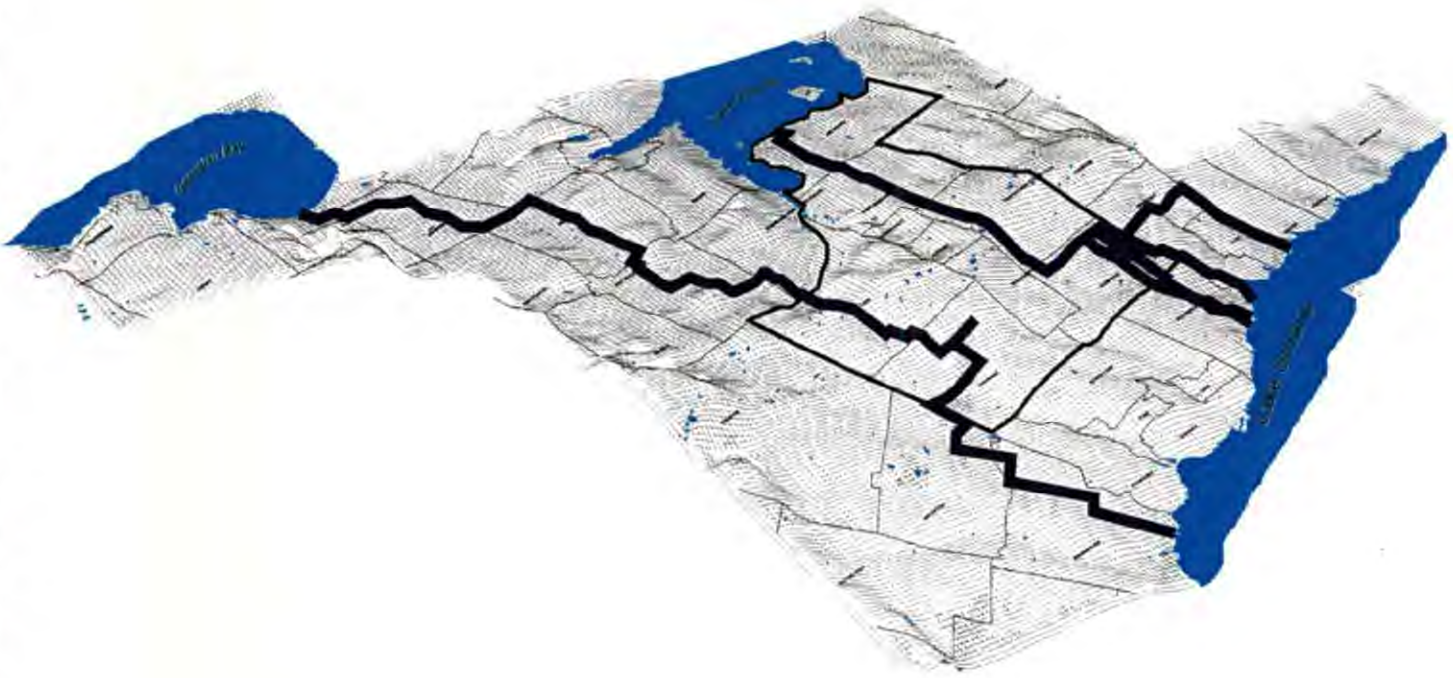
YORK REGION
LONG TERM WATER PROJECT
DECEMBER 1996

SELECTION OF THE PREFERRED SOLUTION



York Region

Consumers Utilities

EXECUTIVE SUMMARY

Background

Since May 1996, the York Region/Consumers Utilities Partnership has undertaken a considerable amount of study and consultation in the search for possible alternative solutions to meet the long-term water needs of the Region. An initial range of alternative solutions was presented to Regional Council on July 11, 1996 and this was followed by presentations to the nine area municipalities, three open houses in the Region, and notification to relevant agencies. Meetings also took place with various ministries, adjacent municipalities and other regulators. No new alternatives were introduced and all solutions were then evaluated in terms of cost and environmental impacts.

Details of the evaluation studies were published following the presentation to Regional Council on October 24, 1996. Since this date, further consultation has taken place, including more public open-houses, further presentations to update area municipal councils and further agency notification. In addition, all evaluation materials have been made freely available to the public in the Long Term Water Project office based at the Region in Newmarket.

The consultation period closed on December 6, 1996 which allowed approximately six weeks for interested parties to make any comments that they felt were necessary in respect of the alternative solutions. One significant comment was for Lake Simcoe to be used as a carrier of water from Georgian Bay. This possibility has been examined but will not be pursued any further because of cost and environmental factors.

Criteria for Selection

In addition to specific commentary, all attendees at the November public open-houses were invited to complete a questionnaire which asked for opinions on the ranking of selection criteria. This exercise supplemented the previous exercise in the July open houses and the polling of residents in the Region. The results of these have been utilized in the selection of the preferred solution.

The selection criteria, which are discussed later in more detail, have been based on the Region's 'Statement of Goals' outlined in the Request for Proposals and have been supplemented by further criteria which have been determined to have relevance.

The following are the criteria:

From the 'Statement of Goals'

- Secure water to continue the Region's future growth
- (Water) Rate stability
- Financing of future infrastructure (project financeability)
- Protection of the environment

Supplementary criteria

- Independence
- Reliability
- Source of supply
- Economic benefits to the Region

In order to address the complex problem of ranking the solutions, the Partnership has utilized a mathematical modeling technique called Multicriterion Ranking (MCR) to assist in the derivation of a solution which best meets the criteria.

