

Evaluation Factors and Sub-Factors		Alternative S8-4 (2019 Preferred)	Alternative S8-5
1.0 Natural Environment			
1.1 Fish and Fish Habitat			
1.1.1 Fish Habitat	<p>9 watercourses impacted:</p> <ul style="list-style-type: none"> 1 permanent, SAR (occupied habitat for Redside Dace) Main East Humber 1 permanent, baitfish and sculpin (contributing habitat for Redside Dace) 1 permanent, baitfish and migratory trout (cool/cold water) 1 intermittent, unconfirmed fish habitat for Redside Dace) 1 permanent, unconfirmed fish habitat (contributing habitat for Redside Dace) 3 ephemeral, no fish habitat (contributing habitat for Redside Dace) <p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, offsetting / enhancement measures; until confirmed, net effects remain the same as potential effects:</p> <ul style="list-style-type: none"> Crossing 1 watercourse identified as occupied habitat for Redside Dace (East Humber River). Crossing main stem East Humber River, although perpendicular crossing possible – effects can be minimized following the <i>Guidance for Development Activities in Redside Dace Protected Habitat</i> document (MNRF 2016) and consultation with MECP and DFO. Crossing main stem Main Humber River at relatively perpendicular angle. Main stem Main Humber River would require a crossing structure of ~660 m long and 30 m deep (along centerline of corridor) to span valley; field confirmed to have highly eroding banks. <ul style="list-style-type: none"> Floodplain width is ~175 m. The channel is less sinuous (meander belt width to be confirmed). Valley confirmed to have highly eroding west slope; on east side, there is a low rise to a gradually sloping 'terrace' that extends some distance to the steep upper east slope. Watercourse supporting diverse moderately sensitive coolwater fish communities. Within the proposed Highway 27 interchange, there is potential for the realignment of a permanent tributary within a deep ravine (skewed for ~310 m) and another permanent tributary of East Humber River (skewed for ~800 m); both contributing habitat to Redside Dace; however, effects can be minimized following the <i>Guidance for Development Activities in Redside Dace Protected Habitat</i> document (MNRF 2016) for indirect/contributing habitat. Realignment requirement 	<p>12 watercourses impacted:</p> <ul style="list-style-type: none"> 1 permanent, SAR (occupied habitat for Redside Dace) 1 permanent, baitfish and sculpin (contributing habitat for Redside Dace) 1 permanent, baitfish and trout migration (cool/cold water) 1 permanent; unconfirmed fish habitat (contributing habitat for Redside Dace) 1 intermittent, unconfirmed fish habitat 1 intermittent, unconfirmed fish 3 ephemeral, no fish habitat (contributing habitat for Redside Dace) 3 ephemeral, unconfirmed fish habitat Infilling of 1 waterbody (approximately 46 m x 35 m) connected online to the intermittent, unconfirmed fish unless alignment shifted to avoid; two tributaries drain into the waterbody within the alignment at the north end <p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, compensation / enhancement measures; until confirmed, net effects remain the same as potential effects:</p> <ul style="list-style-type: none"> Crossing 1 watercourse identified as occupied habitat for Redside Dace (East Humber River). Crossing main stem East Humber River, although perpendicular crossing possible – effects can be minimized following the <i>Guidance for Development Activities in Redside Dace Protected Habitat</i> document (MNRF 2016) and consultation with MECP and DFO. Crossing main stem Main Humber River on large meander bend along the east side of the valley, as well as directly on a parallel section of a meandering reach that flows along south edge of alignment with presumed highly eroding banks (assessed based on aerial imagery). Requires a crossing structure ~1020 m long and 40 m deep (along centreline of corridor) to span valley. <ul style="list-style-type: none"> Floodplain width is ~430m. Highly meandering channel section. Tributary outfall at west edge of valley at a meander could affect structure placement. Potential requirement to realign and/or harden/armour portions of the river channel to site piers to avoid erosion and maintain long term river migratory patterns and associated habitat quality. Watercourse supporting diverse moderately sensitive coolwater fish communities. 	<p>9 watercourses impacted:</p> <ul style="list-style-type: none"> 1 permanent, SAR (occupied habitat for Redside Dace) 1 permanent, baitfish and sculpin (contributing habitat for Redside Dace) 1 permanent, baitfish and trout migration (cool/cold water) 1 permanent; unconfirmed fish habitat (contributing habitat for Redside Dace) 1 intermittent, unconfirmed fish (associated with a reach supporting baitfish assessed during the 2015 field work) 3 ephemeral, no fish habitat (contributing habitat for Redside Dace) 1 waterbody (approximately 46 m x 35 m) connected online to the intermittent, unconfirmed fish tributaries drain into the waterbody immediately north of the alternative <p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, offsetting / enhancement measures; until confirmed, net effects remain the same as potential effects:</p> <ul style="list-style-type: none"> Crossing 1 watercourse identified as occupied habitat for Redside Dace (East Humber River). Crossing main stem East Humber River, although perpendicular crossing possible – effects can be minimized following the <i>Guidance for Development Activities in Redside Dace Protected Habitat</i> document (MNRF 2016) and consultation with MECP and DFO. Crossing main stem Main Humber River on large meander bend that flows along base of steep valley slope along the west side of the valley with presumed highly eroding banks (assessed based on aerial imagery). Requires a crossing structure ~700 m long and 35 m deep (along centreline of corridor) to span valley. <ul style="list-style-type: none"> Floodplain width is ~460 m. Meandering channel section. Erosion scarp present along the valley wall identified on aerial imagery at the east side of the valley where the meandering channel abuts the valley wall. Meandering channel appears to be eroding toe of valley slope. Potential requirement to realign and/or harden/armour portions of the river channel and/or toe of west valley slope to site piers to avoid erosion and maintain long term river migratory patterns and associated habitat quality.

	<p>and extent dependent on Highway 27 interchange configuration.</p>	<ul style="list-style-type: none"> • Within the proposed Highway 27 interchange, there is potential for the realignment of a permanent tributary within a deep ravine (skewed for ~310 m) and another permanent tributary of East Humber River (skewed for ~870m); both contributing habitat to Redside Dace; however, effects can be minimized following the <i>Guidance for Development Activities in Redside Dace Protected Habitat Document (MNRF 2016)</i> for indirect/contributing habitat. Realignment requirement and extent dependent on Highway 27 interchange configuration. • Potential for infilling of the waterbody on the tributary immediately east of Main Humber River, alignment and structure alternatives would be considered to minimize impact. 	<ul style="list-style-type: none"> ○ Watercourse supporting diverse moderately sensitive coolwater fish communities • Within the proposed Highway 27 interchange, there is potential for the realignment of a permanent tributary within a deep ravine (skewed for ~310 m) and another permanent tributary of East Humber River (skewed for ~820 m); both contributing habitat to Redside Dace; however, effects can be minimized following the <i>Guidance for Development Activities in Redside Dace Protected Habitat Document (MNRF 2016)</i> for indirect/contributing habitat. Realignment requirement and extent dependent on Highway 27 interchange configuration. • Potential for infilling of the waterbody on the tributary immediately east of Main Humber River, alignment and structure alternatives would be considered to minimize impact.
