

Regional Municipality of York

Appendix 3F

Comparative Evaluation of the Short-Listed Alternatives To the Undertaking

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60114489

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Comparative Evaluation of the Short-Listed Alternatives To the Undertaking

Factors & Criteria	Indicators	Measures	Net Effects		
			Alternative #6 – Other Additional Area Road Improvements	Alternative #8 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements	Alternative #9 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements, Other Additional Area Road Improvements
1. Transportation					
1.1. Potential effects on road transportation capacity within the study area in 2031	1.1.1. Peak hour volume-to-capacity performance on arterial roads within the study area in 2031	➤ Percentage of arterial roads within each congested corridor operating at AM peak hours volume-to-capacity (V/C) ratio of 0.9 or less in 2031	For the AM peak hours in 2031: ➤ 83% of arterial roads operating at peak hour V/C ratio of 0.9 or less within <u>Corridor 1</u> ¹ ➤ 58% of arterial roads operating at V/C ratio of 0.9 or less within <u>Corridor 2</u> ² ➤ 75% of arterial roads operating at V/C ratio of 0.9 or less within <u>Corridor 3</u> ³ ➤ 50% of arterial roads operating at V/C ratio of 0.9 or less within <u>Corridor 4a</u> ⁴ ➤ 38% of arterial roads operating at V/C ratio of 0.9 or less within <u>Corridor 4b</u> ⁵	For the AM peak hours in 2031: ➤ 83% of arterial roads operating at peak hour V/C ratio of 0.9 or less within <u>Corridor 1</u> ➤ 58% of arterial roads operating at V/C ratio of 0.9 or less within <u>Corridor 2</u> ➤ 75% of arterial roads operating at V/C ratio of 0.9 or less within <u>Corridor 3</u> ➤ 50% of arterial roads operating at V/C ratio of 0.9 or less within <u>Corridor 4a</u> ➤ 50% of arterial roads operating at V/C ratio of 0.9 or less within <u>Corridor 4b</u>	For the AM peak hours in 2031: ➤ 100% of arterial roads operating at peak hour V/C ratio of 0.9 or less within <u>Corridor 1</u> ➤ 58% of arterial roads operating at V/C ratio of 0.9 or less within <u>Corridor 2</u> ➤ 75% of arterial roads operating at V/C ratio of 0.9 or less within <u>Corridor 3</u> ➤ 75% of arterial roads operating at V/C ratio of 0.9 or less within <u>Corridor 4a</u> ➤ 50% of arterial roads operating at V/C ratio of 0.9 or less within <u>Corridor 4b</u>
RANKING OF CRITERION 1.1			LEAST PREFERRED ➤ Least benefit to road transportation capacity as it results in more congestion along arterial roads within Corridors 1 and 4a compared to Alternative #9 and within Corridor 4b compared to Alternatives #8 and #9	MODERATELY PREFERRED ➤ Moderate benefit to road transportation capacity as it results in more congestion along arterial roads within Corridors 1 and 4a compared to Alternative #9 but less congestion along arterial roads within Corridor 4b compared to Alternative #6	MOST PREFERRED ➤ Greatest benefit to road transportation capacity as it results in less congestion along arterial roads within Corridors 1 and 4a compared to Alternative #6 and #8 and within Corridor 4b compared to Alternative #6
1.2. Potential effects on transportation system efficiency within the study area in 2031	1.2.1. Travel time within the study area for the peak hours in 2031	➤ Average travel time for auto trips originating in and/or destined for the study area for the AM peak hours in 2031	For the AM peak hours in 2031: ➤ Average travel time of 15 minutes for auto trips <u>originating</u> in the study area ➤ Average travel time of 18 minutes for auto trips <u>destined</u> for the study area	For the AM peak hours in 2031: ➤ Average travel time of 16 minutes for auto trips <u>originating</u> in the study area ➤ Average travel time of 18 minutes for auto trips <u>destined</u> for the study area	For the AM peak hours in 2031: ➤ Average travel time of 15 minutes for auto trips <u>originating</u> in the study area ➤ Average travel time of 18 minutes for auto trips <u>destined</u> for the study area
	1.2.2. Trip length within the study area for the peak hours in 2031	➤ Average trip length (in km) for auto trips originating in and/or destined for the study area for the AM peak hours in 2031	For the AM peak hours in 2031: ➤ Average trip length of 15 km for auto trips <u>originating</u> in the study area ➤ Average trip length of 19 km for auto trips <u>destined</u> for the study area	For the AM peak hours in 2031: ➤ Average trip length of 15 km for auto trips <u>originating</u> in the study area ➤ Average trip length of 19 km for auto trips <u>destined</u> for the study area	For the AM peak hours in 2031: ➤ Average trip length of 15 km for auto trips <u>originating</u> in the study area ➤ Average trip length of 19 km for auto trips <u>destined</u> for the study area
RANKING OF CRITERION 1.2			MOST PREFERRED ➤ More efficient transportation system in 2031 compared to Alternative #8 due to slightly shorter travel time for auto trips originating in the study area	MODERATELY PREFERRED ➤ Less efficient transportation system in 2031 compared to Alternatives #6 and #9 due to slightly longer travel time for auto trips originating in the study area	MOST PREFERRED ➤ More efficient transportation system in 2031 compared to Alternative #8 due to slightly shorter travel time for auto trips originating in the study area

1. Highway 50/Highway 27 Corridor from Highway 407 northerly to Teston Road.
 2. Weston Road/Highway 400 Corridor – from Highway 7 northerly to Teston Road
 3. Teston Road/Major Mackenzie Drive/Rutherford Road Corridor – from Highway 50 easterly to Highway 400
 4. Highway 7 / Langstaff Road – from Highway 50 easterly to Highway 427 and its planned extension
 5. Highway 7 / Highway 407 – from Kipling Avenue easterly to east of Pine Valley Drive

Comparative Evaluation of the Short-Listed Alternatives To the Undertaking

Factors & Criteria	Indicators	Measures	Net Effects		
			Alternative #6 – Other Additional Area Road Improvements	Alternative #8 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements	Alternative #9 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements, Other Additional Area Road Improvements
1.3. Potential effects on public transit, cycling and pedestrians	1.3.1. Public transit usage for originating and destined travel in 2031	➤ Transit's market share (modal split) for originating and destined travel in 2031	In 2031: ➤ 12.0% transit market share for travel <u>originating</u> in the study area ➤ 7.6% transit market share for travel <u>destined</u> for the study area LEAST PREFERRED ➤ Lowest percentage of transit market share for originating and destined travel compared to other alternatives, although the difference is modest.	In 2031: ➤ 12.4% transit market share for travel <u>originating</u> in the study area ➤ 8.1% transit market share for travel <u>destined</u> for the study area MOST PREFERRED ➤ Highest percentage of transit market share for originating and destined travel compared to the other alternatives, although the difference is modest.	In 2031: ➤ 12.2% transit market share for travel <u>originating</u> in the study area ➤ 7.9% transit market share for travel <u>destined</u> for the study area MODERATELY PREFERRED ➤ Slightly higher percentage of transit market share for originating and destined travel compared to Alternative #6 but slightly lower percentage compared to Alternative #8
	1.3.2. Consistency with the public transit related objectives of the Regional Transportation Master Plan and with the Vaughan Pedestrian and Cycling Master Plan	➤ Relative consistency with the public transit related objectives of the Regional Transportation Master Plan and with the Vaughan Pedestrian and Cycling Master Plan based on improvements to public transit, and walking and cycling infrastructure	➤ Consistent with public transit related objectives of the <u>Regional Transportation Master Plan</u> policies through its provision of additional transit service; however, it does not accommodate an extended transit priority network ➤ Consistent with the <u>Vaughan Pedestrian and Cycling Master Plan</u> policies in terms of accommodating improvements in the approved cycling network and proposed pedestrian system; however, it is not consistent with the City's objectives for developing urban areas that are more pedestrian/bicycle-oriented LEAST PREFERRED ➤ Less consistent with the <u>Regional Transportation Master Plan</u> and the <u>Vaughan Pedestrian and Cycling Master Plan</u> than Alternatives #8 and #9 as it does not accommodate a transit priority network and urban areas that are more pedestrian/bicycle-oriented, respectively	➤ Consistent with public transit related objectives of the <u>Regional Transportation Master Plan</u> policies through its provision of additional transit service and accommodation of an extended transit priority network ➤ Consistent with the <u>Vaughan Pedestrian and Cycling Master Plan</u> policies in terms of accommodating improvements in the approved cycling network and proposed pedestrian system and in developing urban areas that are more pedestrian/bicycle-oriented MOST PREFERRED ➤ Consistent with the <u>Regional Transportation Master Plan</u> and the <u>Vaughan Pedestrian and Cycling Master Plan</u> as it accommodates a transit priority network and urban areas that are more pedestrian/bicycle-oriented, respectively	➤ Consistent with public transit related objectives of the <u>Regional Transportation Master Plan</u> policies through its provision of additional transit service and accommodation of an extended transit priority network ➤ Consistent with the <u>Vaughan Pedestrian and Cycling Master Plan</u> policies in terms of accommodating improvements in the approved cycling network and proposed pedestrian system and in developing urban areas that are more pedestrian/bicycle-oriented MOST PREFERRED ➤ Consistent with the <u>Regional Transportation Master Plan</u> and the <u>Vaughan Pedestrian and Cycling Master Plan</u> as it accommodates a transit priority network and urban areas that are more pedestrian/bicycle-oriented, respectively
RANKING OF CRITERION 1.3			LEAST PREFERRED ➤ Least benefit to transit, cycling and pedestrians as Alternative #6 results in the smallest percentage of transit market share for originating and destined travel and is less consistent with the <u>Regional Transportation Master Plan</u> and the <u>Vaughan Pedestrian and Cycling Master Plan</u> compared to Alternatives #8 and #9	MOST PREFERRED ➤ Highest benefit to transit, cycling and pedestrians as Alternative #8 results in the greatest percentage of transit market share for originating and destined travel compared to Alternatives #6 and #9 and is consistent with the <u>Regional Transportation Master Plan</u> and the <u>Vaughan Pedestrian and Cycling Master Plan</u>	MODERATELY PREFERRED ➤ High benefit to transit, cycling and pedestrians as Alternative #9 results in a larger percentage of transit market share for originating and destined travel compared to Alternative #6 and it is consistent with the <u>Regional Transportation Master Plan</u> and the <u>Vaughan Pedestrian and Cycling Master Plan</u>
1.4. Potential effects on public safety	1.4.1. Number of collisions within the study area in 2031	➤ Total daily travel within the study area (in-vehicle km) in 2031, as a proxy for the number of collisions	➤ Total daily travel of approximately 276,000 km within the study area in 2031 (as a proxy for the number of collisions) LEAST PREFERRED ➤ Greatest potential for collisions compared to Alternative #8 and #9 based on additional 21,000 km and 5,000 km of total daily travel in the study area, respectively	➤ Total daily travel of approximately 255,000 km within the study area in 2031 (as a proxy for the number of collisions) MOST PREFERRED ➤ Least potential for collisions compared to Alternatives #6 and #9 based on total daily travel in the study area	➤ Total daily travel of approximately 271,000 km within the study area in 2031 (as a proxy for the number of collisions) MODERATELY PREFERRED ➤ Greater potential for collisions compared to Alternative #8 based on additional 16,000 km of total daily travel in the study area

