



BURNSIDE

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Appendix E

Evaluation of Alternative Solutions and Alternative Design Concepts

Evaluation of Alternative Solutions	E1
Evaluation of Alternative Design Concepts	E2



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Appendix E1

Evaluation of Alternative Solutions

Criteria for Evaluating Alternatives		Alternative 1: Do Nothing	Alternative 2: Single Intersection	Alternative 3: Two Intersections
A	Natural Environment			
1	Potential impact to vegetation/trees. Potential impact to terrestrial habitat (potential to impact general wildlife and wildlife habitat, habitat connectivity)	No impact to trees and vegetation beyond existing conditions	Impact to some trees and vegetation located adjacent to the existing ROW in areas of road realignment	Impact to trees and vegetation not anticipated to be significantly greater than existing conditions
	Rating			
2	Potential impact to aquatic habitat (aquatic features, fish and fish habitat)	No impact to aquatic features beyond existing conditions	No impact to aquatic features anticipated	No impact to aquatic features anticipated
	Rating			
3	Potential impact to species at risk and habitat of species at risk	No impact beyond existing conditions anticipated	Potential to impact potential habitat of SAR birds, beetle, bees (agricultural area, residential) and bats (trees, residential). SAR species not observed during field assessment	Impact to habitat of SAR not anticipated with minimal impact to terrestrial features as majority of improvements would be located within the existing ROW
	Rating			
4	Potential impact to ground water resources and drainage (source water protection, located in vulnerable area, risk to drinking water, wells, aquifer)	No impact beyond existing conditions anticipated	Realigned road may require decommissioning of existing residential wells. Maintains area for drainage/infiltration	No significant impact beyond existing conditions anticipated. Maintains area for drainage/infiltration
	Rating			

5	Potential climate change impact and resilience - emission of greenhouse gases, impact on carbon removal, carbon storage/ sink (trees and vegetation). Resilience and climate change impact on the undertaking	No impact beyond existing conditions anticipated	Vegetation clearing associated with a realigned road footprint is not anticipated to significantly impact the availability of carbon sinks. Realignment is anticipated to reduce traffic congestions/delay which may result in fewer emissions over existing conditions. Provision of active transportation may also reduce traffic congestion. Potential for GHG emissions anticipated with construction	Vegetation clearing is not anticipated to significantly impact the availability of carbon sinks. Intersection improvements are anticipated to reduce traffic congestions/delay which may result in fewer emissions over existing conditions. Provision of active transportation may also reduce traffic congestion. Potential for GHG emissions anticipated with construction
	<i>Rating</i>			
	Summary Natural Environment			

	Criteria for Evaluating Alternatives	Alternative 1: Do Nothing	Alternative 2: Single Intersection	Alternative 3: Two Intersections
B	Socio-Cultural Environment			
1	Potential impact to built heritage and landscape cultural heritage features	No impact beyond existing conditions anticipated	Impact to identified Built Heritage Resources as a result of earthworks associated with the realigned road	Impact to features not anticipated as majority of improvements are located within the existing ROW
	Rating			
2	Potential impact to archaeological resources	No impact beyond existing conditions anticipated	Impact to potential archaeological resources anticipated as a result of earthworks associated with the realigned road	Impact to potential archaeological resources is not anticipated as majority of improvements are located within the existing (disturbed) ROW
	Rating			
3	Nuisance impacts during construction	No impact beyond existing conditions anticipated	Potential for temporary disruption to local residents during construction	Potential for temporary disruption to local residents during construction
	Rating			
4	Land acquisition needs, impacts to property access	No impact beyond existing conditions anticipated	Property acquisition is required to accommodate road realignment	Property acquisition is not anticipated as improvements are anticipated to be completed within the existing ROW
	Rating			

