

APPENDIX R

Terms of Reference for an Environmental Implementation Report From Subwatershed 11

East Credit Subwatershed Study
Phase III – Management Plan and Implementation Report

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INTRODUCTION

Most of the proposed future studies deal with land use change and associated servicing. These studies will need to be conducted at a tributary scale to ensure that the goals and objectives outlined in the factsheets for the subwatersheds are met.

Environmental Implementation Reports (EIR)

The purpose of the EIR is to:

- Ensure the goals and objectives set for the Silver Creek subwatershed are met when land use change occurs;
- Develop an appropriate plan that will achieve the targets set for individual environmental resources;
- Streamline the review and approval process; and
- Provide sufficient detail such that implementation reports for extraction sites or stormwater management plans for plans of subdivision can be developed.

The EIR consists of three parts namely, Part A - Background Review, Part B - Detailed studies/Impact Assessment and Part C - Implementation. Figure 1 illustrates the approval process from a land use and environmental perspective.

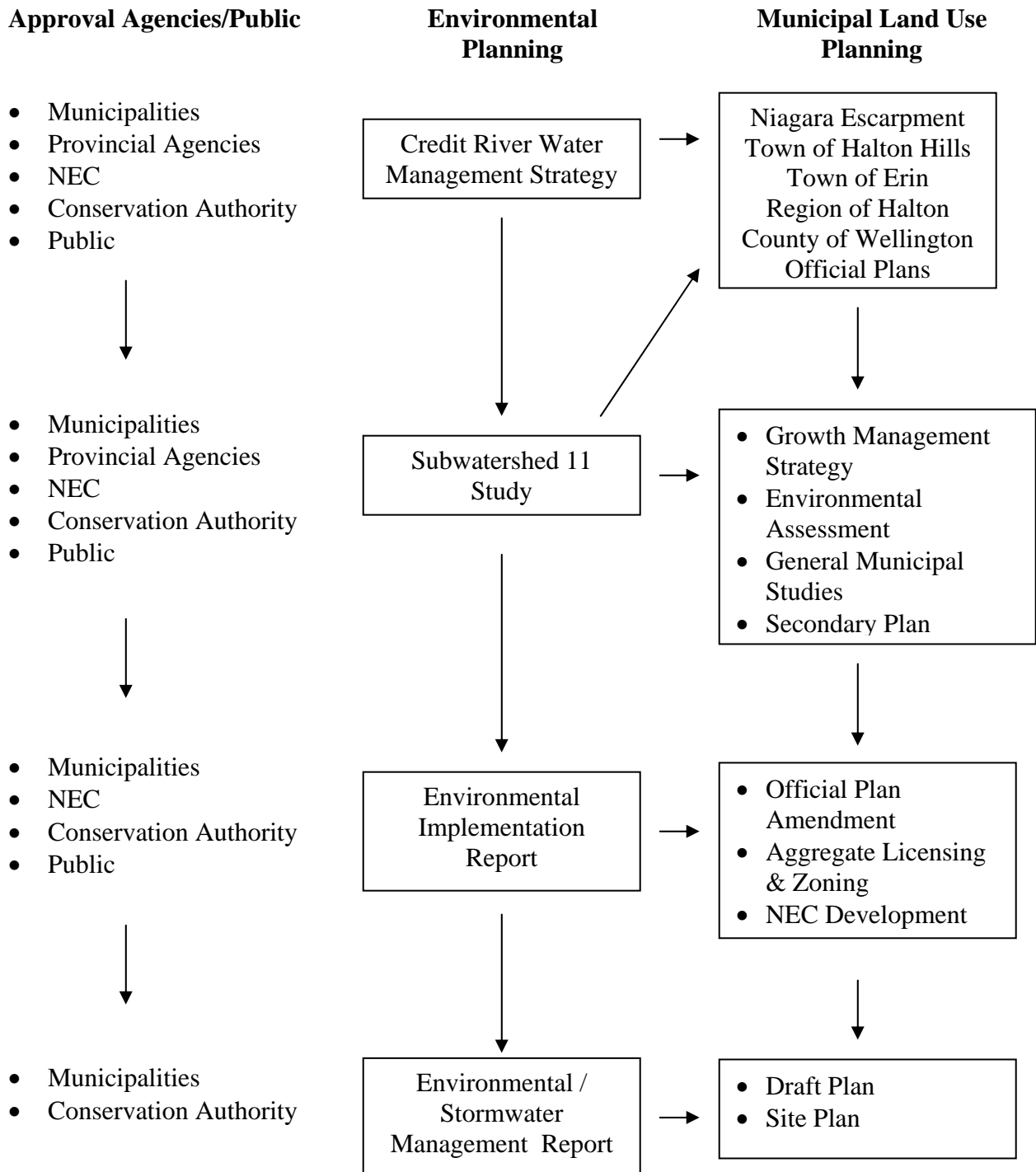
While the approach to an EIR must be consistent, each will be different given the issue of concern for each tributary and the land use change being proposed.

