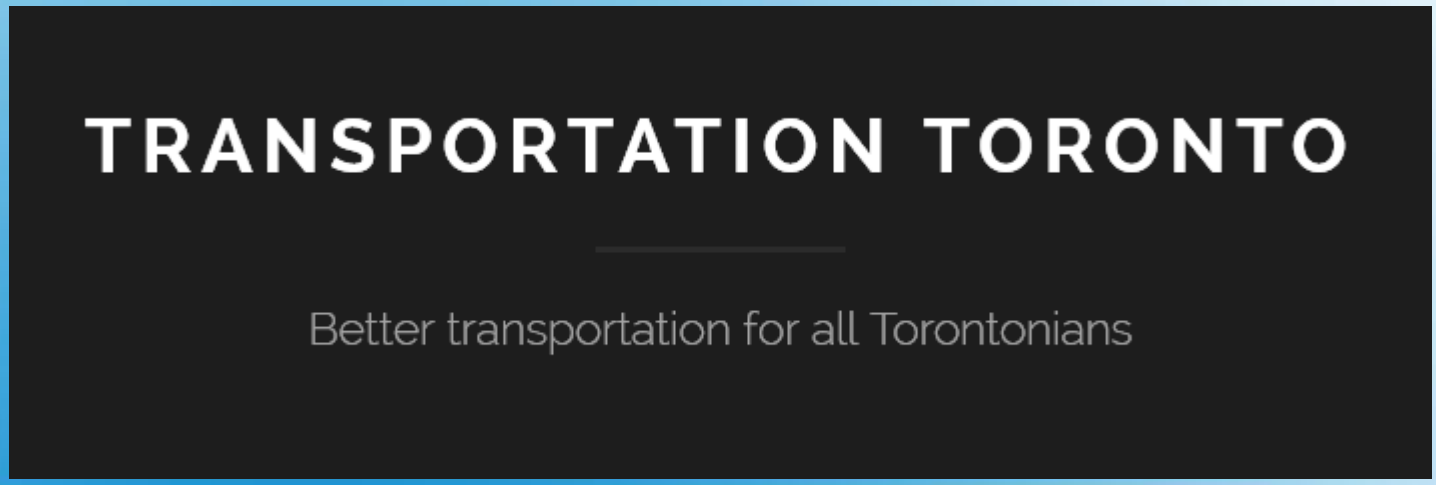
World Class City
World Class Vision
TORONTO



Executive Summary

- TTC documents show what many TTC planners and engineers have known all along – but have been stopped from disclosing.
- Subways can be built in Toronto for $100M/km if the priority is transit.
- Political interference and bureaucratic tinkering have created the fictional $300-$400M/km figure that is taken as gospel.
- Other cities build subways for as low as $89M/km.
- This report investigates how we can bring affordability into transit construction.

From 'the big smoke' to 'Toronto Proud'

Objectives of this report

- Evaluate the feasibility of Doug Ford's 32km subway vision.
- Give a realistic (based on actual costing for Toronto infrastructure builds) budget for future subways in Toronto.
- All references in this report are linked on the Transportation Toronto website.
- Show how Toronto can lead the world by reducing gridlock, improving air quality, and give each Toronto commuter 20 minutes back in commute time each day (83 hours per year) for every bus rider, subway rider, biker or car driver.
- Turn Toronto from 'The Big Smoke' to 'Toronto Proud'.

From 'the big smoke' to 'Toronto Proud'

TTC documents reveal

- Political interference have assured estimated costs for LRTs in Toronto have stayed virtually flat in last 20 years ($80M/km)(* 12-16)

- While estimated costs for subways have increased by almost 3 times (from $160M/km to $460M/km) (* 1-11)

- Last actual finished subway in Toronto was partial Sheppard line in 2003 ($140/km) (* 17)