5	Conformity to policy (federal, provincial agency and municipal policy e.g. Conservation Authority, MECP, Official Plan)	Does not confirm to Cycling Master Plan and Recreational Trails Master Plan recommendations, Transportation Master Plan	The Cycling Master Plan recommended that future reconstructions of the Binbrook Road/White Church Road corridor include the installation of paved shoulders. The Recreational Trails Master Plan also recommends assessing the Binbrook Road/White Church Road corridor for options to include on-road cycling facilities. This alternative allows for consideration of AT facilities. NPCA Regulated lands present at the intersection of White Church Rd and Trinity Church Road. The study area is within Provincial Greenbelt Plan – Protected Countryside Designation permitted use.	The Cycling Master Plan recommended that future reconstructions of the Binbrook Road/White Church Road corridor include the installation of paved shoulders. The Recreational Trails Master Plan also recommends assessing the Binbrook Road/White Church Road corridor for options to include on-road cycling facilities. This alternative allows for consideration of AT facilities. NPCA Regulated lands present at the intersection of White Church Rd and Trinity Church Road. The study area is within Provincial Greenbelt Plan – Protected Countryside Designation permitted use.
	Rating			
	Summary Socio-Cultural Environment			

	Criteria for Evaluating Alternatives	Alternative 1: Do Nothing	Alternative 2: Single Intersection	Alternative 3: Two Intersections
c	Financial Factors			
1	Estimated Capital Costs	There are no capital costs associated with the do nothing solution	Road construction costs will be higher as new road segments need to be constructed on new alignments	Cost associated with intersection traffic control will be primary capital cost and minor roadworks
	Rating			
2	Estimated Operation and Maintenance Costs	There are no additional operating costs associated with the do nothing solution	Operating costs of one intersection will be lower than two	Operating costs of two intersections will be higher than one
	Rating			
3	Property Acquisition Costs	No property requirements for this alternative	This alternative has high property acquisition needs	Property acquisition needs for this alternative are minimal
	Rating			
	Summary Financial Factors			

	Criteria for Evaluating Alternatives	Alternative 1: Do Nothing	Alternative 2: Single Intersection	Alternative 3: Two Intersections
D	Technical Factors			
1	Design Constraints, complexity of construction	There are no design constraints associated with the Do Nothing alternative	This alternative includes a major roadway realignment and one intersection design	This alternative includes primarily two intersection designs with no major roadway realignment.
	Rating			
2	Level of Service-traffic congestion, trucks, goods movement, community connectivity	The current shared-lane configurations have operational deficiencies. At the southbound approach of Trinity Church Road and White Church Road, the skewed intersection geometry requires drivers making left turns to perform a substantial head turn to the left. This design characteristic may contribute to gap misjudgment and an increased likelihood of angle collisions.	This alternative accommodates the anticipated traffic through this area within City level of service thresholds	This alternative may have lower levels of service as traffic must pass through two intersections within a short distance.
	Rating			
3	Multi-modal transportation connectivity and safety, including active transportation pedestrian and cyclist needs	There are no sidewalks or cycling facilities through the study area. The roadway features unpaved and partially paved shoulders.	This alternative accommodates multi-modal users.	This alternative accommodates multi-modal users.
	Rating			
4	Operational safety, roadside safety, speed management	This alternative includes intersections with extreme angles	This alternative would provide better road safety and some speed management through the study area	This alternative would provide better road safety and better speed management through the study area
	Rating			

5	Accommodation of snow storage	This alternative accommodates snow storage	This alternative accommodates snow storage	This alternative accommodates snow storage
	Rating			
6	Potential impacts to utilities	This alternative does not impact utilities	This alternative would have a significant impact on utility relocation	This alternative would have a minor impact on utility relocation
	Rating			
	Summary Technical Factors			

	Criteria for Evaluating Alternatives	Alternative 1: Do Nothing	Alternative 2: Single Intersection	Alternative 3: Two Intersections
E	Problem Statement			
1	Addresses Problem Statement	No	Yes	Yes
	Summary Problem Statement	Does not meet POS	Meets POS	Meets POS

	Criteria for Evaluating Alternatives	Alternative 1: Do Nothing	Alternative 2: Single Intersection	Alternative 3: Two Intersections
	Overall Summary	Not Carried Forward	Least Preferred	Most Preferred

Scoring System

Most Preferred	
More Preferred	
Somewhat Preferred	
Less Preferred	
Least Preferred	



