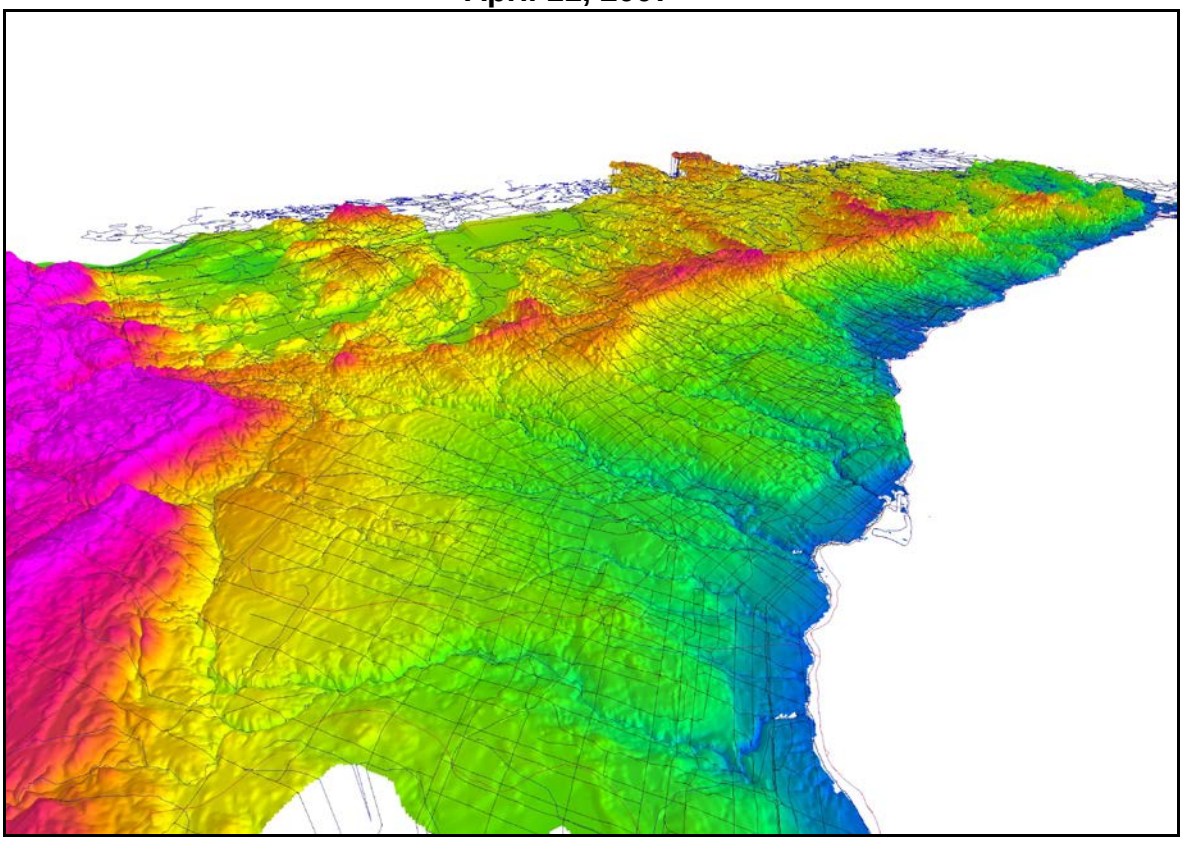
CAMC/YPDT Procedural Report #01-2007

Overview of Operations and Future Planning

April 11, 2007



York-Peel-Durham-Toronto (YPDT) Groundwater Management Program
Conservation Authorities Moraine Coalition (CAMC)

YPDT-CAMC GROUNDWATER MANAGEMENT PROGRAM
Overview of Operations & Future Planning

1.0 PURPOSE OF DOCUMENT

This document has been prepared to address three needs of the YPDT-CAMC Groundwater Management Program:

1) a need to revisit the status of the project and to document the activities and accomplishments that have occurred over the past 5 years (see Appendix A);
2) a need to summarize the operational procedures as to how the project operates on a day to day basis;
3) a need to plan for the upcoming work and needs of the project as it moves forward.

2.0 BACKGROUND

In 1999, the Regional Municipalities of York, Peel, Durham, the City of Toronto (YPDT), and their associated six Conservation Authorities (Credit Valley; Toronto and Region; Lake Simcoe and Region; Central Lake Ontario; Kawartha; and Ganaraska) formed a cooperative alliance for addressing groundwater issues within the collective geographical area of all partnered agencies. In addition to these partners, three additional conservation authorities (Otonabee, Lower Trent, and Nottawasaga) also having jurisdiction on portions of the Oak Ridges Moraine, through the Conservation Authorities Moraine Coalition (CAMC) have also supported the development of the technical tools that have been developed for groundwater management.

Since its inception in 1999 the project has transitioned through what can be identified as three stages:

Stage 1 – 1999 to 2001 - this stage of work was undertaken by a consultant team and was focused on identifying issues related to groundwater management and protection. The work culminated in a report (AMEC Earth and Environmental et al, 2001) that documented some of the groundwater work taking place in other jurisdictions across Canada and the U.S. The report also inventoried and prioritized areas and issues to be considered for additional work.

Stage 2 – 2001 to 2007 - this stage of work has been characterized by developing and building an analysis system that includes several well defined tools required for understanding and managing the groundwater flow system across the area (e.g. database, digital geology, groundwater flow model). Appendix A summarizes the work that has come out of this stage.

