

Alternative Design Concepts

The Preferred Solution as determined in Phase 2 of the Clark Boulevard/Eastern Avenue Improvements Class EA Study includes continuous cycling and pedestrian facilities along the study corridor, widening the road from two to four lanes for the existing Eastern Avenue and extension of the Eastern Avenue to Clark Boulevard from Hansen Road to Rutherford Road. The following documents the alternative design concepts developed and assessed to address the Preferred Solution.

Evaluation of Alternative Design Concepts

The evaluation criteria used to assess the alternative designs is listed in **Table 1**.

Table 1 Evaluation Criteria for Alternative Design Concepts

Consideration	Criteria
Technical and Engineering	<ul style="list-style-type: none"> • Accommodate Future Travel Demands • Provide Connectivity and Compatibility with Road Network • Improve Public Transit Service • Create a Pedestrian-Friendly Environment • Create a Cyclist-Friendly Environment • Improve Safety for All Travel Modes • Improve Mode Choice • Accommodate Emergency Services • Potential to Impact Utilities in the Corridor
Planning Objectives	<ul style="list-style-type: none"> • Consistent with Provincial Plans and Policies • Consistent with Regional Plans and Policies • Consistent with Municipal Plans and Policies
Social and Cultural Environment	<ul style="list-style-type: none"> • Minimize Access Impacts • Minimize Traffic Noise • Preserve Archaeological and Cultural Heritage Features • Improve Visual Aesthetics • Improve Community Character and Public Realm • Minimize Disruption due to Construction
Economic Environment	<ul style="list-style-type: none"> • Improve Access to Businesses and Key Employment Areas • Minimize Operating and Maintenance Costs • Minimize Capital and Construction Costs, and Maximize Construction Value • Minimize Property Requirements
Natural Environment	<ul style="list-style-type: none"> • Minimize Impacts to Designated Natural Areas • Minimize Impacts to Vegetation • Minimize Impacts to Wildlife • Minimize Impacts to Aquatic Habitat • Minimize Impacts to Surface Water and Groundwater Management • Minimize Impacts to Potentially Contaminated Lands • Improve Air Quality • Minimize Effects on Climate Change



Typical Cross-Sections

The official plan right of way (ROW) for Eastern Avenue / Clark Boulevard is 26 to 30m and the existing ROW for the corridor is 30m.

Typical cross-sections to accommodate the Preferred Solution for the corridor were developed based on the recommended element widths listed in **Table 2**. These widths were referenced using established guidelines and standards. Where applicable, the design elements were based on design speed of 60km/h with posted speed of 50km/h.

Table 2: Cross-Section Design Parameters

Road Design Parameters	Design Standards	Source
R.O.W. Width	26-30m	City of Brampton Official Plan Schedule B (August 2020)
Lane Widths	3.3m Through Lane 3.5m Curb Lane	City Direction
Active Transportation Facilities	<u>One-Way In-Boulevard Bicycle Facility</u> 1.8m suggested, 2.0m desired with 0.5m minimum Lateral Clearance <u>Multi-use path (MUP)</u> 3.0 m minimum <u>Sidewalk</u> 1.8m	OTM Book 18 (Table 4.7) City of Brampton Standard 203
Curb and Gutter and Splash Pad and Kill Strip	1.25m (combined 0.5m curb and gutter and 0.75m splash pad)	City Direction
Clearzone Requirements	<u>Design ADT</u> > 6,000 <u>6:1 or flatter =</u> 4.5m – 5.0m	TAC 2017 Chapter 7 Page 12, Table 7.3.1
Lateral Clearance (m)	Min. Lateral Clearance = 0.5 m from face-of-curb to face-of-pole	TAC 2017 Chapter 7 Page 76-77, Section 7.7.1 – 7.7.2

Active Transportation Facilities

The following alternative design concepts were developed to address the Preferred Solution to provide continuous and dedicated active transportation (AT) facilities. All alternatives accommodate a 4 lane roadway. The alternative concepts are as listed in **Table 3**.

Table 3 Alternative Design Concepts for Active Transportation Facilities

Alternative	
<p>Alternative 1: Boulevard One-Directional Cycle tracks and sidewalks on both sides</p>	
<p>Alternative 2: Multi-use paths on both sides</p>	
<p>Alternative 3: Sidewalk on south side and multi-use path on north side</p>	
<p>Alternative 4: Sidewalk on south side, and dual boulevard cycle tracks and sidewalk on north side</p>	

Alternative 5: **Sidewalk and boulevard one-directional cycle track on south side, and multi-use path on north side**



Alternative 6: **On-Road Bike Lanes and Sidewalks**



Active Transportation Screening

A high-level screening of Active Transportation alternatives is provided in **Table 4**, and a discussion of the screening is provided in **Table 5**^{Error! Reference source not found.}. The screening provided consideration to the alignment with the City's Active Transportation Master Plan (2019) and future Greenway proposed on the north boulevard which resulted in the elimination of Alternatives 5 and Alternative 6 as documented.



Table 4 High Level Screening of Active Transportation Facilities

Alternative	Physical Separation from vehicles?	Pedestrian Access		Cyclist Access		Separate Pedestrians from Cyclists		Compliant with future Greenway and City's AT TMP?	Recommendation
		North Side?	South Side?	North Side?	South Side?	North Side?	South Side?		
Alternative 1 Boulevard One-Directional Cycle Tracks and Sidewalks, both sides	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Carry Forward
Alternative 2 Multi-use Path (two-way shared facility), both sides	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Carry Forward
Alternative 3 Sidewalk South Side and Multi-use Path North Side	Yes	Yes	Yes	Yes	No	No	N/a	Yes	Carry Forward
Alternative 4 Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side	Yes	Yes	Yes	Yes	No	Yes	N/a	Yes	Carry Forward
Alternative 5 Sidewalk and boulevard one-directional Cycle Track South Side, and Multi-use Path on North Side	Yes	Yes	Yes	Yes	Partial Access	No	Yes	Yes	Screened out – Do not carry forward
Alternative 6 On-road Bike Lanes and Sidewalks	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Screened out – Do not carry forward

