



CITY OF WINDSOR

Appendix G - Evaluation Matrices

Sewer and Coastal Flood Protection Master Plan



Central Windsor Alternative Solution – Environmental Assessment Comparative Evaluations

Sewer and Coastal Flood Protection Master Plan

Windsor Sewer and Coastal Flood Protection Master Plan
 Environmental Assessment Evaluation
 Combined System Solutions

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Area: Central / Lou Romano Water Reclamation Plant Sewershed Area
Description: Central Windsor Sanitary Sewer System Solutions (SAN-C)
Sewer System: Combined Sewer System

Objective	Evaluation Criteria	Rationale	ALTERNATIVE 1 (SAN-C-1)	ALTERNATIVE 2 (SAN-C-2) DO NOTHING
Alternative:			Enhanced Sewer Separation	Soft Sewer Separation
Description of Alternative:			Construction of a separate storm system to capture storm flows from: - Municipal ROW - Private Property (Downspouts, Front and Rear Yards) - Rear Alleyways	Continue the City's existing separation strategy to provide new storm sewers to capture municipal right-of-way drainage only.
LEVEL OF SERVICE: Reduce Potential for Surface Flooding	Extent of basement flood reduction realized by alternative.	Reducing the potential for damage in homes (generally basements).	90% of the sanitary system meets the Level of Service criteria	25% of the sanitary system meets the Level of Service criteria
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas of infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Meets risk reduction criteria.	Does not meet criteria.
Resiliency	Flexibility of alternative to adjust to climate change.	Being forward looking and resilient considering climate change and growth/intensification.	Proposed recommendation is sized for 1:100 year storm. Major roadway flood mitigation measures as sized based on a Climate Change Storm (1:100 year storm plus 40% resiliency factor).	Reduces flood risk to a lesser degree. Roadway may be impassable during 1:100 year event.
	Flexibility of alternative to accommodate changes in land use.		Allows new development to progress by meeting minimum ingress/egress requirements. Considers infill of vacant areas such as secondary plan areas and areas currently under development reviews.	This alternative provides less flexibility for future development.
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	Reduces/eliminates sewage overflow occurrences to Detroit River due to reduction of rainwater entering sewage system. Higher level of CSO reduction than Alt. 2.	Reduces/eliminates sewage overflow occurrences to Detroit River due to reduction of rainwater entering sewage system. Lower level of CSO reduction than Alt. 1.
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement.	High level complexity of home owner improvements. Larger quantity of storm sewer improvements and comparatively larger sewers. Larger decrease in effluent volume directed to Lou Romano WRP.	Does not meet Level of Service criteria.

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Description: Central Windsor Sanitary Sewer System Solutions (SAN-C)
Sewer System: Combined Sewer System

Objective	Evaluation Criteria	Rationale	ALTERNATIVE 1 (SAN-C-1)	ALTERNATIVE 2 (SAN-C-2) DO NOTHING
Alternative:			Enhanced Sewer Separation	Soft Sewer Separation
Description of Alternative:			Construction of a separate storm system to capture storm flows from: - Municipal ROW - Private Property (Downspouts, Front and Rear Yards) - Rear Alleyways	Continue the City's existing separation strategy to provide new storm sewers to capture municipal right-of-way drainage only.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Periodic cleaning for linear infrastructure Annual maintenance program to be maintained for STP	Does not meet Level of Service criteria.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	<ul style="list-style-type: none"> Timing consideration for disconnection of Roof Leaders and Foundation Drains Highest disruption due to construction of infrastructure & Plant 	
Minimize Impacts of Construction	Disruption to public greenspaces/recreational uses during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	Larger degree of disruption to Riverfront Parklands.	
	Disruption to the public Right of Way		Temporary disruptions anticipated as a result of truck traffic road closures during construction.	
Minimize Long-Term Social/Economical Impacts	Permanent Changes to the Urban Community	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	Potential for disruption and/or displacement of trees and park space. Can be mitigated with replanting of trees at higher ratio than existing.	
	Permanent Impact on Future Land Uses	Potential to influence infill or green field development.	May help development approvals as existing surface flooding risk has been mitigated.	
Minimize/Mitigate Impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, and/or archaeological) and consideration of methods to minimize and/or mitigate impacts.	No impacts to resources anticipated as a result of construction, and reduced flooding damage risk to resources. Infrastructure is proposed to be placed within the existing municipal right-of-way.	

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Description: Central Windsor Sanitary Sewer System Solutions (SAN-C)
Sewer System: Combined Sewer System

Objective	Evaluation Criteria	Rationale	ALTERNATIVE 1 (SAN-C-1)	ALTERNATIVE 2 (SAN-C-2) DO NOTHING
Alternative:			Enhanced Sewer Separation	Soft Sewer Separation
Description of Alternative:			Construction of a separate storm system to capture storm flows from: - Municipal ROW - Private Property (Downspouts, Front and Rear Yards) - Rear Alleyways	Continue the City's existing separation strategy to provide new storm sewers to capture municipal right-of-way drainage only.
Minimize Impacts to the Natural Environment	Minimize Impacts to Natural Environment Features	Potential for impacts to natural environmental features and consideration of how to minimize.	Study area is mostly comprised of urban development. Solutions may require removal of trees.	Does not meet Level of Service criteria.
	Minimize disruption to aquatic systems		New storm sewer outlets will be required along the Detroit River shoreline. Necessary mitigation measures will need to be implemented during construction to reduce impact to aquatic habitat. Implementation of enhanced separation will reduce the frequency of CSO's to the Detroit River.	
Consideration of Cost	Relative capital municipal infrastructure and private property improvements cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	Larger sewers and additional trunk storm sewers are more costly but reduced risk of flooding means reduced likelihood of expensive damages.	
		Preferred Option	Preferred	

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Sewershed /Sub-Sewershed Area: Central / Detroit River
 New Sewer Outlet west of intersection of Chappell Ave and Sandwich St approximately 200m of new storm sewers to an outfall in the McKee Creek including a dewatering Pump station.
Description: (STM-C1)
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C1)
Alternative:			Baseline	New Storm Sewer Outlet to Detroit River
Description of Alternative:			Separated storm sewer system to outlet into existing combined system at the downstream end.	New storm sewers to an outfall in the McKee Creek including the construction of a dewatering pump station.
LEVEL OF SERVICE: Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	No reduction in risk.	Meets risk reduction objective.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet criteria.	Meets risk reduction objective.
Resiliency	Flexibility of alternative to adjust to climate change.	Being forward looking and resilient considering climate change and growth/intensification.	Does not improve resiliency.	Provides added resiliency to the City's sewer system.
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	Does not reduce frequency of CSOs. Does not require discharge of surface drainage to the Detroit River.	Reduces frequency of CSOs to Detroit River. Storm sewer construction must include water quality measures.

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Sewershed /Sub-Sewershed Area: Central / Detroit River
 New Sewer Outlet west of intersection of Chappell Ave and Sandwich St approximately 200m of new storm sewers to an outfall in the McKee Creek including a dewatering Pump station.
Description: (STM-C1)
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C1)
Alternative:			Baseline	New Storm Sewer Outlet to Detroit River
Description of Alternative:			Separated storm sewer system to outlet into existing combined system at the downstream end.	New storm sewers to an outfall in the McKee Creek including the construction of a dewatering pump station.
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement.	No changes to existing infrastructure.	New storm sewer outlet to McKee Creek requires easement acquisition and construction of new storm sewer outlet to water course including a dewatering pump station.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	No change in maintenance.	New infrastructure required; O&M program required.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	N/A	Time required for planning and engineering of proposed outlet and pump station.
Minimize Impacts of Construction	Disruption to public greenspaces/recreational uses during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No disruption to public greenspaces/recreational uses during construction. Potential for disruption to these as a result of flooding.	No disruption to public greenspaces/recreational use during construction. Temporary disruption to adjacent property owners during storm sewer and pump station installation.
	Disruption to the public Right of Way		No disruption to public right of way as a result of construction. Flooding may cause some disruption.	Minimal disruption to public ROW.

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 New Sewer Outlet west of intersection of Chappell Ave and Sandwich St approximately 200m of new storm sewers to an outfall in the McKee Creek including a dewatering Pump station.
Description: (STM-C1)
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C1)
Alternative:			Baseline	New Storm Sewer Outlet to Detroit River
Description of Alternative:			Separated storm sewer system to outlet into existing combined system at the downstream end.	New storm sewers to an outfall in the McKee Creek including the construction of a dewatering pump station.
Minimize Long-Term Social/Economical Impacts	Permanent Changes to the Urban Community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees).	Flood reduction goals cannot be met without this solution., therefore it does not meet the objective or purpose of the Study.	Requires property acquisition of on property for storm sewer and pump station.
	Permanent Impact on Future Land Uses.	Potential to influence infill or green field development.		May help in-fill development approvals as flooding risk has been mitigated.
Minimize/Mitigate Impacts to Cultural/ Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, and/or archaeological) and consideration of methods to minimize and/or mitigate impacts.	Resources remain in situ - risk of damage due to surface flooding.	No designated heritage features in the vicinity of the site. No disruption or displacement of existing resources. Stage 2 Archaeological Assessment require for this site.
Minimize Impacts to the Natural Environment	Minimize Impacts to terrestrial systems.	Potential for impacts to natural environmental features and consideration of how to minimize.	No impact to existing terrestrial systems.	No impact to existing terrestrial systems.
	Minimize disruption to aquatic systems		Maintain existing frequency of CSOs may cause disruption to aquatic systems.	Potential disruption to aquatic systems, necessary mitigation measures shall be implemented.

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 New Sewer Outlet west of intersection of Chappell Ave and Sandwich St approximately 200m of new storm sewers to an outfall in the McKee Creek including a dewatering Pump station.
Description: (STM-C1)
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C1)
			Alternative: Baseline	New Storm Sewer Outlet to Detroit River
			Description of Alternative: Separated storm sewer system to outlet into existing combined system at the downstream end.	New storm sewers to an outfall in the McKee Creek including the construction of a dewatering pump station.
Consideration of Cost	Relative capital municipal infrastructure and private property improvements cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation)	No additional costs.	Cost required for construction of outlet.
		Preferred Option		PREFERRED

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Sewershed /Sub-Sewershed Area: Central / Detroit River
 Increase Size of Existing Storm Sewer Outlet (STM-C2) west of the intersection of Detroit St and Sandwich St approximately 300m of new storm sewers to an outfall to the Detroit River.
Description:
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C2)
Alternative:			Baseline	Increase Size of Sewer Outlet
Description of Alternative:			Maintain existing storm sewer outlet at this location.	West of the intersection of Detroit St and Sandwich St approximately 300m of new storm sewers to an outfall to the Detroit River.
LEVEL OF SERVICE: Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	Does not meet criteria.	Meets risk reduction objective.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet criteria.	Meets risk reduction objective.
Resiliency	Flexibility of alternative to adjust to climate change.	Being forward looking and resilient considering climate change and growth/intensification.	Does not improve resiliency.	Provides added resiliency to the City's sewer system.
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement to water quality; maintain existing water quality.	Added stormwater quality and/or LID measures will include overall improvement to water quality.

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Sewershed /Sub-Sewershed Area: Central / Detroit River
 Increase Size of Existing Storm Sewer Outlet (STM-C2) west of the intersection of Detroit St and Sandwich St approximately 300m of new storm sewers to an outfall to the Detroit River.
Description:
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C2)
Alternative:			Baseline	Increase Size of Sewer Outlet
Description of Alternative:			Maintain existing storm sewer outlet at this location.	West of the intersection of Detroit St and Sandwich St approximately 300m of new storm sewers to an outfall to the Detroit River.
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement.	No changes to existing infrastructure.	Requires the removal and replacement of storm sewers including maintenance of flows.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	No change in maintenance.	New infrastructure required; O&M program required.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	N/A	Time required for planning and engineering of infrastructure improvements.
Minimize Impacts of Construction	Disruption to public greenspaces/recreational uses during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No disruption to public greenspaces/recreational uses during construction. Does not reduce risk of disruption to these areas as a result of flooding.	No disruption to public greenspaces/recreational use during construction.
	Disruption to the public Right of Way		No disruption to public right of way as a result of construction. Increased risk of flooding which may cause some disruption.	Minimal disruption to public ROW.

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Sewershed /Sub-Sewershed Area: Central / Detroit River
 Increase Size of Existing Storm Sewer Outlet (STM-C2) west of the intersection of Detroit St and Sandwich St approximately 300m of new storm sewers to an outfall to the Detroit River.
Description:
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C2)
Alternative:			Baseline	Increase Size of Sewer Outlet
Description of Alternative:			Maintain existing storm sewer outlet at this location.	West of the intersection of Detroit St and Sandwich St approximately 300m of new storm sewers to an outfall to the Detroit River.
Minimize Long-Term Social/Economical Impacts	Permanent Changes to the Urban Community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees).	Flood reduction goals cannot be met without this solution. Therefore it does not meet the objective or purpose of the Study.	No Change.
	Permanent Impact on Future Land Uses.	Potential to influence infill or green field development.		May help in-fill development approvals as flooding risk has been mitigated.
Minimize/Mitigate Impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, and/or archaeological) and consideration of methods to minimize and/or mitigate impacts.	Resources remain in situ - risk of damage due to flooding.	No designated heritage features in the vicinity of the Site. Stage 2 Archaeological Assessment require for this site.
Minimize Impacts to the Natural Environment	Minimize Impacts to Natural Environment Features	Potential for impacts to natural environmental features and consideration of how to minimize.	No impact to existing terrestrial systems.	No impact to existing terrestrial systems.
	Minimize disruption to aquatic systems		Maintain existing frequency of CSOs may cause disruption to aquatic systems.	Reduced potential for disruption to aquatic systems from CSO. Increase in outlet flows during wet weather events will be mitigated through detailed design.

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Sewershed /Sub-Sewershed Area: Central / Detroit River
Description: Increase Size of Existing Storm Sewer Outlet (STM-C2) west of the intersection of Detroit St and Sandwich St approximately 300m of new storm sewers to an outfall to the Detroit River.
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C2)
Alternative:			Baseline	Increase Size of Sewer Outlet
Description of Alternative:			Maintain existing storm sewer outlet at this location.	West of the intersection of Detroit St and Sandwich St approximately 300m of new storm sewers to an outfall to the Detroit River.
Consideration of Cost	Relative capital municipal infrastructure and private property improvements cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	No additional costs.	Cost required for construction of outlet.
	Preferred Option			PREFERRED

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Sewershed /Sub-Sewershed Central / Detroit River
Description: New Trunk Sewer Outlet (STM-C3) to provide an outlet for the new
Sewer System: Cameron Ave. sewer.
 Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C3)
		Alternative:	Baseline	New Storm Sewer Outlet to Detroit River
		Description of Alternative:	Maintaining the existing drainage area delineation in this area. Continue with soft separation of sewers.	Construction of 2,700 m of new storm sewers starting at the intersection of Tecumseh Rd W and Curry Ave heading northerly along Curry Ave to Rooney St, then along McKay Ave to Martindale St, then along Cameron Ave to new outfall at Detroit River. Complete enhanced sewer separation of the entire drainage area.
LEVEL OF SERVICE: Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	Does not meet criteria.	Meets risk reduction objective.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet criteria.	Meets risk reduction objective.
Resiliency	Flexibility of alternative to adjust to climate change.	Being forward looking and resilient considering climate change and growth/intensification.	Does not improve resiliency.	Provides added resiliency to the City's sewer system.
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement to water quality; maintain existing water quality.	Added LID measures will include overall improvement to water quality.

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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Central / Detroit River
Description: New Trunk Sewer Outlet (STM-C3) to provide an outlet for the new
Sewer System: Cameron Ave. sewer.
 Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C3)
		Alternative:	Baseline	New Storm Sewer Outlet to Detroit River
		Description of Alternative:	Maintaining the existing drainage area delineation in this area. Continue with soft separation of sewers.	Construction of 2,700 m of new storm sewers starting at the intersection of Tecumseh Rd W and Curry Ave heading northerly along Curry Ave to Rooney St, then along McKay Ave to Martindale St, then along Cameron Ave to new outfall at Detroit River. Complete enhanced sewer separation of the entire drainage area.
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement.	No changes to existing infrastructure	Requires the construction of a large trunk sewer within the Municipal ROW and the City owned Riverside Park Area.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	No change in maintenance.	New infrastructure required; O&M program required.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	N/A	Time required for planning and engineering of infrastructure improvements.
Minimize Impacts of Construction	Disruption to public greenspaces/recreational uses during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No disruption to public greenspaces/recreational uses during construction. Potential for disruption to these as a result of flooding.	Disruption to public greenspaces/recreational use during construction.
	Disruption to the public Right of Way		No disruption to public right of way as a result of construction. Increased risk of flooding which may cause some disruption.	Disruption to public ROW during construction.

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Sewershed /Sub-Sewershed: Central / Detroit River
Description: New Trunk Sewer Outlet (STM-C3) to provide an outlet for the new Cameron Ave. sewer.
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C3)
Alternative:			Baseline	New Storm Sewer Outlet to Detroit River
Description of Alternative:			Maintaining the existing drainage area delineation in this area. Continue with soft separation of sewers.	Construction of 2,700 m of new storm sewers starting at the intersection of Tecumseh Rd W and Curry Ave heading northerly along Curry Ave to Rooney St, then along McKay Ave to Martindale St, then along Cameron Ave to new outfall at Detroit River. Complete enhanced sewer separation of the entire drainage area.
Minimize Long-Term Social/Economical Impacts	Permanent Changes to the Urban Community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees).	Flood reduction goals cannot be met without this solution. Therefore it does not meet the objective or purpose of the Study.	No Change.
	Permanent Impact on Future Land Uses.	Potential to influence infill or green field development.		May help in-fill development approvals as flooding risk has been mitigated.
Minimize/Mitigate Impacts to Cultural/ Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, and/or archaeological) and consideration of methods to minimize and/or mitigate impacts.	Resources remain in situ - risk of damage due to flooding.	Potential for disruption or displacement of existing resources. Stage 2 Archaeological assessment of this site is required.
Minimize Impacts to the Natural Environment	Minimize Impacts to Natural Environment Features	Potential for impacts to natural environmental features and consideration of how to minimize.	No impact to existing terrestrial systems.	No impact to existing terrestrial systems.
	Minimize disruption to aquatic systems		Maintain existing frequency of CSOs may cause disruption to aquatic systems.	Reduced potential for disruption to aquatic systems from CSO. Impacts of flows from new outlet flows, during wet weather events, will be mitigated through detailed design.

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Sewershed /Sub-Sewershed Central / Detroit River
Description: New Trunk Sewer Outlet (STM-C3) to provide an outlet for the new
 Cameron Ave. sewer.
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C3)
Alternative:			Baseline	New Storm Sewer Outlet to Detroit River
Description of Alternative:			Maintaining the existing drainage area delineation in this area. Continue with soft separation of sewers.	Construction of 2,700 m of new storm sewers starting at the intersection of Tecumseh Rd W and Curry Ave heading northerly along Curry Ave to Rooney St, then along McKay Ave to Martindale St, then along Cameron Ave to new outfall at Detroit River. Complete enhanced sewer separation of the entire drainage area.
Consideration of Cost	Relative capital municipal infrastructure and private property improvements cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	No additional costs.	Cost required for construction of outlet.
	Preferred Option			PREFERRED

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Sewershed /Sub-Sewershed Area: Central / Detroit River
 New Sewer Outlet (STM-C4) to provide an outlet for the new Bruce Ave.
Description: sewer.
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C4)
Alternative:			Baseline	New Storm Sewer Outlet to Detroit River
Description of Alternative:				Construction of 2,000 m of new storm sewers starting just at the intersection of Bruce Ave and Giles Blvd W heading northerly along Bruce Ave until reaching the sewer's outfall at the Detroit River.
LEVEL OF SERVICE: Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	No reduction in risk.	Meets risk reduction objective.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet criteria.	Meets risk reduction objective.
Resiliency	Flexibility of alternative to adjust to climate change.	Being forward looking and resilient considering climate change and growth/intensification.	Does not improve resiliency.	Provides added resiliency to the City's sewer system.
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement to water quality; maintain existing water quality.	Added LID measures will include overall improvement to water quality.
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement.	No changes to existing infrastructure	New infrastructure installation not complex. No utility relocation work required.

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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Area: Central / Detroit River
Description: New Sewer Outlet (STM-C4) to provide an outlet for the new Bruce Ave. sewer.
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C4)
Alternative:			Baseline	New Storm Sewer Outlet to Detroit River
Description of Alternative:				Construction of 2,000 m of new storm sewers starting just at the intersection of Bruce Ave and Giles Blvd W heading northerly along Bruce Ave until reaching the sewer's outfall at the Detroit River.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	No change in maintenance.	New infrastructure required; O&M program required.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	N/A	Time required for planning and engineering of infrastructure improvements.
Minimize Impacts of Construction	Disruption to public greenspaces/recreational uses during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No disruption to public greenspaces/recreational uses during construction. Potential for disruption to these as a result of flooding.	Disruption to public greenspaces/recreational use during construction.
	Disruption to the public Right of Way		No disruption to public right of way as a result of construction. Increased risk of flooding which may cause some disruption.	Requires disruption to public ROW.
Minimize Long-Term Social/Economical Impacts	Permanent Changes to the Urban Community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees).	Flood reduction goals cannot be met without this solution.	No Change.
	Permanent Impact on Future Land Uses.	Potential to influence infill or green field development.	Therefore it does not meet the objective or purpose of the Study.	May help in-fill development approvals as flooding risk has been mitigated.
Minimize/Mitigate Impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, and/or archaeological) and consideration of methods to minimize and/or mitigate impacts.	Resources remain in situ - risk of damage due to flooding.	No designated heritage features in the vicinity of the Site. No disruption or displacement of existing resources. Stage 2 Archaeological Assessment require for this site.

Windsor Sewer and Coastal Flood Protection Master Plan
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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Area: Central / Detroit River
Description: New Sewer Outlet (STM-C4) to provide an outlet for the new Bruce Ave. sewer.
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C4)
Alternative:			Baseline	New Storm Sewer Outlet to Detroit River
Description of Alternative:				Construction of 2,000 m of new storm sewers starting just at the intersection of Bruce Ave and Giles Blvd W heading northerly along Bruce Ave until reaching the sewer's outfall at the Detroit River.
Minimize Impacts to the Natural Environment	Minimize Impacts to Natural Environment Features	Potential for impacts to natural environmental features and consideration of how to minimize.	No impact to existing terrestrial systems.	No impact to existing terrestrial systems.
	Minimize disruption to aquatic systems		Maintain existing frequency of CSOs may cause disruption to aquatic systems.	Reduced potential for disruption to aquatic systems from CSO. Increase in outlet flows during wet weather events will be mitigated through detailed design.
Consideration of Cost	Relative capital municipal infrastructure and private property improvements cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	No additional costs.	Cost required for construction of outlet.
	Preferred Option			PREFERRED

Highlighted cells indicate solution that has least impact or best outcome.

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Sewershed /Sub-Sewershed Area: Detroit River
Description: Increase Size of Sewer Outlet (STM-C5) to provide an outlet for the new Parent Ave. trunk storm sewer, outlet at Marentette Ave.
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C5)
Alternative:			Baseline	Increase Size of Sewer Outlet
Description of Alternative:				Construction of 1,500 m of new storm sewers along Giles Blvd, Erie St and McDougall St. This sewer is designed to "interconnect" the existing storm sewers to better equalize flows in the system.
LEVEL OF SERVICE: Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	No reduction in risk.	Meets risk reduction objective.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet criteria.	Meets risk reduction objective.
Resiliency	Flexibility of alternative to adjust to climate change.	Being forward looking and resilient considering climate change and growth/intensification.	Does not improve resiliency.	Provides added resiliency to the City's sewer system.
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement to water quality; maintain existing water quality.	Added LID measures will include overall improvement to water quality.
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement.	No changes to existing infrastructure	New infrastructure installation not complex. No utility relocation work required.

Highlighted cells indicate solution that has least impact or best outcome.

Windsor Sewer and Coastal Flood Protection Master Plan
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Sewershed /Sub-Sewershed Area: Detroit River
Description: Increase Size of Sewer Outlet (STM-C5) to provide an outlet for the new Parent Ave. trunk storm sewer, outlet at Marentette Ave.
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C5)
Alternative:			Baseline	Increase Size of Sewer Outlet
Description of Alternative:				Construction of 1,500 m of new storm sewers along Giles Blvd, Erie St and McDougall St. This sewer is designed to "interconnect" the existing storm sewers to better equalize flows in the system.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	No change in maintenance.	New infrastructure required; O&M program required.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	N/A	Time required for planning and engineering of infrastructure improvements.
Minimize Impacts of Construction	Disruption to public greenspaces/recreational uses during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No disruption to public greenspaces/recreational uses during construction. Potential for disruption to these as a result of flooding.	Disruption to public greenspaces/recreational use during construction.
	Disruption to the public Right of Way		No disruption to public right of way as a result of construction. Increased risk of flooding which may cause some disruption.	Requires disruption to public ROW.
Minimize Long-Term Social/Economical Impacts	Permanent Changes to the Urban Community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees).	Flood reduction goals cannot be met without this solution. Therefore it does not meet the objective or purpose of the Study.	No Change.
	Permanent Impact on Future Land Uses.	Potential to influence infill or green field development.		May help in-fill development approvals as flooding risk has been mitigated.