Stage 3 – 2008 to 2013 – This stage of work will focus on implementing the tools within various upcoming groundwater studies that arise in the next few years. This stage will also focus on infilling geological and hydrogeological data gaps and on maintaining and updating the available tools.

2.1 Project Mandate

The project was initially established in 2000 recognizing that effective protection and management of groundwater resources required an adequate information base and

coordinated practices and policies. The intent of the groundwater management strategy at the time was to ensure co-ordination and consistency in approaches, policies, and practices across the regions and conservation authorities such that common goals and objectives could be met. At the time a series of objectives were laid out that spoke to the need to protect and/or restore various groundwater based functions (e.g. sustainable use of groundwater, habitat, stream form, assimilative capacity, etc.). It was also recognized early on, that protection, restoration and management of the groundwater flow system first required that an adequate level of understanding be acquired. In 2001, the project was steered in this direction.

In June 2004 the project developed a Governance Document that set out a structure and future direction for the project, recognizing that coordination of the work of the partnership and the work of individual agencies was critical for success. This document outlined six areas where the partnership could coordinate efforts: database management; data collection; technical analyses (geology and groundwater flow modeling); planning and policy initiatives; provincial/federal funding; and education.

The mandate of the YPDT-CAMC Groundwater Management Program partnership can be summarized as to provide a multi-agency, collaborative approach to collecting, analyzing and disseminating water resource data as a basis for effective stewardship of water resources. The YPDT-CAMC Groundwater Management Program is to build, maintain and provide to partnered agencies the regional geological and hydrogeological context for ongoing groundwater studies and management initiatives within the partnership area.

As such the program will:

1. Build and maintain a master database of water related information that is accessible to all partner agencies;
2. Build and maintain a digital geological construction of the subsurface layers that is accessible to all partner agencies;
3. Build and maintain a numerical groundwater flow model that can be used to address any number of issues that arise at any of the partner agencies.
4. Coordinate and lead investigations that will acquire new field data that will strategically infill key data gaps.
5. Provide technical support to Source Water Protection Teams to ensure that interpretations used in source water are consistent with the regional understanding.
6. Provide technical support to planning authorities to ensure that Official Plan policies are developed in a manner which makes them consistent with up to date groundwater science as derived from the project.
7. **Provide technical support to all partnered agencies for addressing other Provincial legislation.**

The desired outcome from the partnership project is significantly improved water management decisions.

3.0 HOW THE PARTNERSHIP WORKS

3.1 Areas of work

The 2004 governance document addresses the areas where the collective YPDT program functions. This document speaks to six areas or divisions under which the YPDT program would be focused. These include:

- Database Management
- Data Collection
- Technical Analyses (Geology and Numerical Modelling)
- Planning/Policy Initiatives
- Securing Federal/Provincial Funding
- Education

To date most of the work has been focused on the first five areas. Although education has been listed, it is recognized that any education efforts would be strategic, perhaps for example, focused on partner agency staff, and would certainly not duplicate efforts that partner agencies are undertaking.

3.2 Staffing

Currently the project has one full time project manager, Steve Holysh who started with the project in 2001. Steve has a current contract that goes through to the end of 2008. With the securement of provincial funding from the Ontario Geological Survey (OGS) in 2003, Steve Davies was retained as a senior hydrogeologist in a coordinating role to write a series of reports for the OGS. Kim Gilder was retained as an assistant in 2004. Both Steve and Kim are retained on a contract basis, and have been assigned to a series of tasks that relate to both "YPDT" focused work as well as "OGS" focused work. Kim's contract expires in June 2007 and Steve's expires in May 2007. Once the funding from the OGS expires, it would be difficult to retain these two staff under the current YPDT budget and this has to be given some thought. Dr. Rick Gerber joined the project in 2006. As a consultant with his own company, Rick was working on many aspects of the project. In addition Rick was also undertaking work on source water protection projects for many of the ORM partnered Conservation Authorities. It made economic sense to bring Rick into the project on a full time basis to assist with various management and technical aspects of the project. Rick tracks his contributions to the YPDT project versus his contributions to Source Water Protection projects and his time is billed accordingly. Rick also has a contract extending until the end of 2008.

To date staff have been spread out with Steve Holysh and Kim Gilder occupying offices out of Halton Region Conservation Authority, Steve Davies occupying a home based office in Rockwood and Rick Gerber occupying an office out of CLOCA. This has served to keep office costs to a minimum, however, it hasn't been ideal for the project. TRCA has recently made available office space at their Downsview building to the program. In the next two months staff will be consolidating to the Downsview office.

3.3 Financing

The YPDT groundwater management project receives core funding through the Regional Municipalities of York, Peel, and Durham as well as the City of Toronto to the amount of $100,000 each on an annual basis which has amounted to $2 Million since 2001 (see Appendix A for more detail). In addition to this core funding the project has successfully obtained provincial funding of over $500,000 from the Ministry of the Environment under the 2001 Municipal Groundwater studies funding, as well as approximately $1.5 million from the Ministry of Northern Development and Mines (Ontario Geological Survey) under their Groundwater Resources Project. The project also received joint funding with the LSRCA from OGS for an additional $500,000 to look at buried valley aquifer systems under the same program. The OGS funding is governed by separate memoranda of understanding with CLOCA and LSRCA which set out finances, timelines and deliverables.

3.4 YPDT Reporting Structure

Figure 1 shows the current structure of the project with the roles of the various groups summarized on the right. Two committees are generally involved in the program decision making; the Executive Steering Committee and the Technical Steering Committee, with the Technical Steering Committee taking on the bulk of the decision making for program direction tasks.

