Data Management Group
Annual Report
1999

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INTRODUCTION

The Data Management Group is a research project located at the Joint Program in Transportation, which is a research centre of the Faculty of Applied Science and Engineering at the University of Toronto. The Joint Program in Transportation was established in 1970 and the Data Management Group began operation in 1988. A history of both is contained in previous annual reports.[1]

Program approval and funding of the Data Management Group is the collective responsibility of the members of the Transportation Information Steeering Committee (TISC), previously called the Toronto Area Transportation Planning Data Collection Steering Committee (TATPDCSC), with the following membership:

City of Toronto
GO Transit
Ministry of Transportation, Ontario
Regional Municipality of Durham
Regional Municipality of Halton
Regional Municipality of Hamilton-Wentworth
Regional Municipality of Peel
Regional Municipality of York
Toronto Transit Commission

Each participating agency appoints a member of the technical staff to the Transportation Research and Data Management Group (TRADMAG), which is a standing committee of TISC, responsible for coordinating the needs of the funding agencies and the activities of the research project.

The Data Management Group operates with a part-time director, a full-time technical staff of four, plus part-time technical staff and summer students. Administrative support is provided by the Joint Program in Transportation.

Until November 1999, the Joint Program and the Data Management Group were located at 42 St. George Street on the St. George campus of the University of Toronto. The building has been demolished for the construction of a new building and the research project has been relocated to temporary premises. Newly renovated space for the Data Management Group will be provided by the Faculty of Applied Science and Engineering in the summer of 2000 at

Galbraith Building, Room 305
35 St. George Street
Toronto, Ontario M5S 1A4

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1 *Data Management Group Annual Report 1995, Report 54, Joint Program in Transportation (May 1996)*

Data Management Group Annual Report 1996, Report 59, Joint Program in Transportation (March 1997)

Data Management Group Annual Report 1997, Report 73, Joint Program in Transportation (October 1998)

INFORMATION PROCESSING

The Data Management Group, in cooperation with the funding agencies, have defined a set of data on urban transportation that is of collective interest to transportation planning agencies and the research community. These data can be summarized as follows:

- household, person and trip data from the 1986 Transportation Tomorrow Survey,
- household, person and trip data from the 1991 Transportation Tomorrow Survey,
- household, person and trip data from the 1996 Transportation Tomorrow Survey,
- trip data from the 1964 MTARTS,
- place of work and place of residence linkages from the 1986 Census,
- GO Rail and GO Bus surveys from 1983 to 1997,
- vehicle and person classification counts contained in all Cordon Counts from 1975 to 1998.

During this calendar year, all data were transferred to a more cost effective relational data base structure on the Data Management Group's computer system. The new system is less expensive to purchase and maintain, featuring better compatibility with web browser development, and with fast implementation of queries. The transfer was carried out and completely tested without the external agencies being aware of the change and without interruption to our access procedures.

Text Based Data Retrieval System 'drs'

Access to all these data, with the exception of Cordon Count data, can be extracted using either the text screen displayed in a normal login to our system or with a web browser. The text based data retrieval system (drs) was rewritten for the new data base system but operates in exactly the same manner as the previous version. Users familiar with drs do not detect any difference, except that queries are somewhat faster.

Staff at the Data Management Group and frequent users of the EMME/2 software use this text based data extraction method extensively with the aid of a data guide[2]. The method of initializing an EMME/2 session requires a text screen, which is appropriate for drs, and the files are conveniently stored in their home directory. The following is a summary of the use of drs during the calendar year 1999.

2 *1996 Transportation Tomorrow Survey: Data Guide Version 2.1, Report 60, Joint Program in Transportation (August 1997), available at <http://www.jpint.utoronto.ca>*

Summary of Text Based 'drs' Data Requests

Month	Number of Data Queries	Number of Sessions
January	79	32
February	143	47
March	286	67
April	128	28
May	86	23
June	72	13
July	74	26
August	114	18
September	124	32
October	85	31
November	67	23
December	48	13
Total	**1305**	**353**

Text Based 'drs' Users

City of Mississauga
City of Toronto
Data Management Group
GO Transit
IBI Consulting Group*
McCormick Rankin*
Ministry of Transportation, Ontario
Regional Municipality of Durham
Regional Municipality of Halton
Regional Municipality of Hamilton-Wentworth
Regional Municipality of Peel
Regional Municipality of York
Ryerson Polytechnic University
Toronto Transit Commission
Totten Simms Hubicki Associates*
University of Toronto
(*access permission granted by a funding agency)

Internet Browser Data Retrieval System (iDRS)

Development of the data retrieval system using a web browser (iDRS) began in 1998 and was made fully functional in 1999. A complete description of the iDRS is contained in the Data Management Group's 1998 Annual Report.[3] After extensive testing in-house, the final version was released to the funding agencies in June 1999.