<p>1.1.2 Fish Community</p>	<p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, offsetting / enhancement measures; until confirmed, net effects remain the same as potential effects:</p> <ul style="list-style-type: none"> • Crossing 1 watercourse identified as occupied habitat for Redside Dace • Crossing 5 watercourses identified as contributing habitat for Redside Dace with potential for two of these requiring realignments • Humber River and East Humber River main stems supporting diverse moderately sensitive coolwater fish communities 	<p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, offsetting / enhancement measures; until confirmed, net effects remain the same as potential effects:</p> <ul style="list-style-type: none"> • Potential requirement of the main stem Main Humber River to realign portions of the river channel and/or channel hardening measures to properly site piers to avoid erosion and maintain long term river migratory patterns and associated habitat quality; however, unlikely to alter fish community • Crossing 1 watercourse identified as occupied habitat for Redside Dace • Crossing 5 watercourses identified as contributing habitat for Redside Dace with potential for two of these requiring realignments • Humber River and East Humber River main stems supporting diverse moderately sensitive coolwater fish communities 	<p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, offsetting / enhancement measures; until confirmed, net effects remain the same as potential effects:</p> <ul style="list-style-type: none"> • Potential requirement of the main stem Main Humber River to realign portions of the river channel and/or channel hardening measures to properly site piers to avoid erosion and maintain long term river migratory patterns and associated habitat quality; however, unlikely to alter fish community • Crossing 1 watercourse identified as occupied habitat for Redside Dace • Crossing 5 watercourses identified as contributing habitat for Redside Dace with potential for two of these requiring realignments • Humber River and East Humber River main stems supporting diverse moderately sensitive coolwater fish communities
<p>1.2 Terrestrial Ecosystems</p> <p>1.2.1 Wildlife and Wildlife Habitat</p>	<p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, compensation/enhancement measures; until confirmed, net effects remain the same as potential effects.</p> <p>Net effects include:</p> <ul style="list-style-type: none"> • Permanent loss of wildlife habitat including confirmed habitat for SAR and SCC, large tracts of confirmed SWH and other areas for breeding and rearing of young (e.g. amphibian breeding habitat) • Fragmentation of two large natural corridors associated with the Humber River and East Humber River • Removals through this alternative would represent ~87.3 ha loss of habitat with respect to total ELC units affected by this alternative. • Reduction of wildlife habitat quality through indirect effects that cannot be fully mitigated including edge 	<p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, compensation/enhancement measures; until confirmed, net effects remain the same as potential effects.</p> <p>Net effects include:</p> <ul style="list-style-type: none"> • Permanent loss of wildlife habitat including confirmed habitat for SAR and SCC, large tracts of confirmed SWH and other areas for breeding and rearing of young (e.g. amphibian breeding habitat) • Fragmentation of two large natural corridors associated with the Main Humber River and East Humber River • Removals through this alternative would represent ~99.1 ha loss of habitat with respect to total ELC units affected by this alternative. • Reduction of wildlife habitat quality through indirect effects that cannot be fully mitigated including edge 	<p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, compensation/enhancement measures; until confirmed, net effects remain the same as potential effects.</p> <p>Net effects include:</p> <ul style="list-style-type: none"> • Permanent loss of wildlife habitat including confirmed habitat for SAR and SCC, large tracts of confirmed SWH and other areas for breeding and rearing of young (e.g. amphibian breeding habitat) • Fragmentation of two large natural corridors associated with the Main Humber River and East Humber River • Removals through this alternative would represent ~102.1 ha loss of habitat with respect to total ELC units affected by this alternative. • Reduction of wildlife habitat quality through indirect effects that cannot be fully mitigated including edge

	<p>effects (e.g. increased light and noise and the introduction of pathways for invasive species) and increased potential for animal-vehicle collisions</p> <ul style="list-style-type: none"> Moderate amount of fragmentation (fragmentation of the two large habitat blocks surrounding the Humber River and East Humber River) and potential for impacts to SAR and SWH. Existing disturbances (residential properties) lessen the extent of fragmentation in this location. Direct impacts on 0.05 ha of interior forest area (in Humber River valley; >100 m from edge); however, this interior forest area consists of primarily coniferous cultural plantation (CUP3 ELC unit), which represents lower quality wildlife habitat and less suitable breeding habitat for area-sensitive birds. <p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, compensation/enhancement measures; until confirmed, net effects remain the same as potential effects.</p> <p>Net effects include:</p> <ul style="list-style-type: none"> Removal of ~12.1 ha of wetland, of which 1.5 ha is PSW Reduction in wetland quality through indirect effects that cannot be fully mitigated including edge effects (e.g. increased light, wind, road contaminants and the introduction of pathways for invasive species) and impacts to hydrologic and groundwater inputs that support these features <p>Affected wetlands are generally small but contribute to feature diversity.</p>	<p>effects (e.g. increased light and noise and the introduction of pathways for invasive species) and increased potential for animal-vehicle collisions</p> <ul style="list-style-type: none"> High amount of fragmentation (fragmentation of the two large habitat blocks surrounding the Humber River and East Humber River) and potential for impacts to SAR and SWH. Direct impacts on 0.49 ha of interior forest area (northwest of patch HU-MH-54; >100 m from edge). Based on air photo interpretation, this interior forest area consists of mixed forest vegetation communities, which represent higher quality wildlife habitat and suitable breeding habitat for area-sensitive birds. <p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, compensation / enhancement measures; until confirmed, net effects remain the same as potential effects.</p> <p>Net effects include:</p> <ul style="list-style-type: none"> Removal of ~15.8 ha of wetland, of which 1.5 ha is PSW Reduction in wetland quality through indirect effects that cannot be fully mitigated including edge effects (e.g. increased light, wind, road contaminants and the introduction of pathways for invasive species) and impacts to hydrologic and groundwater inputs that support these features <p>Affected wetlands are generally small but contribute to feature diversity.</p>	<p>effects (e.g. increased light and noise and the introduction of pathways for invasive species) and increased potential for animal-vehicle collisions</p> <ul style="list-style-type: none"> Moderate-high amount of fragmentation (fragmentation of the two large habitat blocks surrounding the Humber River and East Humber River) and potential for impacts to SAR and SWH. No direct impacts on interior forest areas; however, due to the proximity of this route to interior forest northwest of patch HU-MH-54, there is a greater potential for indirect impacts on this higher quality interior habitat (mixed forest ELC units), which is suitable breeding habitat for area-sensitive birds. <p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, compensation / enhancement measures; until confirmed, net effects remain the same as potential effects.</p> <p>Net effects include:</p> <ul style="list-style-type: none"> Removal of ~13.3 ha of wetland, of which 1.5 ha is PSW Reduction in wetland quality through indirect effects that cannot be fully mitigated including edge effects (e.g. increased light, wind, road contaminants and the introduction of pathways for invasive species) and impacts to hydrologic and groundwater inputs that support these features <p>Affected wetlands are generally small but contribute to feature diversity.</p>
<p>1.2.2 Wetlands</p>	<p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, compensation/enhancement measures; until confirmed, net effects remain the same as potential effects.</p> <p>Net effects include:</p> <ul style="list-style-type: none"> Removal of ~82.3 ha of forest, meadow, thicket, plantation and treed swamp Removal of 31.0 ha of potentially significant woodland and plantation) Removal of 0.05 ha of interior woodland (however, it is considered lower quality interior forest as it is primarily composed of coniferous plantation) Crossing would require spanning a wide, deep portion of the river valley (~660 m long and ~32 m deep) to avoid infilling into the river valley Impacts to one Butternut (END); however, impacts may be compensated pending results of a future Butternut Health Assessment. Impacts to two potentially significant valleylands. 	<p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, compensation / enhancement measures; until confirmed, net effects remain the same as potential effects.</p> <p>Net effects include:</p> <ul style="list-style-type: none"> Removal of ~92.7 ha of plantation, thicket, woodland, meadow, forest, and swamp. Removal of 27.8 ha of potentially significant woodland Removal of 56.0 ha of woodland (forest, treed swamp and plantation) Crossing would require spanning a wide, deep portion of the river valley (~700 m long and 35 m deep) to avoid infilling into the river valley Impacts to one Butternut (END); however, impacts may be compensated pending results of a future Butternut Health Assessment. Impacts to two potentially significant valleylands. Reduction in vegetation community quality through indirect effects that cannot be fully mitigated including effects from road contaminants (e.g. salt, heavy metals, 	<p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, compensation / enhancement measures; until confirmed, net effects remain the same as potential effects.</p> <p>Net effects include:</p> <ul style="list-style-type: none"> Removal of ~88.8 ha of plantation, thicket, meadow, forest, and swamp Removal of 25.4 ha of potentially significant woodland Removal of 52.7 ha of woodland (forest, treed swamp and plantation) Removal of 0.49 ha of interior woodland and associated degradation of remaining adjacent interior woodland. Crossing would require spanning a wide, deep portion of the river valley (~1020 m long and 40 m deep) to avoid infilling into the river valley Impacts to one Butternut (END); however, impacts may be compensated pending results of a future Butternut Health Assessment. Impacts to two potentially significant valleylands.