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	1.4.2. Change in emergency services response times within the study area by 2031	➤ Relative change in emergency services response times (from 2006 to 2031)	➤ Increase in emergency services response times by 2031 due to 8% increase in arterial roads within study area with V/C ratio greater than 0.9 compared to 2006 MODERATELY PREFERRED ➤ Greater increase in emergency response times from 2006 to 2031 based on increase in congestion compared to Alternative #9	➤ Increase in emergency services response times by 2031 due to 17% increase in arterial roads within study area with V/C ratio greater than 0.9 compared to 2006 LEAST PREFERRED ➤ Greatest increase in emergency response times from 2006 to 2031 based on increase in congestion compared to Alternatives #6 and #9	➤ Increase in emergency services response times by 2031 due to 2% increase in arterial roads within study area with V/C ratio greater than 0.9 compared to 2006 MOST PREFERRED ➤ Smallest increase in emergency response times from 2006 to 2031 based on increase in congestion compared to Alternatives #6 and #8
RANKING OF CRITERION 1.4			MODERATELY PREFERRED ➤ Moderate negative effect on public safety due to a greater increase in emergency response times compared to Alternative #9, and the greatest potential for collisions; however, the difference in potential collisions is relatively small between Alternatives #6 and #9	MODERATELY PREFERRED ➤ Moderate negative effect on public safety as the greatest increase in emergency response times is offset by the least potential for collisions compared to Alternatives #6 and #9	MOST PREFERRED ➤ Smallest negative effect on public safety due to smallest increase in emergency response times compared to Alternatives #6 and #8 and less potential for collisions than Alternative #6; however, the difference in potential collisions is relatively small between Alternatives #6 and #9
1.5. Potential approval requirements	1.5.1. Local/regional approval and permit requirements	➤ Type of local/regional approvals / permits anticipated	➤ Four local / regional approvals / permits are anticipated for: <ul style="list-style-type: none"> • Development / interference with wetlands (TRCA) • Alterations to shorelines and watercourses (TRCA) • Effects on local roads (City of Vaughan) • Regional Official Plan amendments (York Region) 	➤ Four local / regional approvals / permits are anticipated for: <ul style="list-style-type: none"> • Development / interference with wetlands (TRCA) • Alterations to shorelines and watercourses (TRCA) • Effects on local roads (City of Vaughan) • Regional Official Plan amendments (York Region) 	➤ Four local / regional approvals / permits are anticipated for: <ul style="list-style-type: none"> • Development / interference with wetlands (TRCA) • Alterations to shorelines and watercourses (TRCA) • Effects on local roads (City of Vaughan) • Regional Official Plan amendments (York Region)
			NO PREFERENCE ➤ Required approvals and permits are the same for all alternatives	NO PREFERENCE ➤ Required approvals and permits are the same for all alternatives	NO PREFERENCE ➤ Required approvals and permits are the same for all alternatives
	1.5.2. Provincial approval and permit requirements	➤ Type of provincial approvals / permits anticipated	➤ Two provincial approvals / permits are anticipated for: <ul style="list-style-type: none"> • Disturbance or displacement of designated heritage features (Ministry of Culture) • Disturbance or displacement of archaeological features (Ministry of Culture) 	➤ Two provincial approvals / permits are anticipated for: <ul style="list-style-type: none"> • Disturbance or displacement of designated heritage features (Ministry of Culture) • Disturbance or displacement of archaeological features (Ministry of Culture) 	➤ Two provincial approvals / permits are anticipated for: <ul style="list-style-type: none"> • Disturbance or displacement of designated heritage features (Ministry of Culture) • Disturbance or displacement of archaeological features (Ministry of Culture)
			NO PREFERENCE ➤ Required approvals and permits are the same for all alternatives	NO PREFERENCE ➤ Required approvals and permits are the same for all alternatives	NO PREFERENCE ➤ Required approvals and permits are the same for all alternatives
	1.5.3. Federal approval and permit requirements	➤ Type of federal approvals / permits anticipated	➤ Four federal approvals / permits are anticipated for: <ul style="list-style-type: none"> • Railroad crossings (Transport Canada) • Navigable water crossings (Transport Canada) • Harmful alteration, disruption, or destruction of fish habitat (DFO) • Federal Environmental Assessment (to be determined based on potential triggers) 	➤ Four federal approvals / permits are anticipated for: <ul style="list-style-type: none"> • Railroad crossings (Transport Canada) • Navigable water crossings (Transport Canada) • Harmful alteration, disruption, or destruction of fish habitat (DFO) • Federal Environmental Assessment (to be determined based on potential triggers) 	➤ Four federal approvals / permits are anticipated for: <ul style="list-style-type: none"> • Railroad crossings (Transport Canada) • Navigable water crossings (Transport Canada) • Harmful alteration, disruption, or destruction of fish habitat (DFO) • Federal Environmental Assessment (to be determined based on potential triggers)
			NO PREFERENCE ➤ Required approvals and permits are the same for all alternatives	NO PREFERENCE ➤ Required approvals and permits are the same for all alternatives	NO PREFERENCE ➤ Required approvals and permits are the same for all alternatives
RANKING OF CRITERION 1.5			NO PREFERENCE ➤ Required approvals and permits are the same for all alternatives	NO PREFERENCE ➤ Required approvals and permits are the same for all alternatives	NO PREFERENCE ➤ Required approvals and permits are the same for all alternatives

