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## **APPENDIX C**

### **PUBLIC AND AGENCY CONSULTATION MATERIALS**

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**Names and addresses of public commenting at open houses and workshops have been deleted from the electronic copy for privacy reasons**

## Municipal Groundwater Study Begins

Middlesex County, the City of London, the Municipality of Central Elgin, Malahide Township and the Town of Aylmer have initiated a Municipal Groundwater Study. Dillon Consulting Ltd., in association with Golder Associates, have been retained to complete this comprehensive regional groundwater study. The Upper Thames River Conservation Authority is managing the study. The study team includes experts in the fields of hydrogeology, hydrology, engineering, groundwater modelling, mapping, municipal planning and agriculture.

Groundwater is one of the primary sources of drinking water within the study area. Protecting this valuable resource is essential to our future quality of life. Existing and future land uses may, however, threaten the sustainability of our groundwater resource. The study will assess our groundwater resources in the context of regional groundwater flow systems, and develop strategies and action plans to protect groundwater resources as a safe supply of potable water.

The final study report is scheduled for completion in December of this year. Funding for the study is shared between the Ministry of the Environment and the various municipal partners. There are 31 similar studies being conducted across Ontario.

The Municipal Groundwater Study has three main components.

1. **Regional aquifer characterization** involves developing an understanding of the aquifers throughout the study area and the processes that control how groundwater moves through them.
2. **Municipal water wellhead protection** involves mapping all the areas that contribute water to the municipal wells in Dorchester, Thorndale, Birr, Melrose, Komoka/Kilworth, Delaware, the City of London stand-by wells, Belmont and Aylmer.
3. **Development of a groundwater protection and management strategy** that will address both regional groundwater protection as well as local wellhead protection measures.

Two sets of public information sessions will give an opportunity for interested community members to learn more about the project and to provide their comments to the study team. The first set of open houses is scheduled for June 12, 2002 at the Belmont Community Centre and June 13, 2002 at the Coldstream Community Centre. The open houses will include both afternoon and evening sessions. Further details will be advertised in local newspapers closer to these dates. A second set of public meetings will be held in the fall when study findings are available and recommendations are being prepared.

### *What is Groundwater?*

Groundwater is water found in the tiny spaces between soil particles and in cracks in bedrock. Aquifers are the underground areas of soil or rock where substantial quantities of water are found, and are the water source for wells and springs. Groundwater discharges when it leaves the ground wherever the water table meets the ground's surface. This discharge is essential for maintaining surface waters.

*The following people are on the study Steering Committee and would be pleased to answer your questions about the study on behalf of the municipalities:*

- Bob Cooper, City of London, 661.5593

- Steve Evans, Middlesex County, 434-7321 x 253.
- Wendell Graves, Town of Aylmer, 773-3164.
- Randy Millard, Malahide Township, 773-5344.
- Lloyd Perrin, Municipality of Central Elgin, 631-4860 x 277.
- Gary Crandall, 268-7338 x 233

*For details regarding the technical information being prepared please contact:*

- Rob Kell, Project Manager, Dillon Consulting 438-6192.
- Linda Nicks, Project Manager, Upper Thames River Conservation Authority, 451-2800 x 292.

## **MUNICIPAL GROUNDWATER STUDY**

### **NOTICE OF PUBLIC OPEN HOUSES**

**Middlesex County, the City of London, the Municipality of Central Elgin, Malahide Township and the Town of Aylmer have initiated a Municipal Groundwater Study.** The project is managed by the Upper Thames River Conservation Authority (UTRCA) with the technical studies being completed by Dillon Consulting Limited, in association with Golder Associates.

Groundwater is one of the primary sources of drinking water within the study area. Protecting this valuable resource is essential to our future quality of life. The Municipal Groundwater Study will assess and map groundwater resources in the study area, and identify strategies for future groundwater protection. Public education and consultation will be an important part of the study process.

**You are invited to attend a Public Open House for the Municipal Groundwater Study.** The dates and locations are listed below. Please choose the one that is most convenient for you.

**Date:** June 12, 2002  
**Time:** 3:00 p.m. to 8:00 p.m.  
**Location:** Belmont Arena and  
Community Centre,  
14020 Belmont Road  
(beside the gas station)

**Date:** June 13, 2002  
**Time:** 3:00 p.m. to 8:00 p.m.  
**Location:** Coldstream Community  
Centre,  
10227 Ilderton Road  
(beside the Middlesex  
Centre Municipal Offices)

For further information, or to be added to the project mailing list, please contact:

Linda Nicks, M.Sc.  
Upper Thames River Conservation Authority  
1424 Clarke Road  
London, Ontario  
N5V 5B9

Tel: 519-451-2800 ext 292  
Fax: 519-451-1188  
Email: [nicks1@thamesriver.on.ca](mailto:nicks1@thamesriver.on.ca)

or Rob Kell, P. Eng. or  
Catherine F. Marsden, M.Sc.  
Dillon Consulting Limited  
Box 426  
London, Ontario  
N6A 4W7

Tel: 519-438-6192  
Fax: 519-672-8209  
Email: [rkell@dillon.ca](mailto:rkell@dillon.ca)  
[cfletchermarsden@dillon.ca](mailto:cfletchermarsden@dillon.ca)



Our File: 02-0394

June 6, 2002

FIELD(Name)



**Municipal Groundwater Study**

Middlesex County, the City of London, the Municipality of Central Elgin, Malahide Township and the Town of Aylmer have initiated a Municipal Groundwater Study. The project is managed by the Upper Thames River Conservation Authority (UTRCA) with the technical studies being completed by Dillon Consulting Limited, in association with Golder Associates. The study will assess and map groundwater resources in the study area, and identify strategies for future groundwater protection.

We attach for your information a copy of the notice regarding the **Public Open Houses** being held for the Municipal Groundwater Study on **Wednesday, June 12<sup>th</sup> and Thursday, June 13<sup>th</sup>, 2002** at the Belmont Arena and Coldstream Community Centre respectively. The notice appeared in local newspapers the week of June 1<sup>st</sup>.

If you are available and would like to attend one of the Open Houses, please refer to the attached notice for details regarding the times and locations. If you are unable to attend but would like further information about the study at this time, the project contact names and numbers are also included on the notice.

We will be in touch with you again once the draft study results and recommendations are available.

Yours sincerely,

**DILLON CONSULTING LIMITED**

Catherine F. Marsden, M.Sc.  
Environmental Planner

CFM:jljb  
Encls.

Our File: 02-0394

June 6, 2002

FIELD(Name)



**Municipal Groundwater Study: Survey and Notice of Open Houses**

Middlesex County, the City of London, the Municipality of Central Elgin, Malahide Township and the Town of Aylmer have initiated a Groundwater Study. The project is managed by the Upper Thames River Conservation Authority (UTRCA) with the technical studies being completed by Dillon Consulting Limited, in association with Golder Associates. The study will assess and map groundwater resources in the study area, and identify strategies for future groundwater protection.

An important part of the study is the collection and analysis of local knowledge and information about groundwater in the study area. We would like your assistance with this task. Please review the attached two-page survey and provide as much information as you can regarding each item in the survey, based on your experience with the municipality and your general knowledge as a member of the community.

**Please assemble the information requested in the survey by June 28, 2002 and send it by mail or fax to:**

**Dillon Consulting Limited  
495 Richmond Street  
London, Ontario  
N6A 5A9  
(519) 438-6192(tel)  
(519) 672-8209(fax)**

**Attention: Rob Kell, P.Eng.**

We understand that, for some of the survey items, the information you have available may be incomplete or anecdotal. Please include and send to us what you have. The information collected will be very beneficial to the groundwater analyses and the development of relevant groundwater protection measures.

We also attach for your information a copy of the notice regarding the **Public Open Houses** being held for the study on **June 12<sup>th</sup> and 13<sup>th</sup>, 2002** at the Belmont Arena and Coldstream Community Centre respectively. The notice appeared in local

... continued

Dillon Consulting  
Limited

Page 2  
June 6, 2002

newspapers the week of June 1<sup>st</sup>. If you are available and plan to attend one of the Open Houses, please refer to the notice for details regarding the times and locations.

The contact names and numbers for further information regarding the study are also included on the notice.

Thank you for your assistance and cooperation in this important study. We look forward to your survey response.

Yours sincerely,

**DILLON CONSULTING LIMITED**

Rob Kell, P.Eng.  
Project Manager

CMF:jlb  
Encls.

**MUNICIPAL GROUNDWATER STUDY FOR  
MIDDLESEX, LONDON, CENTRAL ELGIN, MALAHIDE & AYLMER  
Dillon Project No: 02-0394**

**MUNICIPAL SURVEY**

Please provide information specific to your municipality for the items below. For questions #2 to #9, please mark the location of the properties on a map (for example, a by-law zoning map).

**Please compile the information and send it by mail or fax to:**

**Dillon Consulting Limited  
495 Richmond Street  
London, Ontario, N6A 5A9  
(519) 438-6192 (tel)  
(519) 672-8209 (fax)**

**Attention: Rob Kell**

**Municipal Water Systems**

1. Please provide a list of communities that are serviced by municipally operated water supply systems. Please indicate whether the system obtains water from groundwater (wells) or from a surface water source. For each system, please provide a map showing the servicing limits.

**Groundwater Use**

2. Please provide a list of facilities that obtain their water supply from their own water well system, and are designated under *Ontario Regulation 505, Smaller Water Works Serving Designated Facilities*. Please provide a list of the following facilities, with name, municipal address, geographic township, lot and concession.
  - A. Day nurseries
  - B. Health Care Facilities (clinics, hospitals, nursing homes)
  - C. Retirement Homes
  - D. Universities/Colleges/Technical Training Centres/Schools
  - E. Other "Social Care Facilities" including (emergency social and/or community support shelters, correctional facilities, children residences, children and family intervention centers, sheltered workshops, employment program facilities, adult community support services, and women shelters).
3. Please provide an addressed list (with geographic township, lot and concession, if possible) of the communal water well systems that are designated as such under *Ontario Regulation 459, Drinking Water Regulation*. This would include any water well system that supplies >50,000 L/day or serves 5 or more residents. Categories include:
  - A. Subdivisions (on communal systems)
  - B. Large trailer parks
  - C. Campgrounds.
4. Please provide an addressed list of any property where groundwater source heat pumps are used.

### **Known Contaminated Sites**

5. Please specify any site in your municipality that has experienced historic or current contamination problems (i.e., gasoline stations, road salt application or storage problems, organic solvents, landfill problems, etc). Please specify the type of problem, municipal address, when it happened, and whether the problem was resolved.

### **Known Groundwater Quality Problems**

6. Please specify any known areas/sites that have a history of poor groundwater *quality* (i.e., hard water, salty water, sulphides (“rotten egg odour”), iron, bacteria, etc.). Please specify the approximate geographic township, concession and lot areas or village/hamlet name.

### **Known Groundwater Quantity Problems**

7. Please specify any known areas/sites that have a history of poor groundwater *quantity* (i.e., well interference, low yields). Please specify the geographic township, approximate concession and lot areas or village/hamlet name.

### **Locations of Specific Industries**

8. Please specify the locations (by geographic township, lot and concession) of the following
  - A. Large intensive farms
  - B. Petroleum Bulk Storage facilities
  - C. Chemical factories
  - D. Pesticide/Fertilizer Storage/Manufacturing facilities
  - E. Food Processing Plants/Water Bottling

### **Municipal Planning Issues**

9. If available, please provide a copy of your Official Plan with the Land Use Schedule, and any other Schedules that show Environmental Constraints such as Wetlands or Areas of Natural and Scientific Interest. If preferred, we can copy the OP and return the original.
10. Provide copies of any Private Services Funding studies (PSF) that were completed in the 1970s to 1980s. These studies involved assessing the suitability of individual water well and septic systems for rural communities.
11. If available, please provide a copy of your latest Consolidated Zoning Bylaw and the Schedules. If preferred, we can copy the By-law and return the original.
12. Please describe any issues related to groundwater or surface water and related to either quality or quantity that have arisen in your municipality.
13. Please outline any groundwater or surface water issues related to future development which your municipality has been examining, or which you would like to see examined.

**Thank you for providing information on the above. Your contribution to the protection of local and regional groundwater is much appreciated.**

## CONTACTS LIST 1 AND 2

Ministry of the Environment  
Southwestern Regional Office  
659 Exeter Road  
London, Ontario  
N6E 1L3

Attention: Theo Beukeboom  
Groundwater Group Leader

Ministry of Natural Resources  
Aylmer District Office  
353 Talbot Street West  
Aylmer, Ontario  
N5H 2S8

Attention: Alec Denys  
District Manager

Ministry of Agriculture, Food and Rural Affairs  
667 Exeter Road  
London, Ontario  
N8M 2S2

Attention: Scott Oliver  
Rural Planner

Ministry of Tourism, Culture and Recreation  
Southwestern Region  
55 Centre Street  
London, Ontario  
N6J 1T4

Attention: John MacDonald  
Heritage Planner/Archaeologist

### **Local Agencies**

Lower Thames Valley Conservation Authority  
100 Thames Street  
Chatham, Ontario

N7L 2Y8

Attention: Jack Robertson  
Water Management Supervisor

St. Clair Region Conservation Authority  
205 Mill Pond Crescent  
Strathroy, Ontario  
N7G 3P9

Attention: Geoff Cade  
Environmental Planner/Regulations Officer

Ausable Bayfield Conservation Authority  
R.R. 3  
71108 Morrison Line  
Exeter, Ontario  
N0M 1S5

Attention: Alec Scott  
Water and Planning Manager

Kettle Creek Conservation Authority  
44015 Ferguson Line  
St. Thomas, Ontario  
N5P 3T3

Attention: Vanita Chanthavongse  
Planning Coordinator

Catfish Creek Conservation Authority  
R.R. 5  
Aylmer, Ontario  
N5H 2R4

Attention: Kim Smale  
General Manager

Middlesex-London Health Unit  
50 King Street  
London, Ontario  
N6A 5L7

Attention: Jim Reffle

St. Thomas - Elgin Health Unit  
99 Edward Street  
St. Thomas, Ontario  
N5P 1Y8

Attention: Ganesh Vallamkonda

**Local Interest Groups**

McIlwraith Field Naturalists of London  
c/o Dorothy McCallum  
878 Clearview Avenue  
London, Ontario  
N6H 2N4

Thames Region Ecological Association  
1017 Western Road  
London, Ontario  
N6G 1G5

Ducks Unlimited  
415 Berkshire Drive  
London, Ontario  
N6J 3R5

Middlesex Federation of Agriculture  
633 Lions Park Drive  
London, Ontario  
N0L 1W0

