APPENDIX D

Evaluation of Alternative Solutions

Middlesex Centre Settlement Area
Stormwater Master Plan July, 2020

Table D-1: Evaluation of Alternative Solutions for Arva

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Regional SWM Facility	Alternative 3 – Local SWM Controls
Socio-Economic/ Cultural			
Impacts to existing and future land uses and Developments	No land required for SWM measures. Does not provide SWM controls for lands designated for future development within Official Plan (OP).	The regional pond has an estimated footprint of approximately 0.7 hectares and will require a dedicated block. The regional facility generally requires more land than Alternative 3, which reduced the land available for development.	LID measures will be incorporated into proposed landscaping features. Depending on the proposed land use, the quantity control storage volumes could be partially provided on private sites. LIDs will generally require less overall land, which may result in more land available for development. Feedback from landowners has indicated preference for LID measures based on current development concept.
Built Cultural Heritage and Archaeological Resources	No impacts to built cultural heritage or archaeological resources as no SWM controls are constructed.	Construction of SWMF is not anticipated to impact built cultural heritage resources but will be confirmed prior to detailed design and construction. An archaeological assessment will be required prior to construction of SWMF. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate Planning Act	Construction of local controls is not anticipated to impact built cultural heritage resources but will be confirmed prior to detailed design and construction. An archaeological assessment will be required prior to construction of local controls. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate Planning Act

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Regional SWM Facility	Alternative 3 – Local SWM Controls
		applications for future developments.	applications for future developments.
Community Impacts	Future development would not be permitted because no SWM controls are in place.	SWMF must be designed in order to mitigate the risk of drowning and other hazards to public safety. Pond can be designed as a community amenity.	Property owners may not be aware of the costs associated with maintaining local SWM controls. Future property owners may resist potential bylaw requirement that compels them to operate and maintain their LID measures.
Socio-Economic Summary	Does not meet local or provincial planning standards for stormwater treatment for future development.	Wet pond can be designed as a community amenity. This option reduces available development area.	This option reduces available development area to a lesser extent than Alternative 2. Onsite SWM controls are the responsibility of future property owners.
Natural Environment			
Aquatic Resources	Untreated runoff from proposed development discharges directly into Medway Creek, which could have negative impact on aquatic habitats.	The regional pond mitigates erosion, temperature and water quality impacts of runoff from proposed development on aquatic life and habitat within the tributary to Medway Creek. Prior to construction of the outlet, a review should be undertaken to confirm the presence/absence of aquatic SAR identified through the background review.	Local SWM controls provide at-source mitigation for erosion, temperature and water quality impacts of runoff from proposed development on aquatic life and habitat within the tributary to Medway Creek. Prior to construction of any proposed outlet, a review should be undertaken to confirm the presence/absence of aquatic SAR identified through the background review.
Terrestrial Resources	No significant terrestrial impacts anticipated.	No significant terrestrial impacts anticipated, as the SWMF should be	No significant terrestrial impacts anticipated as SWM controls should

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Regional SWM Facility	Alternative 3 – Local SWM Controls
		designed outside of significant features. Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources, including SAR.	be located outside of significant features. Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources, including SAR.
Hydrogeological	Proposed development reduces local annual infiltration volume which may negatively impact aquifers.	Proposed development reduces local annual infiltration volume.	Local SWM controls mitigate impact of proposed development on local annual infiltration volume and potential groundwater contamination from stormwater infiltration.
Drinking Water Source Protection	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.
Natural Summary	Potential negative impact to natural heritage features from untreated stormwater runoff.	This option mitigates potential impacts to aquatic resources from development. The alternative provides less opportunity for infiltration than Alternative 3.	This option mitigates potential impacts to aquatic resources from development and allows for greater infiltration over Alternative 2.
Technical			
Constructability	No constructability issues as no stormwater works are constructed.	No constructability issues related to high groundwater are anticipated. Proposed storm sewer and culvert crossings may require temporary closure of Medway Road.	No constructability issues related to high groundwater are anticipated. LID measures need to be protected from sediment during construction. This option eliminates the need to cross Medway Road.
Operation and Maintenance	N/A	The regional pond will require ongoing monitoring and	Operation and maintenance of privately-owned LID measures will

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Regional SWM Facility	Alternative 3 – Local SWM Controls
		maintenance by MOMC in accordance with the conditions of the corresponding ECA. Intermittent cleanouts of the pond forebay will be required, likely approximately on a 10-year basis.	be the responsibility of the owner. A bylaw may be required to compel owners to operate and maintain their LID measures. MOMC will be responsible for operating and maintaining any SWM measures located on public lands.
Approvals and Regulatory Requirements	Does not meet MOMC stormwater design standards or the requirements of the OWRA.	An MECP ECA will be required for the proposed regional SWM pond. The MECP may require water balance mitigation measures in the proposed subdivision/site design. UTRCA approval will be required for the proposed pond outlet.	MECP ECAs will be required for any proposed SWM measures that treat the runoff from right-of-ways. Similarly, an ECA will be required for the private LIDs. UTRCA approval may be required for the proposed Medway Creek outlets.
Technical Summary	This alternative cannot be implemented as it does not meet the regulatory requirements.	This alternative can meet the SWM control requirements. Only one outlet to Medway Creek is required, which may reduce permitting/approval requirements.	This alternative can meet the SWM control requirements. Two outlets to Medway Creek are required, which may require additional regulatory approvals.
Economic			
Capital Construction Cost	N/A	Estimated capital cost for proposed regional SWM pond = $720,000	Estimated capital cost for dry SWM ponds and pretreatment measures for right-of-way runoff = $300,000 Capital costs for private LID measures to be borne by the developer.
Operations and Maintenance Costs (Long Term)	N/A	Sediment cleanouts of the pond forebay will need to be budgeted as a capital expenditure.	Annual cleanouts of pretreatment measures to be included in annual catchbasin cleanout program and included in operations budget.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Regional SWM Facility	Alternative 3 – Local SWM Controls
		Forebay cleanout cost estimated at $50,000 every 10 years.	Bottoms of dry ponds will need to be periodically regraded to remove accumulated sediment. Cleanout cost estimated at $30,000 every 10 years.
Economic Summary	No associated costs.	This option has the highest capital and operation and maintenance costs of the evaluated options.	Private LID measures require substantial investment by developer. Capital costs of public owned portion of the proposed works is substantially lower than Alternative 2.

Table D-2: Evaluation of Alternative Solutions for Ballymote

Criteria	Alternative 1 – Do Nothing	Alternative 2 – On-Site SWM Controls	Alternative 3 – Replace Drain with Storm Sewer Located in Easement	Alternative 4 – Replace Drain with Storm Sewer Located in Medway Road
Socio-Economic/Cultural				
Impacts to existing and future land uses	Does not provide for future development on Medway Road since new homes cannot be constructed within municipal drain working easements.	Provides appropriate servicing for future development within the settlement area.	Proposed dry SWM pond slightly reduces developable area within settlement boundary by approximately 0.25 ha.	Proposed dry SWM pond slightly reduces developable area within settlement boundary by approximately 0.28 ha. Urban road cross section provided along proposed storm sewer alignment.
Built Cultural Heritage and Archaeological Resources	No impact to built cultural heritage or archaeological resources as no SWM controls are constructed.	Construction of on-site SWM controls is not anticipated to impact built cultural heritage resources but will be confirmed prior to detailed design and construction. An archaeological assessment will be required prior to construction. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate Planning Act applications for future developments.	Construction of SWMF is not anticipated to impact built cultural heritage resources but will be confirmed prior to detailed design and construction. An archaeological assessment will be required prior to construction of SWMF. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate Planning Act applications for future developments.	Construction of SWMF is not anticipated to impact built cultural heritage resources but will be confirmed prior to detailed design and construction. An archaeological assessment will be required prior to construction of SWMF. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate Planning Act applications for future developments.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – On-Site SWM Controls	Alternative 3 – Replace Drain with Storm Sewer Located in Easement	Alternative 4 – Replace Drain with Storm Sewer Located in Medway Road
Community Impacts	No community impacts are anticipated as no SWM controls will be constructed.	LID features limit private landscaping and yard amenities. Future property owners may resist potential bylaw requirement that compels them to operate and maintain their LID measures.	Construction of the proposed storm sewer in the existing easement would likely have less impact on traffic on Medway Road than Alternative 4. Requirement of easement on private property would have a greater impact on existing properties than Alternative 4.	Construction of the proposed storm sewer along Medway Road may disrupt travel and existing residences.
Socio-Economic Summary	Does not meet local and provincial planning standards for stormwater treatment for future development.	Future property owners responsible for LID features. LID features limit private landscaping and yard amenities.	Storm easement on private property will be required. This option impacts the available development area, however to a lesser extent than Alternative 4.	This option further reduces the development area when compared to Alternative 3.
Natural Environment				
Aquatic Resources	Untreated runoff from future development will move to municipal drains with no peak flow control.	On-site SWM controls mitigate temperature and water quality impacts on aquatic life and habitat.	SWMF mitigates temperature and water quality impacts of proposed development runoff on aquatic life and habitat.	SWMF mitigates temperature and water quality impacts of proposed development runoff on aquatic life and habitat.
Terrestrial Resources	No significant terrestrial impacts anticipated.	No significant terrestrial impacts anticipated, as the SWMF should be designed outside of significant features.	No significant terrestrial impacts anticipated, as the SWMF should be designed outside of significant features.	No significant terrestrial impacts anticipated, as the SWMF should be designed outside of significant features.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – On-Site SWM Controls	Alternative 3 – Replace Drain with Storm Sewer Located in Easement	Alternative 4 – Replace Drain with Storm Sewer Located in Medway Road
		Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources, including SAR.	Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources, including SAR.	Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources, including SAR.
Hydrogeological	Proposed development reduces local annual infiltration volume which may negatively impact water table levels.	On-site SWM controls mitigate impact of proposed development on local annual infiltration volume and potential groundwater contamination from stormwater infiltration.	Storm sewers mitigate impact of proposed development on local annual infiltration volume and potential groundwater contamination from stormwater infiltration.	Proposed development reduces local annual infiltration volume.
Drinking Water Source Protection	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.
Natural Summary	Untreated runoff discharges to the Ballymote East Drain which poses a potential risk for aquatic life and habitat.	Privately owned LID features will mitigate potential impacts on aquatic and terrestrial resources. Features will treat stormwater at source and helps reduce the risk of groundwater contamination.	Proposed SWM features will mitigate potential impacts on aquatic and terrestrial resources. Features will treat stormwater at source and helps reduce the risk of groundwater contamination.	Proposed SWM features will mitigate potential impacts on aquatic, terrestrial and hydrogeological resources.
Technical				
Constructability	No constructability issues are anticipated.	No constructability issues are anticipated.	No constructability issues are anticipated.	Providing sufficient cover over the proposed storm

