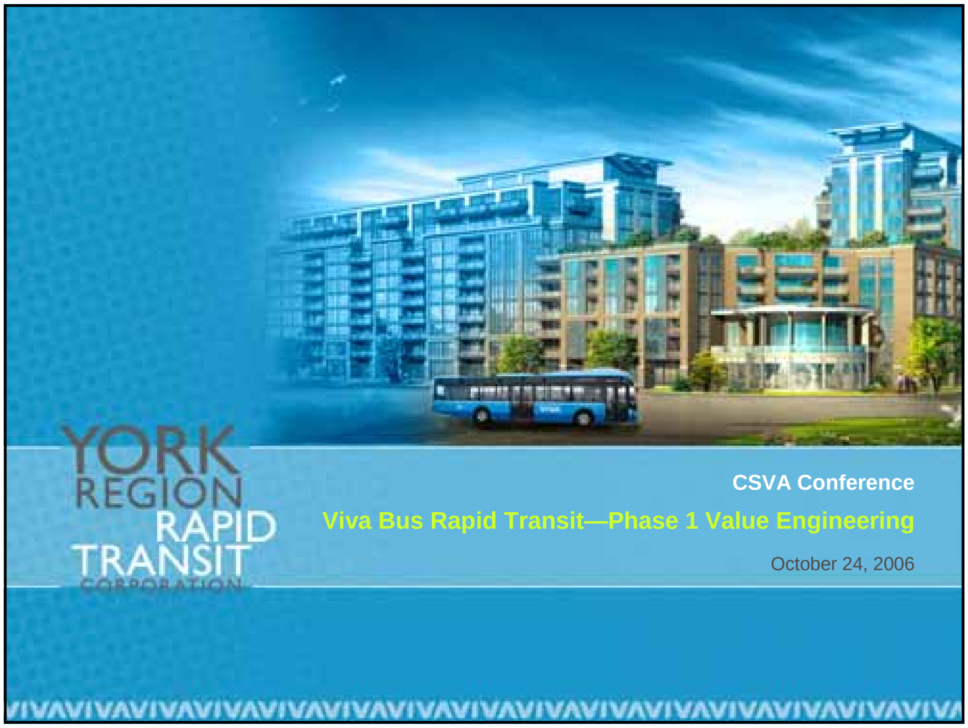
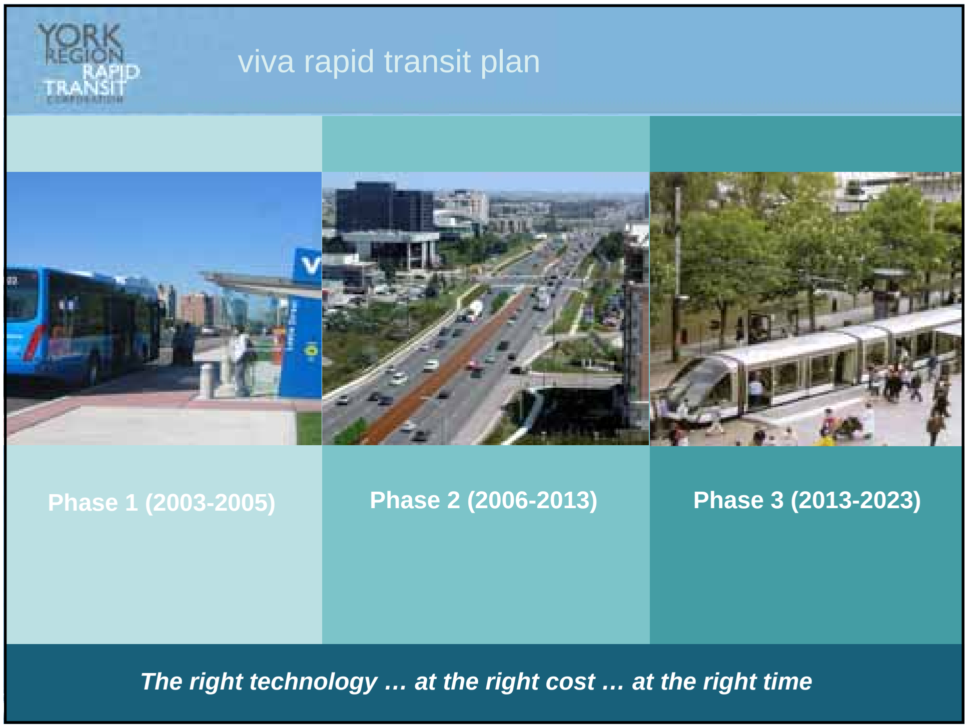


