APPENDIX K

Public / Agency Consultation Materials

WELCOME TO THE AYR STORMWATER MANAGEMENT MASTER PLAN PUBLIC INFORMATION CENTRE

Purpose of Study

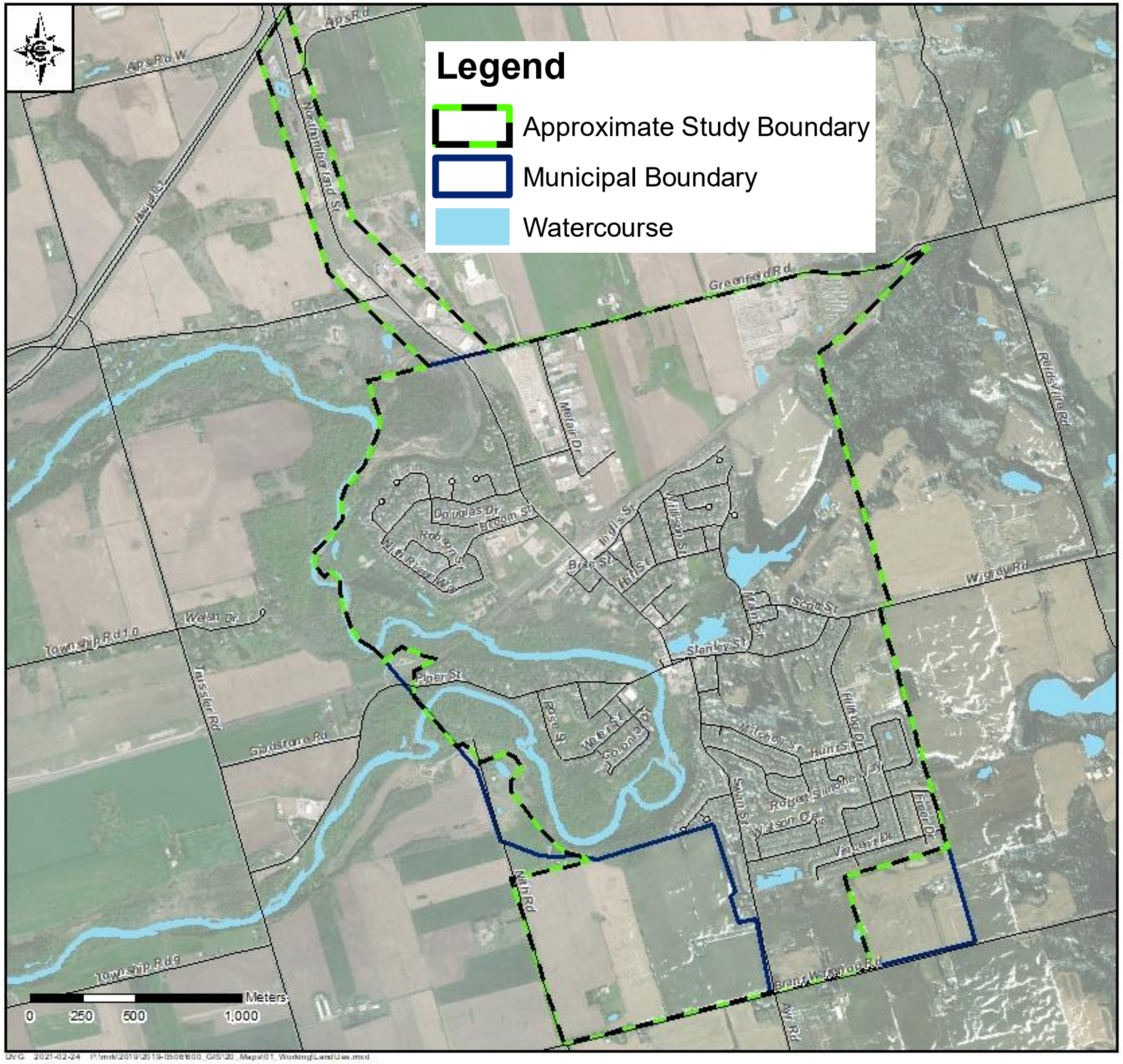
The Community of Ayr requires completion of a Stormwater Management [SWM] Master Plan [SWMMP] following a Master Planning approach in accordance with the Environmental Assessment Act as outlined by the Municipal Engineer's Association Municipal Class Environmental Assessment (MEA), October 2000, as amended.