Attention: Jim Reith

Elgin Federation of Agriculture  
c/o R.R. 3  
Shedden, Ontario  
N0L 2E0

Attention: Ruby Silcox



# GROUNDWATER STUDY

FOR

MIDDLESEX COUNTY, CITY OF LONDON,  
MUNICIPALITY OF CENTRAL ELGIN,  
MALAHIDE TOWNSHIP AND TOWN OF AYLMER

## WELCOME TO THE PUBLIC OPEN HOUSE

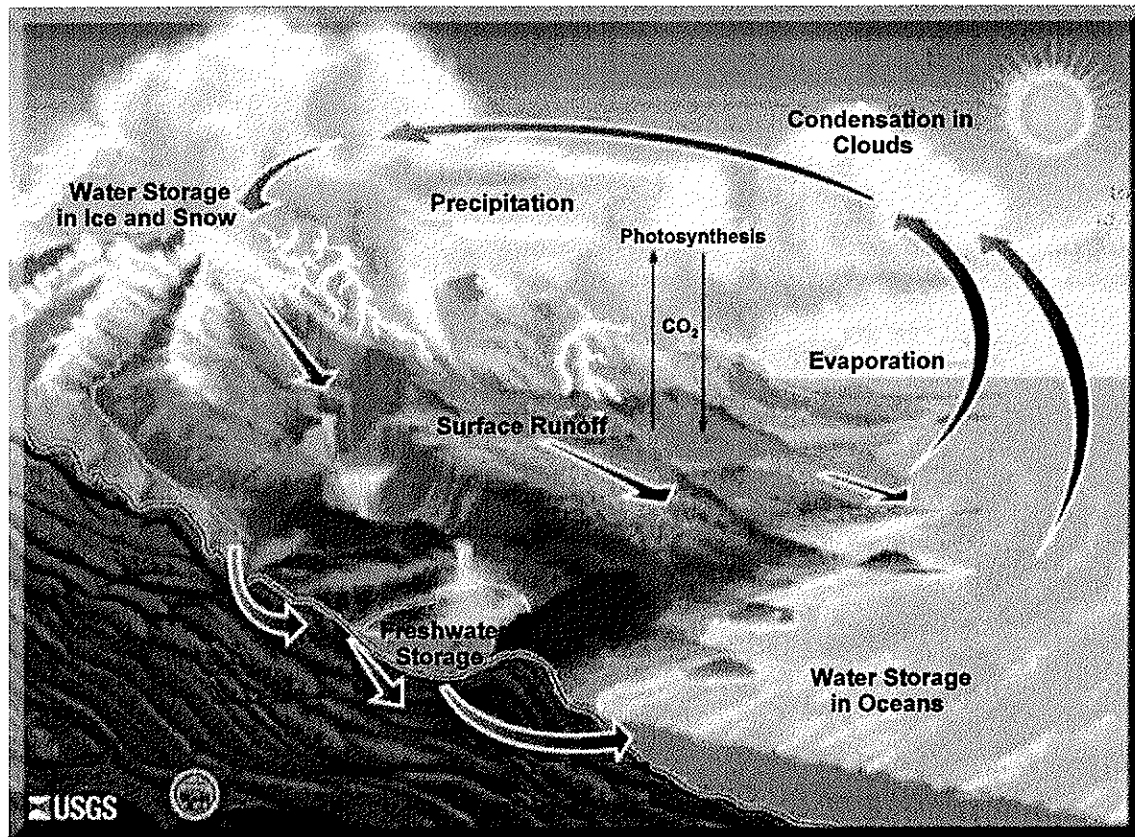
JUNE 2002



# WHAT IS GROUNDWATER?

- ▶ Groundwater is a life-sustaining, renewable natural resource in Ontario.
- ▶ It is a major source of water for human consumption as well as for agricultural / irrigation and industrial / commercial purposes

Groundwater is produced by the Hydrologic Cycle, which is the constant circulation of water between ocean, atmosphere and land.



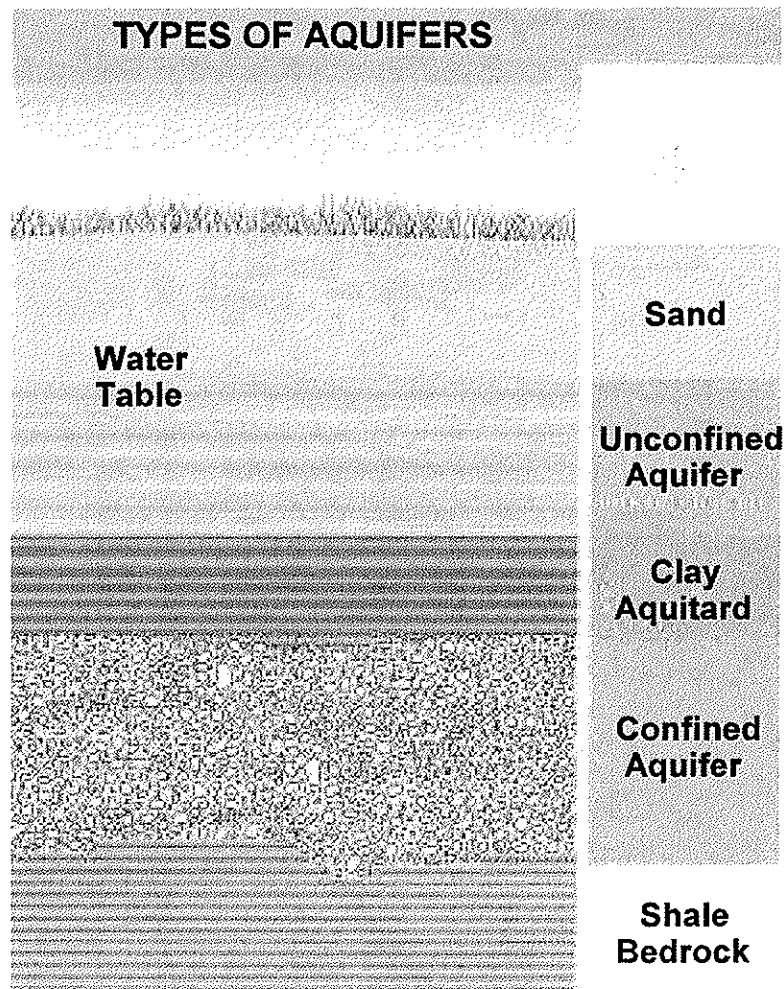
# WHAT IS AN AQUIFER?

Groundwater is stored in the pore spaces of soil or in fractures in rock. It does not exist as underground rivers or lakes.

There are two main types of aquifers:

- ▶ **Unconfined Aquifers** - where the upper boundary is the water table. In these types of aquifers, the groundwater only partially fills the aquifer and the upper surface can rise and decline
- ▶ **Confined or Artesian Aquifers** - have an overlying layer of soil or rock (like clay) that does not transmit water readily

Some types of aquifers are more susceptible to potential contamination from surface or near-surface activities than other types.



# WHY IS THIS STUDY BEING DONE?

In recent years in Ontario, several programs have been initiated by the province to better understand and protect our natural groundwater resources. As part of this, the Ministry of Environment and Energy (MOEE) is sponsoring 32 Groundwater Studies across Ontario.

This **Groundwater Study for Middlesex, London, Central Elgin, Malahide and Aylmer** is one of seven regional studies being completed in southwest and west-central Ontario. The study will assess and map groundwater resources in the study area and identify strategies for future groundwater protection.

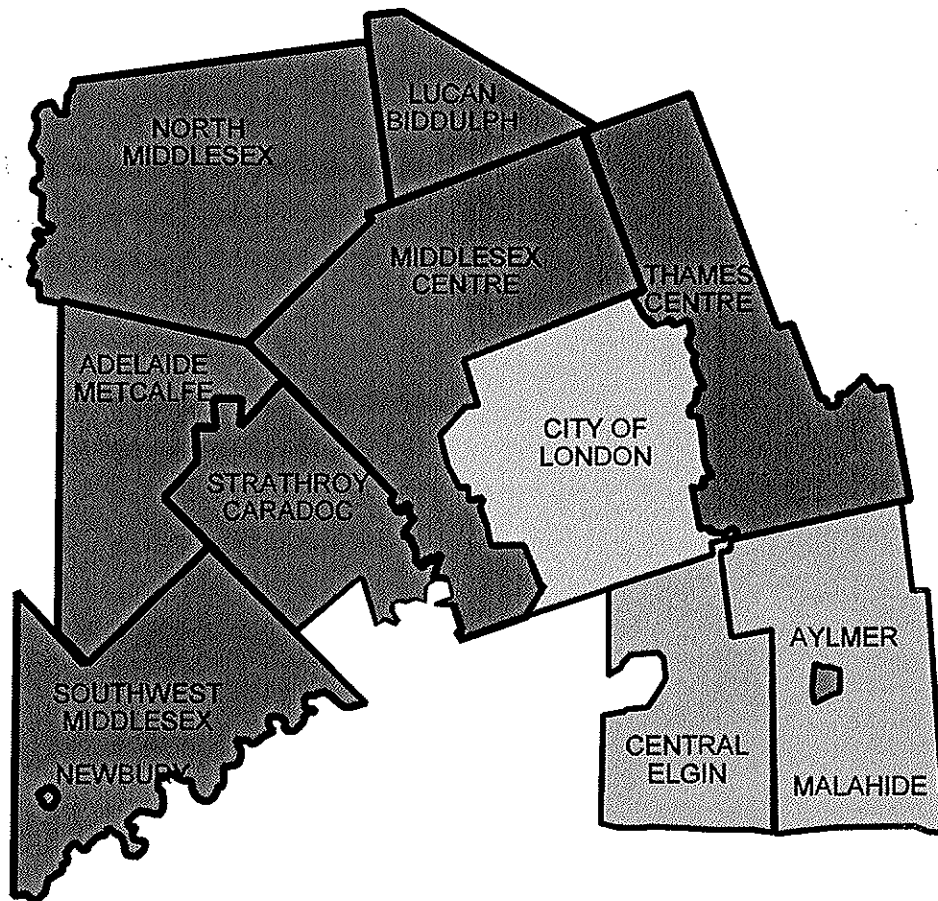
The study consists of the following tasks:

- ▶ **Regional Aquifer Characterization** - to assess the aquifers in the study area and how the groundwater moves through them
- ▶ **Municipal Wellhead Protection Studies** - including mapping areas that contribute water to municipal wells in Dorchester, Thorndale, Birr, Melrose, Komoka/Kilworth, Delaware, Belmont, Aylmer, and London
- ▶ **Groundwater Management / Protection Strategy Development** - to identify possible regional groundwater and local wellhead protection measures.



# STUDY AREA

The study will address groundwater resources and systems in the City of London and the local municipalities of Middlesex County, as well as the Municipality of Central Elgin, Malahide Township, and the Town of Aylmer in Elgin County.



# REGIONAL AQUIFER CHARACTERIZATION

## Task 1 - Geological Mapping

- ▶ In Task 1, we will map Quaternary Geology (surficial soils), the Bedrock Geology, the Bedrock Surface, and the Overburden Thickness (depth from ground surface down to bedrock surface)

## Task 2 - Aquifer Mapping

- ▶ The locations of the three main types of aquifers (Shallow Overburden, Deep Overburden and Bedrock) will be mapped
- ▶ Water Level (Piezometric Surface) Maps will be produced for each aquifer
- ▶ The specific yield for each aquifer will be identified

## Task 3 - Groundwater Use Assessment

- ▶ Municipal records, census data, and records of Permits to Take Water will be used to determine how much groundwater is being used, where, and by whom

## Task 4 - Regional Contaminant Source Assessment

- ▶ In Task 4, possible groundwater contaminants will be identified based on review of data from:
  - Provincial and Municipal Sources
  - Land use survey and risk classification of potential contaminants
- ▶ High-risk sites in sensitive groundwater areas will be identified

## Task 5 - Aquifer Vulnerability Assessment

- ▶ Based on geological and aquifer characteristics, the regional aquifers will be classified as areas of High Vulnerability, Moderate Vulnerability, or Low Vulnerability

# MUNICIPAL WELLHEAD PROTECTION STUDIES

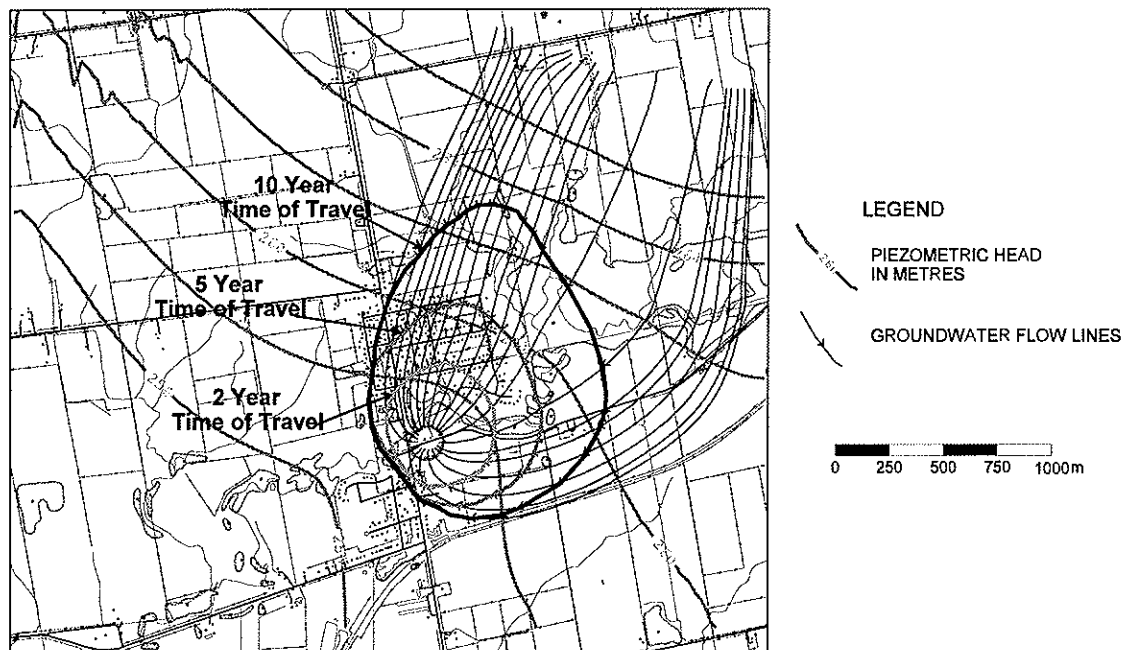
## Task 1 - Wellhead Protection Area Delineation

- ▶ Detailed Examination of Municipal Well Heads
- ▶ Development of Geological Conditions
- ▶ Estimation of "Travel Times" and Protection Zones

## Task 2 - Contaminant Source Inventory

- ▶ Detailed land use survey in WHPAs
- ▶ Ground truthing of potential contaminants and pathways to aquifer
- ▶ Industrial / Commercial / Institutional questionnaire
- ▶ Mapping of potential contaminant sources

EXAMPLE WELL HEAD DELINEATION  
BELMONT



# GROUNDWATER MANAGEMENT AND PROTECTION

Information collected during the previous steps will be used to develop recommendations for groundwater management and protection strategies.