Criteria	Alternative 1 – Do Nothing	Alternative 2 – On-Site SWM Controls	Alternative 3 – Replace Drain with Storm Sewer Located in Easement	Alternative 4 – Replace Drain with Storm Sewer Located in Medway Road
				sewer may prove challenging.
Performance	Higher peak flowrates are anticipated in the Ballymote East Drain, which may cause downstream flooding.	Proposed privately owned LID measures treat runoff from approximately 3.2 ha. Meets existing drainage servicing levels.	Proposed dry SWM pond treats runoff from approximately 8.6 ha. Meets existing drainage servicing levels.	Proposed dry SWM pond treats runoff from approximately 13.9 ha. Meets MOMC drainage design standards.
Operations and Maintenance	Existing operation and maintenance schedules will remain in effect.	Operation and maintenance of privately-owned LID measures will be the responsibility of the owner. A bylaw may be required to compel owners to operate and maintain their LID measures.	MOMC will be responsible for operating and maintaining proposed dry SWM pond, this includes annual inspections in accordance with the conditions of the corresponding ECA.	MOMC will be responsible for operating and maintaining proposed dry SWM pond, this includes annual inspections in accordance with the conditions of the corresponding ECA.
Approvals and Regulatory Requirements	Does not meet the requirements of the OWRA.	Municipal Drain realignments must be completed in accordance with the provisions of the Drainage Act. An MECP ECA may be required for LID measures.	Municipal Drain realignments must be completed in accordance with the provisions of the Drainage Act. An MECP ECA will be required for the proposed dry SWM pond and storm sewer.	Municipal Drain realignments must be completed in accordance with the provisions of the Drainage Act. An MECP ECA will be required for the proposed dry SWM pond and storm sewer.
Technical Summary	This alternative cannot be implemented as it does not meet the	This alternative meets the SWM control requirements and meets the existing drainage	This alternative meets the SWM control requirements and improves drainage servicing in the southeast	This alternative meets the SWM control requirements and provides drainage

Criteria	Alternative 1 – Do Nothing	Alternative 2 – On-Site SWM Controls	Alternative 3 – Replace Drain with Storm Sewer Located in Easement	Alternative 4 – Replace Drain with Storm Sewer Located in Medway Road
	regulatory requirements.	servicing levels in Ballymote. This alternative best mitigates the effects of development on water balance.	portion of Ballymote. The shallow depth of the Ballymote East Drain results in a relatively large dry SWM pond footprint.	servicing consistent with MOMC standards. The shallow depth of the Ballymote East Drain results in a relatively large dry SWM pond footprint. Due to limited pipe cover, proposed storm sewer will likely need to be insulated.
Economic				
Capital Construction Cost	No SWM measures.	Estimated capital costs for proposed Municipal Drain realignments = $40,000	Estimated capital costs for proposed Municipal Drain realignments, storm sewer, and dry SWM pond = $210,000	Estimated capital costs for proposed Municipal Drain realignments, storm sewer, and dry SWM pond = $270,000 (does not include costs for urban road cross section)
Operations and Maintenance Costs (Long Term)	No significant anticipated operations or maintenance costs.	No significant anticipated operations or maintenance costs.	Bottom of dry pond will need to be periodically regraded to remove accumulated sediment. Cleanout cost estimated at $20,000 every 10 years.	Bottom of dry pond will need to be periodically regraded to remove accumulated sediment. Cleanout cost estimated at $20,000 every 10 years.
Economic Summary	No associated costs.	All costs associated with drain realignment and on-site SWM controls to be borne by developer.	Costs associated with drain realignments to be borne by developer. Costs associated with proposed storm sewer and dry SWM pond to be borne	This alternative has the highest capital costs. Costs associated with drain realignments to be borne by developer.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – On-Site SWM Controls	Alternative 3 – Replace Drain with Storm Sewer Located in Easement	Alternative 4 – Replace Drain with Storm Sewer Located in Medway Road
			by MOMC through development charges.	Costs associated with proposed storm sewer and dry SWM pond to be borne by MOMC through development charges.

Table D-3: Evaluation of Alternative Solutions for Ilderton Drain No.2

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Drain Improvements	Alternative 2 – SWM Pond	Alternative 4 – SWM Pond and Downstream Sewer Improvements
Socio-Economic				
Impacts to existing and future land uses	MOMC continues to require permission from property owners to access municipal drains. Property owners may experience flooding associated with blocked and/or insufficient drains.	Temporary impacts to Hyde Park Road residents during upgrades to the Van Bussell Agreement drain and construction of proposed storm sewer (work subsequently completed). Allows urbanization of Hyde Park Road right-of-way.	Land for proposed dry SWM pond must be acquired. Temporary impacts to Hyde Park Road residents during construction of SWM1 and proposed storm sewer. Allows urbanization of Hyde Park Road right-of-way.	Land for proposed dry SWM pond must be acquired. Temporary impacts to Meadow Creek Subdivision residents during construction of storm sewer improvements. Temporary impacts to Hyde Park Road residents during construction of SWM1 and proposed storm sewer. Allows urbanization of Hyde Park Road right-of-way.
Built Cultural Heritage and Archaeological Resources	No impact to cultural heritage or archaeological resources anticipated.	No impacts to cultural heritage or archaeological resources are anticipated. If potential resources are identified, they should be avoided. A Cultural Heritage Resource and Archaeological Assessment may be conducted during planning of the specific facility to further define resource potential.	No impact to cultural heritage or archaeological resources are anticipated. If potential resources are identified, they should be avoided. A Cultural Heritage Resource and Archaeological Assessment may be conducted during planning of the specific facility to further define resource potential.	No impact to cultural heritage or archaeological resources are anticipated. If potential resources are identified, they should be avoided. A Cultural Heritage Resource and Archaeological Assessment may be conducted during planning of the specific facility to further define resource potential.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Drain Improvements	Alternative 2 – SWM Pond	Alternative 4 – SWM Pond and Downstream Sewer Improvements
Community Impacts	Potential flooding associated with blocked municipal drains may pose a threat to public safety.	Existing residents along Hyde Park Road will experience temporary disruptions including access, noise, etc. Reduced flood risk improves public safety.	Existing residents along Hyde Park Road will experience temporary disruptions including access, noise, etc. Reduced flood risk improves public safety.	Existing residents in the Meadow Creek subdivision and along Hyde Park Road will experience temporary disruptions including access, noise, etc. Reduced flood risk improves public safety.
Socio-Economic Summary	Properties located near Hyde Park are at risk of occasional but severe flooding.	This alternative reduces flood risk near Hyde Park low point.	Alternative requires some disruption to existing land uses but less so than Alternative 4. This alternative further reduces the flood risk at Hyde Park low point when compared to Alternative 2.	This alternative requires the most disruption of existing land uses. Lowest flood risk at Hyde Park low point.
Aquatic Resources	No significant impacts on aquatic resources.	Increased conveyance along Hyde Park Road mitigates potential impacts of flooding on water quality. The existing SWM pond continues to provide treatment to reduce temperature and quality impacts on aquatic resources.	Proposed catchbasin and dry pond provide treatment and mitigate changes to water quality and temperature which may impact aquatic resources.	Proposed SWMF provide treatment and mitigate changes to water quality and temperature which may impact aquatic resources. Increased conveyance capacity will mitigate flooding and associated water quality impacts on aquatic wildlife and habitat.
Terrestrial Resources	No significant impacts on terrestrial resources.	Two trees must be removed for Van Bussell	Loss of trees within proposed SWM1 footprint.	Loss of trees within proposed SWM1 footprint.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Drain Improvements	Alternative 2 – SWM Pond	Alternative 4 – SWM Pond and Downstream Sewer Improvements
		Agreement Drain replacement. Can be undertaken outside of breeding bird window (subsequently completed).	Can be undertaken outside of breeding bird window.	Can be undertaken outside of breeding bird window.
Hydrogeological	No significant hydrogeological impacts anticipated.	No significant hydrogeological impacts anticipated.	No significant hydrogeological impacts anticipated.	No significant hydrogeological impacts anticipated.
Drinking Water Source Protection	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.
Natural Summary	This has minimal impacts to natural and aquatic habitats.	This option has lower potential to negatively impact terrestrial resources than Alternatives 3 or 4. However, the solution does not provide additional opportunities for treatment of runoff.	Loss of trees within proposed SWM1 footprint. Proposed pond provides additional stormwater treatment to protect downstream aquatic life and habitat.	Loss of trees within proposed SWM1 footprint. Proposed pond provides additional stormwater treatment to protect downstream aquatic life and habitat.
Technical				
Constructability	No constructability issues are anticipated.	Requires work in rear yards, so construction footprint must be minimized to reduce impacts on residents.	Requires work in rear yards, so construction footprint must be minimized to reduce impacts on residents.	Requires work in rear yards, so construction footprint must be minimized to reduce impacts on residents. Replacement of Meadow Creek Subdivision SWM outfall may require partial pond dewatering.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Drain Improvements	Alternative 2 – SWM Pond	Alternative 4 – SWM Pond and Downstream Sewer Improvements
				Storm PDCs to be constructed to property lines.
Performance	The Hyde Park Road low point continues to flood during frequent storm events.	Flooding occurs at the Hyde Park Road low point during storms more severe than the 2-year event.	Flooding occurs at the Hyde Park Road low point during storms more severe than the 25-year event. Minor storm system is provided on Hyde Park Road in accordance with MOMC standards.	Flooding occurs at the Hyde Park Road low point during storms more severe than the 100-year event. Minor storm system is provided on Hyde Park Road in accordance with MOMC standards. Storm PDCs provided along Meadow Creek Subdivision storm sewer improvements.
Operation and Maintenance	Existing Van Bussell Agreement Drain is prone to sediment accumulation. Access to existing rear yard municipal drains is impeded by fencing and landscaping.	Improved Van Bussell Agreement Drain will likely require occasional flushing to remove accumulated sediment. Access to existing rear yard municipal drains is impeded by fencing and landscaping.	MOMC will be responsible for operating and maintaining the proposed SWM measures. This includes annual cleaning of pretreatment measures and annual inspection of the proposed dry SWM pond in accordance with the conditions of the corresponding ECA.	Addresses pavement deterioration concerns in a portion of the Meadow Creek Subdivision. MOMC will be responsible for operating and maintaining the proposed SWM measures. This includes annual cleaning of pretreatment measures and annual inspection of the proposed dry SWM pond in accordance with the conditions of the corresponding ECA.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Drain Improvements	Alternative 2 – SWM Pond	Alternative 4 – SWM Pond and Downstream Sewer Improvements
Approvals and Regulatory Requirements	Does not meet MOMC stormwater design standards.	Improvements to Van Bussell Agreement Drain to be completed in accordance with the requirements of the *Drainage Act* (work subsequently completed.).	Municipal drain abandonment to be completed in accordance with the requirements of the *Drainage Act*. An MECP ECA will be required for the proposed dry SWM pond and the proposed Hyde Park Road storm sewers.	Municipal drain abandonment to be completed in accordance with the requirements of the Drainage Act. An MECP ECA will be required for the proposed dry SWM pond, the Meadow Creek Subdivision storm sewer improvements, and the proposed Hyde Park Road storm sewers.
Technical Summary	This alternative does not address the existing drainage concerns and does not provide a level of service consistent with the current MOMC design standards.	This alternative reduces the frequency of flooding at the Hyde Park Road low point but does not provide a level of service consistent with current MOMC design standards. Concerns with rear yard municipal drains and surface sump pump discharges are not addressed.	This alternative reduces the frequency of flooding at the Hyde Park Road low point more than Alternative 2 but does not provide a level of service consistent with current MOMC design standards. The proposed Hyde Park Road trunk storm sewer diverts flows away from the existing municipal drain located southeast of the Hyde Park Road/Ilderton Road intersection.	This alternative provides level of service on Hyde Park Road consistent with current MOMC design standards. The proposed Hyde Park Road trunk storm sewer diverts flows away from the existing municipal drain located southeast of the Hyde Park Road/Ilderton Road intersection. The proposed storm PDCs should mitigate some of the problems caused by surface sump pump