The Preferred Solution

It is recommended that the expansion of supplies to the Region be viewed as a phased strategy comprising four steps.

1. Finalize the Metro Agreement

The first step, involves the continuation of the expansion of water supplies from Metro Toronto to 57 MIGD (average day). This will provide a bridge until 2004 and will support the Region's growth needs until then. The Partnership can pursue opportunities to mitigate the required investments in conjunction with Metro to provide an optimal agreement between York and Metro Regions. Amounts up to 57 MIGD (average day) are technically relatively easy to secure from the Metro system, but higher quantities are considered problematic.

2. Implement Water-Use Efficiency Program

The second step, a water-use efficiency program, will produce up to 4 MIGD. This step should occur at an early date in order to make immediate cost savings for the Region and its area municipalities as well as to defer capital expenditures. The cooperation and support of the area municipalities is required for this step.

3. Construct a New Water Treatment Facility at Lake Simcoe

The third step is the construction of a new water treatment facility in Georgina. This is a required step which needs early attention to ensure the continued growth in the Town of Georgina and to replace the Sutton Filtration Plant which is nearing the end of its useful life. This solution could also provide up to an additional 20 MIGD to feed other areas to the south of the Region but this will need further discussion with various regulators, members of the Great Lakes Charter and other stakeholders.

4. A Great Lakes Source of Supply

The fourth step, a supply from the Great Lakes, involves taking a supply from Lake Ontario via the Durham (West) solution in order to meet the 2031 demand forecast of 210 MIGD (maximum day). This was derived from the "Multicriterion Ranking" exercise. Given the uncertainty of the timing of growth, commitment to the fourth step needs very careful consideration as it is the most capital intensive of the four steps. The scale of this project may vary due to a number of factors including; the potential for additional supplies from Lake Simcoe which could feed areas south of Georgina and, the possibility of implementing the Durham (West) solution cooperatively with Durham Region.

Finally, it is recommended that a second option be retained for a Great Lakes source of supply. This option, Peel Cooperative, could be introduced if it became apparent that the bridging period was being exhausted without significant progress being made on the Durham (West) option due to unforeseen circumstances. A final decision on this second option could be held for one year after which time progress on the preferred option could be reviewed and the decision on the long term water supply strategy can be revisited if necessary.

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NOVEMBER PUBLIC OPEN HOUSES SUMMARY

One hundred and sixty-nine people attended three public meetings in November, 1996, at which the York Region/Consumers Utilities Partnership presented information about the long-term water supply system alternatives being evaluated. Attendees expressed a high degree of satisfaction with the day, time and location of the meetings and with the helpfulness of the staff in attendance. They expressed a moderate degree of satisfaction with the information displays.

Fifty-nine attendees at the meetings completed a questionnaire through which they expressed their opinions. The questionnaire included a summary of information about the water supply system alternatives being evaluated, so that all respondents had the benefit of a minimum level of information upon which to base their responses. Highlights of the responses were:

- Georgian Bay and Lake Ontario are equally preferred as primary water sources, and both are considered preferable to Lake Simcoe as a water source;
- a cooperative system is preferred over a fully independent system;

- ensuring the reliability of water quality and quantity is the most important factor to consider when designing the long-term water supply system, followed by stability of water rates, protection of the environment and stability of development charges.

A number of additional system design factors and other comments were made in the questionnaire responses. These are listed in the report.

However, caution should be exercised in the interpretation of the results because of the relatively small sample size attending the meetings. The open house results should not therefore be viewed as statistically representative.

REVIEW AGENCIES

The York Region/Consumers Utilities Partnership has been fully aware of the need to keep all relevant agencies notified of progress with the long-term water strategy Phase II EA activities. Accordingly, every effort has been made to comply with the Class EA notification requirements. However further to the mandatory communications, an additional notification step was taken in July of this year in which various agencies were advised of the Partnership's preliminary considerations in respect of the pipeline routings and water sources which were to be examined.

Meetings were also held with, or presentations given to, the following agencies and interested parties in order to provide the opportunity for discussion and comments:

- Ministry of Environment and Energy
- Ministry of Natural Resources
- Ministry of Municipal Affairs and Housing (Office for the Greater Toronto Area)
- Ontario Hydro
- Orillia Water Light and Power
- Region of Peel
- Metro Toronto

- Region of Durham
- Simcoe County Council
- Trent-Severn Waterway
- Town of Aurora
- Town of East Gwillimbury
- Town of Georgina
- Township of King
- Town of Markham
- Town of Newmarket
- Town of Richmond Hill
- City of Vaughan
- Town of Whitchurch-Stouffville

The Provincial Ministries of Environment and Energy, Natural Resources, Transportation and Municipal Affairs and Housing have responded jointly. Staff from these ministries attended at the York Region offices to meet with Partnership staff on 4 December, 1996 to discuss their views on the project. Significant comments included: the view that if a solution from Georgian Bay was preferred then the burden of proof would be on York Region to present an "overwhelming" case in support of this option compared to the other alternatives still under consideration. Provincial representatives also referred to relevant matters contained in the Provincial Policy Statement (1996) that must be addressed.

A comprehensive list of agencies which have been notified is attached in the appendix together with a copy of all their written responses.