Table 5 High Level Discussion for Screening Active Transportation Alternatives

Alternative	Discussion	Recommendation
Alternative 1 Boulevard Cycle Tracks and Sidewalks, both sides	<ul style="list-style-type: none"> • Provides grade separation and horizontal distance from vehicular traffic • Provides separation between cyclists and pedestrians on both sides • Provides pedestrian and cycling access on both sides 	Carry forward
Alternative 2 Multi-use Path (two-way shared facility), both sides	<ul style="list-style-type: none"> • Provides grade separation and horizontal distance from vehicular traffic • Does not provide separation between cyclists and pedestrians • Provides pedestrian and cycling access on both sides 	Carry forward
Alternative 3 Sidewalk South Side and Multi-use Path North Side	<ul style="list-style-type: none"> • Provides grade separation and horizontal distance from vehicular traffic • Does not provide separation between cyclists and pedestrians on north side • Does not provide cycling access on south side of the corridor. Provides pedestrian access on both sides 	Carry forward
Alternative 4 Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side	<ul style="list-style-type: none"> • Provides grade separation and horizontal distance from vehicular traffic • Provides separation between cyclists and pedestrians • Does not provide cycling access on south side of the corridor 	Carry forward
Alternative 5 Sidewalk and boulevard one-directional Cycle Track South Side, and Multi-use Path on North Side	<ul style="list-style-type: none"> • Provides grade separation and horizontal distance from vehicular traffic • Provides separation between cyclists and pedestrians. Provides pedestrian access on both sides • Cycling access on south side is limited to one-direction only 	Screened out – Do not carry forward
Alternative 6 On-road Bike Lane and Sidewalks	<ul style="list-style-type: none"> • Does not provide grade separation from vehicular traffic for cyclists • Provides separation between cyclists and pedestrians • Not supported/ aligned with City of Brampton’s Active Transportation Master Plan (2019) or future Greenway. 	Screened out – Do not carry forward



Active Transportation Evaluation

The detailed evaluation for the Active Transportation Alternatives carried forward from the high level screening are shown in **Table 6**. The evaluation was conducted based on the evaluation criteria identified in **Table 1**. Each category that was evaluated was summarized using the following rankings from Least Preferred to Preferred:

Least Preferred (Does not meet objectives)	Less Preferred (Partially meets objectives)	Preferred (Meets objectives)
--	---	--

Each evaluation criteria were considered, however in several instances no difference amongst the alternatives is indicated. Please refer to the Widening Evaluation table for documentation of impacts of the overall Typical Section including the road widening, active transportation facility and streetscaping opportunities.

Table 6: Active Transportation Alternatives Detailed Evaluation

Evaluation Criteria and Sub-Factors	Alternative 1: Boulevard One-Directional Cycle Tracks and Sidewalks, both sides	Alternative 2: Multi-use Path (two-way shared facility), both sides	Alternative 3 Sidewalk South Side and Multi-use Path North Side	Alternative 4 Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side
Technical and Engineering				
Accommodate Future Travel Demands Provide Connectivity and Compatibility with Road Network Improve Access to Public Transit Service	<ul style="list-style-type: none"> Alternative encourages active modes of transportation which support trips by walking, cycling and transit thus reducing congestion and accommodates emergency services. AT facilities provide access to transit on both boulevards for pedestrians and cyclists. 	<ul style="list-style-type: none"> Same as Alternative 1 	<ul style="list-style-type: none"> Alternative encourages active modes of transportation which support trips by walking, cycling and transit thus reducing congestion and accommodate emergency services. AT facilities provide access to transit on both boulevards for pedestrians, and on north boulevard only for cyclists 	<ul style="list-style-type: none"> Same as Alternative 3
Create a Pedestrian-Friendly Environment Create a Cyclist-Friendly Environment <ul style="list-style-type: none"> <i>Separation for pedestrians from cyclists</i> <i>Compatible with adjacent land uses / destinations and access</i> <i>Direct, Continuous, and Convenient Connections</i> 	<ul style="list-style-type: none"> Cyclists and pedestrians are in separated dedicated space eliminating potential conflicts Cycle tracks and sidewalks provide direct access on both boulevards for pedestrians and cyclists to existing and planned adjacent land uses / destinations Cycle tracks are one-directional resulting in potentially longer cyclist travel distance (depending on origin and destination) due to the inability to travel eastbound in the north boulevard and westbound in the south boulevard Boulevard cycle tracks (1.8m each) and sidewalks (1.8m each) on both sides take up a combined 7.2m of the ROW 	<ul style="list-style-type: none"> Cyclists and pedestrians are in shared space on both sides resulting in potential conflicts MUPs provide direct access on both boulevards for pedestrians and cyclists to existing and planned adjacent land uses / destinations MUPs allow for two-way travel which minimizes cyclist travel distance to destinations on either boulevard MUPs (3.0m each) on both sides take up a combined 6.0m of ROW 	<ul style="list-style-type: none"> Cyclists and pedestrians are in shared space resulting in potential conflicts on north side and pedestrians are in separated space on south side eliminating potential conflicts Sidewalk and MUP provide direct access on both boulevards for pedestrians to existing and planned adjacent land uses / destinations MUP provides direct access on north boulevard only for cyclists to existing and planned adjacent land uses / destinations MUP allows for two-way travel which minimizes cyclist travel distance to destinations on north boulevard Facilities on both sides (1.8m sidewalk south side and 3.0m MUP north side) take up a combined 4.8m of ROW 	<ul style="list-style-type: none"> Cyclists and pedestrians are in separated dedicated space on north side and pedestrians are in separated space on south side eliminating potential conflicts in both boulevards Dual Cycle tracks provide direct access on north boulevard only for cyclists to existing and planned adjacent land uses / destinations Sidewalks provide direct access on both boulevards for pedestrians to existing and planned adjacent land uses / destinations Dual cycle tracks offer a two-directional cycling facility on the north side, resulting in potentially shorter cyclist travel distance Facilities on both sides (1.8m sidewalks on both sides and 3.6m dual cycle track on north side) take up a combined 7.2m of ROW
Improve Safety for All Travel Modes Improve Mode Choice <ul style="list-style-type: none"> <i>Separation/ Protection for pedestrians and cyclists from vehicular lanes</i> <i>Opportunity to provide safe facilities that accommodates different cyclist users and pedestrians</i> 	<ul style="list-style-type: none"> Pedestrians and cyclists will be separated from vehicular lanes. Separated cycle tracks and sidewalks provide dedicated space to eliminate conflicts between pedestrians and cyclists, and between cyclists traveling in opposing directions. One-directional cycling facilities minimize potential conflicts at adjacent driveways and intersections, based on driver expectation of one-way cyclist travel on both boulevards 	<ul style="list-style-type: none"> Pedestrians and cyclists will be separated from vehicular lanes. MUPs have potential conflicts between pedestrians and cyclists due to shared facilities in shared space, and between cyclists traveling in opposing directions, on both sides. Bi-directional facilities for cyclists increase potential conflicts at adjacent driveways and intersections, based on driver expectation of two-way cyclist travel on both boulevards 	<ul style="list-style-type: none"> Pedestrians and cyclists will be separated from vehicular lanes. MUP has potential conflicts between pedestrians and cyclists due to shared facilities in shared space, and between cyclists traveling in opposing directions, on north boulevard. Bi-directional facilities for cyclists increase potential conflicts at adjacent driveways and intersections, based on driver expectation of two-way cyclist travel on north boulevard. 	<ul style="list-style-type: none"> Pedestrians and cyclists will be separated from vehicular lanes. Separated cycle tracks and sidewalks provide dedicated space to eliminate conflict between pedestrians and cyclists, and between cyclists traveling in opposing directions. Bi-directional facilities for cyclists increase potential conflicts at adjacent driveways and intersections, based on driver expectation of two-way cyclist travel but are limited to conflict points on the north boulevard only.