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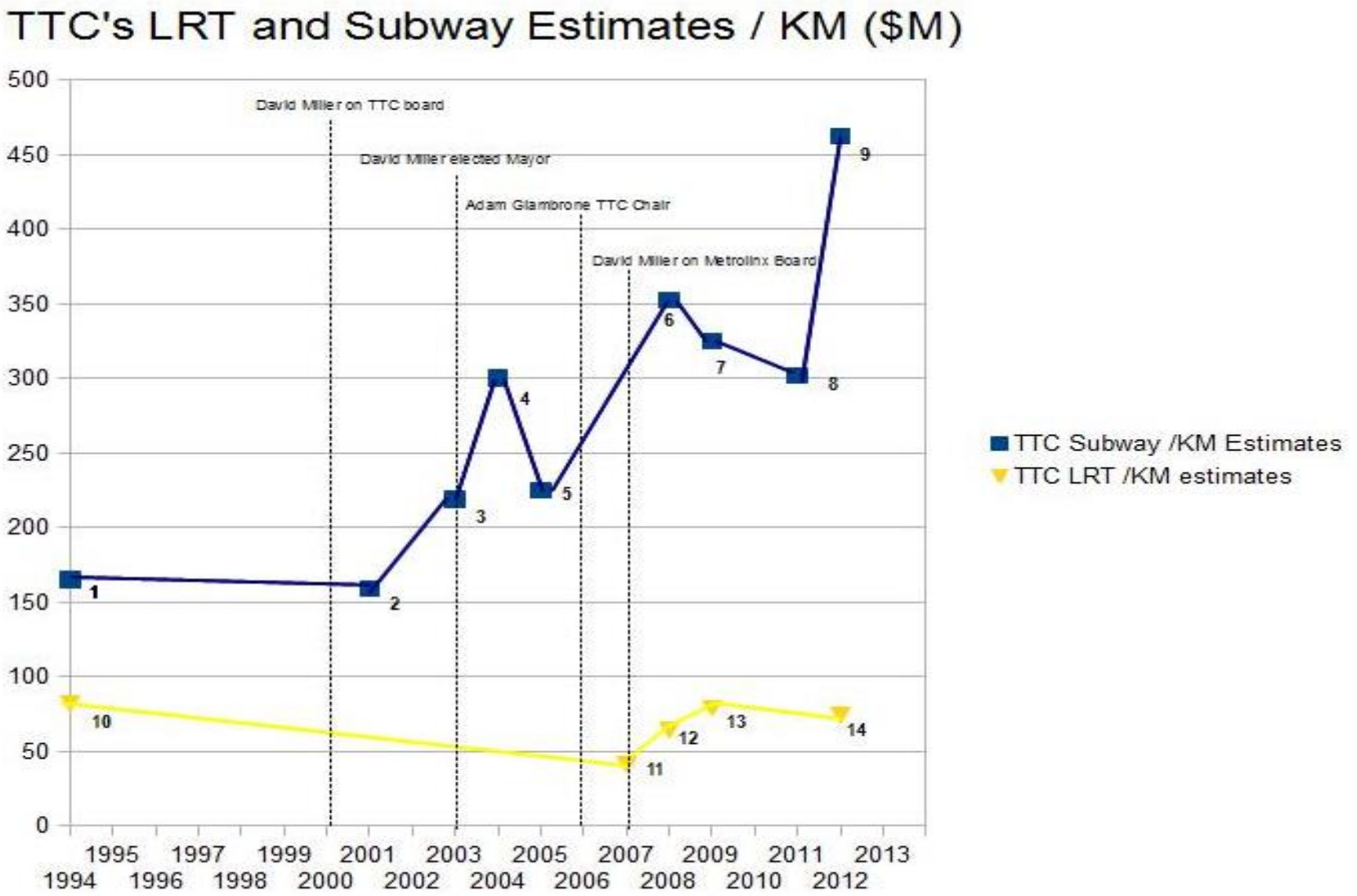

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TTC documents further reveal

- Actual tunneling costs for subways (from contracts) has only increased from $25M/km to $35M/km (* 17-19)
- Tunneling is only 8-10% of cost of subway construction if $300-400M/km figure is to be believed.
- Significantly oversized tunnel for Eglinton LRT was recently awarded for $50M/km (* 20-21)

From 'the big smoke' to 'Toronto Proud'

What makes Toronto subways so expensive if tunneling is so cheap?

