UNIVERSITY OF TORONTO
FACULTY OF APPLIED SCIENCE & ENGINEERING
Transportation Research Institute

datamanagementgroup

2024

Data Management Group

Annual Report

Prepared by:

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INTRODUCTION

The Data Management Group (DMG) was established in 1988 based on a proposal from the University of Toronto's Joint Program in Transportation for an autonomous research group with the following objectives:

(a) to establish a common, centrally accessible database containing information on transportation activities, zone systems, transportation networks, and land use activity,
(b) to provide a transportation data retrieval service to the participating agencies,
(c) to monitor the adequacy of available data and propose approaches for adding to or updating the data as mutually agreed upon by the agencies,
(d) to promote greater interaction between university researchers and practitioners in the field of urban transportation planning,
(e) to promote the communication of transportation information and data obtained or administered by the Data Management Group to interested agencies and the public, and
(f) to further the improvement of transportation demand analysis, research, and forecasting in the Greater Toronto Area.

Although the group's administration has changed and DMG is now a part of the University of Toronto Transportation Research Institute (UTTRI), under the Department of Civil and Mineral Engineering at the University of Toronto, DMG continues to be guided by these objectives into its 36th year of continuous operation.

Program approval and funding of DMG is the collective responsibility of members of the Transportation Information Steering Committee (TISC) with the following membership:

City of Hamilton
City of Toronto
Metrolinx
Ministry of Transportation, Ontario (MTO)
Regional Municipality of Durham
Regional Municipality of Halton
Regional Municipality of Peel
Regional Municipality of York
Toronto Transit Commission (TTC)

Each participating agency appoints a member of its 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.

This report provides a brief profile of the staff employed and a description of the activities undertaken by DMG during the calendar year 2024. These are presented in the following sections:

1. Staff and Location
2. Transportation Tomorrow Survey
3. Information Processing
4. Computer Resources and Technical Support
5. Work Plan
6. Budget and Contributions
7. Meetings

STAFF AND LOCATION

Research Director

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TRANSPORTATION TOMORROW SURVEY

Under the guidance of TISC, a series of urban travel surveys, the Transportation Tomorrow Survey (TTS), has been conducted every five years since 1986. DMG managed the surveys from 1991 to 2011. Since 2016, the Ministry of Transportation has engaged consultants through the Ontario government tendering process to conduct the TTS on behalf of the funding partners.

The 2022 TTS was originally scheduled for the fall of 2021 and the spring of 2022. However, due to renewed outbreaks of new strains of COVID-19, which impacted Ontario's reopening plans, the data collection periods were postponed. The first phase of the survey took place from September 12, 2022, to December 19, 2022, while the second phase was conducted from April 12, 2023, to July 28, 2023.

The 2022 TTS was jointly undertaken by 25 funding agencies, including the Ministry of Transportation, Metrolinx, the TTC and various municipalities across the Greater Golden Horseshoe and surrounding areas. The survey also expanded its coverage area to include Northumberland County, the Town of Blue Mountains, and Grey County. Similar to the 2016 TTS, DMG has taken on an advisory role and is part of the Technical Advisory Committee (TAC). This committee oversees the technical aspects of the survey and provides guidance to the consultant.

Before data collection, a pilot test was conducted to assess the impact of COVID-19 and the changes made to the questionnaire on response rates. The results were evaluated by DMG and TAC to refine the survey instrument aiming to enhance survey efficiency, reduce respondents' burden, and increase the response rate. However, the response rates from the first phase were lower than those observed during the pilot test. To address this, several mitigation strategies were proposed by the consultant, including revising the invitation letter and utilizing social media. Some of these strategies were implemented in the second phase.

DMG collaborated with survey partners to assist the consultant in the essential post-survey processing and validation of the data collected. This involved thorough communication and coordination to ensure that all information provided for validation purposes was accurate and comprehensive. In order to address the underrepresentation of certain populations, the consultant presented several weighting options, including adjustments for transit usage and labour force, for DMG and TAC to consider. After careful evaluation, one option was selected and implemented, and a set of expansion factors was created.

Along with evaluating various weighting options, DMG carefully examined multiple versions of the data sets to confirm that the data were accurately coded and consistent with those from previous surveys. The preliminary data set was released to the technical committee in August for review, and the final data set was officially released to public on December 13, 2024. As with prior surveys, a collection of reports accompanied the data release. The Design and Conduct of the Survey report, the Data Guide,

and the Lessons Learned report were provided by the consultant for DMG review and were available at the time of the data release. DMG will continue to collaborate with the consultant in the production of the remaining reports, which are anticipated to be released in early 2025. Further details regarding the 2022 TTS can be found in the respective reports, which will be published on the DMG website.

TTS Modernization Initiatives

The TTS has employed similar methodologies over the past three decades, and the 2022 TTS encountered numerous challenges. Although the TTS 2.0 research project explored alternative methods for collecting transportation data, the recommendations presented in the final report were not implemented in the 2022 TTS. This was due to various reasons, including limited time for field tests caused by the COVID-19 pandemic.