Evaluation Criteria and Sub-Factors	Alternative 1: Boulevard One-Directional Cycle Tracks and Sidewalks, both sides	Alternative 2: Multi-use Path (two-way shared facility), both sides	Alternative 3 Sidewalk South Side and Multi-use Path North Side	Alternative 4 Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side
	<ul style="list-style-type: none"> Minimize potential conflicts between cyclists and transit riders with transit rider expectation of one-way cyclist travel, however there is potential conflict for boarding/alighting at transit shelters/pads due to limited available right-of-way at intersections Potential to accommodate east-west pedestrian and cyclist crossing at intersections with crossrides on north and south approaches Pedestrians and cyclists will cross railway tracks on both boulevards All alternatives improve mode choice though the provision of dedicated and continuous active transportation facilities 	<ul style="list-style-type: none"> Increase potential conflicts on both boulevards between cyclists and transit riders with transit rider expectation of two-way cyclist travel, however there is potential conflict for boarding/alighting at transit shelters/pads due to limited available right-of-way at intersections. Potential to accommodate east-west pedestrian and cyclist crossing at intersections with crossrides on north and south approaches Pedestrians and cyclists will cross railway tracks on both boulevards All alternatives improve mode choice though the provision of dedicated and continuous active transportation facilities 	<ul style="list-style-type: none"> Increase potential conflicts on north boulevard between cyclists and transit riders with transit rider expectation of two-way cyclist travel, however there is potential conflict for boarding/alighting at transit shelters/pads due to limited available right-of-way at intersections. Potential to accommodate east-west pedestrian and cyclist crossing at intersections with crosswalk on south approach and crossride on north approach Pedestrians will cross railway tracks on both boulevards and cyclists will cross railway tracks on north boulevard only All alternatives improve mode choice though the provision of dedicated and continuous active transportation facilities 	<ul style="list-style-type: none"> Increase potential conflicts on north boulevard between cyclists and transit riders with transit rider expectation of two-way cyclist travel, however there is potential conflict for boarding/alighting at transit shelters/pads due to limited available right-of-way at intersections. Potential to accommodate east-west pedestrian and cyclist crossing at intersections with crosswalk on south approach and crossride on north approach Pedestrians will cross railway tracks on both boulevards and cyclists will cross railway tracks on north boulevard only All alternatives improve mode choice though the provision of dedicated and continuous active transportation facilities
Accommodates Emergency Services	<ul style="list-style-type: none"> All alternatives include road widening and intersection improvements which reduce congestion and can improve the efficiency of travel and direct access to accommodate emergency services 			
Potential to Impact Utilities in the Corridor	<ul style="list-style-type: none"> New utility corridors will be required on both sides of Eastern Ave to accommodate illumination for cyclists and pedestrians 			
Technical and Engineering Evaluation Summary	Preferred	Less Preferred	Least Preferred	Preferred
Planning Objectives				
Consistent with Provincial Plans and Policies <i>(Provincial Policy Statement, Places to Grow Act, Greenbelt Plan)</i>	<ul style="list-style-type: none"> All alternatives have the ability for the road to accommodate future travel demands due to implementation of AT facilities supports the density targets set out by Provincial Plans and Policies for the City of Brampton. 			
Consistent with Regional Plans and Policies <i>(Peel Region Official Plan, Peel Region Long Range Transportation Plan, Region of Peel Road Characterization Study, Region of Peel Active Transportation Study, Region of Peel Strategic Goods Movement Network Study)</i>	<ul style="list-style-type: none"> All alternatives have the ability for the road to accommodate future travel demands and improve modal choices due to implementation of AT facilities is consistent with Regional Plans and Policies. All alternatives accommodate planned development and growth by providing additional capacity on the road for pedestrians and cyclists 			
Consistent with Municipal Plans and Policies <i>(City of Brampton Official Plan, City of Brampton Transportation Master Plan Update, Brampton Vision 2040, Queen Street Corridor Secondary Plan, Brampton Human Health and Sciences Cluster Development Strategy, City of</i>	<ul style="list-style-type: none"> The ability for the road to accommodate future travel demands and improve modal choices from implementing AT facilities is consistent with Municipal Plans and Policies. All alternatives accommodate planned development and growth by providing 	<ul style="list-style-type: none"> The ability for the road to accommodate future travel demands and improve modal choices from implanting AT facilities is consistent with Municipal Plans and Policies. All alternatives accommodate planned development and growth by providing 	<ul style="list-style-type: none"> The ability for the road to accommodate future travel demands and improve modal choices from implanting AT facilities is consistent with Municipal Plans and Policies. All alternatives accommodate planned development and growth by providing 	<ul style="list-style-type: none"> The ability for the road to accommodate future travel demands and improve modal choices from implanting AT facilities is consistent with Municipal Plans and Policies. All alternatives accommodate planned development and growth by providing