To date, work is done both by consultants as well as by YPDT staff, depending on the task. YPDT consultant contracts, as well as YPDT field work, both of which involve the expenditure of finances, are taken through the TRCA Board for formal approval. Expenditures of the 2001 MOE funds were also directed through the TRCA Board for approval. The MNDM (OGS) funding, allocated to contract staff and various field work projects was approved by a Steering Committee set up by the Ontario Geological Survey. The Table in Appendix A outlines the various projects and tasks to which project money has been allocated from 2001 to 2007. It should be noted that although the finances to fund many of the key field work activities have come from the OGS funding, the scope of these activities has been angled to best utilize the OGS funding for advancing both OGS and CAMC-YPDT objectives at the same time. For example, the OGS funding has been used to better delineate bedrock valleys in the Caledon area through seismic studies and boreholes and to better delineate tunnel channel aquifers in the Port Perry area.

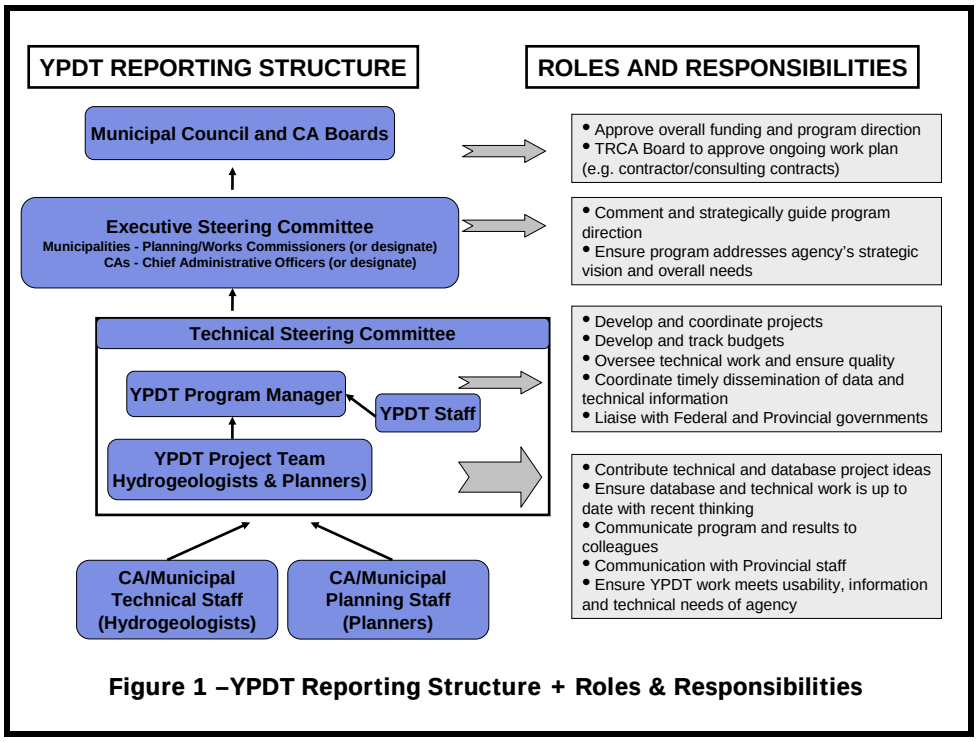


Figure 1 –YPDT Reporting Structure + Roles & Responsibilities

3.5 Oversight/Administration

The annual funding to the project from the four municipal partners is received by TRCA. Central Lake Conservation Authority (CLOCA) administers the project on behalf of TRCA and holds the staff contracts with Steve Holysh, Rick Gerber, Steve Davies and Kim Gilder. The project manager provides quarterly project updates at the CAMC meetings attended by the CAOs of the 9 partnered Conservation Authorities in the Conservation Authorities Moraine Coalition (CAMC). In addition the Commissioners of Planning and Public works form the "Executive Steering Committee" (see Figure 1). Although this committee has not met for two years, prior to that, and into the future, the intent is to establish an annual meeting of this committee (probably in January – see Section 2.7 below).

3.6 Technical Steering Committee

The Technical Steering Committee, comprised of technical groundwater and/or planning staff from the partner agencies, is the committee that to date has made the key recommendations on work undertaken through the project. Steve Holysh chairs the committee with meetings being held on a quarterly basis. Typically the committee discusses current issues arising with respect to any aspect of the project (e.g. database, geology, modeling, planning) or with respect to groundwater in general across the YPDT area and recommends actions that the partnership could undertake to assist in addressing these issues. All minutes of the YPDT Technical Steering Committee are found on the password protected section of the project's website (YPDT-CAMC.CA).

3.7 Executive Steering Committee

The Executive Steering Committee is to meet on one occasion per year in order to be updated on the accomplishments and progress of the project and to provide input and

approve the strategic direction of the project. The committee is chaired by Russ Powell the Chief Administrative Officer from Central Lake Ontario Conservation Authority. The minutes of the Executive Steering Committee will also be found on the password protected section of the project's website (YPDT-CAMC.CA).

3.8 The Role of Subcommittees

In the past few years the Technical Steering Committee has addressed the need to examine certain aspects of the project in more detail, by striking various subcommittees. These subcommittees were charged with undertaking specific tasks and reporting back on their efforts (see Appendix B for the roles of subcommittees). Currently, five standing subcommittees have been set up by the Technical Steering Committee:

- Planning
- Database
- Training
- Data Ownership/Distribution & Governance
- Website

In addition, two other short lived subcommittees were set up, one to review the Earthfx Modelling Report and a second to assist in preparation of the initial governance document. As of the January 2007 YPDT Technical Steering Committee meeting, this "governance" role has been rolled into the Data Ownership/Distribution subcommittee.

