



# Short-Range Planning Practice

## Outline

1. Definition & Introduction
2. Measures and Standards
3. Current Practice & Critique



# Public Transport Planning

- Long Range ( $> 3$  Years)
  - Major Capital Investment: Infrastructure
  - Major Institutional Changes
- Medium Range (1 - 3 Years)
  - Bus Network Structure
  - Network Size
  - Fleet Size
  - Fare Policy and Technology
- Short Range ( $< 1$  Year)
  - Route Structure
  - Service Frequency
  - Vehicle and Crew Scheduling
- Control (Real Time)
  - Revise Route of Specific Vehicle
  - Revise Schedule of Specific Vehicle

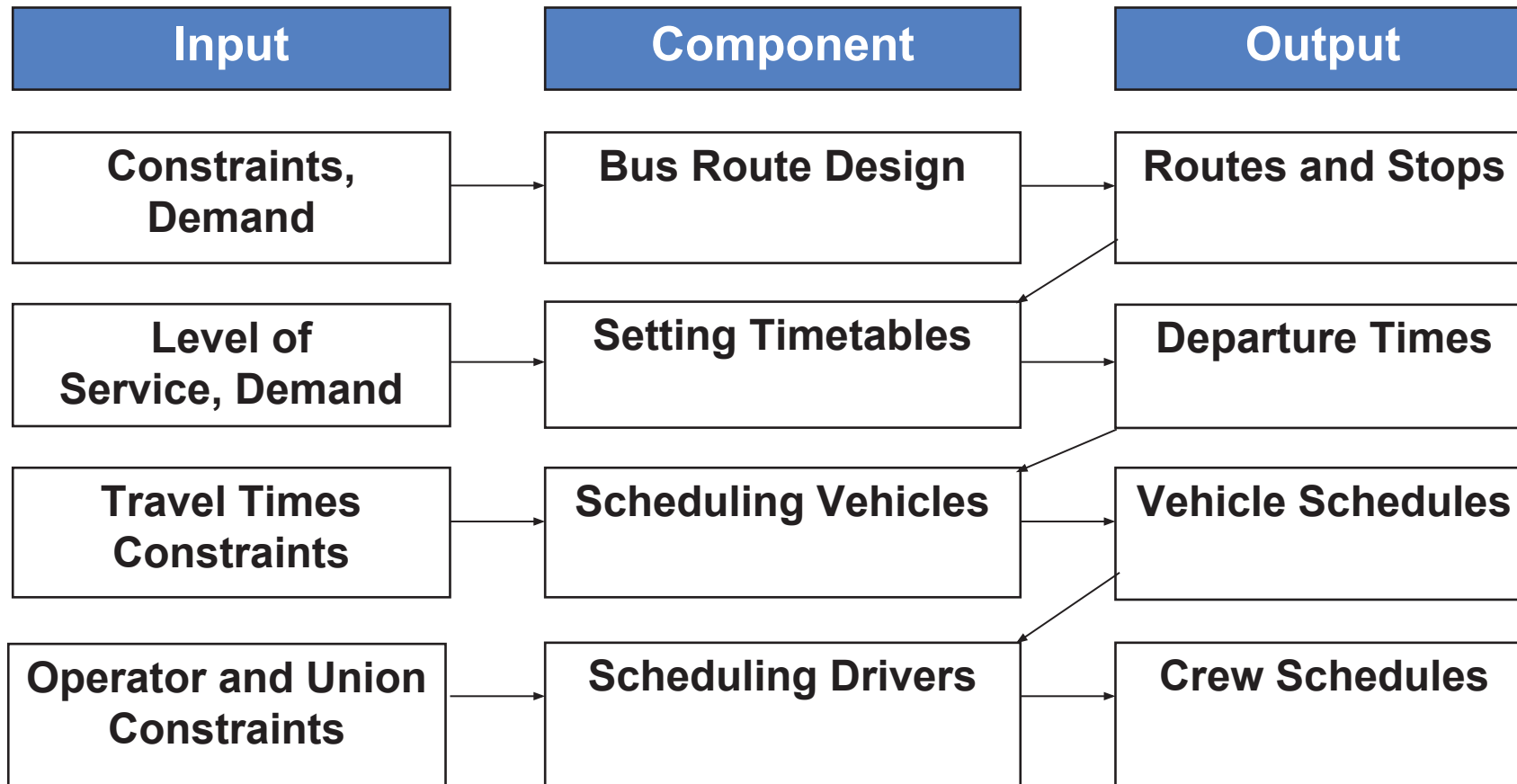


# Major Planning Elements

- Data Collection
- Problem/Opportunity Identification
- Design Options/Strategies
- Cost Estimation
- Ridership/Revenue Estimation