- Steeles West Subway Station:
- Final build cost estimate - $145M (* 22)
- Plus Est. Design/Engineering cost - $30M

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What makes Toronto subways so expensive if tunneling is so cheap?

- York University Station:
- Final build cost estimate - $130M (* 23)
- Plus Est Design/Engineering cost - $28M

From 'the big smoke' to 'Toronto Proud'

What makes Toronto subways so expensive if tunneling is so cheap?

- Hwy 407 Station:
- Final build cost estimate - $140M (* 24)
- Plus Est Design/Engineering cost - $31M

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Why not build realistic stations?

- Bessarion Station on Sheppard
- Total complete costs $35M (* 25)
- Plus Est Design/Engineering cost - $2M
- Do these stations allow people to board/exit the subway safely?

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Or, have others build it for free...

- Sell air rights and build multi use Stations.
- Total complete costs $0M.
- Plus Est Design/Engineering cost - $0M.
- Subway entrances integrated into shopping/living space.

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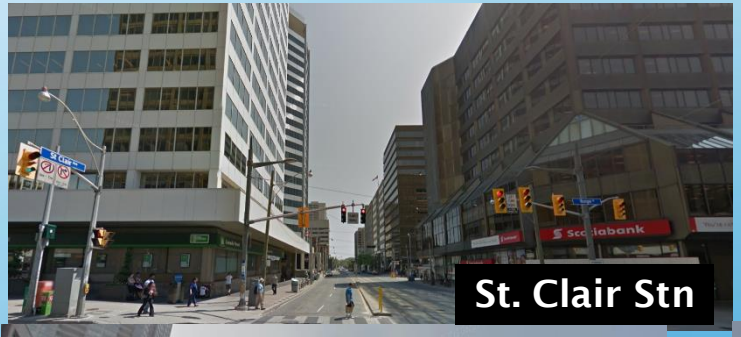
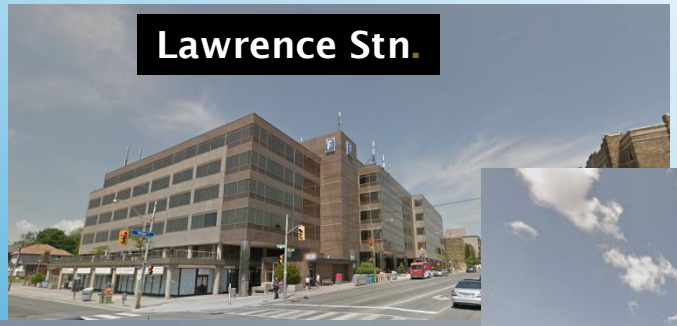
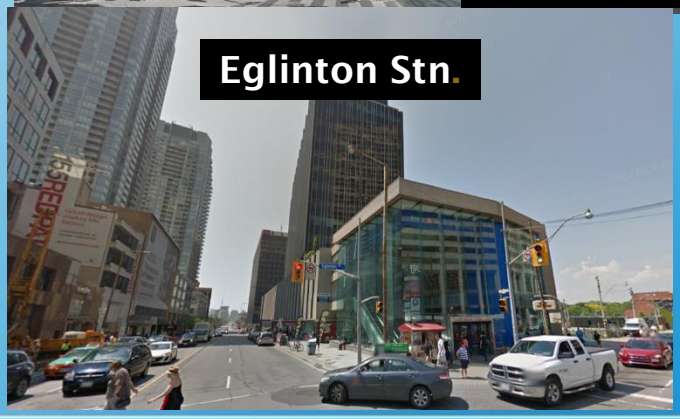
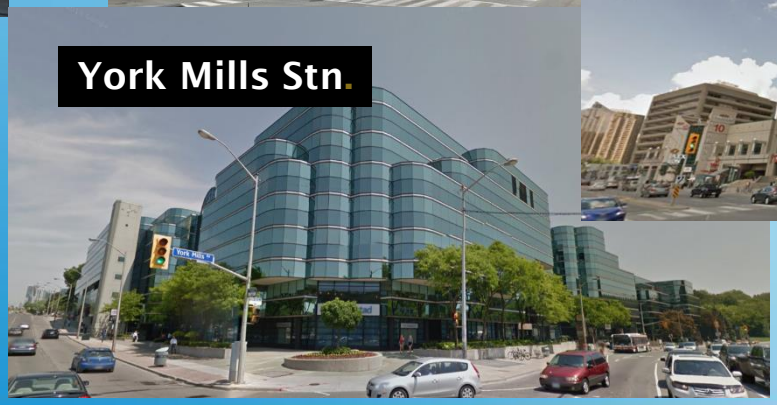
Existing Air Right Development Examples in Toronto

There are already a number of examples in Toronto where developments have occurred at subway station's air rights. Why can't we continue doing the same?