The SWMMP will serve as a decision support tool, a methodology for the prioritization of works, a means to estimate future SWM requirements and costs and a transparent community process by which the Township can establish stormwater management guidelines and policies for the next ten to fifteen years.

GLOSSARY OF TERMS

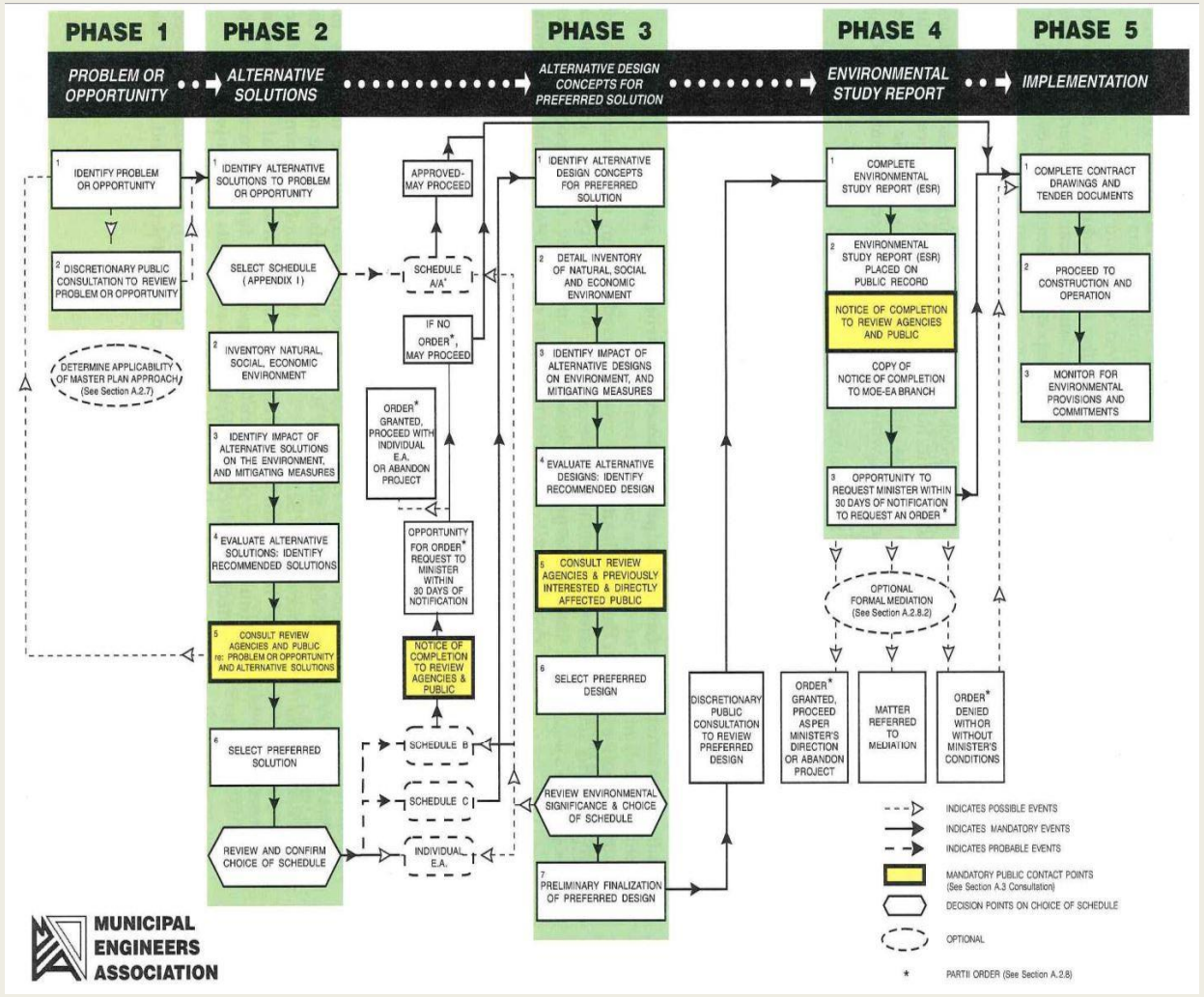
- EA = Environmental Assessment
- GRCA = Grand River Conservation Authority manages water and other natural resources on behalf of 39 municipalities and close to one million residents of the Grand River watershed.
- MECP = Ministry of Environment, Conservation, and Parks
- SPA = Special Policy Areas are areas within flood plain boundaries of a watercourse where exceptions to the development restrictions of the natural hazards policy (3.1) in the Provincial Policy Statement (PPS), 2005, may be permitted in accordance with technical criteria established by the MNR.
- SWM = Stormwater Management
- SWMMP = SWM Master Plan
- TP = Total Phosphorus, consisting of suspended and dissolved phosphorus, is a nutrient which, in excess amounts, has detrimental effects on aquatic health.