# Operational Planning Process





# Service and Operations Planning Definitions

## Service Planning

Defines services as understood by the public

- Network of routes and stops
- Service spans and frequencies
- Timetables

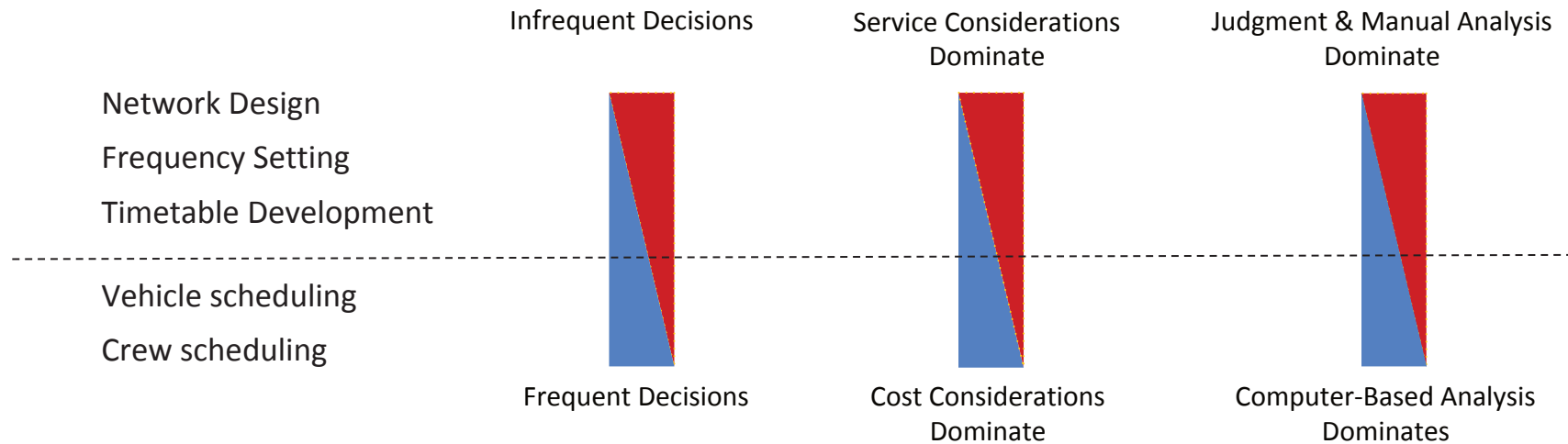
## Operations Planning

Defines how operations occur to produce the service

- Vehicle scheduling
- Crew scheduling

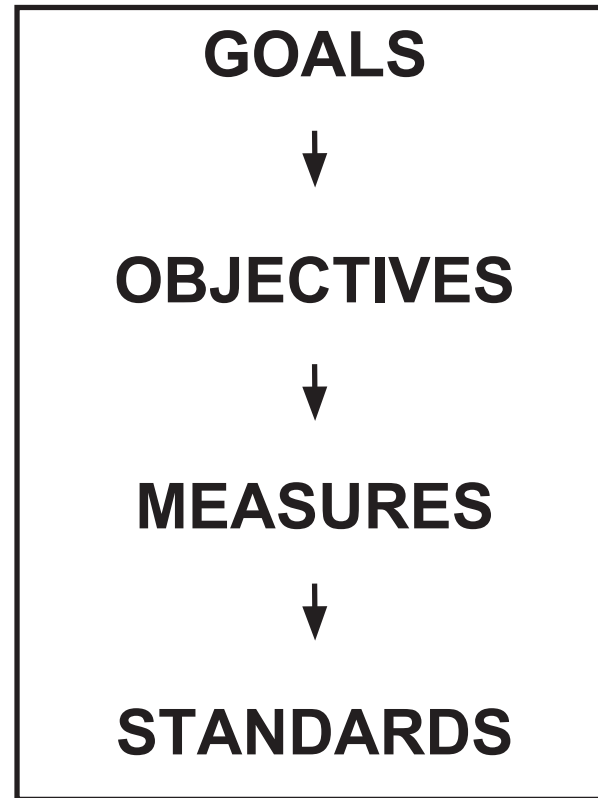


# Decision Characteristics





# Classical Evaluation Structure





# Transit Service Guidelines

## Purpose

- Communicate to the public and their representatives how decisions are made on changes in the transit network and allocation of resources
- Ensure provision of an acceptable level of service quality to customers on all services
- Provide a consistent and fair basis for:
  - evaluating proposed improvements to existing services
  - considering new services
- Balance improvements to level of service with efficient use of resources

Adapted from TransLink Service Guidelines: Public Summary Report. Greater Vancouver Transportation Authority, 2004





# Aspects Covered by Service Guidelines

- Service Design
- Operating Performance
  - Service Quality
  - Economic/Productivity



# Factors of Service Quality

Availability	Comfort and Convenience
Frequency	Passenger Load
Service Span	Reliability
Access	Travel Time

## Top Drivers of Perceived Service Quality

1. Frequency
2. Waiting Time
3. Reliability
4. Access (closeness to origin and destination)

Source: Transit Capacity and Quality of Service Manual

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# Service Design: Span of Service

Most agencies have guidelines covering span of service.

## **Example** MBTA Bus

The first trip should arrive no later than, and the last trip should depart no earlier than, the times shown below (for local bus service):

Weekdays 7 a.m. – 6:30 p.m.

For higher density areas only:

Saturdays 8 a.m. – 6:30 p.m.

Sundays 10 a.m. – 6:30 p.m.



# TransLink Convenience Objective

**Minimum Service Guidelines to ensure that 95% of trips listed can be completed at the times shown**

LATEST ARRIVAL TIME OF FIRST TRANSIT TRIP IN MORNING			
SERVICE	WEEKDAYS	SATURDAYS	SUNDAYS & HOLIDAYS
From any point to Downtown Vancouver	7:00 AM	8:00 AM	9:00 AM
From any point to nearest town centre	7:00 AM	8:00 AM	9:00 AM
EARLIEST DEPARTURE TIME OF LAST TRANSIT TRIP IN EVENING			