The potential intra-basin transfer of water within the Great Lakes Basin appears to offer the most significant obstacle. The issue has been highlighted federally, provincially, by the Lake Simcoe Region Conservation Authority, and by others as well.

Written responses have been received from two upper tier adjacent municipalities, the Region of Durham and the County of Simcoe. Durham Region Council adopted a recommendation which provides:

> *"That the Region of Durham indicate interest in York Region's Class Environmental Assessment process and the evaluation of water supply sourcing options which may be of long term benefit to Durham Region."*

Simcoe County Council passed the following motion on November 26, 1996:

> *"That the County of Simcoe support the efforts of the Towns of Collingwood and New Tecumseth to research the feasibility of supply surface water from Georgian Bay to south Simcoe, and that the County of Simcoe participate in the long term examination of the feasibility of supplying water to users outside Simcoe County."*

Other written comments have been received from:

- Ajax (Town of), Office of the Clerk
- Citizenship, Culture and Recreation, Province of Ontario, Policy Advisor
- Clarington, (Municipality of), Office of the Clerk
- Environment Canada, Water Issues Division
- Georgian Bay Association, President
- Georgina Hydro
- Great Lakes United, President
- King Township, Office of the Clerk
- Lake Simcoe Region Conservation Authority, Manager Technical & Field Services
- Markham Hydro, Chief Engineer
- Metropolitan Toronto & Region Conservation Authority
- Ministry of Transportation, Ontario, Environmental Section
- Natural Resources Canada, Geological Survey of Canada
- Newmarket Hydro, Director of Engineering
- North York, (City of), Office of the Clerk
- Northern Development & Mines, Senior Manager, Sedimentary Geoscience Section, Province of Ontario
- Parks Canada, Superintendent, Trent-Severn Waterway
- Rouge Park, G. Weeden, General Manager
- Safe Sewage Committee
- Wasaga Beach (Town of), Office of the Clerk-Treasurer
- York (City of), Office of the Clerk

LONG TERM WATER STRATEGY SELECTION PROCESS

Primary Evaluation Criteria

The primary evaluation criteria used to select the preferred alternative to complete Phase II of the EA process are contained within the 'Statement of Goals' prepared by the Region. These are:

- Secure water to continue the Region's future growth
- Water rate stability
- Financing of future infrastructure
- Protection of the environment

A total of nine separate alternative solutions were presented to York Region on October 24, 1996. The first three of these solutions presented the opportunity for full independence of the Region with no long-term reliance on Metro Toronto. At this stage however, it is recommended that no further detailed consideration be given to these three alternatives as significant benefits and cost avoidance can be gained by retaining a supply of water from Metro Toronto. These benefits provide greater reliability of supply to

the Region and for economic supplies in the short term which drive down overall costs and the related impact upon water rates and development charges.

It is also recommended that the more easterly of the two Lake Ontario solutions via Durham (Durham East) should receive no further detailed consideration as little opportunity existed with this particular solution for cooperative benefits with Durham Region. Furthermore, this alternative would involve higher capital costs compared to the Durham West solution. Another complication arises with the Durham East solution when consideration is given to the potential conflict with the future location of Highway 407.

It is proposed therefore that only five of the nine alternative solutions presented on October 24th, 1996 be evaluated further to arrive at a preferred solution. All five alternatives are inclusive of a groundwater supply in rural areas, together with a new water treatment facility in Georgina to replace the Sutton Filtration Plant to meet Georgina's growth. In addition, all five solutions are capable of providing the 2031 demand forecast of 210 MIGD (maximum day). The five alternatives evaluated are in Table 1 on the following page.

TABLE 1

Technical Solution	Components of Supply*
Georgian Bay/Expanded Metro	80 MIGD Georgian Bay, 97 MIGD expanded Metro, 33 MIGD Groundwater & L. Simcoe
Peel/Expanded Metro	80 MIGD L. Ont via Peel, 97 MIGD expanded Metro, 33 MIGD Groundwater & L. Simcoe
Metro/Expanded Metro	80 MIGD L Ont via Metro, 97 MIGD expanded Metro, 33 MIGD Groundwater & L. Simcoe
Durham/Expanded Metro	80 MIGD L. Ont via Durham, 97MIGD expanded Metro, 33 MIGD Groundwater & L. Simcoe
Peel Cooperative/ Expanded Metro/Expanded L. Simcoe	70 MIGD L Ont via Peel, 97 MIGD expanded Metro, 10 MIGD expanded L Simcoe, 33 MIGD Groundwater & L. Simcoe

*Note: Maximum Day 2031

In order to provide a simple comparison of these five alternatives, the four 'Statement of Goals' criteria which were described more fully in the RFP as follows have been used:

> ***Secure Water to Continue Region's Future Growth***
>
> *The Region anticipates securing sufficient short term water supplies from an expansion of an existing water agreement with Metropolitan Toronto. The amount of water available from the Metro system is limited to 57 MIGD* (which allows for 97 MIGD maximum day). *It is estimated this volume will satisfy the Region's demands for a period of about six years. The Region therefore requires additional water to allow it to continue to grow well into the twenty-first century.*

(Water) ***Rate Stability and Cost Minimization***

In developing its long-term water supply, the Region views rate stability and cost minimization to be key objectives. The Region prefers to work cooperatively with its neighbours in the Greater Toronto Area ('GTA') and/or Simcoe County to the mutual benefit of all.