Appendix B lists the members who have been attending the various subcommittee meetings.

4.0 PROJECT SCOPE 2008 - 2013

To date, the project has been focused on building key elements required for long term water resources management, namely:

- a working partnership of staff from the key government agencies responsible for water management across the GTA (Conservation Authority and Regional Municipal planning and water resources staff);
- the creation of a comprehensive water resources database;
- the creation of digitized geological surfaces that reflect depositional patterns and events that shaped the subsurface environment;
- the creation of regional numerical groundwater models
- strategic infilling of data gaps.

In addition, the study has been leading in the collection of high quality subsurface data, as well as in helping to coordinate a key planning study related to the linkage between Watershed Plans and Official Plans. Appendix A, summarizes the tasks, accomplishments and associated costs over the past few years, whereas Appendix C shows the current ongoing tasks within the project and the staff or consultants that are

assisting with the tasks. A review of both of these tables reveals the breadth of the scope of the project.

As a result of the foundation work that has been completed, the project tools (e.g. database, model, etc.), are available to assist partner agencies with a number of ongoing activities ranging from day to day development review, to ongoing planning or watershed studies, to larger scale source water protection projects. Staff are also available to assist partner agencies on an as needed basis.

Although there continues to be much development or improvement work still to be done with respect to the database, geology and groundwater model, the project will soon be coming to a point where the majority of the work will be considered to be moving away from development and more towards implementation or application of the tools that have been developed. As a result, it is an appropriate time to step back and assess how the program will continue to progress into the future.

The program can be considered to have two components:

1) **Ongoing program work** – this area would encompass work associated with maintaining the tools that have been developed; addressing technical needs of partner agencies; addressing issues that arise from the Province related to the project or tools; working with planning staff to ensure proposed policy directions are consistent with the scientific understanding generated from the project; coordinating communication amongst the partners; organizing and developing training sessions and field trips for the partner agencies, etc. This area of work would require on the order of a minimum of 30% of staff time depending on the immediate needs of the program partners.
2) **Specific Project Work** – as has been the practice over the past five years, specific projects arise from time to time that are considered by the project partners to be best undertaken under the umbrella of the YPDT-CAMC Groundwater Management Program. Such projects could be undertaken either by consultants or by YPDT-CAMC and/or partner agency staff depending on the timelines and the expertise required for any given project.

4.1 Specific Projects for Consideration by Technical Steering Committee

With respect to the second program component, YPDT staff, along with the Technical Steering Committee, have considered the possibility of undertaking any of the following specific projects or initiatives over the next few years. For each project a theme area has been assigned and a rough cost and timeline estimate are provided.

1. Develop a new methodology for updating and synchronizing the database (remote desktop applications):
    - **Theme area** - Database;
    - **Significance** – Much improved data management and less time synchronizing databases;
    - **Estimated time for completion** – 1 year;
    - **Estimated cost** - $40,000

2. Develop a system for easy partitioning of data for consultant requests (this will only be needed if there is forward progress on the issue of external data sharing):
    - **Theme area** – Database;
    - **Significance** – better data management and client response times (should this be a direction the program embarks upon);
    - **Estimated time for completion** – 1 year;
    - **Estimated cost** - $50,000
3. Undertake a pilot study with MNR to undertake near surface, climate focused modeling in order to better estimate groundwater recharge rates (as well as runoff and evapotranspiration rates) across the area.
    - **Theme area** - ORM/Source Water;
    - **Significance** – Will help to address water budgeting issues that are required under both the ORMCP and Source Water; will provide uniform approach across YPDT; will help set provincial direction that will conform to needs of program partners; will set YPDT area as leader in this area;
    - **Estimated time for completion** – 8 months to 1.5 years;
    - **Estimated cost** - $225,000
4. Undertake a pilot study with the MOE to provide science based methods of delineating significant recharge areas and vulnerable areas as per January 2006 YPDT meeting;
    - **Theme area** - Source Water/Provincial Policy Statements
    - **Significance** - Will help to address delineation issues that are required under both the ORMCP and Source Water; will provide uniform approach across YPDT; will help set provincial direction that will conform to needs of program partners; will set YPDT area as leader in this area;
    - **Estimated time for completion** – 8 months to 1.5 years
    - **Estimated cost** - $100,000
5. Better characterize the Laurentian Valley aquifer system through a combination of drilling and geophysical surveys;
    - **Theme area** – Geology;
    - **Significance** – this enormous, trans-jurisdictional feature is considered to play a significant role in groundwater movement and has not been studied in great detail – it might prove to be a target for water supply purposes;
    - **Estimated time for completion** – ongoing
    - **Estimated costs** - $1 million
6. Undertake a project to better characterize till units in the GTA area using field studies (e.g. geochemistry, drilling);
    - **Theme area** – Geology;
    - **Significance** – The till units are the most uniform “marker” beds within the subsurface, however there is difficulty in mapping continuity of them across regions; this project would help to better characterize individual till units;
    - **Estimated time for completion** – 1 year;
    - **Estimated cost** - $100,000