CSVA Conference

Viva Bus Rapid Transit—Phase 1 Value Engineering

October 24, 2006



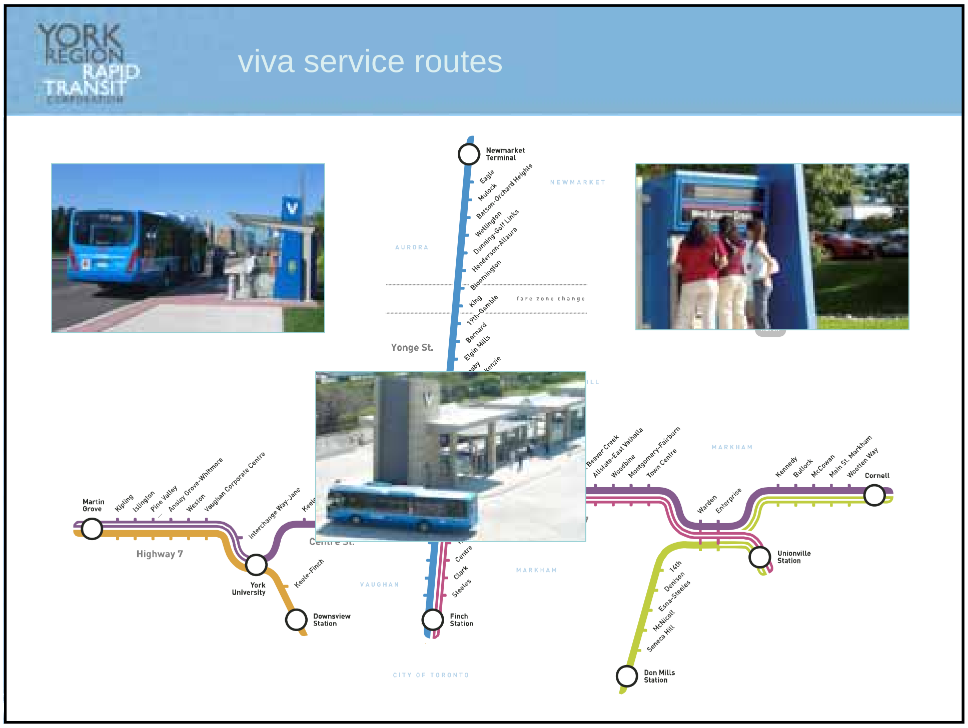
viva rapid transit plan

Phase 1 (2003-2005)

Phase 2 (2006-2013)

Phase 3 (2013-2023)