In 2024, a new initiative was launched by TISC to modernize data collection. Led by MTO, this project aims to enhance TTS, making it more efficient in capturing transportation data within the Greater Golden Horseshoe area. The improvements will focus on better data collection methods, increased respondent engagement, and ensuring the survey remains relevant and valuable. The ultimate goal of this project is to create a comprehensive roadmap for the next TTS.

As part of technical advisory committee, DMG was involved in the procurement process, which included developing the request for proposals document and evaluation criteria, as well as participating in the vendor selection process. Once the consultant was chosen, DMG collaborated with them to provide essential information and insights regarding previous TTS cycles and TTS 2.0. DMG has also been reviewing versions of key deliverables throughout the process. The initial target end date of the project was set to December 31, 2024, but it has been extended to March 31, 2025.

INFORMATION PROCESSING

The term 'information processing' is used in this instance to describe activities supporting the management, storage, and distribution of urban travel information. The principal components of this information are the results of the Transportation Tomorrow Surveys and a collection of all Cordon Count Surveys.

Transportation Tomorrow Surveys and iDRS

DMG manages the urban travel data files from all Transportation Tomorrow Surveys (TTS) conducted from 1986 to 2022. These data files are organized in relational databases and can be accessed using various access methods. Direct access to the original files containing coordinates is restricted to DMG staff to protect household anonymity. Currently, the data files available to users include the following information:

TTS Number of records

Year	Households	Persons	All Trips	Transit Detail
1986	61,453	171,086	370,248	56,615
1991	24,507	72,496	157,349	14,896
1996	115,193	312,781	657,971	70,295
2001	136,379	374,182	817,744	85,095
2006	149,631	401,653	864,348	87,244
2011	159,157	410,404	858,848	86,703
2016	162,708	395,885	798,093	91,437
2022	158,662	366,172	759,736	55,261

There are many factors that affect the size of the databases, including the survey coverage, sampling rate as well as the growth in travel in the area.

The first text-based data retrieval system (DRS) was developed in the mid-1990s by the staff of DMG as the original method for external users to gain access to the data files and complete the data extraction themselves. This retrieval system was very effective when a modem was used as the principal remote access method to DMG's computer system. Over the years, as the demand for travel data grew and the Internet became the preferred remote access method, a data retrieval system specifically designed for Internet access was developed (iDRS). All the features of DRS were incorporated into the browser-based iDRS, and the DRS process was phased out.

The initial release of iDRS was restricted to use by the funding agencies. In 2002, access to iDRS was made available to any individual who requested it. The individual was required to sign an agreement

form, and system security was maintained by giving each user a unique login and password. This procedure has the added benefit that agencies outside the Greater Toronto and Hamilton Area participating in the Transportation Tomorrow Surveys could access their data without setting up their database system.

In order to meet changing data management needs, DMG developed a new version of iDRS. The software was rewritten to incorporate a new database management system, PostgreSQL, which was part of the survey software used in the 2006 and 2011 TTS. Several new functions have been added, such as additional filter criteria and the ability to store the query for future use. In addition, the speed of extraction has increased dramatically. A new authorization process has also been implemented. The process has been automated so that any individual can request access by entering their name, affiliation, email address, and contact number online. Once the information is submitted, it will be approved by DMG staff, and an email with the credentials will be sent to the new user.

The current version of the iDRS was officially released in 2016. It has been undergoing continuous updates by DMG, and the 2022 TTS data has been incorporated.

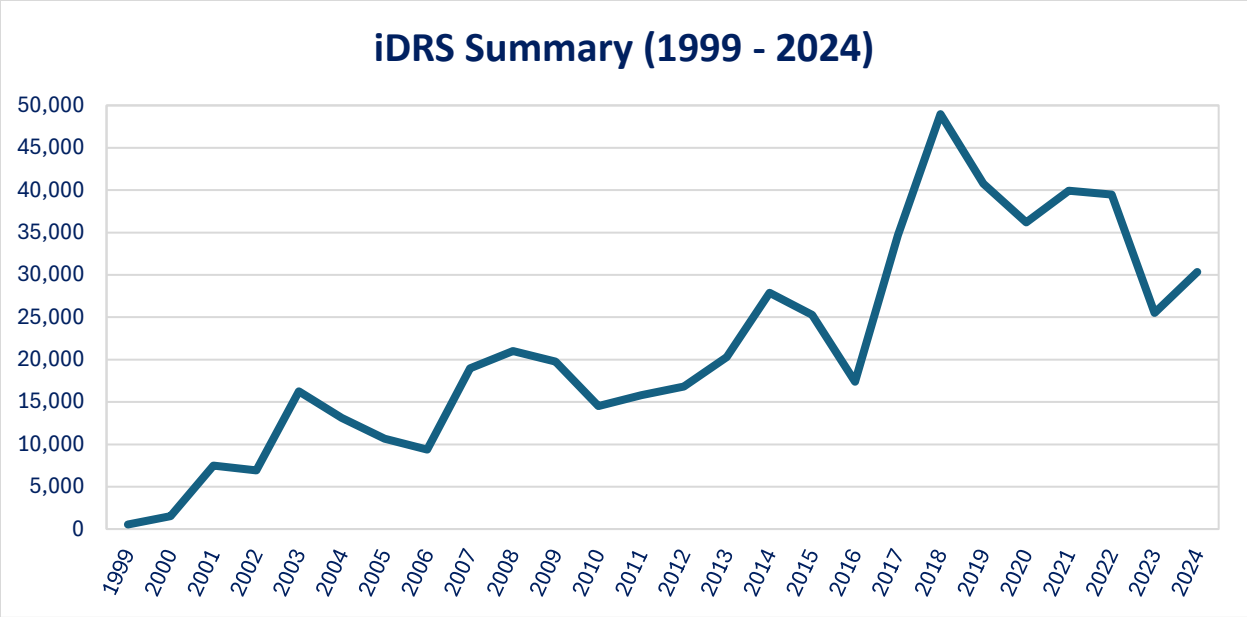
The redevelopment of a new data retrieval system began in 2024, and it is expected to be in production in 2025.