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Drain Improvements	Alternative 2 – SWM Pond	Alternative 4 – SWM Pond and Downstream Sewer Improvements
				discharges in the Meadow Creek Subdivision.
Economic				
Capital Construction Cost	N/A	Estimated capital cost for proposed Van Bussell Agreement Drain improvements = $100,000 (work subsequently completed).	Estimated capital cost for proposed Hyde Park Road storm sewer, and SWM1 = $800,000.	Estimated capital cost for proposed Hyde Park Road storm sewer, Meadow Creek Subdivision storm sewer improvements, and SWM1 = $1,600,000.
Operations and Maintenance Costs (Long Term)	Cleaning and periodic repairs to Van Bussell Agreement Drain assumed to be $5,000 annually.	Periodic cleaning of Van Bussell Agreement Drain assumed to be $5,000 every 5 years.	Annual cleanouts of Hyde Park Road pretreatment measures to be included in annual catchbasin cleanout program and included in operations budget. Bottom of SWM1 will need to be periodically regraded to remove accumulated sediment. Cleanout cost estimated at $40,000 every 35 years.	Annual cleanouts of Hyde Park Road pretreatment measures to be included in annual catchbasin cleanout program and included in operations budget. Bottom of SWM1 will need to be periodically regraded to remove accumulated sediment. Cleanout cost estimated at $40,000 every 35 years.
Economic Summary	While there are no capital costs associated with this option, the condition of the Van Bussell Agreement Drain is deteriorated and requires frequent maintenance, with	The improved Van Bussell Agreement Drain should be less prone to debris and sediment accumulation than the existing drain, thus the anticipated operations and maintenance costs are lower than Alternative 1.	This alternative has higher capital and maintenance costs than Alternative 1 or 2. However, it requires less maintenance, although cleanout costs are slightly higher when compared to Alternative 2.	This option has the highest capital costs.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Drain Improvements	Alternative 2 – SWM Pond	Alternative 4 – SWM Pond and Downstream Sewer Improvements
	significant associated costs. However, this is the least costly option.			

Table D-10: Evaluation of Alternative Solutions for the Kilworth East Area

Criteria	Alternative 1 – Do Nothing	Alternative 2 – SWM Strategy per Glendon Drive EA	Alternative 3 – Grassed Ditches to Provide Treatment
Socio-Economic			
Impacts to existing and future land uses	Occasional nuisance flooding due to debris accumulation at driveway culverts is anticipated.	Occasional nuisance flooding due to debris accumulation at driveway culverts is anticipated. Some moderate impacts on landscaping within the right-of-way are anticipated.	Perceived loss of private property due to ditch widening. Significant impacts on landscaping within the right-of-ways. Proposed grassed ditches will require mowing by landowners. Property access disruptions during construction due to driveway culvert replacement.
Built Cultural Heritage and Archaeological Resources	No impact to cultural heritage or archaeological resources is anticipated.	A Stage 1 archaeological Assessment was conducted as part of the Glendon Drive EA. The report should be reviewed, and for disruption to areas identified as maintaining archaeological potential, the recommended Stage 2 investigations shall be completed.	No impact to cultural heritage or archaeological resources is anticipated. A Cultural Heritage Resource and Archaeological Assessment may be conducted during planning of the specific facility to further define resource potential.
Community Impacts	Limited community impacts, which include occasional nuisance ponding	Limited community impacts, which include occasional nuisance ponding	Significant disruption to the community and property owners (access, noise, etc.) during construction. Landowners will also be required to mow grassed ditches.
Socio-Economic Summary	Occasional nuisance flooding due to debris accumulation at driveway culverts is anticipated.	Occasional nuisance flooding due to debris accumulation at driveway culverts is anticipated.	Significant impacts to existing land uses are anticipated.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – SWM Strategy per Glendon Drive EA	Alternative 3 – Grassed Ditches to Provide Treatment
		This option has significantly fewer impacts on private properties than Alternative 3.	
Natural Environment			
Aquatic Resources	The proposed Glendon Drive improvements discharge untreated stormwater to the Thames River which may harm aquatic life and habitat.	The proposed enhanced grassed swale mitigates the effects of the Glendon Drive runoff on aquatic life and habitat downstream.	The proposed enhanced grassed swale mitigates the effects of the Glendon Drive runoff on aquatic life and habitat. Grassed ditches would provide additional treatment of stormwater, with less impact on aquatic habitats.
Terrestrial Resources	No anticipated terrestrial resource impacts.	Edge impacts are anticipated on the Komoka provincial Park ANSI located on the north side of Glendon Drive. Site assessments should be conducted to delineate the extent of significant environmental features and provide specific mitigation measures.	Edge impacts are anticipated on the Komoka provincial Park ANSI located on the north side of Glendon Drive. Site assessments should be conducted to delineate the extent of significant environmental features and provide specific mitigation measures. Ditch improvements may have significant impacts to street trees. Can be undertaken outside of breeding bird window.
Hydrogeological	No significant hydrogeological impacts anticipated.	No significant hydrogeological impacts anticipated.	No significant hydrogeological impacts anticipated.
Drinking Water Source Protection	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – SWM Strategy per Glendon Drive EA	Alternative 3 – Grassed Ditches to Provide Treatment
Natural Summary	Untreated runoff from the proposed Glendon Drive improvements discharges into the Thames River, with potential impacts on aquatic habitats..	Mitigates the impacts of runoff from Glendon Drive on aquatic life and habitat.	Mitigates the impacts of runoff from Glendon Drive on aquatic life and habitat.
Technical			
Performance	Runoff from proposed Glendon Drive improvements is not treated in accordance with the SWM design criteria.	Runoff from proposed Glendon Drive improvements is treated in accordance with the SWM design criteria.	Runoff from proposed Glendon Drive improvements is treated in accordance with the SWM design criteria. Approximately 200 m of new grassed ditches will provide additional water quality treatment to the drainage area runoff.
Constructability	No SWM facilities will be constructed.	Construction associated with Glendon Drive Streetscape improvements.	Relocation of existing fire hydrants and hydro poles required to widen Kilworth Subdivision Roadside ditches.
Approvals and Regulatory Requirements	Does not meet MOMC stormwater design standards or the requirements of the OWRA.	An MECP ECA will be required for the proposed Glendon Drive enhanced grassed swale.	An MECP ECA will be required for the proposed Glendon Drive enhanced grassed swale.
Operation and Maintenance	Existing concrete lined ditches require frequent removal of accumulated debris at driveway culverts.	Existing concrete lined ditches require frequent removal of accumulated debris at driveway culverts. Proposed Glendon Drive enhanced grassed swale and pretreatment measures will require periodic regrading.	Proposed Glendon Drive enhanced grassed swale and pretreatment measures will require periodic regrading. Proposed replacement driveway culverts should reduce the frequency of debris accumulation.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – SWM Strategy per Glendon Drive EA	Alternative 3 – Grassed Ditches to Provide Treatment
Technical Summary	Does not meet MOMC stormwater design standards or the requirements of the OWRA.	Runoff can be treated in accordance with the SWM design criteria.	Runoff can be treated in accordance with the SWM design criteria. Grassed ditches will provide additional water quality treatment to the drainage area runoff.
Economic			
Capital Construction Cost	No SWM facilities will be constructed.	Moderate capital costs anticipated.	Significant capital cost associated with utility relocation and removal of concrete ditches.
Operations and Maintenance Costs (Long Term)	No additional costs related to operation and maintenance are anticipated.	Debris removal and periodic regrading are anticipated to result in high operation and maintenance costs.	This option is anticipated to have lower operations and maintenance costs than Alternative 2.
Economic Summary	Ongoing operation and maintenance costs related to concrete channel debris removal and repairs.	Capital costs included in the Glendon Drive Streetscape improvements.	This option has significantly higher capital costs as compared to Alternative 2.

