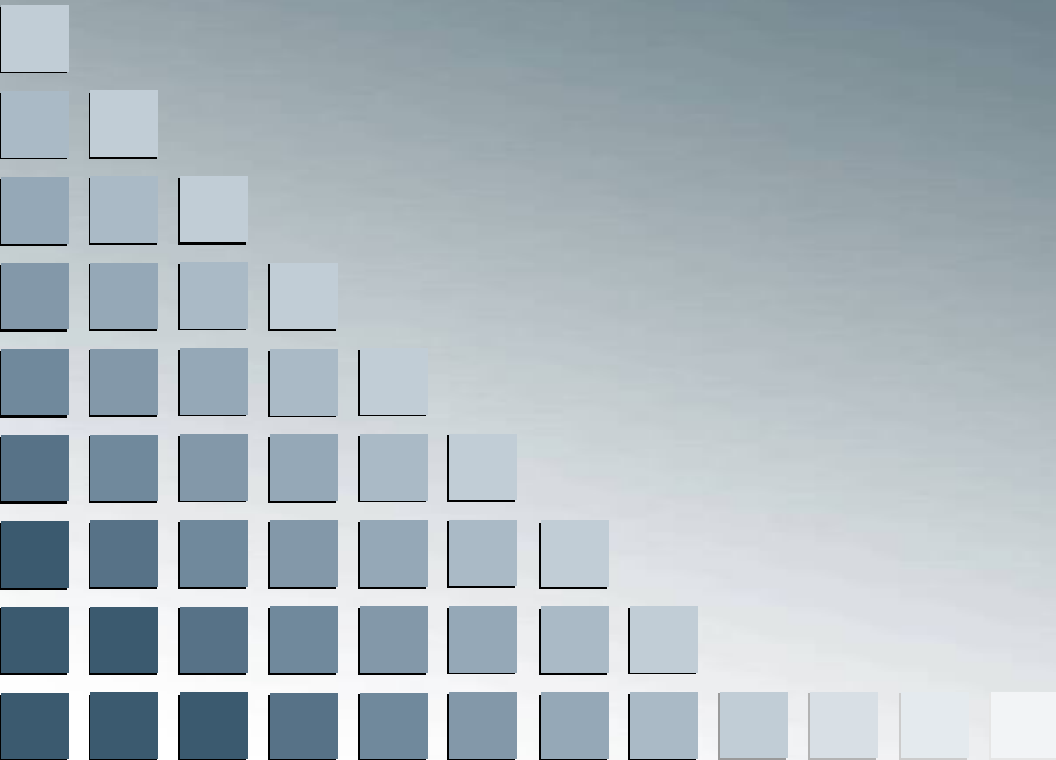




Yonge Subway Extension - Recommended Concept/Project Issues



Presented by: Charles Wheeler

Date: December 17, 2008

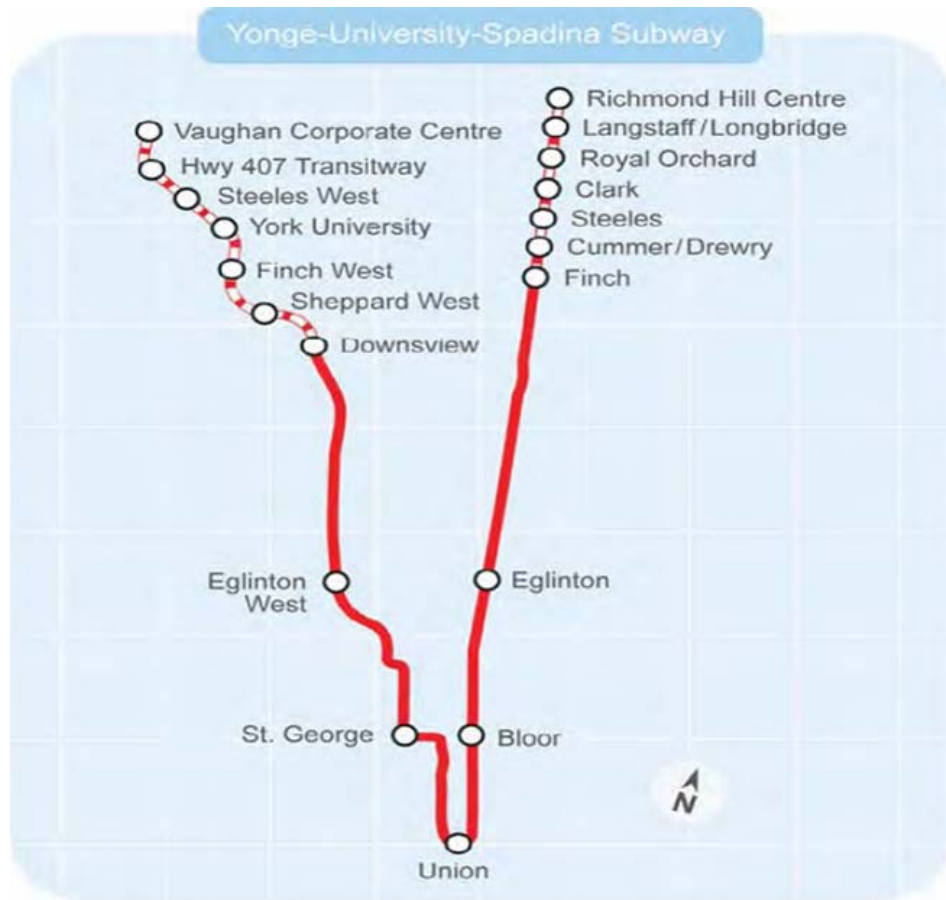


Purpose of Presentation

- History and benefits of project
- Status of TPAP process
- Overview of recommended project/construction methods
- Capital cost/schedule
- TTC/City Issues
- Ridership/capacity of Yonge Subway
- Related studies:
 - Bloor-Yonge Capacity Study
 - Subway Rail Yard Needs Study
- Other funding issues/risks/financial principles
- Future densities
- Project implementation principles
- Next Steps
- Construction methods



Yonge University-Spadina Subway





Benefits of Project to City/TTC

- Convenience/ridership of two new stations
- Improved reliability, quality, speed of service
- Re-development/property tax assessment around new stations at Cummer/Drewry and Steeles
- Increased TTC ridership
- Improved transit connectivity to York Region
- Significant reduction in bus traffic on Yonge Street (Finch to Steeles)
- 2000 commuter parking spaces located at the end of line
- Supports re-development of Finch Station Lands
- Renovation of Finch Station





Background

- York leading functional planning/TPAP process
- At no cost to TTC/City
- Metrolinx RTP puts Yonge Extension as top priority in first 15 years
- TTC/City conditions established:
 - Funding commitment to ATO/ATC YES
 - TYSSE open before Yonge Extension to divert riders YES
 - RTP supportive of Transit City YES
- TTC/City joins York as co-proponents
- Related studies identified:
 - Subway Rail Yard Needs Study
 - Yonge-Bloor Station Capacity Study





TPAP Process

- Significant project definition/public consultation prior to TPAP start
- TTC/City as co-proponents (September, October 2008)
- TPAP Notice of Study commencement:
 - York (October 3, 2008)
 - City/TTC (November 19, 2008)
 - Final public meetings (late November, early December)
- December 17 Commission Report re: Recommended project concept
- City Staff Report:
 - Executive Committee (January 5, 2009)
 - City Council (January 27/28, 2009)
- TPAP Notice of Study Completion (January 30, 2009)
- Formal TPAP submission to MOE (February 2, 2009)
- Final TPAP MOE approval (April 2009)
- \$5 million to commence design expected in Spring 2009 Provincial budget





Recommended Project

- 6.8 kilometre extension to Richmond Hill Centre
- 6 stations, average spacing of 1.13 kilometres
- Two stations in Toronto:
 - Cummer/Drewry
 - Steeles
- 4 stations in York:
 - Clark
 - Royal Orchard
 - Langstaff/Longbridge
 - Richmond Hill Centre
- Bridge over East Don River
- Alignment in Richmond Hill Centre west of Yonge Street
- Connects to Richmond Hill GO line/Highway 407 Transitway/VIVA
- 2000 commuter parking spaces at Langstaff/Longbridge Station



