



# Algonquin Road Watershed Stormwater Management Class Environmental Assessment Study

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## 1. INTRODUCTION

This document describes the planning process that was followed and the conclusions that were reached during the Algonquin Road Watershed Stormwater Management Class Environmental Assessment.

The City of Greater Sudbury (City) retained Earth Tech Canada Inc. (Earth Tech) to identify ways and means to control quantity and address quality of stormwater within the Algonquin Road Watershed during minor and major rainfall/snowmelt events for both pre-development and post-development conditions. Figure 1-1 illustrates the Algonquin Road Watershed.

Stormwater management is required to mitigate the effects of urbanization on the hydrologic cycle, including increased runoff and decreased infiltration of rain and snowmelt. Without proper stormwater management, reduced baseflow, degradation of water quality, and increased flooding and erosion can lead to reduced diversity of aquatic life, fewer opportunities for human uses of water resources, and loss of property and human life.

Watershed planning integrates environmental and land use planning. Criteria for the protection of water quantity, water quality, habitat and biota are established to help achieve the goals set for the watershed. Strategies to manage human activities within the watershed are developed to meet protection criteria. A stormwater management strategy may include protection of natural areas, design of communities to reduce stormwater generation, pollution prevention programs and stormwater management practices<sup>1</sup>.

Two Community Meetings were held during completion of this study to present information to, and obtain input from, review agencies, area property owners / residents and the public.

At the first Community Meeting, preliminary findings, including identification of the problem, watershed characteristics and alternative solutions to the problem were presented.

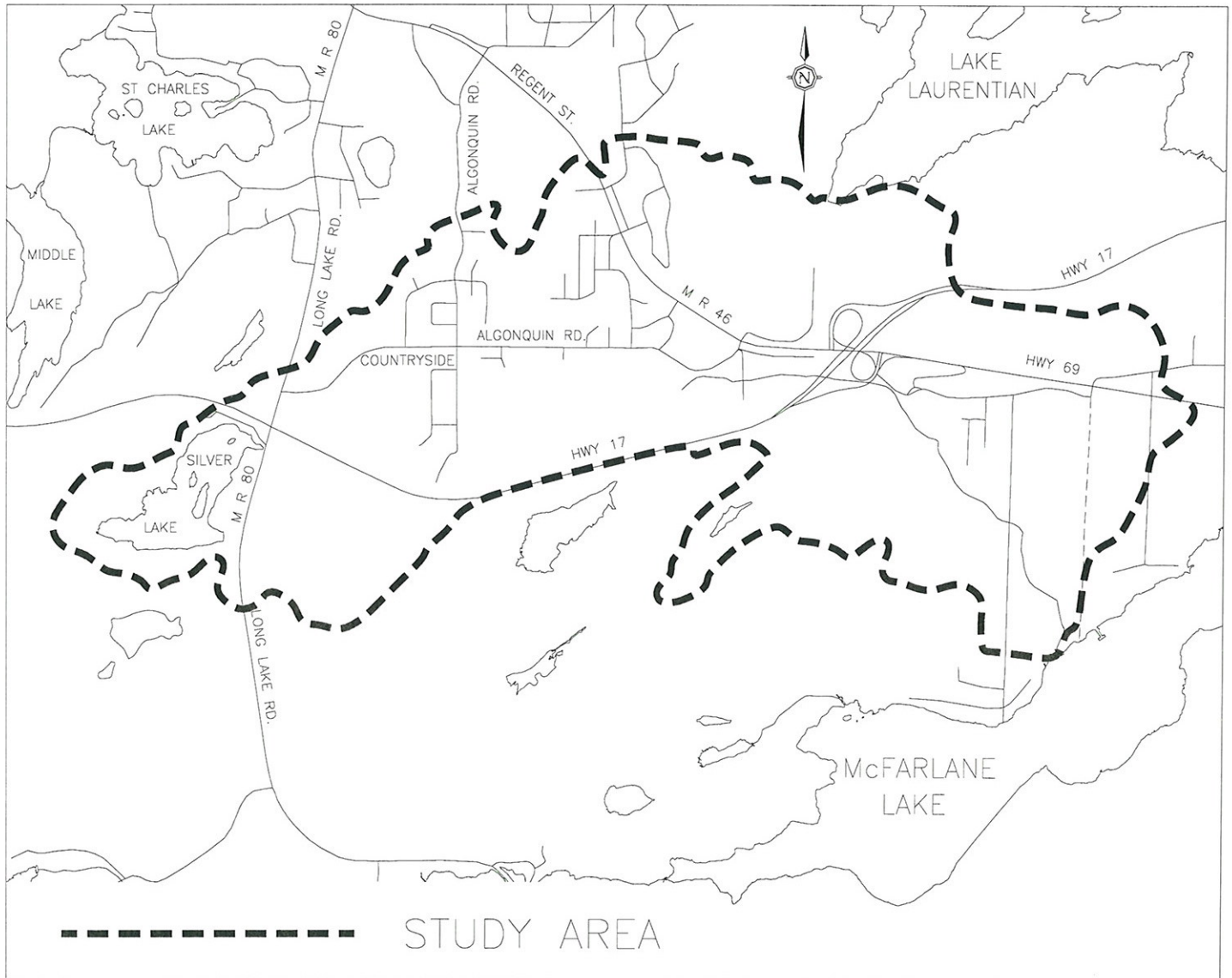
At the second Community Meeting, the Recommended Stormwater Management Plan was presented.

Comments received at both Community Meetings have been considered during the selection of the Preferred Stormwater Management Plan.

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<sup>1</sup> Ministry of the Environment, Stormwater Management Planning and Design Manual, March 2003.





**Figure 1-1:**  
**Algonquin Road Watershed**  
**Key Plan of Study Area**

## 2. OVERVIEW OF THE MUNICIPAL CLASS EA MASTER PLANNING PROCESS

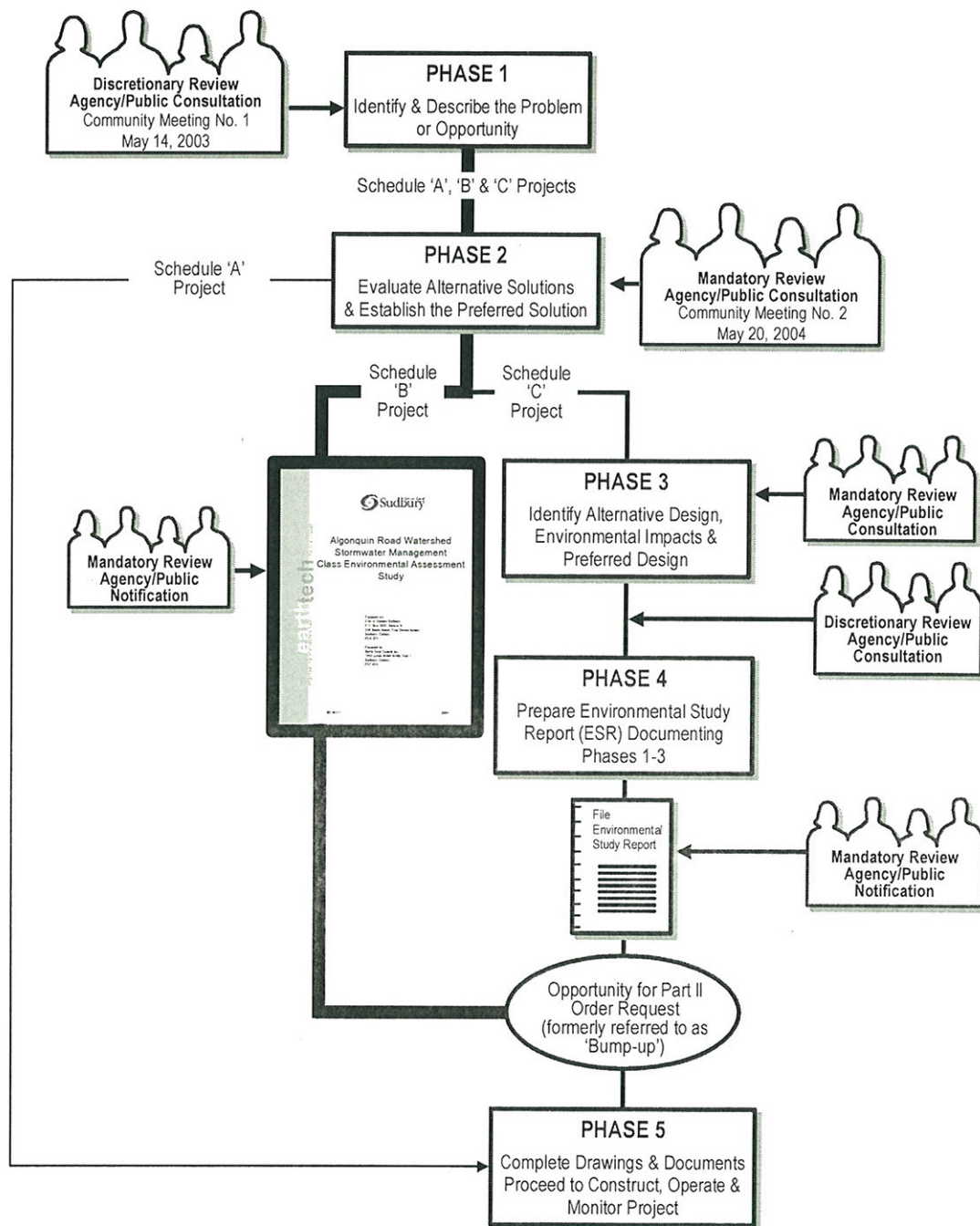
All municipalities in Ontario are subject to the provisions of the Environmental Assessment Act (EAA) and the requirement to undertake an Environmental Assessment of infrastructure projects.

The Ontario Municipal Engineers Association (MEA) has published the “Municipal Class Environmental Assessment” (Class EA) which provides municipalities with a process approved under the EAA to plan and implement municipal infrastructure projects that recur frequently, are usually limited in scale, and have a predictable range of environmental impacts.

The Class EA process allows a municipality to meet the requirements of the EAA for a municipal infrastructure projects without having to either undertake an Individual EA or request a specific exemption for the project.

The phases summarized below are considered essential for compliance with the requirements of the EAA.

- Phase 1** Identify the problem or opportunity but also describing it in sufficient detail to lead to a clear problem/opportunity statement (see Section 4).
- Phase 2** Identify alternative solutions to address the problem or opportunity by taking into consideration the existing environment and establish the recommended solution accounting for public and agency review and input. This phase involves six steps: (1) identify all reasonable alternative solutions to the problem/opportunity; (2) prepare a general inventory of the existing natural, social and economic environments in which the project is to occur; (3) identify the net positive and negative impacts of each alternative solution including mitigating measures; (4) evaluate the alternative solutions; (5) consult with review agencies and the public to solicit comment and input; and (6) select or confirm the recommended solution (see Section 9).



Indicates the Status of the Study With Respect to the Class EA Planning Process

Figure 2-1: Overview of Class EA Process



- Phase 3** Examine alternative methods of implementing the recommended solution based on the existing environment, public and government agency input, anticipated environmental impacts and methods of minimizing negative impacts and maximizing positive impacts.
- Phase 4** Document, in an Environmental Study Report (ESR), a summary of the rationale and the planning, design and consultation process followed in the project and make such documentation available for scrutiny by review agencies and the public.
- Phase 5** Complete contract drawings and documents. Proceed to construction and operation and monitor construction for adherence to environmental provisions and commitments. Where special conditions dictate, also monitor the operation of the completed facilities.

Based on the Class EA document, projects are classified as either Schedule “A”, “B”, or “C” projects. Each of these classifications requires a different level of review to complete the requirements of the Class EA, as noted below, and thus comply with the EAA:

- **Schedule “A”** projects are limited in scale, have minimal adverse impacts and include the majority of municipal stormwater management, water, sewage operations and maintenance activities. These projects are approved and may be implemented without following the Class EA planning process.

Schedule “A” projects typically include normal or emergency operational maintenance activities where the environmental impacts of these activities are usually minimal.

- **Schedule “B”** projects have the potential for some adverse environmental impacts. The municipality is required to undertake a screening process (Phases 1 and 2) involving mandatory contact with directly affected public and relevant review agencies to ensure that they are aware of the project and that their concerns are addressed. Schedule “B” projects require that a report be prepared and submitted for review by the public and review agencies. If there are no outstanding concerns raised by the public and/or review agencies then the municipality may proceed to project implementation (Phase 5). If the screening process raises a concern that cannot be resolved, then the Part II Order<sup>2</sup>

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<sup>2</sup> Part II Order refers to a request to the Minister of the Environment for a project to comply with Part II (addresses individual Environmental Assessments) of the Environmental Assessment Act. The requirement to prepare an individual Environmental Assessment (EA) can involve the preparation of a Terms of Reference and EA document that is submitted to the Ministry of the Environment (MOE) and other government agencies for a government review. This can be considered a large study undertaking that has historically been applied to large-scale significant infrastructure projects.



procedure (commonly referred to as a “bump-up”) may be invoked. Alternatively, the municipality may voluntarily elect to plan the project as a Schedule “C” undertaking.

- **Schedule “C”** projects have the potential for significant environmental impacts and must proceed under the full planning and documentation procedures specified in the Class EA Document (Phases 1 to 4). Schedule “C” projects require that an Environmental Study Report be prepared and submitted for review by the public and review agencies. If concerns are raised that cannot be resolved, then the Part II Order procedure may be invoked. If there are no outstanding concerns, then the municipality may proceed to Phase 5 for implementation.

## 2.1 Schedule “B” Classification

As this Project involves establishing new stormwater retention/detention ponds and appurtenances or infiltration systems, including an outfall to a receiving water body, it is classified as a Schedule “B” Project.

Therefore, Phases 1 and 2 of the Class EA planning process as described previously apply to this project. Appendix A further expands on the steps required to complete the Class EA planning and design process.

### **3. STUDY AREA**

The following sections describe the study area including its location, existing land uses and natural environment features. This information was considered when reviewing the potential impacts of alternative stormwater management strategies.

Drawing 1 is an aerial photograph of the study area, taken in May 2002.

#### **Location**

The study area is located in the southern portion of the City of Sudbury locally referred to as 'the South End'. The study area limits are shown in Figure 1-1.

#### **Land Use**

The secondary plan for the area sets out a combination of low density residential, commercial and light industrial land uses.

#### **Natural Environment**

As depicted on Drawing 2, stormwater within the Algonquin Road Watershed follows a drainage course from Silver Lake to McFarlane Lake and is characterized by many minor wetlands, culvert crossings under highways and residential roads, storm sewer systems conveying water to open ditches, overland flow in rural areas and roadside ditches.

Natural environmental features within the project study area include Silver Lake, a watercourse (main channel) that flows from Silver Lake to McFarlane Lake, through the entire study area, Mallard's Pond (an engineered stormwater pond on the main channel), a number of tributaries to the main channel and a wetland area adjacent to McFarlane Lake.

The natural environment has been modified by roadways, lot grading, stormwater retention (such as Mallard's Pond), channel enclosure, residential development and some infilling (the Countryside Arena site and the Petro Canada gas station site on Regent Street just west of Ida Street).

Silver Lake is currently considered to be without fish due to poor water quality, caused by acidification and elevated metal levels. However, recent sample results provide some evidence of a trend towards improved water quality. Silver Lake will probably recover as other lakes in the area have done. The reach of the drainage course between the outlet of Silver Lake and Mallard's Pond is primarily a series of small, interconnected wetlands and municipal / highway drainage systems. Natural features of this

section include emergent wetland plants typical of the area and shoreline cover plants such as sedges, grasses, rushes and woody shrubs. Tree cover tends to be sparse and presently, a significant natural dieback of white birch predominates the landscape. The area to the immediate south of the study area, between Long Lake and the Highway 17 southwest bypass, contains sufficient wild area to provide habitat and travel corridors for wildlife, including moose and black bear.

Mallard's Pond is a recently developed stormwater retention pond for the residential development at Mallards Landing. The pond has become important habitat for waterfowl, including ducks and Canada geese. Subsequent to the construction of the pond, fish populations grew and there is now an established community of brown bullheads.

Downstream of Mallard's Pond, the watercourse falls precipitously as it crosses the Highway 69/17 Interchange. The extent and nature of the steeper gradient is a barrier to fish movement. The slope from Winterhaven Avenue to McFarlane Lake is very gentle (locally known as the McFarlane Flats) and upstream of the confluence with McFarlane Lake, the stream forms a treed wetland area. Beaver and other aquatic mammals are present in the lower reaches of the study and from time to time, the drainage pattern is altered by the activity of beavers.

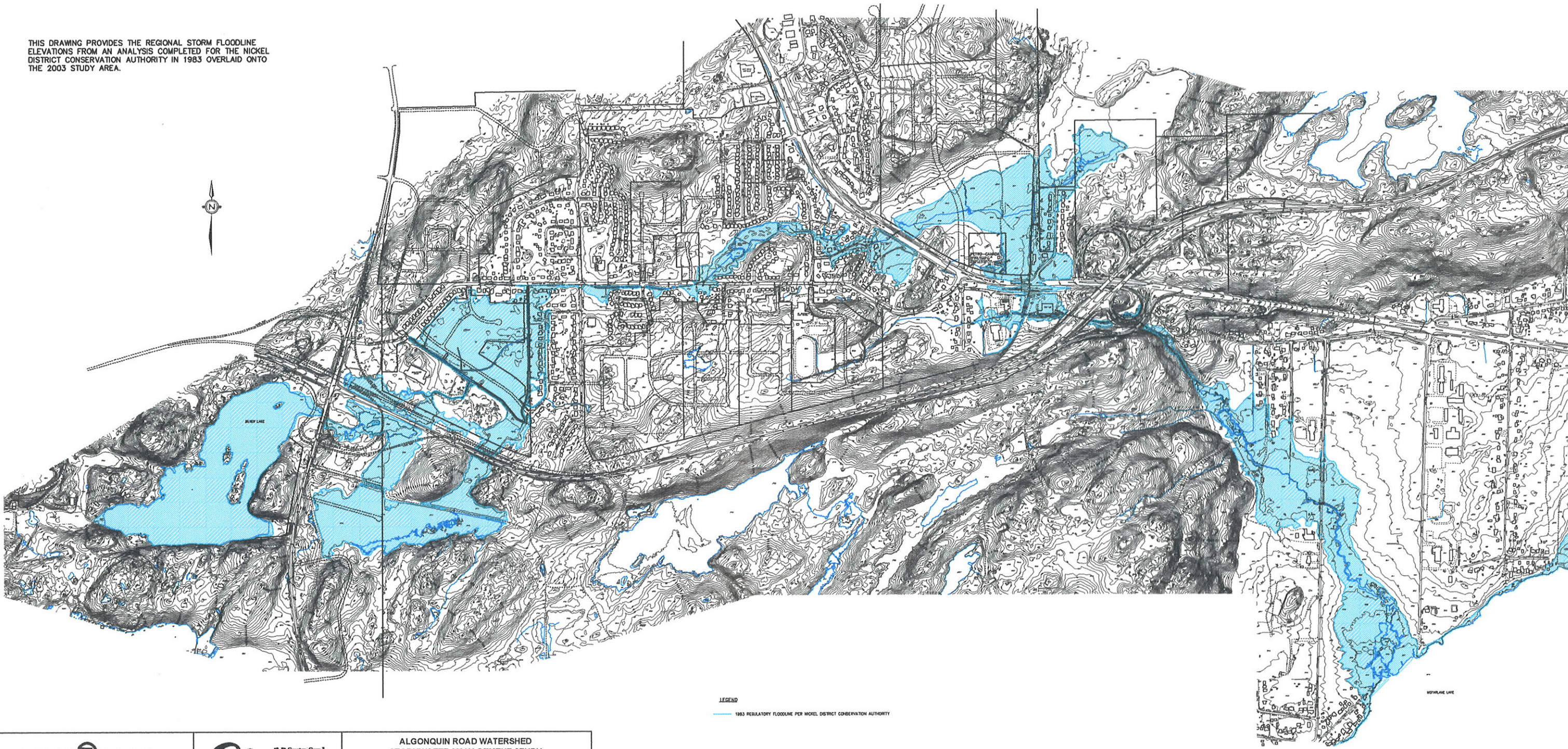
McFarlane Lake is an important urban lake in the area, with many permanent homes on the shoreline. The lake contains an important warm water fishery, primarily small mouth bass and walleye. The lake has been identified as becoming nutrient rich (eutrophic) and efforts need to be taken to ensure that the contribution of nutrients to the lake environment is reduced.

There are no Environmentally Significant Areas (ESAs), Provincially Significant Wetlands (PSWs), or Areas of Natural and Scientific Interest (ANSIs) within the study area. There are three rare species in the study area, including the Northern Long-eared Bat (rare to uncommon, last seen in 1966), an unnamed sensitive species (rare to uncommon, last seen in 1988), and Nuttall Alkali Grass (historically known, but not verified recently).

Insert Drawing 1 (aerial from City)



THIS DRAWING PROVIDES THE REGIONAL STORM FLOODLINE ELEVATIONS FROM AN ANALYSIS COMPLETED FOR THE NICKEL DISTRICT CONSERVATION AUTHORITY IN 1983 OVERLAID ONTO THE 2003 STUDY AREA.



LEGEND  
1983 REGULATORY FLOODLINE PER NICKEL DISTRICT CONSERVATION AUTHORITY



## **4. PHASE 1: IDENTIFICATION AND DESCRIPTION OF THE PROBLEM/OPPORTUNITY**

### **4.1 Deficiencies Associated with the Existing Algonquin Road Watershed Drainage System**

The existing drainage system in the Algonquin Road Watershed cannot fully accommodate peak flows in isolated areas during extreme rainfall events. Drawings 3 and 4 illustrate pre-development floodline elevations, as determined during this study, taking into account existing land uses and the existing conveyance system. According to accepted practice, flood elevations were determined with both the 100-year storm and the Timmins Storm. The higher of the two elevations at each location in the watercourse were used to develop the floodlines.

### **4.2 Future Urban Growth in the Algonquin Road Watershed**

The City is experiencing urban growth in the Algonquin Road Watershed that is expected to continue. Drawing 5 illustrates existing development within the watershed as well as plans of proposed subdivisions (at various stages of approval). The proposed alignment of the new Highway 17 interchange is also shown. For the purpose of this study, the post-development condition assumed full build-out of the planned development shown on Drawing 5.

### **4.3 Anticipated Stormwater Runoff Quantity and Quality Changes**

As a result of planned urban growth, quantity and quality changes to stormwater runoff are anticipated. As development occurs, the amount of impervious area increases which reduces the amount of infiltration and causes the volume of stormwater runoff and peak flows to increase. Increased flow velocities may cause increased erosion in existing channels.

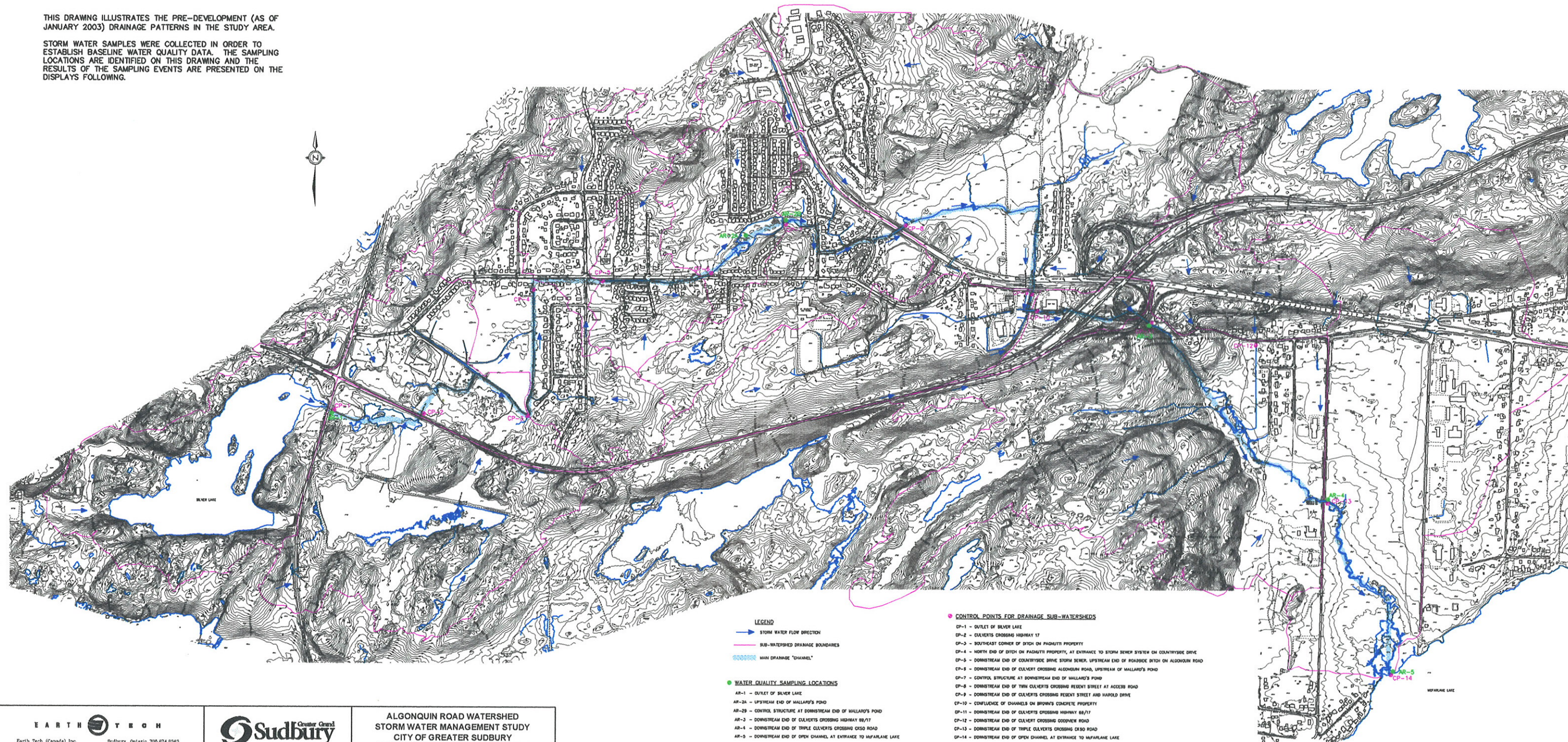
With an increase in impervious area, the amount of pollutants being picked up in the stormwater runoff increases, all of which ends up in downstream receivers.

Drawing 5 illustrates floodline elevations, as determined during this study, taking into account post development conditions and the existing conveyance system.



THIS DRAWING ILLUSTRATES THE PRE-DEVELOPMENT (AS OF JANUARY 2003) DRAINAGE PATTERNS IN THE STUDY AREA.

STORM WATER SAMPLES WERE COLLECTED IN ORDER TO ESTABLISH BASELINE WATER QUALITY DATA. THE SAMPLING LOCATIONS ARE IDENTIFIED ON THIS DRAWING AND THE RESULTS OF THE SAMPLING EVENTS ARE PRESENTED ON THE DISPLAYS FOLLOWING.



**LEGEND**

— STORM WATER FLOW DIRECTION

— SUB-WATERSHED DRAINAGE BOUNDARIES

— MAIN DRAINAGE "CHANNEL"

**WATER QUALITY SAMPLING LOCATIONS**

- AR-1 - OUTLET OF SILVER LAKE
- AR-2A - UPSTREAM END OF MALLARD'S POND
- AR-2B - CONTROL STRUCTURE AT DOWNSTREAM END OF MALLARD'S POND
- AR-3 - DOWNSTREAM END OF CULVERTS CROSSING HIGHWAY 88/17
- AR-4 - DOWNSTREAM END OF TRIPLE CULVERTS CROSSING CROSO ROAD
- AR-5 - DOWNSTREAM END OF OPEN CHANNEL AT ENTRANCE TO MAFARLANE LAKE

**CONTROL POINTS FOR DRAINAGE SUB-WATERSHEDS**

- CP-1 - OUTLET OF SILVER LAKE
- CP-2 - CULVERTS CROSSING HIGHWAY 17
- CP-3 - SOUTHEAST CORNER OF DITCH ON PADGETT PROPERTY
- CP-4 - NORTH END OF DITCH ON PADGETT PROPERTY, AT ENTRANCE TO STORM SEWER SYSTEM ON COUNTRYSIDE DRIVE
- CP-5 - DOWNSTREAM END OF COUNTRYSIDE DRIVE STORM SEWER, UPSTREAM END OF ROADSIDE DITCH ON ALGONQUIN ROAD
- CP-6 - DOWNSTREAM END OF CULVERT CROSSING ALGONQUIN ROAD, UPSTREAM OF MALLARD'S POND
- CP-7 - CONTROL STRUCTURE AT DOWNSTREAM END OF MALLARD'S POND
- CP-8 - DOWNSTREAM END OF TWIN CULVERTS CROSSING RECENT STREET AT ACCESS ROAD
- CP-9 - DOWNSTREAM END OF CULVERTS CROSSING RECENT STREET AND HAROLD DRIVE
- CP-10 - CONFLUENCE OF CHANNELS ON BROWN'S CONCRETE PROPERTY
- CP-11 - DOWNSTREAM END OF CULVERTS CROSSING HIGHWAY 88/17
- CP-12 - DOWNSTREAM END OF CULVERT CROSSING COOPERS ROAD
- CP-13 - DOWNSTREAM END OF TRIPLE CULVERTS CROSSING CROSO ROAD
- CP-14 - DOWNSTREAM END OF OPEN CHANNEL AT ENTRANCE TO MAFARLANE LAKE

EARTH TECH

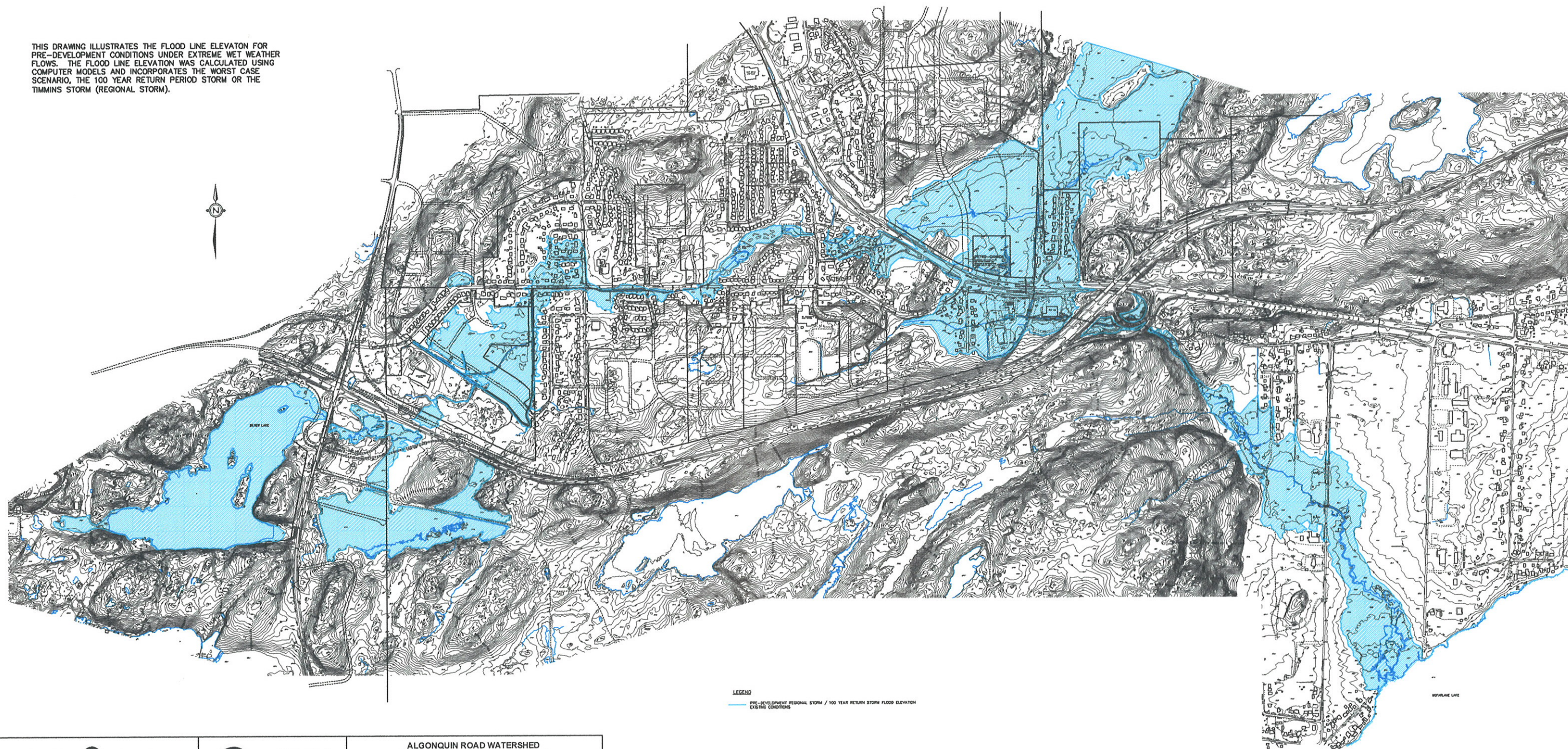
Earth Tech (Canada) Inc. Sudbury, Ontario 706.674.6945

Sudbury

ALGONQUIN ROAD WATERSHED  
STORM WATER MANAGEMENT STUDY  
CITY OF GREATER SUDBURY  
PRE-DEVELOPMENT DRAINAGE PLAN



THIS DRAWING ILLUSTRATES THE FLOOD LINE ELEVATION FOR PRE-DEVELOPMENT CONDITIONS UNDER EXTREME WET WEATHER FLOWS. THE FLOOD LINE ELEVATION WAS CALCULATED USING COMPUTER MODELS AND INCORPORATES THE WORST CASE SCENARIO, THE 100 YEAR RETURN PERIOD STORM OR THE TIMMINS STORM (REGIONAL STORM).



LEGEND  
PRE-DEVELOPMENT REGIONAL STORM / 100 YEAR RETURN STORM FLOOD ELEVATION  
EXISTING CONDITIONS

EARTH TECH

Earth Tech (Canada) Inc. Sudbury, Ontario 705.674.6543

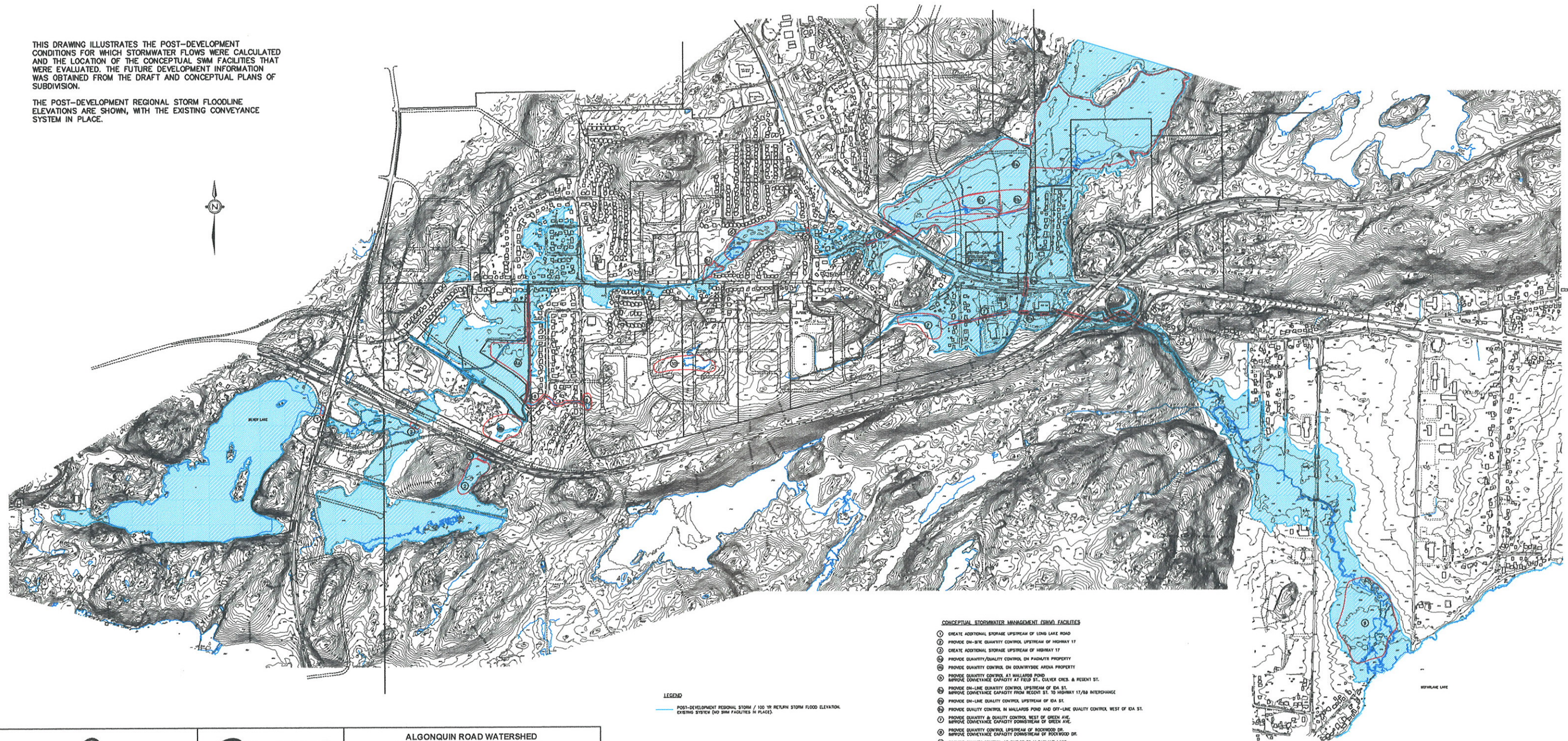
**Sudbury** Greater Grand

ALGONQUIN ROAD WATERSHED  
STORMWATER MANAGEMENT STUDY  
CITY OF GREATER SUDBURY  
PRE-DEVELOPMENT / COMPUTER ANALYSIS RESULTS



THIS DRAWING ILLUSTRATES THE POST-DEVELOPMENT CONDITIONS FOR WHICH STORMWATER FLOWS WERE CALCULATED AND THE LOCATION OF THE CONCEPTUAL SWM FACILITIES THAT WERE EVALUATED. THE FUTURE DEVELOPMENT INFORMATION WAS OBTAINED FROM THE DRAFT AND CONCEPTUAL PLANS OF SUBDIVISION.

THE POST-DEVELOPMENT REGIONAL STORM FLOODLINE ELEVATIONS ARE SHOWN, WITH THE EXISTING CONVEYANCE SYSTEM IN PLACE.



**LEGEND**

— POST-DEVELOPMENT REGIONAL STORM / 100 YR RETURN STORM FLOOD ELEVATION  
— EXISTING SYSTEM (NO SWM FACILITIES IN PLACE)

**CONCEPTUAL STORMWATER MANAGEMENT (SWM) FACILITIES**

- ① CREATE ADDITIONAL STORAGE UPSTREAM OF LONG LAKE ROAD
- ② PROVIDE ON-SITE QUANTITY CONTROL UPSTREAM OF HIGHWAY 17
- ③ CREATE ADDITIONAL STORAGE UPSTREAM OF HIGHWAY 17
- ④ PROVIDE QUANTITY/QUALITY CONTROL ON PADGETT PROPERTY
- ⑤ PROVIDE QUANTITY CONTROL ON COUNTRYSIDE ARENA PROPERTY
- ⑥ PROVIDE QUANTITY CONTROL AT MALLARD POND
- ⑦ IMPROVE CONVEYANCE CAPACITY AT FIELD ST., GULVER CIRC. & RECENT ST.
- ⑧ PROVIDE ON-LINE QUANTITY CONTROL UPSTREAM OF IDA ST.
- ⑨ IMPROVE CONVEYANCE CAPACITY FROM RECENT ST. TO HIGHWAY 17/88 INTERCHANGE
- ⑩ PROVIDE ON-LINE QUANTITY CONTROL UPSTREAM OF IDA ST.
- ⑪ PROVIDE QUALITY CONTROL IN MALLARD POND AND OFF-LINE QUALITY CONTROL WEST OF IDA ST.
- ⑫ PROVIDE QUANTITY & QUALITY CONTROL WEST OF GREEN AVE.
- ⑬ IMPROVE CONVEYANCE CAPACITY DOWNSTREAM OF GREEN AVE.
- ⑭ PROVIDE QUANTITY CONTROL UPSTREAM OF ROCKWOOD DR.
- ⑮ IMPROVE CONVEYANCE CAPACITY DOWNSTREAM OF ROCKWOOD DR.
- ⑯ PROVIDE QUALITY CONTROL AT OUTLET TO MAIFARLANE LAKE
- ⑰ PROVIDE ON-SITE QUANTITY/QUALITY CONTROL AT VINTAGE GREEN/MANIPORA PLACE



#### 4.4 Problem Statement

Phase 1 of the Class EA process requires the proponent of an undertaking (i.e. the City) to first document factors leading to the conclusion that the improvement is needed, and develop a clear statement of the identified problem/opportunity to be investigated.

As such, the **Problem Statement** is the principle starting point in the undertaking of a Class EA and becomes the central theme and integrating element of the project. It also assists in setting the scope of the project.

##### Problem Statement

The problem statement for the Algonquin Road Watershed Stormwater Management Study is as follows:

*The existing drainage system in the Algonquin Road Watershed cannot fully accommodate peak flows in isolated areas during extreme rainfall events.*

*The City of Greater Sudbury is experiencing urban growth in the Algonquin Road Watershed that is expected to continue.*

*As a result of urban growth, quantity and quality changes to stormwater runoff are anticipated.*

*Therefore, the purpose of this Study is to provide a plan for managing the impacts of urban growth on stormwater runoff.*

## **5. PUBLIC AND AGENCY CONSULTATION**

### **5.1 Consultation with Review Agencies, Area Property Owners, and the Public on the Preliminary Findings**

In accordance with the Municipal Class EA process, several steps have been undertaken to inform government agencies, area property owners / residents and the local community / general public of the nature and scope of the study and to solicit comments that may effect the outcome of the study.

#### **5.1.1 Notification of Study Commencement and Community Meeting No. 1**

To inform review agencies of the project and to solicit comments, a “Notice of Study Commencement and Community Meeting No. 1” was distributed. A copy of the letter that was mailed and a list of the review agencies to which the letter was sent are included in Appendix B.

The public was notified of the Study’s Commencement and Community Meeting No. 1 through newspaper notices. In addition, letters were sent to those who had contacted Earth Tech and requested to be added to the mailing list.

#### **5.1.2 Community Meeting No. 1 – May 14, 2003**

Community Meeting No. 1 was held to provide an opportunity for review agencies, special interest groups, potentially affected property owners and the public to review the preliminary results to date including the problem statement, alternative solutions, proposed evaluation criteria, and to discuss issues or concerns with City and Earth Tech staff. This venue followed an informal “drop-in” format, with no formal presentation made. Large display boards were used to present the relevant information. The Community Meeting was held on May 14, 2003 from 4:00 pm to 8:00 pm at the Countryside Arena in Sudbury, Ontario.

The following information was presented at Community Meeting No. 1:

- Study Overview (Study Purpose and Area Map);
- Overview of the Class Environmental Assessment Planning Process;
- Pre-Development Stormwater Quality Data;
- McFarlane Lake Historical Water Quality Data;
- Problem Statement;
- Alternative Stormwater Management Strategies
- Proposed Evaluation Criteria; and
- Next Steps.



A copy of the Community Meeting No. 1 presentation information is included in Appendix B.

The Community Meeting was well attended with approximately 30 names on the sign-in sheet, including representatives from the Greater Sudbury Lake Improvement Advisory Panel.

Table 5-1 includes a summary of comments received regarding Community Meeting No. 1 and how they have been addressed.

**Table 5-1**  
**Community Meeting No. 1 – May 14, 2003**  
**Comment Summary**

Contact Information	Comment	How Addressed
Ms. Margaret Martin and Mr. Pete Neilson 2773 Greenvalley Drive Sudbury, Ontario P3E 5B7 Tel: (705) 522-5562	<ul style="list-style-type: none"> <li>Water drains from the marsh area on Rockwood and Joseph Streets and Highway 17 Bypass.</li> <li>All house sump pumps and stormsewer on the street are directed into a culvert under the road directly in front of the property resulting in basement flooding and water coming in under the cement basement floor, washing sand into the sump hole.</li> <li>The lot is boulder fill with no soil to hold water.</li> <li>The marsh area drains through a three foot culvert crossing under Rockwood that drains into a two foot culvert crossing under Greenvalley Drive.</li> <li>During spring run-off, the water cannot go through the smaller culvert fast enough – it is full to the top and the water back up washes the road shoulder away.</li> <li>Two smaller culverts that cannot handle volume of water, resulting in more bottlenecks.</li> </ul>	<ul style="list-style-type: none"> <li>Recommended Alternative 8-2: Improve Conveyance Capacity Downstream of Rockwood, No Storage Provided.</li> </ul>
Ms. Linda Maki 167 Countryside Drive Sudbury, Ontario P3E 6G3	<ul style="list-style-type: none"> <li>Concerned with the development in the low lying area south of her house.</li> <li>The water table is quite high and that the snow dumping (from the roadside ditches) may be adding to the drainage issues at her home.</li> <li>Standing water in the empty lot beside her home.</li> <li>Would like the comments from her phone calls to Wendi Mannerow (prior to May 14, 2003) to be noted.</li> </ul>	<ul style="list-style-type: none"> <li>House fronts on Countryside Drive with planned development in rear.</li> <li>Final grades on development should alleviate standing water issues.</li> <li>See follow-up memo to file, dated September 2, 2003.</li> </ul>
Mr. Alex Sorenson 9 Saturn Street Sudbury, Ontario P3E 6B8	<ul style="list-style-type: none"> <li>Thinks the floodline at Access Road is shown inaccurately.</li> <li>The road is quite high and feels that the water level indicated on the drawing is too high at the end near Regent Street.</li> </ul>	<ul style="list-style-type: none"> <li>Floodlines have been confirmed in this area.</li> </ul>
Ms. Kathy Lessard 2711 Green Avenue Sudbury, Ontario P3E 4X3	<ul style="list-style-type: none"> <li>During spring runoff, there is a significant amount of water crossing Green Avenue from the channel originating behind St. Benedict's School. Also a lot of water drains from Highway 17 to Green Avenue.</li> <li>Standing water in the roadside ditches along Green Avenue and some yard flooding during spring runoff and summer peak wet weather events.</li> <li>Basement flooding at parents' home on the west side of Green Avenue beside the channel.</li> <li>Believes that the property (a managed forest) is owned by Sitiri Investments Ltd.</li> </ul>	<ul style="list-style-type: none"> <li>Recommended Alternative 7-2: Improve Conveyance Capacity Upstream/ Downstream of Green Avenue through Brown's Concrete Property.</li> </ul>
Mr. Maurice Conrad 2521 Ida Street Sudbury, Ontario P3E 4W9	<ul style="list-style-type: none"> <li>Culvert in backyard drains all of the backyards on the west side of Ida Street, under the Ethier driveway, and into the main ditch.</li> <li>Backyard flooding is caused by culvert freezing.</li> </ul>	<ul style="list-style-type: none"> <li>This is a maintenance issue, not a stormwater management problem.</li> <li>See memo to file dated September 2, 2003.</li> </ul>
Mr. Luke Luukonen 208 Beatrice Street West Oshawa, Ontario L1G 7M9	<ul style="list-style-type: none"> <li>Concerned with water levels on Silver Lake.</li> <li>Family owned the cottage since the 1940s and the water level has risen over two feet (dock had to be raised).</li> <li>Concerned that the planned development/stormwater management controls in that area may raise the water level even more.</li> <li>In the 1950s, the culvert draining the lake (crossing Long Lake Road) would go dry but now it has a constant flow.</li> <li>Believes the construction of the golf course and Long Lake Road since that time has contributed to rising water levels.</li> <li>There is some erosion occurring along the west bank of the lake.</li> <li>Runoff from the Highway may flow directly into the lake, impacting water quality.</li> </ul>	<ul style="list-style-type: none"> <li>Met with Wendi Mannerow on August 29, 2003. See memo dated September 2, 2003.</li> <li>Wendi explained that in the context of this study, one of the alternatives that will be evaluated is installing a control structure on the culvert with the intent to raise water levels.</li> <li>She also noted that according to the floodline mapping of the lake, the water level does not rise significantly during the Regional Storm and that because the lake is at the top of the system, Earth Tech has already determined that a control structure at that location is not warranted.</li> <li>Added to contact list.</li> </ul>

## **5.2 Consultation with Review Agencies, Area Property Owners, and the Public on the Recommended Plan**

### **5.2.1 Notification of Community Meeting No. 2 and Invitation for Comments**

A Notice of Community Meeting No. 2 was mailed to review agencies inviting them to attend. A copy of the letter that was mailed and a list of the agencies to which the letter was sent are included in Appendix B.

The public was notified of Community Meeting No. 2 through newspaper notices. In addition, letters were sent to those who contacted Earth Tech and requested to be added to the mailing list, those who attended Community Meeting No. 1, and those whose homes were found to be within the pre-development (2003) floodline.

### **5.2.2 Community Meeting No. 2 – May 20, 2004**

Community Meeting No. 2 provided an opportunity for review agencies, special interest groups, potentially affected property owners and the public to review the results to date, including the recommended stormwater management plan and discuss issues or concerns with City and Earth Tech staff. This Community Meeting was held on May 20, 2004 from 4:00 pm to 8:00 pm at Countryside Arena in Sudbury, Ontario.

The following information (in addition to the information presented at Community Meeting No. 1) was presented at Community Meeting No. 2:

- Evaluation of Alternative Stormwater Management Strategies;
- Evaluation of Alternative Stormwater Management Facilities;
- Recommended Solution; and
- Next Steps.

A copy of the Community Meeting No. 2 presentation information is included in Appendix B.

Community Meeting No. 2 was well attended with 37 names on the sign-in sheet. Table 5-2 includes a summary of comments received and how they have been addressed.