Study Area


Legend
Approximate Study Boundary
Municipal Boundary
Watercourse
Greenfield Rd
Township Rd 10
Township Rd 9
Welsh Dr
Piper St
Stanley St
Douglas Dr
Meters
0
250
500
1,000

Municipal Class EA Process

- The project is being conducted as a Schedule B project in accordance with the *Municipal Engineers Association Class Environmental Assessment (October 2000, as amended in 2007, and 2011)*.
- The requirements for Schedule B activities include **Phase 1 (Identification and Description of the Problem) and Phase 2 (Identification/Evaluation of Alternative Solutions to the Problem)** of the planning process of the Class EA and associated consultation.
- Following this Public Consultation and the Class Environmental Study process, the Project File report will be made available for a 30-day public review and comment period.



Purpose of Master Plan

The SWM Master Plan (SWMMP) shall be an integrated approach that considers flood and erosion control, groundwater and surface water quality management, natural heritage environment management and infrastructure. In addition, the plan shall integrate existing policies, regulations, acts and guidelines and where appropriate develop new policies and design guidelines to aid in implementation and shall do so within a water sustainability context. In addition, the SWMMP should provide a framework for the provision of a stormwater utility user fee if desired.

Background

- The Community of Ayr has a population of approximately 5,000 persons and is anticipated to increase to a population of 10,000 to 11,000 persons by 2031, making it a Future Settlement Area.
- Increases in population require residential and employment lands, which increase the impervious cover of existing lands, and the stormwater which runs off during events requires mitigation. The SWMMP will provide specific recommendations for SWM measures to mitigate urban growth in the Study Area.
- The SWMMP will provide guidance for future development in these areas, including an overview of opportunities and constraints for SWM measures.

Localized Flooding

- Ayr does not typically employ traditional storm sewer systems (inlet catchbasins [CBs], manholes, storm sewers, outfalls), and instead has historically employed pervious (open bottom) CBs.
- As the CBs lack a traditional outlet, how fast they can convey stormwater runoff away from streets and yards is limited by the infiltration/percolation rate of the underlying soils and the size of the CB
- This storm management design has led to nuisance flooding.
- This study has an aim of making recommendations to guide solutions to this nuisance flooding.

Source: Photograph of 2016 flood taken by local resident

Stormwater Management Objectives

Based on a review of the available information on the watershed, the following objectives were developed for the SWMMP:

- **Quantity Control**: Control post development to predevelopment levels for all storms up to 100-year return period
- **Erosion Control** – Retain minimum 5 mm on-site, adhere to GRCA requirements
- **Water Balance**: Emulate pre-development water balance infiltration volumes on an annual basis
- **Water Quality**: Provide 80% TSS Removal and phosphorus reduction

Stormwater Management Engineering and Development Standards – Quantity Control

Quantity Control:

Proponents shall demonstrate via appropriate hydrologic modeling (Rational/Modified Rational for Sites less than 5 ha, hydrologic model (ex. VisualOTTHYMO) for Sites larger than 2 ha.

The latest IDF curves from the GRCA shall be used.

Stormwater Management Engineering and Development Standards – Erosion Control

Erosion Control:

Ayr requires on-site retention of the first 5mm of runoff.

If a site drains to a sensitive creek, or if a subwatershed study, MESP or similarly comprehensive study is required, then the proponent must complete a geomorphologic assessment study to determine the appropriate erosion threshold and volume requirement. The geomorphologic assessment should be conducted in consultation with the GRCA to verify critical decisions and to confirm the scope of the analyses outlined above.

For sites with a SWM pond, extended detention of the 25mm event for a period of 48 hours may also be required, depending on the results of an erosion assessment.

Stormwater Management Engineering and Development Standards – Water Balance

Water Balance:

Retain stormwater on-site (retention) to the extent practical to ensure that post-development infiltration volumes on an annual basis meet pre-development rates. Demonstrate using a monthly Thornthwaite-Mather water budget on an average annual basis.

Stormwater Management Engineering and Development Standards – Quality Control

Water Quality (Total Suspended Solids):

The water quality target is the long-term average removal of 80% of Total Suspended Solids (TSS) on an annual loading basis from all runoff leaving the proposed development site based on the post-development level of imperviousness.

