

































Appendix F – Evaluation Table

Evaluation of Design Alternatives

EVALUATION CRITERIA	DESIGN ALTERNATIVE NO. 1 Do Nothing	DESIGN ALTERNATIVE NO. 2 On Road Buffered Bike Lane	DESIGN ALTERNATIVE NO. 3 Separated Bike Lane with Enhanced Sidewalk	DESIGN ALTERNATIVE NO. 3a Separated Bike lane with Physical barrier curb
LEGEND:	LEAST PREFERRED ○ 0 ◐ 1 ◑ 2 ◒ 3 ● 4 MOST PREFERRED			
1. Operations				
Existing Traffic How does the alternative serve the current volume of: Vehicular Traffic Pedestrian traffic Cycling traffic?	○ No changes to current flow of vehicular traffic. Current sidewalk widths are narrow (1.5m wide) and do not meet current Region of Waterloo Corridor Design Guidelines (2013) for a Neighbourhood Connector – Avenue. Cycle lanes are not consistent within the study area.	◑ Addition of on road buffered bike lanes will keep cyclists and motorists separated.	◒ Separated bike lanes will allow cyclists to remain off road, decrease visibility issues between vehicular traffic and cyclists at intersections. Eg. Right turns at intersections may impact cyclist movements.	● Physical grade separation of bike lanes maintains safety of cyclist, and good visibility for vehicular traffic. Vehicular traffic is not affected.
Forecasted Traffic/Transportation Network Does the alternative efficiently and safely handle the forecasted traffic?	● Four (4) through lanes plus turn lanes will handle forecasted vehicular traffic volumes to 2032.			
Safety Does the alternative address/ identify traffic safety issues along the corridor or at specific locations?	○ Reconstruction of roadway to address pavement condition.	◑ Reconstruction of roadway to address pavement condition, and safety of cyclists by providing on-road cycle lanes.	● Centre two-way left turn lane provided between King Street and Weber Street except near intersections, where dedicated turn lanes are provided. Centre turn lane will permit more efficient access to adjacent properties (e.g., turning to and from private driveways) and will reduce overall through lane congestion during peak periods. Extended vehicle storage length (e.g., number of vehicles in a lane) will allow for more efficient traffic operations. Additional signal timing optimization will further improve intersection operations.	● Centre two-way left turn lane provided between King Street and Weber Street except near intersections, where dedicated turn lanes are provided. Centre turn lane will permit more efficient access to adjacent properties (e.g., turning to and from private driveways) and will reduce overall through lane congestion during the peak periods. Extended vehicle storage length (e.g., number of vehicles in a lane) will allow for more efficient traffic operations. Additional signal timing optimization will further improve intersection operations.
Access Management What effect will the alternative have on traffic access to properties fronting on University Avenue?	◐ All existing accesses maintained with full left and right turn access with left turn lanes at intersections where they currently exist. No dedicated turning lanes mid-block.	◑ All existing accesses maintained with full left and right turn access with left turn lanes at intersections where they currently exist, except near intersections where the centre median is required to minimize turning conflicts near intersections/traffic signals.	● All existing accesses maintained with full left and right turn access with left turn lanes at intersections where they currently exist, except near intersections where the centre median is required to minimize turning conflicts near intersections/traffic signals. Addition of centre turning lane allows for easier turning into adjacent properties	● All existing accesses maintained with full left and right turn access with left turn lanes at intersections where they currently exist, except near intersections where the centre median is required to minimize turning conflicts near intersections/traffic signals. Addition of centre turning lane allows for easier turning into adjacent properties