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Hidden Truths

- Torontonians have been told that subways are expensive and not feasible.

Tunneling is not the issue (or main expense) – building high end subway stations is...

- Recent subway budgets have included 40% contingency on top of exaggerated cost estimates. Government projects always spend (often over) to approved budgets.
- Ineffective and old fashioned project management techniques entice over budget, over estimated and late delivery of infrastructure projects in Toronto.
- Subways do not require large, expensive stations to be effective.
- Subways are significantly cheaper to operate than streetcars or LRTs (* 1, * 30).

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Breaking down components of subway construction

- Tunneling
- Concrete liners, installed by tunnel contractors but purchased separately
- Tracks/power generation and transmission/signaling system
- Stations (typically 1km apart – depends on many factors)
- Engineering/Design – of route and stations
- Rolling Stock (additional trains) typically 6-8 cars per km
- Property acquisition (for stations - if applicable)

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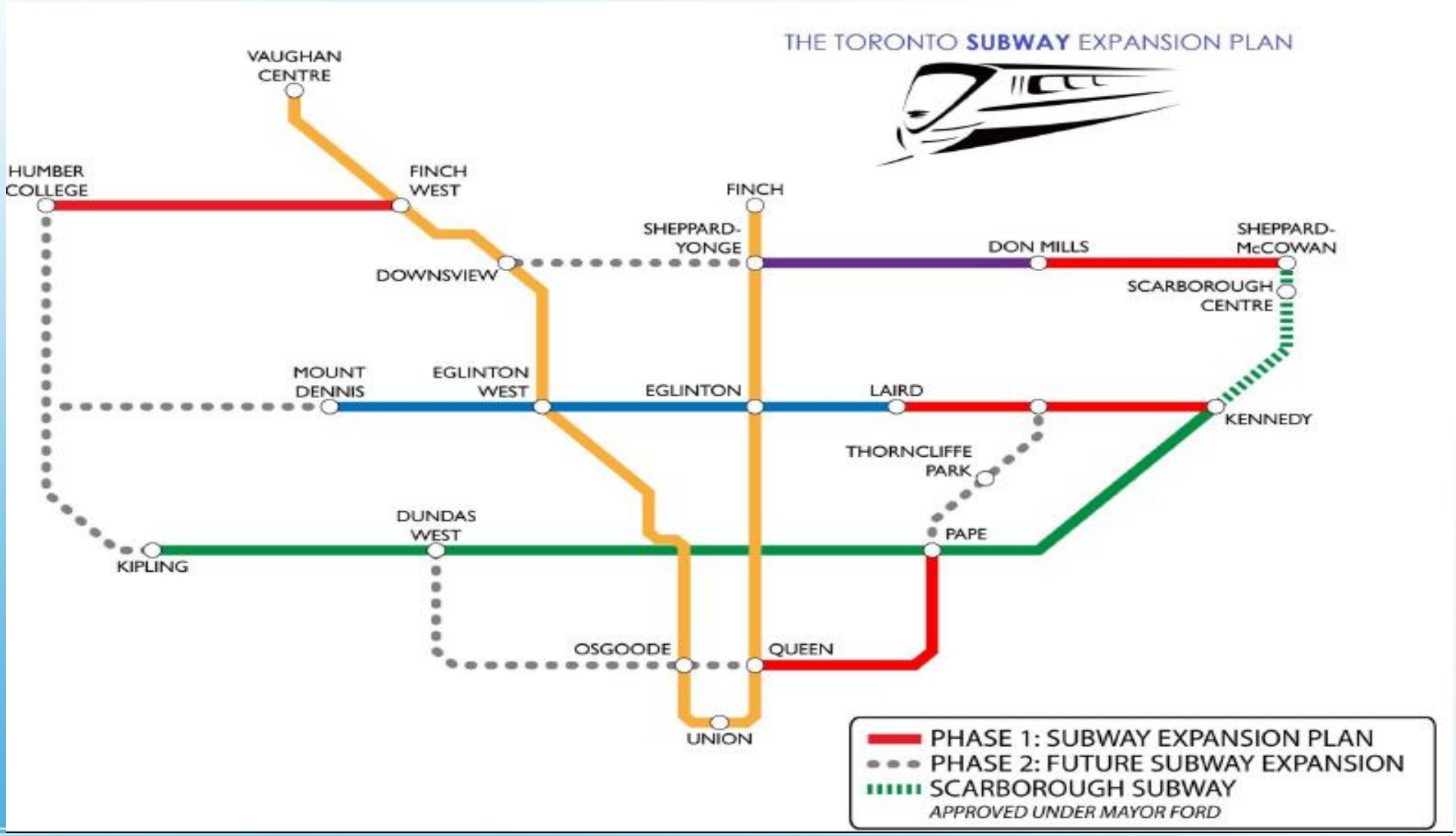
Applying realistic costs to Ford's Vision