Stormwater Management Engineering and Development Standards – Quality Control

Water Quality (Total Phosphorus):

Control post-development total phosphorus annual loading to pre-development levels.

At present, GRCA does not have specific, approved phosphorus loading coefficients. In IBI's sample analysis, we have utilized average values from the NVCA TP Tool.

At detailed design, pre- and post-development P loadings should be calculated using a similar method, along with the required Best Management Practices (BMPs) to meet GRCA targets.

Operation and Maintenance Manuals

At detailed design, the Consultant should provide an Operation & Maintenance Report for any stormwater management pond, underground storage system, or stormwater device along with forecasted costs of maintenance and cleanout.

Alternative Solutions

- **Do Nothing**: With the “Do Nothing” approach, existing SWMFs are left “as is” and Future Settlement Areas are developed without SWM measures. That strategy would result in water balance deficit, reduced baseflows, increased erosion; increased peak flows, and increased phosphorus loading.

- **Traditional SWM Strategy (Ponds):** Reduces high flow rates and erosion potential and phosphorus loading, therefore reducing damage to the environment and property. Ponds do not increase baseflow, improve infiltration, or reduce runoff volumes

Source: Photograph of Hilltop Community SWM Pond A taken by Cole Engineering Group Ltd.

Alternative Solutions

- **Traditional SWM with Best Management Practices [BMP] Implementation Strategy**: This approach consists of SWM ponds in conjunction with BMPs/Low Impact Developments [LID] for Future Settlement Areas. This combination can reduce water balance deficit, decrease volumetric runoff, increase baseflow, reduce erosion, reduce peak flows, and reduce phosphorus loading.

- **Traditional SWM with Retrofit Strategy**: This approach consists of SWM ponds in conjunction with BMPs/LIDs for Future Settlement Areas; as well as retrofitting of existing SWMFs, or application of BMPs in areas with SWMFs. This combination can reduce water balance deficit, decrease volumetric runoff, increase baseflow, reduce erosion, reduce peak flows, and reduce phosphorus loading