**Table 5-2**  
**Community Meeting No. 2 – May 20, 2004**  
**Comment Summary**

Contact Information	Comment	How Addressed
Ms. Celia Teale Dalron 130 Elm Street Sudbury, Ontario P3C 1T6 Tel: (705) 560-9770	<ul style="list-style-type: none"> <li>Cost of solution is \$4.4 million. Who will pay?</li> <li>Cost associated with Alternative 5 should be at City's expense.</li> <li>Costs associated with Alternative 6a should be at City's expense. MTO culverts were undersized from the outset.</li> <li>Alternative 6b (proposed pond site) is private property.</li> <li>Was consideration given to removal of City fill at Countryside? Would this reduce the size/cost of proposed solutions elsewhere?</li> </ul>	<ul style="list-style-type: none"> <li>Cost sharing plan between City and developers.</li> <li>Aware that the proposed pond site for alternative 6b (Online Quality Control Facility Upstream of Ida Street is private property. Property acquisition may be required.</li> <li>No consideration was given to the removal of City fill at Countryside Drive. Reduction of size/cost would require further modeling.</li> <li>Additional storage at the arena might decrease flows, however it does not address/treat the new development at the Pagnutti property or east of Rockwood (see Alternative 4-4: Provide Quantity Control on Countryside Arena property).</li> <li>See memo to file about the Dalron meeting on April 23, 2003.</li> </ul>
Ms. Jan Linquist 1130 Southlane Road Sudbury, Ontario P3G 1N6 Tel: (705) 522-5990 (705) 522-7858	<ul style="list-style-type: none"> <li>Resides on McFarlane Lake and conducts monitoring on the lake through MOE's Lake Partners Program since the late 1980s.</li> <li>TP levels in the Algonquin Road watershed already exceed MOE's PWQO from downstream of the Silver Lake outlet to McFarlane Lake.</li> <li>Water quality conditions within McFarlane Lake appear to be deteriorating.</li> <li>General thrust of the stormwater management strategy and the majority of the management alternatives presented focus on conveyance of stormwater through the watershed with minimal concern for water quality within the Algonquin Road area and McFarlane Lake.</li> <li>As a taxpayer, the costs associated with these alternatives are reasonable.</li> <li>As McFarlane Lake is also the drinking water supply for the majority of residents surrounding the lake, one must consider long-term cost implications in not protecting the lake water quality. Should water quality continue to degrade, the City may be forced to extend water supply to this area (a significant cost expenditure).</li> <li>Would like to see more emphasis put on storage within the watershed during peak flow events (Alternatives 4-3 and 10-2) that addresses water quality issues.</li> <li>Does not believe that public education programs within the Algonquin Road area would be sufficient to provide protection and reduce loadings, in particular, nutrient and fertilizers to the watershed.</li> </ul>	<ul style="list-style-type: none"> <li>Added to mailing list.</li> <li>Comments will be considered during determination of preferred solution.</li> </ul>
Ms. Sylvie Mathieu and Mr. Michel Thibeault 51 Countryside Drive Sudbury, Ontario P3E 5A2 Tel: (705) 522-4895	<ul style="list-style-type: none"> <li>Backyard is overly saturated when it rains.</li> <li>Heavy rainfall leads to water entering the basement through the footings in the southwest corner up to 15 feet from either side.</li> <li>We encourage and endorse the action as outlined in Stormwater Management Facility 4a, Alternative 4-3.</li> </ul>	<ul style="list-style-type: none"> <li>No action required.</li> <li>Recommended Alternative 4-3: Provide Quantity and Quality Control on Pagnutti Property and in Channel.</li> </ul>
Mr. Henry Schroeder 2642 Green Avenue Sudbury, Ontario P3E 4X2	<ul style="list-style-type: none"> <li>For about five years, have had to fix the ditch behind the lot, as it would drain poorly.</li> <li>This year, had about \$20,000 damage in basement due to a sewage backup. The City had to drain the main stream across Green Avenue through the sanitary sewer.</li> <li>The ditches in spring are not cleaned out in time for spring runoff. Once water ran down the driveway and into the house.</li> <li>Where are the City engineers?</li> <li>We have to move, as the City is not senior friendly.</li> </ul>	<ul style="list-style-type: none"> <li>Recommended Alternative 7-2: Improve Conveyance Capacity Upstream/Downstream of Green Avenue, No Storage Provided.</li> <li>Also a City maintenance issue – roadside ditch.</li> </ul>

Contact Information	Comment	How Addressed
Ms. Nancy Gouchie 2481 Ida Street Sudbury, Ontario P3E 4W9 Tel: (705) 522-6103	<ul style="list-style-type: none"> <li>This is an urgent matter that must be dealt with sooner rather than later.</li> <li>Ida Street residents can no longer get insurance coverage (or very little) for sewer back-ups.</li> <li>Viewing the maps, it is obvious that the start of the solution has to begin at this end.</li> <li>I know this is for natural runoff but we are dealing with both issues of natural runoff and sewer back-up.</li> </ul>	<ul style="list-style-type: none"> <li>Recommended Alternative 6-2: Improve Conveyance Capacity from Regent Street to Highway 17/69 Interchange, No Quality Control Upstream of Ida Street.</li> </ul>
Mr. Brad Bowman 1130 Southland Road Sudbury, Ontario P3G 1N6 Tel: (705) 522-7858 brad.bowman@bellnet.ca	<ul style="list-style-type: none"> <li>Provides background sampling data/evidence of deteriorating water clarity/quality (attributed to runoff and erosion).</li> <li>New erosion controls in ditches on Southlane Road are ineffective in reducing total and suspended solids and associated nutrients into the lake.</li> <li>Based on presented materials, the study seems to be technically weak in terms of details and fails to address the broader issue of ongoing and proposed urban development within the Algonquin Road subwatershed and impacts on McFarlane Lake.</li> <li>Urban water quality is poor and gets progressively poorer moving downstream from the outlet of Silver Lake. The preferred option fails to address this matter and the decision not to build stormwater management facilities is based on high capital costs.</li> <li>What about the possible future cost of providing municipal water to the residents using McFarlane Lake as their water supply?</li> </ul>	<ul style="list-style-type: none"> <li>See attached memo of June 24, 2004.</li> </ul>
Mr. Rod LaRocque 2509 Ida Street Sudbury, Ontario P3E 4W9	<ul style="list-style-type: none"> <li>The study seems to be an “after the fact” measure implemented by the Zoning Department and NDCA.</li> <li>Area residents run sump pumps continuously.</li> <li>Believes it is due to the new truck stop pushing the water that used to sit in that area to surrounding areas.</li> </ul>	<ul style="list-style-type: none"> <li>Comments noted.</li> <li>Recommended Alternative 6-2: Improve Conveyance Capacity from Regent Street to Highway 17/69 Interchange, No Quality Control Upstream of Ida Street.</li> </ul>
Mr. Maurice Conrad 2521 Ida Street Sudbury, Ontario P3E 4W9 Tel: (705) 522-1559	<ul style="list-style-type: none"> <li>The report is thorough and the study is more than expected.</li> <li>The drawing of the rear of Ida Street through Ethier Sand and Gravel property is noted.</li> <li>Sees possible encroachment in the winter on the drainage across the highway behind or the side of Brown Concrete and the tire firm with snow and debris being disposed of into the drainage ditch or creek. Control of this may already be in hand.</li> </ul>	<ul style="list-style-type: none"> <li>Comments noted.</li> <li>This is a maintenance issue, not a stormwater management problem.</li> </ul>
Ms. Lise Anderson 2676 Green Avenue Sudbury, Ontario P3E 4X2 Tel: (705) 522-3953	<ul style="list-style-type: none"> <li>During a discussion with Wendi Mannerow, suggested that the culvert crossing Green Avenue be extended past the houses on the east side of the road to improve safety and erosion issues.</li> </ul>	<ul style="list-style-type: none"> <li>Recommended Alternative 7-2: Improve Conveyance Capacity Upstream/Downstream of Green Avenue, No Storage Provided.</li> <li>Comments will be considered during the determination of the preferred solution.</li> </ul>
Ms. Carmen Huggins 975 Goodview Road Sudbury, Ontario P3G 1B5	<ul style="list-style-type: none"> <li>Unable to attend last two meetings.</li> <li>Would like to be kept informed.</li> <li>Please add to mailing list.</li> </ul>	<ul style="list-style-type: none"> <li>Added to mailing list.</li> <li>Mailed Community Meeting No. 2 Information Package.</li> <li>No response/comments received as of June 24, 2004.</li> </ul>

### **5.3 Meetings with Stakeholders and Government Agencies**

#### **5.3.1 Dalron Homes**

On April 23, 2003, a meeting was held with representatives of Dalron Homes to introduce the Algonquin Road Watershed Stormwater Management Study, inform the representatives of progress to date and obtain their comments. Discussions included the impacts of the study on existing and future development and possible locations of stormwater management facilities.

A representative of Dalron Homes attended both Community Meetings. Comments are summarized in Table 5-3 and can also be found in Appendix B. Meeting minutes can be found in Appendix B.

#### **5.3.2 Ethier Sand and Gravel**

On April 24, 2003, a meeting was held with representatives from Ethier Sand and Gravel to introduce the Algonquin Road Watershed Stormwater Management Study, inform the representatives of progress to date and obtain their comments. Ethier Sand and Gravel owns some land that is proposed for development (industrial and residential) west of Ida Street.

A representative of Ethier Sand and Gravel attended both Community Meetings. Meeting minutes can be found in Appendix B.

#### **5.3.3 Ministry of Natural Resources and Fisheries and Oceans Canada**

On June 4, 2003, a meeting was held with representatives from the Ministry of Natural Resources (MNR) and Department of Fisheries and Oceans Canada (DFO) to introduce the Study, review information presented at Community Meeting No. 1, and to obtain their comments.

MNR and DFO representatives suggested the following:

- Best management practices should be incorporated wherever possible;
- No net increase in quantity or no net decrease in quality of stormwater;
- McFarlane Lake should be considered a sensitive receptor (warm water fishery);
- No degradation of Mallard's Pond (newly established fishery);
- Culverts must be installed to allow for the easy passage of fish;
- Potential for fish migration between Silver Lake and McFarlane Lake does exist, therefore the main line of the study area should be considered a fishery; and



- Creation of fish habitat would be beneficial.

Meeting minutes can be found in Appendix B.

#### **5.3.4 Ministry of Transportation**

The MTO is a stakeholder as the main channel crosses under MTO highways at two locations:

- Highway 17 in the vicinity of at the Highway 17 / Municipal Road 80 intersection; and
- Highway 69/17 interchange.

A meeting was held on July 14, 2003 with Ministry of Transportation (MTO) representatives to introduce the Algonquin Road Watershed Stormwater Management Study, inform the representatives of progress to date, review findings, and to seek input. Meeting minutes and subsequent correspondence can be found in Appendix B.

#### **5.3.5 Nickel District Conservation Authority**

On June 18, 2003, a meeting was held with representatives from the Nickel District Conservation Authority (NDCA) to introduce them to the Study, discuss the preliminary findings of the study, and to obtain their input.

Meeting minutes can be found in Appendix B. Representatives from the NDCA attended both Community Meetings.

**Table 5-3  
Agency Comment Summary**

Contact Information	Comment	How Addressed
Mr. Andrew Hinshelwood Heritage Planner Ministry of Culture 435 South James Street, Suite 334 Thunder Bay, Ontario P7E 6S7 Tel: (807) 475-1632 Fax: (807) 475-1297 May 27, 2003	<ul style="list-style-type: none"> <li>Based on mapping provided, we are unable to determine, at this time, whether the proposed undertaking will result in adverse impacts to cultural heritage or archaeological values.</li> <li>Would appreciate receiving additional detailed mapping of the planning areas, indicating where anticipated impacts will occur.</li> </ul>	<ul style="list-style-type: none"> <li>See letter dated May 27, 2003. Reference Number MCL 2003-52WT001.</li> <li>Mailed information package and drawings showing the recommended solution (Community Meeting No. 2) on May 31, 2004.</li> <li>No other comments received as of June 24, 2004.</li> </ul>
Mr. Carl Jorgensen Fish Habitat Biologist Fisheries and Oceans Canada 1-1500 Paris Street Sudbury, Ontario P3E 3B8 Tel: (705) 522-8524 June 10, 2003	<ul style="list-style-type: none"> <li>The following best management practices should be considered if a new off-line pond is created:</li> <li>Install a rocky channel from the outfall to the creek.</li> <li>Consider impacts on bank stability of the creek.</li> <li>Constructing a barrier to fish passage to prevent access to the outfall and pond.</li> <li>Angling the outfall downstream and not perpendicular to the bank.</li> <li>Discharge to a straight reach of creek and not on a bend.</li> </ul>	<ul style="list-style-type: none"> <li>Comments received subsequent to June 4, 2003 meeting at which the conceptual stormwater management facilities were presented.</li> <li>General information given, no direct action required.</li> <li>Will be considered when developing recommended alternatives.</li> <li>Was contacted for Community Meeting No. 2 but did not attend and did not request information.</li> <li>No other comments received as of June 24, 2004.</li> </ul>
Mr. Tom Brown District Supervisor Ms. Paula Allen EA Coordinator Ministry of the Environment 199 Larch Street, Suite 1101 Sudbury, Ontario P3E 5P9 June 11, 2003	<ul style="list-style-type: none"> <li>Tom Brown called and would like to be added to the mailing list.</li> <li>Paula Allen called and notified Wendi Mannerow that she is the new EA coordinator and should be added to the mailing list.</li> </ul>	<ul style="list-style-type: none"> <li>Community Meeting No. 1 package was mailed.</li> <li>Notification of Community Meeting No. 2 was mailed.</li> <li>No response/comments received as of June 24, 2004.</li> </ul>
Mr. Stephen DeVos Area Supervisor Sudbury Area, Sudbury District Ministry of Natural Resources 3763 Highway 69 South, Suite 5 Sudbury, Ontario P3G 1E7 Tel: (705) 564-7856 Fax: (705) 564-7879 June 26, 2003	<ul style="list-style-type: none"> <li>The MNR has no specific permitting requirements given the scope of the work at this time.</li> <li>The City has approval authority under the Lakes and Rivers Improvement Act.</li> <li>The NDCA has jurisdiction over stormwater and flood control and DFO has jurisdiction over fish habitat.</li> <li>Recommend that the policy of "no net gain of water quality or no net loss of water quality" be applied at each stormwater management facility location.</li> <li>McFarlane Lake is a warm water fishery containing walleye, both large and small mouth bass, pike, suckers, perch and bullheads. No in water work should take place prior to July 15 of each year.</li> <li>Sediment control measures should be employed to isolate segments of the stream during construction.</li> <li>Designs should incorporate natural processes or environments.</li> </ul>	<ul style="list-style-type: none"> <li>Comments received subsequent to June 4, 2003 meeting at which the conceptual stormwater management facilities were presented.</li> <li>General information given, no direct action required.</li> <li>Will be considered when developing recommended alternatives.</li> <li>Notification of Community Meeting No.2 was mailed.</li> <li>No response/comments received as of June 24, 2004.</li> </ul>

Contact Information	Comment	How Addressed
<p>Mr. Ron Norton City of Greater Sudbury</p> <p>April 30, 2004 phone call</p>	<ul style="list-style-type: none"> <li>There have been some residents of Green Avenue complaining to politicians about the flooding on their properties and in roadside ditches. The City is aware of problems in this area and has an alternative for a stormwater management pond just west of Green Avenue.</li> <li>The developers are preparing plans for the area east of Rockwood Drive (extension to Vintage Green subdivision) but have not yet submitted anything official to the City. There is an existing alternative for a stormwater management pond just east of Rockwood Drive.</li> <li>Mr. Ethier applied to infill the part of their property just north of the PetroCan station. This area is within the existing floodplain and is considered part of one of the stormwater management alternatives for the study. The City turned down the application at this time, noting floodplain considerations and pending the results of this study.</li> <li>A severance application was submitted for a piece of property within the floodplain on Culver Crescent. The City turned down the application at this time noting floodplain considerations and pending the results of this study.</li> </ul>	<ul style="list-style-type: none"> <li>Recommended Alternative 7-2: Improve Conveyance Capacity Upstream/Downstream of Green Avenue Through Brown's Concrete Property, No Storage Provided is recommended for the area.</li> <li>Recommended Alternatives 8-2: Improve Conveyance Capacity Downstream of Rockwood, No Storage Provided and 4-3: Provide Quantity and Quality Control on Pagnutti Property and In Channel addresses this area.</li> <li>Recommended Alternatives 6-2: Improve Conveyance Capacity from Regent Street to Highway 17/69 interchange, No quantity Control Upstream of Ida Street and 6-4: On-Line Quality Control Facility Upstream of Ida Street, Wet Pond addresses this area.</li> <li>Recommended Alternative 5-3: Provide No Quantity Control at Mallard's Pond, Improve Conveyance Capacity at Field Street, Culver Crescent and Regent Street addresses this area.</li> </ul>



## 6. PHASE 2: IDENTIFICATION OF ALTERNATIVE STORMWATER MANAGEMENT STRATEGIES

### 6.1 Identification and Description of Alternative Stormwater Management Strategies

In order to address the problem statement, the following five alternative strategies were evaluated.

The alternative strategies are generalized approaches to fulfill both stormwater quantity and quality criteria, including minimizing the risk and impacts of flooding on public and private property, erosion and sedimentation of watercourses, and runoff pollution in drainage channels, watercourses and lakes.

Alternative Strategies	Description
<b>Alternative A:</b> Do Nothing	<ul style="list-style-type: none"> <li>No changes or improvements to the current drainage system would be made.</li> <li>Even though the Do Nothing alternative does not address the Problem Statement, it was included because the Class EA requires it to be documented along with any other alternatives that have been considered. The reason for this is that it provides a benchmark for evaluating the other alternatives.</li> </ul>
<b>Alternative B:</b> Implement Stormwater Quality Management Policies and Outreach Programs	<ul style="list-style-type: none"> <li>Stormwater quality management policies and outreach programs applicable to the Study Area would be developed and implemented.</li> <li>Policies aimed at reducing pollutants (i.e. road salt, sand) at source would be implemented and would reduce the need for stormwater quality management facilities downstream.</li> <li>Nutrients would be reduced through a successful outreach program dealing with residential fertilization application.</li> </ul>
<b>Alternative C:</b> Undertake Conveyance System Modifications	<ul style="list-style-type: none"> <li>The capacity of existing storm sewers and/or culverts would be increased to reduce/eliminate the risk of upstream flooding under post-development flow conditions.</li> <li>Flows greater than those under pre-development conditions would be conveyed.</li> </ul>
<b>Alternative D:</b> Implement Design Guidelines and Programs to Promote Surface Drainage	<ul style="list-style-type: none"> <li>Design Guidelines for future growth within the Watershed would be developed and implemented to reduce the risk of: <ul style="list-style-type: none"> <li>Surface ponding</li> <li>Uncontrolled subsurface drainage</li> </ul> </li> <li>In addition, inspection and monitoring programs would be implemented to promote surface drainage through existing developments.</li> </ul>

Alternative Strategies	Description
<b>Alternative E:</b> Construct Stormwater Management Facilities (Ponds)	<ul style="list-style-type: none"> <li>Stormwater management facilities (detention ponds) would be constructed at various locations throughout the Study Area allowing for stormwater storage with controlled release rates providing quantity and/or quality management.</li> <li>Conceptual stormwater management facility locations were identified in the City's Terms of Reference for this Study. Additional locations based on land use and topography were identified and evaluated.</li> </ul>

## 7. EVALUATION OF THE ALTERNATIVE STRATEGIES

### 7.1 Evaluation Methodology

An evaluation was undertaken based on criteria developed within the following categories of consideration representing the broad definition of the environment described in the EAA:

- **Technical** - having regard for the technical suitability / longevity and other engineering aspects of the alternative solution;
- **Natural Environment** - having regard for protecting the natural and physical components of the environment (i.e. air, land, water and biota) including natural and / or environmentally sensitive areas;
- **Social/Cultural** - having regard for residents, neighbourhoods, businesses, community character, social cohesion, community features, historical / archaeological remains, and heritage features; and
- **Financial** - having regard for capital and operation / maintenance costs.

Within each category, project specific evaluation criteria were developed based on a review of the Class EA document, study area and problem statement. These criteria were chosen based on their ability to identify the potential environmental impacts of each alternative and distinguish the strengths / weaknesses between them.

Considering that two of the evaluation criteria related to the natural and social / cultural environments of the study area, the five alternative stormwater management strategies were comparatively evaluated according to a descriptive, rather than a numerical or quantitative, assessment. While a numerical approach may appear to provide a more scientific or precise method of comparing alternative solutions, developing a common comparative yardstick is usually subject to debate and may result in controversy that detracts from the evaluation. Subjectivity inherent in many numerical ranking systems can lead to disagreement and focus attention on rankings and assigning points, rather than concentrating on the primary objective; namely, comparatively evaluating each alternative's strengths and weaknesses to identify the best possible solution to the identified problem/opportunity.

With the criteria defined, a net impact evaluation was undertaken through the following steps:

1. Apply the evaluation criteria to each of the alternative strategies to identify the potential impacts on the environment;
2. Identify reasonable mitigative measures available to avoid or minimize any potential negative impacts on the environment;



3. Apply the mitigative measures to determine the net positive or negative impacts on the environment; and
4. Identify the relative advantages and disadvantages of each alternative strategy based on the net environmental impacts.

Table 7-1 provides a summary of the results of the net impact evaluation.

Based on the evaluation on Table 7-1, Alternatives B, C, D and E were carried forward for further consideration because a combination of all of the strategies is required to adequately address the problem statement. The “Do Nothing” alternative strategy was eliminated because it does not address the problem statement.

As the Recommended Strategy included Alternative C (Undertake Conveyance System Modifications) and Alternative E (Construct Stormwater Management Facilities), alternative conveyance system modifications and stormwater management facility locations were identified and comparatively evaluated during the next step in the study.

Table 7-1: Alternative Stormwater Management Strategy Evaluation Summary

ALTERNATIVE STORMWATER MANAGEMENT STRATEGIES	CATEGORIES OF CONSIDERATION				
	TECHNICAL	NATURAL ENVIRONMENT	SOCIAL/CULTURAL	LEGAL/JURISDICTIONAL	FINANCIAL
<b>ALTERNATIVE A</b>  <i>DO NOTHING</i>	<ul style="list-style-type: none"> <li>Does not accommodate peak flows in isolated area during extreme rainfall events.</li> <li>Does not address anticipated stormwater quality and quantity changes due to planned urban growth.</li> </ul>	<ul style="list-style-type: none"> <li>No short-term construction related impacts on the watershed and McFarlane Lake.</li> <li>No improvement in water quality (i.e. continued erosion/sedimentation of watercourses and runoff pollution).</li> </ul>	<ul style="list-style-type: none"> <li>No short-term construction related impacts on area residents.</li> <li>Potential flooding on public and private property remains.</li> </ul>	<ul style="list-style-type: none"> <li>Alternative can be fully implemented by the City.</li> </ul>	<ul style="list-style-type: none"> <li>No capital costs.</li> </ul>
<b>ALTERNATIVE B</b>  <i>IMPLEMENT STORMWATER QUALITY MANAGEMENT POLICIES AND OUTREACH PROGRAMS</i>	<ul style="list-style-type: none"> <li>Does not accommodate peak flows in isolated area during extreme rainfall events.</li> <li>Does address anticipated stormwater quality changes, but not quantity changes due to planned urban growth.</li> </ul>	<ul style="list-style-type: none"> <li>No short-term construction related impacts on the watershed and McFarlane Lake.</li> <li>Potential improvement in water quality (i.e. reduced sedimentation of watercourses and runoff pollution).</li> </ul>	<ul style="list-style-type: none"> <li>No short-term construction related impacts on area residents.</li> <li>Potential flooding on public and private property remains.</li> </ul>	<ul style="list-style-type: none"> <li>Alternative implementation is partially dependent upon community participation.</li> </ul>	<ul style="list-style-type: none"> <li>Relatively minor capital costs.</li> </ul>
<b>ALTERNATIVE C</b>  <i>UNDERTAKE CONVEYANCE SYSTEM MODIFICATIONS</i>	<ul style="list-style-type: none"> <li>Does accommodate peak flows in isolated area during extreme rainfall events.</li> <li>Does address anticipated stormwater quantity changes, but not quality changes due to planned urban growth.</li> </ul>	<ul style="list-style-type: none"> <li>Short-term construction related impacts on the watershed and McFarlane Lake would be minimized through standard mitigation measures.</li> <li>No improvement in water quality (i.e. continued erosion/sedimentation of watercourses and runoff pollution).</li> </ul>	<ul style="list-style-type: none"> <li>Short-term construction related impacts on area residents would be minimized through standard mitigation measures.</li> <li>Potential flooding on public and private property would be reduced.</li> </ul>	<ul style="list-style-type: none"> <li>Alternative can be fully implemented by the City.</li> </ul>	<ul style="list-style-type: none"> <li>Relatively major capital costs.</li> </ul>
<b>ALTERNATIVE D</b>  <i>IMPLEMENT DESIGN GUIDELINES AND PROGRAMS TO PROMOTE SURFACE DRAINAGE</i>	<ul style="list-style-type: none"> <li>Does not accommodate peak flows in isolated area during extreme rainfall events.</li> <li>Does address anticipated stormwater quantity changes, but not quality changes due to planned urban growth.</li> </ul>	<ul style="list-style-type: none"> <li>No short-term construction related impacts on the watershed and McFarlane Lake.</li> <li>No improvement in water quality (i.e. continued erosion/sedimentation of watercourses and runoff pollution).</li> </ul>	<ul style="list-style-type: none"> <li>No short-term construction related impacts on area residents.</li> <li>Potential flooding on public and private property can be reduced.</li> </ul>	<ul style="list-style-type: none"> <li>Alternative can be fully implemented by the City but is dependent upon development compliance.</li> </ul>	<ul style="list-style-type: none"> <li>Relatively minor capital costs.</li> </ul>
<b>ALTERNATIVE E</b>  <i>CONSTRUCT STORMWATER MANAGEMENT FACILITIES</i>	<ul style="list-style-type: none"> <li>Does accommodate peak flows in isolated area during extreme rainfall events.</li> <li>Does address anticipated stormwater quantity and quality changes due to planned urban growth.</li> </ul>	<ul style="list-style-type: none"> <li>Short-term construction related impacts on the watershed and McFarlane Lake would be minimized through standard mitigation measures.</li> <li>Improvement in water quality (i.e. reduced sedimentation of watercourses and runoff pollution).</li> </ul>	<ul style="list-style-type: none"> <li>Short-term construction related impacts on area residents would be minimized through standard mitigation measures.</li> <li>Potential flooding on public and private property would be reduced.</li> </ul>	<ul style="list-style-type: none"> <li>Alternative can be fully implemented by the City.</li> </ul>	<ul style="list-style-type: none"> <li>Relatively major capital costs.</li> </ul>

Legend:

Recommended Stormwater Management Strategy



## 8. IDENTIFICATION AND EVALUATION OF ALTERNATIVE STORMWATER MANAGEMENT FACILITIES

### 8.1 Alternative Stormwater Management Facilities

Alternative stormwater management facilities which could fulfill both stormwater quantity and quality criteria, including minimize the risk and impacts of flooding on public and private property, erosion and sedimentation of watercourses, and the amount of pollutants being picked up in the stormwater runoff have been identified. The first criterion is considered a stormwater quantity issue, while the others are related to stormwater quality.

Although quality control is a very important part of stormwater management, emphasis has been placed on quantity control because the primary concern in this watershed is flood risk associated with development.

Alternative Stormwater Management (SWM) Facilities		Description
<b>SWM Facility #1</b>		
<i>Alternative 1-1:</i> Create additional storage within Silver Lake.		<ul style="list-style-type: none"> <li>Construct berm with low-flow outlet to create additional storage within Silver Lake.</li> </ul>
<i>Alternative 1-2:</i> Maintain existing conditions.		<ul style="list-style-type: none"> <li>Existing storage area (Silver Lake and surrounding wetlands) covers more than half of the catchment area.</li> <li>Utilize existing storage.</li> </ul>
<b>SWM Facility #2</b>		
<i>Alternative 2-1:</i> Provide on-site quantity control upstream of Highway 17 (assumes development of lands within catchment).		<ul style="list-style-type: none"> <li>If more than 50% of the catchment area is developed, then undertake a Wetland Impact Assessment (WIA). The WIA will determine if on-site quantity control is feasible within the catchment area.</li> <li>If feasible, then create an on-site storage facility for quantity control.</li> </ul>
<i>Alternative 2-2:</i> Provide no on-site quantity control upstream of Highway 17 (assumes development of lands within catchment).		<ul style="list-style-type: none"> <li>If WIA determines that on-site quantity control is not feasible then enlarge size of SWM Facility #4 from 9,600 m<sup>2</sup> to 11,600 m<sup>2</sup> to provide storage of increased stormwater runoff.</li> </ul>

Alternative Stormwater Management (SWM) Facilities		Description
<b>SWM Facility #3</b>		
Alternative 3-1: Create additional storage upstream of Highway 17 (assumes no development of lands).		<ul style="list-style-type: none"> <li>Construct berm with low-flow outlet to create additional storage.</li> </ul>
Alternative 3-2: Maintain existing conditions (assumes no development of lands).		<ul style="list-style-type: none"> <li>Existing storage area (ponds and wetlands) covers more than half of the catchment area.</li> <li>Utilize existing storage.</li> </ul>
<b>SWM Facility #4a</b>		
Alternative 4-1: Provide quantity control on Pagnutti property.		<ul style="list-style-type: none"> <li>Construct 3,000 m<sup>3</sup> of storage within dedicated SWM block, achieving pre=post development flows from the Pagnutti property alone.</li> <li>Dry facility (normally open space) would be filled only during significant rainfall events.</li> </ul>
Alternative 4-2: Provide quantity control on Pagnutti property and in channel.		<ul style="list-style-type: none"> <li>Construct 3,000 m<sup>2</sup> of storage within the dedicated SWM block addressing Pagnutti property requirements and 8,000 m<sup>3</sup> of storage in the adjacent channel, addressing upstream development requirements.</li> <li>Dry facility (normally open space) would be filled only during significant rainfall events.</li> <li>The two storage facilities would perform in series to control peak flows.</li> </ul>
Alternative 4-3: Provide quantity and quality control on Pagnutti property and in channel.		<ul style="list-style-type: none"> <li>Construct 9,600 m<sup>3</sup> of storage within the dedicated SWM block and adjacent channel, addressing all upstream areas (including the Pagnutti property).</li> <li>A portion of the SWM facility would be dry (normally open space) and used (filled) only during heavy rainfall events.</li> <li>Construct a berm with low flow control outlet for extended detention in the channel. Provide for access and removal of sediment from the channel bottom.</li> <li>The two storage facilities would perform in parallel f to control peak flows.</li> </ul>
<b>SWM Facility #4b</b>		
Alternative 4-4: Provide quantity control on Countryside Arena property.		<ul style="list-style-type: none"> <li>Construct SWM pond on Countryside Arena property.</li> </ul>



Alternative Stormwater Management (SWM) Facilities	Description
<b>SWM Facility #5</b>	
<p><i>Alternative 5-1:</i></p> <p>Provide quantity control at Mallard's Pond. No improvement of the conveyance system at Field Street, Culver Crescent or Regent Street.</p>	<ul style="list-style-type: none"> <li>Construct a new outlet structure at Mallard's Pond creating an additional 20,000 m<sup>2</sup> of storage (maximum available storage at this location), allowing water levels to rise during significant rainfall events.</li> </ul>
<p><i>Alternative 5-2:</i></p> <p>Provide quantity control at Mallard's Pond. Improve the conveyance system at Field Street, Culver Crescent and Regent Street.</p>	<ul style="list-style-type: none"> <li>Construct a new outlet structure at Mallard's Pond creating an additional 20,000 m<sup>2</sup> of storage.</li> <li>Replace the inlet culvert at Field Street and improve the inlet configuration to minimize entrance losses.</li> <li>Extend the existing storm sewer outlet at Culver Crescent and improve the downstream channel.</li> <li>Replace the existing twin culverts with larger twin box culverts at the Regent Street crossing (at the end of Culver Crescent).</li> </ul>
<p><i>Alternative 5-3:</i></p> <p>Provide no quantity control at Mallard's Pond. Improve the conveyance system at Field Street, Culver Crescent and Regent Street.</p>	<ul style="list-style-type: none"> <li>Replace the inlet culvert at Field Street and improve the inlet configuration to minimize entrance losses.</li> <li>Extend the existing storm sewer outlet at Culver Crescent and improve the downstream channel.</li> <li>Replace the existing twin culverts with larger twin box culverts at the Regent Street crossing (at the end of Culver Crescent).</li> </ul>
<b>SWM Facility #6a (Quantity Control Alternatives)</b>	
<p><i>Alternative 6-1:</i></p> <p>Provide on-line quantity control upstream of Ida Street. Do not improve the conveyance system between Regent Street and the Highway 17/69 Interchange. Improve the conveyance system at Ida Street (localized).</p>	<ul style="list-style-type: none"> <li>Construct approximately 300,000 m<sup>3</sup> of storage over 30 hectares, in the low-lying area upstream of Ida Street.</li> <li>Upsize the existing culvert crossing the north end of Ida Street and regrade to promote drainage from Ida Street to the main channel.</li> <li>Upsize the existing culvert draining the backyards of Ida Street homes (west side) and regrade the backyards to promote drainage toward culvert.</li> </ul>
<p><i>Alternative 6-2:</i></p> <p>Improve the conveyance system from Regent Street through the Highway 17/69 Interchange. Do not provide quantity control upstream of Ida Street. Improve the conveyance system at Ida Street (localized).</p>	<ul style="list-style-type: none"> <li>Provide seven (7) new culverts in series from Regent Street to the Highway 17/69 interchange.</li> <li>Upsize the existing culvert crossing the north end of Ida Street and regrade to promote drainage from Ida Street to main channel.</li> <li>Upsize the existing culvert draining the backyards of Ida Street homes (west side) and regrade the backyards to promote drainage toward the culvert.</li> </ul>

Alternative Stormwater Management (SWM) Facilities	Description
<p><i>Alternative 6-3:</i></p> <p>Improve the conveyance system from Regent Street through the Highway 17/69 Interchange.</p> <p>Provide on-line quantity control upstream of Ida Street.</p> <p>Improve the conveyance system at Ida Street (localized).</p>	<ul style="list-style-type: none"> <li>• Provide seven (7) new culverts in series from Regent Street to the Highway 17/69 interchange.</li> <li>• Construct 20,000 m<sup>3</sup> of storage on the main channel, in low-lying area upstream of Ida Street.</li> <li>• Upsize the existing culvert crossing the north end of Ida Street and regrade channel to promote drainage from Ida Street to main channel.</li> <li>• Upsize the existing culvert draining the backyards of Ida Street homes (west side) and regrade the backyards to promote drainage toward culvert.</li> </ul>
<b><i>SWM Facility #6b (Quality Control Alternatives)</i></b>	
<p><i>Alternative 6-4:</i></p> <p>Provide on-line quantity control upstream of Ida Street (Wet Pond).</p>	<ul style="list-style-type: none"> <li>• Construct storage on main channel, in low-lying area upstream of Ida Street.</li> <li>• The channel and surrounding lands will be excavated to create required storage.</li> <li>• The footprint of the pond would be approximately 3 hectares.</li> </ul>
<p><i>Alternative 6-5:</i></p> <p>Provide on-line quantity control upstream of Ida Street (Wetland).</p>	<ul style="list-style-type: none"> <li>• Construct storage on main channel, in low-lying area upstream of Ida Street.</li> <li>• The channel and surrounding lands will be excavated to create required storage.</li> <li>• The footprint of the wetland would be approximately 5 hectares.</li> </ul>
<p><i>Alternative 6-6:</i></p> <p>Provide additional quality control in Mallard's Pond and off-line quality control upstream of Ida Street north of the existing channel (Wet Pond)</p>	<ul style="list-style-type: none"> <li>• Provide extended detention and forebay in Mallard's Pond to settle sediment.</li> <li>• Construct storage north of main channel.</li> </ul>
<b><i>SWM Facility #7</i></b>	
<p><i>Alternative 7-1:</i></p> <p>Provide quantity and quality control upstream of Green Avenue.</p>	<ul style="list-style-type: none"> <li>• Construct SWM facility upstream of Green Avenue to provide quantity and quality control for all upstream catchments.</li> <li>• Limit peak flows to the capacity of the downstream culvert and channel.</li> </ul>



Alternative Stormwater Management (SWM) Facilities	Description
<p><i>Alternative 7-2:</i></p> <p>Improve the conveyance system upstream and downstream of Green Avenue</p> <p>Do not provide storage.</p>	<ul style="list-style-type: none"> <li>• Replace the existing Green Avenue culvert with a new 1500 mm culvert and extend it past the houses on east side of the road.</li> <li>• Provide two (2) additional 1500 mm culverts.</li> <li>• Undertake channel improvements from just upstream of Green Avenue through Brown's Concrete property.</li> </ul>
<b>SWM Facility #8</b>	
<p><i>Alternative 8-1:</i></p> <p>Provide quantity control upstream of Rockwood</p> <p>Do not improve the conveyance system downstream of Rockwood.</p>	<ul style="list-style-type: none"> <li>• Construct SWM facility upstream of Rockwood Avenue.</li> </ul>
<p><i>Alternative 8-2:</i></p> <p>Improve the conveyance system downstream of Rockwood.</p> <p>Do not provide storage.</p>	<ul style="list-style-type: none"> <li>• Increase the size of the existing Rockwood, Greenvalley and driveway culverts to 1200 mm.</li> <li>• Improve the existing channel from 260 m downstream of the Rockwood culvert to the confluence with main channel downstream of Greenvalley via erosion/sedimentation mitigation measures.</li> </ul>
<b>SWM Facility #9</b>	
<p><i>Alternative 9-1:</i></p> <p>Provide quality control at the outlet to McFarlane Lake (Wet Pond).</p>	<ul style="list-style-type: none"> <li>• Construct 80,000 m<sup>2</sup> of on-line storage just upstream of McFarlane Lake.</li> <li>• The footprint of the wet pond would be approximately 6 hectares.</li> </ul>
<p><i>Alternative 9-2:</i></p> <p>Provide quality control at the outlet to McFarlane Lake (Wetland).</p>	<ul style="list-style-type: none"> <li>• Construct 50,000 m<sup>2</sup> of on-line storage just upstream of McFarlane Lake.</li> <li>• The footprint of the wetland would be approximately 10 hectares.</li> </ul>
<p><i>Alternative 9-3:</i></p> <p>Maintain existing conditions.</p>	<ul style="list-style-type: none"> <li>• No change at the McFarlane Lake outlet.</li> <li>• Water quantity and quality addressed upstream of this location.</li> </ul>
<b>SWM Facility #10</b>	
<p><i>Alternative 10-1:</i></p> <p>Provide on-site quantity control at Vintage Green/Mariposa Place (Dry Pond)</p>	<ul style="list-style-type: none"> <li>• Construct 3,500 m<sup>2</sup> of storage.</li> <li>• Dry facility (normally open space) would be used (filled) only during heavy rainfall events.</li> </ul>

Alternative Stormwater Management (SWM) Facilities	Description
<p><i>Alternative 10-2:</i></p> <p>Provide on-site quantity control at Vintage Green/Mariposa Place (Wet Pond).</p>	<ul style="list-style-type: none"> <li>• Construct 3,500 m<sup>2</sup> of storage.</li> <li>• Wet facility (permanent pool) with dry portion (filled only during heavy rainfall events).</li> </ul>
<p><i>Alternative 10-3:</i></p> <p>Provide no on-site quantity control. Improve conveyance system to service the site.</p>	<ul style="list-style-type: none"> <li>• Construct storm sewers and drainage ditches extending from the subdivision to Algonquin Road.</li> </ul>

## 8.2 Comparative Evaluation of Alternative Stormwater Management Facilities

The evaluation of stormwater management facilities in presented Table 8-1 was undertaken through the use of criteria previously presented in Table 7-1.



Table 8-1: Alternative Stormwater Management Facility Evaluation

STORMWATER MANAGEMENT (SWM) FACILITIES AND ALTERNATIVES		ALTERNATIVE DESCRIPTION	CATEGORIES OF CONSIDERATION				EVALUATION SUMMARY
			TECHNICAL	NATURAL ENVIRONMENT	SOCIAL/CULTURAL	FINANCIAL	
SWM FACILITY #1	Alternative 1-1: Create Additional Storage within Silver Lake	<ul style="list-style-type: none"> <li>Construct berm with low-flow outlet to create additional storage with Silver Lake.</li> </ul>	<ul style="list-style-type: none"> <li>Peak flows not significantly affected by provision of additional storage (peak flows effectively reduced due to existing conditions).</li> <li>Facility to service existing developed areas.</li> <li>No existing water quality concerns.</li> </ul>	<ul style="list-style-type: none"> <li>Potential negative impact on existing vegetation and wetlands in fringe areas due to larger fluctuations in water levels.</li> </ul>	<ul style="list-style-type: none"> <li>Insignificant reduction to downstream flood risk elevation due to provision of additional storage.</li> <li>Potential negative impact on property immediately adjacent to Silver Lake due to higher water levels.</li> </ul>	<ul style="list-style-type: none"> <li>\$18,000 capital costs</li> </ul>	<ul style="list-style-type: none"> <li>Highest cost alternative.</li> <li>Insignificant reduction to downstream flood risk elevation by provision of additional storage.</li> <li>Peak flows are not significantly reduced by provision of additional storage (Peak flows effectively reduced due to existing conditions).</li> <li>Potential negative impact on existing vegetation and wetlands in fringe areas due to larger fluctuations in water levels.</li> <li>Potential negative impact on property immediately adjacent to Silver Lake due to higher water levels.</li> <li>No existing water quality concerns.</li> </ul>
	Alternative 1-2: Maintain Existing Conditions	<ul style="list-style-type: none"> <li>Existing storage area (Silver Lake and surrounding wetlands) covers more than half of the catchment area.</li> <li>Utilize existing storage.</li> </ul>	<ul style="list-style-type: none"> <li>The majority of stormwater runoff from the catchment is naturally stored.</li> <li>Peak flows are effectively reduced by existing conditions.</li> <li>No concerns with water quality.</li> </ul>	<ul style="list-style-type: none"> <li>No impact on existing vegetation and wetlands in fringe areas.</li> <li>Natural wetland process enhances quality by addition of alkalinity and adsorption of metals. Process also provides enhancement of vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>Maintains flood risk elevation downstream</li> <li>No impact on property immediately adjacent to Silver Lake</li> </ul>	<ul style="list-style-type: none"> <li>No capital costs</li> </ul>	<p><b>RECOMMENDED</b></p> <ul style="list-style-type: none"> <li>Lowest cost alternative</li> <li>Flood risk elevation downstream is maintained</li> <li>Peak flows effectively reduced due to existing conditions.</li> <li>No impact on existing property immediately adjacent to Silver Lake.</li> <li>No existing water quality concerns.</li> <li>Benefits associated with natural wetland process.</li> </ul>
SWM FACILITY #2	Alternative 2-1: Provide On-Site Quantity Control Upstream of Highway 17 (Assumes development of lands within catchment)	<ul style="list-style-type: none"> <li>If more than 50% of the catchment area is developed, then undertake a Wetland Impact Assessment (WIA). The WIA will determine if on-site quantity control is feasible within the catchment area.</li> <li>If feasible, then create an on-site storage facility for quantity control.</li> </ul>	<ul style="list-style-type: none"> <li>Existing natural storage is effective. (Volume requirement is related to portion of area that is developed and the loss of natural storage)</li> <li>Facility could service potential development area.</li> <li>The peak flow capacity of the highway culverts cannot be exceeded.</li> <li>Water quality is not addressed.</li> </ul>	<ul style="list-style-type: none"> <li>Potential negative impact on natural environment due to construction of storage facility.</li> <li>Wetland impact assessment required prior to proceeding.</li> </ul>	<ul style="list-style-type: none"> <li>Maintains flood risk elevation downstream</li> </ul>	<ul style="list-style-type: none"> <li>Dependent upon extent of development</li> </ul>	<p><b>RECOMMENDED</b> – IF more than 50% of the catchment area is developed and if WIA determines on-site quantity control is feasible.</p> <ul style="list-style-type: none"> <li>Lowest cost alternative</li> <li>Maintains flood risk elevation downstream</li> <li>Potential negative impact on natural environment due to construction of storage facility.</li> <li>Water quality not addressed</li> </ul>
	Alternative 2-2: Provide No On - Site Quantity Control Upstream of Highway 17 (Assumes development of lands within catchment)	<ul style="list-style-type: none"> <li>If WIA determines that on-site quantity control is not feasible, then:</li> <li>Enlarge size of SWM Facility #4 (from 9,600 to 11,600 m<sup>3</sup>) to provide storage for increased runoff..</li> </ul>	<ul style="list-style-type: none"> <li>Existing natural storage upstream of Highway 17 maintained.</li> <li>Capacity of the Highway 17 culverts is not exceeded</li> <li>Peak flows reduced by small increase in storage of SWM Facility #4.</li> <li>Water quality not addressed</li> </ul>	<ul style="list-style-type: none"> <li>Minimal impact on natural environment</li> </ul>	<ul style="list-style-type: none"> <li>Maintains flood risk elevation downstream.</li> <li>Increase in runoff addressed through provision of additional storage at SWM Facility #4.</li> <li>No existing conveyance problems between SWM Facility #2 and SWM Facility #4.</li> </ul>	<ul style="list-style-type: none"> <li>Dependent upon extent of development</li> </ul>	<p><b>RECOMMENDED</b> – IF more than 50% of the catchment area is developed and IF WIA determines on-site quantity control is not feasible.</p> <ul style="list-style-type: none"> <li>Highest cost alternative.</li> <li>Maintains flood risk elevation downstream.</li> <li>Minimal impact on natural environment.</li> <li>Water quality not addressed.</li> </ul>

STORMWATER MANAGEMENT (SWM) FACILITIES AND ALTERNATIVES		ALTERNATIVE DESCRIPTION	CATEGORIES OF CONSIDERATION				EVALUATION SUMMARY
			TECHNICAL	NATURAL ENVIRONMENT	SOCIAL/CULTURAL	FINANCIAL	
SWM FACILITY #3	Alternative 3-1: Create Additional Storage Upstream of Highway 17 <i>(Assumes no development of lands within catchment)</i>	<ul style="list-style-type: none"><li>Construct berm with low-flow outlet to create additional storage</li></ul>	<ul style="list-style-type: none"><li>Peak flows not significantly reduced by provision of additional storage (Peak flows effectively reduced due to existing conditions)</li><li>Facility to service existing development.</li><li>No existing water quality concerns.</li></ul>	<ul style="list-style-type: none"><li>Potential negative impact on existing vegetation and wetlands in fringe areas due to larger fluctuations in water levels.</li></ul>	<ul style="list-style-type: none"><li>Insignificant reduction to downstream flood risk elevation by provision of additional storage</li><li>Potential negative impact on property immediately adjacent to wetland.</li></ul>	<ul style="list-style-type: none"><li>\$22,000 capital costs</li></ul>	<ul style="list-style-type: none"><li>Highest cost alternative.</li><li>Insignificant reduction to downstream flood risk elevation by provision of additional storage.</li><li>Peak flows not significantly affected by provision of additional storage (Peak flows effectively reduced due to existing conditions).</li><li>Potential negative impact on existing vegetation and wetlands in fringe areas due to larger fluctuations in water levels.</li></ul>
	Alternative 3-2: Maintain Existing Conditions <i>(Assumes no development of lands within catchment)</i>	<ul style="list-style-type: none"><li>Existing storage area (ponds and wetlands) covers more than half of the catchment area.</li><li>Utilize existing storage.</li></ul>	<ul style="list-style-type: none"><li>Peak flows effectively reduced due to existing conditions.</li><li>No existing water quality concerns</li></ul>	<ul style="list-style-type: none"><li>No impact on existing vegetation and wetlands.</li></ul>	<ul style="list-style-type: none"><li>Maintains flood risk elevation downstream.</li><li>No impact on property immediately adjacent to wetland.</li></ul>	<ul style="list-style-type: none"><li>No capital costs</li></ul>	<b>RECOMMENDED</b> <ul style="list-style-type: none"><li>Lowest cost alternative</li><li>Maintains flood risk elevation downstream</li><li>No impact on property immediately adjacent to wetland</li></ul>



STORMWATER MANAGEMENT (SWM) FACILITIES AND ALTERNATIVES		ALTERNATIVE DESCRIPTION	CATEGORIES OF CONSIDERATION				EVALUATION SUMMARY
			TECHNICAL	NATURAL ENVIRONMENT	SOCIAL/CULTURAL	FINANCIAL	
SWM FACILITY #4(a)	Alternative 4-1: Provide Quantity Control on Pagnutti Property	<ul style="list-style-type: none"> <li>Construct 3000 m<sup>3</sup> of storage within dedicated SWM block, achieving pre=post development flow from this site.</li> <li>Dry facility (normally open space) would be filled only during significant rainfall events.</li> </ul>	<ul style="list-style-type: none"> <li>Peak flows would be controlled through provision of on-site storage. Peak flow control provided for this site only.</li> <li>Facility to service potential development of this site.</li> <li>No increase in capacity of downstream conveyance system required.</li> <li>Water quality is not addressed.</li> </ul>	<ul style="list-style-type: none"> <li>Minimal impact on the natural environment (dry pond facility would require grading on lands that have no environmental sensitivities).</li> <li>Location of dry pond, not currently considered fish habitat and fish habitat is not being created.</li> </ul>	<ul style="list-style-type: none"> <li>Maintains flood risk elevation downstream</li> <li>SWM facility consistent with current site development plan.</li> <li>Dry storage could be integrated into park like setting.</li> <li>SWM facility close to existing residences. Public education, public interaction required.</li> </ul>	<ul style="list-style-type: none"> <li>\$104,000 capital costs.</li> </ul>	<ul style="list-style-type: none"> <li>Lowest cost alternative.</li> <li>Flood risk elevation downstream maintained at existing levels.</li> <li>Peak flow control provided for development of this site only.</li> <li>No negative impact on fish habitat.</li> <li>Water quality not addressed.</li> </ul>
	Alternative 4-2: Provide Quantity Control on Pagnutti Property and in Channel	<ul style="list-style-type: none"> <li>Construct 3000 m<sup>3</sup> of storage within dedicated SWM block, addressing requirements of the Pagnutti property, and 8000 m<sup>3</sup> of storage in the adjacent channel, addressing upstream development requirements.</li> <li>Dry facility (normally open space) would be filled only during significant rainfall events.</li> <li>The two storage facilities would perform in series and control peak flows.</li> </ul>	<ul style="list-style-type: none"> <li>Peak flows would be controlled through provision of on-site storage. Peak flow control provided for this site and upstream area.</li> <li>Facility to service existing development and potential growth areas.</li> <li>No increase in existing capacity of downstream conveyance system.</li> <li>Water quality not addressed.</li> </ul>	<ul style="list-style-type: none"> <li>Minimal impact on the natural environment (dry pond facility would require grading on lands with no environmental sensitivities).</li> <li>Location of dry pond not currently considered fish habitat and fish habitat is not being created.</li> <li>Potential for negative impact on fish habitat within the channel.</li> </ul>	<ul style="list-style-type: none"> <li>Flood risk elevation reduced.</li> <li>SWM facility consistent with current site development plan.</li> <li>Dry storage could be integrated into park like setting.</li> <li>SWM facility close to existing residences. Public education, public interaction required.</li> </ul>	<ul style="list-style-type: none"> <li>\$ 190,000,000 capital costs</li> </ul>	<ul style="list-style-type: none"> <li>Highest cost alternative.</li> <li>Flood risk elevation reduced.</li> <li>Peak flow control provided for this site and upstream area.</li> <li>Potential for negative impact on fish habitat within the channel.</li> <li>Water quality not addressed.</li> </ul>
	Alternative 4-3: Provide Quantity and Quality Control on Pagnutti Property and in Channel	<ul style="list-style-type: none"> <li>Construct 9600 m<sup>3</sup> of storage within the dedicated SWM block and adjacent channel, addressing all upstream development (including the Pagnutti property).</li> <li>A portion of the SWM facility would be dry (normally open space) and used (filled) only during significant rainfall events.</li> <li>Construct a berm with low flow outlet for extended detention in the channel. Provide access for the removal of sediment from the channel bottom</li> <li>The two storage facilities would perform in parallel to control peak flows.</li> </ul>	<ul style="list-style-type: none"> <li>Peak flow control and existing flood risks addressed. Peak flow control provided for this site and upstream catchments</li> <li>Facility to service existing developed and potential growth areas</li> <li>The two storage facilities performing in parallel would be more efficiency allowing a portion of Pagnutti property to remain dry.</li> <li>Water quality addressed through extended detention in the channel.</li> </ul>	<ul style="list-style-type: none"> <li>Minimal impact on natural environment (dry pond facility would require grading on lands with no environmental sensitivities).</li> <li>Location of dry pond, not currently considered fish habitat and fish habitat is not being created.</li> <li>Potential for negative impact on fish habitat within the channel.</li> </ul>	<ul style="list-style-type: none"> <li>Flood risk elevation reduced.</li> <li>SWM facility consistent with current site development plan.</li> <li>Dry storage could be integrated into park like setting.</li> <li>SWM facility close to existing residences. Public education, public interaction required.</li> </ul>	<ul style="list-style-type: none"> <li>\$150,000 capital costs</li> </ul>	<p><b>RECOMMENDED</b></p> <ul style="list-style-type: none"> <li>Medium cost alternative.</li> <li>Flood risk elevation reduced.</li> <li>Peak flow control provided for this site and upstream areas.</li> <li>The two storage facilities performing in parallel would result in increased efficiency and a slight reduction in size allowing a portion of Pagnutti lands to remain dry.</li> <li>Potential for negative impact on fish habitat within the channel.</li> <li>Water quality benefits.</li> </ul>
SWM FACILITY #4(b)	Alternative 4-4: Provide Quantity Control on Countryside Arena Property	<ul style="list-style-type: none"> <li>Construct SWM pond on Countryside Arena property</li> </ul>	<ul style="list-style-type: none"> <li>Location not appropriate for size/planned land uses for upstream catchments</li> <li>Not technically feasible</li> </ul>	<ul style="list-style-type: none"> <li>Alternative not developed – see technical considerations</li> </ul>	<ul style="list-style-type: none"> <li>Alternative not developed – see technical considerations</li> </ul>	<ul style="list-style-type: none"> <li>Alternative not developed – see technical considerations</li> </ul>	<ul style="list-style-type: none"> <li>Location not appropriate for planned land uses upstream. Quantity control not required at this location</li> <li>Not technically feasible</li> </ul>