Examples of regulatory and voluntary strategies that may be applicable to the study area include:

## POSSIBLE REGULATORY MEASURES

Land-Use Restrictions on new development in groundwater sensitive areas

- ▶ Restriction of new developments using private septic systems
- ▶ Restriction of new waste disposal sites and industrial development
- ▶ Restriction of large livestock operations
- ▶ Bylaw requires farms to have a NMP before issuing Building Permits
- ▶ Restriction of new underground storage tanks for hazardous materials



## POSSIBLE VOLUNTARY MEASURES

- ▶ Water Testing for Private Wells
  - resident sampling with assistance from the Public Health Unit
  - Baseline Well Water Testing Program for farms (through OFA)
- ▶ Best Management Practices (BMPs)
  - partnership between OMAF and the OFA which has produced publications providing farmers with information on affordable options for management practices to protect the quality of on-farm soil and water resources
- ▶ Community Consultation Programs
  - grade school water education programs
  - preparation of pamphlets, brochures, websites with water-related messages such as: water efficient gardening; well maintenance; septic system maintenance; proper handling and use of chemicals etc.
  - presentation of workshops on proper well location, well maintenance and abandonment, nutrient management planning, etc.

# NEXT STEPS

We are currently undertaking data collection and database integration. Our timetable to complete this study is as follows:

Regional Aquifer Characterization - Summer 2002

Municipal Wellhead Protection Studies - Early Fall 2002

Groundwater Management/Protection Strategy - Late Fall 2002

A second series of Open Houses will be held in the fall to present and obtain comments on the study results and recommendations.

For further information, or to be added to the project mailing list, please contact:

Linda Nicks, M.Sc.  
Upper Thames River Conservation Authority  
1424 Clarke Road  
London, Ontario  
N5V 5B9

Tel: 519-451-2800 ext 292  
Fax: 519-451-1188  
Email: [nicks1@thamesriver.on.ca](mailto:nicks1@thamesriver.on.ca)

or Rob Kell, P. Eng. or  
Catherine F. Marsden, M.Sc.  
Dillon Consulting Limited  
Box 426  
London, Ontario  
N6A 4W7

Tel: 519-438-6192  
Fax: 519-672-8209  
Email: [rkell@dillon.ca](mailto:rkell@dillon.ca)  
[cfletchermarsden@dillon.ca](mailto:cfletchermarsden@dillon.ca)

*The following people are on the study Steering Committee and would be pleased to answer your questions about the study on behalf of the municipalities:*

- Bob Cooper, City of London, 661.5593
- Steve Evans, Middlesex County, 434-7321 x 253.
- Wendell Graves, Town of Aylmer, 773-3164.
- Randy Millard, Malahide Township, 773-5344.
- Lloyd Perrin, Municipality of Central Elgin, 631-4860 x 277.
- Gary Crandall, 268-7338 x 233

**GROUNDWATER STUDY FOR  
MIDDLESEX COUNTY, CITY OF LONDON, MUNICIPALITY OF CENTRAL  
ELGIN, MALAHIDE TOWNSHIP AND TOWN OF AYLMER**

**PUBLIC OPEN HOUSE, JUNE 12, 2002**

**COMMENT FORM**

**THANK YOU** for attending our Open House. Please take a few minutes and let us know what concerns or suggestions you have about your groundwater resources. Comments received will be considered during completion of the study process. Except for personal information, comments will be summarized in the Groundwater Study Report.

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Please use reverse if necessary →

Name: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

**Comments can be left in the “Comments” box at this Public Open House or sent to:**

Catherine F. Marsden, Senior Environmental Planner  
Dillon Consulting Limited  
495 Richmond Street, London Ontario N6A 5A9  
Phone: (519) 438-6192 Fax: (519) 672-8209  
Email: cfletchermarsden@dillon.ca





Ministry of Culture    Ministère de la Culture  
Heritage & Libraries Branch  
Southwest Archaeological Field Office  
55 Centre Street  
London, Ontario N6J1T4



(519) 675-7742; Fax: 675-7777

June 10, 2002

To: Catherine F. Marsden  
Environmental Planner  
Dillon Consulting  
495 Richmond Street  
London, Ontario N6A 5A9

RE: Municipality of Central Elgin, Malahide Township and the Town of Aylmer  
Municipal Groundwater Study  
Your File: 02-0394

I have had an opportunity to review the information provided in your letter of June 6<sup>th</sup>, 2002 concerning the above-noted study. A principal concern of this office is the adverse effects that undertakings such as the above mentioned might have on cultural heritage resources. If there are areas of heritage potential that will be impacted by this project, then our office would recommend that an archaeological assessment be conducted as part of the EA. If any significant heritage or archaeological remains are identified, then any negative impacts will have to be mitigated by either avoidance or excavation.

Consequently, our office would wish to continue to be involved in this project. In particular, it would be useful to be provided with detailed information and maps outlining the extent and type of land disturbance anticipated and the extent of previous disturbance within the study area. With this information I will be able to determine what portions of the project, if any, may exhibit potential for impacting heritage resources, and thus would require an assessment to inventory all heritage resources present, and determine what mitigation work, if any, may be required.

I trust that this is of assistance. Please do not hesitate to contact me if you require further information.

Sincerely,

Kristy Snarey, for  
Neal Ferris  
Regional Archaeologist  
Southwestern Ontario

Our File: 02-0394-6000

January 3, 2003



SAME LETTER TO: (see attached Contact List 1)

**Middlesex-Elgin Groundwater Protection Workshop:  
Participant Confirmation Letter**

Dear :

The Middlesex-Elgin Groundwater Study was initiated in the spring of 2002, sponsored by the Ontario Ministry of the Environment and municipalities within Middlesex and Elgin. The study objectives are to assess and map groundwater resources in the study area and identify strategies for future groundwater protection (see study overview attached). Dillon Consulting Limited, along with Golder Associates Ltd. are completing the technical and consultation study activities.

A **Groundwater Protection Workshop** will be held this month to define measures for the protection of local and regional groundwater resources in Middlesex and Elgin. Participants will include representatives from the local municipalities, conservation authorities, provincial ministries, agricultural associations, health units and interest groups. The intent is to develop a "made in Middlesex-Elgin" strategy for groundwater protection.

The date, time and location for the workshop are as follows:

<b>Date:</b>	<b>Wednesday, January 22, 2003</b>
<b>Time:</b>	<b>9:30 a.m. to 1:30 p.m. (Lunch will be provided)</b>
<b>Location:</b>	<b>Middlesex County Building 399 Ridout Street North London, Ontario</b>

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495  
Richmond Street  
London, Ontario  
Canada  
N6A 5A9  
Mail: Box 426  
London, Ontario  
Canada  
N6A 4W7  
Telephone:  
(519) 438-6192  
Fax  
(519) 672-8209

**Dillon Consulting  
Limited**

*SAME LETTER TO:*

*Page 2*

*January 3, 2003*

**You have confirmed that you will attend the workshop and we look forward to your participation.** An agenda and information package will be sent to you a week prior to the workshop (by January 15, 2003). Meanwhile, if you have questions or would like further information, please contact:

**Catherine F. Marsden or Shannon Whitney**  
**Dillon Consulting Limited**  
**495 Richmond Street**  
**London, Ontario, N6A 5A9**  
**Tel: 519-438-6192**  
**Fax: 519-672-8209**  
**E-mail: [cfletchermarsden@dillon.ca](mailto:cfletchermarsden@dillon.ca) or [swhitney@dillon.ca](mailto:swhitney@dillon.ca)**

Yours sincerely,

**DILLON CONSULTING LIMITED**



Shannon Whitney  
for R. F. Kell, P.Eng.  
Project Manager

CFM:lgg  
Encl.

cc: Steve Evans, Director of Planning, County of Middlesex  
Ted Briggs, UTRCA  
Linda Nicks, UTRCA

CONTACT LIST NO. 1 (January 3, 2003) (Confirmed Attendance)

Municipality of Central Elgin  
450 Sunset Drive  
St. Thomas, Ontario  
N5R 5V1

Attention: Mr. Lloyd Perrin  
Director of Physical Services

The Corporation of the City of London  
P.O. Box 5035  
London, Ontario  
N6A 4L9

Attention: Mr. Bob Cooper  
Division Manager,  
Water Engineering

Town of Aylmer  
46 Talbot Street West  
Aylmer, Ontario  
N5H 1J7

Attention: Layne Wilson

Town of Aylmer  
46 Talbot Street West  
Aylmer, Ontario  
N5H 1J7

Attention: Mr. Roger Vandierendocnk  
Councillor

Ministry of Municipal Affairs and Housing  
659 Exeter Road, 2<sup>nd</sup> Floor  
London, Ontario  
N6E 1L3

Attention: Mr. Erick Boyd  
Municipal/Planning Advisor

Municipality of Thames Centre  
4305 Hamilton Road  
Dorchester, Ontario  
N0L 1G3

Attention: Mr. Jarrod Craven  
Area Superintendent,  
Thames Centre

Middlesex County  
5270 Trafalgar Street  
Dorchester, Ontario  
N0L 1G4

Attention: Mr. Al Marr  
Councillor

The Corporation of the City of London  
P.O. Box 5035  
London, Ontario  
N6A 4L9

Attention: Ms. Joni Baechler  
Councillor

The Corporation of the City of London  
P.O. Box 5035  
London, Ontario  
N6A 4L9

Attention: Mr. Dave Leckie  
City Engineer

The Corporation of the City of London  
P.O. Box 5035  
London, Ontario  
N6A 4L9

Attention: Mr. Rob Panzer  
Director of Planning



Municipality of Central Elgin  
44694 Fruitridge Line  
R.R.5  
St. Thomas, Ontario  
N5P 3S9

Attention: Danial R. Dale  
Councillor

Township of Malahide  
87 John Street South  
Aylmer, Ontario  
N5H 2C2

Attention: Mr. Mark Widner  
Councillor

Municipality of Thames Centre  
4305 Hamilton Road  
Dorchester, Ontario  
N0L 1G3

Attention: Mr. Gary Crandall  
Director of Operations

Middlesex Federation of Agriculture  
R.R. #2  
Ilderton, Ontario  
N0M 2A0

Attention: Mr. Jim Reith

County of Middlesex  
399 Ridout Street North  
London, Ontario  
N6A 2P1

Attention: Brent Stainton

St. Clair Region Conservation Authority  
205 Mill Pond Crescent  
Strathroy, Ontario  
N7G 3P9

Attention: Patty Hayman  
Director of Planning & Research

Catfish Creek Conservation Authority  
R.R. 5  
Aylmer, Ontario  
N5H 2R4

Attention: Kim Smale  
General Manager

Ministry of the Environment  
733 Exeter Road  
London, Ontario  
N6E 1L3

Attention: Theo Beukeboom  
Groundwater Evaluator/Group Leader  
Technical Support Section

Middlesex-London Health Unit  
50 King Street  
London, Ontario  
N6A 5L7

Attention: Mr. Jim Reffle

Elgin-St. Thomas Health Unit  
99 Edward Street  
St. Thomas, Ontario  
N5P 1Y8

Attention: Ganesh Vallamkonda

Corporation of the City of St. Thomas  
Environmental Services Department  
P.O. Box 520  
St. Thomas, Ontario  
N5P 3V7

Attention: Mr. Gerald Reu

Corporation of the City of St. Thomas  
P.O. Box 520  
St. Thomas, Ontario  
N5P 3V7

Attention: Mr. John Dewancker

Ausable Bayfield Conservation Authority  
R.R. 3  
71108 Morrison Line  
Exeter, Ontario  
N0M 1S5

Attention: Peter MacDonald

Township of Southwold  
35663 Fingal Line  
Fingal, Ontario  
N0L 1K0

Attention: Mr. David Aristone

Ontario Ministry of Agriculture and Food  
1 Stone Road West  
3<sup>rd</sup> Floor SE  
Guelph, Ontario  
N1G 4Y2

Attention: Mr. Hugh Simpson  
Rural Groundwater Specialist

Municipality of Dutton-Dunwich  
P.O. Box 329  
199 Main Street  
Dutton, Ontario  
N0L 1J0

Attention: Mr. Ken Loveland

Township of Middlesex Centre  
10227 Ilderton Road  
R.R. 2  
Ilderton, Ontario  
N0M 2A0

Attention: Cathy Saunders

Mr. Marvin Recker  
1460 Norman Avenue  
London, Ontario  
N6K 2A7

Lower Thames River Conservation Authority  
100 Thames Street  
Chatham, Ontario  
N7L 2Y8

Attention: Mr. Jack Robertson  
Water Management Supervisor

Municipality of West Elgin  
R.R. #1  
Wardsville, Ontario  
N0L 2C0

Attention: Mayor Duncan McPhail

EEPAC Chair  
Patrick Lozon  
29 Gilles Street  
London, Ontario  
N5Z 2V3

Species at Risk Section  
Ontario Parks  
Box 7000  
Peterborough, Ontario  
K9J 8M5

Attention: Mr. Alan Dextrase  
Sydenham River Recovery Team Chair

Middlesex Soil and Crop Improvement Association  
3320 Mullifarry Drive  
R.R. #7  
Strathroy, Ontario  
N7G 3H8

Attention: Mr. Nick Stokman

Township of Middlesex Centre  
10227 Ilderton Road  
R.R. 2  
Ilderton, Ontario  
N0M 2A0

Attention: Arnie Marsman

The Township of Malahide  
87 John Street South  
Aylmer, Ontario  
N5H 2C2

Attention: Mr. John Wilson

Elgin Federation of Agriculture  
12215 Lawrence Road  
R.R. #4  
Iona Station, Ontario  
N0L 1P0

Attention: Mr. Don Miller  
President

Ministry of the Environment  
733 Exeter Road  
London, Ontario  
N6E 1L3

Attention: Mr. Bill Armstrong  
Environmental Planner  
Technical Support Section

The Corporation of the City of London  
P.O. Box 5035  
London, Ontario  
N6A 4L9

Attention: Mr. Charlie Murray

Township of Southwold  
35663 Fingal Line  
Fingal, Ontario  
N0L 1K0

Attention: Mayor James McIntyre

Salah Syed  
EEPAC Member  
550 Sarnia Road, Unit 38  
London, Ontario  
N6G 3A8

Ontario Ground Water Association  
7522 Aberfeldy Line  
R.R.#2  
Bothwell, Ontario  
N0P 1C0

Attention: Mr. Earl Morwood  
Executive Director

Our File: 02-0394-6000



January 3, 2003

SAME LETTER TO: (see attached Contact List 2)

**Invitation to the Middlesex-Elgin  
Groundwater Protection Workshop**

Dear :

The Middlesex-Elgin Groundwater Study was initiated in the spring of 2002, sponsored by the Ontario Ministry of the Environment and municipalities within Middlesex and Elgin. The study objectives are to assess and map groundwater resources in the study area and identify strategies for future groundwater protection (see study overview attached). Dillon Consulting Limited, along with Golder Associates Ltd are completing the technical and consultation study activities.