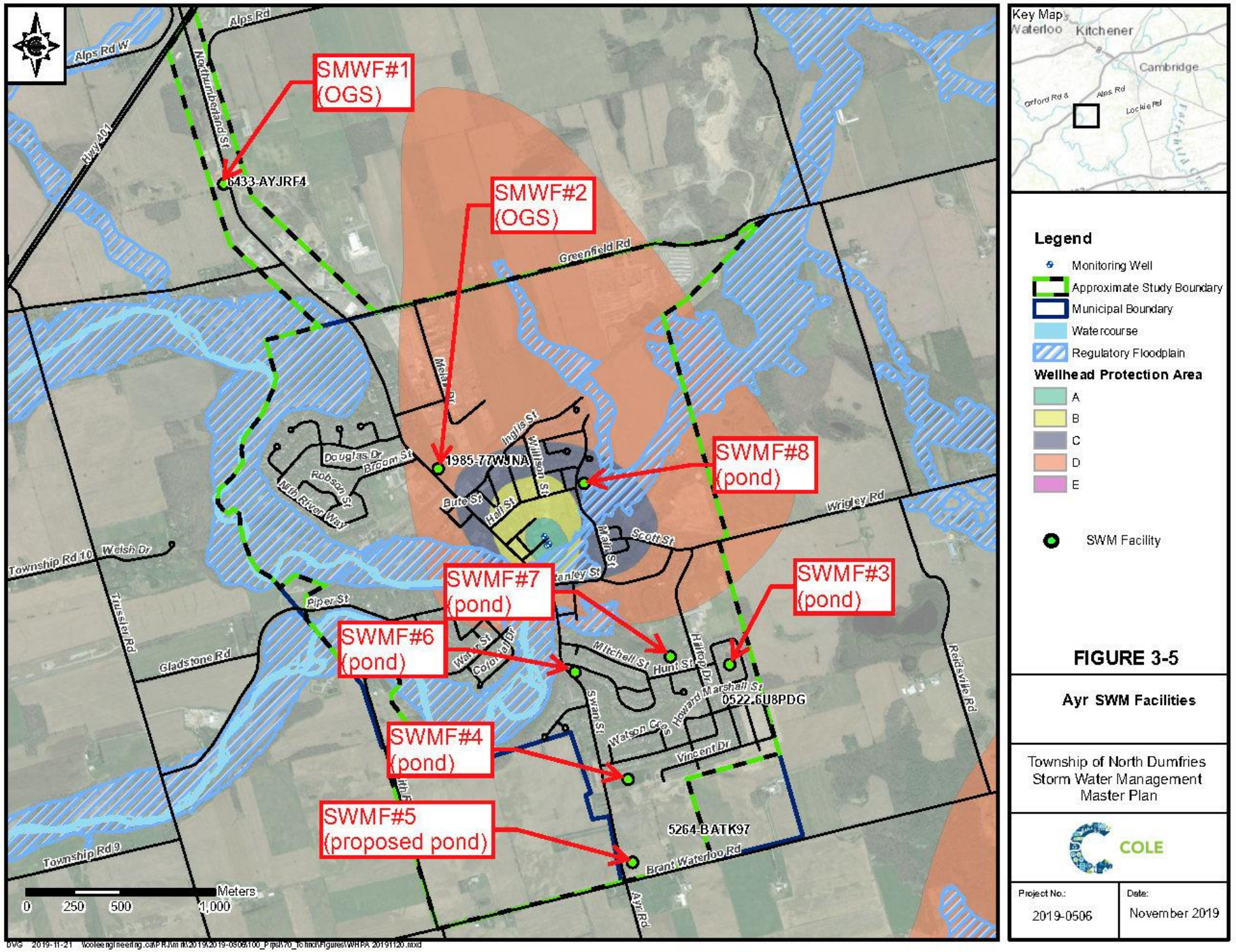


FIGURE 3-5

Ayr SWM Facilities

Township of North Dumfries
Storm Water Management
Master Plan

COLE

Project No.:	Date:
2019-0506	November 2019

Stormwater Retrofit Opportunities

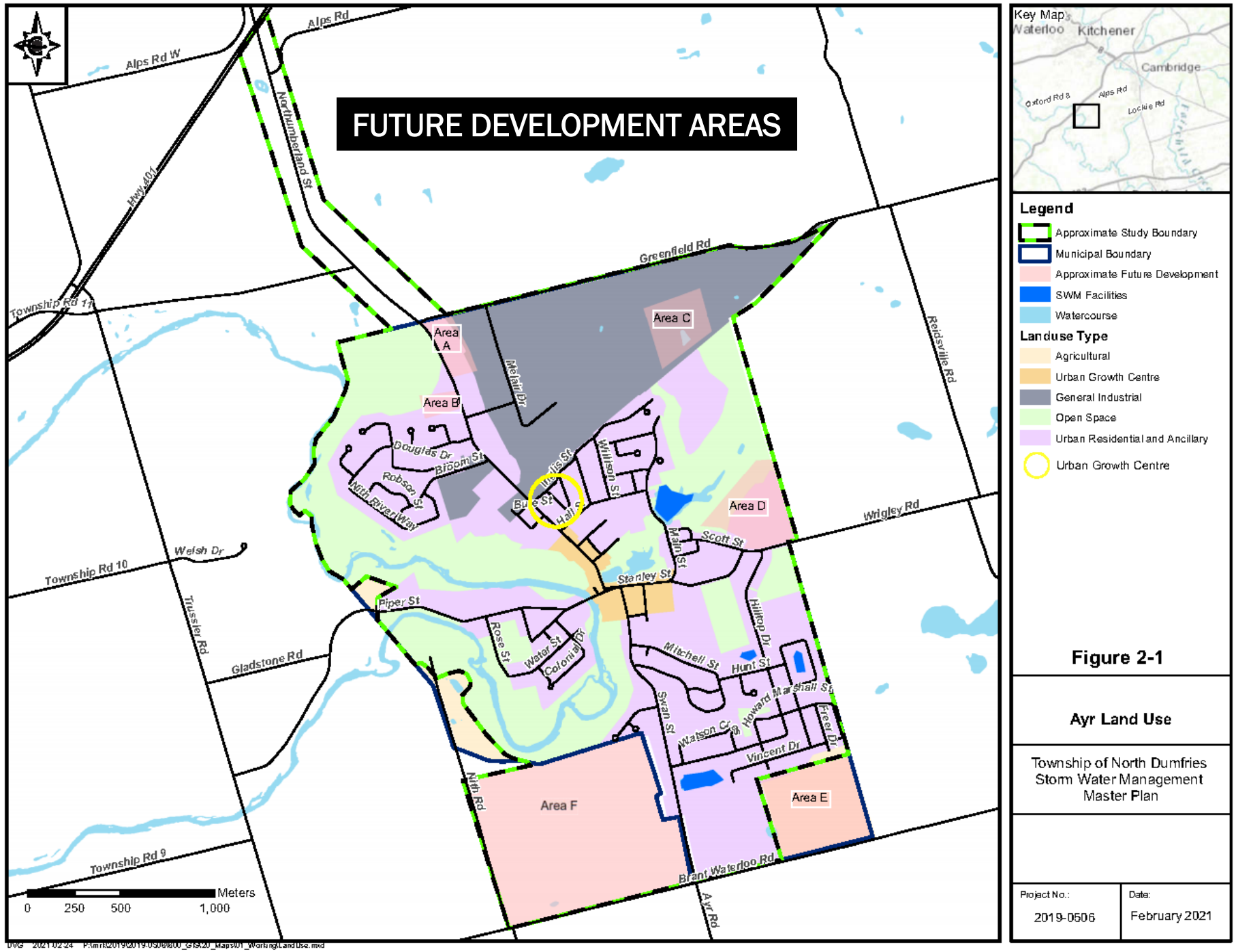
Through inspections by IBI, it was determined that 2 ponds could be considered for retrofit opportunities, SWMF #7 and #8.

