TRANSPORTATION TOMORROW SURVEY
2006

CODING MANUAL

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A Telephone Interview Survey on
Household Travel Behaviour in
Greater Toronto and the surrounding Areas
Conducted in the fall of 2005 and 2006

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Working Paper
Prepared for the
Transportation Information
Steering Committee

By the

Data Management Group
University of Toronto
Joint Program in Transportation

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Participating Agencies:
Ministry of Transportation, • Ontario City of Barrie • City of Guelph
City of Hamilton • City of Kawartha Lakes • City of Peterborough • City of Toronto
County of Dufferin • County of Peterborough • County of Simcoe • County of Wellington
Go Transit • 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

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1.0 Background

The Transportation Tomorrow Survey (TTS) is a travel survey conducted every 5 years on behalf of twenty one local, municipal and provincial government agencies in Ontario. The 2005-2006 survey, usually referred to as the 2006 TTS, is the fifth in the series of surveys the first of which was done in 1986.

In the 2006 TTS, information will be collected from households in an area that includes much of Southern Ontario and stretches from the Region of Waterloo in the west to Peterborough County and the City of Kawartha Lakes in the east.

The survey was completed over two years. In 2005, travel data was collected for areas external to the Greater Toronto Area (GTA) and the City of Hamilton. The areas involved in this 2005 segment of the survey are the Regional Municipalities of Niagara and Waterloo, Counties of Dufferin, Peterborough, Simcoe and Wellington and the Cities of Barrie, Brantford, Guelph, Orillia and Peterborough and the Town of Orangeville.

In 2006 travel data was collected for the GTA and the City of Hamilton. The GTA comprises the Regional Municipalities of Durham, Halton, Peel and York and the City of Toronto.

The purpose of the survey is to establish a database of travel information which can be used by various planning professionals and agencies involved in the planning of future transportation facilities in the area.

For more info on the Survey check out <http://www.jpint.utoronto.ca/dmg/tts.html>.

2.0 TTS Information

The information collected by TTS is both demographic and trip related data related to the households contacted and the persons who make up those households.

Specific information collected in TTS can be categorized into four different groupings:

Household information: includes Household Address, Dwelling Unit type, Number of persons in household, number of vehicles available to household occupants etc.

Person information: includes age, gender, possession of a driver's license, student and employment status, place of work and place of school of the individuals who make up the household.

Trip information: includes start time of trip, destination of trip, mode of travel and purpose for a specific trip.

Transit information: Collected when a trip is made via the transit mode this includes specific bus routes, subway or train stations involved in making the trip.

For more on the information collected by TTS see the 2006 Transportation Tomorrow Survey Data Guide, Data Management report 112 available at <http://www.jpint.utoronto.ca/dmg/dmgreports.html#ttsreports>.

3.0 Geocoding

In order for the location information collected to be of use in the database it needs to have valid x-y coordinates assigned.

Geocoding is name given to the assignment of valid x-y coordinates to the location data. All location information collected by the TTS interviewers is checked for accuracy and then passed on to geocoding.

Interviewers collect three types of trip locations**: Addresses, Intersections and Monuments.**

Addresses: Street addresses along with the municipality of the street e.g.: 500 University Ave, Toronto or 436 Taunton Rd E , Whitby.

Intersections: Street intersections along with the municipality e.g.: Bloor St W & Spadina Ave, Toronto

Monuments: Names of places along with their municipality e.g.: Union Station Toronto, Pen Centre Niagara Falls, Square One Mall Mississauga, University of Toronto Toronto.

There are two types of geocoding which take place; **Batch geocoding** and **manual geocoding**.

3.1 Batch Geocoding

Batch Geocoding is an automated process carried out in an attempt to geocode as many of the trip locations collected as possible. Completed interviews are usually passed to Batch geocoding a day or two after the interview has been completed.

In a perfect world all of the information collected by the interviewers would be successfully geocoded in the batch geocoding process but this is not possible in our survey due to any number of reasons including incorrect spelling of a street name, invalid intersection recorded or the address for the monument is not recorded in our lookup database. Records which cannot be geocoded in the batch mode are passed on to manual geo-coding.