Windsor Sewer and Coastal Flood Protection Master Plan
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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Area: Detroit River
Description: Increase Size of Sewer Outlet (STM-C5) to provide an outlet for the new Parent Ave. trunk storm sewer, outlet at Marentette Ave.
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C5)
Alternative:			Baseline	Increase Size of Sewer Outlet
Description of Alternative:				Construction of 1,500 m of new storm sewers along Giles Blvd, Erie St and McDougall St. This sewer is designed to "interconnect" the existing storm sewers to better equalize flows in the system.
Minimize/Mitigate Impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, and/or archaeological) and consideration of methods to minimize and/or mitigate impacts.	Resources remain in situ - risk of damage due to flooding.	No designated heritage features in the vicinity of the Site. No disruption or displacement of existing resources. Stage 2 Archaeological Assessment require for this site.
Minimize Impacts to the Natural Environment	Minimize Impacts to Natural Environment Features	Potential for impacts to natural environmental features and consideration of how to minimize.	No impact to existing terrestrial systems.	No impact to existing terrestrial systems.
	Minimize disruption to aquatic systems		Maintain existing frequency of CSOs may cause disruption to aquatic systems.	Reduced potential for disruption to aquatic systems from CSO. Increase in outlet flows during wet weather events will be mitigated through detailed design.
Consideration of Cost	Relative capital municipal infrastructure and private property improvements cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	No additional costs.	Cost required for construction of outlet.
Preferred Option				PREFERRED

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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Area: Central / Detroit River
 Description: Optimist Park Underground Stormwater Storage (STM-C6)
 Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C6-1)	ALTERNATIVE 2 (STM-C6-2)
Alternative:			Baseline	Optimist Park Underground Storage under the existing Parking Lot	Surface surcharge storage using the Optimist Park wood lot area.
Description of Alternative:			Maintain existing storm sewer drainage system.	New underground storage under parking lot (2,900cm).	utilize the existing wood lot to temporary store stormwater during a rain event.
LEVEL OF SERVICE: Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	Does not meet criteria.	Meets risk reduction objective.	Meets risk reduction objective.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet criteria.	Meets risk reduction objective.	Meets risk reduction objective.
Resiliency	Flexibility of alternative to adjust to climate change.	Being forward looking and resilient considering climate change and growth/intensification.	Does not improve resiliency.	Provides added resiliency to the City's sewer system.	Provides added resiliency to the City's sewer system.
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements	Allows new development to progress by meeting minimum ingress/egress requirements
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement to water quality; maintain existing water quality.	Added LID measures will include overall improvement to water quality.	Added LID measures will include overall improvement to water quality.
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement.	No changes to existing infrastructure.	Requires installation of storm sewers and underground stormwater storage facility.	Requires installation of storm sewers.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	No change in maintenance.	New infrastructure required; O&M program required.	New infrastructure required; O&M program required.

Windsor Sewer and Coastal Flood Protection Master Plan
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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Area: Central / Detroit River
 Description: Optimist Park Underground Stormwater Storage (STM-C6)
 Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C6-1)	ALTERNATIVE 2 (STM-C6-2)
Alternative:			Baseline	Optimist Park Underground Storage under the existing Parking Lot	Surface surcharge storage using the Optimist Park wood lot area.
Description of Alternative:			Maintain existing storm sewer drainage system.	New underground storage under parking lot (2,900cm).	utilize the existing wood lot to temporary store stormwater during a rain event.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	N/A	Time required for planning and engineering of infrastructure improvements.	Time required for planning and engineering of infrastructure improvements.
Minimize Impacts of Construction	Disruption to public greenspaces/recreational uses during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No disruption to public greenspaces/recreational uses during construction. Potential for disruption to these as a result of flooding.	Temporary disruption to existing parking lot area.	Greater disruption to treed, natural heritage area.
	Disruption to the public Right of Way		No disruption to public right of way as a result of construction. Flooding may cause some disruption.	Minimal disruption to public ROW.	Minimal disruption to public ROW.
Minimize Long-Term Social/Economical Impacts	Permanent Changes to the Urban Community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees).	Flood reduction goals cannot be met without this solution. Therefore it does not meet the objective or purpose of the Study.	No Change.	Using forested area for stormwater surcharge could have negative impact on vegetation.
	Permanent Impact on Future Land Uses.	Potential to influence infill or green field development.		May help in-fill development approvals as flooding risk has been mitigated.	May help in-fill development approvals as flooding risk has been mitigated.
Minimize/Mitigate Impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, and/or archaeological) and consideration of methods to minimize and/or mitigate impacts.	Resources remain in situ - risk of damage due to flooding.	No designated heritage features in the vicinity of the site. No disruption or displacement of existing resources. This site has Low archaeological potential.	This site is a natural heritage site. Could pose disruption to existing vegetation. This site has Low archaeological potential.
Minimize Impacts to the Natural Environment	Minimize Impacts to Natural Environment Features	Potential for impacts to natural environmental features and consideration of how to minimize.	No impact to existing terrestrial systems.	No impact to existing terrestrial systems.	Potential impacts to terrestrial environments.
	Minimize disruption to aquatic systems		N/A	N/A	N/A

Windsor Sewer and Coastal Flood Protection Master Plan
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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Area: Central / Detroit River
 Description: Optimist Park Underground Stormwater Storage (STM-C6)
 Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C6-1)	ALTERNATIVE 2 (STM-C6-2)
Alternative:			Baseline	Optimist Park Underground Storage under the existing Parking Lot	Surface surcharge storage using the Optimist Park wood lot area.
Description of Alternative:			Maintain existing storm sewer drainage system.	New underground storage under parking lot (2,900cm).	utilize the existing wood lot to temporary store stormwater during a rain event.
Consideration of Cost	Relative capital municipal infrastructure and private property improvements cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	No additional costs.	Cost required for construction of underground stormwater storage facility and storm sewers.	Less cost to utilize existing low lying area.
	Preferred Option			PREFERRED	

Windsor Sewer and Coastal Flood Protection Master Plan
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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Area: Central / Detroit River
Description: Increase Size of Sewer Outlet (STM-C7) to improve existing outlet of the Albert St. storm system.
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C7)
			Alternative: Baseline	Increase Size of Sewer Outlet
			Description of Alternative:	Trunk improvement on St. Luke, upsize and/or add new 1,650mm trunk sewer (350m of sewer) & Upsize existing 450 to 600mm with 750mm sewer (190m of new sewer).
LEVEL OF SERVICE: Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	No reduction in risk.	Meets risk reduction objective.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet criteria.	Meets risk reduction objective.
Resiliency	Flexibility of alternative to adjust to climate change.	Being forward looking and resilient considering climate change and growth/intensification.	Flood risk still there, road impassable.	Reduces flood risk.
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement to water quality; maintain existing water quality.	Improvement to water quality.
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement.	No changes to existing infrastructure.	New infrastructure installation is required.

Windsor Sewer and Coastal Flood Protection Master Plan
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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Area: Central / Detroit River
Description: Increase Size of Sewer Outlet (STM-C7) to improve existing outlet of the Albert St. storm system.
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C7)
Alternative:			Baseline	Increase Size of Sewer Outlet
Description of Alternative:				Trunk improvement on St. Luke, upsize and/or add new 1,650mm trunk sewer (350m of sewer) & Upsize existing 450 to 600mm with 750mm sewer (190m of new sewer).
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	No change in maintenance.	New infrastructure required; O&M program required.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	N/A	Time required for planning and engineering of infrastructure improvements.
Minimize Impacts of Construction	Disruption to public greenspaces/recreational uses during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No disruption to public greenspaces/recreational uses during construction. Potential for disruption to these as a result of flooding.	No disruption to public greenspaces/recreational uses during construction.
	Disruption to the public Right of Way		No disruption to public right of way as a result of construction. Flooding may cause some disruption.	Requires disruption to public ROW.
Minimize Long-Term Social/Economical Impacts	Permanent Changes to the Urban Community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees).	Flood reduction goals cannot be met without this solution.	No Change.
	Permanent Impact on Future Land Uses.	Potential to influence infill or green field development.	Therefore it does not meet the objective or purpose of the Study.	May help in-fill development approvals as flooding risk has been mitigated.

Windsor Sewer and Coastal Flood Protection Master Plan
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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Area: Central / Detroit River
Description: Increase Size of Sewer Outlet (STM-C7) to improve existing outlet of the Albert St. storm system.
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C7)
		Alternative:	Baseline	Increase Size of Sewer Outlet
		Description of Alternative:		Trunk improvement on St. Luke, upsize and/or add new 1,650mm trunk sewer (350m of sewer) & Upsize existing 450 to 600mm with 750mm sewer (190m of new sewer).
Minimize/Mitigate Impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, and/or archaeological) and consideration of methods to minimize and/or mitigate impacts.	Resources remain in situ - risk of damage due to flooding.	No designated heritage features in the vicinity of the Site. No disruption or displacement of existing resources. This site has low archaeological potential.
Minimize Impacts to the Natural Environment	Minimize Impacts to Natural Environment Features	Potential for impacts to natural environmental features and consideration of how to minimize.	Flooding may cause disruption to existing natural environment features. Does not meet the objective of the Study.	Potential improvement to existing natural environment resources.
	Minimize disruption to aquatic systems		Flooding may cause disruption to aquatic systems. Does not meet the objective of the Study.	Reduced potential for disruption to aquatic systems.
Consideration of Cost	Relative capital municipal infrastructure e and private property improvements cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	No additional costs.	Cost required for construction of new storm sewer outlet.
	Preferred Option			PREFERRED

Windsor Sewer and Coastal Flood Protection Master Plan
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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Area: Central / Detroit River
Description: New Pump Station (STM-C8) and storm sewers to improve drainage of the Drouillard Road underpass.
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C8-1)	ALTERNATIVE 2 (STM-C8-2)
Alternative:			Baseline	New pump station and upgraded sewers.	Maintain existing pump station with new underground storage.
Description of Alternative:				New pump station and wet well at NW corner of Drouillard and Wyandotte & upgrade 270m of downstream sewer with 825mm sewer. Approximate pump station depth is 11m.	New pump station and wet well at NW corner of Drouillard and Wyandotte & upgrade 270m of downstream sewer with 825mm sewer. Approximate pump station depth is 11m.
LEVEL OF SERVICE: Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	No reduction in risk.	Meets risk reduction objective.	Meets risk reduction objective.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet criteria.	Meets risk reduction objective.	Meets risk reduction objective.
Resiliency	Flexibility of alternative to adjust to climate change.	Being forward looking and resilient considering climate change and growth/intensification.	Flood risk still there, road impassable.	Reduces flood risk.	Reduces flood risk.
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements	Allows new development to progress by meeting minimum ingress/egress requirements
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement to water quality; maintain existing water quality.	Improvement to water quality.	Improvement to water quality.
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction)	Reducing homeowner and City challenges and barriers to implement.	No changes to existing infrastructure.	New large trunk storm sewer and pump station installation is required.	New infrastructure installation is required.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	No change in maintenance.	Large trunk sewers and pump station similar to Alternative 2.	Large trunk sewers and pump station similar to Alternative 2.

Windsor Sewer and Coastal Flood Protection Master Plan
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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Area: Central / Detroit River
Description: New Pump Station (STM-C8) and storm sewers to improve drainage of the Drouillard Road underpass.
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C8-1)	ALTERNATIVE 2 (STM-C8-2)
Alternative:			Baseline	New pump station and upgraded sewers.	Maintain existing pump station with new underground storage.
Description of Alternative:				New pump station and wet well at NW corner of Drouillard and Wyandotte & upgrade 270m of downstream sewer with 825mm sewer. Approximate pump station depth is 11m.	New pump station and wet well at NW corner of Drouillard and Wyandotte & upgrade 270m of downstream sewer with 825mm sewer. Approximate pump station depth is 11m.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the Study.	Highest time required to construction storm sewer and pump station.	Moderate length of time required to construction storm sewers along Wyandotte St. E.
Minimize Impacts of Construction	Disruption to public greenspaces/recreational uses during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No disruption to public greenspaces/recreational uses during construction. Potential for disruption to these as a result of flooding.	Disruption to public greenspaces/recreational use during construction.	Minimal disruption to public greenspaces/recreational use during construction.
	Disruption to the public Right of Way		No disruption to public right of way as a result of construction. Flooding may cause some disruption.	Moderate level of disruption to public ROW.	Most disruption to public ROW and major arterial roadway.
Minimize Long-Term Social/Economical Impacts	Permanent Changes to the Urban Community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees).	Flood reduction goals cannot be met without this solution. Therefore it does not meet the objective or purpose of the Study.	Impacts to existing park land area.	No Change.
	Permanent Impact on Future Land Uses.	Potential to influence infill or green field development.		May help in-fill development approvals as flooding risk has been mitigated.	May help in-fill development approvals as flooding risk has been mitigated.
Minimize/Mitigate Impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, and/or archaeological) and consideration of methods to minimize and/or mitigate impacts.	Resources remain in situ - risk of damage due to flooding.	No designated heritage features in the vicinity of the Site. No disruption or displacement of existing resources. A Stage 2 Archaeological Assessment is required for this site.	No designated heritage features in the vicinity of the Site. No disruption or displacement of existing resources. A Stage 2 Archaeological Assessment is required for this site.

Windsor Sewer and Coastal Flood Protection Master Plan
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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Area: Central / Detroit River
Description: New Pump Station (STM-C8) and storm sewers to improve drainage of the Drouillard Road underpass.
Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-C8-1)	ALTERNATIVE 2 (STM-C8-2)
Alternative:			Baseline	New pump station and upgraded sewers.	Maintain existing pump station with new underground storage.
Description of Alternative:				New pump station and wet well at NW corner of Drouillard and Wyandotte & upgrade 270m of downstream sewer with 825mm sewer. Approximate pump station depth is 11m.	New pump station and wet well at NW corner of Drouillard and Wyandotte & upgrade 270m of downstream sewer with 825mm sewer. Approximate pump station depth is 11m.
Minimize Impacts to the Natural Environment	Minimize Impacts to Natural Environment Features	Potential for impacts to natural environmental features and consideration of how to minimize.	Flooding may cause disruption to existing natural environment features. Does not meet the objective of the Study.	Potential improvement to existing natural environment resources.	Potential improvement to existing natural environment resources.
	Minimize disruption to aquatic systems		Flooding may cause disruption to aquatic systems. Does not meet the objective of the Study.	Reduced potential for disruption to aquatic systems.	Reduced potential for disruption to aquatic systems.
Consideration of Cost	Relative capital municipal infrastructure and private property improvements cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	No additional costs.	Relatively low cost for outlet replacement.	Highest cost associated with the construction of large trunk storm sewers within the Wyandotte St. E underpass area.
	Preferred Option			PREFERRED	



South Windsor Alternative Solution – Environmental Assessment Comparative Evaluations

Sewer and Coastal Flood Protection Master Plan

Sewershed / Sub-Sewershed / South / Lou Romano Water Reclamation Plant
 Description: Basement flood relief to the South Windsor Sewershed area. (SAN-S)
 Sewer System: Sanitary Sewer System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (SAN-S-1)	ALTERNATIVE 2 (SAN-S-2)
			Alternative: Baseline	Targeted Sub-trunk Storage	Decentralized Upstream Storage
Description of Alternative:				New trunk sanitary sewer (750 to 900mm dia) on Dominion Blvd, Woodland Ave, Howard Ave, Parkwood Ave, Conservation Drive, Grand Marais Rd E, and Tourangeau Rd. Construction on approximately 8 km of road ways. Requires foundation drain disconnection for homes older than 1980.	New sanitary sewers on multiple streets, approximately 26 km of road ways. Proposed sewer diameter 600 mm to 750 mm. Requires foundation drain disconnection for homes older than 1980.
LEVEL OF SERVICE: Reduce Potential for Flooding (Adaptive Approach)	Extent of basement flood reduction realized by alternative.	Reducing the potential for damage in homes (generally basements).	No reduction in basement flooding risk. Does not meet objectives of this study.	Meets risk reduction objective.	Meets risk reduction objective.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	No reduction in risk of flooding.	Meets risk reduction objective	Meets risk reduction objective
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	Existing level of service will be maintained. This does not meet the purpose or objectives of this Study.	Reduces risk of basement flooding, but still prevalent.	Reduces risk of basement flooding, but still prevalent.
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Considers infill of vacant areas such as secondary plan areas and areas currently under development reviews.	Considers infill of vacant areas such as secondary plan areas and areas currently under development reviews.
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement. Does not meet the purpose or objectives of this Study.	Reduces total rain derived flow to plant and increase of flow reaching complete (secondary treatment).	Reduces total flow to plant and increase % of flow reaching complete (secondary treatment).
Ease of Implementation	Complexity of installation and operation.	Reducing homeowner and City challenges and barriers to flood reduction measures. Includes consideration of space requirements, construction requirements, installation, and operation.	Not achieving city-wide foundation drain disconnection program will not reduce the excess quantity of rainwater getting into the sanitary system and therefore will not meet the basement flood risks.	Least complex due to relatively less quantity of new sewer and associated road reconstruction. Approximately 7 km of new sanitary sewers. Need for foundation drain disconnection is identified to be City Wide similar to Alternative 2.	More complex due to relatively larger quantity of new sewer and associated road reconstruction. Approximately 26 km of new sanitary sewers. Need for foundation drain disconnection is identified to be City Wide similar to Alternative 1.

Sewershed / Sub-Sewershed / South / Lou Romano Water Reclamation Plant
 Description: Basement flood relief to the South Windsor Sewershed area. (SAN-S)
 Sewer System: Sanitary Sewer System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (SAN-S-1)	ALTERNATIVE 2 (SAN-S-2)
			Alternative: Baseline	Targeted Sub-trunk Storage	Decentralized Upstream Storage
Description of Alternative:				New trunk sanitary sewer (750 to 900mm dia) on Dominion Blvd, Woodland Ave, Howard Ave, Parkwood Ave, Conservation Drive, Grand Marais Rd E, and Tourangeau Rd. Construction on approximately 8 km of road ways. Requires foundation drain disconnection for homes older than 1980.	New sanitary sewers on multiple streets, approximately 26 km of road ways. Proposed sewer diameter 600 mm to 750 mm. Requires foundation drain disconnection for homes older than 1980.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained, requiring increasingly more maintenance effort. This does not meet the objectives of this Study.	Smaller quantity of oversized sewer has relatively less maintenance.	Oversized sewers require regular flushing and sediment removal. Larger quantity of oversized sewer has relatively more maintenance.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the Study.	Relatively less time required to construct shorter length of sewer.	Relatively more time required to construct longer amount of sewer.
Minimize Impacts of Construction	Disruption during construction.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction required. Nothing to implement.	Minimal disruption due to shorter length of road/sewer construction required.	Higher relative construction impacts due to larger length of road/sewer construction required.
Minimize Long-Term Social/Economical Impacts	Permanent changes to the urban community.	Potential for disruption of displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	Increasing flooding problems in the community does not meet the objective or purpose of the Study.	Relatively low impact to urban community for ultimate sewer recommendations. Recommended private property improvements will have overall benefit to all existing communities.	Relatively low impact to urban community for ultimate sewer recommendations. Recommended private property improvements will have overall benefit to all existing communities.
	Permanent impact on future land uses.	Potential to influence infill or green field development.		Recommendations have accounted for future development. New developments should be assessed on a case by case basis.	Recommendations have accounted for future development. New developments should be assessed on a case by case basis.
Minimize/Mitigate Impact to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, and/or archaeological) and consideration of methods to minimize and/or mitigate impacts.	No initial disruption or displacement of existing resources, however, increasing flooding problems will eventually impact these resources in a permanent manner.	Sewer infrastructure work is to be completed within the existing ROW. No impact to heritage resources anticipated. No archaeological resources in Study Area.	Sewer infrastructure works is to be completed within the existing ROW. No impact to heritage resources anticipated. No archaeological resources in Study Area.

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed / South / Lou Romano Water Reclamation Plant
 Description: Basement flood relief to the South Windsor Sewershed area. (SAN-S)
 Sewer System: Sanitary Sewer System

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (SAN-S-1)	ALTERNATIVE 2 (SAN-S-2)
			Alternative: Baseline	Targeted Sub-trunk Storage	Decentralized Upstream Storage
Description of Alternative:				New trunk sanitary sewer (750 to 900mm dia) on Dominion Blvd, Woodland Ave, Howard Ave, Parkwood Ave, Conservation Drive, Grand Marais Rd E, and Tourangeau Rd. Construction on approximately 8 km of road ways. Requires foundation drain disconnection for homes older than 1980.	New sanitary sewers on multiple streets, approximately 26 km of road ways. Proposed sewer diameter 600 mm to 750 mm. Requires foundation drain disconnection for homes older than 1980.
Minimize Impacts to the Natural Environment	Minimize impacts to the natural environment.	Potential for impacts to natural environmental features and consideration of how to minimize.	Increasing flooding problems in the community are anticipated to impact the natural environment in every aspect, and does not meet the objective of the Study.	No significant natural features in the area of impact (existing municipal right-of-way).	No significant natural features in the area of impact (existing municipal right-of-way).
	Minimize disruption to aquatic systems			Improvements are proposed within the existing municipal right-of-way. Minimal potential for impact to existing aquatic systems.	Improvements are proposed within the existing municipal right-of-way. Minimal potential for impact to existing aquatic systems.
Consideration of Cost	Relative capital municipal infrastructure and private property improvements cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	Increasing flooding problems in the community will increase community costs in the short and long run and does not address the purpose of the Study.	Least Costly Alternative (8 km of infrastructure to install).	Most Costly Alternative (26 km of infrastructure to install).
	Preferred Option			Preferred	

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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed Area: South / Grand Marais Drain
 Description: Surface flooding solutions to address road flooding on Dougall Ave., Eugenie St. E and Ouellette Pl. (ROAD-S1)
 Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	Do Nothing	ALTERNATIVE A (ROAD-S1-1)	ALTERNATIVE B (ROAD-S1-2)
Alternative:			Baseline	Surcharge Pond - Vacant Lands	Surcharge Pond - ECRow On Ramps
Description of Alternative:				New surcharge surface storage pond on vacant land with 14,000 m3 of storage. Maximum surface area of 16,000 m2 with a maximum depth of 4 m. Approximately 1,500 m of new 825mm sewer.	Two new surcharge surface storage ponds on vacant land within EC ROW ramps. Approximately 2,000 m of new 825mm sewer.
LEVEL OF SERVICE: Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	No reduction in risk.	Meets risk reduction criteria.	Meets risk reduction criteria.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet criteria.	Meets risk reduction criteria.	Meets risk reduction criteria.
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	Existing level of service will be maintained. This does not meet the purpose or objectives of this Study.	Proposed recommendation is sized for Climate Change Storm (1:100 year storm plus 40% resiliency factor).	Proposed recommendation is sized for Climate Change Storm (1:100 year storm plus 40% resiliency factor).
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements	Allows new development to progress by meeting minimum ingress/egress requirements
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement. Does not meet the purpose or objectives of this Study.	Changes to stormwater runoff characteristics will be addressed with on-site SWM measures required for all new private development. Dry pond has potential to improve water quality.	Changes to stormwater runoff characteristics will be addressed with on-site SWM measures required for all new private development. Dry pond has potential to improve water quality.

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Sewershed / Sub-Sewershed Area: South / Grand Marais Drain
 Description: Surface flooding solutions to address road flooding on Dougall Ave., Eugenie St. E and Ouellette Pl. (ROAD-S1)
 Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	Do Nothing	ALTERNATIVE A (ROAD-S1-1)	ALTERNATIVE B (ROAD-S1-2)
			Alternative: Baseline	Surcharge Pond - Vacant Lands	Surcharge Pond - ECRow On Ramps
			Description of Alternative:	New surcharge surface storage pond on vacant land with 14,000 m3 of storage. Maximum surface area of 16,000 m2 with a maximum depth of 4 m. Approximately 1,500 m of new 825mm sewer.	Two new surcharge surface storage ponds on vacant land within EC ROW ramps. Approximately 2,000 m of new 825mm sewer.
Ease of Implementation	Complexity of installation and operation.	Reducing homeowner and City challenges and barriers to flood reduction measures. Includes consideration of space requirements, construction requirements, installation, and operation.	Not achieving city-wide foundation drain disconnection program will not reduce the excess quantity of rainwater getting into the sanitary system and therefore will not meet the basement flood risks.	Least complex to implement one stormwater management pond and less length to install new storm sewer infrastructure.	More complex to implement two stormwater management ponds. Due to location of ponds, retaining walls and slope stabilization measures would be required along the on/off ramps to EC-ROW. Larger quantity of storm sewer infrastructure and road reconstruction required as well as infrastructure within the EC-ROW.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained, requiring increasingly more maintenance effort. This does not meet the objectives of this Study.	Relatively less amount of maintenance for one dry stormwater management pond.	Relatively larger amount of maintenance for one dry stormwater management pond.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the Study.	Time to implement dependent on timing of property acquisition and funding.	Time to implement dependent on timing of property acquisition and funding. Additional time required for work permits within ECROW. Construction duration is relatively longer due to longer storm sewer infrastructure and additional pond.