From their appearance, it is assumed that these ponds have had little to no maintenance since their construction. They appear to be quantity control only ponds and could, in theory, be retrofitted to provide quality control.

Stormwater Retrofit Opportunities

Further investigation is needed to improve retrofit strategy development. Potential strategies could include:

- Surveys and ‘reverse engineering’ of Ponds 7 and 8 to determine retrofit opportunities to provide quality control;
- Replacement or repairs to pond features such as inlets and outlets;
- Adding a permanent pool/forebay to increase effluent quality;
- Changing capacity of existing pond to correspond to changes in drainage area;


FUTURE DEVELOPMENT AREAS
Alps Rd
Alps Rd W
Northumberland St
Hwy 401
Township Rd 11
Greenfield Rd
Area A
Area B
Area C
Area D
Area E
Area F
Melair Dr
Douglas Dr
Broom St
Robson Dr
North River Way
Bute St
Hall St
Williston St
Reidsville Rd
Wrigley Rd
Scott St
Main St
Stanley St
Township Rd 10
Welsh Dr
Trussler Rd
Piper St
Rose St
Water St
Colonial Dr
Gladstone Rd
Mitchell St
Hunt St
Howard Marshall St
Hilltop Dr
Swan St
Watson Cres
Freer Dr
Vincent Dr
Nith Rd
Brant Waterloo Rd
Ayr Rd
Township Rd 9
Meters
0
250
500
1,000
Key Map
Waterloo
Kitchener
Cambridge
Oxford Rd 8
Alps Rd
Lockie Rd
Legend
Approximate Study Boundary
Municipal Boundary
Approximate Future Development
SWM Facilities
Watercourse
Landuse Type
Agricultural
Urban Growth Centre
General Industrial
Open Space
Urban Residential and Ancillary
Urban Growth Centre
Figure 2-1
Ayr Land Use
Township of North Dumfries
Storm Water Management
Master Plan
Project No.:
2019-0506
Date:
February 2021

Future Development Areas

- **AREA A**: A development of 4.15 ha is proposed which would create an infiltration deficit of 8,604 m3/year without mitigation. This area will need to consider SPA 2.7.11. Stormwater could discharge to the oxbow lake of the Nith River, west of Northumberland St. BMP source/lot level controls and conveyance controls outlined in Section 8.0 could be applied. The largest obstacle appears to be getting the stormwater under the road and overcoming the mild slope towards the train tracks to the west.

- **AREA B**: A development of 1.59 ha is proposed which would create an infiltration deficit of 2,236 m3/year without mitigation. This area will need to consider SPA 2.7.9. Stormwater could be discharged directly to the oxbow lake of the Nith River directly North. BMP source/lot level controls and conveyance controls outlined in Section 8.0 could be applied. The largest obstacle will be ensuring quality measures are in place with the development located adjacent to the watercourse.

Future Development Areas

- **AREA C**: A development of 9.30 ha is proposed which would create an infiltration deficit of 20,664 m3/year without mitigation. This area will need to consider SPA 2.7.7. The area is not adjacent to a watercourse, but there is space for a pond and potential to convey water under the train tracks to the south and into the Jedburgh Pond. From there water moves to the Watson Pond eventually making its way into the Nith River. This area will need to focus on BMP end of pipe controls as outlined in Section 8.0. The largest obstacle will be ensuring quantity control measures are in place with the development.

