transportation tomorrow

2011 TTS
DESIGN AND CONDUCT OF THE SURVEY

TRANSPORTATION TOMORROW SURVEY

2011

A Telephone Interview Survey on
Household Travel Behaviour in the
Greater Toronto and the Surrounding Areas
Conducted in the Fall of 2011 and 2012

DESIGN AND CONDUCT OF THE SURVEY

Prepared for the
Transportation Information
Steering Committee

by the

Data Management Group
Department of Civil Engineering
University of Toronto

October 2014

Participating Agencies:

Ministry of Transportation, Ontario • City of Barrie • City of Brantford • City of Guelph
City of Hamilton • City of Kawartha Lakes • City of Orillia • City of Peterborough
City of Toronto • County of Brant • County of Dufferin • County of Peterborough
County of Simcoe • County of Wellington • Metrolinx • Regional Municipality of Durham
Regional Municipality of Halton • Regional Municipality of Niagara
Regional Municipality of Peel • Regional Municipality of Waterloo
Regional Municipality of York • Toronto Transit Commission • Town of Orangeville

Acknowledgements

Twenty-three agencies were represented on the TTS technical Committee that planned and directed the 2011 survey. The representatives who served on the technical committee were:

Teresa Maranda, Chair	Ministry of Transportation
Muhammad Khan, Secretary	Ministry of Transportation
Arthur Tai	Ministry of Transportation
Steve Rose	City of Barrie
Russ Loukes	City of Brantford
Gwen Zhang	City of Guelph
Mohan Philip	City of Hamilton
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Sabrina Khan	Regional Municipality of Peel
Geoffrey Keyworthy	Regional Municipality of Waterloo
Vi Bui	Regional Municipality of York
Bernard Farrol	Toronto Transit Commission
Meghan Keelan	Town of Orangeville

The survey was managed by the Data Management Group at the University of Toronto. The management team consisted of:

Prof Gerald Steuart	Project Director
Peter Dalton	Project Advisor
Reuben Briggs	Coding Manager
Susanna Choy	Project Coordinator
Sharon Kashino	Interview and Site Manager
Michael O'Cleirigh, Qin Qin Lin, Jason Chan	Computer System Manager and Support

The hiring and training of interview staff was supervised by Ian Fisher, assisted by Lucy Balaisis.

Lorine Jung provided administrative assistance.

The interview team leaders for the 2012 component of the survey were:

Rajan Gaind	Heather Mclean
Marilyn Nugent	David Piller

Trevor Pitman, of the Toronto Transit Commission, provided daily assistance in reviewing the logic and consistency of all the transit route information collected.

Muhammad Khan of the Ministry of Transportation Ontario was instrumental in providing assistance in the procurement of various governmental services and also acting as a day to day liaison between the survey management and the Ministry.

The development and integration of the new Web-based Direct Data Entry (DDE) software was conducted by Michael O'Cleirigh of the Data Management Group. Andre Madarang and QinQin Lin assisted with the development process between August 2008 and May 2011 and Caityln Butler assisted with text review.

Special thanks to the more than 300 interview and coding staff, who got the job done and to all those who contributed so much to the success of the previous surveys.

This report was prepared for the Transportation Information Steering Committee (TISC) by the Data Management Group (DMG) at the Department of Civil Engineering, University of Toronto. The Steering Committee, formerly known as the Toronto Area Transportation Planning Data Collection Steering Committee (TATPDCSC), which also conducted the 1986, 1991, 1996, 2001 and 2006 TTS, is represented by the Ontario Ministry of Transportation, Cities of Toronto and Hamilton, Regional Municipalities of Durham, Halton, Peel and York, Metrolinx and the Toronto Transit Commission. The contributions of the above supporting agencies to the production of this report and to the ongoing work of the DMG are gratefully acknowledged.

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Section 1 Introduction

The 2011 Transportation Tomorrow Survey (TTS) is the largest and most comprehensive travel survey ever conducted in Ontario and perhaps anywhere in North America. The survey was conducted on behalf of 23 local, regional, provincial and transit operating agencies in the Greater Toronto and Hamilton Area (GTHA) and surrounding regions. The TTS data contains detailed demographic information on all members of the surveyed household and a ledger of travel information for an entire weekday.

The TTS is a joint undertaking by the agencies represented on the Transportation information Steering Committee (TISC), formerly known as the Toronto Area Transportation Planning Data Collection Steering Committee (TATPDCSC). The Committee was established in 1977 for the purposes of setting common transportation data collection standards and for coordinating data collection and dissemination between the member agencies. Membership of the committee includes the Cities of Toronto and Hamilton, the Regional Municipalities of Durham, York, Halton, Peel and York, the Toronto Transit Commission, Metrolinx and the Ontario Ministry of Transportation.

The 2011 survey is the sixth in a series of surveys conducted every five years. The first TTS, conducted in 1986, obtained completed interviews for a 4.2% random sample of all households in the GTHA. After completion of the 1986 survey, the Data Management Group was formed at the University of Toronto with one of its prime objectives being the management and distribution of the 1986 TTS data. The Data Management Group was also requested to manage the second TTS undertaken in 1991. The 1991 survey was a smaller update of the 1986 survey focusing primarily on those geographic areas that had experienced high growth since 1986. The survey area was expanded slightly to include a band approximately one municipality deep surrounding the outer boundary of the GTHA for the purpose of obtaining more complete travel information in the fringe areas of the GTHA.

The 1996 TTS was a new survey, not an update. The survey area was expanded to include the Regional Municipalities of Niagara and Waterloo, the Counties of Wellington, Simcoe and Peterborough, the Cities of Guelph, Barrie, Kawartha Lakes (former Victoria County) and Peterborough and the Town of Orangeville. Approximately 115,200 interviews were completed representing a 5% random selection of households throughout the survey area. Based on Census information, the survey area covered 60% of Ontario's population. A technical sub-committee of the TATPDCSC was established that included representation from all participating agencies. The Data Management Group was responsible for all aspects of the management of the survey.

The 2001 TTS was essentially a repeat of the 1996 survey with approximately 137,000 completed interviews. The survey area was the same as in 1996 except for the exclusion of the Regional Municipality of Waterloo and inclusion of City of Orillia and all of the County of Simcoe. The organizational structure and the role of the Data Management Group were also the same as for the 1996 survey.

The 2006 TTS covered all of the area involved in the 2001 survey plus the Regional Municipality of Waterloo, which had been surveyed in 1996 but not in 2001, plus the City of Brantford and the County of Dufferin which had not been surveyed in previous versions of the TTS. In order to provide contiguous coverage in the area surveyed, Brant County was also surveyed during the

training of interview staff. Altogether approximately 149,000 households were successfully interviewed.

The 2011 survey covered all of the area involved in the 2006 survey plus the County of Brant was officially added to the area surveyed. The survey involved cooperation from eight cities, eleven regional and county governments, one town, two transit operators and one provincial ministry. Overall approximately 159,000 households were successfully interviewed.

The 1996, 2001, 2006 and 2011 surveys are four of the largest travel surveys ever undertaken anywhere. The 1986, 1991 and 1996 surveys each involved a major element of technology development. The use of automated geocoding was a key development in the 1986 survey. On-line Direct Data Entry (DDE) was introduced in the 1991 survey and networked computers in the 1996 survey. The survey methods were essentially unchanged in 2001 with only minor revisions to some of the computer software.

In 2006, the survey methodology and questionnaire was the same as the previous surveys but the sample control, interviewing and geocoding software were re-written to take advantage of the experience and knowledge gained in the conduct of such surveys in order to provide better performance and quality control. A telephone interview with on-line Direct Data Entry (DDE) and automated geocoding of all geographic information collected was adopted as the proven most cost effective and reliable means of collecting large quantities of travel data.

In 2011, the survey questionnaire and methodology both received slight changes. Two new questions were added to the interview dealing with Highway 407 usage and automobile occupancy. Also a new web-based interview method was tested to supplement the main telephone interview method of obtaining completed surveys. The telephone interview method however remained the same as previous surveys.

The interviews for the 2011 TTS were conducted in two stages. The first smaller stage was conducted in the fall of 2011 and the second stage was conducted in the fall of 2012. Both stages covered the entire survey area.

Section 2 Planning and Organization

The selection of the Data Management Group to manage the 2011 survey ensured continuity from the initial planning and design of the survey through the dissemination of the final database and subsequent analysis of results. The selection also took advantage of the experience gained from participation in the previous surveys, ensuring consistency in survey methods and results.

2.1 Organisation

A Transportation Tomorrow Survey in the year 2011 was initiated by a long standing Transportation Information Steering Committee (TISC) in the Greater Toronto and Hamilton Area (GTHA). TISC asked the Data Management Group (DMG) to manage the survey and approved an initial budget based on the DMG's initial work plan and schedule. A collection of agencies external to the GTHA that had participated in past surveys was invited to participate in the 2011 survey and one new agency the County of Brant asked to be included. A TTS Technical Steering Committee was assembled consisting of a representative from each participating agency. It met three times over the course of the survey to receive progress reports from the Project Director and to make, or confirm decisions on critical items. Monthly Progress reports were also emailed to the technical committee during the interview stage of the survey in 2011 and 2012.

The management structure was established based on the need to draw on the experiences gained in the conduct of the previous surveys at the same time as broadening the base of experience that might be used in the conduct of future surveys. A Management Team was assembled in 2011 and met on an informal, as required, basis to discuss all aspects of the design and conduct of the survey. The composition of the Management Team was as follows:

Gerald N. Steuart, Project Director
Gerald has been involved in every TTS starting with 1986. He is the Director of the Data Management Group and served as Project Director for the 1996, 2001, 2006 and 2011 TTS.

Peter M. Dalton, Project Advisor
Peter is currently a private consultant and has been involved in a senior management role in every TTS (1986, 1991, 1996, 2001, 2006 and 2011).

Susanna T.T. Choy, Project Coordinator
Susanna was Project coordinator in 2006, Coding Manager in the 2001 survey and was involved in the conduct of the 1991 survey and post survey processing of the 1996 survey data. A long-time employee of the DMG her responsibilities have included the ongoing maintenance and distribution of the TTS data,

Reuben Briggs, Coding manager
Reuben operated as a support person on the 2001 TTS and Coding Manager in the 2006 survey and played a significant role in the development of improvements to the coding process. He is a long time employee of the DMG with responsibilities that include the ongoing maintenance and distribution of the TTS data.

Sharon Kashino, Interview and Site Manager
Sharon is currently a freelance consultant. She began her TTS experience providing software support in addition to being an Interview Team Leader in 1996. She assumed responsibility for telephone interviewers in 2001 and continued in that role up until the present. She was extensively involved in the post processing stages of both the 1996 and 2001 TTS.

Ian Fisher, Manager of Interview Training
Ian is a freelance consultant with experience on every TTS (1986, 1991, 1996, 2001, 2006 and 2011). He personally interviewed more than 350 potential interviewers (over the two phases of the project) and gave each their introduction to the interviewing procedures used in the 2011 TTS.

Michael O'Cleirigh, Computer System Manager (2011)
Michael was a full-time employee of the Data Management Group. He began his experience as the lead software developer of the TTS software re-write undertaken by the DMG for the 2006 survey. He was also responsible for the development of the Web based interview software used in the 2011 survey and was responsible for the smooth running of the interview computers and the production software on site in 2011.

Qin-Qin Lin, Computer System Manager (2012)
Qin Qin was a full time employee of the Data Management Group. She started off in 2010 as a programmer working on the development of the Web Based Direct Data Entry software. In 2011 she assisted Michael O'Cleirigh with the onsite computer support before taking on the manager's role in 2012.

Jason Chan, Computer System Manager (2012)
Jason Chan is a full time employee of the Data Management Group. He began his experience as a summer student assisting with the computer setup for the 2011 phase of the survey. His responsibilities increased in 2012 when he was responsible for the technical support on the survey site computers and the production software.

Muhhamad Khan of the Ontario Ministry of Transportation acted as liaison with the Ministry and as the secretary of the TTS Technical committee.

Trevor Pitman of the Toronto Transit Commission was seconded to the project to review and edit all transit routes in all jurisdictions recorded by the interviewers. Mr. Pitman was also an active member in the conduct of the 1996, 2001 and 2006 TTS.

An Occupational Health and Safety committee was struck in both years of the survey and comprised of representatives from management, each interview team and the geocoding team. The committee members were the contact persons for all health and safety concerns from the teams and the committee met at least once a month to go over any potential health and safety related issues which had been brought to their attention, drawing up a to do list and delegating responsibility for solving the issues. An official mechanism for the reporting of accidents was also implemented on site.

In 2012, after a few safety concerns were raised by staff, the TTS was toured by personnel from the Ontario Labour Board. Orders were issued to post and implement policies and programs related to Harassment and Workplace Violence. Both policies and programs were implemented soon afterwards.

In 2012 the Occupational Health and Safety Committee was made up of the following representatives:

Reuben Briggs – Management
Tracy Ferguson – Team A
Ian Ratchford – Team B
Robert Jerome – Team C
Dorothy Omari – Team D
Ping Ya Lee – Geocoding

2.2 Survey Design

The same survey methods have been used on every TTS since the first was held in 1986. These methods have been both cost effective and very successful. The basic survey methods consisted of an advance letter mailed to each of the selected households followed, about a week later, by a telephone interview to collect demographic data and travel information for the previous weekday for each member of the household. A universal coordinate system was used to record geographic information to allow assignment to any zone system.

In 2011, the procedures were slightly changed as an option of the respondent completing the survey on the internet was added. The advanced letter gave the household the option to either wait for the telephone interview or alternately use a special web-access code for the household, contained in the letter, to access the TTS website and complete the survey information online prior to being called.

The survey software used in 2006 was used again in 2011 with the additional web interview software being integrated into it.

Experience gained in previous surveys reinforced the conviction that management and supervision costs per interview increased when a call centre was larger than 4 teams of approximately 25 to 30 interviewers per team. This meant that the survey needed to be conducted in two phases: one in the fall of 2011 and the second in the fall of 2012. To be certain that school was in session during the interviews, the intent was for each session to start in September and finish as early as possible in December.

Based on anticipated interviewer productivity, the objective of the first phase was to complete 60,000 interviews in the complete survey area. The objective of the second phase was to complete another 94,000 interviews. Both phases of the survey were able to meet their targets.

The 2001 and 2006 TTS both demonstrated a clear advantage for the interviewing site to be located close to a subway station in the central area of Toronto. In 2011, space was acquired at 370 King Street West for phase one of the project and the same space was again used for phase two in 2012. A significant number of interviewers returned from the 2006 TTS. In addition having the same location for the second stage of the survey proved to be beneficial in terms of being able to re-hire many of the same interviewers.

Table 2.1 Schedule of Key Events

Fall 1986	Conduct of the 1986 TTS (61,708 households interviewed)
August 1988	Release of the 1986 TTS database
December 1989	Data Management Group appointed to manage the 1991 TTS
Fall 1991	Conduct of the 1991 TTS (24,507 households interviewed)
June 1992	Release of the 1991 TTS database (Version 2.1)
January 1995	Data Management Group appointed to manage the 1996 TTS
October - November 1995	Conduct of the Waterloo component of the 1996 TTS (7,556 interviews completed)
September - December 1996	Conduct of the main portion of the 1996 TTS (108,850 households interviewed
August 1997	Release of the 1996 TTS database (Version 2.1)
May 1999	Data Management Group appointed to manage the 2001 TTS
September - November 2000	Conduct of external portion of the 2001 TTS (22,000 household interviews)
September - December 2001	Conduct of the main portion of the 2001 TTS (101,000 households interviewed)
May 2002	14,000 additional interviews conducted
December 2002	Release of final 2001 TTS database (version 1.0)
December 2004	First meeting of the 2006 TTS Technical Committee
September 2005 - February 2006	Conduct of external portion of 2006 TTS (37,000 household interviews)
September 2006 - January2007	Conduct of the main portion of the 2006 TTS (115,000 household interviews)
May 2007	2,000 additional interviews conducted
December 2008	Release of final TTS database (Version 1.0)
August 2010	Data Management Group appointed to manage the 2011 TTS
November 2010	First meeting of the 2011 TTS Technical Committee
May 2011	National Census (Statistics Canada)
July 2011	Installation and testing of phones, computer systems and software at 370 King Street West for Phase 1 of the 2011 TTS
August 2011	Initial recruitment and training of interview staff for Phase 1
September - December 2011	Conduct of Phase 1 of the 2011 TTS (60,000 household interviews)
July 2012	Installation and testing of phones, computer systems and software at 370 King St W for Phase 2 of the 2011 TTS
August 2012	Initial recruitment and training of interview staff for Phase 2
September - December 2012	Conduct of Phase 2 of the 2011 TTS (94,000 household interviews)
October 2013	Release of final TTS database

2.3 Survey Content

At the request of the steering committee two new questions were added to the survey content. The two questions were:

1. How many persons were in the vehicle? (only asked where the member of the household was the auto driver)
2. Did you use highway 407? (only asked for relevant trips where the trip mode was auto driver)

The 2011 survey therefore consists of the following questions:

Household Data

- Home Location
- Type of Dwelling Unit
- Number of Persons
- Number of Vehicles available for personal use

Person Data

- Gender
- Age
- Possession of a driver's license
- Possession of a transit pass
- Employment status
- Occupation
- Usual work location
- Availability of free parking at place of work
- Status as a student
- Usual school location (Name of school)
- Origin of first trip

Trip Data (only collected for persons 11 and older)

- Location of destination
- Trip Purpose
- Start Time
- Method (mode) of Travel
- Number of persons in the vehicle (asked only to Auto Drivers)
- Was Hwy 407 used on your trip (asked only to Auto Drivers who made relevant trips)

For Trips made by Public Transit

- Methods of access
- Sequence of transit routes and/or boarding and alighting stations (maximum of 6)*
- Method of egress

* The transit route is recorded for each segment of a transit trip made by bus or streetcar. The access mode, egress mode, each transit route used (maximum 6) as well as boarding and alighting stations (where subway, GO Rail or RT are used) are recorded as parts of a single trip.

Details of all the response categories and definitions are contained in both the Interview Manual (2011 Transportation Tomorrow Survey Working Paper Series: Interview Manual) and the Data Guide (2011 Transportation Tomorrow Survey: Data Guide Version 1.0).

2.4 Fall 2011 Survey

The search for an appropriate interview site commenced in May 2011. Basic requirements were identified as approximately 800 square metres of open floor space in downtown Toronto with good access to the subway system. Appropriate space available from August 16th to the end of December was found at 370 King Street West. A layout of the survey site for the first phase in the Fall of 2011 is shown in Figure 2.1

Figure 2.1 Layout 2011

The site was equipped with approximately 115 HP and Dell computers (a mix of HP Pentium D 3.4Mhz & Dell Pentium 4 2.8 MHz). Three interviewing teams were composed of approximately 29 stations each with two monitoring stations: the remaining computers were utilized by the management team, training and the call-in team. Geocoding utilized the interviewing team machines during off-interviewing hours.

All stations were setup using Debian Linux and further customized to create specific and limited profiles for each of the training, interviewing, reviewing and geocoding roles. Each of the two monitoring stations was able to mirror the screen of any of the 29 workstations in a team, while

at the same time audio monitoring of the interview in progress was carried out using a silent telephone monitoring system.

Internet access to the non-management computers was not permitted except for the geocoders who were provided with a specific profile which allowed them access to the internet.

Three Dell Power Edge 2950 servers and one Dell Power Edge 1950 server were used. All of the computer equipment and telephone equipment was retained for use in the main part of the survey in 2012.

Unlike previous surveys, where the survey areas were divided spatially across survey years with the areas external to the GTHA surveyed in the first survey year and the GTHA the second year, in 2011/12 it was decided to survey portions of all areas over both years. This decision was made primarily because it wasn't certain what obstacles we would be faced with in regards to the new web survey option being used and whether these obstacles would be different based on geographic area being surveyed. Hence 2011 was used as a test year for the web survey option using samples from the entire survey area.

A target of 60,000 interviews was set for 2011. A randomly distributed sample of residential phone listings was purchased from private companies specializing in the maintenance and distribution of phone and mailing lists. An initial list of 4,166 residential phone listings (name, address and telephone number) was obtained in early August from the same company that supplied the lists in 2006 to be used for training, and a larger listing of 63,500 records was obtained at the end of August for the initial stages of the survey.

A decision was made to switch sample providers in September and a third set of sample: 43,000 records, was obtained from CornerStone in late September. A final listing of 125,000 was obtained at the end of October. This fourth listing was done in October in the hope that it would include students moving into university and college residences in September.
The survey commenced on Wednesday, September 7, 2011 and ended on Tuesday, December 20, 2011. A total of 192 interviewers and 6 geocoders were recruited and trained. Two staff members originally recruited as interviewers and team leaders subsequently became geocoders increasing the total coding staff complement to a maximum of 8. 60,187 interviews were completed successfully. A small number of records were subsequently discarded as being incomplete or outside the survey area.

2.5 Fall of 2012 Survey

The scale of the survey was bigger in 2012 than it was in 2011. Basic requirements were identified as approximately 10,000 square metres located in downtown Toronto close to transit. The physical space occupied in 2011 was big enough for the 2012 survey but did not have enough workstations for the setup required for 2012. Hence it was decided to re-occupy the same space but conduct some renovations to remove existing large workstations, replace them with smaller workstations and reconfigure the space. The space was renovated and occupied for 6 months from July 1st to the end of December with renovations and the installation of phones and internet connections taking place in the month of July.

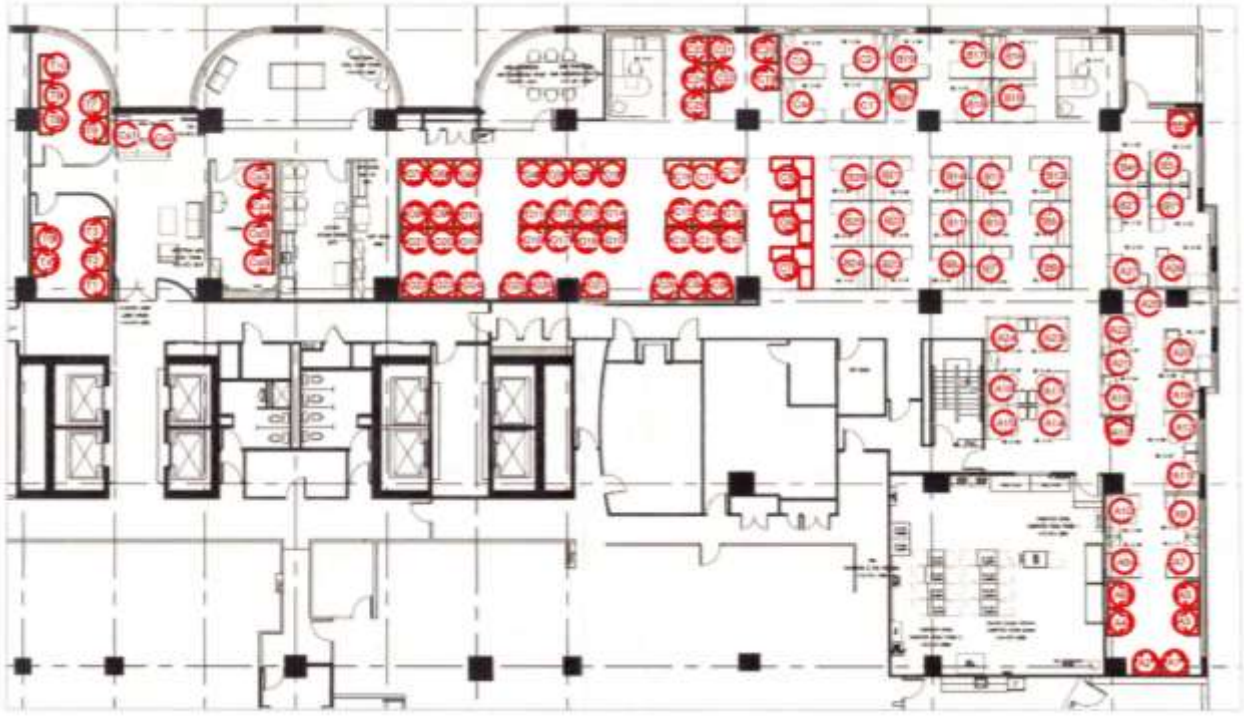
Network setup in 2012 was simplified by having exactly the same configuration. Only two distinct Debian Linux images were required. Four teams of approximately 30 interviewing with two monitor stations each (8 in total) were established. Six computers were separated and

dedicated to processing respondent call-ins. By supporting all user profiles on all survey workstations it was possible to have geocoders and reviewers situate themselves at any location within the call-centre and allow full management control over where such activities could take place. However internet access to the non-management computers was not permitted except for the geocoders and team leaders who were provided with a specific profile which allowed them access to the internet. Most of the computers were resold on completion of the survey.

The survey site's interview stations were separated by screens of various heights ranging from about four feet to six feet, which were used for the purpose of sound attenuation. The monitoring/supervising stations were located in areas with an optimum view of most of the interview stations and team leaders and team monitors were also provided with portable phones which allowed them to move around their teams while still monitoring interviewers. Nights 1, 2, and 3 training was conducted at the far end of the office in separate rooms with computers set to the training profile and were used to train interviewers prior to them going live on the telephone.

The site facilities included a break room and a kitchen area equipped with a microwave, fridge and coffee maker allowing interviewers to take their breaks without leaving the premises. Access into the building and use of the elevators was limited after 5:30 pm by the use of a pass card of which a limited number were available. A layout of the survey site is shown below in Figure 2.2.

Figure 2.2 Layout 2012



The target for 2012 was approximately 94,000 interviews. As in the fall of 2011, samples were purchased in multiple stages. A listing of 74,000 phone numbers were obtained at the end of July to be used during training and the early part of live interviewing. A further 150,000 phone numbers was obtained in October and a final supplementary list of 5,400 records were obtained at the end of November.

To facilitate a faster start in 2012, some of the samples were used for live training in the last two weeks of August but these records were discarded. Live interviewing commenced on Wednesday, September 5, 2012 and finished on Tuesday, December 18, 2012 with the continuation of callbacks for a few more days. A total of 269 interviewer staff and 12 geocoders were recruited. A total of 94,564 interviews were successfully completed.

