

### 3. ANALYSIS AND EVALUATION OF ALTERNATIVES TO THE UNDERTAKING

In accordance with the information requirements set out in Section 6.2 (1) of the *Environmental Assessment Act*, the approved *Terms of Reference* for this study required the Proponent to identify, analyze and evaluate all reasonable alternatives to the proposed undertaking, public transit improvements in the Highway 7 Corridor and Vaughan North-South Link. For this undertaking, the alternatives comprise functionally different transportation strategies to the problem summarized in the study context in **Chapter 1** and addressed in *York Region's Transportation Master Plan (TMP)*. This chapter presents the findings of this step in the EA process.

#### 3.1 DESCRIPTION OF THE ALTERNATIVES TO THE UNDERTAKING

The alternatives to the undertaking or the alternative transportation strategies that could be considered to respond to the Region's mobility needs and Official Plan objectives are outlined below. Components assumed in each alternative are shown in **Table 3.1-1**. In addition to the existing (2001) conditions, five alternative strategies have been examined. These have been built incrementally around different components of the *TMP* and represent a broad range of approaches with different transportation modes.

##### 3.1.1 Do Nothing

The purpose of this "base case" alternative is to confirm the need and justification for an undertaking by assessing the effect of utilizing only the road and public transit infrastructure and services in place in 2001, without improvements throughout the planning period to 2031. For public transit, this assumption applies to all bus and rail transit service providers including GO Transit, York Region Transit (YRT) and the Toronto Transit Commission (TTC).

##### 3.1.2 A Current Commitments Strategy Including Priority Transit and Transportation Demand Management

This base case strategy comprises all road infrastructure improvements currently committed in York Region's 10-year capital plan, the committed service and infrastructure improvements of the local and inter-regional transit authorities, YRT, TTC and GO Transit, and all TMP excluding regional rapid transit network. Also included are Transportation Demand Management (TDM) strategies which the Region and local municipalities

are currently pursuing. Examples include *Smart Commute North Toronto, Vaughan* and *Smart Commute Markham, Richmond Hill*. In this solution, the above commitments are assumed to be the full extent of transportation improvements through the planning period.

**Table 3.1-1  
Summary of Alternative Strategies**

Alternative Transportation Strategy	Components In Each Strategy			
	Road Network	Inter-regional Transit Network (GO Transit)	Local Transit System Network	Public Transit Improvements (e.g. Rapid Transit Network & subway extension)
<b>Do Nothing</b>	<ul style="list-style-type: none"> <li>Existing (2001) road network</li> </ul>	<ul style="list-style-type: none"> <li>Existing GO Rail network</li> </ul>	<ul style="list-style-type: none"> <li>Existing Transit Network</li> </ul>	<ul style="list-style-type: none"> <li>No improvements in York Region</li> </ul>
<b>Current Commitments Including Priority Transit and TDM</b>	<ul style="list-style-type: none"> <li>Planned improvements based on York Region 10 year capital plan and TMP network</li> <li>Expanded provincial highway system</li> </ul>	<ul style="list-style-type: none"> <li>Capacity and Service improvements consistent with GO Transit 10 year Capital Plan</li> </ul>	<ul style="list-style-type: none"> <li>Committed YRT local transit service improvements</li> </ul>	<ul style="list-style-type: none"> <li>No improvements in York Region</li> </ul>
<b>Road Expansion</b>	<ul style="list-style-type: none"> <li>Expansion of road network and widenings to meet travel demand</li> </ul>	<ul style="list-style-type: none"> <li>Existing GO Rail network</li> </ul>	<ul style="list-style-type: none"> <li>Committed YRT Improvements</li> </ul>	<ul style="list-style-type: none"> <li>No improvements in York Region</li> </ul>
<b>Enhanced Richmond Hill Commuter rail and Inter-regional Bus Service</b>	<ul style="list-style-type: none"> <li>Planned improvements based on York Region 10 year capital plan and TMP network</li> <li>Expanded provincial highway system</li> </ul>	<ul style="list-style-type: none"> <li>All day and reverse peak service on all existing GO Rail lines</li> <li>Freeway HOV on Highways 407, 400 and 404</li> </ul>	<ul style="list-style-type: none"> <li>Committed YRT Improvements</li> <li>Connections to new GO services</li> </ul>	<ul style="list-style-type: none"> <li>No improvements in York Region</li> </ul>
<b>York Region Rapid Transit Corridor Initiatives</b>  (in the Highway 7 Corridor and Vaughan North-South Link as represented by the Region's Transportation Master Plan)	<ul style="list-style-type: none"> <li>Planned improvements based on York Region 10 year capital plan and TMP network</li> <li>Expanded provincial highway system</li> </ul>	<ul style="list-style-type: none"> <li>Capacity and Service improvements consistent with GO Transit 10 year Capital Plan</li> </ul>	<ul style="list-style-type: none"> <li>Committed YRT Improvements</li> <li>Connections to new Rapid Transit</li> </ul>	<ul style="list-style-type: none"> <li>Rapid transit in all proposed corridors identified in TMP</li> <li>Implementation of transit priority network in TMP</li> <li>Extension of Yonge Subway to Highway 7</li> <li>Extension of Spadina Subway to Highway 7</li> <li>Extension of Sheppard Subway to Scarborough</li> </ul>

##### 3.1.3 A Road Expansion Strategy

The focus of this solution is an increase in road capacity only beyond the "Current Commitments" Strategy's road and public transit improvements.

Road capacity is assumed to be increased to whatever level is required to meet the demand at the 2021 and 2031 planning horizon.

##### 3.1.4 An Enhanced Richmond Hill Commuter Rail and Inter-regional Bus Service Strategy

In this strategy, the transportation system would comprise all current road and local transit service commitments plus an enhanced inter-regional transit system consisting of both commuter rail and 400 series highway bus services such as those operated by GO Transit.

##### 3.1.5 York Region Rapid Transit Corridor Initiatives Strategy

This strategy focuses on a significant improvement in public transit services in York Region in addition to all components of the "current commitments" strategy. This strategy comprises the implementation of the York Region's Rapid Transit Plan (YRTP) recommended in the *2002 Transportation Master Plan* with associated local service connections encompassing initiate and ultimate technology phases for both surface and subway-based rapid transit.

### 3.2 ANALYSIS OF ALTERNATIVE TRANSPORTATION STRATEGIES

Evaluation of the above alternative strategies must consider the advantages and disadvantages of each in terms of a broad range of criteria reflecting both the problem faced by the Region and the opportunities presented. These criteria, based on the primary objectives introduced in **Chapter 1**, the Purpose of the Undertaking will be identified later in this section. Initially, it is necessary to analyze and quantify the performance of the existing transportation system and improvements currently committed in meeting the forecast travel demand during the planning period.

