



# Forbes Creek Subwatershed Study



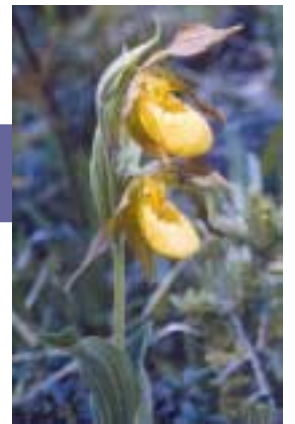
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**SMALL YELLOW LADY'S SLIPPER**  
(*CYPRIPEDIUM CALCEOLUS* VAR *PARVIFLORUM*)



**T**he **Small Yellow Lady's Slipper (*Cypripedium calceolus* var *parviflorum*)** relies on a fungus to absorb nutrients from the soil and prefers wet areas such as swamps, wet meadows and most forests. The Small Yellow Lady's Slipper is one of ten Regionally Significant vascular plant species found in some of the habitats in the Forbes Creek subwatershed.

The genus name *Cypripedium* means "Venus slipper" and refers to the yellow pouch like chamber into which bees enter to gather nectar.

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## EXECUTIVE SUMMARY

### 1.0 Introduction

A subwatershed study for Forbes Creek has been prepared under the direction of the City of Cambridge. It was prepared by an interdisciplinary team of consultants led by Planning & Engineering Initiatives Ltd. in Kitchener.

Development pressure in the Forbes Creek subwatershed in the community of Hespeler required the preparation of a subwatershed plan in order to comply with provincial, regional and municipal planning documents and to ensure that any future urban development would proceed in an environmentally sustainable manner. A subwatershed plan is both a technical document and one that sets in place the framework necessary for effective management of water resources and the related environment. Forbes Creek is a subwatershed of the Speed River watershed that forms a part of the larger Grand River watershed that flows into Lake Erie.

The plan has been prepared for the entire subwatershed including the mix of existing land uses from agriculture and residential development to waterfowl sanctuary and open space. A small portion east of the subwatershed referred to as the expanded study area was included to complete the regional overview of this area of the City. The Forbes Creek subwatershed including the expanded study area boundary is shown on [Figure A 1.1.1](#).

The plan is a component of the integrated planning process because of the interrelationship of water resources, environmental conservation and urbanization within the subwatershed. This integration into the planning process in turn means that the watershed plan has become part of the overall decision-making process that directs land use in the broadest sense in the City of Cambridge.

### 2.0 Background

Watershed plans take a broad ecosystem approach, but are focused on water, water related natural features, terrestrial resources, fisheries, water dependencies and open space systems. Watershed plans are closely linked to land use planning at a Regional level. Land use activities in the broadest sense ultimately govern the health of the natural systems.

A watershed plan is a fundamental background and supporting document to subsequent Community Plans, and ultimately the construction of stormwater management facilities and other water management structures that are subject to the Class Environmental Assessment (EA) process. Therefore, creation of the subwatershed plan was carried out in the spirit of the EA process and in particular, incorporated a similar process of public consultation.

A strength of the process was the public involvement component that involved numerous public meetings and workshops, on-site tours, elementary school sessions and presentations to the Cambridge Environment Advisory Committee, local and regional governments. The project was also detailed and updated on a web site available from the GRCA and PEIL web sites.

### 3.0 Goal of the Subwatershed Plan

The overall goal of the Forbes Creek Subwatershed Study is to protect, maintain and enhance the ecological processes and functions and significant natural features of the subwatershed in a way that is environmentally sound and socially and economically sustainable. This requires a balancing of considerations of the natural environment with those of the human economy that often place considerable stress on the natural systems.

The subwatershed plan through public consultation, agency comments and the study team investigations, defines issues and objectives for resource management and provides an appropriate set of management strategies to achieve these objectives. The policies, guidelines and regulations of both Federal, Provincial and local governments govern baseline or minimum requirements for the protection of watershed resources and these have been used as the starting point in defining goals and





objectives. These were refined according to the specific conditions and issues for Forbes Creek. A summary of the various objectives and issues is shown in Table ES-1 and demonstrates that they have been addressed.

## 4.0 Results of the Technical Studies

The results of the Technical Studies are summarized in the following sections regarding hydrogeology, hydrology, floodplains, fluvial geomorphology, water quality, fish habitat, agriculture, terrestrial resources under the headings of existing conditions and future management considerations.

### Hydrogeology

#### Existing Conditions

The Forbes Creek subwatershed consists of more than 85% sand and gravel, which is highly permeable. Rainfall on these areas contribute to groundwater recharge and baseflow within the subwatershed and related wetland areas. Groundwater therefore plays an important role in sustaining the health of the surfacewater environment within Forbes Creek as well as providing the drinking water supply.

#### Future Management Considerations

Hydrogeological issues are summarized as:

- Need to minimize the loss of groundwater recharge: any increased runoff can be infiltrated near to its point of generation.
- Development in the subwatershed might cause water quality changes related to the increased use of de-icing salts, vehicle exhaust residue, leaks, and spills; and the reduced use of nitrates and other fertilizers.
- Grading and the construction of buried utilities have the potential to alter the groundwater levels and flow patterns within the subwatershed by intercepting or diverting existing groundwater flow and discharge patterns.
- The soils in the Forbes Creek subwatershed contain areas of highly permeable sand and gravel resulting in high levels of infiltration that provides baseflow to the wetlands, ponds and creek. Existing levels of infiltration should be maintained under future development scenarios.
- At-source infiltration should be maximized wherever feasible as this is the most desirable form of stormwater management from a hydrogeological perspective.
- Infiltration of salt-laden stormwaters should be avoided in areas where wetland vegetation communities are particularly sensitive to salt impacts
- Development should be carefully evaluated in areas with a high groundwater table where perimeter drains can result in the capture and short-circuiting or diversion of groundwater flow
- Sound dolostone bedrock is encountered at the ground surface or at shallow depth along the east boundary of the subwatershed. This bedrock will greatly increase the cost of servicing if utility corridors require excavation into rock.
- Water quality should be maintained or improved although the temperature of groundwater discharge is less critical in areas bordering Forbes Creek than would be the case for development bordering coldwater streams.

### Hydrology

#### Existing Conditions

The Forbes Creek subwatershed drains 350 hectares entirely within the City of Cambridge. Forbes Creek has two branches (East and West), which begin west of Regional Road #24. Both branches travel in a southeasterly direction and join just south of Blackbridge Road to form one main branch. The main branch of Forbes Creek flows south to its confluence with the Speed River. In the lower part of Forbes Creek (after the East and West branches join) there are three online ponds and two other ponds to the east (see [Figure A 1.1.2](#) in the study). There is also significant development in this part of the subwatershed primarily west of Guelph Avenue. Runoff from this development discharges to the creek, through storm sewer pipe, near the outlet to the Speed River.





### **Future Management Considerations**

The major considerations in establishing hydrologic management targets are related to ensuring that peak flows are not increased and to ensure that development does not cause flooding in downstream areas. In addition, careful consideration should be given to the discharge of runoff from development to ensure that the fluvial and aquatic characteristics of the creek are not impacted. Considerations include maintaining the hydrograph, maintaining contributions to groundwater recharge, and maintaining the flow attenuation function of the wetlands. Upstream of Regional Road #24, stormwater management detention facilities should be used for erosion protection and to protect significant natural storage areas in the headwater areas.

### **Floodplain**

#### **Existing Conditions**

Forbes Creek originates within wetlands west of Regional Road #24 (Hespeler Road). At this point there are two branches (East and West). The East Tributary travels through a culvert under Regional Road #24 (Hespeler Road). It then flows south and under Blackbridge Road via a culvert. The drainage area to the Regional Road #24 (Hespeler Road) culvert is 84 ha and 118 ha to Blackbridge Road. Floodplain mapping for Forbes Creek was prepared as part of this study.

#### **Future Management Considerations**

The major considerations are to maintain floodlines through stormwater management strategies, update floodline models if channel alterations occur and upgrade the culvert under Blackbridge Road on the east branch of Forbes Creek to reduce road flooding.

### **Fluvial Geomorphology**

#### **Existing Conditions**

The data indicates that the Forbes Creek system has been substantially altered from its natural state however it appears stable regarding sediment and water transport.

#### **Future Management Considerations**

Generally, there are areas of the creek system which are hindered from proper functioning as a result of human interventions: the large number of concrete impediments to flow are a concern and many will need to be removed completely as part of the management strategy. Issues regarding channel rehabilitation, water temperature and quality from stormwater outlets and in-channel barriers to water and sediment flow require attention.

### **Surfacewater Quality**

#### **Existing Conditions**

Both warm and cold water stream conditions occur in the Forbes Creek system. The primary problem regarding the water quality concerns for Forbes Creek is the lack of consolidated information. Monitoring from the results of this study indicate that both point and non-point contaminant sources exist in this system.

#### **Future Management Considerations**

Using the information compiled in this study, preliminary objectives for water quality are based on the Ministry of Natural Resources' criteria for coldwater and warmwater streams in Southern Ontario. Objectives for water quality parameters such as





water temperature, dissolved oxygen, phosphorus, sediment and bacteria are provided for Forbes Creek. Additionally, the Stormwater Management Practices Planning and Design Manual will be implemented for any proposed new development to address water quality concerns and attempt to maintain or improve existing conditions.

## **Fish Habitat and Community**

### **Existing Conditions**

Barriers to fish migration separate Forbes Creek from the Speed River. These barriers are composed of dams, ponds and associated water level control structures. The creek system is considered both a warm and cool water system; warm in the lower reaches of the creek and cool in the upper reaches. Brook trout, creek chub, brook stickleback and pumpkinseed species have been found to inhabit the system.

### **Future Management Considerations**

There are three key habitat factors that effect fish productive capacity in Forbes Creek, specifically base flow, migration barriers and the existing on-line ponds. Preservation of the upper watershed wetlands and implementation of stormwater management practices will ensure base flow is maintained or improved. Improvements to Forbes Creek and related ponds will maintain and potentially improve fish habitat.

## **Agricultural and Rural Resources**

### **Existing Conditions**

Most of the agricultural land within the subwatershed has been rated for soil capability between Classes 1 and 3 with some classified in capability classes 4 and 5. The majority of the land area is in agricultural production with common field crops such as corn and soybeans predominating. Some fields are used as hay/pasture and a relatively small acreage is in specialty crops.

### **Future Management Considerations**

The management of the subwatershed will be influenced by the relative weight given to agriculture within the planning process in the short run as well as in the long-term. Agricultural uses are predominant in the north and west portions of the subwatershed and have the potential to significantly affect water quality and quantity. Two categories of considerations exist related to: preservation of agricultural land with emphasis on specialty crop areas and lands with higher common field crop capability; and recommendations related to best management practices.