2.6 Sample Design

The survey target was to achieve completed interviews for a 5% random selection of households throughout the survey area. The sample frame used for the survey consists of listed residential phone numbers within the boundaries of the survey area defined as accurately as possible by postal codes. When the first TTS was conducted in 1986 more than 90% of households with phone service had listed phone numbers. The widespread use of unlisted mobile phone numbers and the introduction of “do not call” listings has greatly decreased that proportion. The sample frame from which the sample for 2011 TTS was drawn only contained about 50% of the households in the survey area with considerable variation by geographic area. Subsequent analysis showed variations ranging from 80%, or higher, in some rural areas, down to 25% in urban areas like central Toronto. Experience from the previous surveys suggested that these variations in sample representation were likely to be exacerbated by variations in response rate, generally higher for single family homes than for apartment buildings.

In the 1996, 2001 and 2006 TTS, the survey area was divided into 2 with the areas external to the GTHA surveyed in the fall of one year and the GTHA surveyed in the fall of the following year. The 2011 survey was also spread over two years but the entire survey area was included in both years (2011 & 2012). In 2011, apartment units were sampled at a higher rate than single family dwellings but within each of the two categories a random sample was selected for the entire survey area. A measure of the 2011 completed sample rate was obtained by comparing the number of completed interviews in each postal area with the number of single and multi-unit residences that Canada Post delivers to in each postal area. That information was then used to adjust the 2012 sampling rates by geographic area to reflect the observed differences in both sample representation and response rate.

An initial sample list was purchased in July 2011 for use in staff training and for the initial start-up in September. A larger sample was purchased in early October, after September updates to the sample frame had been completed. One of the objectives of delaying the bulk of the sample purchase until October was to improve the representation of post-secondary students moving into new residences for the academic year. The sample used in 2012 was also purchased in 2 stages in August and October. A final smaller sample list was purchased in November 2012 to augment the sample in geographic areas that were experiencing a lower than expected response rate. The total number of responses was closely monitored in the final stages of the survey to ensure that the 5% completion target was distributed in proportion to the total number of residences in each municipality. The mailing of letters and interviewing were selectively terminated as the target was reached in each postal area.

The initial sample in July 2011 was purchased from the same company that supplied the sample lists for the 2006 TTS. They obtain their listing information from a number of different sources. Statistical information drawn from their sample frame suggested a more comprehensive coverage of households than that available from other suppliers. Analysis and experience with the initial training sample, however, revealed numerous problems including non-existing phone numbers, incorrect names & addresses and duplicate addresses leading to a number of complaints from respondents as well as wasted time and effort in the survey process. Subsequent lists were purchased from the Cornerstone Group of Companies who had supplied the sample lists for the 1996 and 2001 TTS. Cornerstone is licensed by Bell Canada to supply information contained in the yellow and white page phone directories. The information is updated on a continuous basis as the data becomes available from Bell Canada and other phone companies. In the previous surveys, Cornerstone was unable to include apartment numbers in the address information, a factor that contributed to the low response rate for those living in apartment buildings. Cornerstone now has that information in their database and was able to include it in the sample listings for the 2011 TTS. The information obtained for each household in the sample list consisted of:

- Name
- Street Address
- Municipality
- Postal code
- Phone number
- Type of dwelling unit (single or multi)

Households without phones, or with unlisted phone numbers, are excluded from the sample frame as are households that have been placed on the “do not call” list with respect to telemarketing and market research. Households with multiple listed phone numbers are included more than once in the sample frame

2.6.1 Sample Selection

The specifications for each of the 5 sample purchases are reproduced in the following sections. The 1st sample list included some postal codes that were known to be outside the survey area. A more general definition of the area was used in order to ensure any recently created postal codes that might otherwise have been missed were included. After geocoding and analysis of the 1st sample the definition of the survey area was refined to exclude the postal codes identified as being outside the survey area. In rural areas, where the 2nd character of the postal code is a “0”, the codes represent individual post offices. In most cases the 6th character is also a “0” but in a few cases other digits are used to denote the delivery route. The 5 character specification covers both cases. Some rural post offices serve areas that straddle the survey area boundary. In most cases the decision to include or exclude the applicable code was made based on the location of the actual post office relative to the survey area boundary.

For the two lists purchased in 2011, apartment units were sampled at a slightly higher rate (between 10% & 15%) than single family dwellings in anticipation of a lower response rate. For 2012 targets were set for the number of completed interviews by FSA in urban areas and LDU in rural areas at 5% of the number of residential dwelling units, subdivided by single family residences and apartments that Canada post delivers to. That information is available online from the Canada Post web site and is updated weekly. The required sample for each postal area was then calculated based on the observed response rate for that area in 2011 and the

corresponding sampling rate calculated based on the total number of households in the sample frame from the data supplied by Cornerstone. The resulting sample rates were stratified into 3 levels each for single family dwelling units and apartments to produce the groupings shown in section 2.6.4. A 20% margin was added to accommodate the expected variation in the required completion rate within each group. Delivery counts were not available for all rural post offices. Those codes for which no counts were available were grouped with adjacent rural areas and sampled at the same rate.

The final list purchased in 2012 was a supplement to enable the completion targets to be met in areas where the completion rate was less than expected based on the experience in 2011.

Table 2.2 provides a summary of the total number of records excluding those external to the survey area in the 1st list.

Table 2.2 Purchase of Sample Lists

	Number of records		
Sample List	House	Apartment	Total
July 2011	41,911	20,025	61,936
October 2011	91,000	34,000	125,000
August 2012	48,000	26,000	74,000
October 2012	96,000	54,000	150,000
November 2012	2,474	2,787	5,261
Total	279,385	136,812	416,197

The numbers of completed interviews, relative to the targets set by postal area, were closely monitored throughout the survey. When the combined target (houses plus apartments) for an area was reached, including an estimate of the number of completed interviews expected from the active sample already allocated, that area was excluded from future mailings. Any remaining sample for that area was held in reserve until the completion of the survey. Table 2.3 shows the termination dates by postal area.

Table 2.3 Final mailing Dates (2012)

No mailing after	Postal codes
Oct 13	N3E N3A N3B N1M L0C1L L0C1G L0A1E L0B1J L0E1N L0R1C L0R1H L0R2B L0R2E L0S1V N0B1E N0B2H N0B2L N0B1N N0B2N N0B1S L0G1B L0G1W L0M1G L0M1P L0K1C L0L1P L0K1C L0L1P K0M1A K0M1G L0B1K K0M1B K0L1V K0L1T N0E1A N0E1K N0B1W
Oct 20	M6R M9L L8T K9V L0H1H L0L1L L0M1J N0E1R
Oct 27	M4L M6G L4T L2J L3C L4R N3L L0H1G L0R1W L0S1P L0S1L L0M1A L0L2T L0K1E K0L2W K0M1K
Nov 3	M2H M4M M4N M4V M6H L6P N1C N1K L0K1A L0G1E N0B1M L0N1S L0L2J
Nov 10	M1T M2J M2K M2L M4G M4H M6J M6N M6P M9M L9L L4A L9C L9K N2K N2N N3C L9V L9Y N3R L0E1E L0R1E L0R2A N0B1B L0K1R K0L2X

Nov 17	N0C N0E M1C M1H M1W M3B M3K M3L M4E M4J M5R M6A M6L M8V M8X M9A M9B M9W L4P L9N L4G L4C L3P L3R L3S L3T L6E L7B L4J L4L L6A L5C L5K L6L L7N L7S L7T L8G L9A L3M L2N L2H L3B L3K L3L N2A N2B N2G N2H N1S N3H N1L L9W L9Z L9M L3V K9H K9J L0C1H L0B1B L0B1E L0B1L L0C1B L0E1A L0E1L L0E1P L0E1R L0E1S L0G1R L0G1H L0G1M L0G1V L0H1L L0J1C L0P1B L0R1R L0R1B L0R2C L0S1S L0R2J N0B1L N0B2E N0B1V N0B1X N0B2A N0B2M N0B1K N0B2B N0B1P N0B1J L0M1K L0M1M L0N1H L0N1M L0N1J L0L1N L0N1R L0L2N L0M1B L0M1C L0M1T L0M1B L0M1N L0M1S N0C1M L0L1X L0L1Y L0L2K L0L1A L0L1B L0L1X L0L1Y L0L2R L0L2P L0L2S L0M1L K0M1C K0M1L K0M1N K0M2A K0M2B K0M2C K0M2L K0M2M K0M2T L0A1B L0A1K K0M2J K0M1E L0A1C N0E1B N0E1L N0E1N
Nov 24	M1G M1N M1S M4R M4S M4T M5M M9P L1J L3X L4E L6C L4H L4K L6W L6Y L5H L6K L8V L2M N2T N2M N3P N3S
Dec 6	M1P M2N M3N L5N N1T N1G N1H
Dec 7	N3T N3V M6M L7K
Dec 8	M6S M9C L7C

2.6.2 Specifications for sample purchase 1 (July 2011)

Definition of survey area:

All postal codes beginning with the following 1 or 2 characters:

M L
N1 N2 N3 N9 K9

Forward sortation areas (FSAs)

K0L K0M N0B

Local Delivery Units with the 1st 5 characters

K0K 1C	Baltimore	K0K 3K	Warkworth
K0K 1H	Brighton	N0C 1M	Singhampton
K0K 1M	Castleton	N0E 1A	Burford
K0K 1R	Codrington	N0E 1B	Cathcart
K0K 1S	Colbourne	N0E 1K	Mount Pleasant
K0K 2E	Gores Landing	N0E 1L	Oakland
K0K 2G	Grafton	N0E 1R	Scotland
K0K 2X	Roseneath	N0E 1N	St George

Number of single family dwelling units selected at random = 43,000
Number of apartment units selected at random = 20,500

2.6.3 Specifications for sample purchase 2 (October 2011)

Definition of survey area:

All postal codes beginning with the following 1 or 2 characters:

M
L0 L2 L3 L4 L5 L6 L7 L8 L9

Forward sortation areas (FSAs)

K0L K0M
K9H K9J K9K K9L K9V (all K9 except K9A)
L1B L1C L1E L1G L1H L1J L1K L1L L1M L1N L1P L1R
L1S L1T L1V L1W L1X L1Y L1Z (all L1 except L1A)
N0B

N1C N1E N1G N1H N1K N1L N1M N1P N1R N1S N1T (all N1 except N1A)
N2A N2B N2C N2E N2G N2H N2J N2K N2L N2M N2N N2P N2R N2T N2V (all N2 except N2Z)
N3A N3B N3C N3E N3H N3L N3P N3R N3S N3T N3V (all N3 except N3W and N3Y)

Local Delivery Units with the 1st 5 characters

K0K 1C	Baltimore	K0K 3K	Warkworth
K0K 1H	Brighton	N0C 1M	Singhampton
K0K 1M	Castleton	N0E 1A	Burford
K0K 1R	Codrington	N0E 1B	Cathcart
K0K 1S	Colbourne	N0E 1K	Mount Pleasant
K0K 2E	Gores Landing	N0E 1L	Oakland
K0K 2G	Grafton	N0E 1R	Scotland
K0K 2X	Roseneath	N0E 1N	St George

91,000 non apartment records (including townhouse and unknown residential type) randomly selected from the entire survey area.
34,000 apartment records randomly selected from the entire survey area.

2.6.4 Specifications for sample purchase 3 (August 2012) and 4 (October 2012)

Two sample lists are required, the 1st one to be drawn in August, after the July updates to the sample frame have been completed, and the 2nd in October as soon as the September updates have been completed. The sample selection is to be stratified by both dwelling type (apartment and house) and geographic area for a total of 6 combinations. The required number of records specified in each of the following sections is after removal of duplicate phone numbers from the previous list October 2011.

The geographic areas to be used in the selection of apartment listings (code X or Y) are:

Area 1 – Forward sortation areas

K9K	K9L	L0C	L0E	L0H	L0J	L1B	L1J	L1R	L2J	L2P
L2V	L3R	L3S	L3T	L3X	L4A	L4B	L4G	L4H	L4C	L4E
L4J	L4K	L4L	L4P	L4T	L4Z	L5B	L5K	L5N	L5C	L5H
L6A	L6C	L6E	L6G	L6H	L6K	L6P	L7B	L7E	L6W	L6X
L7J	L7K	L7T	L8H	L8L	L8M	L8N	L8S	L8W	L8P	L8R
L9B	L9K	L9N	L9S	L9Y	M1C	M1H	M1T	M2J	M1N	M1P
M2K	M2L	M2N	M3J	M3K	M3L	M3N	M4L	M4M	M4G	M4H
M4N	M4P	M4S	M4V	M4X	M4Y	M5A	M5E	M5G	M5B	M5C
M5H	M5J	M5R	M5S	M5T	M5V	M6A	M6J	M6K	M6G	M6H
M6L	M6M	M6N	M6P	M6R	M8V	M8Y	M9L	M9M	M9A	M9B
M9N	M9W	N1G	N2G	N2K	N3A	N3L				

Number of records selected at random:
1st sample purchase – 16,000
2nd sample purchase – 33,000
Our estimate of the combined sampling rate is 20% (approximate)

Area 2 – Forward sortation areas

K0L	K0M	K9H	L0B	L0G	L0K	L0L	L0M	L0N	L0P	L0R
L0S	L1H	L1L	L1M	L1N	L1P	L1T	L1V	L1Z	L2G	L2M
L2R	L2T	L3B	L3P	L3Y	L4S	L5A	L5G	L5J	L5M	L5R
L5V	L5W	L6B	L6R	L6S	L6T	L6V	L6Y	L7A	L7C	L7G
L7R	L7S	L8J	L8K	L9T	L9W	M1G	M1J	M1K	M1L	M1R
M1W	M2H	M2M	M2R	M3A	M3C	M3H	M3M	M4B	M4C	M4E
M4J	M4R	M6C	M6E	M8X	M9P	M9R	N1S	N2C	N2L	N2V
N3B	N3H	N3R	N3S	N3T						

Plus local delivery units with the following 1st 5 characters

N0E 1A N0E 1B N0E 1K N0E 1L N0E 1N N0E 1R

Number of records selected at random:
1st sample purchase – 6,000
2nd sample purchase – 12,000
Our estimate of the combined sampling rate is 13.5% (approximate)

Area 3 – Forward sortation areas

K9J	K9V	L0A	L1C	L1E	L1G	L1K	L1S	L1W	L1X	L1Y
L2A	L2E	L2H	L2N	L2S	L2W	L3C	L3K	L3L	L3M	L3V
L3Z	L4D	L4M	L4N	L4R	L4V	L4W	L4X	L4Y	L5E	L5L
L5S	L5T	L6J	L6L	L6M	L6Z	L7H	L7L	L7M	L7N	L7P
L8E	L8G	L8T	L8V	L9A	L9C	L9G	L9H	L9J	L9L	L9M
L9P	L9R	L9V	L9Z	M1B	M1E	M1M	M1S	M1V	M1X	M2C
M2P	M3B	M3V	M4A	M4K	M4T	M4W	M5K	M5M	M5N	M5P
M5W	M6B	M6S	M8W	M8Z	M9C	M9V	M9Y	N0B	N1C	N1E
N1H	N1K	N1L	N1M	N1P	N1R	N1T	N2A	N2B	N2E	N2H
N2J	N2M	N2N	N2P	N2R	N2T	N3C	N3E	N3P	N3V	

Number of records selected at random:
1st sample purchase – 4,000
2nd sample purchase – 9,000
Our estimate of the combined sampling rate is 9.5% (approximate)

The geographic areas to be used in the selection of <u>house listings</u> (code H, T, blank or unknown) are:

Area 4 – Forward sortation areas

L0C	L0E	L0H	L0J	L3R	L3S	L3T	L3X	L4A	L4C	L4E
L4H	L4J	L4K	L4L	L4T	L6A	L6C	L6E	L6G	L6P	L7B
L7K	L8L	L8M	L8N	L8R	L8S	M3L	M3N	M4H	M4L	M4M
M4V	M4Y	M5A	M5B	M5C	M5E	M5R	M5S	M5T	M5V	M6A
M6G	M6H	M6J	M6K	M6N	M6P	M6R	M8V	M9M	N2G	

Number of records selected at random:

1st sample purchase – 12,000
2nd sample purchase – 25,000
Our estimate of the combined sampling rate is 18% (approximate)

Area 5 – Forward sortation areas

K0L	K0M	K9K	K9L	L0B	L0G	L0K	L0L	L0M	L0N	L0P
L0R	L0S	L1B	L1J	L1L	L1M	L1R	L1T	L1V	L1Z	L2J
L2P	L2R	L2V	L3P	L3Y	L4B	L4G	L4P	L4S	L4Z	L5A
L5B	L5C	L5H	L5K	L5M	L5N	L5R	L5V	L5W	L6B	L6H
L6K	L6M	L6R	L6S	L6V	L6W	L6X	L6Y	L7A	L7C	L7E
L7J	L7S	L7T	L8H	L8P	L8W	L9B	L9K	L9N	L9S	L9Y
M1C	M1H	M1N	M1P	M1T	M2H	M2J	M2K	M2L	M2N	M2R
M3H	M3J	M3K	M3M	M4B	M4C	M4E	M4G	M4J	M4N	M4P
M4S	M4X	M5G	M5H	M5J	M6E	M6L	M6M	M8Y	M9A	M9B
M9L	M9N	M9W	N1G	N2K	N2V	N3A	N3L	N3S		

Plus local delivery units with the following 1st 5 characters

N0E 1A	N0E 1B	N0E 1K	N0E 1L	N0E 1N	N0E 1R

Number of records selected at random:
1st sample purchase – 20,000
2nd sample purchase – 40,000
Our estimate of the combined sampling rate is 10.5% (approximate)

Area 6 – Forward sortation areas

K9H	K9J	K9V	L0A	L1C	L1E	L1G	L1H	L1K	L1N	L1P
L1S	L1W	L1X	L1Y	L2A	L2E	L2G	L2H	L2M	L2N	L2S
L2T	L2W	L3B	L3C	L3K	L3L	L3M	L3V	L3Z	L4D	L4M
L4N	L4R	L4V	L4W	L4X	L4Y	L5E	L5G	L5J	L5L	L5S
L5T	L6J	L6L	L6T	L6Z	L7G	L7H	L7L	L7M	L7N	L7P
L7R	L8E	L8G	L8J	L8K	L8T	L8V	L9A	L9C	L9G	L9H
L9J	L9L	L9M	L9P	L9R	L9T	L9V	L9W	L9Z	M1B	M1E
M1G	M1J	M1K	M1L	M1M	M1R	M1S	M1V	M1W	M1X	M2C
M2M	M2P	M3A	M3B	M3C	M3V	M4A	M4K	M4R	M4T	M4W
M5K	M5M	M5N	M5P	M5W	M6B	M6C	M6S	M8W	M8X	M8Z
M9C	M9P	M9R	M9V	M9Y	N0B	N1C	N1E	N1H	N1K	N1L
N1M	N1P	N1R	N1S	N1T	N2A	N2B	N2C	N2E	N2H	N2J
N2L	N2M	N2N	N2P	N2R	N2T	N3B	N3C	N3E	N3H	N3P
N3R	N3T	N3V								

Number of records selected at random:
1st sample purchase – 16,000
2nd sample purchase – 31,000
Our estimated of the combined sampling rate is 7% (approximate)

2.6.5 Specifications for sample purchase 5 (November 2012)

Selection 1 – 100% sample

M5H

All records not previously selected – estimate 100

Selection 2 – 35% sample (Approx.)

M5B M5G M5V

2000 randomly selected records

Selection 3 – 6% sample (Approx.)

M5C L3Y L6G L8H L8N L8P N2L

1200 randomly selected records

Selection 4

LDUs with the first 5 characters

L0P1K N0B2K L0R1X L0R1M N0B1T L0G1L

L0L1H L0L2X K0L1R

1100 randomly selected records

Selection 5

LDUs with the first 5 characters

L0H1E L0L0L L0J1E L0P1E L0J1J N0B1Z L0L1C

L0L1K L0K1S L0K1P L0K1L L0K1T K0L1E

700 randomly selected records

Selection 6

LDUs with the first 5 characters

L0H1J L0H1M L0G1J L0R2H L0R1P L0S1T

L0K2E L0L1V

300 randomly selected records

Duplicate records from previous lists to be removed prior to selection.
Estimated total number of records = 5,400

2.7 Mailing Plan

On receipt of each sample selection, a random number and a webcode was assigned to each household record. The records were then sorted on the random number and assigned to mailing blocks. An electronic copy of the address information plus the unique webcode to be included in each letter was provided to a commercial mailing house (Corporate Mailing and Printing) who was contracted to mail the advance letter to each household. The files for each mailing were sent to the mailing house by email at least 3 days before each mailing.

Care was taken when new mailing lists were received to move the remaining samples from previous lists that had not already been included in a previous mailing to the end of the combined sample queue in order to maximise the use of the more current listing. The number of households included in the final mailing for each phase of the survey was based on the estimated number of additional records needed to achieve the sample target set for each individual FSA. The remaining households not yet included in a previous mailing were combined into a single list. A priority rating was then assigned to each record equal to:

(The estimated additional sample required to achieve the completion target for that FSA - The number of households already assigned a priority rating for that FSA) / (The estimate additional sample required to achieve the completion target for that FSA).

The households were then assigned to the remaining mailing blocks in priority sequence. In 2011 3rd class mail was used primarily except for a few instances near the beginning of the survey where it was hoped that the use of 1st class mail would get the letters to households quicker. In 2012, only 3rd class mail was used. Generally two mailings per week were sent out. Each mailing was split into 2 sets, one for the households within the GTHA (x.1) and the other for the ones outside of GTHA (x.2) as there were 2 sets of pre-interview letters.

Table 2.4 Mailing Plan

Fall 2011

Mailing	# of Letters	Mailing Date	Mailing Class
1.1	4,028	September 2, 2011	1st
2.1	5,798	September 6, 2011	1st
2.2	2,202	September 6, 2011	1st
3.1	8,704	September 7, 2011	3rd
3.2	3,296	September 7, 2011	3rd
4.1	1,767	September 28, 2011	1st
4.2	743	September 28, 2011	1st
5.1	4,302	September 28, 2011	3rd
5.2	1,744	September 28, 2011	3rd
6.1	1,069	October 5, 2011	3rd
6.2	434	October 5, 2011	3rd
7.1	4,270	October 6, 2011	3rd
7.2	1,732	October 6, 2011	3rd
8.1	4,239	October 12, 2011	3rd
8.2	1,767	October 12, 2011	3rd
9.1	6,060	October 17, 2011	3rd
9.2	2,447	October 17, 2011	3rd
10.1	7,964	October 20, 2011	3rd
10.2	3,242	October 20, 2011	3rd
11.1	8,582	October 24, 2011	3rd
11.2	3,421	October 24, 2011	3rd
12.1	8,111	October 28, 2011	3rd
12.2	3,891	October 28, 2011	3rd
13.1	10,190	November 4, 2011	3rd
13.2	4,810	November 4, 2011	3rd
14.1	9,482	November 11, 2011	3rd
14.2	4,511	November 11, 2011	3rd
15.1	9,550	November 18, 2011	3rd
15.2	4,453	November 18, 2011	3rd
16.1	9,490	November 25, 2011	3rd
16.2	4,506	November 25, 2011	3rd

Fall 2012

Mailing	# of Letters	Mailing Date	Mailing Class	Notes
20.1	8,000	August 17, 2012	3rd	Training Sample
20.2	2,000	August 27, 2012	3rd	Training Sample
21.1	4,027	August 30, 2012	3rd	Training Sample
21.2	973	August 30, 2012	3rd	Training Sample
22.1	6,497	September 4, 2012	3rd	
22.2	1,503	September 4, 2012	3rd	
23.1	8,079	September 7, 2012	3rd	
23.2	1,921	September 7, 2012	3rd	
24.1	11,338	September 11, 2012	3rd	
24.2	2,662	September 11, 2012	3rd	
25.1	6,485	September 18, 2012	3rd	
25.2	1,515	September 18, 2012	3rd	
26.1	6,485	September 21, 2012	3rd	
26.2	1,515	September 21, 2012	3rd	
27.1	6,440	September 28, 2012	3rd	
27.2	1,560	September 28, 2012	3rd	
28.1	6,906	October 2, 2012	3rd	
28.2	1,657	October 2, 2012	3rd	
29.1	6,412	October 9, 2012	3rd	
29.2	1,588	October 9, 2012	3rd	
30.1	6,444	October 12, 2012	3rd	
30.2	1,556	October 12, 2012	3rd	
31.1	6,445	October 16, 2012	3rd	
31.2	1,555	October 16, 2012	3rd	
32.1	8,280	October 19, 2012	3rd	
32.2	1,786	October 19, 2012	3rd	
33.1	6,312	October 23, 2012	3rd	
33.2	1,688	October 23, 2012	3rd	
34.1	4,733	October 26, 2012	3rd	
34.2	1,267	October 26, 2012	3rd	
35.1	7,216	October 30, 2012	3rd	
35.2	1,784	October 30, 2012	3rd	
36.1	4,071	November 2, 2012	3rd	
36.2	929	November 2, 2012	3rd	
37.1	7,453	November 6, 2011	3rd	
37.2	1,547	November 6, 2012	3rd	
38.1	4,104	November 9, 2012	3rd	
38.2	896	November 9, 2012	3rd	
39.1	9,050	November 13, 2012	3rd	
39.2	1,950	November 13, 2012	3rd	
40.1	4,946	November 16, 2012	3rd	

40.2	1,054	November 16, 2012	3rd	
41.1	8,216	November 20, 2012	3rd	
41.2	1,784	November 20, 2020	3rd	
42.1	4,051	November 23, 2012	3rd	
42.2	949	November 23, 2012	3rd	
43.1	8,385	November 27, 2012	3rd	
43.2	1,645	November 27, 2012	3rd	
44.1	3,007	November 30, 2012	3rd	
44.2	993	November 30, 2012	3rd	
45.1	7,053	December 4, 2012	3rd	
45.2	2,213	December 4, 2012	3rd	
46.1	1,320	December 7, 2012	3rd	
46.2	1,491	December 7, 2012	3rd	

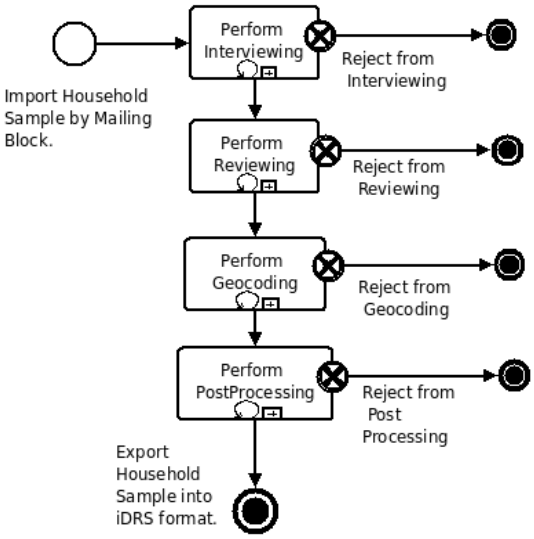
2.8 Sample Management

The 2011 TTS Sample Management System (SMS) unified all aspects of interviewing and the subsequent validation stages within a single environment. This allowed each sample to be identified in full-detail at each step through the interviewing, reviewing, geocoding and post-processing top level stages.

