Ashton, Fran

From: Donald Malcolm Johnston [dmjohnston@imag.net]
Sent: March 12, 2003 9:21 AM
To: Ashton, Fran
Subject: March 19th meeting

Ms. Ashton:

Thank you for making arrangements for me to speak to Richmond's Public works & Transportation Committee. I intend to make my presentation visual and I need an overhead projector. I would like you to give the committee members this copy of Technical data from Calgary's C-Train LRT system.

Technical data from the Calg
Transit
Light Rail Transit

Please note highlights in red.

Downtown

- 2.0 km in-street section, opened May 25, 1981
- Trains share transit mall with buses and emergency vehicles

South LRT

- 14.3 km, opened May 25, 1981
- Trains run on fenced righ-of-way (R.O.W.) parallel to freight rail line from 4 Avenue to Fish Creek Lacombe Station S.W.

Northeast LRT

- 9.8 km, April 29, 1985
- Trains run in median of roadway, with a concrete barrier separation

Northwest LRT

- 5.6 km, opened September 7, 1987
- 1.0 km extension, opened August 31, 1990
- Trains run in median of roadway and on exclusive righ-of-way (R.O.W.) th residential areas

Total Length

- 32.7 km, 5% grade separated, 8% underground
- Proof of purchase fare system, free-fare zone on 7th Avenue
- 22 major stations, 11 side loading platforms downtown

Geometric Characteristics

- Overall width of system for 2 parallel sets of track (m): 12
- Minimum required width for station (m): 20
- Length of station platforms (m): 80
- Maximum gradient in the system: 6%
- Dimensions of dynamic envelope space (Gabarit dynamique)
  Height (m): 4:07
  Width (m): 3:11
- Minimum feasible radius of horizontal curvature (m): 35 mainline, 25 yard
- Minimum actual radius of horizontal curvature (m): 63 mainline, 25 yard
- Minimum actual feasible radius of vertical curvature (m): 500
- Minimum actual radius of vertical curvature (m): 500
- Types of track used:
  ARA - A 100 rail with Pandrol fasteners on concrete ties on ballast
  ARA - A 100 rail on Lord Direct Fixation fasteners on concrete plinths
  Ri 60 girder rail on compressible supports in-street
  Noise levels in DBA: 72 at 25 m

LIGHT RAIL VEHICLES (LRVs)

U2

Fibreglass cab, steel body

LRVs can be operated from either command end

Suspension type: Megi rubber chevron, double coil springs

Type of brakes: Dynamic, disc, and magnetic track brakes (U2 AC + Re-generative) auxiliary and emergency brake system

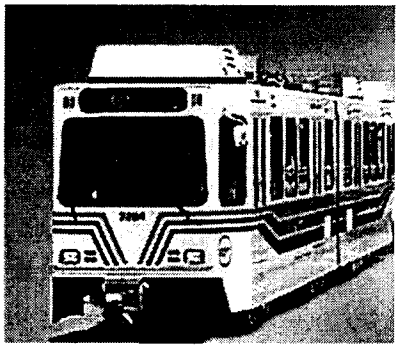
Dead weight (tonnes): DC 32.6 AC 36.0

Maximum payload vehicle (tonnes): 17.7

Service Accelerations (m/s2): 1.1

Service Deceleration (m/s2): 1.3

SD 160



Steel body

LRVs can be operated from eith command end

Suspension type: Megi rubber double coil springs

Type of brakes: Re-generative disc, and magnetic track brakes

Dead weight (tonnes): SD 160

Maximum payload vehicle (ton

Service Accelerations (m/s2):

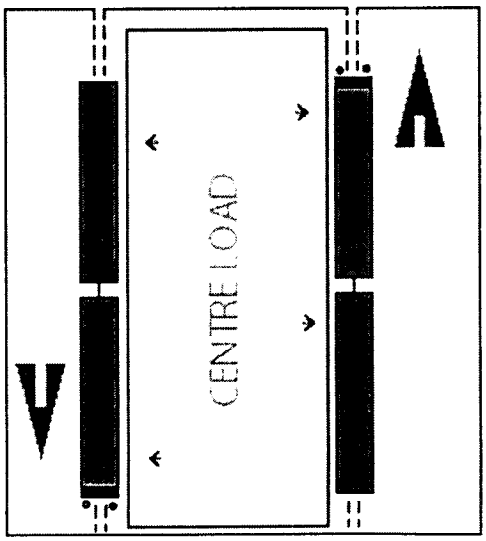
Service Deceleration (m/s2): 1.