SERVICE	WEEKDAYS	SATURDAYS	SUNDAYS & HOLIDAYS
From downtown Vancouver to any town centre	Midnight	Midnight	11:00 PM
From town centre to any adjacent town centre	Midnight	Midnight	11:00 PM

Service provided to major regional activity centres should correspond to customary opening and closing times, but can be provided beyond these hours if it is cost-efficient.



# Service Design: Route Design

## Most agencies with route design guidelines include:

- Population density
- Employment density
- Spacing between routes

## Other primary concerns in route design:

- Service to unserved areas
- Direct, non-circuitous routing

### Coverage Example

MBTA: The MBTA has a policy objective to provide transit service within walking distance (defined as 1/4 mile) of all residents living in areas with population densities greater than 5,000 people per square mile.

### Typical Stop Spacing (by system)

Stops per mile	% of systems
< 4	9
4	21
6-8	51
10-12	13
12	6



# TransLink Comprehensiveness Objective

- At least 90% of all residents and employees in urbanized development areas should have a walk of less than 450 metres to a bus stop.
- 98% of all peak period transit trips to/from Downtown Vancouver should require no more than one transfer
- 95% of all peak period transit trips to the nearest town centre should require no more than one transfer
- All transit trips between one town centre and adjacent town centres should require no transfers
- 95% of all peak period transit trips to major regional activity centres and passenger gateways should require no more than two transfers



# TransLink Route Design Guidelines

Deviations from the most direct route, must have walking time savings for customers on the added route section greater than the increase in total travel time for through passengers.

Minimum Bus Stop Spacing	
<b>Bus</b>	250 m (but both near & far-side stops permitted at major transfer points)
<b>Express Coach</b>	250 m (in local service area)
<b>B-Line</b>	500-1,500 m average spacing on route
<b>Community Shuttle</b>	Flexible to serve local conditions



# Service Design: Schedules

Most agencies have guidelines for scheduling based on

- Maximum (policy) headways
- Maximum passenger crowding

## **Policy Headway Example (MBTA)**

Maximum headway on all local bus routes should be 30 minutes in the peak and 60 minutes at other times. For express service there should be at least 3 trips in each peak period.