3.2 Manual Geocoding

Manual Geocoding is the process by which geocoders use the **Geocoding Console** software (GC) and other aids such as phone books, internet search engines and hardcopy maps to find valid coordinates for the locations which need coding. Manual geocoding occurs only after batch geocoding fails to find a valid geocode for a location.

4.0 Geocoding Console

The Geocoding Console (GC) is available by double clicking the GC icon on the computer desktop.

The Geocoding Console contains five different tabs. These are the **Authenticate**, **Household Search, Today's Work History, Conclude Interview** and **Current Household** tabs.

4.1 Authenticate Tab

The first tab (screen) which appears when the Geocoding Console is started is the **Authenticate Tab** or Login Screen shown below (Figure. 1) where users must enter their User name and password to get access to the software.

Users enter their User name and password, which will be supplied, and click the login button. This takes them to the Household Search tab.
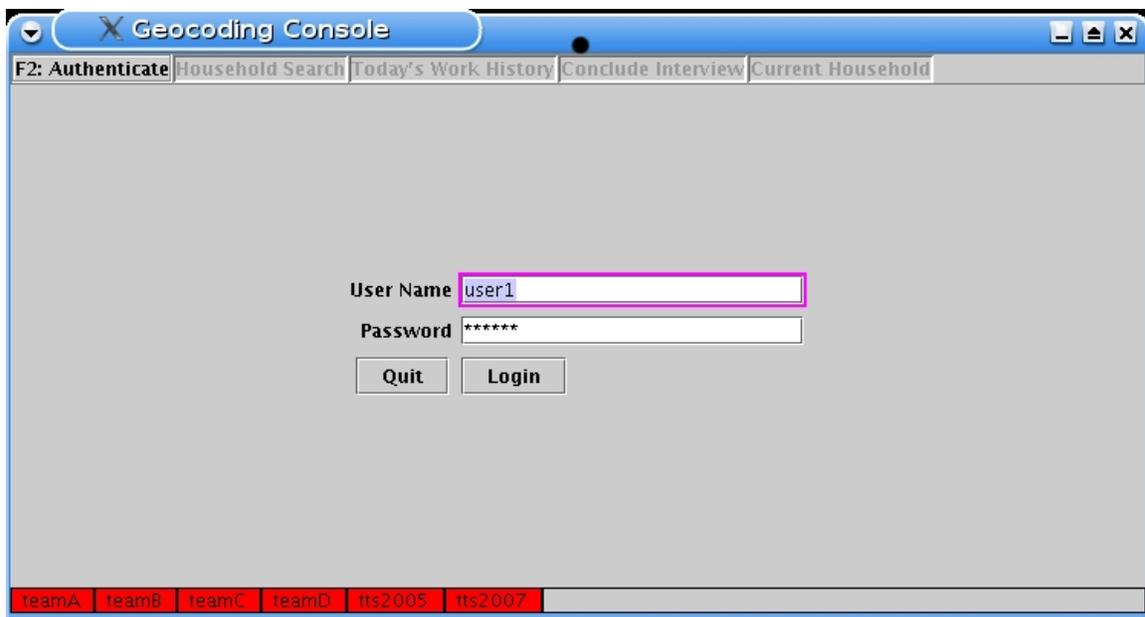