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Appendix E2

Evaluation of Alternative Design Concepts

Binbrook Evaluation of Alternative Design Concepts

	Criteria for Evaluating Alternatives	Alternative 1: Two Roundabouts within Existing Road Alignment	Alternative 2: Two Signalized Intersections within Existing Road Alignment	Alternative 3: Two T-Intersections with Traffic Signal Control	Alternative 4: Peanut-shaped Roundabout	Alternative 5: Two T-Intersections with Roundabout Control
A	Natural Environment					
1	Vegetation/Tree (potential to impact or remove vegetation or trees)	Some vegetation removal required to accommodate roundabout footprint	Some vegetation removal required	Minimal vegetation removal required	Some vegetation removal required to accommodate roundabout footprint.	Some vegetation removal required to accommodate roundabout footprint.
	Rating					
2	Terrestrial Habitat (potential to impact breeding birds, general wildlife habitat, habitat connectivity)	Some impact to wildlife habitat with the impact to vegetation. Direct impact to terrestrial species is not anticipated with the implementation of avoidance and timing windows associated with construction.	Some impact to wildlife habitat with the impact to vegetation. Direct impact to terrestrial species is not anticipated with the implementation of avoidance and timing windows associated with construction.	Minimal anticipated impact to terrestrial habitat	Some impact to wildlife habitat with the impact to vegetation. Direct impact to terrestrial species is not anticipated with the implementation of avoidance and timing windows associated with construction.	Some impact to wildlife habitat with the impact to vegetation. Direct impact to terrestrial species is not anticipated with the implementation of avoidance and timing windows associated with construction.
	Rating					
3	Species at Risk (SAR) (potential to impact habitat of Species at Risk e.g. Barn Swallow, bats, Butternut)	Impact to trees may result in impact to potential SAR habitat (i.e. bats).	Impact to trees may result in impact to potential SAR habitat (i.e. bats).	No anticipated impact to SAR habitat	Impact to trees and agriculture field may result in impact to potential SAR habitat (i.e. SAR bats, birds).	Impact to trees and agriculture field may result in impact to potential SAR habitat (i.e. SAR bats, birds).
	Rating					
4	Groundwater Resources (potential to impact groundwater resources, source water protection, located in vulnerable area, risk to drinking water, wells, aquifer)	No significant impact to groundwater resources anticipated	No significant impact to groundwater resources anticipated	No significant impact to groundwater resources anticipated	No significant impact to groundwater resources anticipated	No significant impact to groundwater resources anticipated
	Rating					
5	Impacts to climate change -emission of greenhouse gases, impact on carbon removal, carbon storage/sink (trees and vegetation). Resilience and climate change impact on the undertaking	Vegetation removal required is not anticipated to significantly impact the availability of carbon sinks. Provision of active transportation options benefit community options for non-vehicle travel. Impacts to air quality will be minor as the distances between the home at 4368 Binbrook Road and the roadway do not significantly change.	Vegetation removal required is not anticipated to significantly impact the availability of carbon sinks. Provision of active transportation options benefit community options for non-vehicle travel	Vegetation removal required is not anticipated to significantly impact the availability of carbon sinks. Provision of active transportation options benefit community options for non-vehicle travel	Vegetation removal required is not anticipated to significantly impact the availability of carbon sinks. Provision of active transportation options benefit community options for non-vehicle travel	Vegetation removal required is not anticipated to significantly impact the availability of carbon sinks. Provision of active transportation options benefit community options for non-vehicle travel
	Rating					
	Summary Natural Environment					