## **Terrestrial Resources**

### **Existing Conditions**

The Forbes Creek Subwatershed Study has documented core habitat areas and corridors that provide habitat for plant and wildlife species, including species considered rare on a local, regional, provincial and national basis. The creek corridor is predominantly vegetated with wetland cover downstream of Blackbridge Road, including the Forbes Creek 'Sanctuary' where ponds were created several decades ago to provide a refuge for wood ducks and other waterfowl species. The upper subwatershed contains upland forest as well as wetlands, and is presently being considered by the Region as a candidate Environmentally Sensitive Policy Area. The Subwatershed Study determined that the Forbes Creek Wetland Complex is Provincially Significant based on current inventory information; subsequently that status has been confirmed by the Ministry of Natural Resources.

Forest cover within the subwatershed is approximately 15% while wetlands cover 13% of the landscape. The corridor provides a relatively continuous natural habitat connection between the regionally significant Speed River corridor, and the upper Forbes





Creek subwatershed as well as adjoining subwatersheds. Although locally constrained by existing residential, agricultural and highway land uses, the variety of upland forest, wetland and successional communities present sustain quality species, and active wildlife movements. The quality, attributes and functions of these habitats are supported in part by the linked cover of the wetland and upland habitats, their relationship to local topography, by the groundwater and surfacewater regimes, and (significantly) by the agricultural matrix which facilitates species movements.

### Future Management Considerations

The wetlands within the Forbes Creek Wetland Complex are Provincially Significant and require protection from development based on Provincial, Regional and City policies. The recommended Greenspace Management Strategy will retain and protect the wetlands and corridor functions within a Natural Heritage System enhanced to offset the impacts of future urbanization. The Subwatershed Study provides a Comprehensive Environmental Impact Study that defines limits to future development, refines the feature boundaries, and the recommends the treatment of adjacent lands. Enhancement and buffer areas are identified to ensure the protection of these areas and their functions. Specific issues to be considered include the impacts of urban encroachment and proximity on habitats and species, the maintenance of significant corridor functions between the Speed River corridor and the upper subwatershed, maintenance of the sensitive shallow hydrogeologic regime downstream of Blackbridge Road, and the potential impacts of urban stormwater runoff on wetland integrity.

## 5.0 Conclusion of the Technical Studies

Based on the results of the technical analyses, the Forbes Creek subwatershed will be capable of accommodating future urban growth by maintaining or enhancing the current subwatershed conditions through consideration and implementation of the following watershed management strategies.

## 6.0 Evaluation of Watershed Management Alternatives

The results of each of the technical studies were assessed in comparison to the goals and objectives of the subwatershed plan. A series of options were evaluated to determine the best management strategy and course of action. Watershed management strategies were then produced that incorporate the optimal approach to achieving the goals and objectives of the subwatershed plan.

## 7.0 Watershed Management Strategies

The Watershed Management Strategy is described under the topics of:

- Greenspace Management Strategy (Map 3) includes all management needs related to terrestrial resource protection and land use management.
- Aquatic Rehabilitation Strategy ([Figure C 3.1.1](#)) describes the rehabilitation and enhancement recommendations for aquatic features and riparian corridors.
- Conceptual Trail Strategy ([Figure C 3.4.2](#)) outlines the concept requirements for future trail corridors.
- Water Management Strategy – includes quantity and quality control for surface and groundwater as well as servicing requirements.
- Adaptive Management / Monitoring Strategy.

### 7.1 Greenspace Management Strategy

It is recommended that the Greenspace Management Strategy (outlined in Section C 3.3) be adopted and implemented. The plan will aid in the protection, enhancement, and use of ecological features and functions for the subwatershed. The plan will be implemented through the Community Plan process and subsequent Official Plan, Zoning By-law, Draft Plan of Subdivision, Scoped and Full Site EIS Studies and other studies related to detailed design and development.



### **Provincial, Regional and Local Policy Areas**

It is recommended that the boundaries of the Policy Areas ([Figure C 1.2.1](#)) be refined in existing Regional and City Official Plan and Zoning By-laws to reflect the boundaries of the features identified on this Figure. These areas include the Regulatory Floodline (not previously mapped), Provincially Significant Wetlands, Locally Significant Natural Areas and the candidate Environmentally Sensitive Policy Area.

### **Environmental Constraints to Development**

The environmental basis or rationale for the Policy Areas described above is reflected by the Environmental Constraints ([Figure B 8.3.2](#)) and shown as either a High or Medium Constraint. This hierarchy of constraint is related to the characteristics of the area: High Constraint being those areas that form Core features of the Greenspace Management Strategy (flood lines, wetlands) and Medium Constraint being terrestrial features often found adjacent to identified high constraint areas and are imperfectly drained areas, moderate slopes, or areas of natural vegetation that provide linkage functions (such as hedgerows). Although not as sensitive to development impacts as high constraint lands, these features and the functions they provide help to reinforce and enhance the functions of the more sensitive features.

Where possible, Medium Constraint areas will be integrated as part of the Greenspace Management Strategy, as natural features, or will be subject to supporting Complementary Land Uses (as outlined in Section 3.3.2), or as Enhancement Areas. Complementary uses such as school playgrounds, stormwater management facilities and other open spaces should be considered in these areas. A list of complementary uses should be prepared as part of the Community Plan and updated as additional information on this alternative management technique becomes available. The Zoning By-Law should be amended to recognize the land use restrictions on these lands to direct land use planning in these areas of the subwatershed,

In the case of hedgerows rated as Medium Constraint, integration may be difficult due to grading or other considerations unless the particular features are taken into account in the layout of land uses. Compensation for hedgerow loss or fragmentation should take the form of replacement plantings in strategic areas in order to maintain and enhance existing functions.

These constraints are an amalgamation of the environmental constraints related to vegetation communities and wildlife inventories completed as part of this study. Watercourse systems and related fish habitat constraints are contained within, or absorbed by the terrestrial constraint areas. Groundwater constraints do exist within these features and buffers however, outside these areas it is not considered a limiting factor to development provided that the Stormwater Management Strategy recommendations are implemented.

Development applications subject to approval under the Planning Act must be located outside these Policy and Constraint areas. A line identifying the development limit is therefore shown as the outside extent of these constraints. The area within these constraints and the appropriate buffer surrounding them is typically shown as Open Space or Parkland in land use planning documents.

### **Enhanced Corridor Areas**

The Greenspace Management Strategy also includes enhanced corridor areas which increase the overall width of the Greenspace Management corridor to a total width of between 250 to 300 m. Subject to confirmation during the Community Plan process, the enhancement areas may be included in future Open Space, or in Parkland designations. These areas may presently include agricultural fields and cultural landscape features such as hedgerows. Agricultural fields currently provide for extensive movement of mammals, amphibians and reptilian species, which will not occur under urban conditions. Confirmation of these specific areas as naturalized buffers and / or subject to complementary land uses described above, is recommended by the Greenspace Management Strategy through the Community Plan process.

### **Buffer Requirements**

Buffers are intended to protect habitats and key functions including: sensitive vegetative species and habitat, wildlife species and habitat for nesting or foraging, shallow groundwater movement, surfacewater quality, and local topography. Sections C 3.3



discussed buffer requirements in the subwatershed, and recommended a preferred option which includes a 50/30 m buffer in conjunction with enhancement of habitat in key areas of the subwatershed, as follows:

- 30 metre buffer from natural features north of Blackbridge Road
- 50 metre buffer from wetland features south of Blackbridge Road with the opportunity to reduce the buffer to not less than 30 metres, provided that it can be justified through a scoped EIS
- A 250 -300 metre wide enhanced corridor (total width) downstream of Blackbridge Road, containing natural features, buffers (to be naturalized), the watercourses and ponds, and enhancement areas (to be naturalized).

It is recommended that these buffers and enhancement areas be implemented to ensure that the key natural areas of the Forbes Creek subwatershed are maintained and enhanced. Grading within buffers will not be allowed except for what may be required by permitted stormwater management facilities, a Community Trail or for Complementary Land Uses approved under the Community Plan. Buffers should be designated as open space and be publicly owned in order to preserve their integrity and function. The ultimate ownership and zoning of buffers and enhancement areas should be determined at the Community Plan level.

### **Environmental Impact Studies (EIS)**

This subwatershed study has been conducted to the level of a Comprehensive Environmental Impact Study which defines limits of future development and recommends management strategies. Scoped or Full Site Environmental Impact Studies should be carried out wherever encroachment or interference with functions are proposed that run counter to the recommendations of the Subwatershed Study. EIS studies will be completed by the development proponent, to the satisfaction of the City of Cambridge and those public agencies having jurisdiction. EIS requirements are outlined in Section E 2.5 of the document. In general, the more extensive the encroachment/interference, the more detailed the required studies to identify and address impacts.

### **Relationship with the adjacent Subwatersheds.**

The subwatershed lies adjacent to other lands that share natural heritage features and functions. Areas such as the Speed River corridor to the south and the upland connections to the adjacent subwatersheds (eg. Chilligo Creek, Glenchristie) should be recognized and enhanced where possible. For example, Enhancement Areas identified in Section C 3.3 specifically deal with that area to the north through corridor enhancement techniques and stewardship opportunities.

## **7.2 Aquatic Rehabilitation Strategy**

It is recommended that remediation of riparian corridors associated with Forbes Creek and associated ponds be carried out prior to, or as development proceeds. The remediation plan includes some channel rehabilitation and buffer plantings as outlined in Section C 3.1. Any future plans to upgrade Blackbridge Road / culvert crossing and culverts under Regional Road #24 by the appropriate agencies should consider the viability of enlarging the culvert size. This would improve the corridor function and improve the potential for the movement of wildlife through the culvert.

## **7.3 Conceptual Trail Strategy**

It is necessary that a well-defined Community Trail system be established by implementation of a comprehensive Trail Strategy through the Community Plan process. The trail system will encourage recreational use of least environmentally sensitive or most resilient natural areas. It will also provide a degree of pedestrian and wildlife safety in a natural setting and provide opportunities for the appreciation of nature. It will provide connections to existing and future communities and to serve as links in the trail network spanning Cambridge.

The specific components are described in Section C 3.4 with conclusions listed in Section C 3.4.9 to be considered and implemented.





## 7.4 Stormwater Management Strategy

The intent of the Stormwater Management strategy is to maintain existing peak flows, maintain the existing infiltration rates, and to reduce the post-development volume of runoff in order to protect local and downstream features. Where a single stormwater management facility serves more than one landowner, an appropriate cost sharing agreement should be implemented through the appropriate means (i.e., Draft Plan conditions, Community Plan, agreement, etc.). General stormwater management criteria include the following:

- Maintain or enhance infiltration using at-source controls for rooftop runoff and pre-treatment facilities and infiltration trenches for road runoff;
- Protect water quality by implementing a range of Stormwater Management Practices;
- Provide stormwater quantity control; and
- Provide erosion control measures for slopes and stream channels.
- Avoid or minimize water quality and quantity impacts to the Provincially Significant Wetlands (Forbes Creek Wetland Complex and Speed River Wetland Complex).

## 7.5 Adaptive Management / Monitoring Strategy

This strategy recommends that public agencies and public stewardship programs undertake the Systems and Post-Development Monitoring and that the During Construction Program be undertaken by the developer. The During Development Program includes three phases: 1) pre-development; 2) during construction; and 3) guarantee period. The proponent is responsible for monitoring surfacewater, groundwater, and terrestrial features that could potentially be impacted by construction.