Table D-5: Evaluation of Alternative Solutions for Komoka Drain No. 1

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Pond Location 4 with Thames River Outlet	Alternative 3 – Pond Location 1 Komoka Road Outlet	Alternative 4 – Pond Location 1 with Municipal Drain Outlet	Alternative 5 – Pond Location Location 6 with Thames River Outlet	Alternative 6 – Combine Alternatives 3 and 5
Socio-Economic						
Impacts to existing and future land uses	Runoff continues to discharge into existing pond network. Property owners identified significant concerns with water levels in private ponds, which is currently not well controlled.	Existing pond at SWM1 location is privately owned and would need to be acquired by municipality. Proposed pond provides potential outlet for future development on lands east of Komoka Road. Significant Landowner concerns with flows into the pond impacting water levels, water quality, and ultimately future development of the lands (currently "deferred" within Official Plan).	Existing pond at SWM1 location is privately owned and would need to be acquired by municipality. Development concept proposed for the adjacent lands, but pond will not have a significant impact on development concept and can be designed as a community amenity. Property owner concerns with impacts to water levels can be mitigated by establishing permanent berm between proposed SWM pond and existing pond directly to the south.	Existing pond at SWM1 location is privately owned and would need to be acquired by municipality. Development concept proposed for the adjacent lands, but pond will not have a significant impact on development concept and can be designed as a community amenity. Proposed culverts limit existing downstream private pond water level fluctuations. Downstream private pond owners have noted concerns with impacts to the quality and quantity of stormwater entering their ponds. Gravel extraction is ongoing downstream, and additional runoff from SWM1 could interfere with mining operations.	Proposed outfall to Provincial Park pond may affect park use near western pond limit. Proposed outfall would require culverts to cross the existing natural gas pipeline easement. Adjacent property owner has significant concerns about the impacts of water levels on his adjacent pond, but can be mitigated through outlet improvements and maintaining an appropriate berm between the ponds. Approval under the Provincial Parks and Conservation Reserves Class EA is required, as well as the registration of an easement (land disposition) required for the stormwater outlet from Infrastructure Ontario (to allow for maintenance by the Municipality).	Private pond must be acquired by MOMC. Outlet agreement must be negotiated with Ontario Parks. Property owner concerns with impacts to water levels can be mitigated by establishing permanent berm between proposed SWM pond and existing pond directly to the south. Approval under the Provincial Parks and Conservation Reserves Class EA is required, as well as the registration of an easement (land disposition) required for the stormwater outlet from Infrastructure Ontario (to allow for maintenance by the Municipality).
Built Cultural Heritage and Archaeological Resources	No impact to cultural heritage or archaeological resources is anticipated.	Construction of SWMF is not anticipated to impact built cultural heritage resources. An archaeological assessment will be required to confirm presence of archaeological potential within working areas. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate	Construction of SWMF is not anticipated to impact built cultural heritage resources. An archaeological assessment will be required to confirm presence of archaeological potential within working areas. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate	Construction of SWMF is not anticipated to impact built cultural heritage resources. An archaeological assessment will be required to confirm presence of archaeological potential within working areas. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate	Construction of SWMF is not anticipated to impact built cultural heritage resources. An archaeological assessment will be required to confirm presence of archaeological potential within working areas. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate Planning Act applications for future developments.	Construction of SWMF is not anticipated to impact built cultural heritage resources. An archaeological assessment will be required to confirm presence of archaeological potential within working areas. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Pond Location 4 with Thames River Outlet	Alternative 3 – Pond Location 1 Komoka Road Outlet	Alternative 4 – Pond Location 1 with Municipal Drain Outlet	Alternative 5 – Pond Location Location 6 with Thames River Outlet	Alternative 6 – Combine Alternatives 3 and 5
		Planning Act applications for future developments.	Planning Act applications for future developments.	Planning Act applications for future developments.		Planning Act applications for future developments.
Community Impacts	Issues with water levels and quality in private ponds continue to cause concern for property owners.	SWMF must be designed in order to mitigate the risk of drowning and other hazards to public safety. Significant property owner concerns with respect to use of private pond.	SWMF must be designed in order to mitigate the risk of drowning and other hazards to public safety. Pond can be designed as a community amenity. No significant concerns from property owner.	SWMF must be designed in order to mitigate the risk of drowning and other hazards to public safety. Property owner concerns with regard to water levels of pond, but concerns would be mitigated through better controlling water levels with proposed culverts.	SWMF must be designed in order to mitigate the risk of drowning and other hazards to public safety. Adjacent property owner has significant concerns about the impacts of water levels on his adjacent pond, but can be mitigated through outlet improvements and establishing an appropriate berm between the ponds.	SWMF must be designed in order to mitigate the risk of drowning and other hazards to public safety. Adjacent property owner has significant concerns about the impacts of water levels on his adjacent pond, but can be mitigated through outlet improvements and establishing an appropriate berm between the ponds.
Socio-Economic Summary	Stormwater continues to discharge to private ponds, and property owner concerns are not addressed.	Significant concerns from property owner with respect to potential impacts on private property.	No significant concerns from property owner, and proposed pond can be designed as a community amenity.	Property owner concerns with regard to water levels of pond can be mitigated through better controlling water levels with proposed culverts.	Concerns from adjacent property owners can be mitigated through outlet improvements and maintaining berm between ponds.	No significant concerns from property owner of existing pond (SWM 1), concerns from adjacent property owners can be mitigated through outlet improvements and maintaining berm between ponds.
Aquatic Resources	Stormwater continues to discharge to private ponds, with potential impacts aquatic life.	Onsite controls and the proposed SWM pond mitigate potential impacts by providing treatment to protect aquatic life and habitat.	Onsite controls and the proposed SWM pond mitigate potential impacts by providing treatment to protect aquatic life and habitat. Outlet to Thames River to be designed to minimize impacts of erosion/sedimentation on downstream habitats.	Onsite controls and the proposed SWM pond mitigate potential impacts by providing treatment to protect aquatic life and habitat. Potential disruption to aquatic life is possible during culvert construction.	Onsite controls and the proposed upstream treatment train mitigate potential impacts to protect aquatic life and habitat.	Onsite controls and the proposed SWM pond mitigate potential impacts to provide treatment to protect aquatic life and habitat.
Terrestrial Resources	No significant impacts to terrestrial resources.	No impacts to significant terrestrial resources. Impacts restricted to along the road right of way and can be mitigated through construction best practices.	Some impacts to vegetation along Komoka Road and impacts associated with construction of outlet to Thames River. Site specific surveys to be conducted prior to design and construction.	No impacts to significant terrestrial resources, Impacts restricted to along the road right of way and can be mitigated through construction best practices.	No anticipated impacts to significant terrestrial resources. Impacts generally restricted to along the road right of way and can be mitigated through construction best practices. Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources,	No anticipated impacts to significant terrestrial resources. Impacts generally restricted to along the road right of way and can be mitigated through construction best practices. Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Pond Location 4 with Thames River Outlet	Alternative 3 – Pond Location 1 Komoka Road Outlet	Alternative 4 – Pond Location 1 with Municipal Drain Outlet	Alternative 5 – Pond Location Location 6 with Thames River Outlet	Alternative 6 – Combine Alternatives 3 and 5
					including SAR, specifically associated with construction activities within the Provincial Park land, including the sewer and associated outlet from Komoka Road.	presence/absence of significant habitats and resources, including SAR, specifically associated with construction activities within the Provincial Park land, including the sewer and associated outlet from Komoka Road.
Hydrogeological	No significant hydrogeological impacts are anticipated.	Dewatering SWM1 for operation and maintenance may negatively impact water table levels. Onsite controls can mitigate potential impacts of untreated stormwater infiltration on groundwater quality. Onsite controls may also mitigate impacts of development on annual infiltration volumes.	Dewatering SWM1 for operation and maintenance may negatively impact water table levels. Onsite controls can mitigate potential impacts of untreated stormwater infiltration on groundwater quality. Onsite controls may also mitigate impacts of development on annual infiltration volumes.	Dewatering SWM1 for operation and maintenance may negatively impact water table levels. Onsite controls can mitigate potential impacts of untreated stormwater infiltration on groundwater quality. Onsite controls may also mitigate impacts of development on annual infiltration volumes.	Dewatering SWM1 for operation and maintenance may impact negatively water table levels. Onsite controls can mitigate potential impacts of untreated stormwater infiltration on groundwater quality. Onsite controls may also mitigate impacts of development on annual infiltration volumes.	Dewatering SWM1 for operation and maintenance may negatively impact water table levels temporarily. Onsite controls can mitigate potential impacts of untreated stormwater infiltration on groundwater quality. Onsite controls may also mitigate impacts of development on annual infiltration volumes.
Drinking Water Source Protection	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.
Natural Summary	Untreated stormwater continues to discharge to private pond and negatively impact water quality and aquatic resources.	Proposed strategy provides treatment to protect downstream aquatic life and habitat as well as groundwater resources.	Proposed strategy provides treatment to protect downstream aquatic life and habitat as well as groundwater resources.	Proposed strategy provides treatment to protect downstream aquatic life and habitat as well as groundwater resources.	Proposed strategy provides treatment to protect downstream aquatic life and habitat as well as groundwater resources.	Proposed strategy provides treatment to protect downstream aquatic life and habitat as well as groundwater resources.
Operation and Maintenance	Sediment will gradually accumulate at the existing outfalls.	Periodic removal of accumulated sediment from SWM1 is required. Dewatering SWM1 for operation and maintenance may not be feasible. The Komoka Provincial Park pond outlet has been previously blocked by beaver activity. Ongoing monitoring and maintenance will be required. Maintenance agreement required for MOMC to maintain pond outlet.	Periodic removal of accumulated sediment from SWM1 is required. Dewatering SWM1 for operation and maintenance may not be feasible.	Periodic removal of accumulated sediment from SWM1 is required. Dewatering SWM1 for operation and maintenance may not be feasible. Proposed culverts will require periodic inspection to verify that they are not blocked by debris.	Annual cleaning of pretreatment measures required to remove accumulated sediment. The Komoka Provincial Park pond outlet has been previously blocked by beaver activity. Ongoing monitoring and maintenance will be required. Maintenance agreement required for MOMC to maintain pond outlet.	Periodic removal of accumulated sediment from SWM1 is required. Dewatering SWM1 for operation and maintenance may not be feasible. The Komoka Provincial Park pond outlet has been previously blocked by beaver activity. Ongoing monitoring and maintenance will be required.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Pond Location 4 with Thames River Outlet	Alternative 3 – Pond Location 1 Komoka Road Outlet	Alternative 4 – Pond Location 1 with Municipal Drain Outlet	Alternative 5 – Pond Location Location 6 with Thames River Outlet	Alternative 6 – Combine Alternatives 3 and 5
						Maintenance agreement required for MOMC to maintain pond outlet.
Constructability	Inverts of proposed Glendon Drive storm sewers are affected by existing municipal drain invert elevations.	Pond location is outside of Settlement Area. Requires significant conveyance infrastructure on Komoka Road for untreated flows from both existing and future development. Anticipate challenges dewatering existing pond for SWM1 construction.	Requires conveyance infrastructure on Komoka Road for treated flows from both existing and future development. The proposed Komoka Road infrastructure needs to provide less capacity than Alternative 2 because the peak flows are attenuated by SWM1. Potential conflicts with proposed outlet pipe and existing natural gas pipeline. Anticipate challenges dewatering existing pond for SWM1 construction.	Access challenges are anticipated for both culvert and Thames River outfall construction. Potential conflicts with proposed culvert and existing natural gas pipeline. Anticipate challenges dewatering existing pond for SWM1 construction.	Pond location is outside of Settlement Area. Requires significant conveyance infrastructure on Komoka Road for treated flows from both existing and future development.	Requires significant conveyance infrastructure on Komoka Road for treated flows from both existing and future development. Potential conflicts with proposed culvert and existing natural gas pipeline.
Approvals and Regulatory Requirements	Does not meet Ontario Water Resources Act for the provision of stormwater servicing.	SWM1 discharges to the neighboring Komoka Provincial Park pond. Approval under the Provincial Parks and Conservation Reserves Class EA may be required, as well as the registration of an easement (land disposition) required for the stormwater outlet from Infrastructure Ontario (to allow for maintenance of the outlet by the Municipality). An MECP ECA will be required for the proposed regional SWM pond. The MECP may require water balance mitigation measures in the proposed Glendon Drive design.	Proposed pipe must cross pipeline easement, which may require a crossing agreement. New outfall to Thames River requires UTRCA approval. An MECP ECA will be required for the proposed regional SWM pond. The MECP may require water balance mitigation measures in the proposed Glendon Drive design.	May require approval for new outlet to Thames River. Proposed culvert outlets obtained in accordance with the *Drainage Act*. Proposed culvert must cross pipeline easement, and a crossing easement may be required. New outfall to Thames River requires UTRCA approval. An MECP ECA will be required for the proposed regional SWM pond. The MECP may require water balance mitigation measures in the proposed Glendon Drive design.	SWM1 located in Komoka Provincial Park. Approval under the Provincial Parks and Conservation Reserves Class EA may be required, as well as the registration of an easement (land disposition) required for the stormwater outlet from Infrastructure Ontario (to allow for maintenance of the outlet by the Municipality). An MECP ECA will be required for the proposed water quality treatment measures. The MECP may require water balance mitigation measures in the proposed Glendon Drive design.	SWM1 located in Komoka Provincial Park. Approval under the Provincial Parks and Conservation Reserves Class EA may be required, as well as the registration of an easement (land disposition) required for the stormwater outlet from Infrastructure Ontario (to allow for maintenance of the outlet by the Municipality). Proposed pipe must cross pipeline easement, and a crossing easement may be required. An MECP ECA will be required for the proposed water quality treatment measures. The MECP may require water balance mitigation measures in the