Figure. 1 – Login Tab

4.2 Household Search Tab

After login users are directed to the Household Search tab. Here users can select a household for geocoding or see the history of a household which has been passed to geocoding.
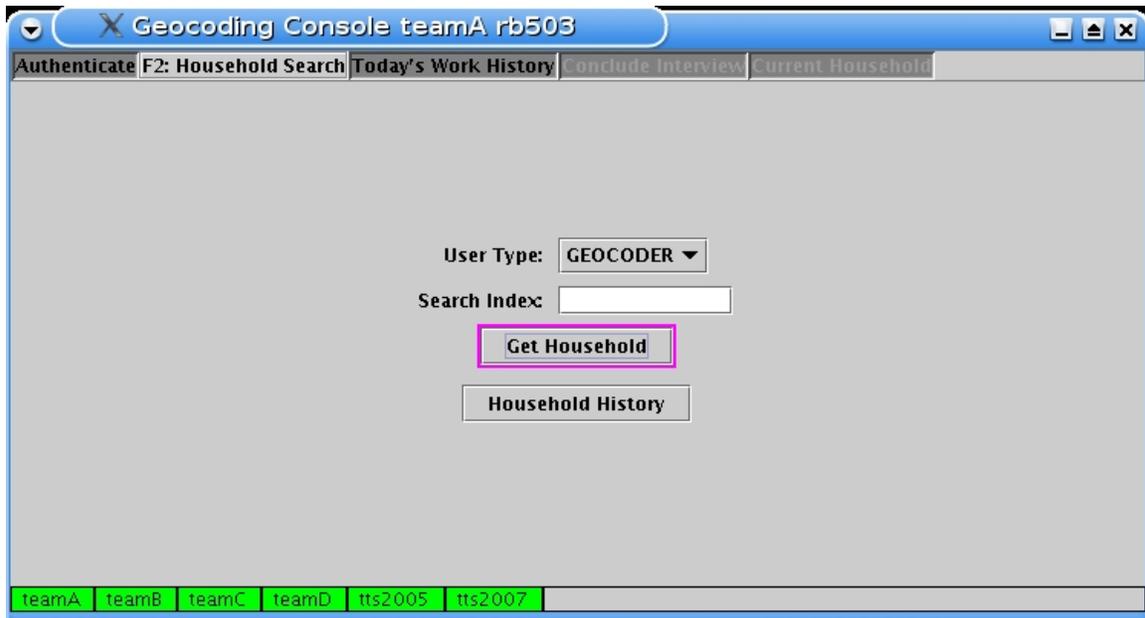

Figure 2 – Household Search Tab

Specific households can be acquired by entering a household number or the 10 digit phone number into the **Search Index** field and clicking on the **Get Household** button.

By leaving the search index field empty and clicking on the **Get Household** button the next household available for geocoding is assigned to the geocoding console.

4.2.1 Household History

On the **household search** page there is also a link to **Household History**. Household History gives a snapshot of the specific states which a household has been through over the course of its lifetime from the instance it was first called up for interviewing until the last point it was accessed for post-processing.

This feature comes in handy when dealing with a location which is difficult to code as it may be necessary to view what location information was originally captured by the interviewer.

Clicking the household history link causes a new resizable window to open. The household number or phone number of the household for which the geocoder is interested in acquiring information can be entered into the text box at the top of the window next to the words **Sample ID**. Clicking on **Get Sample** then brings up the Household history for that particular household.

The format of the household history information is similar to that of the daily printouts which are made of every valid interview. When the household information is first viewed the current state of the household is seen, showing the last user to access it and all of the current information contained in that household. The header shows the date that the household was accessed by a particular user, the User name, the group to which the user belongs, the survey state and the completion code. The rest of the page shows the household information at that current point in the household's lifecycle.

By clicking anywhere on the header a pulldown menu appears which can be scrolled through to select a previous state of the household. Clicking on a previous state causes the information that was recorded at that previous stage to be shown.

The pulldown menu can also be used to toggle back and forth between various states of the collected survey information.

4.3 Today's Work History

This tab gives a list of all of the households that the logged in geocoder has worked on for the day. It contains such important info as the time the specific household was last modified by that user, the phone number and name of the household and the current state of the household. Clicking on a specific household causes a box to pop up which offers the user the option to open that household in the GC.

4.4 Current Household

The **Current Household** tab can be accessed from the **Household Search** or **Today's Work History** tab. This is where **manual geocoding** occurs.

The typical layout of the Current Household page is shown in Figure. 3. The screen layout can be visually divided into four main horizontal segments. These segments are referred to for the rest of this document as follows: the first segment is referred to as the top segment, directly below that is the second segment, followed by the third segment and the last one the bottom segment.

4.4.1 Top Segment

The top segment shows some general household and personal information collected in the survey. This includes household information such as the household name, address, municipality, phone number and the language the interview was conducted in. It also includes person information regarding age, gender, usual place of work and school etc.

This area is not editable by the geocoders. This is shown to provide the geocoders with more information regarding the makeup of the household. This information can come in handy during the geocoding process.