# 8.0 Management Strategy Implementation

## Amendments to Existing Planning Documents

A number of amendments are recommended as a direct result of this subwatershed plan. They pertain to the identification of a) the regulatory flood line associated with Forbes Creek, b) the candidate ESPA areas north of Hespeler Road (subject to their adoption by Regional Council), c) the Forbes Creek Wetland Complex as a Provincially Significant Wetland; and d) changes to the current boundaries of Locally Significant Natural Areas. These changes need to be reflected in both the Regional Official Plan Policies and the City of Cambridge Official Plan.

If all or part of the upper subwatershed is brought into the Urban Area designation of the Regional and City planning documents, the Subwatershed Study must be updated and supplemented to address the environmental features and major infrastructure concerns on these lands as comprehensively as the present report address the lands south of Blackbridge Road.

## Community Plan

There are a number of components of the above strategies including the Greenspace Management Strategy, Scoped and Full Site EIS requirements, Recreational Trail Components, and Stormwater Management Plan that will be implemented at the time of Community Plan creation. These recommendations will be implemented through the policies of the completed Community Plan, existing Zoning By-laws, Draft Plans of Subdivision, Severances, Site Plans, and all other development applications and building permit applications subject to approval under the Planning Act.

## Public Stewardship / Education Program

It is recommended that a public education program (referenced in many sections of this Plan) be implemented by the City of Cambridge, Regional Municipality of Waterloo, other public agencies and the development proponents at the time of development. The Region and the City would develop a consistent and comprehensive public education program that should include (but not be limited to) the following information:



- A description of the natural environment, including sensitive features and functions (locations of rare and threatened species not to be disclosed)
- Potential environmental impacts of the public's activities (e.g., pesticide and fertilizer application, disposal of hazardous materials, illegal dumping of garbage and debris, creation of informal trails, etc.);
- Groundwater protection strategies; and
- Terrestrial habitat protection and promotion techniques (including backyard habitat creation activities).

This information could be used to provide information for local schools, neighbourhood associations and groups, real estate, and development industries and other relevant groups. The developer would use this information and distribute it to builders, real estate firms and potential home buyers (e.g., included in the offer to purchase and other correspondence). Educational signs would be provided as part of the construction work for the development.

## 9.0 Summary

Based on the results of the technical analyses and management strategies, the Forbes Creek subwatershed will be capable of accommodating future urban growth by maintaining or enhancing the current subwatershed conditions through consideration and implementation of the Forbes Creek Subwatershed Management Strategy. This strategy is composed of the Greenspace Management Strategy, Aquatic Rehabilitation Strategy, Community Trail Strategy, Water Management Strategy, Adaptive Management / Monitoring Strategy and Interim Land Use Management Strategy.

**Table ES - 1** outlines the issues identified in the outset of the study and discussed in previous sections of the Subwatershed Plan. It also provides the tools that implement the watershed management strategies by identifying key recommendations to address these issues. **Table ES – 2** outlines the study recommendations, responsibilities and timing for the implementing organizations and groups. A Quick Summary of Development Targets / EIS Requirements forms the final page of this Executive Summary.

**Table ES – 1 Subwatershed Objectives, Issues and Actions**

Objectives	Issues	Tools / Requirements	Key Recommendations
<b>1. AQUATIC</b> 1.1 To identify, protect, maintain and enhance aquatic resources 1.2 To prepare a strategy for the aquatic component of the Forbes Creek Sanctuary 1.3 To determine the impact of bridges, dams and ponds on fish habitat 1.4 To determine the status, potential, and management objectives for Forbes Creek in accordance with the Grand River Fish Habitat Management Plan	A, B, C, E, F, G, I	Delineate and Protect green space system functions and features, Rehabilitate Forbes Creek and associated ponds, Maintain/improve riparian conditions along selected stream reaches.	Adoption and implementation of the Aquatic Rehabilitation Strategy





Table ES – 1 Subwatershed Objectives, Issues and Actions

Objectives	Issues	Tools / Requirements	Key Recommendations
<p>2. TERRESTRIAL</p> <p>2.1 To identify, protect, maintain and enhance terrestrial resources</p> <p>2.2 Identify, protect and manage Environmental Preservation Areas, Environmentally Sensitive Policy Areas and Regionally Significant Natural Corridors</p> <p>2.3 To confirm the wetland boundaries and the status of the wetland complex</p> <p>2.4 To prepare a strategy for the terrestrial component of the Forbes Sanctuary</p> <p>2.5 To assess and provide recommendations for future management of the agricultural lands within the subwatershed</p> <p>2.6 To determine a preferred Natural Habitat Network and the elements of a Natural Habitat Network/ Greenspace Management Plan as per the Regional Official Plan Policies</p> <p>2.7 To determine appropriate woodlot and vegetation management strategies.</p> <p>3. NATURAL HAZARDS</p> <p>3.1 To minimize the risk to life and property due to flooding and erosion</p>	<p>A, E, F, H, I, J</p> <p>A, B, C, F, H, I</p> <p>A, B, E</p>	<p>Delineate and Protect green space system functions and features,</p> <p>Delineate and protect environmentally significant areas,</p> <p>Direct scoped EIS reports to guide adjacent development.</p> <p>Implement appropriate BMP's that maintain / reduce runoff peaks and volumes,</p> <p>Delineate regulatory flood lines,</p> <p>Require levels of development and runoff peak and volume control that maintain existing flood lines,</p> <p>Manage floodplain as integrated whole within greenspace system.</p>	<p>Adoption and implementation of the Greenspace Management Strategy</p> <p>Adoption and implementation of the Natural Heritage Strategy and the Stormwater Management Strategy</p>



**Table ES – 1 Subwatershed Objectives, Issues and Actions**

Objectives	Issues	Tools / Requirements	Key Recommendations
<b>4. SURFACEWATER RESOURCES</b>			
4.1 To preserve natural hydrological systems	A, B, E, F, G	Delineate and protect greenspace system functions and features, Rehabilitate Forbes Creek and associated ponds, Maintain /improve riparian conditions along selected stream reaches, Delineate and protect environmentally significant areas.	Adoption and implementation of the Natural Heritage Strategy and the Stormwater Management Strategy
4.2 To protect and manage surfacewater quality and quantity in order to ensure the future ability of Regional water-taking requirements and maintain the assimilative capacity of downstream wastewater treatment plants.	D		
<b>5. GROUNDWATER RESOURCES</b>			
5.1 To preserve natural hydrogeologic systems	D, F, H, J	Implement appropriate water quality control BMP's and promote infiltration and/or sedimentation control and maintain / reduce runoff peaks and volumes, Limit impervious cover, Promote water conservation, Protect greenspace system functions and features.	Adoption and implementation of the Natural Heritage Strategy and the Water Management Strategy.
5.2 To protect and manage the quantity and quality of groundwater resources			
5.3 To determine implications on water quality and quantity from infiltrated stormwater runoff from development			
<b>6.0 THE RURAL and URBAN ENVIRONMENT</b>			
6.1 To develop an ecosystem-based approach to land use planning and resource management in the subwatershed	ALL	Identify process related to implementing management options through land use planning and stewardship approaches, *Identify monitoring requirements related to the management options.	Adoption and implementation of the Subwatershed Management Strategy composed of the following components: The Greenspace Management Strategy, The Aquatic Rehabilitation Strategy, The Water Management Strategy, Community Trail Strategy and the Adaptive Management - Monitoring Strategy
6.2 To produce an implementation and monitoring plan to guide future development in the subwatershed	ALL		
6.3 To determine and address the implications on development opportunities on the provision of infrastructure	D, E		





Table ES – 1 Subwatershed Objectives, Issues and Actions

Objectives	Issues	Tools / Requirements	Key Recommendations
<p>6.4 To determine the current state of repair of bridges, dams and ponds and to develop long-term remediation recommendations which would address public safety, maintenance and operation, public use and aesthetics</p> <p>6.5 To determine ownership and management strategies of the Forbes Sanctuary.</p> <p>6.6 To determine potential road and servicing crossings of the Forbes Creek and associated wetlands and to assess the potential impacts of these crossings from an environmental perspective.</p> <p>6.7 To determine the appropriate buffers from development</p> <p>6.8 To determine the location and status of any existing agricultural or municipal drains</p> <p>6.9 To determine a potential trail system with potential linkages (within and beyond the subwatershed) and interconnection of natural areas.</p>		<p>Provide options regarding servicing crossings of sensitive environmental features,</p> <p>Delineate and protect greenspace system functions and features,</p> <p>Delineate and protect environmentally significant areas.</p>	

**Issues List for Table**

- A. Forbes Creek Wildlife Sanctuary – status and future plans – ownership, management;
- B. Bridges, Dam and Ponds – impact on fisheries, current state of repair, recommendations;-Fisheries – status, potential, management objectives (per Grand River Fisheries Management Plan);
- C. Wellhead protection area – implications for stormwater infiltration;
- D. Potential road and servicing crossings of Forbes Creek and its wetlands;
- E. Forbes Creek Wetland Complex – confirmation of wetland boundaries, buffers from development;
- F. Location and status of municipal drains;
- G. ROPP Elements of the Natural Habitat Network);
- H. Woodlot protection and vegetation management;
- I. Potential trail linkages (within the subwatershed and beyond) and interconnection of natural areas;
- J. Agricultural land classification and consideration



**Table ES – 2 Study Recommendations, Responsibilities and Timing**

<b>Management Recommendation</b>	<b>Purpose (why)</b>	<b>Responsibility (who)</b>	<b>Timing (when)</b>	<b>Other Considerations (how)</b>
<b>Greenspace Management Strategy</b>	To preserve and protect the core and linkage components of the Forbes Creek natural heritage system.	City, GRCA, Landowners and Community	Develop and adopt policies through Community Plan process: Implement at Community Plan and draft plan stage to complement existing regulatory framework	Designate greenspace in OP and land use zoning by-law; Public education
<ul style="list-style-type: none"> <li>Protect flood line, fill line (steep slopes)</li> <li>Protect PSW</li> </ul>	Protect life & property; water quality buffer for Forbes Creek; preserve hydrologic function;	City, GRCA, Landowners and Community	Develop & adopt floodline policies immediately; implement at Community Plan stage	Implement Flood & Fill regulations SWM design EIS for adjacent development SWM, trail and interface between wetland and development
<ul style="list-style-type: none"> <li>Protect Environmental Policy Areas</li> </ul>	Protect significant habitat and core areas of natural heritage system	Region, City, GRCA, Landowners and Community	Develop & adopt policies immediately; implement at Community Plan stage	Designate greenspace EIS for adjacent developments
<ul style="list-style-type: none"> <li>Require EIS for development in buffer areas as stipulated</li> </ul>	Protect and enhance function of NHS, develop amenity benefit for human residents	City to review and adopt; Developer EIS	Community Plan stage; Prior to development	Refer to specific considerations and features as stated in EIS summary table (trails, SWM, etc.)
<ul style="list-style-type: none"> <li>Incorporate Enhancement Areas</li> </ul>	To protect and maintain the existing corridor function of the stream / wetland corridor	City to review and adopt;	Community Plan stage; Prior to development	Complementary land uses need further definition at Community Plan
<ul style="list-style-type: none"> <li>Apply buffer criteria</li> </ul>	To protect and preserve core features and functions of the NHS	City to review and adopt criteria;	Community Plan stage; Prior to development	Designate as Open space; Consider
<ul style="list-style-type: none"> <li>Road crossings</li> </ul>	To protect and preserve features and functions of the NHS	City to review and adopt recommendations	Community Plan stage; Prior to development	Enlarge any existing culverts to improve wildlife corridor role
<ul style="list-style-type: none"> <li>Best Management Practices</li> </ul>	To enhance the feature and functions of the NHS	GRCA, Landowners and Community	Immediately upon study adoption	Removal of fences & garbage, reduce grass cutting
<b>Aquatic Rehab Strategy</b>	To enhance and rehabilitate the Forbes Creek natural heritage system.	City, GRCA, Landowners and Community	Community Plan stage	Possible CFIP financial assistance