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Pond Location 4 with Thames River Outlet	Alternative 3 – Pond Location 1 Komoka Road Outlet	Alternative 4 – Pond Location 1 with Municipal Drain Outlet	Alternative 5 – Pond Location Location 6 with Thames River Outlet	Alternative 6 – Combine Alternatives 3 and 5
						proposed Glendon Drive design.
Performance	Komoka Drain No. 1 and Tunks Drain were not designed to accommodate runoff from the proposed Glendon Drive storm sewer. Occasional Glendon Drive flooding is anticipated. Outlet may be potentially blocked by downstream landowner activities.	The proposed pond can meet the design water quality targets for the entire drainage area. Limited impact on Komoka Provincial Park pond water levels is anticipated.	The proposed pond can meet the design water quality targets for the entire drainage area.	The proposed pond can meet the design water quality targets for the entire drainage area. Proposed culverts will limit water level fluctuations in downstream private ponds. Proposed culverts mitigate risk of overflows from downstream private ponds to the trout ponds.	May temporarily raise water levels in neighboring pond, however, the anticipated increase is negligible and is unlikely to materially affect the current pond use.	The proposed pond can meet the design water quality targets for the entire drainage area. Anticipated impacts to pond levels are negligible.
Technical Summary	Frequent flooding anticipated in Glendon Drive right-of-way. This option does not meet MOMC stormwater design standards or the requirements of the OWRA.	This option requires significant drainage infrastructure construction on Komoka Road to convey untreated flows. This option utilizes the existing Thames River outlet.	This option requires less infrastructure on Komoka Road than Alternative 2. A new outlet to the Thames River is required.	This option minimizes the amount of infrastructure required to convey the treated stormwater flows to the Thames River.	Upstream at-source treatment is required. Significant drainage infrastructure must be constructed on Komoka Road to convey flows. Utilizes existing Thames River outlet.	This option reduces the infrastructure requirements on Komoka Road compared to Alternative 5. Utilizes the existing Thames River outlet.
Economic						
Capital Construction Cost	No capital costs as no SWM measures are constructed.	Capital cost anticipated to be moderately high.	Highest anticipated capital cost.	Lowest anticipated capital cost.	Capital cost anticipated to be moderately high.	Lower anticipated capital cost than Alternative 3.
Operations and Maintenance Costs (Long Term)	No significant anticipated operations or maintenance costs.	Sediment cleanouts of the pond forebay will need to be budgeted as a capital expenditure. Forebay cleanout cost estimated at $50,000 every 10 years.	Sediment cleanouts of the pond forebay will need to be budgeted as a capital expenditure. Forebay cleanout cost estimated at $50,000 every 10 years.	Sediment cleanouts of the pond forebay will need to be budgeted as a capital expenditure. Forebay cleanout cost estimated at $50,000 every 10 years. Proposed culvert maintenance funded in accordance with the Drainage Act.	Annual cleanouts of at-source treatment measures to be included in annual catchbasin cleanout program and included in operations budget.	Sediment cleanouts of the pond forebay will need to be budgeted as a capital expenditure. Forebay cleanout cost estimated at $50,000 every 10 years. Annual cleanouts of at-source treatment measures to be included in annual catchbasin cleanout program and included in operations budget.
Economic Summary	No associated costs.	Likely significant costs associated with required drainage infrastructure.	Highest anticipated capital cost of feasible evaluated alternatives.	Lowest anticipated capital cost of feasible evaluated alternatives.	Significant, ongoing operation and maintenance costs for at-source water quality treatment measures.	Lower anticipated capital cost than Alternative 3.

Table D-6: Evaluation of Alternative Solutions for Komoka Drain No. 3

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Service Only Proposed Development	Alternative 3 – Service Both Existing and Proposed Development
Socio-Economic			
Impacts to existing and future land uses	No stormwater controls are identified for future development lands in accordance with the OP.	Land area required for SWM facility, which reduces overall development area. Less area required than Alternative 3.	Proposed SWM1 footprint is larger than in Alternative 2, further reducing the future development area.
Built Cultural Heritage and Archaeological Resources	No impact to cultural heritage or archaeological resources is anticipated.	Construction of SWMF is not anticipated to impact built cultural heritage resources. An archaeological assessment will be required prior to construction of SWMF. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate Planning Act applications for future developments.	Construction of SWMF is not anticipated to impact built cultural heritage resources. An archaeological assessment will be required prior to construction of SWMF. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate Planning Act applications for future developments.
Community Impacts	Concerns relating to occasional flooding identified by property owners along Union Ave, but may be associated with maintenance/regular operations of the SWM controls.	SWMF must be designed in order to mitigate the risk of drowning and other hazards to public safety. No impact to existing property owner concerns.	SWMF must be designed in order to mitigate the risk of drowning and other hazards to public safety. Provides the opportunity to mitigate concerns identified by existing stormwater controls within existing development area.
Socio-Economic Summary	Occasional flooding of proposed development is anticipated.	SWMF requires less developable area than Alternative 3. Services only future development area.	SWMF requires more developable area.
Natural Environment			

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Service Only Proposed Development	Alternative 3 – Service Both Existing and Proposed Development
Aquatic Resources	Untreated stormwater discharges to Komoka Creek (coldwater fishery). However, approximately 850 m of existing vegetated open channel on the north side of Oxbow drive likely reduces the temperature and water quality effects of urban runoff on aquatic life and habitat.	SWM1 mitigates temperature and water quality impacts of proposed development runoff on aquatic life and habitat.	SWM1 mitigates temperature and water quality impacts of both proposed and existing development runoff on aquatic life and habitat.
Terrestrial Resources	Occasional flooding may impact terrestrial resources.	No significant terrestrial impacts anticipated, as the SWMF should be designed outside of significant features. Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources, including SAR.	No significant terrestrial impacts anticipated, as the SWMF should be designed outside of significant features. Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources, including SAR.
Hydrogeological	Proposed development reduces local annual infiltration volume which may negatively impact water table levels,	SWM1 mitigates impact of proposed development on local annual infiltration volume which may negatively impact water table levels. Untreated stormwater infiltration presents a potential risk for groundwater contamination.	SWM1 mitigates impact of proposed development on local annual infiltration volume which may negatively impact water table levels. Untreated stormwater infiltration presents a potential risk for groundwater contamination.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Service Only Proposed Development	Alternative 3 – Service Both Existing and Proposed Development
Drinking Water Source Protection	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.
Natural Summary	Untreated stormwater discharges to a sensitive cold-water stream. While the vegetated channel may reduce impacts on aquatic life and habitat, untreated stormwater could negatively impact terrestrial resources.	This option mitigates the impact of proposed development on aquatic and terrestrial resources, as well as infiltration and groundwater quality.	This option mitigates the impact of proposed development on aquatic and terrestrial resources, as well as infiltration and groundwater quality.
Technical			
Constructability	No SWM facility will be constructed.	The constructability of SWM1 is dependent on the local groundwater elevations.	The constructability of SWM1 is dependent on the local groundwater elevations.
Operations and Maintenance	No operations or maintenance will be required.	SWM1 will require ongoing monitoring and maintenance by MOMC in accordance with the conditions of the corresponding ECA. Annual cleaning of pretreatment measures is necessary to remove accumulated sediment.	SWM1 will require ongoing monitoring and maintenance by MOMC in accordance with the conditions of the corresponding ECA. Annual cleaning of pretreatment measures is necessary to remove accumulated sediment.
Approvals and Regulatory Requirements	Does not meet MOMC stormwater design standards or the requirements of the OWRA.	An MECP ECA will be required for the proposed regional SWM pond. The MECP may require water balance mitigation measures in the proposed subdivision/site design if SWM1 is not designed as an infiltration facility.	An MECP ECA will be required for the proposed regional SWM pond. The MECP may require water balance mitigation measures in the proposed subdivision/site design if SWM1 is not designed as an infiltration facility.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Service Only Proposed Development	Alternative 3 – Service Both Existing and Proposed Development
Performance	Occasional flooding is anticipated within the proposed development area.	SWM1 provides Enhanced water quality treatment and peak flow control to runoff for an approximately 23 ha drainage area.	SWM1 provides Enhanced water quality treatment and peak flow control to runoff for an approximately 72 ha drainage area.
Technical Summary	Does not meet the MOMC stormwater design standards or the OWRA requirements.	Feasibility of Alternative 2 is approximately equal to that of Alternative 3.	SWM1 will be sized to accommodate peak flows from future storm sewer improvements.
Economic			
Capital Construction Cost	No capital cost.	Estimated capital cost for proposed regional SWM pond is anticipated to be lower than Alternative 3.	Estimated capital cost for proposed regional SWM pond is anticipated to be higher than Alternative 2.
Operations and Maintenance Costs (Long Term)	No operations or maintenance costs.	Sediment cleanouts of the pond forebay will need to be budgeted as a capital expenditure. Forebay cleanout cost estimated at $50,000 every 10 years.	Sediment cleanouts of the pond forebay will need to be budgeted as a capital expenditure. Forebay cleanout cost estimated at $50,000 every 10 years.
Economic Summary	No associated costs.	Overall costs are anticipated to be lower than Alternative 3.	This option is anticipated to have the highest costs.