7. Initiate more formal documentation of hydrogeological case studies in the GTA, focusing on those that make use of the YPDT work and documenting how things could be improved;
    - **Theme area** - **Modelling/Analyses**
    - **Significance –** There have been several studies, notably in York Region, that have used the YPDT-CAMC tools where the Province has raised some concern; this project would document the processes used in these case studies to determine the most effective use of the YPDT tools in the future;
    - **Estimated time for completion –** 6 months
    - **Estimated cost** - $25,000
8. Initiate a project to systematically look at GTA pumping tests with a view to characterizing specific aquifer settings and the type of response that could be expected within different settings;
    - **Theme area** - Modelling/Analyses
    - **Significance –** pumping tests have been undertaken for the past fifty years within the boundaries of each partner agency; to date there has been no systematic look at the regional or local aquifer setting for these projects and how the monitoring wells responded; the project would review past tests with a view to establishing "rules of thumb" for undertaking future pumping tests within different aquifer settings so that PTTW applications would be more effective;
    - **Estimated time for completion –** 1.5 years
    - **Estimated cost** - $100,000
9. Develop a system to incorporate into the YPDT database and regularly update all relevant PGMN data;
    - **Theme area –** Database
    - **Significance –** the data from the PGMN wells is considered to be some of the best temporal groundwater level data available and should be a part of the YPDT-CAMC database;
    - **Estimated time for completion –** 6 months
    - **Estimated cost** - $15,000
10. Work with the ORM Foundation and other affected stakeholders to prepare a report on the status of the Oak Ridges Moraine's water resources; with a view to assisting in the 2014 review of the ORM Plan;
    - **Theme area** - ORM Plan
    - **Significance** – the report would be the foundation document for the review of the ORM plan in 2014 – the report would establish the program as the lead water resource project on the Oak Ridges Moraine and would be an extremely efficient use of the tools assemble to date;
    - **Estimated time for completion** – 3 years
    - **Estimated cost** - $100,000
11. Strengthen contacts with area universities and colleges (e.g. Trent, Toronto, York, Waterloo, Seneca, etc.) to promote the YPDT-CAMC study area as a focus for geological and hydrogeological research so that broader use of the collected data is promoted.

- **Theme area** - Modelling/Analyses;
- **Significance** – more research focused on the water resources of the area covered by the YPDT-CAMC program would draw additional funding to the area and would promote the use of the data and tools assembled under the program;
- **Estimated time for completion** – ongoing
- **Estimated cost** - minimal

As noted above, the projects have been assigned a theme area or division for the purposes of prioritization. The theme areas considered here are those already developed in the 2004 Governance document (Database, Geology, Numerical modeling/Analysis; and Planning) as well as two additional ones (Source Water Protection and ORM Plan).

4.2 Prioritization of Work

The following prioritization is proposed for discussion. It encompasses both components of the program as presented above:

Priority Area #1 – Continued maintenance of the tools developed, and technical support of the project.

This encompasses the first component of the project: namely the ongoing program work. As presented in Section 2.1 above, the prime mandate of the project are to build and maintain the database, digital geological surfaces and the numerical groundwater model. This is considered to be the number one priority area.

Priority Area #2 – Database Maintenance and Synchronization

Although encapsulated to some degree above, specific database projects could be considered above and beyond the existing program. Having ready access to updated accurate information is one of the most tangible products arising from the project. The database synchronization process has become too lengthy and is not functioning appropriately for the needs of the partnered agencies. Projects #1 and #9 outlined above are therefore considered to be projects where staff will spend time and money. The initiative to improve the database synchronization is ongoing with Earthfx and might require the retaining of a database specialist to assist in giving the database the attention that it requires.

Priority Area #3 – Modelling/Analyses

Projects 7, 8 and 11 fall into this category. Project 7 attempts to learn from existing case studies and seeks to determine how the project can be more effective in assisting partner agencies with their projects. This will aid in all hydrogeological projects, specifically any controversial projects that arise in the future and could held agencies that are going to OMB hearings. Project 8 seeks to understand the behaviour of different aquifer settings when subject to pumping stresses with the goal of providing direction on how to best set up a test to obtain the required data in support of a PTTW. Project 11 is really an ongoing task and seeks to basically get research funding dollars directed at assisting with the ongoing work required to better understand the watersheds in the ORM area.

Priority Area #4 –Technical support for Source Water Assessment Reports (Clean Water Act)

Given the amount of time and money that is being directed by all partner agencies to the Clean Water Act, the linkages between the YPDT-CAMC project and the Clean Water Act could be more explicit and direct. With little additional funding, the YPDT-CAMC project has already provided a key source water protection database to the three Source Water Protection groups (CTC, Lake Simcoe, and Trent). This required the incorporation of an area larger than the CAMC area. It is believed that the project can further assist both the province and the source water protection groups, and ultimately the agencies partnered in the YPDT-CAMC project, by leading science based activities (e.g. mapping). Of course effective communication between the program and the Source Water Protection teams would be necessary to avoid duplication of efforts. It is envisioned that the Source Water Protection teams would make specific requests of the YPDT program and that requests would be considered by the Technical Steering Committee before projects are initiated. Given the efficiencies of undertaking some projects in a coordinated manner and the fact that provincial financial support might be available in the short term, this is considered a priority area.

Both the MNR and the MOE have been contacted with respect to potentially launching pilot projects as suggested in #3 and #4 above. If the Province agrees that these are indeed, Provincial priorities, then the YPDT-CAMC project will co-ordinate and lead these initiatives. If the province does not step forward to financially support these initiatives, then, independently, YPDT-CAMC staff will still seek to coordinate between the three source water protection teams, albeit at a lower level, on these issues to achieve consistency across source protection areas.

Priority Area #5 – Geology

To date the project has been successful in undertaking a number of strategic field based projects to fill in specific geological data gaps. Projects #5 and #6 are both aimed at infilling strategic geological data gaps and are considered a fifth priority area for the project. These projects require large sources of funding and perhaps could be considered when provincial or specific partner support is available.