The right technology … at the right cost … at the right time



viva service routes

viva phase 1 elements

Foundation for transit transit-oriented development

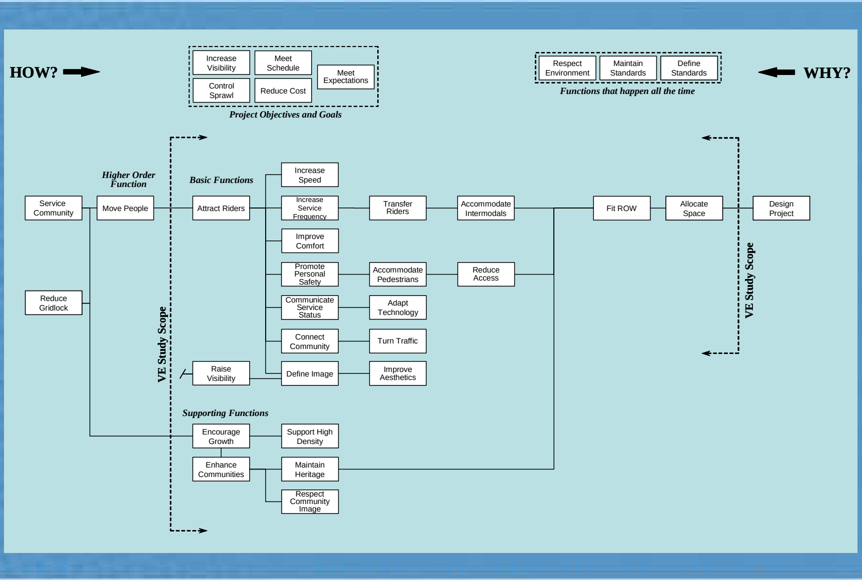
Multi-disciplinary VE team

- Architecture
- Intelligent Transportation Systems
- Construction
- Administration
- Operations
- Transportation Design
- Pavements
- Transportation Engineering

Original cost estimate

Buses	$60.7M	40.4%
Running Ways	$17.6M	11.7%
Stops	$19.0M	12.7%
Intermodal terminals	$12.9M	8.6%
Park & Ride	$0.0M	0.0%
Electrical	$2.9M	2.0%
ITS (Technology)	$7.1M	4.8%
Software	$5.3M	3.5%
Miscellaneous	$3.9M	2.7%
Transit Control	$7.2M	4.7%
Transit Conduct Centre	$1.7M	1.1%
Fare Collection	$9.3M	6.2%
Communications System	$2.4M	1.6%
Maintenance Facility	$0.0M	0.0%
Viva Phase 1 Total	**$150.0M**	**100.0%**

Function analysis



Function-cost analysis

Increase Speed	$17.6M	11.7%
Increase Service Frequency	$50.0M	33.3%
Improve Comfort	$21.7M	14.5%
Communicate Service Status	$18.7M	12.5%
Define Image	$3.0M	2.0%
Turn Traffic	$2.9M	1.9%
Accommodate Pedestrians	$10.0M	6.7%
Transfer Riders	$12.9M	8.6%
Collect Fares	$9.3M	6.2%
Fit ROW	$3.9M	2.6%
Total	**$150.0M**	**100.0%**

Study topics

Operations

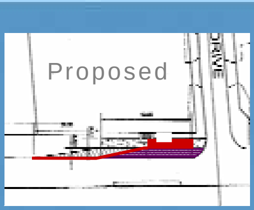
- Use near-side pickup and provide advance signal
- Convert general purpose to bus lane (6 lane sections)
- Convert general purpose to HOV 3+ (6 lane sections)

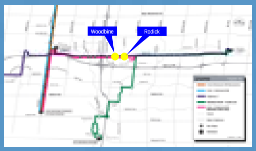
Stops

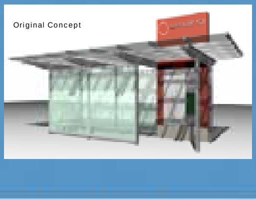
- Eliminate some stops
- Reduce platform length
- Eliminate plinth and move signage to canopy
- Design for locations rather than use standard design

Technology

- Provide next bus information only at some locations







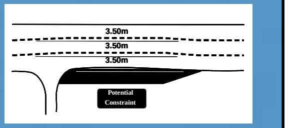
Study topics

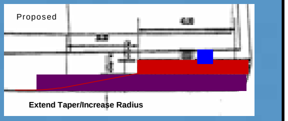
Running Ways

- Review pavement structure at bus bays
- Lengthen the taper for far-side stops
- Eliminate minor widening/tapers on queue jumpers
- Reduce lane widths to 3.5 m where necessary

Strategic

- Add by-law to control lane use
- Provide clear/better graphics to educate users, drivers
- Use one integrated fare pass
- Install off-property fare machines (schools, malls etc.)
- Sell e-tickets on the internet