Financing of Future Infrastructure

The Region desires that the financing of infrastructure required for a long-term water supply should not significantly influence the existing credit rating of the Region and the ability of the Region to undertake other capital expenditures.

Protection of the Environment

In developing a long-term water supply, the Partnership must be sensitive to the environment and must meet or exceed all relevant guidelines, policies and standards. The Partnership will be responsible for developing a safe, efficient and environmentally sound facility.

Of the five solutions referred to in Table 1, all can be regarded as satisfying these basic screening criteria to a greater or lesser degree.

While all of the solutions satisfy the basic screening criteria, there are significant differences as illustrated in Table 2 below:

TABLE 2

Water Rates and Development Charges

Technical Solution	2031 Water Rate (1996$/m^3)	Development Charge Impact	
		Water DC	Total Region DC
Georgian Bay/Expanded Metro	30¢ to 37¢	40% to 63%	12% to 20%
Peel/Expanded Metro			
Metro/Expanded Metro	26¢ to 32¢	10% to 22%	3% to 7%
Durham/Expanded Metro			
Peel Cooperative/ Expanded Metro/Expanded L. Simcoe			

Notes:

1. Water rate ranges and DC impact ranges cover both York Region's most recent (adjusted) population forecast and an independent forecast completed in 3Q 96.
2. Water rate ranges and DC impact ranges assume 80% of growth capital expenditures allocated to development charges and 20% to water rates.
3. Water rates calculated based on steadily declining rate in 1996$ terms; water purchases from Metro based on 1997 rate.
4. DC's calculated based on one-time pro rata increase in residential and non-residential DC's in 1997 and scheduled increases in non-residential DC's in 1997/1998 plus inflation thereafter.
5. Non-taxable entity fully funded by debt at 8.0% p.a. (5.5% real rate after inflation).
6. Calculations assume no outstanding debt in 2031.

In order to fully compare the merits of each of the five technical solutions, a comprehensive ranking mechanism was derived which compared the four 'Statement of Goals' criteria referred to earlier. The ranking of these four criteria was done as follows:

(i) **Secure water to continue the Region's future growth**

Those solutions which best avoid the risk of legislative or cooperative agreement delays or a lengthy approvals process are ranked highest as these best ensure uninterrupted growth for the Region. Given the most recent demand forecast, a new supply is required to be on stream by 2004 when it is anticipated that the Metro supply could be reaching the maximum day limit of 97 MIGD at that time. It has been assumed that all solutions will be developed in a manner which ensures reliability of supply from a technical perspective.

(ii) **(Water) Rate stability**

Those solutions which have the potential to reduce the wholesale water rate (in 1996$ terms) by the highest amounts without any short term price peaks are ranked highest as these give the greatest opportunity for rate stability. The wholesale water rates derived from the financial modeling process were used to provide a ranking.

(iii) **Financing of future infrastructure**

The cost of expansion is recovered primarily from development charges. Timing differences between capital expenditures and collection of development charges result in a need for a significant amount of financing. Those solutions which have the least impact on required development charges and where the development charge is least sensitive to change in demand, interest rates etc. were ranked the highest. These solutions are the easiest to finance and will have the least impact on credit ratings and borrowing capacity. A consensus from the members of the Partnership's financial working group was obtained to provide the ranking.

(iv) **Protection of the environment**

Those solutions which have the least impact on the natural, social and economic environment, identified through the Environmental Assessment inventory of constraints, are ranked highest.

Other Criteria and Public Opinion

Other criteria have emerged since the beginning of the evaluation process and these have been incorporated into the ranking process. Therefore, in addition to the four criteria outlined above, the range has been extended to eight in order to address the following:

- Independence
- Reliability of supply
- Source of supply
- Economic benefits to the Region

These additional criteria are defined as follows:

(v) **Independence.** The proportion of water to be sourced from York Region or facilities owned by the Partnership (in whole or part) expressed as a percentage of total water supplied. The solutions with highest proportions of independently produced water will have the highest ranking.

(vi) **Reliability of supply.** The ability to mitigate failure in a water supply source through the ability to introduce supplies from another source. Solutions with the greatest flexibility in the provision of alternative supplies will rank highest.

(vii) **Source of supply.** This criterion measures preference for sourcing of supplies from particular locations. The preference may vary in extent from a desire to receive a supply from a specific source to indifference on sourcing, given that drinking water quality will be consistent irrespective of source. Ranking of sources was in accordance with views expressed from the public open-houses and from the statistically valid public input.

(viii) **Economic benefits to the Region.** Two aspects can be considered here; first the value of work on any solution which takes place within the Region and second, the price elasticity effects of development charges and their impact on Regional growth. Highest ranking solutions are those which provide greatest benefits on these two aspects.

Varying views on the importance (weightings) of some criteria have emerged from completed open-house questionnaires and statistically valid public input.

Multicriterion Ranking

Rationalizing the conflict between environmental, economic, social and other objectives is a challenge that constantly confronts decision makers in planning. Selection of a water supply scheme is an example of such a challenge in which a decision-support tool is required to provide a mathematical basis for ranking different alternatives and choosing the best overall water supply scheme (considering all relevant objectives). The evaluation process is complex due to the number of objectives which are non-commensurable (expressed in different units) and which often conflict with each other.

Compromise among the conflicting objectives often leads to significant cost savings as well as qualitative benefits such as improved system reliability, reduced environmental impact, fewer problems related to supply, and shorter project installation times. The Compromise Programming technique has been successfully used in many water resources applications.