#### 3.2.1 Forecast of Future Travel Demand

York Region has had the greatest proportional increase in population and employment amongst the four suburban regions of the Greater Toronto Area over the past 10 years. Within the 2021 planning horizon, the population of the Region is forecast to increase from the current 0.8 million residents to 1.2 million residents, while employment is estimated to increase from the existing 385,000 jobs to 655,000 by the year 2021.

A large proportion of this growth is targeted to live and/or work within the Highway 7 Corridor between Steeles Avenue and Major MacKenzie Drive. This growth will generate a proportionate increase in east-west travel

demand. While it is expected there will be a greater segment of the population living and working within the Region itself, north-south travel demand between the Region and the City of Toronto will remain the dominant feature amounting to 35% of total travel demand.

### 3.2.1.1 The Demand Forecasting Model

A comprehensive, state-of-the-art transportation demand forecasting model has been developed to provide an effective planning tool for York Region's Public Transit Improvements program. The model, developed from an extensive survey of travel behaviour, the 2001 Transportation Tomorrow Survey (TTS), has been successfully validated as a forecasting tool. With sensitivity to transportation and transit system connectivity, levels of service and prices, demographic characteristics and land use, the models can be used to analyze alternative policies (e.g., fares, service levels), investments (rapid transit, intermodal connections) and design details. The model estimates a.m. peak period travel for five modes:

- Auto driver and passenger;
- Public transit (YRTP, YRT, TTC, GO Bus) with walk access;
- Public transit with park/kiss-and-ride access;
- GO Rail with public transit or walk access; and
- GO Rail with park/kiss-and-ride access.

Travel is estimated for work, post-secondary school, secondary school and other trip purposes. The Program's model encompasses the Greater Toronto Area (GTA and Hamilton) and is based on the 2001 GTA zone system comprising 1,717 traffic zones. Additional traffic zone detail was included in the YRTP corridors to reflect walk access and station location assumptions. Level-of-service sensitive and behaviour based trip distribution (gravity model) and modal split (logit model) techniques are employed within the four-stage modelling process, described as follows:

- **Trip Generation:** estimates the number of trips that will be made within the study time period. A conventional approach using trip rates and regression equations is used for work, school and other trips. For work and school purpose trips, sub-categories are defined with trip rates developed that reflect the different travel behaviour of social groups by occupation type (professional, manufacturing, general office/sales) and schooling level (secondary and post secondary), respectively;
- **Trip Distribution:** links the trip productions and attractions by trip purpose and type to determine travel flows. A gravity model is calibrated to estimate work trip flows, again accounting for socio-economic differences within the population by calibrating separate models for each occupation type. The process is sensitive to level-of-service, with the resulting travel orientations reflecting the assumed

improvements in public transit facilities and other major transportation system changes. A standard Fratar proportional balancing process is used for school and other trip purposes;

- **Mode Split:** determines the trip travel mode. A multinomial logit model is used to determine the breakdown by mode (auto, transit, commuter rail) for work (by occupation group) and post-secondary school trips. It also distinguishes the transit access mode (park-and-ride or all-way). Existing modal split rates are assumed for non-work trips, based on defined origin-destination superzones; and
- **Trip Assignment:** determines the trip route through the given transportation system. The standard assignment algorithms within EMME/2 are used, involving a multiple path transit assignment and user equilibrium auto assignment.

In recognition of the interaction between the four components of travel behaviour, equilibration is achieved by iterating through the three stages of trip distribution, modal split and trip assignment until a reasonable level is achieved. In addition, a link between the trip distribution and modal split components is maintained to incorporate the interdependence between them.

For preliminary planning purposes, the model forecasts can be translated from the a.m. peak 3-hour period to an a.m. peak hour or daily forecasts using relevant conversion factors. A factor of 0.6 was developed for the a.m. peak hour based upon comparisons of actual auto and transit traffic data, with 0.55 used for the higher volume Yonge Street Corridor. The daily trips were converted using a factor of 3.5, calculated from 2001 TTS data relationships between the time periods.

The model outlined above was used to forecast the travel patterns and mode choice within the region and across regional boundaries in both the 2021 and 2031 horizon years for each of the alternative transportation solutions, including the "Do Nothing" option. Population and employment data, based on the Regional and City of Toronto Official Plans and described in **Chapter 4**, was utilized as the primary input for the modelling. **Chapter 4** also provides details of the basic transportation network modelled using the assumptions outlined below for each transport mode.

### 3.2.1.2 Key Assumptions for Demand Modelling

Components and key assumptions used for the demand modelling are described below.

### Road Network

The base case road network includes all arterial improvements identified in the TMP and the 10-year York Region capital programme. It also includes planned collector roads such as the Rodick Road extension, Birchmount Extension and Enterprise Drive as outlined in area municipality transportation plans. Expansion of the provincial highway system within York Region included the proposed extensions of Highway 427 and Highway 404 and the widening of Highway 400. In the alternative scenario involving road expansion, an iterative approach was used to expand roads to meet projected auto demand.

### Inter-Regional Transit Network (GO Transit)

Improvements considered under the Enhanced Richmond Hill Commuter Rail and Inter-Regional Bus Services Alternative are generally consistent with the GO Transit 10-year Capital Plan and 2021 Plan and included full all-day and reverse peak service on the Richmond Hill, Bradford and Stouffville GO Rail Services.

Peak headways of 15 minutes were assumed for the Richmond Hill and Bradford services while headways of 10 minutes were assumed for the Markham to Union portion of the Stouffville Service. This latter assumption was made to explore the upper end potential of commuter rail service in the Markham North-South Corridor of the Region's proposed rapid transit plan.

In addition to the changes to the GO Rail services, this alternative solution includes an extensive network of Freeway Express Bus or Bus Rapid Transit (BRT) inter-regional transit services including:

- A Highway 400 service from Newmarket (with connections to Barrie) to the Spadina Subway (Downsview);
- A Highway 407 service across York Region; and
- A Highway 404 service from Newmarket to the Bloor Subway (Castle Frank Station).

In all cases, these services included connections to major transit routes in South York and Toronto.

### Local Transit System Network

For all future strategies except the base case "Do Nothing" Alternative, most of the recommendations from the York Region Transit 5-Year Service Plan have been included. This includes route extensions, route restructuring and expansion of service to new communities.

For the York Region Rapid Transit Corridor Initiatives Alternative, YRT services overlapping with rapid transit services (e.g. Express services from Markham and Unionville) have been removed to avoid duplication.