Yonge Subway Extension Station Locations





Construction Methods

a) Cut/Cover Construction

- Stations
- Station crossovers:
 - Steeles
 - Richmond Hill Centre
- Tail tracks (Richmond Hill Centre)
- Demolition/extension of Finch tail track, section to Cummer/Drewry Station
- East Don River Bridge

b) Tunnelling

- In between stations
- 3 tunnel drives:
 - Richmond Hill Centre to East Don River Bridge
 - Steeles to East Don River Bridge
 - Steeles to Cummer/Drewry



Preliminary Construction Methods



Legend

-  Subway station
-  Cut and cover
-  Tunneling
-  Bridge construction
-  Tail tracks
-  Launch shaft
-  Exit shaft





Capital Cost/Schedule

- \$2.4 billion (2008 dollars)
- Avoids implementation of Yonge Busway (Finch – Steeles)
- Potential project cost adjustments for:
 - Separate rail yard
 - Possible deletion of Royal Orchard Station
- Includes \$10 million allowance to renovate Finch Station
- Assuming funding in place, construction start in 2012
- Open for revenue service in 2017



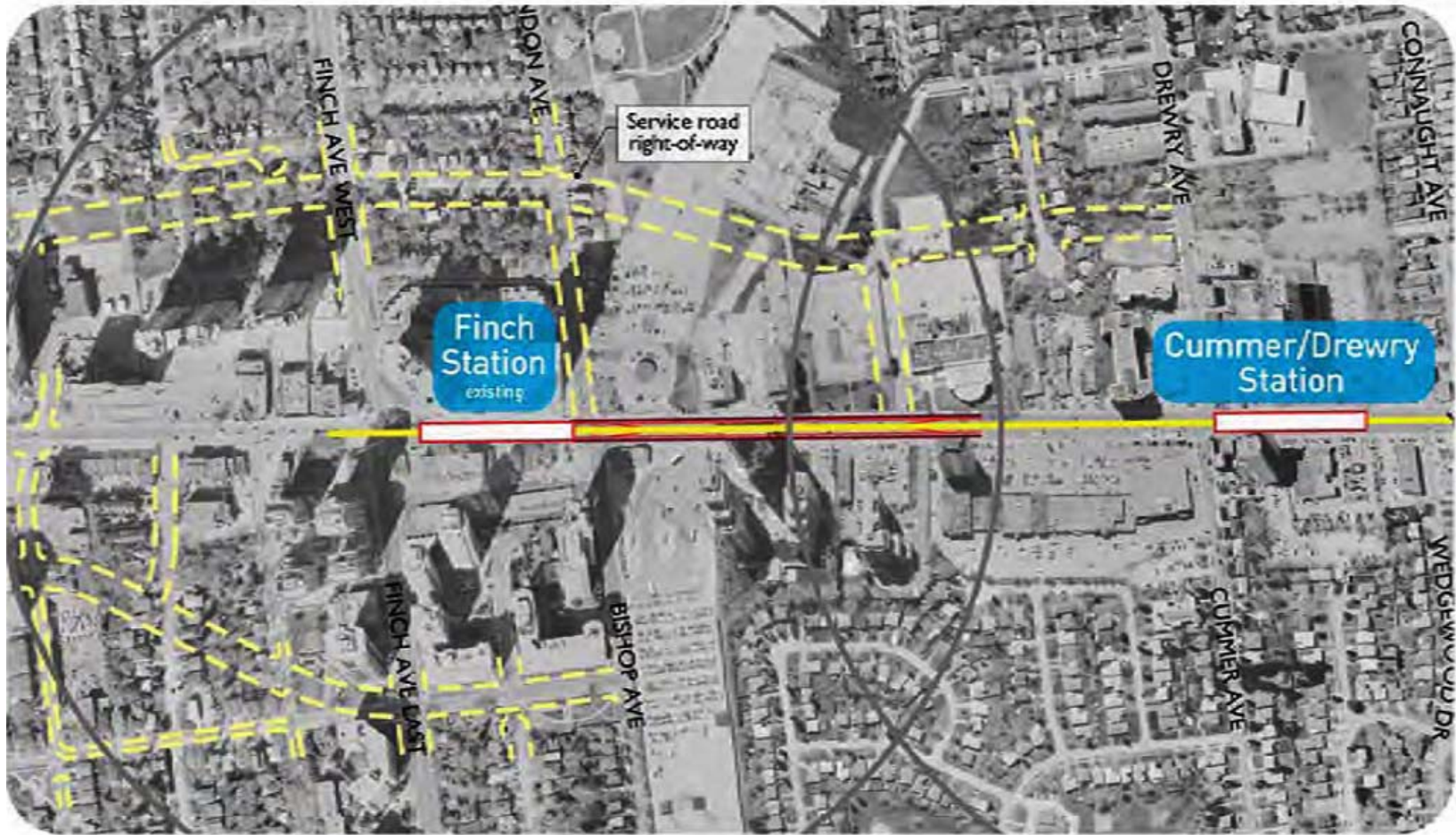


TTC/City Project Issues

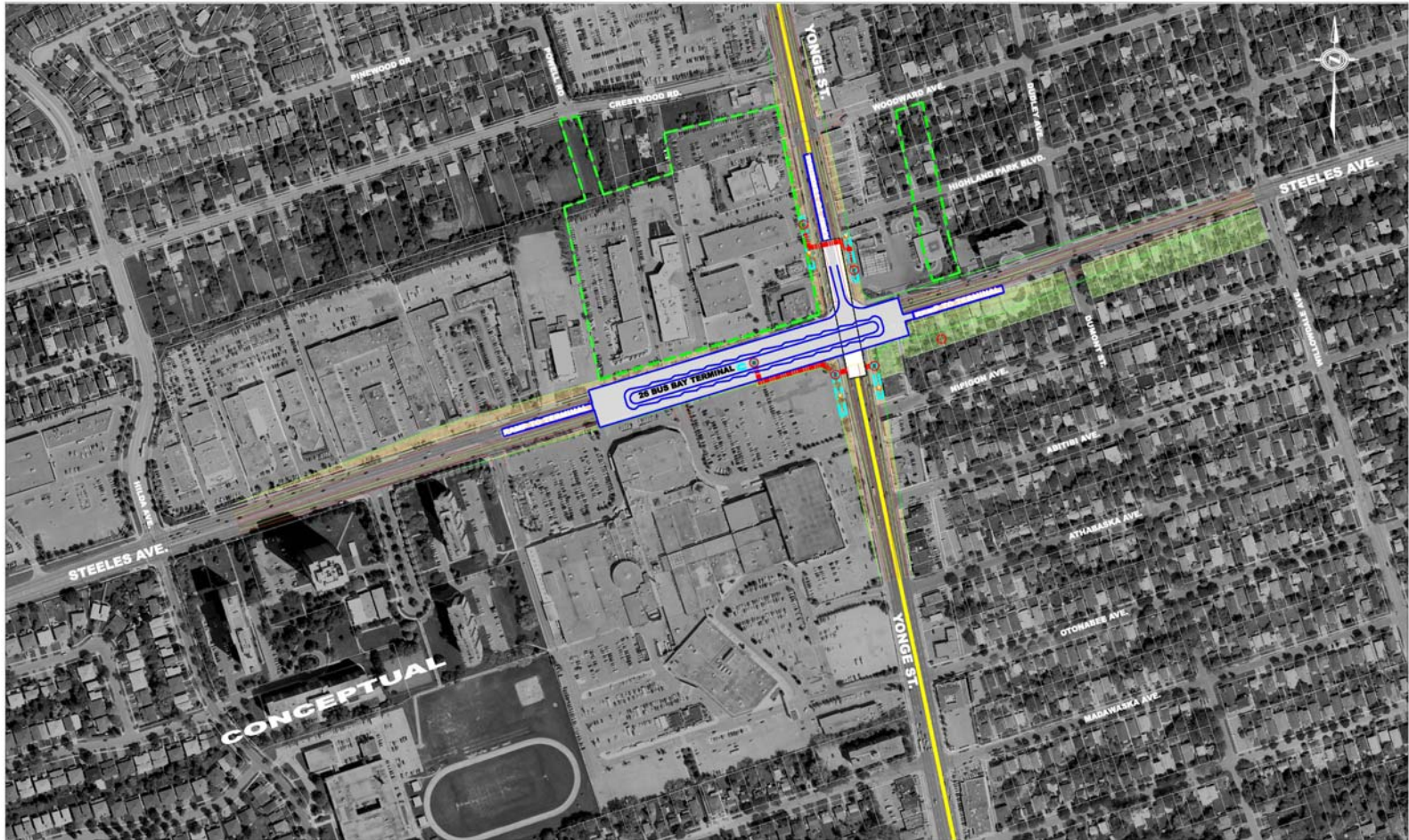
- Station concepts
- Major bus terminal at Steeles/property impacts
- Configuration of East Don River Bridge
- Opposition to commuter parking at Langstaff/Longbridge Station
- Timing of service road extension to Drewry Avenue
- Re-development of Finch bus terminal lands
- Yonge Street Planning Studies review for Yonge corridor (Finch to Steeles)