Priority Area #6 – State of ORM Water Resources Report

The Oak Ridges Moraine Act and the accompanying Conservation Plan have been in place for five years now. Aside from the work of many non-governmental agencies, there has been little systematic work undertaken to monitor the successes of the ORM Plan, especially as it relates to the water resources. In the recent ORM Symposium (Feb 2007), it was noted that there is a need for a report on the status of the moraine's water resources to be completed in the next few years so that agencies and the Province can get prepared for the official review of the plan scheduled in 2014. The YPDT-CAMC program is ideally suited to undertake such a broad based initiative. This task will assist not only water managers but also planners at the various partner agencies.

If the executive steering committee agrees that the projects listed above, as well as those in Appendix C are all worthy of pursuit, and that the priority setting is appropriate in

terms of bigger theme areas, then the Technical Steering committee can adjust the program within this context to deliver results over the next five years.

4.3 Consultant versus Staffing

One question that has arisen within the Technical Steering Committee is that of having staff versus consultants undertake specific tasks. The main consultant on the project has been Earthfx and they have delivered services of excellent quality, although timeliness has been an issue. Staff believe that no other consulting company would have delivered the results for money achieved with Earthfx.

Having stated this, with the upcoming move to Downsview, there is an opportunity to consolidate the program information (database, model, etc.) onto a central server and to shift more responsibility for database/file management to staff. This however would require the need for additional staffing in the database management/information technology field. The YPDT program could continue to contract out this type of service, however it is an opportune time to consider whether the direction of the project necessitates such a move. If this was deemed to be an appropriate move, the program would require additional annual funding in the amount of $25,000 to $50,000 per regional municipality. The longer term retention of the contract staff under the OGS funding (i.e. Kim Gilder and Steve Davies) also needs to be considered and could further increase the funding allocated to the YPDT Groundwater Management study.

APPENDICES

Appendix A
YPDT Expense Summary 2001 - 2006

APPENDIX A
YPDT EXPENSE SUMMARY 2001 to 2006

YPDT-CAMC Groundwater Management Study 2001 to 2006 Budget Tracking									
Administration	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**Total Allocated**	**Comments**
Office/Salary/Disbursements/Meetings	$75,000	$68,000	$80,800	$161,475	$154,466	$142,290		$682,031	
Office/Salary/Disbursements/Meetings			$60,000	$105,272	$150,000	$150,000		$465,272	
Student wages			$29,500					$29,500	
Software		$45,500						$45,500	
Computers	$7,000		$19,000	$3,700		$6,000	$4,900	$40,600	
Database									
Database Design/Maintenance/Distribution	$98,000		$53,500	$53,500	$15,000	$114,000		$334,000	Contract to Earthfx
Geology/Modelling									
TRCA/York Focussed Model (Core)		$194,000						$194,000	Contract to Earthfx
Regional ORM Model		$186,000						$186,000	Contract to Earthfx
Geological Construction			$21,000	$31,500	$10,500			$63,000	Contract to Gerber Geosciences
Core Expansion				$107,000	$55,000	$28,000		$190,000	Contract to Earthfx
West Expansion					$100,000			$100,000	Contract to Earthfx
East Expansion						$25,000		$25,000	Contract to Earthfx
Field Work									
Baseflow Project		$107,000						$107,000	Contract to CRA
Well Record Location Update Project		$59,550						$59,550	Contract to Beatty & Associates
Geophysical Logging		$107,000	$53,500		$80,000			$240,500	Contract to Quantec/DGI
Core Storage/Logging			$30,000	$50,000	$50,000			$130,000	GSC Agreement
Uxbridge Borehole			$17,000					$17,000	Project led by Durham Region
Grasshopper Road Borehole			$27,500					$27,500	Project led by CLOCA
Heart Lake Road BH		$50,000	$35,000					$85,000	Money transferred to CVC
High Park Borehole			$250,000					$250,000	Miscellaneous Drilling/Grouting contractors (City of Toronto Finance
Caledon Seismic Survey			$90,500					$90,500	Contract to GAPS
Schomberg Seismic Survey				$68,800				$68,800	Contract to GAPS
Port Perry Seismic Survey #1				$63,700				$63,700	Contract to GAPS
Centreton Borehole (Rice Lake)					$92,500			$92,500	Contract to All Terrain
Port Perry BH					$28,000			$28,000	Contract to G.Hart & Sons
Boston Mills Rd BH				$35,000				$35,000	Contract to Meadowbank Drilling
Willoughby Road BH Extension					$4,000			$4,000	Contract to Meadowbank Drilling
Miscellaneous lab testing (grain size + water quality)						$4,600		$4,600	Waterloo Isotope Lab/AGAT Lab/V.A. Wood
Borehole Logs					$2,500	$12,500		$15,000	Contract with Wellington IT
Port Perry Seismic Survey #2						$75,000		$75,000	Contract with Conquest
Queensville Seismic						$83,000		$83,000	Contract with Conquest
Training					$69,000	$20,000		$89,000	Contract to Earthfx ($30,000 recovered from Partner Agencies)
Communication - Web Site					$30,000	$29,000		$59,000	Contract with Earthfx
Policy/Planning									
Watershed/OP Study					$59,000			$59,000	Contract with Usher/Ogilvie
Report Preparation									
Figures						$16,371		$16,371	Contract to Grand River
Writing					$15,300	$25,800		$41,100	Contract to Gerber Geosciences
ANNUAL TOTALS	**$131,000**	**$676,050**	**$930,550**	**$706,697**	**$875,266**	**$771,561**	**$4,900**	**$4,096,024**	**$4,096,024**
								Total By Source	
= YPDT Funding	$131,000	$162,500	$226,050	$398,725	$572,466	$479,290		**$2,019,431**	
= MOE 2001 Funding + matching funds	$0	$513,550	$190,000	$0	$0	$0		**$703,550**	
= OGS Funding	$0	$0	$220,000	$199,000	$302,800	$292,271		**$1,123,043**	
= Partner agency funding	$0	$0	$250,000	$0	$0	$0		**$250,000**	