In the existing transit network within the demand model, transit speeds were estimated from timetables and vary by route segment. Assumed speeds for regular bus services generally range from 20–25 km/hr. With future traffic growth, transit speeds on major routes such as Highway 7 and Yonge Street, where minimal road expansion is planned, will likely degrade due to congestion. In order to reflect this condition in the model, speeds for all regular bus routes were reduced by 20% on average. For example, a route that was coded with a 20km/hr speed in the existing network was reduced to 16km/hr in the future network. This reduction was not applied for the Road Expansion Alternative or the York Region Rapid Transit Corridor Initiatives Alternative, as these options include significant improvements to reduce congestion (e.g. road expansion) or improve bus times in key corridors (e.g. bus-rapid transit and transit priority).

**Improved Public Transit**

For the York Region Rapid Transit Corridor Initiatives Alternative, several major transit improvements were incorporated. These included:

- Bus Rapid Transit operating in all YRTP corridors at average speeds of up to 30 km/hr;
- Implementation of transit priority on most major arterials in South York Region, consistent with Figure 20 of the *York Region Transportation Master Plan*. The effect of transit priority was assumed to provide an improvement of 5 km/hr over the base case bus speeds on the transit priority routes; and
- Extension of subways including Yonge Subway to Highway 7, Spadina Subway to York Region (Steeles Avenue) and Sheppard Subway to the Scarborough Town Centre.

The above assumptions formed the basis for forecasting both the 2021 and 2031 travel demand and mode choice, and the ability of the five alternative transportation strategies to carry the forecast travel demand.

**3.2.2 Modelling of Alternative Transportation Strategies**

An established technique for assessing the performance of any transportation system is to compare the relationship between overall travel demand and roadway capacity at selected locations or screenlines in the system. In any scenario being assessed, this method also recognizes the capacity of other non-auto modes contributing to the total capacity across any one screenline.



**Figure 3.2-1**  
Selected Screenlines across the Highway 7 Corridor

Screenlines across the transportation network are selected to provide an improved basis for analysis for the following reasons:

- i) because of parallel facilities, there are a number of alternative routes available and the choice between routes can vary from the most direct route in order to reduce travel time and avoid local congestion.
- ii) comparison of historical and future trends must be based on roadway groupings as present roadways are expanded or new parallel roadways are added.
- iii) the traffic characteristics, i.e. local vs through traffic and modal split vary due to the type and location of the roadway facility and transit service.

For analysis purposes, five north-south screenlines across the Highway 7 Corridor were selected as illustrated in **Figure 3.2-1**. The screenlines extended from Steeles Avenue to Major Mackenzie Drive. The first was located along the Highway 400 right-of-way, the second and third along the west and east sides of the Yonge Street arterial respectively, the fourth along the Highway 404 right-of-way and the fifth in Markham on the west side of the McCowan Road arterial.

**3.2.3 Alternative Strategies: Demand vs Capacity Analysis**

The effectiveness of each transportation strategy in meeting both the near/medium and long-term travel demand within the Region and across regional boundaries was analyzed by modelling 2021 and 2031 a.m. peak period travel. Analysis was done using a network-wide approach adopting

similar system components for all corridors of the Region’s Transportation Master Plan network. In order to reflect the effectiveness of each transportation alternative in its mature form, the 2031 planning horizon adopted in the TMP was used for this analysis. **Figures 3.2-2 to 3.2-11** illustrate the projected near/medium and long-term relationship between demand and capacity in persons per hour during peak period at the five selected screenlines for peak direction travel in each of the alternative strategies in 2021 and 2031.

In the Highway 7 Corridor, there is a clear need to address transportation capacity deficiencies at key screenlines through a broad range of improvements. Under the Do Nothing Alternative, road capacity shortfalls would be significant and without other travel options, travel demand would be severely constrained. In both the Do Nothing and Current Commitments Alternatives, the demand on the existing bus system would be significant; the projected demand would require buses operating at 3 to 5 minute headways on all four major arterials along the screenline (assuming 50 passengers per bus).

For the east of Yonge Street, west of Highway 404 and west of McCowan Road Screenlines the only alternative that would address corridor travel demand in 2031 is an alternative involving significant improvements to the public transit system – a combination of BRT and Subway in the Highway 7 Corridor.