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Sewershed / Sub-Sewershed Area: South / Grand Marais Drain
 Description: Surface flooding solutions to address road flooding on Dougall Ave., Eugenie St. E and Ouellette Pl. (ROAD-S1)
 Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	Do Nothing	ALTERNATIVE A (ROAD-S1-1)	ALTERNATIVE B (ROAD-S1-2)
			Alternative: Baseline	Surcharge Pond - Vacant Lands	Surcharge Pond - ECRow On Ramps
Description of Alternative:				New surcharge surface storage pond on vacant land with 14,000 m3 of storage. Maximum surface area of 16,000 m2 with a maximum depth of 4 m. Approximately 1,500 m of new 825mm sewer.	Two new surcharge surface storage ponds on vacant land within EC ROW ramps. Approximately 2,000 m of new 825mm sewer.
Minimize Impacts of Construction	Disruption during construction.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction required. Nothing to implement.	Temporary disruption to adjacent sidewalks/pathways.	Temporary disruption to adjacent sidewalks/pathways.
				Storm sewer requires full road reconstruction within the municipal right of-way. Pond may require disruption to local roads, South Cameron Blvd. and Northwood Street.	Storm sewer requires full road reconstruction within the municipal right of-way. Pond may require disruption to arterial roads, EC ROW and Dougall Ave.
Minimize Long-Term Social/ Economical Impacts	Permanent changes to the urban commu	Potential for disruption of displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	Increasing flooding problems in the community does not meet the objective or purpose of the Study.	Vacant land acquisition for pond, potential for new park or community amenity.	Ponds require the removal of several tree plantings. Limited opportunity for integration as community amenity due to proximity to EC ROW on/off ramps.
	Permanent impact on future land uses.	Potential to influence infill or green field development.		May help development approvals as existing surface flooding risk has been mitigated.	May help development approvals as existing surface flooding risk has been mitigated.
Minimize/Mitigate Impact to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, and/or archaeological) and consideration of methods to minimize and/or mitigate impacts.	No initial disruption or displacement of existing resources, however, increasing flooding problems will eventually impact these resources in a permanent manner.	Area is currently used for agricultural cultivation. No impact to heritage resources anticipated. Area low potential for archaeological resources.	Works are to be completed within the existing city owned ROW. No impact to heritage resources anticipated. Area low potential for archaeological resources.

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Sewershed / Sub-Sewershed Area: South / Grand Marais Drain
 Description: Surface flooding solutions to address road flooding on Dougall Ave., Eugenie St. E and Ouellette Pl. (ROAD-S1)
 Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	Do Nothing	ALTERNATIVE A (ROAD-S1-1)	ALTERNATIVE B (ROAD-S1-2)
Alternative:			Baseline	Surcharge Pond - Vacant Lands	Surcharge Pond - ECRow On Ramps
Description of Alternative:				New surcharge surface storage pond on vacant land with 14,000 m3 of storage. Maximum surface area of 16,000 m2 with a maximum depth of 4 m. Approximately 1,500 m of new 825mm sewer.	Two new surcharge surface storage ponds on vacant land within EC ROW ramps. Approximately 2,000 m of new 825mm sewer.
Minimize Impacts to the Natural Environment	Minimize impacts to the natural environment.	Potential for impacts to natural environmental features and consideration of how to minimize.	Increasing flooding problems in the community are anticipated to impact the natural environment in every aspect, and does not meet the objective of the Study.	Minimal potential for impact to existing natural environment resources.	Requires removal of newly planted, decorative trees. Minimal potential for impact to existing natural environment resources.
	Minimize disruption to aquatic systems			No change to receiving system	No change to receiving system
Consideration of Cost	Relative capital municipal infrastructure and private property improvements cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	Increasing flooding problems in the community will increase community costs in the short and long run and does not address the purpose of the Study.	Least costly alternative between A and B.	Most costly alternative due to additional stormwater pond and additional storm sewer trunk infrastructure.
	Preferred Option			Preferred	

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed Area: South / Grand Marais Drain
 Description: Surface flooding solutions to address road flooding on Howard Ave. (ROAD-S2)
 Sewer System: Storm Sewer System

Objective	Evaluation Criteria	Rationale	Do Nothing	ALTERNATIVE A (ROAD-S2-1)	ALTERNATIVE B (ROAD-S2-2)
Alternative:			Baseline	Surcharge Pond - Residential Lands	Surcharge Pond - Existing Commercial
Description of Alternative:				New trunk sewers on Howard Ave. to new stormwater pond within existing residential area. Solution is coupled with LID's.	New surcharge surface storage pond on land with existing building to be removed. Proposed pond with 3,500 cubic meters of storage and a maximum surface area of 3,500 square meters. A maximum depth of 4m.
LEVEL OF SERVICE: Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30m (1 ft.)).	No reduction in risk.	Meets risk reduction criteria.	Meets risk reduction criteria.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet objective.	Meets risk reduction criteria.	Meets risk reduction criteria.
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	Existing level of service will be maintained. This does not meet the purpose or objectives of this Study.	Proposed recommendation is sized for Climate Change Storm (1:100 year storm plus 40% resiliency factor).	Proposed recommendation is sized for Climate Change Storm (1:100 year storm plus 40% resiliency factor).
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements	Allows new development to progress by meeting minimum ingress/egress requirements
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement. Does not meet the purpose or objectives of this Study.	Changes to stormwater runoff characteristics will be addressed with on-site SWM measures required for all new private development. Dry pond has potential to improve water quality.	Changes to stormwater runoff characteristics will be addressed with on-site SWM measures required for all new private development. Dry pond has potential to improve water quality.
Ease of Implementation	Complexity of installation and operation.	Reducing homeowner and City challenges and barriers to flood reduction measures. Includes consideration of space requirements, construction requirements, installation, and operation.	Not achieving city-wide foundation drain disconnection program will not reduce the excess quantity of rainwater getting into the sanitary system and therefore will not meet the basement flood risks.	More complex to implement this alternative. Stormwater management pond is located away from the Howard Ave. corridor and requires the acquisition and demolition of 7 properties. Pond is not located at the downstream end of the proposed storm sewer improvements.	Least complex to implement this alternative. Stormwater management pond is located at the downstream end of the proposed storm sewer improvements

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed Area: South / Grand Marais Drain
 Description: Surface flooding solutions to address road flooding on Howard Ave. (ROAD-S2)
 Sewer System: Storm Sewer System

Objective	Evaluation Criteria	Rationale	Do Nothing	ALTERNATIVE A (ROAD-S2-1)	ALTERNATIVE B (ROAD-S2-2)
Alternative:			Baseline	Surcharge Pond - Residential Lands	Surcharge Pond - Existing Commercial
Description of Alternative:				New trunk sewers on Howard Ave. to new stormwater pond within existing residential area. Solution is coupled with LID's.	New surcharge surface storage pond on land with existing building to be removed. Proposed pond with 3,500 cubic meters of storage and a maximum surface area of 3,500 square meters. A maximum depth of 4m.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained, requiring increasingly more maintenance effort. This does not meet the objectives of this Study.	Relatively more maintenance required due to additional linear storm sewer infrastructure compared to alternative 2.	Relatively less maintenance required due to less linear storm sewer infrastructure compared to alternative 2.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the Study.	Additional time required to coordinate the acquisition of various residential properties.	Additional time required to coordinate the acquisition of commercial properties.
Minimize Impacts of Construction	Disruption during construction.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction required. Nothing to implement.	Temporary disruption to adjacent sidewalks/pathways.	Temporary disruption to adjacent sidewalks/pathways.
				Storm sewer requires full road reconstruction within the municipal right of-way. Length of road reconstruction is relatively similar to Alternative 1. Pond may require disruption to local roads (Atkinson Street, Remington Ave., Charles Street)	Storm sewer requires full road reconstruction within the municipal right of-way. Length of road reconstruction is relatively similar to Alternative 2. Pond may require disruption to local roads (Grand Marais Dr. E.).
Minimize Long-Term Social/ Economical Impacts	Permanent changes to the urban commu	Potential for disruption of displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	Increasing flooding problems in the community does not meet the objective or purpose of the Study.	More impactful due to the need for displacement of 7 residential homes.	Less impactful due to the need for displacement of 1 commercial property.
	Permanent impact on future land uses.	Potential to influence infill or green field development.		May help development approvals as existing surface flooding risk has been mitigated.	May help development approvals as existing surface flooding risk has been mitigated.

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed Area: South / Grand Marais Drain
 Description: Surface flooding solutions to address road flooding on Howard Ave. (ROAD-S2)
 Sewer System: Storm Sewer System

Objective	Evaluation Criteria	Rationale	Do Nothing	ALTERNATIVE A (ROAD-S2-1)	ALTERNATIVE B (ROAD-S2-2)
		Alternative:	Baseline	Surcharge Pond - Residential Lands	Surcharge Pond - Existing Commercial
		Description of Alternative:		New trunk sewers on Howard Ave. to new stormwater pond within existing residential area. Solution is coupled with LID's.	New surcharge surface storage pond on land with existing building to be removed. Proposed pond with 3,500 cubic meters of storage and a maximum surface area of 3,500 square meters. A maximum depth of 4m.
Minimize/Mitigate Impact to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, and/or archaeological) and consideration of methods to minimize and/or mitigate impacts.	No initial disruption or displacement of existing resources, however, increasing flooding problems will eventually impact these resources in a permanent manner.	Area is currently used for residential use. No impact to heritage resources anticipated. Area low potential for archaeological resources.	Area is currently used for commercial use. No impact to heritage resources anticipated. Area low potential for archaeological resources.
Minimize Impacts to the Natural Environment	Minimize impacts to the natural environment.	Potential for impacts to natural environmental features and consideration of how to minimize.	Increasing flooding problems in the community are anticipated to impact the natural environment in every aspect, and does not meet the objective of the Study.	Minimal potential for impact to existing natural environment resources.	Minimal potential for impact to existing natural environment resources.
	Minimize disruption to aquatic systems			No change to receiving system. Potential for improvement with LIDs	No change to receiving system. Potential for improvement with LIDs
Consideration of Cost	Relative capital municipal infrastructure and private property improvements cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	Increasing flooding problems in the community will increase community costs in the short and long run and does not address the purpose of the Study.	More costly solution, additional cost for 1.1 km of sewer, road reconstruction, land acquisition (7 residential lots).	Least costly solution, additional cost for 1.2 km of sewer, road reconstruction, land acquisition (1 commercial lot).
	Preferred Option				Preferred

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Area: South / Grand Marais Drain
 Description: Surface flooding solution to address surface flooding along Chrysler Centre (ROAD-S3)
 Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	Baseline Condition	ALTERNATIVE 1 (ROAD-S3-1)	ALTERNATIVE 2 (ROAD-S3-2)
Alternative:			Baseline	2 Underground Storage Tanks	Single Underground Storage Tank
		Description of Alternative:		New storm sewer with increased conveyance from Tecumseh Road East to new surcharge storage underground, two locations.	New storm sewer with increased conveyance from Tecumseh Road East to new surcharge storage underground, centralized.
LEVEL OF SERVICE: Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	No reduction in risk.	Meets risk reduction objective.	Meets risk reduction objective.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet objective.	Meets risk reduction objective.	Meets risk reduction objective
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	Existing level of service will be maintained. This does not meet the purpose or objectives of this Study.	Proposed recommendation is sized for Climate Change Storm (1:100 year storm plus 40% resiliency factor).	Proposed recommendation is sized for Climate Change Storm (1:100 year storm plus 40% resiliency factor).
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements.	Allows new development to progress by meeting minimum ingress/egress requirements.
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement. Does not meet the purpose or objectives of this Study.	Changes to stormwater runoff characteristics will be addressed with on-site SWM measures required for all new private development. Underground storage and infiltration systems have potential to improve water quality.	Changes to stormwater runoff characteristics will be addressed with on-site SWM measures required for all new private development. Underground storage and infiltration systems have potential to improve water quality.
Ease of Implementation	Complexity of installation and operation.	Reducing homeowner and City challenges and barriers to flood reduction measures. Includes consideration of space requirements, construction requirements, installation, and operation.	Not achieving city-wide foundation drain disconnection program will not reduce the excess quantity of rainwater getting into the sanitary system and therefore will not meet the basement flood risks.	More complex to implement this alternative. Stormwater management facility requires the acquisition and reconstruction of the existing industrial parking lot. Two facilities requires additional storm sewer and restoration.	Less complex to implement this alternative. Stormwater management facility requires less land acquisition and reconstruction of the existing industrial parking lot. One facility requires less storm sewer and restoration.

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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Area: South / Grand Marais Drain
 Description: Surface flooding solution to address surface flooding along Chrysler Centre (ROAD-S3)
 Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	Baseline Condition	ALTERNATIVE 1 (ROAD-S3-1)	ALTERNATIVE 2 (ROAD-S3-2)
Alternative:			Baseline	2 Underground Storage Tanks	Single Underground Storage Tank
Description of Alternative:				New storm sewer with increased conveyance from Tecumseh Road East to new surcharge storage underground, two locations.	New storm sewer with increased conveyance from Tecumseh Road East to new surcharge storage underground, centralized.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained, requiring increasingly more maintenance effort. This does not meet the objectives of this Study.	Relatively more maintenance required due to additional linear storm sewer infrastructure and two facilities compared to alternative 2.	Relatively less maintenance required due to less linear storm sewer infrastructure and one facility compared to alternative 1.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the Study.	This solution will require more time to implement due to more construction required.	This solution will require more time to implement due to less construction required.
Minimize Impacts of Construction	Disruption during construction.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction required. Nothing to implement.	More relative disruption due to larger facility footprint.	Less relative disruption due to less facility footprint.
				Disruption of road/sidewalk	Equal construction work required on roadway.
Minimize Long-Term Social/ Economical Impacts	Permanent changes to the urban commu	Potential for disruption of displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	Increasing flooding problems in the community does not meet the objective or purpose of the Study.	No anticipated disruption	No anticipated disruption
	Permanent impact on future land uses.	Potential to influence infill or green field development.		May help development approvals as flooding risk has been mitigated	May help development approvals as flooding risk has been mitigated
Minimize/Mitigate Impact to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, and/or archaeological) and consideration of methods to minimize and/or mitigate impacts.	No initial disruption or displacement of existing resources, however, increasing flooding problems will eventually impact these resources in a permanent manner.	No impacts to existing built or cultural resources. Area low potential for archaeological resources.	No impacts to existing built or cultural resources. Area low potential for archaeological resources.

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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed /Sub-Sewershed Area: South / Grand Marais Drain
 Description: Surface flooding solution to address surface flooding along Chrysler Centre (ROAD-S3)
 Sewer System: Storm System

Objective	Evaluation Criteria	Rationale	Baseline Condition	ALTERNATIVE 1 (ROAD-S3-1)	ALTERNATIVE 2 (ROAD-S3-2)
Alternative:			Baseline	2 Underground Storage Tanks	Single Underground Storage Tank
Description of Alternative:				New storm sewer with increased conveyance from Tecumseh Road East to new surcharge storage underground, two locations.	New storm sewer with increased conveyance from Tecumseh Road East to new surcharge storage underground, centralized.
Minimize Impacts to the Natural Environment	Minimize impacts to the natural environment.	Potential for impacts to natural environmental features and consideration of how to minimize.	Increasing flooding problems in the community are anticipated to impact the natural environment in every aspect, and does not meet the objective of the Study.	Minimal potential for impact to existing natural environment resources.	Minimal potential for impact to existing natural environment resources.
	Minimize disruption to aquatic systems			No change to receiving system. Potential for improvement with storage	No change to receiving system. Potential for improvement with storage
Consideration of Cost	Relative capital municipal infrastructure and private property improvements cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	Increasing flooding problems in the community will increase community costs in the short and long run and does not address the purpose of the Study.	Relatively more costly for two storage facilities.	Relatively less costly for one storage facilities.
	Preferred Option				Preferred

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed Area: South / Grand Marais Drain
 Description: Surface flooding solution to address surface flooding risks identified in Regional Problem Area 7.
 Sewer System: Storm System (STM-S7)

Objective	Evaluation Criteria	Rationale	Do Nothing	ALTERNATIVE 1 (STM-S7-1)	ALTERNATIVE 2 (STM-S7-2)	ALTERNATIVE 3 (STM-S7-3)
Alternative:			Baseline	Surcharge Pond - McDonald Park	Surcharge Pond - Private, N. of YMCA	Central Pond Expansion
		Description of Alternative:		New storm sewers to new underground stormwater management facility within McDonald Park & LIDs along all proposed trunk storm sewers.	New storm sewers to new underground stormwater management facility within vacant land north of YMCA (, & LIDs at all sewers.	New storm sewers to expanded Central Ave Pond.
LEVEL OF SERVICE: Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	No reduction in risk.	Meets risk reduction objective.	Meets risk reduction objective.	Meets risk reduction objective.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet objective.	Meets risk reduction objective.	Meets risk reduction objective.	Meets risk reduction objective.
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	Existing level of service will be maintained. This does not meet the purpose or objectives of this Study.	Proposed recommendation is sized for Climate Change Storm (1:100 year storm plus 40% resiliency factor).	Proposed recommendation is sized for Climate Change Storm (1:100 year storm plus 40% resiliency factor).	Proposed recommendation is sized for Climate Change Storm (1:100 year storm plus 40% resiliency factor).
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements.	Allows new development to progress by meeting minimum ingress/egress requirements.	Allows new development to progress by meeting minimum ingress/egress requirements.
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement. Does not meet the purpose or objectives of this Study.	Changes to stormwater runoff characteristics will be addressed with on-site SWM measures required for all new private development. Dry pond has potential to improve water quality.	Changes to stormwater runoff characteristics will be addressed with on-site SWM measures required for all new private development. Dry pond has potential to improve water quality.	Changes to stormwater runoff characteristics will be addressed with on-site SWM measures required for all new private development. Dry pond has potential to improve water quality.
Ease of Implementation	Complexity of installation and operation.	Reducing homeowner and City challenges and barriers to flood reduction measures. Includes consideration of space requirements, construction requirements, installation, and operation.	Not achieving city-wide foundation drain disconnection program will not reduce the excess quantity of rainwater getting into the sanitary system and therefore will not meet the basement flood risks.	Solutions is mid-level complexity to implement new stormwater storage within private property. Lowest-level complexity due to lowest quantity of sewer and road reconstruction.	Solutions is hardest to implement new stormwater storage within private property. Highest-level complexity due to highest quantity of sewer and road reconstruction.	Solution is easiest to implement as the stormwater storage will be integrated into an existing City owned and operated stormwater management pond. Mid-level quantity of sewer and road reconstruction.

Sewershed / Sub-Sewershed Area: South / Grand Marais Drain
 Description: Surface flooding solution to address surface flooding risks identified in Regional Problem Area 7.
 Sewer System: Storm System (STM-S7)

Objective	Evaluation Criteria	Rationale	Do Nothing	ALTERNATIVE 1 (STM-S7-1)	ALTERNATIVE 2 (STM-S7-2)	ALTERNATIVE 3 (STM-S7-3)
			Alternative: Baseline	Surcharge Pond - McDonald Park	Surcharge Pond - Private, N. of YMCA	Central Pond Expansion
			Description of Alternative:	New storm sewers to new underground stormwater management facility within McDonald Park & LIDs along all proposed trunk storm sewers.	New storm sewers to new underground stormwater management facility within vacant land north of YMCA (, & LIDs at all sewers.	New storm sewers to expanded Central Ave Pond.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained, requiring increasingly more maintenance effort. This does not meet the objectives of this Study.	Mid-level additional maintenance required for this alternative as it is proposed to be an underground storage facility within an already City maintained park.	Most additional maintenance require for this alternative as it requires new additional City owned land to be maintained.	Least additional maintenance required is least for this alternative as we are integrating storage into an existing pond.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the Study.	Mid-level lead time required due to need to acquire park lands to implement stormwater management facility. Smallest quantity of new storm sewer and road reconstruction required requires smallest construction timeline.	Longest lead time required due to need to acquire private property to implement stormwater management facility. Largest quantity of new storm sewer and road reconstruction required requires longest construction timeline.	Least amount of lead time required due to the existence of the stormwater management pond and outlet facility. Mid-level quantity of new storm sewer and road reconstruction requires mid-level construction timeline.
Minimize Impacts of Construction	Disruption during construction.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction required. Nothing to implement.	Requires disruption to City park and sidewalk during construction.	Requires disruption to sidewalk areas during construction.	Minimal amount of recreational spaced in the vicinity of the Central dry pond.
				Disruption to sidewalks/pathways during road re-construction.	Disruption to sidewalks/pathways during road re-construction.	Disruption to sidewalk and roadways during trunk sewer construction.
Minimize Long-Term Social/ Economical Impacts	Permanent changes to the urban commu	Potential for disruption of displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	Increasing flooding problems in the community does not meet the objective or purpose of the Study.	Low potential for impact to existing park land.	Potential for new park land and greenspace.	Increasing existing greenspace area.
	Permanent impact on future land uses.	Potential to influence infill or green field development.		May help development approvals as flooding risk has been mitigated.	May help development approvals as flooding risk has been mitigated.	Provides improved outlet for active development proposals and can be expanded to accommodate new developments.
Minimize/Mitigate Impact to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, and/or archaeological) and consideration of methods to minimize and/or mitigate impacts.	No initial disruption or displacement of existing resources, however, increasing flooding problems will eventually impact these resources in a permanent manner.	No impact to existing built heritage resources. Area low potential for archaeological resources.	No impact to existing built heritage resources. Area low potential for archaeological resources.	No impact to existing built heritage resources. Area low potential for archaeological resources.

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed Area: South / Grand Marais Drain
 Description: Surface flooding solution to address surface flooding risks identified in Regional Problem Area 7.
 Sewer System: Storm System (STM-S7)

Objective	Evaluation Criteria	Rationale	Do Nothing	ALTERNATIVE 1 (STM-S7-1)	ALTERNATIVE 2 (STM-S7-2)	ALTERNATIVE 3 (STM-S7-3)
		Alternative:	Baseline	Surcharge Pond - McDonald Park	Surcharge Pond - Private, N. of YMCA	Central Pond Expansion
		Description of Alternative:		New storm sewers to new underground stormwater management facility within McDonald Park & LIDs along all proposed trunk storm sewers.	New storm sewers to new underground stormwater management facility within vacant land north of YMCA (, & LIDs at all sewers.	New storm sewers to expanded Central Ave Pond.
Minimize Impacts to the Natural Environment	Minimize impacts to the natural environment.	Potential for impacts to natural environmental features and consideration of how to minimize.	Increasing flooding problems in the community are anticipated to impact the natural environment in every aspect, and does not meet the objective of the Study.	Minimal potential for impact to existing natural environment resources.	Minimal potential for impact to existing natural environment resources.	Minimal potential for archeological resources within disturbed ROWs.
	Minimize disruption to aquatic systems			No change to receiving system. Potential for improvement with LIDs	No change to receiving system. Potential for improvement with LIDs	No change to receiving system. Potential for improvement with LIDs.
Consideration of Cost	Relative capital municipal infrastructure and private property improvements cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	Increasing flooding problems in the community will increase community costs in the short and long run and does not address the purpose of the Study.	Additional cost for 3.8 km of sewer plus underground storage in McDonald Park, less overall construction on major roads. Cost for new underground stormwater facility is highest.	Additional cost for 4.7 km of sewer plus land acquisition, more construction work on major roads. Cost for new underground stormwater facility is highest.	Additional cost for X km of sewer plus land acquisition, more construction work on major roads. Cost to expand an existing stormwater pond is the lowest.
	Preferred Option					Preferred

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed Area: South / Lennon Drain
 Description: Downspout Disconnection & Low Impact Development Measures (LIDs) (STM-S8)
 Sewer System: Surface flooding solution to address surface flooding risks identified in Regional Problem Area 8.

Objective	Evaluation Criteria	Rationale	Do Nothing	ALTERNATIVE A (STM-S8-1)	ALTERNATIVE B (STM-S8-2)
Descriptions of Alternative:			Baseline	Area-Wide Source Control LIDs (Low Impact Development Measures) & Downspout Disconnection	Partial Source Control and Modification to Existing Ponds
Description of Alternative:				Low Impact Development (LIDs) measures paired with all existing sewers (13km) and area-wide downspout disconnection.	Lower high water level of three (3) ponds (Lake Como, Lake Grande and Lake Laguna), lower pond floor, modify interconnecting storm sewers.
LEVEL OF SERVICE: Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	No reduction in risk.	Meets risk reduction objective.	Meets risk reduction objective.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet objective.	Meets risk reduction objective.	Meets risk reduction objective.
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	Existing level of service will be maintained. This does not meet the purpose or objectives of this Study.	Proposed recommendation is sized for Climate Change Storm (1:100 year storm plus 40% resiliency factor).	Proposed recommendation is sized for Climate Change Storm (1:100 year storm plus 40% resiliency factor).
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements.	Allows new development to progress by meeting minimum ingress/egress requirements.
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement. Does not meet the purpose or objectives of this Study.	Changes to stormwater runoff characteristics will be addressed with on-site SWM measures required for all new private development. Implementation of LIDs will provide a relative increase in water quality.	Changes to stormwater runoff characteristics will be addressed with on-site SWM measures required for all new private development. No change to current water quality measures.
Compatibility	Ability for solution to integrate with existing municipal and private infrastructure.	Minimize impacts to existing infrastructure such as stormwater ponds, pump stations, downstream drains.	No changes to existing infrastructure.	Relatively easy integration with existing infrastructure.	Relatively easy integration with existing infrastructure.

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed Area: South / Lennon Drain
 Description: Downspout Disconnection & Low Impact Development Measures (LIDs) (STM-S8)
 Sewer System: Surface flooding solution to address surface flooding risks identified in Regional Problem Area 8.