Figure 3 – Current Household tab

4.4.2 Second Segment

The second segment contains two tabs titled **Trips** and **Transit Routes**. It is accessible by clicking on the information contained in this tab or by using the shortcut key F3. These two tabs show the relevant collected trip and transit information for the household being edited and are examined in more detail in the next two sections.

4.4.2.1 Trips Tab

The Trips tab shows the survey data collected, for all locations relevant to the household and its trips. These locations include the home address, usual place of work and school locations and the locations of any trips made by the household's residents.

For each location or trip the following information is shown in this section:

Pers # - The assigned number of the person in the household.

Trp # - The assigned number of a trip made by a specific person in the household. For example trip one is the first trip recorded for the person in question. Trip two would be the second trip etc. Some locations do not have an actual numeric Trp # assigned but are instead coded as Home, Orgn, Schl or Work relating to the Home address, Origin of the initial trip made if it is not from home, Usual place of School or Usual place of Work of a person in the household.

Time – Time that the particular trip started. Note when Trp # is given as Home, Orgn, Schl or Work there is no time associated with the location.

Purp – Code for purpose of the trip. Specific codes include W - work, H - Home, S - School, O – Other and M – Shopping/Market. For all specific trip purposes please see the 2006 TTS data guide http://www.jpint.utoronto.ca/PDF/doc112.html.

Mode – Code representing the travel mode used for this trip. Specific codes include D – Auto Driver, P – Auto passenger, S – School Bus, T – Transit, W – Walk. A complete list of the travel modes is available in the 2006 TTS data guide mentioned above.

Type – Code of either one or two letters representing the type of location information recorded. A means the location was coded as an address, M represents monument, I intersection and there are combinations such as WM – workplace coded as monument, HA – home coded as address. There are also combinations such as XA, XM, XI etc with the second letter standing for address, monument or intersection and the X meaning that the location is linked to another location which has been recorded previously in the survey for either the same household member or for another person in the household.

Original – The last trip information recorded in the household file prior to it being sent to batch geocoding.

Current -The trip information as it is currently in the household file. This is the only field in this section that can be changed by a geocoder and the process of changing it is

what is called **geocoding**.

The trips tab is color coded for simplicity as well. Both text and background are color coded to represent different states of the location data. Text is either colored black or blue with black signifying that the location has already been successfully geocoded and blue signifying that the location does not have a legitimate geocode as yet.

A white background signifies that this is the first occurrence of a particular location in the household's records while a gray background signifies that this location is linked to or has already been entered for a previous trip or location.

Geocoding can only be done directly on the locations with a white background. Geocoding cannot be done directly on the locations with a gray background but if one clicks on an item with the gray background and uses Function F7 the focus will return to the first occurrence of that location detail which can be coded assuming it wasn't batch coded previously.

Regular geocoders are not allowed to recode information that was previously batch coded successfully.

At the end of a successfully geocoded household all of the blue text will have been changed to black.

At the top of this segment there is also a list of shortcut keys that can be used to speed up geocoding.

F6 – Allows access to the next location in the trips tab.
F7 – Allows one to find the original reference to the location that has been selected.
F8 – Allows access to the next location that needs to be geocoded.
F9 – Takes the user to the previous location (the reverse of F6)
F10 – Allows the reselection of the current location if the focus is lost in the program
F11 – Allows the user to code the location as uncodeable. This is only to be used as a last resort as it should be possible to code all of the information collected.

4.4.2.2 Transit Routes Tab

The Transit Routes tab is only selectable when a trip has been made where transit is the mode used for the trip. If this occurs the transit tab is selectable and clicking on this tab shows the origin and destination of the trip and the specific routes including any subway or GO-Train stations used on that trip.

Information in this tab cannot be changed by geocoders but it is sometimes useful for a geocoder to see the transit routes used to get to a destination in order to determine the correct location.

4.4.3 Third Segment

The third segment is divided into three vertical sections labeled **Original Location, New**

Current Location and **Error Table**.

4.4.3.1 Original Location

The leftmost section is labeled **Original Location** and contains the information related to the originally coded location which includes the location type, coding type and the x-y coordinates.