From 'the big smoke' to 'Toronto Proud'

Part 1 – Bury Eglinton Crosstown (8.2 km)

• Tunneling costs - $51M/km (*20) - 8.2km (LRT tunnel is significantly larger)	$418M
• Concrete liners - $8M/km (significantly more than subway)	$66M
• Tracks/power/signals, etc. – same as above ground	$0M
• Stations 8 x $35M	$280M
• Engineering/Design – same as above ground	$0M
• Rolling Stock- same as above ground	$0M
• Property acquisition (for stations -estimated)	$40M
• Recovered costs from above ground construction, property acquisition, stations builds, traffic signal changes contract cancellation charges	-$700M
• **Net additional COSTS to bury LRT entire way**	**$103M**

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Part 2 – Build Finch Subway (11 km)

• Tunneling costs - $33M/km (*18, 19)	$363M
• Concrete liners - $5M/km (*26)	$55M
• Tracks/power/signals, etc. - $11M/km (* 27-29)	$121M
• Stations 11 x $35M	$350M
• Engineering/Design – 10% of above	$90M
• Contingency – 10% of above	$98M
• Rolling Stock – 66 cars each $1.3M	$86M
• Property acquisition (for stations)	$50M
• LESS LRT BUDGET ALREADY ALLOCATED For 11km	-$800M
• **Net additional COSTS to put in subway vs LRT**	**$413M**

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Part 3 – Complete Sheppard Subway (7.4 km)

• Tunneling costs - $33M/km (*18, 19)	$242M
• Concrete liners - $5M/km (*26)	$37M
• Tracks/power/signals, etc. - $11M/km (* 27-29)	$81M
• Stations 7 x $35M	$245M
• Engineering/Design – 10% of above	$61M
• Contingency – 10% of above	$67M
• Rolling Stock – 48 cars each $1.3M	$62M
• Property acquisition (for stations)	$35M
• LESS LRT BUDGET ALREADY ALLOCATED for Sheppard (Note: the Sheppard LRT was proposed for 11 km not 7.4 km)	-$1000M *
• **Net SAVINGS to put in subway vs LRT**	**-$170M**

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Part 4 – Yonge Relief Line (5.5 km)

• Tunneling costs - $33M/km (*18, 19) * add 50% because of more buried infrastructure - $50M	$272M
• Concrete liners - $5M/km (*26)	$28M
• Tracks/power/signals, etc. - $11M/km (* 27-29)	$61M
• Stations 6 x $35M	$210M
• Engineering/Design – 10% of above (double for location)	$114M
• Contingency – 10% of above	$69M
• Rolling Stock – 36 cars (each $1.3M)	$47M
• Property acquisition (for stations – double normal rate)	$70M
• **Net COSTS to put in Yonge Relief Line**	**$871M**

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Part 5 – Rework Scarborough RT replacement 7.6 km)