Evaluation Criteria and Sub-Factors	Alternative 1: Boulevard One-Directional Cycle Tracks and Sidewalks, both sides	Alternative 2: Multi-use Path (two-way shared facility), both sides	Alternative 3 Sidewalk South Side and Multi-use Path North Side	Alternative 4 Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side
<i>Brampton Active Transportation Master Plan, Queen Street East Precinct Plan</i>	<p>additional capacity to accommodate all road users.</p> <ul style="list-style-type: none"> The City of Brampton Active Transportation Master Plan identifies MUP or bike boulevard along the study corridor. All options fall within the category of MUP or bike boulevard. North boulevard accommodates dedicated one-directional cycling and separated pedestrian space, which accommodates the urban greenway identified in the Queen Street East Precinct Plan but limits cyclists travel to one-direction (westbound) travel only. 	<p>additional capacity to accommodate all road users.</p> <ul style="list-style-type: none"> The City of Brampton Active Transportation Master Plan identifies for MUP or bike boulevard along the study corridor. All options fall within the category of MUP or bike boulevard. North boulevard accommodates bi-directional cycling and pedestrians in shared space, which is consistent with the urban greenway identified in the Queen Street East Precinct Plan 	<p>additional capacity to accommodate all road users.</p> <ul style="list-style-type: none"> The City of Brampton Active Transportation Master Plan identifies for MUP or bike boulevard along the study corridor. All options fall within the category of MUP or bike boulevard. North boulevard accommodates bi-directional cycling and pedestrians in shared space, which is consistent with the urban greenway identified in the Queen Street East Precinct Plan 	<p>additional capacity to accommodate all road users.</p> <ul style="list-style-type: none"> The City of Brampton Active Transportation Master Plan identifies for MUP or bike boulevard along the study corridor. All options fall within the category of MUP or bike boulevard. North boulevard accommodates dedicated bi-directional cycling space and separated pedestrian space, which is consistent with the urban greenway identified in the Queen Street East Precinct Plan
Planning Objectives Evaluation Summary	Least Preferred	Less Preferred	Less Preferred	Preferred
Social-Environmental				
Minimize Access Impacts	<ul style="list-style-type: none"> Having cycling and pedestrian facilities on the north and south side of the study corridor will enable pedestrians and cyclists to use accesses on both sides of the study corridor. Potential delays when turning into accesses on north and south side for motorists due to cyclists using cycling facilities on both sides of the corridor. 	<ul style="list-style-type: none"> Having cycling and pedestrian facilities on the north and south side of the study corridor will enable pedestrians and cyclists to use accesses on both sides of the study corridor. 	<ul style="list-style-type: none"> Pedestrian facilities on both sides of the study corridor will enable pedestrians to use accesses on both sides of the study corridor. Cyclists are limited to using accesses on the north side only due to the cycling facility (MUP) being located on the north side of the study corridor only. 	<ul style="list-style-type: none"> Pedestrian facilities on both sides of the study corridor will enable pedestrians to use accesses on both sides of the study corridor. Cyclists are limited to using accesses on the north side only due to the cycling facility (cycle tracks) being located on the north side of the study corridor only.
Minimize Traffic Noise	<ul style="list-style-type: none"> No difference in alternatives as all alternatives encourage active modes of transportation, including walking, cycling and transit thus reducing traffic noise. 			
Minimize Disruption due to Construction	<ul style="list-style-type: none"> No difference in alternatives as all alternatives are anticipated to have the same utility relocation requirements and require similar construction techniques and level of disruption. 			
Preserve Archaeological and Cultural Heritage Features	<ul style="list-style-type: none"> The study area does not retain any cultural heritage resources. The study area does not retain archaeological potential on account of deep and extensive land disturbance. 			
Improve Visual Aesthetics	<ul style="list-style-type: none"> All options have the opportunity to provide planting and improvement to visual aesthetics on both sides of the study corridor. 			
Improve Community Character and Public Realm	<ul style="list-style-type: none"> Implementation of active transportation facilities, tree plantings, and other boulevard treatments will improve community character and public realm. 			
Social Environment Evaluation Summary	Preferred	Preferred	Less Preferred	Less Preferred
Economic Environment				
Improve Access to Businesses and Key Employment Areas	<ul style="list-style-type: none"> Cycle tracks and sidewalks provide direct access for pedestrians and cyclists to existing and planned businesses on both boulevards. 	<ul style="list-style-type: none"> MUPs provide direct access for pedestrians and cyclists to existing and planned businesses on both boulevards. 	<ul style="list-style-type: none"> MUP on the north side and sidewalk on the south side provides direct access to existing and planned businesses for pedestrians on both the north and 	<ul style="list-style-type: none"> Dual cycle track on the north side provides direct access for cyclists to existing and planned businesses on the north side of the study corridor only.



Evaluation Criteria and Sub-Factors	Alternative 1: Boulevard One-Directional Cycle Tracks and Sidewalks, both sides	Alternative 2: Multi-use Path (two-way shared facility), both sides	Alternative 3 Sidewalk South Side and Multi-use Path North Side	Alternative 4 Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side
	<ul style="list-style-type: none"> Cycle tracks are one-directional resulting in potentially longer cyclist travel distance (depending on origin and destination) to access businesses due to the inability to travel eastbound in the north boulevard and westbound in the south boulevard. 	<ul style="list-style-type: none"> MUPs allow for two-way travel which minimize cyclist travel distance to access businesses on either boulevard 	<ul style="list-style-type: none"> south sides and for cyclists on the north side of the study corridor only. MUPs allow for two-way travel which minimize cyclist travel distance to accesses on the north side. 	<ul style="list-style-type: none"> Sidewalks provides direct access to existing and planned businesses for pedestrians on both boulevards. Dual cycle tracks allows for two-way travel which minimize cyclist travel distance to accesses on the north side.
Minimize Operating and Maintenance Costs\ Minimize Capital and Construction Costs, and Maximize Construction Value	<ul style="list-style-type: none"> Greatest capital cost to accommodate widest footprint of all alternatives (sidewalks and cycle tracks on both boulevards) in new structure over Tributary Potential for increased capital costs if varying materials are required for sidewalk and cycle track (asphalt vs concrete) and if pavement markings and signage to delineate facility types and direction is required Moderate operating and maintenance costs to maintain two AT facility types in both boulevards and winter operations 	<ul style="list-style-type: none"> Moderate capital cost to accommodate wider footprint (MUP on both boulevards) in new structure over Tributary Lower capital costs than other alternatives with consistent material Lower operating and maintenance costs to maintain one AT facility type and winter operations 	<ul style="list-style-type: none"> Least capital cost to accommodate narrowest footprint (MUP on north and sidewalk on south) in new structure over Tributary Potential for increased capital costs if varying materials are required for sidewalk and MUP (asphalt vs concrete) Lowest operating and maintenance costs to maintain two AT facility types and winter operations 	<ul style="list-style-type: none"> Greatest capital cost to accommodate widest footprint of alternatives (dual cycle tracks and sidewalk on north and sidewalk on south boulevard) in new structure over Tributary Potential for slightly increased capital costs if varying materials are required for sidewalk and dual cycle track (asphalt vs concrete) Moderate operating and maintenance costs to maintain two AT facility types in both boulevards and winter operations
Minimize Property Requirements	<ul style="list-style-type: none"> Property acquisition / requirements to acquire official plan right-of-way of 30m is the same for all alternatives. 	<ul style="list-style-type: none"> Same as Alternative 1 	<ul style="list-style-type: none"> Same as Alternative 1 	<ul style="list-style-type: none"> Same as Alternative 1.
Economic Environment Evaluation Summary	Less Preferred	Preferred	Preferred	Less Preferred
Natural Environment				
Protect Designated Natural Areas	<ul style="list-style-type: none"> No identified wetlands, no significant wildlife habitat (SWH), no Species At Risk (SAR), no fish species are present in the study area. There is a single occurrence of regionally significant species (Larger Straw Sedge). No impacts to designated natural areas. 			
Minimize Impacts to Vegetation	<ul style="list-style-type: none"> The study area is highly disturbed and heavily industrialized. No significant tree species or federally or provincially significant vascular flora are within the study area. Lowland deciduous forest (FOD07) is associated with the watercourse habitat. No impacts. However, all alternatives offer opportunities to enhance vegetation. 			
Minimize Impacts to Wildlife	<ul style="list-style-type: none"> No suitable habitat for Species At Risk (SAR), Species of Conservation Concern (SCC) nor suitable Significant Wildlife Habitat (SWH) in the study area. Study area is highly developed and disturbed and does not provide important habitat functions. No impacts. 			
Minimize Impacts to Protect Aquatic Habitat	<ul style="list-style-type: none"> A single engineered drain is present east of Hansen Road and is a tributary to the Etobicoke Creek. Numerous barriers to fish movement are present and aquatic habitat is poor. All alternatives provide the same opportunity to improve the existing aquatic habitat with a new watercourse crossing structure anticipated to require channel realignment. Greatest structure 	<ul style="list-style-type: none"> A single engineered drain is present east of Hansen Road and is a tributary to the Etobicoke Creek. Numerous barriers to fish movement are present and aquatic habitat is poor. All alternatives provide the same opportunity to improve the existing aquatic habitat with a new watercourse crossing structure anticipated to require channel realignment. Similar structure 	<ul style="list-style-type: none"> A single engineered drain is present east of Hansen Road and is a tributary to the Etobicoke Creek. Numerous barriers to fish movement are present and aquatic habitat is poor. All alternatives provide the same opportunity to improve the existing aquatic habitat with a new watercourse crossing structure anticipated to require channel realignment. Similar structure 	<ul style="list-style-type: none"> A single engineered drain is present east of Hansen Road and is a tributary to the Etobicoke Creek. Numerous barriers to fish movement are present and aquatic habitat is poor. All alternatives provide the same opportunity to improve the existing aquatic habitat with a new watercourse crossing structure anticipated to require channel realignment. Similar structure