- **AREA D**: A development of 13.37 ha is proposed which would create an infiltration deficit of 28,204 m3/year without mitigation. There is space for a pond here and it is close enough to discharge into Cedar Creek. BMP source/lot level controls, conveyance controls and end of pipe controls outlined in Section 8.0 could be applied. The largest obstacle will be incorporating these SWM controls during the apparent reclamation process from former aggregate pit.

Future Development Areas

- **AREA E**: A development of 23.22 ha is proposed which should follow a target infiltration deficit of 25,542 m3/year. This area will need to consider SPA 2.7.9. Due to the size of the area, there is potential for a SWM pond and outlet at Charlie Creek to the east. BMP source/lot level controls, conveyance controls and end of pipe controls outlined in Section 8.0 could be applied. The largest obstacle will be providing quality and quantity measures required to outlet to natural watercourse.

- **AREA F**: A development of 83.13 ha is proposed which should follow a target infiltration deficit of 33,455 m3/year. Due to the size of the area, there is potential for a SWM pond and potential to discharge to the Nith River to the north. BMP source/lot level controls, conveyance controls and end of pipe controls outlined in Section 8.0 could be applied. The largest obstacle will be avoiding the wetlands and safely conveying any excess water to the Nith River.

Future Development Areas

- **NORTHUMBERLAND ROAD**: The stretch of Northumberland Road between Greenfield Road and Highway 401 is currently a rural cross-section with some curb and catch basins implemented to the south. At the north there is a pond and a wetland on the west side of the road which begins across from Alps Road and continues south for approximately 300m. The east side has a shallow ditch through this area. Continuing south, both the east and west sides are quite flat, but there appears to be room for a deepening of existing ditch or an infiltration trench. There is a high point south of the gas station, therefore depending on the capacity, all runoff to the north of this point could be directed to the pond and wetland. For the section of Northumberland Road to the south of the gas station, the distance to the closest waterbody is approximately 700m to the south with a natural slope of 0.3%. Conveying the water on the west side could be achieved through grass swale or infiltration trench with subdrain. There are areas with more defined ditches, but some areas face a steep slope at the edge of the ROW. Ultimately culverts would be required under driveways and ultimately the west intersection of Greenfield Road. The east side has sections that are flat while other sections slope away from the road. There is space to implement surface LIDs on this side.

Analysis of Alternative Solutions

- The comparative evaluation of the alternative solutions will be carried out using a systematic approach that fulfills the intent of the Class EA process. The evaluation process will be presented in the form of an evaluation matrix in which alternative is scored or ranked against the other alternatives, with respect to a number of criteria that fall into the following categories:
  - *Environmental criteria: These include potential impacts on natural terrestrial features and aquatic habitat, and will include consideration of net change on hydrologic water balance and pollutant loadings to natural watercourses;*
  - *Financial criteria: Includes initial capital cost including consideration of any need for property acquisition; expected life-cycle costs; and implications for future financing of centralized stormwater facilities that may serve more than one development property;*
  - *Public safety and public acceptability: This category will address potential concerns regarding public safety and health; and how ell proposed facilities may fit into existing or future built-up areas;*
  - *Implementation: Includes consideration of how easily implementation can occur as new land development occurs; and how well the SWM plan integrates with current land-use planning and the development approval process.*

Analysis of Alternative Solutions

Technical
Opportunity to reduce peak flows to Nith River
Opportunity to decrease erosion of watercourses
Opportunity to improve water quality
Opportunity to reduce phosphorus loading in Nith River
Opportunity to mitigate changes in water balance
Natural Heritage Features
Provisions of direct and indirect fish habitat
Potential to improve terrestrial habitat
Impacts to natural hazard features
Social Environment
Ability to improve public health and safety
Impacts to private property
Impacts to public property
Cultural Environment
Impacts to built and cultural heritage landscape
Impacts to archeological resources
Economic Environment
Capital costs
Operation and Maintenance costs
Risk Management
Impact on agricultural land use

Analysis of Alternative Solutions

- As these Future Settlement Areas are designated for Residential development, increasing imperviousness requires peak flow control and erosion control. Mitigation of the infiltration deficit requires infiltration measures.
- Stormwater ponds are well suited for quality (total phosphorus and suspended sediment) and quantity control, but do not provide for increased infiltration/baseflow, and do not, on their own, necessarily achieve full phosphorus reduction.
- The use of Low Impact Development (LID) Best Management Practices (BMPs) at the lot level provides for increased infiltration and baseflow and provide phosphorus removal.
- LIDs could reduce costs over a traditional SWM wet pond, which requires draining, soil testing, hauling, etc. and provides for increased infiltration and baseflow, and provide phosphorus removal. In addition, wet ponds can produce odours, which LID measures can reduce.