Mismatch analysis

Elements currently included in project

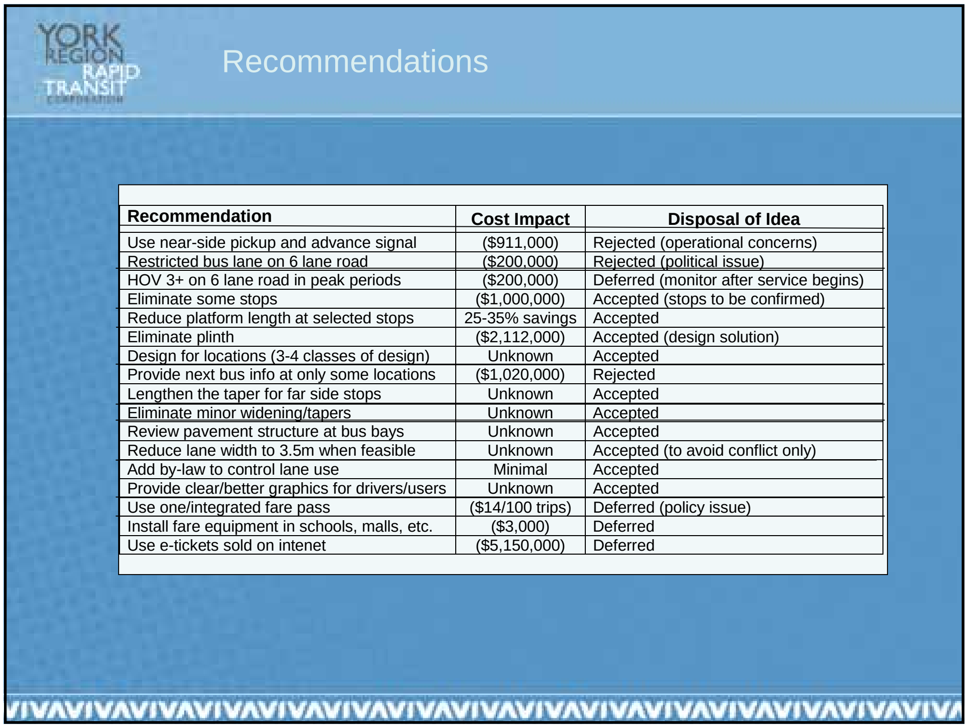
- Number of stops
- Bus stops too elaborate for pilot phase
- Platform size and construction materials
- Fare collection methods

Elements not currently included in project

- Dedicated bus lanes, where possible
- Park-and-ride facilities
- Streetscaping
- Program to accrue benefits to transit upon success
- Prioritize expenditures to maximize ridership

Quality modeling

- Operational effectiveness
- Site image
- Schedule for start-up of service
- Capital cost effectiveness
- O&M cost effectiveness
- Property impacts / access
- Flexibility for future expandability
- Environmental impacts
- User comfort / expectations
- Community values / expectations
- Safety
- Engineering performance / durability



Recommendations

Recommendation	Cost Impact	Disposal of Idea
Use near-side pickup and advance signal	($911,000)	Rejected (operational concerns)
Restricted bus lane on 6 lane road	($200,000)	Rejected (political issue)
HOV 3+ on 6 lane road in peak periods	($200,000)	Deferred (monitor after service begins)
Eliminate some stops	($1,000,000)	Accepted (stops to be confirmed)
Reduce platform length at selected stops	25-35% savings	Accepted
Eliminate plinth	($2,112,000)	Accepted (design solution)
Design for locations (3-4 classes of design)	Unknown	Accepted
Provide next bus info at only some locations	($1,020,000)	Rejected
Lengthen the taper for far side stops	Unknown	Accepted
Eliminate minor widening/tapers	Unknown	Accepted
Review pavement structure at bus bays	Unknown	Accepted
Reduce lane width to 3.5m when feasible	Unknown	Accepted (to avoid conflict only)
Add by-law to control lane use	Minimal	Accepted
Provide clear/better graphics for drivers/users	Unknown	Accepted
Use one/integrated fare pass	($14/100 trips)	Deferred (policy issue)
Install fare equipment in schools, malls, etc.	($3,000)	Deferred
Use e-tickets sold on intenet	($5,150,000)	Deferred

Lessons learned

- Phase 1 VE may have identified other opportunities if additional disciplines included on the team. i.e. ITS, Heritage, Environmental
- Public/Private Partnerships offer opportunities to draw upon specialists such as planners, architects, engineers
- Best solution is not necessarily the cheapest

Lessons learned

Customization of elements is key opportunity to reduce cost without losing functionality

•Buses
•Shelters
•Roads
•IT equipment
•Routes

Looking at these elements earlier in the VE process could afford cost savings