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3 *Data Management Group Annual Report 1998, Report 81, Joint Program in Transportation (May 1999), available at <http://www.jpint.utoronto.ca>*

Security is maintained with password protection. Late in the year, the Transportation Research and Data Management Group (TRADMAG) approved access to iDRS by consultants working on publicly funded transportation planning projects. Consultants are given access with approval by one of the funding agencies for a restricted period of time, depending on the duration of the project.

The following is a summary of the use of iDRS during the calendar year 1999.

Summary of Browser Based 'iDRS' Data Requests

Month	Number of Data Queries	Number of Sessions
June	5	3
July	0	0
August	3	2
September	53	22
October	310	75
November	132	43
December	33	15
Total	**536**	**160**

Browser Based 'iDRS' Users

City of Toronto
Data Management Group
Regional Municipality of Peel
Regional Municipality of York
Ryerson Polytechnic University
Toronto Transit Commission
UMA Engineering Ltd.*
(*access permission granted by a funding agency)

Complex Data Requests

The interactive procedures available on drs and iDRS satisfy the majority of data needs. However, some data needs are too complex and require an analyst to formulate a custom query from the data base. In addition, the Data Management Group's staff can often help define the most relevant data for the problem at hand. There were 39 such requests for data in 1999. In addition, a small number of private firms ask for information. These request are processed on a cost recovery basis. There were 4 such requests in 1999. Brief descriptions of all these special data requests are contained in Appendix A.

Cordon Count Data Retrieval System (CCDRS)

The collective results from a regular program of detailed traffic counts undertaken over several years by various Regional Governments in the Greater Toronto Area on the road and transit system are a rich source of valuable data for a wide range of transportation planning projects. Preliminary testing of the CCDRS in 1998 showed considerable promise to all funding agencies. CCDRS was made fully functional in 1999. A complete description of the CCDRS is contained in the Data Management Group's 1998 Annual Report (op. cit.).

The Data Management Group assembled all such traffic counts for the years prior to 1998 in the file formats maintained by the Regional Governments. The DMG then prepared a common data base structure for the entire compilation. After the Regional Governments checked the results of their 1998 count program, the results were added to the rest of the file and a complete data set was available in October of 1999. A preliminary version, without the complete set of 1998 counts, was made available to participating agencies in May 1999. The complete data set contains detailed information from 38 cordon count programs from five Regional Municipalities spanning the time period from 1975 to 1998. The following is a summary of the use of CCDRS from when the preliminary version became available.

Summary of CCDRS Data Requests

Month	Number of Data Queries	Number of Sessions
May	8	5
June	33	15
July	35	16
August	13	12
September	17	8
October	173	25
November	82	10
December	50	17
Total	**411**	**108**

CCDRS Users in 1999

City of Toronto
Data Management Group
Ministry of Transportation, Ontario
Regional Municipality of Durham
Regional Municipality of Halton
Regional Municipality of Peel
Regional Municipality of York
Toronto Transit Commission

EMME/2 TECHNICAL SUPPORT

A majority of the funding agencies and several local governments, in addition to consultants working for these agencies, share the operation of the EMME/2 simulation package on the Data Management Group's computer system. During the calendar year 1999, the DMG provided technical assistance to these users as required and undertook an experiment in broadening the support to technical advise on travel forecasting.