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			Alternative #6 – Other Additional Area Road Improvements	Alternative #8 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements	Alternative #9 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements, Other Additional Area Road Improvements
RANKING OF TRANSPORTATION FACTOR			LEAST PREFERRED ➤ Alternative #6 is least preferred in terms of the Transportation Factor as it results in the most congestion, the least benefit for transit, pedestrians, and cyclists, and has a moderate negative effect on public safety. Although Alternative #6 results in a more efficient transportation system than Alternative #8, the difference is relatively small.	MODERATELY PREFERRED ➤ Alternative #8 is moderately preferred in terms of the Transportation Factor as it results in less congestion and a smaller negative effect on public safety compared to Alternative #6, and the greatest benefit for transit, pedestrians, and cyclists. However, the latter is offset by a less efficient transportation system than Alternatives #6 and #9, although the difference is relatively small.	MOST PREFERRED ➤ Alternative #9 is most preferred in terms of the Transportation Factor as it results in the least congestion, has the smallest negative effect on public safety, and results in a greater benefit for transit, pedestrians, and cyclists than Alternative #6. It also results in a more efficient transportation system than Alternative #8, the difference is relatively small.
2. Natural Environment					
2.1. Potential effects on the Aquatic Environment	2.1.1. Effects on aquatic habitats and functions	➤ Number and length of potential stream crossings by thermal assessment (i.e., warmwater, coolwater, coldwater and unknown)	➤ The loss of and/or disturbance to aquatic habitats and functions associated with 62 stream crossings along Highway 27, Major Mackenzie Drive, Highway 50, Rutherford Road, Weston Road, Teston Road, and Pine Valley Drive would be avoided by constructing full span bridges, minimized through the use of open bottom culverts and implementation of standard erosion and sedimentation control measures during construction, compensated for where required, and enhanced where possible, thus resulting in no net loss of aquatic habitat	➤ The loss of and/or disturbance to aquatic habitats and functions associated with 50 stream crossings along Highway 27, Major Mackenzie Drive, Highway 50, Rutherford Road, Weston Road and Pine Valley Drive would be avoided by constructing full span bridges, minimized through the use of open bottom culverts and implementation of standard erosion and sedimentation control measures during construction, compensated for where required, and enhanced where possible, thus resulting in no net loss of aquatic habitat	➤ The loss of and/or disturbance to aquatic habitats and functions associated with 62 stream crossings along Highway 27, Major Mackenzie Drive, Highway 50, Rutherford Road, Weston Road, Teston Road, and Pine Valley Drive would be avoided by constructing full span bridges, minimized through the use of open bottom culverts and implementation of standard erosion and sedimentation control measures during construction, compensated for where required, and enhanced where possible, thus resulting in no net loss of aquatic habitat
			MODERATELY PREFERRED ➤ Highest number of stream crossings compared to Alternative #8, but no net loss of aquatic habitat anticipated based on proposed avoidance / mitigation / compensation measures	MOST PREFERRED ➤ Fewest number of stream crossings compared to Alternatives #6 and 9, but no net loss of aquatic habitat anticipated based on proposed avoidance / mitigation / compensation measures	MODERATELY PREFERRED ➤ Highest number of stream crossings compared to Alternative #8, but no net loss of aquatic habitat anticipated based on proposed avoidance / mitigation / compensation measures
			LEAST PREFERRED ➤ Requires the removal of wetland habitat and results in more wetland habitat being disturbed than Alternative #8	MOST PREFERRED ➤ Requires the removal of wetland habitat, although it results in less wetland habitat being disturbed than Alternatives #6 and #9	LEAST PREFERRED ➤ Requires the removal of wetland habitat and results in more wetland habitat being disturbed than Alternative #8
	2.1.2. Effects on wetland habitats and functions	➤ Total length of physical improvements adjacent to or crossing through wetland habitat (in km) ➤ Total area of wetland removed (in ha)	➤ Disturbance to wetland habitat associated with 3 km of physical improvements and removal of 1 ha of wetland north of Langstaff Road would be avoided where possible, minimized through standard erosion and sedimentation control measures during construction and operation through edge management, compensated for where required, and enhanced where possible	➤ Disturbance to wetland habitat associated with 2 km of physical improvements and removal of 1 ha of wetland north of Langstaff Road would be avoided where possible, minimized through standard erosion and sedimentation control measures during construction and operation through edge management, compensated for where required, and enhanced where possible	➤ Disturbance to wetland habitat associated with 3 km of physical improvements and removal of 1 ha of wetland north of Langstaff Road would be avoided where possible, minimized through standard erosion and sedimentation control measures during construction and operation through edge management, compensated for where required, and enhanced where possible
			LEAST PREFERRED ➤ Requires the removal of wetland habitat and results in more wetland habitat being disturbed than Alternative #8	MOST PREFERRED ➤ Requires the removal of wetland habitat, although it results in less wetland habitat being disturbed than Alternatives #6 and #9	LEAST PREFERRED ➤ Requires the removal of wetland habitat and results in more wetland habitat being disturbed than Alternative #8
			LEAST PREFERRED ➤ Requires the removal of wetland habitat and results in more wetland habitat being disturbed than Alternative #8	MOST PREFERRED ➤ Requires the removal of wetland habitat, although it results in less wetland habitat being disturbed than Alternatives #6 and #9	LEAST PREFERRED ➤ Requires the removal of wetland habitat and results in more wetland habitat being disturbed than Alternative #8

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	2.1.3. Effects on fish species at risk (according to COSSARO and COSEWIC), including endangered, concern/rare species and provincially rare species (S1-S3 NHIC)	➤ High likelihood of occurrence (fish species located upstream and downstream of crossing) and low likelihood of occurrence (fish species located either upstream or downstream of similar thermal regime) of fish species at risk, including endangered, threatened and special concern/rare species, and provincially rare species (S1-S3 NHIC).	➤ The highly likely loss of and/or disturbance to fish species at risk associated with 32 stream crossings along Major Mackenzie Drive, Rutherford Road, Teston Road, and Pine Valley Drive and the low likelihood of loss of and/or disturbance to fish species at risk associated with 8 stream crossings along Rutherford Road, Pine Valley Drive and Highway 7 would be avoided where possible by using full span bridges, mitigated through the use of open bottom culverts, construction out of fish spawning or migration periods and implementation of standard erosion and sedimentation control measures, compensated for where required, and enhanced where possible, thus resulting in no net effects on fish species at risk	➤ The highly likely loss of and/or disturbance to fish species at risk associated with 32 stream crossings along Major Mackenzie Drive, Rutherford Road, Teston Road, and Pine Valley Drive and the low likelihood of loss of and/or disturbance to fish species at risk associated with 8 stream crossings along Rutherford Road, Pine Valley Drive and Highway 7 would be avoided where possible by using full span bridges, mitigated through the use of open bottom culverts, construction out of fish spawning or migration periods and implementation of standard erosion and sedimentation control measures, compensated for where required, and enhanced where possible, thus resulting in no net effects on fish species at risk	➤ The highly likely loss of and/or disturbance to fish species at risk associated with 32 stream crossings along Major Mackenzie Drive, Rutherford Road, Teston Road, and Pine Valley Drive and the low likelihood of loss of and/or disturbance to fish species at risk associated with 8 stream crossings along Rutherford Road, Pine Valley Drive and Highway 7 would be avoided where possible by using full span bridges, mitigated through the use of open bottom culverts, construction out of fish spawning or migration periods, and implementation of standard erosion and sedimentation control measures, compensated for where required, and enhanced where possible, thus resulting in no net effects on fish species at risk
			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
	2.1.4. Changes to surface water quality (increased pollutants) and quantity (flood levels and erosion)	➤ Relative changes to surface water quality (increased pollutants) and quantity (flood levels and erosion)	➤ Short and long-term changes to water quality and quantity downstream of road crossings would be minimized by applying mitigation measures during construction and operation, including minimizing temporary removal of vegetation, implementing standard erosion and sedimentation control measures, and implementing a salt management plan	➤ Short and long-term changes to water quality and quantity downstream of road crossings would be minimized by applying mitigation measures during construction and operation, including minimizing temporary removal of vegetation, implementing standard erosion and sedimentation control measures, and implementing a salt management plan	➤ Short and long-term changes to water quality and quantity downstream of road crossings would be minimized by applying mitigation measures during construction and operation, including minimizing temporary removal of vegetation, implementing standard erosion and sedimentation control measures, and implementing a salt management plan
			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
RANKING OF CRITERION 2.1			LEAST PREFERRED	MOST PREFERRED	LEAST PREFERRED
2.2. Potential effects on the Terrestrial Environment	2.2.1. Effects on wildlife habitats / forest cover	➤ Total length of physical improvements adjacent to or crossing through wildlife habitat / forest cover (in km) ➤ Total area of natural cover removed (in ha)	➤ The increased barrier to wildlife movement and increase in wildlife mortality associated with the operation of 26 km of physical improvements crossing through/adjacent to wildlife habitat/forest cover would be minimized through the application of edge management plans with the potential to enhance existing culvert crossings ➤ The removal of 6 ha of natural cover would be compensated for through the restoration of equivalent habitat area	➤ The increased barrier to wildlife movement and increase in wildlife mortality associated with 21 km of physical improvements crossing through/adjacent to wildlife habitat/forest cover would be minimized through the application of edge management plans with the potential to enhance existing culvert crossings ➤ The removal of 6 ha of natural cover would be compensated for through the restoration of equivalent habitat area	➤ The increased barrier to wildlife movement and increase in wildlife mortality associated with 26 km of physical improvements crossing through/adjacent to wildlife habitat/forest cover would be minimized through the application of edge management plans with the potential to enhance existing culvert crossings ➤ The removal of 6 ha of natural cover would be compensated for through the restoration of equivalent habitat area
			MODERATELY PREFERRED	MOST PREFERRED	MODERATELY PREFERRED
			➤ Greater length of disturbed wildlife habitat/ forest cover resulting in a barrier to wildlife movements when compared to Alternative #8	➤ Lesser length of disturbed wildlife habitat/ forest cover resulting in a barrier to wildlife movements when compared to Alternatives #6 and 9	➤ Greater length of disturbed wildlife habitat/ forest cover resulting in a barrier to wildlife movements when compared to Alternative #8