Evaluation Criteria and Sub-Factors	Alternative 1: Boulevard One-Directional Cycle Tracks and Sidewalks, both sides	Alternative 2: Multi-use Path (two-way shared facility), both sides	Alternative 3 Sidewalk South Side and Multi-use Path North Side	Alternative 4 Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side
	footprint to accommodate the widest AT facilities	footprint to Alternative 1 to accommodate AT facilities.	realignment. Smallest structure footprint to accommodate AT facilities	footprint to Alternative 1 to accommodate AT facilities.
Minimize Impacts to Surface Water and Groundwater Management	<ul style="list-style-type: none"> Moderate impact with urbanization, implementation of AT facilities with greatest footprint will increase hard surface area. Stormwater quantity will increase, and quality mitigation will be required, which can be addressed through design 	<ul style="list-style-type: none"> Moderate impact with urbanization, implementation of AT facilities with similar footprint to Alternative 1 will increase hard surface area. Stormwater quantity will increase, and quality mitigation will be required, which can be addressed through design 	<ul style="list-style-type: none"> Moderate impact with urbanization, implementation of AT facilities with smallest footprint will increase hard surface area. Stormwater quantity will increase, and quality mitigation will be required, which can be addressed through design 	<ul style="list-style-type: none"> Moderate impact with urbanization, implementation of AT facilities with similar footprint to Alternative 1 will increase hard surface area. Stormwater quantity will increase, and quality mitigation will be required, which can be addressed through design
Minimize Impacts to Contaminated Properties	<ul style="list-style-type: none"> Potential for impacts to contaminated properties along study corridor to be determined through completion of Contamination Overview Study. Impacts anticipated to be the same amongst all alternatives to accommodate official plan 30m right-of-way. 			
Improve Air Quality	<ul style="list-style-type: none"> All alternatives include implementation of AT facilities which may increase traffic mobility and reduce traffic congestion and delays due to individuals switching from single occupancy vehicles to cycling or walking. This reduction in congestion and associated idling can reduce emissions and have potential for improvements to air quality. 			
Minimize Effects on Climate Change	<ul style="list-style-type: none"> All alternatives include implementation of AT facilities which may increase traffic mobility and reduce traffic congestion and delays due to individuals switching from single occupancy vehicles to cycling or walking. This reduction in congestion and addition of infrastructure to support active transportation modes can decrease vehicle greenhouse gases that contribute to climate change. Greatest hard surface area results in least opportunities for implementation of tree plantings and Low Impact Development stormwater management strategies as part of road improvements to improve the study corridor resiliency to climate change 	<ul style="list-style-type: none"> Similar to Alternative 1 	<ul style="list-style-type: none"> All alternatives include implementation of AT facilities which may increase traffic mobility and reduce traffic congestion and delays due to individuals switching from single occupancy vehicles to cycling or walking. This reduction in congestion and addition of infrastructure to support active transportation modes can decrease vehicle greenhouse gases that contribute to climate change. Least hard surface area of all alternatives results in greatest opportunities for implementation of tree plantings and Low Impact Development stormwater management strategies as part of road improvements to improve the study corridor resiliency to climate change 	<ul style="list-style-type: none"> Similar to Alternative 1
Natural Environment Evaluation Summary	Less Preferred	Less Preferred	Preferred	Less Preferred
Summary of Evaluation	Not Recommended This alternative is <u>not recommended</u> as although this option provides the great separation of pedestrians and cyclists minimizing conflicts between both users and bi-directional cyclists, and provides pedestrian and cyclists access on both the north and south boulevards, this alternative limits cyclist travel direction in the north boulevard to westbound travel only which can limit the potential of the	Not Recommended This alternative is <u>not recommended</u> as although this option has lower financial costs to construct and maintain, has pedestrian and cycling access on both sides of the study corridor and accommodates bi-directional cycling on the north boulevard to support the future greenway, this alternative does not separate pedestrians and cyclists in either boulevard as they share the same space travelling in both directions resulting	Not Recommended This alternative is <u>not recommended</u> as although this option has lower financial costs to construct and maintain, provides the greatest opportunities for plantings and LID treatments, pedestrian access on both sides and accommodates bi-directional cycling on the north boulevard to support the future greenway, this alternative does not separate pedestrians and cyclists on the north boulevard as the share the same	Recommended This alternative is <u>recommended</u> as although this option requires additional capital costs to accommodate the widest structure footprint at the new Tributary crossing, higher maintenance costs, additional hard surface area thus reducing available planting area and opportunities for LID treatments, this alternative provides the greatest separation of pedestrians and cyclists minimizing conflicts between both

Evaluation Criteria and Sub-Factors	Alternative 1: Boulevard One-Directional Cycle Tracks and Sidewalks, both sides	Alternative 2: Multi-use Path (two-way shared facility), both sides	Alternative 3 Sidewalk South Side and Multi-use Path North Side	Alternative 4 Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side
	future greenway. This option also requires additional capital costs to accommodate the widest structure footprint at the new Tributary crossing, higher maintenance costs and additional hard surface area thus reducing available planting area and opportunities for LID treatments.	in potential conflicts in both boulevards. This alternative also results in additional conflict points for cyclists at driveways on both boulevards.	space travelling in both directions resulting in potential conflicts in the north boulevard. This alternative limits additional conflict points for cyclists at driveways to the north boulevard only.	users and bi-directional cyclists. Although this option only provides cyclist access in the north boulevard to support the future greenway, cyclists are provided with separated space from pedestrians and dedicated space for each direction. This alternative also limits additional conflict points for cyclists at driveways to the north boulevard only.