Part A of the EIR will set the stage for completion and could allow for scoping and feasibility in subsequent Parts B and C. The direction of each EIR will be jointly determined between the CVC, Region of Halton, County of Wellington, Town of Halton Hills, the Township of Erin and the Niagara Escarpment Commission, where appropriate. Appendix R provides a terms of reference for the EIR.

If aggregate extraction is proposed below the water table, a hydrogeology study needs to be prepared which demonstrates that regional wells and groundwater functions will be protected (Planning & Engineering Initiatives Ltd. & Associates 1999).

The Region of Halton, County of Wellington, Town of Halton Hills, Township of Erin, Niagara Escarpment Commission, MNR, CVC and the aggregate industry should work together to prepare rehabilitation master plans for the aggregate resource areas in subwatershed 11 (Planning & Engineering Initiatives Ltd. & Associates 1999).

Figure 1: The Approval Process from a Land Use and Environmental Perspective



The Environmental Implementation Report consists of fourteen steps broken up into three parts (see Table 1):

Table 1: Contents of an Environmental Implementation Report

Part A Background Review	<ol style="list-style-type: none"> 1. Introduction to the proposed land use change 2. Background information 3. Baseline Monitoring 4. Existing conditions and constraint mapping 5. Report
Part B Detailed Studies/Impact Assessment	<ol style="list-style-type: none"> 6. Detailed studies 7. Detailed description of the proposed land use change 8. Impact assessment 9. Report – set targets
Part C Implementation	<ol style="list-style-type: none"> 10. Stormwater management plan 11. Long term monitoring plan 12. Conclusions, recommendations and mitigating measures 13. Executive summary 14. Report

If the fourteen steps are followed, the length of time and level of effort required to prepare, submit and review will be minimized. Figure 2 shows how the EIR and subwatershed study processes are connected.

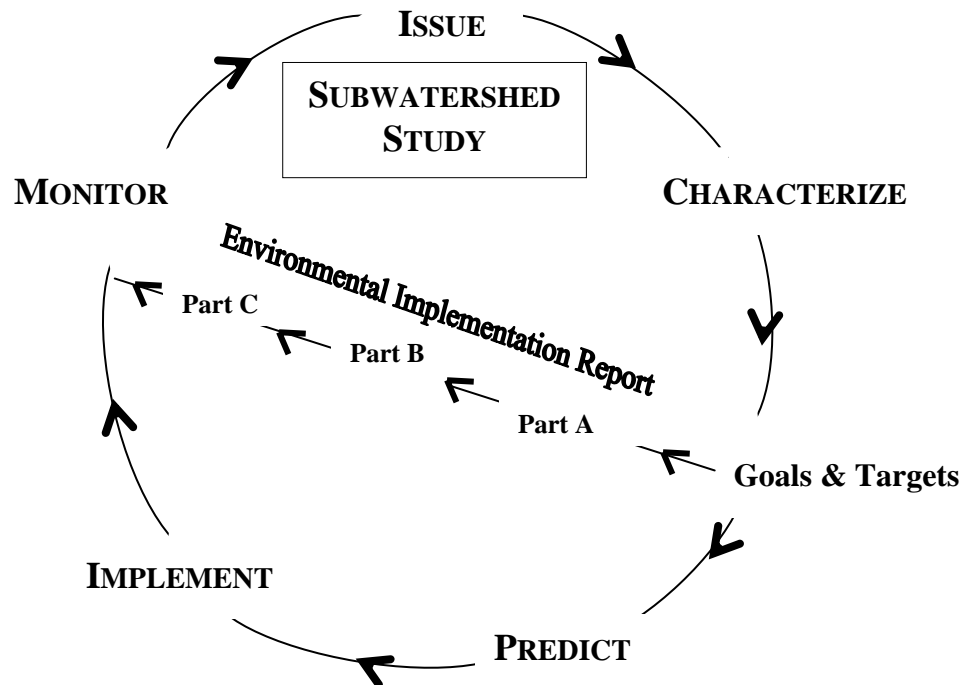


Figure 2: The Environmental Implementation Report and the Subwatershed Planning Process

The outside ring represents the subwatershed planning process. The diagonal line inside the ring is the environmental implementation report preparation process, which is guided by the goals and targets set by the subwatershed planning process. Environmental implementation reports are used to refine and apply the recommendations of a subwatershed plan to the smaller scale site development. Monitoring is an essential component of the EIR process.