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	2.2.2. Effects on terrestrial species at risk (according to COSSARO and COSEWIC), including endangered, threatened and special concern/rare species, provincially rare (S1-S3 NHIC) and locally significant sensitive species (according to MNRs Significant Wildlife Habitat Manual)	<ul style="list-style-type: none"> ➤ Occurrence of terrestrial species at risk, including endangered, threatened and special concern/rare species, provincially rare (S1-S3 NHIC) and locally significant sensitive species (according to MNRs Significant Wildlife Habitat Manual) in the vicinity of physical improvements 	<ul style="list-style-type: none"> ➤ The disturbance to locally significant sensitive bird species inhabiting habitats within 30 m of physical improvements would be minimized by applying edge management plans, and would be compensated for through the restoration of equivalent habitat area 	<ul style="list-style-type: none"> ➤ The disturbance to locally significant sensitive bird species inhabiting habitats within 30 m of physical improvements would be minimized by applying edge management plans, and would be compensated for through the restoration of equivalent habitat area 	<ul style="list-style-type: none"> ➤ The disturbance to locally significant sensitive bird species inhabiting habitats within 30 m of physical improvements would be minimized by applying edge management plans, and would be compensated for through the restoration of equivalent habitat area
			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
	2.2.3. Effects on ANSIs, ESAs, or PSWs	<ul style="list-style-type: none"> ➤ Total length of physical improvements adjacent to or crossing through ANSIs, ESAs, or PSWs (in km) ➤ Total area of natural cover removed from ANSIs, ESAs and PSWs (in ha) 	<ul style="list-style-type: none"> ➤ Disturbance to 3 ANSIs due to 2 km of physical improvements crossing through them and 6 km of physical improvements within 30 m of them would be minimized by applying edge management plans ➤ The removal of 1 ha of natural cover associated with 3 ANSIs (Boyd Conservation Area and Adjacent Lands, Kleinberg Woodlots, Humber River Valley-Kleinberg) and 5 ESAs (Elder Mill's Forest, McLean's Forest, Boyd Forest, Graham's Forest Complex, Pine Valley Forest) would be avoided by realigning Major Mackenzie Drive, Rutherford Road and Pine Valley Drive and otherwise compensated for 	<ul style="list-style-type: none"> ➤ Disturbance to 3 ANSIs due to 2 km of physical improvements crossing through them and 6 km of physical improvements within 30 m of them would be minimized by applying edge management plans ➤ The removal of 1 ha of natural cover associated with 3 ANSIs (Boyd Conservation Area and Adjacent Lands, Kleinberg Woodlots, Humber River Valley-Kleinberg) and 5 ESAs (Elder Mill's Forest, McLean's Forest, Boyd Forest, Graham's Forest Complex, Pine Valley Forest) would be avoided by realigning Major Mackenzie Drive, Rutherford Road and Pine Valley Drive and otherwise compensated for 	<ul style="list-style-type: none"> ➤ Disturbance to 3 ANSIs due to 2 km of physical improvements crossing through them and 6 km of physical improvements within 30 m of them would be minimized by applying edge management plans ➤ The removal of 1 ha of natural cover associated with 3 ANSIs (Boyd Conservation Area and Adjacent Lands, Kleinberg Woodlots, Humber River Valley-Kleinberg) and 5 ESAs (Elder Mill's Forest, McLean's Forest, Boyd Forest, Graham's Forest Complex, Pine Valley Forest) would be avoided by realigning Major Mackenzie Drive, Rutherford Road and Pine Valley Drive and otherwise compensated for
			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
RANKING OF CRITERION 2.2			MODERATELY PREFERRED	MOST PREFERRED	MODERATELY PREFERRED
2.3. Potential Effects on Groundwater	2.3.1. Effects on groundwater recharge areas.	<ul style="list-style-type: none"> ➤ Total area (ha) of low and high permeability soils covered by physical improvements 	<ul style="list-style-type: none"> ➤ Moderate effect on the terrestrial environment due to a longer length of disturbed wildlife habitat/ forest cover when compared to Alternative #8 	<ul style="list-style-type: none"> ➤ Least effect on the terrestrial environment due to a shorter length of disturbed wildlife habitat/ forest cover when compared to Alternatives #6 and #9 	<ul style="list-style-type: none"> ➤ Moderate effect on the terrestrial environment due to a longer length of disturbed wildlife habitat/ forest cover when compared to Alternative #8
			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
			<ul style="list-style-type: none"> ➤ 42 ha of low permeability clayey silt till and 85 ha of high permeability alluvial or glaciolacustrine sediments (dominantly fine to coarse sand) covered by physical improvements, resulting in a marginal loss of groundwater recharge areas (due to the relatively small surface area affected compared to its surroundings) 	<ul style="list-style-type: none"> ➤ 34 ha of low permeability clayey silt till and 77 ha of high permeability alluvial or glaciolacustrine sediments (dominantly fine to coarse sand) covered by physical improvements, resulting in marginal loss of groundwater recharge areas. (due to the relatively small surface area affected compared to its surroundings) 	<ul style="list-style-type: none"> ➤ 42 ha of low permeability clayey silt till and 85 ha of high permeability alluvial or glaciolacustrine sediments (dominantly fine to coarse sand) covered by physical improvements, resulting in a marginal loss of groundwater recharge areas (due to the relatively small surface area affected compared to its surroundings)
			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
			<ul style="list-style-type: none"> ➤ Effects on groundwater recharge areas are the same for all alternatives, as differences in the area covered by physical improvements are minor 	<ul style="list-style-type: none"> ➤ Effects on groundwater recharge areas are the same for all alternatives, as differences in the area covered by physical improvements are minor 	<ul style="list-style-type: none"> ➤ Effects on groundwater recharge areas are the same for all alternatives, as differences in the area covered by physical improvements are minor

Comparative Evaluation of the Short-Listed Alternatives To the Undertaking

Factors & Criteria	Indicators	Measures	Net Effects		
			Alternative #6 – Other Additional Area Road Improvements	Alternative #8 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements	Alternative #9 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements, Other Additional Area Road Improvements
	2.3.2. Effects on groundwater discharge areas.	➤ Relative effect on groundwater discharge areas	➤ Negligible effect on groundwater discharge areas within the 42 ha of till soils covered by physical improvements because the clay silt till soils inhibit groundwater flow and marginal effect on groundwater discharge areas within the 85 ha of sandy soils covered by physical improvements due to the relatively small surface area affected compared to its surroundings	➤ Negligible effect on groundwater discharge areas within the 34 ha of till soils covered by physical improvements because the clay silt till soils inhibit groundwater flow and marginal effect on groundwater discharge areas within the 77 ha of sandy soils covered by physical improvements due to the relatively small surface area affected compared to its surroundings	➤ Negligible effect on groundwater discharge areas within the 42 ha of till soils covered by physical improvements because the clay silt till soils inhibit groundwater flow and marginal effect on groundwater discharge areas within the 85 ha of sandy soils covered by physical improvements due to the relatively small surface area affected compared to its surroundings
			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
	2.3.3. Effects on water supply and groundwater quantity in shallow wells	➤ Number of shallow wells (<15 m deep) within 500 m of physical improvements and relative changes to groundwater quantity (e.g. groundwater flow direction)	➤ Loss of an estimated 33 wells ⁶ within the footprint of physical improvements would be compensated for and short-term construction-related effects (i.e., dewatering) and longer term effects (i.e., loss of groundwater yield) on an additional 60 wells would be mitigated or compensated for	➤ Loss of an estimated 32 wells within the footprint of physical improvements would be compensated for and short-term construction-related effects (i.e., dewatering) and longer term effects (i.e., loss of groundwater yield) on an additional 57 wells would be mitigated or compensated for	➤ Loss of an estimated 33 wells within the footprint of physical improvements would be compensated for and short-term construction-related effects (i.e., dewatering) and longer term effects (i.e., loss of groundwater yield) on an additional 60 wells would be mitigated or compensated for
			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
	2.3.4. Changes to groundwater quality.	➤ Relative changes to groundwater quality.	➤ The negligible reduction in groundwater quality from the 42 ha footprint that covers low permeability material and the marginal reduction in groundwater quality from the 85 ha footprint that covers the high permeability material would be minimized through the implementation of environmental management measures and a salt management plan	➤ The negligible reduction in groundwater quality from the 42 ha footprint that covers low permeability material and the marginal reduction in groundwater quality from the 85 ha footprint that covers the high permeability material would be minimized through the implementation of environmental management measures and a salt management plan	➤ The negligible reduction in groundwater quality from the 42 ha footprint that covers low permeability material and the marginal reduction in groundwater quality from the 85 ha footprint that covers the high permeability material would be minimized through the implementation of environmental management measures and a salt management plan
			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
RANKING OF CRITERION 2.3			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
			➤ Effects on groundwater are the same for all alternatives	➤ Effects on groundwater are the same for all alternatives	➤ Effects on groundwater are the same for all alternatives

6. Estimates of the number of wells are approximate only, as the accuracy of the MOE water well database is very poor. In addition there may be up to 30% more wells because of unrecorded or unreported wells.