Technical Assistance and Network Support

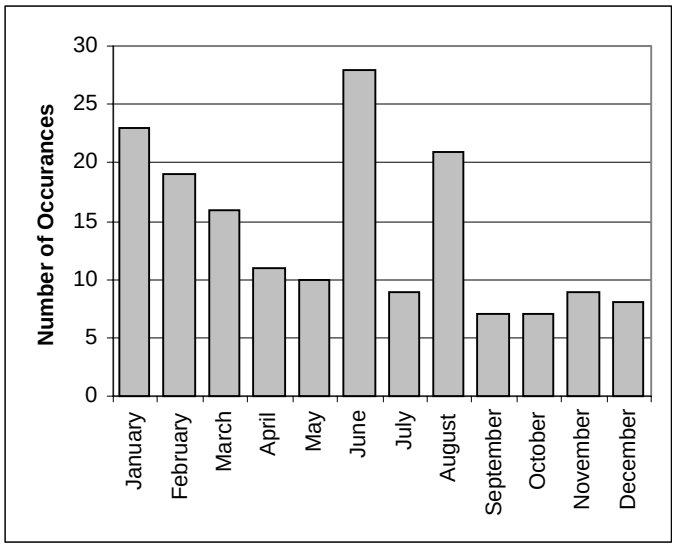
The following are a set of tasks undertaken by the technical staff at the Data Management Group where each was considered to have potential interest to a collection of EMME/2 users.

- prepare an equivalence table for zones external to the GTA (including Hamilton-Wentworth) to link TTS data to an EMME/2 network and assist in the creation of a simplified network in these external areas,
- aggregate the 1996 integrated network to a level of detail that is compatible with planning districts, which correspond to local governments in the areas outside the City of Toronto,
- prepare the necessary files using annotation sets and user data fields to import street names and road numbers into the network representation,
- encode, test and check a representation of high occupancy vehicle (HOV) lanes into the 1996 integrated network,
- add Highway 407 to the representation on a 1996 network to facilitate testing of scenarios with and without this new highway,
- prepare modifications to the network to better represent the actual geometry of interchanges,
- implement disaggregate assignments of transit trips on the integrated 1996 network and compare the impact of parameter changes on the assignment results,
- assist users in conversion to Release 9.2,
- assist users in the development of macros and the conversion of existing macros into Release 9.2,
- preliminary experimentation with the LINUX environment.

Technical support falls into two broad categories. Support that is of short duration taking approximately one hour or less, and support of a substantial

nature that requires several hours. Records are not maintained for short duration support as the act of recording is thought to be too time consuming. However, in 1999 there were 168 instances of support that was considered to be of a substantial nature. The following is a brief summary of the source of these requests for technical support and a distribution over the year.

Source	Number
Funding Agencies	118
Local Municipalities	4
Research U of T	25
Research - other	8
Consultants	13



Technical Advise on Travel Forecasting

Starting in March 1999, the Data Management Group undertook a one year experiment on the feasibility of expanding the technical support available at the DMG to include the operation and application of computer simulation models. The support at DMG includes answering EMME/2 and system inquires but not hands on assistance with EMME/2 projects. The level of this basic DMG support was not to be altered during this initiative. The initiative was to work with participating agencies to assist them with their modelling initiatives, without agency cost. The additional cost was included in the funding available through the 1996 TTS New Initiatives described in the 1998 Annual Report (op.cit.). Additional costs consisted of supplementing the existing DMG staff with technical staff familiar with EMME/2 and the available forecasting procedures.

Coordination of the needs of the participating agencies in travel forecasting and the resources available to the experiment was carried out by an ad-hoc committee reporting to TRADMAG called the GTA Modelling Group. The GTA Modelling Group will evaluate the experiment in March 2000 and make recommendations on whether an expanded role for the DMG in support of EMME/2 activities is desirable.

COMPUTER SYSTEM SUPPORT

The role of the Data Management Group in information processing and technical support of EMME/2 is made possible by the sharing of a central computing resource at the offices of the DMG. The success of such a concept is dependent on three important conditions; a fast and reliable method to access the central system, ease of use, and a level of computing service that is consistent with current technology. Technical support staff at the DMG use these principles to solve problems on a daily basis and as a guide to system improvement. As much as possible, reliable computer system access is provided every day of the week for 24 hours a day.