The next section describes the fourteen steps of preparing an EIR in detail.

PART A – BACKGROUND INFORMATION

1. Introduction to the Proposed Land Use Change

The purpose of this component is to focus on the tributary of concern and translate pertinent known information to establish initial constraints and baseline conditions. The end product is to be able to identify the needed detailed studies to be done in Part B.

This section should include:

- A brief description of the proposed land use change and associated servicing issues; and
- A general map of the area.

2. Background Information

Include literature cited, all background data (including subwatershed studies), list of information sources contacted during the study, and a listing of the professionals on the study team.

3. Baseline Monitoring

Monitoring is completed to check the impact that the proposed land use change has on the environment. The purpose of baseline monitoring is to establish the baseline conditions and existing environmental trends to which future monitoring results will be compared.

Information should be collected on (but not be limited to):

- Water quality
- Fisheries
- Hydrology
- Groundwater quality and quantity
- Stream morphology
- Terrestrial resources – woodlots, wetlands, wildlife, Environmentally Sensitive Areas, Areas of Natural or Scientific Interest

When preparing a baseline monitoring plan, it is important to ensure that many different disciplines are being monitored at the same sampling site where possible and appropriate. For example, fisheries and water quality monitoring should take place at the same site.

The monitoring plan should include an explanation of how the indicator parameters were established, e.g. what criteria were used when deciding what to monitor, will be included in this section.

Baseline monitoring must be included in the project work plan, and associated costs must be included in the project budget.

4. Existing Conditions and Initial Constraint Mapping

Field work should be carried out to better define the existing functions, linkages and limits of the natural environmental resources. Detailed constraint mapping at a tributary scale will be prepared which highlights the environmental resources detailed in the appropriate tributary fact sheet, as well as agency and municipal setback constraints (i.e. Environmental Protection Strategy, Fisheries Act, valley land setbacks). This part of the submission will show how the proposed land use change has been designed in conformance with the initial constraint mapping and will show how the EIR conforms to the general concepts of the Subwatershed Plan. See #14 for mapping specifications.

The mapping may include, but not be limited to:

- All hydrologic features including watercourses, swales, ponds, depression areas, springs, seepage areas and existing stormwater management facilities
- Regulatory flood plain as per the CVC Flood Plain Management Policies
- Present day land use
- Wetlands, woodlots and other terrestrial and riparian communities
- Terrestrial corridors (existing and potential)
- Water quality
- Aquatic communities and habitat, and appropriate setbacks
- Fill lines, valley slopes, top of bank, ecological considerations and geotechnical hazard areas as per the CVC Watercourse and Valleyland Protection Policies
- Groundwater recharge and discharge areas, and the linkages between them
- Groundwatersheds (extending outside the study area – if applicable)
- Stream morphology, channel sensitivity and setbacks required to allow natural channel functions (migration, flooding)
- Preliminary channel classifications (i.e. identify LIKE reaches)
- Limit of extractable resource, and grade and type of extractable resource

Data deficiencies and information gaps need to be summarized and a workplan developed for filling gaps.

5. Report

Once the requirements of steps 1 to 4, have been fulfilled, a preliminary report will be submitted for staff review and approval prior to proceeding to the following steps.

PART B – DETAILED STUDIES AND IMPACT ASSESSMENT

6. Detailed Studies

If found through completing Part A that insufficient information exists to complete the constraint mapping or develop protection, restoration and enhancement plans for the subject area, then detailed studies must be prepared. The need for, and scope of the detailed studies should be confirmed with the Halton Region, Town of Halton Hills, County of Wellington, Town of Erin and CVC at the conclusion of Part A. Detailed studies may include, but are not limited to:

- Surface water and groundwater resources study
- Aquatic resources and water quality study
- Geomorphology study
- Terrestrial resources study
- Hydrogeology impact associated with aggregate extraction