Comparative Evaluation of the Short-Listed Alternatives To the Undertaking

Factors & Criteria	Indicators	Measures	Net Effects		
			Alternative #6 – Other Additional Area Road Improvements	Alternative #8 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements	Alternative #9 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements, Other Additional Area Road Improvements
2.4. Potential effects on the broader regional Natural Heritage System	2.4.1. Effects on ecological connectivity, within and outside of the study area	➤ Relative loss of the broader regional natural cover and connectivity	➤ Loss of connectivity with broader regional natural heritage system due to further fragmentation and severance of 2 main linkages within the study area and to reductions in natural cover would be minimized through enhancing existing culvert crossings and compensated for through the restoration of equivalent habitat area	➤ Loss of connectivity with broader regional natural heritage system due to further fragmentation and severance of 2 main linkages within the study area and to reductions in natural cover would be minimized through enhancing existing culvert crossings and compensated for through the restoration of equivalent habitat area	➤ Loss of connectivity with broader regional natural heritage system due to further fragmentation and severance of 2 main linkages within the study area and to reductions in natural cover would be minimized by enhancing existing culvert crossings and compensated for through the restoration of equivalent habitat area
			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
	2.4.2. Effects on Natural Heritage System or open space	➤ Total length of physical improvements crossing through or adjacent to potential natural cover (defined as Potential Cover in TRCAs Natural Heritage System mapping) (in km) ➤ Total area of potential natural cover removed (in ha)	➤ Effects on Natural Heritage System or open space as a result of 2 km of physical improvements crossing through and 2 km of physical improvements adjacent to potential natural cover, and removal of less than 1 ha of potential natural cover would be compensated for by restoring equivalent habitat area elsewhere	➤ Effects on Natural Heritage System or open space as a result of 2 km of physical improvements crossing through and 2 km of physical improvements adjacent to potential natural cover, and removal of less than 1 ha of potential natural cover would be compensated for by restoring equivalent habitat area elsewhere	➤ Effects on Natural Heritage System or open space as a result of 2 km of physical improvements crossing through and 2 km of physical improvements adjacent to potential natural cover, and removal of less than 1 ha of potential natural cover would be compensated for by restoring equivalent habitat area elsewhere
			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
RANKING OF CRITERION 2.4			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
			➤ Effects on the broader regional natural heritage system are the same for all alternatives.	➤ Effects on the broader regional natural heritage system are the same for all alternatives.	➤ Effects on the broader regional natural heritage system are the same for all alternatives.
RANKING OF NATURAL ENVIRONMENT FACTOR			MODERATELY PREFERRED	MOST PREFERRED	MODERATELY PREFERRED
			➤ Alternative #6 is moderately preferred in terms of the Natural Environment factor as it results in greater adverse net effects on aquatic and terrestrial features and functions compared to Alternative #8	➤ Alternative #8 is most preferred in terms of the Natural Environment factor as it results in the fewest adverse net effects on aquatic and terrestrial features and functions	➤ Alternative #9 is moderately preferred in terms of the Natural Environment factor as it results in greater adverse net effects on aquatic and terrestrial features and functions compared to Alternative #8
3. Socio-Economic Environment					
3.1. Potential effects on existing land uses/resources	3.1.1. Disturbance to residential communities, businesses, institutions, and/or recreational/community facilities.	➤ Total length of physical improvements adjacent to or crossing through developed areas ⁷ (in km)	➤ Short-term construction-related nuisance effects on residential areas, users of parks/sports fields, and schools, and reduced access to businesses and schools along ROW associated with 27 km of physical improvements would be minimized or eliminated through standard construction mitigation measures	➤ Short-term construction-related nuisance effects on residential areas, users of parks/sports fields, and schools, and reduced access to businesses and schools along ROW associated with 27 km of physical improvements would be minimized or eliminated through standard construction mitigation measures	➤ Short-term construction-related nuisance effects on residential areas, users of parks/sports fields, and schools, and reduced access to businesses and schools along ROW associated with 27 km of physical improvements would be minimized or eliminated through standard construction mitigation measures
			➤ Effects on student and pedestrian safety would be minimized by providing crossing guards and crosswalks for schools on Weston Road and by changing traffic signal timing to benefit pedestrians	➤ Effects on student and pedestrian safety would be minimized by providing crossing guards and crosswalks for schools on Weston Road and by changing traffic signal timing to benefit pedestrians	➤ Effects on student and pedestrian safety would be minimized by providing crossing guards and crosswalks for schools on Weston Road and by changing traffic signal timing to benefit pedestrians
			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
			➤ Disturbance to residential communities, businesses, institutions, and/or recreational/community facilities is the same for all alternatives.	➤ Disturbance to residential communities, businesses, institutions, and/or recreational/community facilities is the same for all alternatives.	➤ Disturbance to residential communities, businesses, institutions, and/or recreational/community facilities is the same for all alternatives.

7. Developed areas are defined as identifiable subdivisions or clusters of homes, businesses or community features.

Comparative Evaluation of the Short-Listed Alternatives To the Undertaking

Factors & Criteria	Indicators	Measures	Net Effects		
			Alternative #6 – Other Additional Area Road Improvements	Alternative #8 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements	Alternative #9 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements, Other Additional Area Road Improvements
	3.1.2. Disturbance to individual residences outside of residential communities	➤ Total length of physical improvements adjacent to homes in undeveloped areas ⁸ (in km)	➤ Short-term construction-related nuisance effects (e.g., noise dust, and vibration) and reduced access for residents in undeveloped areas associated with 25 km of physical improvements would be minimized or eliminated through standard construction mitigation measures	➤ Short-term construction-related nuisance effects (e.g., noise dust, and vibration) and reduced access for residents in undeveloped areas associated with 24 km of physical improvements would be minimized or eliminated through standard construction mitigation measures	➤ Short-term construction-related nuisance effects (e.g., noise dust, and vibration) and reduced access for residents in undeveloped areas associated with 25 km of physical improvements would be minimized or eliminated through standard construction mitigation measures
			MODERATELY PREFERRED	MOST PREFERRED	MODERATELY PREFERRED
	3.1.3. Loss of / disturbance to open space land uses	➤ Total length of physical improvements adjacent to or crossing through open space land uses (in km)	➤ Disturbance to more individual residences during construction compared to Alternative #8	➤ Disturbance to fewer individual residences during construction compared to Alternatives #6 and #9	➤ Disturbance to more individual residences during construction compared to Alternative #8
			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
	3.1.4. Loss of Class 1, 2, and 3 agricultural soils	➤ Total length of physical improvements adjacent to or crossing through Class 1, 2, or 3 agricultural soils (in km)	➤ Short-term construction-related nuisance effects (e.g., noise dust, and vibration) on users of open space land uses associated with 8 km of physical improvements would be minimized or eliminated through standard construction mitigation measures	➤ Short-term construction-related nuisance effects (e.g., noise dust, and vibration) on users of open space land uses associated with 8 km of physical improvements would be minimized or eliminated through standard construction mitigation measures	➤ Short-term construction-related nuisance effects (e.g., noise dust, and vibration) on users of open space land uses associated with 8 km of physical improvements would be minimized or eliminated through standard construction mitigation measures
			➤ Increase in distance between sections of Humber Trail on either side of Major Mackenzie Drive would be mitigated through construction of a grade-separated pedestrian crossing	➤ Increase in distance between sections of Humber Trail on either side of Major Mackenzie Drive would be mitigated through construction of a grade-separated pedestrian crossing	➤ Increase in distance between sections of Humber Trail on either side of Major Mackenzie Drive would be mitigated through construction of a grade-separated pedestrian crossing
	3.1.5. Changes to noise levels	➤ Relative change in roadway noise levels	➤ Loss of / disturbance to open space land uses is the same for all alternatives.	➤ Loss of / disturbance to open space land uses is the same for all alternatives.	➤ Loss of / disturbance to open space land uses is the same for all alternatives.
			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
	3.1.4. Loss of Class 1, 2, and 3 agricultural soils	➤ Total length of physical improvements adjacent to or crossing through Class 1, 2, or 3 agricultural soils (in km)	➤ Loss of Class 1 and Class 2 agricultural soils associated with 28 km of physical improvements would be avoided where possible and otherwise compensated for	➤ Loss of Class 1 and Class 2 agricultural soils associated with 27 km of physical improvements would be avoided where possible and otherwise compensated for	➤ Loss of Class 1 and Class 2 agricultural soils associated with 28 km of physical improvements would be avoided where possible and otherwise compensated for
			MODERATELY PREFERRED	MOST PREFERRED	MODERATELY PREFERRED
	3.1.5. Changes to noise levels	➤ Relative change in roadway noise levels	➤ Greater loss of Class 1 and 2 agricultural soils compared to Alternative #8	➤ Least amount of Class 1 and 2 agricultural soils lost compared to Alternatives #6 and #9	➤ Greater loss of Class 1 and 2 agricultural soils compared to Alternative #8
			LEAST PREFERRED	MOST PREFERRED	LEAST PREFERRED
3.1.5. Changes to noise levels	➤ Relative change in roadway noise levels	➤ Insignificant to just noticeable roadway noise levels for most noise sensitive receptors based on likely increase of less than 5 dB	➤ Insignificant to just noticeable increases in roadway noise levels for all noise sensitive receptors based on likely increase of less than 5 dB	➤ Insignificant to just noticeable roadway noise levels for most noise sensitive receptors based on likely increase of less than 5 dB	
		➤ Post mitigation, 90 to 150 receptors may have significant roadway noise level increases of 5 dB or greater		➤ Post mitigation, 90 to 150 receptors may have significant roadway noise level increases of 5 dB or greater	
3.1.5. Changes to noise levels	➤ Relative change in roadway noise levels	➤ Insignificant to just noticeable roadway noise levels for most noise sensitive receptors based on likely increase of less than 5 dB	➤ Insignificant to just noticeable increases in roadway noise levels for all noise sensitive receptors based on likely increase of less than 5 dB	➤ Insignificant to just noticeable roadway noise levels for most noise sensitive receptors based on likely increase of less than 5 dB	
		➤ Post mitigation, 90 to 150 receptors may have significant roadway noise level increases of 5 dB or greater		➤ Post mitigation, 90 to 150 receptors may have significant roadway noise level increases of 5 dB or greater	
3.1.5. Changes to noise levels	➤ Relative change in roadway noise levels	LEAST PREFERRED	MOST PREFERRED	LEAST PREFERRED	
		➤ Greater change in roadway noise levels compared to Alternative #8	➤ Lesser change in roadway noise levels compared to Alternatives #6 and #9	➤ Greater change in roadway noise levels compared to Alternative #8	

8. **Undeveloped areas** are defined as sparse development patterns of residential, businesses or institutional uses.