Objective	Evaluation Criteria	Rationale	Do Nothing	ALTERNATIVE A (STM-S8-1)	ALTERNATIVE B (STM-S8-2)
Descriptions of Alternative:			Baseline	Area-Wide Source Control LIDs (Low Impact Development Measures) & Downspout Disconnection	Partial Source Control and Modification to Existing Ponds
Description of Alternative:				Low Impact Development (LIDs) measures paired with all existing sewers (13km) and area-wide downspout disconnection.	Lower high water level of three (3) ponds (Lake Como, Lake Grande and Lake Laguna), lower pond floor, modify interconnecting storm sewers.
Ease of Implementation	Complexity of installation and operation.	Reducing homeowner and City challenges and barriers to flood reduction measures. Includes consideration of space requirements, construction requirements, installation, and operation.	Not achieving city-wide foundation drain disconnection program will not reduce the excess quantity of rainwater getting into the sanitary system and therefore will not meet the basement flood risks.	New infrastructure required; new LIDs paired with all existing upstream storm sewers and complete downspout disconnection	New infrastructure required; complete downspout disconnection and new pipes between pond and PS. May need to lower pond bottoms and/or aeration of ponds required. Relatively less sewer installation and
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained, requiring increasingly more maintenance effort. This does not meet the objectives of this Study.	Relatively higher level of maintenance required to maintain proposed LIDs.	No change to existing maintenance requirements.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the Study.	More time required to complete full reconstruction of all area sewers.	Less time required to complete proposed pond modifications.
Minimize Impacts of Construction	Disruption during construction.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction required. Nothing to implement.	Most work to be completed within the ROW. Minimal disruption.	Disruption to existing stormwater management pond features.
				Significant disrupting to existing municipal right-of-way.	Minimal disruption to municipal right-of-way.
Minimize Long-Term Social/ Economical Impacts	Permanent changes to the urban community.	Potential for disruption of displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees).	Increasing flooding problems in the community does not meet the objective or purpose of the Study.	Minimal disruption to existing residential neighbourhood.	Some disruption for properties adjacent to the stormwater ponds. Modifications to pond water levels may not be desirable.
	Permanent impact on future land uses.	Potential to influence infill or green field development.		May help development approvals as flooding risk has been mitigated.	May help development approvals as flooding risk has been mitigated.

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed Area: South / Lennon Drain
 Description: Downspout Disconnection & Low Impact Development Measures (LIDs) (STM-S8)
 Sewer System: Surface flooding solution to address surface flooding risks identified in Regional Problem Area 8.

Objective	Evaluation Criteria	Rationale	Do Nothing	ALTERNATIVE A (STM-S8-1)	ALTERNATIVE B (STM-S8-2)
Descriptions of Alternative:			Baseline	Area-Wide Source Control LIDs (Low Impact Development Measures) & Downspout Disconnection	Partial Source Control and Modification to Existing Ponds
Description of Alternative:				Low Impact Development (LIDs) measures paired with all existing sewers (13km) and area-wide downspout disconnection.	Lower high water level of three (3) ponds (Lake Como, Lake Grande and Lake Laguna), lower pond floor, modify interconnecting storm sewers.
Minimize/Mitigate Impact to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, and/or archaeological) and consideration of methods to minimize and/or mitigate impacts.	No initial disruption or displacement of existing resources, however, increasing flooding problems will eventually impact these resources in a permanent manner.	No impact to existing built heritage resources. Area low potential for archaeological resources.	No impact to existing built heritage resources. Area low potential for archaeological resources.
Minimize Impacts to the Natural Environment	Minimize impacts to the natural environment.	Potential for impacts to natural environmental features and consideration of how to minimize.	Increasing flooding problems in the community are anticipated to impact the natural environment in every aspect, and does not meet the objective of the Study.	May help development approvals as flooding risk has been mitigated.	May help development approvals as flooding risk has been mitigated.
	Minimize disruption to aquatic systems			No change to receiving system. Potential for improvement with LIDs	No change to receiving system.
Consideration of Cost	Relative capital municipal infrastructure and private property improvements cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	Increasing flooding problems in the community will increase community costs in the short and long run and does not address the purpose of the Study.	Costly due to need full reconstruction of all storm sewer and roadways.	Least costly alternative.
	Preferred Option				Preferred



East Windsor Alternative Solution – Environmental Assessment Comparative Evaluations

Sewer and Coastal Flood Protection Master Plan

Windsor Sewer and Coastal Flood Protection Master Plan
 Environmental Assessment Evaluation
 Sanitary System Solutions

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed Area: East / Little River Pollution Control Plant Sewershed Area
 Description: East Windsor Sanitary Sewer System Solutions (SAN-E)
 Sewer System: Sanitary Sewer System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (SAN-E-1)	ALTERNATIVE 2 (SAN-E-2)
Alternative:			Baseline	Sanitary sewer improvements and underground water storage facility at McHugh Park. No change to treatment plant PS capacity.	Sanitary sewer improvements without storage at McHugh Park. Increase treatment plant PS capacity, with interim improvement to the Pontiac PS ByPass.
Description of Alternative:				Conveyance Upgrade with Storage at McHugh Park. No change to treatment plant PS capacity. Improve conveyance and provide storage new sanitary sewers ranging from 450 mm diameter to 2,700 mm x 4,200 mm box culverts. Construction includes approximately 40 km of new sewers. Includes provisions for area wide foundation drain disconnection and sealing the sewer system.	Increase Current Little River Pollution Control Plant Capacity. Improvement to the Pontiac PS bypass to provide review in advance of LRPCP upgrades. Improve conveyance and provide storage new sanitary sewers ranging from 450 mm diameter to 2,700 mm x 4,200 mm box culverts. Construction includes approximately 47 km of new sewers. Includes provisions for area wide foundation drain disconnection and sealing the sewer system.
LEVEL OF SERVICE: Reduce Potential for Flooding	Extent of basement flood reduction realized by alternative.	Reducing the potential for damage in homes (generally basements).	Does not meet the Level of Service objective.	Upgrade meets the Level of Service Objective.	Upgrade meets the Level of Service Objective.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas of infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet the Level of Service objective.	Upgrade meets the Level of Service Objective.	Upgrade meets the Level of Service Objective.
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	Does not meet objective.	Some limited flexibility achieved. Proposed storage facility does not provide relief for back to back storm events as it requires >24 hour drawdown time.	Meets objective and criteria.
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Considers infill of vacant areas such as secondary plan areas and areas currently under development reviews.	Considers infill of vacant areas such as secondary plan areas and areas currently under development reviews.
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No reduction to risk so does not address the purpose or objective of the Study.	Reduces/eliminates sewage overflow occurrences to Little River through storage Large storage volume required (122,667 m3)	Reduces sewage overflow occurrences to Little River through Storage Moderate storage volume required (41,990 m3)

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed Area: East / Little River Pollution Control Plant Sewershed Area
 Description: East Windsor Sanitary Sewer System Solutions (SAN-E)
 Sewer System: Sanitary Sewer System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (SAN-E-1)	ALTERNATIVE 2 (SAN-E-2)
Alternative:			Baseline	Sanitary sewer improvements and underground waterwater storage facility at McHugh Park. No change to treatment plant PS capacity.	Sanitary sewer improvements without storage at McHugh Park. Increase treatment plant PS capacity, with interim improvement to the Pontiac PS ByPass.
Description of Alternative:				Conveyance Upgrade with Storage at McHugh Park. No change to treatment plant PS capacity. Improve conveyance and provide storage new sanitary sewers ranging from 450 mm diameter to 2,700 mm x 4,200 mm box culverts. Construction includes approximately 40 km of new sewers. Includes provisions for area wide foundation drain disconnection and sealing the sewer system.	Increase Current Little River Pollution Control Plant Capacity. Improvemnet to the Pontiac PS bypass to provide review in advance of LRPCP upgrades. Improve conveyance and provide storage new sanitary sewers ranging from 450 mm diameter to 2,700 mm x 4,200 mm box culverts. Construction includes approximately 47 km of new sewers. Includes provisions for area wide foundation drain disconnection and sealing the sewer system.
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing City and homeowner challenges and barriers to flood reduction measures. Includes consideration of space requirements, construction requirements, installation, and operation.	244,270 m3 Storage @STP is needed.	High level complexity of home owner. Recommended Connected Roof and Foundation Drain disconnection.	High level complexity of home owner. Recommended Connected Roof and Foundation Drain disconnection.
				<ul style="list-style-type: none"> Upsize 40 km of sewer system being incorporated with future road reconstruction. Large underground storage facility will be complex to construct. Direction of stored diluted flows will require full treatment through LRPCP. Storage facility does not significantly reduce the quantity of sanitary sewer improvements within the system to improve conveyance. 	<ul style="list-style-type: none"> Upsize 47 km of sewer system being incorporated with future road reconstruction. LRPCP Bypass improvement requires new wet well adjacent to the existing Pontiac PS. Electrical and back up power services can be provided by existing plant. Use existing pump station outlet location along the Little Rive Drain. This will be confirmed via the Little River Floodplain Study. If not possible, a new outlet will need to placed within the City's ROW to discharge to the Detroit River.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained. This does not meet the objectives of this study.	<ul style="list-style-type: none"> Periodic cleaning for linear infrastructure Regular maintenance of the proposed underground storage facility. Annual maintenance program to be maintained for STP 	<ul style="list-style-type: none"> Periodic cleaning for linear infrastructure Annual maintenance program to be maintained for STP

Windsor Sewer and Coastal Flood Protection Master Plan
 Environmental Assessment Evaluation
 Sanitary System Solutions

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed Area: East / Little River Pollution Control Plant Sewershed Area
 Description: East Windsor Sanitary Sewer System Solutions (SAN-E)
 Sewer System: Sanitary Sewer System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (SAN-E-1)	ALTERNATIVE 2 (SAN-E-2)
Alternative:			Baseline	Sanitary sewer improvements and underground waterwater storage facility at McHugh Park. No change to treatment plant PS capacity.	Sanitary sewer improvements without storage at McHugh Park. Increase treatment plant PS capacity, with interim improvement to the Pontiac PS ByPass.
Description of Alternative:				Conveyance Upgrade with Storage at McHugh Park. No change to treatment plant PS capacity. Improve conveyance and provide storage new sanitary sewers ranging from 450 mm diameter to 2,700 mm x 4,200 mm box culverts. Construction includes approximately 40 km of new sewers. Includes provisions for area wide foundation drain disconnection and sealing the sewer system.	Increase Current Little River Pollution Control Plant Capacity. Improvemnet to the Pontiac PS bypass to provide review in advance of LRPCP upgrades. Improve conveyance and provide storage new sanitary sewers ranging from 450 mm diameter to 2,700 mm x 4,200 mm box culverts. Construction includes approximately 47 km of new sewers. Includes provisions for area wide foundation drain disconnection and sealing the sewer system.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the study.	<ul style="list-style-type: none"> • Timing consideration for disconnection of Roof Leaders and Foundation Drains • highest disruption due to construction of infrastructure & Plant • longest timing 	<ul style="list-style-type: none"> • Timing consideration for disconnection of Roof Leaders and Foundation Drains • Moderate disruption due to construction of infrastructure • moderate timing (City has obtaining funding to complete these improvements prior to 2028).
Minimize Impacts of Construction	Minimize disruption to public greenspaces/recreational uses/ROW during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction, therefore no impacts.	Temporary disruption to McHugh Park. Moderate level of disruption anticipated overall.	Greatest length and size of sanitary sewers. Bypass and treatmnt plant improvements will have little disruption to pulic. Temporary impacts to Little River during outlet construction.
Minimize Long-Term Social/Economical Impacts	Permanent changes to the urban community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	Increasing flooding problems in the community does not meet the objective of the Study.	Sewer improvements are proposd within existing urban ROWs and therefore impacts are minimal.	Sewer improvements are proposd within existing urban ROWs and therefore impacts are minimal.
Minimize/Mitigate impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, archaeological) and consideration of methods to minimize and/or mitigate impacts.	Increasing flooding problems in the community are anticipated to impact the natural environment in every aspect, and does not meet the objective of the study.	Low Potential for Archaeological resources in the McHugh park where additional storage is required. Impacts from sewer installation is marginal.	High Potential for Archaeological resources in the vicinity of the treatment plant where additional storage is required. Impacts from sewer installation is marginal.
Minimize Impacts to the Natural Environment	Minimize Impacts to the Natural Environment	Potential for impacts to natural environmental features and consideration of how to minimize.	Will not change the number of CSO occurances at the treatment plant.	Will have the greatest reduction of CSO occurances at the treatment plant. Improvements are poposed within urban areas.	Will have the moderate reduction of CSO occurances at the treatment plant Improvements are poposed within urban areas.

Windsor Sewer and Coastal Flood Protection Master Plan
 Environmental Assessment Evaluation
 Sanitary System Solutions

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed Area: East / Little River Pollution Control Plant Sewershed Area
 Description: East Windsor Sanitary Sewer System Solutions (SAN-E)
 Sewer System: Sanitary Sewer System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (SAN-E-1)	ALTERNATIVE 2 (SAN-E-2)
Alternative:			Baseline	Sanitary sewer improvements and underground waterwater storage facility at McHugh Park. No change to treatment plant PS capacity.	Sanitary sewer improvements without storage at McHugh Park. Increase treatment plant PS capacity, with interim improvement to the Pontiac PS ByPass.
Description of Alternative:				Conveyance Upgrade with Storage at McHugh Park. No change to treatment plant PS capacity. Improve conveyance and provide storage new sanitary sewers ranging from 450 mm diameter to 2,700 mm x 4,200 mm box culverts. Construction includes approximately 40 km of new sewers. Includes provisions for area wide foundation drain disconnection and sealing the sewer system.	Increase Current Little River Pollution Control Plant Capacity. Improvemnet to the Pontiac PS bypass to provide review in advance of LRPCP upgrades. Improve conveyance and provide storage new sanitary sewers ranging from 450 mm diameter to 2,700 mm x 4,200 mm box culverts. Construction includes approximately 47 km of new sewers. Includes provisions for area wide foundation drain disconnection and sealing the sewer system.
Consideration of Cost	Relative capital cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	Increasing flooding problems in the community will increase community costs in the short and long run and does not address the purpose of the study.	Most costly.	Moderate cost.
		Preferred Option			Preferred

Sewershed/Sub-Sewershed

Area: East / Detroit River-Riverside

Sewer System: Storm System

Problem Area: Problem Area 1 - St. Rose Pump Station (PS) (PS-E-ROSE)

Description: Improvements to the St. Rose Pump Station is recommended as part of the storm solution alternatives developed for the East Windsor. The recommended St. Rose pump Station recommended capacity is 13.5 cms.

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (PS-E-ROSE-1)	ALTERNATIVE 2 (PS-E-ROSE-2)	ALTERNATIVE 3 (PS-E-ROSE-3)	ALT 4 (PS-E-ROSE-4)	
			Alternative	Baseline	New St. Rose PS - St. Rose Beach	New St. Rose PS - Southeast Corner of Riverside Dr & St Rose Ave.	New St. Rose PS - Southwest Corner of Riverside Dr & St Rose Ave.	New St. Rose PS - Northwest Corner of Wyandotte St. E. and St. Rose Ave.
Summary of Required Infrastructure			No New Infrastructure.	13.5 cms pump station within Park land. Emergency back up power generator Electrical/Control Building Additional Culvert Outlet to Detroit River. 3.0 m x 1.8 m storm sewer culvert on St. Rose Ave.	13.5 cms pump station within residential property. Demo of existing residential home. Emergency back up power generator Electrical/Control Building Additional Culvert Outlet to Detroit River crossing Riverside Drive. Need for outlet chamber within Park Lands (6 m by 6m structure, 1.7 m in Height). 3.0 m x 1.8 m storm sewer culvert on St. Rose Ave.	13.5 cms pump station within residential property. Demo of existing residential home. Emergency back up power generator Electrical/Control Building Additional Culvert Outlet to Detroit River crossing Riverside Drive. Need for outlet chamber within Park Lands (6 m by 6m structure, 1.7 m in Height). 3.0 m x 1.8 m storm sewer culvert on St. Rose Ave.	Larger pump station required within commercial and residential property at Wyandotte St. E. and St. Rose intersection. Demo of existing commercial building. Emergency back up power generator Electrical/Control Building. Need for outlet chamber within Park Lands (6 m by 6m structure, 1.7 m in Height). 3000 mm dia. on St. Rose Ave. directing Riverside Dr. sewer to Wyandotte PS. 3.0 m diameter forcemain (or 3.0 m x 1.8 m storm sewer culvert) on St. Rose Ave.	
Level of Service: Reduce Potential for Flooding	Flood reduction realized by alternative.	Reducing the potential for decreasing undesirable flooding.	Does not meet the Level of Service objectives. Option will not be carried forward for assessment.	Pump station improvements meets the Level of Service Objectives of this study.	Same as Alt. 1.	Same as Alt. 1.	Same as Alt. 1.	
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas of infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet the Level of Service objective.	Pump station improvements meets the Level of Service Objectives of this study.	Same as Alt. 1.	Same as Alt. 1.	Same as Alt. 1.	
Resilience	Flexibility to adjust to impacts climate change will have on rain frequency and volume.	Being forward looking and resilient in considering climate change and growth/intensification.	N/A	Improved resiliency. PS capacity is based on providing level of service for 1:100 + Climate Change Factor.	Same as Alt. 1.	Same as Alt. 1.	Same as Alt. 1.	
	Flexibility to adjust to impacts climate change will have on Detroit River levels.	Considerations required to mitigate risks associated with coastal flood risks along shoreline/low lying areas.	N/A	The pump station wet well must be constructed to mitigate risks of river water back up during periods of instantaneous high water levels. The storms sewer system outlet invert must exceed Climate Change projected instantaneous high water levels (177.1 m). This requires a portion of the pump station to be constructed approximately 1.7 m above existing grade. Additional coastal flood protection will be required onsite to protect the power and electrical equipment.	Coastal flood mitigation measures must be implemented similar to Alt. 1. This will require an outlet chamber with the St. Rose Park area with an approximately height of 1.7 m above existing grade.	Similar to Alt. 2	Similar to Alt. 2. This site is at the highest elevation and is furthest from the existing shoreline.	
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	N/A	Water quality maintained or improved through construction of the upstream storm sewer system.	Water quality maintained or improved through construction of the upstream storm sewer system.	Water quality maintained or improved through construction of the upstream storm sewer system.	Water quality maintained or improved through construction of the upstream storm sewer system.	

Sewershed/Sub-Sewershed

Area: East / Detroit River-Riverside

Sewer System: Storm System

Problem Area: Problem Area 1 - St. Rose Pump Station (PS) (PS-E-ROSE)

Description: Improvements to the St. Rose Pump Station is recommended as part of the storm solution alternatives developed for the East Windsor. The recommended St. Rose pump Station recommended capacity is 13.5 cms.

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (PS-E-ROSE-1)	ALTERNATIVE 2 (PS-E-ROSE-2)	ALTERNATIVE 3 (PS-E-ROSE-3)	ALT 4 (PS-E-ROSE-4)	
			Alternative	Baseline	New St. Rose PS - St. Rose Beach	New St. Rose PS - Southeast Corner of Riverside Dr & St Rose Ave.	New St. Rose PS - Southwest Corner of Riverside Dr & St Rose Ave.	New St. Rose PS - Northwest Corner of Wyandotte St. E. and St. Rose Ave.
Summary of Required Infrastructure			No New Infrastructure.	13.5 cms pump station within Park land. Emergency back up power generator Electrical/Control Building Additional Culvert Outlet to Detroit River. 3.0 m x 1.8 m storm sewer culvert on St. Rose Ave.	13.5 cms pump station within residential property. Demo of existing residential home. Emergency back up power generator Electrical/Control Building Additional Culvert Outlet to Detroit River crossing Riverside Drive. Need for outlet chamber within Park Lands (6 m by 6m structure, 1.7 m in Height). 3.0 m x 1.8 m storm sewer culvert on St. Rose Ave.	13.5 cms pump station within residential property. Demo of existing residential home. Emergency back up power generator Electrical/Control Building Additional Culvert Outlet to Detroit River crossing Riverside Drive. Need for outlet chamber within Park Lands (6 m by 6m structure, 1.7 m in Height). 3.0 m x 1.8 m storm sewer culvert on St. Rose Ave.	Larger pump station required within commercial and residential property at Wyandotte St. E. and St. Rose intersection. Demo of existing commercial building. Emergency back up power generator Electrical/Control Building. Need for outlet chamber within Park Lands (6 m by 6m structure, 1.7 m in Height). 3000 mm dia. on St. Rose Ave. directing Riverside Dr. sewer to Wyandotte PS. 3.0 m diameter forcemain (or 3.0 m x 1.8 m storm sewer culvert) on St. Rose Ave.	
Ease of Implementation	Complexity of installation and operation related to the pump station and storm sewer infrastructure.	Reducing City challenges and barriers to flood reduction measures. Includes consideration of space requirements, construction requirements, installation, and operation. <u>(REFER TO SEPARATE CONSTRUCTABILITY EVALUATION)</u>	N/A	Least comparatively complex to construct overall based on separate constructability comparative evaluation table.	Moderate level of construction complexity.	Similar to Alt. 2.	Most comparatively complex to construct.	
Ease of Maintenance and Operation	Anticipated extent of maintenance required.	Providing solutions that are relatively easy/less costly to maintain.	N/A	Regular pump and mechanical system maintenance required throughout the lifetime of this facility. No additional storm sewer maintenance is anticipated as St. Rose box culvert is similar to the existing configuration.	PS maintenance is similar to Alt. 1, longer outlet sewer and additional outlet chamber will require comparatively more maintenance.	Similar to Alt. 2.	PS maintenance is similar to Alt. 1. Longest enclosed pump station outlet forcemain will require comparatively more maintenance. Minimal access manholes along the outlet pipe will require more complex maintenance. Consideration for a redundant forcemain for maintained and back up.	
Timing for Implementation	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	N/A	Less risk of time delays due to property acquisition/expropriation or building demolition. Time delays related to obtain necessary DFO clearances. Schedule C requirements and additional site assessments must be completed prior to completing detailed design.	Risk of time delays due to need to acquire and demolish 2 existing residential properties. Time delays related to obtain necessary DFO clearances, similar to Alt. 1. Schedule C requirements must be met similar to Alt. 1.	Risk of time delays due to need to acquire and demolish 3 existing residential properties. Time delays related to obtain necessary DFO clearances, similar to Alt. 1. Schedule C requirements must be met similar to Alt. 1.	Risk of time delays due to need to acquire and demolish existing commercial building and one residential property. Time delays related to obtain necessary DFO clearances, similar to Alt. 1. Schedule C requirements must be met similar to Alt. 1.	

Sewershed/Sub-Sewershed

Area: East / Detroit River-Riverside

Sewer System: Storm System

Problem Area: Problem Area 1 - St. Rose Pump Station (PS) (PS-E-ROSE)

Description: Improvements to the St. Rose Pump Station is recommended as part of the storm solution alternatives developed for the East Windsor. The recommended St. Rose pump Station recommended capacity is 13.5 cms.

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (PS-E-ROSE-1)	ALTERNATIVE 2 (PS-E-ROSE-2)	ALTERNATIVE 3 (PS-E-ROSE-3)	ALT 4 (PS-E-ROSE-4)
Alternative			Baseline	New St. Rose PS - St. Rose Beach	New St. Rose PS - Southeast Corner of Riverside Dr & St Rose Ave.	New St. Rose PS - Southwest Corner of Riverside Dr & St Rose Ave.	New St. Rose PS - Northwest Corner of Wyandotte St. E. and St. Rose Ave.
Summary of Required Infrastructure			No New Infrastructure.	13.5 cms pump station within Park land. Emergency back up power generator Electrical/Control Building Additional Culvert Outlet to Detroit River. 3.0 m x 1.8 m storm sewer culvert on St. Rose Ave.	13.5 cms pump station within residential property. Demo of existing residential home. Emergency back up power generator Electrical/Control Building Additional Culvert Outlet to Detroit River crossing Riverside Drive. Need for outlet chamber within Park Lands (6 m by 6m structure, 1.7 m in Height). 3.0 m x 1.8 m storm sewer culvert on St. Rose Ave.	13.5 cms pump station within residential property. Demo of existing residential home. Emergency back up power generator Electrical/Control Building Additional Culvert Outlet to Detroit River crossing Riverside Drive. Need for outlet chamber within Park Lands (6 m by 6m structure, 1.7 m in Height). 3.0 m x 1.8 m storm sewer culvert on St. Rose Ave.	Larger pump station required within commercial and residential property at Wyandotte St. E. and St. Rose intersection. Demo of existing commercial building. Emergency back up power generator Electrical/Control Building. Need for outlet chamber within Park Lands (6 m by 6m structure, 1.7 m in Height). 3000 mm dia. on St. Rose Ave. directing Riverside Dr. sewer to Wyandotte PS. 3.0 m diameter forcemain (or 3.0 m x 1.8 m storm sewer culvert) on St. Rose Ave.
Minimize Impacts of Construction	Disruption during construction.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	N/A	Greatest impact to public park space during construction to construct the PS. Park will require closure during construction. Greatest potential impact to marine environmental with PS construction site closest to Detroit River. Storm outlet requires in water works. Noise and vibration - close proximity to one residential home. Least impact to St. Rose Ave. Row therefore least amount of impact to those properties. Least disruption to Riverside Dr. ROW to facilitate construction of PS inlet. Some disruption to construct one storm sewer culvert along St. Rose Ave.	Least impact to public park to construct outlet culvert and outlet chamber. Park will require closure during construction. Some potential impact to marine environmental with outlet chamber construction within park land area. Storm outlet requires in water works similar to Alt. 1. Noise and vibration- close proximity to two residential homes. Additional ROW impacts to St. Rose Ave. results in additional impact to adjacent property owners. Longer and more extensive disruption to Riverside Dr. ROW to facilitate construction of PS inlet and outlet, comparatively greater construction impact than Alt. 1. Similar to Alt. 1.	Similar to Alt. 2 Similar to Alt. 2 Similar to Alt. 2 Similar to Alt. 2 Similar to Alt. 1.	Similar to Alt. 2 Similar to Alt. 2 Noise and vibration- close proximity to residential homes and commercial properties along Wyandotte St. E. Greatest impact to properties along St. Rose Ave. and Wyandotte St. E. Longer and more extensive disruption on Riverside Dr. E., St. Rose Ave., and Wyandotte St. E. to facilitate construction. Requires greater impact to existing services and may require temporary sewage pumping or on grade watermain during construction.