Summary of iDRS Data Requests

The browser-based data extraction procedure, iDRS, was first introduced in 1999 for registered users of DMG's computer system. The initial reception of iDRS demonstrated positive engagement among users. In late 2000, the Steering Committee authorized the expansion of access to any registered individual who provided relevant information including their affiliation. The growing popularity of TTS data is evident in the rising number of iDRS data extractions.

The following chart illustrates the growth trajectory since the introduction of iDRS in 1999. The 'Number of Queries' reflects the frequency of output generated within a session. Notably, iDRS usage reached its peak in the year following the release of new TTS datasets in 2002, 2007, 2014[1] and 2018[2]. The 2022 TTS dataset was released in mid-December; therefore, any subsequent increase in usage will not be captured in the data at this time.

[1] The interview phase of the 2011 TTS completed in December 2012 and the final data set was released in November 2013.
[2] The interview phase of the 2016 TTS was completed in December 2016 and the final data was released in October 2017.



After peaking in 2018 when the 2016 TTS data was released, the number of queries completed has decreased but still remained at a very high level showing that the data tool is still very highly used today. This downturn in queries can be seen to consistently occur as the time since the last survey increases. It is expected that system queries will rise again in 2025 as the 2022 TTS data was released in December 2024.

The following table shows the monthly summaries since the release of the 2016 TTS data. In 2024, out of the 30,345 quires, 17% were generated by DMG's funding partners and 21% were generated by academics, while the remaining queries were generated by individuals affiliated with other organizations including local municipalities and transportation consultants.

	Year					
Month	2019	2020	2021	2022	2023	2024
January	3,778	3,203	4,206	2,009	1,864	2,425
February	4,098	3,286	2,399	1,822	2,053	1,845
March	4,296	4,953	2,683	2,738	3,432	2,894
April	2,946	5,583	2,281	2,306	2,016	2,570
May	4,209	2,588	2,169	2,463	2,391	4,143
June	3,575	2,026	2,608	3,658	2,206	2,746
July	3,554	2,210	3,373	13,028	2,033	2,788
August	3,205	1,956	5,540	2,549	1,750	2,065
September	2,461	2,389	5,223	2,493	1,923	1,787
October	3,360	2,360	3,163	2,528	1,703	2,248
November	3,149	3,577	4,037	2,732	2,871	2,909
December	2,143	2,069	2,262	1,145	1,257	1,925
Total	40,774	36,200	39,944	39,471	25,499	30,345

Affiliations of iDRS Users in 2024

The following is the list of 94 different agencies and groups that extracted data through iDRS in 2024, demonstrating the wide usage of the data across public, private and academic sectors.

