designing a rapid transit system in york region

Having a rapid transit system will benefit everyone by:

- Making transit easier, faster and more comfortable to get around
- Providing seamless and convenient transit services both within and beyond York Region
- Creating a major gateway and inter-modal passenger hub at Richmond Hill Centre offering transit connections among a range of service providers
- Reducing reliance on personal vehicles

Rapid Transit will help shape York Region as its population continues to grow by:

- Creating new opportunities for places to live, work and play along the transit corridors
- Supporting intensification along the corridors, thereby reducing the pressure for sprawl in the outlying areas
- Helping create new employment opportunities in the corridor that are accessible by transit

The construction of a subway includes the construction of a number of special structures that will require either open cut excavation or construction above ground. The requirements and locations for additional structures needed for the Yonge Street subway extension are currently under study. Special structures include:

**crossover**
- Underground structure that allows trains to cross from one running track to another
- Usually located before reaching a station, ideally no more than three kilometres apart

**triple track structure**
- Underground structure that allows trains to reverse direction at the station in order to operate different train headways [frequency of service] north and south of a station
- Provides train storage opportunity in the event of an emergency

**tail track**
- Underground track that extends 250 to 400 metres beyond the last station on a subway line (e.g. Richmond Hill Centre)
- Underground single track aligned between the two mainline tracks
- Provides permanent or emergency train storage opportunity

**substations**
- Above ground structures that provide electrical power to the subway and related facilities

**emergency exit buildings**
- Above ground structures that provide a point of egress from the underground tunnels to the surface
- Provide an emergency exit for passengers and access between stations for emergency personnel
There are many different elements involved in building a subway, including its tunnels, tracks, stations and other supporting buildings and surface facilities. A number of different construction techniques may be used. The choice of construction method reflects the specific requirements, sensitivity or limitations of the immediate area.

There are two main approaches to building a subway:

**tunnel boring**
- Between stations and special track structures
- No surface effects except at points of machine entry and exit
- Following tunnel boring, the track bed, rails and signal systems are installed

**cut and cover**
- Occurs at station locations (approximately 170 metres in length)
- Occurs where special track structures are needed
- Temporary decking is installed when it is necessary to allow vehicular and pedestrian circulation during construction

Considerations:
- surface effects during construction
- offers flexibility to introduce new stations in the future
- only used for shallow alignments

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**background: a lesson in planning**

The experience of urban regions around the world suggests that having a well-designed rapid transit network will be key to York Region’s future success.

**Successful urban regions tend to have:**
- Places for people to live, work and play in concentrated areas
- Easy connections between those places
- Reduced reliance on cars

A number of key planning strategies have already committed support for elements of York Region’s plans for a rapid transit network, including the Yonge Subway extension.

**Places to Grow** is the Province’s strategy to manage urban growth and protect green spaces across Ontario into the future. This strategy identifies the Richmond Hill/Langstaff Gateway area as an Urban Growth Centre, which will be planned to:
- Accommodate and support major transit infrastructure
- Accommodate a significant share of population and employment growth, with a minimum gross density target of 200 residents and jobs combined per hectare.

**MoveOntario 2020**, a $17.5 billion provincial transit funding strategy for the Greater Toronto and Hamilton area, identified the Viva rapid transit system and the Yonge Street Subway extension as funding priorities.

**York Region’s Network Configuration Report 2003** confirmed bus rapid transit as the preferred rapid transit technology along regional corridors for the foreseeable future and identified the Yonge Subway extension as highly desirable and likely necessary before 2021.

**Regional Official Plan Amendment #43** enhances the regional planning framework through a greater emphasis on compact development, urban design, implementation tools and infrastructure investment, including rapid transit.

**The Big Move** is Metrolinx’s Regional Transportation Plan to reduce gridlock across the Greater Toronto and Hamilton area. The draft plan was released in September 2008. Its top 15 priorities for early implementation included several transit projects, including the Yonge Street subway extension.
When locating and designing subway stations, planners take into account a wide range of factors and considerations. Some factors are highly technical in nature, whereas others reflect the planning priorities and concerns that have been identified by the local municipalities. Many factors are interlinked, and arriving at a final decision requires careful evaluation.

The criteria planners use to evaluate each potential station location include:

- ensuring that the station offers transportation opportunities, including:
  - Transit network connections
  - Associated station surface facilities such as pedestrian entry buildings, space for passenger pick-up and drop-off areas, bus terminals and parking
  - Passenger accessibility

- ensuring all technical/constructability issues are appropriately managed, such as:
  - Construction impacts associated with building the station and the adjacent subway route
  - Compliance with design standards and criteria

- ensuring that a potential station won’t have a negative impact on cultural or socio-economic environment of the surrounding area, such as:
  - Historic/archaeological sites
  - Provincial and local parks/recreation sites
  - Schools, places of worship and unique community features

- ensuring that a potential station won’t have a negative impact on the surrounding area’s natural environment, including:
  - Effects on natural heritage features
  - Impacts on surface water, identified water crossings, drainage features crossed and areas susceptible to surface water contamination
  - Potential effects on local air quality
  - Potential effects on local noise

- the broader land use, either currently or reflecting future planning objectives for the area around the potential station location, including:
  - The existing and potential population and employment density within the station catchment area
  - The existence of major trip attractions/generators within the station catchment area
  - Whether there is the potential to stimulate transit supportive development in proximity to the station
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