Binbrook Evaluation of Alternative Design Concepts

	Criteria for Evaluating Alternatives	Alternative 1: Two Roundabouts within Existing Road Alignment	Alternative 2: Two Signalized Intersections within Existing Road Alignment	Alternative 3: Two T-Intersections with Traffic Signal Control	Alternative 4: Peanut-shaped Roundabout	Alternative 5: Two T-Intersections with Roundabout Control
B	Socio-Cultural Environment					
1	Potential impact to built heritage and landscape cultural heritage features	No anticipated impact to potential BHR or CHL associated with roundabout footprint. Detailed design can avoid impact to cultural heritage features.	No anticipated impact to potential BHR or CHL associated with roundabout footprint. Detailed design can avoid impact to cultural heritage features.	No anticipated impact to potential BHR or CHL associated with roundabout footprint. Detailed design can avoid impact to cultural heritage features.	Minor to moderate anticipated impact to potential BHR associated with roundabout footprint.	Minor anticipated impact to potential BHR and CHL associated with roundabout footprints.
	Rating					
2	Potential impact to archaeological resources	Impact to potential archaeological resources anticipated as a result of earthworks associated with the roundabout footprint. Stage 2 AA required in select areas.	Impact to potential archaeological resources anticipated as a result of earthworks associated with the road realignment. Stage 2 AA require in select areas.	Impact to potential archaeological resources is not anticipated as majority of improvements are located within the existing (disturbed) ROW	Impact to potential archaeological resources anticipated as a result of earthworks associated with the roundabout footprint. Stage 2 AA required in select areas	Impact to potential archaeological resources anticipated as a result of earthworks associated with the roundabout footprint. Stage 2 AA required in select areas
	Rating					
3	Conformity to policy (federal, provincial agency and municipal policy e.g. Conservation Authority, MECP, Official Plan)	May require permit from NPCA for minor roadwork with connection through regulated lands at Trinity Church Rd and White Church Rd E intersection.	May require permit from NPCA for minor roadwork with connection through regulated lands at Trinity Church Rd and White Church Rd E intersection.	May require permit from NPCA due to presence of regulated lands at Trinity Church Rd and White Church Rd E intersection where signalization is proposed.	May require permit from NPCA for minor roadwork with connection through regulated lands at Trinity Church Rd and White Church Rd E intersection.	Requires permit from NPCA due to presence of regulated lands at Trinity Church Rd and White Church Rd E intersection, where proposed roundabout would be located.
	Rating					
4	Land acquisition needs, impacts to property access	No anticipated property acquisition.	No anticipated property acquisition.	No anticipated property acquisition.	Requires some property acquisition (5080 White Church Road E)	Requires some property acquisition at intersections to accommodate roundabouts.
	Rating					
5	Nuisance impacts during construction	Moderate nuisance impacts during construction.	Moderate nuisance impacts during construction.	Moderate nuisance impacts during construction.	Moderate nuisance impacts during construction.	Moderate nuisance impacts during construction.
	Rating					
	Summary Socio-Cultural Environment					

Binbrook Evaluation of Alternative Design Concepts

	Criteria for Evaluating Alternatives	Alternative 1: Two Roundabouts within Existing Road Alignment	Alternative 2: Two Signalized Intersections within Existing Road Alignment	Alternative 3: Two T-Intersections with Traffic Signal Control	Alternative 4: Peanut-shaped Roundabout	Alternative 5: Two T-Intersections with Roundabout Control
c	Financial Factors					
1	Estimated Capital Costs (includes Engineering and Construction Costs)	Road construction costs will be higher as new road segments need to be constructed on new alignments	Road construction costs will be higher as new road segments need to be constructed on new alignments	Cost associated with intersection traffic control will be primary capital cost and minor roadworks	Road construction costs will be higher as new road segments need to be constructed on new alignments	Cost associated with roundabout will be primary capital cost and minor roadworks
	Rating					
2	Estimated Maintenance Costs	Low maintenance costs associated with landscaping maintenance	Moderate maintenance costs associated with signal operations	Moderate maintenance costs associated with signal operations	Low maintenance costs associated with landscaping maintenance	Low maintenance costs associated with landscaping maintenance
	Rating					
3	Property acquisition costs	No property acquisition costs anticipated	No property acquisition costs anticipated	No property acquisition costs anticipated	Medium property acquisition costs, associated with impacts to one property	Medium to High property acquisition costs -associated with impacts to multiple properties
	Rating					
	Summary Financial Factors					