Sample was imported into the SMS prior to each mailing block being sent out. Each record was assigned a unique 6-digit sample identification number, a webcode, mailing block number and forward sortation address. In 2012 each mailing block was split between the four interviewing team servers according to the relative productivities of each and the number of in progress samples that would be called back during the next shift.

Sample progresses through four top-level stages: interviewing, reviewing, geocoding and post-processing. Figure 2.3 shows the paths sample can follow through the top level stages of the survey. At each top level stage there are three options: the stage is not yet complete, the sample is rejected at that stage or the sample is complete and can be transitioned into the next top level stage.

Figure 2.3 Sample Life Cycle



The Sample Management System (SMS) server software controls access to the sample and invokes a transition process nightly at 2:00 am that changes samples between the top level stages. Access to sample is controlled through a variety of sample queues for Interviewers and Geocoders. These queues supply the sample when the interviewer or geocoder requests *any available* sample. Reviewers manually searched for a household to view and Post Processors used a sophisticated search query interface to identify which samples were most in need of additional work.

The Administration Client (AC) was used to apply the management control on the SMS; in addition to the above management features it also allowed:

- Activation/Deactivation of Mailing Blocks.
- Activation/Deactivation of FSA's.
- User creation and role assignment including role specific details such as assigning languages for interviewers and coding zones for geocoders.
- Generation of interviewing and geocoding performance statistics for weekly, monthly and arbitrary date ranges.
- Control of which optional batch processes were executed during the nightly transition process. Only the transition from Interviewing to Reviewing was automatic. The transitions from Reviewing to Geocoding, Geocoding to Post Processing and Post Processing back into Geocoding all required manual Management intervention.

Daily monitoring of the disposition of samples in each stage of the survey using both real-time and daily generated reports was used to determine:

- Changes required in the mailing schedule.
- The appropriate time to activate a new mailing block.
- The number of geocoding samples per coding zone.
- The appropriate allocation of interview staff to interview stations.
- The de-activation of FSAs that had achieved their completion targets.

2.9 Publicity

Previous surveys indicate three constituents need to be informed about the objectives of the survey and, in varying degrees, about the methods used to conduct the survey. These constituents are the local government and public service officials (particularly the police), the press and households scheduled to be interviewed.

2.9.1 Letter to Local Officials

The best organization to compile and distribute information to appropriate recipients was judged to be the funding agencies. A package of information was compiled by the TTS Management Team. Appendix A contains a sample of this package. The distribution lists were generally made up of the following officials:

- Federal and Provincial Members of Parliament
- Regional Chairpersons
- Mayors, Reeves and County Wardens
- Local Councillors
- Police Departments
- Chambers of Commerce

2.9.2 Municipal websites

Each participating agency in TTS added some information regarding TTS to its official website.

2.9.3 Press Release

In some previous surveys, a press release package was sent to newspapers, television and radio stations in the survey area. In 2011 and 2012 dissemination of information about the survey to the media was left to the discretion of the Funding Agencies and Local Officials.

2.9.4 Advance Letter

The advance letter sent to all selected households was regarded as a critical item in the conduct of the survey as it encourages a high response rate and minimizes the time interviewers need to spend explaining the survey. A copy of the advance letter used for both survey periods (2011 and 2012) bears the signatures of the Minister of Transportation and the Regional Chairs (Durham, Halton, Niagara, Peel, Waterloo, York), City or Town Mayors (Barrie, Brantford, Hamilton, Kawartha Lakes, Peterborough, Orangeville, Toronto), and County Wardens (Brant, Dufferin, Peterborough, Simcoe, Wellington) for the participating agencies. Both French and English letters were mailed to all selected households. The advance letters for the GTHA households used in the 2012 phase are contained in Appendix B. The letters for the external component of the survey are contained in Appendix C.

Standard Ministry of Transportation envelopes were used for the mailing of the advance letters for all components of the survey. The use of an official government envelope was regarded as important in giving legitimacy to the survey and ensuring that the advance letter not be treated as junk mail.

2.9.5 MTO Info

As in previous years, MTO Info fielded questions from the public regarding the survey.

Section 3 Software Development

3.1 System Design

The TTS software is a complex system of interdependent software components which control every facet of the survey procedure including sample management, phone and web interview capability, monitoring of phone interviews, production statistics, geocoding and post processing. The software used in 2011/12 was developed for the 2006 survey and is described in detail in the 2006 TTS Conduct of the Survey report.

For the 2011 survey, it was decided that the bulk of the existing TTS software would remain essentially as it was in 2006 except for some necessary fixes and the need to add the two new survey questions into the existing Direct Data Entry (DDE) software.

The bulk of the software development in 2011 came in the form of:

- The design and implementation of the new web browser based data collection software
- Update to the reference update software as part of the Geocoding Console.

3.2 Changes to existing software

The existing TTS software was developed over the course of the three years leading up to the 2006 survey. It replaced the previous Foxpro based software system with a new Java based system.

In 2011 the following changes were made to the TTS software:

- Changes to the Geocoding console and DDE included the conversion from database driven lookups to lookups using the Burst Trie data structure in memory index so that the database lookups would be faster. This was key for the new WebDDE as well since the reference data lookups needed to be faster. Instead of at least 200 milliseconds for a disk read the data was now available in 5 milliseconds.
- Switching to the Spring framework and its transition demarcation to fix an existing memory leak. In 2006, this memory leak problem was associated to the code manually handling transactions and in certain rollback scenarios not cleaning up the associated data properly. Due to this problem the data would accumulate over time and it was necessary to restart the Sample Management System (SMS) every two days to avoid issues caused by this accumulation. By using the Spring Transactional Annotation to identify methods as being transactional Spring was able to consistently handle the transactional setup and rollback cases.
- Two new questions relating to the usage of toll highway 407 and car occupancy were added to the survey and these two questions were added to the Direct Data Entry (DDE) software. It was necessary to determine the circumstances under which these questions would be asked: the car occupancy question was based on the selected travel mode and the 407 question was based on selected travel mode and the relative origin and destination of the trip.

- Integrate the new Web-DDE into the existing software package. The ability had to be developed to allow interviews to be started on Web-DDE and transitioned to the regular DDE if necessary and also for Web-DDE to check out and check back in finished sample to the existing software package.

3.3 WebDDE

TTS has traditionally been a telephone interview survey but call screening, “do not call” lists and answering machines have led to ever decreasing response rates. With this in mind a decision was made to attempt to reach respondents by another means namely give them the ability to conduct the survey via the internet.

A decision was made after the 2006 survey to develop and test an internet based browser software approach to collecting interview data. The software development was initiated in 2008 and followed the same iterative milestone based development process which was used for the previous development of other TTS software. Every 3-4 weeks a new development version of the software was released and distributed to both internal and external testers with subsequent feedback driving the next milestone. Also three pilot projects were conducted on the software with the public to identify defects and points of frustration for the casual user.

The software called the Web Direct Data Entry software (WebDDE) was based on the design for the existing Direct Data Entry (DDE) software used in the TTS call-centre. At the outset of development it was determined that a crucial point to take into consideration in the design of the software was that it was going to be used by untrained household members answering the survey rather than trained call-centre interview staff and hence should be more user friendly than the existing DDE.

The WebDDE software was designed using an Apache-Wicket framework to

- Simplify the information entry for respondents
- Allow many different respondents to concurrently access their specific household records
- Allow users the ability to pause and resume an interview over the period of a few days or partially complete a survey and then contact the call centre to finish up
- Allow for the seamless integration into the existing TTS software system allowing interviews to be transferred from the WebDDE to the call centre DDE and the other TTS software without issues

3.3.1 Testing and Pilot projects

During its development, the WedDDE software was subjected to rigorous testing. As was noted a milestone approach was adopted and at each milestone a new version of the software was released for internal testing with significant milestones being tested externally as well.

Starting in the fall of 2010, three pilot projects were also conducted on the WebDDE software prior to its implementation in the 2011 TTS survey. These pilot projects were meant not only to test the software but also to test a few other issues such as the acquisition of sample and the usage of follow up letters for the survey.

3.3.1.1 First Pilot

The First Pilot project was conducted in October 2010. 1,608 pre-interview letters each containing a unique webcode were sent to households in the Toronto area in an effort to get feedback on the software. Respondents were told that the pilot project was being conducted by the Data Management Group to test new transportation survey software.

Response was low but some valuable information was collected regarding the length of the survey, areas where the software code needed to be more robust to handle its usage by a respondent and the software's connection to the older existing TTS software.

3.3.1.2 Second Pilot

The second pilot was conducted over the period of March 21st to April 11th 2011. A sample of 3,000 households: 1,500 in the City of Toronto, and 750 each in the regions of Niagara and York respectively was obtained from Canada Post and pre-interview letters with webcodes were sent out.

The purpose of this pilot was to:

- Test the updated WebDDE Interface
- Test the use of Canada Post for sample acquisition
- Compare the quality of the completed WebDDE interviews with past interviews completed in the TTS call centre
- Simulate Call Centre Response via phone and email to persons completing the survey online
- Examine web response rates
- Determine the impact of follow up letters

The WebDDE was still not a totally finished product during this pilot with the need still being there to update the databases used for schools, and transit and finishing up the review screens at the end of the survey. However the look and feel of the survey instrument was complete. At the end of the pilot we had an overall completion rate of 3.5% with an average trip rate of 2.1 daily trips which was comparable to the 2006 TTS numbers.

3.3.1.3 Third Pilot

The third pilot was conducted in May of 2011 just a few months before the start of the actual survey. This was the final test to make sure that the software was working as expected and also to test the usage of the Canada Post Unaddressed Admail product to target apartment buildings. Approximately 800 letters were sent out in early May to two high rise apartment buildings in North Toronto. The response was quite low at around 1.5% which was attributed to using the Unaddressed Admail product and not having the occupants' names for the letters.

3.4 Reference Update Software

Both the Geocoding Console and the DDE software use various databases to assist their users in filling in the information collected during an interview. These databases include a transit route and transit connection table as well as monuments and list of schools.

The new Reference Update Software was designed as an add-on to the Geocoding Console and was developed to address issues of school code allocation and to track the history of reference data changes over time which was not possible with the previous method of update. In previous surveys these updates had been performed with additions to the database done manually on a spreadsheet and then uploaded for propagation to all of the TTS software.

A web interface was developed where multiple geocoders could add new locations to the reference data at the same time. It also had search capability to allow users to determine whether a particular monument had already been entered so as to avoid duplication in both name and location information. The new information was then queued and could be reviewed before sending to the database update.

The web application would communicate with the master version of the reference database. This database would be dumped and distributed to the call-centre computers to update their data used by their DDE and GC clients.

Section 4 Equipment

The design and structure of the 2011 TTS network drew heavily on what had been done in the 2006 TTS. The main differences were the addition of the web-DDE which needed to be integrated into our TTS network and ran off a separate server. All computers and servers except one management computer used the Debian Linux operating system. Each of the non-server computers had a valid Windows XP license which was retained for resale purposes.

4.1 Computer Network

The wiring structure of the computers on the floor was similar to the 2006 TTS. The amount of wiring necessary was minimized by locating switches close to each team and linking only 1 wire from each team to the core switch located with the servers. Teams with multiple switches were accommodated by cascading the switches together.

Two networks were created:

1. The 10.0.0.0/16 main 100 megabit network that contained the servers, printer and client workstations. The main network was primarily used to transfer samples between the client workstations and the server computers.
2. The 192.168.0.0/24 gigabit network linking the four servers together. The server network was primarily used to transfer reference update and backup files between the servers at the end of each shift.

The main network was allocated from the 10.0.0.0/16 network range with the following structure:

Team A:	10.0.1.0/24
Team B:	10.0.2.0/24
Team C:	10.0.3.0/24
Team D:	10.0.4.0/24
Call-in:	10.0.5.0/24
Team Leaders/Monitoring:	10.0.5.0/24
Management:	10.0.6.0/24

The 4 servers were split between the 10.0.7.0/24 and 10.0.6.0/24 network.

The host part of each IP address was assigned based on the station number from the floor layout drawing which corresponded to the extension number in the telephone call monitoring system. This allowed the team leaders to easily see, based on who was presently logged into the system, which phone line they could be monitored on.

A Linux Embedded Application Firewall, using Shorewall, was setup as the firewall/router between the private TTS network. Fiber internet for both years was provided by Beanfield Microconnect.

Only management users were able to directly connect to the Internet. All other computers did not have a default route set and were unable to access beyond the local network. Geocoders were allowed to use the Internet but their access was through a proxy which allowed us to restrict access, track which sites they viewed and prevent access to non-work related sites like Facebook.

The Lexmark T652DN printer purchased during the 2011 TTS was used successfully through the 2011 and 2012 survey phases.

Figure 4.1 Main Network Set-up

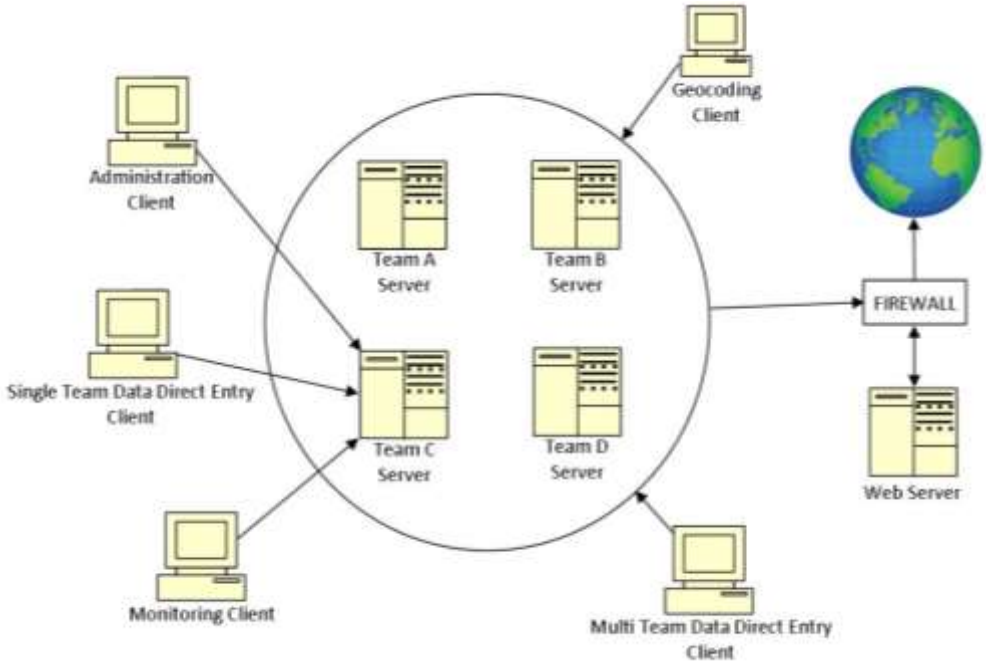
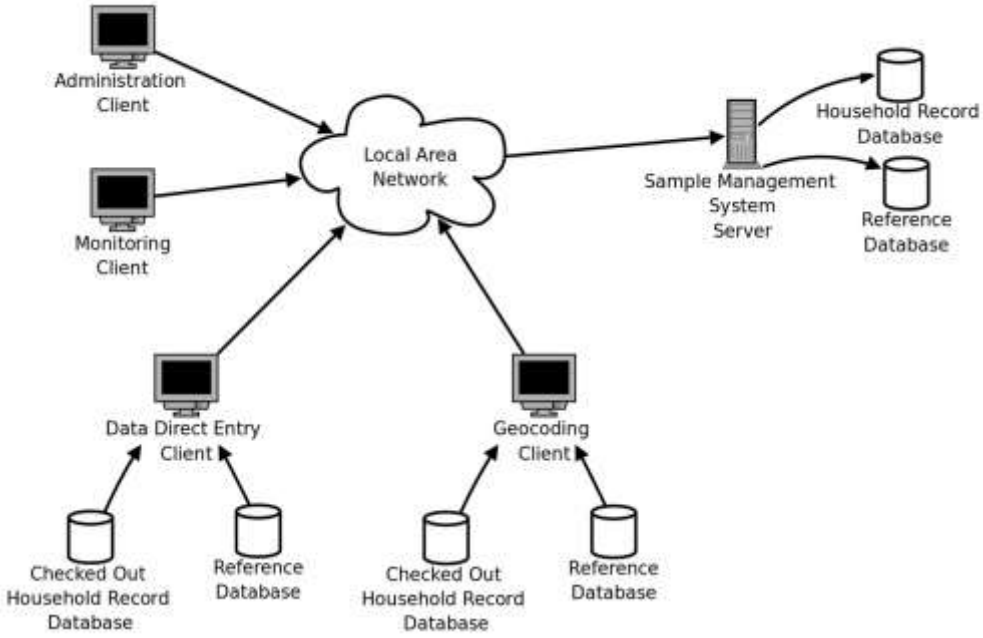


Figure 4.2 Local Area Network Set-up



4.1.1 Servers

In the 2012 TTS, there was one Dell Power Edge 2950 and three Dell Power Edge 1950 servers. The configuration of these servers were:

Dell Power Edge 2950
Intel Xeon E5440 @ 2.83 GHz
16 GB memory
200 GB Hard Drive Space
Two Gigabit network

Dell Power Edge1950
Intel Xeon E5400 2.83 GHz
16 GB memory
150 GB Hard Drive Space
Two Gigabit network interface cards.

The Power Edge 2950 server had an additional Adaptec 2940UW SCSI card which was used to connect to the Quantum DLT 8000 tape drive for backup. The maximum amount of storage provided by each backup tape was 80 GB compressed. This server with its extra storage space was used as the primary file sever that provided backed up network partitions for management users files as well as for reference update related files from the Geocoders. The web server was installed on one of the Power Edge 1950 servers.

Each TTS server ran the Debian Linux stable version and consisted of these elements:

- Java Sample Management System server application.
- PostgreSQL database for samples.
- PostgreSQL database for reference data.
- Lighttpd web server for displaying the HTML reports generated daily.
- System access for administrators to extract real-time statistics from the sample containing databases.

Over the course of the survey over 60 different SQL queries were encoded into scripts to help better inform decision making.

4.1.2 Clients

There were two types of workstation clients: Training and Interview/Geocoding. In 2012, there were 10 training work stations. This was the configuration:

Dell Optiplex GX520
2.8 GHz Pentium 4
512 MB of memory
80 GB disk
17 inch LCD display

All interviewing workstations could be used for both interviewing and geocoding depending on the selected user profile. The 2012 configuration of these workstations was:

HP Compaq DC7700
Pentium D @ 3.4 GHz
1 GB memory
80 GB HDD @ 7200 RPM
17 or 19 inch LCD Display

The workstations were setup to use Debian Linux primarily because of the requirement of having a local PostgreSQL database on each of them to store the currently checked out sample. This was an essential reliability feature to ensure that information given to us by a respondent would never be lost due to a technical problem like the software crashing or loss of power.

Gnome kiosk tools (Pessulus) was used to create an extremely limited user profile that locked the user in to only be able to access the TTS software and in the case of Geocoders the Firefox web browser.

A profile was created for the interviewer/reviewer/post-processor, the geocoder and the team leader/monitoring user classes. Their default account was for the DDE and required no password. The geocoder and team leader classes required a password which was only distributed to those authorized to have access. A special training profile was created which used a specially configured DDE to talk to the training sample server.

The necessary setup was configured on one computer and then replicated to all the computers using the G4u disk imaging system. Each computer was then capable of fulfilling any role in the survey. This feature was used to increase interviewing capacity by converting monitoring and reviewing stations into interviewing stations when necessary for the evening shift

4.1.3 Backup

At 12:00 a.m. every night before the TTS software would move samples between top level stages, a backup process would run on the Dell Power Edge 2950 that was connected to a Quantum DLT 8000 SCSI-2 backup tape drive. A script would be remotely executed using SSH key based authentication to generate database dumps and copy incremental changes to a staging area from which the tape dump could take place.

4.1.4 Resale

Following the 2012 phase of the survey when the leased office space was released most of the computer equipment was placed for sale except for the servers and some workstation computers to be used for post processing related purposes.

It was easier to sell the newer HP Pentium D units than the older Dell Pentium 4s. Resale considerations are important as the cost of the computer equipment is based on the net of original purchased price minus final sale price.

4.2 Telephones

In the Fall 2011 survey, six Dees CM-30 telephone monitoring units were installed and wired to the 78 analogue telephone lines used by the interviewers. This configuration allowed two supervisors to monitor any of the interviewer lines in each of the three teams. Software was installed on the monitoring station computers to allow the supervisor to visually monitor an interviewer's computer screen at the same time as listening to the interview over the phone. In

2006, the phone lines were regular Bell lines which did not show “ONT GOVT” on the call display. In 2011 regular Bell lines were again used but were ordered through the Ministry of Transportation allowing “ONT GOVT” to be shown on the call display. This was insisted upon by the management staff as it gives added validity to the survey in the eyes of the potential respondents and greatly increases the chances of conducting a successful interview.

The same telephone set-up was duplicated for four teams in 2012. The interviewer lines totalled 120 with 8 Dees CM-30 telephone monitoring units operating in four banks. A combination of cordless and regular phones was used for monitoring, enabling one supervisor per team to move around the room while still performing the monitoring function. There were 146 phone lines in total installed for the interviewing, monitoring, and coding and management operations. Again, regular Bell lines were used with the Ontario Government display.

Headsets are an important component for interviewers using computers for direct entry of data. The cost of commercial headsets was considered high given the low resale value after only 4-8 months of operation. Having had previous success using the significantly less costly Plantronics T100 headsets and keypad combination designed for domestic use, a decision was made to populate the floor with them. In previous years each interviewer had been provided with their own headset to plug into the keypad at the workstation but in keeping with 2005 and 2006, to keep costs down while still providing for the comfort of the interviewers, each interviewer was provided with their own set of foam ear and mouth pieces for the workstation headset.

Separate phone lines were installed for management functions and to receive call-ins from potential respondents who had been left a voice mail message. These call-in phones were equipped with automatic transfer to another line if the first line was busy or un-answered. With the number of households now using voice mail or answering machines, these call-in responses to messages left at the household were considered very important. In 2012, 8 lines were dedicated to the call-in feature. Every attempt was made to have these lines answered by a trained interviewer during the day and evening. Otherwise, an answering machine was used to describe the hours of operation and record any message the respondent wished to leave.

Section 5 Conduct of the Survey

5.1 Historical Overview of Survey Statistics

Table 5.1 Historical Overview of Statistics

	1986 TTS	1991 TTS	1996 TTS	2001 TTS	2006 TTS	2011 TTS
Number of households in the survey area	1.47 Million	1.71 Million	2.32 Million	2.51 Million	2.87 Million	3.12 Million
Target sample	5%	High growth 4.5% Low growth 0.5%	5%	5%	5%	5%
Completed sample	4.2%	1.4%	5.0%	5.5%	5.2%	5.1%
Sample used (approximate number of letters mailed)	102,606	34,167	158,753	215,000	340,820	345,541
Valid contacts	83,764	27,813	139,952	174,000	207,082	207,209
Refusal rate (of valid contacts)	25.9%	11.4%	21.8%	21.1%	26.6%	25.1%
Completion rate (of sample used)	60%	72%	70%	64%	44%	46%
Final Database						
Household records	61,453	24,507	115,193	136,379	149,631	159,157
Person records	171,086	72,496	312,781	374,182	401,653	410,404
Trip records	313,633	142,453	587,676	817,744	864,348	858,848
Transit records	56,615	14,896	70,295	85,095	87,244	86,703
Mean household size (expanded data)	2.77 persons	2.77 persons	2.71 persons	2.70 persons	2.68 persons	2.73 Persons
Trips per person 11 or older	2.35	2.54	2.48	2.54	2.47	2.40
Interview stations	86	33	120	120	121	120
Interviewers & Supervisors recruited	390	75	300	275	370	395
Coding staff recruited	N/A	6	17	13	14	13

A household sample becomes a ‘valid contact’ when it has reached the status of either complete or refused.

The lower completion rate reflects the number of households rejected after multiple unsuccessful attempts to contact them.

The above interview station and staffing statistics are for the main components of the 1996, 2001, 2006 and 2011 surveys.