STORMWATER MANAGEMENT (SWM) FACILITIES AND ALTERNATIVES		ALTERNATIVE DESCRIPTION	CATEGORIES OF CONSIDERATION				EVALUATION SUMMARY
			TECHNICAL	NATURAL ENVIRONMENT	SOCIAL/CULTURAL	FINANCIAL	
SWM FACILITY #5	<p><i>Alternative 5-1:</i> <i>Provide Quantity Control at Mallards Pond</i></p> <p><i>No Improvement of Conveyance System at Field St., Culver Cr. or Regent St.</i></p>	<ul style="list-style-type: none"> <li>Construct a new outlet structure at Mallard's Pond creating an additional 20,000 m<sup>3</sup> of storage (maximum available storage at location), allowing water levels to rise during significant rainfall events.</li> </ul>	<ul style="list-style-type: none"> <li>Storage within Mallard's Pond would be increased to reduce flows at the Regent Street culvert.</li> <li>Modeling indicates that an additional 20,000 m<sup>3</sup> storage in Mallard's Pond would not reduce flows at the existing Regent St. culvert enough.</li> <li>To provide 20,000 m<sup>3</sup> storage, existing pond water levels were lowered to provide an active storage volume allowing water levels to rise at least 2 m during significant rainfall events.</li> <li>Water quality is not addressed.</li> <li>Facility to service existing development and potential growth areas.</li> </ul>	<ul style="list-style-type: none"> <li>Potential negative impact on natural environment.</li> <li>Potential negative impact on duck habitat.</li> <li>Mallards Pond is a fish habitat and the wetland upstream is important to the maintenance of water quality in the pond. The design must ensure that the upstream wetland is maintained.</li> </ul>	<ul style="list-style-type: none"> <li>Flood risk elevation not reduced</li> <li>Negative impact on existing park facility.</li> </ul>	<ul style="list-style-type: none"> <li>\$70,000 capital costs</li> </ul>	<ul style="list-style-type: none"> <li>Lowest cost alternative</li> <li>Flood risk elevation not reduced</li> <li>Existing pond water levels would be lowered to provide an active storage volume allowing water levels to rise at least 2 m during significant rainfall events.</li> <li>Potential negative impact on natural environment.</li> <li>Negative impact on existing park facility.</li> <li>Water quality not addressed.</li> </ul>
	<p><i>Alternative 5-2:</i> <i>Provide Quantity Control at Mallards Pond</i></p> <p><i>Improve the Conveyance System at Field St., Culver Cr. and Regent St.</i></p>	<ul style="list-style-type: none"> <li>Construct a new outlet structure at Mallard's Pond creating an additional 20,000 m<sup>3</sup> of storage.</li> <li>Replace the inlet culvert at Field Street and improve the inlet configuration to minimize entrance losses.</li> <li>Extend the existing storm sewer outlet at Culver Crescent and improve the downstream channel.</li> <li>Replace the existing twin culverts with larger twin box culverts at the Regent Street crossing (at the end of Culver Crescent)</li> </ul>	<ul style="list-style-type: none"> <li>Storage within Mallard's Pond increased and, if required, outflow increased due to improved conveyance system downstream.</li> <li>Modeling indicates that an increase of 20,000 m<sup>3</sup> would be sufficient with culvert improvements.</li> <li>Existing pond water levels would be decreased to provide an active storage volume.</li> <li>Existing Field Street culvert / entrance would be replaced / improved to convey design flows with no net increase in flooding.</li> <li>Existing Culver Street outlet / channel would be modified to convey design flows with no flooding.</li> <li>Existing Regent Street twin culverts would be replaced with larger culverts to convey design flows with no flooding.</li> <li>Water quality not addressed.</li> <li>Facility to service existing development and potential growth areas.</li> </ul>	<ul style="list-style-type: none"> <li>Potential negative impact on natural environment.</li> <li>Potential negative impact on duck habitat.</li> <li>Mallards Pond is a fish habitat and the wetland upstream is important to the maintenance of water quality in the pond. The design must ensure that the upstream wetland is maintained</li> <li>Negative impact on fish habitat in the existing channel between Culver Crescent and Regent Street</li> </ul>	<ul style="list-style-type: none"> <li>Flood risk elevation reduced in some areas.</li> <li>Negative impact on existing park facility.</li> <li>Negative impact on traffic during construction phase.</li> </ul>	<ul style="list-style-type: none"> <li>\$360,000 capital costs</li> </ul>	<ul style="list-style-type: none"> <li>Highest cost alternative.</li> <li>Flood risk elevation reduced in some areas.</li> <li>Existing pond water levels would be decreased to provide an active storage volume.</li> <li>Negative impact on natural environment</li> <li>Negative impact on existing park facility.</li> <li>Water quality not addressed.</li> <li>Negative impact on traffic during construction of culverts.</li> </ul>
	<p><i>Alternative 5-3:</i> <i>Provide No Quantity Control at Mallards Pond</i></p> <p><i>Improve Conveyance Capacity at Field St, Culver Cr. and Regent St.</i></p>	<ul style="list-style-type: none"> <li>Replace the inlet culvert at Field Street and improve the inlet configuration to minimize entrance losses.</li> <li>Extend the existing stormsewer outlet at Culver Crescent and improve downstream channel.</li> <li>Replace the existing twin culverts with larger twin box culverts at Regent Street crossing (at the end of Culver Crescent).</li> </ul>	<ul style="list-style-type: none"> <li>Storage within Mallard's Pond not increased and outflow control structure not modified</li> <li>Existing Field Street culvert/entrance would be replaced/improved to convey design flows with no net increase in flooding</li> <li>Existing Culver Street outlet/channel would be modified to convey design flows with no flooding</li> <li>Existing Regent Street twin culverts would be replaced with larger to convey design flows with no flooding</li> <li>Water quality not addressed</li> <li>Facility to service existing developed and potential growth areas</li> </ul>	<ul style="list-style-type: none"> <li>Negative impact on natural environment</li> <li>Negative impact on fish habitat in existing channel between Culver Crescent and Regent Street</li> </ul>	<ul style="list-style-type: none"> <li>Flood risk elevation reduced in some areas</li> <li>Negative impact on existing Mallard's Pond greenspace/park</li> <li>Negative impact on traffic during construction of culverts</li> </ul>	<ul style="list-style-type: none"> <li>\$290,000 capital costs</li> </ul>	<p><b>RECOMMENDED</b></p> <ul style="list-style-type: none"> <li>Medium cost alternative</li> <li>Flood risk elevation reduced in some areas</li> <li>Negative impact on natural environment/fish habitat</li> <li>Negative impact on existing Mallard's Pond greenspace/park</li> <li>Water quality not addressed</li> <li>Negative impact on traffic during construction of culverts</li> </ul>



STORMWATER MANAGEMENT (SWM) FACILITIES AND ALTERNATIVES		ALTERNATIVE DESCRIPTION	CATEGORIES OF CONSIDERATION				EVALUATION SUMMARY	
			TECHNICAL	NATURAL ENVIRONMENT	SOCIAL/CULTURAL	FINANCIAL		
SWM FACILITY #6(a)	Quantity Control Alternatives	<p>Alternative 6-1:</p> <p>Provide On-line Quantity Control Upstream of Ida Street.</p> <p>Do not Improve the Conveyance System between Regent Street and the Highway 17/69 Interchange.</p> <p>Improve the Conveyance System at Ida Street (localized)</p>	<ul style="list-style-type: none"><li>Construct approximately 300,000 m<sup>3</sup> of storage over 30 hectares, in the low-lying area upstream of Ida Street</li><li>Upsize the existing culvert crossing the north end of Ida Street and regrade channel to promote drainage from Ida Street to the main channel.</li><li>Upsize the existing culvert draining the backyards of Ida Street homes (west side). Regrade the backyards to promote drainage toward culvert.</li></ul>	<ul style="list-style-type: none"><li>Increased storage would not sufficiently reduce water levels or flows at the Highway 17/69 Interchange.</li><li>The Highway 17/69 Interchange and Regent Street, embankments would have to be considered dams.</li><li>Conveyance system improved to reduce local flooding at Ida Street.</li><li>Water quality not addressed.</li><li>Facility to service existing development and potential growth areas.</li></ul>	<ul style="list-style-type: none"><li>Main channel is considered fish habitat.</li><li>Negative impact on fish habitat during construction / maintenance activities.</li></ul>	<ul style="list-style-type: none"><li>Maintains existing flood risk elevation.</li><li>Private property required.</li><li>Negative impact due to construction / maintenance activities.</li></ul>	<ul style="list-style-type: none"><li>\$1.0 million capital costs</li></ul>	<ul style="list-style-type: none"><li>Lowest cost alternative</li><li>Maintains flood risk elevation downstream.</li><li>Local flooding reduced at Ida Street.</li><li>Negative impact on fish habitat during construction / maintenance activities</li><li>Private property required</li><li>Water quality not addressed</li><li>Requirement to consider the Highway 17/69 Interchange and Regent Street embankments as dams</li></ul>
		<p>Alternative 6-2:</p> <p>Improve the Conveyance System at Ida Street and between Regent Street and the Highway 17/69 Interchange.</p> <p>Do Not provide Quantity Control Upstream of Ida Street.</p> <p>Improve the Conveyance System at Ida Street (localized)</p>	<ul style="list-style-type: none"><li>Provide 7 new culverts in series from Regent St. to the Highway 17/69 Interchange.</li><li>Upsize the existing culvert crossing the north end of Ida Street and regrade channel to promote drainage from Ida Street to the main channel.</li><li>Upsize the existing culvert draining the backyards of Ida Street homes (west side) and regrade backyards to promote drainage toward the culvert.</li></ul>	<ul style="list-style-type: none"><li>Conveyance system improved to reduce flood risk elevation at the Highway 17 Interchange.</li><li>No requirement to consider the Highway 17 Interchange and Regent Street as dams.</li><li>Conveyance system improved to reduce local flooding at Ida Street.</li><li>Water quality is not addressed.</li><li>Facility to service existing development and potential growth areas.</li></ul>	<ul style="list-style-type: none"><li>Potential negative impact on fish habitat downstream of culverts during construction</li></ul>	<ul style="list-style-type: none"><li>Flood risk elevation reduced</li><li>Negative impact on traffic during construction</li></ul>	<ul style="list-style-type: none"><li>\$2.6 million capital costs</li></ul>	<p><b>RECOMMENDED</b></p> <ul style="list-style-type: none"><li>Medium cost alternative.</li><li>Flood risk elevation reduced.</li><li>Local flooding reduced at Ida Street.</li><li>Negative impact on fish habitat downstream of culverts during construction.</li><li>Water quality not addressed.</li><li>No requirement to consider the Highway 17 Interchange and Regent Street embankments as dams.</li><li>Negative impact on traffic during construction.</li></ul>
		<p>Alternative 6-3:</p> <p>Improve Conveyance Capacity at Ida Street and from Regent Street to Highway 17/69 Interchange</p> <p>Provide On-line Quantity Control Upstream of Ida Street</p> <p>Improve the Conveyance System at Ida Street (localized).</p>	<ul style="list-style-type: none"><li>Provide 7 new culverts in series from Regent St. to the Highway 17/69 Interchange.</li><li>Construct 20,000 m<sup>3</sup> of storage on the main channel, in the low-lying area upstream of Ida Street</li><li>Upsize the existing culvert crossing the north end of Ida Street and regrade channel to promote drainage from Ida Street to the main channel</li><li>Upsize the existing culvert draining backyards of Ida Street homes (west side) and regrade backyards to promote drainage toward culvert</li></ul>	<ul style="list-style-type: none"><li>Conveyance system improved to reduce flood risk elevation at the Highway 17 Interchange.</li><li>Storage west of Ida Street could reduce peak flows by 50%, but would have little effect on water levels created by the interchange</li><li>No requirement to consider the Highway 17/69 Interchange and Regent Street embankments as dams.</li><li>SW conveyance increased to reduce local flooding at Ida Street</li><li>Water quality not addressed.</li><li>Facility to service existing developed and potential growth areas.</li></ul>	<ul style="list-style-type: none"><li>Main channel is considered fish habitat.</li><li>Negative impact on fish habitat during construction/ maintenance</li></ul>	<ul style="list-style-type: none"><li>Flood risk elevation reduced.</li><li>Private property required.</li><li>Negative impact on traffic during construction</li><li>Construction nuisance in Ida Street backyards</li></ul>	<ul style="list-style-type: none"><li>\$3.0 million capital costs</li></ul>	<ul style="list-style-type: none"><li>Highest cost alternative.</li><li>Flood risk elevation reduced.</li><li>Local flooding reduced at Ida Street.</li><li>Negative impact on fish habitat during construction / maintenance.</li><li>Private property required.</li><li>Water quality not addressed.</li><li>No requirement to consider the Highway 17/69 Interchange and Regent Street embankments as dams.</li><li>Negative impact on traffic during construction</li></ul>

STORMWATER MANAGEMENT (SWM) FACILITIES AND ALTERNATIVES			ALTERNATIVE DESCRIPTION	CATEGORIES OF CONSIDERATION				EVALUATION SUMMARY
				TECHNICAL	NATURAL ENVIRONMENT	SOCIAL/CULTURAL	FINANCIAL	
SWM FACILITY #6(b)	Quality Control Alternatives	Alternative 6-4: Provide On-line Quality Control Facility Upstream of Ida Street: WET POND	<ul style="list-style-type: none"><li>Construct storage on main channel in low-lying area upstream of Ida Street</li><li>The channel and surrounding lands would be excavated to create required storage.</li><li>The footprint of the pond would be approximately 3 hectares.</li></ul>	<ul style="list-style-type: none"><li>No significant peak flow control possible (storage volume required for peak flow control is prohibitively large).</li><li>Water quality addressed for entire upstream tributary (approx. 500 hectares).</li><li>Facility to service existing development and potential growth areas</li></ul>	<ul style="list-style-type: none"><li>Main channel is considered fish habitat. Construction/ maintenance of facility would replace existing natural environment</li><li>Fish habitat and water quality issues can be addressed in facility design to enhance natural environment</li></ul>	<ul style="list-style-type: none"><li>Maintains flood risk elevation downstream</li><li>Linkage can be established with Mallards Pond-forming 'green belt' in watershed</li><li>Passive recreation opportunities</li><li>Private property required</li></ul>	<ul style="list-style-type: none"><li>\$1.1 million capital costs</li></ul>	<b>RECOMMENDED</b> <ul style="list-style-type: none"><li>Medium cost alternative</li><li>Water quality addressed for entire upstream tributary (approx. 500 hectares)</li></ul>
		Alternative 6-5: On-line Quality Control Facility Upstream of Ida Street: WETLAND	<ul style="list-style-type: none"><li>Construct storage on main channel, in low-lying area upstream of Ida Street</li><li>The channel and surrounding lands will be excavated to create required storage</li><li>The footprint of the wetland would be approximately 5 hectares.</li></ul>	<ul style="list-style-type: none"><li>No significant peak flow control possible (storage volume required for peak flow control is prohibitively large).</li><li>Water quality addressed for entire upstream tributary (approx. 500 hectares).</li><li>Facility to service existing development and potential growth areas.</li></ul>	<ul style="list-style-type: none"><li>Main channel is considered fish habitat. Construction / maintenance of facility could preserve / enhance natural environment by incorporating habitat / naturalization features.</li></ul>	<ul style="list-style-type: none"><li>Maintains flood risk elevation downstream</li><li>Linkage can be established with Mallards Pond-forming 'green belt' in watershed.</li><li>Passive recreation opportunities.</li><li>Private property required.</li></ul>	<ul style="list-style-type: none"><li>\$1.2 million capital costs</li></ul>	<ul style="list-style-type: none"><li>Highest cost alternative</li><li>Water quality addressed for entire upstream tributary (approx. 500 hectares)</li></ul>
		Alternative 6-6: Provide Additional Quality Control in Mallards Pond AND	<ul style="list-style-type: none"><li>Provide extended detention and forebay in Mallards Pond</li></ul>	<ul style="list-style-type: none"><li>Extended detention and removal of coarse sediment would be undertaken in the upstream portion of the pond. A shallow berm with a low flow outlet would allow access for sediment removal.</li><li>Water quality would be improved through provision of a pool and new sediment forebay. Water quality control provided for all catchments upstream of forebay.</li><li>Facility to service existing development and potential growth areas</li></ul>	<ul style="list-style-type: none"><li>Negative impact on a portion of the existing natural environment at Mallards Pond</li><li>A forebay is a significant long-term feature for the natural environment. Mallards Pond is a fish habitat and the wetland upstream is important to the maintenance of water quality in the pond. The forebay design must ensure that the upstream wetland is maintained</li></ul>	<ul style="list-style-type: none"><li>Maintains flood risk elevation downstream.</li><li>No negative impact on the majority of existing Mallard's Pond greenspace / park like setting.</li><li>Linkage can be established with Mallards Pond forming 'green belt' in watershed.</li><li>Passive recreation opportunities.</li><li>Private property required.</li></ul>	<ul style="list-style-type: none"><li>\$340,000 capital costs</li></ul>	<ul style="list-style-type: none"><li>Lowest cost alternative</li><li>Maintains flood risk elevation downstream</li><li>Negative impact on natural environment</li><li>No negative impact on the majority of existing Mallard's Pond greenspace / park like setting.</li><li>Water quality control addressed for all catchments upstream of Mallards Pond forebay and potential growth areas northeast of Regent Street.</li><li>Portion of watershed will bypass all facilities. On-site SWM Best Management Practices (lot level controls) are required for existing and future developments.</li></ul>
		Off-line Quality Control Facility Upstream of Ida Street- north of existing channel: WET POND	<ul style="list-style-type: none"><li>Construct storage north of main channel</li></ul>	<ul style="list-style-type: none"><li>Water quality control addressed for areas NE and N of facility (approx. 80 hectares).</li><li>Facility to service potential growth area.</li></ul>	<ul style="list-style-type: none"><li>Main channel is considered fish habitat. Construction / maintenance of facility could preserve / enhance natural environment by incorporating habitat / naturalization feature.</li></ul>			



STORMWATER MANAGEMENT (SWM) FACILITIES AND ALTERNATIVES		ALTERNATIVE DESCRIPTION	CATEGORIES OF CONSIDERATION				EVALUATION SUMMARY
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SWM FACILITY #7	Alternative 7-1: <i>Provide Quantity and Quality Control Upstream of Green Ave</i>	<ul style="list-style-type: none"> <li>Construct SWM facility upstream of Green Avenue to provide quantity and quality control for all upstream catchments.</li> <li>Limit peak flows to the capacity of the downstream culvert and channel.</li> </ul>	<ul style="list-style-type: none"> <li>Post development peak flows limited to pre-development peak flows.</li> <li>Peak flow control provided for all upstream catchments.</li> <li>Existing flooding problems downstream reduced by controlling peak flows.</li> <li>Water quality addressed with permanent pool and extended detention.</li> <li>Facility to service potential growth area.</li> </ul>	<ul style="list-style-type: none"> <li>Minor impact on natural environment.</li> <li>Minor removal of existing vegetation due to creation of additional storage (pond).</li> </ul>	<ul style="list-style-type: none"> <li>Flood risk elevation reduced.</li> <li>Potential impacts due to larger peak flows caused by development are addressed.</li> <li>Private property required.</li> <li>SWM facility close to existing residences. Public education, public interaction required.</li> </ul>	<ul style="list-style-type: none"> <li>\$275,000 capital costs</li> </ul>	<ul style="list-style-type: none"> <li>Highest cost alternative.</li> <li>Flood risk elevation reduced.</li> <li>Post development peak flows limited to pre-development peak flows.</li> <li>Peak flow control provided for all upstream catchments.</li> <li>Existing flooding problems downstream reduced by controlling peak flows.</li> <li>Potential impacts due to larger peak flows caused by development are addressed.</li> <li>Minor impact on natural environment.</li> <li>Minor removal of existing vegetation due to creation of additional storage (pond).</li> <li>SWM facility close to existing residences. Public education, public interaction required.</li> <li>Private property required.</li> <li>Water quality addressed.</li> </ul>
	Alternative 7-2: <i>Improve conveyance system upstream and downstream of Green Avenue.</i>  <i>Do not provide storage.</i>	<ul style="list-style-type: none"> <li>Replace the existing Green Avenue culvert with a new 1500 mm culvert and extend it past the houses on east side of road</li> <li>Provide 2 additional 1500 mm culverts</li> <li>Undertake channel improvements from just upstream of Green Avenue through Brown's Concrete property.</li> </ul>	<ul style="list-style-type: none"> <li>Larger culverts would convey design flows.</li> <li>Water quality not addressed.</li> <li>Facility to service potential growth area.</li> </ul>	<ul style="list-style-type: none"> <li>Existing channel improved.</li> <li>Potential for increased erosion/sedimentation due to increased flow velocity minimized through standard mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>Flood risk elevation reduced.</li> <li>Potential impacts due to larger peak flows caused by development are addressed.</li> </ul>	<ul style="list-style-type: none"> <li>\$100,000 capital costs</li> </ul>	<p><b>RECOMMENDED</b></p> <ul style="list-style-type: none"> <li>Lowest cost alternative.</li> <li>Flood risk elevation reduced.</li> <li>Larger culverts would convey design flows.</li> <li>Potential for increased erosion / sedimentation due to increased flow velocity minimized through standard mitigation measures.</li> <li>Potential impacts due to larger peak flows caused by development are addressed.</li> <li>Water quality not addressed.</li> </ul>
SWM FACILITY #8	Alternative 8-1: <i>Provide Quantity Control Upstream of Rockwood.</i>  <i>No improvements to conveyance system downstream of Rockwood.</i>	<ul style="list-style-type: none"> <li>Construct SWM facility upstream of Rockwood Avenue.</li> <li>Wet or dry facility</li> </ul>	<ul style="list-style-type: none"> <li>Post development peak flows limited to pre-development peak flows.</li> <li>Additional storage would address peak flows from all upstream catchments</li> <li>Water quality not addressed.</li> <li>Facility to service potential growth area.</li> </ul>	<ul style="list-style-type: none"> <li>Storage utilizes existing low-lying area..</li> <li>Minor removal of existing vegetation due to creation of additional storage (pond).</li> </ul>	<ul style="list-style-type: none"> <li>Flood risk elevation reduced.</li> <li>Potential impacts due to larger peak flows caused by development are addressed.</li> <li>Private property required. SWM facility not consistent with current site development plan.</li> <li>SWM facility close to existing residences. Public education, public interaction required.</li> </ul>	<ul style="list-style-type: none"> <li>\$30,000 capital costs</li> </ul>	<ul style="list-style-type: none"> <li>Lowest cost alternative</li> <li>Relative high capital costs to benefit small upstream development area</li> <li>Flood risk elevation reduced</li> <li>Potential impacts due to larger peak flows caused by development are addressed.</li> <li>Private property required. SWM facility not consistent with current site development plan</li> <li>SWM facility close to existing residents. Public education, public interaction required</li> <li>Water quality not addressed.</li> </ul>
	Alternative 8-2: <i>Improve conveyance capacity downstream of Rockwood</i>  <i>No storage provided</i>	<ul style="list-style-type: none"> <li>Increase size of existing Rockwood, Greenvally and driveway culverts to 1200 mm</li> <li>Improve existing channel for 260m downstream from Rockwood culvert to confluence with main ditch downstream of Greenvally via erosion/ sedimentation mitigation measures</li> </ul>	<ul style="list-style-type: none"> <li>Larger culverts would convey design flows</li> <li>Water quality not addressed</li> <li>Facility to service existing developed and potential growth areas</li> </ul>	<ul style="list-style-type: none"> <li>Negative impact on natural environment</li> <li>Existing low-lying marshy area upstream of Rockwood Avenue filled in and developed</li> <li>Existing channel improved and potential for increased erosion/sedimentation due to increased conveyance minimized through standard mitigation measures</li> </ul>	<ul style="list-style-type: none"> <li>Flood risk elevation reduced</li> <li>Potential future development impacts due to larger peak flows are addressed</li> <li>SWM facility consistent with current site development plan</li> <li>Potential requirement for private property</li> </ul>	<ul style="list-style-type: none"> <li>\$80,000 capital costs</li> </ul>	<p><b>RECOMMENDED</b></p> <ul style="list-style-type: none"> <li>Highest cost alternative</li> <li>Flood risk elevation reduced</li> <li>Potential future development impacts due to larger peak flows are addressed</li> <li>Negative impact on natural environment</li> <li>Existing channel improved and potential for increased erosion / sedimentation due to increased conveyance minimized through standard mitigation measures</li> <li>SWM facility consistent with current site development plan</li> <li>Potential requirement for private property</li> <li>Water quality not addressed</li> </ul>


STORMWATER MANAGEMENT (SWM) FACILITIES AND ALTERNATIVES		ALTERNATIVE DESCRIPTION	CATEGORIES OF CONSIDERATION				EVALUATION SUMMARY
			TECHNICAL	NATURAL ENVIRONMENT	SOCIAL/CULTURAL	FINANCIAL	
SWM FACILITY #9	Alternative 9-1 Provide Quality Control at Outlet to McFarlane Lake (Wet Pond)	<ul style="list-style-type: none"> <li>Construct 80,000 m<sup>3</sup> of on-line storage just upstream of McFarlane Lake</li> <li>The footprint of the wet pond would be approximately 6 hectares.</li> </ul>	<ul style="list-style-type: none"> <li>Peak flow control provided.</li> <li>The volume requirements would be extremely large because the serviced drainage area includes the entire subwatershed.</li> <li>Storage created by building berms to flood a large area of land (existing grades prohibit making a deep pond).</li> <li>Water quality addressed.</li> <li>Facility would service entire upstream watershed.</li> </ul>	<ul style="list-style-type: none"> <li>Removal of existing vegetation due to significant amount of grading required near McFarlane Lake to create additional storage (pond).</li> <li>Disruption to natural wetland function during construction.</li> <li>Impact on natural environment by converting natural wetland to engineered facility.</li> <li>Negative impact on fish habitat during construction / maintenance activities.</li> </ul>	<ul style="list-style-type: none"> <li>Minimal impact on downstream flood risk elevation.</li> <li>Significant amount of private property required.</li> </ul>	<ul style="list-style-type: none"> <li>\$1.4 million capital costs</li> </ul>	<ul style="list-style-type: none"> <li>Highest cost alternative.</li> <li>Peak flow control provided.</li> <li>The volume / land requirements would be extremely large because the drainage area serviced includes the entire Algonquin Road Watershed.</li> <li>Removal of existing vegetation due to significant amount of grading required near McFarlane Lake to create additional storage (pond).</li> <li>Disruption to natural wetland function during construction</li> <li>Impact on natural environment by converting natural wetland to engineered facility</li> <li>Negative impact on fish habitat during construction / maintenance</li> <li>Significant amount of private property required.</li> <li>Water quality addressed.</li> </ul>
	Alternative 9-2: Provide Quality Control at Outlet to McFarlane Lake (Wetland)	<ul style="list-style-type: none"> <li>Construct 50,000 m<sup>3</sup> of on-line storage just upstream of McFarlane Lake.</li> <li>The footprint of the wetland is approximately 10 hectares.</li> </ul>	<ul style="list-style-type: none"> <li>Peak flow control provided</li> <li>The volume requirements would be extremely large because the serviced drainage area includes the entire subwatershed.</li> <li>Shallow depths required for a wetland would make land requirements extremely large.</li> <li>Water quality addressed.</li> <li>Facility would service entire upstream watershed.</li> </ul>	<ul style="list-style-type: none"> <li>Creation of wetland habitat.</li> <li>Removal of existing vegetation due to significant amount of grading required near McFarlane Lake to create additional storage (wetland).</li> <li>Disruption to natural wetland function during construction.</li> <li>Impact on natural environment by converting natural wetland to engineered facility.</li> <li>Negative impact on fish habitat during construction/ maintenance.</li> </ul>	<ul style="list-style-type: none"> <li>Minimal impact on downstream flood risk elevation.</li> <li>Significant amount of private property required.</li> </ul>	<ul style="list-style-type: none"> <li>\$1.3 million capital costs</li> </ul>	<ul style="list-style-type: none"> <li>Medium cost alternative.</li> <li>Peak flow control provided.</li> <li>The volume / land requirements would be extremely large because the drainage area serviced includes the entire Algonquin Road Watershed.</li> <li>Removal of existing vegetation due to significant amount of grading required near McFarlane Lake to create additional storage (wetland).</li> <li>Disruption to natural wetland function during construction.</li> <li>Impact on natural environment by converting natural wetland to engineered facility.</li> <li>Negative impact on fish habitat during construction / maintenance</li> <li>Significant private property required.</li> <li>Water quality addressed.</li> </ul>
	Alternative 9-3: Maintain Existing Conditions	<ul style="list-style-type: none"> <li>No change at the McFarlane Lake outlet</li> <li>Water quantity and quality addressed in the upstream watershed</li> </ul>	<ul style="list-style-type: none"> <li>No peak flow control</li> <li>Water quality not addressed</li> </ul>	<ul style="list-style-type: none"> <li>No impact on natural environment</li> </ul>	<ul style="list-style-type: none"> <li>Maintains flood risk elevation downstream</li> <li>No private property required</li> </ul>	<ul style="list-style-type: none"> <li>No capital costs</li> </ul>	<p><b>RECOMMENDED</b></p> <ul style="list-style-type: none"> <li>Lowest cost alternative</li> <li>No peak flow control</li> <li>No impact on natural environment</li> <li>No private property required</li> <li>Water quality not addressed</li> <li>Water quantity and quality addressed in upstream watershed</li> </ul>



STORMWATER MANAGEMENT (SWM) FACILITIES AND ALTERNATIVES		ALTERNATIVE DESCRIPTION	CATEGORIES OF CONSIDERATION				EVALUATION SUMMARY
			TECHNICAL	NATURAL ENVIRONMENT	SOCIAL/CULTURAL	FINANCIAL	
SWM FACILITY #10	Alternative 10-1: Provide On-Site Quantity Control at Vintage Green / Mariposa Place (Dry Pond)	<ul style="list-style-type: none"><li>Construct 3500 m<sup>3</sup> of storage.</li><li>Dry facility (normally open space) would be used (filled) only during significant rainfall events</li></ul>	<ul style="list-style-type: none"><li>Post development peak flows limited to pre-development peak flows.</li><li>Water quality not addressed.</li><li>Facility would service potential growth area.</li></ul>	<ul style="list-style-type: none"><li>Minimal impact on natural environment.</li><li>Removal of existing vegetation required due to creation of additional storage (pond).</li></ul>	<ul style="list-style-type: none"><li>Flood risk elevation reduced.</li><li>Dry storage can be integrated into park setting.</li><li>SWM facility not consistent with current site development plan. Severely restricts potential future site development.</li><li>SWM facility close to existing residences. Public education, public interaction required.</li></ul>	<ul style="list-style-type: none"><li>\$100,000 capital costs</li></ul>	<ul style="list-style-type: none"><li>Medium cost alternative.</li><li>Flood risk elevation reduced.</li><li>Peak flow control provided.</li><li>Removal of existing vegetation required due to creation of additional storage (pond).</li><li>Dry storage can be integrated into park setting.</li><li>SWM facility not consistent with current site development plan. Severely restricts potential future site development</li><li>SWM facility close to existing residents. Public education, public interaction required.</li><li>Water quality not addressed.</li></ul>
	Alternative 10-2: Provide On-Site Quantity Control at Vintage Green/Mariposa Place (Wet Pond)	<ul style="list-style-type: none"><li>Construct 3500 m<sup>3</sup> of storage</li><li>Wet facility (permanent pool) with dry portion (filled only during heavy rain events)</li></ul>	<ul style="list-style-type: none"><li>Peak flow addressed by storing post development flows to pre-development levels</li><li>Water quality addressed</li><li>Facility would service potential growth area</li></ul>	<ul style="list-style-type: none"><li>Minimal impact on natural environment</li><li>Removal of existing vegetation required due to creation of additional storage (pond).</li></ul>	<ul style="list-style-type: none"><li>Flood risk elevation reduced.</li><li>SWM facility not consistent with current site development plan. Severely restricts potential future site development</li><li>SWM facility close to existing residences. Public education, public interaction required.</li></ul>	<ul style="list-style-type: none"><li>\$120,000 capital costs</li></ul>	<ul style="list-style-type: none"><li>Highest cost alternative</li><li>Flood risk elevation reduced</li><li>Peak flow control provided</li><li>Removal of existing vegetation required due to creation of additional storage (pond).</li><li>Dry storage can be integrated into park setting</li><li>SWM facility not consistent with current site development plan. Severely restricts potential future site development</li><li>SWM facility close to existing residents. Public education, public interaction required.</li><li>Water quality addressed.</li></ul>
	Alternative 10-3: No Storage On Site Construct conveyance system to service the development site.	<ul style="list-style-type: none"><li>Construct storm sewers and drainage ditches extending from subdivision to Algonquin Road.</li></ul>	<ul style="list-style-type: none"><li>Peak flow would be released to existing conveyance system.</li><li>Capacity for 5-year flow in sewers, with overland flow route to Algonquin Road, must be demonstrated at detailed design.</li><li>Water quality not addressed.</li></ul>	<ul style="list-style-type: none"><li>No impact on natural environment.</li></ul>	<ul style="list-style-type: none"><li>Flood risk elevation not reduced.</li><li>SWM facility is consistent with current site development plan. Does not restrict potential future site development</li><li>On-site SWM Best Management Practices (lot level controls) are required for future developments</li></ul>	<ul style="list-style-type: none"><li>\$45,000 capital costs</li></ul>	<b>RECOMMENDED</b> <ul style="list-style-type: none"><li>Lowest cost alternative.</li><li>Flood risk elevation not reduced.</li><li>Peak flow released to existing conveyance system.</li><li>Existing natural environment would not be affected.</li><li>Water quality not addressed.</li><li>On-site SWM Best Management Practices (lot level controls) are required for future developments.</li></ul>

Total Cost for Recommended Solution = \$4.4 Million

Legend

 Recommended Stormwater Management Facilities and Alternatives

## **9. DESCRIPTION, IMPLEMENTATION AND MONITORING OF THE RECOMMENDED STORMWATER MANAGEMENT PLAN**

### **9.1 Description of the Recommended Stormwater Management Plan**

Drawing 6 (at the end of Section 9.1) illustrates the Recommended Stormwater Management Plan and flood lines generated by the Regional Storm / 100 Year Return Period Storm. The shaded alternatives in Table 8-1 comprise the recommended stormwater management plan. Each of the recommended facilities, when combined, provides a holistic solutions that will the address the Algonquin Road Watershed Stormwater Management Class EA problem statement.

The recommended stormwater management plan will convey the post-development design flows, while maintaining or reducing the existing flood risk. In addition, there are several localized areas that are experiencing minor flooding, that will be addressed by the recommended plan.

Stormwater quality control will be implemented at two locations and will service both existing development and potential growth areas. A discussion on stormwater quality management is included in Section 9.3.

Several of the recommended alternatives that were evaluated, including Alternatives 1-2, 3-2 and 9-3, concluded “Maintain Existing Conditions” and therefore are not detailed in the sections below.

#### **9.1.1 Recommended Alternative 4-3: Provide Quantity and Quality Control on Pagnutti Property and in Channel**

Recommended Alternative 4-3 is shown on Drawing 7 (at the end of Section 9.1) in plan and profile view. The existing channel would be altered in order to provide 9600 m<sup>3</sup> of storage with a high water level of 275.25 m, which would fill during the 5-year storm. A rock check dam would be installed at the downstream end of the channel, just upstream of the stormsewer inlet on Algonquin Road. This rock check dam would provide extended detention allowing for sediment to settle out prior to entering the stormsewer system, hence providing quality control. The pond area of this facility is considered a “dry pond” that can be used for recreational purposes. This dry pond would begin filling under events greater than the 5-year storm and would fill completely during the 100-year storm to an elevation of 276.0 m.

Maintenance road access for sediment removal would be provided around the pond and along the channel. This access road could also be used for a bicycle path / pedestrian walkway. Appropriate erosion protection and landscaping would also be provided.



Overall, this facility would control peak flows from this site and upstream catchments. It would service existing development and potential growth areas. Existing flood risks on this site and on the lands directly north (Colby Street area) would be reduced. Stormwater quality management would be provided through extended detention in the channel.

### **9.1.2 Recommended Alternative 5-3: Provide No Quantity Control at Mallard's Pond, Improve Conveyance Capacity at Field Street, Culver Crescent and Regent Street**

In order to reduce the flood risk downstream of Mallard's Pond to Regent Street (the Culver Crescent area) to acceptable levels, conveyance capacity improvements are recommended. Drawing 8 (at the end of Section 9.1) illustrates Recommended Alternative 5-3.

At the entrance to the stormsewer on Field Street, just downstream of Mallard's Pond, the inlet configuration would be improved to minimize entrance losses and the inlet culvert would be replaced. The existing stormsewer outlet at Culver Crescent would be extended approximately 40 metres, past the houses fronting on Culver Crescent. A shallow swale would be provided along the stormsewer alignment extension to capture local drainage. The swale would be lined with impervious material and grassed to prevent stormwater infiltration along the length of the swale.

At the Regent Street crossing, just downstream of Culver Crescent, the existing twin culverts would be replaced by larger twin box culverts.

This recommended alternative would serve existing development and potential growth areas upstream. The improvements at the entrance to the Field Street stormsewer would provide no net increase in flooding, and the improvements downstream of Culver Crescent would convey design flows with no flooding of homes in that area (a major reduction in floodline elevations would be realized).

### **9.1.3 Recommended Alternative 6-2: Improve Conveyance Capacity at Ida Street and From Regent Street to Highway 17/69 Interchange, No Quantity Control Upstream of Ida Street**

This recommended facility includes provision of seven new culverts in series from the Regent Street crossing, just downstream of Ida Street, through the Highway 17/Highway 69 interchange. Stormwater conveyance would be increased through the system and the flood risk upstream of the Highway 17/69 interchange would be reduced. This facility would service existing development and potential growth areas.

Improvements to address local drainage issues are also recommended. The upsizing of the existing culvert crossing the north end of Ida Street and regrading the existing ditch from the east side of Ida Street to the main channel to promote drainage is recommended. This conveyance improvement should reduce the localized flooding in that area. There is also an existing culvert that drains the backyards of homes on the west side of Ida Street, under the Ethier Sand and Gravel driveway, into the main channel. There is significant backyard flooding every spring that could be reduced by upsizing the culvert, regrading the backyards toward the culvert and providing adequate grade on the culvert to promote drainage into the channel. Local flooding issues would also be reduced.

#### **9.1.4 Recommended Alternative 6-4: On-line Quality Control Facility Upstream of Ida Street (Wet Pond)**

This recommended facility involves the construction of storage on the main channel, just west of Ida Street, as illustrated on Drawing 8. The existing channel would not be altered, but the surrounding lands would be excavated to create the required storage, with a pond footprint of approximately 3 hectares. The main facility would have a permanent pool with a high water level that would be reached during the Regional Storm / 100 Year Return Period Storm. An access road would be provided around the perimeter for maintenance purposes.

A sediment forebay would be located upstream of the main pond and would be constructed with a hard bottom to facilitate maintenance. The existing channel and culvert configurations would provide constant low flow for the passage of fish.

This facility would address stormwater quality management for the entire upstream tributary (existing development and potential growth areas).

#### **9.1.5 Recommended Alternative 7-2: Improve Conveyance Capacity Upstream/ Downstream of Green Avenue, No Storage Provided**

This recommended facility includes improvement of the stormwater conveyance system on one of the main line tributaries from just upstream of Green Avenue through the Brown's Concrete property. The existing culverts would be upsized and channel improvements (incorporating standard erosion / sedimentation control measures) would be completed. The culvert crossing Green Avenue would be installed with enough length to extend past the houses on the east side of the road to reduce existing erosion and safety concerns. Existing localized flooding and channel erosion would be reduced.



The larger culverts would convey the required design flows for the existing developed and the potential growth area.

### **9.1.6 Recommended Alternative 8-2: Improve Conveyance Capacity Downstream of Rockwood, No Storage Provided**

This recommended alternative includes improvement of the conveyance system from just east of Rockwood Drive to just west of Greenvalley Drive. The existing culverts would be upsized and channel improvements (incorporating standard erosion / sedimentation control measures) would be completed. Existing localized drainage issues would be alleviated.

The larger culverts would be sized to convey the required design flows and would service existing development and potential growth areas.

### **9.1.7 Development Dependent Alternatives**

In two drainage catchments, the recommended alternatives are dependent upon development within the specific catchments. Therefore, they are not illustrated on Drawing 6 and are not included in the overall stormwater management plan.

SWM FACILITY #2, Alternative 2-1 is located in the southeast quadrant of the Highway 17 / Municipal Road 80 Interchange. Depending on the amount of the catchment area that is developed, the completion of a Wetland Impact Assessment (WIA) may be necessary to confirm the feasibility of onsite quantity control. If less than 50% of the catchment area is developed, existing storage can be utilized to control peak flows and existing conditions can be maintained.

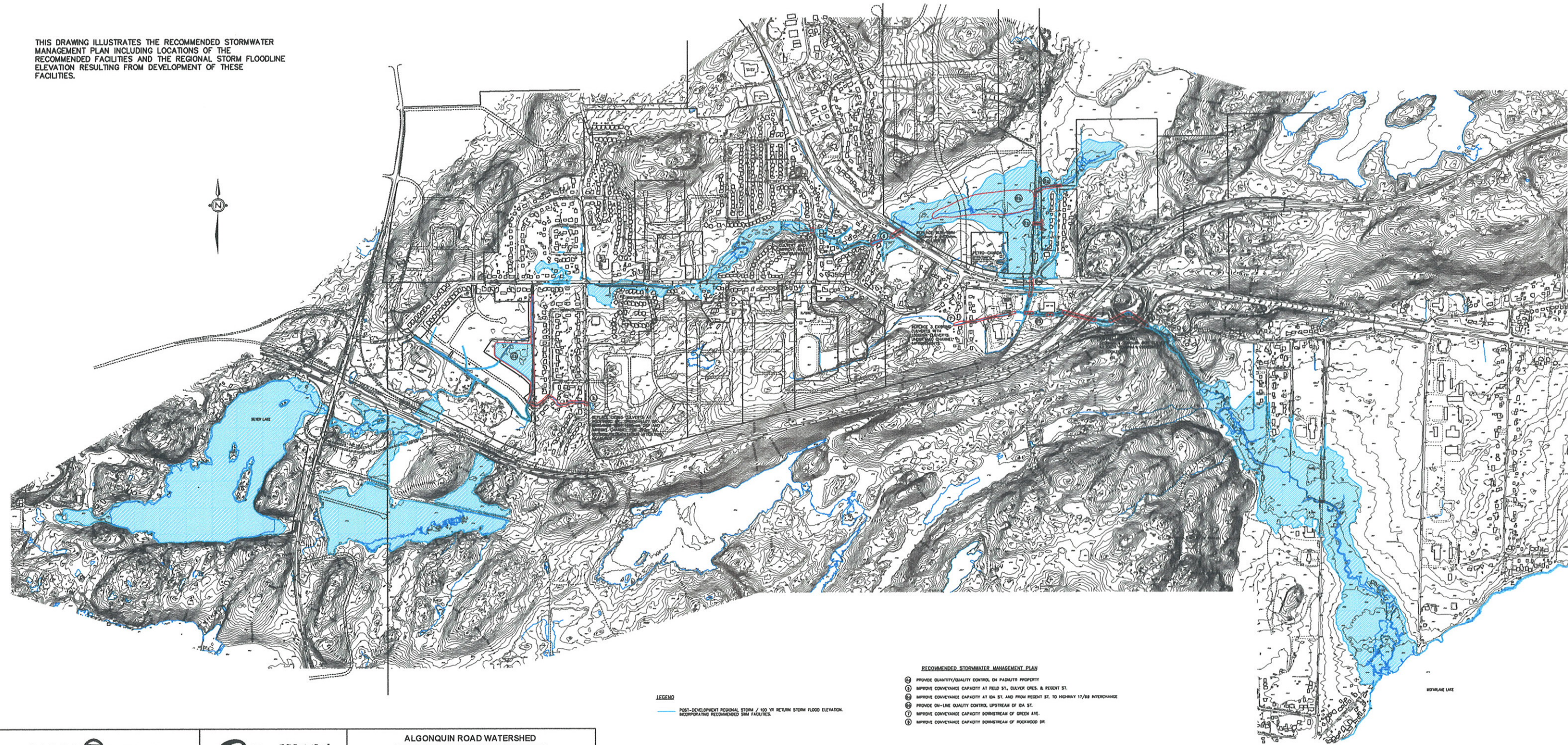
SWM FACILITY #10, Alternative Facility 10-3 is dependent upon development and is located on the site of the future Vintage Green / Mariposa development. The recommended alternative involves construction of a conveyance system to service the site, with the minor storm flows conveyed via stormsewers and the major storm flows conveyed via overland flow routes demonstrated at the detailed design stage. There would be no onsite stormwater quantity or quality control provided.

In general, for new development areas, the stormsewers should be designed to convey the stormwater runoff resulting from the 5-year design storm. The design storm used should therefore be the 6 hour Chicago distribution of the 5 year design storm for Sudbury. For sizing of this stormwater management facility, either the 6 hour Chicago or 24 hour AES distribution (whichever produces the largest volume)

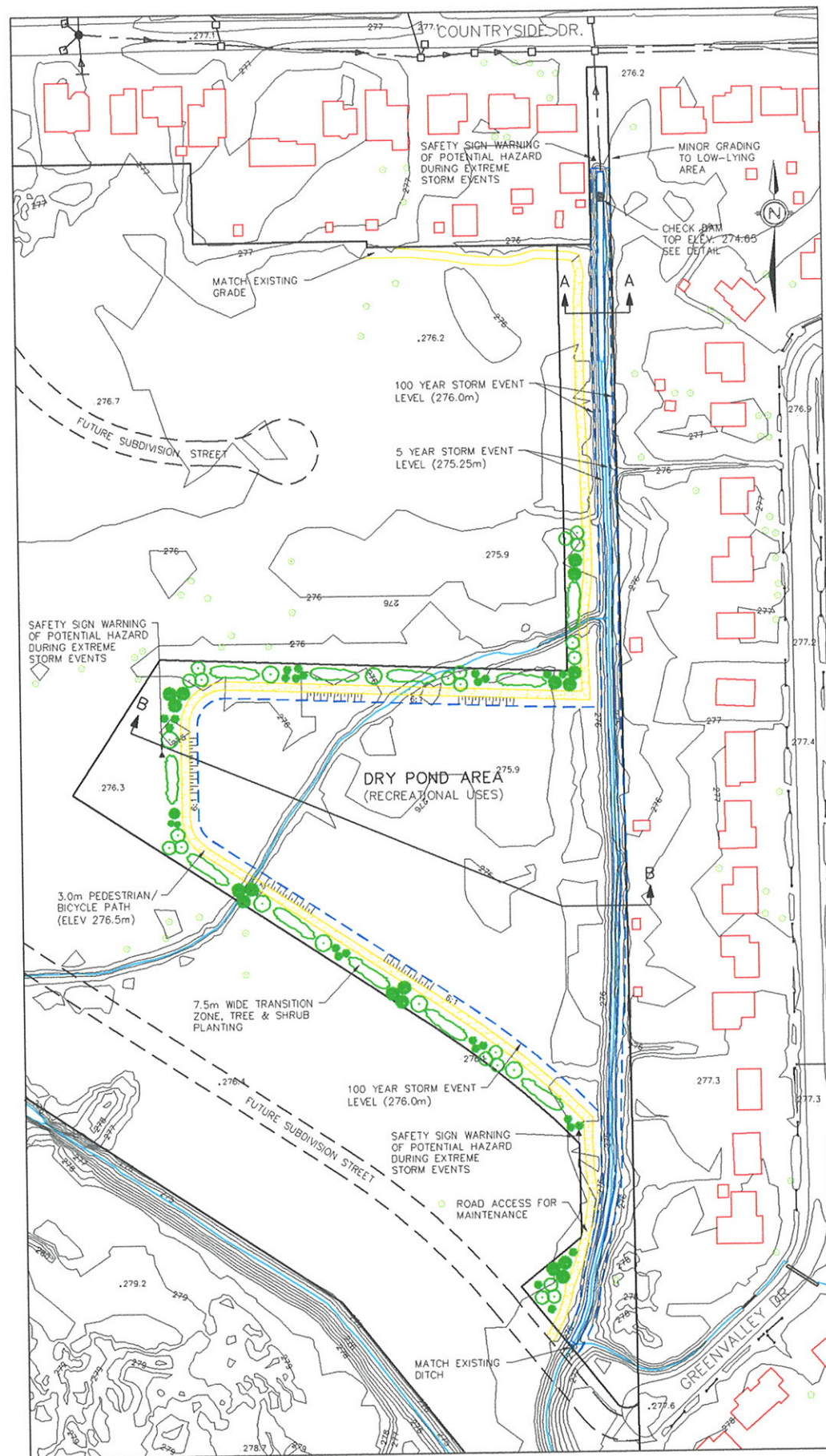
for the specified storm event should be used to determine peak flow control. Typically for small sites, the 6-hour Chicago distribution of the 100-year storm is used for the design of peak flow control.



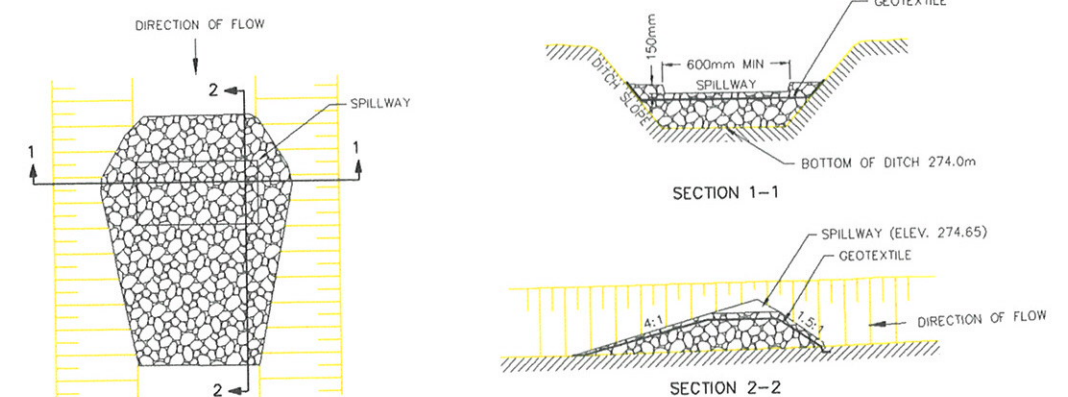
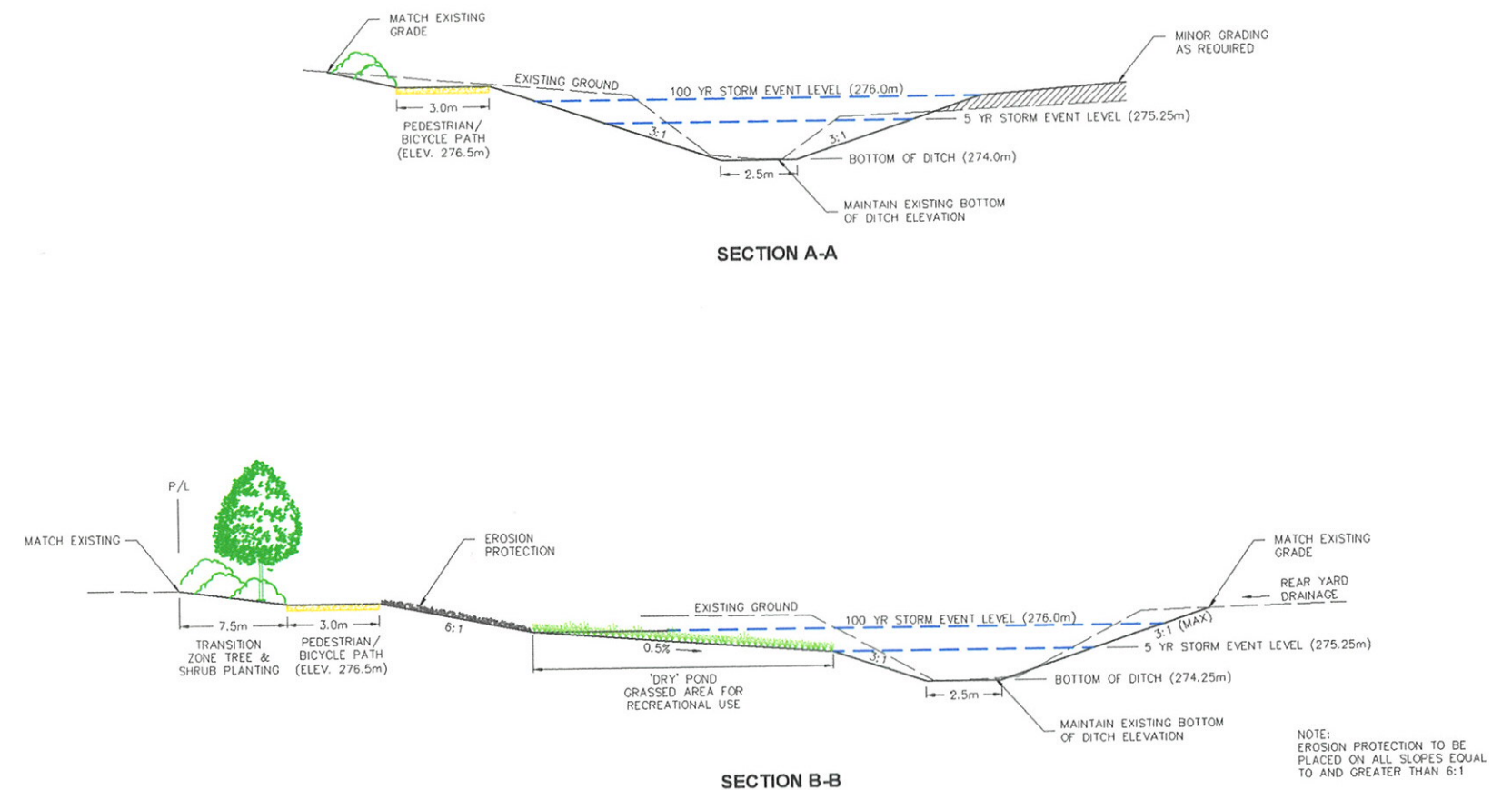
THIS DRAWING ILLUSTRATES THE RECOMMENDED STORMWATER MANAGEMENT PLAN INCLUDING LOCATIONS OF THE RECOMMENDED FACILITIES AND THE REGIONAL STORM FLOODLINE ELEVATION RESULTING FROM DEVELOPMENT OF THESE FACILITIES.