Comparative Evaluation of the Short-Listed Alternatives To the Undertaking

Factors & Criteria	Indicators	Measures	Net Effects		
			Alternative #6 – Other Additional Area Road Improvements	Alternative #8 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements	Alternative #9 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements, Other Additional Area Road Improvements
	3.1.6. Changes to air quality	<ul style="list-style-type: none"> Estimated criteria and greenhouse gas emissions in 2031 	<ul style="list-style-type: none"> Estimated criteria and greenhouse gas emissions in 2031 of: <ul style="list-style-type: none"> CO₂ total emissions = 223 tonnes N₂O total emissions = 0.027 tonnes CH₄ total emissions = 0.029 tonnes CO total emissions = 3.1 tonnes NO_x total emissions = 0.18 tonnes Total VOCs total emissions = 0.011 tonnes TSP total emissions = 1.4 tonnes PM₁₀ total emissions = 0.20 tonnes PM_{2.5} total emissions = 0.013 tonnes 	<ul style="list-style-type: none"> Estimated criteria and greenhouse gas emissions in 2031 of: <ul style="list-style-type: none"> CO₂ total emissions = 206 tonnes N₂O total emissions = 0.025 tonnes CH₄ total emissions = 0.027 tonnes CO total emissions = 2.8 tonnes NO_x total emissions = 0.17 tonnes Total VOCs total emissions = 0.010 tonnes TSP total emissions = 1.3 tonnes PM₁₀ total emissions = 0.18 tonnes PM_{2.5} total emissions = 0.012 tonnes 	<ul style="list-style-type: none"> Estimated criteria and greenhouse gas emissions in 2031 of: <ul style="list-style-type: none"> CO₂ total emissions = 214 tonnes N₂O total emissions = 0.026 tonnes CH₄ total emissions = 0.028 tonnes CO total emissions = 3.0 tonnes NO_x total emissions = 0.17 tonnes Total VOCs total emissions = 0.011 tonnes TSP total emissions = 1.3 tonnes PM₁₀ total emissions = 0.19 tonnes PM_{2.5} total emissions = 0.013 tonnes
			<p>LEAST PREFERRED</p> <ul style="list-style-type: none"> Results in the largest amount of criteria and greenhouse gas emissions as compared to Alternatives #8 and #9 <ul style="list-style-type: none"> CO₂ = 8% greater than Alt #8 N₂O = 8% greater than Alt #8 CH₄ = 8% greater than Alt #8 CO = 8% greater than Alt #8 NO_x = 10% greater than Alt #8 Total VOCs = 8% greater than Alt #8 TSP = 9% greater than Alt #8 PM₁₀ = 10% greater than Alt #8 PM_{2.5} = 11% greater than Alt #8 	<p>MOST PREFERRED</p> <ul style="list-style-type: none"> Results in the fewest criteria and greenhouse gas emissions as compared to Alternatives #6 and #9 	<p>MODERATELY PREFERRED</p> <ul style="list-style-type: none"> Results in more criteria and greenhouse gas emissions than Alternative #8 but fewer than Alternative #6 <ul style="list-style-type: none"> CO₂ = 4% greater than Alt #8 N₂O = 4% greater than Alt #8 CH₄ = 4% greater than Alt #8 CO = 7% greater than Alt #8 NO_x = 6% greater than Alt #8 Total VOCs = 3% less than Alt #8 TSP = 6% greater than Alt #8 PM₁₀ = 6% greater than Alt #8 PM_{2.5} = 7% greater than Alt #8
RANKING OF CRITERION 3.1			<p>MODERATELY PREFERRED</p> <ul style="list-style-type: none"> Greater effect on land use and resources due to disturbance to more individual residences, greater loss of agricultural soils, greater change in roadway noise levels, and largest amount of criteria and greenhouse gas emissions compared to Alternative #8 	<p>MOST PREFERRED</p> <ul style="list-style-type: none"> Least effect on land use and resources due to disturbance to fewer individual residences, least amount of agricultural soils lost, lesser change in roadway noise levels, and fewest criteria and greenhouse gas emissions compared to Alternatives #6 and #9 	<p>MODERATELY PREFERRED</p> <ul style="list-style-type: none"> Greater effect on land use and resources due to disturbance to more individual residences, greater loss of agricultural soils, greater change in roadway noise levels, and more criteria and greenhouse gas emissions compared to Alternative #8
3.2. Potential effects on approved/proposed land uses	3.2.1. Effects on approved/draft approved development plans	<ul style="list-style-type: none"> Relative effect on approved/draft approved development plans 	<ul style="list-style-type: none"> Land takings from 4 approved and 16 draft approved development applications would be avoided and/or minimized by realigning the physical improvements or compensated for where avoidance / minimization is not possible 	<ul style="list-style-type: none"> Land takings from 4 approved and 15 draft approved development applications would be avoided and/or minimized by realigning the physical improvements or compensated for where avoidance / minimization is not possible 	<ul style="list-style-type: none"> Land takings from 4 approved and 16 draft approved development applications would be avoided and/or minimized by realigning the physical improvements or compensated for where avoidance / minimization is not possible
RANKING OF CRITERION 3.2			<p>LEAST PREFERRED</p> <ul style="list-style-type: none"> Greatest effect on approved / proposed land uses as more development applications may lose land compared to Alternative #8. 	<p>MOST PREFERRED</p> <ul style="list-style-type: none"> Least effect on approved / proposed land uses as fewer development applications may lose land compared to Alternatives #6 and #9. 	<p>LEAST PREFERRED</p> <ul style="list-style-type: none"> Greatest effect on approved / proposed land uses as more development applications may lose land compared to Alternative #8.

Comparative Evaluation of the Short-Listed Alternatives To the Undertaking

Factors & Criteria	Indicators	Measures	Net Effects		
			Alternative #6 – Other Additional Area Road Improvements	Alternative #8 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements	Alternative #9 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements, Other Additional Area Road Improvements
3.3. Potential for conforming with approved local, regional and provincial plans and policies (including City and Regional Official Plans, Provincial Policy Statement, Growth Plan, and Greenbelt Plan)	3.3.1. Conformance with local plans and/or policies	➤ Relative potential to conform with approved local policies	➤ Protection of Environmental Features <ul style="list-style-type: none"> Consistent with OPA 600 if amendments are made to address widening of ROW ➤ Protection of Existing Community Character <ul style="list-style-type: none"> Not consistent with the City's objectives for protecting existing character of rural areas. ➤ Accommodation of Intensification Initiatives <ul style="list-style-type: none"> Consistent with the objectives in OPA 600 to support intensification and infill projects within the built-up areas of Western Vaughan ➤ Anticipation of Future Growth/ Promotion of Alternative Modes of Transportation <ul style="list-style-type: none"> Supports the City's objective in OPA 600 for enhancing the transportation network efficiency; however, Alternative 6 is not consistent with the City's objectives for developing urban areas that are more transit and pedestrian/bicycle-oriented 	➤ Protection of Environmental Features <ul style="list-style-type: none"> Consistent with OPA 600 and Regional Map 8 if amendments are made to the policy ➤ Protection of Existing Community Character <ul style="list-style-type: none"> Not consistent with the City's objectives for protecting existing character of rural areas. ➤ Accommodation of Intensification Initiatives <ul style="list-style-type: none"> Consistent with the objectives in OPA 600 to support intensification and infill projects within the built-up areas of Western Vaughan ➤ Anticipation of Future Growth/ Promotion of Alternative Modes of Transportation <ul style="list-style-type: none"> Supports the City's objective in OPA 600 for enhancing the transportation network efficiency; Consistent with the City's objectives for developing urban areas that are more transit and pedestrian/bicycle-oriented 	➤ Protection of Environmental Features <ul style="list-style-type: none"> Consistent with OPA 600 and Regional Map 8 if amendments are made to the policy ➤ Protection of Existing Community Character <ul style="list-style-type: none"> Not consistent with the City's objectives for protecting existing character of rural areas ➤ Accommodation of Intensification Initiatives <ul style="list-style-type: none"> Consistent with the objectives in OPA 600 to support intensification and infill projects within the built-up areas of Western Vaughan ➤ Anticipation of Future Growth/ Promotion of Alternative Modes of Transportation <ul style="list-style-type: none"> Supports the City's objective in OPA 600 for enhancing the transportation network efficiency; Consistent with the City's objectives for developing urban areas that are more transit and pedestrian/bicycle-oriented
	LEAST PREFERRED			MOST PREFERRED	MOST PREFERRED
	3.3.2. Conformance with regional plans and/or policies	➤ Relative potential to conform with approved regional policies	➤ Protection of Environmental Features <ul style="list-style-type: none"> Consistent with York Region Official Plan if amendments are made to Regional Map 8 to address widening of ROW. ➤ Accommodation of Intensification Initiatives <ul style="list-style-type: none"> Consistent with the objectives of the York Region Official Plan to support intensification and infill opportunities within the identified Urban Areas, Regional Corridors, and Local Corridors. ➤ Conformity with planned road improvements/ ROW widths <ul style="list-style-type: none"> Not consistent with the York Region Official Plan in considering opportunities to reduce ROWs in order to enhance street character ➤ Promotion of Alternative Modes of Transportation <ul style="list-style-type: none"> Not consistent with the York Region Official Plan to ensure that roads are improved in a manner that is supportive of all modes of transportation 	➤ Protection of Environmental Features <ul style="list-style-type: none"> Consistent with York Region Official Plan if amendments are made to Regional Map 8 to address widening of ROW. ➤ Accommodation of Intensification Initiatives <ul style="list-style-type: none"> Consistent with the objectives of the York Region Official Plan to support intensification and infill opportunities within the identified Urban Areas, Regional Corridors, and Local Corridors. ➤ Conformity with planned road improvements/ ROW widths <ul style="list-style-type: none"> Not consistent with the York Region Official Plan in considering opportunities to reduce ROWs in order to enhance street character ➤ Promotion of Alternative Modes of Transportation <ul style="list-style-type: none"> Consistent with the York Region Official Plan in ensuring that roads are improved in a manner that is supportive of all modes of transportation 	➤ Protection of Environmental Features <ul style="list-style-type: none"> Consistent with York Region Official Plan if amendments are made to Regional Map 8 to address widening of ROW. ➤ Accommodation of Intensification Initiatives <ul style="list-style-type: none"> Consistent with the objectives of the York Region Official Plan to support intensification and infill opportunities within the identified Urban Areas, Regional Corridors, and Local Corridors. ➤ Conformity with planned road improvements/ ROW widths <ul style="list-style-type: none"> Not consistent with the York Region Official Plan in considering opportunities to reduce ROWs in order to enhance street character ➤ Promotion of Alternative Modes of Transportation <ul style="list-style-type: none"> Consistent with the York Region Official Plan in ensuring that roads are improved in a manner that is supportive of all modes of transportation
LEAST PREFERRED			MOST PREFERRED	MOST PREFERRED	
			➤ Does not conform to regional policies regarding promotion of alternative modes of transportation to the same degree as Alternatives #8 and #9.	➤ Conforms to regional policies regarding promotion of alternative modes of transportation to a greater degree than Alternative #6.	➤ Conforms to regional policies regarding promotion of alternative modes of transportation to a greater degree than Alternative #6.