A **Groundwater Protection Workshop** will be held this month to define measures for the protection of local and regional groundwater resources in Middlesex and Elgin. Participants will include representatives from the local municipalities, conservation authorities, provincial ministries, agricultural associations, health units and interest groups. The intent is to develop a "made in Middlesex-Elgin" strategy for groundwater protection.

**On behalf of the Groundwater Study Steering Committee, you or your delegate are invited to attend this workshop.** The date, time and location for the workshop are as follows:

<b>Date:</b>	<b>Wednesday, January 22, 2003</b>
<b>Time:</b>	<b>9:30 a.m. to 1:30 p.m. (Lunch will be provided)</b>
<b>Location:</b>	<b>Middlesex County Building 399 Ridout Street North London, Ontario</b>

... continued

495  
Richmond Street  
London, Ontario  
Canada  
N6A 5A9  
Mail: Box 426  
London, Ontario  
Canada  
N6A 4W7  
Telephone  
(519) 438-6192  
Fax  
(519) 672-6200

Dillon Consulting  
Limited

*SAME LETTER TO:*

*Page 2*

*January 3, 2003*

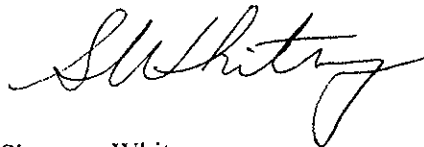
Please let us know whether you or your delegate plan to attend. If a delegate will attend instead of you, please provide their full name and contact information. We can be contacted by e-mail, phone, fax or regular mail as follows:

**Catherine F. Marsden or Shannon Whitney**  
**Dillon Consulting Limited**  
**495 Richmond Street**  
**London, Ontario N6A 5A9**  
**Tel: 519-438-6192**  
**Fax: 519-672-8209**  
**E-mail: [cfletchermarsden@dillon.ca](mailto:cfletchermarsden@dillon.ca) or [swhitney@dillon.ca](mailto:swhitney@dillon.ca)**

We look forward to your response and hope you will be able to be involved. For those who plan to attend the workshop, an agenda and information package will be sent one week prior to the workshop (by January 15, 2003). If you have questions, or would like further information about the study or the workshop, please contact us as indicated above.

Yours sincerely,

**DILLON CONSULTING LIMITED**



Shannon Whitney  
for R. F. Kell, P.Eng.  
Project Manager

SW:lgg  
Encl.

cc: Steve Evans, Director of Planning, County of Middlesex  
Ted Briggs, UTRCA  
Linda Nicks, UTRCA



CONTACT LIST NO. 2 (January 3, 2003) (No response to e-mails/phone calls)

County of Middlesex  
Administration Building  
399 Ridout Street North  
London, Ontario  
N6A 2P1

Attention: Al Edmondson

Thames Region Ecological Association  
1017 Western Road  
London, Ontario  
N6G 1G5

Urban League of London  
Grovenor Lodge  
1017 Western Road  
London, Ontario  
N6G 1G5

Agricultural Advisory Committee  
R.R. #2  
486 Thompson Drive  
Belmont, Ontario  
N0L 1B0

Attention: Mr. Jim Thompson  
Chair

Township of Strathroy-Caradoc  
52 Frank Street  
Strathroy, Ontario  
N7G 2R4

Attention: Mr. Larry Glover  
Strathroy-Caradoc Utilities Operations  
Supervisor

Township of Strathroy-Caradoc  
52 Frank Street  
Strathroy, Ontario  
N7G 2R4

Attention: Mayor Mel Veale

Middlesex Stewardship Council  
Ministry of Natural Resources  
Aylmer District Office  
353 Talbot Street West  
Aylmer, Ontario  
N5H 2S8

Attention: Mr. Dan Schaefer

Elgin Stewardship Council  
Ministry of Natural Resources  
Aylmer District Office  
353 Talbot Street West  
Aylmer, Ontario  
N5H 2S8

Attention: Mr. Rick Drouin

County of Middlesex  
399 Ridout Street North  
London, Ontario  
N6A 2P1

Attention: Warden Vance Blackmore

Kettle Creek Conservation Authority  
44015 Ferguson Line  
St. Thomas, Ontario  
N5P 3T3

Attention: Vanita Chanthavongse  
Planning Coordinator

Township of Adelaide-Metcalf  
2340 Egremont Drive  
R.R. #5  
Strathroy, Ontario  
N7G 3H6

Attention: Sylvia E. Hammer  
Administrator/Clerk

Municipality of North Middlesex  
P.O. Box 9, 229 Main Street  
Parkhill, Ontario  
N0M 2K0

Attention: Shirley Scott  
Administrator/Clerk

Township of Lucan-Biddulph  
P.O. Box 190  
Lucan, Ontario  
N0M 2J0

Attention: Mr. Ronald J. Reymer  
Administrator/Clerk

Village of Newbury  
P.O. Box 130  
22910 Hagerty Road  
Newbury, Ontario  
N0L 1Z0

Attention: Betty D. Gordon  
Clerk-Treasurer

Our File: 02-0394-6000



January 3, 2003

SAME LETTER TO: (see attached Contact List 3)

### Middlesex-Elgin Groundwater Protection Workshop

Dear :

The Middlesex-Elgin Groundwater Study was initiated in the spring of 2002, sponsored by the Ontario Ministry of the Environment and municipalities within Middlesex and Elgin. The study objectives are to assess and map groundwater resources in the study area and identify strategies for future groundwater protection (see study overview attached). Dillon Consulting Limited, along with Golder Associates Ltd. are completing the technical and consultation study activities.

A **Groundwater Protection Workshop** will be held this month to define measures for the protection of local and regional groundwater resources in Middlesex and Elgin. Participants will include representatives from the local municipalities, conservation authorities, provincial ministries, agricultural associations, health units and interest groups. The intent is to develop a "made in Middlesex-Elgin" strategy for groundwater protection.

The date, time and location for the workshop are as follows:

<b>Date:</b>	<b>Wednesday, January 22, 2003</b>
<b>Time:</b>	<b>9:30 a.m. to 1:30 p.m. (Lunch will be provided)</b>
<b>Location:</b>	<b>Middlesex County Building 399 Ridout Street North London, Ontario</b>

... continued

495  
Richmond Street  
London, Ontario  
Canada  
N6A 5A9  
Mail: Box 426  
London, Ontario  
Canada  
N6A 4W7  
Telephone  
(519) 438-6192  
Fax  
(519) 672-8209

**Dillon Consulting  
Limited**

*SAME LETTER TO:*

*Page 2*

*January 3, 2003*

Our records show that you have indicated that you **will not** be able to attend the workshop. If, however, your plans have changed and you would like to attend, or someone else from your organization would like to participate, please let us know. An agenda and information package will be sent to participants a week prior to the workshop (by January 15, 2003). To participate in the workshop, or for further information, we can be contacted as follows:

**Catherine F. Marsden or Shannon Whitney**  
**Dillon Consulting Limited**  
**495 Richmond Street**  
**London, Ontario, N6A 5A9**  
**Tel: 519-438-6192**  
**Fax: 519-672-8209**  
**E-mail: [cfletchermarsden@dillon.ca](mailto:cfletchermarsden@dillon.ca) or [swhitney@dillon.ca](mailto:swhitney@dillon.ca)**

Yours sincerely,

**DILLON CONSULTING LIMITED**



Shannon Whitney  
for R. F. Kell, P.Eng.  
Project Manager

CFM:lgg  
Encl.

cc: Steve Evans, Director of Planning, County of Middlesex  
Ted Briggs, UTRCA  
Linda Nicks, UTRCA

CONTACT LIST NO. 3 (January 3, 2003) (Will Not Attend)

Township of Malahide  
Public Utilities Coordinator  
87 John Street South  
Aylmer, Ontario  
N5H 2C2

Attention: Mr. Don Weir

Township of Malahide  
87 John Street South  
Aylmer, Ontario  
N5H 2C2

Attention: Randy Millard  
Clerk/CAO

Township of Malahide  
87 John Street South  
Aylmer, Ontario  
N5H 2C2

Attention: Mark Wales

Ausable-Bayfield Conservation Authority  
R.R.3  
71108 Morrison Line  
Exeter, Ontario  
N0M 1S5

Attention: Alec Scott

Township of Middlesex Centre  
10227 Ilderton Road  
R.R. 2  
Ilderton, Ontario  
N0M 2A0

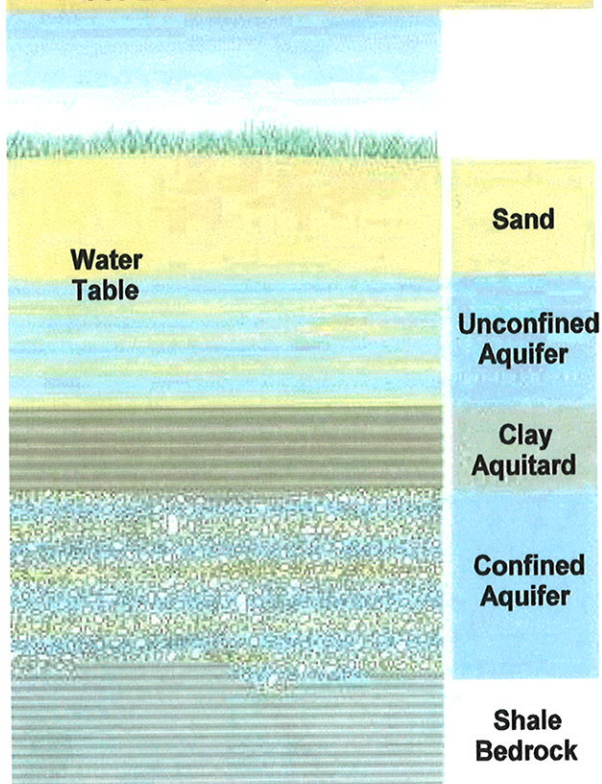
Attention: Mayor Bev Shipley

# MIDDLESEX-ELGIN GROUNDWATER STUDY

## WHY IS THE STUDY BEING DONE?

In recent years in Ontario, several programs have been initiated by the province to better understand and protect our natural groundwater resources. As part of this, the Ministry of Environment and area municipalities are sponsoring the **Groundwater Study** which is one of seven regional studies being completed in southwest and west-central Ontario. The study will assess and map groundwater resources in the study area and identify strategies for future groundwater protection.

### TYPES OF AQUIFERS



## WHAT IS GROUNDWATER?

- ▶ Groundwater is a life-sustaining, renewable natural resource.
- ▶ It is a major source of water for human consumption as well as for agricultural / irrigation and industrial / commercial purposes.
- ▶ Groundwater is stored in the pore spaces of soil or in fractures in rock. It does not exist as underground rivers or lakes.
- ▶ There are two main types of aquifers:
  - Unconfined Aquifers - where the upper boundary is the water table, groundwater only partially fills the aquifer and the upper surface can rise and decline
  - Confined or Artesian Aquifers - have an overlying layer of soil or rock (like clay) that does not transmit water readily
- ▶ Some types of aquifers are more susceptible to potential contamination from surface or near-surface activities than other types.



## Groundwater Study Components

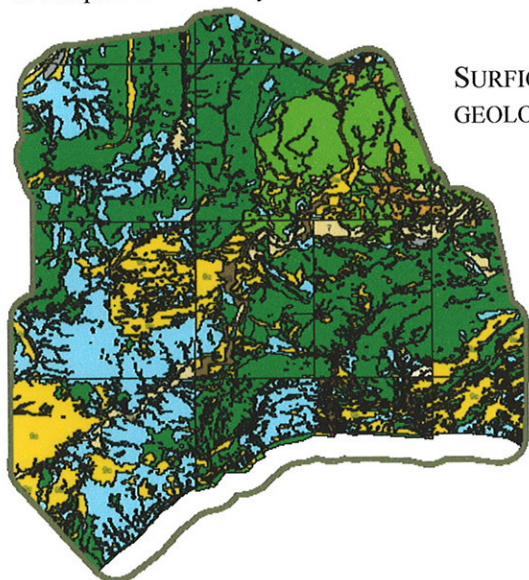
Regional Aquifer  
Characterization

Municipal Wellhead  
Protection Studies

Groundwater Management / Protection  
Strategy Development

### REGIONAL AQUIFER CHARACTERIZATION

Involves developing an understanding of the aquifers throughout the study area and the processes that control how groundwater moves through them. The study will use a dynamic Geographical Information System software to maximize the usefulness of the data and maps developed for the study.



SURFICIAL  
GEOLOGY

### MUNICIPAL WELLHEAD PROTECTION STUDIES

Involves mapping all of the areas that contribute water to the municipal wells in the study area. Protection zones will be defined through the estimation of "Travel Times". A Potential Contaminant Source Inventory, will be completed by detailed land use surveys in Protection Zones.

### GROUNDWATER MANAGEMENT / PROTECTION STRATEGY DEVELOPMENT

A strategy will be developed to address regional groundwater protection as well as local wellhead protection measures. The strategy will include both regulatory and voluntary measures to protect groundwater.

### POSSIBLE REGULATORY MEASURES

Land-Use Restrictions on new development in groundwater sensitive areas such as: new developments using private septic systems, new waste disposal sites and industrial development, new large livestock operations, new underground storage tanks for hazardous materials.