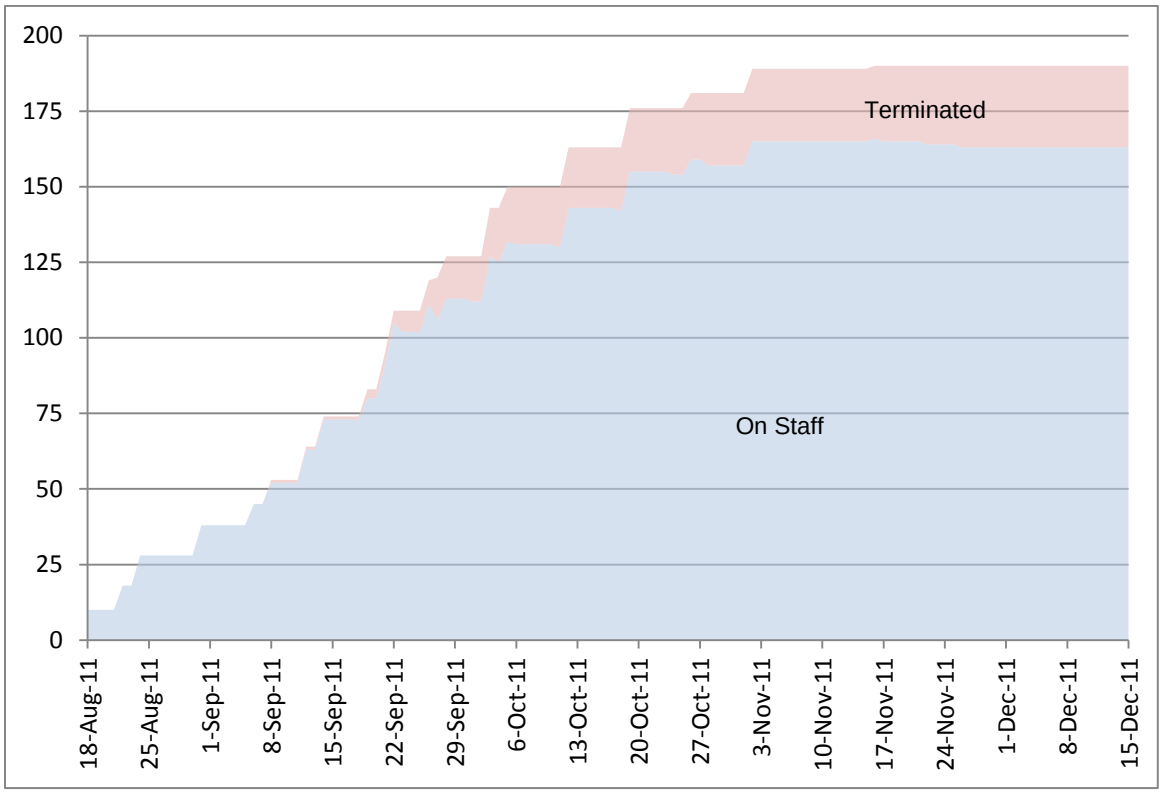
5.2 Interview Staffing

The number of interview staff required, together with the need to recruit and train them in a short time, is unquestionably the most challenging aspect of conducting a survey the size of TTS. As in the previous three surveys, a large number of interviews (more than 60,000) were done in the fall of the 1st year (2011) leaving a target of approximately 95,000 completed interviews for the fall of 2012. The fall 2012 survey was done from the same location in Downtown Toronto as the

fall 2011 component enabling a significant number (68) of the staff hired and trained in 2011 to be re-hired in 2012. 35 of those had also been part of the 2006 survey. The 4-team leaders for the main survey were selected from the 2006 returning staff, as was the chief assistant to the hiring and training manager.

The primary method for recruiting interviewing staff was help-wanted advertisements placed in the Toronto Star newspaper and on "workopolis.ca". Many of the staff from 2006 had remained in contact using Facebook. The hiring and training of staff for the fall 2011 component of the survey commenced on August 18th. A total of 190 interviewers and 6 coders were hired and trained. The maximum number of interviewers on staff in 2011 at any one time was 165 (including team leaders). Figure 5.1 shows how the number of interview staff varied over the course of the 2011 component of the survey.

Figure 5.1 Number of Interview Staff (2011)

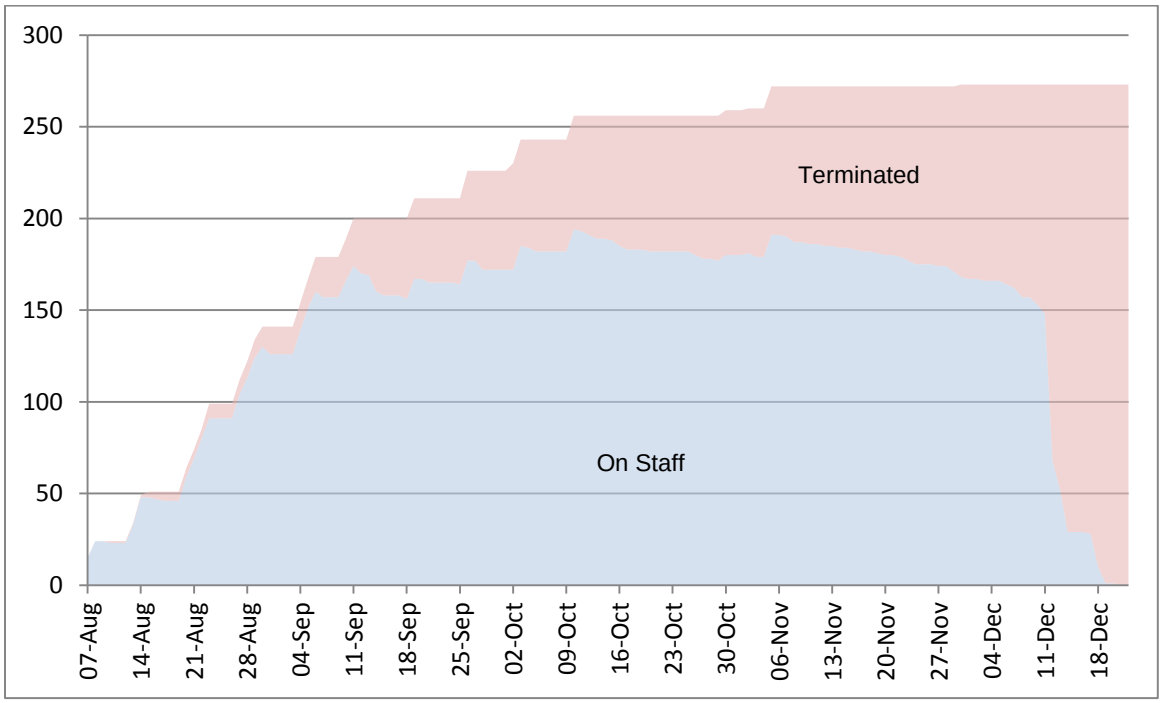


Hiring and training of staff for the 2012 component of the survey commenced August 7th. The availability of the returning staff from the previous year made it possible to have approximately 150 interviewers trained by the time this component of the survey started on September 5, 2012. In total 273 interview staff and 13 coders were recruited in 2012. The maximum number of interview staff on payroll at any one time was 191 near the beginning of November. Figure 5.2 shows how the number of interview staff varied over the course of the survey.

The interview staff were organised into four teams each with a team leader. The leader of each team had the responsibility for the scheduling and supervision of their team. A daytime supervisor was appointed with responsibility for ensuring that enough staff was available during

the day to carry out functions such as answering the phone and making scheduled call backs. The scheduling of staff to review the interviews conducted the previous day was the responsibility of the individual team leaders.

Figure 5.2 Number of Interview Staff (2012)



5.3 Training

The initial training program consisted of three consecutive evening sessions for each new group of 9 to 16 interviewers (average size 11 people). A maximum of three groups a week were trained. In August and early September training usually starting on Monday, Tuesday and Wednesday evenings which allowed each group to complete training in the same week.

The first evening of training consisted of a detailed demonstration of the software by the Training Manager. The demonstration, with appropriate time for questions and answers took 2 to 3 hours. The trainees spent the remainder of the four-hour shift, working in pairs, familiarising themselves with the software.

On the second day of training, the candidates practised interviewing each other. Supervisors were available to answer questions and provide guidance. A review meeting was held towards the end of the evening to provide a recap about certain aspects of the software and to allow questions.

In the third training session, the recruits continued to practice interviewing while the supervisors went around testing each person in turn. Once the training supervisor was satisfied that a

trainee was ready to start live interviewing, that person would be assigned to one of the teams and moved to the main interview floor. Having the new interviewers come on to the floor one at a time enabled the team leaders and their monitoring staff could pay special attention to each person during the conduct of their first few live interviews. Enhancements to the software allowed new interviewers to be assigned only households that had not yet been contacted. This simplified their work and increased their confidence.

An additional 1-2 hours of training was provided after new employees had been interviewing for a week to review performance reports, the visual review procedure, give more detail on geocoding requirements and provide an opportunity to answer questions and clarify issues interviewers had encountered in their first few shifts. In previous surveys this additional training had occurred on an ad-hoc basis. Floor supervisors were always available to answer questions and respond to problems throughout regular interview shifts.

5.4 Rates of Pay

Interviewers were paid $11 per hour during training and $12 per hour as soon as they started to conduct live interviews. Rates of pay were reviewed every week with merit increases awarded on the basis of performance. Daily and weekly performance statistics were calculated for each interviewer taking into account 4 measures:

1. Productivity. Both the number of phone calls placed and the number of interviews completed per paid hour of interviewing time.
2. Trip Rate. The average number of trips recorded per person in the households for which interviews were completed.
3. Refusals. The proportion of valid households contacted where the respondent refused to participate in the survey.
4. Proportion of geographic points recorded as being at intersections instead of exact addresses.

Although performance statistics were used as the primary factor in setting rates of pay, other factors were also taken into consideration. These factors included the number of post interview call backs required, the general accuracy of their work and their willingness and co-operation. Interviewers who were actively conducting surveys in languages other than English were given increases to compensate for the additional time required to translate the interview on-the-fly as well as the additional complexity these households often presented.

Monday to Saturday was chosen as the normal pay period permitting the performance statistics to be compiled on Sunday for review on Monday. Merit increases were applied to the pay period that justified them so that interviewers received immediate reward for good work and improvements in performance. Pay cheques were dated for the following Thursday and were

generally distributed during or after the Friday night shift. This provided a significant incentive for staff to attend the Friday or Saturday shift each week.

Staff members were given a different rate of pay for non-interviewing time including supervisory duty and visual editing of interviews. The non-interview rates of pay were generally kept lower than the rate paid for interviewing in order to maintain the incentive for putting in as many hours as possible on the phone. A bonus of $2 an hour was paid for interviewing time in excess of 14 hours in any one pay period. Part way through the 2012 interviewing, the bonus amount was increased for those interviewers with an interview base rate of pay exceeding $14 per hour with the new bonus amount being the amount by which their base rate exceeded $12. This was done to provide more incentive to the top interviewers. No bonuses were paid during staff training in August 2011 or 2012.

The average rates of pay per hour, including incentive bonuses and vacation pay, are shown in Table 5.2. The corresponding 2001, 1996 and 2006 TTS averages are also shown.

Table 5.2 Average Rates of Pay

	2011	2006	2001	1996
Trainee	$11.00	$10.00	$10.00	$9.00
Interviewer	$14.62	$13.96	$13.23	$11.25
Team Leader	$21.16	$17.15	$16.63	$16.04
Coder	$15.11	$14.03	$12.83	$11.15

5.5 Hours of Work

Standard evening interview shifts ran from 5:30 to 9:30 p.m. Some experimentation was done with weekday afternoon shifts, the results of which confirmed the rationale for starting at 5:30. The daytime success rate and productivity rate were both low for experienced interviewers during the afternoon period, although having cleared the calling queue the evening shift did experience a significant improvement in performance. Taking the afternoon and evening shift together, the total productivity for the day was not an improvement over a day with a standard evening shift.

Due to the ability of respondents to complete interviews via the web more daytime call-in staff was needed than in previous surveys to handle call-ins from respondents who had questions about the web-based survey.

Staff was instructed not to start any new interviews after 9:30 p.m. but were encouraged to complete any interviews in progress. They were credited with an extra 15 minutes of interview time if they had a live interview in progress at 9:35 p.m. This encouraged interviewers to dial right up to the 9:30 cut-off, maximizing potential completions for the day. Interviewers who did not want to 'risk' going overtime would opt to do their confirmation callbacks in the last few minutes of the shift instead. On Saturdays, the basic interview shift was from 10:00 a.m. to 2:00 p.m. A six hour shift from 10:00 a.m. to 4:00 p.m. was tried a few times over the course of the survey but it was found that most interviewers would only work 4 of the 6 hrs allotted, starting either at 10 a.m. and finishing at 2 p.m. or coming in for 12 p.m. and staying until 4 p.m.

5.6 End of Survey Bonuses

An additional incentive bonus was announced at the beginning of November 2012 to encourage staff to remain until the end of the survey putting in as many interview hours as possible. The bonus amount was 5% of the total pay received in the remaining pay periods starting with the one ending on November 24th. To qualify for the end of survey bonus interviewers had to:

A) Remain on staff until the end of the survey.
B) Complete a minimum of 12 hours (3 shifts) of interviewing in every pay period during the incentive period.
C) Short falls in one pay period could be made up by working extra shifts in a subsequent pay period on a two for one basis (i.e. 2 hours of extra interview time to compensate for each 1 hour missed).

5.6.1 Other Work Environment Incentives

Over the years various techniques have been used to encourage staff retention, promote increased shift scheduling, ensure quality work and increase job satisfaction. With the bulk of the staff being both temporary and part-time these initiatives are well-received and differentiate the TTS work environment from other similar work environments.

From the beginning each staff member is treated as an important individual within the organization. They are given their own set of tools (notepad, pen, headset pieces) in a permanent folder left in a designated area on-site. All management staff on-site addresses each interviewer by name. Coffee and filtered water are provided free of charge and a fridge and microwave are available on-site. A break room with a phone for local calling is available. Feedback from interviewers is given due consideration and their preferences regarding work hours and station assignments are respected in so much as it is possible. Any problems they experienced are given quick attention. Strong workers with a good attitude are rewarded financially and are given the opportunity to move-up within the organization. Recognition is offered daily for work well-done and feedback provided on how to improve. Daily postings on a large white-board keep all staff current on our progress and provide a quick way to make any announcements.

Weekly team meetings build morale and provide an opportunity to congratulate individual and team successes. Occasional team-based contests encourage performance and provide a bit of fun. Every Saturday donuts are provided before the start of the shift which gets the day off to a prompt start. Every other month (or so) a whole staff event with pizza or cake provides an opportunity for management to re-cap progress to date and make any significant announcements, as well as providing a chance to socialize. Holiday Season and end-of-the survey parties congratulate the success of the team and help build the foundation of staff that will want to return to future TTS projects. Another key element to building this foundation is the provision of personalized letters of reference to all deserving employees who finished the project. Taken as a whole, these elements have been found to build a real loyalty in a critical mass of interviewers.

The above considerations were in addition to the formation of a Health & Safety Committee to meet statutory workplace requirements.

5.7 Quality Control

Quality control of the information being collected was assured by the following procedures.

1. Logic checks performed by the DDE software
2. Monitoring of interviews while in progress
3. Review of all interviews done via the Web
4. Daily monitoring of interview performance statistics
5. Visual review of all completed interviews
6. Callbacks
7. Feedback from the coding process
8. Rotation of sample between interviewers
9. Random quality control audits

5.7.1 Logic Checks

The DDE software controls the flow of the interview, preventing the interviewer from moving on until a valid response has been entered for each question. At the completion of an interview, the software performs a second series of checks on the consistency and completeness of the information. A list of errors and warning messages appears on the screen prompting the interviewer to go back and make corrections immediately while the respondent is still on the phone. Any errors that are not corrected will appear on the printout of the interview for visual review by a supervisor.

5.7.2 Monitoring

All interview stations were equipped for monitoring, both auditorily and visually, by a supervisor. Newly trained interviewers were monitored more frequently than seasoned interviewers. The team leaders and their most experienced staff carried out monitoring. Any comments were recorded in writing. Minor problems were brought to the attention of the interviewer immediately, particularly if corrections to a just completed interview were required. Serious problems were reported to the team leader for appropriate corrective action. Items of particular concern were the interviewers' telephone manner and their ability to question respondents to ensure completeness and accuracy of information. Interviewers were warned not to lead respondents in their answers, not to make assumptions, and were coached on methods to encourage potential refusals to become completes.

5.7.3 Web Review

Every interview which was completed online was checked by an interviewer before it was deemed to be complete. Web completed responses from the previous day were streamed to designated interviewers during the next night-time shift for checks to make sure that all information entered online was valid and passed the standard logic checks. If errors were detected, attempts were made to contact the respondent for clarification and correction.

5.7.4 Performance Statistics

The sample control software produced data files that were read into Excel to print comprehensive statistics on interviews conducted by each interviewer, both daily and weekly. Team leaders and management staff could also display or print a historical record of any interviewer's weekly performance statistics. In addition to setting rates of pay, the performance reports served to identify other problems, such as below average trip rates and higher than average refusal rates, so that corrective measures could be taken. A sample report is shown in Table 5.3.

5.7.5 Visual Review

After each interview session, all of the completed interviews were printed out. The software used to print the interviews performed the same logic checks as the DDE software, flagging errors with appropriate messages. A supervisor visually reviewed every interview by looking at the error messages, the consistency and logic behind the information collected, and the manner in which descriptive information, such as trip destinations, was recorded. The printouts were sorted by interviewer within each team and the printing was done overnight so that the visual review could be completed before the next interview session. Problems and corrective actions were noted on the printouts.

A separate visual review was done for transit related errors by a staff person from the TTC and for school code errors by the geocoders. Most problems resulted from missing route descriptions in the look-up database or routes that did not connect. The sample control software was designed to prevent a household from being passed on for geocoding until a valid code had been assigned to every transit route used. Most problems were fixed by using the DDE software to amend the route description. In other cases, new route descriptions were added to the look-up database. Problems requiring callbacks were noted on the printout. The review of transit problems was generally done prior to printouts being reviewed by a supervisor.

Table 5.3 Typical Performance Printout

End Date - 28 - Nov																															
							PERCENT DISTRIBUTION OF CALLS																									
ID	Paid hours	Logged hours	Completions	Persons	Trips	Calls	Call Backs	Non English	Do it on line	No Answer	ans. mach.	Line Busy	Intrpt. Interv.	Invalid	Out of Service	Refused	Succ. Compl.	Edits	Intersections	Persons/ hhld	Calls/hour		Comp/hour		Trip Rate		Refusals / Refusals + comp.		Intersections		Perf. Score	
117CR	4	3.9	12	35	73	55	22		2	7	38	4			4	2	22			2.9	14		3.1		2.1		8%				5.8	
155ZP	4	3.5	8	16	35	102	25	1		11	39	1		1	12	2	8	1		2.0	29		2.3		2.2		20%				5.9	
163DP	4	3.8	9	31	48	87	18		2	11	49	3		1	1	2	10		2	3.4	23		2.4		1.5	*	18%		4%		4.6	
166SG	4	3.9	6	19	49	65	31	2		14	43				2		9			3.2	17		1.5	*	2.6						5.1	
178DF	4	3.8	9	28	50	36	22			11	33			3		6	25			3.1	10	*	2.4		1.8	*	18%				3.8	
185LP	4	3.8	7	13	28	76	20	1	3	28	30	3			1	5	9		1	1.9	20		1.9	*	2.2		36%	*	4%		3.8	
202SC	4.25	4.0	4	9	14	71	18	1		18	51	3			1	1	6			2.3	18		1.0	*	1.6	*	20%				2.6	*
203CB	4.25	3.9	8	22	45	44	7	2		11	55	2			2	2	18		3	2.8	11	*	2.0		2.0		11%		7%		4.0	
204MO	4	3.7	9	23	45	91	19	1	2	20	41	2		1	1	3	10			2.6	24		2.4		2.0	*	25%				5.1	
219NN	4	3.7	14	42	84	46	26			17	20	4			2		30	1	2	3.0	12	*	3.8		2.0				2%		6.6	
225SL	4	7.6	15	38	91	150	20		1	13	52	2		1		1	10		3	2.5	20		2.0	*	2.4		6%		3%		5.4	
229TF	4	3.8	8	21	29	103	12	1	2	14	59	2		2	1		8		1	2.6	27		2.1		1.4	*			3%		5.3	
230KP	4.25	4.0	12	32	80	63	16	3	2	11	38	3			6	2	19		18	2.7	16		3.0		2.5		8%		23%		5.9	
246MF	4	3.6	12	26	40	58	17	2		14	36	2			5	3	21		5	2.2	16		3.3		1.5	*	14%		13%		5.1	
261VB	4	7.5	18	59	133	147	18	1		8	56	1		1	1	1	12		3	3.3	20		2.4		2.3		10%		2%		5.5	
268MH	4.25	4.3	6	21	44	86	6	1	7	10	66					2	7			3.5	20		1.4	*	2.1		25%				3.7	
271LM	4.25	3.7	11	31	37	80	21			15	38				6	6	14		8	2.8	22		3.0		1.2	*	31%		22%		3.9	
300VS	4	3.8	10	26	67	78	23		5	12	35			1	5	6	13			2.6	21		2.7		2.6		33%	*			5.4	
327JT	4	3.8	12	33	87	80	9	3	1	34	34	3		1	1		15		5	2.8	21		3.2		2.6				6%		7.3	
349NM	3.75	3.5	7	14	22	44	23			16	32			5	5	5	16		3	2.0	13	*	2.0	*	1.6	*	22%		14%		2.9	*
361MP	4	4.0	7	23	67	64	22	3		8	45	2		3	3	3	11		2	3.3	16		1.8	*	2.9		22%		3%		4.8	
373SS	4	3.8	8	29	55	38	18		3	5	37	3		8		5	21		2	3.6	10	*	2.1		1.9	*	20%		4%		3.5	
375MM	4	3.8	10	34	56	96	13		3	19	44	5			4	2	10		6	3.4	25		2.6		1.6	*	17%		11%		5.2	
Team A	113	110.4	249	707	1442	1944	18	1	1	14	44	2		1	3	3	13	2	71	2.8	18		2.3		2.0		17%		5%		4.6	
Team B	108	112.5	249	677	1315	1944	16	2	1	15	41	3		2	2	4	13	4	92	2.7	17		2.2		1.9	*	26%		7%		4.0	
Team C	112	118.8	305	816	1673	2291	17	2	1	17	41	3		1	2	3	13	5	126	2.7	19		2.6		2.1		21%		8%		5.0	
Team D	99	98.1	225	587	1265	1784	12	3	2	21	37	4		1	2	5	13	3	41	2.6	18		2.3		2.2		28%		3%		4.5	
Daytime	115	76.2	112	295	593	438	13	4	1	11	35	5		2	0	3	26	4	8	2.6	6	*	1.5	*	2.0		10%		1%		3.0	*
Web Review	27	16.8	90	198	429	286	12	6		8	36	3		1	0	1	31		5	2.2	17		5.4		2.2		3%		1%		8.9	
Total	573	533	1230	3280	6717	8687	15	2	1	16	41	3		1	2	4	14	18	343	2.7	16		2.3		2.0		21%		5%		4.4	

5.7.6 Callbacks

Printouts requiring callbacks or clarification were given back to the respective interviewer before the next interview session began. Interviewers were notified, either by the notes on the printout or verbally by the team leader, of areas where improvements to their work could be made. The interviewers were required to make the callbacks during the course of the current shift, and to continue their attempts until the issues had been resolved. Corrected information was written on the printouts, which were then given back to a supervisor. Supervisory staff then made the corrections to the database using the DDE software.

If the original interviewer was not available to work the next session, the printouts were held until the following day. If the callbacks had not been made within two days then a supervisor would arrange for the callback to be made by an alternate interviewer. In some cases, callbacks were made by supervisors which provided an opportunity to check on the quality of the interviewer's work by speaking directly with the interview respondent.

5.7.7 Feedback from the Coding Process

Once all the visual reviews, callbacks and corrections had been made for a given interview date, the data for those households was moved to the coding database for geocoding. A series of computerised logic checks was performed on each household to ensure that the information being passed on was complete. Incomplete interviews, and those containing identifiable errors such as missing transit route codes, were kept in the review database and reprinted for further checking.

If the geographic information in the coding database proved to be insufficient or ambiguous, the coders had the option to flag the record for a new printout to be generated. The following day these printouts were returned to the interview teams for geocoding callbacks. Once callbacks were completed and the information clarified, the corrected printouts were given back to the geocoders for entry into the geocoding database.

Problems encountered in the geocoding process were monitored continuously and reported to the team leaders so that corrective action could be taken with respect to future interviews. The survey procedures were set up with the expectation that the geocoding would take place within 3 days of the interview. For the most part coding was able to keep up with the information being passed to it but there were delays in the review and edit process which sometimes resulted in a time delay much greater than 3 days.

5.7.8 Rotation of Sample Between Interviewers

In previous surveys, once a particular household was assigned to a computer workstation, all future contact with that household had to be from that station. By rotating interviewers at a particular workstation it was possible to observe problems in the way that a given interviewer had previously recorded information and how households had been dispositioned. Of particular concern was an interviewer scheduling callbacks for households instead of accepting refusals.

Improvements to the sample control software in 2006 specified 'ownership' of a household by interviewer ID, not by workstation. Once a household interview was initiated the same interviewer followed up with that household until it was completed, unless that interviewer was unavailable within the acceptable window of time that a repeat contact was scheduled. This allowed an increased efficiency in having the same interviewer complete all contact with a household with which they were familiar, but removed the check and balance of the previous workstation rotation framework.

Releasing sample into the general team queue could be forced by setting any given interviewer to 'fresh only' mode, whereby he/she only received previously uncontacted households. Interviewers were still instructed to report to their supervisors any problems in the way that previously collected information, or call disposition, had been recorded, however the new protocols greatly reduced the instance of this as no single interviewer was ever forced to wade through a collection of work from another single interviewer in the same way. The ability to assign one interviewer's pending work to another, single, interviewer would replicate the check and balance that was previously available in the work-station dependant model, and might be considered in future TTS.

5.7.9 Random quality control audits

Upper level management conducted ad hoc quality control audits at several levels during the interview process:

- Ad hoc real-time monitoring of interviewers including callbacks for additional information.
- Periodic review of team monitoring sheets to assess consistency of monitoring overall, ensure monitoring of each interviewer on a regular basis and identify reoccurring issues.
- Assessments of visual reviews for each team, and for each reviewer, to assess quality of work produced by each team and ensure completeness and correctness of comments provided by reviewing staff.
- Occasional supervisor callbacks to confirm and/or supplement data originally collected.
- Occasional confirmation of completeness of information entered by supervisors following requests for interviewers to gather additional information on paper.
- Duplicate assignment of ad hoc households to multiple geocoders to check for consistent coding methods.