Service Road Extension to Drewry Avenue



Steeles Station



East Don River Bridge



Concept drawing only



Commuter Parking at Langstaff/Longbridge

- Bicycle and pedestrian paths
- Noise buffers
- Maintain a green corridor
- Bio-swales
- Sustainable treatments for parking
- Protection of natural environment





Finch Bus Terminal

- Currently 15 bus bays
- Reduced to 10 bays with Yonge Extension
- Reduced to 8 bays with Yonge Extension and Finch LRT
- Significant opportunity to redevelop bus terminal lands
- May spark redevelopment of Yonge Street frontage





Growth Factors Impacting Yonge Subway Ridership

- Spadina Subway Extension (diversion)
- Yonge Subway Extension (additional)
- Additional volumes from Transit City lines (Finch, Sheppard, Eglinton)
- Phased implementation of ATC/ATO:
 - 2 minute headways
 - 1 minute 45 second headways
- Extension of Spadina Subway short turn
- Growth in Sheppard Subway ridership
- Many factors contribute to increased Yonge line ridership
- Difficult to isolate individual impacts of each project






Ridership Model Assumptions

- 2 zone fare system at Steeles
- Build out to 2031 planned densities
- Transit City network
- No busway on Yonge (Richmond Hill Centre to Finch)
- Model results have not been verified
- To be used with caution





Ridership Forecasts (2031), South of Bloor

No DRT

- Current 27-28,000 per hour
- TTC 36-39,000 per hour
- Metrolinx 42,000 per hour

With DRT (Pape – Queen)

- Yonge 25,100 per hour
- DRT 17,500 per hour





Yonge Subway Capacity

- Nearing capacity south of Bloor
- Capacity improvements to existing line are needed prior to operating the extension
- Funding commitment to re-signal YUS subway line (\$350 million) an important condition
- Increased capacity with closer spacing between trains:
 - Current: 141 seconds
 - With new signal system 90-105 seconds
- New Toronto Rocket Car (2011) will increase capacity
- Additional improvements:
 - Add a 7th car to trains
 - Diversion effect of Spadina Subway extension



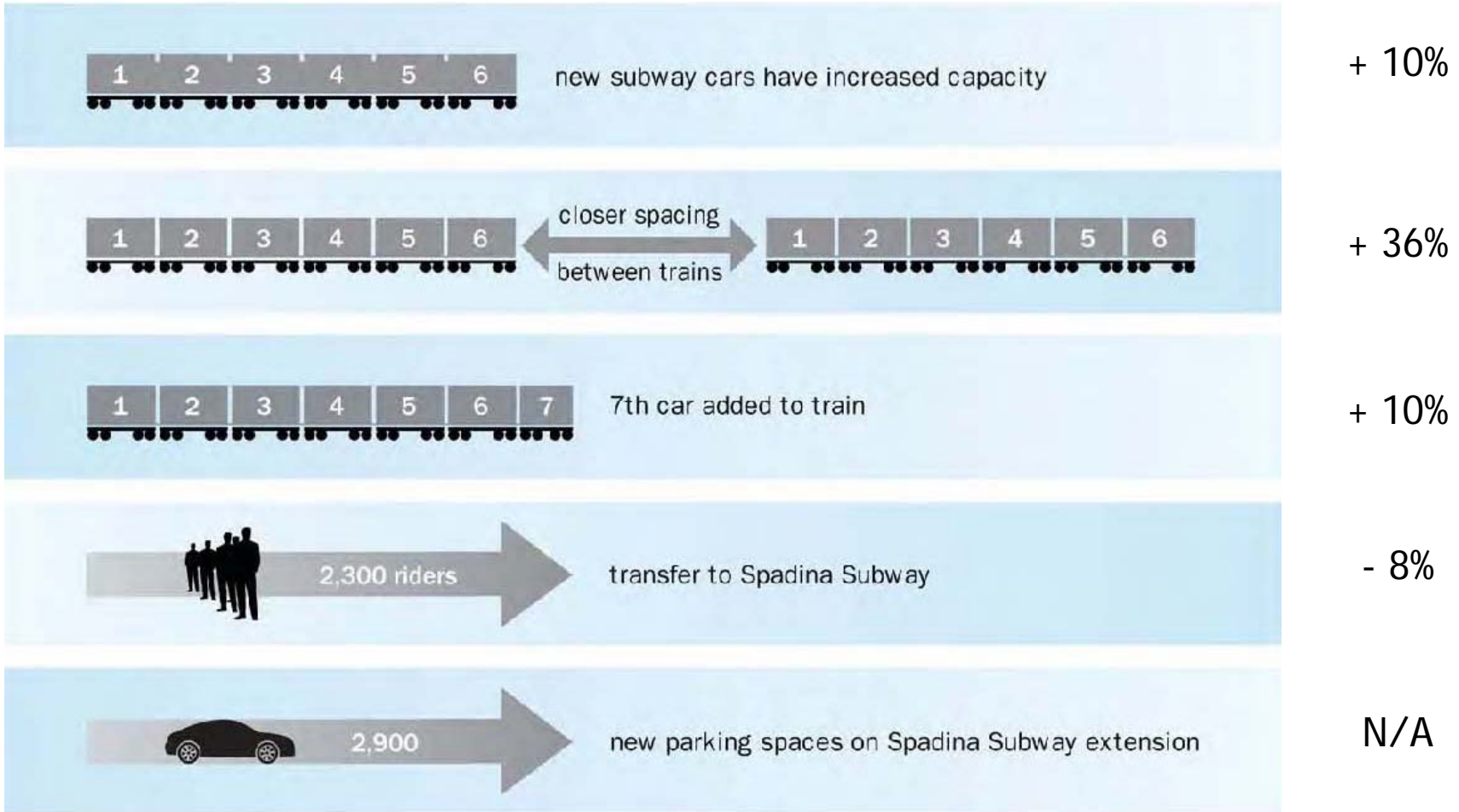


Effect of Spadina Subway Extension

- 8.6 km extension to Vaughan Corporate Centre/Highway 7
- 2,300 peak period Yonge Subway riders moved to Spadina line
- Opens before Yonge extension
- Connections include:
 - Barrie GO line (Sheppard West Station)
 - Finch LRT (Finch West Station)
 - Jane LRT (Steeles West Station)
 - Highway 407 Transitway (407 Station)
 - VIVA/YRT (Vaughan Corporate Centre)
- Will help “dilute” the ridership on Yonge Subway for people from north/west destined downtown



Capacity improvements to the Yonge Line



Sequence of Events/Operational Strategy

Event	Year	Impact on Yonge Line
Toronto Rocket cars in service	2011	Increased capacity of 3,200 per hour
Spadina Subway opens (with ATO)	2015	Diversion of 2,300 riders from Yonge
ATO/ATC in place (Finch to Downsview)	2015	Accommodates future
Yonge Subway Extension opens (with ATO)	2017	Toronto Rocket plus Spadina diversion plus ATO, offset by Yonge Extension
Growth to 2031	2017-2031	<ul style="list-style-type: none">– Gradual increase in service levels with ATO– 7th car added if/when needed





Phasing Strategy of ATO/ATC

Section of YUS line

Approximate Timing

- | | |
|--|---------|
| • Eglinton to Union | 2013 * |
| • Finch to Eglinton | 2014 |
| • Union to Downsview | 2015 ** |
| • Downsview to VCC (TYSSE) | 2015 |
| • Finch to Richmond Hill Centre
(Yonge Extension) | 2017 |

* Possible introduction of additional trains with ATO

** First major opportunity for improved headways with ATO





Risk Analysis

- Assume ATO not available in 2015
- Yonge Extension increased in ridership must be accommodated by:
 - Spadina diversion
 - Toronto Rocket
- What is the risk this capacity improvement exceeds Yonge ridership impact?