Access to Computing Services

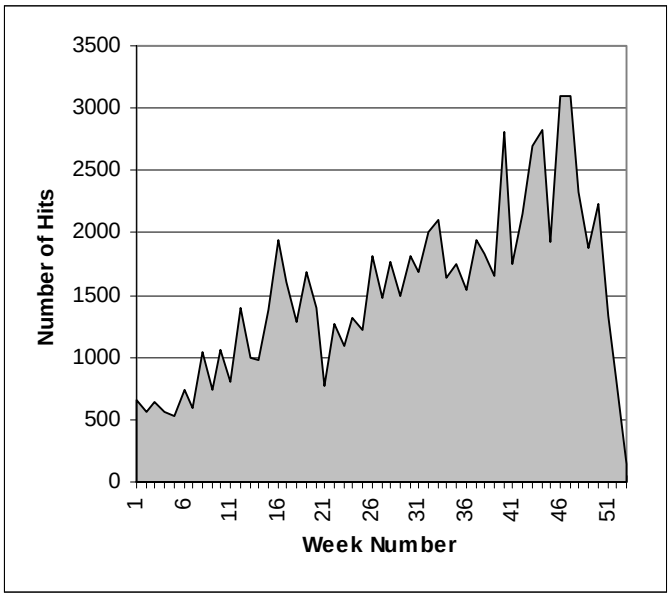
Access to computing services at the Data Management Group is currently provided in one of two ways. The first method, and the one used for the longest period of time, is by modem through a conventional telephone line. The second method is through an internet connection. During 1999, the support for modem connections was changed significantly in an effort to provide better service. The conventional telephone lines were replaced with a series of digital telephone lines (ISDN). In this way, new modems that support the new V.90 protocol can connect at a much faster speed than was possible previously. This enhanced speed is available over a conventional telephone line. The new bank of ISDN telephone lines provides the potential for a cost effective upgrade to the data line now serving the offices of the Ministry of Transportation. The telephone lines are now configured in a 'hunt group' that allocates the next available telephone line to an incoming call. Early indications are that this dynamic allocation of telephone lines can significantly reduce the number of lines required from the original 22 to approximately 8 or 10.

Access by the internet grew significantly during the year as more and more offices activated internet service to their technical staff. The service is usually comparable to a direct telephone connection, and in some instances faster. This trend has the benefit of reducing the load on the bank of telephone lines but raises questions about system security. As reported in the 1998 Annual Report (op.cit.), attempts to break into the system continues to be a problem. The Data Management Group is continually upgrading the system security including the implementation of a secure shell (SSH) for access. The required software is provided without charge by the DMG and operates in a very similar manner to the more familiar telnet remote access procedure. Only with a secure shell the entire session is encrypted to prevent another party from viewing or recording any part of the session. An added advantage is an easy to use download feature using the Zmodem protocol, which allows rapid downloading of files from the DMG computer system to user's local computer.

Web Site Development

The technical staff are jointly developing a web site that satisfies a combination of needs. The web site is now the first entry to iDRS and CCDRS described earlier in this report. This entry is through a secure portion of the site and requires a login name and password. This allows appropriate access restrictions to valuable data bases. The site also describes the procedures necessary to gain access. In addition, this secure portion of the web site contains software that members of the funding agencies can use, such as the secure shell mentioned above.

The unsecure portion of the site at <http://www.jpint.utoronto.ca> contains general information including a set of summaries of the 1986, 1991 and 1996 Transportation Tomorrow Surveys. This portion of the site also provides access to a list of all reports including electronic files of all recent reports in a form



that can be easily downloaded and printed locally. One rough measure of the effectiveness of the web site is the number of times that users attempt to see a page on the site. Every attempt to read a page is recorded as a hit. The number of hits on pages of the unsecure site was approximately 60,000 and the corresponding number on the secure site was approximately 20,000. The 80,000 recorded hits came from 5376 different computer systems. The distribution of activity was uneven over the year. The graph above indicates the number of hits per week for every week of the year. The activity reflects a busy time near the end of the year but also reflects the continuing enhancement of the site and a growing familiarity with the value of the content.

2001 TRANSPORTATION TOMORROW SURVEY

The Data Management Group's experience in technical development and administration of the 1991 and 1996 Transportation Tomorrow Surveys has been applied to advanced planning for a proposed 2001 survey. During 1999 the staff of the DMG assisted with the development of a survey strategy for the 2001 TTS. The net result was approval to proceed with detailed planning for a 2001 TTS very similar to the survey conducted in 1996. All agencies (see 1995 Annual Report, op.cit), with the exception of the Regional Municipality of Waterloo have agreed to participate.

The final decision to proceed with a 2001 TTS was taken in 1999 by the Transportation Information Steering Committee (TISC, formerly TATPDCSC) and the administrative structure of the survey was approved. The responsibility for all policy and funding matters are to rest with TISC. The committee delegated the technical responsibility to a Transportation Tomorrow Survey Technical Committee with representation from all participating agencies, and gave management responsibility to a Management Team associated with the Data Management Group. The technical committee will meet for the first time in early 2000.