**Table ES – 2 Study Recommendations, Responsibilities and Timing**

<b>Management Recommendation</b>	<b>Purpose (why)</b>	<b>Responsibility (who)</b>	<b>Timing (when)</b>	<b>Other Considerations (how)</b>
<ul style="list-style-type: none"> <li>Rehabilitate the lower creek portion from Pond A to Pond D</li> </ul>	To rehabilitate the creek system to a condition closer to the natural state	City, GRCA, Landowners and Community	Community Plan stage	GRCA approvals, Creek bank naturalization
<ul style="list-style-type: none"> <li>Remove barriers within creek near bottom end</li> </ul>	Provide fish migration upstream from Speed River	City, GRCA, Landowners and Community	Community Plan stage	Possible CFIP financial assistance
<b>Community Trail Strategy</b>	To provide access and recreation areas for community residents to low impact recreation through the least sensitive natural areas.	City, GRCA, Landowners and Community	Community Plan stage	Use trail corridors as starting point, apply city policies and standards,
<ul style="list-style-type: none"> <li>Main routes are established with respect to environmental considerations</li> </ul>	To provide a cursory trail layout to work from at more detailed stage	Routes subject to confirmation by City / public; City to incorporate into overall City trail system	Community Plan stage	Ownership: combination of dedication during development, donation and purchase of high priority routes where necessary
<b>Water Management Strategy</b>	To maximize infiltration, protect quality of sfc and gr water, and minimize impact of post development conditions downstream	City, GRCA, Landowners and Community	Community Plan stage and at draft plan of subdivision	Infiltration and recharge criteria
<ul style="list-style-type: none"> <li>Quality standards</li> </ul>	To maintain existing quality due to issues related to fisheries, PSW and Speed River corridor	City, GRCA, and developers	SWM facilities and draft plan considerations	In conformance with Level 1 MOE standards
<ul style="list-style-type: none"> <li>Quantity control                             <ul style="list-style-type: none"> <li>lot level</li> <li>conveyance control</li> <li>end of pipe control</li> </ul> </li> </ul>	To duplicate runoff / maintain flood lines, protect the creek, protect supply to ground water	City, GRCA, and developers	Details to be confirmed at Community Plan stage	Post development flow conditions match pre development
<ul style="list-style-type: none"> <li>Infiltration</li> </ul>	Maintain baseflow to Forbes Creek and wetlands	City and GRCA	Details to be confirmed at Community Plan	Highest rates near rail line area – bedrock outcrops



**Table ES – 2 Study Recommendations, Responsibilities and Timing**

<b>Management Recommendation</b>	<b>Purpose (why)</b>	<b>Responsibility (who)</b>	<b>Timing (when)</b>	<b>Other Considerations (how)</b>
<b>Adaptive Management Strategy (Monitoring)</b>	To provide direction to be able to respond to changes that may occur in the subwatershed.	City, GRCA, Landowners and Community	Community Plan stage	Relies on staff expertise and time commitment; volunteer assistance is possible
<ul style="list-style-type: none"> <li>System Monitoring</li> </ul>	To provide ongoing analysis of the Forbes Creek ecosystem	City, GRCA, local citizens groups, MNR	Ongoing	Update ELC criteria where necessary
<ul style="list-style-type: none"> <li>During development - pre development</li> <li>- during construction</li> <li>- guarantee period</li> </ul>	To provide monitoring during development construction	Developer / City & GRCA	-draft plan of development - detailed design submission - end of guarantee period	Pre development = Minimum of 2 seasons of monitoring prior to construction
<ul style="list-style-type: none"> <li>Post development monitoring</li> </ul>	To track changes and adapt strategies to management criteria	City, GRCA, local citizens groups, MNR	- end of guarantee period, ongoing	Will rely on adaptive management criteria to adjust as necessary
<b>Interim Land Use Management Strategy</b>	To provide land use policy direction immediately following the adoption of the study	Region & City,	Immediate	Community plan process will not capture all areas where policy changes are needed
<ul style="list-style-type: none"> <li>Identify floodplain, PSW and ESPA</li> </ul>	To protect environmental features & functions	Region & City	Immediate	ROPP & OP amendments
<ul style="list-style-type: none"> <li>Encourage BMPs for areas prior to Community Plan stage</li> </ul>	To assist in rehabilitating the NHS and encourage stewardship goals	City, GRCA, local citizens groups, landowners	Immediate	i.e. remove fences, collect garbage, reduce grass cutting
<b>Public Education</b>	To encourage stewardship consistent with study goals	Region, City, GRCA, local citizens groups, MNR	Immediate	Assist in dissemination of study info, data, results

### Quick Summary: Development targets / EIS requirements

The following is a brief summary of the requirements for development that have been recommended by the Forbes Creek Subwatershed Study. Please refer to the text of the parent document for a full description of the recommendations and findings.

### Water Management Issues:

- Water quantity must match post development flows with pre development flows;
- Water quality must be addressed to Level One standards (MOE 1994) due to the temperature characteristics of the Forbes Creek system, the PSW and status of the downstream watercourse (Speed River);





- Surfacewater infiltration be maintained or enhanced using at-source controls for rooftop runoff and pre-treatment facilities and infiltration trenches for road;

#### **Greenspace Management Issues:**

- Buffers form a key management strategy in protecting the core natural areas and corridors that link them;
- Buffers north of Blackbridge Road are 30 metres from natural features;
- Buffers south of Blackbridge Road are 50 metres from natural features with the opportunity to reduce the buffer justified through an EIS process to no narrower than a 30 metre buffer;
- An Enhancement Area south of Blackbridge Road is recommended to achieve a total corridor width of 250 to 300 metres using the identified core areas, buffers and complementary land uses to achieve the required corridor for ecosystem function given the expansion of future development adjacent;
- This study forms a Comprehensive Environmental Impact Study regarding defined limits of future development and recommended management strategies in the context of the PSW;
- Scoped or Full Site Environmental Impact Studies will be required wherever encroachment or interference with functions are proposed that run counter to the recommendations of the Subwatershed Study;
- Full site EIS information is provided through the Subwatershed Study for a period of 5 years after approval by the City - these criteria should be reviewed to ensure continued applicability after that time;
- Development is not permitted to encroach into core natural areas such as floodplains, PSWs, on steep slopes and in ESPA / LSNA designations.

#### **Community Trail Management Issues:**

- A cursory trail route has been provided with suitable minimum setbacks from core environmental features (15 metres);
- Trail construction parameters have been suggested such as total trail width, surface treatment, lighting, and signage near environmental features;
- Any subsequent variation from these recommendations within the Greenspace Management Strategy and environmental feature buffers require further EIS supporting documentation;

#### **Adaptive Management – Monitoring Issues:**

- Monitoring is separated into those responsibilities of public agencies / public stewardship and the development community;
- Public agencies / public stewardship approaches undertake the Systems and Post development Monitoring;
- The development community undertake the during development program which is divided into three phases of responsibility: 1) pre-development, 2) during construction, and 3) the guarantee period;

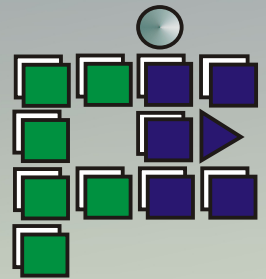
#### **Road Crossings of Forbes Creek / PSW**

- New road crossing of Forbes Creek / PSW is not recommended for environmental reasons;
- A road crossing at the easterly extension of Milton Street would result in the least disruption to the Forbes Creek system if a crossing is deemed required during the community plan stage.





## A - Background



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PLANNERS

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CONSULTING

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ENGINEERS &

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LANDSCAPE

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ARCHITECTS

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**SECTION A - BACKGROUND**

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## A 1.0 INTRODUCTION

### A 1.1 Background

The Forbes Creek subwatershed lies in the northeast sector of the City of Cambridge and encompasses approximately 350 hectares. Forbes Creek drains relatively flat tablelands and outlets to the Speed River, a major tributary of the Grand River. Land use is primarily agriculture and urban residential. Historically, the southern portion of the subwatershed was part of the Forbes family estate (see **Photograph A1**).

Development pressure in the subwatershed necessitated the preparation of a Subwatershed Study in order to comply with provincial, regional and municipal planning documents and to ensure that development would proceed in an environmentally sustainable manner. The immediate area of urban development interest is the land within the "City Urban Area" east of Guelph Avenue, south of Blackbridge Road and west of the CN railroad tracks. However, the study area includes the entire geographic area of the subwatershed and Expanded Study Area (approximately 40 ha) draining directly to the Speed River (See [Figure A 1.1.1](#)).

To aid in proper referencing to the various ponds, which are referred to throughout the document, reference should be made to [Figure A 1.1.2](#).

### A 1.2 Goal

The goal of the Forbes Creek Subwatershed Study, as per the Study Terms of Reference (**Appendix A**), is to protect, maintain and enhance the ecological processes and functions and significant natural features of the

subwatershed in a way that is environmentally sound and socially and economically sustainable.

### A 1.3 Study Team

The Forbes Creek Subwatershed Study has been completed by a Study Team that consisted of a partnership of consultants and agencies. [Figure A 1.3.1](#) details the Study Team and responsibilities.

### A 1.4 Report Structure

This report has been organized into 4 distinct sections, in part reflecting the chronological progress of the study and in part the proper presentation of information in a logical format.

The first section, Background, discusses the organization of the study itself, provides the history of the Forbes Creek subwatershed, discusses the planning context of the subwatershed area, the objectives and goal of the study, and summarizes the public input into the process.

Section B presents the detailed investigations that were undertaken by the study team.

Section C analyzes the various opportunities and constraints that are present in the subwatershed and develops a series of management alternatives. A preferred management alternative is chosen, based on public input, agency criteria and the subwatershed needs.

Section D discusses the Class Environmental Assessment evaluation that was completed for potential water and sanitary servicing and road networks within the subwatershed. The objective was to provide an environmental evaluation of the various options. The Class EA will be completed during the Community Plan process.



Section E, Management Strategy, summarizes the ultimate management strategy for the Forbes Creek subwatershed. A Monitoring Plan and an Implementation Plan are presented. Requirements for future studies are presented.

Section F lists the references used in the preparation of this document.

Various appendices support the Subwatershed Plan.