<p>1.2.3 Woodlands and Vegetation</p>	<p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, compensation/enhancement measures; until confirmed, net effects remain the same as potential effects.</p> <p>Net effects include:</p> <ul style="list-style-type: none"> Removal of ~82.3 ha of forest, meadow, thicket, plantation and treed swamp Removal of 31.0 ha of potentially significant woodland and plantation) Removal of 0.05 ha of interior woodland (however, it is considered lower quality interior forest as it is primarily composed of coniferous plantation) Crossing would require spanning a wide, deep portion of the river valley (~660 m long and ~32 m deep) to avoid infilling into the river valley Impacts to one Butternut (END); however, impacts may be compensated pending results of a future Butternut Health Assessment. Impacts to two potentially significant valleylands. 	<p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, compensation / enhancement measures; until confirmed, net effects remain the same as potential effects.</p> <p>Net effects include:</p> <ul style="list-style-type: none"> Removal of ~88.8 ha of plantation, thicket, meadow, forest, and swamp Removal of 25.4 ha of potentially significant woodland Removal of 52.7 ha of woodland (forest, treed swamp and plantation) Removal of 0.49 ha of interior woodland and associated degradation of remaining adjacent interior woodland. Crossing would require spanning a wide, deep portion of the river valley (~1020 m long and 40 m deep) to avoid infilling into the river valley Impacts to one Butternut (END); however, impacts may be compensated pending results of a future Butternut Health Assessment. Impacts to two potentially significant valleylands. 	<p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, compensation / enhancement measures; until confirmed, net effects remain the same as potential effects.</p> <p>Net effects include:</p> <ul style="list-style-type: none"> Removal of ~92.7 ha of plantation, thicket, woodland, meadow, forest, and swamp. Removal of 27.8 ha of potentially significant woodland Removal of 56.0 ha of woodland (forest, treed swamp and plantation) Crossing would require spanning a wide, deep portion of the river valley (~700 m long and 35 m deep) to avoid infilling into the river valley Impacts to one Butternut (END); however, impacts may be compensated pending results of a future Butternut Health Assessment. Impacts to two potentially significant valleylands. Reduction in vegetation community quality through indirect effects that cannot be fully mitigated including effects from road contaminants (e.g. salt, heavy metals,

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	<ul style="list-style-type: none"> Reduction in vegetation community quality through indirect effects that cannot be fully mitigated including effects from road contaminants (e.g. salt, heavy metals, sediment / debris), introduction of pathways for invasive species, edge / exposure impacts (e.g. canopy blow down) <p>Vegetation communities within this alternative are generally large and represent some of the least disturbed and most well-established vegetation communities in the study area. No rare vegetation communities are affected by this alternative.</p>	<ul style="list-style-type: none"> Reduction in vegetation community quality through indirect effects that cannot be fully mitigated including effects from road contaminants (e.g. salt, heavy metals, sediment / debris), introduction of pathways for invasive species, edge / exposure impacts (e.g. canopy blow down) <p>Vegetation communities within this alternative are generally large and represent some of the least disturbed and most well-established vegetation communities in the study area. No rare vegetation communities are affected by this alternative.</p>	<p>sediment / debris), introduction of pathways for invasive species, edge / exposure impacts (e.g. canopy blow down)</p> <p>Vegetation communities within this alternative are generally large and represent some of the least disturbed and most well-established vegetation communities in the study area. No rare vegetation communities are affected by this alternative.</p>
1.2.4 Designated/Special/ Natural Areas	<p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, compensation/enhancement measures; until confirmed, net effects remain the same as potential effects.</p> <p>Net effects include:</p> <ul style="list-style-type: none"> Removal of ~11.5 ha (mixed forest/coniferous forest/deciduous forest/ cultural meadow) of the East Humber River ESA Removal of 138.5 ha within the Natural Heritage System of the Greenbelt Plan Removals within the York Region 'Greenlands System' and 'Core Features' within the City of Vaughan Removal of ~0.8 ha of Kirby Lands Property (TRCA properties) and ~4.1 ha of Nashville Resource Management Tract Conservation Reserve (TRCA properties) 	<p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, compensation / enhancement measures; until confirmed, net effects remain the same as potential effects.</p> <p>Net effects include:</p> <ul style="list-style-type: none"> Removal of ~11.5 ha of East Humber River ESA Removal of 165.7 ha of Natural Heritage System Area of the Greenbelt Plan Removals within the York Region 'Greenlands System' and 'Core Features' within the City of Vaughan Removal of ~0.9 ha of Kirby Lands Property (TRCA properties) and ~32.1 ha of Nashville Resource Management Tract Conservation Reserve (TRCA properties) 	<p>Net effects associated with the alternative are dependent on the ability to implement avoidance, mitigation, compensation / enhancement measures; until confirmed, net effects remain the same as potential effects.</p> <p>Net effects include:</p> <ul style="list-style-type: none"> Removal of ~11.5 ha of East Humber River ESA Removal of 164.9 ha of the Natural Heritage System of the Greenbelt Plan Removals within the York Region 'Greenlands System' and 'Core Features' within the City of Vaughan Removal of ~0.9 ha of Kirby Lands Property (TRCA properties) and ~34.6 ha of Nashville Resource Management Tract Conservation Reserve (TRCA properties)
1.3 Ecosystem Services	<p>Relative ES Value¹</p> <ul style="list-style-type: none"> Agriculture: Low Natural Cover: High Cumulative: High <p>ES Value Representation</p> <ul style="list-style-type: none"> Agriculture: 14% Natural Cover: 86% 	<p>Relative ES Value²</p> <ul style="list-style-type: none"> Agriculture: Low Natural Cover: High Cumulative: High <p>ES Value Representation</p> <ul style="list-style-type: none"> Agriculture: 13% Natural Cover: 87% 	<p>Relative ES Value³</p> <ul style="list-style-type: none"> Agriculture: Low Natural Cover: High Cumulative: High <p>ES Value Representation</p> <ul style="list-style-type: none"> Agriculture: 12% Natural Cover: 88%
1.4 Groundwater	1.4.1 Areas of Groundwater Recharge or Discharge	1.4.2 Groundwater Source Areas and Wellhead Protection Areas	1.4.3 Large Volume Wells
	<ul style="list-style-type: none"> Small to moderate loss of recharge due to footprint on permeable soils and small loss of discharge due to interception. There is no effect on WHPAs One large volume well may potentially need to be decommissioned. 	<ul style="list-style-type: none"> Small loss of recharge due to footprint on permeable soils and small loss of discharge due to interception. There is no net effect on WHPAs One large volume well may potentially need to be decommissioned. 	<ul style="list-style-type: none"> Small loss of recharge due to footprint on permeable soils and small loss of discharge due to interception. There is no net effect on WHPAs Two large volume wells may potentially need to be decommissioned.

¹ Calculated relative to the range of ecosystem service values for each category (Agriculture, Natural Cover, Total) across all sections & alternatives (i.e. S1-S9 alternatives cumulatively).

² Calculated relative to the range of ecosystem service values for each category (Agriculture, Natural Cover, Total) across all sections & alternatives (i.e. S1-S9 alternatives cumulatively).

³ Calculated relative to the range of ecosystem service values for each category (Agriculture, Natural Cover, Total) across all sections & alternatives (i.e. S1-S9 alternatives cumulatively).

Evaluation Factors and Sub-Factors		Alternative S8-3 (2019 Preferred)	Alternative S8-4	Alternative S8-5
1.4.4 Private Wells	<ul style="list-style-type: none"> Potential reduction in water quality in at least 10 wells due to potential salt issue only, because wells are shallow. At least 31 wells are to be removed / decommissioned by alternative. No commercial use and well displacement 	<ul style="list-style-type: none"> Potential reduction in water quality in at least 3 wells due to potential salt issue only, because wells are shallow At least 23 wells are to be removed / decommissioned by alternative. No commercial use and well displacement 	<ul style="list-style-type: none"> Potential reduction in water quality in at least 2 wells due to potential salt issue only, because wells are shallow At least 39 wells are to be removed / decommissioned by alternative. No commercial use and well displacement 	
1.4.5 Groundwater-Dependent Commercial Enterprises	<ul style="list-style-type: none"> Low potential to affect sensitive ecosystems with four (4) wetland areas within alternative that may be displaced. Sixteen (16) additional wetland areas and warmwater streams present in buffer zone that are not dependent on groundwater. Minimal loss of discharge function anticipated. There are at least five (5) cool to coldwater streams within alternative / buffer zone that are somewhat dependent on groundwater. Some loss of discharge function anticipated. 	<ul style="list-style-type: none"> Low potential to affect sensitive ecosystems with four (4) wetland areas within alternative that may be displaced. Sixteen (16) additional wetland areas and warmwater streams present in buffer zone that are not dependent on groundwater. Minimal loss of discharge function anticipated. There are at least five (5) cool to coldwater streams within alternative/buffer that are somewhat dependent on groundwater. Some loss of discharge function anticipated. 	<ul style="list-style-type: none"> Low potential to affect sensitive ecosystems with four (4) wetland areas within alternative that may be displaced. Sixteen (16) additional wetland areas and warmwater streams present in buffer zone that are not dependent on groundwater. Minimal loss of discharge function anticipated. There are at least five (5) cool to coldwater streams within alternative/buffer that are somewhat dependent on groundwater. Some loss of discharge function anticipated. 	