407 ETR
ACCESS Planning
AECOM
Arcadis
Arup Group
Associated Engineering
Asurza Engineers Ltd.
BA Consulting Group Ltd.
Baxter Analytics
Boston Consulting Group
C.C. Tatham and Associates
C.F. Crozier & Associates Inc.
CGH Transportation Inc.
C&M Associates Inc.
CIMA Canada Inc.
CPCS Transcom Ltd.
Candevcon Limited
Carleton University
City of Brampton
City of Guelph
City of Hamilton
City of Kitchener
City of London
City of Markham
City of Mississauga
City of Peterborough
City of Richmond Hill
City of Toronto
City of Vaughan
Concordia University
David Kriger Consultants Inc.
Dillon Consulting Ltd.
Dunsky Energy + Climate Advisors
Egis Group
EXP Services Inc.
Gannett Fleming Inc.
GHD Group
Hatch Ltd.
Ministry of Transportation
Mohawk College
N Engineering Inc.
Nextrans Consulting Engineers
Novatech Engineering Consultants
Ontario Professional Planners Institute
PB World Consulting
Paradigm Transportation Solutions Ltd.
Parsons Corporation
Quinta Internation Group
Queen's University
R V Anderson Associates Ltd.
Regional Municipality of Durham
Regional Municipality of Halton
Regional Municipality of Peel
Regional Municipality of Waterloo
Regional Municipality of York
RJ Burnside & Associates Ltd.
SDG World
Salvini Consulting Inc.
Scotiabank Canada
Seneca Polytechnic
Sharif University of Technology
Shenzhen University
Stantec Consulting Inc.
Steer Group
T.Y. Lin International Group
Tatham Engineering Ltd.
The Municipal Infrastructure Group Ltd.
The Record
The Star
Toronto Metropolitan University
Toronto Transit Commission
TraffMobility Engineering Inc.
Tranplan Associates
Trans-Plan Transportation Inc.
Tri-Cities Transport Action Group
University of Alberta

HBA Specto Inc.
HDR Inc.
HFR Project
Jacobs Engineering Group
JD Engineering
LEA Consulting Ltd.
McGill University
McMaster University
Metrolinx
University of Calgary
University of French Ontario
University of Toronto
University of Waterloo
Urban SDK Inc.
Urban Systems
WPE Engineering Ltd.
WSP Group Ltd.
York University

Special Data Requests

The interactive procedures available with iDRS satisfy the majority of data needs. However, some data needs are too complex and require the intervention of an experienced analyst to formulate a custom query from the database. In addition, DMG staff can often help define the most relevant data for the problem. One of the typical data requests involves assigning the coordinates of households or trip ends to a specified spatial aggregation, different from the predefined traffic zone systems, as these coordinates are not available to any non-DMG staff in order to protect the privacy of the survey respondents. The list of agencies and details on some of the special data requests completed in 2024 is:

City of Toronto

2011 TTS auto and transit origin-destination matrices during morning peak period at 2022 traffic zone level.

2022 traffic zone centroids for the Greater Toronto and Hamilton Area were created based on the 2016 TTS trip ends as the 2022 TTS data were not available at the time of the request.

2016 TTS cycling trip matrix at Statistics Canada's dissemination area level.

2016 TTS transit trip data for trips accessing the Stouffville GO-rail line

City of Barrie

Assignment of the 2022 TTS data to the 2024 Barrie zone system.

Ministry of Transportation, Ontario

Assignment of the 2016 TTS data to the revised GGHM V5 zone system.

Toronto Metropolitan University

2016 Household-destination matrices for the work trips made by Households in Toronto Statistics Canada's dissemination area level

University of Toronto

2022 TTS mode share at Statistics Canada's dissemination area level.

Disaggregate Data Access

An increasing number of transportation-related projects require access to disaggregate data for modelling work. With approval from TISC in 2017, DMG developed and implemented a new data access protocol for researchers and consultants working on projects on behalf of DMG's funding partners. This protocol allows DMG to maintain security over the disaggregated data.

Potential users must fill out a request form outlining the specific data required, the project and its sponsor, and the time frame for access. If the request is approved, an account is set up, and the users are given login instructions and a unique login and password to access their required datasets on a virtual machine. The datasets provided do not include any coordinates, and all locations are coded to a higher-level geographic area, i.e., traffic zones, Census dissemination areas, planning districts, etc. Some datasets provided require additional processing, similar to those mentioned in the special data request section.

The server is set up so the user can work on the datasets in the account via Remote Desktop Protocol (RDP). However, internet access is not allowed, and data cannot be directly copied from the server. Only aggregate data is allowed off the system, and any data files required to be downloaded must be reviewed and approved by DMG personnel, who will then allow the download of the data from an FTP location. DMG has committed to review and forward the requested data within one business day.

Below is a list of the users of disaggregate data access in 2024 via the RDP method:

User	Agency	Data required	Project
Internal Staff	MTO	2022 TTS	Analyzing TTS data
Internal Staff	Metrolinx	2016 TTS	Examination of transit records in support of COVID scenario planning
Internal Staff	Region of Peel	2011, 2016 & 2022 TTS	Reviewing TTS data
WSP	City of Toronto	2006, 2011, 2016 & 2022 TTS	North York Secondary Plan Study
WSP	City of Barrie	2011, 2016 & 2022 TTS	Developing a new activity-based model for the City of Barrie Transportation Master Plan
Dept. of Earth, Energy & Environment	University of Calgary	2016 & 2022 TTS	Use car commuting patterns in Toronto and nearby metropolitan areas to understand grid requirements assuming a high rate of adoption of EVs