Based on the findings of the Active Transportation Alternatives Evaluation, **Alternative 4 – Sidewalk South Side and Dual Cycle Track and Sidewalk North Side** was recommended. Using the Official Plan ROW of 30m for the study corridor, the EA study approved design criteria, and feedback from the City of Brampton staff, the following midblock typical sections were developed for Alternative 4 (see **Figure 1** and **Figure 2**). The placement of utilities, street trees and AT facilities within the boulevards were discussed with the City of Brampton and **Figure 1** was recommended to prioritize increased separation of vulnerable users (pedestrians and cyclists) from vehicles in the travel lanes.

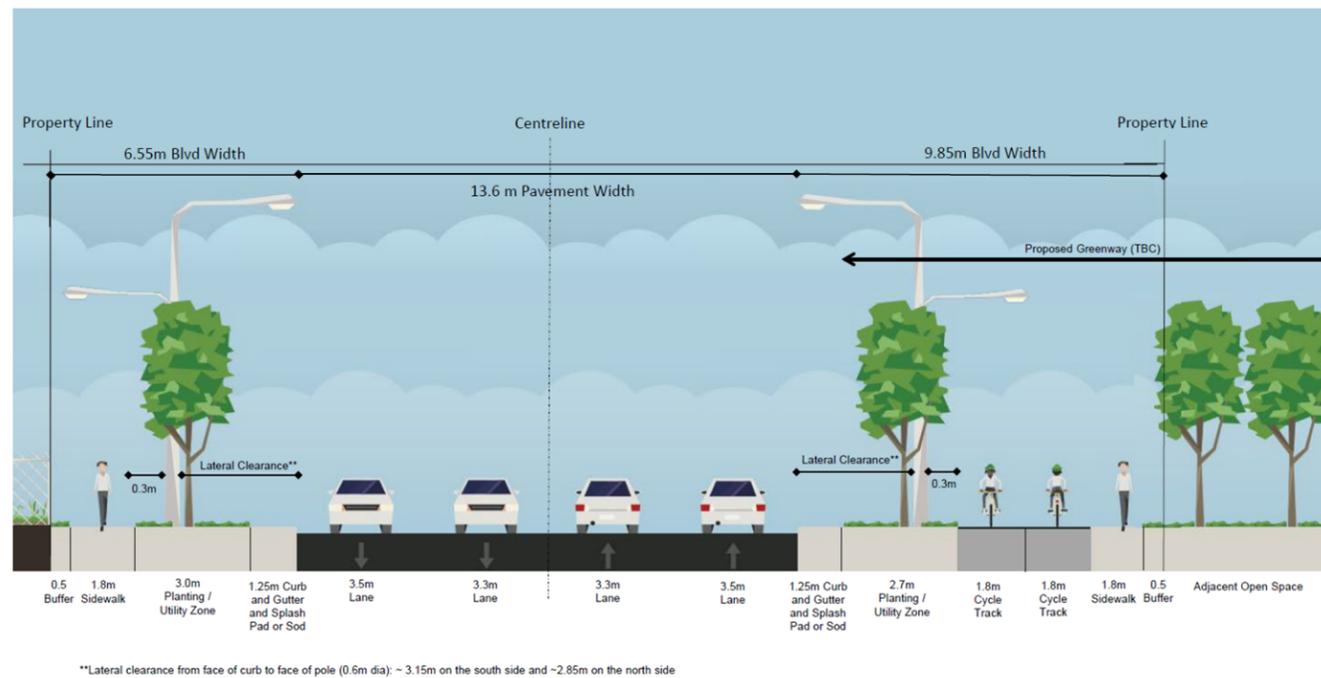


Figure 1: Clark Boulevard / Eastern Avenue Typical Section (Selected)