### POSSIBLE VOLUNTARY MEASURES

Water Testing for Private Wells, Best Management Practices (BMPs) and Community Consultation Programs such as grade school water education programs, preparation of pamphlets, brochures, websites with water-related messages such as: water efficient gardening; well maintenance; septic system maintenance; proper handling and use of chemicals etc., promotion of on proper well location, well maintenance and abandonment, nutrient management planning, etc.

For further information, or to be added to the project mailing list, please contact:

Linda Nicks, M.Sc.

Upper Thames River Conservation Authority  
1424 Clarke Road

London, Ontario, N5V 5B9

Tel: 519-451-2800 ext 292

Fax: 519-451-1188

Email: [nicksl@thamesriver.on.ca](mailto:nicksl@thamesriver.on.ca)

or

Rob Kell, P.Eng., P.Geo. or Catherine F. Marsden, M.Sc.  
Dillon Consulting Limited

495 Richmond Street

London Ontario, N6A 5A9

Tel: 519-438-6192

Fax: 519-672-8209

Email: [rkell@dillon.ca](mailto:rkell@dillon.ca) or [cfletchermarsden@dillon.ca](mailto:cfletchermarsden@dillon.ca)

*The following people are on the Study Steering Committee and would be pleased to answer your questions about the study on behalf of the municipalities:*

Bob Cooper, City of London, 661-5593

Wendell Graves, Town of Aylmer, 773-3164

Gary Crandall, Thames Centre, 268-7338 x 233

Steve Evans, Middlesex County, 434-7321 x 253

Randy Millard, Malahide Township, 773-5344

Lloyd Perrin, Central Elgin, 631-4860 x 277

UPPER THAMES RIVER  
CONSERVATION AUTHORITY

DILLON  
CONSULTING

Golder  
Associates



January 15, 2003



**Middlesex-Elgin Groundwater Study  
Groundwater Protection Workshop**

Dear Groundwater Study Workshop Participant:

We look forward to your participation at the upcoming Middlesex-Elgin Groundwater Protection Workshop to be held on January 22, 2003. The doors will be open for participant arrival and registration at 9:00 am. The workshop will begin at 9:30 a.m. in the Middlesex Room located in the historical jail section of the Middlesex County Building, 599 Ridout Street South, London. Parking is very limited in the lot west of the building. Alternative parking is available on King and Ridout Streets or at the Covent Garden Market building located one block east.

The main goal of the workshop is to define measures for protection of regional and local groundwater resources in Middlesex-Elgin. Enclosed is the agenda, a participant list and an overview of the Middlesex-Elgin Groundwater Study. Also enclosed is a table that summarizes groundwater protection issues and examples of management and protection options which will be used as a framework for the workshop discussions.

We look forward to meeting with you next week. For further information, please contact Catherine Marsden or Rob Kell at Dillon Consulting Limited (519) 438-6192.

Yours sincerely,

**DILLON CONSULTING LIMITED**

Rob Kell, P.Eng., P.Geo.  
Project Manager

RFK:lgg  
Encls.

495  
Richmond Street  
London, Ontario  
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N6A 5A9  
Mail: Box 426  
London, Ontario  
Canada  
N6A 4W7  
Telephone  
(519) 438-6192  
Fax  
(519) 672-8209

**Dillon Consulting  
Limited**

**Middlesex-Elgin Groundwater Protection Workshop**  
**January 22, 2003**  
**Middlesex County Building**  
**London, Ontario**

**AGENDA**

**9:00 - 9:30      Arrival and Registration**

**9:30 - 10:15      Workshop Introduction and Overview**

- Welcome from the Steering Committee
- Workshop Objectives and Agenda Review
- Overview of Groundwater Study Data to date

**10:15 - 10:30      Refreshments/ Break into Discussion Groups**

**10:30 - 11:00      Discussion Topic A : Identifying the Issues**

What are the key groundwater resource issues in the Middlesex-Elgin study area:

- in developed urban areas?
- in transition areas (areas under development pressure)?
- in rural/agricultural areas?
- what are the issues re: groundwater quantity? quality?

**11:10 - 12:00      Discussion Topic B : Identifying Groundwater Protection Measures**

For each issue:

- what groundwater protection measures are available?
- what is already in place at the provincial level? locally?
- what are the gaps? what else could be done? or done better?
- how can these measures best be implemented?
- what role will the municipality, province, conservation authorities, other organizations and individuals play?

**12:00 - 12:30      Lunch**

**12:30 - 1:30      Plenary and Wrap-Up**

# Middlesex-Elgin Groundwater Protection Workshop

## January 22, 2003

List of Participants (confirmed as of January 14, 2003):

NO.	NAME	SC	AFFILIATION
<b>PROJECT TEAM:</b>			
1.	Steve Evans	*	Middlesex County
2.	Ted Briggs	*	Upper Thames River Conservation Authority
3.	Linda Nicks	*	Upper Thames River Conservation Authority
4.	Rob Kell		Dillon Consulting Limited
5.	Catherine Fletcher-Marsden		Dillon Consulting Limited
6.	Janet Smolders		Dillon Consulting Limited
7.	Karla Kolli		Dillon Consulting Limited
8.	Darin Burr		Dillon Consulting Limited
9.	Brad Benson		Golder Associates Ltd.
<b>WORKSHOP PARTICIPANTS:</b>			
10.	Lloyd Perrin	*	Central Elgin
11.	Daniel R. Dale	*	Central Elgin
12.	Mayor Duncan McPhail		West Elgin
13.	Al Marr	*	Middlesex County
14.	Brent Stainton	*	Middlesex County
15.	Erick Boyd		Ministry of Municipal Affairs and Housing
16.	Arnie Marsman		Middlesex Centre
17.	Cathy Saunders	*	Middlesex Centre
18.	Jarrold Craven	*	Thames Centre
19.	Gary Crandall	*	Thames Centre
20.	Dave Leckie	*	City of London
21.	Bob Cooper	*	City of London
22.	Rob Panzer	*	City of London
23.	Joni Baechler	*	City of London

NO.	NAME	SC	AFFILIATION
24.	Charlie Murray		City of London
25.	John Dewancker		City of St. Thomas
26.	Gerald Reu	*	City of St. Thomas
27.	Layne Wilson	*	Town of Aylmer
28.	Roger Vandierendocnk	*	Town of Aylmer
29.	Marvin Recker		Caradoc Township
30.	Ken Loveland	*	Dutton/Dunwich
31.	Ronald J. Reymer		Township of Lucan Biddulph
32.	David Aristone	*	Township of Southwold
33.	James McIntyre		Township of Southwold
34.	Mark Widner	*	Malahide Township
35.	John Wilson		Malahide Township
36.	Eugenio DiMeo		Malahide Township
37.	Peter MacDonald		Ausable-Bayfield Conservation Authority
38.	Kim Smale	*	Catfish Creek Conservation Authority
39.	Jeff Lawrence		Kettle Creek Conservation Authority
40.	Rob Lindsay		Kettle Creek Conservation Authority
41.	Jack Robertson		Lower Thames Valley Conservation Authority
42.	Patty Hayman	*	St. Clair Region Conservation Authority
43.	Don Miller		Elgin Federation of Agriculture
44.	Jim Reith	*	Middlesex Federation of Agriculture
45.	Jim Reffle	*	Middlesex-London Health Unit
46.	Ganesh Vallamkonda	*	Elgin-St. Thomas Health Unit
47.	Hugh Simpson	*	Ontario Ministry of Agriculture and Food
48.	Tricia Radburn		Ministry of Natural Resources - Aylmer Office
49.	Bill Armstrong		Ministry of the Environment, London - Technical Support
50.	Theo Beukeboom	*	Ministry of the Environment, London - Technical Support
51.	Patrick Lozon		EEPAC

NO.	NAME	SC	AFFILIATION
52.	Salah Syed		EEPAC
53.	Jim Thompson		AAC
54.	Alan Dextrase		Ontario Parks Species at Risk Section MNR
55.	Rick Drouin		Elgin Stewardship Council - Aylmer MNR
56.	Dan Schaefer		Middlesex Stewardship Council - Aylmer MNR
57.	Nick Stokman		Middlesex Soil and Crop Improvement Association
58.	Earl Morwood		Ontario Groundwater Association
59.	Lin Qiu		City of London
60.	Dave McLachlin		Ducks Unlimited

\* - Member Steering Committee

## **Middlesex-Elgin Groundwater Protection Workshop: Background Information for Participants**

### **Introduction**

Groundwater is a life sustaining , renewable, natural resource. It is a central component and product of the water cycle, contributing a continual base flow to surface water bodies such as lakes, rivers, streams and wetlands. Even in our increasingly urbanized environment, groundwater remains an essential source of water for consumption by humans, livestock and many other animals and elements of the natural world. It provides for the maintenance of fish and wildlife habitat, contributes to many commercial and industrial uses such as agricultural irrigation and oil and gas production, and supports various recreational activities such as fishing, boating and hunting of wildfowl.

The topic of water resource management and protection is not new; it has long been a subject of attention and concern by many individuals, organizations and levels of government. General interest in this subject has recently been heightened by events such as the drinking water tragedy in Walkerton, Ontario.

Like many environmental issues, water resource issues extend across geographic and political boundaries and transcend individual sectors, disciplines and organizational mandates. The development of water resource protection solutions requires an integrated, multi-disciplinary, and multi-sector approach, involving partnerships, shared responsibilities, and the effective coordination of resources. A variety of programs, policies and legislation are already in place or are currently in development that relate to the management and protection of groundwater. These are administered at the municipal, provincial or federal levels of government, or through conservation authorities and health units. Many funding initiatives and educational programs have also been undertaken by agricultural associations, schools, business and other interest groups.

The Middlesex-Elgin Groundwater Protection Workshop has been organized as part of the Middlesex-Elgin Groundwater Study initiated in the spring of 2002. The main goal of the workshop is to define measures for the protection of local and regional groundwater resources in Middlesex and Elgin. Towards this goal, our focus in the workshop will be two-fold: (1) to identify the key groundwater issues in the Middlesex-Elgin study area and (2) for each issue or set of issues, to identify groundwater protection measures and methods of implementation. The intent is to provide

a forum for the identification, discussion and debate of the issues and measures that participants feel are most important and relevant for this area. The ideas and recommendations generated at the workshop will be summarized and included as part of the Middlesex-Elgin Groundwater Study report, and will provide a foundation for further development and implementation of the strategies identified.

To provide some background for the workshop, an overview of the main Groundwater Study components and outputs is provided below. In addition, we have attached a table which provides examples of groundwater issues and potential protection measures. The information in this table, along with the questions included on your agenda provide an initial framework for the identification of issues, measures and solutions at the workshop.

### **Middlesex-Elgin Groundwater Study Overview**

The Groundwater Study will provide a comprehensive understanding of the state of groundwater resources in our community.

The principal objective for the study is to develop a detailed understanding of groundwater resources in the Study Area and to develop strategies and action plans to protect groundwater resources as a safe supply of potable water for current and future generations. The study consists of three main components:

1. Regional Aquifer Characterization including aquifer mapping, an inventory of potential sources of contamination, a groundwater use assessment and aquifer vulnerability mapping.
2. Municipal Wellhead Protection Studies which include wellhead protection area delineation and identification of potential contaminant sources in the delineated areas.
3. Development of a Groundwater Protection and Management Strategy that will address both regional groundwater protection, as well as local wellhead protection measures.

The first step to protecting any natural resource is to gain a practical understanding of the condition of that resource. With groundwater resources, this understanding takes the form of the characterization of local and regional groundwater aquifer systems.



The basic output from this assessment is a series of maps that can be classified into three types:

- Geological Maps - these maps define the geology of the area, and include:
  - Bedrock Geology
  - Quaternary Geology (often referred to as glacial geology)
  - Overburden Thickness (thickness of soil - sand silt and clay overlying bedrock)
  - Bedrock Topography
- Hydrogeological Maps:
  - Aquifer Types and Locations
  - Water Level Maps
  - Areas of Groundwater Recharge and Discharge
  - Specific Capacity Maps (related to groundwater quantity)
- Assessment Maps:
  - Intrinsic Susceptibility Maps (also referred to as Aquifer Vulnerability Maps).

Figure 1 is an example of a geological map for the new study area. Figure 2 is a preliminary ISI map for the previous study area.

### **Municipal Wellhead Protection Studies**

Municipal Wellhead Protection Studies will be completed for the following municipal groundwater supply systems in the following communities: Dorchester, Thorndale, Birr, Melrose, Komoka area, Lambeth and Fanshawe Lake. These studies define Wellhead Protection Areas based on predicted travel time to the well. An example is given in Figure 3.