In order to address the complex problem of ranking the solutions utilizing the above eight criteria, the Partnership made use of a Compromise Programming technique called Multicriterion Ranking (MCR). This technique is capable of comparing all criteria, provided that weightings are

given to each and then deriving a preferred solution which best meet expectations. MCR will also allow the weightings of the various criteria to be adjusted across a range to test their sensitivity on the chosen solutions.

To determine the weightings, the Partnership polled four groups for their views. The groups were:

- the Steering Committee of the Long Term Water Project
- the questionnaire results obtained from the November Public Open Houses, attended by approximately 169 persons
- a panel of experts comprised of representatives of the engineering, environmental, financial, and legal consultants retained by the Partnership.

The criteria weights obtained from the groups are shown in Table 3. Note that two sets of weightings were provided by the Steering Committee. The weights in "Steering Committee 2" featured an adjustment in the weight assigned to "independence" to test the sensitivity of this factor. The table presents the ranking of each Long Term Water project solution, as determined through the Multicriterion Ranking process.

TABLE 3

WEIGHTINGS					
CRITERIA	Steering Committee 1	Steering Committee 2	Open House	Experts	Water Strategy Task Force
Water Rate	15.0%	15.0%	15.4%	17.2%	15.2%
Finance	15.0%	15.0%	13.1%	12.6%	14.1%
Environment	15.0%	10.0%	15.2%	16.4%	13.5%
Reliability	10.0%	10.0%	18.7%	21.3%	16.6%
Economy	10.0%	10.0%	11.3%	11.3%	8.2%
Secure Supply	15.0%	15.0%	10.1%	9.8%	15.2%
Source	10.0%	10.0%	8.2%	4.9%	5.9%
Independence	10.0%	15.0%	8.0%	6.6%	11.3%
ALTERNATIVE	RANKING				
CRITERIA	Steering Committee 1	Steering Committee 2	Open House	Experts	Water Strategy Task Force
Georgian Bay / Metro-York Water System	4	3	4	5	4
Peel / Metro-York Water System	5	4	5	4	5
Metro (Direct) / Metro York Water System	2	2	2	2	2
Durham (West) / Metro-York Water System	1	1	1	1	1
Peel (Coop) / Lake Simcoe / Metro-York Water System	3	5	3	3	3

The Preferred Solution

Technical

The preferred solution to the Region's long-term water needs should be capable of meeting all of the Region's goals and ensuring that long-term growth needs are met. The Region currently uses approximately 51 MIGD (average day). In 2031, it is estimated that the Region will need an average day supply of 103 MIGD (an additional 52 MIGD). In the short-term and covering the first eight years, a bridging strategy of utilizing additional supplies from Metro Toronto (to a total of 57 MIGD average day and 97 MIGD maximum day) together with water-use efficiency programs will allow growth to occur as forecast in the Region's Official Plan. If growth exceeds this forecast then obviously the bridging period is commensurately reduced.

The growth in capacity of the Region's system to meet the urban demand forecast is illustrated in Figure 2. In addition, the projected requirements of the rural communities and groundwater usage are displayed in Figure 3.

Since 1995, the Region of York and Metro Toronto have been working cooperatively towards increasing the Metro supply contract with York Region to 57 MIGD (average day). A supply of 57 MIGD is known to be

achievable through the Metro system with a total capital contribution from York Region of $103 million. While the original agreement with Metro explicitly limited the supply to 30 MIGD, engineering reports and hydraulic modeling contemplated a supply in the order of 57 MIGD average day (maximum day 97 MIGD). Consequently, there is certainty over the ability of the Metro system to provide 57 MIGD to York Region. It is conceivable that the Metro system may be capable of providing water supplies beyond the 57 MIGD with further capital construction. However, Metro not indicated an interest in providing additional volumes to York Region beyond the 57 MIGD (average day).

The expansion of water supplies to the Region, which will include a new supply from the Great Lakes, should be viewed as a phased strategy which comprises four steps.

(i) **Finalize the Metro agreement.**

Expansion of the Metro Toronto supply to the Region forms the first step of four steps towards meeting the Region's long-term needs. This work is already underway and will eventually provide 57 MIGD average day and 97 MIGD maximum day.

(ii) **Implement a water use efficiency program.**

A water-use efficiency program, will produce savings of up to four million gallons per day. This step should occur at an early date in order to make immediate cost savings for the Region and its area municipalities as well as to defer capital expenditures. The support of the area municipalities is required for this step.

(iii) **Construct a new water treatment facility at Lake Simcoe.**

The construction of a new water treatment facility in Georgina which takes its supply from Lake Simcoe is a required step which needs early attention in order to ensure the continued growth in Georgina. In addition, it will allow the replacement of the Sutton Filtration Plant which is nearing the end of its useful life. This step could also gain economies of scale through the construction of a larger water treatment facility which is capable of meeting the needs of Georgina and providing a further 5 MIGD to Newmarket. This further 5 MIGD will potentially be an intra-basin transfer but should not invoke the higher levels of consultation required by the Great Lakes Charter. However, the provision of additional supplies from Lake Simcoe must not be to the detriment of progress to meet Georgina's immediate needs.