1.4.6 Groundwater-Sensitive Ecosystems	<ul style="list-style-type: none"> Low potential to affect sensitive ecosystems with four (4) wetland areas within alternative that may be displaced. Sixteen (16) additional wetland areas and warmwater streams present in buffer zone that are not dependent on groundwater. Minimal loss of discharge function anticipated. There are at least five (5) cool to coldwater streams within alternative / buffer zone that are somewhat dependent on groundwater. Some loss of discharge function anticipated. 	<ul style="list-style-type: none"> Low potential to affect sensitive ecosystems with four (4) wetland areas within alternative that may be displaced. Sixteen (16) additional wetland areas and warmwater streams present in buffer zone that are not dependent on groundwater. Minimal loss of discharge function anticipated. There are at least five (5) cool to coldwater streams within alternative/buffer that are somewhat dependent on groundwater. Some loss of discharge function anticipated. 	<ul style="list-style-type: none"> Low potential to affect sensitive ecosystems with four (4) wetland areas within alternative that may be displaced. Sixteen (16) additional wetland areas and warmwater streams present in buffer zone that are not dependent on groundwater. Minimal loss of discharge function anticipated. There are at least five (5) cool to coldwater streams within alternative/buffer that are somewhat dependent on groundwater. Some loss of discharge function anticipated. 	
1.5 Surface Water	<ul style="list-style-type: none"> Out of 9 watercourse crossings, seven watercourse crossings require fluvial geomorphology assessment, including the Humber River and the East Humber River. The East Humber River is designated Redside Dace habitat and has wide setbacks. Both Humber River valleys are relatively deep. Remaining crossings will be minor to moderate and require crossing structures. Comparatively less meandering planform and recent aerial imagery does not show any obvious signs of instability. The proposed alignment crosses at a generally straight section of the watercourse. The floodplain width of Humber River is ~175 m. The valley crossing of Humber River will require a total span of ~660 m depending upon the placement of abutments. This route has the lowest impact on the flood plain. Highway 27 interchange can be mitigated by realigning the tributary connection upstream to eliminate the need for a second culvert. 	<ul style="list-style-type: none"> Out of 11 watercourse crossings, seven crossings require fluvial assessments, including the Humber River and the East Humber River. The East Humber River is designated Redside Dace habitat and has wide setbacks. Both Humber River valleys are relatively deep. Remaining crossings would be minor to moderate and require crossing structures. The river has a sinuous planform through this section. Corridor runs nearly parallel to Humber River where it crosses the valley. The flood plain width at the crossing location is ~430 m. The valley crossing of Humber River will require a total span of ~1020 m depending upon the placement of abutments. The placement of piers could be influenced by the meandering channel. The presence of the meandering channel, as seen on aerial imagery, through this reach indicates a higher risk of channel migration along the flood plain. Highway 27 interchange can be mitigated by realigning the tributary connection upstream to eliminate the need for a second culvert. 	<ul style="list-style-type: none"> Out of 9 watercourse crossings, seven crossings require fluvial assessments, including the Humber River and the East Humber River. The East Humber River is designated Redside Dace habitat and has wide setbacks. Both Humber River valleys are relatively deep. Remaining crossings would be minor to moderate and require crossing structures. Although a short section of the Humber River is straight at the river crossing (west bank), the channel meanders through this section and flows along the base of the west valley slope. A large erosion scarp is also identifiable in aerial imagery along the eastern portion of the valley with the meandering watercourse located at the base of this scarp. The flood plain width at the crossing location is ~460 m. The valley crossing of Humber River will require a total span of ~700 m depending upon the placement of abutments. The placement of piers could be influenced by the meandering channel. The presence of the meandering channel, as seen on aerial imagery, through this reach indicates a higher risk of channel migration along the flood plain. Highway 27 interchange can be mitigated by realigning the tributary connection upstream to eliminate the need for a second culvert. 	
1.5.1 Watershed / Subwatershed Drainage Features / Patterns	<ul style="list-style-type: none"> Introduces 46 ha of impervious area including 3 ha to the tributary of Main Humber, 16 ha to Main Branch of Main Humber, 27 ha to East Humber River. Three (3) regulated watercourse crossings; Medium impacts on quality through direct and indirect discharges of contaminated and sediment-laden run-off. Low impacts on hydrology due to changes in ground permeability. 	<ul style="list-style-type: none"> Introduces 52 ha impervious area including 3 ha to the tributary of Main Humber, 18 ha to Main Branch of Main Humber, 31 ha to East Humber River. Three (3) regulated watercourse crossings; Medium impacts on quality through direct and indirect discharges of contaminated and sediment-laden runoff. Low impacts on hydrology due to changes in ground permeability. 	<ul style="list-style-type: none"> Introduces 50 ha of impervious area including 3 ha to the tributary of Main Humber, 18 ha to Main Branch of Main Humber, 29 ha to East Humber River. Three (3) regulated watercourse crossings; Medium impacts on quality through direct and indirect discharges of contaminated and sediment-laden runoff. Low impacts on hydrology due to changes in ground permeability. 	
1.5.2 Surface Water Quality and Quantity	<ul style="list-style-type: none"> Introduces 46 ha of impervious area including 3 ha to the tributary of Main Humber, 16 ha to Main Branch of Main Humber, 27 ha to East Humber River. Three (3) regulated watercourse crossings; Medium impacts on quality through direct and indirect discharges of contaminated and sediment-laden run-off. Low impacts on hydrology due to changes in ground permeability. 	<ul style="list-style-type: none"> Introduces 52 ha impervious area including 3 ha to the tributary of Main Humber, 18 ha to Main Branch of Main Humber, 31 ha to East Humber River. Three (3) regulated watercourse crossings; Medium impacts on quality through direct and indirect discharges of contaminated and sediment-laden runoff. Low impacts on hydrology due to changes in ground permeability. 	<ul style="list-style-type: none"> Introduces 50 ha of impervious area including 3 ha to the tributary of Main Humber, 18 ha to Main Branch of Main Humber, 29 ha to East Humber River. Three (3) regulated watercourse crossings; Medium impacts on quality through direct and indirect discharges of contaminated and sediment-laden runoff. Low impacts on hydrology due to changes in ground permeability. 	

Evaluation Factors and Sub-Factors		Alternative S8-3 (2019 Preferred)	Alternative S8-4	Alternative S8-5
		<ul style="list-style-type: none"> Low effects on modifications to surface drainage patterns and alterations of water bodies. Road runoff from long structure will require a storm collection system to be integrated into the structure design. 	<ul style="list-style-type: none"> Low effects on modifications to surface drainage patterns and alterations of water bodies. Road runoff from long structure will require a storm collection system to be integrated into the structure design. 	<ul style="list-style-type: none"> Low effects on modifications to surface drainage patterns and alterations of water bodies. Road runoff from long structure will require a storm collection system to be integrated into the structure design.
1.6 Air Quality and Climate Change		<ul style="list-style-type: none"> A few residences (Huntington Rd., Kirby Rd., Highway 2/ and Kipling Ave.) are anticipated to be close enough to experience a change in air quality, but pollutants will be within acceptable levels. 	<ul style="list-style-type: none"> A few residences (Huntington Rd., Kirby Rd., Highway 2/ and Kipling Ave.) are anticipated to be close enough to experience a change in air quality, but pollutants will be within acceptable levels. 	<ul style="list-style-type: none"> A few residences (Huntington Rd., Kirby Rd., Highway 2/ and Kipling Ave.) are anticipated to be close enough to experience a change in air quality, but pollutants will be within acceptable levels.