Sewershed/Sub-Sewershed

Area: East / Detroit River-Riverside

Sewer System: Storm System

Problem Area: Problem Area 1 - St. Rose Pump Station (PS) (PS-E-ROSE)

Description: Improvements to the St. Rose Pump Station is recommended as part of the storm solution alternatives developed for the East Windsor. The recommended St. Rose pump Station recommended capacity is 13.5 cms.

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (PS-E-ROSE-1)	ALTERNATIVE 2 (PS-E-ROSE-2)	ALTERNATIVE 3 (PS-E-ROSE-3)	ALT 4 (PS-E-ROSE-4)
		Alternative	Baseline	New St. Rose PS - St. Rose Beach	New St. Rose PS - Southeast Corner of Riverside Dr & St Rose Ave.	New St. Rose PS - Southwest Corner of Riverside Dr & St Rose Ave.	New St. Rose PS - Northwest Corner of Wyandotte St. E. and St. Rose Ave.
		Summary of Required Infrastructure	No New Infrastructure.	13.5 cms pump station within Park land. Emergency back up power generator Electrical/Control Building Additional Culvert Outlet to Detroit River. 3.0 m x 1.8 m storm sewer culvert on St. Rose Ave.	13.5 cms pump station within residential property. Demo of existing residential home. Emergency back up power generator Electrical/Control Building Additional Culvert Outlet to Detroit River crossing Riverside Drive. Need for outlet chamber within Park Lands (6 m by 6m structure, 1.7 m in Height). 3.0 m x 1.8 m storm sewer culvert on St. Rose Ave.	13.5 cms pump station within residential property. Demo of existing residential home. Emergency back up power generator Electrical/Control Building Additional Culvert Outlet to Detroit River crossing Riverside Drive. Need for outlet chamber within Park Lands (6 m by 6m structure, 1.7 m in Height). 3.0 m x 1.8 m storm sewer culvert on St. Rose Ave.	Larger pump station required within commercial and residential property at Wyandotte St. E. and St. Rose intersection. Demo of existing commercial building. Emergency back up power generator Electrical/Control Building. Need for outlet chamber within Park Lands (6 m by 6m structure, 1.7 m in Height). 3000 mm dia. on St. Rose Ave. directing Riverside Dr. sewer to Wyandotte PS. 3.0 m diameter forcemain (or 3.0 m x 1.8 m storm sewer culvert) on St. Rose Ave.
Minimize Long-Term Social/Economical Impacts	Permanent changes to the urban community such as existing residents, greenspaces, recreational uses (parks, open spaces, trees).	Potential for disruption or displacement of existing residents.	N/A	Does not require displacement of residential or commercial property owners.	Requires permanent displacement of 2 existing residents.	Requires permanent displacement of 3 existing residents.	Requires permanent displacement of existing commercial and residential property owners. Will also require the removal of parking spaces within the adjacent commercial property (Grocery Store).
		Noise and Vibration impacts, proximity to existing land uses. (Minimum noise/vibration standards will need to be met for all alternatives.)		Pump station location is adjacent to one residential property. Due to site constraints there is limited opportunity to provide additional buffer between pump station work and adjacent property. Additional noise abatement measures may be required.	Pump station location will be adjacent to two residential properties. Additional property acquisitions required to provide additional buffer.	Pump station location will be adjacent to three residential properties. Additional property acquisitions required to provide additional buffer.	Pump station location will be adjacent to one residential property and one commercial property. Additional property acquisitions required to provide additional buffer.
		Potential for disruption or displacement of greenspaces, recreational uses (parks, open spaces, trees).		Increased impact of noise/vibration within	Increased impact of noise/vibration within existing residential area.	Increased impact of noise/vibration within existing residential area.	Increased impact of noise/vibration within existing
		Potential for disruption or displacement of scenic/heritage views of the waterfront.		Most impact to waterfront community feature which will require the introduction of additional park amenities to offset the permanent impact.	Some impact to waterfront community or park lands to construct outlet and outlet structure.	Similar to Alt. 2.	Similar to Alt. 2.
Minimize/Mitigate impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, archaeological) and consideration of methods to minimize and/or mitigate impacts.	N/A	No designated heritage features in the vicinity of the site. Most impact to heritage of the area due to the potential impact to the waterfront park. Potential for temporary and permanent impact to public waterfront access as a cultural feature.	No designated heritage features in the vicinity of the site. Least cultural impact to place PS in Commercial zoned lands. No permanent impact to public waterfront access as a cultural feature.	No designated heritage features in the vicinity of the site. Less cultural impact than Alt. 1 to place PS in Commercial zoned lands. No permanent impact to public waterfront access as a cultural feature.	No designated heritage features in the vicinity of the site. Least cultural impact to place PS in Commercial zoned lands. No permanent impact to public waterfront access as a cultural feature.
		Although proposed works are within high archaeological potential areas, the majority of lands have been significantly disturbed. This site is mostly comprised of infill with exported materials.		Although proposed works are within high archaeological potential areas, the majority of lands have been significantly disturbed due to the construction of a residential home.	Similar to Alt. 2.	Although proposed works are within high archaeological potential areas, the majority of lands have been significantly disturbed before due to the development in the area. This site is furthest from the Detroit River and is at the boundary of the high/low archaeological potential boundary per the City's Archaeological Master Plan.	

Sewershed/Sub-Sewershed

Area: East / Detroit River-Riverside

Sewer System: Storm System

Problem Area: Problem Area 1 - St. Rose Pump Station (PS) (PS-E-ROSE)

Description: Improvements to the St. Rose Pump Station is recommended as part of the storm solution alternatives developed for the East Windsor. The recommended St. Rose pump Station recommended capacity is 13.5 cms.

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (PS-E-ROSE-1)	ALTERNATIVE 2 (PS-E-ROSE-2)	ALTERNATIVE 3 (PS-E-ROSE-3)	ALT 4 (PS-E-ROSE-4)
		Alternative	Baseline	New St. Rose PS - St. Rose Beach	New St. Rose PS - Southeast Corner of Riverside Dr & St Rose Ave.	New St. Rose PS - Southwest Corner of Riverside Dr & St Rose Ave.	New St. Rose PS - Northwest Corner of Wyandotte St. E. and St. Rose Ave.
		Summary of Required Infrastructure	No New Infrastructure.	13.5 cms pump station within Park land. Emergency back up power generator Electrical/Control Building Additional Culvert Outlet to Detroit River. 3.0 m x 1.8 m storm sewer culvert on St. Rose Ave.	13.5 cms pump station within residential property. Demo of existing residential home. Emergency back up power generator Electrical/Control Building Additional Culvert Outlet to Detroit River crossing Riverside Drive. Need for outlet chamber within Park Lands (6 m by 6m structure, 1.7 m in Height). 3.0 m x 1.8 m storm sewer culvert on St. Rose Ave.	13.5 cms pump station within residential property. Demo of existing residential home. Emergency back up power generator Electrical/Control Building Additional Culvert Outlet to Detroit River crossing Riverside Drive. Need for outlet chamber within Park Lands (6 m by 6m structure, 1.7 m in Height). 3.0 m x 1.8 m storm sewer culvert on St. Rose Ave.	Larger pump station required within commercial and residential property at Wyandotte St. E. and St. Rose intersection. Demo of existing commercial building. Emergency back up power generator Electrical/Control Building. Need for outlet chamber within Park Lands (6 m by 6m structure, 1.7 m in Height). 3000 mm dia. on St. Rose Ave. directing Riverside Dr. sewer to Wyandotte PS. 3.0 m diameter forcemain (or 3.0 m x 1.8 m storm sewer culvert) on St. Rose Ave.
Minimize Impacts to the Natural Environment	Minimize Impacts to the Natural Environment	Potential for impacts to natural environmental features and consideration of how to minimize.	N/A	Additional outlet culvert required for pump station outlet will require mitigation with in-water sediment and erosion protection measures. Due to proximity of construction to shoreline additional sedimentation and erosion control measures are needed. No impacts to the terrestrial environment.	Additional outlet culvert required for pump station outlet will require mitigation with in-water sediment and erosion protection measures. No impacts to the terrestrial environment.	Similar to Alt. 2.	Similar to Alt. 2.
Consideration of Cost	Relative capital cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	N/A	Lowest comparative capital cost due to pump station proximity to the outlet, least amount infrastructure conflicts, does not require building demo and lowest cost for land purchase. Additional incremental costs may be required for site dewatering due to proximity to the Detroit River. Additional cost to export fill material from site during excavation including environmental testing. No costs associated with the relocation of residents or costs for property acquisition.	Moderate capital cost due to additional sewer works at the St. Rose and Riverside intersection and property acquisition of several properties and demolition of existing buildings. Less comparative cost for dewatering, export of material, environmental testing required. Additional costs for relocating residents, potential risk of additional legal fees (i.e. expropriation).	Similar to Alt. 2.	Highest capital cost due requirement for an additional deep storm sewer along St. Rose Ave. (and potentially Wyandotte Street), property acquisition of several properties and potential demolition of existing building(s). Increased pump size required to account for increased head losses to outlet at Detroit River. Less comparative cost for dewatering, export of material, environmental testing required. Additional costs for relocating residents, potential risk of additional legal fees (i.e.. expropriation).
		Preferred:		PREFERRED			

Windsor Sewer and Coastal Flood Protection Master Plan
 Environmental Assessment Evaluation
 Storm Pump Station Solutions - St Paul Pump Station

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Detroit River
 Sewer System: Storm System (PS-E STPAUL)
 Problem Area: Problem Area 1
 Description: Improvements to the St Paul Pump Station

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (PS-E-STPAUL)
Alternative:			Baseline	Increase Capacity of St. Paul Pump Station
Description of Alternative:				Expansion of the existing pump station, east of the existing building. New outlet sewers to Detroit River from the proposed expansion. Expansion electrical systems within the existing system. New back up power generator for additional load.
Level of Service: Reduce Potential for Flooding	Flood reduction realized by alternative.	Reducing the potential for reducing undesirable flooding.	Does not meet the Level of Service objective.	Upgrade meets the Level of Service Objective.
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	Existing level of service will be maintained. This does not meet the purpose or objectives of this study in alleviating flooding issues in the community.	Improved resiliency. PS capacity is based on providing a more flexible level of service for 1:100 + Climate Change Factor. New development standards will mandate development to not exceed existing runoff rates and improve flooding issues in the community.
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No reduction risk so does not address the purpose or objective of the Study.	Water quality maintained.
Ease of Implementation	Complexity of installation and operation.	Reducing City and homeowner challenges and barriers to flood reduction measures. Includes consideration of space requirements, construction requirements, installation, and operation.	No construction required. Nothing to implement.	Modifications to existing pump station, relatively easier to implement. Space is available for staging of construction works outside of the road ROW. Minimal conflict with existing infrastructure.

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 Storm Pump Station Solutions - St Paul Pump Station

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Detroit River
 Sewer System: Storm System (PS-E STPAUL)
 Problem Area: Problem Area 1
 Description: Improvements to the St Paul Pump Station

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (PS-E-STPAUL)
Alternative:			Baseline	Increase Capacity of St. Paul Pump Station
Description of Alternative:				Expansion of the existing pump station, east of the existing building. New outlet sewers to Detroit River from the proposed expansion. Expansion electrical systems within the existing system. New back up power generator for additional load.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	No change to maintenance needs.	Relative increase in maintenance for additional wet well structure and additional pumps.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the study.	Implementation is dependent on available funding.
Minimize Impacts of Construction	Disruption during construction.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction required. Nothing to implement.	Temporary impact to public park space. Minimal disruption to existing public Right-of-Way travelled roadway portion. Space available for temporary staging areas.
Minimize Long-Term Social/Economical Impacts	Permanent changes to the urban community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	Increasing flooding problems in the community does not meet the objective or purpose of the Study.	Minimal impact to waterfront community as no residents displaced. Minimal impact to public waterfront access as a community feature.
Minimize/Mitigate impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, archaeological) and consideration of methods to minimize and/or mitigate impacts.	No initial disruption or displacement of existing resources, however, increasing flooding problems will eventually impact these resources in a permanent manner.	No designated heritage features in the vicinity of the site. Minimal impact to waterfront access. No disruption or displacement of existing resources.

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 Storm Pump Station Solutions - St Paul Pump Station

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Detroit River
 Sewer System: Storm System (PS-E STPAUL)
 Problem Area: Problem Area 1
 Description: Improvements to the St Paul Pump Station

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (PS-E-STPAUL)
Alternative:			Baseline	Increase Capacity of St. Paul Pump Station
Description of Alternative:				Expansion of the existing pump station, east of the existing building. New outlet sewers to Detroit River from the proposed expansion. Expansion electrical systems within the existing system. New back up power generator for additional load.
Minimize Impacts to the Natural Environment	Minimize Impacts to the Natural Environment	Potential for impacts to natural environmental features and consideration of how to minimize.	Increasing flooding problems in the community are anticipated to impact the natural environment in every aspect, and does not meet the objective of the study.	No significant natural features in the area. Removal of mature trees can be mitigated with new plantings at 2:1 ratio. Modification to existing outlet structure minimal in nature, anticipated to not have impact on the aquatic environment if mitigation measures in place during construction.
Consideration of Cost	Relative capital cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	Increasing flooding problems in the community will increase community costs in the short and long run and does not address the purpose of the study.	Modifications to existing pump station infrastructure.
	Preferred Option			Preferred

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Detroit River-Riverside
 Description: Conveyance Upgrade With Overland Flow to St. Rose Outlet (STM-E1)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-E1-1)	ALTERNATIVE 2 (STM-E1-2)
Alternative:			Baseline	Partial Conveyance of Overland Flow to St. Rose Outlet	Full Conveyance of Overland Flow to St. Rose Outlet
Description of Alternative:				Sewer Upgrades to Belleperche Local storm trunk sewer on Riverside Drive between Jefferson and St. Rose PS Upgrades to the St. Paul Pump Station (18.0 cms) New Pump Station at St. Rose Ave. (11.0 cms) New Pump Station at Ford Blvd. (18.0 cms)	Sewer Upgrades to Belleperche and a new storm trunk sewer on Riverside Drive, between Jefferson Ave. and Ford Blvd. New storm trunk sewer along St. Rose Ave. Wyandotte, Janisse, Ontario, St. Mary's, Raymond, Homedale. PS Upgrades to the St. Paul Pump Station (18.0 cms). New Pump Station at St. Rose Ave. (13.5 cms). Upgrades to the Ford Blvd. PS
Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	Does not meet criteria.	Meets objective.	Meets objective.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet criteria.	Meets risk reduction criteria.	Meets risk reduction criteria.
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	Does not meet criteria.	Meets risk reduction objective.	Meets risk reduction objective.
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements	Allows new development to progress by meeting minimum ingress/egress requirements
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement	Comparatively less potential to reduce frequency of CSO (Combined Sewer Overflows)	Provides an improved outlet for the existing combined sewer area, south of South National providing greater potential for the elimination of CSO (Combined Sewer Overflows). G19

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 Storm System Solutions

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Detroit River-Riverside
 Description: Conveyance Upgrade With Overland Flow to St. Rose Outlet (STM-E1)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-E1-1)	ALTERNATIVE 2 (STM-E1-2)
Alternative:			Baseline	Partial Conveyance of Overland Flow to St. Rose Outlet	Full Conveyance of Overland Flow to St. Rose Outlet
Description of Alternative:				Sewer Upgrades to Belleperche Local storm trunk sewer on Riverside Drive between Jefferson and St. Rose PS Upgrades to the St. Paul Pump Station (18.0 cms) New Pump Station at St. Rose Ave. (11.0 cms) New Pump Station at Ford Blvd. (18.0 cms)	Sewer Upgrades to Belleperche and a new storm trunk sewer on Riverside Drive, between Jefferson Ave. and Ford Blvd. New storm trunk sewer along St. Rose Ave. Wyandotte, Janisse, Ontario, St. Mary's, Raymond, Homedale. PS Upgrades to the St. Paul Pump Station (18.0 cms). New Pump Station at St. Rose Ave. (13.5 cms). Upgrades to the Ford Blvd. PS
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement low impact development measures.	No changes to existing infrastructure	New infrastructure required Possible utility relocation work	New infrastructure required Possible utility relocation work
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained. This does not meet the objectives of this study.	New infrastructure required; Operation and Maintenance (O&M) program required.	New infrastructure required; O&M program required.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the study.	Timing impacted by outfall and environmental assessment requirements.	Timing impacted by outfall and environmental assessment requirements.

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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Detroit River-Riverside
 Description: Conveyance Upgrade With Overland Flow to St. Rose Outlet (STM-E1)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-E1-1)	ALTERNATIVE 2 (STM-E1-2)
Alternative:			Baseline	Partial Conveyance of Overland Flow to St. Rose Outlet	Full Conveyance of Overland Flow to St. Rose Outlet
Description of Alternative:				Sewer Upgrades to Belleperche Local storm trunk sewer on Riverside Drive between Jefferson and St. Rose PS Upgrades to the St. Paul Pump Station (18.0 cms) New Pump Station at St. Rose Ave. (11.0 cms) New Pump Station at Ford Blvd. (18.0 cms)	Sewer Upgrades to Belleperche and a new storm trunk sewer on Riverside Drive, between Jefferson Ave. and Ford Blvd. New storm trunk sewer along St. Rose Ave. Wyandotte, Janisse, Ontario, St. Mary's, Raymond, Homedale. PS Upgrades to the St. Paul Pump Station (18.0 cms). New Pump Station at St. Rose Ave. (13.5 cms). Upgrades to the Ford Blvd. PS
Minimize Impacts of Construction	Minimize disruption to public greenspaces/recreational uses/ROW during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction required. Nothing to implement.	Disruption of road/sidewalk, trees and heritage park at St. Rose Beach and disruption at Coventry Gardens. Disruption of road/sidewalk and trees.	Disruption of road/sidewalk, trees and heritage park at St. Rose Beach. Disruption of road/sidewalk and trees.
Minimize Long-Term Social/Economical Impacts	Permanent changes to the urban community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	Increasing flooding problems in the community does not meet the objective or purpose of the Study.	Land acquisition for 2 pumping stations. Permanent changes to two park areas, and posing greater impact to waterfront areas and scenic views. May help in-fill development approvals as flooding risk has been mitigated.	Land acquisition for 1 pumping station. Permanent changes to one park area and posing less impact to waterfront areas and scenic views. May help in-fill development approvals as flooding risk has been mitigated.
Minimize/Mitigate impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, archaeological) and consideration of methods to minimize and/or mitigate impacts.	No initial disruption or displacement of existing resources, however, increasing flooding problems will eventually impact these resources in a permanent manner.	Area is established residential, commercial, institutional and recreational land use. Impact on Reaume Park, St. Rose Park with proposed pumping station. Minimal potential for archaeological resources within disturbed ROWs.	Area is established residential, commercial, institutional and recreational land use. Impact on St. Rose Park with proposed pumping station. Minimal potential for archaeological resources within disturbed ROWs.

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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Detroit River-Riverside
 Description: Conveyance Upgrade With Overland Flow to St. Rose Outlet (STM-E1)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-E1-1)	ALTERNATIVE 2 (STM-E1-2)
Alternative:			Baseline	Partial Conveyance of Overland Flow to St. Rose Outlet	Full Conveyance of Overland Flow to St. Rose Outlet
Description of Alternative:				Sewer Upgrades to Belleperche Local storm trunk sewer on Riverside Drive between Jefferson and St. Rose PS Upgrades to the St. Paul Pump Station (18.0 cms) New Pump Station at St. Rose Ave. (11.0 cms) New Pump Station at Ford Blvd. (18.0 cms)	Sewer Upgrades to Belleperche and a new storm trunk sewer on Riverside Drive, between Jefferson Ave. and Ford Blvd. New storm trunk sewer along St. Rose Ave. Wyandotte, Janisse, Ontario, St. Mary's, Raymond, Homedale. PS Upgrades to the St. Paul Pump Station (18.0 cms). New Pump Station at St. Rose Ave. (13.5 cms). Upgrades to the Ford Blvd. PS
Minimize Impacts to the Natural Environment	Minimize Impacts to the Natural Environment	Potential for impacts to natural environmental features and consideration of how to minimize.	Determine potential changes anticipated as a result of each alternative.	Increasing flooding problems in the community are anticipated to impact the natural environment in every aspect, and does not meet the objective of the study.	Minimal potential for impact to existing natural environment resources. Diverts flows from Little River to Detroit River.
Consideration of Cost	Relative capital cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	No additional cost	Highest cost.	Moderate cost.
		Preferred Option			PREFERRED

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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Detroit River (Drainage Area 3 & 4)
 Description: Direct Storm Flows to Little River or Optimize Ford Blvd Outlet (STM-E3)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	ALTERNATIVE 1 (STM-E3-1)	ALTERNATIVE 2 (STM-E3-2)
			Alternative: Direct Storm Flows to Little River (Do Nothing)	Optimize Ford Blvd. Outlet
			Description of Alternative: Continue Soft Separation	Enhanced Sewer Separation of Combined Sewer Systems & New Stormwater Drainage Areas: Complete separation of combined sewage flows into separated and sanitary sewer systems. Includes construction of 10.5km of new sewers (ranging from 450mm-1,650mm diameter to 1,800mmx 3,000 mm box culverts).
Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	Moderately meets risk reduction objective.	Meets risk reduction objective.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Moderately meets risk reduction objective.	Meets risk reduction objective.
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	Does not provide a resilient solution.	Most resilient solution that allows for the level of service to be met for 1:100 year storm.
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	Moderate reduction in CSO frequency.	Greatest reduction in CSO frequency.

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Sewershed/Sub-Sewershed Area: East / Detroit River (Drainage Area 3 & 4)
 Description: Direct Storm Flows to Little River or Optimize Ford Blvd Outlet (STM-E3)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	ALTERNATIVE 1 (STM-E3-1)	ALTERNATIVE 2 (STM-E3-2)
			Alternative: Direct Storm Flows to Little River (Do Nothing)	Optimize Ford Blvd. Outlet
Description of Alternative:			Continue Soft Separation	Enhanced Sewer Separation of Combined Sewer Systems & New Stormwater Drainage Areas: Complete separation of combined sewage flows into separated and sanitary sewer systems. Includes construction of 10.5km of new sewers (ranging from 450mm-1,650mm diameter to 1,800mmx 3,000 mm box culverts).
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement low impact development measures.	New infrastructure required. Significant utility relocation work on Tecumseh Road.	New infrastructure required will be more extensive than Alt. 1. Significant utility relocation work on Tecumseh Road.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	New infrastructure required; O&M program required.	New infrastructure required; O&M program required.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	Moderate timeframe.	Longest timeframe.
Minimize Impacts of Construction	Minimize disruption to public greenspaces/recreational uses/ROW during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	Relatively less disruption to local businesses during construction and tree impacts. Disruption of road/sidewalk anticipated.	Disruption of local businesses during construction and tree impacts. Disruption of road/sidewalk anticipated.
Minimize Long-Term Social/Economical Impacts	Permanent changes to the urban community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	No Change. May help in-fill development approvals as flooding risk has been mitigated.	This solution allows vacant lands within drainage area to develop.

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Sewershed/Sub-Sewershed Area: East / Detroit River (Drainage Area 3 & 4)
 Description: Direct Storm Flows to Little River or Optimize Ford Blvd Outlet (STM-E3)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	ALTERNATIVE 1 (STM-E3-1)	ALTERNATIVE 2 (STM-E3-2)
		Alternative:	Direct Storm Flows to Little River (Do Nothing)	Optimize Ford Blvd. Outlet
		Description of Alternative:	Continue Soft Separation	Enhanced Sewer Separation of Combined Sewer Systems & New Stormwater Drainage Areas: Complete separation of combined sewage flows into separated and sanitary sewer systems. Includes construction of 10.5km of new sewers (ranging from 450mm-1,650mm diameter to 1,800mmx 3,000 mm box culverts).
Minimize/Mitigate impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, archaeological) and consideration of methods to minimize and/or mitigate impacts.	Area is established residential, commercial, institutional and recreational land use. Minimal potential for archaeological resources within disturbed ROWs.	Area is established residential, commercial, institutional and recreational land use. Minimal potential for archaeological resources within disturbed ROWs.
Minimize Impacts to the Natural Environment	Minimize Impacts to the Natural Environment	Potential for impacts to natural environmental features and consideration of how to minimize.	Potential improvement to existing natural environment resources. Some reduction in area draining to Little River. Soft separation reduces the frequency of CSOs less than Alt. 1.	Potential improvement to existing natural environment resources. Greatest reduction in flows draining to Little River. Hard separation reduced the frequency of CSOs greater than Alt. 1.
Consideration of Cost	Relative capital cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/ operation).	Moderate cost.	Highest cost.
Preferred Option				PREFERRED

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Sewershed/Sub-Sewershed Area: East Sewershed /Blue Heron-Lakeview PS (Blue Heron Pond Drainage - Area 5)
 Description: Upgrade Lakeview PS & Blue Heron Pond Outlet (STM-E5)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-E5-1)
Alternative:			Baseline	Upgrade Lakeview Pump Station & Blue Heron Pond Outlet
Description of Alternative:				Increasing the pump station capacity. Larger outlet sewers to Lake St. Clair. Consider the addition of back up power generator.
Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	No reduction in risk. Does not meet criteria.	Meets risk reduction objective
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	No reduction in risk. Does not meet criteria.	Meets risk reduction objective
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	No reduction in risk. Does not meet criteria.	Downstream flood risk eliminated
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	Not able to maintain or improve water quality.	Water quality maintained.
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement low impact development measures.	No changes to existing infrastructure	Increase size of pumping station and upgraded outfall. Property acquisition not required (outfall easement to be confirmed).