A) Surface water and Groundwater Resources Study

Note the groundwater detailed study is more extensive if the proposed land use change is an aggregate pit – additional study components are required. If this is the case see the section on Hydrogeology Impacts Associated with Aggregate Extraction

The constraint mapping will have identified hydrologic features within the study area; however the overall hydrologic system must be described. The components of the system to be addressed by the detailed studies include:

- a) Identification of flow characteristics in on-site watercourses and swales, and a general description of the water balance on the site;
- b) Characterization of all hydrologic features (watercourse, swales, natural areas providing flood storage/attenuation, depression storage, recharge areas, seepage areas and springs);
- c) Identification of volume and distribution patterns of the major discharge areas and a representative location used for monitoring; and
- d) Description of the relationship and dependencies between these features and the surrounding terrestrial, wetland and aquatic resources.

B) Aquatic Resources and Water Quality Study

The constraint mapping will have identified fish habitat and water quality classification for the tributaries. The detailed study is to provide the following information in support of the habitat classifications and planned land use change conditions:

- a) The direct and indirect physical impacts on water bodies and water quality from the activity;
- b) The fish species present, and the direct and indirect biological impacts of the physical impacts in a);
- c) The life stages of aquatic animals and bugs supported by the impacted habitat; and

- d) Whether the impacted habitat represents a limiting factor for the proposed land use change.

C) Stream Morphology Study

The study will describe the physical form of the watercourse. The following information will be included:

- a) Characterization of geomorphic features including sensitive reaches, areas of erosion and aggradation, channel migration, and
b) Determine the relationship between geomorphology and hydrology of the system.

D) Terrestrial Resources Study

The study will describe the physical form and function of the ecological features of the area, any functional relationships to adjacent areas, define what additional issues must be examined (i.e. buffers) and demonstrate how the proposed land use change will maintain or compensate for the area's existing ecological/hydrological functions. Reference to section 5 of the Natural Heritage Reference Manual (MNR 1999) will be of some assistance.

The terrestrial resources study will contain, but not be limited to:

- a) Maps illustrating land ownership, and land use zoning;
b) Maps illustrating any of the following that occur in or within 120 metres of the proposed land use change: significant wetlands; significant portions of habitat of endangered or threatened species, significant woodlands or valley lands; significant wildlife habitat; areas of natural and scientific interest; and environmentally sensitive areas; and
c) A biological description of the natural environment that might reasonably be expected to be affected by the land use change proposal.

E) Hydrogeology Impact Associated with Aggregate Extraction

The developer is expected to follow the provincial standards set out in the document *Aggregate Resources for Ontario* and the following more detailed requirements.

If extracting above the water table:

- a) Establish the water table elevation before extraction occurs;
b) Determine how hydrology and hydrogeology will change, and the effect of the change on the fishery, terrestrial resources, geomorphology, surface water, water quality, etc.

If extracting below the water table, the study should include, but not be limited to:

- The general groundwater setting and linkages between the local and surrounding groundwater system;

- Sensitivity of the natural environment and the function of the groundwater related to natural features such as the fishery, terrestrial resources, geomorphology, surface water, water quality, etc. ;
- Approximate high water table location;
- Groundwater flow and direction and the general geologic setting;
- Potential recharge and discharge areas on and adjacent to the site;
- Local groundwater resource usage;
- Location and usage of water wells within 1 km of the site;
- Detailed description of the local geologic conditions and the function of the geologic units from a hydrogeologic perspective;
- Detailed assessment of the groundwater flow system, local flow direction, linkages to surface water and the regional groundwater flow system;
- Detailed local and regional water budget related to the groundwater system. The emphasis should be on estimating recharge to the site, groundwater flux off site to the local system, regional system and local and regional discharge. The water budget should be evaluated on a sensitivity perspective to potential change in groundwater movement on a sub-catchment and subwatershed scale;
- Delineate major and local aquifers in the area and interpret the connection to the site;
- Studies on springs, surface water courses or discharge to surface water that focus on groundwater/surface water interaction, determining linkages to recharge and discharge areas through baseflow assessment, vertical gradients, and water table location. This information should be incorporated into the water balance; and
- Proposed water diversions or storage and drainage facility studies should focus on the linkage of the surface water to the groundwater.