2.0 Land Use / Socio-Economic Environment				
2.1 Land Use Planning Policies, Goals, Objectives				
2.1.1 Indigenous Land Claims		Treaties including Nanfan (1701), Treaty 3 (1795), Treaty 3.75 (1795), Treaty 13 (1805), Treaty 13A (1805), Treaty 18, 1818, Treaty 19 (1918), Williams Treaty (1923), as well as various Assertions and Claims.	Treaties including Nanfan (1701), Treaty 3 (1795), Treaty 3.75 (1795), Treaty 13 (1805), Treaty 13A (1805), Treaty 18, 1818, Treaty 19 (1918), Williams Treaty (1923), as well as various Assertions and Claims.	Treaties including Nanfan (1701), Treaty 3 (1795), Treaty 3.75 (1795), Treaty 13 (1805), Treaty 13A (1805), Treaty 18, 1818, Treaty 19 (1918), Williams Treaty (1923), as well as various Assertions and Claims.
2.1.2 Provincial / Federal Land Use Planning Policies / Goals / Objectives		<ul style="list-style-type: none"> Additional Indigenous Assertions and/or Claims may be filed and/or proven at any time. Impacts PPS agricultural lands policies. Impacts 153 hectares of Greenbelt (Protected Countryside & NHS). Impacts 31 hectares of Agricultural lands. Impacts 4 ha of existing Urban Area Impacts 16 ha of Rural Area 	<ul style="list-style-type: none"> Additional Indigenous Assertions and/or Claims may be filed and/or proven at any time. Impacts PPS agricultural lands policies. Impacts 188 ha of Greenbelt (Protected Countryside & NHS). Impacts 37 ha of Agricultural lands 	<ul style="list-style-type: none"> Additional Indigenous Assertions and/or Claims may be filed and/or proven at any time. Impacts PPS agricultural lands policies. Impacts 185 ha of Greenbelt (Protected Countryside & NHS). Impacts 38 ha of Agricultural lands Impacts 2 ha of Rural Area
2.1.3 Municipal (local and regional) Land Use Planning Policies / Goals / Objectives		<ul style="list-style-type: none"> Impacts 153 ha of lands designated as Greenbelt (Protected Countryside & NHS). Impacts 31 ha of Agricultural lands Impacts 46 ha of North Kleinburg Nashville Secondary Plan. Impacts 22 ha of Huntington Road Community Area Impacts 3 hectares of Environmental Policy Area. Impacts 16 hectares of Rural Area. 	<ul style="list-style-type: none"> Impacts 188 ha of lands designated as Greenbelt (Protected Countryside & NHS). Impacts 37 ha of Agricultural lands. Impacts 0.46 ha North Kleinburg Nashville Secondary Plan No impacts to Huntington Road Community Area Future Urban Area impact is approximately 0.5 ha of non-active development applications. 	<ul style="list-style-type: none"> Impacts 185 ha of lands designated as Greenbelt (Protected Countryside & NHS). Impacts 38 ha of Agricultural lands. Impacts 13.5 ha of North Kleinburg Nashville Secondary Plan. Impacts 1.4 ha of the Huntington Road Community Area.
2.1.4 Development Objectives of Private Property Owners		<ul style="list-style-type: none"> Impacts 45.5 hectares of North Kleinburg Nashville Secondary Plan. Impact is anticipated by Secondary Plan policies but would require significant revision to that Plan. 	<ul style="list-style-type: none"> Avoids most of North Kleinburg Nashville Secondary Plan (Impacts 0.46 ha). Future Urban Area located on lands outside of developable areas. 	<ul style="list-style-type: none"> Impacts 13.5 ha of North Kleinburg Nashville Secondary Plan.
2.2 Land Use – Community				
2.2.1 First Nation Reserves		<ul style="list-style-type: none"> No reserves in study area. 	<ul style="list-style-type: none"> No reserves in study area. 	<ul style="list-style-type: none"> No reserves in study area.
2.2.2 Indigenous Sacred Areas		<ul style="list-style-type: none"> No known or reported Indigenous Sacred Areas 	<ul style="list-style-type: none"> No known or reported Indigenous Sacred Areas 	<ul style="list-style-type: none"> No known or reported Indigenous Sacred Areas
2.2.3 Urban and Rural Residential Uses and Properties		<ul style="list-style-type: none"> 28 residential properties impacted. 	<ul style="list-style-type: none"> 20 residential properties impacted. 	<ul style="list-style-type: none"> 22 residential properties impacted.
2.2.4 Commercial/ Industrial Uses and Properties		<ul style="list-style-type: none"> Impacts four (4) commercial operations: Huntington E. Stud Farm, Nashville Sod Supply, Silver Spur Camp and Empire Venus Group LTD. 	<ul style="list-style-type: none"> Impacts four (4) commercial operations: Downsview Group Storage, Pels Get Physical, Silver Spur Camp and Young-Winfield Inc. 	<ul style="list-style-type: none"> Impacts five (5) commercial operations: RGH Bloodstock, Downsview Group Storage, Pels Get Physical, Silver Spur Camp and Young-Winfield Inc.
2.2.5 Recreational Areas and Tourist Attractions		<ul style="list-style-type: none"> Route crosses small portion of the Humber Valley Heritage Trail however impacts can be mitigated. 	<ul style="list-style-type: none"> Route crosses the west trailhead access and a northerly portion of the Humber Valley Heritage Trail and may reduce the natural heritage/ urban wilderness values associated with the trail. 	<ul style="list-style-type: none"> Crosses a central portion of the Humber Valley Heritage Trail and may reduce the natural heritage/ urban wilderness values of that portion of the trail.
2.2.6 Community Facilities / Institutions		<ul style="list-style-type: none"> No impacts. 	<ul style="list-style-type: none"> No impacts. 	<ul style="list-style-type: none"> No impacts.
2.2.7 Municipal Infrastructure and Public Service Facilities		<ul style="list-style-type: none"> No impacts. 	<ul style="list-style-type: none"> No impacts. 	<ul style="list-style-type: none"> No impacts.

2.3 Noise Sensitive Areas (NSA's)			
2.3.1 Transportation Noise	<ul style="list-style-type: none"> This alternative is the closest route to existing and future residential developments. Several residences (Huntington Rd., Kirby Rd., Highway 27 and Kipling Ave., subdivision on Orico and Belsite Rd.) are anticipated to be close enough to experience an increase in traffic noise. 	<ul style="list-style-type: none"> This alternative is the furthest away from existing and future developments. For example, it is more than 1km from the existing community in the northeast quadrant of Nashville Road and Huntington Road. Several residences (Huntington Rd., Kirby Rd., Highway 27 and Kipling Ave., subdivision on Orico and Belsite Courts.) are anticipated to be close enough to result in an increase in traffic noise levels. 	<ul style="list-style-type: none"> This alternative is further from existing and future developments than S8-3 but closer than S8-4. It is nearly 1km from the existing community in the northeast quadrant of Nashville Road and Huntington Road. Several residences (Huntington Rd., Kirby Rd., Highway 27 and Kipling Ave., subdivision on Orico and Belsite Courts.) are anticipated to be close enough to result in an increase in traffic noise levels.
2.4 Land Use – Resources	<p>Treaties including Nantian (1701), Treaty 3 (1795), Treaty 3.75 (1795), Treaty 13 (1805), Treaty 13A (1805), Treaty 18, 1818, Treaty 19 (1918), Williams Treaty (1923), as well as various Assertions and Claims.</p> <ul style="list-style-type: none"> Additional Indigenous Assertions and/or Claims may be filed and/or proven at any time. 	<p>Treaties including Nantian (1701), Treaty 3 (1795), Treaty 3.75 (1795), Treaty 13 (1805), Treaty 13A (1805), Treaty 18, 1818, Treaty 19 (1918), Williams Treaty (1923), as well as various Assertions and Claims.</p> <ul style="list-style-type: none"> Additional Indigenous Assertions and/or Claims may be filed and/or proven at any time. 	<p>Treaties including Nantian (1701), Treaty 3 (1795), Treaty 3.75 (1795), Treaty 13 (1805), Treaty 13A (1805), Treaty 18, 1818, Treaty 19 (1918), Williams Treaty (1923), as well as various Assertions and Claims.</p> <ul style="list-style-type: none"> Additional Indigenous Assertions and/or Claims may be filed and/or proven at any time.