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Sewershed/Sub-Sewershed Area: East Sewershed /Blue Heron-Lakeview PS (Blue Heron Pond Drainage - Area 5)
 Description: Upgrade Lakeview PS & Blue Heron Pond Outlet (STM-E5)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-E5-1)
Alternative:			Baseline	Upgrade Lakeview Pump Station & Blue Heron Pond Outlet
Description of Alternative:				Increasing the pump station capacity. Larger outlet sewers to Lake St. Clair. Consider the addition of back up power generator.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained. This does not meet the objectives of this study.	New infrastructure required; O&M program required.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the study.	Short timeframe. Timing impacted by outfall requirements.
Minimize Impacts of Construction	Minimize disruption to public greenspaces/recreational uses/ROW during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction required. Nothing to implement.	Tree impacts to be mitigated Disruption to local trails. Potential disruption of road/sidewalk anticipated.
Minimize Long-Term Social/Economical Impacts	Permanent changes to the urban community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	Increasing flooding problems in the community does not meet the objective or purpose of the Study.	Improvements downstream of Lakeview pumping station. May help in-fill development approvals as flooding risk has been mitigated.
Minimize/Mitigate impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, archaeological) and consideration of methods to minimize and/or mitigate impacts.	No initial disruption or displacement of existing resources, however, increasing flooding problems will eventually impact these resources in a permanent manner.	Area is established residential, commercial, institutional and recreational land use. Minimal potential for archaeological resources within disturbed ROWs.

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Sewershed/Sub-Sewershed Area: East Sewershed /Blue Heron-Lakeview PS (Blue Heron Pond Drainage - Area 5)
 Description: Upgrade Lakeview PS & Blue Heron Pond Outlet (STM-E5)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (STM-E5-1)
Alternative:			Baseline	Upgrade Lakeview Pump Station & Blue Heron Pond Outlet
Description of Alternative:				Increasing the pump station capacity. Larger outlet sewers to Lake St. Clair. Consider the addition of back up power generator.
Minimize Impacts to the Natural Environment	Minimize Impacts to the Natural Environment	Potential for impacts to natural environmental features and consideration of how to minimize.	Increasing flooding problems in the community are anticipated to impact the natural environment in every aspect, and does not meet the objective of the Study.	Minimal potential for impact to existing natural environment resources. No changes to receiving system.
Consideration of Cost	Relative capital cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	No additional cost.	Low cost anticipated.
	Preferred Option			PREFERRED

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Pontiac PS (Area 6)
 Description: PS Upgrades & Storage Facility (STM-E6)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 Storm Sewer Improvements, USMF, and East Marsh Area Modifications
			Alternative: Baseline	
Description of Alternative:			Maintain the existing Drainage Area.	Installation of a new underground stormwater management facility (USMF) within Brumpton Park, new storm sewer along Cedarview St., redirecting stormwater from the East Marsh Pump Station system to the Pontiac Pump Station System. East Marsh pump station improvements including replacing existing pumps with new pumps and installing backup power generators.
Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	No reduction in risk. Does not meet criteria.	Meets risk reduction objective
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet criteria.	Meets risk reduction criteria.
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	No reduction in risk. Does not meet criteria.	Flood risk reduced and potentially eliminated.
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement.	Water quality measures can be integrated into the storm system improvements.

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Pontiac PS (Area 6)
 Description: PS Upgrades & Storage Facility (STM-E6)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 Storm Sewer Improvements, USMF, and East Marsh Area Modifications
			Alternative: Baseline	
Description of Alternative:			Maintain the existing Drainage Area.	Installation of a new underground stormwater management facility (USMF) within Brumpton Park, new storm sewer along Cedarview St., redirecting stormwater from the East Marsh Pump Station system to the Pontiac Pump Station System. East Marsh pump station improvements including replacing existing pumps with new pumps and installing backup power generators.
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement low impact development measures.	No changes to existing infrastructure	New infrastructure required.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained. This does not meet the objectives of this study.	New infrastructure required; O&M program required.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required.	Long-term timeframe.
Minimize Impacts of Construction	Minimize disruption to public greenspaces/recreational uses/ROW during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction required. Nothing to implement.	Impacts to trees within Brumpton Park. Impacts to park areas. Disruption of road and sidewalk anticipated.

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Pontiac PS (Area 6)
 Description: PS Upgrades & Storage Facility (STM-E6)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 Storm Sewer Improvements, USMF, and East Marsh Area Modifications
			Alternative: Baseline	
			Description of Alternative: Maintain the existing Drainage Area.	Installation of a new underground stormwater management facility (USMF) within Brumpton Park, new storm sewer along Cedarview St., redirecting stormwater from the East Marsh Pump Station system to the Pontiac Pump Station System. East Marsh pump station improvements including replacing existing pumps with new pumps and installing backup power generators.
Minimize Long-Term Social/Economical Impacts	Permanent changes to the urban community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	Increasing flooding problems in the community does not meet the objective or purpose of the Study.	Long term benefits related to reduce safety risks associated with roadway flooding. Redirection of East Marsh drainage area reduces risks associated with high lake levels on the inland stormwater system. Minimal impacts to the existing Brumpton park.
Minimize/Mitigate impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, archaeological) and consideration of methods to minimize and/or mitigate impacts.	No initial disruption or displacement of existing resources, however, increasing flooding problems will eventually impact these resources in a permanent manner.	Area is established residential, commercial, institutional and recreational land use. Stage 2 archaeological assessment is required.

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Sewershed/Sub-Sewershed Area: East / Pontiac PS (Area 6)
 Description: PS Upgrades & Storage Facility (STM-E6)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 Storm Sewer Improvements, USMF, and East Marsh Area Modifications
			Alternative: Baseline	
Description of Alternative:			Maintain the existing Drainage Area.	Installation of a new underground stormwater management facility (USMF) within Brumpton Park, new storm sewer along Cedarview St., redirecting stormwater from the East Marsh Pump Station system to the Pontiac Pump Station System. East Marsh pump station improvements including replacing existing pumps with new pumps and installing backup power generators.
Minimize Impacts to the Natural Environment	Minimize Impacts to the Natural Environment	Potential for impacts to natural environmental features and consideration of how to minimize.	Minimal potential for impact to existing natural environment resources. No changes to receiving aquatic systems.	Tree impacts in Brumpton Park. No changes to receiving aquatic system.
Consideration of Cost	Relative capital cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	No additional cost.	Moderate cost for SWM storage. Moderate cost for re-direction of sewers.
	Preferred Option			PREFERRED

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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Detroit River
 Description: Sewer Upgrade (Jefferson Ave) (ROAD-E2)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALT 1 (ROAD-E2)	ALT 1 (ROAD-E2)
Alternative:			Baseline	New Storm Sewers & Underground Sto	New Storm Sewers & Box Culverts
Description of Alternative:				Installation of new storm sewers along Jefferson Blvd. and Ontario St., an underground stormwater storage facility on the Dr. David Suzuki School grounds and a surface storage swale along the south property boundary of the Dr. David Suzuki School grounds.	Installation of new storm sewers and box culverts along Jefferson Blvd., Ontario St. and Raymond Ave.
Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	No reduction in risk. Does not meet criteria.	Meets risk reduction objective.	Meets risk reduction objective.
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet criteria.	Meets risk reduction criteria.	Meets risk reduction criteria.
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	No reduction in risk. Does not meet criteria.	Flood risk reduced but not eliminated.	Flood risk reduced but not eliminated.
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements	Allows new development to progress by meeting minimum ingress/egress requirements
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement.	Added LID mesures will include overall improvement to water quality.	Added LID mesures will include overall improvement to water quality.

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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Detroit River
 Description: Sewer Upgrade (Jefferson Ave) (ROAD-E2)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALT 1 (ROAD-E2)	ALT 1 (ROAD-E2)
Alternative:			Baseline	New Storm Sewers & Underground Sto	New Storm Sewers & Box Culverts
Description of Alternative:				Installation of new storm sewers along Jefferson Blvd. and Ontario St., an underground stormwater storage facility on the Dr. David Suzuki School grounds and a surface storage swale along the south property boundary of the Dr. David Suzuki School grounds.	Installation of new storm sewers and box culverts along Jefferson Blvd., Ontario St. and Raymond Ave.
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement low impact development measures.	No changes to existing infrastructure	Improvements requires the cconstruction of storm sewers and an underground storage facilitiy with the school property.	Improvements require the construction of large box culverts and trunk storm sewers. Relatively more complex to construct than Alt. 1.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained. This does not meet the objectives of this study.	Greatest amount of maintance required for the underground stormwater facility.	Increase level of maintenance for larges storm sewers.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the study.	Improvements require acquisition of private property.	Storm improvement can be done in conjunction with road reconstruction projects.
Minimize Impacts of Construction	Minimize disruption to public greenspaces/recreational uses/ROW during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction required. Nothing to implement.	Significant disrumpion to existing school site.	Potential disruption of road and sidewalk anticipated.
Minimize Long-Term Social/Economical Impacts	Permanent changes to the urban community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	Increasing flooding problems in the community does not meet the objective or purpose of the Study.	No significant cahnge to the urban community.	No significant cahnge to the urban community.

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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Detroit River
 Description: Sewer Upgrade (Jefferson Ave) (ROAD-E2)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALT 1 (ROAD-E2)	ALT 1 (ROAD-E2)
Alternative:			Baseline	New Storm Sewers & Underground Sto	New Storm Sewers & Box Culverts
Description of Alternative:				Installation of new storm sewers along Jefferson Blvd. and Ontario St., an underground stormwater storage facility on the Dr. David Suzuki School grounds and a surface storage swale along the south property boundary of the Dr. David Suzuki School grounds.	Installation of new storm sewers and box culverts along Jefferson Blvd., Ontario St. and Raymond Ave.
Minimize/Mitigate impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, archaeological) and consideration of methods to minimize and/or mitigate impacts.	No initial disruption or displacement of existing resources, however, increasing flooding problems will eventually impact these resources in a permanent manner.	Area is established residential, commercial, institutional and recreational land use. Minimal potential for archaeological resources within disturbed ROWs.	Area is established residential, commercial, institutional and recreational land use. Minimal potential for archaeological resources within disturbed ROWs.
Minimize Impacts to the Natural Environment	Minimize Impacts to the Natural Environment	Potential for impacts to natural environmental features and consideration of how to minimize.	Minimal potential for impact to existing natural environment resources. No changes to receiving aquatic systems.	Minimal impact as area is established land uses. No changes to receiving aquatic system.	Minimal impact as area is established land uses. No changes to receiving aquatic system.
Consideration of Cost	Relative capital cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	No additional cost	Greatest cost.	Low to moderate cost for sewer upgrades.
	Preferred Option				PREFERRED

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Little River
 Description: In-line Storage - Lauzon Parkway /Meadowbrook Park / Golf Course Pond (ROAD-E4)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (ROAD-E4-1)	ALTERNATIVE 2 (ROAD-E4-2)
Alternative:			Baseline	In-line Storage and Little River Golf Course Pond and Meadowbrook Park Storage	Little River Golf Course Pond/ Meadowbrook Park
Description of Alternative:			Lauzon Pkwy - Cantelon Dr to Hawthorne Dr Hawthorne Dr - Kew Dr to Lauzon Pkwy	In-line Storage (Large sewers) and offline underground 10,000 m3 storage in Meadowbrook Park with max depth of 4m.	In-line Storage (Large sewers), offline underground 10,000 m3 storage in Meadowbrook Park. Road Re-Grading of Lauzon and LID Swales along the W side of Lauzon. Hawthorne / Kew Relief Sewers (900 mm) 20,000 m3 storage in Little River Golf Course.
Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	No reduction in risk. Does not meet criteria.	Some flood risk reduction. Does not meet criteria.	Meets risk reduction objective.
	Consideration to provide an enhanced level of service for sensitive land uses.		No reduction in risk. Does not meet criteria.	Some flood risk reduction. Does not meet criteria.	Meets risk reduction objective.
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	Existing level of service will be maintained. This does not meet the purpose or objectives of this Study.	Flood reduction is less than Alt. 2.	Proposed recommendation is sized for Climate Change Storm (1:100 year storm plus 40% resiliency factor).
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements.	Allows new development to progress by meeting minimum ingress/egress requirements.
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement	No impact to receiving system. Stormwater quality measures can be incorporated into storm sewer improvements.	No impact to receiving system. Stormwater quality measures can be incorporated into storm sewer improvements. Improvements provided greatest potential to improve water quality with the construction of a stormwater pond and surface surcharge swale.
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement low impact development measures.	No changes to existing infrastructure	Possible conflicts with other utilities. Requires staged closure of Lauzon Pkwy.	More complex to implement than Alt. 1 due to the implementation of grating along Lauzon Pkwy and the surface swales along the west property limits.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained. This does not meet the objectives of this study.	New infrastructure required; O&M program required.	New infrastructure required; O&M program required.

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Little River
 Description: In-line Storage - Lauzon Parkway /Meadowbrook Park / Golf Course Pond (ROAD-E4)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (ROAD-E4-1)	ALTERNATIVE 2 (ROAD-E4-2)
Alternative:			Baseline	In-line Storage and Little River Golf Course Pond and Meadowbrook Park Storage	Little River Golf Course Pond/ Meadowbrook Park
Description of Alternative:			Lauzon Pkwy - Cantelon Dr to Hawthorne Dr Hawthorne Dr - Kew Dr to Lauzon Pkwy	In-line Storage (Large sewers) and offline underground 10,000 m3 storage in Meadowbrook Park with max depth of 4m.	In-line Storage (Large sewers), offline underground 10,000 m3 storage in Meadowbrook Park. Road Re-Grading of Lauzon and LID Swales along the W side of Lauzon. Hawthorne / Kew Relief Sewers (900 mm) 20,000 m3 storage in Little River Golf Course.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the study.	Short-term timeframe to implement compared to Alt. 2.	Moderate to long-term time frame depending on property and easement acquisition
Minimize Impacts of Construction	Minimize disruption to public greenspaces/recreational uses/ROW during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction required. Nothing to implement.	Moderate disruption of park area. Minimal disruption of road and sidewalk anticipated.	Moderate disruption of park area. Minimal disruption of road, sidewalk, and private property anticipated.
Minimize Long-Term Social/Economical Impacts	Permanent changes to the urban community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	Increasing flooding problems in the community does not meet the objective or purpose of the Study.	Passable road during extreme event. May help re-development approvals as flooding risk has been mitigated.	Passable road during extreme event. May help re-development approvals as flooding risk has been mitigated.
Minimize/Mitigate impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, archaeological) and consideration of methods to minimize and/or mitigate impacts.	No initial disruption or displacement of existing resources, however, increasing flooding problems will eventually impact these resources in a permanent manner.	Area is established residential, commercial, industrial land use. Minimal potential for archaeological resources within disturbed ROWs.	Area is established residential, commercial, industrial land use. Minimal potential for archaeological resources within disturbed ROWs.
Minimize Impacts to the Natural Environment	Minimize Impacts to the Natural Environment	Potential for impacts to natural environmental features and consideration of how to minimize.	No impact to existing natural environment resources. No changes to receiving aquatic systems.	Minimal impact to natural features. No changes to receiving aquatic system. Stage 2 Archaeological Assessment is required.	Mitigate impacts to trees on west side of Lauzon Rd. No changes to receiving aquatic system. Stage 2 Archaeological Assessment is required.
Consideration of Cost	Relative capital cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	No additional cost	Moderate cost	Most Costly.
	Preferred Option				PREFERRED

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Sewershed /Sub-Sewershed Area: East / Little River
 Description: Sewer Upgrade (ROAD-E8)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (ROAD-E8-1)	ALTERNATIVE 2 (ROAD-E8-2)
Alternative:			Baseline	Installation of new box culverts and regrading of approximately 350 m of McHugh St.;	Construction of new storm sewers and a surface SWM Pond, and regrading of approximately 350 m of McHugh St. .
Description of Alternative:			McHugh St. (Lauzon Rd. to Little River)	In-line storage (twin 4.2 m X 2.4 M box culvert with < 1.2 m cover)	New 4,000m3 offline storage
Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	No reduction in risk. Does not meet criteria.	Meets risk reduction objective	Meets risk reduction objective
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet objective.	Meets risk reduction objective.	Meets risk reduction objective.
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	No reduction in risk. Does not meet criteria.	Flood risk reduced to < 20 m along major roadway.	Flood risk reduced to < 20 m along major roadway.
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements.	Allows new development to progress by meeting minimum ingress/egress requirements.
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement.	No impact to receiving system	No impact to receiving system
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement low impact development measures.	No changes to existing infrastructure.	Possible conflicts with other utilities. Requires staged closure of McHugh Street.	Possible conflicts with other utilities. Requires staged closure of McHugh Street and impacts to private property.

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 Environmental Assessment Evaluation
 Storm System Solutions

Sewershed /Sub-Sewershed Area: East / Little River
 Description: Sewer Upgrade (ROAD-E8)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (ROAD-E8-1)	ALTERNATIVE 2 (ROAD-E8-2)
Alternative:			Baseline	Installation of new box culverts and regrading of approximately 350 m of McHugh St.;	Construction of new storm sewers and a surface SWM Pond, and regrading of approximately 350 m of McHugh St. .
Description of Alternative:			McHugh St. (Lauzon Rd. to Little River)	In-line storage (twin 4.2 m X 2.4 M box culvert with < 1.2 m cover)	New 4,000m3 offline storage
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained. This does not meet the objectives of this study.	Moderative level of maintenance.	Requires greatest level of maintenance for storm sewers and stormwater management pond.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the study.	Less time to implement infrastructure than Alt. 2	Requires negotiation with developer owning lands to the south for a SWM pond.
Minimize Impacts of Construction	Minimize disruption to public greenspaces/recreational uses/ROW during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction required. Nothing to implement.	Disruption to arena access. Disruption to road and sidewalk anticipated.	Disruption to arena access. Disruption to road and sidewalk anticipated.
Minimize Long-Term Social/Economical Impacts	Permanent changes to the urban community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	Increasing flooding problems in the community does not meet the objective or purpose of the Study.	Mitigates surface flood risks along McHugh St. No permanent changes to the urban community.	Requires acquisition of developable land.
Minimize/Mitigate impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, archaeological) and consideration of methods to minimize and/or mitigate impacts.	No initial disruption or displacement of existing resources, however, increasing flooding problems will eventually impact these resources in a permanent manner.	Area is established residential, commercial and recreational land use. Minimal potential for archaeological resources within disturbed ROWs.	Area is established residential, commercial and recreational land use. Minimal potential for archaeological resources within disturbed ROWs and formerly developed private property lands.

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Sewershed /Sub-Sewershed Area: East / Little River
 Description: Sewer Upgrade (ROAD-E8)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (ROAD-E8-1)	ALTERNATIVE 2 (ROAD-E8-2)
Alternative:			Baseline	Installation of new box culverts and regrading of approximately 350 m of McHugh St.;	Construction of new storm sewers and a surface SWM Pond, and regrading of approximately 350 m of McHugh St. .
Description of Alternative:			McHugh St. (Lauzon Rd. to Little River)	In-line storage (twin 4.2 m X 2.4 M box culvert with < 1.2 m cover)	New 4,000m3 offline storage
Minimize Impacts to the Natural Environment	Minimize Impacts to the Natural Environment	Potential for impacts to natural environmental features and consideration of how to minimize.	Minimal potential for impact to existing natural environment resources. No changes to receiving aquatic systems.	Minimal impact to natural features. No changes to receiving aquatic systems.	Minimal impact to natural features. No changes to receiving aquatic systems.
Consideration of Cost	Relative capital cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	No additional cost	Lower cost than Alt. 2.	Moderate to high cost depending on land acquisition cost.
	Preferred Option				

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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed Area: East / Pontiac PS
 Description: Commercial Land Stormwater Management Facility (ROAD-E9)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (ROAD-E9-1)
			Alternative: Baseline	Commercial Land Underground Storage
			Description of Alternative: Wyandotte St. E. Storm Sewers	Sewer Improvements along Wyandotte Street East and Off-Line underground storage within two commercial zoned parcels. Volumes are 8,000m ³ and 5,000m ³ .
Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	No reduction in risk. Does not meet criteria.	Meets risk reduction objective
	Consideration to provide an enhanced level of service for sensitive land uses.		No reduction in risk. Does not meet criteria.	Meets risk reduction objective
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	No reduction in risk. Does not meet criteria.	Flood risk reduced to < 20 m with passable lanes
	Flexibility of alternative to accommodate changes in land use.		This alternative provides less flexibility for future development.	Allows new development to progress by meeting minimum ingress/egress requirements
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement	No impact to receiving system
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement low impact development measures.	No changes to existing infrastructure	Possible conflicts within RoW with other utilities Dependent on land acquisition from private property

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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed Area: East / Pontiac PS
 Description: Commercial Land Stormwater Management Facility (ROAD-E9)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (ROAD-E9-1)
			Alternative: Baseline	Commercial Land Underground Storage
			Description of Alternative: Wyandotte St. E. Storm Sewers	Sewer Improvements along Wyandotte Street East and Off-Line underground storage within two commercial zoned parcels. Volumes are 8,000m ³ and 5,000m ³ .
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained. This does not meet the objectives of this study.	New infrastructure required; O&M program required.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the study.	Short-term timeframe
Minimize Impacts of Construction	Minimize disruption to public greenspaces/recreational uses/ROW during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction required. Nothing to implement.	Minimal disruption of road and sidewalk anticipated.
Minimize Long-Term Social/Economical Impacts	Permanent changes to the urban community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	Increasing flooding problems in the community does not meet the objective or purpose of the Study.	Passable road during extreme weather event. Meets objective.
Minimize/Mitigate impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, archaeological) and consideration of methods to minimize and/or mitigate impacts.	No initial disruption or displacement of existing resources, however, increasing flooding problems will eventually impact these resources in a permanent manner.	Area is established residential, commercial land use. Minimal potential for archaeological resources within disturbed ROWs.

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 Storm System Solutions

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed / Sub-Sewershed Area: East / Pontiac PS
 Description: Commercial Land Stormwater Management Facility (ROAD-E9)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (ROAD-E9-1)
			Alternative: Baseline	Commercial Land Underground Storage
			Description of Alternative: Wyandotte St. E. Storm Sewers	Sewer Improvements along Wyandotte Street East and Off-Line underground storage within two commercial zoned parcels. Volumes are 8,000m ³ and 5,000m ³ .
Minimize Impacts to the Natural Environment	Minimize Impacts to the Natural Environment	Potential for impacts to natural environmental features and consideration of how to minimize.	Minimal potential for impact to existing natural environment resources. No changes to receiving aquatic systems.	Minimal impact to natural features. No changes to receiving aquatic system.
Consideration of Cost	Relative capital cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	No additional cost.	Low to moderate depending on land acquisition costs.
Preferred Option				PREFERRED

Windsor Sewer and Coastal Flood Protection Master Plan
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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Little River
 Description: Offline Underground Storage (ROAD-E11)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (ROAD-E11)
			Alternative: Baseline	Off-line storage on WCSB property
			Description of Alternative:	Increased offline underground storage to 25,000 m3 with a facility max. depth of 5m. Open bottom storage chambers to permit infiltration.
Reduce Potential for Surface Flooding	Extent of roadway flood reduction realized by alternative.	Reducing the potential for reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m(1 ft.)).	No reduction in risk. Does not meet criteria.	Meets risk reduction objective
	Consideration to provide an enhanced level of service for sensitive land uses.	Provide additional protection to areas or infrastructure that provide service to sensitive populations. Consider safety of residents and maintain emergency services.	Does not meet objective.	Meets risk reduction objective.
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient in considering climate change and growth/intensification.	No reduction in risk. Does not meet criteria.	Flood risk reduced to < 20 m with access/egress
	Flexibility of alternative to accommodate changes in land use.		No reduction in risk. Does not meet criteria.	Flood risk reduced to < 20 m with access/egress
Water Quality	Ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.	No improvement	Underground stormwater management facility will provide added water quality.
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).	Reducing homeowner and City challenges and barriers to implement low impact development measures.	No changes to existing infrastructure	Requires construction of large storm sewers and underground storage unit within park lands.

Windsor Sewer and Coastal Flood Protection Master Plan
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Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Little River
 Description: Offline Underground Storage (ROAD-E11)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (ROAD-E11)
			Alternative: Baseline	Off-line storage on WCSB property
			Description of Alternative:	Increased offline underground storage to 25,000 m3 with a facility max. depth of 5m. Open bottom storage chambers to permit infiltration.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained. This does not meet the objectives of this study.	New infrastructure required; O&M program required.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the study.	Short-term timeframe
Minimize Impacts of Construction	Minimize disruption to public greenspaces/recreational uses/ROW during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction required. Nothing to implement.	Disruption of school field and trees. Disruption of road and sidewalk also anticipated.
Minimize Long-Term Social/Economical Impacts	Permanent changes to the urban community.	Potential for disruption or displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees)	Increasing flooding problems in the community does not meet the objective or purpose of the Study.	Permanent impact on park and school lands.
Minimize/Mitigate impacts to Cultural/Heritage Resources	Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, archaeological) and consideration of methods to minimize and/or mitigate impacts.	No initial disruption or displacement of existing resources, however, increasing flooding problems will eventually impact these resources in a permanent manner.	Area is established residential, commercial, institutional and recreational land use. Minimal potential for archaeological resources within disturbed ROWs.