7. Description of Proposed Land Use Change

Section 7 should include, but not be limited to:

- The purpose of the proposed land use change and associated servicing issues;
- A detailed location map and site plan;
- Activities associated with the proposed land use change both during the construction phase and the post development phase which may have an impact on the natural environment;
- A schedule of the proposed land use change, including any phasing for the development;
- A discussion of the “do nothing” alternative and other alternatives to the proposal; and
- How the proposed land use change has incorporated the environmental resources and planning/designing the proposed land use change.

8. Impact Assessment

A concise description of potential impacts for each study completed will be included. This will include how linkages between environmental resources, and functions of the resources will be affected. Predicted changes in all natural features will be included.

Revised or updated Constraint Mapping will be required to reflect the results of the Impact Assessment.

9. Report

Once the requirements of steps 6 to 8, have been fulfilled, a report on Part B will be submitted to the Halton Region, Town of Halton Hills, Wellington County, Town of Erin and CVC for review and approval prior to proceeding to the following steps. The report will include environmental targets for the area should the land use change be approved.

PART C – IMPLEMENTATION

The implementation section should focus on how the recommendations and findings will be addressed. There may be several recommendations in various aspects on the environment. Stormwater management is a given requirement and as such, is outlined here.

10. Stormwater Management Plan

Stormwater management facilities and enhancement techniques will be required to ensure that hydrologic characteristics of the subwatershed will be maintained and ecological resources will be protected. This is not required for all developments. Check with CVC staff to determine if it is necessary to prepare a stormwater management plan.

The stormwater management study will define and provide the following:

- a) Description of existing and proposed runoff conditions by subcatchment;
- b) Identification of significant watercourses;
- c) Identification of management practices and design considerations necessary to ensure that the stormwater management plan conforms to the Silver Creek Subwatershed Study;
- d) Identification of downstream problems and methods to mitigate or eliminate them;
- e) Identification, screening and design of alternative management practices based on guidelines provided in the Stormwater Management Practices Planning and Design Manual (MOEE 1994) and CVC Stormwater Management Guidelines (CVC, 1996);
- f) Where basins are proposed, confirmation of location, catchment area, functional considerations, outlet characteristics and preliminary design elements;
- g) Documentation and adherence to criteria related to water quality, water quantity and base flow protection;
- h) Detailed implementation steps and programs;
- i) A summary of the technical findings and recommendations; and
- j) Location, sizing and design of all stormwater management facilities.

It is acknowledged that these details will be fleshed out when needed.

11. Long Term Monitoring plan

Monitoring should continue after baseline conditions are established. The monitoring plan should be designed in such a way that impacts can be distinguished from natural trends at an early stage.

If impacts are detected:

- A more aggressive type of monitoring should take place that determines where, why and how fast the change is occurring;

- Establish cause-effect relationships between environmental resources and land use change;
- Be able to deal with change by proposing appropriate mitigative measures; and
- Focus on evaluating ongoing or proposed management practices.

Items that should be monitored over the long term include, but are not limited to:

- Water quality
- Fisheries
- Hydrology
- Groundwater quality and quantity
- Stream morphology
- Terrestrial resources – woodlots, wetlands, wildlife, Environmentally Sensitive Areas, Areas of Natural or Scientific Interest

It is essential that long term monitoring be included in the project work plan, and that monitoring costs are included in the project budget

12. Conclusions, Recommendations and Mitigating Measures

This section will include, but not be limited to:

- A comparative evaluation of alternative management options leading to the selection of the preferred option;
- Conclusions and recommendations - include the advisability of proceeding. ; and
- Mitigation Measures – if impacts are expected, what plans are in place to maintain functions within the natural system.

13. Executive summary

Include a summary at the front of the report that contains a description of the land use change, the effects on the environment, and all recommendations. The summary should include information from Parts A, B, and C.

14. Reporting Format

A complete description of all the work and conclusions involved in the EIR (Parts A,B, and C) needs to be included here.

Reports should be submitted in hard copy along with an electronic copy in Word 7 or lower on a labeled 3.5 inch floppy disk, or CD, or via e-mail. Diskettes should be scanned for viruses and corruption prior to delivery. 3 copies of the report, each with a full set of maps should be prepared, and one submitted to Credit Valley Conservation, one to the either the Region of Halton or Wellington County and one to either the Town of Halton Hills, or the Town of Erin.

Graphics

Graphics will be submitted in Microsoft Powerpoint format, version 4 or lower. The graphic should be delivered on disk separately from the main document, although it should also be incorporated into the main document file.

Artwork

Artwork should be provided in Corel Draw 5.0 or lower, and should also be delivered on 3.5 inch floppy separately from the main document, even though incorporated into the main document. If the artwork has been scanned, it may be delivered in GIF or TIF bitmat format.

