

Appendix J - Station Passenger Level of Service

Station Passenger Data

1. Introduction

- (a) This part of Appendix J [Station Passenger Level of Service] sets out the ridership data to be used by Project Co for passenger Level of Service (LOS) analysis for each Station to achieve the requirements set out in Article 10 [Architecture] of Part 2 of Schedule 4. For background information pertaining to the derivation of the Station passenger data included in this Appendix, including the use of 3.5 minute train headways for all Stations, except Arbutus Station, and 2.5 minute train headways only for Arbutus Station, see Memo re: Derivation of Station Passenger Data for BSP provided as Disclosed Data.

2. Ridership Data for Passenger Level of Service Analysis

- (a) This Section 2 provides the ridership data to be used by Project Co for LOS analysis at each Station.

(i) Great Northern Way Station

Table 1a - Great Northern Way Station PM Peak Hour Ridership to/ from Street

IN MOVEMENT	VOLUME	OUT MOVEMENT	VOLUME
Street to West-Bound	340	West-Bound to Street	168
Street to East-Bound	616	East-bound to Street	214

Table 1b - Great Northern Way Station PM Peak Hour Through Ridership

DIRECTION	VOLUME
East-Bound	7482
West-Bound	3380

(ii) Mount Pleasant Station

Table 2a - Mount Pleasant Station PM Peak Hour Ridership to/from Street

IN MOVEMENT	VOLUME	OUT MOVEMENT	VOLUME
Street to West-Bound	438	West-Bound to Street	595

Street to East-Bound	448	East-bound to Street	1174
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Table 2b - Mount Pleasant Station PM Peak Hour Through Ridership

DIRECTION	VOLUME
East-Bound	7248
West-Bound	3125

(iii) Broadway-City Hall Station

Table 3a - Broadway City-Hall Station PM Peak hour Transfer Ridership

	Canada Line (Brig) North-Bound	Canada Line (YVR) NB North-Bound	Canada Line (Brig Branch) South-Bound	Canada Line (YVR Branch) South-Bound	Canada Line (Trunk) South-Bound	Broadway Subway East-Bound	Broadway Subway West-Bound	TOTAL
Canada Line (Brighthouse) North-Bound	-	-	-	-	-	946	305	1,251
Canada Line (Brighthouse) South-Bound	-	-	-	-	-	679	485	1,164
Canada Line (YVR) North- Bound	-	-	-	-	-	576	183	759
Canada Line (YVR) South- Bound	-	-	-	-	-	679	485	1,164
Broadway Subway East- Bound	243	243	544	31	790	-	-	1,851
Broadway Subway West-Bound	93	93	459	103	933	-	-	1,681
TOTAL	336	336	1,003	134	1,723	2,880	1,458	7,867

(iv) Fairview - VGH Station

Table 4a - Fairview - VGH Station PM Peak Hour Ridership to / from Street

IN MOVEMENT	VOLUME	OUT MOVEMENT	VOLUME
Street to West-Bound	425	West-Bound to Street	610
Street to East-Bound	1363	East-bound to Street	455

Table 4b - Fairview - VGH Station PM Peak Hour Through Ridership

DIRECTION	VOLUME
East-Bound	5493
West-Bound	2553

(v) South Granville Station

Table 5a - South Granville Station PM Peak Hour Ridership to / from Street

IN MOVEMENT	VOLUME	OUT MOVEMENT	VOLUME
Street to West-Bound	163	West-Bound to Street	615
Street to East-Bound	1001	East-bound to Street	408

Table 5b - South Granville Station PM Peak Hour Through Ridership

DIRECTION	VOLUME
East-Bound	4947
West-Bound	2362

(vi) Arbutus Station

Table 6a - Arbutus Station PM Peak Hour Ridership Transfer Volumes

	99 B-Line West-Bound	Broadway Subway East-Bound
99 B-Line East-Bound	-	1115
Broadway Subway West-Bound	260	-

Table 6b - Arbutus Station PM Peak Hour Ridership to / from Street

IN MOVEMENT	VOLUME	OUT MOVEMENT	VOLUME
Street to 99 B-Line West-Bound	34	Broadway Subway West-Bound to Street	1496
Street to Broadway Subway East-Bound	1556	99 B-Line East-Bound to Street	86

APPENDIX J - FRUIN'S

Level of Service Criteria

Result Interpretation by Project Co:

When assessing the performance of a station passenger density is the key tool in considering a design's performance. Density measure outputs from Legion (and other approved equivalent pedestrian modelling software) are based upon Fruin's Levels of Service (LoS) which are calculated on a passenger by passenger basis. There are four different density scales of which details are given below in Table 1.0, and which LoS have been specified in the Project Agreement that Project Co must achieve in the design of the Stations. (refer to Article 10.3.5 [Dimensional Criteria and Level of Service], Part 2 of Schedule 4).

