

Annual Station Boardings

The total number of people entering the station and boarding a train for the year.

Station boardings do not include instances when someone enters and exits a station without using the transit service. For example, employees working inside Broadway-City Hall Station enter and exit the station for their shifts.

We also do not include transfers between different platforms at the same station. For example, transfers at Commercial-Broadway, Loughheed Town Centre, Production Way-University, Columbia, and Bridgeport Stations are not counted as additional station boardings.

Transfers between the Canada Line and Expo Line at Waterfront Station are counted as additional station boardings because customers must tap out from one fare paid zone and into another fare paid zone to transfer.

Average Station Boardings by Day Type

The average number of daily station boardings for the station organized by day type (Monday-Friday, Saturday, and Sunday/Holiday).

Station Boardings/Alightings per Hour

The average number of station boardings (entries) and alightings (exits) by clock hour. These can be filtered by the day type at the selected station.

As with annual station boardings, this metric does not include instances when someone enters and exits a station without using the transit service or transfers between different platforms at the same station.

Data

Rail data for this TSPR was collected from the following data sources:

Compass Card

Rail line (Expo/Millennium, Canada, and WCE) and station level boarding data were collected from Compass fare media (including credit card taps) starting in 2016.

The Compass Card system, including closed fare gates at SkyTrain stations, was not fully implemented until July 2016. Therefore, Compass Card data for 2016 include only data from August 1st to December 31st.

An inflation factor for all SkyTrain metrics (boardings, alightings, volumes) has been used to account for boardings that have an unknown origin or destination. These inflation factors are mode and year specific and are calculated based on the difference between known boardings and alightings and final annual ridership.

British Columbia Rapid Transit Company (BCRTC) Performance Monitoring

Service level indicators, e.g. capacity-km, car-hours, and car-km, were provided by BCRTC Performance Monitoring data.

TransLink Finance

Annual Operating Cost was provided by TransLink Finance.

Limitations of the analysis

This performance review does not consider external factors that may impact transit ridership including fare increases, fuel prices, economic conditions, and others.