5.7.10 Paper Management

The amount of paper generated in the processing and validating of households through the various stages of the survey is not insignificant. Great care is taken in tracking and organizing this paper, both as a means of being able to step-back through additional information and edits made to individual records, and for the purpose of maintaining the confidentiality of our respondents. Every page of every printout is collected, changes entered into the database and then re-sorted by team and interview date. Only when all the pages have been accounted for and relevant changes made are the households for any interview date passed to the next stage of the process. At the completion of the data collection portion of the survey, all of the printouts are shredded.

5.8 Answering Machines (Voice mail)

The terms answering machines and voice mail in this section, and elsewhere in this report, are used inter-changeably and refer to either answering machines or voice mail.

After some experimentation with the procedure for handling answering machines in 2006 the following procedure was used throughout 2011:

> CALL 1 – no message left, callback scheduled for next available week-day between 7:30 and 8:30 p.m. or during a Saturday shift if CALL 1 occurred on a Friday.
>
> CALL 2 (assuming CALL 1 encountered an answering machine) – no message left, callback scheduled for next week-day at 2pm.
>
> CALL 3 (assuming CALL 1 & 2 encountered an answering machine) – leave a detailed message with similar content to the advance letter. Advise the recipient that an interviewer will call that evening or the next day. Leave a phone number that the recipient can call to do the survey at their convenience.
>
> CALL 4 – same as CALL 1
>
> CALL 5 (final attempt) – message left stressing importance of recipient's participation in the survey with a request to call in to complete the survey.

A household was removed from the active calling queue under the following circumstances:

1. After the 8th call
2. After 5 consecutive no answers

These households were still available for completion if the household called in to complete the survey. Any household that reached this state and had any trip information was printed for review by a supervisor who could decide to further pursue gathering the data to make it complete.

Call-in From Voice Mail

In previous surveys, when a household called in it was necessary to take their phone number and have an interviewer call them from the particular workstation that contained their sample information. Improvements to the software for the 2006 TTS allowed respondents calling in to be interviewed immediately. Most of these calls were in response to the answering machine message. The call-in phones were staffed from 9 a.m. to 9:30 p.m. each day and from 10 a.m. to 2 p.m. on Saturdays. At other times a voice mail message was provided asking the respondent to either call back between those hours or, if the call was in response to a request for a specific piece of information, to leave that information on the voice mail. In 2011 and 2012, a total of 8 bounce lines were used in a dedicated call-in room. In both cases, a supervisor carried a cordless telephone for the last bounce line ensuring someone was always available to answer an incoming call during regular interviewing hours.

While this improvement streamlined the process from the perspective of the respondent, the interviewers lost the additional incentive to leave proficient messages in the hopes that the complete would come back to them by way of a respondent returning their personalized message. In future surveys returning call-ins to the interviewer who last made contact with the household in cases where the interviewer is present and the household is willing to wait to be called back would be advisable to increase morale on the floor and enthusiasm for leaving effective messages. Another option would be to track who left the last message and offer recognition through an increase in performance score (and possible resultant pay increase) or a fixed bonus amount.

5.9 Web Surveys

In 2011 it was possible for respondents to complete surveys online. The pre-interview letters sent out to households were personalized not only with the name of the household but also with a specific web-access code that allowed the household to access the survey online at our website tts11.ca.

Surveys started on the web were given a 48 hour window in which to be completed. On completion they were reviewed by an experienced interviewer on the floor to determine if they met our standards. If more information was required the household was called back. If they were started but not completed within the 48 hour window the surveys were also sent to an experienced interviewer on the floor who made a follow up call to the household in an attempt to obtain a completed survey.

Respondents who started surveys on the web also had the option of calling in to the survey site to get assistance from an interviewer in either completing the survey in which case the survey was transferred from the webDDE software to the call centre DDE for completion. They could also call in to clarify any questions which they needed help with in the online version.

5.10 Survey Interruptions

Unlike the 2006 survey there was only one localized interruption to the survey. In 2011, there was a transit strike in York region which started on October 24th and lasted until February of the next year. As a result of this transit strike, household sample in the York Region area was turned off within a day of the October 24th start of the strike and remained off (no interview letters sent, no calls to households in that area) for the remaining duration of the 2011 survey period. York Region sample was turned back on in 2012 for the second part of the survey and the required sample percentage in that area was completed for the entire survey.

5.11 Non-English Callbacks

The Direct Data Entry (DDE) software allowed the interviewers to schedule a callback to be made in a language other than English. The languages that could be specified were selected based on the frequency with which they were used in previous surveys. Those languages (and the total interviews in the 2011 TTS) were Cantonese (1,115), Mandarin (498), Italian (700), Portuguese (484), Spanish (250), Greek (234) and French (78). The category "Other" could be selected for other languages or if the appropriate language

could not be identified. Interviewers were instructed to specify the 'other' language, where known, in the comments. A report was generated, sorted by the language specified in the comments. Where possible, this report was distributed to interviewers proficient in the relevant language and in many cases the interview could be completed in the respondent's language of choice. The interviewers conducting non-English interviews did their own translation from the Standard English script. Households in the other category, where the required language was not identified or not spoken by one of our interviewers, were contacted by an experienced interviewer who would attempt to conduct the survey in English, in most cases with another member of the household from the one which was originally contacted. There was limited monitoring of non-English interviews.

A total of 1,292 interviews were completed in 'other' languages including: Arabic, Bengali, Bosnian, Farsi, German, Gujarati, Hindi, Hungarian, Korean, Lithuanian, Polish, Punjabi, Romanian, Russian, Serbo-croatian, Somali, Tamil, Tagalog, Ukranian and Urdu.

Households coded as non-English were available from any work-station within the team from which it was initially contacted, or from any work-station operating in 'call-in' mode. No special efforts were made to recruit a sufficient number of interviewers with non-English language skills, although early attempts were made to identify and encourage other language skills. In 2011 and 2012 we managed to have adequate amounts of interviewers on staff who could handle the non-English interviews including some interviewers who returned from 2006.

Section 6 Completion Statistics

Table 6.1 shows the number of completed interviews in the final database for the areas represented by each of the agencies. The table also includes dwelling unit and population counts from the 2011 Canada Census. The 2011 survey differs from previous TTS in that the data are expanded by population, not dwelling units. Initial comparisons between the survey data and the census revealed significant age bias most likely due to the use of listed phone numbers as the sample frame. Figure 6.1 shows the estimated sampling rate of census population by age cohort for the survey area as a whole. The estimated sample rates suggest that the sample frame likely included 75% of the population over age 63 but only 30% of young adults in the 18 to 32 age range. The population based expansion factors have been calculated using a combination of age cohort and geographic areas defined by postal codes. Table 6.2 shows the age cohorts used and the mean adjustment in expansion factor relative to using non-age specific expansion factors based solely on the number of dwelling units. The expanded dwelling unit counts shown in Table 6.1 were calculated by applying an expansion factor to each household equal to the mean of the expansion factors for the individual persons in that household. The sample target, 5% of households, was achieved or exceeded in all areas except the Region of Peel and the City of Barrie, both 4.8%.

Table 6.1 Completed Interviews by Agency

	2011 Census		TTS Records		Expanded Totals		Mean Expansion Factor	Mean Sample Rate	
	Dwelling Units	Population	Dwelling Units	Person	Dwelling Units	Person		Dwelling Units	Person
City of Toronto	1047880	2616785	51961	125518	1009444	2616785	20.85	5.0%	4.8%
Region of Durham	213675	608035	10841	28599	216904	608234	21.27	5.1%	4.7%
Region of York	323445	1032250	16580	49288	336857	1032741	20.95	5.1%	4.8%
Region of Peel	402930	1296820	19503	59133	414245	1297577	21.94	4.8%	4.6%
Region of Halton	179030	501670	8926	23190	183694	502026	21.65	5.0%	4.6%
City of Hamilton	203800	519950	10469	25274	204937	519811	20.57	5.1%	4.9%
GTHA	2370760	6575510	118280	311002	2366081	6577174	21.15	5.0%	4.7%
Region of Niagara	174665	431355	9246	21367	175077	431531	20.20	5.3%	5.0%
Region of Waterloo	191595	507095	10412	26762	186270	507458	18.96	5.4%	5.3%
City of Guelph	48120	121690	2474	6143	46935	121724	19.82	5.1%	5.0%
Wellington County	20420	56875	1503	4006	20795	56848	14.19	7.4%	7.0%
Town of Orangeville	10080	27975	589	1531	10403	27979	18.27	5.8%	5.5%
City of Barrie	49935	135710	2416	6106	50623	135793	22.24	4.8%	4.5%
Simcoe County	105750	277610	6114	14600	107543	277974	19.04	5.8%	5.3%
City of Kawartha Lakes	29685	73215	1592	3598	29918	73302	20.37	5.4%	4.9%
City of Peterborough	33435	78695	1670	3622	32977	78763	21.75	5.0%	4.6%
Peterborough County	16395	42960	1067	2548	16605	42983	16.87	6.5%	5.9%
City of Orillia	12970	30585	751	1663	12782	30653	18.43	5.8%	5.4%
County of Dufferin	10010	28915	507	1316	10625	28836	21.91	5.1%	4.6%
City of Brantford	37500	93650	1892	4551	37507	93648	20.58	5.0%	4.9%
Brant County	12935	35635	644	1589	13371	35640	22.43	5.0%	4.5%
Total excl. GTHA	753495	1941965	40877	99402	751431	1943132	19.55	5.4%	5.1%
Total survey area	3124255	8517475	159157	410404	3117512	8520306	20.76	5.1%	4.8%

Figure 6.1 Mean Sample Rate by Age and Gender

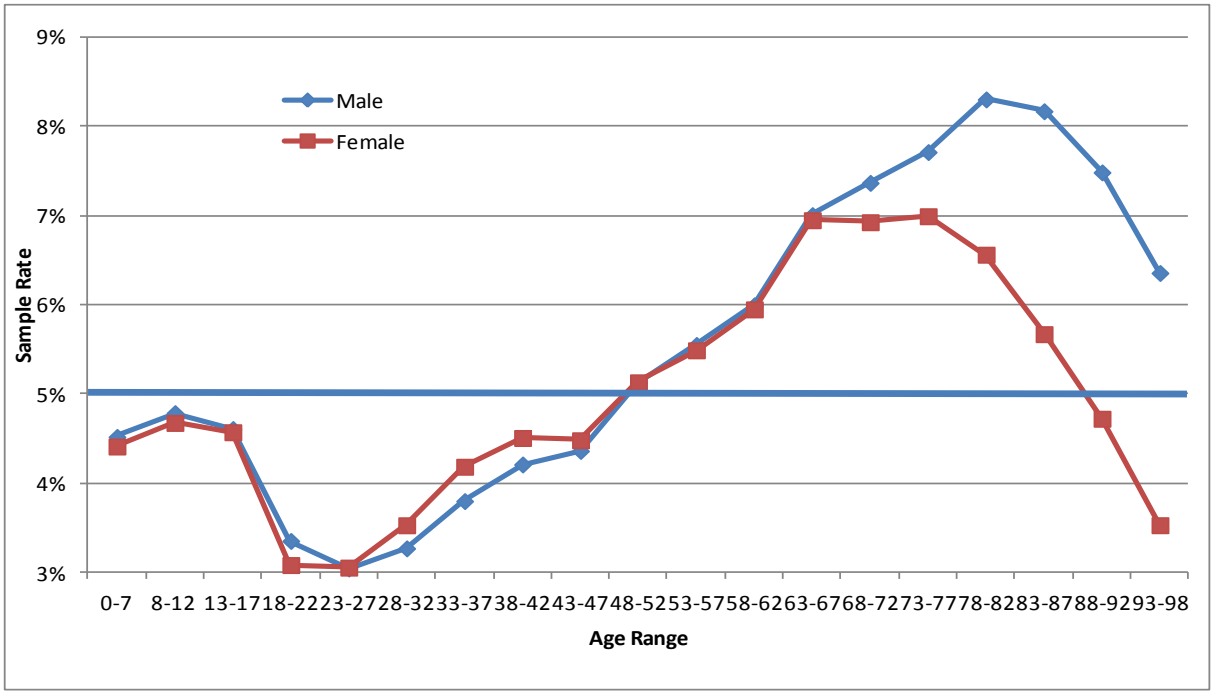


Table 6.2 Age Adjustment

Age cohort	Proportion of total population TTS	Census	Mean age adjustment
0-17	20%	21%	1.081
18-32	13%	20%	1.535
33-47	20%	22%	1.158
48-62	24%	21%	0.905
63-77	16%	11%	0.701
78+ Female	3.5%	2.9%	0.854
78+ Male	3.1%	1.9%	0.613

Preliminary comparisons made between the 1996 TTS and Canada Census data suggested that the survey underrepresented people in the age range of 18 to 22 years by 8%. The same age group was underrepresented by about 11% in the 2001 TTS. In the 2006 survey, the age group of 18 to 27 was underrepresented, based on comparison to Canada Census data, by an average of 20%, and the age range of 28 to 37 were under represented by an average 10%. In 2011 the 18 to 32 age group is estimated to be under represented by 35% and the 63 to 77 age group over represented by 45%. Possible explanations for the increasing age distribution discrepancy between the TTS and the Census include:

1. The increasingly widespread use of cell phones. Most cell phone numbers are not listed and are therefore excluded in the sample selection. Their exclusion is not a

problem for those cell phones which are used in addition to a household's regular land line. However if cell phones are used as a substitute for land lines it could result in an underrepresentation of some segments of the population in the survey results.
2. Expansion of the “Do not call” list excluded from the sample frame.
3. It is not known to what extent the phone listings from which the sample was drawn are completely up to date with respect to students moving into new homes or residences at the start of the school year.
4. People who are frequently out in the evenings are harder to contact and are therefore less likely to be surveyed than those who remain at home.

The under or overrepresentation of one age group creates the potential for bias in the survey results to the extent that the travel patterns and behaviour of that age group differ from the population as a whole. While the age bias can be identified and corrected for, at the person level, by comparison with the census, there may well be other socio-economic factors not identified that affect the likelihood of a person being included in the sample frame and responding. The potential for hidden unidentified biases in the survey results is therefore greater than in previous surveys.

Table 6.2 gives a summary of the combined completion statistics for the 2011 TTS. The numbers shown for the 1996 TTS are not exactly comparable because of the change in procedure with respect to answering machines. Starting in 2001, the inclusion of most answering machines in the "sample used" sub-total is done to give a better measure of contact and completion rates but leads to an overstatement of the difference in those rates relative to the 1996 rates.

The refusal rate in 2011 (24.2%) was lower than in 2006 (26.6%) but higher than in 2001 (21.1%) and 1996 (21.8%). The completion rate (48.9%) was higher than in 2006 (45.7%) but significantly lower than in 2001 (64.1%) and 1996 (68.9%). The sample for the 2006 survey was obtained from a different supplier than the sample for the other 3 surveys including 2011. The experience with the initial sample for the 2011 survey, obtained from the same supplier as the sample for the 2006 survey, contained a high proportion of errors and invalid households. If there were similar problems that went undetected in the sample for the 2006 survey that would have reduced the completion rate for that survey. In addition the inclusion of apartment numbers in the mailing addresses for the 2011 survey would have contributed to a lower refusal rate and higher completion rate relative to the other 3 surveys. The fact that the 2011 refusal and completion rates were only marginally better than in 2006, and significantly worse than the previous surveys, suggests that the problems associated with obtaining an unbiased response to the survey continue to deteriorate.

Table 6.3 Completion Statistics

Total sample	416,917					
Not used (no letter)	71,376					
Letters mailed	345,541					
Not attempted	13,801					
Incomplete	6,070					
Sample used	333,939					
Rejected (Invalid or no contact)	115,625	**2011**	**2006**	**2001**	**1996**	
Valid Contacts	207,082	60.0%	62.0%	81.2%	88.0%	of sample used
Refusals	54,314	24.2%	26.2%	21.1%	21.8%	of valid contacts
Completed interviews	152,768	48.9%	45.7%	64.1%	68.9%	of sample used
Rejected in review	?		844	857	849	

		2011	**2006**	**2001**	**1996**	
Households	159,157	-	-	-	-	
Persons	410,404	2.58	2.68	2.74	2.72	per Household
Trips	858,848	2.09	2.15	2.19	2.13	per Person
Transit trips	87,244	-	-	-	-	

The number of completed interviews excludes approximately 6,400 completed on line without follow up contact. Refusal rate, calculated as: Households who refuse/(households who refuse + households who complete).

In 2006 the completion rate was estimated to be from 20% to 35% lower, depending on the geographic area, for apartment units than for single family dwellings with the biggest difference in Toronto. Analysis of the difference in completion rate for the main sample in the fall of 2011 revealed a difference of only 9% for the survey area as a whole and 6% in Toronto. The dramatic improvement is most likely due to the inclusion of apartment numbers in the address information used to mail the advance letter underlining the importance of the letter in achieving a good response rate. The use of selected sampling rates in 2012, based on dwelling type as well as postal area, further reduced the potential for survey bias associated with dwelling type in both the sample frame and response rates. As a result dwelling type has not been a major issue in the expansion of the survey data as it was in the 2001 and 2006 surveys.

In 2006 the low response rate from multiple unit dwellings appeared to be the primary reason for the lower completion rate in Toronto relative to the other areas. Figure 6.2 shows the location of the 24 FSAs within Toronto with a completion rate of less than 40%. By comparison in the 2001 TTS there were only 8 FSAs (M6E, M5V, M6J, M6K M5S, M5T, M5G and M3N) within Toronto with a completion rate less than 40%. The number outside Toronto was 7 (L8L, L1H, L6G, L9M, N3V, L4T and L8N) compared to 6 in 2006.

Figure 6.2 2006 Completion Rates for Toronto Postal Areas

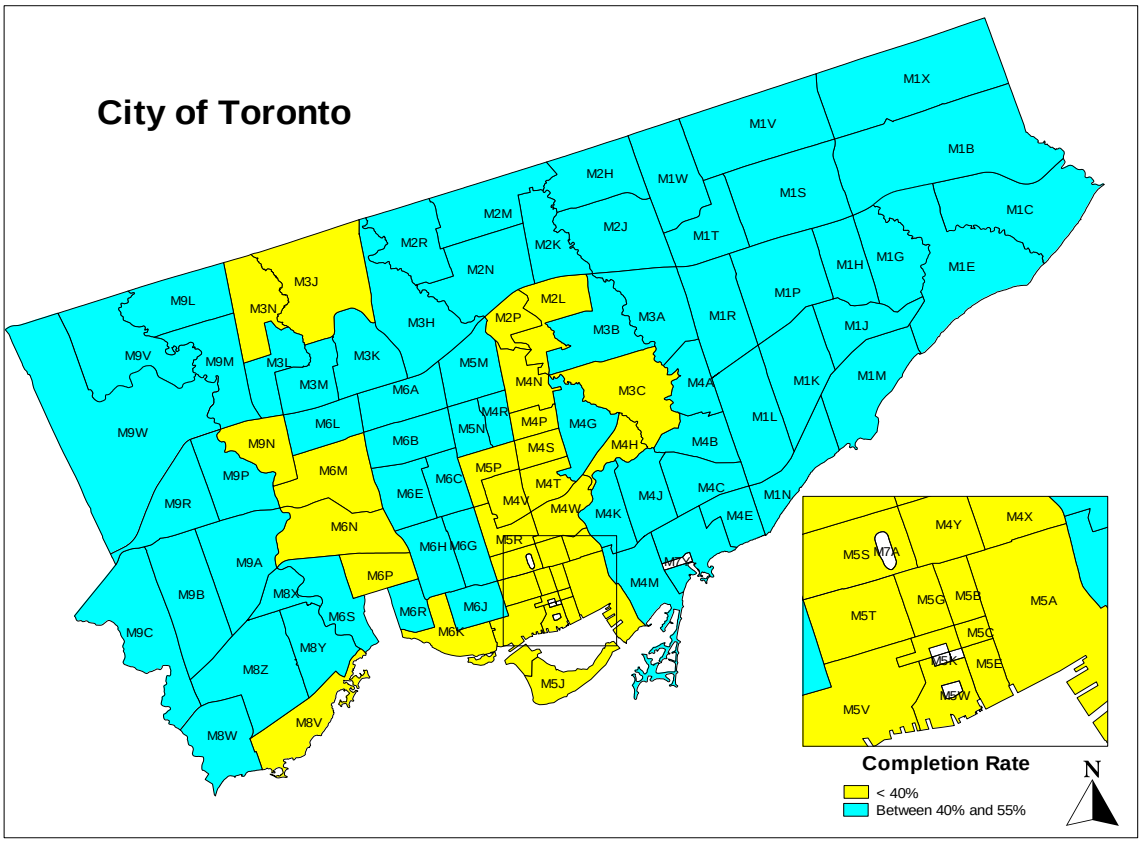


Table 6.4 shows the outcome of all of the phone calls that were made during each of 2011, 2006, 2001 and 1996 surveys. The most significant trend is in the number of calls that either resulted in no answer or contact with an answering machine. The combined total of these categories increased from 42% of the calls placed in 1996, 49% in 2001, 52% in 2006 to 56% in 2011. A substantial increase was also noted in 2006 and 2011 for line busy (3%, up from 1% in both 2001 and 1996) and out of service (2%, up from 1% in both 2001 and 1996). The number of callbacks, both English and non-English has remained relatively constant between 18% (in 2011) and 21% (in 2001). 1% of the people contacted in 2011 indicated that they would prefer to do the survey on line. That option was not available in the previous surveys. The net result is that the average number of calls that had to be placed to obtain each completed interview in 2011 was only marginally higher in 2011 than in 2006 but 50% more than in 2001 and 90% more than in 1996. Including the interviews completed on line without any follow-up phone contact would reduce the average number of calls per completion in 2011 to 6.8 which is slightly less than in 2006. Completions which were started on-line but required follow-up phone contact would also have required fewer than average calls to complete. Not having the option to do the survey online would almost certainly have increased the average number of calls per completed interview.

Table 6.4 Disposition of Phone Calls

Phone calls	2011 TTS		2006 TTS		2001 TTS		1996 TTS	
Out of service	25,325	2%	25,171	2%	5,543	1%	4,527	1%
Invalid	17,720	2%	22,261	2%	8,877	2%	9,279	2%
Line Busy	28,736	3%	33,094	3%	7,080	1%	5,487	1%
No answer *	192,094	18%	172,749	17%	128,529	27%	80,271	20%
Answering Machine								
Message left	97,410	9%	228,545	22%	104,025	22%	90,315	22%
No message left	311,829	29%	135,051	13%	*		n/a	
Call back								
English	169,584	16%	184,202	18%	89,680	19%	68,270	17%
Non-English	24,507	2%	22,871	2%	10,716	2%	6,742	2%
Will do it online	15,129	1%						
Interrupted					184	0%	464	0%
Refused	50,886	5%	51,024	5%	25,231	5%	31,260	8%
Complete**	153,160	14%	147,154	14%	101,568	21%	109,204	27%
Total	1,086,380		1,022,122		481,433		405,819	
Calls per completion	7.09		6.95		4.74		3.71	

*The 2001 No answer count includes an estimated 50,000 to 65,000 answering machines that were recorded as no answer and are not included in the answering machine count.
**The 2011 complete total excludes approximately 6,400 interviews completed on line without follow up contact.
The 2001 totals are based on the fall 2001 component only.
The 2006 totals are based on the main survey periods of Sep 12 '05 to Feb 9 '06 and Sep 6 '06 to Jan 24 '07

Table 6.5 shows the number of completed interviews by trip day of the week. Trip data for Fridays were collected on both Saturday and Monday except on the occasional Saturday when Thursday trip data were collected to limit the overrepresentation of Friday trips.

Table 6.5 Completed Interviews by Trip Day

Trip Day	% of Completes	Trip rate
Monday	17.8% (17.4%)	2.06 (2.10)
Tuesday	17.4% (19.4%)	2.08 (2.13)
Wednesday	19.3% (19.2%)	2.09 (2.13)
Thursday	22.7% (21.1%)	2.11 (2.14)
Friday	22.8% (22.9%)	2.13 (2.22)

(2006 rates as published in 2006 Design and Conduct of the Survey Report are displayed in brackets)

Figure 6.3 shows the number of interviews completed by day in 2011 and compares it with the corresponding day in the 2005 survey. Figure 6.4 provides the same comparison between 2012 and 2006. Figure 6.5 shows the cumulative totals. Figure 6.6 shows the completed interviews per paid hour in 2001, 2006, 2011 and 2012. Interviewer productivity averaged 2.7 completed interviews per paid hour in 2011 and

2.2 in 2012. The reduction in productivity in 2012 towards the end of the survey can be attributed to a concentrated effort to clean up incomplete interviews and increasing concentration of the sample in those areas with a low response rate as required to obtain the required number of completions in those areas. Those rates compare with an average of 2.83 completed interviews per hour in 2006 and 3.42 in 2001 although rates are based on logged hours on the computer as opposed to paid hours. Although logged hours are generally less than paid hours most of the difference can be attributed to the escalation in the average number of calls required to achieve each completed interview.