User	Agency	Data required	Project
School of Earth, Environment & Society	McMaster University	1986, 1991, 1996, 2001, 2006, 2011, 2016 & 2022 TTS	Exploring mobility of care, all the travel needed to fulfil household needs, such as travel to grocery stores, to run errands, or to escort children; Examining the intersectional (gendered and spatial) patterns as well as changes over time.
School of Earth, Environment & Society	McMaster University	2016 & 2022 TTS	As part of a Climate Action and Awareness Fund grant, building a tour-based travel demand model for the Hamilton CMA. Emphasizing public transit and shared forms of mobility. Descriptive and inferential statistics will be estimated, along with discrete-choice models.
Dept. Of Civil & Environmental Engineering	Concordia University	2016 TTS	Modelling the impacts of electric vehicle charging on the grid at different spatio-temporal granularity
Dept. of Systems Design Engineering	University of Waterloo	2016 TTS	Understanding and optimizing charging behaviour for electric vehicle owners; Investigating the implications of different charger access and use based on housing characteristics on large-scale charging strategy to minimize relative greenhouse gas emissions; Investigating potential impacts on greenhouse gas emissions of time-of-day pricing for EV charging.
Dept. of Human Geography	University of Toronto	2016 TTS	Examining how income and transit accessibility interacts with activity participation
Dept. of Civil Engineering	University of Toronto	All TTS	Travel demand modelling research
Dept. of Civil Engineering	University of Toronto	2016 TTS	Development of the Canadian Open Energy Model (CANOE) by calculating electric vehicle hourly charging demand within the TTS survey area

User	Agency	Data required	Project
Dept. of Civil Engineering	University of Toronto	2016 TTS	Development of the HOV model by understanding individual travel behavior in detail to improve the GTAModel.
Dept. of Civil Engineering	University of Toronto	2016 TTS	Investigating the impact of daily activity patterns on household mobility tool ownership.
Dept. of Civil Engineering	University of Toronto	2016 TTS	Examining how income and transit accessibility interact with activity participation, i.e., whether there is a threshold of income-transit accessibility below which activity participation decreases significantly.
Dept. of Civil Engineering	University of Toronto	2016 & 2022 TTS	Analysis of travel behaviour of persons jointly with serve dependents in a household. The serve-dependent activities impact the activity schedule and trip making behaviour of household members.
Dept. of Civil Engineering	University of Toronto	2022 TTS	Investigating social exclusions in the 2022 TTS cycle from a mobility equity perspective.
Dept. of Civil Engineering	University of Toronto	2016 TTS	Estimating the life cycle emissions of housing and neighbourhoods.
Dept. of Civil Engineering	University of Toronto	2016 & 2022 TTS	Analyzing demand for research projects with the City of Mississauga, TTC and iCity2.0.
Dept. of Civil Engineering	University of Toronto	2016 & 2022 TTS	Cycling mode choice analysis by understanding interactions between demographics and mode choice, and the effect of infrastructure on mode choice.

In addition, a virtual machine was designated for the datasets from the three cycles of the COVHITS survey, which had been undertaken by the University of Toronto to study travel trends throughout the pandemic. Funding partners of this survey and their consultants can access and analyze the disaggregated records of the survey the same way as the TTS data.

Cordon Counts and CCDRS

The City of Toronto (then the Regional Municipality of Metropolitan Toronto) began collecting detailed information on the type and volume of traffic crossing selected points on the road system as early as 1975. The counting locations were chosen so that screen lines or cordon lines could be defined, and the counting program has continued regularly since then.

Subsequently, other regions began similar programs. Given the number of areas with a similar program, they began coordinating their count programs and defining a common set of data standards. In 1998, DMG collected these traffic counts in a common database structure and developed a Cordon Count Data Retrieval System (CCDRS). CCDRS is now widely used by a variety of public and private agencies.

In addition, participating agencies now use CCDRS as a tool to verify their cordon count results. The approved procedure is to place new cordon count data directly into the CCDRS database, with a disclaimer notice to all users that the new information is preliminary and allow the agencies to run queries on this preliminary database.

In late 2021, the 2022 Spring Cordon Count program was postponed to Fall 2022. As vendors could only be procured by some regions involved, some of the fall surveys were then pushed back to spring 2023. DMG met with the committee on multiple occasions to coordinate the delivery of the cordon count data for input to the CCDRS. After receiving data for Toronto and Hamilton in 2023, data was provided from the other regions over the course of 2024.

DMG started the development of a new version of the CCDRS tool in 2022, updating both the structure and the programming underlying that system. The new version includes a PostgreSQL 14 backend database, a Razor frontend and a new data updating tool. In 2024, the new Cordon Count datasets were loaded and tested in the new CCDRS tool. As the data was not released publicly, DMG provided the regions with access to a restricted test version of the new CCDRS tool to examine their new datasets with the intention of releasing both the tool and the 2022 data to the public in early 2025.

Additionally, DMG met with the Cordon Count committee on multiple occasions to coordinate efforts in producing a trends report examining the cordon data for 2022 and previous years. DMG also liaised with the selected consultant and provided them with access to the datasets.