An additional 20 MIGD above the needs of Georgina could possibly be obtained from Lake Simcoe but in order to fully determine an allowable withdrawal from Lake Simcoe, it will be necessary to enter into further discussions with the appropriate regulators, members of the Great Lakes Charter and other stakeholders. These discussions should commence immediately as the scale of the fourth step could be reduced depending upon the amount of water supplied from Lake Simcoe. Additionally, for volumes of water greater than 10 MIGD it would be economical to introduce this water further south in the Region and therefore provide an extension to the bridging period.

(iv) **A Great Lakes source of supply.**

The fourth step requires taking a new supply from the Great Lakes. The preferred solution is a supply from Durham West and this is shown on the map in Figure 3. This choice best meets the initial criteria which were established by the Region in their 'Statement of Goals' as well as being ranked first in the additional criteria. Durham West has further advantages in that it provides a significant opportunity for mutually beneficial cooperation with the Region of Durham as the area known as Seaton and other areas to the west of Durham

are developed. It is also relevant that the Region has existing relationships with Durham through the operation of the York-Durham sewer.

Given the uncertainty of growth within the Region, the timing of commitment to the fourth step needs very careful consideration as it is the most capital intensive of the four steps and therefore subject to the highest risk. In addition, the scale of this step may vary and be dependent upon the volume of water ultimately derived from the three initial steps of the Long Term Water Supply Strategy.

The bridging period is obviously variable. Therefore, to obtain the necessary approvals, discussions with regulators, Ministries and other stakeholders should commence immediately. This period, if compared with other similar projects in Ontario, could be as long as six years and with a fast-track two year construction program may require up to eight years before water can be brought to the Region from a Great Lakes source. However it is the Partnership's opinion that consultation and approvals for the Durham West solution could be obtained in four years.

The fourth step of taking a supply from Durham West could run into difficulties through unforeseen events and therefore a second alternative would need to be introduced if the bridging period was being exhausted without significant progress being made. It is therefore recommended that a second option of Peel Cooperative be held in reserve. This option is also viewed as a good partnering option with another Region.

Financial

From a financial perspective, the actual level of water rates and development charges depend on a variety of variables including demand for water, growth rates, interest rates, inflation levels, capital and operating costs, purchased water costs, commercial structure and allocation of capital costs between development charges and water rates.

While the assumptions could change over time, the same criteria and assumptions were used to model each technical solution. This modeling resulted in Durham West being the preferred solution from an overall financial perspective.

The water rate in 2031 of an expanded York Region water system encompassing supply from Durham West is forecast to decline significantly in 1996 dollar terms from the current uniform rate. The nominal water rate in 2031 will depend on the inflation rate over the period. It is expected that a new water supply from Durham West will require a modest one time increase in development charges in 1996 dollar terms as indicated in Table 2 (plus currently scheduled increases in the non-residential development charge) followed by inflationary increases thereafter.

During the timeframe required to implement a new water supply from Durham West, the Partnership will seek the optimum balance between water rate, development charges and risk transfer from the Region to Consumers Utilities after which a specific financing structure could be put in place.

