

TABLE OF CONTENTS

	Page
1.0 STUDY REQUIREMENTS	J-1
2.0 STORMWATER AND ENVIRONMENTAL MANAGEMENT PLAN	J-2
2.1 Existing Environmental Conditions and Constraint Mapping	J-2
2.2 Detailed Studies	J-3
2.3 Stormwater and Environmental Management Plan	J-3
2.4 Cost and Implementation Information	J-4
2.5 Assessment of Phasing Requirements	J-4
2.6 Conclusions and Recommendations	J-4
3.0 SANITARY SEWER AND WATER SERVICING.....	J-5

August 21, 2010
M:\PROJECTS\DRAFT\974771\REPORT\Sept-RPT\APP-J.wpd

**APPENDIX J
SUGGESTED TERMS OF REFERENCE
FOR AN ENVIRONMENTAL MANAGEMENT PLAN
AND SERVICING STUDY**

1.0 STUDY REQUIREMENTS

The purpose of this study is to provide detailed information regarding requirements for servicing proposed developments in Shirley's Brook and Watts Creek Subwatersheds, while ensuring the maintenance of the desirable hydrologic characteristics of the watershed and the optimum protection of ecological resources. This Environmental Management Plan and Servicing Study (EMPSS) is to address the needs for stormwater management and sanitary and water servicing for the proposed development taking into account the environmental constraints and opportunities on the site.

The integrated environmental analysis required for the EMPSS considers all of the natural and technical elements that will provide for quality development in the City of Kanata. This Terms of Reference provides a framework for addressing a range of resource features at the detailed planning and design phase of the planning process and provides a means to integrate resource protection with servicing plan requirements.

The importance of doing this integrated planning is reflected in the design of subdivisions elsewhere in Ontario. In identifying environmental constraints and opportunities as the first step in developing a subdivision plan, the best combination of stormwater management practices and servicing design can be developed which both preserves and enhances environmental features while meeting technical needs.

The subwatershed study identifies features worthy of preservation at a broad scale. However, the EMPSS refines the development limits based on detailed field studies (e.g. tree surveys, aquatic habitat classification, wildlife corridor identification, hydrologic modelling). Once the significance and sensitivity of these features have been ground-truthed, on-site meetings can be held with all relevant agencies (e.g. the city, the region, the conservation authority) to confirm the final development limits. In addition, this detailed environmental and servicing review can suggest other innovative practices such as restoration of degraded natural areas and preservation of green space to form corridors and linkages.

The EMPSS thus ensures that good and reasonable decisions are made early in the final design of the subdivision. This provides for cost effective and innovative solutions that should satisfy the developer, municipality, government review agencies, and the public.

2.0 STORMWATER AND ENVIRONMENTAL MANAGEMENT PLAN

This section shall be undertaken in conformity with the objectives and criteria of the Shirley's Brook/Watts Creek Subwatershed Plan Study Report.

The subwatershed study states that detailed environmental impact statements shall be prepared in situations where natural heritage features are located in areas potentially affected by development. These include:

- areas of fish habitat;
- significant wetlands;
- significant woodlands;
- significant valleylands;
- significant areas of natural and scientific interest; and
- adjacent lands to significant wetlands.

In addition, standard flood control measures shall also be recognized, specifically relating to areas of no development and fill, control of post-development peak flows, and computation of flood lines. Stormwater management recommendations from the subwatershed study contain criteria for selection of best management practices, treatment and control requirements for water quality, and streambank erosion. They also include erosion and sediment guidelines in a subwatershed-wide basis.

A key purpose of the EMPSS is to take those subwatershed criteria and refine them to address site specific requirements in an integrated way, respecting natural environmental features and technical criteria.

The Consultant shall develop a stormwater and environmental management plan that provides adequate flexibility for integration with adjacent development and redevelopment areas, assists in the establishment of open space linkages, identifies opportunities and constraints to development, and details location and area requirements for stormwater management facilities, as well as restoration and enhancement opportunities. The purpose of the stormwater and environmental management plan is to demonstrate the conformance of the proposed future development with the Shirley's Brook/Watts Creek Subwatershed Plan.

Accordingly, the Consultant shall provide the following for the study:

2.1 Existing Environmental Conditions and Constraint Mapping

Mapping to delineate the Regulatory Flood Plain, valley slopes in accordance with MVCA policies, existing land uses, hydrologic features, vegetation communities (including functional classification), existing and potential habitat linkages, and aquatic habitat conditions (including

identification of Fish Habitat Type for each watercourse). (Scale of mapping is to be specified by the Steering Committee).

The Consultant is referred to Section 2.0 of the Shirley's Brook/Watts Creek Subwatershed Plan Study Report for a detailed description of mapping requirements.

2.2 Detailed Studies

Additional work necessary to ensure compatibility with the Shirley's Brook Subwatershed Plan may include the following: hydrologic features and functions, tree preservation plans, fish habitat impacts and mitigation measures, recognition of meander belt widths, environmental impact statement related to development on or adjacent to the Greenspace System, and the impact of alternative major transportation, servicing and utility corridors.