Binbrook Evaluation of Alternative Design Concepts

	Criteria for Evaluating Alternatives	Alternative 1: Two Roundabouts within Existing Road Alignment	Alternative 2: Two Signalized Intersections within Existing Road Alignment	Alternative 3: Two T-Intersections with Traffic Signal Control	Alternative 4: Peanut-shaped Roundabout	Alternative 5: Two T-Intersections with Roundabout Control
D	Technical Factors					
1	Design constraints, complexity of construction	No significant design constraints.	No significant design constraints.	No significant design constraints.	No significant design constraints. The peanut-shape may have greater complexity of construction.	No significant design constraints.
	Rating					
2	Levels of Service (traffic congestion, trucks, goods movement, community connectivity)	This alternative is anticipated to have sufficient capacity. When considering performance across both intersections and the resulting queue lengths, this alternative performs the best.	This alternative is anticipated to have sufficient capacity.	This alternative is anticipated to have sufficient capacity.	This alternative is anticipated to have sufficient capacity. Would have a lower service level, not a common form in Ontario.	This alternative is anticipated to have sufficient capacity.
	Rating					
3	Multi-modal transportation connectivity and safety, including pedestrian and cyclist needs	Roundabouts have less conflict points between active transportation users and vehicles. Residents have noted strong support and comfort with roundabouts.	Intersections have more conflict points than roundabouts, having a slightly lower level of safety for active transportation. Residents indicated lower preference/comfort for signalization.	Intersections have more conflict points than roundabouts, having a slightly lower level of safety for active transportation. Residents indicated lower preference/comfort for signalization.	Roundabouts have less conflict points between active transportation users and vehicles. Residents have noted strong support and comfort with roundabouts, however the peanut roundabout is an uncommon form.	Roundabouts have less conflict points between active transportation users and vehicles. Residents have noted strong support and comfort with roundabouts.
	Rating					
4	Operational safety, roadside safety, speed management	Roundabouts have the best operational safety and speed management. Road realignment would allow for improvement over the skew angle at the existing intersections.	Road realignment would allow for improvement over the skew angle at the existing intersections.	The existing intersections have a skew angle which would not be improved with maintaining the existing alignment. This carries a greater collision risk.	Roundabouts have the best operational safety and speed management. Road realignment would allow for improvement over the skew angle at the existing intersections.	Roundabouts have the best operational safety and speed management. Maintaining the existing road alignment does not improve the intersection skew angle.
	Rating					
5	Accommodation of snow storage	This design concept is able to accommodate snow storage.	This design concept is able to accommodate snow storage.	This design concept is able to accommodate snow storage.	This design concept is able to accommodate snow storage. This configuration results in some snow clearing challenges.	This design concept is able to accommodate snow storage.
	Rating					
6	Potential impact to utilities	Moderate impact to utilities at location of roundabouts.	Moderate impact to utilities at location of intersections. This option will require power for signals.	Moderate impact to utilities at location of intersections. This option will require power for signals.	Moderate impact to utilities at location of roundabout.	Moderate impact to utilities at location of roundabouts.
	Rating					
	Summary Technical Factors					

Binbrook Evaluation of Alternative Design Concepts

	Criteria for Evaluating Alternatives	Alternative 1: Two Roundabouts within Existing Road Alignment	Alternative 2: Two Signalized Intersections within Existing Road Alignment	Alternative 3: Two T-Intersections with Traffic Signal Control	Alternative 4: Peanut-shaped Roundabout	Alternative 5: Two T-Intersections with Roundabout Control
E	Problem Statement					
1	Addresses Problem Statement	Yes	Yes	Yes	Yes	Yes
	Summary Problem Statement	Meets POS	Meets POS	Meets POS	Meets POS	Meets POS

Criteria for Evaluating Alternatives	Alternative 1: Two Roundabouts within Existing Road Alignment	Alternative 2: Two Signalized Intersections within Existing Road Alignment	Alternative 3: Two T-Intersections with Traffic Signal Control	Alternative 4: Peanut-shaped Roundabout	Alternative 5: Two T-Intersections with Roundabout Control
Overall Summary	Most Preferred	More Preferred	More Preferred	More Preferred	More Preferred

Order of Preference	
Most Preferred	
More Preferred	
Somewhat Preferred	
Less Preferred	
Least Preferred	