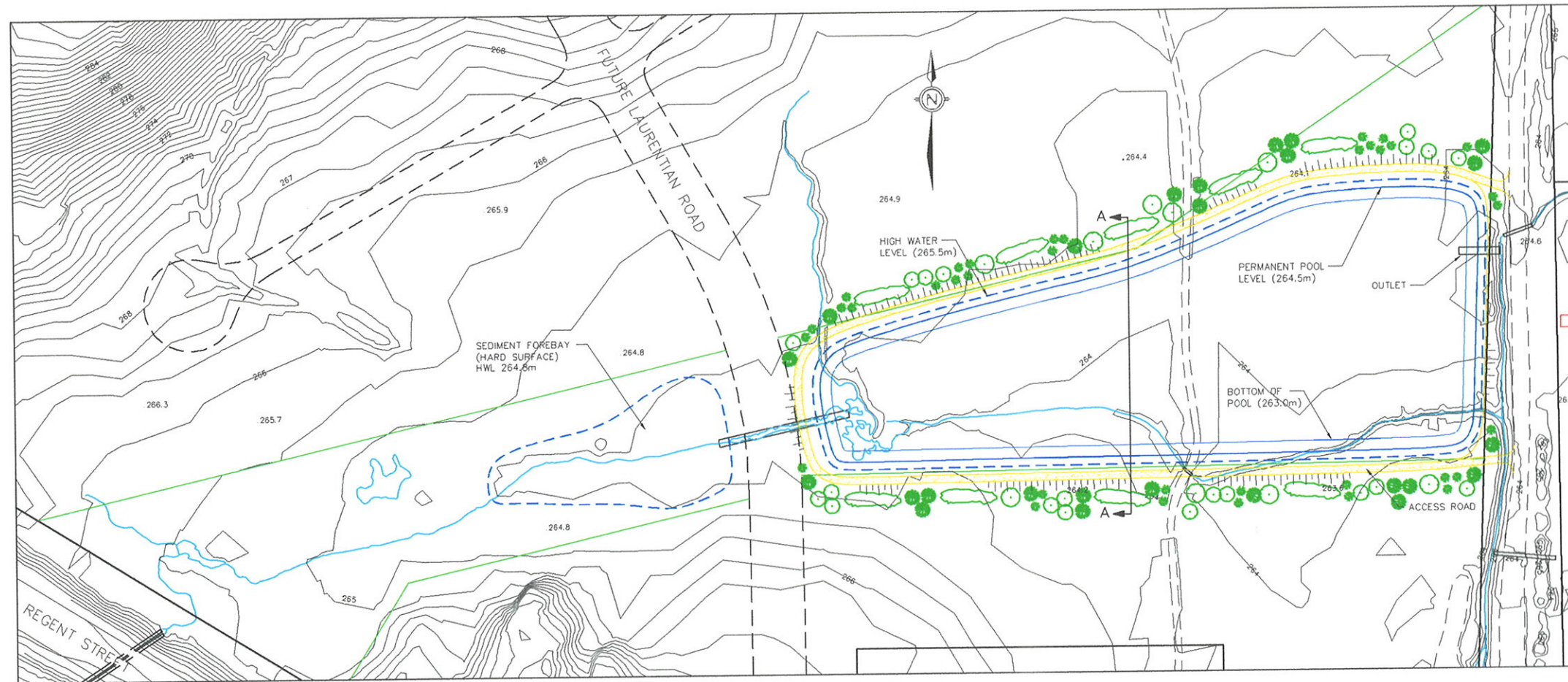


PLAN VIEW



CHECK DAM DETAIL

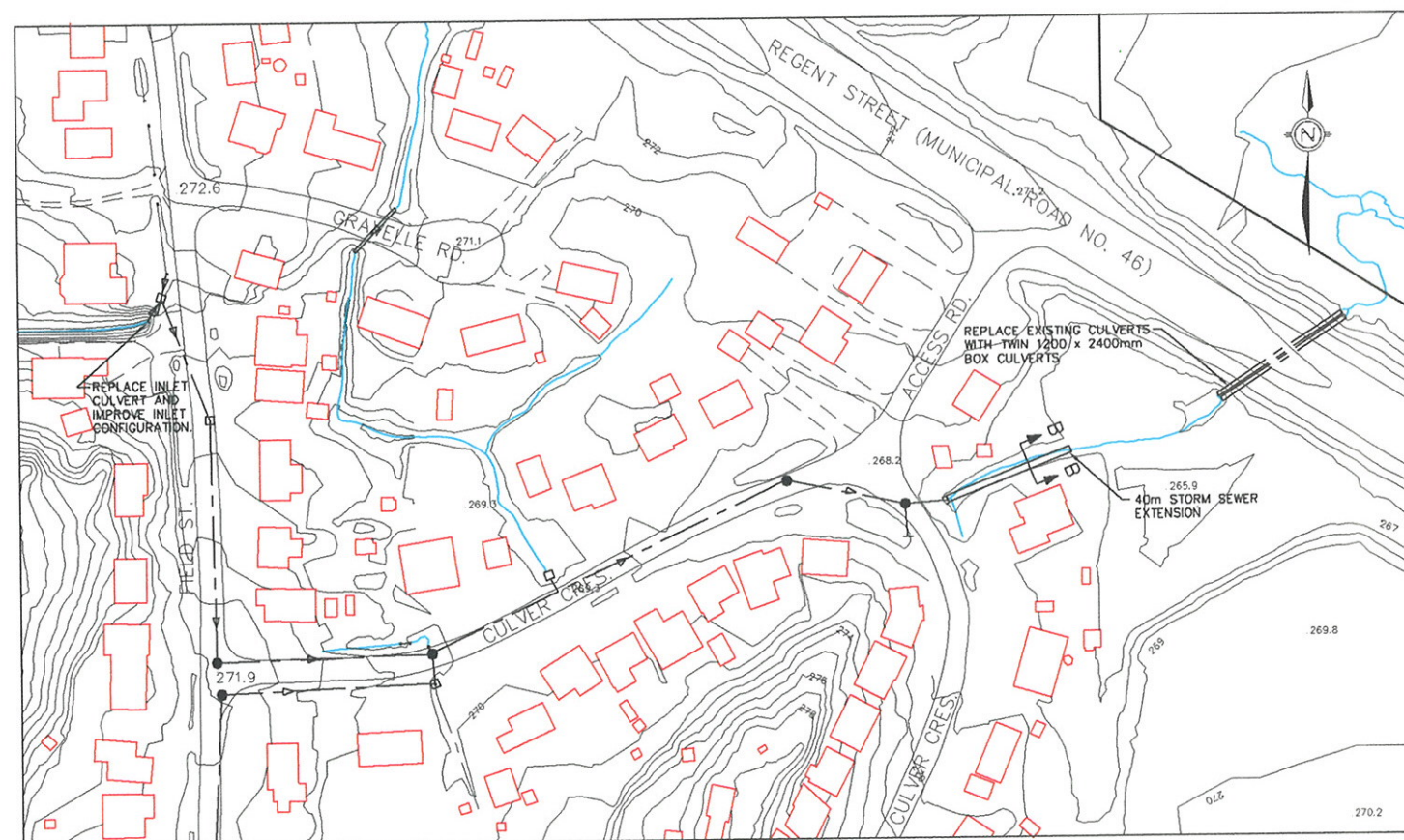




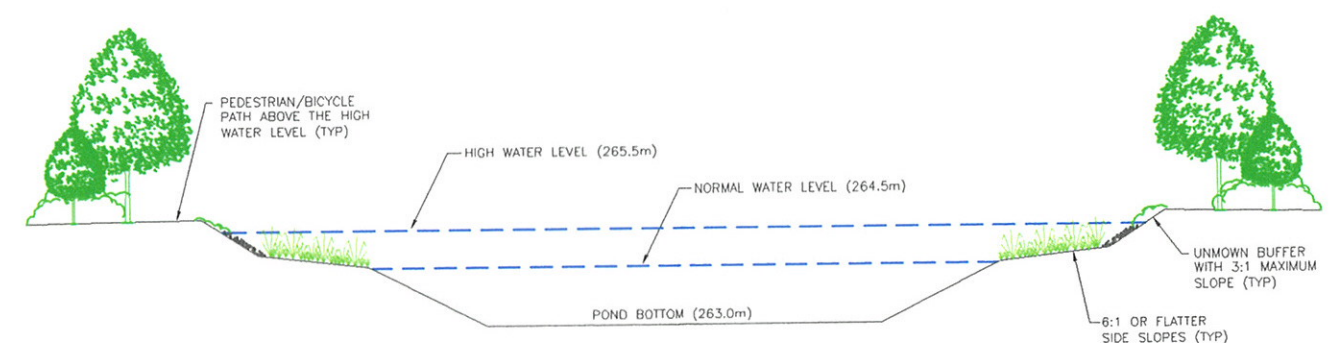
PLAN VIEW SWM 6b

**ON-SITE SWM BEST MANAGEMENT PRACTICES:**

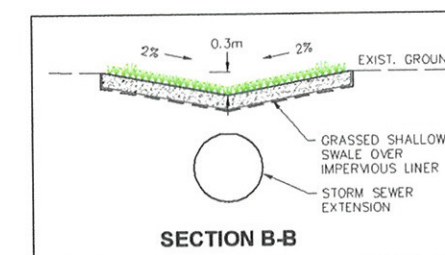
- A) FOR NEW DEVELOPMENTS**
  - INDUSTRIAL / COMMERCIAL:
    - OIL / GRIT SEPARATORS
    - ON-SITE DETENTION
  - RESIDENTIAL:
    - REDUCED LOT GRADING
    - RAIN BARRELS
    - PUBLIC EDUCATION ON USE OF FERTILIZERS & PESTICIDES
- B) FOR EXISTING DEVELOPMENT**
  - RAIN BARRELS
  - PUBLIC EDUCATION ON USE OF FERTILIZERS & PESTICIDES



PLAN VIEW SWM 5



SECTION A-A



SECTION B-B



## 9.2 Estimated Costs

The total estimated capital costs to implement all components of the recommended stormwater management plan is approximately \$4.4 million, with costs for each specific alternative presented in Table 8-1.

### 9.2.1 Cost Sharing Method

As a guiding principle, stormwater management practices are implemented to benefit a development; therefore, related costs (i.e. engineering, capital, operation and maintenance, and land) should be incurred by the development and not the taxpayers in general.

Currently, developers are required to undertake stormwater studies and then implement stormwater management practices. Initial funding must be provided by the developer, and then recovered through the sale of homes or properties.

When the opportunity exists for a stormwater management facility to serve additional upstream lands (either future or existing), cost sharing amongst benefiting parties should be considered.

Cost sharing should be established according to the relative contribution of flow to the facility, generally determined by the total impervious area added by development<sup>6</sup>. The City's portion of the cost for stormwater management facilities benefiting existing areas would come from tax levy.

The City's portion of the cost for SWM facilities benefiting future development areas could also come from the tax levy, but would be recoverable through an assessment on future growth areas.

Recognizing the large up-front costs associated with the construction of stormwater management facilities, it may be prudent for the City to consider the potential benefits of introducing a City-managed fund, which would be funded partially through developer contributions and partially by the tax levy, allowing the upfront financing of all stormwater infrastructure. The fund would be created through voluntary contributions from the development community, based on the number of units serviced. However, pending such an arrangement ever being worked out with the development community, there is no proposed change to the present way of funding.

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<sup>6</sup>Note that "natural" impervious areas onsite (such as rock outcroppings) are not to be considered in this assessment since the stormwater management facilities are not sized or required for these areas.



The City's portion of the cost of future stormwater management practices must currently be drawn from annual department budgets. Stable funding could be achieved through the creation of a stormwater utility or through a dedicated stormwater surcharge, with all existing properties 'taxed' according to the impervious area on the property.

### **9.3 Stormwater Quality Considerations**

Silver Lake is located at the upstream end of the Algonquin Road Watershed, with McFarlane Lake being the downstream receiver. A stormwater quality analysis was completed based on limited sampling during the spring of 2003. Figures 9-1 to 9-4 summarize the findings of the sampling events with a discussion of the results included below. Drawing 3 illustrates the sample locations.

At the upstream end of the drainage system, the discharge from Silver Lake is relatively low in nutrients and suspended solids and exhibits a low pH. The water chemistry is typical of the more dilute, poorly buffered lakes of the Precambrian shield. Historically, the pH of Silver Lake was depressed from acidic precipitation. Although the upstream area has shown recovery from the low pH levels, the lake is still considered to be fishless.

As the stormwater moves downstream through the system, there is a trend toward increasing concentrations of selected constituents in the downstream watercourse, including higher nutrients, pH, metals concentration, and dissolved and suspended solids. The increase in the concentration of chemical variables is attributable to urban runoff and winter storage of salt/sand from roadways.

Mallard's Pond is located part way through the drainage system. From a water quality perspective, Mallard's Pond is an important stormwater management facility in the watershed. The pond contains a fish population that could be impacted by low dissolved oxygen, particularly during periods of ice cover. The marsh environment upstream of Mallard's Pond and the pond are important for the control of sediments and nutrients from the developed upstream area of the watershed.

The Algonquin Road Watershed terminates at McFarlane Lake. The lake is a major urban lake with permanent development encompassing most of the shoreline. The lakefront lots are not serviced and the majority of residents utilize the lake as a drinking water source. The lake is relatively enriched with nutrients and has been identified as an urban lake that could be deteriorated by additional nutrient inputs. The water quality of McFarlane Lake is affected by high concentrations of phosphorus and the lake is susceptible to algal blooms and growths of aquatic weeds, including dense beds of Eurasian milfoil. Control of nutrients and sediment loading, therefore, is an important consideration for the Algonquin

Road watershed. Although the watershed only represents one part of the McFarlane Lake drainage basin, the contribution of nutrients and sediment from the developed portion of the watershed can be significant.

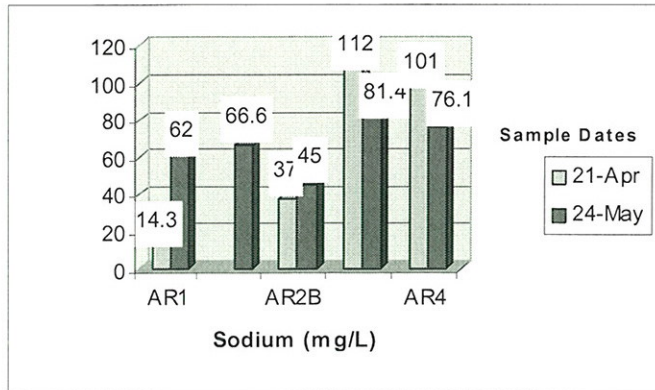


Figure 9-1: Pre-Development Concentrations of Sodium in Stormwater

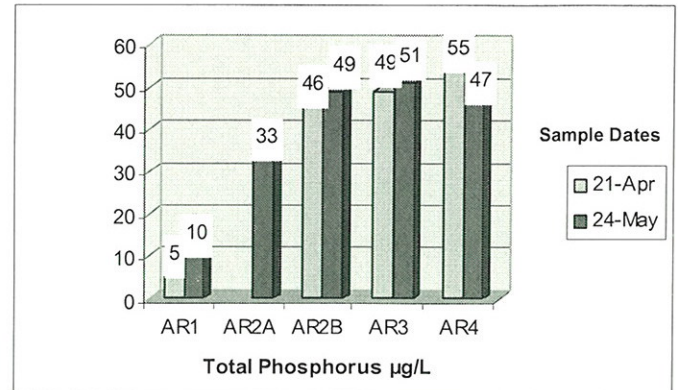


Figure 9-2: Pre-Development Concentrations of Phosphorus in Stormwater

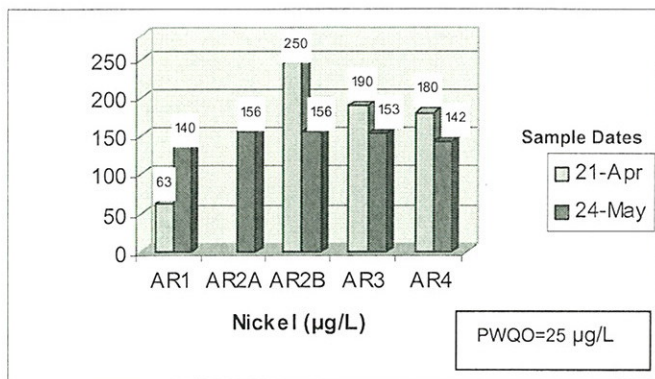


Figure 9-3: Pre-Development Concentrations of Nickel in Stormwater

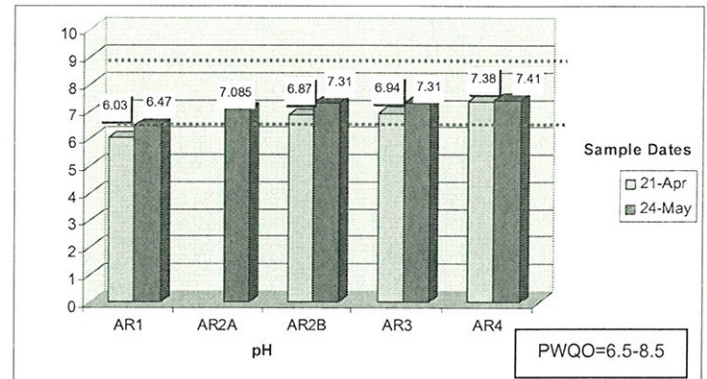


Figure 9-4: Pre-Development pH Levels in Stormwater

#### Legend

AR1 – Silver Lake Outlet  
AR2A – Upstream End of Mallards Pond  
AR2B – Mallards Pond Outlet

AR3 – Highway 69 Bypass Culvert  
AR4 – CKSO Road  
PWQO – Provincial Water Quality Objectives

Sample Dates: April 21 and May 24, 2003



### 9.3.1 Recommended Stormwater Management Quality Control Facilities

An objective of no net impact of future development on stormwater quality was set as a minimum for this study, with an added benefit of stormwater quality improvement. The recommended stormwater management plan for the Algonquin Road Watershed includes engineered systems to allow for stormwater quality treatment at two key locations:

- Stormwater Management Facility 4(a) at Countryside Drive, and
- Stormwater Management Facility 6(b) west of Ida Street.

These facilities will address existing developed and potential growth areas within the watershed.

Mallard's Pond also provides some stormwater quality control, however it was not evaluated in detail during this study. The removal rates associated with Mallard's Pond are based on the assumption that the pond was designed and built according to accepted stormwater management practices. There are also other existing natural storage areas that provide some quality control that were not quantified for this analysis.

Table 9-1 summarizes the characteristics of the upstream watersheds contributing to the recommended stormwater quality control facilities. Table 9-2 summarizes the net impacts of the recommended quality control facilities.

According to Table 9-2, the net benefit of implementing the recommended quality control facilities based on sediment loading is a 22% reduction in sediment reaching the McFarlane Lake outlet from pre-development (existing) conditions. The placement of stormwater management facilities enables the treatment of 77% of the total impervious areas in the watershed under post development conditions.

Phosphorus concentrations in urban runoff can often range to relatively high values. Average values reported in a review of a large number of urban runoff studies were 0.315 mg/L. The levels reported for the Algonquin Road watershed (based on limited sampling in 2003, see Figure 9-3) are considerably lower at 0.047 mg/L (excluding values at the outlet of Silver Lake). Treatment being considered for the Algonquin Road drainage basin is considered effective in removing greater than 40% of the phosphorus in storm runoff. That will represent an overall reduction of nutrients to McFarlane Lake the order of 30%.

Table 9-1: Recommended Stormwater Quality Control Facilities  
Watershed Characteristics

Facility	Location	Type	Pre-Development Watershed Characteristics				Post Development Watershed Characteristics			
			Total Upstream Catchment Area (ha)	Developed Area as % of Total Area	Total Area Developed (ha)	Total Upstream Impervious Area (ha) <sup>1</sup>	Total Upstream Catchment Area (ha)	Developed Area as % of Total Area	Total Area Developed (ha)	Total Upstream Impervious Area (ha) <sup>1</sup>
Stormwater Management Facility #4(a)	Pagnutti Development Site Countryside Drive	Channel/pond (wet/dry facility)	223	10.7	23.8	11.9	223	28.2	63.0	31.5
Mallard's Pond (existing) <sup>3</sup>	South of Mallard's Landing Development	In-line pond (wet facility) and marsh area	309	22.1	68.2	34.1	309	37.7	116.4	58.2
Stormwater Management Facility #6(b)	Ethier property north of Regent Street, west of Ida Street	In-line pond (wet/dry facility)	487	20.3	98.9	49.4	487	42.3	206.2	103.1
Outlet to McFarlane Lake <sup>4</sup>	Downstream end of system		854	16.6	142.2	71.1	854	31	268.9	134.5

<sup>1</sup> Assumes 50% of developed area as impervious.  
<sup>2</sup> Without quality control.  
<sup>3</sup> Net benefit not calculated but does provide some stormwater quality control.  
<sup>4</sup> Not a facility, incorporated for comparison purposes.



Table 9-2: Recommended Stormwater Management Quality Control Facilities  
Net Impacts

Facility	Pre-Development Conditions				Post-Development Conditions			
	Net Upstream Impervious Area (ha)	Sediment Loading from Upstream Impervious Area <sup>1</sup>	SWM Facility Sediment Removal (70% efficiency)	Net Sediment Loading <sup>2</sup>	Net Upstream Impervious Area (ha)	Sediment Loading from Upstream Impervious Area <sup>1</sup>	SWM Facility Sediment Removal (70% efficiency)	Net Sediment Loading <sup>2</sup>
Stormwater Management Facility #4(a) – Pagnutti Development Site	11.9	27,370	0	27,370	31.5	72,450	50,715	21,735
Mallard’s Pond (existing) <sup>3</sup>	22.2	78,430	0	78,430	27.0			
Stormwater Management Facility #6(b) – Ida Street	15.3	-	0	-	44.0			
Outlet to McFarlane Lake <sup>4</sup>	21.5	-	N/A	-	30.0			
<b>TOTAL</b>	70.9	105,800	0	105,800	132.5	72,450	50,715	21,735

<sup>1</sup> 2,300kg/ha per MOE Table 6-3 plus net sediment loading from upstream facility

<sup>2</sup> Sediment Loading from Upstream Impervious Area minus Previous SWM Facility Sediment Removal

<sup>3</sup> Net benefit not calculated but does provide some stormwater quality control. With the assumption that the pond was designed/built according to accepted stormwater management practices, sediment removal numbers were calculated.

<sup>4</sup> Not a facility, incorporated for comparison purposes.

### **9.3.2 Removal of Sand and Debris from Winter Maintenance Operations**

Each spring, the City of Sudbury completes a street sweeping and vacuuming program over a three week time period. The estimated sediment removed from the Algonquin Road Watershed through this program is 150,000 kg over 10 km of road (curb and gutter road only). Without this program in place, a large percentage of that material would otherwise find its way into the drainage courses as suspended solids and sodium chloride and subsequently, be carried as suspended solids and/or the sediment bed load (re-suspended) towards and into McFarlane Lake. The City's road clean-up program appears to be an effective first line of watershed protection.

Another important part of the annual maintenance program is the cleaning of stormsewer catchbasins. Sediment trapped in the catchbasins is removed from the drainage system and prevented from contributing nutrients and suspended solids that otherwise would gain access to the watercourse. Additionally, catchbasins will only function as designed to remove sediment when they are cleaned. As the sediment load builds up, the efficiency of removal declines.

The required maintenance frequency of the stormwater management facilities would increase without the street sweeping program.

### **9.4 Summary of the Potential Impacts and Mitigating Measures Associated with the Recommended Stormwater Management Plan**

Based on the evaluation of potential impacts, the Algonquin Road Stormwater Management Study is not expected to result in any significant environmental impacts. However, the following identifies the potential adverse impacts associated with implementing the recommended stormwater management plan, along with the various mitigative measures developed during the course of the study in order to minimize and / or eliminate these adverse impacts.

Impacts related to construction will be short-term and minor. By incorporating proper best management practices / construction techniques and controls, these impacts can be minimized. Anticipated construction related impacts are summarized below along with the associated mitigating measures. It is recommended that these mitigating measures be employed to reduce the potential impacts during the construction of the proposed works.



### 9.4.1 Natural Environment Considerations

#### Erosion/Sedimentation and Impacts to Water Resources

The proposed construction activities will include in-stream works, however the in-stream works at these locations will not result in a harmful alteration, disruption or destruction (HADD) of fish habitat, according to Section 35 (2) of the federal *Fisheries Act*. Consultation with the Nickel District Conservation Authority (NDCA) at the detailed design phase will confirm whether a formal Fisheries Act Authorization is required. As well, the NDCA will require consultation at the detailed design phase to determine if an Ontario Ministry of Natural Resources work permit is required.

While there will be no HADD of fish habitat associated with this project, the in-water construction activities have the potential to result in soil disturbances that allow for the possibility of short-term construction related impacts on fish habitat within the main channel. However, since the possibility of adverse impacts from uncontrolled erosion and sedimentation is recognized, the implementation and maintenance of the appropriate mitigation measures for sediment and erosion control and watercourse/fisheries protection prior to the commencement of construction and during construction will eliminate or minimize these potential impacts.

Areas of highly erodible soils (associated with locations where there is a high potential for sediment discharge to sensitive areas, such as watercourses) will be identified and investigated. An understanding of the local site conditions will then be integrated with the following protection principles to develop an erosion and sediment control plan for the project:

- Apply timing restrictions for work.
- Minimize soil exposure duration.
- Retain existing vegetation, where feasible to minimize erosion and sedimentation.
- Divert runoff away from exposed soil.
- Keep runoff velocities low.
- Trap sediment as close to the source as possible.
- As a general precaution, construction activities requiring in-stream works should only be permitted during the warm water timing window, which prohibits in-stream work between April 1 and June 30.
- As required, a light duty silt fence barrier is required (MTO, Ontario Provincial Standard Drawing (OPSD) 219.110) adjacent to construction areas to prevent runoff from migrating toward any open water within the study area. This fencing is to be in place prior to the start of construction. Excess

silt fence and straw bales are to be maintained on site prior to commencement of construction and throughout the duration of the project.

- As required, temporary rock flow checks (OPSD 219.210) or silt fence flow checks (OPSD 219.190) are to be installed along all toes-of-slope and within all ditches leading to the main channel in order to slow surface water flow velocities, reduce erosive forces and trap suspended particles.
- As required, all excavated materials requiring stockpiling shall be placed in pre-determined locations, as specified in the contract. The perimeters of stockpiles are to be encircled with light duty silt fence barriers according to OPSD 219.110.
- As required, excess silt fence, straw bales and/or rip-rap are to be maintained on site, prior to the commencement of construction operations and throughout the duration of construction, in case of an emergency.
- The integrity of all sediment trapping devices should be monitored regularly (weekly and following rain events) and properly maintained. Such structures should be removed only after the soils of construction areas have been stabilized and then only after the trapped sediments have been removed.
- In addition to the above, standard wetland mitigation measures include: light duty silt fence barriers (OPSD 219.110) adjacent to marsh communities; and light duty silt fence barriers and/or barrier for tree protection (OPSD 220.01) adjacent to swamp communities.
- Long-term erosion/sedimentation control measures on channels that have existing or potential for erosion issues.
- All exposed surfaces susceptible to erosion shall be revegetated through the placement of seeding, mulching or sodding immediately upon completion of construction activities, or as soon as possible after exposure, with sufficient time to allow for successful establishment prior to winter.
- Ensure watercourses with existing or potential for fish habitat allow for fish passing.
- The erosion and sediment control plan will ensure that grading, drainage, and structural operations during construction prevent sedimentation of sensitive areas. The plan will also, at a minimum, be consistent with the recommendations contained within the MOE "Guidelines for Evaluation Activities Impacting on Watercourses". Practices described in "Guidelines on Erosion and Sediment Control for Urban Construction Sites" (MNR, May 1987) and "Technical Guidelines for Erosion and Sediment Control" (MNR, February 1989) will be followed.



## Impacts to Terrestrial Resources

- Removal of large trees or large stands of trees will be avoided.
- All trees to be saved shall be clearly marked.
- Trees that must be removed should be replaced after construction and clean up.
- Contamination of soils through spills and leaks can be avoided by ensuring that fuel storage, refueling and maintenance of construction equipment are handled properly and not allowed in or adjacent to watercourses/bodies.
- Spill containment plans must be prepared before projects begin for the control and clean up of a spill if one should occur.

### 9.4.2 Social/Cultural Considerations

#### Archaeology

- Complete a Stage I assessment during detailed design phase to determine if there are any archaeological concerns at the specific stormwater management facility locations. Subsequent mitigation programs will be defined at the detailed design phase of the project, prior to implementation of the Recommended Stormwater Management Plan.
- If any archaeological and/or historical resources are discovered during the performance of construction work, the performance of work in the area is to halt. The Ministry of Culture (Archaeological Unit) will be notified for an assessment of the discovery. Work in the area of the discovery would not resume until cleared to do so by the Ministry.

#### Short-Term Construction Impacts

- During the course of construction, traffic will be temporarily disrupted along area roads. The following measures will be employed to ensure that impacts are eliminated or minimized:
  - Construction Traffic Management Plan-Advanced Notification Signage
  - Access to properties at all times
  - Temporary access will be made available to residents if the access is severed for an extended period of time.
  - In addition to newspaper notice, affected property owners will be individually notified in advance regarding construction schedule/duration.

- Construction operations will be restricted to the day shift (wherever possible). In addition, the contractor will be required to comply with local noise by-laws.
- Maintain equipment in proper working order and operating condition that prevents unnecessary noise.
- No excessive idling of equipment.
- Dust control by spraying water, street sweeping.
- The construction will be completed in accordance with MOE guidelines.

### Other Measures

In addition, the provision of an experienced field representative to review construction will ensure that the project follows contract specifications and does not unnecessarily impact vegetation, the community, or the aquatic environment. Furthermore, contract tender documents will address mitigative measures in an explicit manner and ensure that compliance is maintained.

## 9.5 Implementation of the Recommended Stormwater Management Plan

There are a number of steps or phases associated with implementing the recommended stormwater management plan. These steps or phases are summarized in the following sub-sections.

### 9.5.1 Notification of Completion

Since this study is being undertaken in accordance with the Municipal Class EA planning process, the first step of implementing the study involves issuing a “Notice of Completion” and filing the Master Plan Document for review. In terms of this first implementation step, a letter was mailed on [REDACTED], 2004 to each of the previously contacted individuals on the study mailing list who wished to be further involved in the project. The letter notified them of the study’s completion, including the recommended solution and their rights regarding the Part II Order provisions. Appendix B contains a copy of the letter and list of the recipients.

In addition to letter notification, the general public in the study area was informed of the notice of completion through an advertisement in the Sudbury Star on [REDACTED], 2004 and [REDACTED], 2004. A copy of the advertisement submitted for publication is contained in Appendix B.



### **9.5.2 Construction of the Recommended Stormwater Management Plan**

Following the end of the thirty-calendar day review period for this Master Plan Document, if there are no outstanding Part II Order Requests, the City may proceed to detail design and construction. The design would form the basis of tenders for obtaining bids for construction.

Although the overall stormwater management plan was developed as a watershed plan, several of the recommended stormwater management facilities relate to localized issues that occur on a yearly, if not more frequent, basis. The facilities are generally smaller and less expensive than the facilities that are intended to service larger areas, controlling to larger storm events. There are also a few facilities that are based on development occurring, for which construction could be timed accordingly.

The following table outlines the recommended construction schedule for the recommended stormwater management facilities.

**Table 9-3: Stormwater Management Facility Construction Schedule**

Facility	Description	Primary Stormwater Issues	Construction Timing Justification	Priority Number
<b>Stormwater Management Facility #2, Alternative 2-1</b> <ul style="list-style-type: none"> <li>Provide On-site Quantity Control Upstream of Highway 17.</li> </ul>	<ul style="list-style-type: none"> <li>If more than 50% of the catchment area is developed, then undertake a Wetland Impact Assessment (WIA). The WIA will determine if on-site quantity control is feasible within the catchment area.</li> <li>If feasible, then create an on-site storage facility for quantity control.</li> </ul>	<ul style="list-style-type: none"> <li>Quantity control for potential growth area</li> </ul>	<ul style="list-style-type: none"> <li>When development occurs, if required by WIA.</li> </ul>	4
<b>Stormwater Management Facility #4, Alternative 4-3</b> <ul style="list-style-type: none"> <li>Provide Quantity and Quality Control on Pagnutti Property and in Channel</li> </ul>	<ul style="list-style-type: none"> <li>Construct 9600 m<sup>3</sup> of storage within the dedicated SWM block and adjacent channel, addressing all upstream development (including the Pagnutti property).</li> <li>A portion of the SWM facility would be dry (normally open space) and used (filled) only during significant rainfall events.</li> <li>Construct a berm with low flow outlet for extended detention in the channel. Provide access for the removal of sediment from the channel bottom</li> <li>The two storage facilities would perform in parallel to control peak flows.</li> </ul>	<ul style="list-style-type: none"> <li>Existing flood risk.</li> <li>Quantity and quality control for existing development and potential growth areas.</li> </ul>	<ul style="list-style-type: none"> <li>Prior to development.</li> <li>Some existing issues.</li> </ul>	1
<b>Stormwater Management Facility #5, Alternative 5-3</b> <ul style="list-style-type: none"> <li>Provide No Quantity Control at Mallards Pond</li> <li>Improve Conveyance Capacity at Field St, Culver Cr. and Regent St.</li> </ul>	<ul style="list-style-type: none"> <li>Replace the inlet culvert at Field Street and improve the inlet configuration to minimize entrance losses.</li> <li>Extend the existing stormsewer outlet at Culver Crescent and improve downstream channel.</li> <li>Replace the existing twin culverts with larger twin box culverts at Regent Street crossing (at the end of Culver Crescent).</li> </ul>	<ul style="list-style-type: none"> <li>Existing localized flood risk.</li> <li>Existing, flooding issues.</li> </ul>	<ul style="list-style-type: none"> <li>As soon as possible.</li> <li>Will address local issues without significant impacts downstream.</li> </ul>	1
<b>Stormwater Management Facility #6, Alternative 6-2</b> <ul style="list-style-type: none"> <li>Improve the Conveyance System at Ida Street and between Regent Street and the Highway 17/69 Interchange.</li> <li>Do not provide Quantity Control Upstream of Ida Street.</li> <li>Improve the Conveyance System at Ida Street (localized).</li> </ul>	<b>Phase 1:</b> <ul style="list-style-type: none"> <li>Upsize the existing culvert crossing the north end of Ida Street and regrade channel to promote drainage from Ida Street to the main channel.</li> <li>Upsize the existing culvert draining the backyards of Ida Street homes (west side) and regrade backyards to promote drainage toward the culvert.</li> </ul>	<ul style="list-style-type: none"> <li>Existing flooding problems.</li> </ul>	<ul style="list-style-type: none"> <li>As soon as possible.</li> <li>Will address local issues without significant impacts downstream.</li> </ul>	1
<b>Stormwater Management Facility #6, Alternative 6-2</b> <ul style="list-style-type: none"> <li>Improve the Conveyance System at Ida Street and between Regent Street and the Highway 17/69 Interchange.</li> <li>Do not provide Quantity Control Upstream of Ida Street.</li> <li>Improve the Conveyance System at Ida Street (localized).</li> </ul>	<b>Phase II:</b> <ul style="list-style-type: none"> <li>Provide 7 new culverts in series from Regent St. to the Highway 17/69 Interchange.</li> </ul>	<ul style="list-style-type: none"> <li>Existing flood risk.</li> </ul>	<ul style="list-style-type: none"> <li>Will reduce flood risk.</li> </ul>	2



Table 9-3: Stormwater Management Facility Construction Schedule

Facility	Description	Primary Stormwater Issues	Construction Timing Justification	Priority Number
<b>Stormwater Management Facility #6, Alternative 6-4<sup>1</sup></b> <ul style="list-style-type: none"> <li>Online Quality Control Facility Upstream of Ida Street (Wet Pond)</li> </ul>	<ul style="list-style-type: none"> <li>Construct storage on main channel in low-lying area upstream of Ida Street</li> <li>The channel and surrounding lands would be excavated to create required storage.</li> <li>The footprint of the pond would be approximately 3 hectares.</li> </ul>	<ul style="list-style-type: none"> <li>Quality control for existing development and potential growth areas.</li> </ul>	<ul style="list-style-type: none"> <li>Provides quality control and protects downstream receiver.</li> </ul>	2
<b>Stormwater Management Facility #7, Alternative 7-2</b> <ul style="list-style-type: none"> <li>Improve conveyance system upstream and downstream of Green Avenue.</li> <li>Do not provide storage.</li> </ul>	<ul style="list-style-type: none"> <li>Replace the existing Green Avenue culvert with a new 1500 mm culvert and extend it past the houses on east side of road</li> <li>Provide 2 additional 1500 mm culverts</li> <li>Undertake channel improvements from just upstream of Green Avenue through Brown's Concrete property.</li> </ul>	<ul style="list-style-type: none"> <li>Existing flooding problems.</li> <li>Existing erosion in channel.</li> </ul>	<ul style="list-style-type: none"> <li>As soon as possible.</li> <li>Will reduce problems in local area without significant impacts downstream.</li> </ul>	1
<b>Stormwater Management Facility 8-2</b> <ul style="list-style-type: none"> <li>Improve conveyance capacity downstream of Rockwood.</li> <li>No storage provided</li> </ul>	<ul style="list-style-type: none"> <li>Increase size of existing Rockwood, Greenvalley and driveway culverts to 1200 mm.</li> <li>Improve existing channel for 260 m downstream from Rockwood culvert to confluence with main ditch downstream of Greenvalley via erosion/ sedimentation mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>Existing flooding problems.</li> <li>Existing erosion in channel.</li> </ul>	<ul style="list-style-type: none"> <li>As soon as possible.</li> <li>Will reduce problems in local area without significant impacts downstream.</li> </ul>	1
<b>Stormwater Management Facility 10-3</b> <ul style="list-style-type: none"> <li>No Storage On Site.</li> <li>Construct conveyance system to service the development site.</li> </ul>	<ul style="list-style-type: none"> <li>Construct storm sewers and drainage ditches extending from subdivision to Algonquin Road.</li> </ul>	<ul style="list-style-type: none"> <li>Quantity control for potential growth area</li> </ul>	<ul style="list-style-type: none"> <li>When development occurs.</li> </ul>	4

<sup>1</sup>The construction of Stormwater Management Facility 6-4 could be staged according to amount of upstream development (i.e. construct volume for existing development, then add additional pools as development occurs).

## **9.6 Monitoring**

### **9.6.1 Construction Monitoring Program**

As a condition of the construction contract, the mitigative measures associated with short-term construction related impacts will be monitored and maintained throughout the construction phase of the project to ensure that:

- Individual mitigating measures are providing the expected control and/or protection continuously throughout the construction period;
- The mitigating measures are adequate to minimize or eliminate adverse impacts;
- Additional mitigating measures are provided if required to address any unanticipated environmental impacts which arise during construction; and
- Adequate information is available for the assessment of the mitigative measures.

The frequency of the monitoring program varies depending upon the specifics of the required mitigative measure, and will be undertaken accordingly.

Environmental monitoring will include periodic site visits by the City or its representative throughout the course of the construction to administer the environmental control aspects of the contract and ensure their application and effectiveness. The City will review the effectiveness of the mitigative measures and the monitoring process with the Contractor to ensure the design drawings and contract documents are fully complied with and the environment is adequately protected against the potential adverse impacts associated with the proposed project.

### **9.6.2 Post Construction Monitoring and Maintenance Program**

It is recommended that the City review this Stormwater Management Plan within five years to determine the need for a detailed formal review and/or updating. Potential changes that may trigger the need for a detailed review include:

- Major changes to original assumptions;
- Major changes to components of the Master Plan;
- Significant new environmental impacts; or
- Major changes in proposed timing of projects within the Master Plan.

Monitoring and maintenance of the specific facilities will be outlined during the detailed design phase.



The recommended stormwater management plan addresses long-term quantity control at key locations along the main channel and its tributaries. There is potential for temporary obstruction of the waterways (i.e. beaver dams), especially in the rural areas of the watershed. The City must monitor the condition of the main channel and maintain unobstructed flow paths at all times.

## **10. SUMMARY**

This Class EA Master Plan Report satisfies the Class EA process required to ensure that the proposed Algonquin Road Watershed Stormwater Management project meets the requirements of the Environmental Assessment Act. The Class Environmental Assessment process requires initial screening for a project of this type. The initial screening has not identified any significant environmental concerns that cannot be addressed by incorporating established mitigative measures during construction.

The recommended stormwater management plan resolves the problem statement identified in this report. A preliminary evaluation of potential impacts was included in the screening, and indicates only minor and predictable impacts, which are addressed by recommended mitigative measures presented in Section 9.

Public notification and opportunity for comment was provided and no comments were received that cannot be adequately addressed. As a result, this project is considered to meet the requirements of the Environmental Assessment Act.



## Appendix A

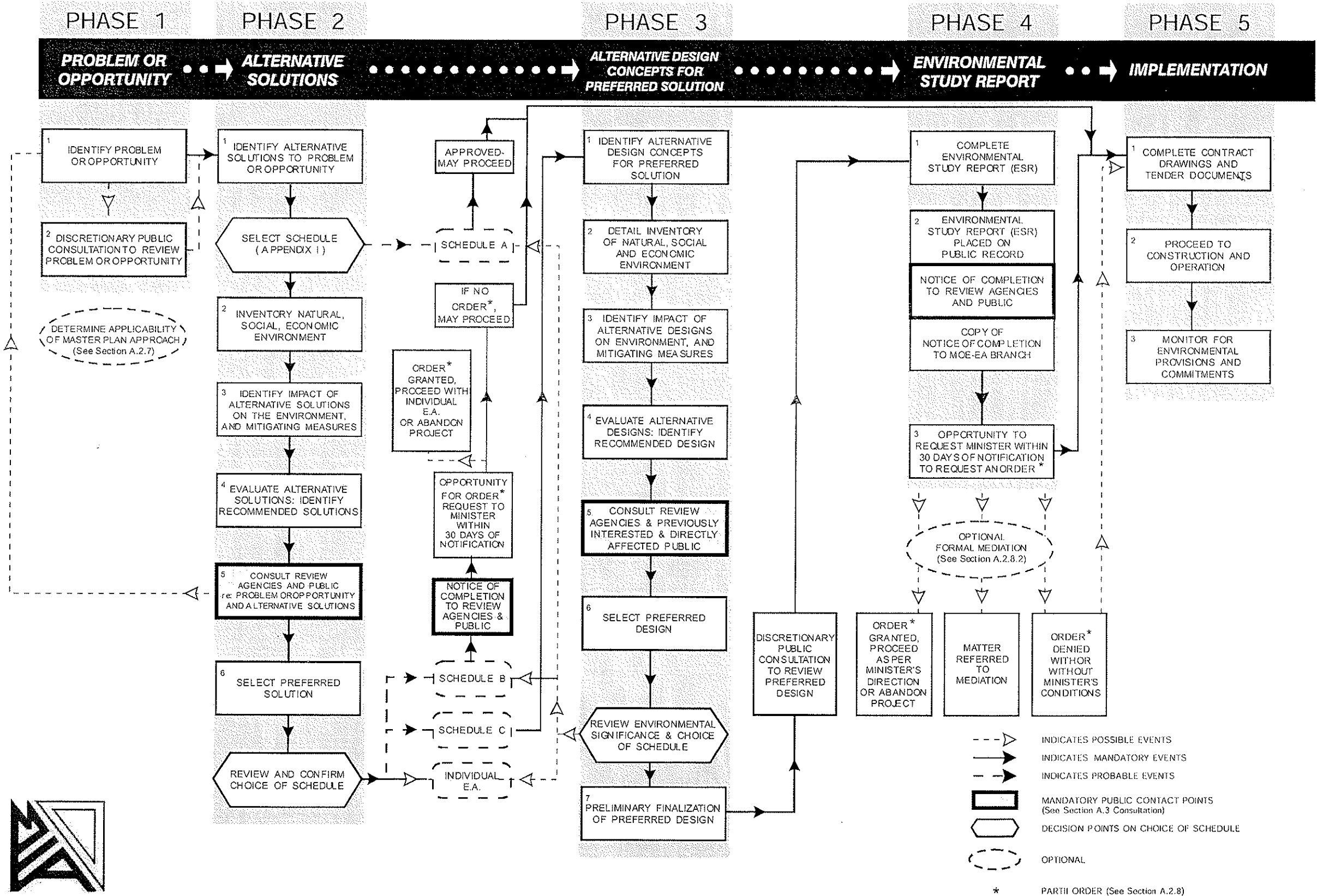
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# MEA Municipal Class Environmental Assessment Planning Process



# MUNICIPAL CLASS EA PLANNING AND DESIGN PROCESS

*NOTE: This flow chart is to be read in conjunction with Part A of the Municipal Class EA*





## Appendix B

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# Public/Review Agency Consultation



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## Notice of Study Commencement and Community Meeting No. 1

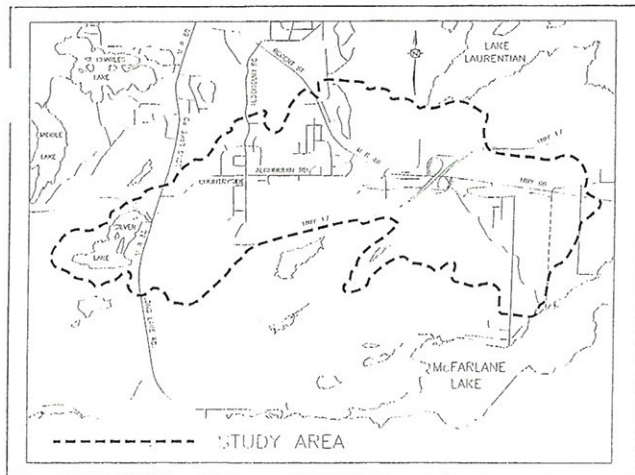




**NOTICE OF STUDY COMMENCEMENT  
AND  
COMMUNITY MEETING NO. 1  
ALGONQUIN ROAD WATERSHED  
STORM WATER MANAGEMENT STUDY CLASS EA**

**The Study**

The City of Greater Sudbury, through Earth Tech (Canada) Inc., has initiated a study to identify ways and means to control quantity and address quality of storm water from the Algonquin Road Watershed during minor and major rainfall / snow melt events for both pre-development (January 2003) and post-development conditions.



**The Process**

The Study is being undertaken in accordance with the approved Municipal Class Environmental Assessment (Class EA) process. The Class EA process requires identification of the problem, development and evaluation of alternative solutions to the problem, public and review agency consultation, assessment of environmental impacts, and development of environmental protection / mitigation measures.

Two Community Meetings will be held to present information to, and obtain input from, review agencies, area property owners / residents and the public.

At the first Community Meeting, preliminary findings of the Study, including identification of the problem, watershed characteristics and alternative solutions to the problem, will be presented. This meeting is scheduled as follows:

**Date:** Wednesday, May 14, 2003  
**Time:** 4 p.m. – 8 p.m.  
**Location:** Countryside Arena

City and Earth Tech staff will be in attendance to answer questions.

**Comments**

Comments received at the Community Meeting will be considered during development / selection of the preferred solution. Following this, a Storm Water Management Plan will be developed and presented at a second Community Meeting. The date, time and location of the second Community Meeting will be advertised at the appropriate time through a similar newspaper notice.

Comments and information are being collected to assist the Study Team in meeting the requirements of the Environmental Assessment Act.

Please contact either one of the following Study Team members if you have any questions, comments, wish to obtain more information, or be added to the mailing list to receive direct notification of future Study events:

Chris Redmond, P. Eng.  
Project Manager  
Earth Tech (Canada) Inc.  
1040 Lorne Street South, Unit 1  
Sudbury, Ontario  
P3C 4R9  
Phone: (705) 674-8343  
Fax: (705) 674-1694  
E-mail: [chris.redmond@earthtech.ca](mailto:chris.redmond@earthtech.ca)

Wendi Mannerow, P. Eng.  
Project Engineer  
Earth Tech (Canada) Inc.  
1040 Lorne Street South, Unit 1  
Sudbury, Ontario  
P3C 4R9  
Phone: (705) 674-8343  
Fax: (705) 674-1694  
E-mail: [wendi.mannerow@earthtech.ca](mailto:wendi.mannerow@earthtech.ca)



May 2, 2003

Project EO 64517

Mr. Bruce Sedgwick, P. Eng.  
Area Contracts Engineer  
Sudbury Area  
Ministry of Transportation  
159 Cedar Street  
Suite 503  
Sudbury, ON P3E 6A5

**Subject:** Notice of Study Commencement and Community Meeting No. 1  
Algonquin Road Watershed  
Storm Water Management Study Class EA  
City of Greater Sudbury

Telephone:

705.674.8343

Facsimile:

705.674.1694

Dear Mr. Sedgwick:

The City of Greater Sudbury, through Earth Tech (Canada) Inc., has initiated a study to identify ways and means to control quantity and address quality of storm water from the Algonquin Road Watershed during minor and major rainfall / snow melt events for both pre-development (January 2003) and post-development conditions (see attached map).

The Study is being undertaken in accordance with the approved Municipal Class Environmental Assessment (Class EA) process. The Class EA process requires identification of the problem, development and evaluation of alternative solutions to the problem, public and review agency consultation, assessment of environmental impacts, and development of environmental protection / mitigation measures.

Two Community Meetings will be held to present information to, and obtain input from, review agencies, area property owners / residents and the public.

At the first Community Meeting, preliminary findings of the Study including identification of the problem, watershed characteristics and alternative solutions to the problem, will be presented. This meeting is scheduled as follows:

Date: Wednesday, May 14, 2003  
Time: 4 p.m. – 8 p.m.  
Location: Countryside Arena

City and Earth Tech staff will be in attendance to answer questions.

Mr. Bruce Sedgwick, P. Eng.  
Ministry of Transportation  
May 2, 2003

Project EO 64517  
Page 2

Comments received at the Community Meeting will be considered during development / selection of the preferred solution. Following this, a Storm Water Management Plan will be developed and presented at a second Community Meeting. You will be notified of the date, time and location of a second Community Meeting at the appropriate time through a similar letter.

Comments and information is being collected to assist the Study Team in meeting the requirements of the Environmental Assessment Act.

Please contact either one of the following Study Team members if you have any questions, comments, or wish to obtain more information on the study:

Chris Redmond, P. Eng.  
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1040 Lorne Street South, Unit 1  
Sudbury, Ontario  
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E-mail: [wendi.mannerow@earthtech.ca](mailto:wendi.mannerow@earthtech.ca)

Very truly yours,

Earth Tech Canada Inc.



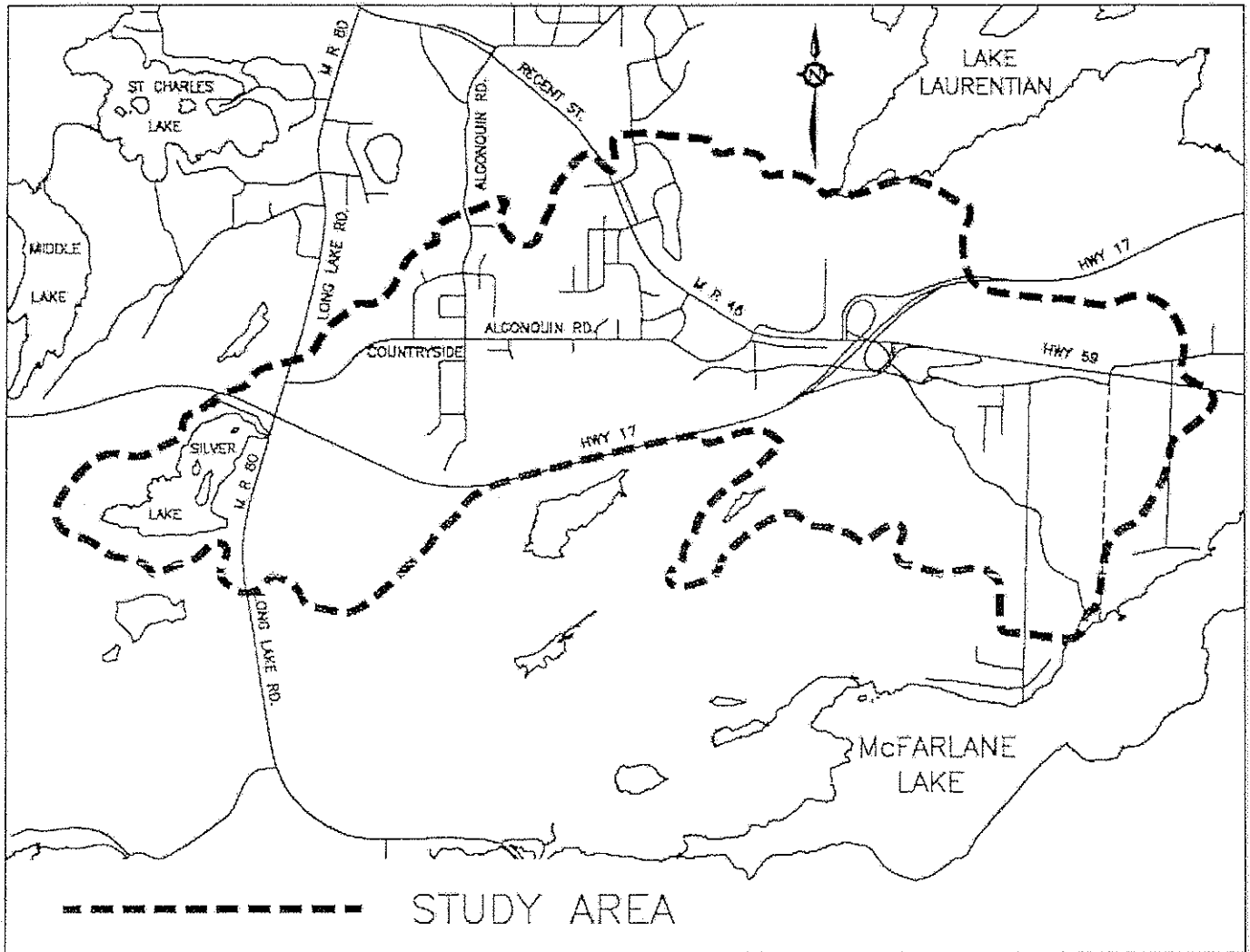
Chris Redmond, P. Eng.  
Project Manager

cc: Ron Norton, City of Greater Sudbury  
Ian Dobrindt, Earth Tech (Canada) Inc.