# Groundwater Study

## Middlesex, London, Central Elgin, Malahide Aylmer

### Legend

- 5KM Boundary Buffer
- 3: Paleozoic bedrock
- 5b: Stone-poor, carbonate-derived silty to sandy till
- 5d: Glaciolacustrine-derived silty to clayey till
- 6a: In moraines, kames, eskers and crevasse fills
- 7: Glaciofluvial deposits
- 7a: Sandy deposits
- 7b: Gravelly deposits
- 8a: Massive-well laminated
- 9a: Deltaic deposits
- 9b: Littoral-foreshore deposits
- 9c: Foreshore-basinal deposits
- 12: Older alluvial deposits
- 13: Fine-textured lacustrine deposits
- 14b: Littoral-foreshore deposits
- 14c: Foreshore-basinal deposits
- 17: Eolian deposits
- 19: Modern alluvial deposits
- 20: Organic deposits
- 21: Man-made deposits



### Quaternary Geology

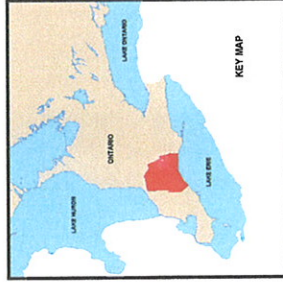
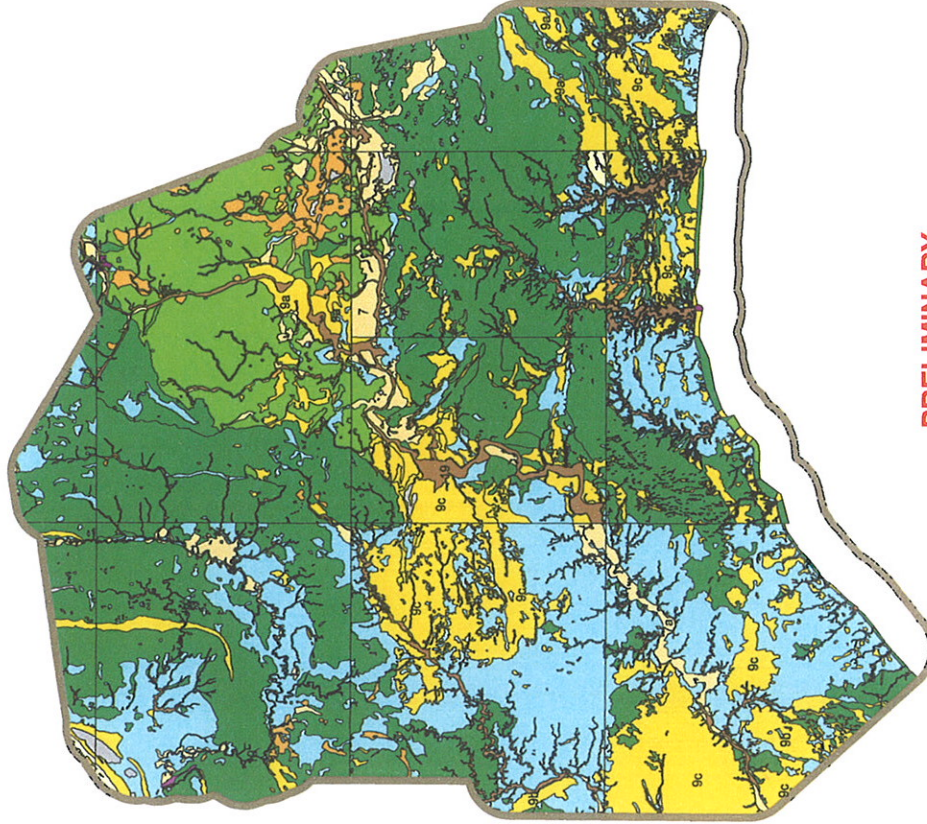


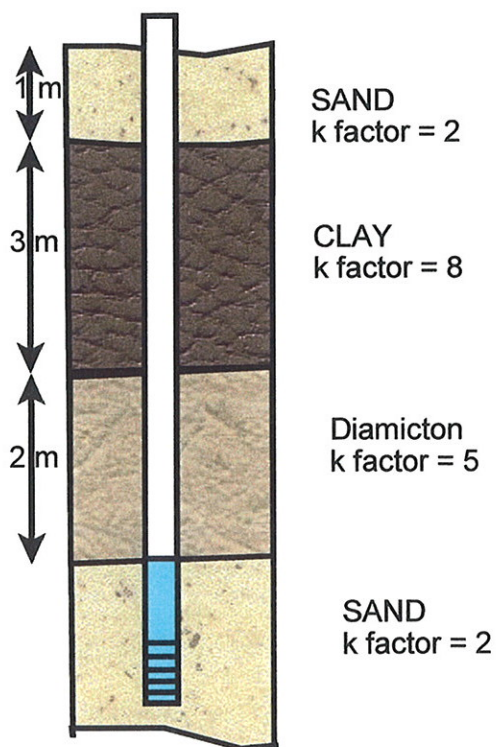
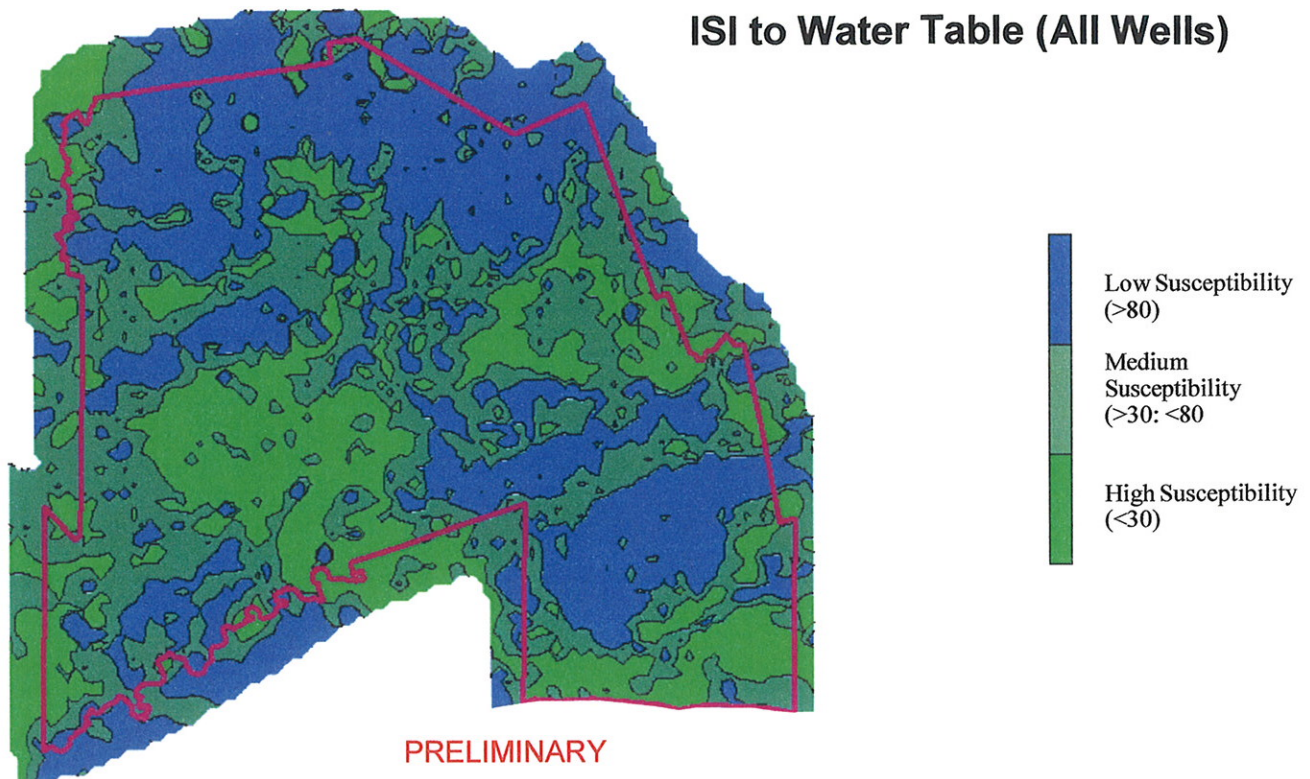
Figure 1 - Example Geology Map



**PRELIMINARY**



Figure 2 - Intrinsic Aquifer Susceptibility Map - Previous Study Area

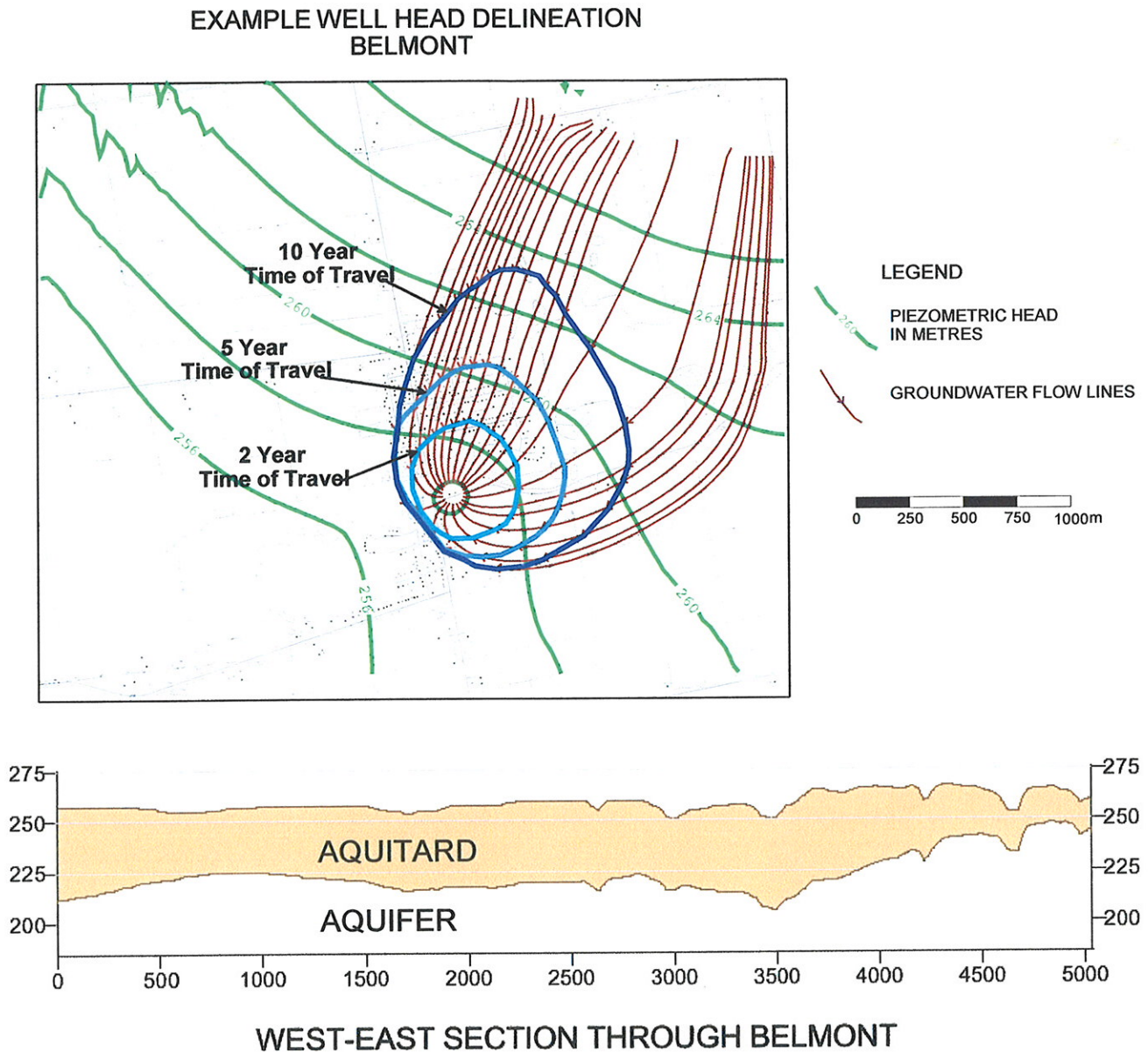


- Based on Well Records
- Based on Soil Types Above Water Table for Unconfined Aquifers
- Based on Soil Types of Confining Units for Confined Aquifers

$$ISI = 2 \times 1 + 3 \times 8 + 2 \times 5 = 36$$



**Figure 3 - Example Well Head Delineation - Belmont**



- Time of Travel is within aquifer
- Time for surface water to travel through aquitard in the order of 100 years
- Similar situation in Thorndale, Birr, Lambeth

## Middlesex-Elgin Groundwater Protection Workshop:

### Discussion Framework for the Identification of Issues and Protection Measures

This table provides a framework for the identification of groundwater issues in Middlesex and Elgin, and the possible protection measures. The first page provides an overview of key elements of the provincial and federal context for groundwater protection. Examples of specific groundwater issues are then presented according to three general categories: developed and transition areas, rural/agricultural areas, and other areas. For each issue, examples of possible groundwater protection measures are outlined.

Possible Groundwater Issues	Examples of Groundwater Protection Measures	Type of Measure
<b>General</b>		
Groundwater Protection Issues in general	Existing and emerging policies, programs and legislation at the provincial and federal levels provide a context for local groundwater protection measures and actions. Provincial-level examples include the Ontario Water Resources Act, the Environmental Protection Act, the Nutrient Management Act, the Safe Drinking Water Act, the Provincial Policy Statement under the Planning Act, and Ontario's "Smart Growth" vision. Examples at the federal level are the Federal Water Policy, the "Source to Tap" initiative by the Canadian Council of Ministers of the Environment (CCME), and the federal-provincial Water Use and Supply Project. The Report of the Walkerton Inquiry has become an important reference in the development of new regulatory requirements.	Provincial/ Federal context
	Many existing regional and local Official Plans already include groundwater management and protection policies. Examples in the study area include the (former) Township of Caradoc Official Plan and Zoning By-law, the (former) Township of North Dorchester Official Plan and Zoning By-law, and the City of London Official Plan. Examples from elsewhere in Ontario include the Official Plans for the County of Brant, the County of Oxford, the Region of Halton, the Region of Peel, and the Region of Waterloo.	Regulatory
	<p>Under Section 34 of the Planning Act, Zoning By-laws can be passed for :</p> <ul style="list-style-type: none"> <li>• "prohibiting any use of land and the erecting, locating or using of any class or classes of buildings or structures on land... that is a sensitive ground water recharge area or head-water area or on land that contains a sensitive aquifer"</li> <li>• This provides very clear powers but all zoning and "down-zoning" (especially) must be defensible at the OMB. It requires very reliable mapping of aquifer vulnerability and wellhead cones, and expert evidence from a hydrogeologist and other engineering disciplines on the risks of prohibited/restricted uses.</li> </ul>	Regulatory

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Possible Groundwater Issues	Examples of Groundwater Protection Measures	Type of Measure
<b>Developed Areas/Transition Areas</b>		
Underground fuel storage tanks	Municipalities could include policies in their Official Plan to prohibit underground storage tanks or require detailed investigation in wellhead protection areas and areas where the aquifer is susceptible to contamination.	Regulatory
High Risk Land Uses (e.g. certain manufacturing facilities)	Municipalities could include policies in their Official Plan to prohibit high risk land uses or require detailed investigation in wellhead protection areas and areas where the aquifer is susceptible to contamination.	Regulatory
	The Ministry of the Environment has created an "Environmental SWAT Team" that carries out spot checks of industry sectors to ensure compliance with provincial environmental laws.	Regulatory
	Educate business owners regarding ground and surface water protection.	Non-Regulatory
	Purchase property in wellhead protection areas.	Non-Regulatory

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Possible Groundwater Issues	Examples of Groundwater Protection Measures	Type of Measure
<b>Developed Areas/Transition Areas</b>		
Increased Development	Municipalities can consider wellhead protection areas and intrinsic susceptibility mapping in their growth management decisions. Higher-risk development and activities could be more highly controlled on aquifers susceptible to contamination.	Non-Regulatory
Quality and Quantity of Urban Runoff	Watershed and Subwatershed planning can assist a municipality in appropriately locating development to minimize impacts on water resources. A number of Subwatershed studies have been carried out in Middlesex-Elgin including: Lynnhurst, Southblock, Port Stanley, Block 1 (NE part of St. Thomas), Belmont Area. Generally, the focus of analysis is lands proposed for urban development that will be municipally serviced so little emphasis has been placed on groundwater.	Non-Regulatory
	The EcoAction Community Funding Program (Environment Canada) provides financial support to community groups for projects that have measurable, positive impact on the natural environment. One of the areas for priority funding is clean water: projects that reduce and divert the use of toxic substances such as pesticides and household hazardous products that affect water quality.	Non-Regulatory
	Make the removal of combined sewers high priority.	Non-Regulatory