Open Data

In March 2011, the first generation of Open Data Portal was launched by the Government of Canada. "Open Data is defined as structured data that is machine-readable, freely shared, used and built on without restrictions." The data must be available as a whole and at no more than a reasonable reproduction cost, preferably by downloading over the internet. It must also be available in a convenient and modifiable form and must be provided under terms that permit re-use and redistribution including the intermixing with other datasets. Everyone must be able to use, re-use, and redistribute. There

should be no discrimination against fields of endeavour or against persons or groups. For example, 'non-commercial' restrictions that would prevent 'commercial' use, or restrictions of use for certain purposes (e.g., only in education), are not allowed.

With the approval from TISC, DMG started providing Open Data files from the TTS and Cordon Count data to the public in 2014. Unlike the online data retrieval systems, users can download the pre-generated text files from the DMG website without registration.

The Open Data Portal at DMG was updated to include the 2016 TTS data and the 2016 Cordon Count data bringing the total number of files available to 129 TTS data files and 222 Cordon Count data files. Each TTS data file contains household, person, and trip information for a specific survey year, geographic area, and spatial aggregation for different time periods. Each cordon count data file contains various types of vehicles and person counts for a specific year, geographic area, and time period. The files are in comma-delimited text format and ready to be imported into Excel or other spreadsheet software. DMG continues to update the Open Data Portal to include new TTS and Cordon Count data files as new datasets become available.

Other Datasets

In addition to the TTS and Cordon Count data, DMG houses various other datasets. Access to these datasets is regulated, with permissions varying based on the nature of the data and the user's needs.

- Statistics Canada Data – Various years based on data type
- Canada Mortgage and Housing Corporation Data – Various years based on data type
- Canadian Business Data – 2017 to 2021
- Computerized Household Activity Scheduling Elicitor Survey (CHASE) – April 2002 to May 2003
- Covid-19 Influenced Households' Interrupted Travel Survey (COVHITS) – Fall 2020, Summer 2021, Fall 2021
- DMTI Spatial Data – 2001 to 2016
- EMME Computed Data – 2001 to 2016
- GO Transit Bus and Train Passenger Surveys – 1985 to 1997
- Google Timeline Travel Survey – Spring 2023 and Fall 2023
- Metropolitan Toronto Area and Region Transportation Study (MTARTS) – 1964
- Other Longitudinal Data – Various years based on data type
- StudentMove TO Survey – 2015 and 2019
- Teranet Housing Data – 2001 to 2016
- Transit Boarding Counts – 2001 to 2022

COMPUTER RESOURCES AND TECHNICAL SUPPORT

The DMG computer system is comprised of several servers located behind the DMG firewall for security reasons. The DMG central server is a Dell R620 running Windows Server 2012 R2 with a Hyper-V application. This application allows the server to run multiple virtual machines, i.e., operating systems emulated within another operating system by imitating dedicated hardware. One of the virtual machines running on this server was the DMG Exchange Server, which was decommissioned in late 2020 when DMG transitioned to the University's Office 365 for email management. In preparation for releasing the COVHITS survey data to the sponsoring partners, a new virtual machine was also set up.

The following virtual machines are running on this server:

- DMG website created in WordPress. Linux, Apache, MySQL, PHP, and Lamp stack are also running on this machine.
- Data Retrieval System developed using MEAN stack, a free and open-source JavaScript software stack for building web applications running in Debian. The data are hosted in PostgreSQL, which is an open-source relationship database management system.
- 2015 StudentMoveTO Data Retrieval Portal.
- A development and test server.
- Git system for version control and code repository.
- COVHITS data server

There are two other significant servers, both Dell R430 running Windows Server 2012 R2 Datacenter and Windows Server 2019 Datacentre, each equipped with Hyper-V applications. These servers host virtual machines that hold disaggregated TTS and COVHITS data for use by funding agencies, their consultants, and researchers. They also feature a NGINX proxy server to manage web traffic.

In order to accommodate the increasing demand for data in disaggregated format, DMG configured additional virtual machines with extra storage space in 2019. There are currently eight virtual machines hosted at DMG. RStudio, Anaconda, and Python are installed on these virtual machines with essential software such as Office, Adobe Reader, Notepad, 7-Zip, etc., to facilitate modelling work.

Additionally, our CCDRS system has been rebuilt and modernized to be more secure and more efficient, and the rehauling of the iDRS system is currently in progress. Two virtual machines for testing updates before production rollout have also been created and are on the above servers.

In 2022, we began rebuilding our website on a new virtual machine using the latest OS. This allowed us to use the newest version of WordPress, along with secure versions of PHP, WP themes, and plugins. This task was completed in 2023 and continues to be updated and maintained.