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Assessment\StudyCommencementCommunityMeetingNo.1\_FormLetter\_May2\_03.doc



**ALGONQUIN ROAD WATERSHED  
STORM WATER MANAGEMENT STUDY CLASS EA  
CITY OF GREATER SUDBURY**



**ALGONQUIN ROAD WATERSHED  
KEY PLAN OF STUDY AREA**

Title	FirstName	LastName	JobTitle	Company	Address1	Address2	City	State	PostalCode
Mr.	Tom	Brown	District Supervisor	Ministry of the Environment	199 Larch Street, Suite 1101	11th Floor	Sudbury	ON	P3E 5P9
Ms.	Cindy	Blancher-Smith	District Manager	Ministry of Natural Resources	3767 Highway 69 South	Suite 5	Sudbury	ON	P3G 1E7
Mr.	Chris	Anderson	Regional Archaeologist	Ministry of Culture	Heritage Operations	400 University Avenue, 3rd Floor	Toronto	ON	M7A 2R9
Ms.	Nancy	Recollect	Consultant	Ministry of Culture	Ontario Government Building	199 Larch Street, Suite 401	Sudbury	ON	P3E 5P9
Mr.	Tom	Marcolini	Senior Transportation Economist	Ministry of Northern Development and Mines	Transportation Unit	70 Foster Drive	Sault Ste. Marie	ON	P6A 6V8
Mr.	Ian	Davidson	Police Chief	Greater Sudbury Police Service	190 Brady Street		Sudbury	ON	P3E 1C7
Mr.	Wayne	Ropp	Acting Fire Chief	Greater Sudbury Emergency Services	P. O. Box 5000, Station "A"	200 Brady Street, Tom Davies Square	Sudbury	ON	P3A 5P3
Ms.	Shelley	Martel	MPP	Member of Provincial Parliament - Nickel Belt Riding	Constituency Office - Hanmer Valley Mall	Highway 69 North	Hanmer	ON	P3P 1P7
Mr.	Kevan	Moxam	Countryside Arena	City of Greater Sudbury Leisure Services	P. O. Box 5000, Station "A"	200 Brady Street, Tom Davies Square	Sudbury	ON	P3A 5P3
Ms.	Cindy	Dent	Algonquin Playground	City of Greater Sudbury Leisure Services	P. O. Box 5000, Station "A"	200 Brady Street, Tom Davies Square	Sudbury	ON	P3A 5P3
Mr.	Doug	Craig	Councillor, Ward 5	City of Greater Sudbury	P. O. Box 5000, Station "A"	200 rue Brady Street, Tom Davies Square	Sudbury	ON	P3A 5P3
Mr.	J. Austin	Davey	Councillor, Ward 5	City of Greater Sudbury	P. O. Box 5000, Station "A"	200 rue Brady Street, Tom Davies Square	Sudbury	ON	P3A 5P3
Mr.	Al	Bonnis	Director of Operations	Nickel District Conservation Authority	200 Brady Street		Sudbury	ON	P3A 5K3
Mr.	Paul	Sajatovic	Planner	Nickel District Conservation Authority	200 Brady Street		Sudbury	ON	P3A 5K3
Mr.	Larry	Fitzpatrick	Chief Financial Officer	Rainbow District School Board	69 Yonge Street		Sudbury	ON	P3E 3G5
Ms.	Zandra	Zubac	Director of Education	Sudbury Catholic District	165 A D'Youville Street		Sudbury	ON	P3C 5E7



Title	FirstName	LastName	JobTitle	Company	Address1	Address2	City	State	PostalCode
				School Board					
Ms.	Helene	Chayer	Director of Education	Sudbury Catholic District School Board	201 Jogues Street		Sudbury	ON	P3C 5L7
Mr.	Marc	Dionne	Director of Education	Conseil Scolaire due District du Grand Nord de l'Ontario	296 Van Horne Street		Sudbury	ON	P3B 1H9
Mr.	Ron	Purchase	General Manager	Ontario Federation of Snowmobile Clubs (OFSC)	106 Saunders Road	Unit #2	Barrie	ON	L4N 9A8
Mr.	Vassey	Lumley		Sudbury Trail Plan	P. O. Box 2900, Station "A"		Sudbury	ON	P5E 1G4
Mr.	Lloyd	Myllinen	Club President	Broderdale Snowmobile Association	P. O. Box 1085, Station "A"		Sudbury	ON	P3E 4S6
Mr.	Jim	Reid	Trail Director	Broderdale Snowmobile Association	3800 Sunvalley Road		Sudbury	ON	P3G 1K3
Ms.	Debbie	Nicholson	President and CEO	Greater Sudbury Chamber of Commerce	166 Douglas Street		Sudbury	ON	P3E 1G1
Mr.	Barry	Cotton		South End Rate Payers Association	218 Steward Drive		Sudbury	ON	P3E 2R5
Mr.	Ted	MacMillian		Regent Street Rate Payers Association	345 Austin Street		Sudbury	ON	P3E 2K3
Ms.	Judith	Comtois	Chairperson	Silver Lake Committee	242 Tenth Avenue	P. O. Box 518	Lively	ON	P3Y 1M5
Mr.	Larry	Ship	Manager of Design and Planning	Regional Cable Systems	500 Barrydowne Road	P. O. Box 4500	Sudbury	ON	P3E 5W1
Mr.	Paul	Deredin		Union Gas	P. O. Box 4000, Station "A"		Sudbury	ON	P3A 4S3
Mr.	Jim	Krats	Technician	Hydro One	957 Falconbridge Road	P. O. Box 2040, Station "A"	Sudbury	ON	P3A 4R8
Mr.	Dave	Runnals		Hydro One	Sudnorth Utility	P. O. Box 2040, Station "A"	Sudbury	ON	P3A 4R8
Mr.	Kerry	Taylor		Greater Sudbury Hydro Plus	500 Regent Street	P. O. Box 250	Sudbury	ON	P3E 4P1
Mr.	Erro	Makela	Manager	Bell Canada	Access Network Provisioning	200 Brady Street, Floor 1	Sudbury	ON	P3E 3L9
Mr.	Larry	Hautamaki		c/o Pro Can Realty Ltd.	3077 Long Lake Road		Sudbury	ON	P3G 1N4
Mr.	Lou	Pagnutti		Pagnutti Developments Ltd.	c/o Ernst & Young	222 Bay Street Tower, P. O. Box 251	Toronto	ON	M5K 1J7
Mr.	Ron	Arnold		Dalron Construction		130 Elm Street	Sudbury	ON	P3C 1T6

Title	FirstName	LastName	JobTitle	Company	Address1	Address2	City	State	PostalCode
Ms.	Nancy	Titton		Ltd. J. N. Construction Ltd.		311 Harrison Drive	Sudbury	ON	P3E 5E1
Mr.	E. Carroll	Sheppard		510153 Ontario Ltd.	c/o Mr. E. Carroll Sheppard	23 Maki Avenue	Sudbury	ON	P3E 2P3
Mr.	G.	Ceccarelli	CA	1085903 Ontario Ltd.	c/o B & J Holdings Ltd.	P. O. Box 913, Station "B"	Sudbury	ON	P3E 4S4
Mr.	Norm	Ethier		Ethier Sand & Gravel Ltd.	2589 Ida Street		Sudbury	ON	P3E 4W9
Dr.	David	Pearson		Laurentian University	Department of Earth Sciences	935 Ramsey Lake Road	Sudbury	ON	P3E 2C6
Dr.	Graeme	Spiers		Laurentian University	MIRARCO	933 Ramsey Lake Road	Sudbury	ON	P3E 6B5
Mrs.	Linda	Maki			167 Countryside Drive		Sudbury	ON	P3E 6G3
Mr.	David	Cook			89 Countryside Drive		Sudbury	ON	P3E 5A2
Mr.	Scott	Hancock			2653 Greenvalley Drive		Sudbury	ON	P3E 5B7
Mrs.	Sondra	Lawrie			2665 Greenvalley Drive		Sudbury	ON	P3E 5B7
Mr.	Ronald	Yeomans			2670 Greenvalley Drive		Sudbury	ON	P3E 5B8
Mr. & Mrs.	John and Lucille	Kulik			2784 Greenvalley Drive		Sudbury	ON	P3E 5B9
Mr.	Lawrence	Lachance			2801 Rockwood Drive		Sudbury	ON	P3E 5B3
Mr. & Mrs.	Robert and Mirelle	Tuttle			2779 Algonquin Road		Sudbury	ON	P3E 4X7
Mr. & Mrs.	John and Mildred	Thompson			2858 Algonquin Road		Sudbury	ON	P3E 4X6
Mr. & Mrs.	Dwight and Kelly	Leach			138 Pond Hollow Drive		Sudbury	ON	P3E 6C1
Mrs.	Beverly	Charles			2569 Field Street		Sudbury	ON	P3E 4X8
Mr. & Mrs.	Mario and Marcelle	Lague			2577 Field Street		Sudbury	ON	P3E 4X8
Mr. & Mrs.	Joseph and Janet	Burns			402 Gravelle Road		Sudbury	ON	P3E 4Y8
Mr. & Mrs.	Chris and Linda	Melchior			420 Culver Crescent		Sudbury	ON	P3E 4Y3
Mr.	Adriano	Mastroianni			466 Culver		Sudbury	ON	P3E 4Y4



Title	FirstName	LastName	JobTitle	Company	Address1	Address2	City	State	PostalCode
& Mrs.	and Luisa				Crescent				
Mr. & Mrs.	James and Lori	Lee			2679 Green Avenue		Sudbury	ON	P3E 4X3
Mr. & Mrs.	John and Lisa	Anderson			2676 Green Avenue		Sudbury	ON	P3E 4X2
Mr.	Leo	Lapierre		Brown's Concrete	3075 Herold Drive		Sudbury	ON	P3E 6K9
Mr.	Robyn	Lafortune		GCR Tire	3161 Herold Drive		Sudbury	ON	P3E 6K9
Mr. & Mrs.	Rodney and Monique	Laroque			2509 Ida Street		Sudbury	ON	P3E 4W9
Mr. & Mrs.	Michael and Nancy	Gouchie			2481 Ida Street		Sudbury	ON	P3E 4W9
Mr.	Bruce	Sedgwick	Area Contracts Engineer	Ministry of Transportation	159 Cedar Street	Suite 503	Sudbury	ON	P3E 6A5
Mr.	Carl	Jorgensen	Fish Habitat Biologist	Department of Fisheries and Oceans	1500 Paris Street	Unit #1	Sudbury	ON	P3E 3B8
Mr.	Paul	McMillan		McFarlane Lake Stewardship Group	1169 Leedale Avenue		Sudbury	ON	P3G 1B9
Mr.	Sheldon	Lowe		Clearwater Lake Stewardship Group	468 Arnley Street		Sudbury	ON	P3C 1E9
Mr.	Michael	Mirka	Chair	Greater Sudbury Lake Improvement Advisory Panel	729 Griffiths Street		Sudbury	ON	P3E 4A6
Ms.	Karen	Ojanpera		Panache Lake Stewardship Group	Penage Road		Whitefish	ON	P0M 3E0
Ms.	Elin	Maki-Flora		Little Lake Panache Stewardship Group	95 Field Street		Lively	ON	P3Y 1B2

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# Community Meeting No. 1

## May 14, 2003



**Welcome to the  
Algonquin Road Watershed  
Storm Water Management Study Class EA  
Community Meeting  
May 14, 2003**

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- ❖ Please sign in on the sheet provided. Then feel free to walk around and view the displays.
- ❖ Our representatives will be pleased to discuss the project with you.
- ❖ Comment sheets are provided for those who wish to provide comments in writing. Please either place your completed sheets in the Comment Box or mail/fax them to one of the identified Project Team Members (see below) by **May 30, 2003**.
- ❖ Thank you for your involvement in this project.
- ❖ Please contact one of the following Team Members for additional information:

Chris Redmond, P.Eng

Project Manager

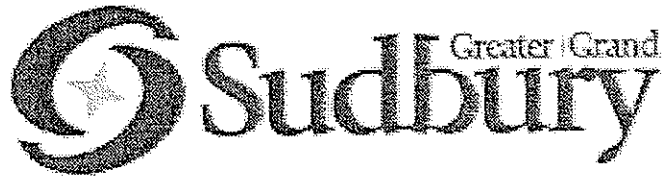
E-mail: [chris.redmond@earthtech.ca](mailto:chris.redmond@earthtech.ca)

Wendi Mannerow, P.Eng

Project Engineer

E-mail: [wendi.mannerow@earthtech.ca](mailto:wendi.mannerow@earthtech.ca)

Earth Tech (Canada) Inc.  
1040 Lorne Street South, Unit 1  
Sudbury, Ontario  
P3C 4R9  
Phone: (705) 674-8343  
Fax: (705) 674-1694



The City of Greater Sudbury

# COMMUNITY MEETING No. 1 INFORMATION PACKAGE

## ALGONQUIN ROAD WATERSHED STORM WATER MANAGEMENT STUDY CLASS EA

May 14, 2003  
Countryside Arena



A **tyco** INTERNATIONAL LTD. COMPANY



# Study Overview

## Community Meeting No. 2

- ❖ The purpose of Community Meeting No. 2 is to inform you of our progress since the May 14, 2003 Community Meeting, present the recommended strategy, and obtain your comments.

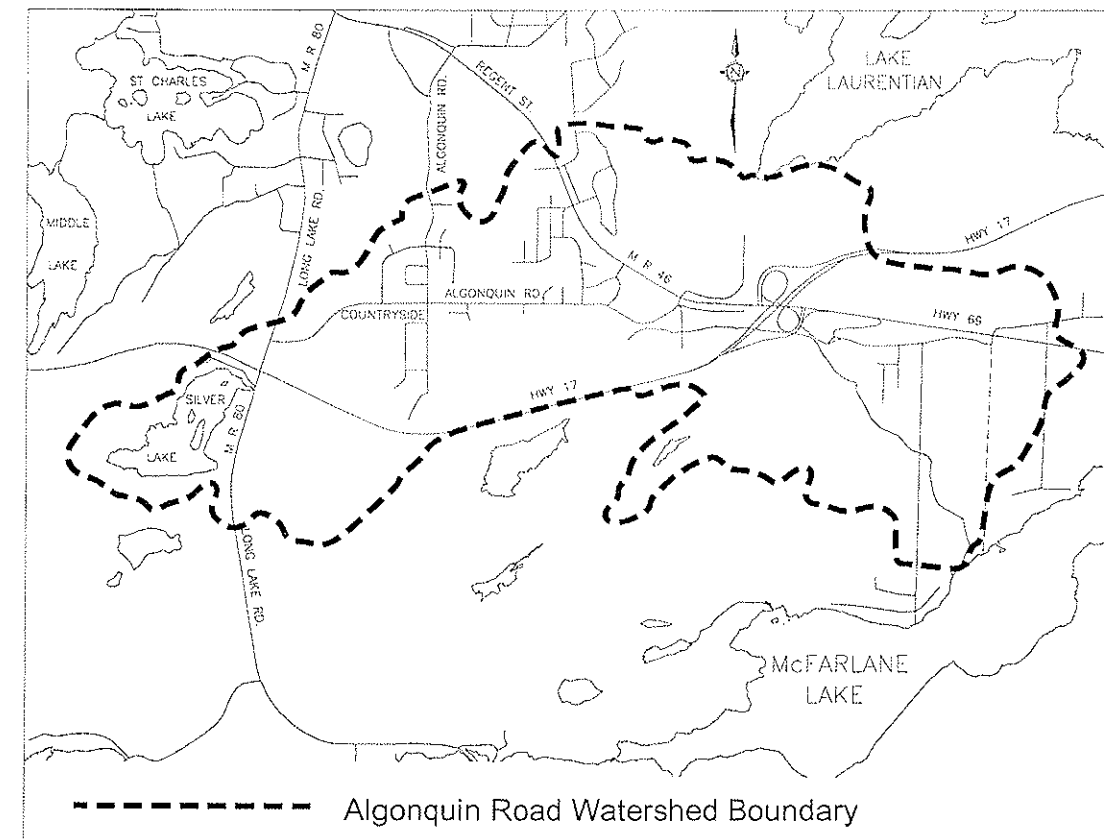
## Study Purpose

- ❖ The City of Greater Sudbury, through Earth Tech Canada Inc., has initiated a study to carry out a Municipal Class Environmental Assessment (EA) to identify ways and means to control quantity and address quality of storm water within the Algonquin Road Watershed during minor and major rainfall / snow melt events for both pre-development and post-development conditions to minimize the risk and effects of:
  - o Flooding on public and private property;
  - o Erosion and sedimentation of water courses; and
  - o Runoff pollution in drainage channels, water courses and McFarlane Lake.
- ❖ For the purpose of this study, the system as of January 2003 is considered “pre-development” and the conceptual fully developed watershed is considered “post-development”.

- ❖ Storm water within the Algonquin Road Watershed follows a drainage course from Silver Lake to McFarlane Lake and is characterized by:

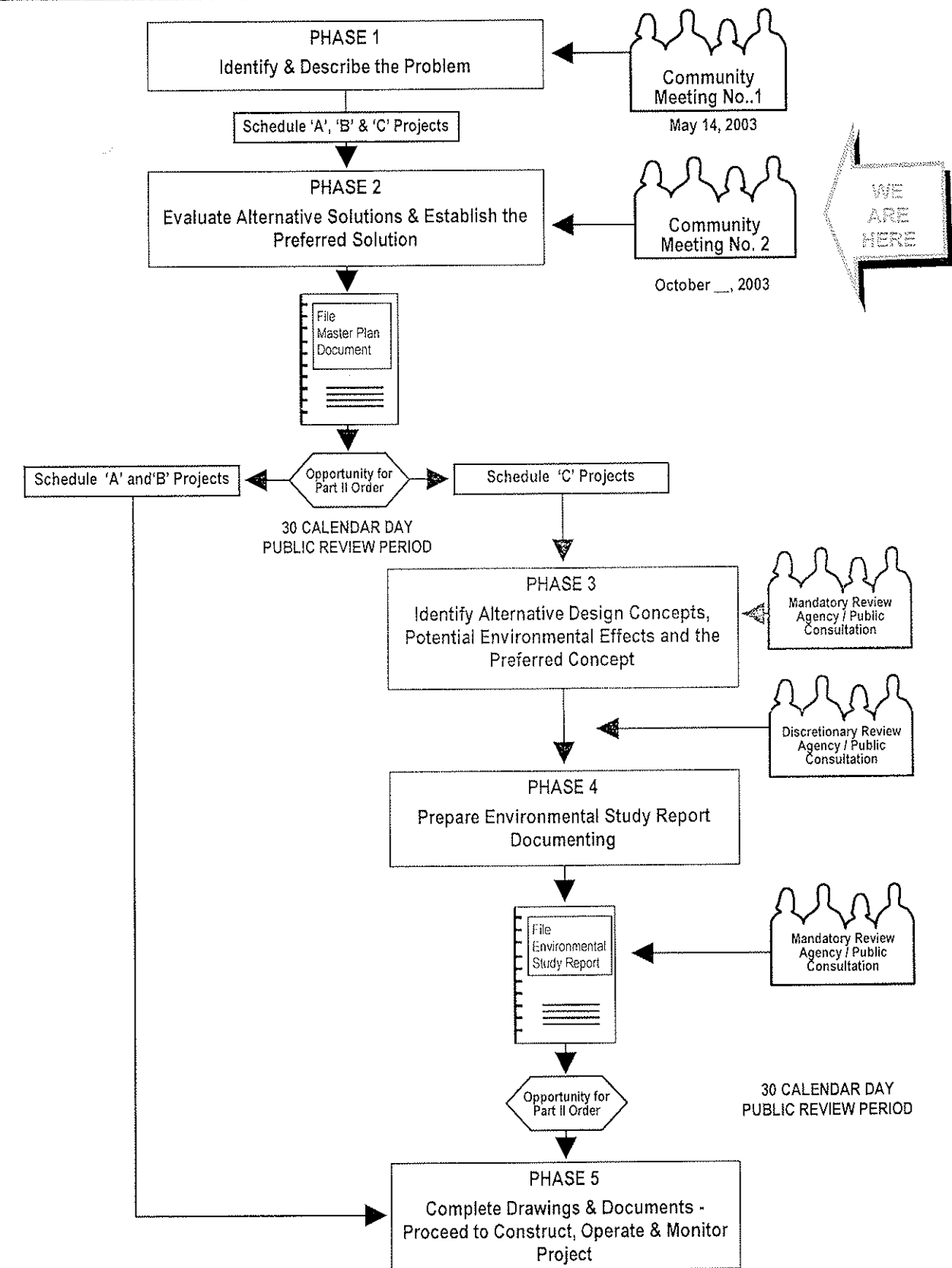
- o Many minor wetlands;
- o Culvert crossings under highways and residential roads;
- o Storm sewer systems conveying water to open ditches;
- o Overland flow in rural areas; and
- o Roadside ditches.

## Study Area



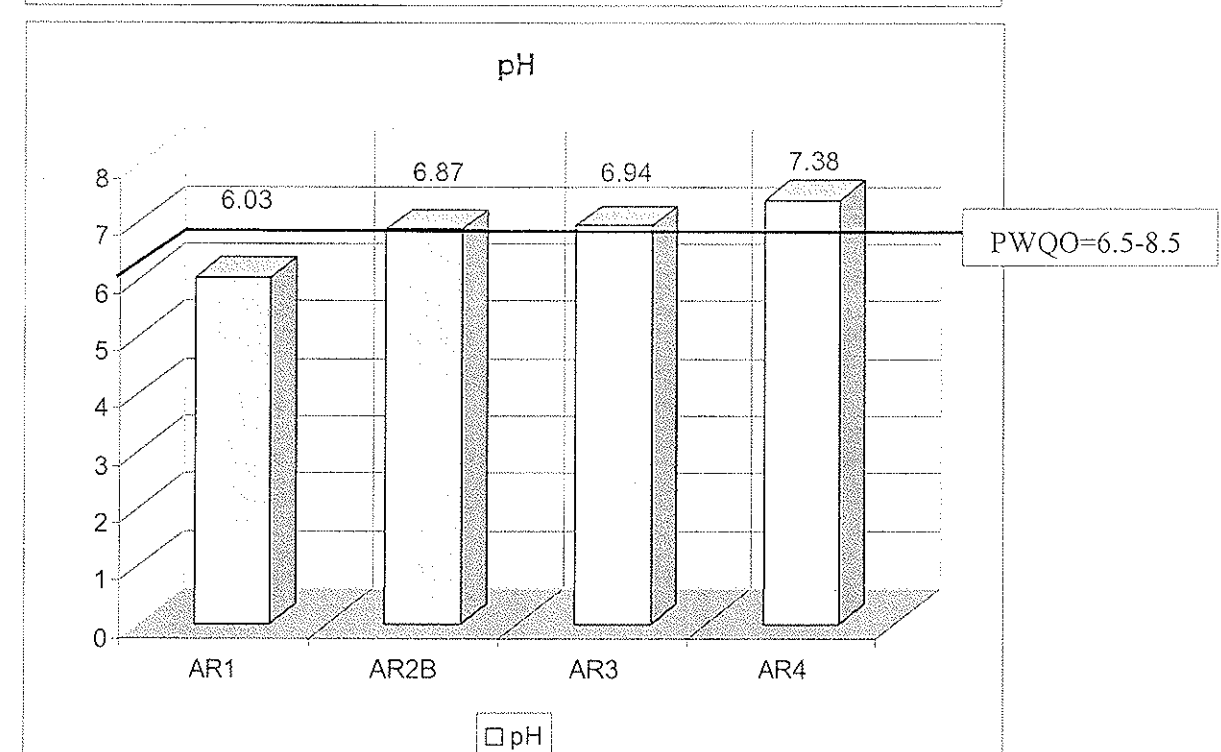
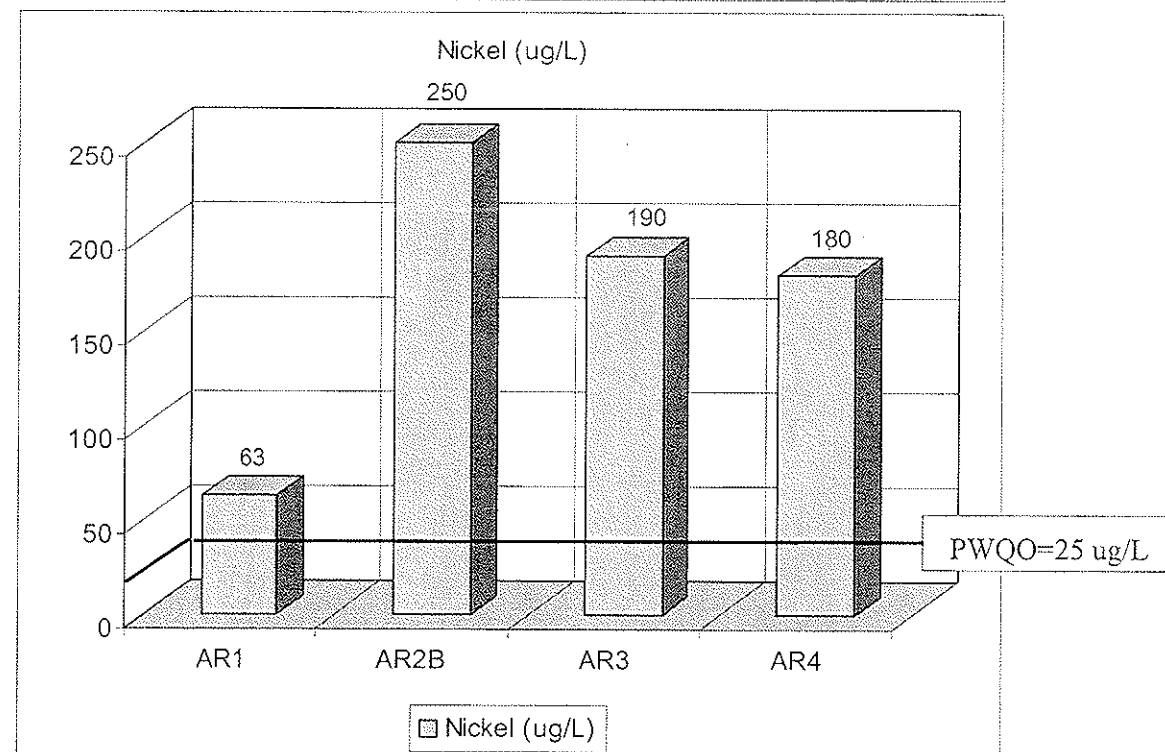
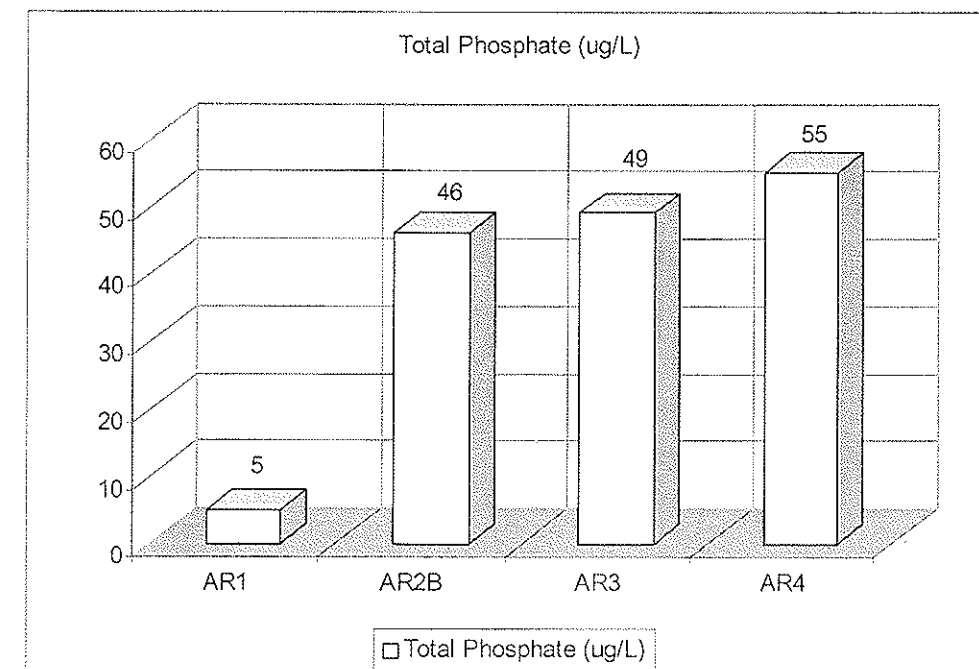
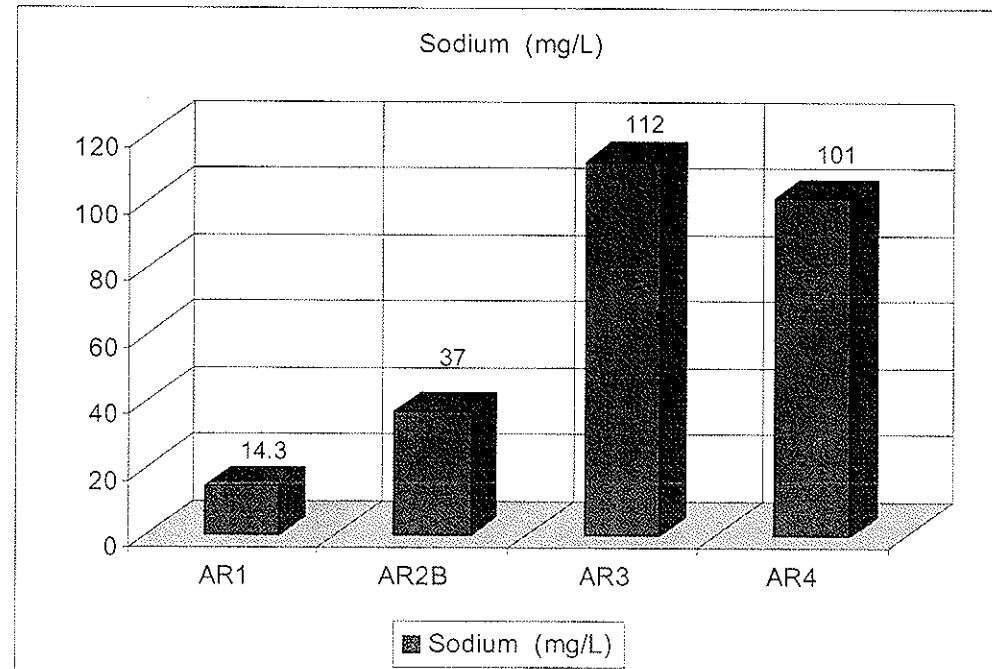
# Overview of the Class Environmental Assessment Process

- ❖ This study is being undertaken in accordance with the *Municipal Class Environmental Assessment* (Class EA) Master Planning process.
- ❖ The Class EA is approved under the *Environmental Assessment Act* and enables the planning of municipal infrastructure projects in accordance with a proven procedure for protecting the environment.
- ❖ The Master Planning process allows for the integration of the Class EA planning principles with the infrastructure requirements for existing and future land uses and involves the preparation of a Master Plan document at the conclusion of Phases 1 and 2 of the Class EA. The Master Plan document is then made available for public comment.
- ❖ The final public notice for the Master Plan will become the Notice of Completion for the recommended Schedule 'B' projects.
- ❖ The Master Plan will provide the basis for any recommended Schedule 'C' projects, but they will have to complete Phases 3 and 4 prior to filing an Environmental Study Report for public review.





# Pre Development Storm Water Quality Data



PWQO = Provincial Water Quality Objectives

AR1 = Outlet Silver Lake

AR2A= Upstream end of Mallards Pond (data not yet available)

AR2B = Outlet Mallards Pond

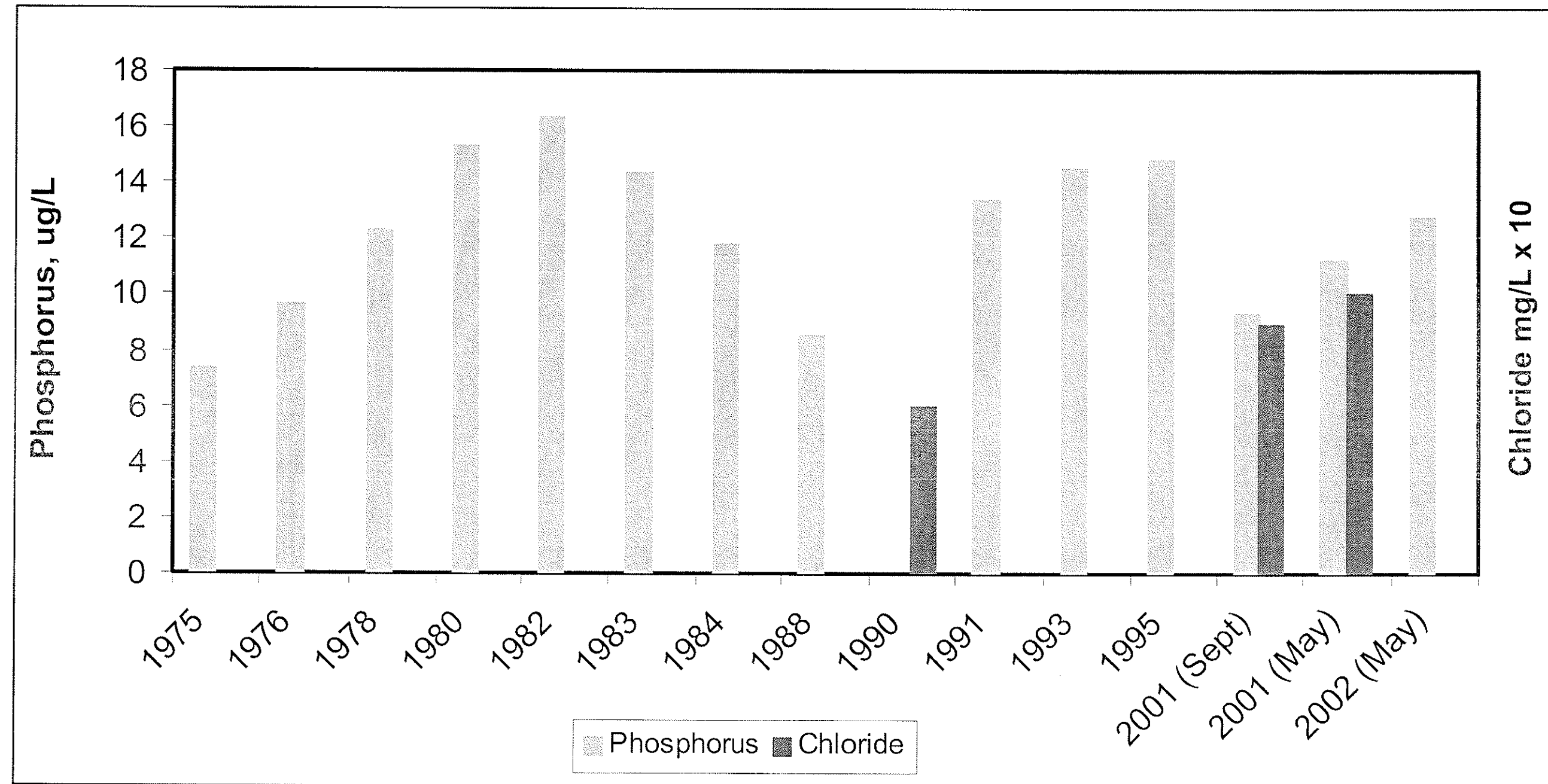
AR3 = Hwy 69 Bypass Culvert

AR4 = CKSO Road

AR5= Entrance to McFarlane Lake (data not yet available)

Date of Sampling: April 21, 2003

# McFarlane Lake Historical Water Quality Data (Phosphorus and Chloride Concentrations)



Data obtained from: [www.city.greatersudbury.on.ca](http://www.city.greatersudbury.on.ca)



## The Problem Statement

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- ❖ The existing drainage system in the Algonquin Road Watershed is not adequate for accommodating peak flows in isolated areas and under extreme rainfall events.
- ❖ The City of Greater Sudbury is experiencing urban growth in the Algonquin Road Watershed that is expected to continue.
- ❖ As a result of planned urban growth, quantity and quality changes to storm water runoff are anticipated.
- ❖ This study will provide a plan for managing the impacts of urban growth on storm water runoff.

# Alternative Storm Water Management Strategies

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## **A. Do Nothing**

- o No changes or improvements to the existing storm water management system would be undertaken. Since no changes or improvements are proposed, this alternative provides a comparative benchmark for evaluating the other alternatives.

## **B. Implement Storm Water Quality Management Policies and Outreach Programs**

- o Storm water quality management policies (e.g., road sweeping) and outreach programs (e.g., residential fertilization application) applicable to the Study Area would be developed and implemented based on the experiences of other municipalities.
- o Implementing policies for removing road sediment at source would reduce the need for storm water quality management facilities downstream. Similarly, phosphorus loading downstream would be reduced through a successful outreach program on residential fertilization application.

## **C. Undertake Conveyance System Modifications**

- o The capacity of existing stormsewers and/or culverts would be increased to reduce/eliminate the risk of upstream flooding under post-development flow conditions. As a result, flows greater than those under pre-development conditions would be conveyed.

## **D. Implement Design Guidelines and Programs to Promote Surface Drainage**

- o Design Guidelines for future growth within the Watershed would be developed and implemented to reduce the risk of:
  - surface ponding
  - uncontrolled subsurface drainage
- o Programs for inspection / monitoring of conveyance systems would be implemented to promote surface drainage through existing developments.

## **E. Construct Storm Water Management Facilities (Ponds)**

- o Storm water management facilities (ponds) would be constructed at various locations throughout the Study Area allowing for storm water storage with controlled release rates for quantity and/or quality management.
- o Conceptual storm water management facility locations have been identified in the City's Terms of Reference for this Study and additional locations based on land use and topography may be identified and evaluated.



# Proposed Evaluation Criteria

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- ❖ The following five categories of consideration and their respective criteria are proposed for use in evaluating the Alternative Storm Water Management Strategies:

1. Technical

- Servicing Capabilities
- Facility Characteristics
- Inlet Conveyance
- Outlet Conveyance
- Excavation
- Flexibility
- Maintenance

2. Natural Environment

- Wildlife
- Vegetation
- Fish, Aquatic Vegetation and Wildlife
- Flood Plain
- Water Course
- Geology
- Pest Control

3. Social/Cultural

- Aesthetics
- Public Health and Safety
- Recreation
- Proximity Impacts
- Heritage Resources

4. Legal/Jurisdictional

- Property Acquisition
- Official Plan / Growth Requirements
- Flexibility to address Planning / Technical Alternatives
- Synergy with Open Space Areas, Policies and Programs

5. Financial

- Property Costs
- Initial Capital Costs
- Potential Long Term Operating / Maintenance Costs

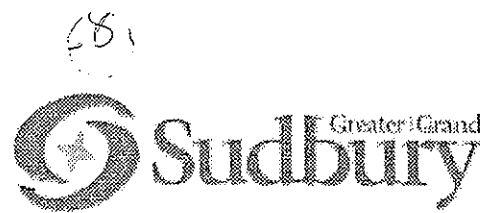
- ❖ The preceding categories and criteria will be finalized based on input received from review agencies and the public provided at this Community Meeting.

## The Next Steps . . .

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- ❖ The comments received from this Community Meeting will be considered along with those received from review agencies to:
  - o Confirm the problem statement;
  - o Confirm the alternative storm water management strategies; and
  - o Finalize the proposed evaluation criteria.
- ❖ The finalized evaluation criteria will be applied to the confirmed strategies to identify a recommended storm water management strategy. The recommended strategy will likely be a combination of alternatives.
- ❖ The recommended strategy will be presented at a Second Community Meeting (**Summer 2003**) to provide an opportunity for comments.
- ❖ The public and review agencies will be notified of the Second Community Meeting at the appropriate time.





# Algonquin Road Watershed Storm Water Management Study Class EA



Community Meeting No. 1  
Wednesday, May 14, 2003  
4 p.m. – 8 p.m.  
Countryside Arena

	<u>NAME</u>	<u>ADDRESS (Street, City &amp; Postal Code)</u>	<u>TELEPHONE</u>
1.	FRANK BENISH	409 NEPAHWIN AVE-SUDBURY BE 2H5	522-1572
2.	Alan Lock	933 Ramsey LK. RD. MIRARCO, Laurentian University	675-1151 ext. 5065
3.	Colin Teale	130 Elm St Dalron Construction	566 9770 ext 235
4.	L. HAJTAMAKI	3077 LONG LAKE RD.	522-8974
5.	Margaret Martin	<del>2223</del> GREENVALLEY ADRIVE 2173	522-5562
6.	Peter Neilson	2773 GREENVALLEY DR.	522-5562
7.	Brad Bannon	1130 Southland Rd. Sudbury P3G 1N6	522-7888
8.	Hedyn Butler	647 Silver Lake Road P3C 1T9	522-1173
9.	NORM ESTER	645 EDGEWATER RD.	677-9057
10.	Mike Minko	729 Griffith St. Sudbury ON. Chair Greater Sudbury Lake Improvement Advisory Panel.	

# Algonquin Road Watershed Storm Water Management Study Class EA

Community Meeting No. 1  
Wednesday, May 14, 2003  
4 p.m. – 8 p.m.  
Countryside Arena

	NAME	ADDRESS (Street, City & Postal Code)	TELEPHONE
11.	ALEX SORENSON	9 SATURN SUDBURY P3E 6B8	522-8547
12.	LINDA MAK	167 Countryside Dr. Sudbury P3E 6G3	522-5089
13.	ARMAND THERRIEN	436 WESTMOUNT AVE SUDBURY	560-5555
14.	KATHY LESSARD	2711 Green Ave., P3E 4X3	522-8117
15.	Gerry Seguin	515 Eastern Ave Lively	692-1921
16.	Tony Lecourt	Earth Tech	
17.	RICK AHOLA	24 LAKE ST. LIVELY	692-3166
18.	LAURA + DENISE THIRIOT	60 TUPPENHAM P3C3G3 SUDBURY	674-8511
19.	DIETER SCHÖNEFELD	945 LEEDALE AVE. SUDBURY	522-3085
20.	LEIGHAN EPAULETTE BOSSON	7404 ARKLEY CR. SUDBURY P3E 5Z8	523-3765



Community Meeting No. 1  
 Wednesday, May 14, 2003  
 4 p.m. – 8 p.m.  
 Countryside Arena

	NAME	ADDRESS (Street, City & Postal Code)	TELEPHONE
21.	Tim Ruthenberg	2718 Greenvalley Dr. Sudbury P3E 5B8	522-7998
22.	Paul McMillan	1169 Leedale Ave. Sudbury P3G 1B9	523-8272
23.	Maureen McMillan	1169 Leedale Ave Sudbury P3G 1B9	523-8272
24.	Sandra McMillan	(( ))	(( ))
25.	Pto Antti	331 Marttila - S1307	523-5627
26.	JACK ANDERSON	2676 GREEN AVE	522-3953
27.	Lise Anderson	2676 Green Ave	522-3953
28.	JOHN LINDSAY	1439 BANCROFT DR. (G5L4P)	560-6087
29.			
30.			

## Algonquin Road Watershed Storm Water Management Study Class EA

Community Meeting No. 1  
Wednesday, May 14, 2003  
4 p.m. - 8 p.m.  
Countryside Arena

Your views are important to us. Please take a moment to provide any comments or questions that you may have with respect to this project.

DRAINING OF VAST MARSH AREA ON ROCKWOOD & JOSEPH STS.  
ALSO FROM HIGHWAY 17 BY-PASS. ALL HOUSE SUMP  
PUMPS + STORM SEWER ON THESE TWO STREETS  
ARE ALL DIRECTED INTO A CULVERT UNDER  
THE ROAD DIRECTLY IN FRONT OF MY PROPERTY  
AT 2773 GREENVALLEY DRIVE RESULTING IN  
FLOODING MY BASEMENT & WATER COMING IN  
UNDER MY CEMENT BASEMENT FLOOR WASHING  
SAND INTO SUMP HOLE, MY LOT IS BOLDER FILL SO  
NO SOIL TO HOLD ANY WATER. THE VAST MARSH AREA DRAINS  
THRU A 3 FOOT CULVERT & CROSSING UNDER ROCKWOOD. THIS DRAINS  
DOWN TO A 2 FOOT CULVERT CROSSING UNDER GREENVALLEY DR. DURING  
SPRING RUN OFF THIS LARGE VOLUME OF WATER CAN NOT GO THROUGH  
THIS CULVERT FAST ENOUGH. THIS CULVERT IS FULL TO THE TOP AND  
THE WATER BACKS UP WASHING THE SHOULDER OF THE ROAD AWAY. THEN  
2 SMALLER CULVERTS WHICH CAN NOT HANDLE THE VOLUME OF WATER FROM THE  
2 FOOT CULVERT, RESULTING IN TWO MORE BOTTLE NECKS. THIS MAKES NO  
SENSE TO ME. THIS HAPPENS DURING SPRING RUN OFF FOR ONE TO TWO  
WEEKS DEPENDING ON AMOUNT OF SNOWFALL.

The City of Greater Sudbury and Earth Tech Canada Inc. thank you for your involvement in this Study. Please drop your completed comment sheet in the box on your way out, or mail/fax it no later than May 30, 2003 to one of the following Team Members

Chris Redmond, P. Eng.  
Project Manager  
Earth Tech (Canada) Inc.  
1040 Lorne Street South, Unit 1  
Sudbury, Ontario  
P3C 4R9  
Phone: (705) 674-8343  
Fax: (705) 674-1694  
E-mail: [chris.redmond@earthtech.ca](mailto:chris.redmond@earthtech.ca)

Wendi Mannerow, P. Eng.  
Project Engineer  
Earth Tech (Canada) Inc.  
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P3C 4R9  
Phone: (705) 674-8343  
Fax: (705) 674-1694  
E-mail: [wendi.mannerow@earthtech.ca](mailto:wendi.mannerow@earthtech.ca)

Comments and information regarding this study are being collected to assist the City of Greater Sudbury in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in the study documentation. With the exception of personal information, all comments will become part of the public record.

COMPLETED BY: (please print clearly)

Name: MARGARET MARTIN & PETE NEILSON

Phone: 522-5562

Address: 2773 GREENVALLEY DRIVE



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## Notice of Community Meeting No. 2

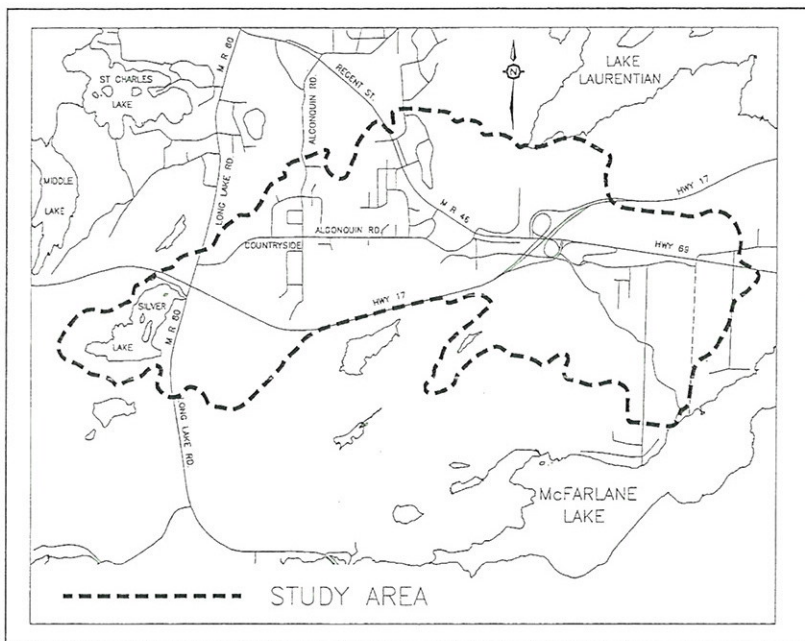




## NOTICE OF COMMUNITY MEETING NO. 2 ALGONQUIN ROAD WATERSHED STORMWATER MANAGEMENT STUDY CLASS EA

### The Study

The City of Greater Sudbury, through Earth Tech (Canada) Inc., has initiated a study to identify ways and means to control quantity and address quality of stormwater from the Algonquin Road Watershed during minor and major rainfall / snow melt events for both pre-development (January 2003) and post-development conditions.



### The Process

The Study is being undertaken in accordance with the approved Municipal Class Environmental Assessment (Class EA) process. The Class EA process requires identification of the problem, development and evaluation of alternative solutions to the problem, public and review agency consultation, assessment of environmental impacts, and development of environmental protection / mitigation measures.

The first of two **Community Meetings** was held in May 2003, to present the preliminary findings of the study including watershed characteristics, identification of the problem and alternative solutions to the problem.

The Recommended Stormwater Management Plan will be presented at the **second Community Meeting**. This meeting is scheduled to occur as follows:

**Date:** May 20, 2004  
**Time:** 4 p.m. – 8 p.m.  
**Location:** Countryside Arena

City and Earth Tech staff will be in attendance to answer questions.

### Comments

Comments received at the second Community Meeting will be considered during the selection of the Preferred Stormwater Management Plan. Input from the public and review agencies is sought to assist the Study Team in meeting the requirements of the Environmental Assessment Act.

Please contact any of the following Study Team members if you have any questions, comments, wish to obtain more information, or be added to the mailing list to receive direct notification of future Study events:

**Chris Redmond, P. Eng.**  
Project Manager  
Earth Tech (Canada) Inc.  
1040 Lorne Street South, Unit 1  
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P3C 4R9  
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chris.redmond@earthtech.ca

**Wendi Mannerow, P. Eng.**  
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**Ron Norton, P. Eng.**  
Coordinator of Technical Services  
City of Greater Sudbury  
200 Brady Street, Tom Davies Square  
P.O. Box 5000, Station "A"  
Sudbury, Ontario  
P3A 5P3  
Phone: (705) 671-2489 ext. 2362  
Fax: (705) 673-5171  
E-mail:  
ron.norton@city.greatersudbury.on.ca



May 13, 2004

Project EO 64517

Ms. Paula Allen  
EA Coordinator  
Ministry of the Environment  
199 Larch Street, Suite 1101  
Sudbury, ON P3E 5P9

**Subject: Notice of Community Meeting No. 2**  
**Algonquin Road Watershed Stormwater Management Study Class EA**  
**City of Greater Sudbury**

Dear Ms. Allen:

The City of Greater Sudbury, through Earth Tech (Canada) Inc., has initiated a study to identify ways and means to control quantity and address quality of stormwater from the Algonquin Road Watershed (see attached key plan) during minor and major rainfall / snow melt events for both pre-development (January 2003) and post-development conditions.

The study is being undertaken in accordance with the approved Municipal Class Environmental Assessment (Class EA) process. The Class EA process requires identification of the problem, development and evaluation of alternative solutions to the problem, public and review agency consultation, assessment of environmental impacts, and development of environmental protection / mitigation measures.

As part of the process, the first of two **Community Meetings** was held in May 2003, to present the preliminary findings of the study including watershed characteristics, identification of the problem and alternative solutions to the problem.

An update on the study including the Recommended Stormwater Management Plan will be presented at the **second Community Meeting**. This will provide an opportunity for the public and stakeholders to review and comment on the Recommended Stormwater Management Plan. This meeting is scheduled as follows:

**Date:** Thursday, May 20, 2004  
**Time:** 4 p.m. - 8 p.m.  
**Location:** Countryside Arena

City and Earth Tech staff will be in attendance to answer questions.

Telephone

705.674.8343

Facsimile

705.674.1694



Ms. Paula Allen  
Ministry of the Environment  
May 13, 2004

Project EO 64517  
Page 2

Comments received at Community Meeting No. 2 will be considered during the selection of the Preferred Stormwater Management Plan. Following this, a Stormwater Management Master Plan documenting the study will be prepared and filed for 30 calendar days for public review and comment. You will be notified of the review opportunity at the appropriate time through a similar letter.

Input from the public and review agencies is sought to assist the Study Team in meeting the requirements of the Environmental Assessment Act.

Please contact any of the following Study Team members if you have any questions, comments, wish to obtain more information, or be added to the mailing list to receive direct notification of future study events:

Chris Redmond, P. Eng.  
Project Manager  
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Coordinator of Technical Services  
City of Greater Sudbury  
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Sudbury, Ontario  
P3A 5P3  
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Fax: (705) 673-5171  
E-mail:  
ron.norton@city.greatersudbury.on.ca

Very truly yours,

Earth Tech (Canada) Inc.

*Wendi Mannerow*

*for*  
Chris Redmond, P. Eng.  
Project Manager

Enclosure

cc: Ron Norton, City of Greater Sudbury  
Karl van Kessel/Ryan Doyle, Earth Tech (Canada) Inc.

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Le 13 mai 2004

Numéro du projet : 64517

Stan Miller  
394 Culver Crescent  
Sudbury, ON P3E 4Y3

**Objet :       Avis de réunion communautaire n° 2**  
**Bassin hydrographique du chemin Algonquin;**  
**évaluation environnementale de portée générale**  
**Gestion des eaux pluviales**

Monsieur,  
Madame,

Telephone

705.674.8343

Facsimile

705.674.1694

Par l'entremise de Earth Tech (Canada) Inc., la Ville du Grand Sudbury a entrepris une étude pour identifier des moyens de contrôler la quantité d'eaux pluviales et de considérer la qualité de ces eaux du bassin hydrographique du chemin Algonquin durant la fonte des neiges et les précipitations mineures et importantes en ce qui a trait aux conditions antérieures à l'aménagement (janvier 2003) et de postaménagement.

L'étude est actuellement menée en conformité avec le processus approuvé d'évaluation environnementale municipale de portée générale. Ce processus comporte l'identification du problème, l'élaboration et l'évaluation de solutions de rechange, une consultation publique et auprès d'un organisme de révision, l'évaluation des impacts environnementaux et l'élaboration de mesures de protection et d'atténuation relatives à l'environnement.

La première de deux réunions communautaires a eu lieu en mai 2003, pour présenter les résultats préliminaires de l'étude, y compris les caractéristiques du bassin hydrographique, l'identification du problème et les solutions de rechange.

Le plan de gestion des eaux pluviales recommandé sera présenté à la deuxième réunion communautaire. Cette réunion aura lieu :

**Date :       Le 20 mai 2004**  
**Heure :     16 h à 20 h**  
**Endroit :   Aréna Countryside**

Le personnel de la Ville et de Earth Tech sera présent pour répondre aux questions.