## Middlesex-Elgin Groundwater Protection Workshop:

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Possible Groundwater Issues	Examples of Groundwater Protection Measures	Type of Measure
<b>Developed Areas/Transition Areas</b>		
	Conduct public education of citizens on household hazardous waste, and stormwater and groundwater protection. The City of Toronto for example has a program where school children paint fish on storm sewers to remind citizens not to throw hazardous substances into the sewer.	Non-Regulatory
Landfills	New or expanded landfills must obtain approval under the <i>Environmental Assessment Act</i> , and <i>Environmental Protection Act</i> both of which address potential for groundwater impacts.	Regulatory
Chemical storage and use	In their Official Plan municipalities can include policies to prohibit new high risk land uses and/or require more detailed investigation in areas where the aquifer is susceptible to contamination. The County of Oxford for example, has a draft policy that prohibits bulk storage of chemicals, hazardous substances (excluding on-farm storage for agricultural purposes) in sensitive wellhead areas and in areas where the aquifer is considered highly vulnerable. In medium vulnerable aquifer areas, additional study is required before such land use is permitted.	Regulatory

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Possible Groundwater Issues	Examples of Groundwater Protection Measures	Type of Measure
<b>Developed Areas/Transition Areas</b>		
Lawn fertilizer and pesticides	<p>The NMA applies to any user of nutrients (above a minimum quantity). Thus golf courses or other recreational facilities who use significant nutrients will be required to complete a nutrient management plan. However, regulations requiring golf courses to comply with the act will be phased in over time.</p> <p>NMA prohibits the application of sewage byproducts or other non-agricultural nutrients (with the exception of commercial fertilizer) on lawns, golf courses or other recreational areas.</p>	Regulatory
	Conduct public education on environmentally friendly lawn care including information about the potential impact on the environment from chemical fertilizers and pesticides.	Non-Regulatory
Oil and gas pipelines	New oil and gas pipelines are required to obtain approval from the Ontario Energy Board or the National Energy Board. As part of this approval they must address potential environmental impacts including any impacts on groundwater.	Regulatory
Servicing in Developing Areas	Municipalities can stipulate a hierarchy of sewage servicing requirements for new development in their Official Plans. The City of London has a policy that delineates a servicing hierarchy with a preference for municipal servicing. A similar approach is under discussion for the Central Elgin Official Plan consolidation.	Regulatory



### Middlesex-Elgin Groundwater Protection Workshop:

#### Discussion Framework for the Identification of Issues and Protection Measures

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Possible Groundwater Issues	Examples of Groundwater Protection Measures	Type of Measure
<b>Developed Areas/Transition Areas</b>		
	Municipal zoning by-laws can require full communal or municipal services for all new development.	Regulatory
	Communal sewage treatment such as large septic systems are defined as "sewage works" and require a Certificate of Approval under the <i>Ontario Water Resources Act</i> . They are inspected and approved by MOE.	Regulatory
	Multi-lot development on individual sub-surface disposal systems (septic systems as well as proprietary systems) were once reviewed by MOE; municipalities could provide a framework for impact assessment and approval. Additional requirements could also be included (e.g. provision of 100% "spare area" for a leaching bed).	Regulatory

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Possible Groundwater Issues	Examples of Groundwater Protection Measures	Type of Measure
<b>Rural/Agricultural Areas</b>		
Manure and fertilizer storage and land application	<p>The <i>Nutrient Management Act</i> provides "...for the management of materials containing nutrients in ways that will enhance protection of the natural environment and provide a sustainable future for agricultural operations and rural development."</p> <p>The NMA will regulate the collection, storage, handling and land application of all nutrients including manure, commercial fertilizer, municipal Biosolids, septage. Under the draft regulations, operations generating manure will require a nutrient management plan. Regulations will apply first to new or expanding farms and eventually to all farms.</p>	Regulatory
	Many municipalities including a number in Middlesex and Elgin have adopted nutrient management by-laws requiring a nutrient management plan for livestock operations. These by-laws are triggered by the need for a building permit for new or expanded facilities. Chatham-Kent is one example of a municipality which has tailored their by-law to focus on potential groundwater impacts. The NMA will largely supercede existing municipal nutrient management by-laws. Other mechanisms may be available for municipalities to go beyond the NMA.	Regulatory
	In their Official Plan, municipalities could include policies to prohibit manure storage and land application in certain areas. For example, Oxford County has proposed that intensive livestock operations, and associated manure storage facilities and land application of manure be prohibited on sensitive wellhead protection areas.	Regulatory

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Possible Groundwater Issues	Examples of Groundwater Protection Measures	Type of Measure
<b>Rural/Agricultural Areas</b>		
	Many municipal zoning by-laws include minimum distance separation standards for the control of farm practices and new rural residential development.	Regulatory
	The Ontario Environmental Farm Plan program encourages farmers to adopt environmentally sustainable practices. Farmers prepare a plan that highlights actions to prevent environmental problems. They are encouraged to implement and monitor the results. Funding up to \$1500 has been available for participants. Over 20,000 farms have participated since 1993.	Non-regulatory
	The Ministry of Agriculture and Food has a number of publications promoting best management practices for farming available on their web site.	Non-regulatory
	Healthy Futures for Ontario Agriculture is a program sponsored by OMAF and the agri-food industry. One of the program initiatives relates to Rural Water Quality focusing on implementing best management practices or technologies in the agri-food sector to safeguard water quality and quantity in rural Ontario.	Non-regulatory

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Possible Groundwater Issues	Examples of Groundwater Protection Measures	Type of Measure
<b>Rural/Agricultural Areas</b>		
	The Upper Thames River Clean Water Project offers financial assistance to farmers to improve and protect water quality on farms. It's carried out in partnership with Healthy Futures for Ontario Agriculture and requires farms to complete an Environmental Farm Plan. ( <a href="http://www.thamesriver.org/cleanwaterproject.cwp.htm">www.thamesriver.org/cleanwaterproject.cwp.htm</a> )	Non-regulatory
	Healthy Futures in Chatham-Kent offers grants for farmers and rural landowners to improve rural water quality. ( <a href="http://www.lowerthames-conservation.on.ca">www.lowerthames-conservation.on.ca</a> )	Non-regulatory
	The collection and sharing of data can assist in the protection of groundwater. In the County of Oxford, for example, nutrient management plans and land application locations are mapped on a GIS database so that the county can keep track of where manure is being applied.	Non-regulatory
	Public information and education can also assist in the protection of groundwater. Children's groundwater festivals are one example of a community event that can educate children and parents about groundwater. Over 3,000 grade 3 and 5 students attended the 2001 Oxford Children's Groundwater Festival. Festivals have also been held in Durham and Waterloo/Wellington.	Non-regulatory

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Possible Groundwater Issues	Examples of Groundwater Protection Measures	Type of Measure
<b>Rural/Agricultural Areas</b>		
Septic system installation and maintenance	Municipal zoning by-laws can set minimum lot size and maximum density for new septic systems and minimum set backs from watercourses.	Regulatory
	Municipalities have the responsibility for inspecting, approving and monitoring septic systems and can set up a program to inspect and record information on septic tanks in their area.	Regulatory
	Funding programs such as the Upper Thames River Clean Water Project and Healthy Futures in Chatham Kent offer grant money for septic system upgrades.	Non-regulatory
	Conduct public education on proper septic system maintenance.	Non-regulatory
Improper well installation and decommissioning	Municipalities can pass a by-law to allow them to inspect newly installed wells. Municipalities may be able to pass a by-law to allow inspection of wells upon property transfer.	Regulatory
	Well water contractors are in the process of developing a self-regulating inspection process.	Non-Regulatory

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Possible Groundwater Issues	Examples of Groundwater Protection Measures	Type of Measure
<b>Rural/Agricultural Areas</b>		
	Conduct public education on proper well installation, maintenance and decommissioning.	Non-regulatory
High risk land use (e.g. farm chemical supply business)	Municipalities could include policies in their Official Plan to prohibit high risk land uses or require detailed investigation in wellhead protection areas and areas where the aquifer is susceptible to contamination.	Regulatory
	Educate the public, farmers and business owners on groundwater protection.	Non-Regulatory
Increasing water use (e.g. irrigation, industrial water takings, etc)	To protect groundwater quantity, municipalities could identify and protect aquifer recharge areas in their Official Plan. The City of London has identified groundwater recharge areas. Knowledge of these areas informs municipal land use decisions. Some have already implemented restrictions such as alternate-day watering.	Non-Regulatory
	Municipalities could consider Drought Management Policies that impose more restrictive groundwater use during times of drought. Some have already implemented restrictions such as alternate-day watering.	Non-Regulatory

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Possible Groundwater Issues	Examples of Groundwater Protection Measures	Type of Measure
<b>Other Areas</b>		
Road Salt application	Conduct/ensure training of operators to include the potential for groundwater impacts as a result of salt application and measures to minimize impacts.	Non-Regulatory
	Develop salt application guidelines that consider potential groundwater impacts.	Non-Regulatory
Risk of spills	Haulers of sewage must obtain a Certificate of Approval from the MOE under the Environmental Protection Act. Haulers of dangerous goods must fulfill requirements of the <i>Transportation of Dangerous Goods Act</i> and regulations.	Regulatory
	Place signs delineating well head protection areas.	Non-Regulatory
	Prepare a municipal spills response program that addresses protection of groundwater.	Non-Regulatory
Existing High Risk Land Uses in Wellhead Protection Areas	Document potential sources of contamination.	Non-Regulatory



## Middlesex-Elgin Groundwater Protection Workshop:

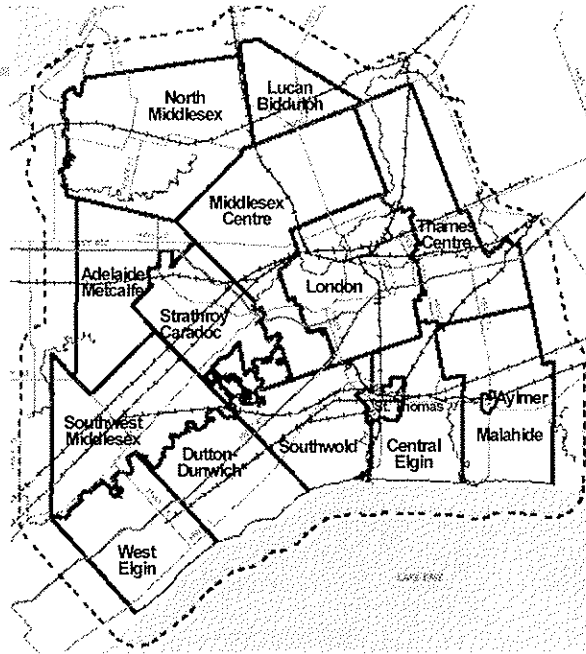
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Possible Groundwater Issues	Examples of Groundwater Protection Measures	Type of Measure
<b>Other Areas</b>		
	Educate landowners on groundwater protection and inappropriate activities in wellhead protection areas.	Non-Regulatory
	Purchase wellhead protection area property. Install Sentry Wells in wellhead protection areas, especially in areas with existing land use concerns.	Non-Regulatory
New High Risk Land Uses in Wellhead Protection Areas	Municipalities can include policies in their Official Plan to prohibit high risk land uses or require detailed investigation in wellhead protection areas.	Regulatory



# Middlesex-Elgin Groundwater Protection Workshop



## Agenda Overview

- Groundwater Study presentation
- Discussion Groups
- Plenary Session :
  - Key issues and measures identified
  - Next steps

# **GOAL**

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**To define measures for the protection of local and regional groundwater resources in Middlesex and Elgin**

## **Workshop Objectives**

---

- **Need for groundwater protection is “a given”**
- **Workshop will focus on the “what” and “how” of groundwater protection**
  - **What are the issues ?**
  - **What protection measures are available ?**
  - **How can these measures be implemented ?**

## **Workshop Objectives (cont'd)**

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- **To synthesize participants' experience, expertise**
  - **Water resource issues cross boundaries, and transcend individual sectors and mandates**
  - **Solutions are multi-sector, multidisciplinary**

## **Workshop Objectives (cont'd)**

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- **Geographic focus : Middlesex and Elgin**
  - **What are the main issues in this area ?**
  - **What groundwater protection measures would be most relevant here, most effective ?**

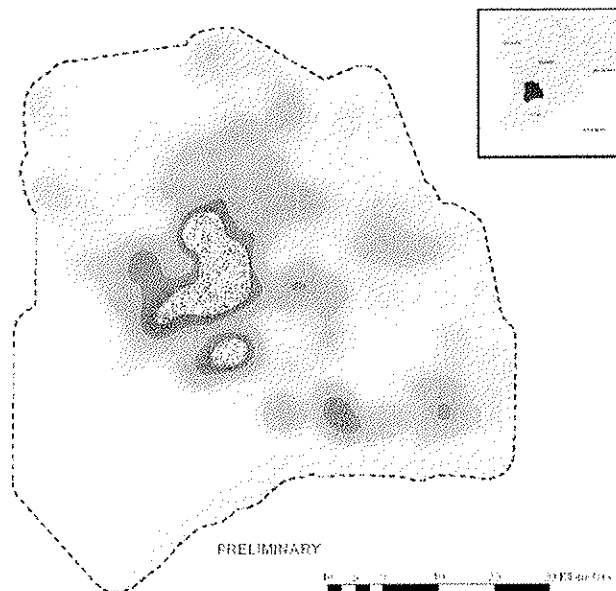
# Discussion Framework

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- ▶ **Table provides examples of:**
  - ▶ **Groundwater issues, possible protection measures (regulatory and non-regulatory)**
  
- ▶ **Three general categories for discussion:**
  - ▶ **Developed and Transition Areas**
  - ▶ **Rural/Agricultural Areas**
  - ▶ **Other (e.g. wellhead protection areas, roads)**
  
- ▶ **Many issues can be included in more than one general category**

## Overview of Middlesex-Elgin Groundwater Study

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**Middlesex-Elgin Groundwater Study:  
Groundwater Protection Workshop  
January 22, 2003**

**DISCUSSION NOTES**

The following is a summary of the notes recorded during the group discussions at the Groundwater Protection Workshop held on January 22, 2003. The issues and measures identified at the workshop are being synthesized with the ideas generated from other stakeholder discussions and sources. The resulting information base will be used in the development of the Middlesex-Elgin Strategy for Groundwater Protection.