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Transportation Demand Management / Active Transportation				
Transit How does the alternative serve future transit needs?	 Transit service is maintained but roadside is shared with cyclists. Potential conflicts between cyclist and transit vehicles.	 Transit service is maintained but roadside is shared with cyclists over a buffered bike lane. Conflicts between cyclist and transit vehicles are slightly mitigated.	 Transit service is maintained and a bike lane/sidewalk is separated from traffic. Conflicts between cyclist and transit vehicles are greatly mitigated.	 Transit service is maintained and a bike lane/sidewalk is separated from traffic. Conflicts between cyclist and transit vehicles are greatly mitigated.
Cycling How does the alternative serve future cycling needs?	 On Road cycling is preserved where it currently exists (Between Albert Street and King Street). No cycling lanes would be added between King Street and Weber Street. Potential conflicts between cyclist and vehicles.	 On Road cycling is preserved where it currently exists between Albert Street and King Street, and added between King Street and Weber Street. Potential conflicts between cyclist and vehicles.	 Separated cycling facility is provided where the cycling facility is separated from vehicular traffic by flexible bollards. This reduces potential conflicts between cyclists and vehicles.	 Separated cycling facility is provided, where the cycling facility is separated from vehicular traffic by full height concrete curb and gutter. This further reduces potential conflicts between cyclists and vehicles.
Pedestrians How does the alternative serve future pedestrian traffic needs? (Pedestrian space)	 Existing sidewalk is maintained (1.5m wide). This does not meet current Region of Waterloo Corridor Design Guidelines (2013) for a Neighbourhood Connector – Avenue.	 Enhanced 2.1 metre wide sidewalk to be constructed on north side and south side of University Avenue right-of-way as much as possible.	 Enhanced 2.1 metre wide sidewalk to be constructed on north side and south side of University Avenue right-of-way as much as possible.	 Enhanced 2.1 metre wide sidewalk to be constructed on north side and south side of University Avenue right-of-way as much as possible.
Constructability	 Temporary road detours during construction and reduced lanes. May be traffic delays.	 Temporary road detours during construction and reduced lanes. May be traffic delays.	 Temporary road detours during construction and reduced lanes. May be traffic delays.	 Temporary road detours during construction and reduced lanes. May be traffic delays.
Emergency Services How does the alternative affect Emergency Service Response times?	 Emergency response times will remain the same, as no changes to the current configuration will be made.	 Emergency response times will remain the same, as no changes to the current configuration will be made.	 Emergency response times will improve due to additional two way left turn lane and related reductions in conflict, delays and congestion. Centre lane provides bypass lane potential for emergency vehicles.	 Emergency response times will improve due to additional two way left turn lane and related reductions in conflict, delays and congestion. Centre lane provides bypass lane potential for emergency vehicles.
Operations/Maintenance Impact? How does the alternative affect Operation and Maintenance Services (i.e. Snowplowing, landscape care, etc.)	 No change in the current operation and maintenance services	 No change in current operation and maintenance services. Snow plows will continue to clear snow	 Additional snow clearing methods will need to be used for the separated bike lane, and will require several passes of snow clearing equipment.	 No change in current operation and maintenance services. Snow plows will continue to clear snow
Accessibility	 Current pedestrian crossings do not meet AODA standards	 Opportunity to upgrade pedestrian crossings at intersections to current AODA standards	 Opportunity to upgrade pedestrian crossings at intersections to current AODA standards	 Opportunity to upgrade pedestrian crossings at intersections to current AODA standards
Illumination/Streetlighting	 Current streetlighting does not meet current lighting standards in some areas along the corridor.	 Opportunity to improve streetlighting to current standards	 Opportunity to improve streetlighting to current standards	 Opportunity to improve streetlighting to current standards
Operations Score	18	30	38	43