All air photography used as a base for Maps and Figures in this study was flown in April 2000.

### A 1.5 Subwatershed Planning

Subwatershed planning uses watersheds and subwatersheds as the biophysical basis for planning and management. It is the preferred resource management approach to analyzing ecosystems. Subwatershed planning considers the complexity, biodiversity, and inter-connections within natural systems taking into account the dynamic nature and finite capacities of ecosystems. It has environmental, social and economic benefits.

From Watershed Planning Initiative - Final Report (Ministry of the Environment, 1997), the objective of subwatershed planning is to provide decision-makers with a broad understanding of ecosystem function and status, and to develop recommendations for appropriate resource management in the subwatershed. This will allow relevant ecosystem considerations to be integrated into land use planning decisions and allow for better-informed resource use decisions to be made.

The process of subwatershed planning determines targets and objectives prior to the adoption of official plans or land use decisions and allows for informed decision-making. Key to subwatershed planning is the balanced approach to ensuring that environmental, social and economic issues

are addressed. Subwatershed planning is an evolving process and forms part of the process known as Adaptive Environmental Management (Figure A 1.5.1).

Subwatershed Planning (MOE & MNR, 1993) states that subwatershed planning is undertaken for:



**Figure A 1.5.1  
Adaptive Environmental Management**

- Environmental protection and pollution prevention
- Better planning
- Infrastructure guidance
- Streamlined approvals
- Savings
- Public involvement
- Credibility of participating agencies
- Enhanced economic viability

This document also notes that subwatershed plans will:

- Identify the location, areal extent, present status, significance and sensitivity of the existing natural environment within the subwatershed;





*Photograph A1 - Aerial view of Forbes Creek Subwatershed*



- Establish goals and objectives for management of the subwatershed
- Identify environmentally sensitive or hazard lands, and recommend, with reason, appropriate environmental management practices;
- Identify lands where development may be permitted, provided it is designed to ensure that ecological functions are protected and maintained;
- Provide directions for the screening and selection of best management practices for the subwatershed;
- Address cumulative impacts for changes to the subwatershed on the natural environment;
- Integrate disciplines, policies, mandates, and requirements of all agencies and interests;
- Provide direction, consistency and uniformity of conditions of approval;
- Promote public participation;
- Establish an implementation strategy;
- Outline requirements for monitoring programs and information updates; and
- Provide technical information for the completion of community plans and subdivision designs.

The Government of Ontario has issued the Provincial Policy Statement (1997), which requires municipalities (upper and lower tier) to provide proper planning and environmental considerations. Legislation, such as the Planning Act, the Conservation Authorities Act, and the Environmental Assessment Act are used to implement these policies.

Section 2 of the Provincial Policy Statement provides specific policies dealing with natural heritage features and areas including wetlands, aquatic and terrestrial habitat, as well as water quality and quantity. Natural features diversity and the natural connections between them should

be maintained, and improved where possible. Effective subwatershed planning will satisfy these policies.

The Provincial Policy Statement contains other specific policies regarding Agriculture, Mineral Resources, Cultural Heritage and Archeological Resources that may also pertain to the Study Area. Policies specific to land use and development as well as public health and safety are included in the PPS document. Their implications are most commonly included in Regional and City Official Plan documents and subsequent land use planning processes.

The Regional Municipality of Waterloo (the Region) has recognized the importance of subwatershed planning by including a subsection of Chapter 3 - "Environmental Planning" on the topic in the ROPP. Subsection 3.1 - "Watershed Planning" contains eight policies regarding the completion of watershed plans including direction on amending land use planning documents based on the results of watershed plans. The Region's priority in such studies is the preparation of recommendations related to:

1. Protection and management of groundwater resources;
2. Surface water quality;
3. Identification, protection and management of environmental protection areas, environmentally sensitive policy areas and regionally significant natural corridors; and,
4. The implications of development opportunities on the provision of regional infrastructure.

Portions of subwatershed studies that deal specifically with regional interests (as identified above) will be approved by the Region prior to the adoption of area municipal official plan amendments or approval of area municipal implementation plans that implement the recommendations of the study (Policy 3.1.5).



The City of Cambridge is conducting the Forbes Creek Subwatershed Study in order to comply with the Region and its own official planning documents. Policy 6.2.1 of the Cambridge Official Plan titled "Subwatershed Studies and Plans" details the requirements of the City and the priorities for such studies. Study components are listed in Section 6.2.1.4.

The City also requires that a subwatershed study contain a comprehensive environmental impact statement (Section 6.2.1.5) that provides sufficient analysis to formulate general parameters for development through the Official Plan and other means of land use regulation. This section also stipulates that where feasible, the study will fulfill, in whole or part, the Environmental Assessment Act requirements for major infrastructure works located within that subwatershed.

Other relevant sections regarding the natural environment system within the Official Plan include water resources protection (6.2.2), floodplain planning (6.2.3), stormwater management (6.2.5), fish habitat restoration and protection (6.2.6), and vegetative management (6.2.7). These policies have been considered in the completion of the subwatershed study.

## A 1.6 Study Process

An interdisciplinary Consultant Team conducted the Forbes Creek Subwatershed Study in three phases, as described below (also see [Figure A 1.6.1](#)).

### Phase 1: Project Initiation

#### Step 1: Background Information

- Collection and review of existing physiographic, hydrologic, hydrogeologic, natural features and land use information.

- Synthesis, interpretation and integration of existing information.
- Production of a base plan map for the subwatershed, which is current and correct.
- Preliminary description of the ecosystem functions and linkages.

#### Step 2: Issue Identification

- Refinement of issues and problem statements. Refinement and prioritizing of goals and objectives.
- Identification of data deficiencies.
- Familiarization of the Steering Committee with existing database and subwatershed characteristics.
- Field monitoring initiated.
- Revised work plan based on information gathered to date. Initial contact with landowners, special interest groups and directly affected parties.
- Public meeting.

### Phase 2: Study and Refine

#### Step 3: Detailed Study

- Commencement of base line data gathering and detailed study, inventory, and analysis addressing hydrology (model determined in consultation with the City and the GRCA), flooding, erosion, hydrogeologic and baseflow characteristics, fish habitat, natural environment and surface water quality.
- Review of existing and proposed trail linkages.
- Production of a seasonal and annual water budget.



- Understanding of the relationship between the biophysical aspects of the subwatershed and the existing and potential land use.
- Identification of opportunities and constraints.

**Step 4: Targets**

- Establishment of the targets necessary to achieve the objectives.
- Investigate and develop various management plans, which include practices and measures to meet subwatershed objectives and targets.

**Step 5: Alternatives and Recommended Plan**

- Evaluation of alternative management plans. Recommendation of the preferred Subwatershed Plan for Forbes Creek.
- Public meetings to receive input.

**Step 6: Implementation and Monitoring Plans**

- Preparation of the Implementation Plan and long term Monitoring Plan with specific time frames and responsible parties.

**Phase 3: Study Finalization**

**Step 7: Final Plan/Presentation to Council**

- Production of the final Forbes Creek Subwatershed Plan, including an Executive Summary, the Implementation and Monitoring Plans.
- Presentation to Cambridge Council (and potentially Regional Council) at a public meeting for approval.

**A 1.7 History of the Forbes Creek Subwatershed**

**A 1.7.1 General**

As with much of the Region of Waterloo area, the Forbes Creek subwatershed was part of the lands originally granted to the Six Nations Indians by the British Crown in 1784. Joseph Brant, as leader of the Indians, sold 90,000 acres to a land development group, Richard Beasley and his partners. These developers eventually sold much of the land to Pennsylvania Mennonites who began to settle the area.

The area along the Speed River was ideal for various types of mills that relied on waterpower for energy in the particular process (e.g. sawmills, foundries, woollen mills and grist mills). With the arrival of the railroad, the settlement became incorporated as the Village of Hespeler in 1859. The village was named after Jacob Hespeler, a chief industrialist and businessman.

Jacob Hespeler was only one of many leading businessmen in the Village. Robert Forbes owned the textile business on the Speed River (later known to many as Silknet). Robert passed the operation of the R. Forbes Company to his son George Duthie Forbes in 1895. George, who was also the first mayor of the Town of Hespeler in 1901, eventually sold the company to Dominion Woollen and Worsteds in 1928. This factory at one time employed 1500 people in a town of 3000 and was obviously a great influence in the area. George Duthie Forbes was involved in many industries in the area and donated the Forbes Park in downtown Hespeler to the Town in 1915. Unlike his father, George Duthie built a home (Collynie) and lived in Hespeler. He built the existing Forbes Estate (Hillhead) for his sister, Annie Victoria (after whom Victoria Park in Hespeler is named). George Duthie also developed many of the residential lots north of the



existing Forbes Estate. George Alexander Forbes took over his father's business activities upon George Duthie's death in 1934. "Alex" was an avid hunter and operated a skeet club at the end of Shaw Avenue up to the 1950s (see **Photographs A2 and A3**). The club house was demolished to make way for the storm sewer outlet. However, Alex was better known for his conservation actions and the establishment of the "Wood Duck Sanctuary" in the 1950s.

The Forbes Creek subwatershed remained largely agricultural and the "Wood Duck Sanctuary" played a major role in maintaining this land use. Land located west of Guelph Avenue, not part of the Forbes Estate, was developed in the 1970s, 80s and 90s. During that time however, Alex personally ensured the preservation of the "sanctuary" lands. In addition, electric fencing and animal traps ensured the safety of the wood ducks within the enclosure and the lands were designated as Sanctuary in the Official Plan. Alex died in 1986 and the estate and sanctuary lands passed on to his two daughters. The Forbes estate, Hillhead, is a visible landmark to many of the local residents.

In the northern parts of the subwatershed, agricultural land uses continue to this day. A key landowner in this area is the Snyder family who have operated a potato farm along Beaverdale Road and Chilligo Road for many years.

In earlier days, the subwatershed was home to noted industrialists and businessmen. Portions of the subwatershed have been developed and development continues by today's business people.

Much has been written by others on the history of Hespeler, the Forbes family and the Wood Duck Sanctuary. No attempt has been made at this time to duplicate this effort but rather to provide a quick overview of changes and key figures during the last two hundred years. Reference

should be made to various publications by City Archivist Jim Quantrell and the following website <http://www.thecompanyofneighbours.com/> for further historical information.

### A 1.7.2 G Alex Forbes

George Alexander Forbes was born January 2, 1897, on the family estate adjacent to the Speed River in Hespeler, Ontario. Married to Millicent Buck in 1922, he had two daughters, 5 grandchildren and several great-grandchildren. Mr. Forbes had a career as a well-known industrialist in southern Ontario, having served on numerous corporate boards and owning a number of local industries. As a child, he was always interested in wildlife, and became an avid hunter, often in company with such personalities as author and columnist Gregory Clark.

Upon retirement, Alex Forbes decided to take a more active role in conservation work, which led to his establishing a Wood Duck sanctuary on his 240-acre property within the city limits of Cambridge (Hespeler) (see **Photographs A4 and A5**). Consisting of eight (8) waterfowl ponds excavated from a small tributary of the Speed River, the Forbes sanctuary features enclosed protective fencing and the establishment of nesting and feeding areas.