Mapping

Mapping should be in a scale of 1:5000 or less

It should be noted that ArcView 3.0 and PC Arc/Info comprise the GIS software currently in use at CVC; as such, Arc/Info format coverages are considered to be the standard for the organization.

In general, digital graphic data:

- **must** be georeferenced in either UTM (preferred, using NAD 27) or latitude-longitude co-ordinates;
- **must** be clean, i.e. polygons should be closed, dangles eliminated, polygons with common borders should not overlap, etc.;
- should be packaged/organized into logical layers, for example, a soils layer, a wetlands layer, etc.;
- must be in vector as opposed to raster format, unless otherwise specified;
- should be in either uncompressed ASCII Arc/Export E00 format (preferred), ArcView Shapefile or AutoCAD exchange DXF format.

If provided in DXF format, the elements necessary to produce correct topology in Arc/Info should be included, such as feature codes and attributes. Peripheral graphics such as page borders and title boxes should be included only if they are stored in layers distinct and separate from the actual map graphic. All features should be in separate, named layers, and layers should be colour-coded; a single, unique, numeric label feature ID should be placed inside of polygons. Attributes may be provided in separate tables, although it should be ensured that a common variable exists between the attribute table and the map features, such as feature ID, to allow their association and/or joining.

Tabular Attribute Data

Attribute data should be provided in Microsoft Access 97 format files (preferred), dBase IV format files, or in formatted (i.e. with defined columns) ASCII files.

Textual Data for Graphics

Text should be provided in Word for Windows version 7.0, or in ASCII format. Please be aware that any tabular data to be referenced to actual map features should **not** be provided as tables in a Word document.

Digital Photos

Digital photos, whether they be scanned photographs or computer-generated artwork, should be provided in Corel DRAW 5.0 (i.e. for vector graphics), encapsulated postscript (EPS), or bitmap (either TIF or PCX) format for scanned graphics.

For more information on delivering digital data, refer to the document *Specifications for the Delivery of Digital Data to Credit Valley Conservation*

Table 2: Summary of the EIR Process

PART	DESCRIPTION	OUTPUT	STEPS
A	<p>Background Review</p> <ul style="list-style-type: none"> • Brief introduction of the proposed land use change and associated servicing issues • Describe and implement monitoring to collect baseline conditions • Field work carried out to better define the environmental resources 	<p>Background Report which includes:</p> <ul style="list-style-type: none"> • General site map • Development schedule • Literature cited • List background data consulted • Constraint maps that include all environmental and water related features in and adjacent to the proposed land use change area • List detailed studies needed for Part B 	1, 2, 3, 4, 5
B	<p>Detailed Studies and Impact Assessment</p> <ul style="list-style-type: none"> • Describe the purpose of the land use change and its associated servicing • Describe the activities associated with the land use change and servicing issues • Describe possible alternatives to the proposal • <i>If</i> insufficient information exists to adequately assess the impact of the proposal, then detailed studies need to be completed. • The hydrogeology study requirements are more detailed for extraction developments that plan to go below the water table • An impact assessment will be included in this phase – a statement that describes the potential impacts that the land use change will have on environmental resources • Show how the proposed land use change has considered the environmental resources in planning/design proposal • Set environmental targets 	<p>Impact Assessment Report which includes</p> <ul style="list-style-type: none"> • Detailed location map • Site plan • Surface water and groundwater resources study • Geomorphology study • Aquatic resources and water quality study • Terrestrial resources study • Hydrogeology impact associated with aggregate extraction • Report summarizing alternative scenarios associated impacts and list of mitigative measures. • Revised Constraint Mapping • Forecasted changes in all environmental resources <p><i>Note: acceptable mitigation must conform to the goals and objectives and must meet targets</i></p>	6, 7, 8, 9
C	<p>Implementation</p> <ul style="list-style-type: none"> • Will include a long term monitoring plan to determine if and where change is occurring • Includes a recommended plan that shows how goals and objectives are achieved • Includes the recommendations for implementation 	<p>Implementation Report which includes:</p> <ul style="list-style-type: none"> • Stormwater management plan • Long term monitoring plan • Conclusions • Recommendations • Mitigating measures • Executive summary of Parts A,B, and C <p><i>Note: monitoring plan must be designed to evaluate if the targets set are being met</i></p>	5, 6, 10, 11, 13