Coding type is information relating to how the original location was coded. There are three options here:
- Online – Coded in the batch geocoding process.
- Manual – Coded by manual geocoding.
- Uncoded – Still needs to be geocoded.

Any location which has been previously batch geocoded cannot be coded by a geocoder without special permission being given.

4.4.3.2 New Current Location

The middle section contains the **New Current Location** information and allows the coder to enter information on codable locations with the option to update, clear, restore or fill in the information.

At the top of this section is a pulldown menu for Location Type. This gives the user the option of choosing Address, School, Monument or Intersection as the Location type and the editable text boxes available in that section vary depending on the Location type chosen.

Users have the option at the bottom of the box to update, clear, restore, or fill in the information.

Update allows the user to update the current location as listed in the second segment to the new current location information available here.

Clear allows the user to clear the contents of the text boxes in this section

Restore allows the user to restore the contents to their original pre-geocoded state

Fill in allows the user to take the information in the new current location data and automatically enter it into the bottom segment in order to find information with which to geocode the data.

4.4.3.3 Error Table

The rightmost section of this third segment contains the **Error table** which is a list of error messages generated for the location being presently coded. These messages are there to inform users as to what is wrong with the current location as coded. Examples of messages are coordinate is missing, the streets given do not intersect, municipality not

found in reference data.

4.4.4 Bottom Segment

Reference data used by the Geocoding Console is stored in reference files as part of the backend of the Geocoding Console software. Reference Files are used by GC for all locations that require coding. Reference files used by GC include separate files for Monuments, Schools, Intersections, Street Addresses, Places within the Survey and Places outside of the Survey Area.

The Street Address and Intersection reference files are relatively static once the survey has begun but throughout the survey changes are continually made to the Monuments, Schools, Places within the survey and Places outside of the Survey area reference files. This occurs as locations that are not part of the initial database appear in the survey data and are added to assist the geocoders.

The bottom segment gives geocoders access to the reference data. It is headed by six tabs corresponding to reference data for **Monument, School, Intersection, Places within the Survey Area, Places Beyond the Survey area** and **Street Ranges**. The current tab is shown with a green background while the other tabs have a pink background.

Directly below the tabs is a collection of unique text boxes corresponding to the reference data type selected which contains the information which geocoders require.

Beneath that is the area which contains the reference data. The tabs in this segment correspond to the option chosen in the **New Current Location** box above.

If Intersection is chosen in the New Current Location box the focus in the Bottom segment will be on List Intersection. If Address is chosen the focus will be on List Street Range. If School or Monument is chosen the focus is on School or Monument respectively but Places within the Survey and Places beyond the survey area can also be accessed.

4.4.4.1 List Monuments

This tab shows the reference data for the monuments currently in the monuments reference file. The information given is the Name of the Monument, Address, Municipality, CSD, Coordinates and Area code. Monuments included in this file include Subway and GO-Rail stations, Shopping Malls, Hospitals, Libraries, arenas, fire stations and police stations, tourist attractions and some big box stores, supermarkets, cinemas and major employers amongst others. It is not intended to be an exhaustive list of all monuments in the area but rather a list of monuments which occur with some frequency during the course of the survey.

The monument file is provided to make the geocoders life easier by not having to constantly spend extra time looking up the addresses and coordinates of highly frequented locations which occur in the survey data.

4.4.4.2 List Schools

This tab shows the reference data for the schools currently in the schools reference file. The information given is the Name of the School, Address, Municipality, School Code CSD, Coordinates and Area code. All schools to which an actual school trip occurred in the survey should be listed in the schools database. Each unique school has a unique school code.

If a school and trip to that school occurs in the survey locations and it is not in the schools database the school must be added to the schools database and the household completed with a Completion code of **Reference Update Required.** The schools database must be updated and this completion code sends the household back to another cycle of batch geocoding

4.4.4.3 List Intersections

This tab shows the reference data available for the valid intersections listed in the intersections database. The information given includes the Municipality, Street 1, Street 2, Coordinates and Area.