2.4.2 Agriculture / Specialty Crop	<ul style="list-style-type: none"> Removal or sterilization of Class 1 – 3 agricultural lands Specialty Crops/Cropland affected Cropland affected Livestock operations affected Loss of agricultural buildings Agricultural buildings within 50 m Field crop operations affected Farm properties greater than 20 ha affected Farm properties less than 20 ha affected Severed parcels greater than 20 ha created Severed parcels less than 20 ha created Landlocked parcels created High investment operations affected 	<ul style="list-style-type: none"> Loss of 2.4 ha of Class 1 – 3 lands No effect Potential effect remains the same Three livestock operations affected (horse, 2 hobby horse) (loss of land and farm residential unit on horse farm, loss of buildings and land on both hobby horse farms) Potential effect remains the same Potential effect remains the same Potential effect remains the same Potential effect remains the same Potential effect remains the same Eight severed parcels greater than 20 ha created Nine severed parcels less than 20 ha created Three landlocked parcels created No effect 	<ul style="list-style-type: none"> Loss of 17.5 ha of Class 1 – 3 lands Loss of 1.9 ha of nursery stock lands Potential effect remains the same Four livestock operations affected (3 horse and one poultry) (buildings and land) Potential effect remains the same No effect Potential effect remains the same Potential effect remains the same Potential effect remains the same Fifteen severed parcels greater than 20 ha created Twenty-one severed parcels less than 20 ha created Ten landlocked parcels created No effect
			<ul style="list-style-type: none"> Loss of 18.8 ha of Class 1 – 3 lands Loss of 1.9 ha of nursery stock lands Potential effect remains the same Four livestock operations affected (3 horse and one poultry) (buildings and land) Potential effect remains the same No effect Potential effect remains the same Potential effect remains the same Potential effect remains the same Thirteen severed parcels greater than 20 ha created Nineteen severed parcels less than 20 ha created Nine landlocked parcels created No effect

Evaluation Factors and Sub-Factors		Alternative S8-3 (2019 Preferred)	Alternative S8-4	Alternative S8-5
<ul style="list-style-type: none"> Farm equipment transportation routes affected Division of agricultural community areas Loss of tile drainage 		<ul style="list-style-type: none"> No effect No effect Loss of 5.8 ha of systematic tile drainage Route crosses small portion of the Humber Valley Heritage Trail however impacts can be mitigated. No impacts. 	<ul style="list-style-type: none"> No effect No effect No effect Route crosses northerly portion of the Humber Valley Heritage Trail and may reduce the natural heritage/urban wilderness values associated with the trail. No impacts. 	<ul style="list-style-type: none"> No effect No effect No effect Crosses the central portion of the Humber Valley Heritage Trail and may reduce the natural heritage/urban wilderness values of that portion of the trail. No impacts.
	2.4.3 Recreation			
	2.4.4 Aggregate and Mineral Resources			
2.5 Major Utility Transmission Corridors and Pipelines		<ul style="list-style-type: none"> Alternative has 1 hydro line crossing. Alternative has 1 pipeline crossing. No impacts. 	<ul style="list-style-type: none"> Alternative has 1 hydro line crossing. Alternative has 1 pipeline crossing. No impacts. 	<ul style="list-style-type: none"> Alternative has 1 hydro line crossing. Alternative has 1 pipeline crossing. No impacts.
2.5.1 Major Existing Utility Transmission Corridors and Pipelines				
2.5.2 Major Proposed Utility Transmission Corridors and Pipelines				
2.6 Contaminated Property and Waste Management		<p>Properties within alternative:</p> <ul style="list-style-type: none"> A waste disposal site is located at the southeast corner of Kipling Avenue and King-Vaughan Road (4853 King Vaughan Road) in Vaughan A waste disposal site is present at the west end of the Kirby Road. This waste disposal site has been closed for >25 years One (1) commercial property. <p>Properties within 250 m of alternative:</p> <ul style="list-style-type: none"> One (1) commercial property. 	<p>Properties within alternative:</p> <ul style="list-style-type: none"> A waste disposal site is located at the southeast corner of Kipling Avenue and King-Vaughan Road (4853 King Vaughan Road) in Vaughan A waste disposal site is present at the west end of the Kirby Road. This waste disposal site has been closed for >25 years One (1) commercial property with farm operations, outdoor storage and abandoned automobiles. <p>Properties within 250 m of alternative:</p> <ul style="list-style-type: none"> One (1) commercial property with outdoor storage and abandoned/used cars. 	<p>Properties within alternative:</p> <ul style="list-style-type: none"> A waste disposal site is located at the southeast corner of Kipling Avenue and King-Vaughan Road (4853 King Vaughan Road) in Vaughan A waste disposal site is present at the west end of the Kirby Road. This waste disposal site has been closed for >25 years. One (1) commercial property with outdoor storage and abandoned/used cars. <p>Properties within 250 m of alternative:</p> <ul style="list-style-type: none"> One (1) commercial property with farm operations, outdoor storage and abandoned automobiles.
2.7 Landscape Composition				
2.7.1 Terrain		<ul style="list-style-type: none"> Rolling hills with some flat agricultural lands. Designated primarily Greenbelt Protected Countryside, Urban area, near southern end of Hwy 27 borders on a developed area. Small area of wetland impacted/removed. Affects 9 watercourses including 2 high-level watercourses. Majority of this alternative falls within the Greenbelt Protected Countryside (low level) constraint. Conceptual bridge crossing for Humber River Main covers a moderate gap in this alternative. Humber East River crossing for this alternative alters more surrounding terrain. 	<ul style="list-style-type: none"> Rolling hills with some flat agricultural lands. Designated primarily Greenbelt Protected Countryside, Urban area, near southern end of Hwy 27 borders on a developed area. Moderate area of wetland impacted/removed. Affects 12 watercourses. Majority of the alternative falls within the Greenbelt Protected Countryside (low level) constraint. Conceptual bridge crossing for Humber River Main River covers a moderate to large gap in this alternative. Humber East River crossing for this alternative alters the least terrain. West end of alternative impacts Downsview Group Outdoor storage. 	<ul style="list-style-type: none"> Rolling hills with some flat agricultural lands. Designated primarily Greenbelt Protected Countryside, small designated Agricultural area and Future Urban area, near southern end of Hwy 27 borders on a developed area. Moderate area of wetland impacted/removed. Affects 9 watercourses. Majority of the alternative falls within the Greenbelt Protected Countryside (low level) constraint. Conceptual bridge crossing for Humber River Main River covers a moderate gap in this alternative. Humber East River crossing for this alternative alters the least terrain. West end of alternative goes through Downsview Group Outdoor storage.
2.7.2 Vegetation		<ul style="list-style-type: none"> Intersects East Humber River ESA. Affects 7 unevaluated wetlands. Affects 1 Provincially Significant Wetland (PSW). Interior woodland removal of 0.05 ha. Interrupts 2 potentially significant wooded areas. 	<ul style="list-style-type: none"> Intersects East Humber River ESA. Affects 8 unevaluated wetlands. Affects 1 Provincially Significant Wetland (PSW). Interior woodland removal of 0.49 ha. Interrupts 2 potentially significant wooded areas. 	<ul style="list-style-type: none"> Intersects East Humber River ESA. Affects 10 unevaluated wetlands. Affects 1 Provincially Significant Wetland (PSW). Interrupts 2 potentially significant wooded areas. ~56 ha of woodland removed (cultural woodland, deciduous forest, coniferous forest, mixed forest,

Evaluation Factors and Sub-Factors		Alternative S8-3 (2019 Preferred)	Alternative S8-4	Alternative S8-5
		<ul style="list-style-type: none"> -54 ha of woodland removed (deciduous forest, coniferous forest, mixed forest, deciduous swamp, mixed swamp and cultural plantation). 	<ul style="list-style-type: none"> -53 ha of woodland removed (deciduous forest, coniferous forest, mixed forest, deciduous swamp, mixed swamp and cultural plantation). 	<ul style="list-style-type: none"> deciduous swamp, mixed swamp and cultural plantation).