Maximum Acceleration (m/s2): 1.3	**Maximum Acceleration (m/s2):**
Maximum Deceleration (m/s2): 3.0	**Maximum Deceleration (m/s2):**
Overall length of vehicle (m): 24.4	**Overall length of vehicle (m):** 2
Overall length of a 3 vehicle train (m): 73.2	**Overall length of a 3 vehicle tr** 74.4
Overall width of vehicle (m): 2.65	**Overall width of vehicle (m):** 2.
Number of doors per vehicle: 4 each side, **Double folding width of doors (mm):** 1,300 **Height of doors (mm):** 1,900	**Number of doors per vehicle:** **Sliding/plug width of doors (m** **Height of doors (mm):** 1,900
Practical passenger capacity: design: 200	**Practical passenger capacity:** design: 200
Number of seating passengers per vehicle: 64	**Number of seating passengers vehicle:** 60
Number of motors per train: one each end 2 **Type of power:** 600 V DC **Motor rating:** DC (at 1,200 rpm): 150 kw	**Number of motors per train:** tw 4 **Type of power:** AC **Motor rating:** 145 kw at 1588 rp
Type of power collection: pantograph	**Type of power collection:** pant
Power consumption (kwh per veh-km of operation) at: 3.23	**Power consumption (kwh per operation) at:** 3.23
Auxiliary input power (volts): 24	**Auxiliary input power (volts):** 2

Stations and Platforms

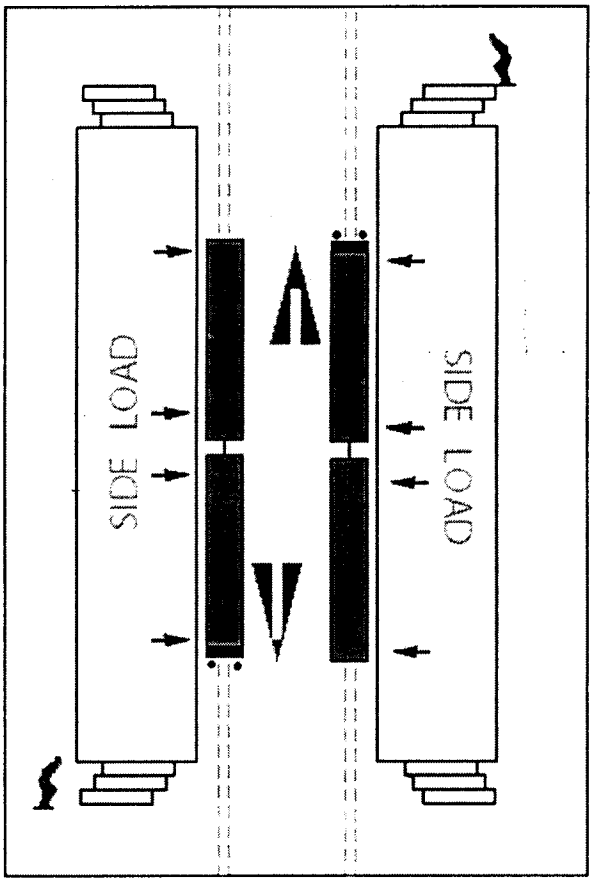
CENTRE LOADING:
Passengers board train from centre platform.

Fish Creek Station
Canyon Meadow Station
Anderson Station
Southland Station
Heritage Station
Chinook Station
Erlton Station
Stampede Station
Whitehorn Station
Rundle Station
Marlborough Station
Franklin Station
Barlow Bell Station
Bridgeland Station
Brentwood Station
U of C Station
SAIT Station



SIDE LOADING:
Passengers board train from side platforms.