Yonge Ridership Risks

- Current Yonge ridership at Finch 9,500 per hour
- Projected ridership at Finch (2031) 17,500 per hour
- Net increase in ridership (2031) + 8,400

- Assumptions for 2017
 - 50% of 2031 increase is in place by 2017
 - 100% attributable to Yonge Extension
 - Net increase in 2017 + 4,200
 - Toronto Rocket/Spadina diversion 4,200
 - Net impact at Finch in 2017 None
 - Assumes no benefit of ATO/ATC





Yonge Subway: Initial Service Level (AM Rush Hour)

- Every second northbound train will short-turn at Finch Station
- These trains will be empty for southbound departures at Finch Station
- Walk in traffic from Finch Station only
- Every other train will start at Richmond Hill Centre Station
- Capacity improvements will also help to increase Yonge Subway seat availability for existing riders





Resulting Service Levels

AM Rush Hour

Downsview - Finch - 2 minutes 21 seconds

Downsview - Richmond Hill Centre - 4 minutes 42 seconds

PM Rush - Initially

Downsview - Richmond Hill Centre - 2 minutes 21 seconds





Conclusions

- Impact on Yonge extension on ridership in 2017 is manageable
- Toronto Rocket/Spadina diversion address 2017 impacts
- ATO/ATC plus 7th car beyond 2017
- DRT in the long term
- Given the above, five major risks to City/TTC:
 - Yonge-Bloor Capacity
 - Expansion of rail yards
 - Subway trains for ATO/ATC
 - Funding principles
 - Future station densities