Beginning in the late 1960s and early 1970s, Mr. Forbes assisted the Ontario Ministry of Natural Resources and the former Ontario Waterfowl Research Foundation with its Giant Canada Goose program, by raising and releasing these birds on his property. More important has been his role in initiating Wood Duck enhancement programs, both through his raising of 3,500 birds and their release both locally and throughout Ontario, and his development of proper Wood Duck nesting boxes. Thousands of these nesting boxes, packaged as knock-down kits using Mr.



Forbes's design, have been utilized in every province of Canada and in five states of the United States of America. Mr. Forbes was also the first person to breed Canvasback Ducks in captivity, thereby providing a mechanism for enhancement programs for this species.

Until his death in 1986, Mr. Forbes continued his active participation in waterfowl work. His sanctuary is visited by thousands of birds annually, and permanent residents include Canada Geese, Lesser Snow Geese and Wood Ducks. Until recently, the pond adjacent to the office was kept ice-free during the winter months by aeration, and during peak migration periods, one ton of shelled corn was required weekly to feed his waterfowl guests. The cost of maintenance and feed resulted in the discontinuance of these management practices. However, varied species still utilize the area.

In an urbanized Region such as the Grand River valley of southern Ontario, the provision of wildlife habitat and breeding programs is essential, and the long-term dedication of Mr. Forbes has greatly contributed to wildlife success in Canada. His efforts continue to be enjoyed (GRCA, 1986). On February 1, 2002, George "Alex" Forbes was inducted into the Cambridge Hall of Fame for his extensive efforts as a citizen, industrialist and conservationist.

## A 2.0 EXISTING MUNICIPAL POLICY FRAMEWORK

Both the Regional Official Policies Plan (Policy 3.1 Watershed Planning) and the City of Cambridge Official Plan (Policy 6.2.1 Subwatershed Studies and Plans) identify the priority of subwatershed planning. The formulation and development of the Forbes Creek Subwatershed Study has therefore been predicated on this priority and implements the existing planning and

environmental policy framework for the natural environment from these two Official Plans. The planning partners in subwatershed planning include the Regional Municipality of Waterloo, the City of Cambridge, the Grand River Conservation Authority (GRCA), the Ontario Ministries of Agriculture, Food and Rural Affairs (OMAFRA) and Natural Resources (OMNR) and the public.

### A 2.1 Regional Municipality of Waterloo Official Policies Plan (ROPP)

The Regional Official Policies Plan (ROPP) for the Regional Municipality of Waterloo was adopted by Regional Council on October 11, 1995 and approved in part by the Minister of Municipal Affairs and Housing on December 19, 1995. No outstanding deferrals or referrals of the ROPP affect the area of the Forbes Creek Subwatershed Study Area.

The Forbes Creek Subwatershed Study area is located within two distinct Settlement Patterns as identified on Map No. 6 (Settlement Patterns) of the ROPP. The portion of the study area located south of Blackbridge Road and east of Regional Road #24 (Hespeler Road) is designated as 'CITY URBAN AREA (see **Photograph A6**). The remaining area north of Blackbridge Road and west of Regional Road #24 (Hespeler Road) is designated 'AGRICULTURAL RESOURCE AREA'.

Lands within the 'CITY URBAN AREA' have been designated in the ROPP to accommodate the majority of forecasted employment needs consistent with the Regional

Employment Forecast and with the Regional Population and Household Forecast housing needs for the three urban municipalities (Cities of Cambridge, Kitchener and Waterloo) of the Region to the year 2016. The 'CITY URBAN AREA' settlement pattern provides for a wide range of urban serviced land uses and the specific land use





designation is provided in the City of Cambridge Official Plan to implement the employment and population/household forecasts of the ROPP to the year 2016.

Lands within the 'AGRICULTURAL RESOURCE AREA' primarily permit farming, mineral aggregate extraction and forestry. The ROPP further defines the Agricultural Resource Area (ROPP Map No. 3) as either Prime Agricultural Areas or as Non-Prime Agricultural Areas & Other. ROPP Map No. 3 - Agricultural Areas further defines the subject area as Prime Agricultural Areas. The range of agricultural activities within 'PRIME AGRICULTURAL RESOURCE AREAS' is limited to farming, on-farm business activities, and farm related non-residential uses (see **Photograph A7**). The introduction of new non-farm-related uses is prohibited and farm related consents are limited.

Map No. 1, Natural Habitat Network, of the ROPP has not identified any areas within the study area as Environmentally Sensitive Policy Areas (ESPA). ROPP Map No. 2, Provincially Significant Wetlands (PSW), has not identified any Provincially Significant Wetland Areas within the Study Area. However, the Ontario Ministry of Natural Resources has confirmed that the Forbes Creek wetland and a small wetland area south of Blackbridge Road next to the railway line are both classified as PSW. Also, as a result of this study, the Region's Ecological and Environmental Advisory Committee (EEAC) has identified the Forbes Creek Headwaters as a proposed ESPA.

Through Amendment No. 12 to the ROPP (approved December 2000), ROPP Map No. 4, Water Resource Protection Areas was replaced with a new map entitled "Wellhead Protection Area-Urban Point Source Sensitivity Mapping". On this map, the Region has identified portions of the Forbes Creek subwatershed as a Wellhead Sensitivity Protection Area as there is an existing Regional

Well located at the intersection of Hespeler Road, Guelph Avenue and Blackbridge Road. Two out of four Sensitivity Areas have been identified within the Study Area. The greater portion of the protection areas is located within the Agricultural Resource Area. Section 5.2 of the ROPP would limit the range of new non-residential land uses within these Sensitivity Areas (see [Figure A 2.1.1](#)).

ROPP Map No. 5 identifies generally the area to the north of Blackbridge Road along Regional Road #24 as Mineral Aggregate Resource Area. This designation applies to lands where there is a high potential for aggregate extraction to occur due to the high quality of the identified deposits. These areas are to be protected from future land uses that would prohibit future extraction or be incompatible to extraction operations. However, recent correspondence from OMNR in regard to the Cambridge Official Plan indicates that this area should be deleted from the mapping.

Community Core Areas, Regional Shopping Centres or Regional Power Centre have not been identified within the study area as indicated on ROPP Map No. 7, Commercial Structure.

Regional Road #24 (Hespeler Road) is identified as a "Regional Controlled Access Prohibited" road and the northern leg of the road is identified as a Proposed Provincial or Regional Road Corridor as shown on ROPP Map No. 9 (Existing, Planned & Proposed Roads). Any new access to Regional Road #24 will be limited and would require an amendment to the Access By-law to be approved by Regional Council.

Many of the environmental features are referenced in the proceeding discussion of individual maps. However, the specific policies that apply are summarized below. These are provided for information purposes only and the complete text should be used for reference.





*Photograph A2 - Skeet Club (1)*



*Photograph A3 - Skeet Club (2)*



*Photograph A4 - G. Alex Forbes*



*Photograph A5 - Wood Duck*





*Photograph A6 - Designated Urban Areas within Forbes Creek*



*Photograph A7 - Typical Agricultural Land Use in Watershed*



*Chapter 3.0 (Environmental Planning):*

- a) Policy 3.2 – Environmental Impact Statements, provide direction on the type, content and specific requirements of such statements.
- b) Policy 3.3 – Biodiversity, provides support for the conservation and enhancement of the region's native biodiversity.

Environmentally Significant Discharge Areas (RESDA) where they are not already contained within ESPA, EPA, PSW or Regionally Significant Natural Corridors.

- i) Policy 5.4 – Woodland Resources, provides direction in order to conserve, protect and enhance woodlands.

*Chapter 4.0 (Region's Natural Heritage Network):*

- c) Policy 4.2 – Environmental Preservation Areas (EPA), which relates to significant portions of habitat of Endangered Species and / or of Threatened Species. There were no known areas located within the subwatershed nor were any found in the course of the study.
- d) Policy 4.3 - Environmentally Sensitive Policy Areas (ESPA), provides direction and criteria for identifying and managing ESPA locations. Existing ESPA are not found within the subwatershed as listed in Table 4.1 from the policy. New ESPA designations must fulfill environmental criteria listed in the policy.
- e) Policy 4.4 – Provincially Significant Wetlands (PSW), which supports provincial criteria for identification and management of these features.
- f) Policy 4.5 – Flood plains, that recognizes the criteria and management as stipulated by the GRCA and the Province.

## **A 2.2 City of Cambridge Official Plan**

The City of Cambridge Official Plan was adopted by the City Council on September 22, 1997 and Regional Council approved the Official Plan subject to a series of deferrals and modifications on July 14, 1999 and issued the Notice of Decision on July 16, 1999. This Official Plan replaced the Plan approved May 10, 1983 and implements the approved Regional Official Policies Plan (ROPP). The City of Cambridge Official Plan provides more site-specific detail and policies that implement the broad based ROPP policies.

In accordance with Map No. 6 of the ROPP, Map 1 of the City of Cambridge Official Plan ([Figure A 2.2.1](#)) identifies City Urban Area, Agricultural Resource Area, Community Core Areas and Candidate Nodes. The area east of Regional Road #24 (Hespeler Road) and south of Blackbridge Road is identified as City Urban Area. The remaining area within the Study Area is identified as Agricultural Resource Area.

*Chapter 5.0 (Region's Natural Resources):*

- g) Policy 5.2.1 – Sensitive Groundwater Areas, as identified and managed through implementation of the Region's Water Resources Protection Strategy.
- h) Policy 5.2.2 – Groundwater Discharge Areas, provides for the identification of Regional

On Map 15 ([Figure A 2.2.2](#)) General Land Use Plan, the land to the east of Regional Road #24 (Hespeler Road) and south of Blackbridge Road is designated as Class 1 (Urban) Residential and Class 1 (Significant Natural Features) Open Space Districts. The remaining area of the Study Area is shown as Class 1 (Prime) Agricultural Resource and Class 1 (Significant Natural Features) Open Space Districts. Class 1 (Urban) Residential Districts are



those areas where urban residential uses, specific government uses and limited commercial uses are permitted where full municipal services are or will be available by the year 2016. The implementation/development of these lands for urban type uses would require the availability of full municipal services, detailed servicing and environmental studies, a community plan and the submission of draft plans of subdivision. The Planning Act applications would be reviewed by the planning review agencies and the public prior to the City and the Region making a decision on the acceptability of the proposed development.

Agricultural soils that are predominantly Class 1 to 3 agricultural capabilities as defined by the Canada Land Inventory have been identified as Class 1 (Prime) Agricultural Resource District. The predominant permitted use is farming or farm related activities. All policies are consistent with the ROPP.

Three significant environmental areas north of Regional Road #24 (Hespeler Road), the floodplain of Forbes Creek and the floodway of the Speed River have been identified as Class 1 (Significant Natural Features) Open Space District on Map 15 General Land Use Plan. These features are further defined through Map 8 ([Figure A 2.2.3](#)) Provincially Significant Wetlands and Map 9 ([Figure A 2.2.4](#)) Environmentally Sensitive Policy Areas and Locally Significant Natural Areas.