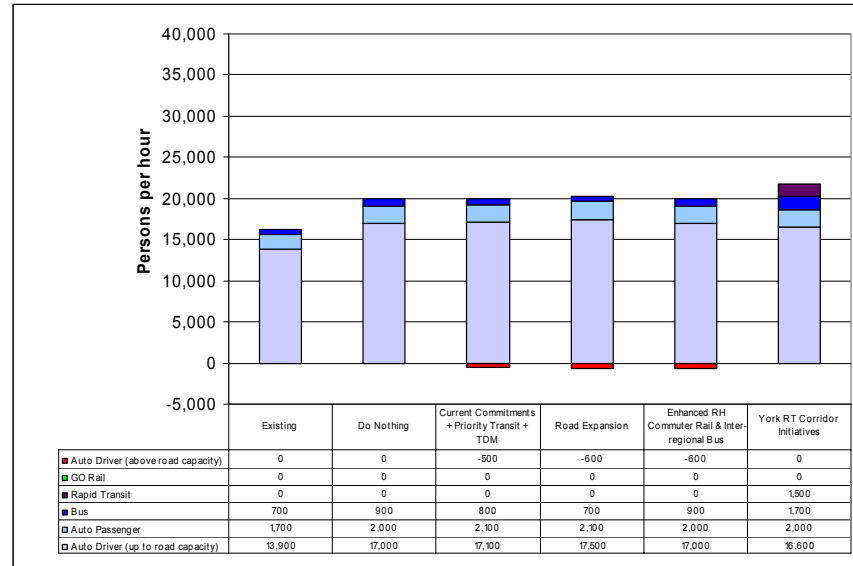


Figure 3.2-2  
Eastbound across Screenline at East of Highway 400 - 2021

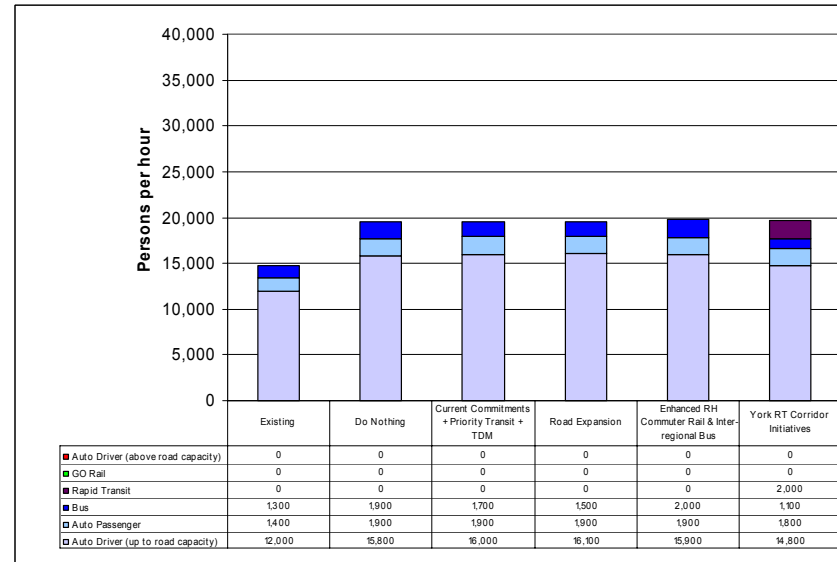


Figure 3.2-4  
Eastbound across Screenline at East of Yonge Street - 2021

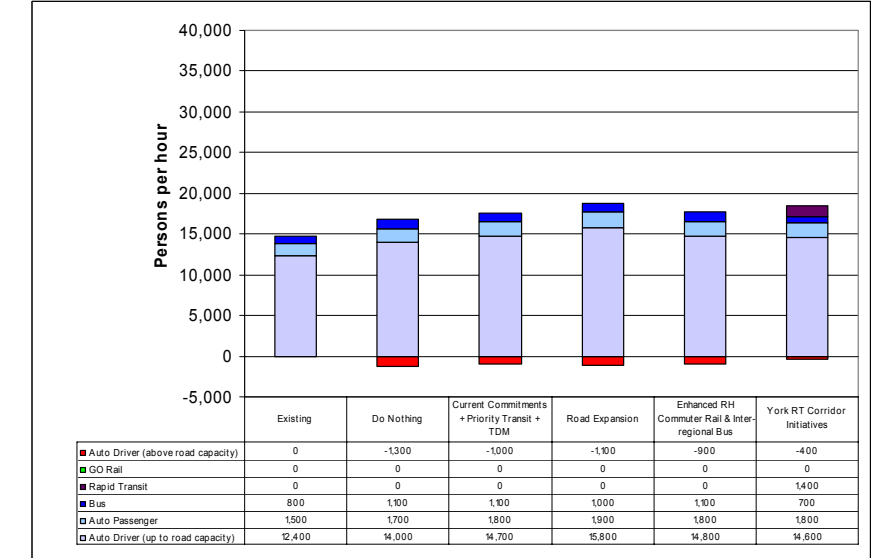


Figure 3.2-6  
Eastbound across Screenline at West of Highway 404 - 2021

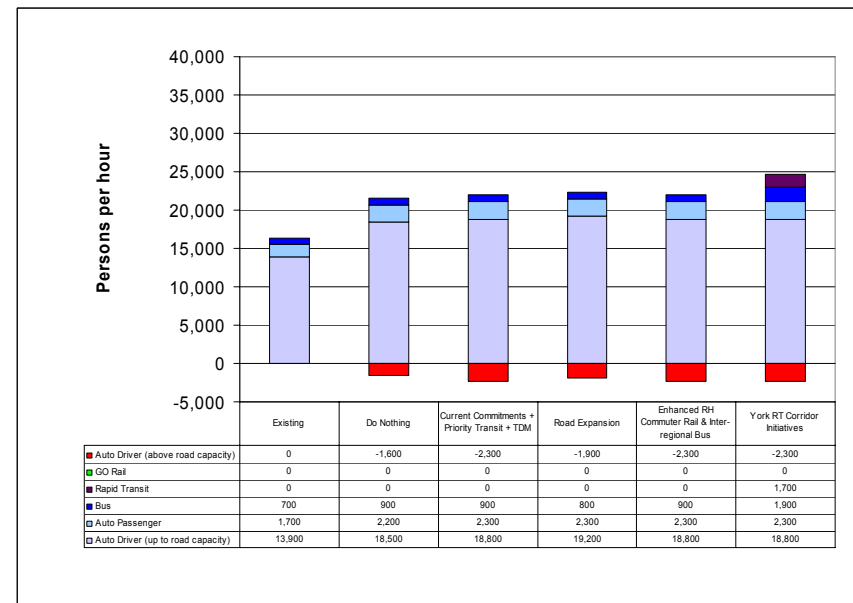


Figure 3.2-3  
Eastbound across Screenline at east of Highway 400 - 2031

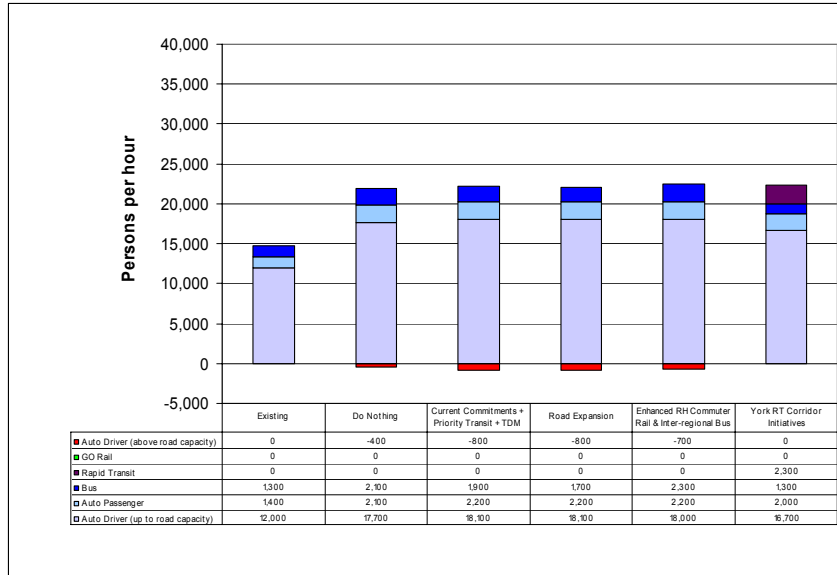


Figure 3.2-5  
Eastbound across Screenline at East of Yonge Street - 2031

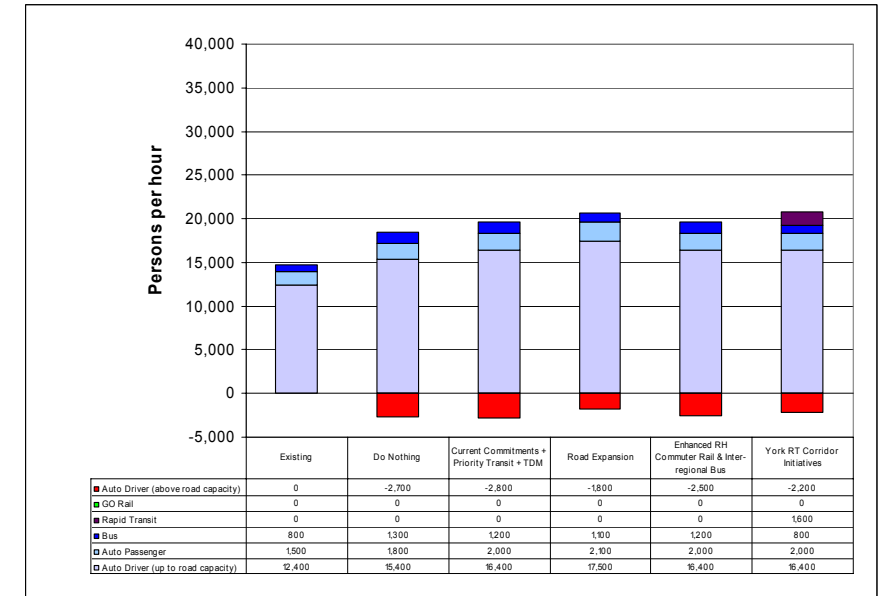


Figure 3.2-7  
Eastbound across Screenline at West of Highway 404 - 2031

3.2.4 Criteria for Evaluation of Alternative Strategies

The framework adopted for evaluation of the alternative strategies was that of the *Regional Official Plan* objectives or themes stated in **Chapter 1** in describing the Purpose of the Undertaking. These principle themes incorporate the criteria proposed in the approved Terms of Reference (Section 5.7.2) within the following categories of criteria for the evaluation:

3.2.4.1 Effects on the Social Environment (reflecting the “Healthy Communities” theme)

Criteria in this category address the impact on the socio-economic environment and include the need for acquisition of residential or commercial property for new or widened road rights-of-way, level of traffic congestion, the potential for traffic infiltration through neighbourhoods, the effect of increased noise and vibration during construction and operation and the likelihood of adverse effects on archaeological resources and heritage or cultural features.

3.2.4.2 Effects on the Natural Environment (reflecting the “Sustainable Natural Environment” theme)

The focus of this category of criteria is to assess the potential effect of a transportation strategy on elements of the natural environment such as fisheries and aquatic habitat, wildlife habitat, natural vegetation and wetlands, ground and surface water resources, regional and local air quality and ecosystems.

3.2.4.3 Effects on the Economic Environment (reflecting the “Economic Vitality” theme)

This category addresses the economic aspects of the socio-economic environment and the impact on urban form by encompassing criteria that assess either opportunities to promote existing and increased economic activity or the potential adverse effects on current business activity in the corridor. The criteria measuring benefits include support of the Region’s overall vision, approved urban structure and development distribution, improved access to business and community centres, increased pedestrian activity around facilities, the quality of commuting options for employees and the effect on congestion levels in the corridor.

Potential adverse effects of the strategies are assessed by criteria such as disruption or modification of access to businesses, displacement of businesses due to right-of-way widening and convenience of goods movement.