Stan Miller  
Le 13 mai 2004

Numéro du projet : 64517  
Page 2

Les commentaires reçus durant la deuxième réunion communautaire seront pris en compte durant la sélection du plan de gestion des eaux pluviales privilégié. Le plan de gestion des eaux pluviales documentant l'étude sera ensuite préparé et déposé pendant 30 jours civils pour permettre aux membres du public et aux parties intéressées de l'examiner et de le commenter. Par voie d'une lettre semblable à celle-ci, nous vous aviserons en temps utile quand vous pourrez examiner le plan.

Nous aimerions recevoir des commentaires des citoyennes et des citoyens ainsi que d'organismes de révision afin d'aider le groupe d'étude à répondre aux exigences de la *Loi sur les évaluations environnementales*.

Veuillez communiquer avec l'un des membres du groupe d'étude suivant si vous avez des questions, des commentaires, si vous désirez obtenir de plus amples renseignements ou si vous voulez que l'on ajoute votre nom à la liste d'envoi afin de vous aviser d'autres activités relatives à l'étude :

Chris Redmond, ing.  
Gestionnaire de projet  
Earth Tech (Canada) Inc.  
1040, rue Lorne Sud, bureau 1  
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Télec. : (705) 674-1694  
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chris.redmond@earthtech.ca

Wendi Mannerow, ing.  
Ingénieure de projets  
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Ron Norton, ing.  
Coordonnateur des Services  
techniques  
Ville du Grand Sudbury  
200, rue Brady, Place Tom Davies  
C. P. 5000, succ. A  
Sudbury (Ontario)  
P3A 5P3  
Tél. : (705) 671-2489, poste 2362  
Télec. : (705) 673-5171  
Courriel :  
ron.norton@city.greatersudbury.on.ca

Le gestionnaire du projet de Earth Tech (Canada) Inc.,

*Wendi Mannerow*

*pour* Chris Redmond, ing.

Pièce jointe

cc : Ron Norton, Ville du Grand Sudbury  
Karl van Kessel/Ryan Doyle, Earth Tech (Canada) Inc.



A *tyco* INTERNATIONAL LTD. COMPANY



Title	FirstName	LastName	JobTitle	Company	Address1	Address2	City	State	PostalCode
Ms	Paula	Allen	EA Coordinator	Ministry of the Environment	199 Larch Street, Suite 1101		Sudbury	ON	P3E 5P9
Mr	Ray	Mantha	Manager of Engineer Office	Ministry of Transportation	447 McKeown Avenue, Suite 301		North Bay	ON	P1B 9S9
Mr	Bruce	Sedgwick, P. Eng.	Area Contracts Engineer	Ministry of Transportation	159 Cedar Street, Suite 503		Sudbury	ON	P3E 6A5
Mr	Stephen	Devos	Senior Lands and Waters Technical Specialist	Ministry of Natural Resources	3767 Highway 69 South, Suite 5		Sudbury	ON	P3G 1E7
Mr	Jim	Coughlin	Municipal Planning Advisor	Ministry of Municipal Affairs	159 Cedar Street, Suite 401		Sudbury	ON	P3E 6A5
Mr	Paul	Bradette	Northern Development Advisor	Ministry of Northern Development and Mines	159 Cedar Street, Suite 601		Sudbury	ON	P3E 6A5
Mr	Andrew	Hinshelwood	Regional Archaeologist	Ministry of Culture	435 James Street South, Suite 334		Thunder Bay	ON	P7E 6S7
Mr	Ed	Gardner	Manager of Health Protection	Sudbury District Health Unit	1300 Paris Street		Sudbury	ON	P3E 3A3
Mr	Carl	Jorgensen	Fish Habitat Biologist	Department of Fisheries and Oceans	1500 Paris Street, Unit #1		Sudbury	ON	P3E 3B8
Mr	Ian	Davidson	Police Chief	Greater Sudbury Police Service	190 Brady Street	Tom Davies Square	Sudbury	ON	P3E 1C7
Mr	Donald	Davidson	Fire Chief	Greater Sudbury Emergency Services	P.O. Box 5000, Station "A"	200 Brady Street, Tom Davies Square	Sudbury	ON	P3A 5P3
Ms	Shelley	Martel, MPP	Member of Provincial Parliament	Nickel Belt Riding	Constituency Office, Hanmer Valley Mall	Highway 69 North	Hanmer	ON	P3P 1P7
Mr	Rick	Bartolucci, MPP	Member of Provincial Parliament	Sudbury Riding	Constituency Office	100 Elm Street	Sudbury	ON	P3C 1T5
Honourable	Diane	Marleau, MP	Member of Parliament	Sudbury Riding	36 Elgin Street		Sudbury	ON	P3C 5B4
Mayor	David	Courtemanche		City of Greater Sudbury	P.O. Box 5000, Station "A"	200 Brady Street, Tom Davies Square	Sudbury	ON	P3A 5P3
Mr	Kevan	Moxam	Countryside Arena	City of Greater Sudbury Leisure Services	P.O. Box 5000, Station "A"	200 Brady Street, Tom Davies Square	Sudbury	ON	P3A 5P3
Ms	Cindy	Dent	Algonquin Playground	City of Greater Sudbury Leisure Services	P.O. Box 5000, Station "A"	200 Brady Street, Tom Davies Square	Sudbury	ON	P3A 5P3
Councillor	Doug	Craig	Ward 5	City of Greater Sudbury	P.O. Box 5000, Station "A"	200 Brady Street, Tom Davies Square	Sudbury	ON	P3A 5P3
Councillor	Frances	Caldarelli	Ward 5	City of Greater Sudbury	P.O. Box 5000, Station "A"	200 Brady Street, Tom Davies Square	Sudbury	ON	P3A 5P3
Mr	Thom	Mowry	City Clerk	City of Greater Sudbury	P.O. Box 5000, Station "A"	200 Brady Street, Tom Davies Square	Sudbury	ON	P3A 5P3
Ms	Barb	McDougall	Coordinator of EarthCare Initiatives	City of Greater Sudbury	P.O. Box 5000, Station "A"	200 Brady Street, Tom Davies Square	Sudbury	ON	P3A 5P3
Mr	Al	Bonnis	Director of Operations	Nickel District Conservation Authority	200 Brady Street	Tom Davies Square	Sudbury	ON	P3E 5K3
Mr	Paul	Sajatovic	Resource Planner	Nickel District Conservation Authority	200 Brady Street	Tom Davies Square	Sudbury	ON	P3E 5K3
Ms	Diane	Cayen-Arnold	Chief Financial Officer	Rainbow District School Board	69 Yonge Street		Sudbury	ON	P3E 3G5

Title	FirstName	LastName	JobTitle	Company	Address1	Address2	City	State	PostalCode
Ms	Zandra	Zubac	Director of Education	Sudbury Catholic District School Board	165A D'youville Street		Sudbury	ON	P3C 5E7
Ms	Helene	Chayer	Director of Education	Conseil Scolaire Catholique du Nouvel Ontario	Sudbury Catholic District School Board	201 Jogues Street	Sudbury	ON	P3C 5L7
Mr	Marc	Dionne	Director of Education	Conseil Scolaire du District du Grand Nord de l'Ontario	296 Van Horne Street		Sudbury	ON	P3B 1H9
Mr	Paul	Temelini, B.A., LL.B.		Temvest Inc.	Barrister, Solicitor & Notary, Avocat	703 - 901 Lasalle Boulevard	Sudbury	ON	P3A 1X8
Mr	Ron	Purchase	General Manager	Ontario Federation of Snowmobile Clubs (OFSC)	106 Saunders Road, Unit 12		Barrie	ON	L4N 9A8
Mr	Vassey	Lumley		Sudbury Trail Plan	P.O. Box 2900, Station "A"		Sudbury	ON	P5E 1G4
Mr	Lloyd	Myllyen	Club President	Broderdale Snowmobile Association	P.O. Box 1085, Station "A"		Sudbury	ON	P3E 4S6
Mr	Jim	Reid	Trail Director	Broderdale Snowmobile Association	3800 Sunvalley Road		Sudbury	ON	P3G 1K3
Ms	Debbie	Nicholson	President and CEO	Greater Sudbury Chamber of Commerce	166 Douglas Street		Sudbury	ON	P3E 1G1
Mr	Barry	Cotton		South End Rate Payers Association	218 Stewart Drive		Sudbury	ON	P3E 2R5
Mr	Ted	MacMillan		Regent Street Rate Payers Association	345 Austin Street		Sudbury	ON	P3E 2K3
Ms	Judith	Comtois	Chairperson	Silver Lake Committee	242 Tenth Avenue, P.O. Box 518		Lively	ON	P3Y 1M5
Mr	Larry	Ship	Manager of Design and Planning	Regional Cable Systems	500 Barrydowne Road	P.O. Box 4500	Sudbury	ON	P3E 5W1
Mr	Paul	Deredin		Union Gas	P.O. Box 4000	Station "A"	Sudbury	ON	P3A 4S3
Mr	Greg	Towns	First Line Manager	Hydro One	957 Falconbridge Road	P.O. Box 2040, Station "A"	Sudbury	ON	P3A 4R8
Mr	Kerry	Taylor	Manager of Engineering	Greater Sudbury Hydro Plus	500 Regent Street, P.O. Box 250		Sudbury	ON	P3E 4P1
Mr	Erro	Makela	Manager	Bell Canada	Access Network Provisioning	200 Brady Street, 1st Floor	Sudbury	ON	P3E 3L9
Mr	Larry	Hautamaki	Hautamaki Property	c/o Pro Can Realty Ltd.	3077 Long Lake Road		Sudbury	ON	P3G 1N4
Mr	Lou	Pagnutti	Pagnutti Developments Ltd.	c/o Ernst & Young	222 Bay Street Tower, P.O. Box 251		Toronto	ON	M5K 1J7
Ms	Celia	Teale		Dalron Construction Ltd.	130 Elm Street		Sudbury	ON	P3C 1T6
Mr	Ron	Arnold		Dalron Construction Ltd.	130 Elm Street		Sudbury	ON	P3C 1T6
Ms	Nancy	Titton		J.N. Construction Ltd.	311 Harrison Drive		Sudbury	ON	P3E 5E1
Mr	G.	Ceccarelli, C.A.	1085903 Ontario Ltd.	c/o B & J Holdings Ltd.	P.O. Box 913, Station "A"		Sudbury	ON	P3E 4S4
Mr	Marcel	Ethier		Ethier Sand and Gravel Ltd.	2589 Ida Street		Sudbury	ON	P3E 4W9



Title	FirstName	LastName	JobTitle	Company	Address1	Address2	City	State	PostalCode
Mr	Michael	Mirka		Lake Stewardship Committee	5694 Raft Lake Road		Sudbury	ON	P3G 1M4
Mr	Sheldon	Lowe	Lake Stewardship Committee	Clearwater Lake	5437 Clearwater Lake Road		Sudbury	ON	P3G 1L9
Ms	Elin	Maki-Flora	Lake Stewardship Committee	Lake Penage	95 Field Street		Lively	ON	P3Y 1B2
Mr	Paul	McMillan	Lake Stewardship Committee	McFarlane Lake	1169 Leedale Avenue		Sudbury	ON	P3G 1B9
Ms	Karen	Ojanpera	Lake Stewardship Committee	Lake Penage	Penage Lake Road		Whitefish	ON	P0M 3E0
Dr.	David	Pearson	Co-operative Freshwater Ecology Unit	Department of Earth Sciences	Laurentian University	935 Ramsey Lake Road	Sudbury	ON	P3E 2C6
Mr	Alan	Lock	MIRARCO	Laurentian University	933 Ramsey Lake Road		Sudbury	ON	P3E 6B5
Dr	Graeme	Spiers	Director	MIRARCO	Laurentian University	933 Ramsey Lake Road	Sudbury	ON	P3E 6B5
Mr	John	Haine			2783 Algonquin Road		Sudbury	ON	P3E 4X7
Mr	John	Rutherford			67 Indian Road		Sudbury	ON	P3E 2M8
Mr	John	Lindsay	GSLIAP	Minnow Lake Restoration Group	1439 Bancroft Drive		Sudbury	ON	P3B 1R6
Mrs	Linda	Maki			167 Countryside Drive		Sudbury	ON	P3E 6G3
Mr and Mrs	Chris and Linda	Melchior			420 Culver Crescent		Sudbury	ON	P3E 4Y3
Mr and Mrs	Antonio and Luisa	Mastroianni			466 Culver Crescent		Sudbury	ON	P3E 4Y4
Mr	Gerry	Seguin			515 Eastern Avenue		Lively	ON	P3Y 1M5
Mr and Mrs	John and Lise	Anderson			2676 Green Avenue		Sudbury	ON	P3E 4Y4
Ms	Kathy	Lessard			2711 Green Avenue		Sudbury	ON	P3E 4X3
Mr	Scott	Hancock			2653 Greenvalley Drive		Sudbury	ON	P3E 5B7
Mrs	Sondra	Lawrie			2665 Greenvalley Drive		Sudbury	ON	P3E 5B7
Mr	Ronald	Yeomans			2670 Greenvalley Drive		Sudbury	ON	P3E 5B8
Mr	Tim	Ruthenberg			2718 Greenvalley Drive		Sudbury	ON	P3E 5B8
Ms	Lana	McKinnon	Lake Water Quality Program Co-ordinator	City of Greater Sudbury	P.O. Box 5000, Station "A"	200 Brady Street, Tom Davies Square	Sudbury	ON	P3A 5P3
Mr and Mrs	Peter and Margaret	Neilson/Martin			2509 Ida Street		Sudbury	ON	P3E 5B7
Mr and Mrs	Rodney and Monique	Larocque			2509 Ida Street		Sudbury	ON	P3E 4W9
Mr and Mrs	Leighton and Paulette	Roslyn			7 Lady Ashley Court		Sudbury	ON	P3E 4W9
Mr	Rick	Ahola			36 Lake Street		Lively	ON	P3Y 1G1
Mr	Dieter	Schoenefeld			945 Leedale Avenue		Sudbury	ON	P3G 1B9
Mr	Peter	Hewitt			331 Martilla Drive, Apt. 1307		Sudbury	ON	P3C 3G3

Title	FirstName	LastName	JobTitle	Company	Address1	Address2	City	State	PostalCode
Mr	Frank	Benish			409 Nepahwin Avenue		Sudbury	ON	P3E 2H5
Mr	Alex	Sorsensen			9 Saturn Street		Sudbury	ON	P3E 4X7
Mr	Haydn	Butler			647 Silver Lake Road		Sudbury	ON	P3C 1J9
Mr	Brad	Bowman			1130 Southlane Road		Sudbury	ON	P3C 1J9
Mr and Mrs	Lauri and Denise	Tainio			60 Tuddenham Street		Sudbury	ON	P3C 3G3
Mr	Armand	Therrien			436 Westmount Avenue		Sudbury	ON	P3A 5Z8
Mr	Luke	Luukonen			208 Beatrice Street West		Oshawa	ON	L1G 7M9
Ms	Caroline	Recollect		Wahnapitae First Nations	P.O. Box 1501, Lot 1E		Capreol	ON	P0M 1H0
Mr	Bill	Keller		Co-operative Freshwater Ecology Unit/MOE	1222 Ramsey Lake Road		Sudbury	ON	P3E 2C6
Mr	Bud	Hebner	Area Supervisor - Sudbury District	Ministry of Natural Resources	3767 Highway 69 South, Suite 5		Sudbury	ON	P3G 1E7
Mr	John	Gunn		Co-operative Freshwater Ecology Unit/MNR/LU	1222 Ramsey Lake Road		Sudbury	ON	P3E 2C6
Mr	Rod	Sein	Surface Water Specialist	Ministry of the Environment	199 Larch Street, Suite 1101		Sudbury	ON	P3E 5P9
Mr	Raymond	Sauve			3274 Algonquin Road		Sudbury	ON	P3E 4X4
Ms	Jacqueline	Beaulieu			1009 Lynwood Drive		Sudbury	ON	P3A 3N6
Mr	Gerald	Desroches			955 Bancroft Drive		Sudbury	ON	P3B 1P8
			Lornvic Investments Inc.		409 Nepahwin Avenue		Sudbury	ON	P3E 2H5
			Marslen Investments limited		2589 Ida Street		Sudbury	ON	P3E 4W9
Mr	Norm	Ethier		Ethier Sand and Gravel Ltd.	2589 Ida Street		Sudbury	ON	P3E 4W9
Mr	Roland	Ethier			Turenne Road	R.R. 4, Site 1, Box 15	Alban	ON	P0M 1A0
Mr	Armand	Sauve			2995 Regent Street		Sudbury	ON	P3E 5H6
Mr	Bradley	Hayes			3221 Algonquin Road		Sudbury	ON	P3E 4X5
Ms	Lindsay	Clark			3233 Algonquin Road		Sudbury	ON	P3E 4X5
Mr	Gordon	Racicot			3248 Algonquin Road		Sudbury	ON	P3E 4X5
Mr	Richard	Lebourque			3252 Algonquin Road East		Sudbury	ON	P3E 4X4
Mr	Henry	Vaillancourt			3232 Algonquin Road East		Sudbury	ON	P3E 4X4
Ms	Farah	Bassem			115 Windsor Crescent		Sudbury	ON	P3E 1Z6
Mr	Agostino	Rocca			384 Gravelle Road		Sudbury	ON	P3E 4Y8
Mr	Blayne	Armstrong			374 Gravelle Road		Sudbury	ON	P3E 4Y8



Title	FirstName	LastName	JobTitle	Company	Address1	Address2	City	State	PostalCode
Mr and Mrs	Joseph and Janet	Burns			402 Gravelle Road		Sudbury	ON	P3E 4Y8
Mr	Wayne	Hunt			406 Gravelle Road		Sudbury	ON	P3E 4Y8
Mr	John	Gouchie			411 Gravelle Road		Sudbury	ON	P3E 4Y9
Mr	Christopher	Stokes			405 Gravelle Road		Sudbury	ON	P3E 4Y9
Ms	Joan	Smeltzer			393 Gravelle Road		Sudbury	ON	P3E 4Y9
Mr	Marc	Morin			377 Gravelle Road		Sudbury	ON	P3E 4Y9
Mr	Dennis	Frohlick			2558 Ida Street		Sudbury	ON	P3E 4X1
Ms	Jeanne	Hermikari			2548 Ida Street		Sudbury	ON	P3E 4X1
Mr	Daniel	Adams			2540 Ida Street		Sudbury	ON	P3E 4X1
Mr and Mrs	Gregory and Karen	Morrow			2530 Ida Street		Sudbury	ON	P3E 4X1
Mr	Frederick	Beaudry			2522 Ida Street		Sudbury	ON	P3E 4X1
Mr	Paolo	Durigon			2514 Ida Street		Sudbury	ON	P3E 4X1
Ms	Edith	Hodgins			2494 Ida Street		Sudbury	ON	P3E 4X1
Mr	Richard	Brachman			2486 Ida Street		Sudbury	ON	P3E 4X1
Mr	Timothy	Williams			2476 Ida Street		Sudbury	ON	P3E 4X1
Ms	Diane	Gagnon			2468 Ida Street		Sudbury	ON	P3E 4X1
Ms	Sarina	Dattilo			55 Crater Crescent		Sudbury	ON	P3E 5Y6
Mr	Robert	Knight			2471 Ida Street		Sudbury	ON	P3E 4W9
Mr and Mrs	Michael and Nancy	Gouchie			2481 Ida Street		Sudbury	ON	P3E 4W9
Mr	Josef	Stronegger			2491 Ida Street		Sudbury	ON	P3E 4W9
Ms	Debbie	Legault			2499 Ida Street		Sudbury	ON	P3E 4W9
Mr	Maurice	Conrad			2521 Ida Street		Sudbury	ON	P3E 4W9
Mr	Christopher	Sheridan			2531 Ida Street		Sudbury	ON	P3E 4W9
Ms	Maryillis	Taylor			2545 Ida Street		Sudbury	ON	P3E 4W9
Mr	Benito	Rocca			935 Woodlawn Road		Sudbury	ON	P3E 6J6
Mr	Henry	Schroeder			2642 Green Avenue		Sudbury	ON	P3E 4X2
Mr	Saverio	Rocca			935 Woodland Road		Sudbury	ON	P3E 6J6
Mr	Fernand	Laurin			2650 Green Avenue		Sudbury	ON	P3E 4X2
Ms	Tina	Korzeniecki			2666 Green Avenue		Sudbury	ON	P3E 4X2
Mr	John	Anderson			2676 Green Avenue		Sudbury	ON	P3E 4X2
Ms	Eva	Sarre			2686 Green Avenue		Sudbury	ON	P3E 4X2
Mr	Howard	Ireland			2698 Green Avenue		Sudbury	ON	P3E 4X2
Ms	Muriel	Anderson			2712 Green Avenue		Sudbury	ON	P3E 4X2
Mr	Edgar	Lessard			2711 Green Avenue		Sudbury	ON	P3E 4X3
Mr	Morgan	Piccinetti			2701 Green Avenue		Sudbury	ON	P3E 4X3
Ms	Elaine	Yasinowski			2685 Green Avenue		Sudbury	ON	P3E 4X3
Mr	Robert	Morneau			2685 Green Avenue	Basement Apartment	Sudbury	ON	P3E 4X3
Mr and Mrs	James and Lori	Lee			2679 Green Avenue		Sudbury	ON	P3E 4X3
Mr	John	Jakov			2661 Green Avenue		Sudbury	ON	P3E 4X3
Mr	Ralph	Pileggi			2649 Green Avenue		Sudbury	ON	P3E 4X3
Ms	Giuseppina	Pileggi			2635 Green Avenue		Sudbury	ON	P3E 4X3
Mr	Lawrence	Michasiw			376 Culver Crescent		Sudbury	ON	P3E 4Y3

Title	FirstName	LastName	JobTitle	Company	Address1	Address2	City	State	PostalCode
Mr	Patrick	Thompson			396 Culver Crescent		Sudbury	ON	P3E 4Y3
Mr	Stan	Miller			394 Culver Crescent		Sudbury	ON	P3E 4Y3
Mr	John	Mearini			420 Culver Crescent		Sudbury	ON	P3E 4Y3
Ms	Jo-Anne	Valin			428 Culver Crescent		Sudbury	ON	P3E 4Y3
Mr	Andrew	Burke			581 Princess Street		Woodstock	ON	N4S 4H3
Mr	Giuseppe	Mastroianne			482 Culver Crescent		Sudbury	ON	P3E 4Y4
Ms	Mildred	Powell			498 Culver Crescent		Sudbury	ON	P3E 4Y4
Ms	Eva	Kamarainen			508 Culver Crescent		Sudbury	ON	P3E 4Y4
Mr	Ken	Johnson			522 Culver Crescent		Sudbury	ON	P3E 4Y4
	Hannu	Hintsa			387 Culver Crescent		Sudbury	ON	P3E 4Y5
Mr	Umberto	Isabella			399 Culver Crescent		Sudbury	ON	P3E 4Y5
Mr	Philip	Doiron			413 Culver Crescent		Sudbury	ON	P3E 4Y5
Mr	Fook	Lum			407 Culver Crescent		Sudbury	ON	P3E 4Y5
Mr	Peter	Williams			419 Culver Crescent		Sudbury	ON	P3E 4Y5
	Leslie	Walsh			425 Culver Crescent		Sudbury	ON	P3E 4Y5
Ms	Birgitt	Rahmenfuehrer			435 Culver Crescent		Sudbury	ON	P3E 4Y5
Mr	Dario	Rocca			443 Culver Crescent		Sudbury	ON	P3E 4Y5
Mr	Ross	Riley			459 Culver Crescent		Sudbury	ON	P3E 4Y5
Mr	John	Provatopoulos			491 Culver Crescent		Sudbury	ON	P3E 4Y5
Mr	Alan	Gorman			497 Culver Crescent		Sudbury	ON	P3E 4Y5
Ms	Kimberly	Pageau			503 Culver Crescent		Sudbury	ON	P3E 4Y5
Mr	Ole	Madsen			509 Culver Crescent		Sudbury	ON	P3E 4Y5
Mr	Leo	Lapiere		Brown's Concrete		3075 Herold Drive	Sudbury	ON	P3E 6K9
Mrs	Beverly	Charles			2569 Field Street		Sudbury	ON	P3E 4X8
Mr and Mrs	Mario and Marcelle	Lague			2577 Field Street		Sudbury	ON	P3E 4X8
				Petro Canada	Central Region Business Centre	3275 Rebecca Street	Oakville	ON	L6L 6N5
				Estate of Joyce Chapman	2504 Ida Street		Sudbury	ON	P3E 4X1



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## Community Meeting No. 2

May 20, 2004

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FILE COPY



The City of Greater Sudbury

# COMMUNITY MEETING NO. 2 INFORMATION PACKAGE

## ALGONQUIN ROAD WATERSHED STORMWATER MANAGEMENT STUDY CLASS EA

May 20, 2004  
Countryside Arena

E A R T H  T E C H

A *tyco* INTERNATIONAL LTD. COMPANY



# **Welcome to the Algonquin Road Watershed Stormwater Management Study Class EA Community Meeting No. 2 May 20, 2004**

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- ❖ Please sign in on the sheet provided. Then feel free to walk around and view the displays.
- ❖ Our representatives will be pleased to discuss the project with you.
- ❖ Comment sheets are provided for those who wish to provide comments in writing. Please either place your completed sheets in the Comment Box or mail/fax them to one of the identified Project Team Members (see below) by **June 4, 2004**.
- ❖ Thank you for your involvement in this project.
- ❖ Please contact one of the following Team Members for additional information:

Chris Redmond, P.Eng  
Project Manager  
E-mail: [chris.redmond@earthtech.ca](mailto:chris.redmond@earthtech.ca)

Ron Norton, P.Eng  
Coordinator of Technical Services  
E-mail: [ron.norton@city.greatersudbury.on.ca](mailto:ron.norton@city.greatersudbury.on.ca)

Wendi Mannerow, P.Eng  
Project Engineer  
E-mail: [wendi.mannerow@earthtech.ca](mailto:wendi.mannerow@earthtech.ca)

Earth Tech (Canada) Inc.  
1040 Lorne Street South, Unit 1  
Sudbury, Ontario  
P3C 4R9  
Phone: (705) 674-8343  
Fax: (705) 674-1694

City of Greater Sudbury  
P.O. Box 5000, Station "A"  
200 Brady Street, Tom Davies Square  
Sudbury, Ontario  
P3A 5P3  
Phone: (705) 671-2489 ext. 2362  
Fax: (705) 673-5171



# Study Overview

## Community Meeting

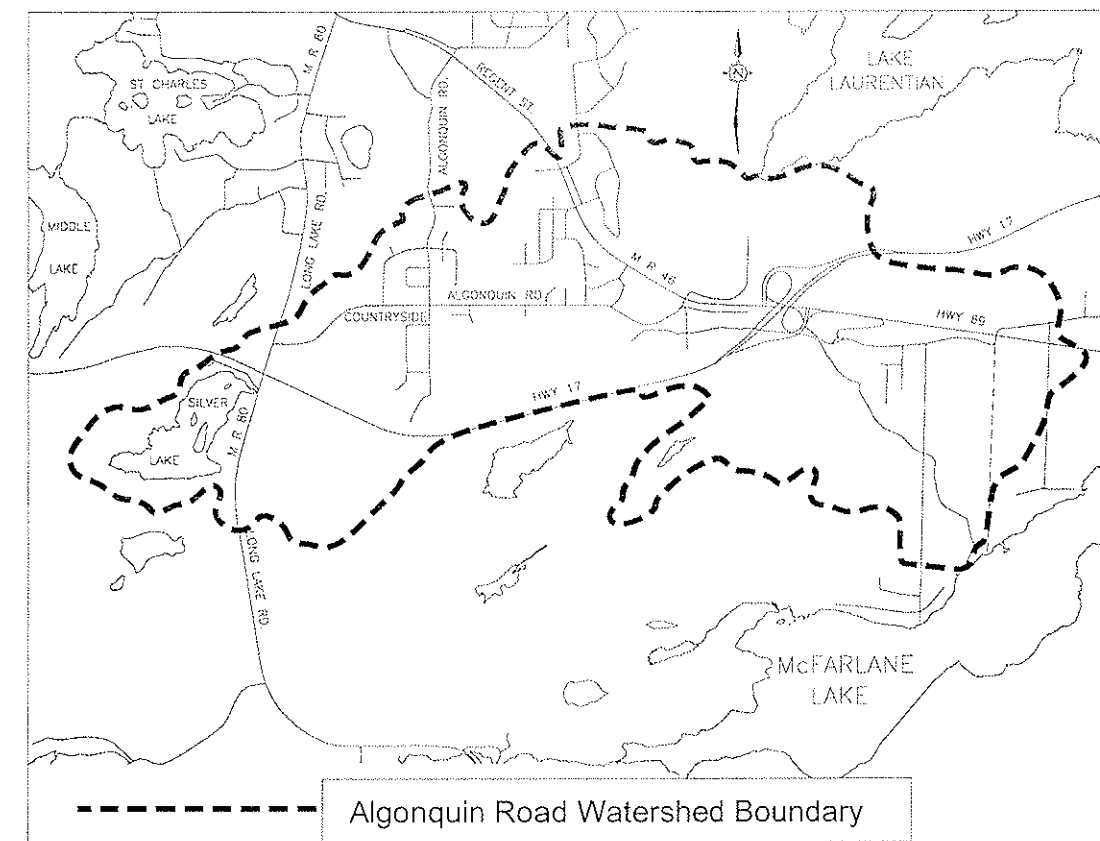
- ❖ The purpose of this Community Meeting is to introduce you to this study, inform you of our progress to date, and obtain your comments.

## Study Purpose

- ❖ The City of Greater Sudbury, through Earth Tech Canada Inc., has initiated a study to carry out a Municipal Class Environmental Assessment (EA) to identify ways and means to control quantity and address quality of storm water within the Algonquin Road Watershed during minor and major rainfall / snow melt events for both pre-development and post-development conditions to minimize the risk and effects of:
  - o Flooding on public and private property;
  - o Erosion and sedimentation of water courses; and
  - o Runoff pollution in drainage channels, water courses and McFarlane Lake.
- ❖ For the purpose of this study, the system as of January 2003 is considered “pre-development” and the conceptual fully developed watershed is considered “post-development”.

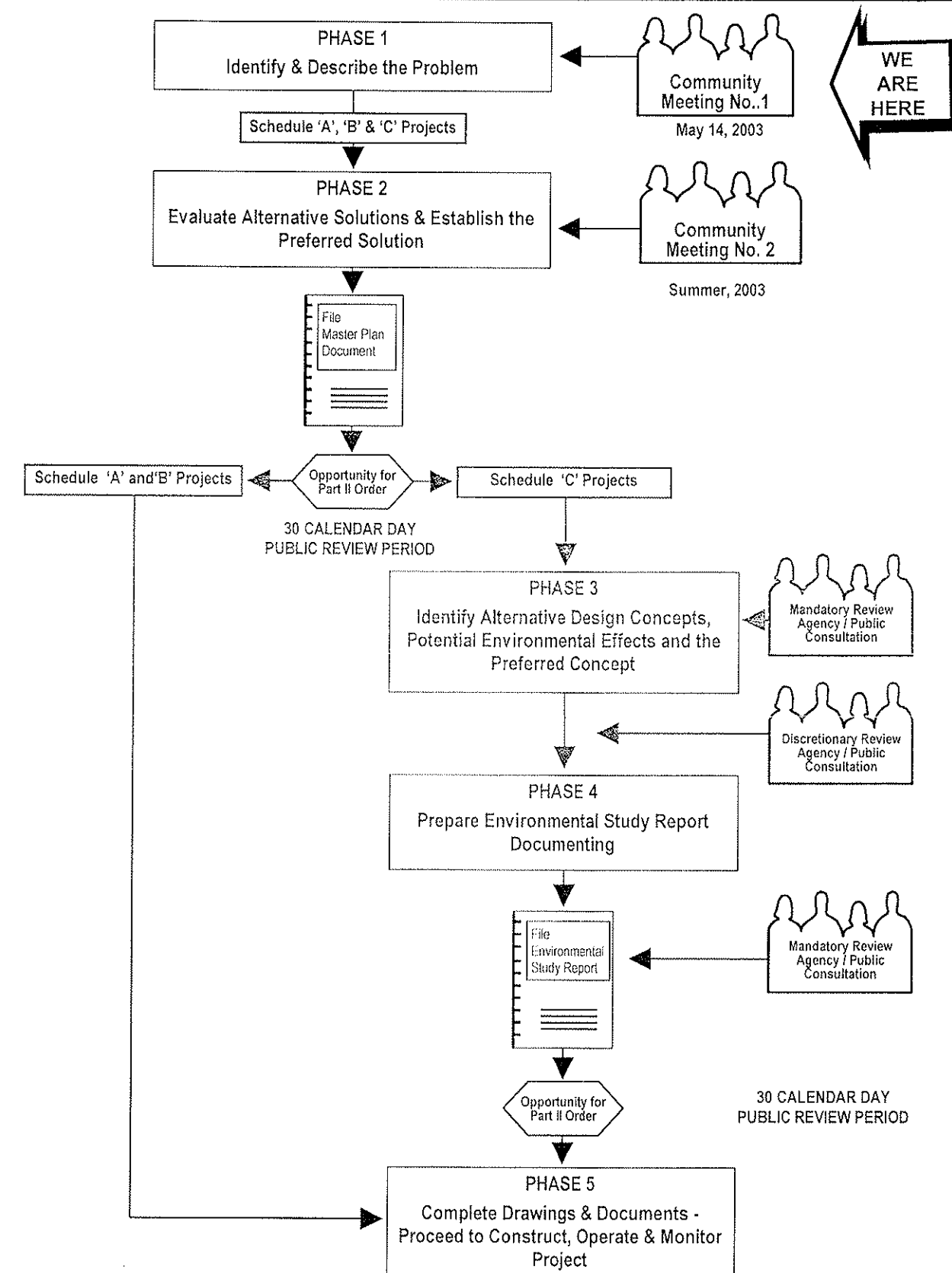
- ❖ Storm water within the Algonquin Road Watershed follows a drainage course from Silver Lake to McFarlane Lake and is characterized by:
  - o Many minor wetlands;
  - o Culvert crossings under highways and residential roads;
  - o Storm sewer systems conveying water to open ditches;
  - o Overland flow in rural areas; and
  - o Roadside ditches.

## Study Area



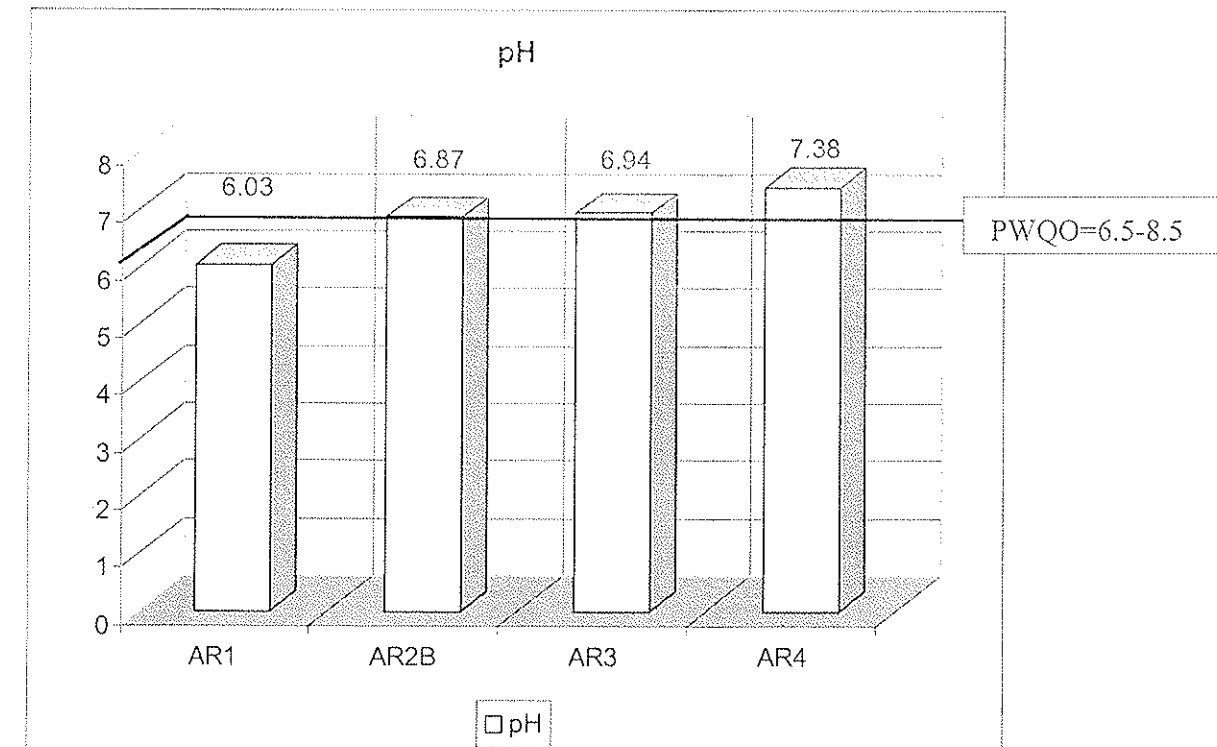
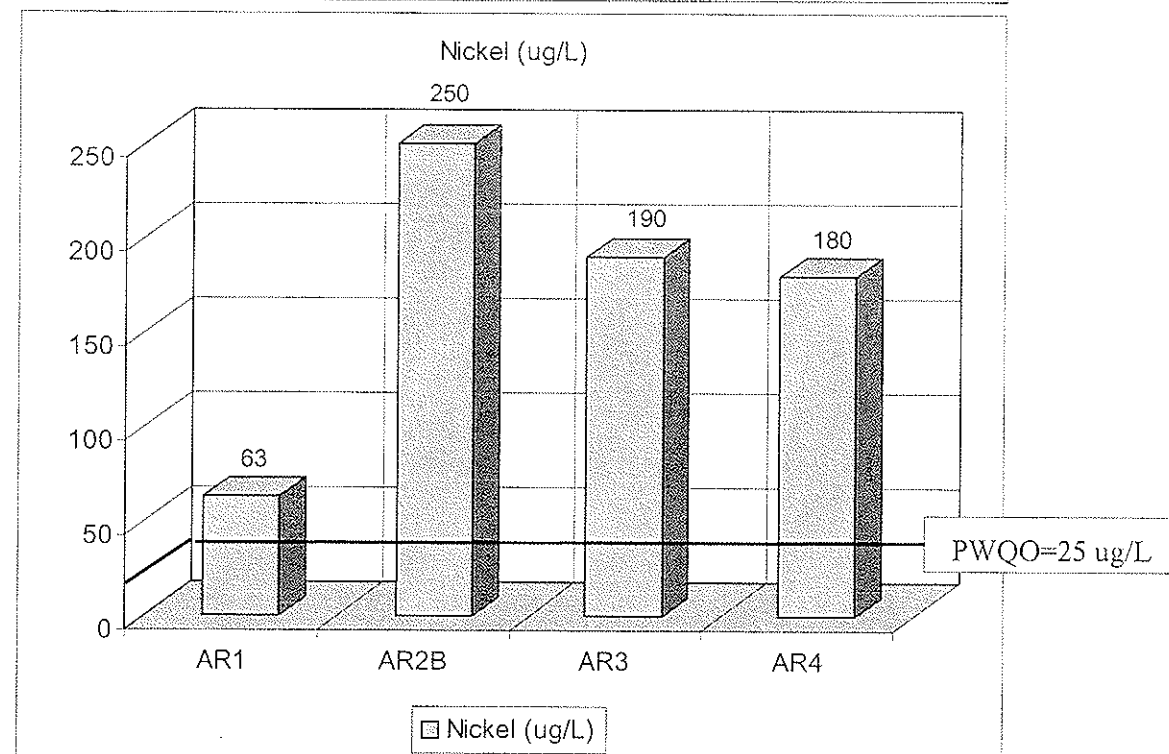
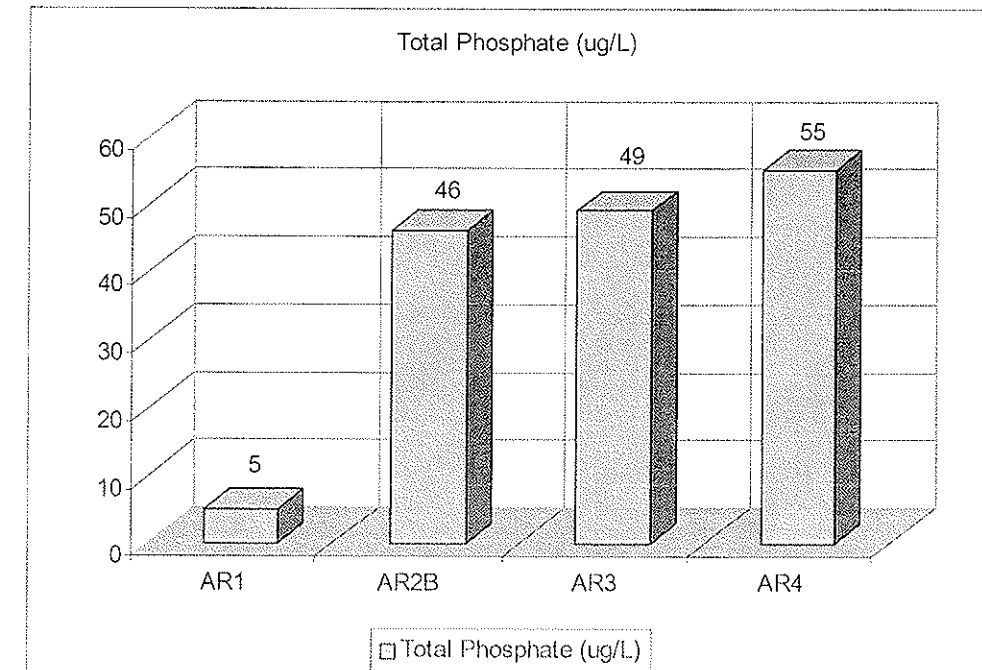
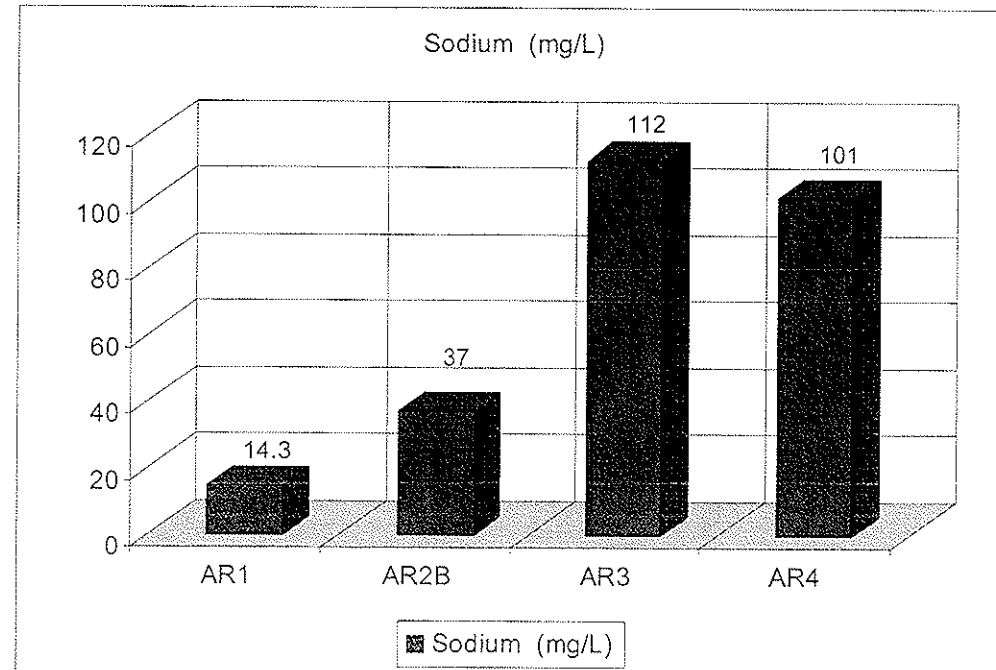
# Overview of the Class Environmental Assessment Process

- ❖ This study is being undertaken in accordance with the *Municipal Class Environmental Assessment* (Class EA) Master Planning process.
- ❖ The Class EA is approved under the *Environmental Assessment Act* and enables the planning of municipal infrastructure projects in accordance with a proven procedure for protecting the environment.
- ❖ The Master Planning process allows for the integration of the Class EA planning principles with the infrastructure requirements for existing and future land uses and involves the preparation of a Master Plan document at the conclusion of Phases 1 and 2 of the Class EA. The Master Plan document is then made available for public comment.
- ❖ The final public notice for the Master Plan will become the Notice of Completion for the recommended Schedule 'B' projects.
- ❖ The Master Plan will provide the basis for any recommended Schedule 'C' projects, but they will have to complete Phases 3 and 4 prior to filing an Environmental Study Report for public review.





# Pre Development Storm Water Quality Data



PWQO = Provincial Water Quality Objectives

AR1 = Outlet Silver Lake

AR2A= Upstream end of Mallards Pond (data not yet available)

AR2B = Outlet Mallards Pond

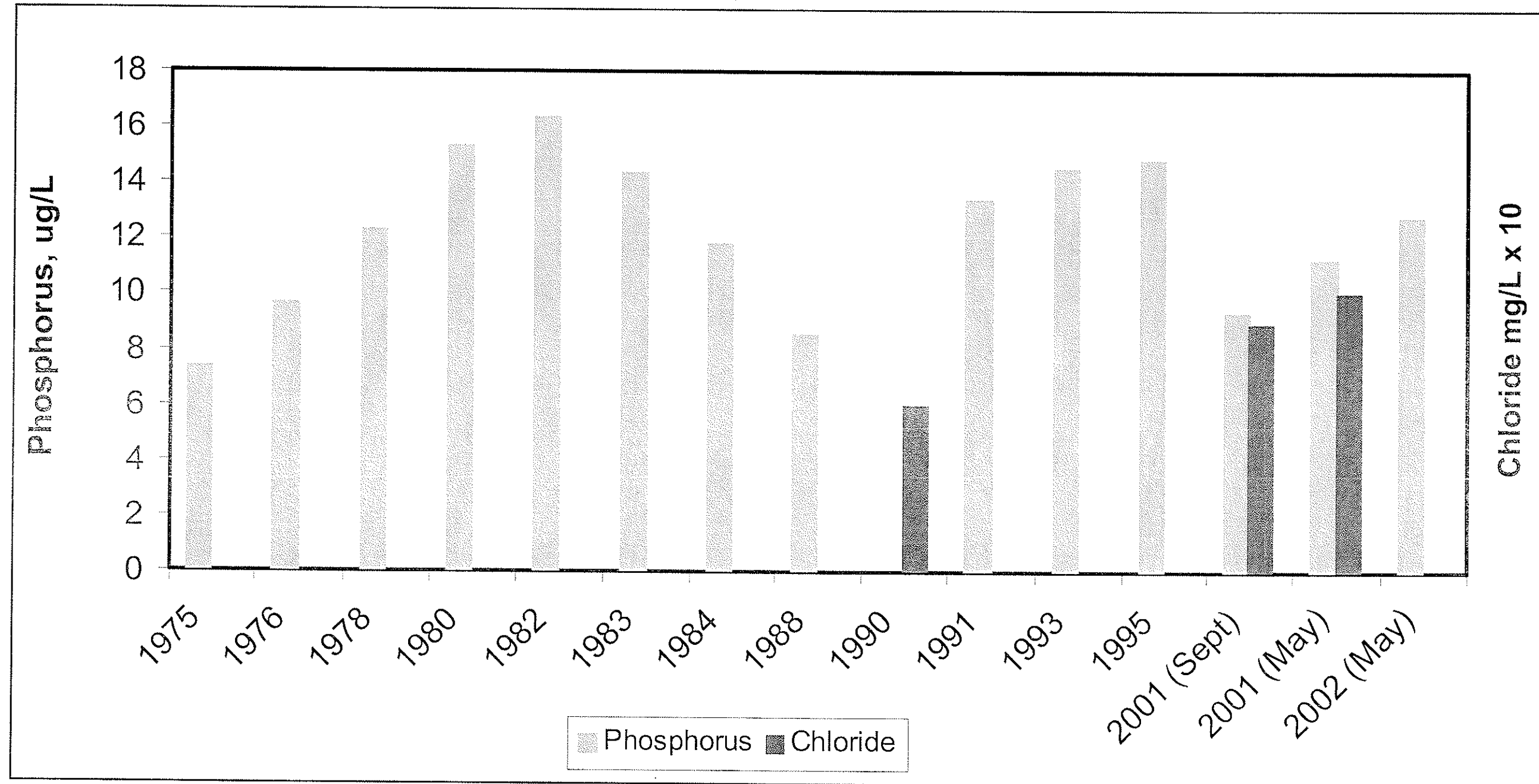
AR3 = Hwy 69 Bypass Culvert

AR4 = CKSO Road

AR5= Entrance to McFarlane Lake (data not yet available)

Date of Sampling: April 21, 2003

# McFarlane Lake Historical Water Quality Data (Phosphorus and Chloride Concentrations)



Data obtained from: [www.city.greatersudbury.on.ca](http://www.city.greatersudbury.on.ca)



## The Problem Statement

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- ❖ The existing drainage system in the Algonquin Road Watershed is not adequate for accommodating peak flows in isolated areas and under extreme rainfall events.
- ❖ The City of Greater Sudbury is experiencing urban growth in the Algonquin Road Watershed that is expected to continue.
- ❖ As a result of urban growth, quantity and quality changes to stormwater runoff are anticipated.
- ❖ This study will provide a plan for managing the impacts of urban growth on stormwater runoff.

# Alternative Storm Water Management Strategies

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## A. *Do Nothing*

- o No changes or improvements to the existing storm water management system would be undertaken. Since no changes or improvements are proposed, this alternative provides a comparative benchmark for evaluating the other alternatives.

## B. *Implement Storm Water Quality Management Policies and Outreach Programs*

- o Storm water quality management policies (e.g., road sweeping) and outreach programs (e.g., residential fertilization application) applicable to the Study Area would be developed and implemented based on the experiences of other municipalities.
- o Implementing policies for removing road sediment at source would reduce the need for storm water quality management facilities downstream. Similarly, phosphorus loading downstream would be reduced through a successful outreach program on residential fertilization application.

## C. *Undertake Conveyance System Modifications*

- o The capacity of existing stormsewers and/or culverts would be increased to reduce/eliminate the risk of upstream flooding under post-development flow conditions. As a result, flows greater than those under pre-development conditions would be conveyed.

## D. *Implement Design Guidelines and Programs to Promote Surface Drainage*

- o Design Guidelines for future growth within the Watershed would be developed and implemented to reduce the risk of:
  - surface ponding
  - uncontrolled subsurface drainage
- o Programs for inspection / monitoring of conveyance systems would be implemented to promote surface drainage through existing developments.

## E. *Construct Storm Water Management Facilities (Ponds)*

- o Storm water management facilities (ponds) would be constructed at various locations throughout the Study Area allowing for storm water storage with controlled release rates for quantity and/or quality management.
- o Conceptual storm water management facility locations have been identified in the City's Terms of Reference for this Study and additional locations based on land use and topography may be identified and evaluated.