Portions of the three significant environmental areas and the floodplain of the Speed River have been identified as Classes 1, 2 and 3 (Provincially Significant) and portions of the floodplain of Forbes Creek have been identified as Classes 4, 5, 6 and 7 (Locally Significant) on Map 8 ([Figure A 2.2.3](#)). All of these areas may require a detailed environmental study and may be protected should urban type development be permitted through the planning review process. No Unevaluated Wetlands were identified.

Map 10 ([Figure A 2.2.5](#)) Floodplains identifies the floodplain of the Speed River and not Forbes Creek, as floodplain mapping was not available at the time of completion of the Cambridge Official Plan. Map 13 ([Figure A 2.2.6](#)) Watercourses, Subwatersheds and Selected Fish Habitat Resources identifies Forbes Creek as a Type 4 Warmwater Baitfish Stream.

Map 14 ([Figure A 2.2.7](#)) Mineral Aggregate Resource Areas has been deferred as No. 22. A decision on this issue has not been made.

The north side of Regional Road #24 (Hespeler Road) is identified on Map 6 Major Transportation Facilities And Hydro Corridors for a proposed Freeway or Major Arterial Road. This is consistent with the ROPP Map No. 8. New access to this roadway would be restricted. The Provincial Highway Class Environmental Assessment under the Environmental Assessment Act was completed in October 1996. An Environmental Study Report consolidated the Study findings and conclusions.

The following maps of the Official Plan do not apply to the Study Area:

- Map 2 - Galt City Centre
- Map 3 - Preston Towne Centre
- Map 4 - Hespeler Village
- Map 5 - Candidate Areas in Transition
- Map 7 - Provincially Identified Former Waste Disposal Sites
- Map 11 - Preston and Hespeler Two-Zone Floodplain Policy Areas
- Map 12 - Galt City Centre Floodplain Special Policy Area

Many of the environmental features are referenced in the proceeding discussion of individual maps. However, the specific policies that apply are summarized below. These are provided for information purposes only and the complete text should be used for reference.



Chapter 6.0 (City's Natural Environment System):

- a) Policy 6.1 – Open Space System, provides a list of elements of the Open Space System including such features as significant natural features, flood plains, hazard lands and conservation areas. Direction is given on the identification of a Woodland Strategy and on natural corridors.
- b) Policy 6.1.2 – Provincially Significant Wetlands, supports the provincial identification and evaluation of PSW features.
- c) Policy 6.1.3 – Environmentally Sensitive Policy Areas (ESPA), supports the regional designation and provides direction on EIS requirements.
- d) Policy 6.1.4 - Locally Significant Natural Areas, outline the criteria for identifying LSNA locations that are shown on Map 9 ([Figure A.2.2.4](#)). New LSNA designations must be a locally significant wetland or fulfill 3 of 12 environmental criteria listed in the policy.
- e) Policy 6.1.5 - Environmental Impact Statements, provides a definition for the completion of such a statement, the criteria and specific requirements. The significant natural features where this applies are identified in policy 6.1.1.2, Elements of the Open Space System.
- f) Policy 6.2.1 – Subwatershed Studies and Plans, provides overall guidance for the completion of such studies based on significance and sensitivity of environmental features and functions, priorities for development and funding availability.
- g) Policy 6.2.2 – Water Resource Protection, discusses the implementation of the Regional Water Resources Strategy in relation to both surface and groundwater resources.
- h) Policy 6.2.3 – Flood Plain Planning, highlights the criteria used by the GRCA and the Province in determining the extent of flood lands, the management criteria and management options.
- i) Policy 6.2.4 – Watercourses, provides the names of and the absence or inclusion of watercourses in the GRCA Registered Fill Lines. Development restrictions are discussed.
- j) Policy 6.2.5 – Storm Water Management, provides direction and reference to the City adopted Policies and Guidelines.
- k) Policy 6.3 – Fish Habitat Restoration and Protection, describes the ecosystem approach used for resource management including fish species that support similar Federal and Regional policies. Reference is made to GRCA as the DFO delegate in implementing fisheries management under the Fisheries Act.
- l) Policy 6.4 – Vegetative Management, provides for the protection, preservation and restoration of vegetative cover. Sub policies related to Tree Management Policies and Guidelines (Policy 6.4.1), Street Trees (6.4.2), and Biodiversity (6.4.3) are also included providing direction and approaches to meet the stated goals.

### A 2.3 City of Cambridge Zoning By-law 150-85, as Amended

The City of Cambridge Zoning By-law 150-85, as amended, was approved by the Ontario Municipal Board on May 25, 1987. The Study Area is located within Maps B12 to B14 and C12 to C13 in the City of Cambridge Zoning By-law.



[Figure A 2.3.1](#) is a consolidated version of these plans as provided by the City of Cambridge.

On [Figure A 2.3.1](#), the area west of Regional Road #24 (Hespeler Road) is zoned A 1 - Agricultural Use which primarily permits farming.

The area west of Regional Road #24 (Hespeler Road) and north of Blackbridge Road is zoned A 1 - Agricultural Use which primarily permits farming and the area adjacent to the north-side of Regional Road #24 (Hespeler Road) is zoned (E)A 1 which would also permit the extraction of aggregate. The lands south of Blackbridge Road and east of Guelph Avenue are zoned (H)R4. The (H)R4 Zone is used as a precursor to residential development and will likely be amended through the subdivision process to permit a wider range of residential uses.

The area north of Blackbridge Road and west of the C.N.R. line is zoned A 1 - Agricultural Use. The area east of the CNR line is zoned OS1-Open Space, which restricts development to a number of open space type uses, including environmental significant areas, conservation areas, and environmentally sensitive areas recognized by the Region Municipality of Waterloo.

The lands west of Regional Road #24 (Hespeler Road) permit farming through the A 1 - Agricultural Uses zone.

The lands east of the existing development to the western limit of the C.N.R. line is zoned (H)R4 and would permit single detached residential dwellings once the holding provision is removed. The land to east of the C.N.R. line is zoned OS1. The Forbes Sanctuary is also zoned OS1. Upon completion of this study, refinements to the boundaries between the zones may be required.

## A 2.4 Staging of Development

For all potential developable lands located within the urban area of the Official Plan, the City Council adopts annually a Staging of Development Report to identify the potential development areas, potential residential type and density, the infrastructure required to provide for the development and the logical sequence of development. The City utilizes this report for the review and allocation of fiscal (Capital Budget) and staffing resources. This report also provides guidance to the Region, School Boards, Hydro Electric Commission and the development industry for the allocation of their physical and financial resources in their business planning.

The North Hespeler Community Plan is identified within the Staging of Development Report and it is recognized that upon the completion of this Subwatershed Study that the community plan process will be initiated. Upon the completion of the Community Plan, it is anticipated that property owners will be initiating the submission of planning applications to implement the recommendations of the Subwatershed and Community Plans. A consultant for a property owner estimates that there is a potential for a range of between 650 to 1000 residential units to be accommodated within the North Hespeler Community (as shown in **Appendix 5** of the Annual Staging of Development 2001 Report). Phasing and staging of development will be required to ensure availability of wastewater treatment capacity.

## A 2.5 Watercourse & Water Resource Policy Issues

### A 2.5.1 Background

Various Federal, Provincial, Regional and Municipal agencies are involved in planning approvals and have a



broad framework of legislation governing land development, natural heritage and hazard, water resource and environmental issues in the Province of Ontario. [Figure A 2.5.1](#) details some of the legislation in effect that controls activities within or proximate to stream systems. It is not meant to suggest that this is all-encompassing but rather just the few pieces of legislation that are most commonly encountered. Further investigation, specific to the application, should be conducted at the Community Plan and Plan of Subdivision stages of the planning process. Three specific policies are discussed in further detail in the following two subsections.

### **A 2.5.2 Fish Habitat Policy**

The principal legislation governing fish habitat is the Fisheries Act. This federal legislation states no person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat (Section 35(2)) without authorization by the Department of Fisheries and Oceans. As well, no person shall deposit or permit the deposit of any deleterious substance into water frequented by fish (Section 36(3)).

The Department of Fisheries and Oceans (1986) *Policy for the Management of Fish Habitat* has the objective of creating a net gain of habitat for Canada's Fisheries resources. The goals of the policy are:

1. Maintain the current productive capacity of fish habitats supporting Canada's fisheries resources, such that fish suitable for human consumption may be produced.
2. Rehabilitate the productive capacity of fish habitats in selected areas where economic or social benefits can be achieved through the fisheries resource.

3. Improve and create fish habitats in selected areas where the production of fisheries resources can be increased for the social or economic benefit of Canadians.

The guiding principle of Goal 1 is the **no net loss principle** which requires that if the productive capacity of a fish habitat is reduced, then a compensating increase in fish production must be made to occur. The hierarchy of preferences for applying this principle is as follows:

1. Maintain, without disruption, the natural productive capacity of habitats through re-design or mitigation.
2. If the former proves impossible or impractical, then compensation by either creating new habitat, or by increasing the productive capacity of existing habitat will be considered.

It should be noted that compensation may not be acceptable in some cases where the habitats in question are deemed especially important or sensitive. It should also be noted that an Authorization under the Fisheries Act triggers the Canadian Environmental Assessment Act, so that screening under this Act becomes necessary. Activities that alter fish habitat will be subject to Fisheries Act approval.

### **A 2.5.3 Natural Heritage System Policy**

The definition of the Forbes Creek Wetland Complex as Provincially Significant means that approval agencies must 'have regard for' the provisions of Section 2.3 of the Provincial Policy Statement (1997) which states:

- "2.3.1 Natural heritage features and areas will be protected from incompatible development.



a) Development and site alteration will not be permitted in:

- Significant wetlands south and east of the Canadian Shield.

2.3.2 Development and site alteration may be permitted on adjacent lands to a) and b) if it has been demonstrated that there will be no negative impacts on the natural features or on the ecological functions for which the area is identified.

2.3.3 The diversity of natural features in an area, and the natural connections between them should be maintained, and improved where possible.”

2.3.4 Nothing in policy 2.3 is intended to limit the ability of agricultural uses to continue.”

Development permitted within PSWs is limited to infrastructure such as roads and servicing, which are usually assessed under the provisions of the Environmental Assessment Act. Proposals for development on ‘adjacent lands’ (i.e. lands within 120 m of the PSW) are subject to analysis in an Environmental Impact Statement (EIS) to determine whether negative impacts may occur if development proceeds, and to provide standards and strategies for the avoidance of impacts. With respect to the 120m ‘adjacent lands’ threshold identified in the Natural Heritage Manual (MNR 1999), this study has documented and analyzed the functions, attributes and linkages within the entire landscape of the Subwatershed in order to prescribe protection and enhancement measures that will apply as projected land use changes occur.

The majority of the Natural Heritage System in the subwatershed was previously identified as a Locally Significant Natural Area (LSNA) as shown on Map 9 in the

City of Cambridge Official Plan (Corporation of the City of Cambridge, 1999). Section 6.1.4 of the Official Plan indicates that it is the policy of the City to preserve, protect and enhance all LSNAs, and any permitted development within or adjacent to an LSNA must have regard for the preservation and enhancement of the LSNA.