Table D-11: Evaluation of Alternative Solutions for the Melrose Area

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Relocate Drainage System
Socio-Economic		
Impacts to existing and future land uses	Future municipal drain maintenance may require fence and tree removal and may affect private landscaping.	Need to secure drainage easements for proposed storm sewer leads to rear yard catchbasins. Construction of storm sewer leads may require fence and tree removal and may affect private landscaping.
Built Cultural Heritage and Archaeological Resources	No impact to cultural heritage or archaeological resources is anticipated.	Construction of SWMF is not anticipated to impact built cultural heritage resources but will be confirmed prior to detailed design and construction. An archaeological assessment will be required prior to construction of SWMF to confirm archaeological potential. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate Planning Act applications for future developments.
Community Impacts	N/A	Requirement of easements on private property would have a greater impact on existing properties than Alternative 1. However, the proposed strategy is more convenient for property owners as less maintenance is required.
Socio-Economic Summary	This option is anticipated to have less impact on existing land use than Alternative 2.	This option is anticipated to have more impact on existing land use than Alternative 1.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Relocate Drainage System
Natural Environment		
Aquatic Resources	Existing SWM infrastructure mitigates temperature and water quality impacts of existing development runoff on aquatic life and habitat.	Existing SWM infrastructure mitigates temperature and water quality impacts of existing development runoff on aquatic life and habitat.
Terrestrial Resources	No significant impacts to terrestrial resources.	Tree removal may be required for potential rear yard storm leads and catchbasins.
Hydrogeological	No significant impacts anticipated.	No significant impacts anticipated.
Drinking Water Source Protection	No impacts to drinking water sources or source protection policies are anticipated.	Stormwater management facilities should be located outside of WHPAs to mitigate impacts to drinking water source protection.
Natural Summary	No impacts anticipated.	Some tree removal may be required.
Technical		
Operation and Maintenance	Access to rear yard municipal drains is impeded by fencing and landscaping.	Access to rear yard catchbasins and storm leads would be protected in drainage easements. New pipes should require less frequent maintenance than existing municipal drains.
Constructability	N/A	Requires some construction in right-of-ways to connect proposed storm leads.
Approvals and Regulatory Requirements	None anticipated.	Municipal drains to be abandoned in accordance with the *Drainage Act* as pipes are replaced with connections to the existing storm sewer system.
Performance	Nuisance flooding will continue in rear yards due to poor pipe condition.	Nuisance flooding in rear yards is mitigated.
Technical Summary	Access to rear yard municipal drains is impeded by fencing and landscaping. Nuisance flooding will continue in rear yards due to poor pipe condition.	Access to rear yard catchbasins and stormwater leads is protected in drainage easements. New pipes should require less frequent maintenance than existing municipal drains. Nuisance flooding is mitigated.
Economic		
Capital Construction Cost	N/A	Construction of approximately 850 m of new storm sewer, five connections to existing storm

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Relocate Drainage System
		sewers/municipal drains, and associated restoration.
Operations and Maintenance Costs (Long Term)	Maintenance and eventual replacement of approximately 715 m of deteriorated rear yard municipal drains.	Future operation and maintenance costs are anticipated to be lower due to reduced maintenance requirements.
Economic Summary	Significant anticipated operation and maintenance costs due to poor condition of existing municipal drains.	Moderate capital costs anticipated to install catchbasins and decommission existing pipes. Lower future operation and maintenance costs. This option is anticipated to cost less overall compared to Alternative 1.

Table D-8: Evaluation of Alternative Solutions for the Northeast Komoka Development Area

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Two SWM Facilities with Surface Water Outlet to Oxbow Creek	Alternative 3 – Two SWM Facilities
Socio-Economic			
Impacts to existing and future land uses	Untreated runoff from future development travels overland to Oxbow Creek.	SWM1/2 reduce available development area. Can be incorporated into the proposed development concept for the site. Easement required to convey flows east to Oxbow Creek across neighbouring property, for which there is no active development proposal. Potential challenges associated with securing easement. Provides the opportunity to incorporate proposed trail connection along sewer route as shown on Land Use Schedule A-2 of the Official Plan.	SWM1 and SWM2 reduce available development area (similar to Alternative 2).
Built Cultural Heritage and Archaeological Resources	No impact to cultural heritage or archaeological resources is anticipated as no SWMF will be built.	Construction of SWMFs is not anticipated to impact built cultural heritage resources but will be confirmed prior to detailed design and construction. An archaeological assessment will be required prior to construction of SWMFs. It is anticipated that appropriate cultural heritage assessments will	Construction of SWMFs is not anticipated to impact built cultural heritage resources but will be confirmed prior to detailed design and construction. An archaeological assessment will be required prior to construction of SWMFs. It is anticipated that appropriate cultural heritage assessments will

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Two SWM Facilities with Surface Water Outlet to Oxbow Creek	Alternative 3 – Two SWM Facilities
		be undertaken in accordance with the appropriate Planning Act applications for future developments.	be undertaken in accordance with the appropriate Planning Act applications for future developments.
Community Impacts	N/A	SWMFs must be designed in order to mitigate the risk of drowning and other hazards to public safety. Property owners will be required to operate and maintain LID features on their property. Provides opportunity to incorporate trail connection along sewer route as shown on Land Use Schedule A-2 of the Official Plan.	SWMFs must be designed in order to mitigate the risk of drowning and other hazards to public safety. Property owners will be required to operate and maintain LID features on their property.
Socio-Economic Summary	Does not meet provincial and local planning policy to provide stormwater treatment for future development land	Construction of sewer outlet required through private lands for which there is no active development application. Potential challenges in securing easement, but opportunity to incorporate trail connection as per Official Plan.	Less impact to private lands without the construction of outlet sewer to Oxbow Creek.
Natural Resources			
Aquatic Resources	Untreated runoff is discharged directly into Oxbow Creek. Temperature changes could have a negative impact on the sensitive, portions of the creek and cold-water aquatic species.	Proposed SWM infrastructure mitigates water quality and temperature impacts on aquatic life and habitat from proposed development.	Proposed SWM infrastructure mitigates water quality and temperature impacts on aquatic life and habitat from proposed development.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Two SWM Facilities with Surface Water Outlet to Oxbow Creek	Alternative 3 – Two SWM Facilities
Terrestrial Resources	Potential overland flows of untreated stormwater may impact terrestrial resources.	No significant terrestrial impacts anticipated, as the SWMF should be designed outside of significant features. Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources, including SAR.	No significant terrestrial impacts anticipated, as the SWMF should be designed outside of significant features. Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources, including SAR.
Hydrogeological	Risk of groundwater contamination from untreated runoff entering former quarry pond.	Proposed SWM infrastructure mitigates risk of groundwater contamination from untreated runoff entering former quarry pond. Significant monitoring may be required to confirm existing infiltration conditions of the site and existing pond.	Proposed SWM infrastructure mitigates risk of groundwater contamination from untreated runoff entering former quarry pond. Significant monitoring may be required to confirm existing infiltration conditions of the site and existing pond.
Drinking Water Source Protection	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.
Natural Summary	Untreated stormwater from the eastern portion of the development area discharges directly to Oxbow Creek.	SWMF mitigates temperature and water quality impacts of proposed development runoff on aquatic life and habitat.	SWMF mitigate temperature and water quality impacts of proposed development runoff on aquatic life and habitat.
Technical			
Performance	Uncertainty regarding long term water levels in former quarry pond. Stormwater discharges to Oxbow Creek without treatment.	Proposed pipe outlet from SWM2 limits the maximum design water levels.	Uncertainty regarding long term water levels/infiltration rates in SWM2.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Two SWM Facilities with Surface Water Outlet to Oxbow Creek	Alternative 3 – Two SWM Facilities
Constructability	N/A	Pond design is dependent on anticipated local groundwater levels. Construction of SWM2 outlet pipe requires deep excavation. Requires registration of easement/property acquisition for sewer outlet through private lands, which may impact construction timing for development application on western portion of the catchment.	Pond design is dependent on anticipated local groundwater levels and infiltration rates. Local building elevations dependent on maximum possible water level in SWM 2.
Operation and Maintenance	Sediment removal from quarry pond will likely be required to maintain existing normal water level.	Operation and maintenance of - privately owned LID measures will be the responsibility of the owner. A bylaw may be required to compel owners to operate and maintain their LID measures. SWM1 will require ongoing monitoring and maintenance by MOMC in accordance with the conditions of the corresponding ECA. MOMC will be responsible for operating and maintaining SWM measures located on public lands. This includes annual cleaning of pretreatment measures and annual inspections of the dry SWM pond in accordance with the	Operation and maintenance of privately-owned LID measures will be the responsibility of the owner. A bylaw may be required to compel owners to operate and maintain their LID measures. SWM1 will require ongoing monitoring and maintenance by MOMC in accordance with the conditions of the corresponding ECA. MOMC will be responsible for operating and maintaining SWM measures located on public lands. This includes annual cleaning of pretreatment measures and annual inspections of the dry SWM pond in accordance with the

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Two SWM Facilities with Surface Water Outlet to Oxbow Creek	Alternative 3 – Two SWM Facilities
		conditions of the corresponding ECA.	conditions of the corresponding ECA.
Approvals and Regulatory Requirements	Does not meet MOMC stormwater design standards or the requirements of the OWRA. UTRCA approval will be required for the proposed storm sewer outlet to Oxbow Creek.	An MECP ECA will be required for proposed SWM ponds and any LID measures that treat the runoff from right-of-ways. Similarly, an ECA will be required for the private LIDs. UTRCA approval will be required for the proposed outlet to Oxbow Creek.	An MECP ECA will be required for proposed SWM ponds and any LID measures that treat the runoff from right-of-ways. Similarly, an ECA will be required for the private LIDs. UTRCA approval will be required for the proposed outlet to Oxbow Creek.
Technical Summary	Does not meet MOMC stormwater design standards or the requirements of the OWRA.	Proposed pipe outlet from SWM2 pond limits the maximum design water levels. Proposed SWM strategy provides all necessary stormwater treatment.	Uncertainty regarding long term water levels in SWM2. Proposed SWM strategy provides all necessary stormwater treatment.
Economic			
Capital Construction Cost	No SWM measures.	Highest anticipated capital costs due to deep excavation requirements and installation of storm sewers.	Anticipated capital costs are lower than Alternative 2.
Operations and Maintenance Costs (Long Term)	No operation and/or maintenance costs.	Costs associated with maintenance of pretreatment measures and inspections are anticipated to be moderately high.	Costs associated with maintenance of pretreatment measures and inspections are anticipated to be moderately high.
Economic Summary	No associated cost.	This option is anticipated to have the highest overall cost.	This option is anticipated to have a lower overall cost than Alternative 2.