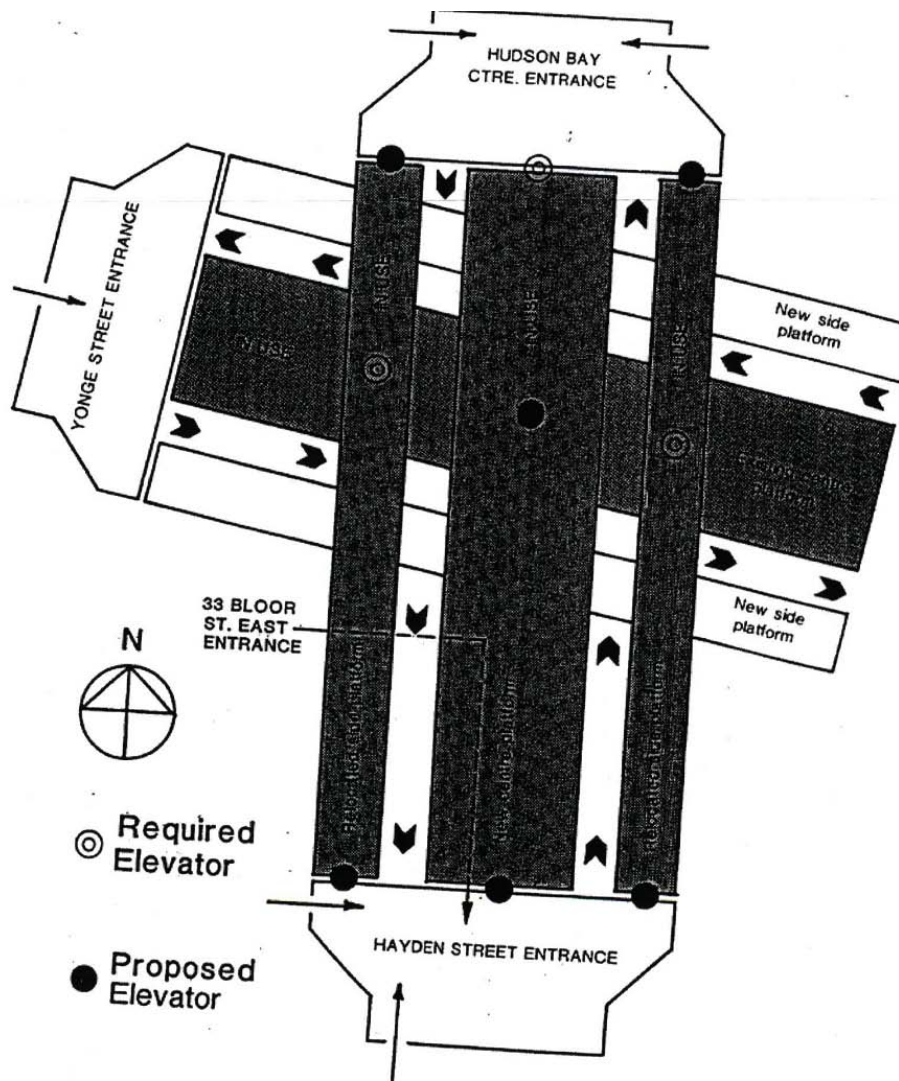


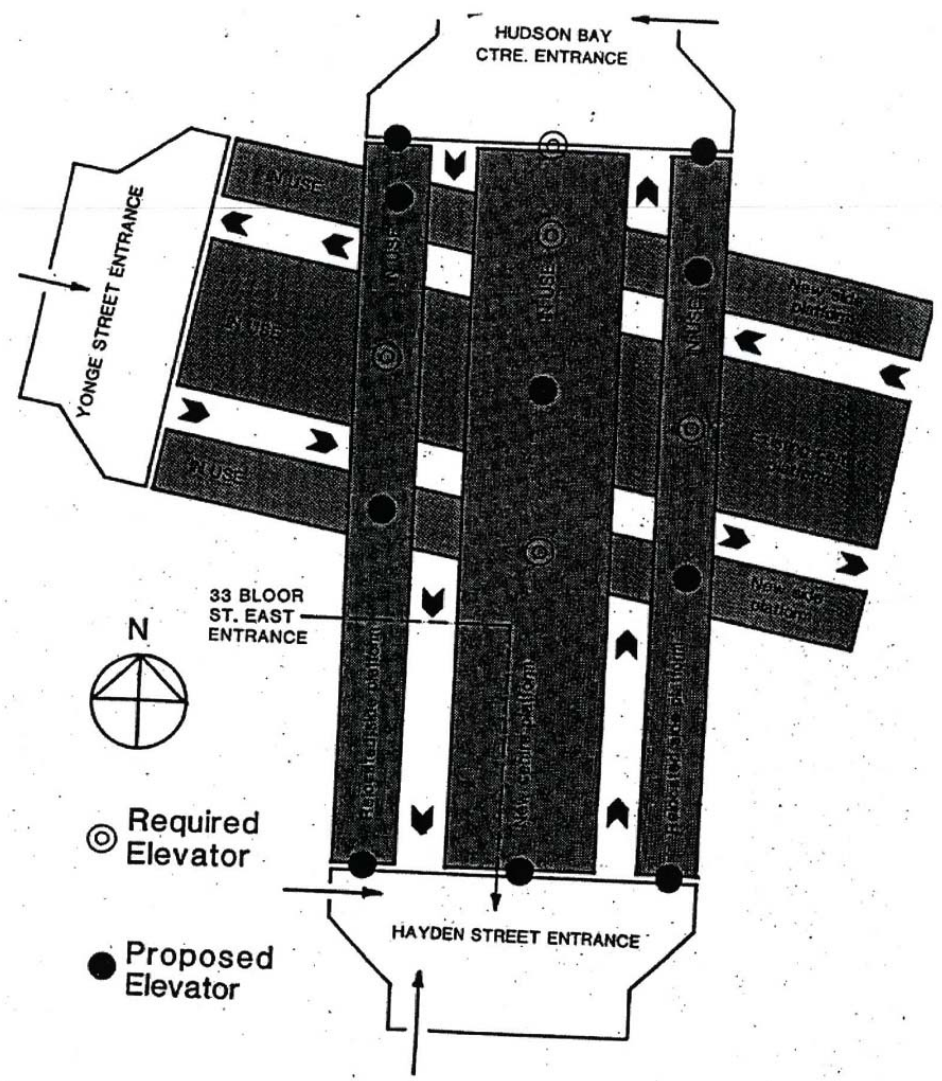


Yonge-Bloor Station

- Two existing problems:
 - Transfer between upper and lower levels
 - Dwell time of trains due to volume of passengers boarding/alignment
 - Current dwell time 60-90 seconds
 - Must be 30 seconds to add more trains with ATO/ATC
- RFP in January
- Comprehensive Study:
 - Solve existing congestion problems
 - Capacity for future growth
 - Staging plan, triggers for capacity improvements
 - Validate 6 platform concept





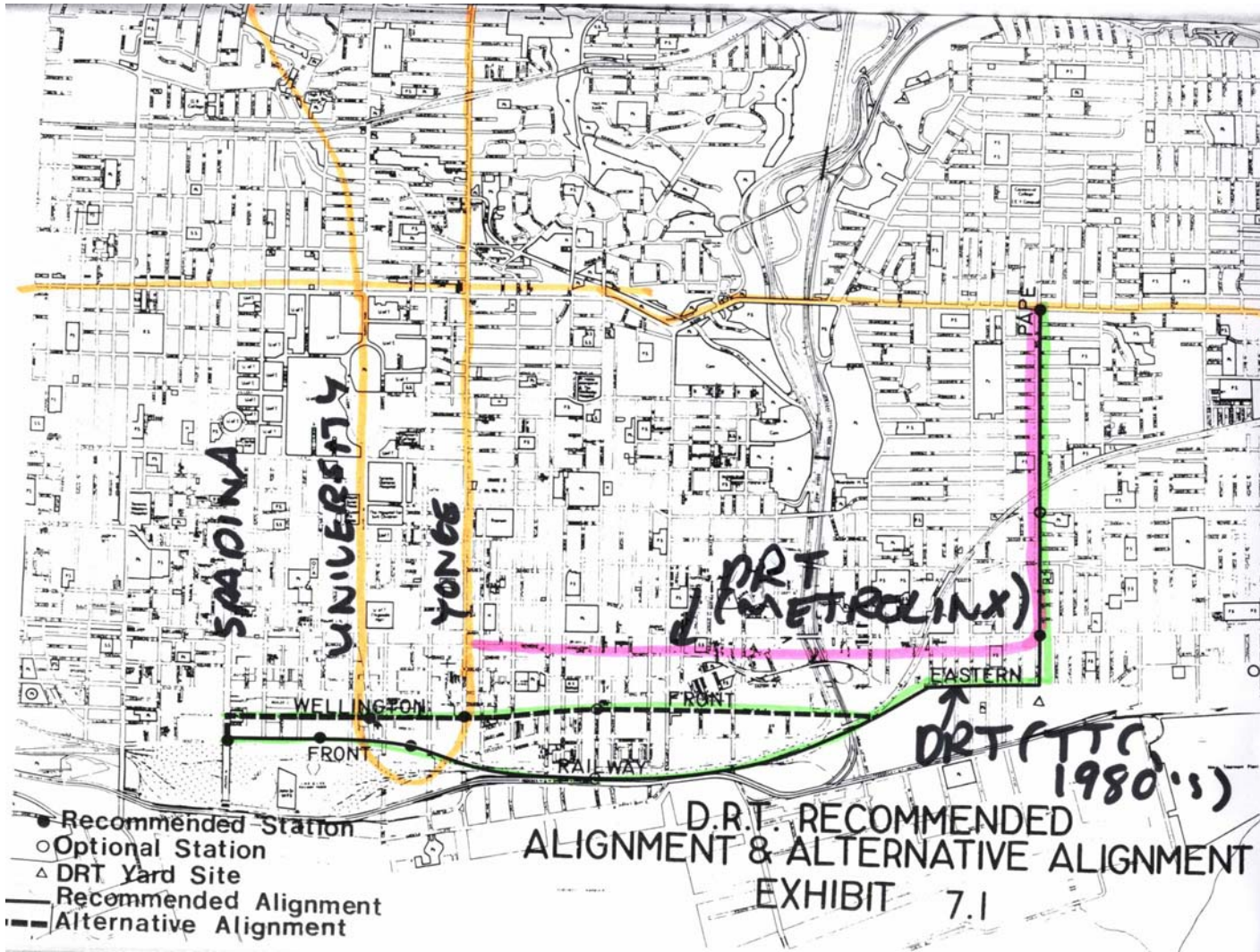




Yonge-Bloor Capacity - Staging

- Short term (next 10 years)
 - Improved Yonge-Bloor Station Capacity
 - Study will provide the road map
- Long term
 - Build the Downtown Relief Line after fixing Yonge-Bloor, a last resort
 - From east as first stage (Pape)
 - Downtown access, from the east without going through Yonge/Bloor
 - Pape to Front Street (1980's)
 - Metrolinx (Pape to Queen)







Subway Fleet Size Impacts

- Spadina Subway Extension
- Yonge Subway Extension
- Phased implementation of ATC/ATO:
 - 2 minute headways
 - 1 minute 45 second headways
- Extension of Spadina Subway short turn
- Growth in Sheppard Subway fleet
- 7 car subway trains
- Yard capacity must keep pace with growth in car fleet





Options for Yard Expansion

- Examine yard requirements to 2031
- Study completed by Spring 2009
- Expand Davisville to extent practical
- Expand Wilson only
- Expand Wilson plus new yard on Yonge line
- Expand Wilson plus new storage tracks at north end of Yonge extension
- With/without Sheppard Subway Extension to Downsview
- Sheppard extension important if:
 - New Yonge yard likely not possible
 - Satellite yard does not mitigate impact on deadhead mileage/maintenance window





Financial Risks

- Trains to implement ATO/ATC not included in base TTC capital budget
- Impact of Rail Yard Needs Study may increase Yonge project costs
- Yonge-Bloor capacity must be addressed
- Yonge Subway extension one of many factors contributing to need for Yonge-Bloor capacity improvements
- Principles in recommendations address these risks





Financial Principles

- Support for project subject to principles:
 - Base capital needs funded
 - Yonge-Bloor/subway fleet to implement ATO/ATC
 - Spadina and ATO prior to Yonge
 - Rail Yard Needs Study may increase Yonge yard costs
 - Property cost at no cost to City/TTC
 - High quality design



TTC/City Density Threshold

- 100 people and jobs per hectare
- This equals a successful station
- Can achieve 25-30% transit model split or better
- Current TTC stations at this level:

	<u>Density</u>	<u>Transit Split</u>
• Keele	107	31%
• Runnymede	83	25%
• Jane	70	20%
• Kennedy	109	22%





Planning Studies to Support Yonge Subway

- Markham
 - East of Yonge, south of 407
- Vaughan
 - West of Yonge, south of 407
- Richmond Hill
 - East and west of Yonge, north of 407
- All three Municipalities undertaking comprehensive planning studies