APPENDIX A
2001 to 2006 Accomplishments

YPDT-CAMC Groundwater Management Study
2001 to 2006 Accomplishments

	Percent Complete (%)									
Database	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Database Design										
Database Distribution 2002										
Database Distribution 2003										
Database Distribution 2004										
Database Distribution 2006										
Addition of Climate Data (2001, 2003, 2004, 2006)										
Addition of Streamflow Data (2001, 2003, 2004, 2006)										
Additon of GSC Data (2002, 2004, 2006)										
Additon of MOE Data (2001, 2006)										
Addition of OGS Data (2004)										
Report Scanning (2002, 2003, 2004)										
QA/QC Maintenance of Database	**On-Going**									
Geology	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Assessment of GSC Surfaces										
Construction of original YPDT surfaces										
Refinement of surfaces for Core Model										
Expansion of surfaces to the west										
Expansion of surfaces to the east										
Distribution to Partners 2004										
Distribution to Partners 2006										
QA/QC Maintenance of Surfaces	**On-Going**									
Modelling	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Construction of Regional ORM Model (2002 - 2004)										
Calibration of Regional Model (2004)										
Construction of Core (TRCA/York) Model (2002 - 2004)										
Calibration of Core Model (2004)										
West model expansion										
East Model Expansion										
QA/QC Maintenance of Model	**On-Going**									
Website	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Prototype Design and launch										
Public Launch										
Maintenance of Website	**On-Going**									
Training	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
2002 (Viewlog + Sitefx)										
2003 (Viewlog + Sitefx)										
2005 (Viewlog + Sitefx + Access + Modelling)										
2006 (Viewlog + Sitefx + Access)										

	Percent Complete (%)									
Reporting	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Core Model/Regional Model Report										
West Model Expansion Report										
East Model Expansion Report										
Caledon Bedrock Valley Report (OGS)										
Schomberg Bedrock Valley Report (OGS)										
Borehole Geophysics Report										
Well Location Update Report										
CRA Stream flow Report										
Database Manual Report										
Model Use Report										
Watershed Plan to Official Plan Policy Report										
Port Perry Tunnel Channel Report (OGS)										
Barrie Bedrock Valley Report (OGS)										
OGS Report CVC										
OGS Report NVCA										
OGS Report LSRCA										
OGS Report TRCA										
OGS Report KVCA										
OGS Report GRCA										
OGS Report LTRCA										
OGS Report ORCA										
Geological Borehole Logs										
Field Work	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Field Trip (2003)										
Baseflow Project										
Well Record Location Update Project										
Geophysical Logging										
Heart Lake Road BH										
High Park Borehole										
Caledon Seismic Survey										
Schomberg Seismic Survey										
Port Perry Seismic Survey #1										
Centreton Borehole (Rice Lake)										
Port Perry BH										
Boston Mills Rd BH										
Willoughby Road BH Extension										
Miscellaneous lab testing (grain size + water quality)										
Port Perry Seismic Survey #2										
Queensville Seismic										

Appendix B
Subcommittees

Due to the informal nature of the subcommittees (i.e. consensus approach vs. voting) the following lists those staff that have attended and contributed to the various subcommittee initiatives. Some of the staff listed have moved on to new positions over the years but their contribution is recognized here (Asterisk indicates no longer an active member of subcommittee).

Planning Subcommittee
This subcommittee was formed in 2002 and was charged with addressing planning issues associated with the YPDT project. This subcommittee led the consultant selection process and the liaison with the successful consultant for the "Watershed Planning – From Recommendations to Municipal Policies" (April 2005) project. The subcommittee is responsible for monitoring the use of the document in various watershed planning projects and will revise the document based on the feedback received as the report is used in the implementation of watershed plans.

Sonya Meek	TRCA
David Burnett	TRCA/CAMC
Mark Head	Peel Region
Simone Banz	Peel Region
Andrea Warren*	Peel Region
Chris Darling	Durham Region
Lori Riviere	Durham Region
Lloyd Lemon*	York Region
Barb Jeffrey	York Region
Laura Atkins-Paul	York Region
Kelly Snow*	Toronto
Anne Rexe*	Toronto
Steve Holysh	CAMC

Database Subcommittee
This subcommittee was formed in 2005 with the direction to assist in the preparation of rules and policies around database management. This subcommittee led the production of the "Database Manual" (Sept. 2006) which has been circulated for review. The subcommittee will be responsible for taking comments from the group and revising the document accordingly.

Cory Ryan	York Region
Sonja Loessl*	Peel Region
Richard Gerber	Gerber Geosciences/CAMC
Shelly Cuddy	CLOCA/Durham Region
Krista Adams*	LSRCA
Steve Davies	CAMC

Kim Gilder	CAMC
Don Ford	TRCA
Ron Carter*	Durham Region
Kelsy Brennan	Earthfx
Steve Holysh	CAMC

WebSite Subcommittee
This subcommittee was formed in 2005 with the direction to turn the then passworded website, into a publicly viewable website for the project. The subcommittee was responsible for directing Earthfx in shaping the website into its current format. The subcommittee will periodically meet into the future to make decisions on the direction of the website.