ALTERNATIVE STORMWATER MANAGEMENT STRATEGIES EVALUATION SUMMARY

ALTERNATIVE STORMWATER MANAGEMENT STRATEGIES	CATEGORIES OF CONSIDERATION				
	TECHNICAL	NATURAL ENVIRONMENT	SOCIAL/CULTURAL	LEGAL/JURISDICTIONAL	FINANCIAL
ALTERNATIVE A <i>DO NOTHING</i>	<ul style="list-style-type: none"><li>Does not accommodate peak flows in isolated area and under extreme rainfalls events</li><li>Does not address anticipated stormwater quality and quantity changes due to planned urban growth</li></ul>	<ul style="list-style-type: none"><li>No short term construction related effects on the watershed and McFarlane Lake</li><li>No improvement in water quality (i.e. continued erosion/sedimentation of watercourses and runoff pollution)</li></ul>	<ul style="list-style-type: none"><li>No short term construction related effects on area residents</li><li>Potential flooding on public and private property remains</li></ul>	<ul style="list-style-type: none"><li>Alternative can be fully implemented by the City</li></ul>	<ul style="list-style-type: none"><li>No capital costs</li></ul>
ALTERNATIVE B <i>IMPLEMENT STORMWATER QUALITY MANAGEMENT POLICIES AND OUTREACH PROGRAMS</i>	<ul style="list-style-type: none"><li>Does not accommodate peak flows in isolated area and under extreme rainfalls events</li><li>Can address anticipated stormwater quality changes, but not quantity changes due to planned urban growth</li></ul>	<ul style="list-style-type: none"><li>No short term construction related effects on the watershed and McFarlane Lake</li><li>Potential improvement in water quality (i.e. reduced sedimentation of watercourses and runoff pollution)</li></ul>	<ul style="list-style-type: none"><li>No short term construction related effects on area residents</li><li>Potential flooding on public and private property remains</li></ul>	<ul style="list-style-type: none"><li>Alternative implementation is partially dependant upon community participation</li></ul>	<ul style="list-style-type: none"><li>Relatively minor capital costs</li></ul>
ALTERNATIVE C <i>UNDERTAKE CONVEYANCE SYSTEM MODIFICATIONS</i>	<ul style="list-style-type: none"><li>Does accommodate peak flows in isolated area and under extreme rainfalls events</li><li>Does address anticipated stormwater quantity changes, but not quality changes due to planned urban growth</li></ul>	<ul style="list-style-type: none"><li>Short term construction related effects on the watershed and McFarlane Lake would be minimized through standard mitigation measures</li><li>No improvement in water quality (i.e. continued erosion/sedimentation of watercourses and runoff pollution)</li></ul>	<ul style="list-style-type: none"><li>Short term construction related effects on area residents would be minimized through standard mitigation measures</li><li>Potential flooding on public and private property would be reduced</li></ul>	<ul style="list-style-type: none"><li>Alternative can be fully implemented by the City</li></ul>	<ul style="list-style-type: none"><li>Relatively major capital costs</li></ul>
ALTERNATIVE D <i>IMPLEMENT DESIGN GUIDELINES AND PROGRAMS TO PROMOTE SURFACE DRAINAGE</i>	<ul style="list-style-type: none"><li>Does not accommodate peak flows in isolated area and under extreme rainfalls events</li><li>Can address anticipated stormwater quantity changes, but not quality changes due to planned urban growth</li></ul>	<ul style="list-style-type: none"><li>No short term construction related effects on the watershed and McFarlane Lake</li><li>No improvement in water quality (i.e. continued erosion/sedimentation of watercourses and runoff pollution)</li></ul>	<ul style="list-style-type: none"><li>No short term construction related effects on area residents</li><li>Potential flooding on public and private property can be reduced</li></ul>	<ul style="list-style-type: none"><li>Alternative can be fully implemented by the City but is dependant upon development compliance</li></ul>	<ul style="list-style-type: none"><li>Relatively minor capital costs</li></ul>
ALTERNATIVE E <i>CONSTRUCT STORMWATER MANAGEMENT FACILITIES</i>	<ul style="list-style-type: none"><li>Does accommodate peak flows in isolated area and under extreme rainfalls events</li><li>Does address anticipated stormwater quantity and quality changes due to planned urban growth</li></ul>	<ul style="list-style-type: none"><li>Short term construction related effects on the watershed and McFarlane Lake would be minimized through standard mitigation measures</li><li>Improvement in water quality (i.e. reduced sedimentation of watercourses and runoff pollution)</li></ul>	<ul style="list-style-type: none"><li>Short term construction related effects on area residents would be minimized through standard mitigation measures</li><li>Potential flooding on public and private property would be reduced</li></ul>	<ul style="list-style-type: none"><li>Alternative can be fully implemented by the City</li></ul>	<ul style="list-style-type: none"><li>Relatively major capital costs</li></ul>

Legend:  Recommended Stormwater Management Strategy

Notes:

1. Since the Recommended Strategies include Stormwater Management Strategy C (Undertake Conveyance System Modifications) and E (Construct Stormwater Management Facilities), Alternative Conveyance System Modifications and Stormwater Management Facility Locations were identified and comparatively evaluated as the next step in the study



# ALTERNATIVE STORMWATER MANAGEMENT FACILITIES EVALUATION SUMMARY

STORMWATER MANAGEMENT (SWM) FACILITIES AND ALTERNATIVES		ALTERNATIVE DESCRIPTION	CATEGORIES OF CONSIDERATION				EVALUATION SUMMARY
			TECHNICAL	NATURAL ENVIRONMENT	SOCIAL/CULTURAL	FINANCIAL	
SWM FACILITY #1	Alternative 1-1: Create Additional Storage within Silver Lake	<ul style="list-style-type: none"> <li>Construct berm with low-flow outlet to create additional storage</li> </ul>	<ul style="list-style-type: none"> <li>Peak flows not significantly affected by provision of additional storage (Peak flows effectively reduced due to existing conditions)</li> <li>Facility to service existing developed areas</li> <li>No existing water quality concerns</li> </ul>	<ul style="list-style-type: none"> <li>Potential negative impact of larger fluctuations in water levels on existing vegetation and wetlands in fringe areas</li> </ul>	<ul style="list-style-type: none"> <li>Insignificant reduction to downstream flood risk elevation by provision of additional storage</li> <li>Potential negative impact of higher water levels on existing property immediately adjacent to Silver Lake</li> </ul>	<ul style="list-style-type: none"> <li>\$18,000 capital costs</li> </ul>	<ul style="list-style-type: none"> <li>Highest cost alternative</li> <li>Insignificant reduction to downstream flood risk elevation by provision of additional storage</li> <li>Peak flows not significantly affected by provision of additional storage (Peak flows effectively reduced due to existing conditions)</li> <li>Potential negative impact of higher water levels on existing property immediately adjacent to Silver Lake</li> <li>No existing water quality concerns</li> </ul>
	Alternative 1-2: Maintain Existing Conditions	<ul style="list-style-type: none"> <li>Existing storage area (Silver Lake and surrounding wetlands) covers more than half of the catchment area</li> <li>Utilize existing storage</li> </ul>	<ul style="list-style-type: none"> <li>The majority of runoff from the catchment is naturally stored</li> <li>Peak flows effectively reduced due to existing conditions</li> <li>No existing water quality concerns</li> </ul>	<ul style="list-style-type: none"> <li>No impact on existing vegetation and wetlands in fringe areas</li> <li>Natural wetland process enhances quality by addition of alkalinity and adsorption of metals. Process also provides some vegetation enhancement</li> </ul>	<ul style="list-style-type: none"> <li>Maintains flood risk elevation downstream</li> <li>No impact on existing property immediately adjacent to Silver Lake</li> </ul>	<ul style="list-style-type: none"> <li>No capital costs</li> </ul>	<b>RECOMMENDED</b> <ul style="list-style-type: none"> <li>Lowest cost alternative</li> <li>Maintains flood risk elevation downstream</li> <li>Peak flows effectively reduced due to existing conditions</li> <li>No impact on existing property immediately adjacent to Silver Lake</li> <li>No existing water quality concerns</li> <li>Natural wetland process benefits</li> </ul>
SWM FACILITY #2	Alternative 2-1: Provide On-Site Quantity Control Upstream of Highway 17 (Assumes development)	<ul style="list-style-type: none"> <li>If more than 50% of the catchment area is developed, then undertake a Wetland Impact Assessment (WIA). The WIA will determine if on-site quantity control is feasible within the catchment area</li> <li>If feasible, then create an on-site storage area for quantity control</li> </ul>	<ul style="list-style-type: none"> <li>Existing natural storage is effective. Volume requirement is related to portion of area that develops and loss of natural storage</li> <li>Facility to service potential growth area</li> <li>As a minimum, the peak flow capacity of the highway culverts cannot be exceeded</li> <li>Water quality not addressed</li> </ul>	<ul style="list-style-type: none"> <li>Potential impact on natural environment by converting natural wetland to engineered facility</li> <li>Wetland impact assessment required prior to proceeding</li> </ul>	<ul style="list-style-type: none"> <li>Maintains flood risk elevation downstream</li> </ul>	<ul style="list-style-type: none"> <li>Dependent upon extent of development</li> </ul>	<b>RECOMMENDED</b> – If more than 50% of the catchment area is developed and if WIA determines on-site quantity control is feasible <ul style="list-style-type: none"> <li>Lowest cost alternative</li> <li>Maintains flood risk elevation downstream</li> <li>Potential impact on natural environment by converting natural wetland to engineered facility</li> <li>Water quality not addressed</li> </ul>
	Alternative 2-2: Provide No On-Site Quantity Control Upstream of Highway 17 (Assumes development)	<ul style="list-style-type: none"> <li>If WIA determines that on-site quantity control is not feasible, then:</li> <li>Enlarge size of SWM Facility 4 (from 9,600 to 11,600 m<sup>3</sup>) to provide storage for increased flow</li> </ul>	<ul style="list-style-type: none"> <li>Existing natural storage remaining upstream of Highway 17 utilized</li> <li>Capacity of the existing Highway 17 culverts not exceeded</li> <li>Peak flows accommodated by small increase in storage of SWM 4</li> <li>Water quality not addressed</li> </ul>	<ul style="list-style-type: none"> <li>Minimal impact on natural environment</li> <li>Wetland impact assessment required prior to proceeding</li> </ul>	<ul style="list-style-type: none"> <li>Maintains flood risk elevation downstream</li> <li>Increase in peak flows from the site accommodated by additional storage at SWM 4</li> <li>No existing conveyance problems between SWM 2 and SWM 4</li> </ul>	<ul style="list-style-type: none"> <li>Dependent upon extent of development</li> </ul>	<b>RECOMMENDED</b> – If more than 50% of the catchment area is developed and if WIA determines on-site quantity control is not feasible <ul style="list-style-type: none"> <li>Highest cost alternative</li> <li>Maintains flood risk elevation downstream</li> <li>Minimal impact on natural environment</li> <li>Water quality not addressed</li> </ul>
SWM FACILITY #3	Alternative 3-1: Create Additional Storage Upstream of Highway 17 (Assumes no development)	<ul style="list-style-type: none"> <li>Construct berm with low-flow outlet to create additional storage</li> </ul>	<ul style="list-style-type: none"> <li>Peak flows not significantly affected by provision of additional storage (Peak flows effectively reduced due to existing conditions)</li> <li>Facility to service existing developed areas</li> <li>No existing water quality concerns</li> </ul>	<ul style="list-style-type: none"> <li>Potential negative impact of larger fluctuations in water levels on existing vegetation and wetlands</li> </ul>	<ul style="list-style-type: none"> <li>Insignificant reduction to downstream flood risk elevation by provision of additional storage</li> <li>Potential negative impact of higher water levels on existing property immediately adjacent to wetland</li> </ul>	<ul style="list-style-type: none"> <li>\$ 22,000 capital costs</li> </ul>	<ul style="list-style-type: none"> <li>Highest cost alternative</li> <li>Insignificant reduction to downstream flood risk elevation by provision of additional storage</li> <li>Peak flows not significantly affected by provision of additional storage (Peak flows effectively reduced due to existing conditions)</li> <li>Potential negative impact of larger fluctuations in water levels on existing vegetation and wetlands</li> </ul>
	Alternative 3-2: Maintain Existing Conditions (Assumes no development)	<ul style="list-style-type: none"> <li>Existing storage area (ponds and wetlands) covers more than half of the catchment area</li> <li>Utilize existing storage</li> </ul>	<ul style="list-style-type: none"> <li>Peak flows effectively reduced due to existing conditions</li> <li>No existing water quality concerns</li> </ul>	<ul style="list-style-type: none"> <li>No impact on existing vegetation and wetlands</li> </ul>	<ul style="list-style-type: none"> <li>Maintains flood risk elevation downstream</li> <li>No impact on existing property immediately adjacent to wetland</li> </ul>	<ul style="list-style-type: none"> <li>No capital costs</li> </ul>	<b>RECOMMENDED</b> <ul style="list-style-type: none"> <li>Lowest cost alternative</li> <li>Maintains flood risk elevation downstream</li> <li>No impact on existing property immediately adjacent to wetland</li> </ul>

ALTERNATIVE STORMWATER MANAGEMENT FACILITIES EVALUATION SUMMARY

STORMWATER MANAGEMENT (SWM) FACILITIES AND ALTERNATIVES		ALTERNATIVE DESCRIPTION	CATEGORIES OF CONSIDERATION				EVALUATION SUMMARY
			TECHNICAL	NATURAL ENVIRONMENT	SOCIAL/CULTURAL	FINANCIAL	
SWM FACILITY #4(a)	Alternative 4-1:  Provide Quantity Control on Pagnutti Property	<ul style="list-style-type: none"><li>Construct 3000 m<sup>3</sup> of storage within dedicated SWM block</li><li>Dry facility (normally open space) would be filled only during heavy rain events</li></ul>	<ul style="list-style-type: none"><li>Peak flows would be controlled to pre-development levels by provision of on-site storage. Peak flow control provided for this development site only</li><li>Facility to service potential growth area</li><li>No increase in existing capacity of downstream conveyance system</li><li>Water quality not addressed</li></ul>	<ul style="list-style-type: none"><li>Minimal impact on natural environment (dry pond facility would require grading on lands with no environmental issues)</li><li>Location of dry pond, not currently considered fish habitat and fish habitat is not being created</li></ul>	<ul style="list-style-type: none"><li>Maintains flood risk elevation downstream</li><li>SWM facility consistent with current site development plan</li><li>Dry storage could be integrated into park setting</li><li>SWM facility close to existing residents. Public education, public interaction required.</li></ul>	<ul style="list-style-type: none"><li>\$104,000 capital costs</li></ul>	<ul style="list-style-type: none"><li>Lowest cost alternative</li><li>Flood risk elevation downstream maintained at existing levels</li><li>Peak flow control provided for this development site only</li><li>No negative impact on fish habitat</li><li>Water quality not addressed</li></ul>
	Alternative 4-2:  Provide Quantity Control on Pagnutti Property and in Channel	<ul style="list-style-type: none"><li>Construct 3000 m<sup>3</sup> of storage within dedicated SWM block and 8000 m<sup>3</sup> of storage in the adjacent channel</li><li>Dry facility (normally open space) would be filled only during heavy rain events</li><li>The two storage facilities would perform in series for peak flow control</li></ul>	<ul style="list-style-type: none"><li>Peak flows would be controlled to pre-development levels by provision of on-site storage. Peak flow control provided for this site and upstream catchments</li><li>Facility to service existing developed and potential growth areas</li><li>No increase in existing capacity of downstream conveyance system</li><li>Water quality not addressed</li></ul>	<ul style="list-style-type: none"><li>Minimal impact on natural environment (dry pond facility would require grading on lands with no environmental issues)</li><li>Location of dry pond, not currently considered fish habitat and fish habitat is not being created</li><li>Potential for negative impact on fish habitat within the channel</li></ul>	<ul style="list-style-type: none"><li>Flood risk elevation reduced</li><li>SWM facility consistent with current site development plan</li><li>Dry storage could be integrated into park setting</li><li>SWM facility close to existing residents. Public education, public interaction required.</li></ul>	<ul style="list-style-type: none"><li>\$ 190,000,000 capital costs</li></ul>	<ul style="list-style-type: none"><li>Highest cost alternative</li><li>Flood risk elevation reduced</li><li>Peak flow control provided for this site and upstream catchments</li><li>Potential for negative impact on fish habitat within the channel</li><li>Water quality not addressed</li></ul>
	Alternative 4-3:  Provide Quantity and Quality Control on Pagnutti Property and in Channel	<ul style="list-style-type: none"><li>Construct 9600 m3 of storage within the dedicated SWM block and adjacent channel</li><li>A portion of the SWM facility would be dry (normally open space) and used (filled) only during heavy rain events</li><li>Construct a berm with low flow outlet for extended detention in the channel. Provision for access and removal of sediment from the channel bottom</li><li>The two storage facilities would perform in parallel for peak flow control.</li></ul>	<ul style="list-style-type: none"><li>Peak flow control and existing flood risks addressed. Peak flow control provided for this site and upstream catchments</li><li>Facility to service existing developed and potential growth areas</li><li>The two storage facilities performing in parallel would result in increased efficiency and a slight reduction in volume allowing a portion of Pagnutti lands to remain dry.</li><li>Water quality addressed through extended detention in the channel. Water quality benefits for this site and upstream catchments.</li></ul>	<ul style="list-style-type: none"><li>Minimal impact on natural environment (dry pond facility would require grading on lands with no environmental issues)</li><li>Location of dry pond, not currently considered fish habitat and fish habitat is not being created</li><li>Potential for negative impact on fish habitat within the channel</li></ul>	<ul style="list-style-type: none"><li>Flood risk elevation reduced</li><li>SWM facility consistent with current site development plan</li><li>Dry storage could be integrated into park setting</li><li>SWM facility close to existing residents. Public education, public interaction required</li></ul>	<ul style="list-style-type: none"><li>\$ 150,000 capital costs</li></ul>	<b>RECOMMENDED</b> <ul style="list-style-type: none"><li>Medium cost alternative</li><li>Flood risk elevation reduced</li><li>Peak flow control provided for this site and upstream catchments</li><li>The two storage facilities performing in parallel would result in increased efficiency and a slight reduction in volume allowing a portion of Pagnutti lands to remain dry</li><li>Potential for negative impact on fish habitat within the channel</li><li>Water quality benefits for the site and upstream catchments</li></ul>
SWM FACILITY #4(b)	Alternative 4-4:  Provide Quantity Control on Countryside Arena Property	<ul style="list-style-type: none"><li>Construct SWM pond on Countryside Arena property</li></ul>	<ul style="list-style-type: none"><li>Location not appropriate for size / planned land uses for upstream catchments</li><li>Not technically feasible</li></ul>	<ul style="list-style-type: none"><li>Alternative not developed – see technical considerations</li></ul>	<ul style="list-style-type: none"><li>Alternative not developed – see technical considerations</li></ul>	<ul style="list-style-type: none"><li>Alternative not developed – see technical considerations</li></ul>	<ul style="list-style-type: none"><li>Location not appropriate for planned land uses upstream. Quantity control not required at this location</li><li>Not technically feasible</li></ul>

ALTERNATIVE STORMWATER MANAGEMENT FACILITIES EVALUATION SUMMARY

STORMWATER MANAGEMENT (SWM) FACILITIES AND ALTERNATIVES		ALTERNATIVE DESCRIPTION	CATEGORIES OF CONSIDERATION				EVALUATION SUMMARY
			TECHNICAL	NATURAL ENVIRONMENT	SOCIAL/CULTURAL	FINANCIAL	
SWM FACILITY #5	<i>Alternative 5-1: Provide Quantity Control at Mallard's Pond  No improvement to Conveyance Capacity at Field St., Culver Cr. or Regent St.</i>	<ul style="list-style-type: none"><li>Construct a new outlet structure at Mallard's Pond creating additional 20,000 m<sup>3</sup> of storage (maximum available storage at location)</li></ul>	<ul style="list-style-type: none"><li>Storage within Mallard's Pond would be increased to the maximum possible to match the existing flow capacity of the Regent Street culvert</li><li>Modeling indicates that an increase of 20,000 m<sup>3</sup> would <u>not be sufficient</u> to reduce flows to existing Regent St. culvert capacity</li><li>To provide 20,00 m<sup>3</sup> storage, existing pond water levels were assumed to decreased to provide an active storage volume allowing water levels to rise at least 2 m during heavy rainfall</li><li>Water quality not addressed</li><li>Facility to service existing developed and potential growth areas</li></ul>	<ul style="list-style-type: none"><li>Negative impact on natural environment</li><li>Potential negative impact on duck nesting area</li><li>Mallard's Pond is a fish habitat and the wetland upstream is important to the maintenance of water quality in the pond. The design must ensure that the upstream wetland is maintained.</li></ul>	<ul style="list-style-type: none"><li>Flood risk elevation not reduced</li><li>Negative impact on existing Mallard's Pond greenspace/park</li></ul>	<ul style="list-style-type: none"><li>\$70,000 capital costs</li></ul>	<ul style="list-style-type: none"><li>Lowest cost alternative</li><li>Flood risk elevation not reduced</li><li>Existing pond water levels would be decreased to provide an active storage volume allowing water levels to rise at least 2 m during heavy rainfall</li><li>Negative impact on natural environment</li><li>Potential negative impact on duck nesting area</li><li>Negative impact on existing Mallard's Pond greenspace/park</li><li>Water quality not addressed</li></ul>
	<i>Alternative 5-2: Provide Quantity Control at Mallard's Pond  Improve Conveyance Capacity at Field St., Culver Cr. and Regent St.</i>	<ul style="list-style-type: none"><li>Construct a new outlet structure at Mallard's Pond creating an additional 20,000 m<sup>3</sup> of storage</li><li>Replace inlet culvert at Field Street and improve inlet configuration to minimize entrance losses</li><li>Extend existing stormsewer outlet at Culver Crescent and improve downstream channel</li><li>Replace existing twin culverts with larger twin box culverts at Regent Street crossing (at the end of Culver Crescent)</li></ul>	<ul style="list-style-type: none"><li>Storage within Mallard's Pond increased and, if required, outflow increased due to improved conveyance downstream.</li><li>Modeling indicates that an increase of 20,000 m<sup>3</sup> would be sufficient with culvert improvements.</li><li>Existing pond water levels would be decreased to provide an active storage volume</li><li>Existing Field Street culvert / entrance would be replaced / improved to convey design flows with no net increase in flooding</li><li>Existing Culver Street outlet / channel would be modified to convey design flows with no flooding</li><li>Existing Regent Street twin culverts would be replaced with larger to convey design flows with no flooding</li><li>Water quality not addressed</li><li>Facility to service existing developed and potential growth areas</li></ul>	<ul style="list-style-type: none"><li>Negative impact on natural environment</li><li>Potential negative impact on duck nesting area</li><li>Mallard's Pond is a fish habitat and the wetland upstream is important to the maintenance of water quality in the pond. The design must ensure that the upstream wetland is maintained</li><li>Negative impact on fish habitat in existing channel between Culver Crescent and Regent Street</li></ul>	<ul style="list-style-type: none"><li>Flood risk elevation reduced in some areas</li><li>Negative impact on existing Mallard's Pond greenspace/park</li><li>Negative impact on traffic during construction of culverts</li></ul>	<ul style="list-style-type: none"><li>\$360,000 capital costs</li></ul>	<ul style="list-style-type: none"><li>Highest cost alternative</li><li>Flood risk elevation reduced in some areas</li><li>Existing pond water levels would be decreased to provide an active storage volume</li><li>Negative impact on natural environment / fish habitat</li><li>Potential negative impact on duck nesting area</li><li>Negative impact on existing Mallard's Pond greenspace/park</li><li>Water quality not addressed</li><li>Negative impact on traffic during construction of culverts</li></ul>
	<i>Alternative 5-3: Provide No Quantity Control at Mallard's Pond  Improve Conveyance Capacity at Field St., Culver Cr. and Regent St.</i>	<ul style="list-style-type: none"><li>Replace inlet culvert at Field Street and improve inlet configuration to minimize entrance losses</li><li>Extend existing stormsewer outlet at Culver Crescent and improve downstream channel</li><li>Replace existing twin culverts with larger twin box culverts at Regent Street crossing (at the end of Culver Crescent)</li></ul>	<ul style="list-style-type: none"><li>Storage within Mallard's Pond not increased and outflow control structure not modified</li><li>Existing Field Street culvert / entrance would be replaced / improved to convey design flows with no net increase in flooding</li><li>Existing Culver Street outlet / channel would be modified to convey design flows with no flooding</li><li>Existing Regent Street twin culverts would be replaced with larger to convey design flows with no flooding</li><li>Water quality not addressed</li><li>Facility to service existing developed and potential growth areas</li></ul>	<ul style="list-style-type: none"><li>Negative impact on natural environment</li><li>Negative impact on fish habitat in existing channel between Culver Crescent and Regent Street</li></ul>	<ul style="list-style-type: none"><li>Flood risk elevation reduced in some areas</li><li>Negative impact on existing Mallard's Pond greenspace/park</li><li>Negative impact on traffic during construction of culverts</li></ul>	<ul style="list-style-type: none"><li>\$290,000 capital costs</li></ul>	<b>RECOMMENDED</b> <ul style="list-style-type: none"><li>Medium cost alternative</li><li>Flood risk elevation reduced in some areas</li><li>Negative impact on natural environment / fish habitat</li><li>Negative impact on existing Mallard's Pond greenspace/park</li><li>Water quality not addressed</li><li>Negative impact on traffic during construction of culverts</li></ul>



# ALTERNATIVE STORMWATER MANAGEMENT FACILITIES EVALUATION SUMMARY

STORMWATER MANAGEMENT (SWM) FACILITIES AND ALTERNATIVES			ALTERNATIVE DESCRIPTION	CATEGORIES OF CONSIDERATION				EVALUATION SUMMARY
				TECHNICAL	NATURAL ENVIRONMENT	SOCIAL/CULTURAL	FINANCIAL	
SWM FACILITY #6(a)	Quantity Control Alternatives	Alternative 6-1: Provide On-line Quantity Control Upstream of Ida Street  No Conveyance Capacity Improvement from Regent Street to Highway 17/69 Interchange	<ul style="list-style-type: none"><li>Construct storage on main channel, in low-lying area upstream of Ida Street</li><li>Use existing storage behind highway embankment</li></ul>	<ul style="list-style-type: none"><li>Increased storage (up to 30,000 m<sup>3</sup>) would not reduce flood risk elevation or flows at the Highway 17/69 Interchange</li><li>Requirement to consider the Highway 17/69 Interchange and Regent Street, dams.</li><li>Water quality not addressed</li><li>Facility to service existing developed and potential growth areas</li></ul>	<ul style="list-style-type: none"><li>Main channel is considered fish habitat</li><li>Negative impact on fish habitat during construction / maintenance</li></ul>	<ul style="list-style-type: none"><li>Maintains flood risk elevation downstream</li><li>Private property required</li></ul>	<ul style="list-style-type: none"><li>\$1.0 million capital costs</li></ul>	<ul style="list-style-type: none"><li>Lowest cost alternative</li><li>Maintains flood risk elevation downstream</li><li>Negative impact on fish habitat during construction / maintenance</li><li>Private property required</li><li>Water quality not addressed</li><li>Requirement to consider the Highway 17/69 Interchange and Regent Street, dams</li></ul>
		Alternative 6-2: Improve Conveyance Capacity from Regent Street to Highway 17/69 Interchange  No Quantity Control Upstream of Ida Street	<ul style="list-style-type: none"><li>Construct 7 new culverts in series from Regent St. to Highway 17/69 Interchange</li></ul>	<ul style="list-style-type: none"><li>SW conveyance increased to reduce flood risk elevation at the Highway 17 Interchange</li><li>No requirement to consider the Highway 17 Interchange and Regent Street, dams.</li><li>Water quality not addressed</li><li>Facility to service existing developed and potential growth areas</li></ul>	<ul style="list-style-type: none"><li>Potential negative impact on fish habitat downstream of culverts during construction</li></ul>	<ul style="list-style-type: none"><li>Flood risk elevation reduced</li><li>Negative impact on traffic during construction</li></ul>	<ul style="list-style-type: none"><li>\$2.6 million capital costs</li></ul>	RECOMMENDED <ul style="list-style-type: none"><li>Medium cost alternative</li><li>Flood risk elevation reduced</li><li>Negative impact on fish habitat downstream of culverts during construction</li><li>Water quality not addressed</li><li>No requirement to consider the Highway 17 Interchange and Regent Street, dams</li><li>Negative impact on traffic during construction</li></ul>
		Alternative 6-3: Improve Conveyance Capacity from Regent Street to Highway 17/69 Interchange  Provide On-line Quantity Control Upstream of Ida Street	<ul style="list-style-type: none"><li>Construct 7 new culverts in series from Regent St. to Highway 17/69 Interchange</li><li>Construct 20,000 m3 of storage on main channel, in low-lying area upstream of Ida Street.</li></ul>	<ul style="list-style-type: none"><li>SW conveyance increased to reduce flood risk elevation at the Highway 17/69 Interchange</li><li>Storage west of Ida Street could reduce peak flows by 50%, but would have little effect on water levels determined by the interchange</li><li>No requirement to consider the Highway 17/69 Interchange and Regent Street, dams.</li><li>Water quality not addressed</li><li>Facility to service existing developed and potential growth areas</li></ul>	<ul style="list-style-type: none"><li>Main channel is considered fish habitat</li><li>Negative impact on fish habitat during construction / maintenance</li></ul>	<ul style="list-style-type: none"><li>Flood risk elevation reduced</li><li>Private property required</li><li>Negative impact on traffic during construction</li></ul>	<ul style="list-style-type: none"><li>\$3.0 million capital costs</li></ul>	<ul style="list-style-type: none"><li>Highest cost alternative</li><li>Flood risk elevation reduced</li><li>Negative impact on fish habitat during construction / maintenance</li><li>Private property required</li><li>Water quality not addressed</li><li>No requirement to consider the Highway 17/69 interchange and Regent Street, dams</li><li>Negative impact on traffic during construction</li></ul>
SWM FACILITY #6(b)	Quantity Control Alternatives	Alternative 6-4: On-line Quality Control Facility Upstream of Ida Street:  WET POND	<ul style="list-style-type: none"><li>Construct storage on main channel, in low-lying area upstream of Ida Street.</li><li>Channel and surrounding lands will be excavated to create required storage</li><li>Pond footprint area required approx 3 hectares.</li></ul>	<ul style="list-style-type: none"><li>No significant peak flow control possible (storage volume required for peak flow control is prohibitively large)</li><li>Water quality addressed for entire upstream tributary (approx. 500 hectares)</li><li>Facility to service existing developed and potential growth areas</li></ul>	<ul style="list-style-type: none"><li>Main channel is considered fish habitat. Construction / maintenance of facility would replace existing natural environment</li><li>Fish habitat and water quality issues can be addressed in facility design to enhance natural environment</li></ul>	<ul style="list-style-type: none"><li>Maintains flood risk elevation downstream</li><li>Linkage can be established with Mallards Pond- forming 'green belt' in watershed</li><li>Passive recreation opportunities</li><li>Private property required</li></ul>	<ul style="list-style-type: none"><li>\$1.1 million capital costs</li></ul>	RECOMMENDED <ul style="list-style-type: none"><li>Medium cost alternative</li><li>High cost relative to local area. Facility must provide volume for entire upstream watershed</li><li>Water quality addressed for entire upstream tributary (approx. 500 hectares)</li></ul>
		Alternative 6-5: On-line Quality Control Facility Upstream of Ida Street:  WETLAND	<ul style="list-style-type: none"><li>Construct storage on main channel, in low-lying area upstream of Ida Street</li><li>Channel and surrounding lands will be excavated to create required storage</li><li>Wetland footprint area required approx 5 hectares</li></ul>	<ul style="list-style-type: none"><li>No significant peak flow control possible (storage volume required for peak flow control is prohibitively large)</li><li>Water quality addressed for entire upstream tributary (approx. 500 hectares)</li><li>Facility to service existing developed and potential growth areas</li></ul>	<ul style="list-style-type: none"><li>Main channel is considered fish habitat. Construction / maintenance of facility could preserve / enhance natural environment by incorporating habitat / naturalization features</li></ul>	<ul style="list-style-type: none"><li>Maintains flood risk elevation downstream</li><li>Linkage can be established with Mallards Pond- forming 'green belt' in watershed</li><li>Passive recreation opportunities</li><li>Private property required</li></ul>	<ul style="list-style-type: none"><li>\$1.2 million capital costs</li></ul>	<ul style="list-style-type: none"><li>Highest cost alternative</li><li>High cost relative to local area. Facility must provide volume for entire upstream watershed</li><li>Water quality addressed for entire upstream tributary (approx. 500 hectares)</li></ul>
		Alternative 6-6: Provide Additional Quality Control in Mallards Pond  AND  Off-line Quality Control Facility Upstream of Ida Street- north of existing channel:  WET POND	<ul style="list-style-type: none"><li>Provide extended detention and forebay in Mallards Pond to settle sediment</li><li>Construct storage north of main channel</li></ul>	<ul style="list-style-type: none"><li>Extended detention and removal of coarse sediment would be provided in the upstream portion of the pond. A shallow berm with a low flow outlet would allow access for sediment removal.</li><li>Water quality would be improved through provision of a pool and new sediment forebay. Water quality provided for all catchments upstream of forebay</li><li>Facility to service existing developed and potential growth areas</li><li>Water quality addressed for areas NE and N of facility (approx. 80 hectares)</li><li>Facility to service potential growth area</li></ul>	<ul style="list-style-type: none"><li>Negative impact on a portion of the existing natural environment at Mallards Pond</li><li>A forebay is a significant long-term feature for the natural environment. Mallards Pond is a fish habitat and the wetland upstream is important to the maintenance of water quality in the pond. The forebay design must ensure that the upstream wetland is maintained</li><li>Main channel is considered fish habitat. Construction / maintenance of facility could preserve / enhance natural environment by incorporating habitat / naturalization feature</li></ul>	<ul style="list-style-type: none"><li>Maintains flood risk elevation downstream</li><li>No negative impact on the majority of existing Mallard's Pond greenspace/park</li><li>Linkage can be established with Mallards Pond- forming 'green belt' in watershed</li><li>Passive recreation opportunities</li><li>Private property required</li></ul>	<ul style="list-style-type: none"><li>\$340,000 capital costs</li></ul>	<ul style="list-style-type: none"><li>Lowest cost alternative</li><li>Maintains flood risk elevation downstream</li><li>Negative impact on part of natural environment</li><li>No negative impact on the majority of existing Mallard's Pond greenspace/park</li><li>Water quality addressed for all catchments upstream of Mallards Pond forebay and potential growth areas northeast of Regent Street</li><li>Portion of watershed will bypass all facilities. On-site SWM Best Management Practices (lot level controls) are required for existing and future developments</li></ul>

# ALTERNATIVE STORMWATER MANAGEMENT FACILITIES EVALUATION SUMMARY

STORMWATER MANAGEMENT (SWM) FACILITIES AND ALTERNATIVES		ALTERNATIVE DESCRIPTION	CATEGORIES OF CONSIDERATION				EVALUATION SUMMARY
			TECHNICAL	NATURAL ENVIRONMENT	SOCIAL/CULTURAL	FINANCIAL	
SWM FACILITY #7	<p><i>Alternative 7-1:</i></p> <p><i>Provide Quantity and Quality Control Upstream of Green Ave</i></p>	<ul style="list-style-type: none"> <li>Construct SWM facility upstream of Green Avenue to provide quantity and quality control for all upstream catchments</li> <li>Restrict and pond the peak flow discharge to the capacity of the downstream culvert and channel</li> </ul>	<ul style="list-style-type: none"> <li>Post development peak flows controlled to pre development levels</li> <li>Peak flow control provided for all upstream catchments</li> <li>Existing flooding problems downstream reduced by overcontrolling flows</li> <li>Water quality addressed with permanent pool and extended detention</li> <li>Facility to service potential growth area</li> </ul>	<ul style="list-style-type: none"> <li>Minor impact on natural environment</li> <li>Minor removal of existing vegetation due to creation of additional storage (pond)</li> </ul>	<ul style="list-style-type: none"> <li>Flood risk elevation reduced</li> <li>Potential future development impacts due to larger peak flows are addressed</li> <li>Private property required</li> <li>SWM facility close to existing residents. Public education, public interaction required</li> </ul>	<ul style="list-style-type: none"> <li>\$275,000 capital costs</li> </ul>	<ul style="list-style-type: none"> <li>Highest cost alternative</li> <li>Flood risk elevation reduced</li> <li>Post development peak flows controlled to pre development levels</li> <li>Peak flow control provided for all upstream catchments</li> <li>Existing flooding problems downstream reduced by overcontrolling flows</li> <li>Potential future development impacts due to larger peak flows are addressed</li> <li>Minor impact on natural environment</li> <li>Minor removal of existing vegetation due to creation of additional storage (pond)</li> <li>SWM facility close to existing residents. Public education, public interaction required</li> <li>Private property required</li> <li>Water quality addressed</li> </ul>
	<p><i>Alternative 7-2:</i></p> <p><i>Improve conveyance capacity upstream / downstream of Green Avenue</i></p> <p><i>No Storage provided</i></p>	<ul style="list-style-type: none"> <li>Replace the existing Green Avenue culvert with a new 1500mm culvert</li> <li>Construct 2 additional 1500mm culverts</li> <li>Undertake channel improvements from just upstream of Green Avenue through Brown's Concrete property</li> </ul>	<ul style="list-style-type: none"> <li>Larger culverts would convey design flows</li> <li>Water quality not addressed</li> <li>Facility to service potential growth area</li> </ul>	<ul style="list-style-type: none"> <li>Existing channel improved</li> <li>Potential for increased erosion / sedimentation due to increased conveyance minimized through standard mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>Flood risk elevation reduced</li> <li>Potential future development impacts due to larger peak flows are addressed</li> </ul>	<ul style="list-style-type: none"> <li>\$100,000 capital costs</li> </ul>	<p><b>RECOMMENDED</b></p> <ul style="list-style-type: none"> <li>Lowest cost alternative</li> <li>Flood risk elevation reduced</li> <li>Larger culverts would convey design flows</li> <li>Potential for increased erosion / sedimentation due to increased conveyance minimized through standard mitigation measures</li> <li>Potential future development impacts due to larger peak flows are addressed</li> <li>Water quality not addressed</li> </ul>
SWM FACILITY #8	<p><i>Alternative 8-1:</i></p> <p><i>Provide Quantity Control Upstream of Rockwood</i></p> <p><i>No improvements to conveyance system downstream of Rockwood</i></p>	<ul style="list-style-type: none"> <li>Construct SWM facility upstream of Rockwood Avenue</li> <li>Wet or dry facility</li> </ul>	<ul style="list-style-type: none"> <li>Post development peak flows controlled to pre development levels</li> <li>Additional storage would address peak flow from all upstream catchments</li> <li>Water quality not addressed</li> <li>Facility to service potential growth area</li> </ul>	<ul style="list-style-type: none"> <li>Storage utilizes existing low-lying area.</li> <li>Minor removal of existing vegetation due to creation of additional storage (pond)</li> </ul>	<ul style="list-style-type: none"> <li>Flood risk elevation reduced</li> <li>Potential future development impacts due to larger peak flows are addressed</li> <li>Private property required. SWM facility not consistent with current site development plan</li> <li>SWM facility close to existing residents. Public education, public interaction required</li> </ul>	<ul style="list-style-type: none"> <li>\$30,000 capital costs</li> </ul>	<ul style="list-style-type: none"> <li>Lowest cost alternative</li> <li>Relative high capital costs to benefit small upstream development area</li> <li>Flood risk elevation reduced</li> <li>Potential future development impacts due to larger peak flows are addressed</li> <li>Private property required. SWM facility not consistent with current site development plan</li> <li>SWM facility close to existing residents. Public education, public interaction required</li> <li>Water quality not addressed</li> </ul>
	<p><i>Alternative 8-2:</i></p> <p><i>Improve conveyance capacity downstream of Rockwood</i></p> <p><i>No storage provided</i></p>	<ul style="list-style-type: none"> <li>Increase size of existing Rockwood, Greenvalley and driveway culverts to 1200 mm</li> <li>Improve existing channel for 260m downstream from Rockwood culvert to confluence with main ditch downstream of Greenvalley via erosion/sedimentation mitigation measures</li> </ul>	<ul style="list-style-type: none"> <li>Larger culverts would convey design flows</li> <li>Water quality not addressed</li> <li>Facility to service existing developed and potential growth areas</li> </ul>	<ul style="list-style-type: none"> <li>Negative impact on natural environment</li> <li>Existing low-lying marshy area upstream of Rockwood Avenue filled in and developed</li> <li>Existing channel improved and potential for increased erosion / sedimentation due to increased conveyance minimized through standard mitigation measures</li> </ul>	<ul style="list-style-type: none"> <li>Flood risk elevation reduced</li> <li>Potential future development impacts due to larger peak flows are addressed</li> <li>SWM facility consistent with current site development plan</li> <li>Potential requirement for private property</li> </ul>	<ul style="list-style-type: none"> <li>\$80,000 capital costs</li> </ul>	<p><b>RECOMMENDED</b></p> <ul style="list-style-type: none"> <li>Highest cost alternative</li> <li>Flood risk elevation reduced</li> <li>Potential future development impacts due to larger peak flows are addressed</li> <li>Negative impact on natural environment</li> <li>Existing channel improved and potential for increased erosion / sedimentation due to increased conveyance minimized through standard mitigation measures</li> <li>SWM facility consistent with current site development plan</li> <li>Potential requirement for private property</li> <li>Water quality not addressed</li> </ul>

# ALTERNATIVE STORMWATER MANAGEMENT FACILITIES EVALUATION SUMMARY

STORMWATER MANAGEMENT (SWM) FACILITIES AND ALTERNATIVES		ALTERNATIVE DESCRIPTION	CATEGORIES OF CONSIDERATION				EVALUATION SUMMARY
			TECHNICAL	NATURAL ENVIRONMENT	SOCIAL/CULTURAL	FINANCIAL	
SWM FACILITY #9	Alternative 9-1: <i>Provide Quality Control at Outlet to MacFarlane Lake</i> <i>(Wet Pond)</i>	<ul style="list-style-type: none"><li>Construct 80,000 m³ of on-line storage just upstream of MacFarlane Lake</li><li>Approximate footprint area of wet pond is 6 hectares</li></ul>	<ul style="list-style-type: none"><li>Peak flow control provided</li><li>The volume requirements would be extremely large because the serviced drainage area includes the entire subwatershed</li><li>Storage created by building berms to flood a large area of land (existing grades prohibit making a deep pond)</li><li>Water quality addressed</li><li>Facility would service entire upstream watershed</li></ul>	<ul style="list-style-type: none"><li>Removal of existing vegetation due to significant amount of grading required near MacFarlane Lake to create additional storage (pond).</li><li>Disruption to natural wetland function during construction</li><li>Impact on natural environment by converting natural wetland to engineered facility</li><li>Negative impact on fish habitat during construction / maintenance</li></ul>	<ul style="list-style-type: none"><li>Minimal impact on downstream flood risk elevation</li><li>Significant amount of private property required</li></ul>	<ul style="list-style-type: none"><li>\$1.4 million capital costs</li></ul>	<ul style="list-style-type: none"><li>Highest cost alternative</li><li>Peak flow control provided.</li><li>The volume / land requirements would be extremely large because the drainage area serviced includes the entire Algonquin Road Watershed</li><li>Minor removal of existing vegetation to create additional storage (pond)</li><li>Disruption to natural wetland function during construction</li><li>Impact on natural environment by converting natural wetland to engineered facility</li><li>Negative impact on fish habitat during construction / maintenance</li><li>Significant private property required</li><li>Water quality addressed</li></ul>
	Alternative 9-2: <i>Provide Quality Control at Outlet to MacFarlane Lake</i> <i>(Wetland)</i>	<ul style="list-style-type: none"><li>Construct 50,000 m³ of on-line storage just upstream of MacFarlane Lake</li><li>Approximate footprint area of wetland is 10 hectares</li></ul>	<ul style="list-style-type: none"><li>Peak flow control provided</li><li>The volume requirements would be extremely large because the serviced drainage area includes the entire subwatershed</li><li>Shallow depths required for a wetland would make land requirements extremely large</li><li>Water quality addressed</li><li>Facility would service entire upstream watershed</li></ul>	<ul style="list-style-type: none"><li>Creation of wetland habitat</li><li>Removal of existing vegetation due to significant amount of grading required near MacFarlane Lake to create additional storage (wetland).</li><li>Disruption to natural wetland function during construction</li><li>Impact on natural environment by converting natural wetland to engineered facility</li><li>Negative impact on fish habitat during construction / maintenance</li></ul>	<ul style="list-style-type: none"><li>Minimal impact on downstream flood risk elevation</li><li>Significant amount of private property required</li></ul>	<ul style="list-style-type: none"><li>\$1.3 million capital costs</li></ul>	<ul style="list-style-type: none"><li>Medium cost alternative</li><li>Peak flow control provided</li><li>The volume / land requirements would be extremely large because the drainage area serviced includes the entire Algonquin Road Watershed</li><li>Minor removal of existing vegetation to create additional storage (wetland)</li><li>Disruption to natural wetland function during construction</li><li>Impact on natural environment by converting natural wetland to engineered facility</li><li>Negative impact on fish habitat during construction / maintenance</li><li>Significant private property required</li><li>Water quality addressed</li></ul>
	Alternative 9-3: <i>Maintain Existing Conditions</i>	<ul style="list-style-type: none"><li>No change at the MacFarlane Lake outlet</li><li>Water quantity and quality addressed in the upstream watershed</li></ul>	<ul style="list-style-type: none"><li>No peak flow control</li><li>Water quality not addressed</li></ul>	<ul style="list-style-type: none"><li>No impact on natural environment</li></ul>	<ul style="list-style-type: none"><li>Maintains flood risk elevation downstream</li><li>No private property required</li></ul>	<ul style="list-style-type: none"><li>No capital costs</li></ul>	<b>RECOMMENDED</b> <ul style="list-style-type: none"><li>Lowest cost alternative</li><li>No peak flow control</li><li>No impact on natural environment</li><li>No private property required</li><li>Water quality not addressed</li><li>Water quantity and quality addressed in upstream watershed</li></ul>
SWM FACILITY #10	Alternative 10-1: <i>Provide On-Site Quantity Control at Vintage Green/Mariposa Place</i> <i>(Dry Pond)</i>	<ul style="list-style-type: none"><li>Construct 3500 m³ of storage</li><li>Dry facility (normally open space) would be used (filled) only during heavy rain events</li></ul>	<ul style="list-style-type: none"><li>Peak flow addressed by storing post development flows to pre-development levels</li><li>Water quality not addressed</li><li>Facility would service potential growth area</li></ul>	<ul style="list-style-type: none"><li>Minimal impact on natural environment</li><li>Minor removal of existing vegetation due to creation of additional storage (pond).</li></ul>	<ul style="list-style-type: none"><li>Flood risk elevation reduced</li><li>Dry storage can be integrated into park setting</li><li>SWM facility not consistent with current site development plan. Severely restricts potential future site development</li><li>SWM facility close to existing residents. Public education, public interaction required.</li></ul>	<ul style="list-style-type: none"><li>\$100,000 capital costs</li></ul>	<ul style="list-style-type: none"><li>Medium cost alternative</li><li>Flood risk elevation reduced</li><li>Peak flow control provided</li><li>Minor removal of existing vegetation due to creation of additional storage (pond).</li><li>Dry storage can be integrated into park setting</li><li>SWM facility not consistent with current site development plan. Severely restricts potential future site development</li><li>SWM facility close to existing residents. Public education, public interaction required</li><li>Water quality not addressed</li></ul>
	Alternative 10-2: <i>Provide On-Site Quantity Control at Vintage Green/Mariposa Place</i> <i>(Wet Pond)</i>	<ul style="list-style-type: none"><li>Construct 3500 m³ of storage</li><li>Wet facility (permanent pool) with dry portion (filled only during heavy rain events)</li></ul>	<ul style="list-style-type: none"><li>Peak flow addressed by storing post development flows to pre-development levels</li><li>Water quality addressed</li><li>Facility would service potential growth area</li></ul>	<ul style="list-style-type: none"><li>Minimal impact on natural environment</li><li>Minor removal of existing vegetation due to creation of additional storage (pond).</li></ul>	<ul style="list-style-type: none"><li>Flood risk elevation reduced</li><li>SWM facility not consistent with current site development plan. Severely restricts potential future site development</li><li>SWM facility close to existing residents. Public education, public interaction required.</li></ul>	<ul style="list-style-type: none"><li>\$120,000 capital costs</li></ul>	<ul style="list-style-type: none"><li>Highest cost alternative</li><li>Flood risk elevation reduced</li><li>Peak flow control provided</li><li>Minor removal of existing vegetation due to creation of additional storage (pond).</li><li>Dry storage can be integrated into park setting</li><li>SWM facility not consistent with current site development plan. Severely restricts potential future site development</li><li>SWM facility close to existing residents. Public education, public interaction required</li><li>Water quality addressed</li></ul>
	Alternative 10-3: <i>No Storage On Site</i> <i>Construct conveyance system to service the development site</i>	<ul style="list-style-type: none"><li>Construct storm sewers and drainage ditches extending from subdivision to Algonquin Road</li></ul>	<ul style="list-style-type: none"><li>Peak flow would be released to existing conveyance system</li><li>Capacity for 5-year flow in sewers, with overland flow route to Algonquin Road, must be demonstrated at detailed design</li><li>Water quality not addressed</li></ul>	<ul style="list-style-type: none"><li>No impact on natural environment</li></ul>	<ul style="list-style-type: none"><li>Flood risk elevation not reduced</li><li>SWM facility is consistent with current site development plan. Does not restrict potential future site development</li><li>On-site SWM Best Management Practices (lot level controls) are required for future developments</li></ul>	<ul style="list-style-type: none"><li>\$45,000 capital costs</li></ul>	<b>RECOMMENDED</b> <ul style="list-style-type: none"><li>Lowest cost alternative</li><li>Flood risk elevation not reduced</li><li>Peak flow released to existing conveyance system</li><li>Existing natural environment would not be affected</li><li>Water quality not addressed</li><li>On-site SWM Best Management Practices (lot level controls) are required for future developments</li></ul>

Total Cost for Recommended Solution = \$4.4 Million



## **The Next Steps . . .**

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- ❖ The comments received from Community Meeting No. 2 will be considered along with those received from review agencies to identify the Preferred Stormwater Management Plan.
- ❖ A Master Plan Document will be prepared summarizing the planning process that was followed and the findings of the study.
- ❖ The Master Plan Document will be made available for 30 calendar days to allow review agencies and the public an opportunity to review the findings of the study. Notification of this review opportunity will be made at the appropriate time.



Algonquin Road Watershed  
Stormwater Management Study Class EA

Community Meeting No. 2

Thursday, May 20, 2004

4 p.m. – 8 p.m.

Countryside Arena

	<u>NAME</u>	<u>ADDRESS (Street, City &amp; Postal Code)</u>	<u>TELEPHONE</u>
1.	Denis Paquette	63 Countryside Dr. Sudbury P3E 5A2	523-2594
2.	NOAM ETHIER	645 EDGEWATER RD P3G 1J7	522-1289
3.	Celia Teale	130 Elm St Sudbury Delton P3C 1T6	560 9770
4.	Dan Wunsch	436 WESTMOUNT AVE, SUDBURY P3A 5Z8	560-5555
5.	Mitch Thibeault (Sylvie Mathieu)	51 COUNTRYSIDE DRIVE P3E 5A2	522-4895
6.	Jack Hukula	683 Silverlake Rd. P3G 1J9	523 5477
7.	Paul Sajutaric	N. D. C. A.	674-5249
8.	Rolly ETHIER	RR1 Site 4 Box 15 Albion On P0M 1A0	857-2963



Algonquin Road Watershed  
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4 p.m. – 8 p.m.

Countryside Arena

	<u>NAME</u>	<u>ADDRESS (Street, City &amp; Postal Code)</u>	<u>TELEPHONE</u>
9.	GIUSEPPE MASTROCIANNI	482 CALDER. P3E 4X4	522 0633
10.	NANCY GOICHIE	2481 IDA ST P3E 4W9	522-6103
11.	MORGAN PICCINETTI	2701 GREEN ST. P3E 4X3	671-9543
12.	AUVO PELTOLA	546 ESTER ST P3E 5C4	522-2524
13.	FRAN CANDARELLI	106 Windsor c. P3E 1Z7	6739208
14.	Henry Schroeder	2642 Green Ave P3E 4X2	522.4767
15.	FRANK BENISH	409 NEPAHWIN AVE SUDBURY P3E 2H5	522-1572
16.			





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Stormwater Management Study Class EA

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Countryside Arena

	<u>NAME</u>	<u>ADDRESS (Street, City &amp; Postal Code)</u>	<u>TELEPHONE</u>
17.	ADRIANO/ANTONIO MASTROIANNI	466 CULVER Cres Sudbury, Ontario P3E 4Y4	(705) 523-2636
18.	L. MAKI	167 Countryside Dr.	522-5089
19.	AUAKHAMA	523 SILVER LK RD P3E 1B9	522-2277
20.	Brad Bowman	1130 Southlanc Rd Sudbury P3B 1N1	522-7858
21.	Doug CRAIG	664 Moonrock Ave P3E 5Z6.	523 1987
22.	L. Hautamaki	3077 Hong Lake Rd	522 8974
23.	Jim Haavisto	2762 Hong Lake Road, P3E 1B9	-
24.	Penny Kukkonen	329 Marttila Dr P3E 6C8	523-2513



Algonquin Road Watershed  
Stormwater Management Study Class EA

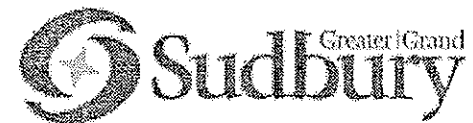
Community Meeting No. 2

Thursday, May 20, 2004

4 p.m. – 8 p.m.

Countryside Arena

	<u>NAME</u>	<u>ADDRESS (Street, City &amp; Postal Code)</u>	<u>TELEPHONE</u>
25.	Chris Sheridan	2531 Ida Street Sudbury <del>P3E 4W9</del> P3E 4W9	522-8582
26.	Kathy Lussac	2711 Green Ave P3E 4X3	522-8117
27.	Mike Ambrose	Silver Lake	523-2725
28.	Stephen Mont	Planning Dept.	
29.	Lise Anderson	2676 Green Ave	522-3953
30.	Jack Anderson	-	-
31.	Joe Korzeniak	2666 Green Ave - P3E 4X2.	523-4925
32.	Scoville	Parcel 4265 (Bypass) 545 Horn St. P3C 4R3.	674-4730



Algonquin Road Watershed  
Stormwater Management Study Class EA

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4 p.m. – 8 p.m.

Countryside Arena

	<u>NAME</u>	<u>ADDRESS (Street, City &amp; Postal Code)</u>	<u>TELEPHONE</u>
33.	Karen McDonald	309 Edgewood Rd, P3G 1J8	523-1452
34.	Jan Linguis	Southlane (1180) P3G 1N6	
35.	John & Colleen Jankov	2661 Green St. P3E 4X3	522-6398
36.			
37.			
38.			
39.			
40.			



## Algonquin Road Watershed Stormwater Management Study Class EA

Community Meeting No. 2  
Thursday, May 20, 2004  
4 p.m. – 8 p.m.  
Countryside Arena

Your views are important to us. Please take a moment to provide any comments or questions that you may have with respect to this project.

- BACK YARD SATURATED (OVERLY) WHEN IT RAINS  
- HEAVY RAINFALL = WATER COMING INTO  
BASEMENT THROUGH BOTTOM (FOOTING) IN SOUTH  
WEST CORNER 15 feet (up to) FROM CORNER ON OTHER  
SIDE ...