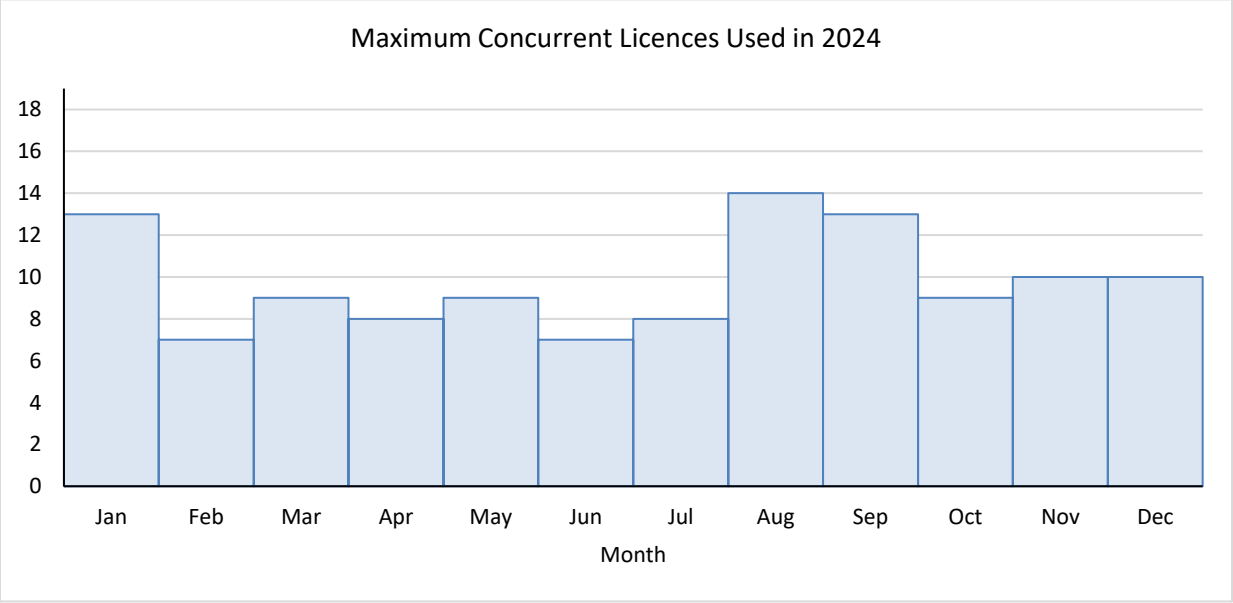
OpenPaths (EMME)

The EMME software is a transportation modelling software platform developed by INRO software. Rather than each funding agency purchasing an individual licence, DMG negotiated several concurrent licences to authenticate several machines operating simultaneously. DMG developed a licence management system and dedicated a proxy server to provide remote authentication to the participating partners. In addition, DMG hosted one of the MTO's licences on the EMME proxy server and set up accounts for their internal staff so that they could access this licence the same way they access DMG licences.

In July 2023, DMG migrated to a new licence management system following Bentley Systems' acquisition of INRO software. The system is hosted on the Bentley platform, and licences are authenticated through their licence utility. There are no more licencing constraints, and users can access the maximum network size. Additionally, students can access the software through the Bentley Educational program that the educational licences previously maintained by DMG for student training have been disabled.

In 2024, the software underwent a rebranding process and was merged with several other software packages to become OpenPaths. Many users encountered issues, including connection problems. DMG worked in collaboration with Bentley and the users to resolve these issues. DMG continues to manage the licence user database and provides ongoing support to the participating agencies.

The total number of licences under the DMG account remains at nineteen. The following chart shows the maximum number of concurrent licences used per month in 2024.



Over the years, DMG has acquired additional licences for the participating agencies. The table below displays the number of hours used by each participating agency in 2024. The numbers in brackets indicate the number of concurrent licences each agency is entitled to.

Total # of Hours Used											
Brampton (1)	Durham (2)	Halton (1)	Metrolinx (2)	Mississauga (2)	MTO (4)	Peel (2)	TMG (3)	Toronto (4)	TTC (1)	York (3)	Total
4,627	1,218	6	176	1,597	11,217	1,283	11,770	3,927	1,134	1,675	38,628

The following is the list of EMME users in the year 2024.

Arup Group
City of Brampton
City of Toronto
City of Mississauga
Metrolinx
Ministry of Transportation Ontario
Regional Municipality of Durham
Regional Municipality of Halton
Regional Municipality of Peel
Regional Municipality of York
Transportation Transit Commission
Travel Modelling Group, University of Toronto

WORK PLAN

This section presents the proposed DMG two-year work plan for 2024 and 2025.