Table D-4: Evaluation of Alternative Solutions for the South Ilderton Development Area

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Single SWM Facility	Alternative 3 – Two SWM Facilities	Alternative 4 – On-Site SWM Controls
Socio-Economic				
Impacts to existing and future land uses	Option increases potential for erosion and flooding downstream.	Proposed wet SWM facility slightly reduces available developable area.	Proposed SWM facilities slightly reduce available developable area. Option results in less developable area than Alternative 2 or 4.	Less land required for SWM facilities. LID measures can be incorporated into site design.
Built Cultural Heritage and Archaeological Resources	No impact to cultural heritage or archaeological resources anticipated.	Construction of SWMF is not anticipated to impact built cultural heritage resources but will be confirmed prior to detailed design and construction. An archaeological assessment will be required prior to construction of SWMF. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate Planning Act applications for future developments.	Construction of SWMF is not anticipated to impact built cultural heritage resources but will be confirmed prior to detailed design and construction. An archaeological assessment will be required prior to construction of SWMF. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate Planning Act applications for future developments.	Construction of SWMF is not anticipated to impact built cultural heritage resources but will be confirmed prior to detailed design and construction. An archaeological assessment will be required prior to construction of SWMF. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate Planning Act applications for future developments.
Community Impacts	Potential flooding could post a threat to public safety.	SWMF must be designed in order to mitigate the risk of drowning and other hazards to public safety.	SWMF must be designed in order to mitigate the risk of drowning and other hazards to public safety.	Property owners will be required to maintain LID measures.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Single SWM Facility	Alternative 3 – Two SWM Facilities	Alternative 4 – On-Site SWM Controls
Socio-Economic Summary	Does not meet local or provincial policy standards for SWM servicing for future development.	Proposed pond impacts less developable area than Alternative 3.	Proposed ponds impact the most developable area of all alternatives presented.	Proposed features allow total development of the available lands; however, LID features may limit development footprints.
Aquatic Resources	Untreated stormwater discharges directly to Oxbow Creek Tributary.	Proposed feature mitigates potential water quality and temperature impacts of runoff from proposed development on aquatic wildlife and habitat.	Proposed feature mitigates potential water quality and temperature impacts of runoff from proposed development of aquatic wildlife and habitat.	Proposed features treat runoff at source and mitigate water quality and temperature impacts on aquatic wildlife and habitat in Oxbow Creek.
Terrestrial Resources	Potential erosion impacts caused by higher runoff volumes from proposed development.	No significant terrestrial impacts anticipated, as the SWMF should be designed outside of significant features. Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources, including SAR.	No significant terrestrial impacts anticipated, as the SWMF should be designed outside of significant features. Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources, including SAR.	No significant terrestrial impacts anticipated, as the SWMF should be designed outside of significant features. Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources, including SAR.
Hydrogeological	Proposed development reduces local annual infiltration volume which can negatively impact local aquifer levels.	Proposed development reduces local annual infiltration volume which can negatively impact local aquifer levels.	Proposed development reduces local annual infiltration volume which can negatively impact local aquifer levels.	Proposed features mitigate impact of proposed development on local annual infiltration volume.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Single SWM Facility	Alternative 3 – Two SWM Facilities	Alternative 4 – On-Site SWM Controls
				Potential groundwater contamination from stormwater infiltration.
Drinking Water Source Protection	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.
Natural Summary	Untreated stormwater discharges directly to Oxbow Creek. Solution does not appropriately address potential impacts to aquatic or terrestrial resources.	Proposed SWM pond will mitigate potential impacts on aquatic and terrestrial resources.	Proposed SWM ponds will mitigate potential impacts on aquatic and terrestrial resources.	Proposed features will mitigate potential impacts on aquatic and terrestrial resources. Features will treat stormwater at source and helps reduce the risk of groundwater contamination.
Operation and Maintenance	Operation and maintenance of storm sewer system only.	Operation and maintenance of proposed regional SWM pond to be performed by MOMC in accordance with the corresponding ECA conditions.	Operation and maintenance of proposed SWM ponds to be performed by MOMC in accordance with the corresponding ECA conditions.	Individual site owners responsible for operating and maintaining on-site SWM controls.
Constructability	No SWM features constructed.	Pond must be constructed prior to development of design service area. Difficulties in providing sufficient cover over the upstream storm sewers are anticipated. Storm sewer inlet to proposed regional SWM pond will likely be submerged.	Better suited for development phasing than Alternative 2. This option will require smaller storm sewer trunks than Alternative 2. Difficulties in providing sufficient cover over the SWM1 upstream storm sewers are anticipated.	SWM servicing is provided as development proceeds.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Single SWM Facility	Alternative 3 – Two SWM Facilities	Alternative 4 – On-Site SWM Controls
			Storm sewer inlets to proposed SWM ponds will likely be submerged.	
Approvals and Regulatory Requirements	Does not meet OWRA requirements.	MECP ECA required for proposed regional SWM pond. UTRCA approval will be required for the proposed Oxbow Creek Drain outlet.	MECP ECA required for proposed SWM ponds. UTRCA approval will be required for the proposed Oxbow Creek Drain outlet.	MECP ECA required for proposed on-site SWM controls on industrial lands. Infiltration measures are typically discourage by MECP for runoff from industrial lands
Performance	No SWM facilities will be constructed.	SWM outlet will be influenced by tailwater elevations in Oxbow Creek Drain.	SWM outlet will be influenced by tailwater elevations in Oxbow Creek Drain.	Conveyance system outlet will be influenced by tailwater elevations in Oxbow Creek Drain.
Technical Summary	Alternative does not meet regulatory requirements of the OWRA or planning policy set out by MOMC or the Province. This option cannot be implemented.	Can meet the MOMC and Provincial SWM control requirements. This option is less suited to allow development phasing than Alternative 3. The proposed SWM pond must be designed to operate under high tailwater conditions in Oxbow Creek.	Can meet the MOMC and Provincial SWM control requirements. This option provides more flexibility for development phasing and requires The proposed SWM pond must be designed to operate under high tailwater conditions in Oxbow Creek.	Can meet the MOMC and Provincial SWM control requirements. The proposed SWM controls must be designed to operate under high tailwater conditions in Oxbow Creek.
Economic				
Capital Construction Cost	No capital cost.	Capital costs are estimated to be moderate.	Capital costs are estimated to be highest of all proposed alternatives.	Capital costs would be borne by future site owners.
Operations and Maintenance	No operation or maintenance costs.	Periodic pond cleanouts will be borne as a capital expense.	Periodic pond cleanouts will be borne as a capital expense.	Maintenance and operation costs of LID features will be the

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Single SWM Facility	Alternative 3 – Two SWM Facilities	Alternative 4 – On-Site SWM Controls
Costs (Long Term)				responsibility of future block owners.
Economic Summary	No associated costs.	The alternative has moderate capital and operation/maintenance costs compared to Alternative 3. Associated costs to be borne by MOMC through development charges.	Highest cost of all alternatives proposed. Associated costs to be borne by MOMC through development charges.	Associated costs to be borne by individual site owners. Capital and operations/maintenance costs will likely be significant.