LoS	Fruin's Level of Service (Walkway)	Fruin's Level of Service (Stairs)	Fruin's Level of Service (Queuing)
A	0 to 0.31	0 to 0.54	0 to 0.83
B	0.31 to 0.43	0.54 to 0.72	0.83 to 1.08
C	0.43 to 0.72	0.72 to 1.08	1.08 to 1.54
D	0.72 to 1.08	1.08 to 1.54	1.54 to 3.59
E	1.08 to 2.17	1.54 to 2.69	3.59 to 5.38
F	Above 2.17	Above 2.69	Above 5.38

Table 1.0: Fruin's LoS - Passenger Density Parameters (persons per sq. m)

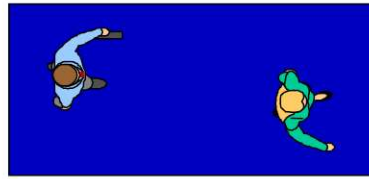
It is clear from Table 1.0 that higher densities are to be expected, and tolerated in station areas where the main purpose will be to queue/wait. Here it is assumed that passengers expect to travel at a lower speed and in more confined conditions. Examples of these locations are listed below.

- (i) At the tops and bottoms of Stairs and Escalators
- (ii) Immediate Gateline
- (iii) Boarding areas for escalators/stairs
- (iv) Platform area immediately adjacent to the train doors e.g. waiting to board

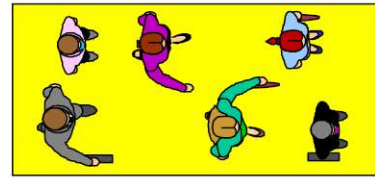
Figures 1.1 and 1.2 give a rough idea of passenger walkway densities.

When interpreting the results produced by the Legion (or approved equivalent) model it should be remembered that it has been determined to be generally desirable to attain a Level of Service of A, B or C in all parts of the station, with the area's purpose (e.g. walking, queuing or stairs) determining which Level of Service scale this is taken from.

Notwithstanding the above, Levels of Service which are less that Level of Service C can sometimes be accepted for short periods of time in localised areas of the station (e.g. in locations away from platforms edges and the tops of escalators). However acceptance of any lower LoS by the Province will be subject to the requirements set out in the Project Agreement (refer Article 10.3.5 [Dimensional Criteria and Level of Service Design], Part 2 of Schedule 4).



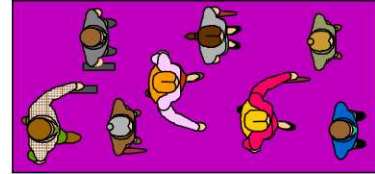
Level of Service A - free flow



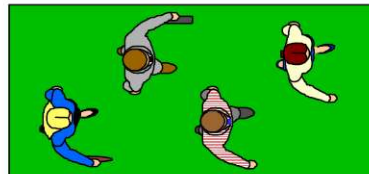
Level of Service D - most restricted



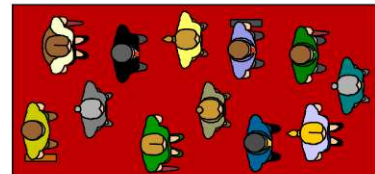
Level of Service B - minor conflicts



Level of Service E - all restricted



Level of Service C - reduced speed



Level of Service F - shuffling only

Figure 1.1: Fruin's Walkway Level of Service

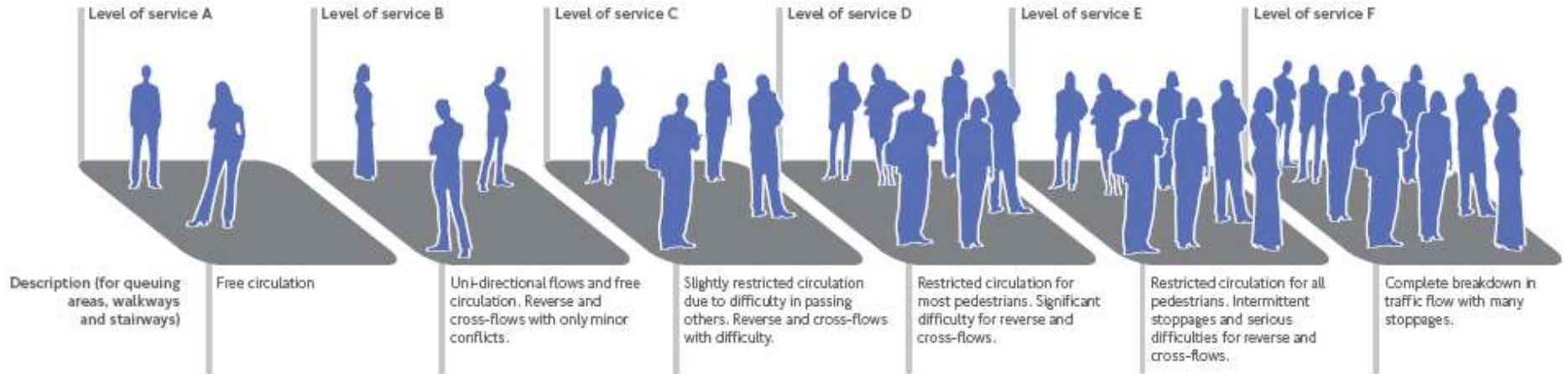


Figure 1.2: Fruin's Walkway Level of Service