UNIVERSITY RESEARCH

A portion of the funding provided to the DMG is allocated to unspecified research on topics related to urban transportation. In addition to these funds, the very research nature of the DMG's activities is conducive to the development of other research projects, some of which receive funding from other sources. The research support that is made possible by the existence of the DMG include; access to the data bases, access to the EMME/2 network and modelling system, access to software (ArcInfo, Oracle, SAS, etc.), and technical support in the use of these data and software. At least 11 such research projects of this nature were undertaken in 1999 and 8 technical papers published. Listed below is a sample of some of the research projects with direct relevance to the participating agencies.

Alvarado, G., Conical Travel Time Functions for the GTA Road Network, M.A.Sc. (Toronto)

Popadynick, D., Testing Assignment Efficiency Using Conical Functions on the GTA Network,. B.A.Sc. (Toronto)

Wong, R., Historical GTA Transportation Network Modelling Using EMME/2, B.A.Sc. (Toronto)

Peiravian, F., Road Network Modelling for Environmental Impact Analysis, Ph.D. (in progress Toronto)

Miller, E. and A. Shalaby, Travel in the Greater Toronto Area: Past and Current Behaviour and Relation to Urban Form, for the Neptis Foundation

Pawlowski, L., Relationship Between Travel Demand and Occupation Type, B.Eng. (Ryerson)

APPENDIX A DATA REQUESTS

Data Requests Summarized by Agency

In addition to the data requests that are served directly through the on-line interactive TTS Data Retrieval System (DRS), the DMG staff processed the following requests. The diversity of the requests illustrates the robust nature of the Transportation Tomorrow Survey Data sets as currently housed at the DMG.

Participating Agencies

January

1996 TTS home to work trips originated from or destined to Uxbridge, broken down by trip end and travel mode, for Read, Voorhees and Associates Ltd. on behalf of the Region of Durham.

Region of York requested 1996 TTS trip matrices, broken down by start time, travel mode and trip purpose.

Region of Durham requested PM peak period trips originating from the region using the 1996 TTS data base, broken down by trip purpose.

February

Total population and population cohorts were requested for the City of Toronto, Durham, Halton, Hamilton-Wentworth, Peel and York Regions, by the Region of York.

March

1996 TTS trip matrices, broken down by trip purpose, travel mode and time period, were requested by McCormick Rankin Corporation for the Development Charges Study in the Region of Peel.

Region of Hamilton-Wentworth requested average straight line distance for trips made in all regions in the GTA from the 1986, 1991 and 1996 TTS databases.

Average straight line trip distance for home to work trips made from/to/within a specified area was requested by the City of Toronto Planning Department.

1996 TTS auto driver trips for the cities of Mississauga and Brampton and Peel Region, were requested by McCormick Rankin Corporation for the Development Charges Study in the Region of Peel. In addition, local transit trips made from/to/within these area were also requested.

1989, 1991 and 1996 cordon counts for trucks and all vehicles in Durham Region were provided to Trimap Communications Inc. for Durham's internal studies.

1993, 1995 and 1998 cordon count data for Peel Region for five time periods were requested by Region of Peel.

APPENDIX A DATA REQUESTS (continued)

April

Total number of transit trips made by each transit operator were requested by the City of Toronto Planning Department.

Giffels Associates Ltd. requested total population and vehicular trips from 1996 TTS for a project with the Town of Whitchurch-Stouffville.

1996 TTS origin-destination matrices for all purpose and work trips, broken down by travel mode, were requested by the Region of York.

Population, population over 16 of age, distribution of household type, and number of available vehicles were extracted from 1986, 1991 and 1996 TTS at zone level. The data were provided to BA Consulting Group Ltd. for the Town of Oakville Parking Study.

May

All GO Rail and GO Bus survey data on the DMG computer system were requested in comma-limited format by GO Transit.

June

Region of Durham requested EMME/2 plots of the Durham model with traffic volume in the Town of Whitby for DS Lea Consultants.

Region of Peel requested the 1996 GTA zone map of the Town of Orangeville.

1996 TTS AM peak period and 24-hour home-to-work transit trips from all regions in the GTA, with York Region broken down into local municipalities, to the City of Vaughan, and vice versa, were requested by Region of York. In addition, subway trips with auto access from Vaughan to all regions were extracted for both time periods.