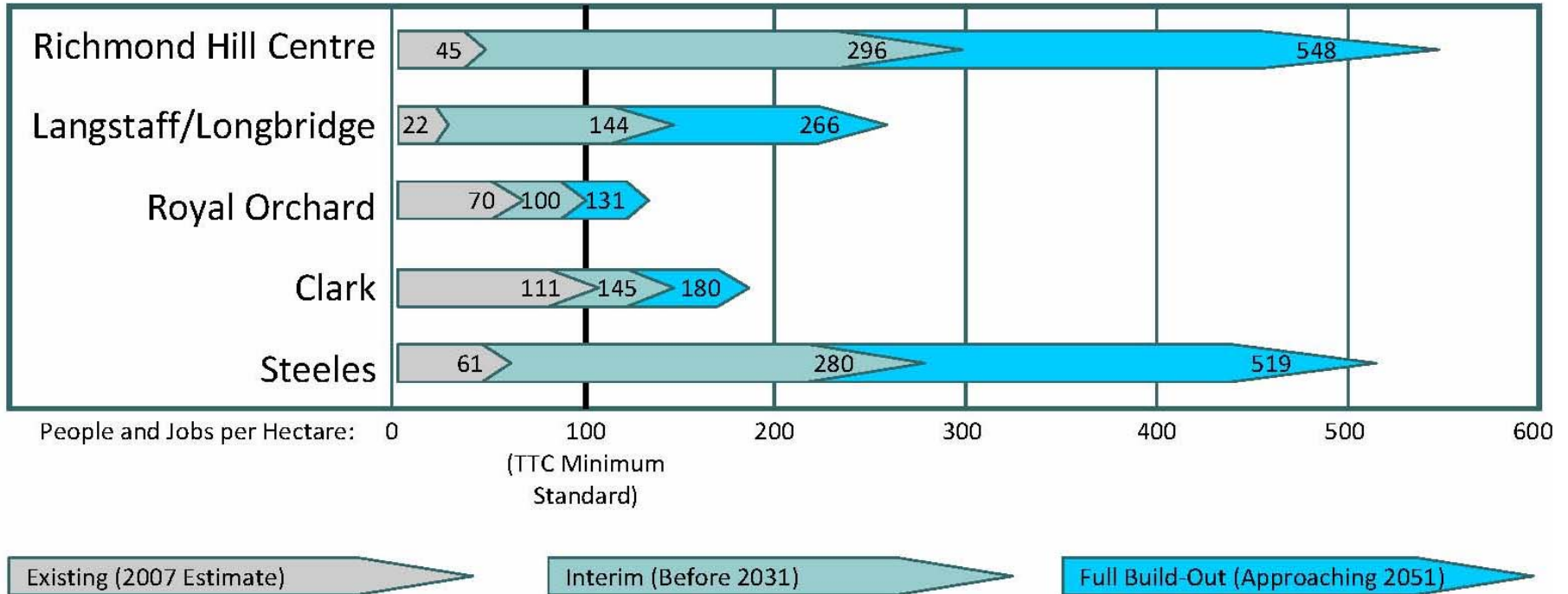


Station Area Developmental Analysis

- Existing (2007)
- Interim (2031)
- Full Build Out (2051)



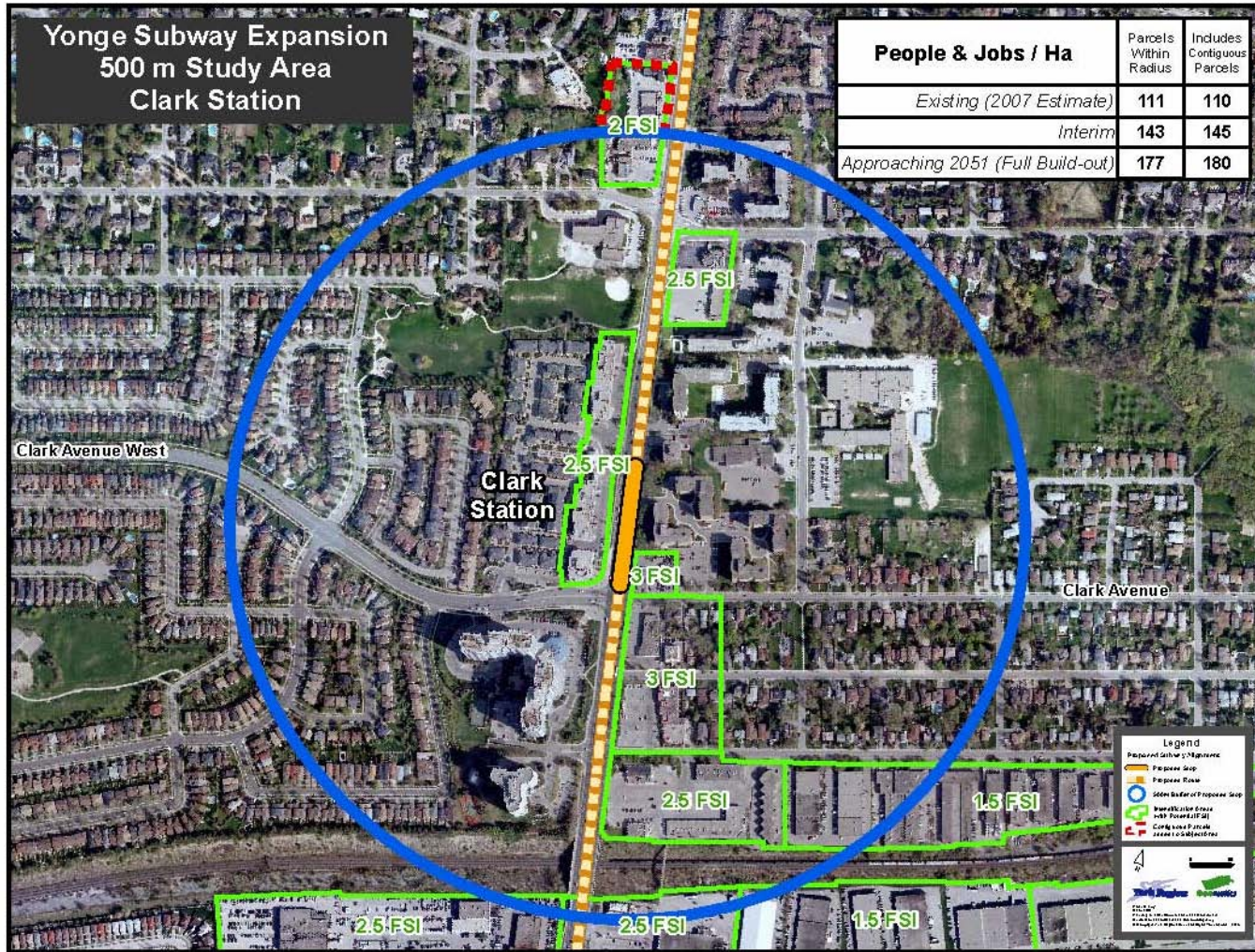
Comparing Development Potential Over Time



Steeles Station



Clark Station



Royal Orchard Station



Langstaff/Longbridge Station



Richmond Hill Station





Project Implementation Principles

- TTC to be the project manager/directly responsible
- Same requirement as TYSSE for TTC to own subway assets/property it will operate/maintain
- TTC to operate/maintain extension except regional PPUDO/bus terminals
- Governance structure to reflect prominent Metrolinx role
- Coordinating Committee of City/TTC/York Staff
- No net capital cost to City/TTC
- No net operating cost to City/TTC





Next Steps/Recommendations

- 1) Additional public meetings (January 2009)
- 2) Councillor briefing (January 2009)
- 3) Report to January City Council re: ridership/capacity issues
- 4) Finalize TPAP Submission/Environmental Project Report to MOE
- 5) Develop project start up plan (Spring 2009)
- 6) Negotiate project implementation/governance issues including related funding needs
- 7) Finish related studies:
 - Rail Yard Needs Study
 - Yonge/Bloor Capacity Study
- 7) Initiate Yonge Planning Studies (Steeles to Finch)