Windsor Sewer and Coastal Flood Protection Master Plan
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 Storm System Solutions

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed/Sub-Sewershed Area: East / Little River
 Description: Offline Underground Storage (ROAD-E11)
 Sewer System: Storm System

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1 (ROAD-E11)
Alternative:			Baseline	Off-line storage on WCSB property
Description of Alternative:				Increased offline underground storage to 25,000 m3 with a facility max. depth of 5m. Open bottom storage chambers to permit infiltration.
Minimize Impacts to the Natural Environment	Minimize Impacts to the Natural Environment	Potential for impacts to natural environmental features and consideration of how to minimize.	Minimal potential for impact to existing natural environment resources. No changes to receiving aquatic systems.	Significant tree impacts on school property. No changes to receiving aquatic system.
Consideration of Cost	Relative capital cost.	Being cognizant of the need to consider capital municipal infrastructure improvement costs of each alternative (construction/installation/operation).	No additional cost.	Low to moderate cost.
	Preferred Option			PREFERRED



Riverside Drive East (Ford Blvd. to East City Limits) - Environmental Assessment Comparative Evaluations

Sewer and Coastal Flood Protection Master Plan

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed Area: East Windsor
 Sewer System: Coastal Flood Protection System
 Riverside Area: Area 1 - Ford Blvd to St. Rose Ave - Riverside Vista 2 A Boundaries (BERM-1)
 Description: Solutions alternatives developed to provide protection of inland systems from high water levels within Lake St. Clair and Detroit River.

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
		Alternative:	Baseline	BERM-1-1	BERM-1-2	BERM-1-3
		Description of Alternative:	No Improvements	Landform Barrier Elevation 176.45 Earth Berm - South of Riverside Drive	Flood Protection Elevation 176.45 Earth Berm - North of Riverside Drive	Flood Protection Elevation 176.80 Earth Berm - North of Riverside Drive
Flood Protection	Percentage of protection provided to inland areas from potential high lake water levels.	Potential for reducing undesirable surface flooding.	Zero percentage. Does not provides flood protection of inland areas from potential high lake water levels (to the current flood protection elevation). Does not protect properties, north of Riverside Drive from overland flow.	Provides nearly 100% of flood protection to the current flood protection elevation. Does not protect all properties, north of Riverside Drive from overland flow.	Provides nearly 100% of flood protection to the current flood protection elevation. Protects properties, north of Riverside Drive from overland flow.	Provides 100% of flood protection to the current flood protection elevation and provides 0.35 m freeboard. Protects properties, north of Riverside Drive from overland flow.
	Level of protection to existing and proposed storm sewer infrastructure.	Mitigate impacts to storm sewer system to reduce impacts to drainage during high lake events.	Does not provide protection to the local storm sewer system.	Does not provide protection to the local storm sewer system.	Provides protection to the local storm system.	Provides high level of protection to the local storm system.
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient considering climate change.	Does not provide protection under the projected climate change conditions.	Provides some protection under the projected climate change conditions.	Provides some protection under the projected climate change conditions.	Provides protection under the projected climate change conditions.
Ease of Implementation	Complexity of installation and operation, and level of disruption.	Reducing City and homeowner challenges and barriers to flood reduction measures. Includes consideration of space requirements, construction requirements, installation, and operation.	No construction required. Nothing to implement. No disruption to existing conditions.	Minimal disruption to existing properties. Local drainage and sewer improvements will be required. Requires emergency flood protection at road crossing, west of St. Rose Beach.	Moderate level of disruption to existing properties. Additional parallel storm sewer system is required to service properties north of the berm. Passive earth berm proposed within study area is anticipated to provide passive flood protection.	High level of disruption to existing properties. Additional parallel storm sewer system is required to service properties north of the berm. Passive earth berm proposed within study area is anticipated to provide passive flood protection.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained, requiring increasingly more maintenance effort. This does not meet the objectives of this study.	City will have full access to complete regular monitoring and maintenance.	City will have full access to complete regular monitoring and maintenance.	City will have full access to complete regular monitoring and maintenance.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the study.	Low risk of time delays, minimal easements and/or property acquisition required.	Moderate risk of time delays due to need to acquire easements and/or property.	Moderate risk of time delays due to need to acquire easements and/or property.
Minimize Impacts of Construction	Disruption to public greenspaces/recreational uses during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction, therefore no impacts.	Minimal impact to the proposed sidewalk on the south side of Riverside Drive. Smallest construction footprint.	Proposed sidewalk on north side of Riverside Drive will need to be integrated into berm design. Moderate construction footprint.	Proposed sidewalk on north side of Riverside Drive will need to be integrated into berm design. Largest construction footprint.
	Disruption to the public Right of Way.			No disruption to public ROW. Construction to be completed during the Riverside Vista 2A project.	No disruption to public ROW. Construction to be completed during the Riverside Vista 2A project.	No disruption to public ROW. Construction to be completed during the Riverside Vista 2A project.

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed Area: East Windsor
 Sewer System: Coastal Flood Protection System
 Riverside Area: Area 1 - Ford Blvd to St. Rose Ave - Riverside Vista 2 A Boundaries (BERM-1)
 Description: Solutions alternatives developed to provide protection of inland systems from high water levels within Lake St. Clair and Detroit River.

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
		Alternative:	Baseline	BERM-1-1	BERM-1-2	BERM-1-3
		Description of Alternative:	No Improvements	Landform Barrier Elevation 176.45 Earth Berm - South of Riverside Drive	Flood Protection Elevation 176.45 Earth Berm - North of Riverside Drive	Flood Protection Elevation 176.80 Earth Berm - North of Riverside Drive
Minimize Long-Term Social/Economical Impacts	Level of disruption on Urban Community (displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees))	To minimize the disruption on the Urban Community.	No improvements. Potential high level of disruption.	Least impact to trees and landscape features.	Moderate impact to trees and landscape features.	Highest impact to trees and landscape features.
	Potential Impact on Future Land Uses (influence on infill, or green field development).	To minimize the impact on future land uses.	No improvements. Potential high level of disruption.	Provides benefit to permit development of lands to the south.	Provides minimal benefit to permit development of lands to the south.	Provides most benefit to permit development of lands to the south.
Minimize/Mitigate impacts to Heritage/Cultural Resources	Potential Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources.	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, archaeological) and consideration of methods to minimize and/or mitigate impacts.	No heritage/cultural resources, so no disruption or displacement.	Low level of impact to listed heritage building sites. Proposed works are within areas of high potential archaeological resources. Majority of lands impacted have been previously disturbed. Estimated to be smallest disruption overall.	Moderate level of impact to listed heritage building sites. Proposed works are within areas of high potential archaeological resources. Majority of lands impacted have been previously disturbed. Estimated to be moderate disruption overall.	Highest level of impact to listed heritage building sites. Proposed works are within areas of high potential archaeological resources. Majority of lands impacted have been previously disturbed. Estimated to be large disruption overall.
Minimize Impacts to the Natural Environment	Potential Impacts to Natural Environment Features	Potential for impacts to natural environmental features and consideration of how to minimize.	No improvements and no known natural environment features identified, so no impacts.	No natural environmental features identified for this alternative. No potential impacts identified.	No natural environmental features identified for this alternative. No potential impacts identified.	No natural environmental features identified for this alternative. No potential impacts identified.
	Potential disruption to aquatic systems.		No improvements, so high likelihood of disruption to aquatic systems.	Minimal impact to aquatic systems.	Minimal impact to aquatic systems.	Minimal impact to aquatic systems.
Consideration of Cost	Relative capital cost.	Being cognizant of the need to consider capital municipal infrastructure and private property improvements cost.	Increasing flooding problems in the community will increase community costs in the short and long run and does not address the purpose of the study.	Lowest relative cost.	Moderate relative cost.	High relative cost.
	Preferred Option:			PREFERRED		

Windsor Sewer and Coastal Flood Protection Master Plan
 Environmental Assessment Evaluation
 Riverside Coastal Flood Protection Solutions

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed Area: East Windsor
 Sewer System: Coastal Flood Protection System
 Riverside Area: Area 2 - St. Rose Ave. to Riverdale Ave. (BERM-2)
 Description: Solutions alternatives developed to provide protection of inland systems from high water levels within Lake St. Clair and Detroit River.

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1	ALTERNATIVE 2
			Alternative: Baseline	BERM-2-1	BERM-2-2
Description of Alternative:			No Improvements	Landform Barrier Elevation 176.45 Earth Berm - North or South of Riverside Drive	Landform Barrier Elevation 176.80 Earth Berm - North or South of Riverside Drive
Flood Protection	Percentage of protection provided to inland areas from potential high lake water levels.	Potential for reducing undesirable surface flooding.	Zero percentage. Does not provides flood protection of inland areas from potential high lake water levels (to the current flood protection elevation). Does not protect properties, north of Riverside Drive from overland flow.	Provides nearly 100% of flood protection to the current flood protection elevation. Provides protection to some properties, north of Riverside Drive from overland flow.	Provides 100% of flood protection to the current flood protection elevation and provides 0.35 m freeboard. Provides protection to some properties, north of Riverside Drive from overland flow.
	Level of protection to existing and proposed storm sewer infrastructure.	Mitigate impacts to storm sewer system to reduce impacts to drainage during high lake events.	Does not provide protection to the local storm sewer system.	Provides a high level of protection to a portion of the local storm system.	Provides a high level of protection to a portion of the local storm system .
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient considering climate change.	Does not provide protection under the projected climate change conditions.	Provides some protection under the projected climate change conditions.	Provides protection under the projected climate change conditions.
Ease of Implementation	Complexity of installation and operation, and level of disruption.	Reducing City and homeowner challenges and barriers to flood reduction measures. Includes consideration of space requirements, construction requirements, installation, and operation.	No construction required. Nothing to implement. No disruption to existing conditions.	Moderate level of disruption to existing properties. Additional parallel storm sewer system is required to provide local storm drainage, separate from storm system south of the berm.	High level of disruption to existing properties. Additional parallel storm sewer system is required to provide local storm drainage, separate from storm system south of the berm.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained, requiring increasingly more maintenance effort. This does not meet the objectives of this study.	City will have full access to complete regular monitoring and maintenance.	City will have full access to complete regular monitoring and maintenance.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the study.	Implementation is dependent on available funding. Moderate risk of time delays due to need to acquire easements and/or property.	Implementation is dependent on available funding. High risk of time delays due to need to acquire easements and/or property.

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Sewershed Area: East Windsor
 Sewer System: Coastal Flood Protection System
 Riverside Area: Area 2 - St. Rose Ave. to Riverdale Ave. (BERM-2)
 Description: Solutions alternatives developed to provide protection of inland systems from high water levels within Lake St. Clair and Detroit River.

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1	ALTERNATIVE 2
			Alternative: Baseline	BERM-2-1	BERM-2-2
Description of Alternative:			No Improvements	Landform Barrier Elevation 176.45 Earth Berm - North or South of Riverside Drive	Landform Barrier Elevation 176.80 Earth Berm - North or South of Riverside Drive
Minimize Impacts of Construction	Disruption to public greenspaces/recreational uses during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction, therefore no impacts.	Moderate construction footprint.	Largest construction footprint.
	Disruption to the public Right of Way.			Moderate degree of disruption to the ROW.	Highest degree of disruption to the ROW.
Minimize Long-Term Social/Economical Impacts	Level of disruption on Urban Community (displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees))	To minimize the disruption on the Urban Community.	No improvements. Potential high level of disruption.	Moderate impact to trees and landscape features.	High impact to trees and landscape features.
	Potential Impact on Future Land Uses (influence on infill, or green field development).	To minimize the impact on future land uses.	No improvements. Potential high level of disruption.	Provides benefit to permit development of lands to the south.	Provides most benefit to permit development of lands to the south.
Minimize/Mitigate impacts to Heritage/Cultural Resources	Potential Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources.	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, archaeological) and consideration of methods to minimize and/or mitigate impacts.	No heritage/cultural resources, so no disruption or displacement.	Moderate level of impact to listed heritage building sites. Proposed works are within areas of high potential archaeological resources. Majority of lands impacted have been previously disturbed. Appropriate site mitigation may be required. Moderate disruption overall.	Highest level of impact to listed heritage building sites. Proposed works are within high potential areas. Majority of lands impacted have been previously disturbed. Appropriate site mitigation may be required. Large disruption overall.

Windsor Sewer and Coastal Flood Protection Master Plan
 Environmental Assessment Evaluation
 Riverside Coastal Flood Protection Solutions

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed Area: East Windsor
 Sewer System: Coastal Flood Protection System
 Riverside Area: Area 2 - St. Rose Ave. to Riverdale Ave. (BERM-2)
 Description: Solutions alternatives developed to provide protection of inland systems from high water levels within Lake St. Clair and Detroit River.

Objective	Evaluation Criteria	Rationale	DO NOTHING ALTERNATIVE	ALTERNATIVE 1	ALTERNATIVE 2
			Alternative: Baseline	BERM-2-1	BERM-2-2
Description of Alternative:			No Improvements	Landform Barrier Elevation 176.45 Earth Berm - North or South of Riverside Drive	Landform Barrier Elevation 176.80 Earth Berm - North or South of Riverside Drive
Minimize Impacts to the Natural Environment	Potential Impacts to Natural Environment Features	Potential for impacts to natural environmental features and consideration of how to minimize.	No improvements and no natural environment features identified, so no impacts.	No natural environmental features identified for this alternative. No potential impacts identified.	No natural environmental features identified for this alternative. No potential impacts identified.
	Potential disruption to aquatic systems.		No improvements, so potential high likelihood of disruption to aquatic systems.	Minimal impact to aquatic systems.	Minimal impact to aquatic systems.
Consideration of Cost	Relative capital cost.	Being cognizant of the need to consider capital municipal infrastructure and private property improvements cost.	Increasing flooding problems in the community will increase community costs in the short and long run and does not address the purpose of the study.	Lowest relative cost.	High relative cost.
Preferred Option:				PREFERRED	

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed Area: East Windsor
 Sewer System: Coastal Flood Protection System
 Riverside Area: Area 3 - Riverdale Ave. to East City Limits (BERM-3)
 Description: Solutions alternatives developed to provide protection of inland systems from high water levels within Lake St. Clair and Detroit River.

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1	ALTERNATIVE 2
			Alternative: Baseline	BERM-3-1	BERM-3-2
		Description of Alternative:	No Improvements	Flood Protection Elevation 176.45 - Infill of Existing Berm South of Riverside Drive	Flood Protection Elevation 176.80 Build-Up of Existing Berm South of Riverside Drive
Flood Protection	Percentage of protection provided to inland areas from potential high lake water levels.	Potential for reducing undesirable surface flooding.	Zero percentage. Does not provides flood protection of inland areas from potential high lake water levels (to the current flood protection elevation). Does not protect properties, north of Riverside Drive from overland flow.	Provides flood protection to the current flood protection elevation. Provides protection to some properties, north of Riverside Drive from overland flow.	Provides best flood protection to the current flood protection elevation and provides 0.35 m freeboard. Provides the most protection to some properties, north of Riverside Drive from overland flow.
	Level of protection to existing and proposed storm sewer infrastructure.	Mitigate impacts to storm sewer system to reduce impacts to drainage during high lake events.	Does not provide protection to the local storm sewer system.	Provides protection to a portion of the local storm system .	Provides protection to a portion of the local storm system .
Resiliency	Flexibility to adjust to climate changes.	Being forward looking and resilient considering climate change.	Does not provide protection under the projected climate change conditions.	Provides some protection under the projected climate change conditions.	Provides best available protection under the projected climate change conditions.
Ease of Implementation	Complexity of installation and operation, and level of disruption.	Reducing City and homeowner challenges and barriers to flood reduction measures. Includes consideration of space requirements, construction requirements, installation, and operation.	No construction required. Nothing to implement. No disruption to existing conditions.	Minimal level of disruption and need for construction. Low level of complexity for this alternative. Minimal disruption to private properties.	Moderate level of disruption to municipal right-of-way. Moderate level of complexity for this alternative. Significant disruption to private properties to build-up berm in the rear of properties.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.	Existing level of service will be maintained, requiring increasingly more maintenance effort. This does not meet the objectives of this study.	City will has full limited access to complete regular monitoring and maintenance along City Limits.	City will has full limited access to complete regular monitoring and maintenance along City Limits.
Optimal Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.	No construction required. Nothing improved so doesn't meet the purpose of the study.	Lowest amount of time required to complete minimal level of improvements.	Highest amount of time required to complete build-up of the existing berm.
Minimize Impacts of Construction	Disruption to public greenspaces/recreational uses during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.	No construction, therefore no impacts.	Smallest construction footprint.	Largest construction footprint.
	Disruption to the public Right of Way.			Lowest degree of disruption to the ROW.	Highest degree of disruption to the ROW.

Windsor Sewer and Coastal Flood Protection Master Plan
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 Riverside Coastal Flood Protection Solutions

Highlighted cells indicate solution that has least impact or best outcome.

Sewershed Area: East Windsor
 Sewer System: Coastal Flood Protection System
 Riverside Area: Area 3 - Riverdale Ave. to East City Limits (BERM-3)
 Description: Solutions alternatives developed to provide protection of inland systems from high water levels within Lake St. Clair and Detroit River.

Objective (what)	Evaluation Criteria (how measured)	Rationale (why being considered)	DO NOTHING ALTERNATIVE	ALTERNATIVE 1	ALTERNATIVE 2
		Alternative:	Baseline	BERM-3-1	BERM-3-2
		Description of Alternative:	No Improvements	Flood Protection Elevation 176.45 - Infill of Existing Berm South of Riverside Drive	Flood Protection Elevation 176.80 Build-Up of Existing Berm South of Riverside Drive
Minimize Long-Term Social/Economical Impacts	Level of disruption on Urban Community (displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees))	To minimize the disruption on the Urban Community.	No improvements. Potential high level of disruption.	No impact to existing trees.	Impact to trees and landscape features.
	Potential Impact on Future Land Uses (influence on infill, or green field development).	To minimize the impact on future land uses.	No improvements. Potential high level of disruption.	Provides benefit to permit development of lands to the south.	Provides most benefit to permit development of lands to the south.
Minimize/Mitigate impacts to Heritage/Cultural Resources	Potential Impacts to Built Heritage, Cultural Heritage, and/or Archaeological Resources.	Potential for temporary or permanent disruption or displacement of existing resources (built heritage, cultural heritage, archaeological) and consideration of methods to minimize and/or mitigate impacts.	No heritage/cultural resources, so no disruption or displacement.	No built heritage or cultural heritage resources, so no disruption or displacement. Proposed works are within areas of high potential archaeological resources. Majority of lands impacted have been previously disturbed. Lowest disruption footprint.	No built heritage or cultural heritage resources, so no disruption or displacement. Proposed works are within areas of high potential archaeological resources. Majority of lands impacted have been previously disturbed. Largest disruption footprint.
Minimize Impacts to the Natural Environment	Potential Impacts to Natural Environment Features	Potential for impacts to natural environmental features and consideration of how to minimize.	No improvements and no natural environment features identified, so no impacts.	No natural environmental features identified for this alternative. No potential impacts identified.	No natural environmental features identified for this alternative. No potential impacts identified.
	Potential disruption to aquatic systems.		No improvements, so potential high likelihood of disruption to aquatic systems.	Minimal impact to aquatic systems.	Minimal impact to aquatic systems.
Consideration of Cost	Relative capital cost.	Being cognizant of the need to consider capital municipal infrastructure and private property improvements cost.	Increasing flooding problems in the community will increase community costs in the short and long run and does not address the purpose of the study.	Lowest relative cost.	Highest relative cost.
	Preferred Option:			PREFERRED	



Summary of Potential Effects and Proposed Mitigation for Schedule B Projects

Sewer and Coastal Flood Protection Master Plan

APPENDIX G: SUMMARY OF POTENTIAL EFFECTS AND PROPOSED MITIGATION FOR SCHEDULE B PROJECTS

Recommended Schedule B Project		Existing Conditions/Land Use		Natural Environment ¹		Socio-Cultural Environment ²	
Label Code	Project Name	Project Location/Description	Windsor OP, Schedule D – Land Use	Label Code	Project Name	Project Location/Description	Windsor OP, Schedule D – Land Use
Central Sewershed Drainage Area							
STM-C2	Detroit Street Trunk Sewer Outfall	Installation of approx. 300 m of storm sewer along Detroit Street, from Sandwich St. to an improved outfall at the Detroit River.	Waterfront Recreation	<ul style="list-style-type: none"> Some significant wildlife habitat present (Turtle Wintering Areas and Amphibian Breeding Habitat (Wetlands)) Some potential for Species of Conservation Concern (see Appendix H-2, Appendix H-2-c for list) Some potential for Species at Risk (SAR) including federal aquatic SAR (see Appendix H-2, Appendix H-2-c for list) This project include the replacement of an existing outlet to the Detroit River, some potential to impact to fish habitat during construction. 	<ul style="list-style-type: none"> MECP will be consulted on the need for additional field investigations and permitting and approvals requirements under the ESA where appropriate. A wildlife sweep of the project area at least 48 hours prior to the proposed works to ensure no nesting wildlife, SAR, and/or SAR habitat will be negatively impacted. Any in-water works will occur between July 1 & March 14 of any given year to protect sensitive life stages/process of resident fish. <p>The City will liaise with DFO to confirm requirements associated with the Fisheries Act.</p>	<ul style="list-style-type: none"> Recommended improvements that will alter infrastructure along the waterfront. These improvements include the replacement of an existing storm sewers with a large sewer within an existing sewer easement. No added impacts to development of private property in the vicinity of the storm sewer. Construction within road rights-of-way has the potential to impact traffic. <p>Archaeological potential is high (level of disturbance uncertain)</p>	<ul style="list-style-type: none"> The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. <p>Stage 2 assessments will be completed prior to construction where required. Should archaeological resources be discovered during construction, work will stop immediately and appropriate contacts will be made, including notifications to First Nations.</p>
STM-C6	Ypres Ave. Stormwater Management Facility	Installation of an underground stormwater storage facility under existing a parking lot within Optimist Park on Ypres Ave.	Recreation/ Natural Heritage	<ul style="list-style-type: none"> Some significant wildlife habitat present (see Appendix H-2, Appendix H-2-c for list) Some potential for Species of Conservation Concern (see Appendix H-2, Appendix H-2-c for list) Some potential for Species at Risk (SAR) including federal aquatic SAR (see Appendix H-2, Appendix H-2-c for list) <p>No potential to impact fish habitat.</p>	<ul style="list-style-type: none"> MECP will be consulted on the need for additional field investigations and permitting and approvals requirements under the ESA where appropriate. A wildlife sweep of the project area at least 48 hours prior to the proposed works to ensure no nesting wildlife, SAR, and/or SAR habitat will be negatively impacted. Construction will be limited to the existing parking lot areas. Protection will be provided to separate proposed construction from the existing natural heritage area, east of the project site. 	<ul style="list-style-type: none"> New facility to be constructed under the existing asphalt parking lot. Temporary disruption to park use during construction and displacement of park space for above ground facilities. Construction within road rights-of-way has the potential to impact traffic. <p>Archaeological potential is low.</p>	<ul style="list-style-type: none"> Removal and restoration of parking lot required to accommodate these works. The City will keep construction periods as short as possible and park features will be restored after construction. Additional landscaping will be provided for above ground facilities in parks to compensate for the removal of park space. The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. Minimum requirements of the City's Archaeological Master Plan shall be followed during construction. No additional archaeological assessment is required.

¹ Table 7-1 in Section 7.1 of the Master Plan includes information on potential construction impacts that could occur for all options and proposed mitigation. The effects and mitigation common to all projects are not repeated in this table. A tree inventory will be completed to assess which trees may be impacted and how impacts can be mitigated through detailed design. Trees removed throughout these projects will be replaced in an appropriate location and surrounding trees will be protected during construction.

² Table 7-1 in Section 7.1 of the Master Plan includes information on potential construction impacts that could occur for all options and proposed mitigation. The effects and mitigation common to all projects are not repeated in this table.