Comparative Evaluation of the Short-Listed Alternatives To the Undertaking

Factors & Criteria	Indicators	Measures	Net Effects		
			Alternative #6 – Other Additional Area Road Improvements	Alternative #8 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements	Alternative #9 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements, Other Additional Area Road Improvements
	3.3.3. Conformance with provincial plans and/or policies	<ul style="list-style-type: none"> ➤ Relative potential to conform with approved provincial policies 	<ul style="list-style-type: none"> ➤ Protection of Environmental Features <ul style="list-style-type: none"> • Consistent with the Greenbelt Plan if the City and Regional Official Plans are amended to include a widening of ROW ➤ Promotion of Alternative Modes of Transportation <ul style="list-style-type: none"> • Consistent with the objectives of the Provincial Policy Statement and Growth Plan to provide additional connectivity among the transportation system; however, the Alternative does not provide new opportunities for multi-modal transportation choices. ➤ Accommodation of Intensification Initiatives <ul style="list-style-type: none"> • Consistent with the objective of the Growth Plan to support intensification and infill projects within the built-up areas of Western Vaughan <p>LEAST PREFERRED</p> <ul style="list-style-type: none"> ➤ Does not conform to provincial policies regarding providing new opportunities for multi-modal transportation choices to the same degree as Alternatives #8 and #9. 	<ul style="list-style-type: none"> ➤ Protection of Environmental Features <ul style="list-style-type: none"> • Consistent with the Greenbelt Plan if the City and Regional Official Plans are amended to include a widening of ROW ➤ Promotion of Alternative Modes of Transportation <ul style="list-style-type: none"> • Consistent with the objectives of the Provincial Policy Statement and Growth Plan to provide additional connectivity among the transportation system and to provide new opportunities for multi-modal transportation choices. ➤ Accommodation of Intensification Initiatives <ul style="list-style-type: none"> • Consistent with the objective of the Growth Plan to support intensification and infill projects within the built-up areas of Western Vaughan <p>MOST PREFERRED</p> <ul style="list-style-type: none"> ➤ Conforms to provincial policies regarding providing new opportunities for multi-modal transportation choices to a greater degree than Alternative #6. 	<ul style="list-style-type: none"> ➤ Protection of Environmental Features <ul style="list-style-type: none"> • Consistent with the Greenbelt Plan if the City and Regional Official Plans are amended to include a widening of ROW ➤ Promotion of Alternative Modes of Transportation <ul style="list-style-type: none"> • Consistent with the objectives of the Provincial Policy Statement and Growth Plan to provide additional connectivity among the transportation system and to provide new opportunities for multi-modal transportation choices. ➤ Accommodation of Intensification Initiatives <ul style="list-style-type: none"> • Consistent with the objective of the Growth Plan to support intensification and infill projects within the built-up areas of Western Vaughan <p>MOST PREFERRED</p> <ul style="list-style-type: none"> ➤ Conforms to provincial policies regarding providing new opportunities for multi-modal transportation choices to a greater degree than Alternative #6.
RANKING OF CRITERION 3.3			<p>LEAST PREFERRED</p> <ul style="list-style-type: none"> ➤ Least degree of conformance with local, regional, and provincial policies compared to Alternatives #8 and 9. 	<p>MOST PREFERRED</p> <ul style="list-style-type: none"> ➤ Greater degree of conformance with local, regional, and provincial policies compared to Alternative #6. 	<p>MOST PREFERRED</p> <ul style="list-style-type: none"> ➤ Greater degree of conformance with local, regional, and provincial policies compared to Alternative #6.
3.4. Potential effects on existing community character and sustainability	3.4.1. Change in the perception of the community as a place to live, work or do business.	<ul style="list-style-type: none"> ➤ Relative potential to change the perception of the community as a place to live, work or do business based on the location/extent of physical improvements, number/type of transportation options available in the study area 	<ul style="list-style-type: none"> ➤ Positive long-term change in perception of the community as a place to live, work or do business due to 60 km of infrastructure improvements and a minor increase in transit service frequency compared to current conditions ➤ Negative short-term change in perception of the community due to nuisance effects would be minimized to the extent possible through standard construction related mitigation measures <p>LEAST PREFERRED</p> <ul style="list-style-type: none"> ➤ Smallest positive effect on existing community character and sustainability as it provides the fewest number of transportation options of the three alternatives and does not reduce congestion to the same extent as Alternative #9 	<ul style="list-style-type: none"> ➤ Positive long-term change in perception of the community as a place to live, work or do business due to 59 km of infrastructure improvements, a tripling in transit service frequency compared to current conditions, and TDM and TSM features ➤ Negative short-term change in perception of the community due to nuisance effects would be minimized to the extent possible through standard construction related mitigation measures <p>MODERATELY PREFERRED</p> <ul style="list-style-type: none"> ➤ Moderate positive effect on existing community character and sustainability as it provides a greater range of transportation options than Alternative #6 but does not reduce congestion to the same extent as Alternative #9. 	<ul style="list-style-type: none"> ➤ Positive long-term change in perception of the community as a place to live, work or do business due to 60 km of infrastructure improvements, a tripling in transit service frequency compared to current conditions, and TDM and TSM features ➤ Negative short-term change in perception of the community due to nuisance effects would be minimized to the extent possible through standard construction related mitigation measures <p>MOST PREFERRED</p> <ul style="list-style-type: none"> ➤ Largest positive effect on existing community character and sustainability as it provides a greater range of transportation options than Alternative #6 and results in the greatest reduction in congestion compared to the other two alternatives.
RANKING OF CRITERION 3.4			<p>LEAST PREFERRED</p> <ul style="list-style-type: none"> ➤ Smallest positive effect on existing community character and sustainability as it provides the fewest number of transportation options of the three alternatives and does not reduce congestion to the same extent as Alternative #9 	<p>MODERATELY PREFERRED</p> <ul style="list-style-type: none"> ➤ Moderate positive effect on existing community character and sustainability as it provides a greater range of transportation options than Alternative #6 but does not reduce congestion to the same extent as Alternative #9. 	<p>MOST PREFERRED</p> <ul style="list-style-type: none"> ➤ Largest positive effect on existing community character and sustainability as it provides a greater range of transportation options than Alternative #6 and results in the greatest reduction in congestion compared to the other two alternatives.
RANKING OF SOCIAL ENVIRONMENT FACTOR			<p>LEAST PREFERRED</p> <ul style="list-style-type: none"> ➤ Alternative #6 is least preferred in terms of the Social Environment factor as it has a greater adverse effect on existing land use and resources and on approved / proposed land uses compared to Alternative #8, has the least degree of conformance with local, regional, and provincial policies compared to Alternatives #8 and 9, and results in the smallest positive effect on existing community character and sustainability compared to Alternative #9. 	<p>MOST PREFERRED</p> <ul style="list-style-type: none"> ➤ Alternative #8 is most preferred in terms of the Social Environment factor as it has the least adverse effect on existing land use and resources and on approved / proposed land uses compared to Alternatives #6 and #9, has a greater degree of conformance with local, regional, and provincial policies and greater positive effect on existing community character and sustainability compared to Alternative #6. 	<p>MODERATELY PREFERRED</p> <ul style="list-style-type: none"> ➤ Alternative #9 is moderately preferred in terms of the Social Environment factor as it has a greater adverse effect on existing land use and resources and on approved / proposed land uses compared to Alternative #8, has a greater degree of conformance with local, regional, and provincial policies compared to Alternative #6, and has the largest positive effect on existing community character and sustainability.