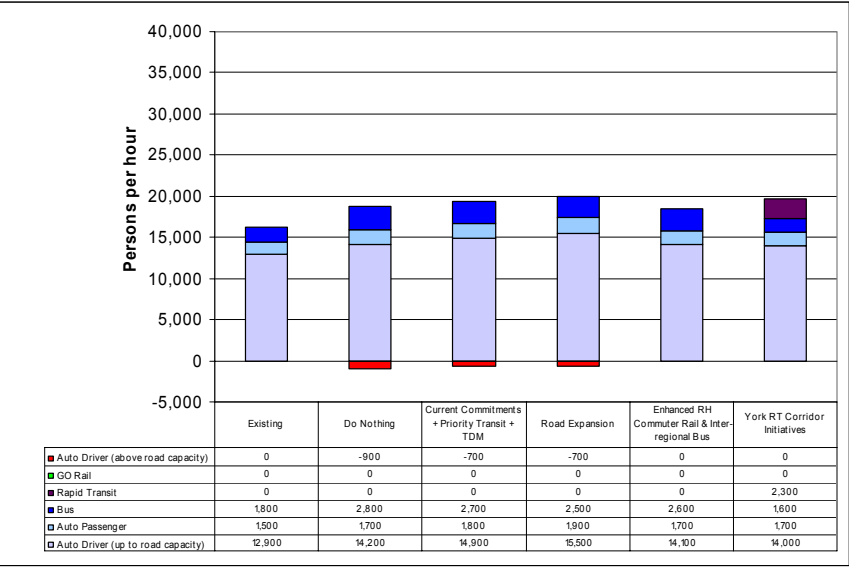


Figure 3.2-8 Westbound across Screenline at West of Highway 404 - 2021

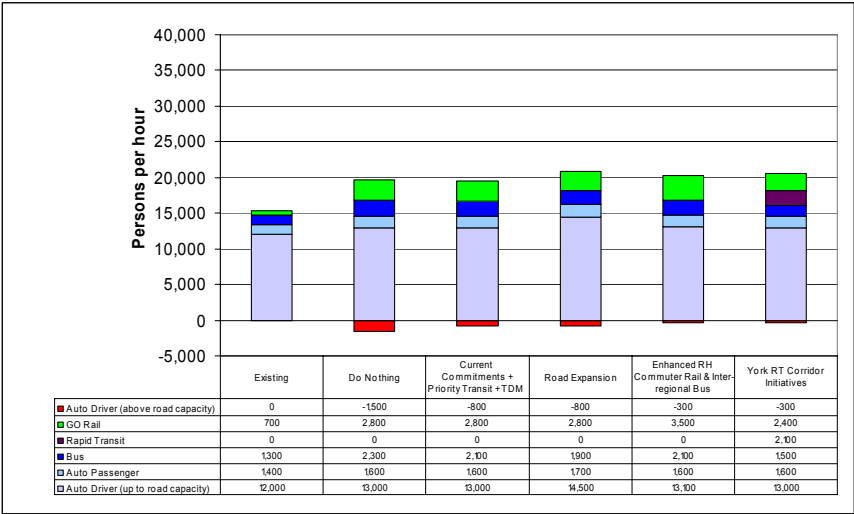


Figure 3.2-10 Westbound across Screenline at West of McCowan Road - 2021

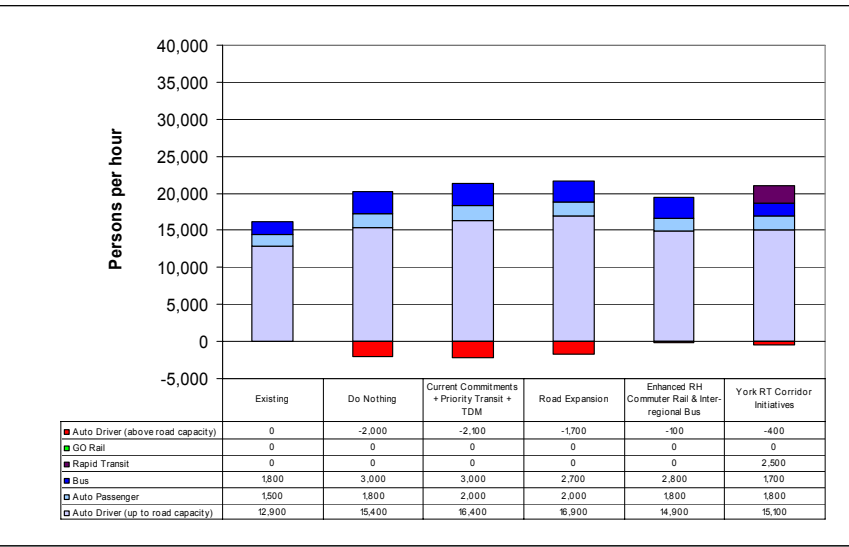


Figure 3.2-9 Westbound across Screenline at West of Highway 404 - 2031

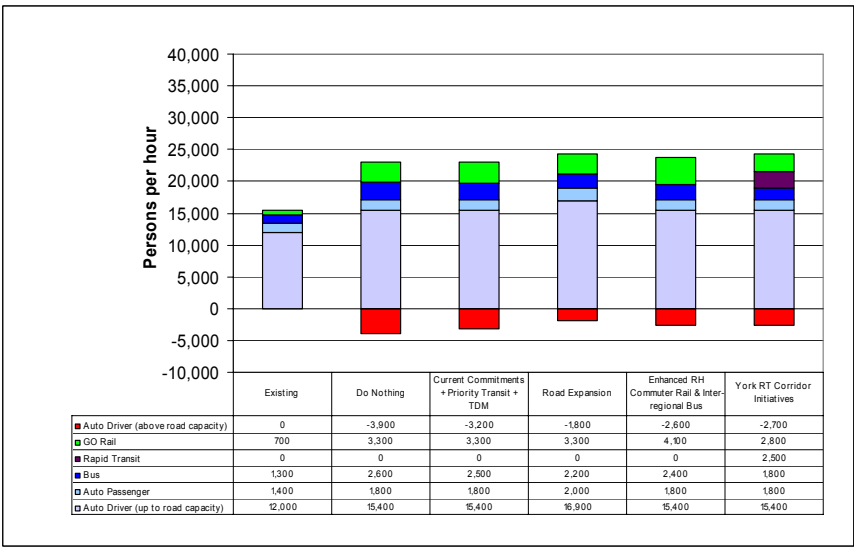


Figure 3.2-11 Westbound across Screenline at West of McCowan Road - 2031

Direct costs in the form of public sector capital funding needed and the travel time delay costs are also addressed in this category.

#### 3.2.4.4 Effectiveness of the Transportation Strategy in Meeting Travel Demand

The purpose of this category is to compare the effectiveness of the alternatives in terms of their capacity to contribute to the forecast travel demand at the 2031 horizon year. A qualitative assessment of the long-term growth capacity is also considered in this category.

#### 3.2.5 Evaluation of Alternative Transportation Strategies

The selection of the preferred transportation strategy stems from the multi-criteria comparative evaluation presented in tabular form in **Table 3.2-1**. Each transportation alternative was assessed in terms of the criteria described previously and its ability to meet the overall planning objective for each category.

A “quality of response” rating for each criterion was assigned to each alternative to provide a graphical indication of their relative merits on the basis of this qualitative and quantitative evaluation. The findings lead to the following conclusions:

- a) Clearly, “Doing Nothing” cannot be considered a valid alternative because although it would be the least capital cost alternative it is not responsive to any of the key objectives in addressing the transportation problem.
- b) Although the “Current Commitments” strategy includes several road improvements in various parts of the Region, it is unable to reduce the capacity shortfall across the entire Highway 7 Corridor. Without corresponding improvement in public transit, continued operation of existing conventional transit service will not provide an effective alternative to the severe traffic congestion predicted for the arterial roads and their intersections in the corridor.
- c) A strategy focussed on “Road Expansion” until the shortfall is eliminated is not practical in that one to three extra traffic lanes in each direction over and above the *Transportation Master Plan* commitments still leaves a shortfall in capacity of three lanes at the Highway 404 screenline. Clearly, widening of arterial roads to this extent will result in major social impacts in the form of property acquisition, a decrease in air quality, a higher accident potential and community barrier effects. In addition to the lane increases above, this strategy also requires the conventional bus service to carry over 2,700 passengers/hour/direction across the screenline. This capacity translates into a service

comprising standard buses at six-minute headways on all arterial roads in the corridor.

- d) “Enhancing Richmond Hill Commuter Rail and Inter-regional Bus Services” in the corridor will not reduce the road capacity shortfall significantly because more frequent rail service attracts primarily downtown-Toronto destined trips and inter-regional bus service on Highway 407, while passing close to some core development nodes along the corridor, functions primarily as a longer distance commuter service. In addition, the location of the inter-regional transit routes does not support the urban form envisioned in the *Region’s Official Plan* and thus will not encourage transit-oriented development within the Region.
- e) As noted previously, the “**York Region Rapid Transit Corridor Initiatives**” strategy is the only alternative that reduces shortfall in road capacity across most screenlines in the corridor. By providing an effective alternative to auto use, this strategy supports both York Region and local municipal Official Plan objectives. At the same time, the improvements can incorporate significant flexibility to expand the system capacity over time for the long-term travel needs in the Region.

As well as responding best to the transportation demands, this alternative can be implemented with minimal adverse effects on the natural environment and will make a positive contribution to the reduction of harmful vehicle emissions. In addition, adverse effects on the social environment can be mitigated and the strategy offers the opportunity to support the desired urban form, enhance streetscapes and encourage development of more liveable communities.

As a result, the “**York Region Rapid Transit Corridor Initiatives**” Strategy was selected as the preferred transportation strategy for the undertaking.

##### 3.2.5.1 Effect of Alternative Strategies on Transit Mode Share

Improving public transit is fundamental to the York Region Growth Strategy from a social, environmental and economic perspective. In order to evaluate the ability of each alternative to improve the attractiveness and use of public transit in York Region, this section presents a summary and discussion of the impacts of each alternative on transit mode shares.

As shown in **Table 3.2-2**, transit mode shares are expected to remain relatively constant under the “Do Nothing” and “Current Commitments” alternatives. The exception is in corridors where severe congestion contributes to significant shifts from auto to transit (a result that is mostly related to the underlying model assignment procedures that do not reflect capacity constraints on the transit system).