Table D-7: Evaluation of Alternative Solutions for West Komoka

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Service Only Proposed Development	Alternative 3 – Service Both Existing and Proposed Development
Socio-Economic			
Impacts to existing and future land uses	SWM controls would not be provided for future development areas in accordance with the OP.	Proposed SWMF footprint reduces future development area.	Proposed SWMF footprint is larger than in Alternative 2, further reducing the future development area.
Built Cultural Heritage and Archaeological Resources	No impact to cultural heritage or archaeological resources is anticipated.	Construction of SWMF is not anticipated to impact built cultural heritage resources. An archaeological assessment will be required prior to construction of SWMF. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate Planning Act applications for future developments.	Construction of SWMF is not anticipated to impact built cultural heritage resources. An archaeological assessment will be required prior to construction of SWMF. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate Planning Act applications for future developments.
Community Impacts	N/A	N/A	N/A
Socio-Economic Summary	Occasional flooding of proposed development is anticipated.	This option has a smaller footprint and impact on future development as compared to Alternative 3.	This option has the highest impact on available developable area.
Natural Environment			
Aquatic Resources	Komoka Drain 2 discharges untreated stormwater to Komoka Creek. However, approximately 1300 m of existing vegetated open channel on the south side of the railroad likely reduces the	Komoka Drain 2 discharges untreated stormwater to Komoka Creek. However, approximately 1300 m of existing vegetated open channel on the south side of the railroad likely reduces the temperature and water quality	SWMFs mitigate temperature and water quality impacts of both proposed and existing development runoff on aquatic life and habitat.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Service Only Proposed Development	Alternative 3 – Service Both Existing and Proposed Development
	temperature and water quality effects of urban runoff on aquatic life and habitat. Untreated stormwater from the eastern portion of the development area discharges directly to Komoka Creek.	effects of urban runoff on aquatic life and habitat. SWM1 and SWM2 mitigate temperature and water quality impacts of proposed development runoff on aquatic life and habitat.	
Terrestrial Resources	The discharge of untreated stormwater to the channel along Glendon Drive may impact habitat and wildlife within the area, however impacts are likely not significant.	No significant terrestrial impacts are anticipated. Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources, including SAR.	No significant terrestrial impacts anticipated, as the SWMF should be designed outside of significant features. Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources, including SAR.
Hydrogeological	Proposed development reduces local annual infiltration volume which can impact local aquifer levels.	SWMFs mitigate impact of proposed development on local annual infiltration volume which can negatively impact local aquifer levels. Untreated stormwater infiltration presents a potential risk for groundwater contamination.	SWMFs mitigate impact of proposed development on local annual infiltration volume which can negatively impact local aquifer levels. Untreated stormwater infiltration presents a potential risk for groundwater contamination.
Drinking Water Source Protection	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.
Natural Summary	Untreated stormwater discharges directly to the environment which can negatively impact aquatic species.	This option mitigates the impact of proposed development on aquatic and terrestrial resources, as well as infiltration and groundwater quality.	This option mitigates the impact of proposed development on aquatic and terrestrial resources, as well as infiltration and groundwater quality.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Service Only Proposed Development	Alternative 3 – Service Both Existing and Proposed Development
Technical			
Constructability	N/A	The constructability of SWM1 and SWM2 is dependent on the local groundwater elevations.	The constructability of SWM1 and SWM2 is dependent on the local groundwater elevations. The conveyance infrastructure required to convey the runoff from Komoka Drain No. 2 to SWM2 may present a significant obstruction to future servicing.
Operations and Maintenance	No significant impacts to operation and maintenance schedules are anticipated.	SWMF will require ongoing monitoring and maintenance by MOMC in accordance with the conditions of the corresponding ECAs. Annual cleaning of pretreatment measures is necessary to remove accumulated sediment. Occasional removal of accumulated sediment from the proposed Glendon Drive ditches is necessary.	SWMF will require ongoing monitoring and maintenance by MOMC in accordance with the conditions of the corresponding ECAs. Annual cleaning of pretreatment measures is necessary to remove accumulated sediment. Occasional removal of accumulated sediment from the proposed Glendon Drive ditches is necessary.
Approvals and Regulatory Requirements	Does not meet MOMC stormwater design standards or the requirements of the OWRA.	An MECP ECA will be required for the proposed regional SWM ponds. The MECP may require water balance mitigation measures in the proposed subdivision/site design if SWM1 and SWM2 are not designed as infiltration facilities.	An MECP ECA will be required for the proposed regional SWM ponds. The MECP may require water balance mitigation measures in the proposed subdivision/site design if SWM1 and SWM2 are not designed as infiltration facilities.
Performance	Occasional flooding is anticipated within the proposed development area.	SWMF provide Enhanced water quality treatment, peak flow control and temperature mitigation	SWMF provide Enhanced water quality treatment, peak flow control and temperature mitigation

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Service Only Proposed Development	Alternative 3 – Service Both Existing and Proposed Development
		to runoff from approximately 70 ha. Glendon drive ditches provide stormwater treatment to the runoff from the proposed road improvements.	to runoff from approximately 108 ha. Glendon drive ditches provide stormwater treatment to the runoff from the proposed road improvements. SWM2 provides treatment to the Komoka Drain No. 2 drainage area.
Technical Summary	Does not meet MOMC stormwater design standards or the requirements of the OWRA.	This option provides Enhanced water quality treatment, peak flow control and temperature mitigation for runoff from approximately 70 ha.	This option provides Enhanced water quality treatment, peak flow control and temperature mitigation for runoff from approximately 108 ha.
Economic			
Capital Construction Cost	No associated costs.	Estimated capital cost for proposed regional SWM ponds is anticipated to be lower than Alternative 3.	This alternative has the highest estimated capital costs.
Operations and Maintenance Costs (Long Term)	No significant anticipated operations or maintenance costs.	Annual cleanouts of pretreatment measures to be included in annual catchbasin cleanout program and included in operations budget.	Annual cleanouts of pretreatment measures to be included in annual catchbasin cleanout program and included in operations budget.
Economic Summary	No associated costs.	This option is anticipated to have a lower overall cost than Alternative 3.	This option is anticipated to have the highest overall cost.

Table D-9: Evaluation of Alternative Solutions for the Kilworth-Glendon Drive Area

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Discharge to Oxbow Creek	Alternative 3 – Discharge to Glendon Drive Trunk Storm Sewer
Socio-Economic			
Impacts to existing and future land uses	No lands dedicated for SWM measures. Overland flows from development area anticipated on lands east of Tunks Lane.	SWM1 utilizes a location that may by otherwise challenging to develop due to its shape and proximity to the railway corridor. On-site private SWM controls are required for the western portion of the development area.	The proposed SWM1 location is designated for future commercial development in the Official Plan.
Built Cultural Heritage and Archaeological Resources	N/A	Construction of SWMF is not anticipated to impact built cultural heritage resources. An archaeological assessment will be required prior to construction of SWMF. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate Planning Act applications for future developments.	Construction of SWMF is not anticipated to impact built cultural heritage resources. An archaeological assessment will be required prior to construction of SWMF. It is anticipated that appropriate cultural heritage assessments will be undertaken in accordance with the appropriate Planning Act applications for future developments.
Community Impacts	Overland flows may cause erosion of soil on private property. Occasional flooding may impact public safety.	SWMF must be designed in order to mitigate the risk of drowning and other hazards to public safety.	SWMF must be designed in order to mitigate the risk of drowning and other hazards to public safety.
Socio-Economic Summary	Does not meet local or provincial planning standards for stormwater management for future development.	Option utilizes a location which is less desirable for commercial development than Alternative 3.	This option may not meet land use objectives set out within the Official Plan.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Discharge to Oxbow Creek	Alternative 3 – Discharge to Glendon Drive Trunk Storm Sewer
Natural Environment			
Aquatic Resources	Untreated stormwater from the eastern portion of the development area discharges directly to Oxbow Creek.	SWMF mitigates anticipated impacts of proposed development runoff on aquatic life and habitat in Oxbow Creek.	SWMF mitigates anticipated impacts of proposed development runoff on aquatic life and habitat in downstream receiver.
Terrestrial Resources	No anticipated impacts.	Potential loss of some vegetation and/or habitat within the SWMF footprint. Wetland areas within the catchment area. Site specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources, including SAR.	No significant terrestrial impacts anticipated as SWM controls should be located outside of significant features. Site-specific environmental reviews should be conducted prior to detailed design and construction to confirm the presence/absence of significant habitats and resources, including SAR.
Hydrogeological	Proposed development reduces local annual infiltration volume, which may negatively impact water table levels.	Proposed development reduces local annual infiltration volume which may negatively impact water table levels.	Proposed features mitigate the impact of proposed development on infiltration volumes, which may negatively impact water table levels. Stormwater infiltration presents a potential risk for groundwater contamination; however, treatment through the proposed LID development helps mitigate this risk.
Drinking Water Source Protection	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.	No impacts to drinking water or source protection policies are anticipated.
Natural Summary	Untreated stormwater from the eastern portion of the development area discharges directly to Oxbow Creek.	This option mitigates impacts of runoff from proposed developments on aquatic resources.	This option better mitigates potential impacts of runoff from future development on aquatic resources and the surrounding hydrogeology than Alternative 2.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Discharge to Oxbow Creek	Alternative 3 – Discharge to Glendon Drive Trunk Storm Sewer
Technical			
Performance	Occasional flooding is anticipated on Tunks Lane and upstream of the Coldstream Road culvert.	SWMF provides Enhanced water quality treatment and peak flow control to runoff from the proposed development area. On-site SWM controls provide all necessary stormwater treatment to the runoff from the western portion of the development area.	SWMF provides Enhanced water quality treatment and peak flow control to runoff from the proposed development area.
Constructability	Providing sufficient cover over proposed storm sewers may prove challenging due to limited depth of available surface water outlets.	Providing sufficient cover over proposed storm sewers may prove challenging due to elevation of Coldstream Road culvert. Required separation distances from the existing railway line may limit design width of SWM1. Must secure drainage easement for lands fronting on Tunks Lane to convey major flows.	Proposed Glendon Drive storm sewers west of area will need to be larger to accommodate additional flows. Limited flexibility for implementation phasing – Glendon Drive storm sewer must be constructed prior to servicing in development area
Approvals and Regulatory Requirements	Does not meet MOMC stormwater design standards or the requirements of the OWRA.	An MECP ECA will be required for the proposed regional SWM pond. The MECP may require water balance mitigation measures in the proposed subdivision/site design if SWM1 is not designed as an infiltration facility.	An MECP ECA will be required for the proposed regional SWM pond. The MECP may require water balance mitigation measures in the proposed subdivision/site design if SWM1 is not designed as an infiltration facility.
Operation and Maintenance	Operation and maintenance is limited to occasional inspection of the proposed storm sewer outlets.	The regional pond will require ongoing monitoring and maintenance by MOMC in accordance with the conditions of the corresponding ECA. Intermittent cleanouts of the pond	The regional pond will require ongoing monitoring and maintenance by MOMC in accordance with the conditions of the corresponding ECA. Intermittent cleanouts of the pond

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Discharge to Oxbow Creek	Alternative 3 – Discharge to Glendon Drive Trunk Storm Sewer
		forebay will be required, likely approximately on a 10-year basis. Operation and maintenance of privately owned LID measures will be the responsibility of the owner. A bylaw may be required to compel owners to operate and maintain their LID measures.	forebay will be required, likely approximately on a 10-year basis.
Technical Summary	Does not meet regulatory standards.	The option is more feasible compared to Alternative 1. The potential requirement of a by-law to ensure property owners comply with proposed LID measures and the challenge of elevating the Coldstream Road culvert make this option less favourable than Alternative 3.	This option has limited flexibility in the construction phasing; however, it is likely more feasible given that there are fewer construction challenges and regulatory requirements to ensure effective implementation.
Economics			
Capital Construction Cost	No SWM measures.	Estimated capital cost for proposed regional SWM pond is expected to be moderate. Capital costs for private LID measures to be borne by the developer.	Due to required size of the Glendon Drive storm sewers, this option will have the highest capital cost.
Operations and Maintenance Costs (Long Term)	No additional cost will be added to the existing operation and maintenance budget.	Sediment cleanouts of the pond forebay will need to be budgeted as a capital expenditure. Forebay clean out costs likely to be the highest for this alternative.	Sediment cleanouts of the pond forebay will need to be budgeted as a capital expenditure. Costs likely to be less than Alternative 2 given the smaller proposed pond size.

Criteria	Alternative 1 – Do Nothing	Alternative 2 – Discharge to Oxbow Creek	Alternative 3 – Discharge to Glendon Drive Trunk Storm Sewer
Economic Summary	No associated costs.	Capital costs of private LID to be borne by the developer. Overall cost to MOMC is moderate compared to Alternative 3.	Highest anticipated capital costs due to sizing of the proposed storm sewers.