July

Mean trip lengths made by residents of City of Toronto, Durham, Halton, Hamilton-Wentworth, Peel, and York Regions were requested by City of Toronto Planning Department, broken down by trip purpose and travel mode.

August

1986 TTS household coordinates, household sizes and expansion factors were requested by the City of Toronto for the evaluation of Vertical Mapper in MapInfo.

Auto trip records that were made from/to Planning District 15 during the AM peak period were requested by TTC.

September

1996 TTS trip matrices broken down by trip purpose and travel mode between 8:00 a.m. to 9:00 a.m. were requested by the Region of Hamilton-Wentworth.

Region of Hamilton-Wentworth requested 1996 TTS trip matrices broken down by trip purpose and travel mode between 8:00 a.m. to 8:59 a.m.

APPENDIX A DATA REQUESTS (continued)

Distribution of households in the 905 area of the GTA that made at least one trip to the City of Toronto, broken down by planning district, was requested by TTC.

October

1996 TTS a.m. peak period trip matrices from or to Simcoe County broken down by travel mode and trip purpose were requested by Entra Consultants Inc. for the Master Servicing Study for the Towns of Bradford and West Gwillimbury.

1996 TTS employed person records were requested by Professor Eric Miller for the development of the GTA model.

November

A.M. and P.M. peak period station counts along Steeles Ave., between Weston Rd. and Dufferin St., were requested by Cansult Ltd. for the rapid transit study for the City of Vaughan. In addition, the GO rail occupancy counts for the Bradford line were also requested.

A.M. peak period trips made to downtown core broken down by travel mode from the 1986, 1991 and 1996 TTS database were requested by TTC.

December

UTM coordinates and simulated auto times and distances from some specified GO rail stations to Union Station using 1996 TTS data and network were provided to GO Transit.

City of Toronto requested 1986 and 1996 TTS trips made on TTC and other transit operators for the 24-hour and morning peak periods.

GO Transit requested the simulated automotive travel times and distances between Union Station and eight specified GO stations.

1996 TTS trip matrices in the morning peak period broken down by planning district and travel mode were requested by IBI Group for the project “Transportation Funding Opportunities Study” undertaken by the Regions of Durham, Halton, Hamilton-Wentworth, Peel, Toronto and York, and GO Transit.

University Research

Trevor Fleck from the Department of Environmental Studies requested the number of people who drove to work in the City of Toronto and the percentage of them who had free parking broken down by wards for his undergraduate course work. In addition, he requested the modal split for the work trips in the City of Toronto.

Duad Kamal, masters’ student in civil engineering at the University of Toronto requested the cordon count data from three Toronto stations for his HOV analysis with Professor Abdulhai.

APPENDIX A DATA REQUESTS (continued)

Household, person and trip information was requested by Professor Pierre Filion from the University of Waterloo for the areas of Bramalea, Parkdale and Newmarket. The data were used in the GTA Suburban Downtown Study. In addition, number of households, population, number of trips and total trip distances made by residents of the GTA were requested at traffic zone level.

Hanna Maoh of McMaster University requested the household and person information in the Hamilton-Wentworth Region from the 1991 TTS for his masters' thesis. He also requested an origin-destination work trip matrix during the morning peak period.

Private

BA Consulting Group Ltd. requested six trip matrices aggregated at planning district level from the 1996 TTS database. These matrices consisted of trips made during different time periods by different travel modes.

J.C. Williams Group Ltd. requested the downtown work trips broken down by travel mode, age and gender of persons for the a.m. peak period and 24-hour from the 1996 TTS data.

iTRANS Consulting requested 1996 TTS auto driver work trip matrices for five time periods at planning district level, with special aggregation in Brampton, Mississauga, and Vaughan.

Total number of trips originated from or destined to Mississauga, Brampton and Caledon broken down by time periods and trip purpose were extracted from the 1996 TTS for BA Consulting Group Ltd.

Miscellaneous Data Requests

1996 TTS a.m. peak period auto driver and transit trip matrices, broken down by trip purpose, were requested by Entra Consultants Inc. The data were used in the Master Servicing Study of the Towns of Bradford and West Gwillimbury for Simcoe County.

City of Peterborough requested population, employed labour force, employment, trip matrices by trip purpose, travel mode and time period from the 1996 TTS for a specified zone aggregation.

Origin-destination information was geocoded and provided to Tranplan Associates for the Greater Toronto Airports Authority taxi/limousine survey through the Region of Peel.