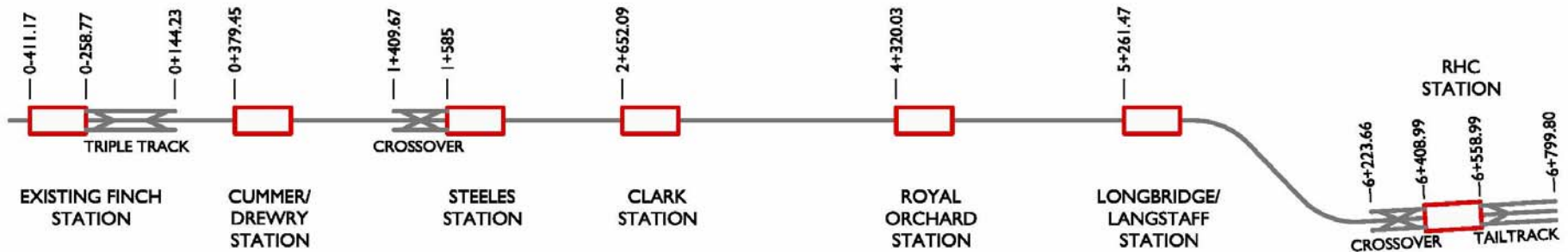


Yonge Subway Extension Study Area

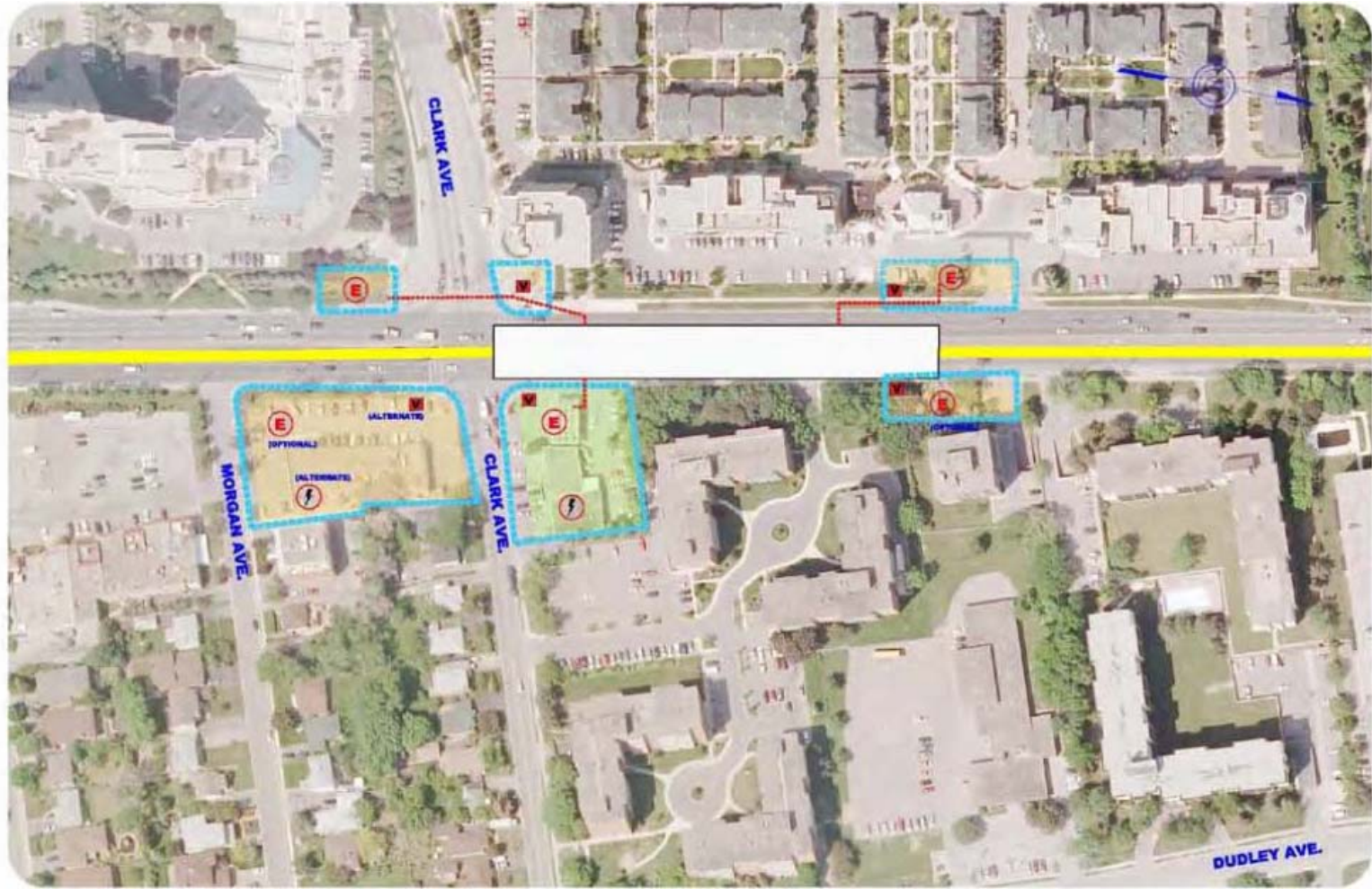


Yonge Subway Preliminary Alignment Station & Special Track Schematic

Note: 0+000 (Reference) - End of existing Tail Track

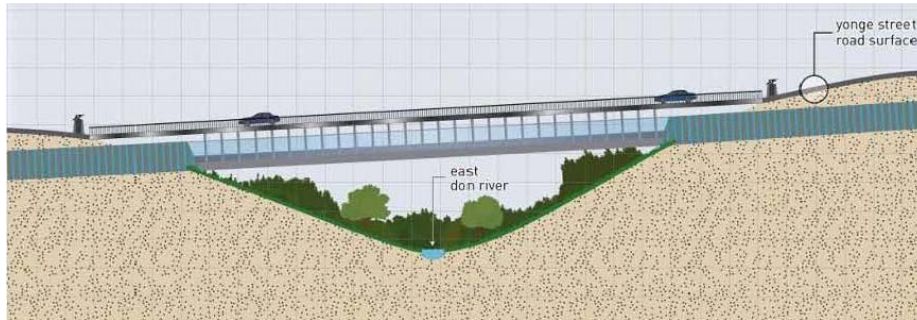


Clark Station



East Don River Crossing Options

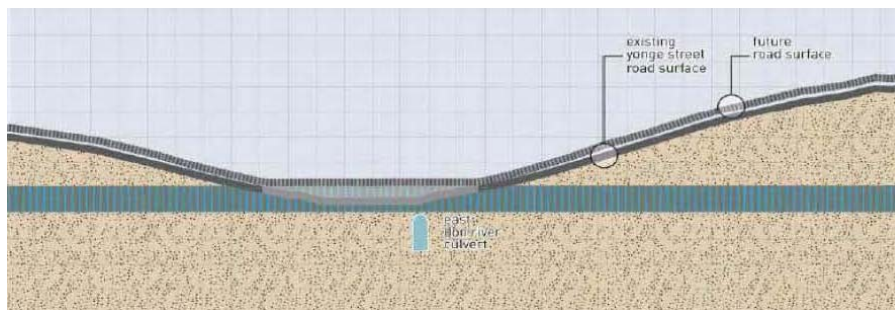