Figure 6.3 Completed Interviews by Day - 2011

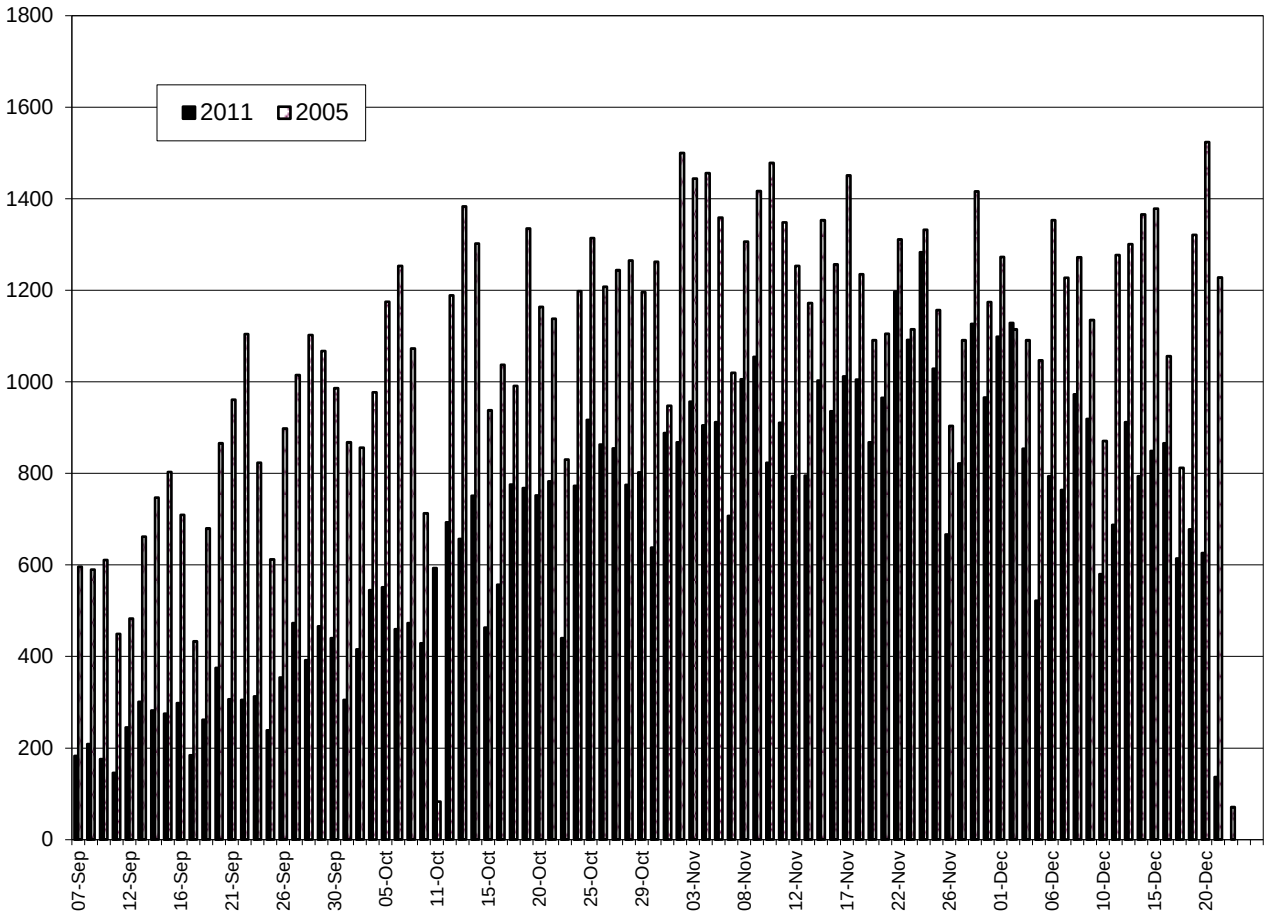


Figure 6.4 Completed Interviews by Day – 2012

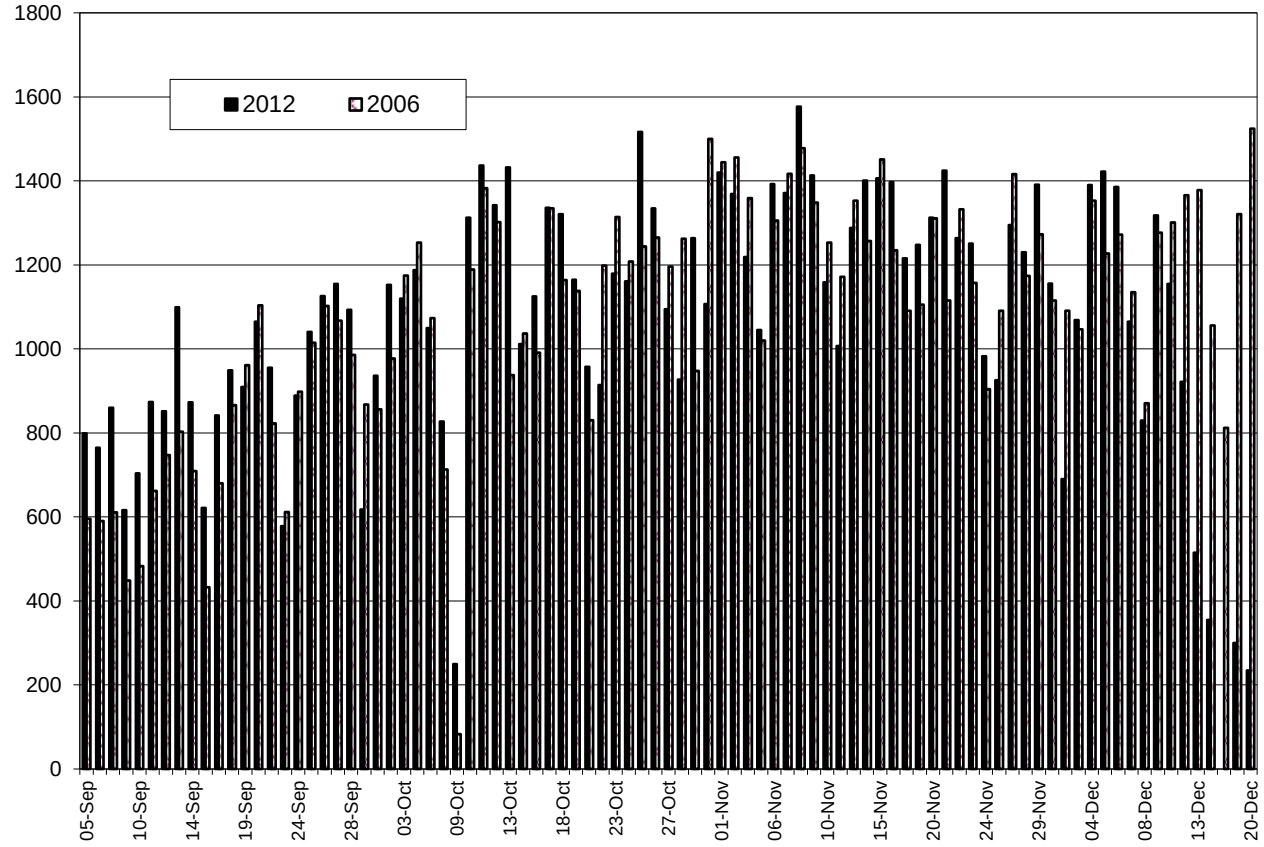


Figure 6.5 Completed Interviews – Cumulative Totals

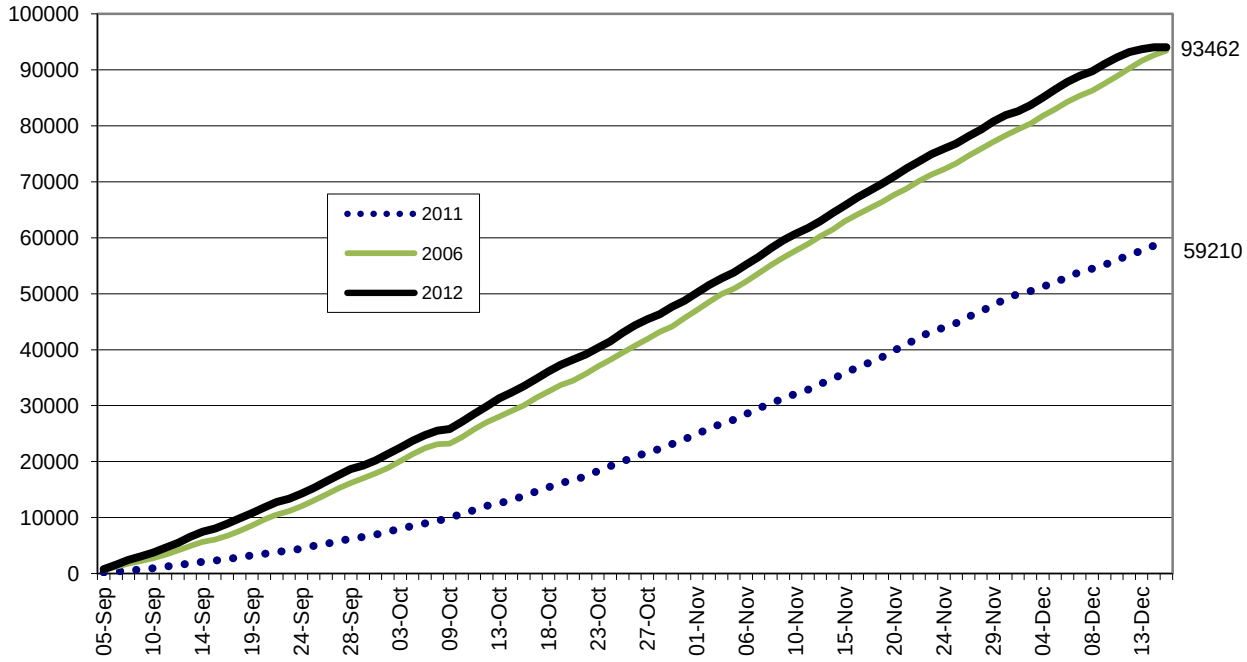
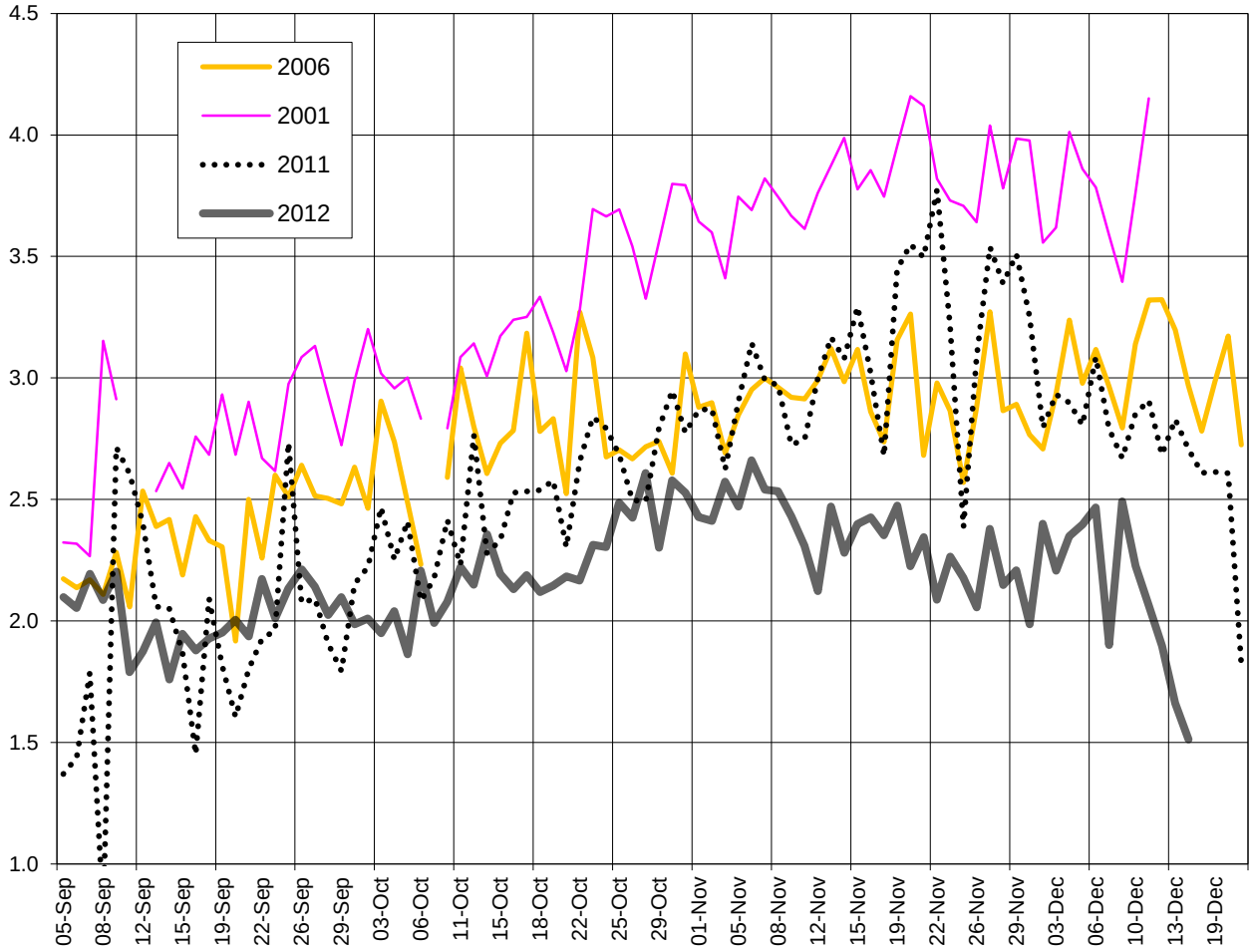


Figure 6.6 Completed Interviews per Paid Hour



6.1 Web survey completions

The ability to complete the survey online was new for 2011. Each pre-interview letter which was sent to all households included a unique web-code for each individual household.

Of the 159,157 completed households collected in the 2011 TTS approximately 17% (26,863 records) used the web interface at some point during the survey. Table 6.6 summaries the web interface usage by region. For those completed households that used the web interface:

- 61% started the survey using the web interface before any telephone calls were made
- 73% finished the survey using the web interface with or without follow-up telephone calls

Table 6.6 Web-Survey Usage by Region

Region	Use Web
Toronto	18%
Durham	16%
York	18%
Peel	16%
Halton	20%
Hamilton	15%
Niagara	16%
Waterloo	18%
Guelph	18%
Wellington	16%

Region	Use Web
Orangeville	13%
Dufferin	16%
Barrie	13%
Simcoe	13%
Orillia	15%
Kawartha Lakes	14%
Peterborough City	14%
Peterborough County	14%
Brant	15%
Brantford	14%

Figures 6.7 and 6.8 show the usage of the web in comparison to the non-web completed interviews over both years of the survey

Figure 6.7 2011 Interview Responses

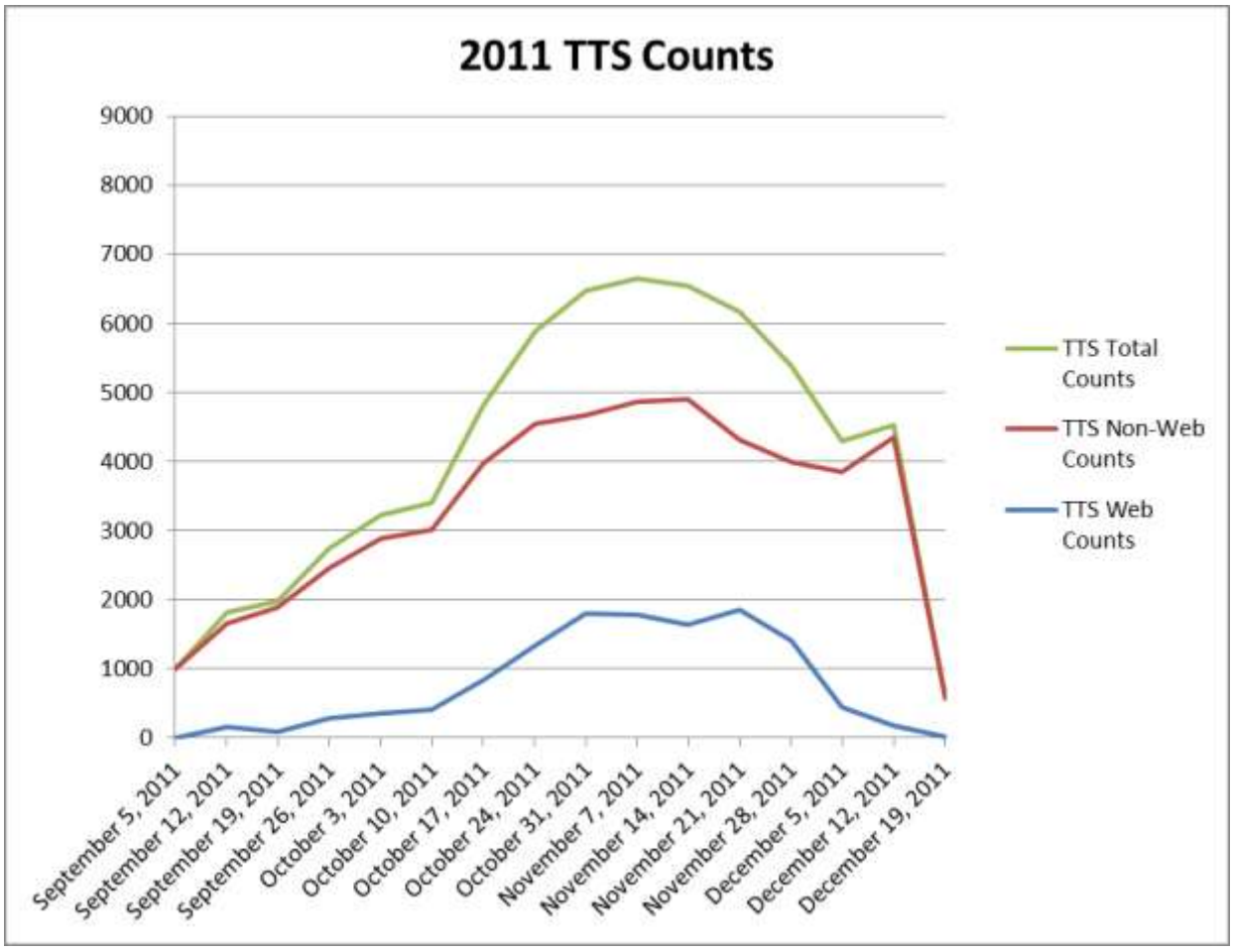
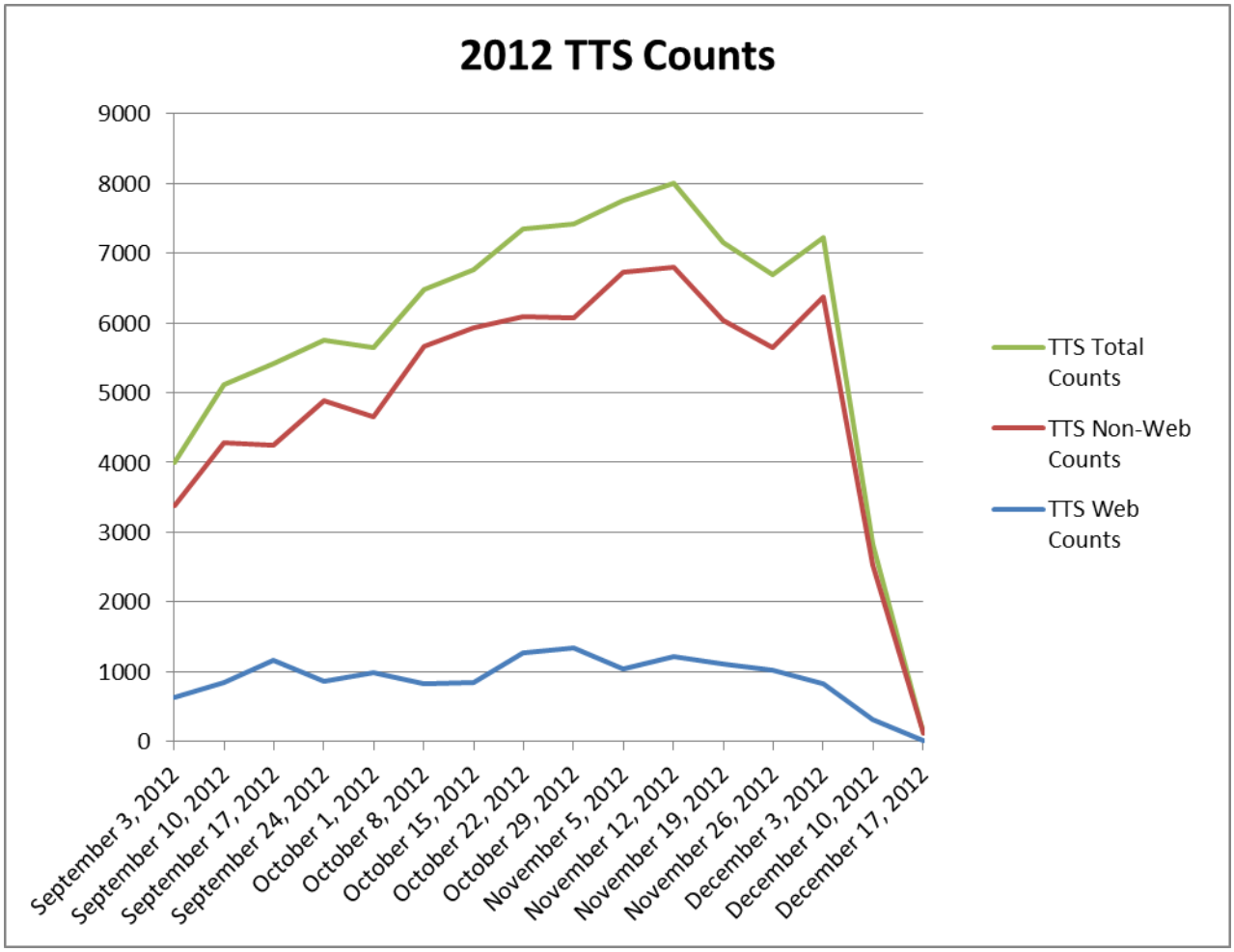


Figure 6.8 2012 Interview Responses



Section 7 Coding

7.1 Staffing and Training

In 2011, recruiting of geocoders started during the first week of live interviewing in September. There was an issue with the coding software but 3 initial coders were hired to perform manual checks. For 2011, a total of six coders were hired from approximately 10 who were interviewed.

In 2012, we were able to retain three of the coders from 2011 and started recruiting for a full complement of coders in August. Approximately 15 applicants were interviewed and 9 of those 15 were retained. At its maximum in 2012 we had 9 to 10 coders on staff. Coding positions were advertised through the University of Toronto, University of York and Ryerson University's employment placement centres with emphasis on computer and geography knowledge for applicants. Nearly all of the coding staff had a University education with the majority coming from Geography, Engineering and Computing backgrounds. In addition, two interviewers joined the geocoding team during the survey.

Training for the coders took 2 days, with a formal ½ day session at the beginning where coders were introduced to the project and what was required of them. The coders were introduced to the geocoding console program and trained to use reference material such as telephone books, internet search engines and paper maps. This was followed by more training where the coders were allowed access to the geocoding console and worked on interviews collected during the interview training period. During this period the trainee coders were supervised by one or more of the senior coders.

Some of the coders were also trained to perform visual review and edit corrections in the early stage of the 2011 survey in order to reduce the load of the non-interviewing component on the day-time interviewing staff. Since coding was the last part of the survey process, extra effort was placed in stressing accuracy of information. The pay rate for coders started at $12 per hour and was increased to $13 per hour in November 2011 for most coders. By the end of 2012, two senior coders were making $15 per hour and assisting in setting up the geocode reference database, training of the new coders and some administrative and site computer work.

The coding staff was hired in stages throughout September and November of 2011 and August and October of 2012 and there was minimum turnover in both years.

7.2 Coding Activity

7.2.1 Coding in 2011

The coding plan was to geocode survey records within three days of the interview. The shorter the turn around time the better it would be for callbacks if households had to be contacted again to clarify information.

In the 2011 segment of the survey however it was not possible to fully geocode the interviews within three days of their completion. There was an issue with the reference update for the Geocode console software which rendered the software unusable and

hence coding took a different course. During the interview phase, instead of using the Geocode console during the actual interview phase, coders worked on hardcopies of the previous night's interviews. Using a combination of GIS software, paper maps and internet search engines to check locations on the interview sheets, an emphasis was placed on ensuring that home, work, school and other trip locations were codeable. If they were not, the household interviews were sent for callback. This paper coding process was done before the interviews were passed on to the daytime visual review staff and hence was done in a limited time frame usually until 1 p.m. to 2 p.m. on the day after the interview although as more interviews were completed daily the time frame to complete took longer.

When the Geocode console was ready in January 2011, the completed interviews were then completely coded using this software. The completed interviews were divided into 63 geozone areas and coders were assigned to specific zones allowing them to develop better knowledge of their section of the survey area. No significant problems were encountered using this method of coding as most of the issues had been addressed in the initial paper coding process. Coding was stopped in April 2011 even though all records had not been finished coding. The remaining records were left to be coded in August-September to get the new coding staff up to speed.

From September until November the paper coding was done by the 3 coders plus the coding manager. Two more coders were added in early November to bring the complement to 5 coders as the number of daily interviews increased. Four of these coders remained on staff after the interview phase was completed. These four coders plus two interviewers who joined the group after the interview phase were responsible for the final coding using the geocoding console.

To ensure the quality of geocode work was of a high standard geocoded households were randomly checked by the geocoding manager every day.

7.2.2 Coding in 2012

In 2012, the geocoding staff started in mid-August coding the remaining 2011 interviews plus the interviews collected during interview training in August so that when interviewing in September started they would be up to speed. The goal again was to geocode within three days of the interview. However, the review and edit stage of the interview process at times took longer than anticipated because there was a large volume of work to process and many of the interviewers did not work consecutive days.

Completed interviews were assigned to one of the 63 geozones and coders were assigned households to work on based on the geozones, number of households available for coding in the specific geozone and the update status of the available interviews (households just passed in from reviewing first, then the oldest in the backlog). This was done to allow newer data to be processed ahead of the existing backlog to facilitate geocoding callbacks occurring as early as possible. Given this structure and the fact that some geozones had more households than others, some balancing of coding resources was necessary to ensure the strategy was adhered to.

Geocoding was done between 9 a.m. and 5 p.m. daily. This allowed sharing of the machines between geocoding and interviewing staff. Interview completions did not reach a maximum until sometime in mid-October. At this time coding was required for a

large volume of households on a daily basis. For the most part the coding staff was able to keep up with the required schedule without too much difficulty.

At the end of the interviewing portion of the survey, five coders stayed on to assist with additional coding and other post-processing clean-up and validation work.