**1. “Yellow Dot Group” led by Karla Kolli, Dillon Consulting Limited**

Issue Identification

*All Areas*

The following issues were identified in all areas, including urban, transition and rural/agricultural areas:

- problem uses include improperly decommissioned facilities, such as wells and abandoned oil and gas pipelines that corrode and leak. Other problems include landfills or “dumps”, accidental spills of hazardous material, direct discharge of hazardous materials into municipal drains and storm sewers, the use of road salt and underground fuel storage tanks
- septic systems installed too close to wells and sand points installed too close to septic systems, allowing a direct conduit to groundwater. This is an issue in Strathroy and Dorchester
- overuse of groundwater for irrigation and industrial water takings potentially decreasing groundwater quantity. An example is aggregate operations where open pits allow significant evaporation of groundwater. Also, when industries take water, it is often returned with some degree of contamination. Water taking can interfere with other groundwater uses.

*Rural/Agricultural Areas*

Issues and problems in these areas include dead stock removal/burial, nutrient management and land application of septage (both legal and illegal dumping). Removal of water and replacement in a different catchment area can result in quantity issues. Another problem is that tile drainage can remove water, thereby changing the water cycle.

---

*Urban Areas*

- lawn spraying/pesticides
- combined (sanitary and storm) sewers
- wellhead protection is needed in developed and developing areas
- poor management of hazardous materials on industrial sites
- development can result adversely affect recharge areas. Also need to properly remove stormwater from developed areas.

The group also mentioned that historic and current development decisions made without considering the quantity/availability of drinking water can affect the quantity and quality of groundwater. For example, cottages were originally developed as seasonal low water users, but have been converted to year-round use, using more water and discharging more sewage to septic systems. Also, older residential developments did not have the high rate of consumption/waste currently evident today.

Groundwater Protection Measures

*Dead stock management*

Dead stock is regulated by the *Dead Stock Removal Act*. It is no longer collected for free from farmers and disposal fees are high. Often, farmers bury dead stock on their property. Suggested potential protection measures included:

- Provincial funding to cover or supplement the cost of dead stock removal
- place more emphasis on composting alternatives. Some education is already occurring. Composting machines are quite expensive
- municipalities are not likely to become involved in funding or managing this issue.

*Nutrient management*

One member of the group stated that the Province should have passed the *Nutrient Management Act* before the municipalities had to pass their own by-laws. Now, the by-laws that farmers are just getting used to will be replaced by the regulations of the new Act. The lack of consistency and two sets of rules potentially create problems. Some subsidies to farmers may be necessary to implement the Act.

---

Potential measures identified to protect groundwater from nutrients were:

- funding for farm/rural improvement projects. The Clean Water project was noted as an example of a funding program being carried out on a pilot scale
- placement of covers and ends on drains. This is being examined by the Province and tested on a pilot scale
- tree planting/buffer strips/livestock fencing. The Conservation Authorities are carrying out pilot projects with CA and provincial funding
- MOE Swat team could look at farm management. This is unlikely, however, due to limited staff
- education of farmers. Members of the group noted that farmers are already environmentally conscious and local farm associations have existing education programs
- different areas may require different levels of nutrient management. Strathroy is an example of an area where more care should be taken when applying nutrients because of the sandy soil. Malahide was also noted as an example where nutrients applied in tobacco fields discharge through sand points to groundwater
- soil testing by farmers (bore hole testing, water quality testing) could be encouraged..

The group also suggested that even with the new Act, municipal by-laws may still be necessary to deal with local issues.

#### *Lawn Spraying/Pesticides*

The application of herbicides, pesticides and fertilizers was identified as an issue in urban or transition areas. The group suggested that urban areas and rural areas be treated more equally - if farmers have to take more care in applying nutrients, so should homeowners. Suggested measures to protect groundwater from pesticides were:

- eliminate the use of pesticides through by-laws
- require those applying pesticides to complete the same education and testing that farmers have to. However, it was noted that the concentrations of chemicals homeowners can purchase are less than those used by farmers
- identify a maximum allowable concentration in the soil and require commercial pesticide applicators to test the soil before applying to make sure that maximum levels aren't exceeded
- educate the public that broadleaf herbicides are not "bad"
- lawn care issues also pertain to water quantity. Education efforts should deal with both quality and quantity.

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### *Combined Sewers*

Older areas of municipalities have combined storm and sanitary sewers that have both wet and dry by-passes allowing sewage to flow directly into receiving waters. Some members of the group felt that this was more a surface water issue. Others felt that this is a valid groundwater issue since surface water and groundwater are connected.

Potential measures to deal with combined sewer overflows included:

- Provincial funding to municipalities to separate sewers. Since municipalities are opting for zero taxes, they can't afford to fix infrastructure, especially "hidden" underground infrastructure
- the City of London sets aside money for infrastructure improvements
- encourage lower water use through education to reduce the number of by-passes.

### *Improper Decommissioning of Wells*

Potential measures to protection groundwater from poorly decommissioned wells were:

- create an abandoned well database. The CA's propose to create a database of abandoned wells and a plan for "plugging" them. Summer students could be hired to knock on doors and survey wells (location, status, etc.). This information could be held by a central body such as MOE
- funding for well decommissioning. "Healthy Futures" funds up to 50% for the decommissioning of wells
- require by law or by-law that wells be properly decommissioned when piped water is brought in
- building inspectors should be required to inspect decommissioned wells. Proper training is needed
- need MOE enforcement/inspection of well drilling and decommissioning. Although MOE does not have the staff to do this, they may have funding for other agencies.

### *Wellhead Protection*

Compensation to landowners in wellhead protection areas should be considered if the use of land is restricted. Generally, it was noted that there needs to be care in applying prohibitive Official Plan policies so that municipalities are not overly restrictive to farmers. The Development Permit system under the *Planning Act* provides a tool to regulate the use of



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property. A pilot study is underway in Waterloo

### *Malfunctioning Septic Systems*

A member of the group noted that 80% of septic systems empty to local drains without proper treatment. Measures to deal with malfunctioning systems include:

- funding to improve/upgrade septic systems. One of the most popular elements of the Healthy Futures program is funding for septic system upgrades.

### *Groundwater Quantity*

Measures to deal with quantity issues are:

- monitor low flows to act as a drought indicator. The Ontario Low Water Response monitoring is one example
- irrigation advisory groups. These are rural peer groups that have successfully been used to monitor and advise farmers on irrigation practices
- use irrigation schedules and best management practices.

## **2. “Green Dot Group” led by Linda Nicks, Upper Thames River Conservation Authority**

### Issue Identification

Issues identified during the group discussions included:

- depletion of groundwater caused by water taking
- disturbance of aquifers, potentially creating a pathway to sources of pollution and interfering with flow
- discharges from point sources to groundwater. Fuels and hydrocarbons from underground storage tanks are examples of potentially harmful discharges
- erosion and resulting sedimentation impacts on streams discharging to groundwater is an example of a potentially harmful environmental (or non-point source) discharge
- agricultural run-off is another example of a non-point source
- development in Natural Heritage areas undermines the ability of these areas to provide natural filtration/remediation
- urban development and some types of rural development (with large impervious areas)

decreases infiltration to groundwater potentially decreasing quantity. Unrestricted lawn watering and crop irrigation from wells also potentially decreases quantity

- poorly maintained/malfunctioning septic systems have adverse impacts on groundwater. Well construction in sensitive groundwater areas potentially provides a conduit for pollution sources to groundwater. Improper abandonment of wells also has potential adverse impacts.

### Groundwater Protection Measures

Available groundwater protection measures to deal with the issues identified by the discussion group included:

- watershed approach to source protection. This approach can consider water balance, water quantity and quality and indicators of ecosystem balance (such as the presence of trout) and ensure that “bigger picture” issues are addressed such as impacts on the Great Lakes. A watershed approach can also provide for drought response and monitoring
- other important tools are Official Plans, Zoning By-laws and other municipal by-laws. Official Plans can direct development to lands that are suitable for development and include servicing policies discouraging multi-lot development on individual services. The Official Plan process can also be used to educate the public on the importance of groundwater protection
- problem areas should be a priority for protection. Success should also be measured
- mapping can be used to assess resources, source vulnerability and sensitivity and establish protection zones (wellhead protection areas). The economic impacts of groundwater protection measures were also discussed. Returning land to non-agricultural use in sensitive areas has economic impacts on farmers
- site-specific risk assessments can determine potential point sources for discharges to groundwater
- nutrient management plans reduce the impacts of intensive farm operations
- incentives to developers for “wise” development. Examples include requiring developers to pay for storm sewer outfalls (to encourage developments with effective stormwater management (SWM) measures) and incentives to provide conservation measures, such as rain barrels, cisterns for lawn irrigation and other gray water systems
- SWM measures can be used to protect groundwater quantity and quality. An example includes mechanical systems to remove total suspended solids. Currently, there are three types of systems
- emergency response to spills can mitigate potential adverse impacts on groundwater
- grasses that don’t require much water, watering at night rather than during the day and trickle irrigation can reduce lawn watering. Also, municipal water use by-laws should be passed and

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- enforced
  - education, based on conservation principles, is another important tool.

The group also emphasized the importance of a multi-disciplinary (planning, engineering, natural sciences), multi-jurisdictional (Federal, Provincial, municipal), integrated approach to groundwater management and protection.

### 3. “Red Dot Group” led by Janet Smolders, Dillon Consulting Limited

#### Issue Identification

##### *Developed Urban Areas and Transition Areas*

Issues or problem areas include:

- the impacts of urban development, especially landfills, industrial uses, rail yards and brownfields, on the quantity and quality of groundwater
- the value of groundwater to the natural environment should be emphasized, not just its socio-economic value
- there is no lead agency or “groundwater champion” responsible for source protection. This was mentioned as a shortcoming of the *Drinking Water Act*
- existing uses with potential adverse impacts on groundwater are a problem since zoning only readily applies to new uses. Although other Provincial Acts and municipal by-laws can be used to deal with problem uses, it is difficult to “get rid” of them. A municipality should expect to pay some type of compensation for restrictions imposed to protect groundwater
- transition areas often include large, marginal uses on private services that are not properly maintained leading to potential adverse impacts on groundwater
- old oil and gas wells, abandoned water wells and mined out gravel pits are also problem uses. The Acts applying to these are not well enforced. More funding is required to enforce these and other regulations
- more laws and by-laws are needed to regulate new wells and wells for lawn watering. There are no controls over the amount of water taken for a private well. MOE permits to take water are rarely denied mostly because adequate information on groundwater quantity and quantity is not available.

Another important issue is the lack of co-ordination among adjoining municipalities to protect groundwater. Aquifers do not follow municipal boundaries.

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*Rural/Agricultural Areas*

Problems and issues discussed by the group for these areas included:

- impacts of intensive agricultural uses and agricultural related uses, such as farm supply outlets (fertilizers and chemicals) on groundwater. New intensive agricultural uses are likely to have fewer impacts than some of the existing uses since the new uses are subject to "new rules"
- faulty septic systems, septage and land applications also cause problems
- volumes of water used for farm irrigation can negatively impact groundwater quantity.

A recent problem mentioned by the group is the increase of applications under municipal Tree Cutting By-laws to clear land to dispose of nutrients. This was seen as an unintended impact of the new *Nutrient Management Act*.

Groundwater Protection Measures

Protection measures suggested by the group covered Provincial, municipal and individual actions and included:

- a Provincial groundwater monitoring network based on watersheds is needed to deal with inter-municipal issues
- many existing Provincial Acts can be used to protect groundwater, such as the EPA, OWRA and the rules and regulations that apply to fuels and spills. One interesting observation was that the focus of the *Drainage Act* should be changed from simply draining land to retaining more water. One person stated that one of the problems is that there are too many rules and regulations and regulatory agencies. The lack of an integrated, focused approach is seen as a major problem
- Official Plans, Zoning By-laws, development approvals, subdivision and site plan control, SWM Master Plans and measures with policies/provisions focused on the protection of groundwater are essential tools
- there are many examples of municipal by-laws that can be used to help protect groundwater. These include by-laws to regulate the approval, monitoring and maintenance of septic systems passed under the *Building Code Act*, Property Standard By-laws to regulate wrecked car yards and the outdoor storage of risky materials, municipal water use by-laws (which discourage water use for discretionary uses) and municipal Tree-Cutting By-laws to protect wooded areas. Another suggestion was the re-creation of wetlands
- the purchase of land provides the ultimate control tool and is sometimes the only available

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protection measure in sensitive areas.

The group emphasized that the limited resources of the Province and municipalities should be directed to priority areas. We should focus on problems based on the level of risk. The group also felt that public education and stewardship programs, such as those offered by the Conservation Authorities, are key protection tools. Funding and incentive programs should be available to the public to encourage individual actions.

#### **4. “Blue Dot Group” led by Darin Burr, Dillon Consulting Limited**

##### *Developed Areas*

Groundwater protection issues and measures in developed areas included:

- groundwater interference adversely affects quantity and lowers the water table. Compensation to affected landowners should be available to deal with quantity impacts
- chemical storage and use should be restricted by by-law. Municipalities should consider expropriation for problem areas. There is a need for a common municipal approach
- in areas where groundwater recharge has been reduced by development, natural recharge/habitat should be re-established to provide recharge areas
- public awareness is important through education of school age children and the media, with an emphasis on best practices
- surface water/groundwater interactions should be investigated and mapped to identify and protect vulnerable areas
- all abandoned wells should be identified. Proper decommissioning of wells could be required as part of a land use change or redevelopment. Well drillers are a good source of information for the location of abandoned wells.

##### *Rural/Agricultural Areas*

Issues and measures identified by the group included:

- in areas of competing land use (such as agricultural uses in wellhead protection areas), land owners should be compensated for any restrictions placed on land uses
- nutrient management is an important tool for groundwater protection
- education regarding the operation and maintenance of septic systems should be provided. Also, designs should be improved. Often, the design of septic systems is too generic to deal

with a site's particular characteristics

- gravel pits can adversely affect groundwater quantity and quality. In-depth studies are required for the rehabilitation of gravel pits to other uses.

Other issues and measures discussed by the group were:

- data management. All data should be updated and made accessible to all agencies involved in groundwater management and protection
- the need for inter-department/agency co-operation was discussed
- it was suggested that zoning should be standardized for municipalities and funding programs should be more consistent
- another major problem is the lack of enforcement of existing regulations. There are many rules regarding groundwater management and protection but they are not being enforced.