## **Maximum Passenger Crowding Example (MBTA)**

On the Green line (light rail) the maximum passengers per car should be no more than 225% of the seats in the peak period. In the off peak the maximum passengers per car should be no more than the seated capacity except in the central subway where it should be no more than 140% of the seated capacity.





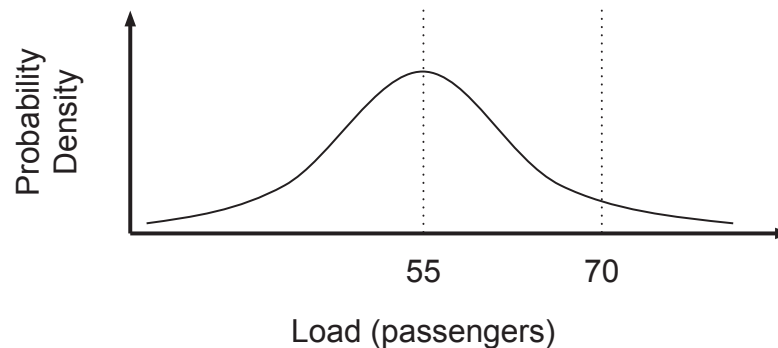
# TransLink Frequency Objective

	Weekday peak & mid-day periods	Evenings and weekends
<b>SkyTrain (ALRT)</b>	5-6 minutes	8-10 minutes
<b>B-Line (BRT)</b>	10 minutes	15 minutes except early AM and late PM
<b>West Coast Express</b>	30 minutes	
<b>Bus*</b>	at least every 30 minutes	
<p>* Bus services without timed connections at transit stations, bus loops or major street intersections should provide service every 15 minutes or better in peak and midday periods and every 20 minutes or better in the evening.</p>		



# Setting Load Standards: Peak Load

- Peak half-hour
  - avoid such high loads that
    - passengers frequently cannot board the first vehicle to arrive
    - vehicles encounter high dwell times
  - acceptable load of about 70 passengers for a standard 40 ft. bus
    - acceptable average load (at maximum load point) of 55 passengers



- Other times
  - normally expect to provide a seat for all passengers
  - acceptable average load of about 40 passengers for a standard 40 ft. bus



# TransLink Comfort Objective: Bus

Maximum Number of Passengers On-Board (standing passengers)*			
Bus Type	Peak 15 min in AM & PM peak	Peak 30 min in AM & PM peak	Weekday Mid-day, Evening, Weekends (peak 60 min.)
12-m high floor trolley coach (38 seats)	60 (22)	55 (17)	45 (7)
12-m low floor bus (38 seats)	55 (17)	50 (12)	45 (7)
12-m highway coach (47 seats)	50 (3)	47 (0)	47 (0)
18-m low floor articulated bus (54 seats)	85 (31)	75 (21)	65 (11)
* These guidelines are for the highest passenger loads averaged for all bus trips on a route within the busiest 15 minutes and 30 minutes in peak periods and over 60 minutes in off-peak periods. Passenger loads on some individual bus trips may exceed the guidelines.			



# TransLink Comfort Objective

Service	Level of compliance	Maximum customer standing time
SkyTrain	95%	$\leq 20$ minutes off-peak periods
Bus	90%	$\leq 30$ minutes peak periods
	95%	$\leq 30$ minutes off-peak periods
West Coast Express	90%	$\leq 30$ minutes peak periods
West Coast Express	$\leq 5$ standees average over peak 60 minutes	



# TTC Loading Standards

Acceptable Maximum-Hour Average Vehicle Loads at Peak Flow Point  
(Passengers Per Vehicle)

	Peak Periods	Off-Peak Periods	
Vehicle Type	All Routes	High Frequency headway < 10 min	Low Frequency headway > 10 min
40-ft Bus	50-57	35-49	28-39
50-ft Streetcar	74	58	46
75-ft Articulated Streetcar	108	76	61
6-car Subway Train	1100	400-500	--