An alternative involving enhanced Richmond Hill Commuter Rail and Inter-regional Bus Services will have some impacts on east-west transit mode shares, but not as great as the Rapid Transit Corridor Initiatives alternative.

Not surprisingly, the only option that could contribute to significant improvements in transit mode shares is an option involving public transit improvements, and in particular rapid transit. With the combination of transit improvements considered, mode shares could be expected to more than double across several of the screenlines.

Table 3.2-1 Evaluation of Alternatives to the Undertaking

Evaluation Categories and criteria	ALTERNATIVE TRANSPORTATION STRATEGIES				
	Do Nothing	Current Commitments Including Priority Transit and Transportation Demand Management	Road Expansion	Enhanced Richmond Hill Commuter Rail and Inter-regional Bus Service	York Region Rapid Transit Corridor Initiatives
<b>Effects on Social Environment</b> <ul style="list-style-type: none"> <li>acquisition of residential or commercial property for new or widened road rights-of-way;</li> <li>the level of traffic congestion;</li> <li>the potential for traffic infiltration through neighbourhoods;</li> <li>the effect of increased noise and vibration; and</li> <li>effects on archaeological resources and heritage or cultural features.</li> </ul>	Congestion due to a significant road capacity shortfall in corridor will cause: <ul style="list-style-type: none"> <li>neighbourhood traffic infiltration,</li> <li>a loss of community mobility,</li> <li>an increased accident potential</li> <li>degraded transit service making it less attractive as a travel option.</li> </ul>	Residual road capacity shortfall in corridor will, to a lesser degree, still cause: <ul style="list-style-type: none"> <li>neighbourhood traffic infiltration,</li> <li>some loss of community mobility and pressure on existing road rights-of-way,</li> <li>an increased traffic accident potential</li> <li>the present low transit mode split to continue in the absence of an enhanced transit service.</li> </ul>	Road widening beyond current commitments minimizes capacity shortfall but will: <ul style="list-style-type: none"> <li>require commercial/ residential property to achieve wider rights-of-way on major arterials,</li> <li>initially reduce neighbourhood traffic infiltration but create more of a barrier between communities,</li> <li>perpetuate reliance on auto use in an already congested corridor,</li> <li>not reduce traffic accident potential.</li> </ul>	Residual road capacity shortfall in corridor will, to a lesser degree, still cause: <ul style="list-style-type: none"> <li>neighbourhood traffic infiltration,</li> <li>some loss of community mobility and pressure on existing road rights-of-way,</li> <li>an increased traffic accident potential,</li> <li>Higher service frequency on rail rights-of-way increases noise intrusion potential,</li> <li>Little opportunity for streetscape enhancement. A focus on inter-regional transit enhancement will not improve mode split for internal travel.</li> </ul>	Replacing most of road capacity shortfall by greater transit use will: <ul style="list-style-type: none"> <li>reduce neighbourhood traffic infiltration,</li> <li>reduce traffic accident potential,</li> <li>offer improved access to community amenities by providing a convenient alternative to auto use,</li> </ul> Insertion of new transit infrastructure can act as a catalyst for streetscape improvement and urban renewal. However dedicated surface transitways in existing road rights-of-way often require modified access patterns to adjacent properties. Underground rapid transit technology does not have this requirement.
	○	◐	◑	◒	◓
<b>Effects on Natural Environment</b> The potential effect on: <ul style="list-style-type: none"> <li>fisheries</li> <li>aquatic habitat</li> <li>wildlife habitat</li> <li>natural vegetation and wetlands</li> <li>ground and surface water resources</li> <li>regional and local air quality ecosystems</li> </ul>	Continued reliance on auto use for growing travel demand will increase overall vehicle trips and congestion resulting in increased vehicle emission and energy consumption.	Continued reliance on auto use for growing travel demand will increase overall vehicle trips and congestion resulting in increased vehicle emission and energy consumption.	Continued reliance on auto use for growing travel demand will increase overall vehicle trips and congestion resulting in increased vehicle emission and energy consumption. Marginally better than "Do Nothing" since added road capacity will reduce overall traffic congestion. Road widening will require more new or widened bridges at creeks and rivers.	<ul style="list-style-type: none"> <li>A higher mode split for inter-regional travel will reduce vehicle total number of vehicle trips thereby reducing emissions and GHG effects.</li> <li>Expansion of transit infrastructure in existing rail and freeway rights-of-way minimizes adverse effects on natural features.</li> </ul>	<ul style="list-style-type: none"> <li>A higher transit mode split for all travel destinations will contribute to the greatest reduction in vehicle trips and have the greatest overall benefit to reducing emission and GHG effect as compared to the other alternatives.</li> <li>Expansion of transit infrastructure in existing road or rail rights-of-way minimizes adverse effects on natural features. Road widening for transit facilities will require some new or widened bridges at creeks and rivers.</li> </ul>
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<b>Effects on Economic Environment and Smart Growth</b> <ul style="list-style-type: none"> <li>opportunities to promote existing and increased economic activity;</li> <li>potential adverse effects on current business activity in the corridor;</li> <li>support for the Region's vision and approved urban structure</li> <li>access to community centres, increased pedestrian activity around facilities;</li> <li>the quality of commuting options and the effect on congestion levels</li> <li>access to and displacement of, businesses and convenience of goods movement.</li> <li>Direct costs</li> <li>Travel time delay costs</li> </ul>	Resulting significant loss of mobility will: <ul style="list-style-type: none"> <li>discourage business investment,</li> <li>prevent achievement of O.P. land use and development objectives,</li> <li>degrade employees' work commute in and to, the Region,</li> <li>significantly increase time-related cost of travel in the Regional economy.</li> </ul> Doing nothing minimizes public sector capital costs and business displacement but will increase indirect business costs due to inefficiency of goods and people movement. Indirect cost due to urban sprawl requiring additional facilities	Continuing corridor congestion without an effective non-auto alternative will: <ul style="list-style-type: none"> <li>slow business investment,</li> <li>not promote regional/municipal O.P. urban form and development objectives,</li> <li>degrade employees' work commute in and to, the Region,</li> <li>gradually increase time-related cost of travel and goods movement in the Region off-setting lower public sector capital spending</li> </ul> Region's TMP current commitments will require fairly significant on-going public sector capital spending. Worsening congestion over time will gradually increase time-related cost of travel and goods movement in the Region,	A focus on meeting travel demand by increasing road capacity alone: <ul style="list-style-type: none"> <li>does not promote regional/municipal O.P. urban form objectives and constrains development levels,</li> <li>downgrades viability of the transit option forcing people and goods to share the enhanced road system,</li> <li>requires significant investment in capital works and high property acquisition costs due to lack of road right-of-way for extensive widening.</li> <li>implies a higher unit travel cost by general public who will have no alternative to auto use on the enhanced road system.</li> </ul> Increase in time-related costs is considered less significant assuming road capacity increases can be achieved.	<ul style="list-style-type: none"> <li>Use of existing rail or provincial highway rights-of-way offers limited opportunities to support regional/municipal O.P. urban form and development pattern objectives.</li> <li>Improves goods movement by providing some reduction in auto volumes on arterial roads.</li> <li>Requires significant government investment in capital works and inter-regional transit operations and maintenance.</li> <li>Longer term congestion related costs for goods and people movement will still increase for intra-regional travel</li> </ul>	<ul style="list-style-type: none"> <li>Improvement such as a rapid transit network supports Region's O.P. centres and corridors urban form and municipal development objectives.</li> <li>Improves goods movement by providing some reduction in auto volumes on arterial roads.</li> <li>Requires substantial and likely the highest, government investment in capital works and regional transit operations and maintenance.</li> <li>Reduces land acquisition costs for transportation facilities by promoting greater use of high capacity vehicles.</li> <li>Offers a lower unit travel cost option to the general public.</li> </ul>
	○	◐	◑	◒	◓
<b>Effectiveness of Transportation Solution in meeting travel demand</b> <ul style="list-style-type: none"> <li>their capacity to contribute to the forecast travel demand at the 2031 horizon year; and</li> <li>the long-term growth capacity is also considered in this category.</li> </ul>	Forecast major shortfall in corridor road capacity (2 - 7 traffic lanes each direction depending on screenlines) indicates that <ul style="list-style-type: none"> <li>relying on existing systems is not an effective solution to future intra- and inter-regional travel needs,</li> <li>system operational performance will be severely degraded.</li> </ul>	Forecast continuing shortfall in corridor road capacity (2 - 7 traffic lanes each direction depending on screenlines) indicates that: <ul style="list-style-type: none"> <li>focus on auto-based system without TMP rapid transit initiative is not an effective solution to future intra- and inter-regional travel needs,</li> <li>local transit system operational performance will be severely degraded.</li> <li>Reduction in transit person trips is between 100 and 200.</li> </ul>	<ul style="list-style-type: none"> <li>Requires 1 – 8 arterial lanes (depending on screenlines) in addition to current commitments to provide 2031 capacity.</li> <li>Reduces road capacity shortfall and provides limited reserve capacity for long-term growth.</li> <li>Relies primarily on auto use for connectivity to inter-regional transit services.</li> <li>Solution discourages the use of committed transit services.</li> </ul>	<ul style="list-style-type: none"> <li>Forecast continuing shortfall in corridor road capacity (1 - 7 traffic lanes each direction depending on screenlines) indicates this solution cannot increase transit mode split for shorter intra-regional trips.</li> <li>Requires enhanced local transit service and large park-and-ride lots to attract ridership and reach employment centres.</li> <li>Enhanced bi-directional inter-regional rail and 400 series service offers long-term reserve capacity for some origin-destination pairs.</li> <li>Solution increases transit person trips between 200 and 800 (depending on screenlines).</li> <li>Auto use reduces between 100 and 3,500 (depending on screenlines).</li> </ul>	<ul style="list-style-type: none"> <li>Rapid transit in dedicated lanes reduces road capacity shortfall and provides reserve transit capacity for long-term growth, particularly in the case of subway system extensions.</li> <li>Provides improved access and connectivity to inter-regional services operating in Region.</li> <li>Offers long-term growth capacity for several origin-destination pairs.</li> <li>Solution increases transit trips between 100 and 2,800 (depending on screenlines).</li> <li>Auto use reduces between 200 and 3,000 (depending on screenlines).</li> </ul>
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**LEGEND:** Least Responsive ○ ◐ ◑ ◒ ◓ Most Responsive