A Comprehensive EIS, as represented by the present study, must result in the final determination of areas where development is prohibited, areas where development may occur subject to certain impact mitigation methods, and the provision of buffers or setbacks to minimize impacts. The scope of Provincial, Regional and City policies also requires consideration of enhancements to habitats and functions to ensure sustainability in a changing landscape. Any alteration of the recommended approach will require more substantive study of particular factors and functions in the areas in question.

#### A 2.5.4 Water Resource Policy

Approval agencies must ‘have regard for’ the provisions of Section 2.4 of the Provincial Policy Statement (1997) which state:

#### “2.4 Water Quality & Quantity

2.4.1 The *quality and quantity* of groundwater and surface water and the function of sensitive groundwater recharge/discharge areas, aquifers and headwaters will be protected or enhanced.”

The result of this study must provide insight into the stated functions of groundwater recharge/discharge areas. These results also comply with Regional and City land use policies.



### A 2.5.5 Natural Hazard Policy

Approval agencies must also “have regard” for provisions of Section 3.1 of the Provincial Policy Statement (1997) which state:

- “3. Public Health & Safety
  - 3.1 Natural Hazards
    - 3.1.1 Development will generally be directed to areas outside of:
      - b) *hazardous lands adjacent to river and stream systems which are impacted by flooding and/or erosion hazards*
    - 3.1.2 Development and site alteration will not be permitted within:
      - a *floodway* (except in those exceptional situations where a *Special Policy Area* has been approved).
    - 3.1.3 Except as provided in policy 3.1.2, *development and site alteration* may be permitted in *hazardous lands* and *hazardous sites*, provided that all of the following can be achieved:
      - a) The hazards can be safely addressed, and the development *and* site alteration *is carried out in accordance with* established standards and procedures;
      - b) New hazards are not created and existing hazards are not aggravated;
      - c) No adverse environmental impacts will result;
      - d) Vehicles and people have a way of safely entering and exiting the area during times of flooding, erosion, and other emergencies; and

- e) The *development* does not include *institutional uses or emergency services* or the disposal, manufacture, treatment or storage of *hazardous substances*.”

As a result, this study will determine the Forbes Creek Regulatory floodline and provide a preliminary assessment of steep slopes and recommend development setbacks. These results also comply with Regional and City land use planning policy.

### A 3.0 PUBLIC PARTICIPATION

The Class Environmental Assessment and Subwatershed planning processes require public consultation to ensure that subwatershed, resident and stakeholder issues are incorporated into the study. The Forbes Creek Subwatershed Study included a full complement of public contact points to ensure that the study results and management alternatives were properly discussed and disseminated. The following key public contact points are noted and the corresponding advertisements and press articles are presented in **Appendix B** (Public Consultation):

1. On December 7, 2000, the Consultant Team, the Steering Committee and members of the Cambridge Environmental Advisory Committee toured the subwatershed.
2. The first Public Open House was held December 7, 2000 at the W.G. Johnson Centre. Notice of the meeting was published in the Record and local papers and flyers were sent to over 100 individuals, land owners and interested public. Approximately 30 people attended the Open House where the study process was described and preliminary background material presented.
3. Subsequently, an Open House was held for the Class Environmental Assessment component of



the project on May 23, 2001 at the W. G. Johnson Centre. Notice of the meeting was published in the Record and local papers and flyers were direct mailed. Approximately 50 people attended the Open House where the study process was once again described and various servicing options were presented.

4. A unique component of the study was a 1/2 day field trip (May 25, 2001) with students of Jacob Hespeler Secondary School. Key members of the Consultant Team introduced the Environmental Studies students to a variety of concepts and practical applications of field assessments in stream morphology, aquatic species assessment, wetland species identification and habitat delineation, and stream flow. The field trip was very successful and students were further informed of the Forbes Creek Subwatershed Study process and goals. Cambridge Times reporter, Ray Martin, who was present the entire time and endured the weather with the rest of the participants, published an excellent article in the Cambridge Times.
5. To effectively communicate with concerned stakeholders, the Study Team advertised a Community Workshop on September 11, 2001 at the W.G. Johnson Centre. The intent was to present the background material and have the public review and comment on the information through a series of breakout groups. Unfortunately, terrorist events in the United States were of greater concern and the Study Team was unanimous in determining that the Workshop be greatly condensed to allow participants the opportunity to go home early. The Consultant Team did present its background information to the public. In spite of the disturbing events that

had occurred that day, approximately 50 people did attend.

6. Following the 1st Community Workshop, a Public Tour of the subwatershed was held on October 3, 2001. The key points that were toured included the Wood Duck Sanctuary, the various ponds, the agricultural areas and the Forbes Creek outlet. Various consultant and Steering Committee Team members were present and approximately 30 people attended the tour. The Tour expanded on the background information presented at the 1st Community Workshop, allowed the public to gain firsthand knowledge of the conditions within the subwatershed, and provided an additional opportunity to ask questions and raise concerns about the subwatershed and watershed process.
7. The 2nd Community Workshop (October 11, 2001) was attended by approximately 50 members of the public. Key members of the Consultant Team, the Steering Committee and senior City staff were also present at the Workshop. The objective of the workshop, which was held at the Beehive Room in the Hespeler Memorial Arena, was to present the results of the background research and the various management alternatives. There was excellent group discussion regarding subwatershed issues. The various management alternatives were presented to the public. Three questions were given to the breakout groups (to facilitate discussion), specifically:
  1. Are the Management Alternatives complete (brainstorming);
  2. Do the Management Alternatives meet the Goals and Objectives of the Study; and,
  3. What is the preferred Management Strategy?



8. The results of the group discussions were discussed in a plenary session. These results are provided in **Appendix B**, however, it can be stated that the desire of the public was to maintain the creek and pond system within the subwatershed but that safety, aesthetics and long-term maintenance issues were to be addressed.

To assist in the dissemination of information to stakeholders, notices of the Public Meetings and Community Workshops were also published on the GRCA and PEIL websites. Background material that was presented at each of the contact points was also placed on the PEIL website. In addition, preliminary data was made available on the PEIL website after the 1st Public Workshop so that the public was able to review information prior to the field tour. Eventually the entire draft and final document was placed on the PEIL website. Notices of all meetings were also placed in local papers and, if applicable, in the Hespeler Happenings.

## A 4.0 ISSUES AND OBJECTIVES

As a result of the public consultation, agency comments, and study team investigations, the following particular issues were raised and identified and will need to be addressed during the course of the study:

- a) Forbes Creek Wildlife Sanctuary: Status and future plans for the sanctuary. Ownership and management strategies of the lands.
- b) Bridges, Dams and Ponds: Impact on Fish Habitat, current state of repair, long-term recommendations.
- c) Fish Habitat: Status, potential, and management objectives (per the Grand River Fish Habitat Management Plan).

- d) Wellhead Protection: Implications on water quality and quantity from infiltrated stormwater runoff from development.
- e) Potential road and servicing crossings of the Forbes Creek and associated wetlands.
- f) Forbes Creek Wetland Complex: Confirmation of wetland boundaries, buffers from development, and status of the complex.
- g) Municipal Drains: Location and status of any existing agricultural or municipal drains.
- h) Natural Habitat Network: Elements of a Natural Habitat Network as per the Regional Official Policies Plan.
- i) Woodlots: Protection of woodlots and vegetation management strategies.
- j) Trail System: Potential linkages (within and beyond the subwatershed) and interconnection of natural areas.

As a result, the study will need to address:

1. The goal of the Forbes Creek Subwatershed Study (Section 1.2):
2. General objectives laid out in provincial documents with respect to subwatershed study contents (Section 1.3); and
3. The issues raised by the public, agencies and the consultant team (Section 4.0).

In achieving the above three items, the objectives of the Forbes Creek Subwatershed Study are:

### OBJECTIVE 1 - AQUATIC RESOURCES

#### Objective 1.1

To identify protect, maintain and enhance aquatic resources.

#### Objective 1.2

To prepare a strategy for the aquatic component of the Forbes Sanctuary.



**Objective 1.3**

To determine the impact of bridges, dams and ponds on fish habitat.

**Objective 1.4**

To determine the status, potential, and management objectives of Forbes Creek in accordance with the Grand River Fish Habitat Management Plan.

**OBJECTIVE 2 – TERRESTRIAL RESOURCES****Objective 2.1**

To identify protect, maintain and enhance terrestrial resources.

**Objective 2.2**

Identify, protect and manage Environmental Preservation Areas, Environmentally Sensitive Policy Areas, and Regionally Significant Natural Corridors.

**Objective 2.3**

To confirm the wetland boundaries and the status of the wetland complex.

**Objective 2.4**

To prepare a strategy for the terrestrial component of the Forbes Sanctuary.

**Objective 2.5**

To assess and provide recommendations for future management of the agricultural lands within the subwatershed.

**Objective 2.6**

To determine a preferred Natural Habitat Network and the elements of a Natural Habitat Network as per the Regional Official Policies Plan.

**Objective 2.7**

To determine appropriate woodlot and vegetation management strategies.

**OBJECTIVE 3 - NATURAL HAZARDS****Objective 3.1**

To minimize the risk to life and property due to flooding and erosion.

**OBJECTIVE 4 - SURFACEWATER RESOURCES****Objective 4.1**

To preserve natural hydrological systems.

**Objective 4.2**

To protect and manage surface water quality and quantity in order to ensure the future ability of Regional water-taking requirements and maintain the assimilative capacity of downstream wastewater treatment plants.

**OBJECTIVE 5 - GROUNDWATER RESOURCES****Objective 5.1**

To preserve natural hydrogeological systems.

**Objective 5.2**

To protect and manage the quantity and quality of groundwater resources.

**Objective 5.3**

To determine the implications on water quality and quantity from infiltrated stormwater runoff from development.

**OBJECTIVE 6 - THE RURAL AND URBAN ENVIRONMENT****Objective 6.1**

To develop an ecosystem-based approach to land use planning and resource management in the subwatershed.

**Objective 6.2**

To produce an implementation and monitoring plan to guide future development in the subwatershed.

**Objective 6.3**

To determine and address the implication of development opportunities on the provision of infrastructure.

**Objective 6.4**

To determine the current state of repair of bridges, dams and ponds and to develop long-term remediation recommendations which would address public safety, maintenance and operation, public use and aesthetics.

**Objective 6.5**

To determine ownership and management strategies of the Forbes Sanctuary.

**Objective 6.6**

To determine potential road and servicing crossings of the Forbes Creek and associated wetlands and to assess the potential impacts of these crossings from an environmental perspective.

**Objective 6.7**

To determine the appropriate buffers from development.





**Objective 6.8**

To determine the location and status of any existing agricultural or municipal drains.

**Objective 6.9**

To determine a potential trail system with potential linkages (within and beyond the subwatershed) and interconnection of natural areas.

The goal of the Forbes Creek Subwatershed Study has been considered throughout the study. The objectives and issues have determined the appropriate course of action during our field investigations, in the determination of subwatershed management alternatives and finally in the selection of the preferred management plan.

The following Section contains the detailed background studies which have been completed in order to allow the Study Team to address the above noted objectives and issues. Section E demonstrates that they have been addressed.