Don Goodyear	LSRCA
Mary Prawecki*	York Region
Gayle Soo Chan	CLOCA
Kim Gilder	CAMC
Kelsy Brennan	Earthfx
Steve Holysh	CAMC

Training Subcommittee
This subcommittee was struck in 2004 to oversee the training needs of the group. The subcommittee was responsible for the role out of the two most recent training sessions; one in February 2005 and a second session in the fall of 2006. The subcommittee continues to meet on an as needed basis to assess and fill the training needs of the project partners.

Wendy Kemp	York Region
Sonja Loessl*	Peel Region
Shelly Cuddy	CLOCA/Durham Region
Don Ford	TRCA
Don Goodyear	LSRCA
Steve Davies	CAMC

Data Ownership/Distribution/Governance
This subcommittee was established in 2004 to oversee the issue of sharing data with parties external to the partner agencies. The subcommittee produced the report "Directions on Information/ Data Ownership and Distribution" (Feb 2007). The report is out for circulation and comments received will be incorporated into the final draft by the committee.

Lloyd Lemon*	York Region
Wendy Kemp	York Region
Beata Golas	Durham Region
Alina Korniluk*	Peel Region
Mark Head	Peel Region

William Snodgrass	Toronto
Gayle Soo Chan	CLOCA
Don Ford	TRCA
Steve Holysh	CAMC

Earthfx Report Review Subcommittee

Patty Meyer*	CVC
Lloyd Lemon*	York Region
Steve Holysh	CAMC

Appendix C
Current Program Tasks

APPENDIX C
SUMMARY OF YPDT-CAMC TASKS

Tasks		CAMC-YPDT				CAMC-YPDT	Consultants/Other Partners				Notes
		Steve H	Rick	Steve D	Kim	Subcommittee	Earthfx	Papadopulos	GSC	Gorrell	
DATABASE											
	New Data (Reports)	■	■	■	■		■				Build new data into database (BHs, PGMN, PWQM, etc.) Establish process to link data (LocID to Report)
	New Data (Field)	■	■	■	■				■	■	Coordinate new field projects (both ours and partners). Maintain summary of active projects.
	Distribution to Partner Agencies	■	■	■			■				Regular distribution to partner agencies. Work underway to improve process.
	External sharing	■				■					Data sharing process - have to finalize documentation and apporve process.
	Library	■			■						Continue scanning process; update library as .pdf files come in.
	Obtain/Organize PGMN wells	■			■						MOE permission + organizing data
	Obtain/Organize PWQMN data	■			■						MOE permission + organizing data
	Reports	■			■	■	■				Database Manual; 2006 Update summary, Original Report, etc.
	QA/QC process	■	■		■						Need clearer process on QA of new and existing data in the database.
COMMUNICATION											
	Web Site	■		■	■	■	■				Kim has been updating graphs on website
	Project Fact Sheets	■	■	■							Need to promote sheets and add to list
	Key BH Logs	■		■							Maybe produce better logs for BHs other than ones we drill
	Technical Papers	■	■								Continue to contribute professionally
	Talks	■	■	■							As invited - promote efforts of partner agencies
	Day to Day Support/Inquiry Emails & Phone Calls	■	■	■							Ongoing
	Staff Reports	■									As required
MODELLING											
	Model Useage	■	■				■	?			Have to ensure model is used appropriately and that it is known how the model is being used.
	West Expansion	■	■				■				Report to be prepared by end of 2007
	East Expansion - Durham	■	■				■				Report to be prepared by end of 2007
	Far East Expansion - Trent, etc										Have to see whether this is feasible.
	MOE Coordination	■	■								Manual on how to use model being prepared.
	Peer Review Process	■	■	■			■	■	■		
GEOLOGY											
	Check (improve) Core Model	■	■	■	■						Ongoing
	Check (improve) West expansion	■	■	■	■						Ongoing
	Check (improve) East expansion	■	■	■	■						Ongoing
	Nottawasaga + Far East		■	■	■						Ongoing
TRAINING											
	Oraganization of Training Sessions		■		■	■					As required
	Delivery of Training	■	■	■		■	■				As required
POLICY											
	EIS Terms of Reference										
	Watershed Plans	■									
	Official Plans	■									
	Link technical info to policy	■				■					Usher/Olgilvie Report
SOURCE WATER											
	Coordination	■	■	■							Keeping all on track - minimize duplication
OTHER REPORTS											
	Model Expansion Report	■	■	■			■				Due by end of 2007
	Core Model Peer Review Report	■	■				■	■	■		Projected for end of 2007
	OGS Schomberg	■		■					■		Under review with OGS
	OGS Caledon Buried Valley	■		■					■		Under review with OGS
	OGS Port Perry	■		■					■		
	OGS Barrie	■		■					■		
	MNR Source Water WB Guidance Module	■	■								
	OGS GRP CVC	■	■	■	■						Under review with OGS
	OGS GRP NVCA	■	■	■	■						Ongoing
	OGS GRP TRCA	■	■	■	■						Under review with OGS
	OGS GRP LSRCA	■	■	■	■						Ongoing
	OGS GRP Kawartha RCA	■	■	■	■						Ongoing
	OGS GRP Ganaraska RCA	■	■	■	■						Ongoing
	OGS GRP Otonabee RCA	■	■	■	■						Ongoing
	OGS GRP Lower Trent CA	■	■	■	■						Ongoing