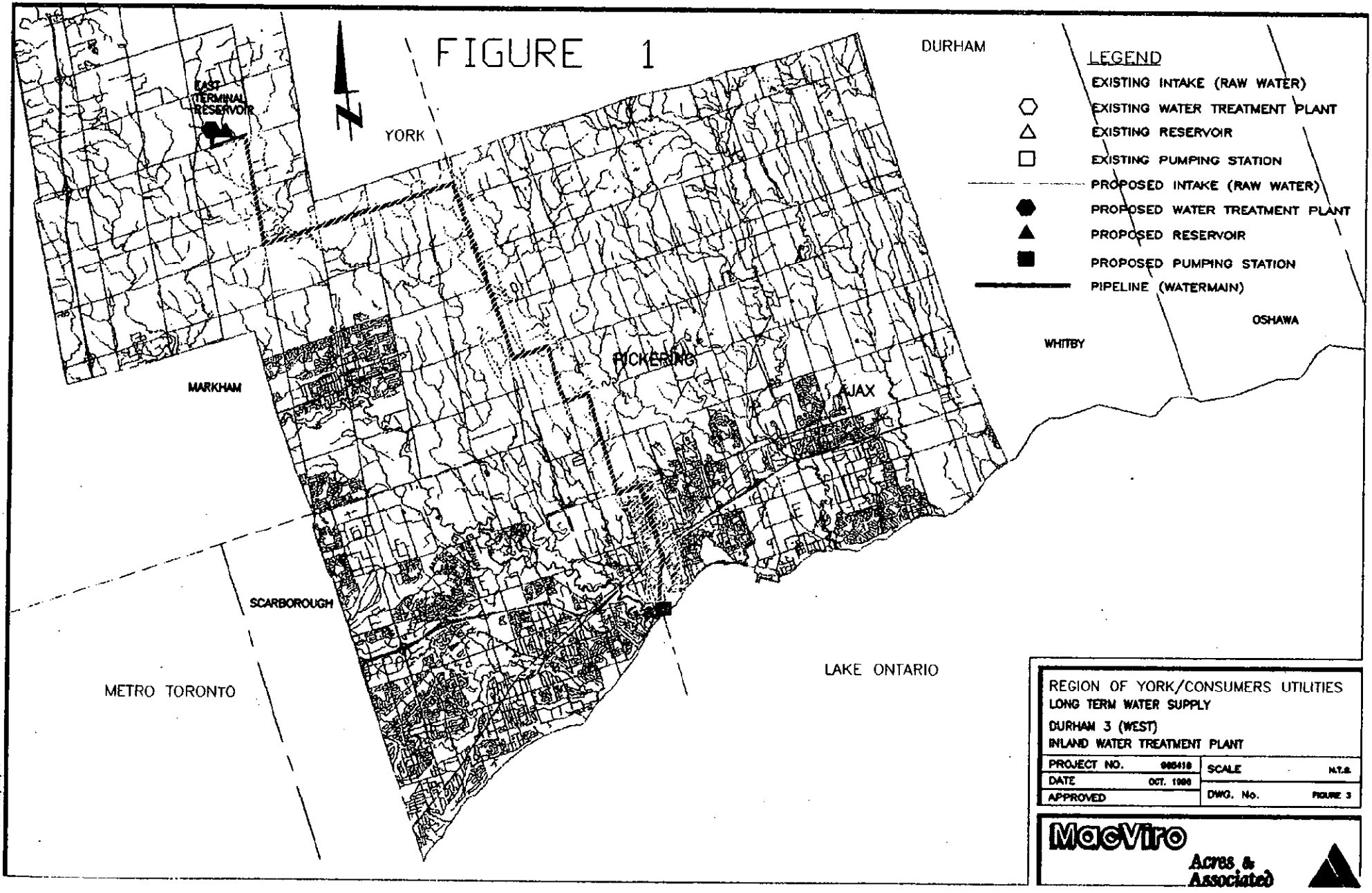


FIGURE 1
EAST TERMINAL RESERVOIR
YORK
DURHAM
MARKHAM
PICKERING
AJAX
WHITBY
OSHAWA
SCARBOROUGH
METRO TORONTO
LAKE ONTARIO
LEGEND
EXISTING INTAKE (RAW WATER)
EXISTING WATER TREATMENT PLANT
EXISTING RESERVOIR
EXISTING PUMPING STATION
PROPOSED INTAKE (RAW WATER)
PROPOSED WATER TREATMENT PLANT
PROPOSED RESERVOIR
PROPOSED PUMPING STATION
PIPELINE (WATERMAIN)
REGION OF YORK/CONSUMERS UTILITIES
LONG TERM WATER SUPPLY
DURHAM 3 (WEST)
INLAND WATER TREATMENT PLANT
PROJECT NO. 995418
SCALE N.T.S.
DATE OCT. 1998
APPROVED
DWG. No. FIGURE 3
MacViro
Acres & Associated