Evalution of Alternatives

	Evaluation Criteria	Do Nothing	Traditional SWM Strategy	Traditional SWM with BMP	Traditional SWM w/ Retrofit Strategy
TECHNICAL	Opportunity to reduce peak flows to Nith River	0	1	1	1
	Opportuntity to decrease erosion of watercourses	0	1	2	1
	Opportuntity to improve water quality	0	1	1	1
	Opportuntity to reduce phosphorus loading in Nith River	0	1	2	1
	Opportunity to mititgage changes in water balance	0	0	1	1
NATURAL HERITAGE FEATURES	Provisions of direct and indirect fish habitat	0	0	0	1
	Potentital to improve terrestrial habitat	0	1	1	1
	Impacts to natural hazard features	0	0	0	0
SOCIAL ENVIRONMENT	Ability to improve public health and safety	0	1	1	1
	Impacts to private property	-1	1	1	1
	Impacts to public property	-1	1	1	1
CULTURAL ENVIRONMENT	Impacts to built and cultural heritage landscape	0	0	0	0
	Impacts to archeological resources	0	-1	-1	-1
ECONOMIC ENVIRONMENT	Capital costs	0	-1	-1	-2
	Operation and Maintenance costs	0	-1	-1	-1
	Risk Management	0	0	0	0
	Impact on agricultural land use	0	0	0	0
	TOTAL SCORE	**-2**	**5**	**8**	**6**

Scoring System
-2 = greater negative impact
-1 = net negative impact
0 = no impact
1 = positive impact
2 = greater positive impact

Preferred Alternative

- The preferred SWM strategy for this area is the **Traditional SWM with BMP Implementation Strategy** – SWM pond(s) for peak flow control and erosion control, in conjunction with LID BMPs to reduce phosphorus, promote infiltration, and to potentially offset the need for a permanent pool. Where applicable, it is recommended to provide BMPs in areas where soils and groundwater levels permit on a future development basis.

- When SWM Ponds and LID measures are utilized in conjunction with one another (i.e. a treatment train approach), total phosphorus loading can be reduced further over Traditional SWM (Ponds) alone.

IMPLEMENTATION PLAN

- IBI has established a municipality-wide stormwater asset database, which includes catchbasins, oil-grit separators, SWM Ponds.
- IBI will identify the operation and maintenance requirements of each SWM facility and its assets which will allow for forecasting future requirements in terms of capital costs, operation and maintenance costs, and resources required by the Township to maintain its SWM facilities. The life cycle costs of each SWM facility will be calculated based on the forecasted operations and maintenance requirements. This information will be incorporated into the database, allowing Township staff to easily identify and plan yearly costs and resources required for each SWM facility and the overall program.

IMPLEMENTATION PLAN

IBI has provided in the SWMMP a manual that specifies in detail the procedures community staff will need to undertake when monitoring and inspecting the SWM facility and includes the following:

- *Timelines for monitoring, inspections, and maintenance activities;*
- *Monitoring and inspection checklist based on the timelines;*
- *Guidance to interpret the monitoring data;*
- *Recommendations for the various maintenance activities that may be undertaken for each SWM facility based on the monitoring data;*
- *A standardized rating system to assess the priority of the maintenance needs for the various SWM facilities;*
- *Procedures for sediment sampling, removal, and disposal; and,*
- *Procedures for obtaining required approvals for removal and disposal of sediments.*

The above will help the Township ensure that it remains in compliance with the ECAs for its municipal stormwater facilities

Next Steps in EA Process

- Consider input received through the public consultation process on the problem opportunity statement, the evaluation criteria and alternative solutions.
- Analyze the alternative solutions against the evaluation criteria and select the preferred alternative.
- Following Public Consultation and the Class Environmental Study process, the Project File report will be made available for a 30-day public review and comment period.
- This provides the opportunity for interested stakeholders to file a Part II Order request (requests for a bump-up)

THANK YOU!

- Thank you for coming to our Public Information Centre.
- Please let us know what you thought, and if you have any comments or questions.
- **Please email back the comment form by March 31st, 2021.**
- If you have any questions about this study, feel free to ask any member of the Study Team.
- Information requests or questions may be directed to:

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