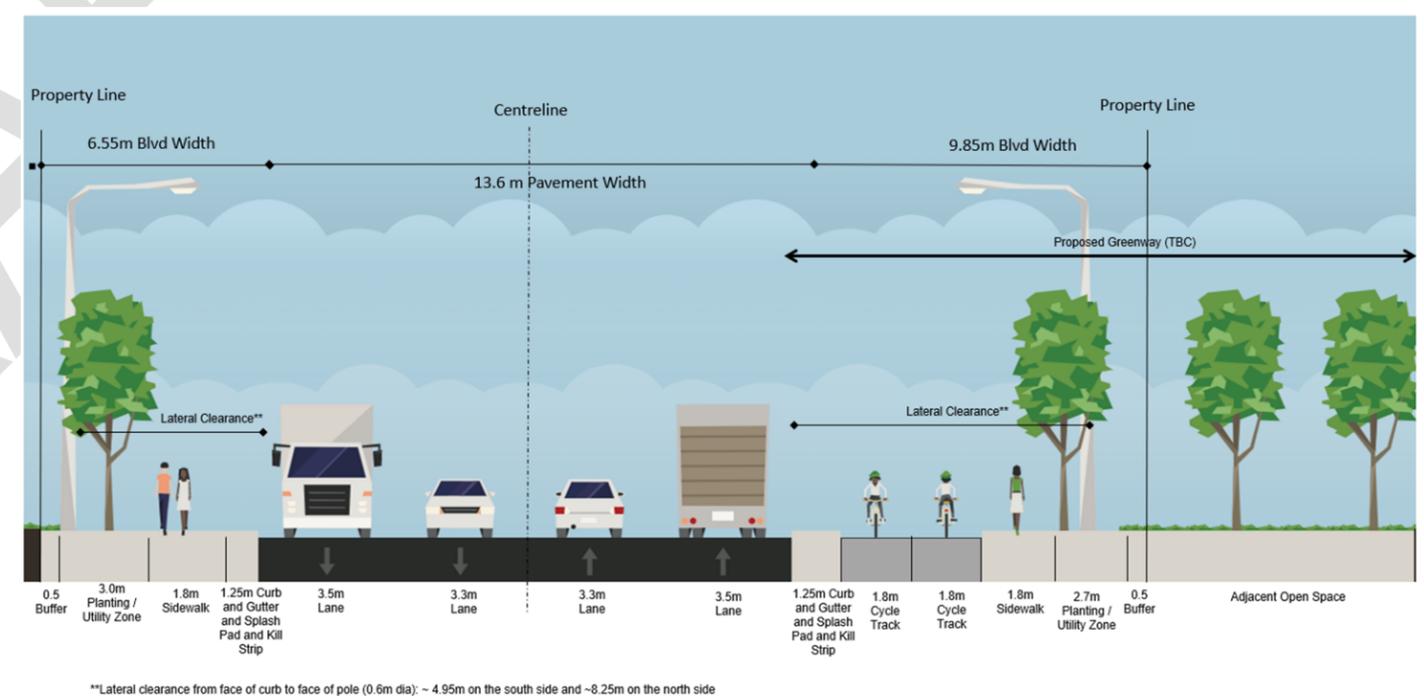


Figure 2: Clark Boulevard/Eastern Avenue Typical Section (Considered , Not Selected)

Evaluation of Road Widening

With the development of the Recommended Typical Section for the corridor, three options were identified for widening the existing Eastern Avenue between Kennedy Road and Hansen Road:

- Option 1 – Widen to the north of the road
- Option 2 – Widen about the centreline of the road
- Option 3 – Widen to the south of the road

Based on the evaluation criteria identified in **Table 1**, an evaluation was conducted amongst the alternatives and a recommended design was carried forward. Each category that was evaluated was summarized using the following rankings from Least Preferred to Preferred:

Least Preferred (Does not meet objectives)	Less Preferred (Partially meets objectives)	Preferred (Meets objectives)
--	---	--

Each evaluation criteria were considered, however in several instances no difference amongst the alternatives is indicated. Please refer to the Active Transportation Alternatives for documentation of impacts specific to the recommended typical section with respect to the active transportation facility type and streetscaping opportunities.

The evaluation is provided in **Table 7**.

Table 7 Detailed Evaluation of Road Widening Alternatives (Eastern Avenue from Kennedy Road to Hansen Road)

Evaluation Criteria and Sub-Factors	1. Widen to the North of the Road	2. Widen about the Centreline of the Road	3. Widen to the South of the Road
Technical and Engineering			
Accommodate Future Travel Demands	<ul style="list-style-type: none"> All alternatives include road widening, intersection improvements and continuous and dedicated active transportation facilities. Road improvements will increase traffic mobility and reduce traffic congestion and delays, thus accommodating future travel demands. 		
Provide Connectivity and Compatibility with Road Network	<ul style="list-style-type: none"> Widening the existing road and adding a new connection to Clark Boulevard will provide connectivity and compatibility with the Road Network. 		
Improve Public Transit Service	<ul style="list-style-type: none"> Although no public transit service currently runs along the study corridor, the road widening and intersection improvements along the study corridor can provide opportunities for transit service to be implemented. 		
Create a Pedestrian-Friendly Environment	<ul style="list-style-type: none"> All alternatives will implement continuous and dedicated active transportation facilities. 		
Create a Cyclist-Friendly Environment	<ul style="list-style-type: none"> All alternatives will implement continuous and dedicated active transportation facilities. 		
Improve Safety for All Travel Modes	<ul style="list-style-type: none"> All alternatives provide widening and intersection improvements including potential crossrides/crosswalks which have the potential to reduce sudden stops to make turns and rear-end collisions, accommodate safe passage of pedestrians and cyclists at intersections, and a provided dedicated space in boulevards to increase pedestrian and cyclist comfort, and increase separation with vehicles to minimize conflicts. 		
Improve Mode Choice	<ul style="list-style-type: none"> All alternatives improve mode choice through the provision of dedicated and continuous active transportation facilities, and road widening and intersection improvements to improve transit. 		
Accommodates Emergency Services	<ul style="list-style-type: none"> All alternatives include road widening and intersection improvements which reduce congestion and can improve the efficiency of travel and direct access to accommodate emergency services 		
Potential to Impact Utilities in the Corridor	<ul style="list-style-type: none"> Existing utility poles are generally located along the north side of Eastern Avenue and would require relocation. Additional utility impacts anticipated and extent to be determined at a later stage. New utility corridors will be required on both sides of Eastern Ave to accommodate illumination and hydro. 	<ul style="list-style-type: none"> Existing utility poles are generally located along the north side of Eastern Avenue and would require relocation. Additional utility impacts anticipated and extent to be determined at a later stage. New utility corridors will be required on both sides of Eastern Ave to accommodate illumination and hydro. 	<ul style="list-style-type: none"> Utility poles may not have to be relocated as they are located on the north side of the road. However, additional utility impacts are anticipated; extent to be determined at a later stage. New utility corridors will be required on both sides of Eastern Ave to accommodate illumination and hydro.
Technical and Engineering Evaluation Summary	Preferred	Preferred	Preferred
Planning Objectives			
Consistent with Provincial Plans and Policies <i>(Provincial Policy Statement, Places to Grow Act, Greenbelt Plan)</i>	<ul style="list-style-type: none"> The ability for the road to accommodate future travel demands due to widening supports the density targets set out by Provincial Plans and Policies for the City of Brampton. 		
Consistent with Regional Plans and Policies <i>(Peel Region Official Plan, Peel Region Long Range Transportation Plan, Region of Peel Road Characterization Study, Region of Peel Active Transportation Study, Region of Peel Strategic Goods Movement Network Study)</i>	<ul style="list-style-type: none"> The ability for the road to accommodate future travel demands and improve modal choices due to widening is consistent with Regional Plans and Policies. All alternatives accommodate planned development and growth by providing additional capacity to accommodate all road users. 		
Consistent with Municipal Plans and Policies <i>(City of Brampton Official Plan, City of Brampton Transportation Master Plan Update, Brampton Vision 2040, Queen Street Corridor Secondary Plan, Brampton Human Health and Sciences Cluster Development Strategy, City of Brampton Active Transportation Master Plan)</i>	<ul style="list-style-type: none"> The ability for the road to accommodate future travel demands and improve modal choices due to widening is consistent with Municipal Plans and Policies. All alternatives accommodate planned development and growth by providing additional capacity to accommodate all road users. 		
Planning Objectives Evaluation Summary	Preferred	Preferred	Preferred