2.3 Stormwater and Environmental Management Plan

A Stormwater and Environmental Management Plan that includes the following information:

- Description of natural environment features and their significance and sensitivity to development, including: areas of fish habitat, significant wetlands, significant woodlands, significant valleylands, significant areas of natural and scientific interest, and adjacent lands to significant wetlands.
- Description of existing and proposed runoff conditions by subcatchment (including identification of proposed and existing discharge points to the Creek).
- Identification of significant tributary areas, including their classification relating to aquatic habitat.
- Identification of management practices and design considerations necessary to ensure that the development will conform to the Shirley's Brook/Watts Creek Subwatershed Plan.
- Identification of downstream problems and methods to mitigate or eliminate the same.
- Identification, screening and design of alternative management practices, based on guidelines provided in the Stormwater Management Practices Planning and Design Manual (MOEE, 1994).
- Where storage facilities are used, confirmation of location, catchment area, functional considerations, outlet characteristics and preliminary design elements.
- Detailed implementation steps and programs.

- Identification and description of a monitoring program necessary to demonstrate that stormwater management facilities are performing as designed and the water quantity and quality targets are being met; a monitoring program may also be required to evaluate potential impacts to on-site downstream and fisheries.
- Identification of maintenance implications in so far as the City is concerned.
- Any proposed infrastructure components such as modifications to any existing facilities (sewers).
- Documentation and adherence to criteria related to: fish habitat, extended detention, erosion and sedimentation control, flood control, and use of swales and constructed wetlands for water quality enhancement.

2.4 Cost and Implementation Information

Requirements relating to detailed engineering design submissions between the draft plan and registration stages of the subdivision approvals.

Cost estimates, preferred cost sharing formula, and implementation measures for proposed stormwater management facilities as may be warranted.

2.5 Assessment of Phasing Requirements

An outline of potential development phasing strategies in consultation with the steering committee and City staff, as well as a determination of the advantages/disadvantages and present value costs of the incremental stormwater management facility extensions/ requirements associated with each strategy. (For the purpose of the study report, it may be appropriate to combine the assessments of phasing requirements for both the sanitary sewer, water services and for the stormwater management facilities into one section.)

2.6 Conclusions and Recommendations

A summary of the methodology and findings, specifying and justifying a recommended stormwater and environmental management plan for implementation and identifying the costs and benefits of the optimum development sequence and 1 or 2 alternative development sequences as specified by the Steering Committee.

3.0 SANITARY SEWER AND WATER SERVICING

This section of the study shall determine and specify the optimum sewer and water servicing requirements to service the development area, together with all other potential mature state development within the logical limits of the affected servicing areas. The study should provide enough detail to satisfy the requirements of the "Approved Development Plan" approach to obtaining environmental assessment and approval.

Accordingly, the Consultant shall provide the following for the sanitary sewer and water servicing section of this study:

i) *Existing Infrastructure and Network Descriptions*

Maps of the locations and sizes of pipes (trunks and sub-trunks) and related major facilities, design data and tables based on current standards, overall system descriptions and maps, identification of drainage areas/pressure zone boundaries, and invert elevations at key points including creek crossings.

ii) *Future Land Use and Servicing Implications*

The specification and consideration of reasonable and mature state alternative development assumptions for areas within and external to the immediate study area; and, on the basis of those assumptions, it shall determine and document (by means of appropriate maps and tables), the relevant capacity limitations of existing sewer trunks, water mains and treatment plants in the overall system.

Since much of this information may already be addressed in other completed studies, this study need only include summaries of such information with source references and such evaluation/analysis as is required to address matters not yet adequately addressed.

iii) *Design Criteria and Characteristics*

The specification and justification of flow estimation assumptions and data (including relevant background, tables and/or graphs), and proposed network/pressure zone boundaries/ loops.

iv) *Proposed Infrastructure Alternatives and Recommendations*

The identification and evaluation of potential infrastructure alternatives and of a recommended solution supported by the provision of information respecting the alternative designs and facility requirements (including descriptions, maps, sizes, etc.); the advantages/ disadvantages of each alternative including environmental impacts, functional effectiveness and public and private capital and operating cost differences; and, the reasons for the selection and recommendation of the preferred solution.

v) *Assessment of Phasing Requirements*

An outline of potential development phasing strategies in consultation with the steering committee and City staff, as well as a determination/ calculation of the advantages and disadvantages and present value costs of the incremental sanitary sewer and water servicing extensions associated with each such strategy. (For the purpose of the study report, it may be appropriate to combine the assessments of phasing requirements for both the sanitary sewer, water services and for the stormwater management facilities into one section.)

vi) *Conclusions and Recommendations*

A summary of the methodology and findings of the report specifying and justifying recommended sanitary sewer and water servicing systems, documenting the functional design details of those systems, proposing an optimum development sequence and phasing strategy from a servicing perspective, and identifying and assessing the costs and benefits of alternatives.