Comparative Evaluation of the Short-Listed Alternatives To the Undertaking

Factors & Criteria	Indicators	Measures	Net Effects		
			Alternative #6 – Other Additional Area Road Improvements	Alternative #8 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements	Alternative #9 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements, Other Additional Area Road Improvements
4. Cultural Environment					
4.1. Potential effects on archaeological resources	4.1.1. Loss or disturbance of known archaeological sites	➤ Number of documented archaeological sites adjacent to physical improvements	➤ No documented sites in the vicinity of the proposed physical improvements would be affected by expansion of existing ROWs. (Note: All known sites in the vicinity have been mitigated and/or destroyed).	➤ No documented sites in the vicinity of the proposed physical improvements would be affected by expansion of existing ROWs. (Note: All known sites in the vicinity have been mitigated and/or destroyed).	➤ No documented sites in the vicinity of the proposed physical improvements would be affected by expansion of existing ROWs. (Note: All known sites in the vicinity have been mitigated and/or destroyed).
			NO PREFERENCE	NO PREFERENCE	NO PREFERENCE
	4.1.2. Loss or disturbance of lands with potential for archaeological sites	➤ Total length of land frontage (in m) with potential for archaeological sites (on one or the other side of the ROW) that would be affected by expansion of the existing ROW (Note: total length of land frontage is twice the length of the ROW.)	➤ Construction-related loss or disturbance of 24,000 m of land frontage with potential for archaeological sites would be avoided or minimized where possible through further archaeological assessments, which would identify actual site locations and cleared lands.	➤ Construction-related loss or disturbance of 19,500 m of land frontage with potential for archaeological sites would be avoided or minimized where possible through further archaeological assessments, which would identify actual site locations and cleared lands.	➤ Construction-related loss or disturbance of 24,000 m of land frontage with potential for archaeological sites would be avoided or minimized where possible through further archaeological assessments, which would identify actual site locations and cleared lands.
			MODERATELY PREFERRED	MOST PREFERRED	MODERATELY PREFERRED
RANKING OF CRITERION 4.1			MODERATELY PREFERRED	MOST PREFERRED	MODERATELY PREFERRED
4.2. Potential effects on cultural/heritage resources	4.2.1. Disturbance or removal of built heritage features	➤ Number of built heritage features that would be disturbed or removed	➤ Removal of 8 built heritage features and construction-related disturbance of an additional 3 features would be avoided by realigning the physical improvements where possible or would otherwise be compensated for	➤ Removal of 7 built heritage features and construction-related disturbance of an additional 8 features would be avoided by realigning the physical improvements where possible or would otherwise be compensated for	➤ Removal of 8 built heritage features and construction-related disturbance of an additional 3 features would be avoided by realigning the physical improvements where possible or would otherwise be compensated for
			LEAST PREFERRED	MOST PREFERRED	LEAST PREFERRED
	4.2.2. Disturbance or removal of cultural landscape units	➤ Number of cultural landscape units that would be disturbed or removed	➤ Construction-related disturbance to 6 cultural landscapes and disturbance to 4 cultural landscapes during operation would be minimized and compensated for if required, with the potential for enhancements	➤ Construction-related disturbance to 5 cultural landscapes and disturbance to 4 cultural landscapes during operation would be minimized and compensated for if required, with the potential for enhancements	➤ Construction-related disturbance to 6 cultural landscapes and disturbance to 4 cultural landscapes during operation would be minimized and compensated for if required, with the potential for enhancements
			LEAST PREFERRED	MOST PREFERRED	LEAST PREFERRED
			➤ Disturbance of most cultural landscapes during construction and operation compared to Alternative #8	➤ Disturbance of fewest cultural landscapes during construction and operation compared to Alternatives #6 and #9	➤ Disturbance of most cultural landscapes during construction and operation compared to Alternative #8

Comparative Evaluation of the Short-Listed Alternatives To the Undertaking

Factors & Criteria	Indicators	Measures	Net Effects		
			Alternative #6 – Other Additional Area Road Improvements	Alternative #8 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements	Alternative #9 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements, Other Additional Area Road Improvements
	4.2.3. Disturbance or removal of cemeteries	➤ Number of cemeteries that would be disturbed or removed	➤ Removal of 4 cemeteries and disturbance to 2 cemeteries would be avoided and/or minimized and compensated for if required, with the potential for enhancements. NO PREFERENCE ➤ Disturbance or removal of cemeteries is the same for all alternatives.	➤ Removal of 4 cemeteries and disturbance to 2 cemeteries would be avoided and/or minimized and compensated for if required, with the potential for enhancements. NO PREFERENCE ➤ Disturbance or removal of cemeteries is the same for all alternatives.	➤ Removal of 4 cemeteries and disturbance to 2 cemeteries would be avoided and/or minimized and compensated for if required, with the potential for enhancements. NO PREFERENCE ➤ Disturbance or removal of cemeteries is the same for all alternatives.
RANKING OF CRITERION 4.2			LEAST PREFERRED ➤ Greatest adverse effect on cultural/heritage resources as a result of removal of most built heritage features and disturbance of most built heritage features and cultural landscapes compared to Alternative #8	MOST PREFERRED ➤ Least adverse effect on cultural/heritage resources as a result of removal of fewer built heritage features and disturbance of fewer built heritage features and cultural landscapes compared to Alternatives #6 and #9	LEAST PREFERRED ➤ Greatest adverse effect on cultural/heritage resources as a result of removal of most built heritage features and disturbance of most built heritage features and cultural landscapes compared to Alternative #8
RANKING OF CULTURAL ENVIRONMENT FACTOR			LEAST PREFERRED ➤ Alternative #6 is least preferred in terms of the Cultural Environment factor as it results in the greatest adverse effect on archaeological / cultural / heritage resources compared to Alternative #8	MOST PREFERRED ➤ Alternative #8 is most preferred in terms of the Cultural Environment factor as it results in least adverse effect on archaeological / cultural / heritage resources compared to Alternatives #6 and #9	LEAST PREFERRED ➤ Alternative #9 is least preferred in terms of the Cultural Environment factor as it results in the greatest adverse effect on archaeological / cultural / heritage resources compared to Alternative #8
5. Financial					
5.1. Potential Implementation Costs	5.1.1. Capital costs	➤ Approximate net present value in current CDN \$ of York Region improvements within the study area	➤ Approximately \$255M in total capital costs (\$75M for road improvements and \$180M for transit improvements) MODERATELY PREFERRED ➤ Highest capital costs compared to Alternative #8, although the difference is modest.	➤ Approximately \$245M in total capital costs (\$65M for road improvements and \$180M for transit improvements) MOST PREFERRED ➤ Lowest capital costs compared to Alternatives #6 and #9, although the difference is modest.	➤ Approximately \$255M in total capital costs (\$75M for road improvements and \$180M for transit improvements) MODERATELY PREFERRED ➤ Highest capital costs compared to Alternative #8, although the difference is modest.
	5.1.2. Land acquisition costs	➤ Estimated area of land to be acquired (as a proxy for cost)	➤ Acquisition of approximately 27 ha of land would be reduced where possible LEAST PREFERRED ➤ Approximately twice as much land to be acquired as Alternative #8	➤ Acquisition of approximately 14 ha of land would be reduced where possible MOST PREFERRED ➤ Approximately half as much land to be acquired as Alternatives #6 and #9	➤ Acquisition of approximately 27 ha of land would be reduced where possible LEAST PREFERRED ➤ Approximately twice as much land to be acquired as Alternative #8
	5.1.3. Annual operating and maintenance costs	➤ Approximate net present value in current CDN \$ of operating and maintenance costs associated with road improvements within the study area ➤ Relative operations and maintenance costs for transit	➤ \$630,000 per year (based on 60 km of road improvements) ➤ Modest relative operations and maintenance costs for transit MODERATELY PREFERRED ➤ Highest operating costs compared to Alternative #8	➤ \$544,000 per year (based on 59 km of road improvements) ➤ High relative operations and maintenance costs for transit MODERATELY PREFERRED ➤ Lowest operating costs compared to Alternatives #6 and #9	➤ \$630,000 per year (based on 60 km of road improvements) ➤ High relative operations and maintenance costs for transit LEAST PREFERRED ➤ Highest operating costs compared to Alternative #8
RANKING OF FINANCIAL FACTOR			MODERATELY PREFERRED ➤ Alternative #6 is moderately preferred in terms of the Financial factor as it results in the highest capital and land acquisition costs compared to Alternative #8; however, operating costs are the lowest of the three alternatives	MOST PREFERRED ➤ Alternative #8 is most preferred in terms of the Financial factor as it results in the lowest capital and land acquisition costs compared to Alternatives #6 and #9	LEAST PREFERRED ➤ Alternative #9 is least preferred in terms of the Financial factor as it results in the highest capital and land acquisition costs compared to Alternative #8, and higher operating costs compared to the other alternatives.

Comparative Evaluation of the Short-Listed Alternatives To the Undertaking

Factors & Criteria	Indicators	Measures	Net Effects		
			Alternative #6 – Other Additional Area Road Improvements	Alternative #8 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements	Alternative #9 – TDM, TSM, Other Public Transit Initiatives, Planned Road and Transit Improvements, Other Additional Area Road Improvements
OVERALL ALTERNATIVE RANKING			<p>LEAST PREFERRED</p> <p>➤ Overall, Alternative #6 is least preferred of the three alternatives because it provides the least Transportation benefits while having similar adverse net effects on the Natural, Social, and Cultural Environments and only moderately lower implementation costs compared to Alternative #9.</p>	<p>MOST PREFERRED</p> <p>➤ Overall, Alternative #8 is most preferred of the three alternatives, as it has the least adverse net effects on the Natural, Social, and Cultural Environments. In comparison to the other alternatives, Alternative # 8 has relatively modest implementation costs, and results in moderate Transportation benefits. .</p>	<p>MODERATELY PREFERRED</p> <p>➤ Overall, Alternative #9 is moderately preferred because it has the greatest benefit from a Transportation perspective, but has greater adverse net effects on the Natural, Social, and Cultural Environment and has higher implementation costs compared to Alternative #8.</p>