39 Avenue Station
Sunny Side Station
Lions Park Station
Banff Trail Station
All Downtown Stations



Length of platforms (m): 80
Height of the platforms over the track (mm): 930

Functional Characteristics

- Maximum PRACTICAL single direction capacity at de: capacity of 162 pass./car and 2 min. headway:
  3-car train (present) 14,580
  4-car train (future) 19,440
- Maximum THEORETICAL single direction capacity (pass./hr/dir) at 256 pass./car and 2 min. headway:
  3-car train 23,040
  4-car train 30,720
- **Actual maximum peak hour passenger load (pass. a.m. peak (2002) 12,150**
- Current average headway (secs):
  for peak: 300
  off peak: - 900

- Minimum practical headway (secs): 120
- Average speed (km/hr): 30
- Maximum speed (km/hr): 80
- Train hours of operation: (2002)
  annual: 109,630
  per weekday: 390
- Type of train (no. of units):
  Siemens-Duwag U2 - DC - 82
  - AC - 2 SD-160 AC -15
- LRV availability: 84%
- Mean distance between system downtimes and failures (kw): 64,655km.
- Average number of boarding passengers per day: (2002) 176,803
- Weekday ridership per C-Train line:
  South - 63,100
  Northwest - 49,500
  Northeast - 51,900
  Downtown (free fare zone) - 22,800
  187,300 (Novembe
- Weekday boarding passengers per revenue operating hour: 616

Personnel Requirements

- No. of operators per vehicle: 1
- No. of attendants per station: 0
- No. of central control attendants:
  on each shift/peak/off-peak 2
- No. of maintenance personnel: 74
  Permanent Management Exempt staff members 7
- Remainder:
  Journeyman I Electromechanic
  Journeyman II Electromechanic
  Trainee Electromechanic
  Preventative Maintenance Person LRV, Servicelane Attendant
  LRV, Fleet Lineup Attendant LRV

Maintenance Facilities

- 1 heavy maintenance & cleaning facility - Anderson Garage 19,000 m2
- 1 light maintenance & storage facility - Haysboro Garage 3,500 m2

Development/Operating Costs

- **Total system development costs to date: $548 M**
- Cost of vehicle acquisition/unit: $1.2 M
- Vehicle replacement cost: $3.7 M
- Total costs of track construction per meter:
  above ground $30,000
  below ground $35,000
  at grade $15,000
- Average costs per station: $2.1 M

- Cost of Rail Control facilities: $3.1M
- Vehicle Maintenance costs: $7.7M (2002)
- Station Maintenance costs: $2.2M (2002)
- Right of Way Maintenance costs: $2.0M (2002)
- Signals Maintenance costs: $2.1M (2002)
- Average annual power costs: $3.0M
- Annual LRV Operator wages: $3.6M (includes fringe b of 17.66%)

Ashton, Fran

From: Ashton, Fran
Sent: March 11, 2003 11:00 AM
To: 'Donald Malcolm Johnston'
Subject: RE: A request

Mr. Johnston,

This is to confirm that arrangements have been made for you to appear as a delegation on the matter of the proposed Richmond Airport Vancouver transportation system at the Wednesday, March 19th, 2003 open meeting of the Public Works & Transportation Committee. This meeting will be held at 4:00 p.m., in the Anderson Room, located on the 2nd floor of Richmond City Hall.

You mentioned in your email that your presentation would include overhead pictures. Would you please confirm with me that you will require the use of an overhead projector. If you are making a written submission to the Committee, could you please provide me with a copy. Thank you.

If you have any further questions, please do not hesitate to contact me.

Fran J. Ashton
Executive Assistant, City Clerk's Office
604-276-4163
fashton@city.richmond.bc.ca

-----Original Message-----
From: Donald Malcolm Johnston [mailto:dmjohnston@imag.net]
Sent: March 7, 2003 11:54 AM
To: Ashton, Fran
Subject: A request

I would like to appear as a delegation for the Transportation Committee on March 19, 2003. I understand that I would be allowed 10 minutes. My presentation would be as follows:

- introduction 1 min.
- what is LRT? 6 min., including overhead pictures.
- The RAV. 2 min.

Sincerely:

D. Malcolm Johnston
Light Rail Committee
604-889-4484