2.7.3 Visual Impacts		<ul style="list-style-type: none"> Diminished aesthetic quality of scenic views, reduced visual effect through mitigation/compensation measures. Key receptor at Humber Valley Heritage Trail likely affected by this alternative. Nobleton key receptor least affected (and 2 closer residential clusters moderately) least affected by this alternative. Kleinburg and Nashville receptors and 2 closer residential subdivisions clusters most affected by this alternative. Low landscape absorptivity at west end of alternative and moderate through east end, moderate to high absorptivity through the rest of the alternative, some natural buffering (forested areas) between two of the key receptors and the alternative. Subdivision north of Nashville likely the most affected, particularly by this alternative. 	<ul style="list-style-type: none"> Diminished aesthetic quality of scenic views, reduced visual effect through mitigation/compensation measures. Key receptor at Humber Valley Heritage Trail likely affected by this alternative. Nobleton key receptor least affected and 2 closer residential clusters less affected by this alternative. Kleinburg and Nashville receptors and closer residential subdivisions less affected by this alternative. Moderate to high landscape absorptivity at west end of alternative at the East Humber River valley and moderate to low through east end where it becomes predominately agriculture. Some natural buffering (forested areas) between two of the key receptors and the alternative. Subdivision north of Nashville likely the most affected. 	<ul style="list-style-type: none"> Diminished aesthetic quality of scenic views, reduced visual effect through mitigation/compensation measures. Key receptor at Humber Valley Heritage Trail likely affected by this alternative. Nobleton key receptor least affected and 2 closer residential clusters less affected by this alternative. Kleinburg and Nashville receptors and closer residential subdivisions less affected by this alternative. Moderate to high landscape absorptivity at west end of alternative at the East Humber River valley and moderate to low through east end where it becomes predominately agriculture. Some natural buffering (forested areas) between two of the key receptors and the alternative. Subdivision north of Nashville likely the most affected.
2.7.4 Aesthetics		<ul style="list-style-type: none"> Alternative fairly related to landscape, compatibility with residential uses to the south may be challenging. Several commercial/industrial facilities are located under the west end of this alternative. Potential vistas of the Greenbelt wooded areas and watercourses. 	<ul style="list-style-type: none"> Alternative fairly well related to landscape Several commercial/industrial facilities are located under the west end of this alternative. Potential vistas of the Greenbelt wooded areas and watercourses. 	<ul style="list-style-type: none"> Alternative fairly related to landscape Few commercial/industrial facilities are located under the west end of this alternative. Potential vistas of the Greenbelt wooded areas and watercourses.
3.0 Cultural Environment and Cultural Heritage Landscapes				
3.1 Built Heritage and Cultural Heritage Landscapes				
3.1.1 Built Heritage Resources		<ul style="list-style-type: none"> There are five (5) listed BHRs (BHR 235, BHR 236, BHR 242, BHR 244, BHR 245) and one (1) potential BHR (BHR 250) affected by this alternative 	<ul style="list-style-type: none"> There are four (4) listed BHRs (BHR 238, BHR 242, BHR 244, BHR 245), two (2) potential BHRs (BHR 239, BHR 250), and one (1) Designated BHR (BHR 237) affected by this alternative. 	<ul style="list-style-type: none"> There are four (4) listed BHRs (BHR 238, BHR 242, BHR 244, BHR 245), two (2) potential BHRs (BHR 239, BHR 250), and one (1) Designated BHR (BHR 237) affected by this alternative.
3.1.2 Heritage Bridges		<ul style="list-style-type: none"> There are no Heritage Bridges affected by this alternative 	<ul style="list-style-type: none"> There are no Heritage Bridges affected by this alternative 	<ul style="list-style-type: none"> There are no Heritage Bridges affected by this alternative
3.1.3 Cultural Heritage Landscapes		<ul style="list-style-type: none"> There are two (2) listed (CHL-241 and CHL-243) CHLs affected by this alternative. 	<ul style="list-style-type: none"> There are two (2) listed (CHL-241, CHL-243) CHLs affected by this alternative. 	<ul style="list-style-type: none"> There are two (2) listed (CHL-241, CHL-243) CHLs affected by this alternative.
3.2 Archaeology				
3.2.1 Pre-Contact and Contact Indigenous Archaeological Sites		<ul style="list-style-type: none"> No registered sites, however archaeological potential is present within 189 hectares of this alternative 	<ul style="list-style-type: none"> There are five (5) registered pre-contact or contact Indigenous Archaeological sites (AIGV-399, AIGV-79, AIGV-80, AIGV-81 and findsport NDFS-0049) within this alternative. No further work is required on NDFS-0049. Archaeological potential is present within 235 hectares of this alternative 	<ul style="list-style-type: none"> There are three (3) registered pre-contact or contact Indigenous Archaeological sites (AIGV-67, AIGV-79, AIGV-80) within this alternative. Archaeological potential is present within 227 hectares of this alternative
3.2.2 Historic Euro-Canadian Archaeological Sites		<ul style="list-style-type: none"> No registered sites, however archaeological potential is present within 189 	<ul style="list-style-type: none"> There is one (1) registered archaeological site (AIGV-188), although the site has no further work required as it has been cleared. Archaeological potential is also present within 235 hectares of this alternative. 	<ul style="list-style-type: none"> There are no registered Euro-Canadian Archaeological sites within this alternative. However archaeological potential is present within 227 hectares of this alternative.
3.2.3 Indigenous Burial Sites		<ul style="list-style-type: none"> No known or reported Indigenous Burial Sites 	<ul style="list-style-type: none"> No known or reported Indigenous Burial Sites 	<ul style="list-style-type: none"> No known or reported Indigenous Burial Sites
3.2.4 Cemeteries		<ul style="list-style-type: none"> No cemeteries present within this alternative 	<ul style="list-style-type: none"> No cemeteries present within this alternative 	<ul style="list-style-type: none"> No cemeteries present within this alternative
4.0 Transportation				
4.1 System Capacity & Efficiency				
4.1.1 Movement of People		<ul style="list-style-type: none"> 706,000 auto vehicle km 	<ul style="list-style-type: none"> 706,000 auto vehicle km 	<ul style="list-style-type: none"> 706,000 auto vehicle km

Evaluation Factors and Sub-Factors		Alternative S8-3 (2019 Preferred)	Alternative S8-4	Alternative S8-5
		<ul style="list-style-type: none"> 2,937,000 auto vehicle km 86% better than LOS D (80% in base without GTAW) 68% better than LOS (60% in base without GTAW) Improves connections to existing and planned urban centres. Improves connections to transitway from urban centres, mobility hubs, and other transit services. Improved transportation options for travellers. GTA West – 5.8 km. GTAW (East of Hwy 27) - 390 vehicles 52,000 truck vehicle km 255,000 truck vehicle km 85% better than LOS D (78%) 69% better than LOS D (62%) Supports connections to existing and planned freight trip generators 	<ul style="list-style-type: none"> 2,937,000 auto vehicle km 86% better than LOS D (80% in base without GTAW) 68% better than LOS (60% in base without GTAW) Improves connections to existing and planned urban centres. Improves connections to transitway from urban centres, mobility hubs, and other transit services. Improved transportation options for travellers. GTA West – 5.8 km. GTAW (East of Hwy 27) - 390 vehicles 52,000 truck vehicle km 255,000 truck vehicle km 85% better than LOS D (78%) 69% better than LOS D (62%) Supports connections to existing and planned freight trip generators 	<ul style="list-style-type: none"> 2,937,000 auto vehicle km 86% better than LOS D (80% in base without GTAW) 68% better than LOS (60% in base without GTAW) Improves connections to existing and planned urban centres. Improves connections to transitway from urban centres, mobility hubs, and other transit services. Improved transportation options for travellers. GTA West – 5.8 km. GTAW (East of Hwy 27) - 390 vehicles 52,000 truck vehicle km 255,000 truck vehicle km 85% better than LOS D (78%) 69% better than LOS D (62%) Supports connections to existing and planned freight trip generators
4.1.2 Movement of Goods		<ul style="list-style-type: none"> GTAW (East of Hwy 27) - 390 vehicles 52,000 truck vehicle km 255,000 truck vehicle km 85% better than LOS D (78%) 69% better than LOS D (62%) Supports connections to existing and planned freight trip generators 	<ul style="list-style-type: none"> GTAW (East of Hwy 27) - 390 vehicles 52,000 truck vehicle km 255,000 truck vehicle km 85% better than LOS D (78%) 69% better than LOS D (62%) Supports connections to existing and planned freight trip generators 	<ul style="list-style-type: none"> GTAW (East of Hwy 27) - 390 vehicles 52,000 truck vehicle km 255,000 truck vehicle km 85% better than LOS D (78%) 69% better than LOS D (62%) Supports connections to existing and planned freight trip generators
4.1.3 System performance during peak periods		<ul style="list-style-type: none"> South of King St - 0.79 North of Teston Rd / Nashville Rd - 0.52 West of Hwy 27 - 0.67 East of Hwy 27 - 0.65 GTAW (West of Hwy 27) – 0.96 GTAW (East of Hwy 27) – 0.83 Hwy 27 (South of King St) - 0.86 Hwy 27 (North of Kirby Rd) - 0.60 Hwy 27 (North of Teston Rd / Nashville Rd) - 0.71 Islington Ave (North of Teston Rd / Nashville Rd) - 0.41 Supports potential demand management strategies and travel demand supportive measures Good opportunity for redundancy on the local road network. 	<ul style="list-style-type: none"> South of King St - 0.79 North of Teston Rd / Nashville Rd - 0.52 West of Hwy 27 - 0.67 East of Hwy 27 - 0.65 GTAW (West of Hwy 27) – 0.96 GTAW (East of Hwy 27) – 0.83 Hwy 27 (South of King St) - 0.86 Hwy 27 (North of Kirby Rd) - 0.60 Hwy 27 (North of Teston Rd / Nashville Rd) - 0.71 Islington Ave (North of Teston Rd / Nashville Rd) - 0.41 Supports potential demand management strategies and travel demand supportive measures Good opportunity for redundancy on the local road network. 	<ul style="list-style-type: none"> South of King St - 0.79 North of Teston Rd / Nashville Rd - 0.52 West of Hwy 27 - 0.67 East of Hwy 27 - 0.65 GTAW (West of Hwy 27) – 0.96 GTAW (East of Hwy 27) – 0.83 Hwy 27 (South of King St) - 0.86 Hwy 27 (North of Kirby Rd) - 0.60 Hwy 27 (North of Teston Rd / Nashville Rd) - 0.71 Islington Ave (North of Teston Rd / Nashville Rd) - 0.41 Supports potential demand management strategies and travel demand supportive measures Good opportunity for redundancy on the local road network.