7.2.3 Reference Update

The geocoding console needs regular updates of the monument and school reference database files. In 2006, a procedure was put in place where coders made a list of new monuments and schools which needed to be added and these were then passed on to one of the senior coders who double checked the information before adding the locations that were necessary to the database. This was done by manually updating the text files that went into the reference database.

One of the additions to the geocoding console in 2011 was a new reference update interface. This interface allowed the user to see where a location was in space using a GIS interface and also code it using the geocoding software's street network information if the address existed in the street network. If the address wasn't in the street network the software also allowed a user to manually input the coordinates for the location and confirm that the entered coordinates were spatially correct.

This allowed reference update to be done both more accurately and more efficiently as all coders were trained on how to use the new reference update add-on although a senior geocoder still performed a check on all reference updates before they were integrated into the reference databases.

7.3 Post-Processing

Once geocoding was completed, the households in the TTS database were passed to a final post-processing phase. In this phase, checks were performed to search for miscoded locations, uncodable locations were removed and extensive logic checks were performed on the locations and information contained in the database to make sure that the data was correct. This process was used to identify any errors that may have gotten past the previous stages of data processing.

The first step in this process was a batch process run on all completed households in the database to check for errors in logic or geocoding errors. If potential errors were found in the household they were flagged and the households sent for manually checking. If no errors were found the data was placed into a final state in the database.

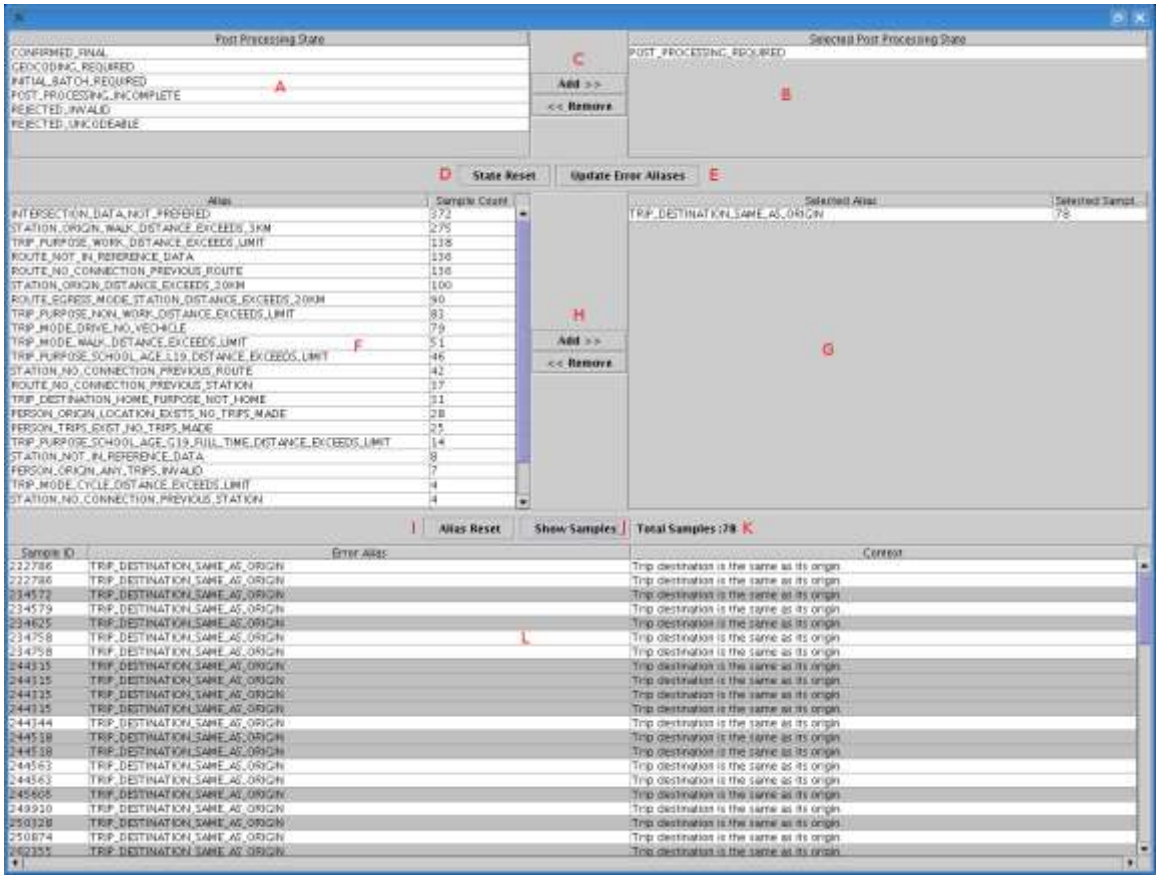
Some of the logic checks performed on the data during this batch process include (but weren't limited to) checks for:

- Walk or cycle trip distances which were longer than thought to be valid
- Trip speeds which were excessive
- Lengthy access or egress distances from transit transfer points
- Extremely long school and work trip distances
- Transit routes not connecting

This process produced a list of potential errors to be manually reviewed and recoded as necessary. Figure 7.1 illustrates how post-processors used the DDE to identify households to work on:

A Post-processing states available to search.
B Selected post-processing states. Only samples in these states will be shown in the sample summary table (L).
F List of error aliases and their frequency (count of sample occurrences) that exist in the selected post-processing states (B). If the error alias is moved into the selected error alias list (G) then it will not appear in this list.
G Selected error aliases that samples will be displayed for in the sample summary table (L).
K Shows the total number of samples that match the assigned post-processing state list (B) and the assigned error alias list (G).
L Lists the sample summary information for the samples that meet the requirements of the selected post-processing state (B) and error alias data (G). An alternating colouring pattern is used to differentiate between different household samples. Selecting a row will provide the option to review the history of the sample and to check-out a specific version of the household.

Figure 7.1 Post-Processing DDE Screen



7.4 Statistics

A location was geocoded by one of three methods:

1. Cross referenced to another location field (i.e., trips to home, usual place of work or usual place of school)
2. batch processing or
3. interactive geocoding.

Table 7.1 is a breakdown of coding methods (i.e. address type) for different surveyed information (i.e. location type).

In 2011, no records were coded to Traffic Zone. Overall less than one percent of the records were coded to the more general Place Name address types and 74% of the records were coded to Street Address which is the type of accuracy that was strived for. This is about the same as the 75% recorded in 2006. There was a large increase in the percentage of records coded as monuments and a corresponding decrease in the percentage coded as intersections singling an increase in the accuracy of the coding and also probably reflecting the increased usage of the monuments file due to the easier reference update process as detailed in the previous sections.

Table 7.1 Location type versus Address Type

Location Type	Street Address	Intersection	Monument	School	Place Name	Total
Home	158,268 (99%)	113 (0%)	731 (0%)	-	45 (0%)	159,157
Work	140,383 (79%)	14,118 (8%)	22,971 (13%)	-	1,049 (1%)	178,521
School	1,090 (2%)	-	56,561 (98%)	-	-	57,651
Destination	623,681 (73%)	57,500 (7%)	173,044 (20%)	-	4,623 (1%)	858,848
Total	923,422 (74%)	71,731 (6%)	196,746 (16%)	56,561 (5%)	5,717 (0%)	1,254,177

Section 8 Survey Budget and Costs

The total budget for the survey was $3.692 million including: software development, conduct of the survey, preparation of the final database, production of a series of Working Papers and production of the following three Reports:

Design and Conduct of the Survey
Data Guide
Validation

The Data Management Group undertook the preparation of:

2011, 2006, 1996 and 1986 Summary of results for the entire survey area
2011, 2006, 1996 and 1986 Summary of results for the GTHA
2011 Summary of results for the GTHA by Ward

The original budget estimate for all aspects of the survey up to the presentation of results was:

$2.784 million for the areas within the Greater Toronto and Hamilton Area (GTHA),
$0.884 million for the areas outside the GTHA but within the survey area.

The cost sharing agreement in the GTHA was for Metrolinx to cover 6% of the GTHA budget, and of the remainder the Ministry of Transportation would cover 60% with the remaining 40% covered by the Regions in proportion to their 2001 population. Outside the GTHA the participants were to be charged on the basis of the number of successful completions with the Ministry of Transportation covering 65% of that cost. In addition, all participants were to be invoiced in accordance with their wishes with billings in 2010, 2011, 2012 and 2013.

8.1 University Overhead and Taxes

The overhead charged by the University of Toronto was 40% of University staff staffing costs and 2% of other expenditures. These overhead charges helped cover the cost of providing the Data Management Group office facilities, general supplies and secretarial services. University staffing costs includes the fees charged by the Project Manager but excludes the interviewers, coders and supervisors hired specifically for the survey. The appropriate amount of University overhead has been included in the individual itemised costs in the following sections.

8.2 Cost Summary and Comparison with Previous Surveys

Table 8.1 provides a summary of expenditures incurred in the conduct of the 2011 Survey together, for comparison, with the same information for the 1996, 2001 and 2006 Surveys. The costs incurred for interview and coding staff in the 2011 Survey are the net of payroll expenditures including fringe benefits and payroll taxes. The staff were hired and paid by Peter Dalton Consulting, who invoiced the Data Management Group for the

net amount of the payroll cost plus 4% to cover the cost of administration and interim financing.

Table 8.1 Actual Expenditures for TTS's in 1996, 2001, 2006 and 2011

	1996	2001	2006	2011
Software Development and Testing	$233,000	$21,000	$163,000	$115,000
Interviewing Staff and Training	$714,000	$1,076,000	$1,369,000	$1,600,000
Coding Staff and Training	$132,000	$143,000	$223,000	$235,000
Computer Hardware and Software (Net after sales)	$123,000	$11,000	$65,000	$86,000
Telephones (Equipment and Charges)	$24,000	$94,000	$183,000	$160,000
Printing and Mailing	$73,000	$120,000	$208,000	$225,000
Office Space and Furniture (Security in 1996)	$86,000	$187,000	$266,000	$400,000
Sample	$19,000	$31,000	$34,000	$35,000
Office Expenses and Supplies	$25,000	$26,000	$16,000	$17,000
Management and Coordination	$636,000	$414,000	$523,000	$482000
Computer Support	$0	$0	$0	$293,000
Post Survey Processing	$309,000	$300,000	$101,000	$20,000
Total Cost	$2,374,000	$2,423,000	$3,151,000	$3,668,000

8.2.1 Software Development and Testing

The computer software used in the 2011 survey was first developed for the 2006 TTS. Updates were made to accommodate the two new questions added in the survey and improvements were made for better reference data update. With the introduction of a web based alternative of data collection, the Data Management Group undertook the pilot testing and preliminary design. The 2011 TTS undertook the development of the operational web based data collection component and incorporated it into the main suite of data collection software.

8.2.2 Interview Staff and Training

The management team anticipated the difficulty with the productivity of interviewing staff due to call screening and were able to minimize the growing trend with intensive training and interviewer incentives. In addition, the introduction of the online survey introduced a productivity gain when an interviewer called a household that had tried the online procedure but required assistance. The result was a household already familiar with the survey and usually willing to participate.

8.2.3 Coding Staff and Training

Problems with the Geocoding Console continued to influence the productivity of coding staff in the 2011 TTS. However, once the Geocoding Console was fully operational in 2012, the productivity of coding staff was then sufficient to almost match the productivity of previous surveys. The result had an impact on the need for computer support to finalize the software but the impact on the cost of coding staff was minimal.

8.2.4 Computer Hardware and Software

The combined cost of computer hardware and sale of equipment in 2001 was unique as the purchases occurred just at the time agencies were disposing of hardware in anticipation of a problem when the date changed to the year 2000. The combined cost in 2006 was a reflection of the true cost of purchasing and disposing of computer hardware, in particular, the personal computers used by the interviewers. Approximately half of the computers, which satisfied the needs of the first phase in 2005, were purchased as used equipment from a University of Toronto computer laboratory. After two years of use (2005 and 2006) on TTS these computers had limited resale value. The cost of computer equipment in the 2011 TTS reflects the purchase of used equipment from the University of Toronto and a private vendor. Similar to the 2006 TTS, these computers had very limited resale value after an extra two years of use.

8.2.5 Telephones

The cost of telephone equipment in 2006 was reduced somewhat by recycling some telephones from the 2001 TTS. However, many of these sets encountered an unacceptable failure rate and had to be replaced. Again in 2011, some telephones were recycled from 2006 but a large number needed replacement. The telephone lines and long distance charges were organized through the Ministry of Government Services with the advantage that call display indicated the call was associated with the Government of Ontario.

8.2.6 Printing and Mailing

The increased cost of printing and mailing in the 2006 Survey reflects two things. The first is that more pre-interview letters were required because of the call screening mentioned above and because of difficulty reaching apartment dwellers, particularly occupants of large apartment complexes. Due to a restriction imposed by the Canadian Radio-television and Telecommunications Commission, apartment numbers were not included in the sample detail. In an effort to overcome the poor response rate from apartment dwellers, a larger sample was used for dwellings in this category. A decision was also taken to use 3rd class mail rather than the less reliable bulk mailing. In 2011, the sample contained apartment numbers, however, the cost of postage increased and the lower contact rate required more pre-interview letters. The complexity of adding a unique access code to each letter also increased the cost.

8.2.7 Office Space and Furniture

The cost of office space and furniture reflect the cost of renting commercial office space. In 1996, the Metropolitan Toronto Planning Department provided office space and furniture as part of their contribution to the cost of the survey. The amount shown is the net amount of the credit they received under the cost sharing agreement with the other agencies. The cost of office space in the 2001 survey reflected a reduced cost of occupying space at 500 University Avenue that was available during a change of use. The costs in 2006 and 2011 reflect the true cost of commercial space in central Toronto.

8.2.8 Sample

The cost of purchasing a sample from a commercial listing service has been very similar over the last three surveys (2001, 2006 and 2011). The listing service used in 2011 was the most knowledgeable and cooperative.

8.2.9 Office Expenses and Supplies

The Management Team made a conscious effort to reduce office expenses in 2006, which continues for the 2011 TTS.

8.2.10 Management and Coordination

The cost of Management and Coordination after 1996 reflects the active participation of staff from the Data Management Group. In addition to reducing the management cost, the participation increases the knowledge DMG staff brings to the distribution of results. The need to extend the survey period into January and February in 2007 accounts for the increased management cost in the 2006 TTS.

8.2.11 Computer Support

The introduction of a web based data collection method in 2011 introduced a new level of computer complexity that was beyond the capacity of the Data Management Group. The 2011 TTS absorbed the cost of developing a link between online data collection and the requirement of interviewer assistance. In addition, computer support was needed to quickly solve the problems that occurred with new software and procedures. Essentially during the interview phases, computer support was available on site for 12 hours a day for six days a week.

8.3 Unit Cost Comparison with Previous Surveys

Table 8.2 gives a comparison of the per interview 2011 survey costs with the 1996, 2001 and 2006 surveys. the unit cost per completed interview is presented as well as an adjusted cost per interview adjusted for inflation according to the Consumer Price Index as documented by the Bank of Canada.

The unit cost of conducting the interviews has been reasonably stable over these surveys with 2001 being a particularly efficient survey. The absence of any significant development cost associated with the 2001 TTS contributed to the low unit cost of that survey. The low fixed cost, primarily management and co-ordination, associated with the 2001 survey resulted, to a large extent, from the use of tried and tested procedures, continuity of staffing from previous surveys and the effective staging of the survey over 2 years. Some of those cost savings were unique to the situation in 2001 and were not carried forward to subsequent surveys.

The growing cost of conducting an urban travel survey using a retrospective telephone interview is evident, partly attributable to the difficulty in obtaining telephone contact with households and partly due to inflation. The increase in fixed cost in 2011 is mainly due to the complexity of introducing a web-based component into the process.

Table 8.2 Unit Cost Comparisons for TTS's in 1996, 2001, 2006 and 2011

	1996 TTS	2001 TTS	2006 TTS	2011 TTS
Variable Cost				
Interviewing Staff and Training	$714,000	$1,076,000	$1,369,000	$1,600,000
Cost per Completion	$6.20	$7.89	$9.15	$10.05
Cost per Completion in 2011 Dollars	$8.38	$9.65	$10.02	$10.05
Coding Staff and Training	$132,000	$143,000	$223,000	$235,000
Cost per Completion	$1.15	$1.05	$1.49	$1.48
Cost per Completion in 2011 Dollars	$1.55	$1.28	$1.63	$1.48
Other Variable Cost (incl. 50% of Management)	$557,000	$463,000	$751,500	$747,000
Cost per Completion	$4.84	$3.39	$5.02	$4.69
Cost per Completion in 2011 Dollars	$6.54	$4.15	$5.50	$4.69
Total Variable Cost	$1,403,000	$1,682,000	$2,343,500	$2,582,000
Cost per Completion	$12.18	$12.33	$15.66	$16.22
Cost per Completion in 2011 Dollars	$16.46	$15.08	$17.16	$16.22
Fixed Cost				
Total Fixed Cost (incl. 50% of Management)	$971,000	$741,000	$807,500	$1,086,000
Cost per Completion	$8.43	$5.43	$5.40	$6.82
Cost per Completion in 2011 Dollars	$11.39	$6.64	$5.91	$6.82
Total Survey Cost				
Total	$2,374,000	$2,423,000	$3,151,000	$3,668,000
Cost per Completion	$20.61	$17.77	$21.06	$23.05
Cost per Completion in 2011 Dollars	$27.86	$21.72	$23.07	$23.05
Bank of Canada Inflation Factor	35.17%	22.26%	9.56%	0.00%
Number of completed Interviews	115,193	136,379	149,631	159,157

Section 9 Conclusions

9.1 Data Quality

Every TTS has used the same basic survey instrument, which uses a telephone interview to record a retrospective reporting of travel by all members of a household on the day prior to the interview. The sample frame consists of listed residential phone numbers within the boundaries of the survey area. The interview is conducted with the person answering the telephone unless that person is unaware of the travel by other members of the household. In that case, an attempt is made to interview the other household member(s) either during that interview or a subsequent 'callback'.

Listed residential telephone numbers do not provide total representation of all the households in the survey area. The increasing use of cell phones as a substitute for landlines was first identified as a major concern in the 2006 TTS. This concern is confirmed in the 2011 TTS. Households without landlines, with unlisted numbers and those on the "do not call" list are excluded from the sample frame. Initial comparison to the 2011 Canada Census using expanded data based on the traditional expansion method on dwelling units showed that there were discrepancies in age distribution which is an indirect outcome of a biased sample. IN the 2011 TTS the 18 to 29 age range was under-represented by over 30% relative to the census compared to about 20% in the 2006 TTS. The 65+ age group however was over-represented by as much as 70% in 2011 comparing to 20% in 2006. A different expansion strategy was used in the 2011 TTS. Expansion factors were calculated based on age specific population counts and applied to the person and trip data associated with each individual person.

Validation of the expanded TTS data included comparisons with employed labour force data from the 2011 National Household Survey, post-secondary enrollments, municipal cordon counts and transit ridership. The comparisons identify significant differences but the comparisons do not identify either the reason for the difference or which data set is likely to be the more reliable.

9.2 Software

The 2011 TTS was the largest travel survey conducted to date and utilised the technological developments that were implemented in previous surveys.

1986 The 1986 TTS was a pioneer in the use of automated geocoding.

1991 The 1991 TTS was the first to use Direct Data Entry. Although the information was compiled without the aid of a computer network, it was the first application of recording interviews directly on a computer file.

1996 The most significant new development for the 1996 survey was the on-line networking of the interview computers.

2001 No significant changes were made to the software for the conduct of the 2001 TTS. While significant cost savings were realised the software limitations became evident.

2006 The entire data entry, sample control and geocoding process was reviewed and a complete re-write of the software was undertaken for the 2006 TTS. The process began in early 2004 and improvements were implemented through the entire survey period.

2011 A new internet software interview tool was developed. The process began in 2008 and was operational in the 2011 TTS.

9.3 Hardware

Very few computer hardware problems were experienced during the conduct of the survey. With on-site computer support, these problems were always resolved quickly. The decision to have only two different personal computer hardware models made rapid updates possible. The purchase, and subsequent resale, of used name brand equipment is recommended as the most cost effective and efficient way to equip a survey of this magnitude. The main servers are central to most operations. "Over" purchasing, in terms of its performance, reliability and back up capabilities, is recommended.

9.4 Supervisory Staff

Finding an adequate number of staff with the experience and background necessary to act in a supervisory role is a significant challenge in the conduct of each TTS. The quality of first level supervision is probably the single most important aspect in overall quality control. Early in the recruiting process in 2011 and 2012 previous supervisors and interviewers in good-standing were contacted with an offer of employment. We were fortunate to have a significant number of past employees return from previous surveys. The team leaders for the main survey were selected from returning staff, as was the chief assistant to the hiring and training manager and the daytime manager. The other supervisory positions were filled from the early ranks of the interview staff (all of whom also had previous TTS experience).
Supervisory responsibilities include:

- The training of new interviewers.
- Supervision of and assistance to interviewers.
- Selective monitoring of interviews in progress.
- Visual review of completed interviews.
- Review of call back information.
- Entry of corrections.
- Passing completed interviews to the next stage of the survey process

Efforts to build the foundation of staff that will want to return to future TTS projects should be continued and contact lists and employment details of previous employees should be maintained for future TTS projects. Returning employees understand the scope and intent of the project, reach production targets more quickly and have nearly twice the retention of staff hired without TTS experience. Conducting a smaller scale survey in the year prior to a full-scale survey provides an essential opportunity to pre-

train a critical mass of interviewers and provides a pool of trained staff from which to select supervisory personnel for the main component of the survey.

9.5 Interview Site

The requirements for interview site space for TTS include convenient size and layout and subway access plus a lease compatible with TTS needs. In 2011 finding these requirements proved to be extremely difficult especially regarding the appropriate lease timeframe but eventually a central site location in Toronto with convenient subway access was found.
Having the location central meant that there was no shortage of applications for interview and coding staff positions. The use of space in the same building for both the 2011 and 2012 components of the survey was an added convenience although not as important as the downtown location and subway access.

Site costs were significantly higher than previous surveys due to the need to rent commercial office space. However having quality commercial space proved to be a significant bonus in attracting and retaining interview staff.

9.6 Advance Letter

The advance letter has always been regarded as a critical item in reducing respondent refusals. Having the advance letter increases interviewer's confidence and provides respondents with a measure of the survey's validity. While it has been shown that experienced and competent interviewers can achieve the same degree of respondent compliance with or without the letter, the reality of the varied skill levels of the interviewers, and short time frame in which interviewing is done, dictates the necessity of the letter. Households where respondents report having received the letter usually require less explanation from the interviewer, are completed more quickly and often have more detail.

Approximately 35% of respondents in 2011 claimed not to have received the advance letter, an 11% decrease from 2006. This decrease may be due partially to the availability of apartment numbers in the sample used in 2011 which would ensure that more of the mail to apartments actually gets into the mailboxes and to the specified household. Since 2001 it was felt that the use of Government of Ontario envelopes aided in the higher reporting of letter receipt. Non-government envelopes were used for the 1996 TTS. The continued use of official Government envelopes is recommended for all future surveys. Households reporting receipt of the letter increased to 62.8% in 2011, which was compatible to the 1991 TTS when complete address information was available and government envelopes were used.

Receipt of advance letter (not in 1986)

	2011	2006	2001	1996	1991
Unknown	1.8%	0.6%	7.7%	5.9%	2.4%
No	35.4%	46.5%	36.9%	45.2&	33.1%
Yes	62.8%	52.9%	55.4%	48.9%	64.5%

Receipt of the advance letter significantly reduces the refusal rate, probably by about 15% (consistent with previous experience when there has been a problem with the mailing).

Control letters to survey staff members were included in each mailing as a check on the timing. Based on previous experience and the pilot projects conducted prior to the survey, bulk mail was not used. Canada Post offers no guarantee for bulk mail as to how long delivery will take. The cost of third class postage is slightly higher but there are savings in mail preparation costs since the letters do not have to be pre-sorted. Testing was done in previous surveys to compare the use of first and third class mail services. First class mail was used in 2011 only at the start and end of the survey when prompt delivery was essential. The commercial mailing house was cost effective and efficient in preparing the mailings, as was the case in previous surveys.

9.7 New questions

There was varying success for two new questions added. The car occupancy question was answered quite well and gave interview reviewers another key piece of data with which to validate the interviews trip making. The usage of Highway 407 question needs to be reviewed.

9.8 Productivity

Table 9.1 shows two measures that are factors in determining both productivity and the quality of the survey results.

Table 9.1 Productivity and Quality Measures

	Calls per completed interview	Overall Response Rate
1986	not available	60%
1991	not available	72%
1996	3.71	70%
2001	4.74	64%
2006	6.95	46%
2011	7.09	49%

The average number of phone calls made per completed interview in conducting the 2011 TTS was 2% higher than in the 2006 TTS and 90% higher than in the 1996 TTS. More calls per completed interview translate into the need for more interviewers, more equipment, more training and more supervision. Quality control inevitably suffers due to production pressures and the finite resources available.

Overall response rate is the number of completed interviews divided by the number of households where contact was attempted. The lower the response rate the greater the potential for hidden biases in the survey results in addition to any bias that might be present in the original sample frame. The slight increase in response rate in 2011 from 2006 was due to the complete address information available and thus the increase in the receipt of the pre-interview letters.

All of the potential measures of interviewer productivity have steadily deteriorated since 1986. These measures include: number of calls per completed interview, number of answering machines encountered and number of refusals after contact is made. It is expected that any attempt at using telephone interviews in the future will encounter more difficulty in making contact, and likely experience more refusals.

9.9 Younger Population

Younger adults and student travel is an important component of total daily travel patterns with distinct characteristics. Two problems exist in capturing information on that component. The first problem is in obtaining a representative sample that includes the younger population. This segment of population is more likely to use cell phone as a substitute for landlines and are not included in the current sample frame. The second is the method of expansion given that the Canada Census is not done during the post secondary school year. It is clear from comparisons with post-secondary enrollments, that student population is underreported in TTS.