Table 3.2-2  
Effect of Alternative Strategies on Transit Mode Share

Corridor	Screenline	Direction	Transit Modal Shares Including GO Rail						
			Existing	Do Nothing	Current Commitments + Priority Transit + TDM (Base Case)	Road Expansion	Enhanced RH Commuter Rail & Inter-regional Bus Service	York Region Rapid Transit Corridor Initiatives	York Region Rapid Transit Corridor Initiatives vs. Base Case (% change)
<b>Yonge Street*</b>	N of Steeles	NB	11%	10%	9%	9%	9%	13%	43%
	N of Steeles	SB	24%	40%	39%	39%	40%	50%	27%
	S of Rutherford	NB	7%	5%	5%	5%	5%	6%	32%
	S of Rutherford	SB	17%	32%	33%	33%	33%	41%	23%
	S of Stouffville	NB	5%	4%	4%	4%	4%	5%	24%
	S of Stouffville	SB	14%	33%	34%	34%	35%	40%	15%
<b>Highway 7</b>	E of Highway 50	EB	1%	1%	1%	1%	2%	3%	86%
	E of Highway 50	WB	0%	1%	1%	1%	1%	2%	179%
	E of Highway 400	EB	4%	4%	4%	4%	4%	14%	256%
	E of Highway 400	WB	4%	4%	4%	4%	4%	12%	191%
	W of Yonge	EB	12%	13%	13%	13%	14%	20%	55%
	W of Yonge	WB	7%	9%	9%	9%	13%	18%	114%
	E of Yonge	EB	9%	10%	9%	9%	10%	16%	84%
	E of Yonge	WB	15%	20%	23%	23%	24%	28%	22%
	W of Highway 404	EB	6%	6%	6%	6%	6%	11%	95%
	W of Highway 404	WB	11%	14%	14%	14%	14%	20%	47%
	W of McCowan	EB	6%	5%	5%	5%	6%	12%	167%
	W of McCowan	WB	13%	23%	22%	22%	25%	27%	19%
<b>Vaughan Link</b>	S. of Highway 7	NB	20%	13%	13%	13%	15%	30%	138%
	S. of Highway 7	SB	9%	10%	9%	9%	8%	40%	369%
<b>Markham Link</b>	S of Finch	NB	16%	15%	13%	13%	14%	18%	38%
	S of Finch	SB	20%	26%	24%	24%	26%	27%	11%
	N of Steeles	NB	7%	7%	6%	6%	7%	12%	85%
	N of Steeles	SB	10%	19%	16%	16%	20%	23%	39%
	S of 14th Avenue	NB	6%	6%	5%	5%	6%	10%	88%
	S of 14th Avenue	SB	8%	17%	15%	15%	18%	21%	40%
	S of Highway 7	NB	5%	5%	5%	5%	7%	11%	105%
	S of Highway 7	SB	10%	19%	16%	16%	19%	19%	20%

Note: \* Yonge Street Screenlines include ridership from both the Richmond Hill and Bradford GO Lines.