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2. Natural Environment				
Aquatic Habitat, Fisheries, and Surface Water How does the alternative affect the aquatic life and aquatic habitats contained within the various watercourses crossing University Avenue?	● There are no existing watercourses, culvert crossings or bridges requiring widening or replacement within the study area. Impact on fisheries is not anticipated.			
Terrestrial Habitat (Natural) How would the alternative affect existing vegetation (i.e. trees & woodlots) and bird/animal habitat within the project area?	● No impacts to significant woodland areas or vegetation communities. Vegetation removal is limited to cultural woodland or cultural thicket communities and landscape trees.			
Floodplain What effect would the alternative have on the flood plain of various watercourses?	● No impacts on the flood plain are anticipated for any of the alternatives.	● Weber at university Ave is within the GRCA floodplain limit, a fill alteration permit will be required during construction.	● Weber at university Ave is within the GRCA floodplain limit, a fill alteration permit will be required during construction.	● Weber at university Ave is within the GRCA floodplain limit, a fill alteration permit will be required during construction.
Wetlands What impacts does the alternative have on any evaluated wetlands within the project area?	● Hydrogeological impacts are similar for all alternatives, and can be mitigated.			
Trees (Landscaping) Are there any impacts to existing tree plantings and tree canopy within the project area?	● No significant existing landscape trees on existing road allowance. Trees that need to be removed can be replaced during construction, with enhanced plantings.			
Wildlife What are the effects of the alternative on "Species At Risk/Endangered Species" within the project area?	● Significant species would not be affected with this alternative	● A single candidate SWH was identified within the study area: Special Concern and Rare Wildlife Species (habitat for SCC). These alternative do not directly impact any of the trees having potential suitable roost habitat features for SAR bats, trees identified are just outside of the public ROW and would not be affected by construction.		
Property Contamination Are there any known or potentially contaminated sites that require further investigation, and how will they affect any improvements?	◐ There are no known environmentally impacted lands affected by any of the proposed options. No contaminated properties have been identified in the City's past studies.			
Storm Water Management Are stormwater management ponds required?	● No storm water management (SWM) ponds will be included but oil/grit separators are planned as well as Low Impact Development (LID) measure where they can be accommodated. This same condition exists for all the alternatives. Sediment controls on existing storm sewers will be required. Opportunities to be evaluated for improved stormwater management.			
Natural Environment Score	34	34	34	34

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3. Social Environment				
Cultural Heritage • What impact does the alternative have on known and potential Built Heritage Resources and Cultural Heritage Landscapes • What impact does the alternative have on Archaeological Resources and Areas of Archeological potential?	● No anticipated impacts on matters of heritage interest.			
Cultural & Recreational Are there any cultural or recreational institutions with the project area that may be affected by this alternative?	● No cultural or recreational facilities are directly affected by any of the alternatives			
Business Impacts How will the alternative affect existing businesses, and how will businesses be affected during construction Any businesses affected by a particular alternative?	◐ The block between King St and Regina St is impacted by all alternatives. Property acquisition is not anticipated. Less traffic congestion may improve overall future access to businesses. Will be disruption during construction, but access will be maintained. Business visibility and access improvements with additional Active Transportation. ◐ Temporary property access impacts will be experienced during construction of curbs, sidewalks and driveway restorations. There will be short term disruption during construction but access will be maintained.			
Construction Impacts Is it constructible and how long will construction take?	◐ Traffic will be able to be maintained by constructing the north side, then the south side (or vice versa) while maintaining traffic on existing pavement or newly constructed pavement. Construction will likely proceed in stages (i.e., between major intersections possibly one block at a time), with construction taking approximately 1+ year for each stage which will be determined in detailed design.	◐ Additional impacts will be experienced during construction due to the second curb construction on the cycle lane and paving operations. There will be short term disruption during construction but property access will be maintained.	◐ Additional curb and paving will take longer than alternative 1 and 2.	◐ Additional curb and paving will take longer than alternative 1 and 2.
Streetscaping Can the alternative incorporate streetscaping features to maintain and enhance the character of the community?	● Opportunities for Streetscaping adjacent to designated road allowance including plantings, decorative paving materials, decorative streetlights, etc.			