9.10 Geocoding

Duplication of street and municipal names within the vast survey area made coding especially difficult. For example, there are 52 Church Streets in the survey area without accounting for variations such as Church Road, Church Lane and Church Street East and West. Coding small towns and hamlets in rural areas were also more difficult because of the lack of commercial street maps and reference materials. Also some street names used and reported to interviewers by locals tended to be different from the official names found on maps and in reference materials.

9.11 Coding Reference Databases

Coding of most of the street and intersection databases has been easier since 2006 due to the street base map for the entire area being obtained from one organization, Land Information Ontario (LIO). This eliminated much of the processing to consolidate the data which had occurred previously when the files were being obtained from multiple sources.

With the new Reference Update component, it was more efficient and accurate when a new monument or school was added to the database. Coding of the monument files began a few months before the survey's start. For future surveys it is recommended that development work on the reference databases start even earlier.

Section 10 Recommendations for 2016

10.1 Background

The basis of all six previous TTS was a retrospective of trips taken during the previous day by all members of a household. The information was collected from a telephone interview. A 5% sample of households was the target and the universe of households and estimates of total travel were based on the number of households reported in the national census.

Applications of the TTS data by a wide variety of users has evolved over the years to assume a content and level of accuracy that is possible with a large sample using a consistent set of questions during the interviews. However with the changes in communication technologies, there are increasing challenges in the current data collection method and several issues have been identified:

- A growing number of households do not have a listed telephone number as they use a cell phone exclusively and these households are not equally distributed over the universe of households.
- A growing number of households with listed telephone number register their numbers on the National Do Not Call List.
- A growing number of households use call-screening.
- Young adults are underrepresented in the sample.

The TTS Management Team recommends the Steering Committee to invest in the development and pilot testings of some innovative methods to replace the traditional telephone interviewing methods. However, if a TTS is to be conducted in 2016, a set of changes are suggested to the existing TTS method while still maintaining the same basic survey instrument. The concept is to maintain consistency with existing data while, at the same time, testing some alternate data collection procedures.

10.2 A Feasible Approach

Using the standard telephone directory as a sample source is no longer effective. Any alternate sample source representing a cross-section of all households is unlikely to contain complete information for each household. A few possible sample sources include Statistics Canada, Canada Post and Municipal Property Assessment Corporation (MPAC). The sample would likely contain the complete address, including the apartment number, but might not contain the occupant's name or phone number. A reverse telephone lookup on all households that have a unique street address should yield a unique telephone number for 50% to 60% of the sample in the GTHA and more in external areas.

10.2.1 Survey Method 1

Households which were successfully matched with a telephone number would be sent a pre-interview letter and be interviewed by telephone in the same manner as previous surveys. It is important that the telephones at the call centre be installed with call displaying 'Government of Ontario' as in 2011, which should help reduce the incidence of call screening.

10.2.2 Survey Method 2

Households not successfully matched with a telephone number would be sent a letter to their unique address with a request to complete a survey either by calling in or via the Internet. A call centre would be set up that would be specifically designed to receive calls and conduct the interview immediately. As in 2011 a browser based web site would be established to complete the survey questions. The respondent could complete the survey independently online, and would have a telephone number to call with any questions. The call centre could display the current status of the household completion and guide the respondent through to completion over the phone. If the sample was not completed within a given time period, a follow-up letter would be sent.

10.2.3 Survey Method 3

In the 2006 TTS, under-reporting was primarily a concern for the post-secondary students. However it is noticed in the 2011 TTS that this problem is extending to the early 30s age group as it is increasingly common to replace costly landline telephones with cell phones. Currently there are no cell phone only directories. Some vendors provide cell phone only numbers by calling known cell phone exchanges and asking if the individuals have a landline. These numbers however do not have any address information. These individuals could be contacted. If they confirm they live within the study area and are willing to participate, they will be asked to complete the survey on the telephone or the Internet. The results of these interviews would then be integrated into the estimates of travel with consideration given to the possibility of double counting.

10.2.4 Survey Method 4

The age distribution bias in the 2011 TTS varied among different areas. It was most severe in planning district 1 in the City of Toronto where a person in the 63 to 77 age range was more than 6 times as likely to have been included in the survey as someone in the 18 to 32 age range. A different approach could be taken for these areas where a small group of interviewers is sent out to conduct the surveys in person or distribute pre-interview letters to the households. Similar to method 3, the results of these interviews would then be integrated into the estimates of travel with consideration given to the possibility of double counting.

10.2.5 Survey Method 5

Extensive considerations and planning should be given to develop the new survey methods. Pilot testings could be conducted parallel to the main survey so that results from various methods could be compared and evaluated.

10.3 Issues Requiring Early Attention

10.3.1 Sample Selection

Contact with different sample vendors such as Statistics Canada, Canada Post and MPAC is likely to be more effective if initiated by the Ministry of Transportation and perhaps some regional municipalities. If a sample from any of these sources is not possible, other possible methods of sample selection need to be investigated as soon as possible.

10.3.2 Development of Cost Estimates

It should be anticipated that the cost per completed interview will be significantly higher than for previous TTS's. Factors contributing to higher costs include:

- Continuation of the downward trend in productivity associated with the telephone components.
- Higher per unit costs associated with the mail only component.
- Higher per unit costs associated with cell phone only samples.
- Higher per unit costs associated with in-person interviews.

Additional sample, pre-processing and post-processing costs associated with the increased complexity of the survey.

New survey methods should be regarded as different projects and cost estimates should be prepared separately using the similar structure as in TTS.

Appendix A

Letters to Local Officials

transportationtomorrow
SURVEY 2011

NEWS RELEASE FOR IMMEDIATE RELEASE

August 2011

Transportation Tomorrow Survey To Include More Than 150,000 Households

Twenty regional, county and local municipal governments are participating in a major travel survey of more than 150,000 households designed to help municipalities meet their future needs for roads and transit services.

"The 2011 Transportation Tomorrow Survey will examine the travel habits and preferences of residents of the Greater Toronto Area as well as the extended area from St. Catharines to Barrie and Peterborough," announced Gerald Steuart, the project director of the survey. "It will help in making decisions about road and transit improvements, and provide information for long-term planning."

The first phase of the survey will take place in the fall of 2011 and the second phase in the fall of 2012. The survey area includes the Cities of Barrie, Brantford, Guelph, Hamilton, Kawartha Lakes, Orillia, Peterborough and Toronto; the Counties of Brant, Dufferin, Peterborough, Simcoe, and Wellington; the Regional Municipalities of Durham, Halton, Niagara, Peel, Waterloo and York; and the Town of Orangeville.

"This survey will help us better respond to each community's needs," said Mr. Steuart. "The population of the survey area is expected to grow to well over seven million people in the next 20 years. We need to assess how this will affect our transportation system and ensure that it can meet the increased requirements."

This is the sixth Transportation Tomorrow Survey. It has been conducted every five years since 1986. Information gathered in previous surveys has been used to plan a wide range of transportation initiatives in the Southern Ontario.

The survey consists of a telephone interview of randomly selected households. For the first time, households are given the option to complete the survey online. In addition to trip information for each household member (i.e., origin, destination, time, reason for travel, mode of transportation), the number of vehicles available for personal use and where each family member works or attends school will also be asked.

The University of Toronto's Data Management Group, hired to develop and carry out the survey and gather the results, and is conducting the survey.

Used for statistical purposes only, all information related to individual households will be kept strictly confidential. Once the study is complete, the survey results will be collated and released early in 2013.

For further information, please contact:

Gerald Steuart
Project Director
Transportation Tomorrow Survey
(416) 978-5979

transportationtomorrow
SURVEY 2011

This letter is being sent to municipal councils, members of Legislature and Parliament, police and senior government officials to inform you that a major travel survey will be conducted in your community. We would appreciate your assistance in ensuring that all members of your organization that deal with the public are aware that this survey is underway.

The survey will consist of telephone interviews of a randomly selected sample of households in the Southern Ontario. The survey is spread over 2 periods: August to December of 2011, and August to December of 2012. The Ministry of Transportation Ontario is providing financial support in this study and the local governments participating are:

Cities of Barrie, Brantford, Guelph, Hamilton, Kawartha Lakes, Orillia, Peterborough and Toronto;
Counties of Brant, Dufferin, Peterborough, Simcoe, and Wellington;
Regional Municipalities of Durham, Halton, Niagara, Peel, Waterloo and York;
And Town of Orangeville

The purpose of the survey is to collect information on the travel habits of residents and provide a data base for long-range planning and improvement of transportation facilities. Similar surveys were conducted in 1986, 1991, 1996, 2001 and 2006. In addition to trip information of each household member (i.e. trip origin, destination, time, purpose, method of travel) survey participants will be asked about age, gender, employment status, size of household and number of motor vehicles.

All information collected will be kept in the strictest confidence and cannot be traced to an individual household.

Enclosed is a sample of the notification letter that will be sent to each household chosen for telephone interviews. Selected households are given the additional options of completing the survey using the Internet or calling us directly. Separate press kits have been prepared to notify the general public through regular television and cable channels as well as local and regional newspapers.

If you have any questions about the survey please contact the Ministry of Transportation at 1-800-268-4686 or (416) 235-4686, or visit our website at www.tts2011.ca

Sincerely,

Gerald Steuart
Professor Emeritus
University of Toronto
Project Director

Appendix B

Advance Letters for the GTHA Households

transportationtomorrow
SURVEY 2012

City of Hamilton • City of Toronto • Metrolinx/GO Transit • Regional Municipality of Durham • Regional Municipality of Halton
Regional Municipality of Peel • Regional Municipality of York • Toronto Transit Commission • Ministry of Transportation Ontario

The Transportation Tomorrow Survey is an important travel survey, conducted on behalf of your municipality, other municipalities in central Ontario, and the Province of Ontario. Every five years for the past 25 years, this survey has collected travel information of persons in your community to keep pace with changing transportation needs.

Your household has been randomly selected to represent your community in the current survey. A professional interviewer will contact you in the next two weeks and ask you to spend about 10 minutes answering our questionnaire. However, if you prefer, you can complete the survey online at tts2012.ca using your secure access code or by calling in at 1-855-586-3800 or 416-586-3800. More details are provided overleaf.

It is important that your household take part in this survey to assist the planning of transportation services to meet your future needs as well as the needs of your community. Information collected in the past has been used to forecast future road usage and plan public transit services in your area.

All information collected will be kept strictly confidential. Your responses will be combined with other responses in your area and used to identify travel patterns. No information will be released in any way that could be traced to your household.

If you have any questions, please call the Ministry of Transportation at 1-800-268-4686, or visit our web site at tts2012.ca.

Your household's involvement in this project is critical to its overall success. Please advise other members of your household of this opportunity to participate in the development of transportation services in your area and throughout central Ontario, so they too will be prepared to take part.

Thank you for your assistance,

Mayor Bob Bratina
City of Hamilton

Mayor Rob Ford
City of Toronto

Chair and CEO Roger Anderson
Regional Municipality of Durham

Chair Gary Carr
Regional Municipality of Halton

Chair Emil Kolb
Regional Municipality of Peel

Chair and CEO Bill Fisch
Regional Municipality of York

Minister Bob Chiarelli
Ministry of Transportation Ontario

2012 Transportation Tomorrow Survey

How it works

A sample list of the questions to be asked is shown below and you can participate in the survey three ways:

1. You may choose to fill out the survey online by going to our secure website tts2012.ca and use the access code listed on the first page. If you commence the survey online and require assistance, or if you prefer to complete the survey in a language other than English, we provide phone-in support between 9 a.m. and 9 p.m. Monday to Friday and Saturday from 10 a.m. to 2 p.m. at 1-855-586-3800 or 416-586-3800.
2. You may also choose to conduct the survey over the telephone. Give us a call at 1-855-586-3800 or 416-586-3800 during those same hours listed above and one of our professional telephone interviewers will be happy to conduct the survey with you.
3. If we have not heard from you, your household will be contacted within the next two weeks by a professional interviewer. On weeknights, the calls will be made between 5:30 p.m. and 9:30 p.m. If the interviewer calls on a Saturday, it will be between 10:00 a.m. and 5:00 p.m.

Survey Questions

Most of the questions asked will be about you and your household's travel on the previous weekday. We will only be collecting trip data for persons 11 years of age or older. We would like to know specific information about where and when trips were taken by each member of your household. This information, collected from approximately 150,000 households in Central Ontario, will give us a better picture of changing travel patterns to assist in the planning of improved transportation services in your area.

Here is a sample of the questions asked:

A. About your household
   - Type of building (house or apartment)
   - Number of people
   - Number of vehicles available for personal use

B. About each person
   - His/her age
   - Does he/she have a driver's license?
   - What is the address of his/her workplace or school?

C. About each trip made by each person on the previous day
   - From where, to where?
   - Reason for making the trip (e.g. shopping)
   - Start time of the trip
   - Mode of transportation (bus, car, bicycle, etc.)

A trip is a one-way journey from one location to another by any form of motorized transportation or bicycle. We will request some information on walking, but only for trips to and from work or school. These details provide an understanding of how members of a household interact with the transportation system. This level of understanding leads to better estimates of future needs for road and transit as your area grows.

transportationtomorrow
SONDAGE 2012

Cité de Hamilton • Cité de Toronto • Metrolinx/GO Transit • Municipalité régionale de Durham • Municipalité régionale de Halton
Municipalité régionale de Peel • Municipalité régionale de York • Toronto Transit Commission • Ministère des Transports de l'Ontario

Le Sondage pour le système de transports de demain est un important sondage dans le domaine des transports, réalisé au nom de votre municipalité, d'autres municipalités dans le Centre de l'Ontario et de la province de l'Ontario. Mené tous les cinq ans depuis les 25 dernières années, ce sondage a permis de recueillir des renseignements sur les déplacements des habitants de votre collectivité, afin de rester au diapason des besoins en constante évolution en matière de transport.

Votre ménage a été sélectionné de façon aléatoire afin de représenter votre collectivité dans le sondage de cette année. Un sondeur professionnel communiquera avec vous au cours des deux prochaines semaines et vous demandera de prendre environ dix minutes pour répondre à notre questionnaire. Toutefois, si vous le désirez, vous pouvez répondre au sondage en ligne à tts2012.ca en utilisant votre code d'accès sécurisé ou par téléphone en composant le 1 855 586-3800 ou 416 586-3800. De plus amples renseignements figurent au verso.

Il est important que votre ménage prenne part à ce sondage afin de faciliter la planification des services de transport et de répondre ainsi à vos futurs besoins ainsi qu'à ceux de votre collectivité. Les renseignements recueillis dans le cadre des précédents sondages ont servi à prévoir les futurs modèles de déplacements et à organiser les services de transport public dans votre région.

Tous les renseignements recueillis demeureront strictement confidentiels. Vos réponses seront combinées aux autres réponses obtenues dans votre région et utilisées pour déterminer les modèles de déplacement. Aucune information précise permettant d'identifier votre ménage ne sera diffusée.

Si vous avez des questions, veuillez communiquer avec le ministère des Transports au

1 800 268-4686 ou consultez notre site Web à tts2012.ca.

La participation de votre ménage à ce projet est essentielle à sa réussite globale. Veuillez prévenir les autres membres de votre ménage de cette occasion de participer à l'amélioration des services de transport de votre région et du Centre de l'Ontario dans son ensemble, afin qu'ils soient également prêts à répondre au sondage.

Nous vous remercions pour votre collaboration.

Bob Bratina
Maire de Hamilton

Rob Ford
Maire de Toronto

Roger Anderson, président et chef de la direction,
Municipalité régionale de Durham

Gary Carr, président,
Municipalité régionale de Halton

Emil Kolb, président,
Municipalité régionale de Peel

Bill Fisch, président et chef de la direction,
Municipalité régionale de York

Bob Chiarelli, ministre,
Ministère des Transports de l'Ontario

Sondage 2012 pour le système de transports de demain

Fonctionnement

Un échantillon des questions posées est présenté ci-dessous. Vous pouvez répondre au sondage des trois façons suivantes :

1. Vous pouvez répondre au sondage en ligne en vous rendant sur notre site Web sécurisé à l'adresse www.tts2012.ca et en utilisant le code d'accès indiqué sur la première page du présent document. Si vous avez besoin d'aide après avoir commencé le sondage, ou si vous préférez répondre au sondage dans une langue autre que l'anglais, nous fournissons également une aide téléphonique du lundi au vendredi, de 9 h à 21 h et le samedi, de 10 h à 14 h au 1 855 586-3800 or 416 586-3800.
2. Vous pouvez également répondre au sondage par téléphone. Téléphonez au 1 855 586-3800 ou 416 586-3800 pendant les heures indiquées ci-dessus et l'un de nos sondeurs professionnels aura le plaisir de mener le sondage avec vous.
3. En l'absence de réponse de votre part, un sondeur professionnel communiquera avec vous dans les deux prochaines semaines. Durant la semaine, les appels sont effectués en fin de journée entre 17 h 30 et 21 h 30. Si un sondeur téléphone le samedi, il le fera entre 10 h et 17 h.

Questions du sondage :

La plupart des questions posées porteront sur les déplacements effectués la veille (jour de la semaine) par tous les membres de votre ménage. Les données relatives aux déplacements seront uniquement recueillies auprès des personnes de 11 ans ou plus. Nous demanderons à chacun des membres du ménage d'indiquer avec précision le lieu et le moment de leurs déplacements. Ces renseignements, obtenus auprès d'environ 150 000 ménages du Centre de l'Ontario, nous permettront d'avoir une meilleure représentation de l'évolution des habitudes de déplacement afin d'améliorer les services de transport de votre région grâce à une planification mieux adaptée.

Voici un échantillon de questions concernant :

A. Votre ménage
   - Type d'habitation (maison ou appartement)
   - Nombre de personnes le composant
   - Nombre de véhicules réservés à une utilisation personnelle

B. Chaque personne
   - Âge
   - Détention d'un permis de conduire
   - Adresse du lieu de travail ou de l'établissement scolaire.

C. Chaque déplacement effectué la veille par chaque personne
   - Lieux de départ et de destination
   - Raison du déplacement (p. ex. magasinage)
   - Heure de départ
   - Moyen de transport (bus, voiture, bicyclette, etc.)

Un déplacement est un aller simple d'un lieu à un autre, effectué par n'importe quel moyen de transport motorisé ou par bicyclette. Nous vous demanderons quelques renseignements sur les déplacements à pied, mais uniquement pour les trajets effectués au départ et à destination du lieu de travail ou de l'établissement scolaire. Ces détails nous permettront de comprendre comment les membres d'un ménage interagissent avec le système de transport. Cette compréhension contribuera à améliorer les prévisions des futurs besoins en termes de routes et de transport à mesure que votre région se développe.

L'autorisation de recueillir ces renseignements a été obtenue auprès de chacun des gouvernements régionaux et locaux participants à ce sondage. La confidentialité de ces données est protégée en vertu de la Loi sur l'accès à l'information et la protection de la vie privée.

Appendix C

Advance Letters for the Non-GTHA Households

transportationtomorrow
SURVEY 2012

City of Barrie • City of Brantford • City of Guelph • City of Kawartha Lakes • City of Orillia • City of Peterborough • County of Brant • County of Dufferin • County of Peterborough
County of Simcoe • County of Wellington • Regional Municipality of Niagara • Regional Municipality of Waterloo • Town of Orangeville • Ministry of Transportation Ontario

The Transportation Tomorrow Survey is an important travel survey, conducted on behalf of your municipality, other municipalities in central Ontario, and the Province of Ontario. Every five years for the past 25 years, this survey has collected travel information of persons in your community to keep pace with changing transportation needs.

Your household has been randomly selected to represent your community in the current survey. A professional interviewer will contact you in the next two weeks and ask you to spend about 10 minutes answering our questionnaire. However, if you prefer, you can complete the survey online at tts2012.ca using your secure access code or by calling in at 1-855-586-3800 or 416-586-3800. More details are provided overleaf.

It is important that your household take part in this survey to assist the planning of transportation services to meet your future needs as well as the needs of your community. Information collected in the past has been used to forecast future road usage and plan public transit services in your area.

All information collected will be kept strictly confidential. Your responses will be combined with other responses in your area and used to identify travel patterns. No information will be released in any way that could be traced to your household.

If you have any questions, please call the Ministry of Transportation at 1-800-268-4686, or visit our web site at tts2012.ca.

Your household's involvement in this project is critical to its overall success. Please advise other members of your household of this opportunity to participate in the development of transportation services in your area and throughout central Ontario, so they too will be prepared to take part.

Thank you for your assistance,

Mayor Jeff Lehman
City of Barrie

Mayor Chris Friel
City of Brantford

Mayor Karen Farbridge
City of Guelph

Mayor Ric McGee
City of Kawartha Lakes

Mayor Angelo Orsi
City of Orillia

Mayor Daryl Bennett
City of Peterborough

Mayor Ron Eddy
County of Brant

Warden Walter Kolodziechuk
County of Dufferin

Warden J. Murray Jones
County of Peterborough

Warden Cal Patterson
County of Simcoe

Warden Chris White
County of Wellington

Chair Gary Burroughs
Regional Municipality of Niagara

Chair Ken Seiling
Regional Municipality of Waterloo

Mayor Rob Adams
Town of Orangeville

Minister Bob Chiarelli
Ministry of Transportation Ontario

2012 Transportation Tomorrow Survey

How it works

A sample list of the questions to be asked is shown below and you can participate in the survey three ways:

1. You may choose to fill out the survey online by going to our secure website tts2012.ca and use the access code listed on the first page. If you commence the survey online and require assistance, or if you prefer to complete the survey in a language other than English, we provide phone-in support between 9 a.m. and 9 p.m. Monday to Friday and Saturday from 10 a.m. to 2 p.m. at 1-855-586-3800 or 416-586-3800.
2. You may also choose to conduct the survey over the telephone. Give us a call at 1-855-586-3800 or 416-586-3800 during those same hours listed above and one of our professional telephone interviewers will be happy to conduct the survey with you.
3. If we have not heard from you, your household will be contacted within the next two weeks by a professional interviewer. On weeknights, the calls will be made between 5:30 p.m. and 9:30 p.m. If the interviewer calls on a Saturday, it will be between 10:00 a.m. and 5:00 p.m.

Survey Questions

Most of the questions asked will be about you and your household's travel on the previous weekday. We will only be collecting trip data for persons 11 years of age or older. We would like to know specific information about where and when trips were taken by each member of your household. This information, collected from approximately 150,000 households in Central Ontario, will give us a better picture of changing travel patterns to assist in the planning of improved transportation services in your area.

Here is a sample of the questions asked:

A. About your household
   - Type of building (house or apartment)
   - Number of people
   - Number of vehicles available for personal use

B. About each person
   - His/her age
   - Does he/she have a driver's license?
   - What is the address of his/her workplace or school?

C. About each trip made by each person on the previous day
   - From where, to where?
   - Reason for making the trip (e.g. shopping)
   - Start time of the trip
   - Mode of transportation (bus, car, bicycle, etc.)

A trip is a one-way journey from one location to another by any form of motorized transportation or bicycle. We will request some information on walking, but only for trips to and from work or school. These details provide an understanding of how members of a household interact with the transportation system. This level of understanding leads to better estimates of future needs for road and transit as your area grows.

transportationtomorrow
SONDAGE 2012

Cité de Barrie • Cité de Brantford • Cité de Guelph • Cité de Kawartha Lakes • Cité de Orillia • Cité de Peterborough • Comté de Brant • Comté de Dufferin • Comté de Peterborough
Comté de Simcoe • Comté de Wellington • Municipalité régionale de Niagara • Municipalité régionale de Waterloo • Ville d'Orangeville • Ministère des Transports de l'Ontario

Le Sondage pour le système de transports de demain est un important sondage dans le domaine des transports, réalisé au nom de votre municipalité, d'autres municipalités dans le Centre de l'Ontario et de la province de l'Ontario. Mené tous les cinq ans depuis les 25 dernières années, ce sondage a permis de recueillir des renseignements sur les déplacements des habitants de votre collectivité, afin de rester au diapason des besoins en constante évolution en matière de transport.

Votre ménage a été sélectionné de façon aléatoire afin de représenter votre collectivité dans le sondage de cette année. Un sondeur professionnel communiquera avec vous au cours des deux prochaines semaines et vous demandera de prendre environ dix minutes pour répondre à notre questionnaire. Toutefois, si vous le désirez, vous pouvez répondre au sondage en ligne à tts2012.ca en utilisant votre code d'accès sécurisé ou par téléphone en composant le 1 855 586-3800 ou 416 586-3800. De plus amples renseignements figurent au verso.

Il est important que votre ménage prenne part à ce sondage afin de faciliter la planification des services de transport et de répondre ainsi à vos futurs besoins ainsi qu'à ceux de votre collectivité. Les renseignements recueillis dans le cadre des précédents sondages ont servi à prévoir les futurs modèles de déplacements et à organiser les services de transport public dans votre région.

Tous les renseignements recueillis demeureront strictement confidentiels. Vos réponses seront combinées aux autres réponses obtenues dans votre région et utilisées pour déterminer les modèles de déplacement. Aucune information précise permettant d'identifier votre ménage ne sera diffusée.

Si vous avez des questions, veuillez communiquer avec le ministère des Transports au 1 800 268-4686 ou consultez notre site Web à tts2012.ca.

La participation de votre ménage à ce projet est essentielle à sa réussite globale. Veuillez prévenir les autres membres de votre ménage de cette occasion de participer à l'amélioration des services de transport de votre région et du Centre de l'Ontario dans son ensemble, afin qu'ils soient également prêts à répondre au sondage.

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Maire de Barrie

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Mairesse de Guelph

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Maire de Kawartha Lakes

Angelo Orsi
Maire de Orillia

Daryl Bennett
Maire de Peterborough

Ron Eddy
Maire de Brant

Walter Kolodziechuk, Président du conseil
du comté de Dufferin

J. Murray Jones, Président du conseil
du comté de Peterborough

Cal Patterson, Président du conseil
du comté de Simcoe

Chris White, Président du conseil
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Gary Burroughs, Président
Municipalité régionale de Niagara

Ken Seiling, Président
Municipalité régionale de Waterloo

Rob Adams
Maire d'Orangeville

Bob Chiarelli, ministre,
ministère des Transports de l'Ontario

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