East Don River - Bridge Alternative



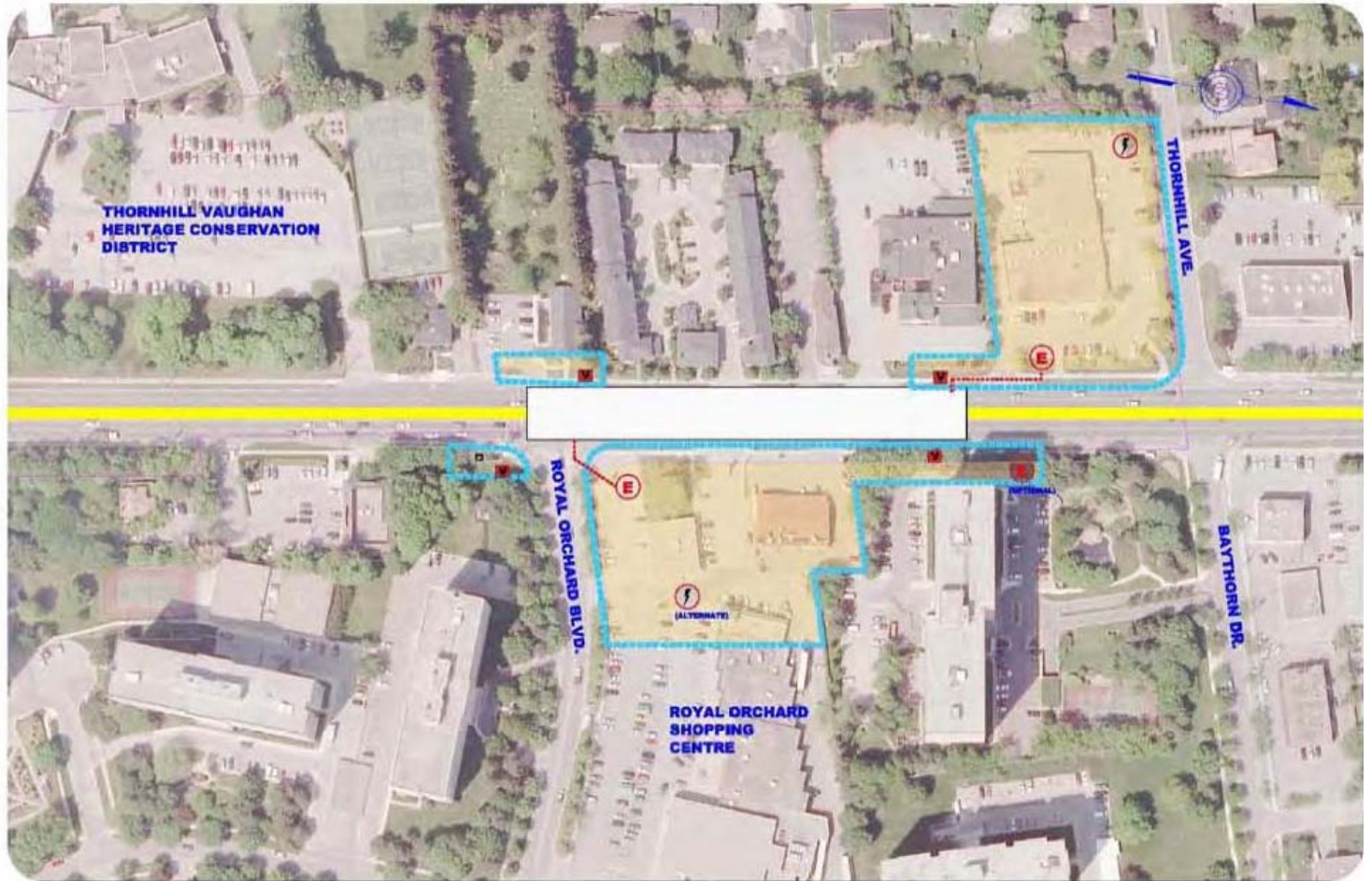
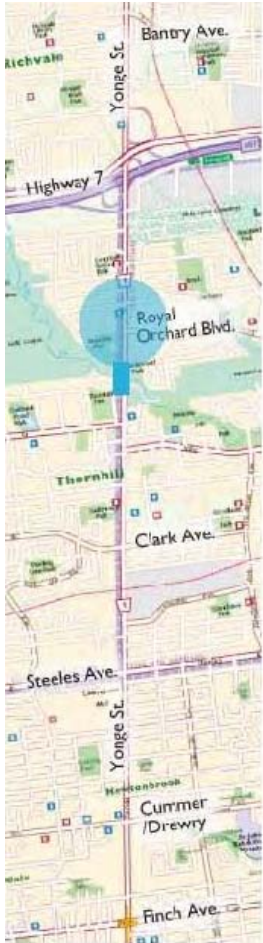
East Don River -Tunnel Alternative



East Don River - Embankment Alternative



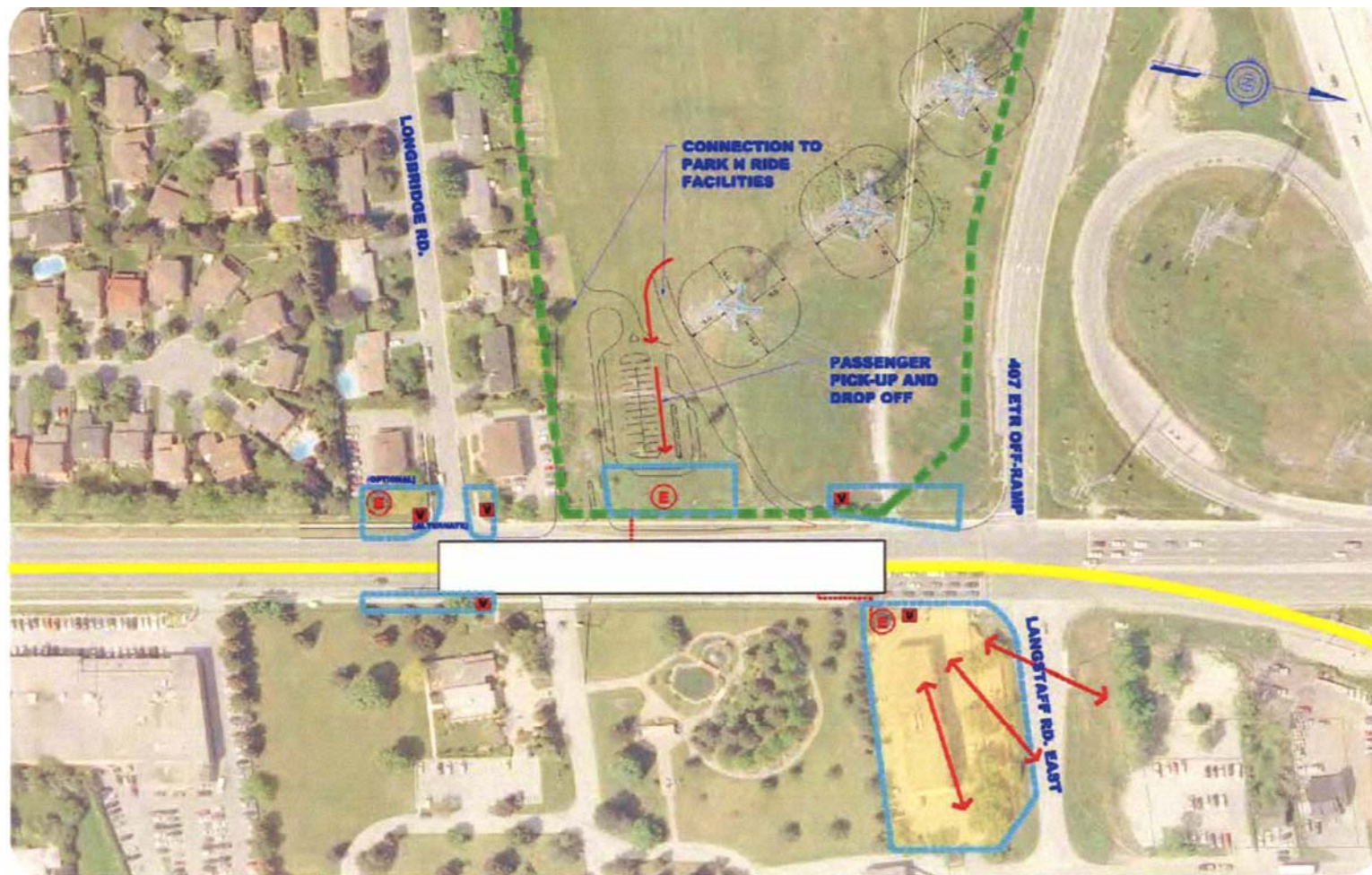
Royal Orchard Station



Langstaff / Longbridge / Richmond Hill Centre Station Linkage



Langstaff / Longbridge Station



Transit Hub at Richmond Hill Centre Station