1. 2022 Transportation Tomorrow Survey
   DMG will support the 2022 TTS in the following areas:
   - Update the online data retrieval system to include the final 2022 data
   - Create data files on the Open Data Portal and provide updated files to MTO
   - Publish all survey related reports on the DMG website
   - Assign the final 2022 data to additional geographic aggregations
   - Analyze 2022 data for possible sampling/response biases and develop guidance for best use of the data

2. 2026 Transportation Tomorrow Survey
   Preparation work for 2026 survey:
   - Preliminary work on RFPs, databases
   - Review of lessons learned from 2022 survey
   - Review of best practices and emerging survey methods (smartphone tracking apps, etc.) as possible complements/additions to the standard TTS methodology
   - Provide cost estimates for 2026 survey

3. Data Management and Modernizing Practices
   DMG will continue to manage the datasets in its care, maintain the access systems, and create new user-friendly means for sharing disaggregate records and non-license/copyright-limited resources while complying with privacy requirements.
   - Continue to develop and evaluate the secure remote access capability to support disaggregate TTS and COVHITS data analysis and modelling by member agencies and their consulting teams:
     - Migrate remote access to new servers.
     - Investigate and evaluate methods of remote access and their limitations.
   - Prepare a workplan to improve timely access to disaggregate version(s) of TTS data beyond VM solutions. The workplan will consider:
     - The use of aggregation and anonymization techniques (e.g., data released with broader zones, noise/geo-indistinguishability, etc.).
     - Policies used by other jurisdictions to improve access to files.
     - Guidance, standards and laws governing privacy to better understand what constitutes personally identifiable information, consent provided by respondents, and privacy protections that should be built in while delivering more convenient and accessible data.
     - Timelines/ milestones for process improvements

- Continue to maintain, upgrade and document the existing TTS portal. This will include a rewrite of the iDRS software system for accessing TTS data.
- Investigate mapping and data visualization options for existing TTS data
- Create and maintain a holistic "list" of DMG-managed data sources other than TTS survey data and boundary files indicating its core users (internal/external) on the website.
- Assign TTS data to various geographic aggregations as required.
- Investigate the potential to acquire and curate additional datasets of general transportation planning, analysis and modelling applications. These will include:
  - Municipal traffic count data.
  - Transit agency ridership count data.
  - Useful aggregations of Presto card data.
  - Other travel demand-related datasets where available.
  - Land use data.

4. Cordon Count Program

   DMG will assist the program committee in conducting the Cordon Count Program.
   - Provide technical advice on cordon count data collection options.
   - Provide advice on database requirements.
   - Develop 2022 Cordon Count Trend Report.
   - Update DRS to include the 2022 Cordon Count data.
   - Provide technical assistance to consultant preparing 2022 GTHA wide Cordon Count report
   - Continue to investigate mapping and visualization options for Cordon Count data to enhance the accessibility and usability of these data.
   - Determine current best practices and investigate new methodologies available for collection of future Cordon Count data.

5. EMME System

   DMG will continue to provide support to funding agencies and users:
   - Manage the EMME accounts using the new Bentley platform.
   - Monitor usage and manage licences.
   - Provide EMME support to member agencies and their consultants.

6. Other Activities
   - Generate customized data for member agencies and their consultants to support their modelling work.
   - Provide technical support to the University of Toronto's Mobility Network activities.
   - Provide technical support to any user of the data hosted on the DMG system
   - Update and maintain the DMG web site, including the DMG mandate (About Us) to reflect the shift in focus and activities.
   - Provide bi-annual progress report and participate in performance review meeting with the TISC.
   - Create and provide Annual Reports for review by funding partners.

- Improve user-experience and transfer of knowledge by moving from responding to individual custom tabulation requests to preparing guides and videos related to TTS uses and limitations and hosting virtual workshops to help users understand how to access and use data.
- Prepare trend and topical reports using TTS results.

BUDGET AND CONTRIBUTIONS

The following table presents the 2024 DMG budget and contributions by funding agencies. DMG budget supported three full time staff members and the Director's stipend. It did not include the cost of the Emme software maintenance, which was proportionally contributed based on the number of licences allocated to each agency and a "flow-through" expenditure with an overhead of 2%.

2024 Budget	Amount
Salaries & Benefits	$430,380.00
Hardware & Software Upgrades	$ 5,000.00
Software License Support	$ 1,000.00
Overhead @40%	$174,552.00
Total Budget	$610,932.00

2024 Contributions	Amount
Ministry of Transportation	$395,069.36
Metrolinx	$18,327.96
City of Toronto	$37,902.13
Toronto Transit Commission	$37,902.13
Regional Municipality of Durham	$18,907.74
Regional Municipality of York	$31,829.77
Regional Municipality of Peel	$39,362.38
Regional Municipality of Halton	$16,185.35
City of Hamilton	$15,445.20
Total Contributions	$610,932.00

MEETINGS

In 2024, a total of eight TTS TAC meetings were held with the vendor to discuss weighting options and the survey results. Additionally, DMG staff conducted several meetings with MTO and various funding partners to review expansion methods, evaluation criteria, and reporting formats. Furthermore, there were eleven TTSMI meetings involving DMG, the vendor, and MTO staff to discuss and assess project criteria and deliverables.

There were also five Cordon Count meetings in 2024 to discuss the 2023 program and the consultant's report.

Moreover, DMG staff held numerous meetings with staff members from various agencies, consultants, and researchers to assist their work.