FIGURE 2

DEMAND CAPACITY MODEL - URBAN

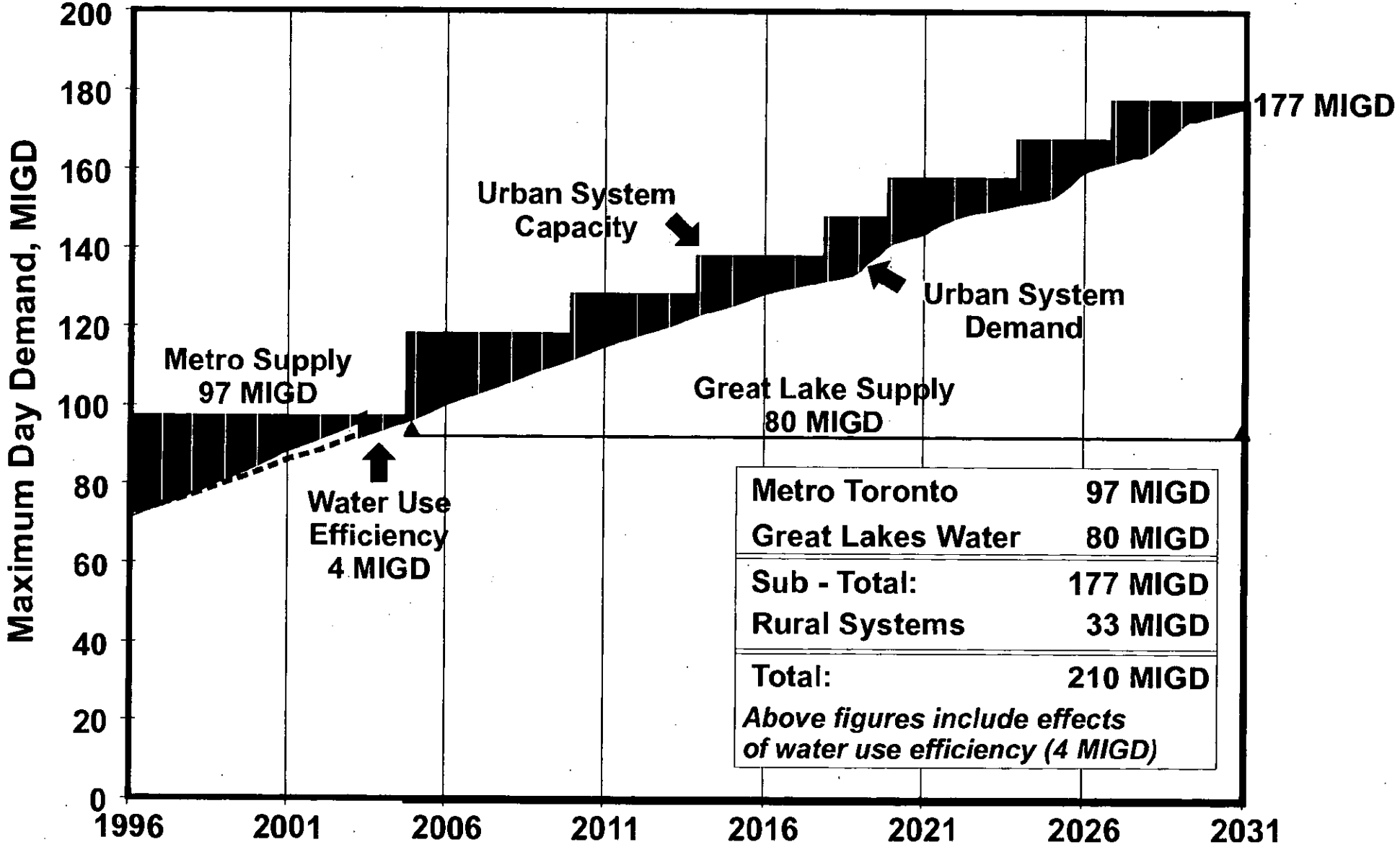
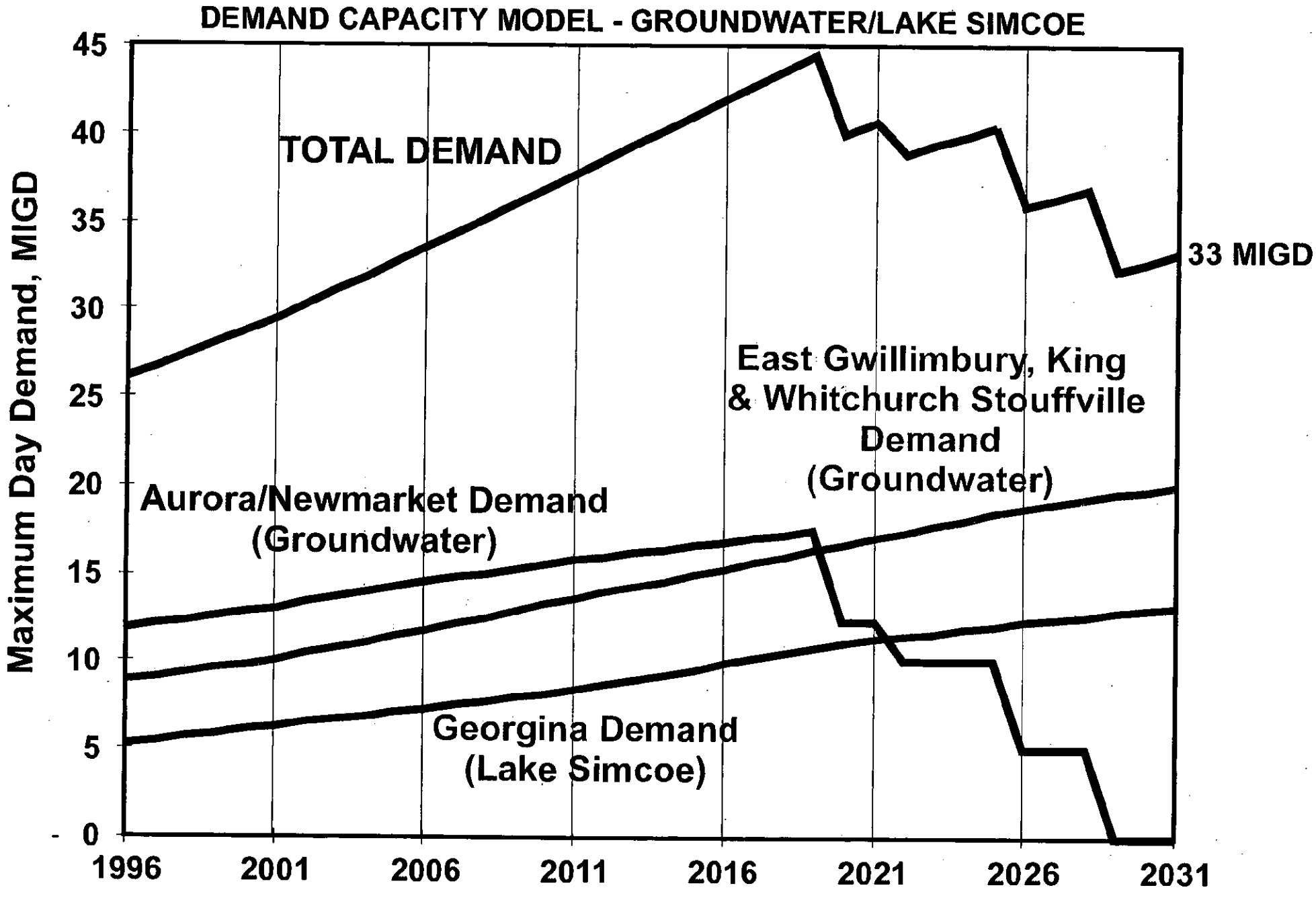


FIGURE 3


DEMAND CAPACITY MODEL - GROUNDWATER/LAKE SIMCOE
Maximum Day Demand, MIGD
45
40
35
30
25
20
15
10
5
0
1996
2001
2006
2011
2016
2021
2026
2031
TOTAL DEMAND
33 MIGD
East Gwillimbury, King & Whitchurch Stouffville Demand (Groundwater)
Aurora/Newmarket Demand (Groundwater)
Georgina Demand (Lake Simcoe)