4.2 System reliability / redundancy		<ul style="list-style-type: none"> Good opportunity for redundancy on the local road network. 	<ul style="list-style-type: none"> Good opportunity for redundancy on the local road network. 	<ul style="list-style-type: none"> Good opportunity for redundancy on the local road network.
4.3 Safety				
4.3.1 Traffic Safety		<ul style="list-style-type: none"> Good opportunity for traffic safety on the local road network. 	<ul style="list-style-type: none"> Good opportunity for traffic safety on the local road network. 	<ul style="list-style-type: none"> Good opportunity for traffic safety on the local road network.
4.3.2 Emergency Access		<ul style="list-style-type: none"> High potential for improved access without reductions to existing access. 	<ul style="list-style-type: none"> High potential for improved access without reductions to existing access. 	<ul style="list-style-type: none"> High potential for improved access without reductions to existing access.
4.4 Mobility & Accessibility				
4.4.1 Modal integration and balance		<ul style="list-style-type: none"> Good opportunity for intermodal connections at transitway stations and carpool lots. Improved access to future employment lands. High support for inter-regional connections. Maintains all existing roads crossing the future corridor 	<ul style="list-style-type: none"> Good opportunity for intermodal connections at transitway stations and carpool lots. Improved access to future employment lands. High support for inter-regional connections. Maintains all existing roads crossing the future corridor 	<ul style="list-style-type: none"> Good opportunity for intermodal connections at transitway stations and carpool lots. Improved access to future employment lands. High support for inter-regional connections. Maintains all existing roads crossing the future corridor
4.4.2 Linkages to Population and Employment Centres		<ul style="list-style-type: none"> Improved access to future employment lands. 	<ul style="list-style-type: none"> Improved access to future employment lands. 	<ul style="list-style-type: none"> Improved access to future employment lands.
4.4.3 Recreation and Tourism Travel		<ul style="list-style-type: none"> High support for inter-regional connections. 	<ul style="list-style-type: none"> High support for inter-regional connections. 	<ul style="list-style-type: none"> High support for inter-regional connections.
4.4.4 Accommodation for pedestrians, cyclists, snowmobiles, and specialized vehicles		<ul style="list-style-type: none"> Maintains all existing roads crossing the future corridor 	<ul style="list-style-type: none"> Maintains all existing roads crossing the future corridor 	<ul style="list-style-type: none"> Maintains all existing roads crossing the future corridor
4.5 Network Compatibility				
4.5.1 Network connectivity		<ul style="list-style-type: none"> High potential for improved connectivity to/from the Study Area 	<ul style="list-style-type: none"> High potential for improved connectivity to/from the Study Area 	<ul style="list-style-type: none"> High potential for improved connectivity to/from the Study Area
4.5.2 Flexibility for future expansion		<ul style="list-style-type: none"> Opportunities to expand freeway and transitway within the proposed right-of-way 	<ul style="list-style-type: none"> Opportunities to expand freeway and transitway within the proposed right-of-way 	<ul style="list-style-type: none"> Opportunities to expand freeway and transitway within the proposed right-of-way
4.6 Engineering				

<p>4.6.1 Constructability</p>	<ul style="list-style-type: none"> Significant constructability issues related to the crossing of the Humber valley and associated tributaries. This alternative falls into the middle in terms of combined structure length (~1,120 m). Length of crossing and number of piers in deep river valley will contribute to constructability issues. Conforms to design criteria Estimated Cost – 373 M dollars <ul style="list-style-type: none"> The cost estimates assume that the Humber River crossings are multi-span, using short-to-medium span lengths (i.e., girder-type structures). Long-span structures (i.e., greater than 50 m spans such as concrete segmental, variable depth steel girder, cable-type bridges) can be assessed further in preliminary design to mitigate impacts in the river valleys; construction costs would greatly increase depending on required span lengths and structure types. 	<ul style="list-style-type: none"> Significant constructability issues related to the crossing of the Humber valley and associated tributaries. This alternative falls into a higher range in terms of combined structure length (~1,500 m). Length of crossing and number of piers in deep river valley will contribute to more significant constructability issues. Conforms to design criteria Estimated Cost – 460 M dollars <ul style="list-style-type: none"> The cost estimates assume that the Humber River crossings are multi-span, using short-to-medium span lengths (i.e., girder-type structures). Long-span structures (i.e., greater than 50 m spans such as concrete segmental, variable depth steel girder, cable-type bridges) can be assessed further in preliminary design to mitigate impacts in the river valleys; construction costs would greatly increase depending on required span lengths and structure types. 	<ul style="list-style-type: none"> Significant constructability issues related to the crossing of the Humber valley and associated tributaries. This alternative falls into the middle in terms of combined structure length (~1,250 m). Length of crossing and number of piers in deep river valley will contribute to constructability issues. Conforms to design criteria Estimated Cost – 403 M dollars <ul style="list-style-type: none"> The cost estimates assume that the Humber River crossings are multi-span, using short-to-medium span lengths (i.e., girder-type structures). Long-span structures (i.e., greater than 50 m spans such as concrete segmental, variable depth steel girder, cable-type bridges) can be assessed further in preliminary design to mitigate impacts in the river valleys; construction costs would greatly increase depending on required span lengths and structure types.
<p>4.6.2 Compliance with design criteria</p> <p>4.7 Construction Cost</p>	<ul style="list-style-type: none"> Conforms to design criteria Estimated Cost – 373 M dollars <ul style="list-style-type: none"> The cost estimates assume that the Humber River crossings are multi-span, using short-to-medium span lengths (i.e., girder-type structures). Long-span structures (i.e., greater than 50 m spans such as concrete segmental, variable depth steel girder, cable-type bridges) can be assessed further in preliminary design to mitigate impacts in the river valleys; construction costs would greatly increase depending on required span lengths and structure types. 	<ul style="list-style-type: none"> Conforms to design criteria Estimated Cost – 460 M dollars <ul style="list-style-type: none"> The cost estimates assume that the Humber River crossings are multi-span, using short-to-medium span lengths (i.e., girder-type structures). Long-span structures (i.e., greater than 50 m spans such as concrete segmental, variable depth steel girder, cable-type bridges) can be assessed further in preliminary design to mitigate impacts in the river valleys; construction costs would greatly increase depending on required span lengths and structure types. 	<ul style="list-style-type: none"> Conforms to design criteria Estimated Cost – 403 M dollars <ul style="list-style-type: none"> The cost estimates assume that the Humber River crossings are multi-span, using short-to-medium span lengths (i.e., girder-type structures). Long-span structures (i.e., greater than 50 m spans such as concrete segmental, variable depth steel girder, cable-type bridges) can be assessed further in preliminary design to mitigate impacts in the river valleys; construction costs would greatly increase depending on required span lengths and structure types.
<p>4.8 Traffic Operations</p>	<ul style="list-style-type: none"> Low potential of reduced traffic operations 	<ul style="list-style-type: none"> Low potential of reduced traffic operations 	<ul style="list-style-type: none"> Low potential of reduced traffic operations