Recommended Schedule B Project		Existing Conditions/Land Use		Natural Environment ¹		Socio-Cultural Environment ²	
Label Code	Project Name	Project Location/Description	Windsor OP, Schedule D – Land Use	Label Code	Project Name	Project Location/Description	Windsor OP, Schedule D – Land Use
STM-C7.1	Albert Trunk Storm Sewer/Outfall	Installation of approx. 350 m of storm sewer along Albert Rd. to connect to an improved outfall to the Detroit River and Drainage Area Sewer Separation.	Waterfront Port	<ul style="list-style-type: none"> Some significant wildlife habitat present (see Appendix H-2, Appendix H-2-c for list) Some potential for Species of Conservation Concern (see Appendix H-2, Appendix H-2-c for list) Some potential for Species at Risk (SAR) including federal aquatic SAR (see Appendix H-2, Appendix H-2-c for list). This project include the replacement of an existing outlet to the Detroit River, some potential to impact to fish habitat during construction. 	<ul style="list-style-type: none"> MECP will be consulted on the need for additional field investigations and permitting and approvals requirements under the ESA where appropriate. A wildlife sweep of the project area at least 48 hours prior to the proposed works to ensure no nesting wildlife, SAR, and/or SAR habitat will be negatively impacted. Any in-water works will occur between July 1 & March 14 of any given year to protect sensitive life stages/process of resident fish. <p>The City will liaise with DFO to confirm requirements associated with the Fisheries Act.</p>	<ul style="list-style-type: none"> Recommended improvements that will alter infrastructure along the waterfront. These improvements include the replacement of an existing storm sewer with a large sewer within an existing sewer easement. No added impacts to development of private property in the vicinity of the storm sewer. Construction within road rights-of-way has the potential to impact traffic. <p>Archaeological potential is low.</p>	<ul style="list-style-type: none"> The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. Minimum requirements of the City's Archaeological Master Plan shall be followed during construction. No additional archaeological assessment is required.
STM-C8	Drouillard PS Improvements	Installation of approx. 270 m of storm sewer along Drouillard Rd. between Riverside Dr. E. and Wyandotte St. E. Construction of a new pumping station within Cadillac Park and decommissioning of the existing pumping station.	Recreation	<ul style="list-style-type: none"> No potential natural environmental impacts anticipated. <p>No potential to impact fish habitat.</p>	N/A	<ul style="list-style-type: none"> New pump station foot print will impact the use of this park. The operation of a pumping station has some potential to result in noise and vibration. Construction within road rights-of-way has the potential to impact traffic. Archaeological potential is high (level of disturbance uncertain). 	<ul style="list-style-type: none"> To minimize disruption to the park, mitigation measures will be developed during the detailed design phase. Where required, park infrastructure will be relocated. The City will design pump stations to meet MECP noise criteria and to minimize any potential for vibration impacts on neighbouring properties. The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. <p>Minimum requirements of the City's Archaeological Master Plan shall be followed during construction. No additional archaeological assessment is required.</p>
South Sewershed Drainage Area							
ROAD-S1-	Dougall Ave. Stormwater Management Pond and Storm Sewer Improvements	Installation of approx. 1,400 m of storm sewers on Eugenie St. E., between McDougall St. and Dougall Ave., and along Dougall Ave., from Eugenie St. E. to a proposed SWM Pond, south of South Cameron Blvd. providing approx. 14,000 m ³ storage volume within private property.	Agricultural	<ul style="list-style-type: none"> Some potential for Species of Conservation Concern (see Appendix H-2, Appendix H-2-c for list) Some potential for Species at Risk (SAR) including federal aquatic SAR (see Appendix H-2, Appendix H-2-c for list) No potential for impact on fish habitat 	<ul style="list-style-type: none"> MECP will be consulted on the need for additional field investigations and permitting and approvals requirements under the ESA where appropriate. <p>A wildlife sweep of the project area at least 48 hours prior to the proposed works to ensure no nesting wildlife, SAR, and/or SAR habitat will be negatively impacted.</p>	<ul style="list-style-type: none"> The City will need to acquire the property, south of South Cameron Blvd. to accommodate the proposed stormwater management pond. Construction within road rights-of-way has the potential to impact traffic. <p>Archaeological potential is low.</p>	<ul style="list-style-type: none"> The City will purchase property at fair market value. The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. Minimum requirements of the City's Archaeological Master Plan shall be followed during construction. No additional archaeological assessment is required.

Recommended Schedule B Project		Existing Conditions/Land Use		Natural Environment ¹		Socio-Cultural Environment ²	
Label Code	Project Name	Project Location/Description	Windsor OP, Schedule D – Land Use	Label Code	Project Name	Project Location/Description	Windsor OP, Schedule D – Land Use
ROAD-S2-	Howard Ave. Stormwater Management Pond and Storm Sewer Improvements	Installation of approx. 1,200 m of storm sewer on Howard Ave. between Edinborough St. and E.C ROW Expressway to a proposed SWM Pond providing approx. 3,500 m ³ storage volume within private property.	Commercial	<ul style="list-style-type: none"> Some potential for two Species of Conservation Concern (Giant Ironweed and Climbing Prairie Rose) No potential to impact fish habitat. 	<ul style="list-style-type: none"> MECP will be consulted on the need for additional field investigations and permitting and approvals requirements under the ESA where appropriate. A wildlife sweep of the project area at least 48 hours prior to the proposed works to ensure no nesting wildlife, SAR, and/or SAR habitat will be negatively impacted. 	<ul style="list-style-type: none"> The City will need to acquire the property, west of Howard Ave., south of Grand Marais E. Rd. accommodate the proposed stormwater management pond. Construction within road rights-of-way has the potential to impact traffic. <p>Archaeological potential is low.</p>	<ul style="list-style-type: none"> The City will purchase property at fair market value. The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. <p>Minimum requirements of the City's Archaeological Master Plan shall be followed during construction. No additional archaeological assessment is required.</p>
ROAD-S3-	Chrysler Centre Underground Stormwater Management Facility and Storm Sewer Improvements	Installation of approx. 600 m of storm sewer along Chrysler Centre between Tecumseh Rd. E. and Grand Marais Rd. E. to a proposed underground stormwater management facility within private property, providing approx. 11,000 m ³ .	Industrial	<ul style="list-style-type: none"> Some potential for one Species of Conservation Concern (Common Nighthawk) Some potential for one Species at Risk (SAR) including federal aquatic SAR (Chimney Swift) <p>No potential to impact fish habitat.</p>	<ul style="list-style-type: none"> MECP will be consulted on the need for additional field investigations and permitting and approvals requirements under the ESA where appropriate. <p>A wildlife sweep of the project area at least 48 hours prior to the proposed works to ensure no nesting wildlife, SAR, and/or SAR habitat will be negatively impacted.</p>	<ul style="list-style-type: none"> The City will need to obtain an easement for the proposed underground stormwater management facility. Construction within road rights-of-way has the potential to impact traffic. Archaeological potential is low. 	<ul style="list-style-type: none"> The City will continue to reduce property requirements during detailed design where possible and will purchase or negotiate easements for any property required at fair market value. The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. <p>Minimum requirements of the City's Archaeological Master Plan shall be followed during construction. No additional archaeological assessment is required.</p>
STM-S7	Regional Area 7 (Central Ave. and Pillette Rd.) Stormwater Management Pond and Storm Sewer Improvements	Installation of approx. 1,200 m of storm sewer along Pillette Rd., Central Ave., Grand Marais Rd. E. Tourangeau Rd., and Bernard Rd., to the existing Central Ave. SWM Pond. This includes the expansion of the Central Ave. pond within private property areas.	Industrial	<ul style="list-style-type: none"> Some potential for Species of Conservation Concern (see Appendix H-2, Appendix H-2-c for list) Some potential for Species at Risk (SAR) including federal aquatic SAR (see Appendix H-2, Appendix H-2-c for list) No impact to fish habitat as the stormwater ponds are not connected to other watercourses and not considered fish habitat. 	<ul style="list-style-type: none"> MECP will be consulted on the need for additional field investigations and permitting and approvals requirements under the ESA where appropriate. A wildlife sweep of the project area at least 48 hours prior to the proposed works to ensure no nesting wildlife, SAR, and/or SAR habitat will be negatively impacted. Any in-water works will occur between July 1 & March 14 of any given year to protect sensitive life stages/process of resident fish. Vegetation needs to be maintained on the west bank of the existing pond. <p>The proposed pond modifications will need to mitigate waterfowl habitat and adhere to airport requirements.</p>	<ul style="list-style-type: none"> The City will need to acquire a portion of the property, east of the existing stormwater management pond. Property requirements impact the development potential for the adjacent site. Construction within road rights-of-way has the potential to impact traffic. Archaeological potential is low. 	<ul style="list-style-type: none"> The City will purchase property required at fair market value. The City will work with the adjacent property owner to develop a stormwater management pond layout that will consider redevelopment needs of the adjacent site. The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. Minimum requirements of the City's Archaeological Master Plan shall be followed during construction. No additional archaeological assessment is required.

Recommended Schedule B Project		Existing Conditions/Land Use		Natural Environment ¹		Socio-Cultural Environment ²	
Label Code	Project Name	Project Location/Description	Windsor OP, Schedule D – Land Use	Label Code	Project Name	Project Location/Description	Windsor OP, Schedule D – Land Use
East Sewershed Drainage Area							
STM – E1	Regional Areas 1 & 2 (Riverside Area) -St. Paul. Drainage Area Storm Sewer and Pump Station Improvements	Installation of storm trunk sewers on Belleperche Pl., Clairview Ave., and a proposed easement through Kiwanis Park.	Residential, Recreational	<ul style="list-style-type: none"> Potential Tree impacts. No potential to impact fish habitat 	<ul style="list-style-type: none"> Where possible, through detailed design, the proposed work will be designed to mitigate the need to remove existing trees. Tree protection will be provided as needed. 	<ul style="list-style-type: none"> Temporary disruption to park use during construction. Construction within road rights-of-way has the potential to impact traffic. Archaeological potential is low. 	<ul style="list-style-type: none"> To minimize disruption to the park, mitigation measures will be developed during the detailed design phase, where required, park infrastructure will be relocated. The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. Minimum requirements of the City's Archaeological Master Plan shall be followed during construction. No additional archaeological assessment is required.
STM – E1	Regional Areas 1 & 2 (Riverside Area) - St. Rose Ave. Drainage Area Storm Sewer and Pump Station Improvements	Installation of storm trunk sewers along Riverside Dr. E., St. Rose Ave., Wyandotte St. E., Janisse Dr., Ontario St., and St. Mary's Blvd.	Recreational	Potential Tree impacts.	<ul style="list-style-type: none"> Where possible, through detailed design, the proposed work will be designed to mitigate the need to remove existing trees. Tree protection will be provided as needed. 	<ul style="list-style-type: none"> Need for easements for utilities/municipal infrastructure to accommodate large trunk sewers within the existing ROW. Construction within road rights-of-way has the potential to impact traffic. Archaeological potential is low. 	<ul style="list-style-type: none"> The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. Minimum requirements of the City's Archaeological Master Plan shall be followed during construction. No additional archaeological assessment is required.
PS-E1-PAUL	St. Paul PS Improvements	Expansion eastwards of the existing PS, new outfall at the Detroit River from the expansion, and backup generators.	Waterfront Recreation	<ul style="list-style-type: none"> Some significant wildlife habitat present (Turtle Wintering Areas and Amphibian Breeding Habitat (Wetlands)) Some potential for Species of Conservation Concern (see Appendix H-2, Appendix H-2-c for list) Some potential for Species at Risk (SAR) including federal aquatic SAR (see Appendix H-2, Appendix H-2-c for list) This project includes the replacement of an existing outlet to the Detroit River, some potential to impact to fish habitat during construction. 	<ul style="list-style-type: none"> MECP will be consulted on the need for additional field investigations and permitting and approvals requirements under the ESA where appropriate. A wildlife sweep of the project area at least 48 hours prior to the proposed works to ensure no nesting wildlife, SAR, and/or SAR habitat will be negatively impacted. Any in-water works will occur between July 1 & March 14 of any given year to protect sensitive life stages/process of resident fish. <p>The City will liaise with DFO to confirm requirements associated with the Fisheries Act.</p>	<ul style="list-style-type: none"> Temporary disruption to park use during construction and displacement of park space for above ground facilities. New Pump station foot print will impact the use of this park. The operation of a pumping station has some potential to result in noise and vibration. Archaeological potential is low (level of disturbance uncertain) 	<ul style="list-style-type: none"> To minimize disruption to the park, mitigation measures will be developed during the detailed design phase, where required, park infrastructure will be relocated. Additional landscaping will be provided for above ground facilities in parks to compensate for the removal of park space. The City will design pump stations to meet MECP noise criteria and to minimize any potential for vibration impacts on neighbouring properties. <p>Minimum requirements of the City's Archaeological Master Plan shall be followed during construction. No additional archaeological assessment is required.</p>

Recommended Schedule B Project		Existing Conditions/Land Use		Natural Environment ¹		Socio-Cultural Environment ²	
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STM – E3	Regional Areas 3 & 4 (East Windsor/ Fountainbleu Area) - Storm Sewer Improvements	Separation of sewers in the Regional Areas 3 and 4 (between Pillette Rd., and Jefferson Blvd., south of South National St., and north of the E.C.ROW Expressway). This includes the installation of approximately 9,500 m of large trunk storm sewers and culverts.	Municipal ROW	Potential Tree impacts.	<ul style="list-style-type: none"> Where possible, through detailed design, the proposed work will be designed to mitigate the need to remove existing trees. Tree protection will be provided as needed.	<ul style="list-style-type: none"> Need for easements for utilities/municipal infrastructure to accommodate large trunk sewers within the existing ROW. Construction within road rights-of-way has the potential to impact traffic. Archaeological potential is low (level of disturbance uncertain) 	<ul style="list-style-type: none"> Need for easements for utilities/municipal infrastructure to accommodate large trunk sewers within the existing ROW. The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. Minimum requirements of the City's Archaeological Master Plan shall be followed during construction. No additional archaeological assessment is required.
ROAD-E4	Lauzon Parkway Storm Sewer Improvements Underground	Installation of large storm culverts on Lauzon Pkwy. including the grading improvements within the municipal right-of-way.	Municipal ROW	No Impacts	N/A	<ul style="list-style-type: none"> Construction within road rights-of-way has the potential to impact traffic. Archaeological potential is low (level of disturbance uncertain) 	<ul style="list-style-type: none"> The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. Minimum requirements of the City's Archaeological Master Plan shall be followed during construction. No additional archaeological assessment is required.
ROAD-E4	Lauzon Parkway Surface Storage Swales	Installation of 500 m of surface storage swale located within private property are, west of Lauzon Pkwy., between Cantelon Dr. and Hawthorne Dr.	Industrial	Potential Tree impacts.	<ul style="list-style-type: none"> Where possible, through detailed design, the proposed work will be designed to mitigate the need to remove existing trees. Tree protection will be provided as needed.	<ul style="list-style-type: none"> The City will need to acquire an easement for these swales, west of the existing Lauzon Parkway ROW. Construction within road rights-of-way has the potential to impact traffic. Archaeological potential is high (level of disturbance uncertain) 	<ul style="list-style-type: none"> The City will continue to reduce property requirements during detailed design where possible and will purchase or negotiate easements for any property required at fair market value. The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. Stage 2 assessments will be completed prior to construction where required. Should archaeological resources be discovered during construction, work will stop immediately and appropriate contacts will be made, including notifications to First Nations.

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ROAD-E4	Meadowbrook Park Underground Stormwater Management Facility	Installation of an underground stormwater management facility within the park lands, west of Meadowbrook Lane.	Residential	<ul style="list-style-type: none"> Some potential for Species of Conservation Concern (see Appendix H-2, Appendix H-2-c for list) Potential Tree impacts. No potential to impact fish habitat 	<ul style="list-style-type: none"> Where possible, through detailed design, the proposed work will be designed to mitigate the need to remove existing trees. Tree protection will be provided as needed.	<ul style="list-style-type: none"> Temporary disruption to park use during construction. The City will need to acquire an easement for this facility within the Meadowbrook Park area. Archaeological potential is high (level of disturbance uncertain). 	<ul style="list-style-type: none"> To minimize disruption to the park, mitigation measures will be developed during the detailed design phase, where required, park infrastructure will be relocated. The City will continue to reduce property requirements during detailed design where possible and will purchase or negotiate easements for any property required at fair market value. The City will keep construction periods as short as possible and park features will be restored after construction. Additional landscaping will be provided for above ground facilities in parks to compensate for the removal of park space. Stage 2 assessments will be completed prior to construction where required. Should archaeological resources be discovered during construction, work will stop immediately and appropriate contacts will be made, including notifications to First Nations.
ROAD-E4	Little River Golf Course Stormwater Management Pond	Installation of stormwater management pond within the Little River Golf Course.	Recreational	MNRP mapped woodland present.	N/A	<ul style="list-style-type: none"> The City will need to acquire a portion of the property, west of the existing Little River Drain. Park lands will need to be conveyed to Public Works. Construction within road rights-of-way has the potential to impact traffic. Archaeological potential is high (level of disturbance uncertain)	<ul style="list-style-type: none"> To minimize disruption to the park, mitigation measures will be developed during the detailed design phase, where required, park infrastructure will be relocated. The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. Stage 2 assessments will be completed prior to construction where required. Should archaeological resources be discovered during construction, work will stop immediately and appropriate contacts will be made, including notifications to First Nations.

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ROAD-E11	Roseville Garden Underground Stormwater Management Facility and Storm Sewer Improvements	Installation of approx. 700 m of storm sewers and culverts along Roseville Garden Dr., as well as an underground stormwater storage facility under Roseville Park and Roseville Public School's green space.	Recreational/Institutional	Potential Tree impacts.	<ul style="list-style-type: none"> Where possible, through detailed design, the proposed work will be designed to mitigate the need to remove existing trees. <p>Tree protection will be provided as needed.</p>	<ul style="list-style-type: none"> Temporary disruption to park use during construction. The City will need to acquire an easement for this facility within the park and school property areas. Recommended improvements that will alter infrastructure within storm sewer easement, west of Roseville Garden Drive, south of Tecumseh Road east. These improvements include the replacement of an existing storm sewer with a larger sewer within an existing sewer easement. Construction within road rights-of-way has the potential to impact traffic. <p>Archaeological potential is low.</p>	<ul style="list-style-type: none"> To minimize disruption to the park and school yard areas, mitigation measures will be developed during the detailed design phase, where required, park infrastructure will be relocated. The City will continue to reduce property requirements during detailed design where possible and will purchase or negotiate easements for any property required at fair market value. The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. <p>Minimum requirements of the City's Archaeological Master Plan shall be followed during construction. No additional archaeological assessment is required.</p>
STM-E5-1	Regional Area 5 (Blue Heron Pond Area) PS and Storm Sewer Outlet Improvements	Improve the Lakeview pump station at South Rendezvous Park and upgrade the existing outlet to Lake St. Clair.	Recreation	<ul style="list-style-type: none"> Some potential for one Species of Conservation Concern (Brindled Madtom) Some potential for one Species at Risk (SAR) including federal aquatic SAR (Northern Madtom) <p>A new outlet to Lake St. Clair may have some potential to impact fish habitat.</p>	<ul style="list-style-type: none"> MECP will be consulted on the need for additional field investigations and permitting and approvals requirements under the ESA where appropriate. A wildlife sweep of the project area at least 48 hours prior to the proposed works to ensure no nesting wildlife, SAR, and/or SAR habitat will be negatively impacted. Any in-water works will occur between July 1 & March 14 of any given year to protect sensitive life stages/process of resident fish. <p>The City will liaise with DFO to confirm requirements associated with the Fisheries Act.</p>	<ul style="list-style-type: none"> Temporary disruption to park use during construction and displacement of park space for above ground facilities. Construction within road rights-of-way has the potential to impact traffic. The operation of a pumping station has some potential to result in noise and vibration. <p>Archaeological potential is high (level of disturbance uncertain)</p>	<ul style="list-style-type: none"> To minimize disruption to the park, mitigation measures will be developed during the detailed design phase, where required, park infrastructure will be relocated. Additional landscaping will be provided for above ground facilities in parks to compensate for the removal of park space. The City will keep construction periods as short as possible and park features will be restored after construction. Additional landscaping will be provided for above ground facilities in parks to compensate for the removal of park space. The City will design pump stations to meet MECP noise criteria and to minimize any potential for vibration impacts on neighbouring properties. <p>Stage 2 assessments will be completed prior to construction where required. Should archaeological resources be discovered during construction, work will stop immediately and appropriate contacts will be made, including notifications to First Nations.</p>

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STM-E6	Regional Area 6 Surface Flooding Risk Reduction	Installation of a storm sewer along Cedarview Dr., and new stormwater pond in Brumpton Park.	Recreation	<ul style="list-style-type: none"> Some potential for one Species of Conservation Concern (Brindled Madtom) Some potential for one Species at Risk (SAR) (Northern Madtom) <p>The new outlet to Little River has some potential to impact fish habitat</p>	<ul style="list-style-type: none"> MECP will be consulted on the need for additional field investigations and permitting and approvals requirements under the ESA where appropriate. A wildlife sweep of the project area at least 48 hours prior to the proposed works to ensure no nesting wildlife, SAR, and/or SAR habitat will be negatively impacted. <p>The City will liaise with DFO to confirm requirements associated with the Fisheries Act.</p>	<ul style="list-style-type: none"> Temporary disruption to park use during construction. Construction within road rights-of-way has the potential to impact traffic. <p>Archaeological potential is high (level of disturbance uncertain)</p>	<ul style="list-style-type: none"> To minimize disruption to the park, mitigation measures will be developed during the detailed design phase, where required, park infrastructure will be relocated. The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. <p>Stage 2 assessments will be completed prior to construction where required. Should archaeological resources be discovered during construction, work will stop immediately and appropriate contacts will be made, including notifications to First Nations.</p>
STM-E6	Regional Area 6 Surface Flooding Risk Reduction	New storm sewers required to redirect drainage south of Ganatchio Trail Berm from East Marsh PS to Pontiac PS in conjunction with East Marsh PS improvements which include upgraded s (no change in capacity) and installation of backup generators.	Municipal ROW	No Impacts	N/A	<ul style="list-style-type: none"> Construction within road rights-of-way has the potential to impact traffic. <p>Archaeological potential is high (level of disturbance uncertain).</p>	<ul style="list-style-type: none"> The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. <p>Stage 2 assessments will be completed prior to construction where required. Should archaeological resources be discovered during construction, work will stop immediately and appropriate contacts will be made, including notifications to First Nations.</p>
ROAD-E9-2	Wyandotte St. E. at Watson Ave. Underground Stormwater Management Facilities	Construction of storm sewers and two underground stormwater management facilities within two commercial properties; north of Wyandotte St. E., east of Watson Ave.	Commercial	No potential natural environmental impacts anticipated.	No Impacts	Archaeological potential is low.	<ul style="list-style-type: none"> The City will continue to reduce property requirements during detailed design where possible and will purchase or negotiate easements for any property required at fair market value. The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. <p>Minimum requirements of the City's Archaeological Master Plan shall be followed during construction. No additional archaeological assessment is required.</p>

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Riverside Dr. E. Landform Barrier							
BERM-E1	Area 1 Riverside Dr. E. (Ford Blvd to St. Rose Ave) – Landform Barrier and Backflow Prevention	Construct a landform barrier (earth berm) within applicable low lying private property areas along the north Riverside Dr. E. boulevard. Construction of a storm sewer to provide local storm sewer drainage. Installation of backflow prevention devices within the storm sewers system.	Residential/Commercial, Municipal ROW	Potential Tree impacts.	<ul style="list-style-type: none"> Where possible, through detailed design, the proposed berm will be placed to mitigate the need to remove existing trees. <p>Tree protection will be provided during construction of the earth berm.</p>	<ul style="list-style-type: none"> Construction within road rights-of-way has the potential to impact traffic. Construction of the landform barrier and some stormwater facilities will require easements. Heritage Listed properties that have brick/concrete pillars are located along the north side of Riverside Drive. <p>Archaeological potential is high (level of disturbance uncertain).</p>	<ul style="list-style-type: none"> The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. The City will continue to reduce property requirements during detailed design where possible and will purchase or negotiate easements for any property required at fair market value. Where the berm is proposed in the vicinity of walls related to designated properties, the walls will be designed to mitigate the need for removal, where possible and walls will be protected during construction. No impacts are anticipated for existing residents. <p>Stage 2 assessments will be completed prior to construction where required. Should archaeological resources be discovered during construction, work will stop immediately and appropriate contacts will be made, including notifications to First Nations.</p>
BERM-E2	Area 2 Riverside Dr. E. (St. Rose to Riverdale Ave) – Landform Barrier and Backflow Prevention	Construct a landform barrier (earth berm) within applicable low lying private property areas along the north of Riverside Dr. E. boulevard, between St. Rose Ave. and Frank Ave., and south of Riverside Dr. E. between Frank Ave. and Riverdale Ave. Installation of backflow prevention devices within the storm sewers system.	Residential/Commercial, Municipal ROW	Potential Tree impacts.	<ul style="list-style-type: none"> Where possible, through detailed design, the proposed berm will be placed to mitigate the need to remove existing trees. <p>Tree protection will be provided during construction of the earth berm.</p>	<ul style="list-style-type: none"> Construction within road rights-of-way has the potential to impact traffic. Construction of the landform barrier and some stormwater facilities will require easements. <p>Archaeological potential is high (level of disturbance uncertain).</p>	<ul style="list-style-type: none"> The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. The City will continue to reduce property requirements during detailed design where possible and will purchase or negotiate easements for any property required at fair market value. <p>Stage 2 assessments will be completed prior to construction where required. Should archaeological resources be discovered during construction, work will stop immediately and appropriate contacts will be made, including notifications to First Nations.</p>

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BERM-E3	Area 3 Riverside Dr. E. (Riverdale Ave. to East City Limits) – Landform Barrier and Backflow Prevention	Construct a landform barrier (earth berm) within applicable low lying private property areas along the north of Riverside Dr. E. boulevard, between St. Rose Ave. and Frank Ave., and south of Riverside Dr. E. between Frank Ave. and Riverdale Ave. Installation of backflow prevention devices within the storm sewers system.	Residential/Commercial, Municipal ROW	Potential Tree impacts.	<ul style="list-style-type: none"> Where possible, through detailed design, the proposed berm will be placed to mitigate the need to remove existing trees. <p>Tree protection will be provided during construction of the earth berm.</p>	<ul style="list-style-type: none"> Construction within road rights-of-way has the potential to impact traffic. Construction of the landform barrier and some stormwater facilities will require easements. <p>Archaeological potential is high (level of disturbance uncertain).</p>	<ul style="list-style-type: none"> The City will schedule construction to minimize traffic impacts where feasible. Appropriate traffic management procedures and signage will be put in place. The City will continue to reduce property requirements during detailed design where possible and will purchase or negotiate easements for any property required at fair market value. <p>Stage 2 assessments will be completed prior to construction where required. Should archaeological resources be discovered during construction, work will stop immediately and appropriate contacts will be made, including notifications to First Nations.</p>