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Private Property Impacts <ul style="list-style-type: none"> How does the alternative impact the residential and commercial properties along the corridor? How much property will be required? 	● No property acquisition is anticipated	◐ Property acquisition is required to accommodate sidewalk encroachments at intersections along the corridor. This alternative requires additional land from the properties at #25, 15 University Avenue East, 75 University Ave West, 245 Weber Street North, 248 King Street North. 308.5m2	◐ Property acquisition is required to accommodate sidewalk encroachments at intersections along the corridor. This alternative requires additional land from the properties at #25-35 University Avenue East, 75 University Ave West, 245 Weber Street North, 248 King Street North. 438.5m2	● Property acquisition is required to accommodate sidewalk encroachments at intersections along the corridor. This alternative requires additional land from the properties at #25-31, 15 University Avenue East, 245 Weber Street North, 248 King Street North. 252.5m2
Air Quality & Noise What effect does the alternative have on air quality and noise within the project area?	◐ A reduction in overall traffic delay and related vehicle idling will result in reduced exhaust air emissions and, as a result, should provide improved overall air quality. ◐ Noise levels may increase due to projected traffic volumes.			
Social Score	23	21	20	24

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4. Costs				
Utility Impacts What would be the extent of impacts on existing utilities that must be relocated and/or protected to construct the alternative?	Hydro/Communication poles on north side of University Avenue. No relocation anticipated for this alternative.	Hydro/Communication poles on north side of University Avenue. Approximately 11 Hydro poles will have to be relocated under this alternative at approx. cost of approx. \$220,000. Recently reconstructed pole line, no relocation constitutions from WNH	Hydro/Communication poles on north side of University Avenue. Approximately 9 Hydro poles (this includes service and anchor poles) will have to be relocated under this alternative at approx. cost of approx. \$180,000. Recently reconstructed pole line, no relocation constitutions from WNH	Hydro/Communication poles on north side of University Avenue. Approximately 6 Hydro poles (this includes service and anchor poles) will have to be relocated under this alternative at approx. cost of approx. \$120,000. Recently reconstructed pole line, no relocation constitutions from WNH
	No significant impacts to existing underground gas lines, watermains, sewers or communications cables, anticipated other than minor relocations, adjustments to manholes, etc.			
Initial Capital Cost What is the estimated initial capital cost of the alternative? (including utility relocations and property acquisition/decommissioning)	Preliminary Cost Estimate including the following: <ul style="list-style-type: none"> Property Acquisition Utility Relocations Road Works Signals/Illumination Landscaping/Sidewalks *UNDERGROUNDS NOT INLCUED IN COST ESTIMATE* TOTAL (Excl. HST) \$1,969,000	Preliminary Cost Estimate including the following: <ul style="list-style-type: none"> Property Acquisition Utility Relocations Road Works Signals/Illumination Roadside Protection and Line Markings Landscaping/Sidewalks *UNDERGROUNDS NOT INLCUED IN COST ESTIMATE* TOTAL (Excl. HST) \$4,240,000	Preliminary Cost Estimate including the following: <ul style="list-style-type: none"> Property Acquisition Utility Relocations Road Works Signals/Illumination Roadside Protection and Line Markings Landscaping/Sidewalks *UNDERGROUNDS NOT INLCUED IN COST ESTIMATE* TOTAL (Excl. HST) \$4,321,000	Preliminary Cost Estimate including the following: <ul style="list-style-type: none"> Property Acquisition Utility Relocations Road Works Signals/Illumination Roadside Protection and Line Markings Landscaping/Sidewalks *UNDERGROUNDS NOT INLCUED IN COST ESTIMATE* TOTAL (Excl. HST) \$4,124,000
Total Cost Score	10	5	5	9
Total Overall Score	85	90	97	110
Conclusion	Does not address safety and design deficiencies identified in the problem/opportunity statement for this study.	This alternative fails to adequately address operational and safety deficiencies. It does not address the parameters laid out in the active transportation master plan.	This alternative does not address all pedestrian and cyclist conflicts that exist with this alternative.	This alternative balances transportation needs, and enhances safety of pedestrians and cyclists while enhancing urban design / streetscaping along the corridor.
Recommendation	Not recommended	Not recommended	Not recommended	Recommended