- PLEASE! WE ENCOURAGE & ENDORSE ACTION! AS  
OUTLINED IN #4(d)! ALTERNATIVE 4.3

The City of Greater Sudbury and Earth Tech Canada Inc. thank you for your involvement in this Study. Please drop your completed comment sheet in the box on your way out, or mail/fax it **no later than June 4, 2004** to one of the following Team Members

Chris Redmond, P. Eng.  
Project Manager  
Earth Tech (Canada) Inc.  
1040 Lorne Street South, Unit 1  
Sudbury, Ontario  
P3C 4R9  
Phone: (705) 674-8343  
Fax: (705) 674-1694  
E-mail: [chris.redmond@earthtech.ca](mailto:chris.redmond@earthtech.ca)

Wendi Mannerow, P. Eng.  
Project Engineer  
Earth Tech (Canada) Inc.  
1040 Lorne Street South, Unit 1  
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P3C 4R9  
Phone: (705) 674-8343  
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E-mail: [wendi.mannerow@earthtech.ca](mailto:wendi.mannerow@earthtech.ca)

Ron Norton, P. Eng.  
Coordinator of Technical Services  
City of Greater Sudbury  
200 Brady Street, Tom Davies Square  
P.O. Box 5000, Station "A"  
Sudbury, Ontario  
P3A 5P3  
Phone: (705) 671-2489 ext. 2362  
Fax: (705) 673-5171  
E-mail: [ron.norton@city.greatersudbury.on.ca](mailto:ron.norton@city.greatersudbury.on.ca)

Comments and information regarding this study are being collected to assist the City of Greater Sudbury in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in the study documentation. With the exception of personal information, all comments will become part of the public record.

COMPLETED BY: (please print clearly)

Name: Sylvie Mathieu & Michel Thibault

Phone: 705 522-4895

Address: 51 COUNTRYSIDE DRIVE  
P3C 5A2

## Algonquin Road Watershed Stormwater Management Study Class EA

Community Meeting No. 2

Thursday, May 20, 2004

4 p.m. - 8 p.m.

Countryside Arena

Your views are important to us. Please take a moment to provide any comments or questions that you may have with respect to this project.

for about five years to have the ditch  
behind my lot fixed so it would drain, for  
always on the list. This year we had  
about \$20,000.00 damage in basement sewer backup  
the city tried to drain the main stream across  
from the through the sanitary sewer.  
the ditches in spring are not cleaned out  
in time for spring runoff once water ran  
down drive way in to the house  
where are the city engineers?  
we have to move. This city is not  
senior friendly.

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E-mail: [chris.redmond@earthtech.ca](mailto:chris.redmond@earthtech.ca)

Wendi Mannerow, P. Eng.  
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Ron Norton, P. Eng.  
Coordinator of Technical Services  
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200 Brady Street, Tom Davies Square  
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Comments and information regarding this study are being collected to assist the City of Greater Sudbury in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in the study documentation. With the exception of personal information, all comments will become part of the public record.

COMPLETED BY: (please print clearly)

Name: Henry P. Schneider  
Phone: 522 4767  
Address: 3642 Green Ave.

## Algonquin Road Watershed Stormwater Management Study Class EA

Community Meeting No. 2  
Thursday, May 20, 2004  
4 p.m. – 8 p.m.  
Countryside Arena

Your views are important to us. Please take a moment to provide any comments or questions that you may have with respect to this project.

*This is an urgent matter that must  
be dealt with sooner than later. Dda St.  
residents can no longer get insurance coverage  
for sewer back-up (or very little). Having the  
maps, it is ~~obvious~~ obvious that the  
start of the ~~problem~~ solution has to begin at  
our end. We need help now!  
I know this is for natural run-off, but  
we are dealing with both issues of natural run-off  
& sewer back-up.*

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City of Greater Sudbury  
200 Brady Street, Tom Davies Square  
P.O. Box 5000, Station "A"  
Sudbury, Ontario  
P3A 5P3  
Phone: (705) 671-2489 ext. 2362  
Fax: (705) 673-5171  
E-mail: [ron.norton@city.greatersudbury.on.ca](mailto:ron.norton@city.greatersudbury.on.ca)

Comments and information regarding this study are being collected to assist the City of Greater Sudbury in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in the study documentation. With the exception of personal information, all comments will become part of the public record.

COMPLETED BY: (please print clearly)

Name: NANCY GOUGHIE

Phone: 522-6103

Address: 2481 IPA ST.

Sudbury, ON P3E 4W7





PN 64517

## Algonquin Road Watershed Stormwater Management Study Class EA

Community Meeting No. 2  
Thursday, May 20, 2004  
4 p.m. - 8 p.m.  
Countryside Arena



Your views are important to us. Please take a moment to provide any comments or questions that you may have with respect to this project.

- ① Cost of solution = 4.4 million who will pay?
- ② cost associated with item 5 should be at City cost existing problem, costs with 6a should also be at City expense/mro culverts undersized from outset
- ③ 6b is private property / proposed pond to be constructed
- ④ was consideration given to removal of City fill at Countryside would this reduce size / cost of proposed solutions elsewhere

The City of Greater Sudbury and Earth Tech Canada Inc. thank you for your involvement in this Study. Please drop your completed comment sheet in the box on your way out, or mail/fax it no later than June 8, 2004 to one of the following Team Members

Chris Redmond, P. Eng.  
Project Manager  
Earth Tech (Canada) Inc.  
1040 Lorne Street South, Unit 1  
Sudbury, Ontario  
P3C 4R9  
Phone: (705) 674-8343  
Fax: (705) 674-1694  
E-mail: chris.redmond@earthtech.ca

Wendi Mannerow, P. Eng.  
Project Engineer  
Earth Tech (Canada) Inc.  
1040 Lorne Street South, Unit 1  
Sudbury, Ontario  
P3C 4R9  
Phone: (705) 674-8343  
Fax: (705) 674-1694  
E-mail: wendi.mannerow@earthtech.ca

Ron Norton, P. Eng.  
Coordinator of Technical Services  
City of Greater Sudbury  
200 Brady Street, Tom Davies Square  
P.O. Box 5000, Station "A"  
Sudbury, Ontario  
P3A 5P3  
Phone: (705) 671-2489 ext. 2362  
Fax: (705) 673-5171  
E-mail: ron.norton@city.greatersudbury.on.ca

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COMPLETED BY: (please print clearly)

Name: Colia Leale

Phone: 560-9770

Address: 130 Elm Street, Sudbury Ontario

P3C 1T6



FILE NO: 64517-216

DESCRIPTION	NOTED BY
COM	✓
C.R.	✓
B.R.	✓
N.C.	✓
R. Doyle	✓

FAX: LC

FILE NO: 64517	
DISTRIBUTION	WM
SL	1/22

## Algonquin Road Watershed Stormwater Management Study Class EA

Community Meeting No. 2  
Thursday, May 20, 2004  
4 p.m. - 8 p.m.  
Countryside Arena



Your views are important to us. Please take a moment to provide any comments or questions that you may have with respect to this project.

*The report is thorough and study is more than I expected, thank you.*

- 1) The drainage off rear of Lda street through other land as gravel property seems noted*
- 2) I see possible encroachment now in the winter on the drainage across the highway behind or side of Brown Concrete and the fire firm with snow and debris being disposed of into the drainage ditch or creek*

*Control of this may already be in hand.*

*Do you require returning of drawings?*

The City of Greater Sudbury and Earth Tech Canada Inc. thank you for your involvement in this Study. Please drop your completed comment sheet in the box on your way out, or mail/fax it **no later than June 4, 2004** to one of the following Team Members

*June 7, 2004*

Chris Redmond, P. Eng.  
Project Manager  
Earth Tech (Canada) Inc.  
1040 Lorne Street South, Unit 1  
Sudbury, Ontario  
P3C 4R9  
Phone: (705) 674-8343  
Fax: (705) 674-1694  
E-mail: [chris.redmond@earthtech.ca](mailto:chris.redmond@earthtech.ca)

Wendi Mannerow, P. Eng.  
Project Engineer  
Earth Tech (Canada) Inc.  
1040 Lorne Street South, Unit 1  
Sudbury, Ontario  
P3C 4R9  
Phone: (705) 674-8343  
Fax: (705) 674-1694  
E-mail: [wendi.mannerow@earthtech.ca](mailto:wendi.mannerow@earthtech.ca)

Ron Norton, P. Eng.  
Coordinator of Technical Services  
City of Greater Sudbury  
200 Brady Street, Tom Davies Square  
P.O. Box 5000, Station "A"  
Sudbury, Ontario  
P3A 5P3  
Phone: (705) 671-2489 ext. 2362  
Fax: (705) 673-5171  
E-mail: [ron.norton@city.greatersudbury.on.ca](mailto:ron.norton@city.greatersudbury.on.ca)

Comments and information regarding this study are being collected to assist the City of Greater Sudbury in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in the study documentation. With the exception of personal information, all comments will become part of the public record.

COMPLETED BY: (please print clearly)

Name: MAURICE CONRAD  
Phone: 705 - 522 - 1559  
Address: 2521 IDA ST. Sudbury  
P3E 4W6

**Mannerow-McBride, Wendi**

---

**From:** Carmen Huggins [chuggins@personainternet.com]

**Sent:** Tuesday, May 25, 2004 10:01 AM

**To:** wendi.mannerow@earthtech.ca

**Subject:** Algonquin Road Watershed

Hello,

My name is Carmen Huggins. I was not able to attend the last 2 meetings concerning the Algonquin Road watershed because of my disability. I would, however, like to be kept informed as to its development since I live close to the heart of it all. Could you send me relevant information to:


Carmen Huggins  
975 Goodview Rd.  
Sudbury, On.  
P3G 1B5

+ Morris Conrad  
2521 Ida  
P3E 4W9

Respectfully,

Carmen

---

 [IncrediMail](#) - Email has finally evolved - [Click Here](#)

5/25/2004

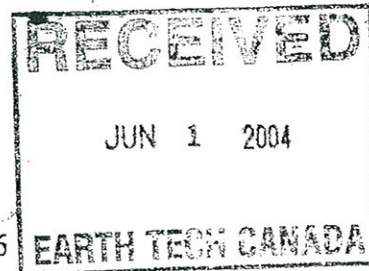


By FAX, 1 of 3 (673-5171)

June 1, 2004

1130 Southlane Road  
Sudbury, ON, P3G 1N6  
Phone: 522-7858

e-mail: brad.bowman@bellnet.ca

City of Greater Sudbury  
200 Brady Street  
P.O. Box 5000, Stn A  
Sudbury, ON, P3A 5P3

Attention: Mr. Ron Norton, P.Eng., Coordinator of Technical Services

**Re: Algonquin Road Stormwater Management Study**

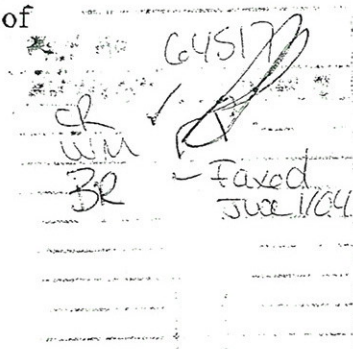
During the recent Community Meeting No. 2 for Class EA, I offered some informal input on the relationship between this stormwater management study and McFarlane Lake. The following is some background on water quality conditions in McFarlane Lake, and my comments on the options presented in the Algonquin Road Stormwater Management study.

**Background**

Since 1976, total phosphorus (TP) levels have been tracked through the MOE's spring sampling program, and more recently through MOE's Lake Partners Program. From 1976 to 1995, springtime TP, measured about 2 weeks after ice-off when the lake is fully mixed, has ranged between 12.3 and 16.3 ug/L. Based on MOE's lake classification, McFarlane Lake is a Level 2 lake, having good water quality and some level of seasonal nutrient enrichment.

Since 1995, sampling has been conducted under the Lakes Partners Program, where we have measured water clarity using a Secchi disc throughout the open water season and collected water samples each spring to again track TP levels. Annual secchi disc visibilities from 1995 to 2000 have averaged 4.5 m, and are classified at the upper end of the moderate water quality category. TP results during this period averaged 11 ug/L, a Level 2 classification.

Overall, TP levels pre-2002 averaged 12 ug/L (n=30), while TP levels in duplicate samples collected in the spring of 2002 and 2003 were 10.9 and 13.6 ug/L, and 14.0 and 21.1 ug/L, respectively. In general, historical water quality in McFarlane Lake has been good, showing a moderate level of nutrient enrichment and good water clarity. Until more recently, water quality has remained constant during the 25 year period of monitoring. Recent results indicate a rise in spring TP levels to 15 ug/L.



Accepting the above data at face value, these trends in degrading water quality are also supported by ancillary data, including a) increasing taste and odour problems associated with lake supply drinking water and b) an increasing levels of summer anoxia in the lake's bottom waters. Monitoring conducted by myself under late summer stratification has indicated no dissolved oxygen in the bottom waters of both basins of the lake. As of last week, Secchi disc values in the lake were 1.5 m. Typically in May, these values range from 2.75 to 3.0 m.

This recent decrease in water clarity I attribute to run-off and excessive soil erosion from the urban ditches along Southlane Road, which were ditched last November just prior to freeze-up. After some months of in-action, the City has take some recent action, prompted by my complaints, to install what at best could be considered "cosmetic erosion controls" downstream of three culverts that discharge to McFarlane Lake.

These *ad hoc* erosion controls consist of approximately a 1 m length of silt curtain staked to two t-bars and one or two straw bales placed immediately upstream. The soils through which ditches have been excavated are highly erodable tills, and the ditches, in the absence of vegetative or geotextile cover, continue to rill, slump and erode. With the recent wet weather, these erosion controls have proven to be in-effective in reducing excessive loadings of total and suspended solids, and associated nutrients to the lake.

These materials are a "deleterious substance" as defined by the Fisheries Act, and have potential to impact on associated fish habitat in McFarlane Lake.

### **The Algonquin Road Watershed Study**

Based on the information presented at the open house, and a review of the Community Meeting No. 2 information package, the study seems to be technically weak in terms of details, and fails to address the broader issue of on-going and proposed urban development within the Algonquin Road sub-watershed and it's impacts on McFarlane Lake.

The limited data collected as part of the study indicate that urban water quality in the catchment is poor (e.g. TP exceeds PWQO by a factor of approximately 2X) and gets progressively poorer as one moves downstream from the outlet of Silver lake. What appears to be the City's preferred options technically fails to address this matter. The decision not to construct the stormwater management facilities has been rationalized on the basis of higher capital costs.

What is not considered in this costing rationale are the costs of providing municipal water to the residential properties presently utilizing McFarlane Lake as their water supply, if water quality conditions in the lake degrade to unacceptable levels. Decreasing water clarity levels and increasing levels of complaints and questions from our neighbours about taste and odour problems, and treatment solutions for their drinking water are admittedly hear-say evidence of an evolving issue, but are the best I can offer in the lack of good monitoring data.

I would encourage the City to take a broader view of the issue at hand, and the true costs of not implementing the needed stormwater management facilities with the Algonquin Road sub-watershed.

In general, the City has been pro-development in this sub-watershed, as evident by the recent construction of a PetroCanada commercial refuelling station. A fuel spill at this station would be a major threat to McFarlane Lake, as would by-passing of the City's sewage lift station immediately across Highway 69.

I do not believe the study has adequately addressed these broader issues within the Province's watershed planning policy framework.

#### Closure

Thanks you for the opportunity to input to the Class EA process.

We have recently completed the annual spring sampling for McFarlane Lake. I will try to solicit this data from MOE in the next month in advance of their normal winter reporting format, and provide the same to yourself.

Sincerely



A.B. Bowman

cc. C. Redmond, Earth Tech (Canada) Inc.



**Mannerow-McBride, Wendi**

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**From:** Jan Linquist [jan.linquist@bellnet.ca]  
**Sent:** Friday, June 04, 2004 10:32 AM  
**To:** wendi.mannerow@earthtech.ca  
**Subject:** Comments - Community Meeting No. 2

To Wendi Mannerow

I attended the May 20th meeting in conjunction with the Algonquin Road Watershed Stormwater Management Study. Following my review of the display materials and the information package provided, I wish to provide the following comments.

I reside on McFarlane Lake and have been conducting monitoring on the lake through MOE's Lake Partners Program since the late 80's.

As your 2004 sampling illustrated, TP levels in the Algonquin Road watershed already exceed MOE's Provincial Water Quality Objective of 30 ug/L from downstream of the Silver Lake outlet to McFarlane Lake. This is under existing development levels.

While McFarlane Lake is currently considered Level 2 with respect to TP concentrations, water quality conditions within the lake appear to be deteriorating. 2002/03 spring P results through the Lake Partners Program indicate a spring turnover TP level of 15 ug/L. In 2004, water clarity during turnover was 1.5 m, approximately half of historic levels. Recent monitoring in the two lake basins has shown anoxic conditions in the bottom waters under late summer stratification.

The general thrust of the management strategy and the majority of the stormwater management alternatives presented focus on conveyance of stormwater through the watershed with minimal concern for water quality both within the Algonquin Road area and in the ultimate receiver. I would like to see more emphasis put on storage within the watershed during peak flow events (Alternative 4-3 and 10-2) that addresses water quality issues.

I do not believe that public education programs within the Algonquin Road area would be sufficient to provide protection and reduce loadings, in particular nutrients and fertilizers, to the watershed. It is difficult enough to convince homeowners on the lake who have a vested interest in protecting their water supply to reduce nutrient inputs, much less residents upstream who will have no connection or stake in the downstream lake.

As a city taxpayer, the costs associated with these alternatives are reasonable. As McFarlane Lake is also the drinking water supply for the majority of residents surrounding the lake, one must consider long term cost implications in not protecting the lake water quality. Should water quality continue to degrade, the City may be forced to extend water supply services to this area, at a significant capital expenditure.

Thank you for the opportunity to express my opinions. If you have any questions or require clarification of the above, please contact me to discuss.

Jan Linquist

1130 Southlane Road, Sudbury P3G 1N6  
phone: 522-5990 (W)  
522-7858 (H)

6/7/2004

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## Agency Meetings



# M E M O

Date: April 23, 2003 Project No. 64517  
To: File cc: See Distribution List  
From: Wendi Mannerow  
Subject: **City of Greater Sudbury  
Algonquin Road Storm Water Management Study  
Meeting with Developer - Dalron**

A meeting was held on Wednesday, April 23, 2003, at 8:30 a.m. in the Earth Tech Boardroom 1040 Lorne Street South, Sudbury. Present for this meeting were:

Ron Arnold, Dalron Homes  
Celia Teale, Dalron Homes  
Ron Norton, City of Greater Sudbury (City)  
Chris Redmond, Earth Tech Canada Inc.  
Wendi Mannerow, Earth Tech Canada Inc.

**Purpose:** To introduce the Dalron representatives to the study, inform them of the progress to date and obtain their comments.

## 1.0 Overview of Storm Water Management (SWM) Study

- Ron Norton presented an overview of the SWM Study, including the conceptual SWM facility locations as defined by the Terms of Reference. Mr. Norton presented the study area (watershed) and conceptual facility locations with the aid of the Future Development / Land Use Plan.

## 2.0 Overview of Existing Drainage Patterns

- Wendi Mannerow provided an overview of the existing drainage patterns within the watershed (study) area.

## 3.0 Description of the Class EA Process

- Ms. Mannerow provided a brief description of the Class EA Process, noting that there will be two Community Meetings during the course of the Study. The first Community Meeting will be held within the next couple of weeks and will present the background of the Study, preliminary SWM facility alternatives (drawings and descriptions), and the proposed evaluation criteria. Earth Tech will then incorporate the public comments into the study evaluation matrix, choose a recommended alternative and present that recommended alternative in a Draft Environmental Screening Document at the second Community Meeting.



- Ms. Mannerow noted that Dalron would be notified of the upcoming meetings by mail.

4.0 Discussion on the Pagnutti / Dalron Lands, South of Countryside Drive

- Ms. Teale stated that a pond on the Pagnutti / Dalron site would be beneficial from a marketing perspective, similar to Mallard's Pond. She understands that the flood elevations in this area are very important with respect to the design of the new development.
- Mr. Norton explained the potential benefits of a dry pond in that area with respect to incorporating landscaping and aesthetics into the design. He noted that these benefits have been discussed with the City parks department, with a positive outcome.
- He stressed that the soils on this particular property pose a lot of challenges and noted that optimization of materials may allow for the use of excavated soil from a SWM facility as fill for the low-lying land on that property.
- Mr. Norton stated that one of the options to be studied will include discharging storm sewers from the property into the SWM pond.
- Ms. Mannerow stressed the challenges of designing the pond to perform as a stormsewer outlet; the property is very low, flat and the design constraint will be the invert of the stormsewer at Countryside Drive (the outlet of the existing ditch).

5.0 Discussion on the Proposed Fiddlers Green Development, northwest of St. Benedict School

- Ms. Teale noted that the subdivision agreement for the Fiddlers Green property to currently being re-drafted. Ms. Teale is concerned about the capacity of the existing open ditch at the Northeast corner of the property that is the proposed storm sewer outlet for the development.
- Mr. Norton stated that it should be acceptable to proceed with the Fiddlers Green development, however the proposed storm sewer is required to be sized adequately for all contributory future development under accepted design storm criteria.



6.0 Discussion on the Mallard's Green Development

- Ms. Teale expressed a concern about the conceptual SWM facility alternative of expanding Mallard's Pond. She noted that the pond was designed in conjunction with Duck's Unlimited to ensure a sufficient habitat for the mallard ducks. The pond was constructed with a specific land to water ratio and depth of water.
- Mr. Norton explained that we would take that factor into consideration when developing the alternative designs. He also noted that the pond could act as a SWM facility with minimal fluctuations on a day-to-day basis and that only extreme (low frequency) rain events would result in significant changes in water levels. He stated that under this option, the control structure would undergo modifications to ensure a low-flow outlet.
- Ms. Mannerow requested a copy of the Duck's Unlimited information from Ms. Teale.
- Ms. Teale noted that within the next year, the Mallard's Green development will be extended to include:
  - A section of the proposed road off of Mist Hollow (running west), just north of Pond Hollow Drive; and
  - A westerly extension of Mallard's Landing Drive (the alignment may be slightly modified from that shown on the Future Development / Land Use drawing).

She also noted that the proposed northerly extension of Sweetberry Drive north of Mallard's Landing Drive will not be developed.

7.0 Discussion of the Proposed Algonquin and Poupore Developments

- Ms. Mannerow inquired about the availability of the proposed storm sewer location drawings for the Algonquin and Poupore developments. Ms. Teale stated that Ms. Mannerow should contact Dan Wunsch at Dennis Consultants to obtain that information.
- Ms. Teale noted that the proposed Poupore development will have 22 lots for single family dwellings.

8.0 Miscellaneous

- Ms. Teale asked if Earth Tech was aware of the conceptual walking/biking trail plan for the area between Algonquin Road and Highway 17. She noted that the information is included in the South End Local Area Development Plan and could be obtained through Art Potvin at the City's Planning Department. Ms. Mannerow will obtain the trail information from Mr. Potvin.
- Ms. Teale asked if Dalron could obtain a copy of the Future Development / Land Use Plan. Mr. Norton said that would be fine and Ms. Mannerow suggested that the conceptual SWM facility locations be removed. Ms. Mannerow will contact Ms. Teale when the plan is prepared for Dalron's use.

9.0 Meeting Close-Out

- The meeting was adjourned at 9:30 a.m.

Please report any errors or omissions to Wendi Mannerow, Earth Tech (Canada) Inc.

Distribution List

Ron Norton, City of Greater Sudbury  
Nels Conroy, Earth Tech Canada Inc.  
Ian Dobrindt, Earth Tech Canada Inc.  
Brian Richert, Earth Tech Canada Inc.  
Chris Redmond, Earth Tech Canada Inc.

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# M E M O

Date: April 24, 2003 Project No. 64517  
To: File cc: See Distribution List  
From: Wendi Mannerow  
Subject: **City of Greater Sudbury  
Algonquin Road Storm Water Management Study  
Meeting with Developer - Ethier**

A meeting was held on Thursday, April 24, 2003, at 8:30 a.m. in the Earth Tech Boardroom 1040 Lorne Street South, Sudbury. Present for this meeting were:

Norm Ethier, Either Sand & Gravel  
Marcel Ethier, Either Sand & Gravel  
Ron Norton, City of Greater Sudbury (City)  
Chris Redmond, Earth Tech Canada Inc.  
Wendi Mannerow, Earth Tech Canada Inc.

**Purpose:** To introduce Ethier representatives to the study, inform them of the progress to date and obtain their comments.

## 1.0 Overview of Storm Water Management (SWM) Study

- Ron Norton presented an overview of the SWM Study, including the conceptual SWM facility locations as defined by the Terms of Reference. Mr. Norton presented the study area (watershed) and conceptual facility locations with the aid of the Future Development / Land Use Plan.

## 2.0 Overview of Existing Drainage Patterns

- Wendi Mannerow provided an overview of the existing drainage patterns within the watershed (study) area.

## 3.0 Description of the Class EA Process

- Ms. Mannerow provided a brief description of the Class EA Process, noting that there will be two Community Meetings during the course of the Study. The first Community Meeting will be held within the next couple of weeks and will present: the background of the Study, preliminary SWM facility alternatives (drawings and descriptions), and the proposed evaluation criteria. Earth Tech will then incorporate the public comments into the study evaluation matrix, choose a recommended alternative and present that recommended alternative in a Draft Environmental Screening Document at the second Community Meeting.



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- Ms. Mannerow noted that Norm Ethier would be notified of the upcoming meetings by mail.

#### 4.0 Discussion of the Ethier Lands, North of Regent Street

- Ms. Mannerow asked what information would be acceptable to show at the Community Meeting with respect to the conceptual layout of the Ethier property. Marcel Ethier stated that the entire conceptual plan could be shown and Ms. Mannerow noted that it would be labeled "conceptual".
- Marcel Ethier noted that the conceptual development of the their property will most likely be constructed within 5 years. The final design will depend on the Access Road to Laurentian University and a potential alternate entrance to their property from Regent Street, located directly across from Culver Crescent / Access Road.
- Marcel Ethier clarified the Land Use designation of their property that includes the Sand & Gravel Office and the driveway that runs north off Ida Street (just west of the NDCA lands). That particular segment of land should be indicated as "mixed light industrial / service commercial". Earth Tech will update the Future Development / Land Use plan to that effect.
- Mr. Ethier also noted that Roland Ethier owns a piece of property on the east side of Ida Street, between the most northerly house and the NDCA property, in addition to the lands he owns southeast of the NDCA lands. He commented that Roland might develop his property as residential (there are no available conceptual plans at this time), using the Ida Street lot as an access road to the new development.

#### 5.0 Meeting Close-Out

- The meeting was adjourned at 9:30 a.m.

Please report any errors or omissions to Wendi Mannerow, P. Eng., Project Engineer, Earth Tech Canada Inc.

#### Distribution List

Ron Norton, City of Greater Sudbury  
Nels Conroy, Earth Tech Canada Inc.  
Ian Dobrindt, Earth Tech Canada Inc.  
Brian Richert, Earth Tech Canada Inc.  
Chris Redmond, Earth Tech Canada Inc.

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**ALGONQUIN ROAD STORM WATER MANAGEMENT STUDY  
CITY OF GREATER SUDBURY**

**MINUTES OF MEETING WITH THE MINISTRY OF NATURAL RESOURCES AND FISHERIES AND  
OCEANS CANADA  
Project No. 64517**

<b>Present:</b>	Stephen Devos Carl Jorgensen Ron Norton Chris Redmond Nels Conroy Wendi Mannerow	Ministry of Natural Resources (MNR) Fisheries and Oceans Canada (DFO) City of Greater Sudbury (City) Earth Tech Canada Inc. (ETC) Earth Tech Canada Inc. (ETC) Earth Tech Canada Inc. (ETC)
-----------------	---	--

**Held:** Wednesday, June 4, 2003 at 9:00 a.m., Earth Tech Boardroom

ITEM		ACTION BY
1.0	<u>Meeting Purpose</u>	
1.1	The purpose of the meeting was to introduce the MNR and DFO representatives to the Study, to present them with the information from Community Meeting #1 and to obtain their input regarding the Study.	Info.
2.0	<u>Overview of Storm Water Management (SWM) Study</u>	
2.1	Mr. Norton summarized the background of and Terms of Reference for the Study.	Info.
2.2	Ms. Mannerow presented the Pre-Development (existing conditions) Drainage Plan as well as the Future Development / Land Use Plan.	Info.
3.0	<u>Discussion of MNR Concerns</u>	
3.1	Mr. Devos stated that his initial reaction to the Study in general is that the MNR encourages this type of SWM Study and stressed that SWM Best Management Practices should be incorporated whenever possible.	Info.
3.2	Mr. Devos noted that he would have to review this information in more detail as well as have it reviewed by others within the MNR.  Mr. Norton asked if a reasonable time for review could be a maximum of 3 weeks. Mr. Devos stated that he would attempt to expedite this "preliminary" review.	MNR
3.3	Mr. Devos stressed that during the development of the SWM alternatives, the following criteria should be followed, where possible: <ul style="list-style-type: none"> <li>▪ No net increase in quantity or no net decrease in quality of storm water;</li> <li>▪ Discourage channelization;</li> <li>▪ Simulate natural conditions, where possible;</li> <li>▪ Enhance the quality of Silver Lake, if possible;</li> <li>▪ Treat McFarlane Lake as a sensitive receptor (warm water fishery); and</li> <li>▪ No degradation of Mallard's Pond related to the newly established fishery (minnows).</li> </ul>	ETC



ITEM		ACTION BY
3.4	Mr. Devos noted that the City would be exempt from the Lakes and Rivers Improvement Act.	Info.
3.5	There will be a restriction on timing of construction of any facilities that could affect bass and walleye fishery in McFarlane Lake.	Info
4.0	<b><u>Fisheries and Oceans Canada Comments</u></b>	
4.1	Mr. Jorgensen commended the City on their efforts to promote SWM, noting that this Study will set a good example for future watershed planning Studies. He felt that this type of SWM Study is long overdue in this area.	Info.
	Mr. Jorgensen noted that official comments from the DFO can only be provided on the final design, however, he would provide his preliminary thoughts at this time:	
	<ul style="list-style-type: none"> <li>Regarding upsizing culverts within the system – they must be installed properly to allow for the easy passage of fish. During the design, the potential for removal of barriers at culverts should be considered.</li> <li>Silver Lake is a potential fishery – the DFO would consider it fish habitat. A control structure at the outlet of Silver Lake may be an issue with respect to fish migration.</li> <li>McFarlane Lake is a fishery.</li> <li>The potential for fish migration between Silver Lake and McFarlane Lake does exist. Therefore, the Study “main line” should be considered a fishery. Also, there may be small migration paths within the Study area. The DFO would not consider feeder / off-line flows as fish habitat.</li> <li>It is important to keep the low flow conditions in mind; any existing wet areas (on the main line) should not be “dried up” as a result of the implementation of SWM facilities. The creation of fish habitat (net gain) would be beneficial.</li> <li>The DFO may have concerns at the conceptual on-line facility west of Ida Street. If this facility is developed, the maintenance operations must create as little disturbance as possible.</li> </ul>	
	With respect to maintenance activities, Mr. Jorgensen stated that the DFO must approve any major undertaking for sediment removal. Mr. Devos noted that the pros and cons must be considered to determine the appropriate timing of maintenance activities. More frequent maintenance activities incur more cost, but create less disturbance than less frequent cleanings. Mr. Norton noted that the SWM facilities would be designed with easy access for equipment and specific contained areas to trap sediment, therefore allowing for less cost and disturbance during maintenance activities.	
4.2	Mr. Redmond asked Mr. Jorgensen to provide information regarding the DFO requirements for SWM facilities. Mr. Redmond also requested any information that the DFO may have regarding engineering standards or considerations for the design of new or maintenance of existing fish habitat. Mr. Jorgensen noted that he would provide Mr. Redmond with as much information on the above issues as possible.	DFO
5.0	<b><u>Miscellaneous</u></b>	
5.1	Mr. Norton noted that the same information presented at this meeting has already been presented to some of the developers who own property within the Study area, and so far, we have received positive reactions from them.	Info.
6.0	<b><u>Meeting Close-Out</u></b>	

**ITEM****ACTION BY**

6.1 The meeting was adjourned at 11:00 a.m.

Info.

Any errors or omissions to be reported to the undersigned.

Minutes prepared by:

**EARTH TECH CANADA INC.**

Wendi Mannerow, P.Eng.  
Project Engineer

WM:wm  
Attachments

**Distribution List**

All attendees  
Ian Dobrindt, ETC  
Brian Richert, ETC

*G:\CA\SUDBURY\WORK\PROJECTS\EO2003\64517 - ALGONQUIN RD\MINUTES\AGENCY\_MTG\_MNR\_DFO\_REV2.DOC*

**ALGONQUIN ROAD WATERSHED STORM WATER MANAGEMENT STUDY**  
**CITY OF GREATER SUDBURY**  
Project No. 64517

**INFORMATION MEETING**

**Date:** Monday, July 14, 2003

**Time:** 10:30 a.m.

**Location:** Manitou Boardroom, MTO North Bay Northeastern Regional Office

1. Purpose of Meeting

- The purpose of this meeting is to introduce you to this Study, inform you of our progress to date, review our findings and seek your input.

2. The Study

- The City of Greater Sudbury, through Earth Tech (Canada) Inc., has initiated a study to identify ways and means to control quantity and address quality of storm water from the Algonquin Road Watershed during minor and major rainfall / snow melt events for both pre-development (January 2003) and post-development conditions in order to minimize the risk and effects of:
  - i. Flooding on public and private property;
  - ii. Erosion and sedimentation of watercourses; and
  - iii. Runoff pollution in drainage channels, watercourses and McFarlane Lake.
- The Study is being undertaken in accordance with the approved Municipal Class Environmental Assessment (Class EA) process. The Class EA process requires identification of the problem, development and evaluation of alternative solutions to the problem, public and review agency consultation, assessment of environmental impacts, and development of environmental protection / mitigation measures.
- Two Community Meetings will be held to present information to, and obtain input from, review agencies, area property owners / residents and the public.
- At the first Community Meeting, which was held on May 14, 2003, preliminary findings of the Study, including identification of the problem, watershed characteristics and alternative solutions to the problem were presented.
- Comments received at the Community Meeting are being considered during development of the recommended solution. Following this, a Storm Water Management Master Plan will be developed and presented at a second Community Meeting.



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### 3. Overview of Existing Study Area and Drainage Patterns

- Storm water within the Algonquin Road Watershed follows a drainage course from Silver Lake to McFarlane Lake and is characterized by
  - Many minor wetlands;
  - Culvert crossings under highways and residential roads;
  - Storm sewer systems conveying water to open ditches;
  - Overland flow in rural areas; and
  - Roadside ditches.

### 4. Discussion regarding Pre-Development (Existing Conditions) Flood Plain Mapping

- The most up-to-date flood plain mapping available from the Nickel District Conservation Authority (NDCA) was produced in 1983. In order to determine up-to-date flood line elevations, Earth Tech:
  - 1) Delineated existing sub-watershed boundaries from topographic mapping and developed hydrologic parameters for the individual drainage areas.
  - 2) Utilized the SWMHYMO hydrologic model to determine peak wet weather flows through the system under various storm flow events.

The results of the hydrologic analysis indicated a slight increase in flows since 1983.

- Earth Tech proceeded to create a water surface profile by routing the calculated flows through a HECRAS computer model of the system (similar to the 1983 study which used HEC-2). The HECRAS model incorporated the existing configuration of the Highway 17/69 interchange (which was constructed in the late 1980's / early 1990's). The updated flood lines are illustrated on Drawing #1 and are a combination of the levels derived from the Timmins (Regional) storm and the 100-year Return Period Storm, whichever produced higher elevations in the specific drainage areas. The results indicate a significant increase in water levels since 1983, in the areas between Mallard's Pond and the Highway 17/69 interchange.
- Further assessment indicated that the design flows from the hydrologic model could not be conveyed hydraulically through the culverts in the new interchange configuration without significantly raising water levels. This was also true of the design flows from the 1983 study.
- Discussion regarding Methodology/Assumptions utilized by Earth Tech to develop the mapping:
  - a) Normally, the hydrology for floodline assessment does not consider storage just upstream of Highway culverts. Similarly, the Highway culverts are not normally designed or sized to create storage/flood attenuation, and the Highway is not normally designed as a dam. Neither the 1983 hydrologic model nor the 2003 model for floodline mapping originally considered available (actual) storage upstream of the Highway 17/69 interchange.
  - b) During the SWM Study, Earth Tech was required to analyze the entire watershed to include storage for quantity/quality control. Whether it was the intent or not when the culverts were originally designed, there is an enormous amount of storage available upstream of the Highway 17 culverts when flows back up. As a result, the drainage area just upstream of the Highway 17/69

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interchange was modeled as a large reservoir, allowing for storage in the existing, flat, low-lying areas.

5. Conveyance/Storage Alternatives to reduce flood risk

- To reduce the flood risk in the area just upstream of the Highway 17/69 interchange, two alternatives can be considered:
  - 1) Increase the conveyance capacity of the culverts under the interchange and the culvert crossing Regent Street at Ida Street. This can reduce the backwater created by the culverts, lowering the flood elevations, removing a large amount of land from the floodplain and significantly removing the risk of flooding to 10-20 buildings; or
  - 2) Accept the use of the Highway 17/69 interchange and Regent Street at Ida Street as dams, recognizing that the additional area flooded provides storage and attenuation of floodwater and this storage is integral to conveying design flows under the Highway. (Please note that the NDCA will be required to authorize the "newly created" floodline.)

The resulting water levels of the two alternatives described above, are illustrated on Drawing #2.

6. Questions:

- Was MTO aware of the role of storage upstream of the Highway, and were the culverts designed to make use of this storage?
- Is MTO aware of any cost/benefit assessment that may have been performed regarding the cost of upsizing the culverts vs. the benefits of reduced flood elevations? Some type of this assessment will be required to identify and evaluate preferred alternatives.

7. Other Business:

Attendees:

Chris Redmond	Earth Tech (Canada) Inc.
Wendi Mannerow	ETC
Brian Richert	ETC
Ray Mantha	MTO, Engineering Office
Kevin Morphet	MTO, Planning & Design

Distribution:

All Attendees	
Ian Dobrindt	ETC
Ron Norton	City of Greater Sudbury

**ALGONQUIN ROAD STORM WATER MANAGEMENT STUDY  
CITY OF GREATER SUDBURY**

**MEETING WITH THE NICKEL DISTRICT CONSERVATION AUTHORITY  
MINUTES OF MEETING  
Project No. 64517**

<b>Present:</b>	Allen Bonnis Ron Norton Chris Redmond Brian Richert Wendi Mannerow Tony Cecutti	Nickel District Conservation Authority (NDCA) City of Greater Sudbury (City) Earth Tech Canada Inc. (ETC) Earth Tech Canada Inc. (ETC) Earth Tech Canada Inc. (ETC) Earth Tech Canada Inc. (ETC)
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**Held:** Wednesday, June 18, 2003 at 2:00 p.m., Earth Tech Boardroom

ITEM		ACTION BY
1.0	<u>Meeting Purpose</u>	
1.1	The purpose of the meeting was to inform Mr. Bonnis, (NDCA), of the Study progress to date, review our findings and seek input from him.	Info.
2.0	<u>Overview of Storm Water Management (SWM) Study</u>	
2.1	Further to previous communications pertaining to this Study between Ms. Mannerow and Mr. Bonnis, Ms. Mannerow presented a brief overview of the Study purpose and Terms of Reference.	Info.
2.2	Ms. Mannerow supplied the information package that was distributed at Community Meeting #1 to Mr. Bonnis.	Info.
3.0	<u>Discussion of Floodplain mapping (1983 and 2003) for the Study area</u>	
3.1	Mr. Richert provided a summary of the methodology and assumptions utilized by Earth Tech to develop the 2003 flood plain mapping as required by this study. Earth Tech delineated drainage areas and determined hydrologic parameters from the topographic mapping, flown in 2002, as provided by the City. Those parameters were incorporated into a SWMHYMO hydrologic model to determine peak wet weather flows at different locations throughout the system. The flows were then injected into the HECRAS hydraulic model to determine floodline elevations throughout the system. Earth Tech utilized the 1983 mapping, report and HEC-2 hydraulic model as a reference during the development of the 2003 mapping.	Info.



- 3.2 Mr. Richert noted that the HECRAS model of the existing system results in a significantly higher and more extensive floodline upstream of the Highway 17 / 69 interchange than the 1983 Study. (See attached sketches.) The flood line elevations indicate that the storm water actually spills to the northeast, into Lake Laurentian (the Ramsey Lake Watershed). It was noted that the increase in flows (due to development) since that time, is approximately 20%, which should not result in such a significant difference. The interchange was constructed in the early 1990's, which raised the road elevation and required the installation of new box culverts to convey storm water under the interchange. The 1983 floodplain mapping illustrates water overtopping the intersection, which, because of the raised road, now cannot occur. Consequently, the water backs up at the interchange, resulting in higher flood line elevations upstream. The 1983 flows were routed through the updated HECRAS model, with very similar results. Info.
- 4.0 **Storm Water Management Options**
- 4.1 Mr. Richert noted that at this time, two main alternatives are evident to lower the flood lines in that area: Info.
1. Increase the conveyance under the interchange by installing additional culverts; or
  2. Construct a berm north of Ida Street to protect the homes in that area by backing up water to the northwest. This option may cause additional spilling into the Ramsey Lake watershed.
- 4.2 Mr. Redmond asked about what problems would be created downstream of the interchange if Option #1 was completed. Mr. Richert explained that the flood lines would not change downstream, because the HECRAS model calculates flood levels from downstream to upstream (upstream information is not taken into account when determining flood line elevations). However, with additional culverts, the flow downstream would increase and therefore the velocity would increase, under smaller rain events. This may increase erosion in the downstream channel. Info.
- 4.3 With respect to Option #2 above, Ms. Mannerow noted that she would contact Tom Endleman at the City to enquire about the availability of up-to-date topographic mapping for the Ramsey Lake Watershed. ETC
- 5.0 **Policy**
- 5.1 Mr. Cecutti asked what administration is required to update floodplain mapping by the NDCA. Info.  
Mr. Bonnis commented that the NDCA utilizes as much available information as possible with respect to watershed mapping when considering development applications.
- 5.2 Mr. Bonnis stated that he would try to locate the Storm water management policy / agreement between the MNR and the MTO and would provide it to Earth Tech, if available. NDCA
- 6.0 **Study Schedule**
- 6.1 It was noted that the second Community Meeting will be held in August, at which time, the recommended SWM alternatives for the entire watershed will be presented. The recommended alternatives will also be presented at a City Council Meeting. Mr. Bonnis noted that Earth Tech should meet with Councilors Courtemanche, Bradley, Kilgour and Petryna prior to the Council Meeting. ETC
- 7.0 **Meeting Close-Out**
- 7.1 The meeting was adjourned at 3:30p.m. Info.

Any errors or omissions to be reported to the undersigned.

**ITEM****ACTION BY**

Minutes prepared by:

**EARTH TECH CANADA INC.**

Wendi Mannerow, P.Eng.  
Project Engineer

WM:wm  
Attachments

**Distribution List**

All attendees  
Ian Dobrindt, ETC  
Brian Richert, ETC

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## Agency Comments





Fisheries  
and Oceans

Pêches  
et Océans

Ontario – Great Lakes Area  
Sudbury District Office

1500 Paris St., Unit 1  
Sudbury, Ontario  
P3E 3B8

Secteur de l'Ontario et des Grands Lacs  
Bureau de district de Sudbury

Numéro 1, 1500 rue Paris  
Sudbury (Ontario)  
P3E 3B8



Your reference:  
Our reference: SU-03-1199

May 14, 2003

Chris Redmond  
Earth Tech Canada (Inc.)  
1040 Lorne St. South  
Unit #1  
Sudbury, ON  
P3C 4 R9

Dear Mr. Redmond

Fisheries and Oceans Canada, Ontario – Great Lakes Area (DFO-OGLA) would like to acknowledge receipt of your proposed **Storm Water Management Study** on **May 8, 2003**. This proposal has been assigned file number **SU-03-1199**. Please refer to this file number in future inquiries.

In addition to our review for potential impacts to the fish habitat under the *Fisheries Act*, your project will be reviewed for implications under the *Navigable Waters Protection Act*.

A Fish Habitat Biologist will be assigned to review this proposal and will contact you if additional information is required.

For your information, electronic versions of Guidelines and Fact Sheets pertaining to fish habitat and working around water can be obtained at our web site <http://www.dfo-mpo.gc.ca/canwaters-eauxcan>. If you are unable to access our site, please contact this office and information can be mailed or faxed to you.

Yours truly,

Renaud Lacroix  
Administrative Assistant  
Ontario Great Lakes Area  
Phone Number: (705) 522-1697  
Fax Number: (705) 522-6421

Copy: Dennis Lenzi-NDCA, Sudbury

FILE NO:	64517
DISTRIBUTION	
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Canada

Ministère de la Culture



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Heritage and Libraries Branch  
Heritage Operations Unit  
andrew.hinshelwood@mczcr.gov.on.ca

Wendi Mannerow, P.Eng  
Earth Tech (Canada) Inc.  
1040 Lorne Street South, Unit 1  
Sudbury, ON P3C 4R9

~~May 27, 2003~~

Dear Ms Mannerow

Re: EO 64517  
Algonquin Road Watershed  
MCL File 2003-52WT001

I have had the opportunity to review the information provided by fax from Nancy Recollet of our Sudbury office, dated May 2, 2003 for the above noted project. Based on the mapping provided, we are unable to determine at this time whether the proposed undertaking will result in adverse impacts to cultural heritage or archaeological values. We would therefore appreciate receiving, at your earliest convenience, additional detailed mapping of the planning areas, indicating where anticipated impacts will occur. Anticipated impacts would include grading, excavating, inundation or other surface soil disturbances.

Please note that two standard conditions will remain even upon approval by this Ministry, and that cultural heritage resources include all materials or features of historical, architectural, or archaeological interest. All archaeological work must be performed by a consultant licensed by this Ministry and all work must be conducted in accordance to this Ministry's *Archaeological Assessment Technical Guidelines* (1993). Prior to the clearance of this concern, this office will require an opportunity to review the results of the archaeological resource assessment, as well as the results of any subsequent mitigation programs.

Please feel free to contact me regarding this project or for any future environmental assessment or development projects undertaken by your firm.

Yours,

Andrew Hinshelwood  
Heritage Planner (Archaeologist)

**Mannerow-McBride, Wendi**

---

**From:** JorgensenC@DFO-MPO.GC.CA  
**Sent:** Tuesday, June 10, 2003 4:42 PM  
**To:** chris.redmond@earthtech.ca  
**Cc:** Wendi.mannerow@earthtech.ca; stephen.devos@mnr.gov.on.ca; tom.brown@ene.gov.on.ca  
**Subject:** INFO: SU-03-1199 Storm water ponds & BMP's

Chris,

At our meeting last week, you asked if DFO has any recommendations on storm water retention ponds.

We don't have specific designs, however, if for example, a new offline pond was to be created, that when filled, would overflow into an existing creek, the following BMP's should be considered:

- installing a rocky channel from the outfall to the creek
- consider impacts on bank stability of the creek
- constructing a barrier to fish passage to prevent access to the outfall & pond
- angling the outfall downstream and not perpendicular to the bank
- discharge to a straight reach of creek and not on a bend

Also, the BMP's in sections 3 & 4 of the following document (which you probably already have) address many of DFO's concerns...

<http://www.ene.gov.on.ca/envision/gp/4329eindex.htm>

Once I did a bit of research, it occurred to me that the MOE would also be quite interested in this endeavour. I have supplied Tom Brown at their Sudbury District office with Wendi's phone number.

Cheers,

**Carl Jorgensen (705) 522-8524**

Fish Habitat Biologist | *Biologiste de l'habitat du poisson*

Fisheries and Oceans Canada | *Pêches et Océans Canada*

Ontario Great Lakes Area | *Secteur de l'Ontario et des Grands Lacs*

1-1500 Paris Street, Sudbury, ON P3E 3B8

1-1500, rue Paris, Sudbury, ON P3E 3B8

Fax/téléc: (705) 522-6421

JorgensenC@dfo-mpo.gc.ca

Government of Canada | *Gouvernement du Canada*

<<Jorgensen, Carl A.vcf>>



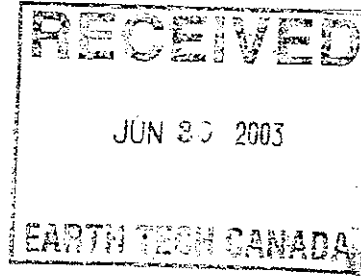
3767 Highway 69 South, Suite 5  
Sudbury, ON P3G 1E7  
Tel: 705/564-7856  
Fax: 705/564-7879  
Internet: [stephen.devos@mnr.gov.on.ca](mailto:stephen.devos@mnr.gov.on.ca)

June 26, 2003

Earth Tech (Canada) Inc.  
1040 Lorne Street south,  
Unit #1  
Sudbury, ON P3C 4R9

Attention: Wendi Mannerow, P. Eng.  
Project Engineer

SUBJECT: Algonquin Road Watershed  
Storm Water Management Study Class EA  
City of Greater Sudbury

[illegible]

I would like to thank you for the opportunity to attend your presentation and review the project proposal. I am happy to see the City's efforts with respect to storm water management and would applaud any effort the City can make in this regard here or else where within their jurisdiction. Hopefully, if the City takes a leadership roll in this area other Municipalities in the north will follow their example.

First, please be advised that this office has no specific permitting requirements given the scope of the work described to this office at this time. The City has approval authority under the Lakes and Rivers Improvement Act. The Nickel District Conservation Authority has jurisdiction over storm water and flood control and the Department of Fisheries and Oceans has jurisdiction over Fish Habitat. Therefore my comments will address other matters within our mandate and not address engineering, hydrology or the potential destruction of fish habitat.

In general this Ministry encourages the general principal of no net gain of water quantity or no net loss of water quality when reviewing storm water plans for a specific property. Given the plan is looking at a number of key locations for storm water management facilities we recommend that this principal be applied at each of the successive locations. Further the Ministry of Natural Resources endorses the Storm Water Management Practices Planning and Design Manual, 1994 and it's subsequent version Storm Water Management Planning and Design Manual, March 2003 along with any new innovations, which have become standard or accepted engineering practices since the manuals were written. For further information regarding Storm Water Management you may wish to contact the Ministry of the Environment.

Specifically, McFarlane Lake, the receptor water body of this system, is a warm water fishery containing walleye, both large and small mouth bass, pike, suckers, perch and bullheads to name a few. Therefore no in water work should take place prior to July 15<sup>th</sup> of each year. Sediment control measures should be employed to isolate segments of the stream during construction. For more specific information, if required, regarding the fishery community in McFarlane Lake please contact Mike Hall at (705) 564-7862.

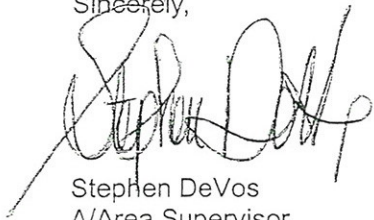
Page 2  
June 26, 2003  
Earth Tech (Canada) Inc.

Wherever possible and practical designs should incorporate natural processes or environments. However, any areas requiring periodic or frequent maintenance should be designed in such a manner as to minimize disturbance and sedimentation.

I hope these comments prove useful in developing and selecting the preferred solution. Please keep us informed of the progress of the Study. We would appreciate copies of the final design and an opportunity to review and provide comment.

If you have any questions regarding the content of this letter please feel free to contact me at (705) 564-7856.

Sincerely,

A handwritten signature in black ink, appearing to read 'Stephen DeVos', written over a horizontal line.

Stephen DeVos  
A/Area Supervisor  
Sudbury Area, Sudbury District

SD/mc

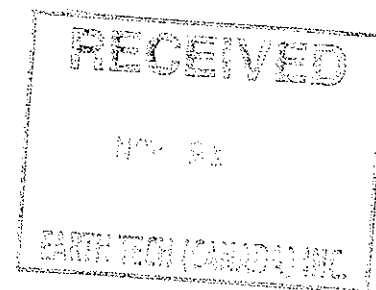
Ministry of Transportation  
Engineering Office  
Planning and Design Section  
Northeastern Region  
301-447 McKeown Avenue  
North Bay ON P1B 9S9  
Tel.: (705) 497-6905  
Fax: (705) 497-5499

Ministère des Transports  
Bureau du génie  
Section de planification et de conception  
Région du Nord-Est  
301-447, avenue McKeown  
North Bay ON P1B 9S9  
Tél : (705) 497-6905  
Téléc : (705) 497-5499



November 19<sup>th</sup>, 2003

Earth Tech Canada Inc.  
1040 Lorne Street, Unit #1  
Sudbury, Ontario  
P3C 4R9



Attention: Chris Redmond, P.Eng.

Dear Sir:

RE: Algonquin Road Watershed Storm Water Management Study  
City of Greater Sudbury  
Your Project No. 64517

Thank you for the information meeting introducing us to the above referenced study. We welcome the opportunity to respond.

It is our understanding your assessment indicated that the design flows from your hydrologic model could not be conveyed hydraulically through the culverts in the new interchange configuration without significantly raising water levels. Please provide a copy of your drainage mosaic, report and calculations for our review.

Further, we wish to be included on your mailing list and wish to be kept informed of any developments.

If you have any questions or comments, please contact the undersigned.

Yours truly,

A handwritten signature in cursive script, appearing to read "Josée Vallée".

Josée Vallée, P.Eng.  
Project Engineer

cc: Kevin Morphet  
Wilf Roy

PROJECT NO. 64517	
CR	✓
BU	✓
SR	✓
KUR	✓
RD	✓