• Tunneling costs - $33M/km (*18, 19)	$251M
• Concrete liners - $5M/km (*26)	$38M
• Tracks/power/signals, etc. - $11M/km (* 27-29)	$84M
• Stations 3 x $35M	$105M
• Engineering/Design – 10% of above	$48M
• Contingency – 10% of above	$53M
• Rolling Stock – 56 cars each $1.3M	$62M
• Property acquisition (for stations)	$15M
• Rework/demolition of existing RT track/property	$500M
• LESS TTC budget already allocated for Scarborough subway	-$2800M
• **Net SAVINGS through proper project management**	**-$1644M**

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Overview of realistic costs of Ford's Subway Vision vs costs already allocated

- Part 1 – Bury Eglinton Crosstown $103M
- Part 2 – Build Finch Subway vs LRT $413M
- Part 3 – Complete Sheppard Subway vs LRT -$170M
- Part 4 – Build Yonge Relief Line $871M
- Part 5 – Rework Scarborough Subway costs -$1644M
- **We have $471M MORE than we NEED already allocated to existing LRT / Subway projects.**

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Summary of Recommendations

- Plan a subway to provide cost effective, high speed transit, not award winning station design competitions.
- Engage a single company to do most or all of tunneling.
- Do a standard simple station design to be used as a base for all new stations, and modify it based on the local needs.
- Consider operating unmanned stations, many cities do this (Boston, London, etc.)
- Consider operating unmanned subways.
- Use proven project management practices to create reasonable budgets, plan the implementation and deliver on time and on budget – other cities can do it, why can't we?

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Items not discussed:

- LRT's are at least 2x more expensive to operate and maintain than subways per person. (* 1, * 30)
- LRT's cause significant traffic congestion issues (many simulations to prove this fact).
- Subways can be operated without a driver, LRT's can never be.
- Subways will attract far more riders.
- LRT's cost significantly more to buy.
- Plus many more.

From 'the big smoke' to 'Toronto Proud'

References:

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- 2 – TTC - Rapid Transit Expansion Study (2001)
- 3 – TTC - Sheppard Subway - Status of Project (2002)
- 4 – TTC - Subway Expansion Plan (2003)
- 5 – TTC - 5 Yr Capital Plan & 10 Yr Capital Forecast (2004)
- 6 – TTC - Spadina Subway Extension EA Study Final Recommendations (2005)
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- 9 – National Post - The Sheppard Line subtext (2000)
- 10 – City of Vaughan - Toronto-York Spadina Subway Extension (2013)
- 11 – Report of the Expert Advisory Panel Regarding Transit on Sheppard Avenue East (2012)
- 12 – Sheppard EA 1992 - LRT vs Subway Costs & Impacts Comparison
- 13 – TTC - Toronto Transit City (2007)
- 14 – URS - Sheppard LRT EA Executive Summary
- 15 – TTC - Sheppard East LRT Connection at Don Mills Station (2009)
- 16 – Report of the Expert Advisory Panel Regarding Transit on Sheppard Avenue East (2012)
- 17 – National Post - The Sheppard Line subtext (2000)
- 18 – Kiewit - Eastern Canada District Projects (2013)
- 19 – TTC - TYSSE Hwy 407 Stn Procurement Authorization (2011)
- 20 – Railway Technology - Metrolinx awards Eglinton Crosstown LRT contract to Crosstown Transit Constructors (2012)
- 21 – TunnelTalk - Toronto awards Crosstown LRT eastern section (2013)
- 22 – TTC - TYSSE Steeles West Stn design (2009)
- 23 – TTC - TYSSE York U Stn (2010)
- 24 – TTC - TYSSE Hwy 407 Stn (2010)
- 25 – National Post - The Sheppard Line subtext (2000)
- 26 – ARMTEC - Armtec Infrastructure Income Fund Awarded $43 Million Contract to Supply Precast Tunnel Liner Rings for Construction of TYSSE
- 27 – TTC - TYSSE Trackwork Installation (2011)
- 28 – TTC - TYSSE Supply Substation (2012)
- 29 – TTC - PA Design Supply Installation Signals (2012)
- 30 – Transportation Toronto – APTA Stats (2012)