Evaluation Criteria and Sub-Factors	1. Widen to the North of the Road	2. Widen about the Centreline of the Road	3. Widen to the South of the Road
Social-Environmental			
Minimize Access Impacts	<ul style="list-style-type: none"> Major impact to accesses of businesses on the north side of the study corridor during construction. 	<ul style="list-style-type: none"> Minor impact to accesses of businesses on both the north side and south side of the study corridor during construction. 	<ul style="list-style-type: none"> Major impact to accesses of businesses on the south side of the study corridor during construction.
Minimize Traffic Noise	<ul style="list-style-type: none"> Traffic noise anticipated to increase based on additional traffic from additional road capacity which is equal for all alternatives. However, no additional impact is identified as there no outdoor living areas (OLAs) within the study corridor for noise mitigation. 		
Preserve Archaeological and Cultural Heritage Features	<ul style="list-style-type: none"> The Study Area does not retain any potential cultural heritage resources. No impact. The Study Area does not retain archaeological potential on account of deep and extensive land disturbance. No impact. 		
Improve Visual Aesthetics	<ul style="list-style-type: none"> Visual aesthetics will be slightly reduced due to increased pavement width for road widening and active transportation facilities but can be improved through tree plantings and other boulevard treatments within available ROW. No change in impact amongst the alternatives. 		
Improve Community Character and Public Realm	<ul style="list-style-type: none"> Implementation of active transportation facilities, tree plantings, and other boulevard treatments will improve community character and public realm. No change amongst the alternatives 		
Minimize Disruption due to Construction	<ul style="list-style-type: none"> Major impact to businesses on the north side of the study corridor during construction. 	<ul style="list-style-type: none"> Minor impact to businesses on both the north side and south side of the study corridor during construction. 	<ul style="list-style-type: none"> Major impact to businesses on the south side of the study corridor during construction.
Social Environment Evaluation Summary	Less Preferred	Preferred	Less Preferred
Economic Environment			
Improve Access to Businesses and Key Employment Areas	<ul style="list-style-type: none"> Moderate impact to businesses on the north side during construction, as well as railway service at the rail crossing. Property acquisition to widen on the north side will reduce parking and access length of businesses on the north side. Road will be in closer proximity to the termination of the rail line and train storage building and may reduce available track length on the subject site. Accesses will benefit from pedestrian and cycling access in addition to vehicle traffic following the road widening. 	<ul style="list-style-type: none"> Minor impact to businesses on the north and south side during construction, as well as railway service at the rail crossing. Accesses will benefit from pedestrian and cycling access in addition to vehicle traffic following the road widening. 	<ul style="list-style-type: none"> Moderate impact to businesses on the south side during construction, as well as at the railway service at the rail crossing. Property acquisition to widen on the south side will reduce parking and access length of businesses on the south side. Road will be in closer proximity to the convergence point for two rail tracks to one rail track. Accesses will benefit from pedestrian and cycling access in addition to vehicle traffic following the road widening.
Minimize Operating and Maintenance Costs	<ul style="list-style-type: none"> Comparable operation/maintenance cost for all options 		
Minimize Capital and Construction Costs, and Maximize Construction Value	<ul style="list-style-type: none"> Higher capital and construction costs due to implementing mitigation measures for affecting businesses (property and access) on the north side and the rail crossing 	<ul style="list-style-type: none"> Lower capital and construction costs due to construction taking place generally within the right-of-way 	<ul style="list-style-type: none"> Higher capital and construction costs due to having to implementing mitigation measures for affecting businesses (property and access) on the south side and the rail crossing
Minimize Property Requirements	<ul style="list-style-type: none"> Property acquisition of existing businesses is anticipated on the north side of the study corridor 	<ul style="list-style-type: none"> Minor to no property acquisition anticipated as widening would generally fit within the current right-of-way of 30m. 	<ul style="list-style-type: none"> Property acquisition of existing businesses is anticipated on the south side of the study corridor.
Economic Environment Evaluation Summary	Least Preferred	Preferred	Least Preferred
Natural Environment			
Protect Designated Natural Areas	<ul style="list-style-type: none"> No identified wetlands, no significant wildlife habitat (SWH), no Species At Risk (SAR), and no impacts to designated natural areas. 		
Minimize Impacts to Vegetation	<ul style="list-style-type: none"> The study area is highly disturbed and heavily industrialized. No significant tree species or federally or provincially significant vascular flora are within the study area. No impacts. However, all alternatives offer opportunities to enhance vegetation with street tree plantings. 		



Evaluation Criteria and Sub-Factors	1. Widen to the North of the Road	2. Widen about the Centreline of the Road	3. Widen to the South of the Road
Minimize Impacts to Wildlife	<ul style="list-style-type: none"> No suitable habitat for Species At Risk (SAR), Species of Conservation Concern (SCC) nor suitable Significant Wildlife Habitat (SWH) in the study area. Study area is highly developed and disturbed and does not provide important habitat functions. No impacts. 		
Minimize Impacts to Protect Aquatic Habitat	<ul style="list-style-type: none"> No impact as there are no watercourses within the existing Eastern Avenue segment from Kennedy Road to Hansen Road.. 		
Minimize Impacts to Surface Water and Groundwater Management	<ul style="list-style-type: none"> Moderate impact with urbanization, increased roadway width and hard surface area. Stormwater quantity will increase, and quality mitigation will be required, which can be addressed through design. No change in impact amongst the alternatives Moderate impact to shallow groundwater system due to potential increase in contaminants related to increased roadway width and extension (i.e. road salt, etc.) 		
Minimize Impacts to Contaminated Properties	<ul style="list-style-type: none"> Potential for impacts to contaminated properties along study corridor to be determined through completion of Contamination Overview Study. 		
Improve Air Quality	<ul style="list-style-type: none"> All alternatives include road widening and intersection improvements which will increase traffic mobility and reduce traffic congestion and delays as well as improvements to support active transportation modes and transit. This reduction in congestion and associated idling can reduce emissions and have potential for improvements to air quality. No change in impact amongst the alternatives 		
Minimize Effects on Climate Change	<ul style="list-style-type: none"> All alternatives include road widening and intersection improvements which will increase traffic mobility and reduce traffic congestion and delays as well as support active transportation modes. This reduction in congestion, infrastructure to support active transportation modes, and improved transit operations can decrease vehicle greenhouse gases that contribute to climate change. No change in impact amongst the alternatives Opportunities for implementation of tree plantings and Low Impact Development stormwater management strategies as part of road improvements can improve the study corridor resiliency to climate change. No change in impact amongst the alternatives 		
Natural Environment Evaluation Summary	Preferred	Preferred	Preferred
	Not Recommended	Recommended	Not Recommended
Summary of Evaluation	This alternative is not recommended because it requires additional property acquisition, impacts to businesses on the north side (property, access and parking), potential impact to the rail crossing and higher capital and construction costs.	This alternative is recommended due to balancing impacts to businesses and accesses, minor to no anticipated property acquisition, and low capital and construction costs	This alternative is not recommended because it requires additional property acquisition, impacts to businesses on the south side (property, access and parking), potential impact to the rail crossing and higher capital and construction costs.