4.4.4.4 List Places Within Survey Area

This tab shows the reference data available for places within the survey area. These are more general locations such as towns, villages, hamlets, townships, cities etc. The information given includes the Place Name, Source type, CD (census district) name and coordinates. As was mentioned places within the survey is a rather general location and it is not preferred as a coded location in the survey. It is to be used only if information regarding the monument, intersection or actual street address for a specific trip location cannot be found. It should never be used to code Household, Work or School locations.

4.4.4.5 List Places Beyond Survey Area

This tab shows the reference data available for places outside the survey area. Occasionally persons who have been surveyed will have made trips external to the survey area. For example if trips were made to cities outside the survey area such as Ottawa or Montreal or trips were made across the border to the U.S. These locations would be coded using this tab. Places beyond the survey area should never be used to code School locations. If it is used to code Household locations then the households should be given a completion code of **Rejected Invalid** as they are outside the survey area.

4.4.4.6 List Street Range

This tab shows the reference data available for the street address ranges. The information given includes:
Street Name – the name of the street
L Start – The street # at the start of the street segment on the left hand side
L End – The street # at the end of the street segment on the left hand side
R Start – The street # at the start of the street segment on the right hand side

R End – The street # at the end of the street segment on the right hand side
X Street – The cross street(s) at that segment of the street if any exist.
Municipality – The municipality in which the street segment is located
CSD – Census sub division in which the street segment is located
Start Coord – Coordinate at start of the street segment
End Coord – Coordinate at the end of the street segment
Area – Code for the region in which the street is located

4.5 Conclude Interview

After geocoding of a household is completed the **Conclude Interview** tab is used by the geocoder to close the current household. The layout for this tab is shown in Figure 4.

The screen layout can be divided into four main horizontal segments. These segments (starting from the top) are Past Comments, Household Comments, Completion Code and Validation Errors.

4.5.1 Past Comments

This section shows a list of details relating to the selected household. Each time the household was accessed a line of code will be generated here showing the date and time it was accessed, the user name of the person who accessed it, the survey state, the completion code and any user comments that were entered at that point.

This section is not editable by the geocoder.

4.5.2 Household Comments

This section is a text box into which the geocoder can enter any comments pertaining to the selected household. These comments can be on assumptions made to code a location, missing information in a household or questions to ask if the interview is sent for a callback etc.

These comments can then be viewed in the **Past Comments** section if the interview is reopened at any point in the future. They can also be viewed via the **Household History**.

4.5.3 Completion Code

This section is used to enter a completion code for the interview and to close the current household.

The first line in this section is a submit button to give the user the option to pull up the household history (see section 3.1.2.1). The second line shows the Last completion code for the current household.

The third line contains a pulldown menu for the completion code. There are seven options for the completion code:

- **Coding Complete** – All locations in the household have been geocoded.
- **Coding Incomplete** – There are still locations in the household without a valid geocode. This is used in instances such as the coder is passing the household to another coder or the coder is leaving the household unfinished to return to it at a later date.
- **Callback** - A household may be sent for callback to clarify or try to obtain more detailed information where insufficient information now exists to code the location. Callbacks should only be used as a last resort and only on information relating to the home, school and work locations.
- **Rejected Uncodable** – Used when a home, school or work location in the information provided is uncodable and all means have been exhausted to get more detailed information.
- **Rejected Incomplete** – Used when the data given is incomplete and all means have been exhausted to acquire the missing information.
- **Rejected Invalid** – Used when the home location of the household is outside of the survey area.
- **Reference Update Required** – Used when there is a location in the data that has been coded to a monument but the monument's coordinates need to be updated in the reference files.

The GC software has built in checks which will not allow the user to code an incomplete household as complete. It will also give the user a prompt asking for confirmation if all the information has been successfully coded but the household has been given a completion code of one of the Rejection codes.

At the very bottom of this section is a fourth line which contains a submit box marked **Conclude Interview**. This closes and saves the information in the current household and takes the user back to the **Household Search** tab (Section 3.1.2)

4.5.4 Validation Errors

This section shows a list of the errors remaining in a household. Errors may or may not be related to geocoding locations.

Each error is shown related to the person and trip to which it is affiliated. Errors include Coordinates missing, municipality not found in reference database, streets do not intersect and errors relating to validation checks done on speed and distance.
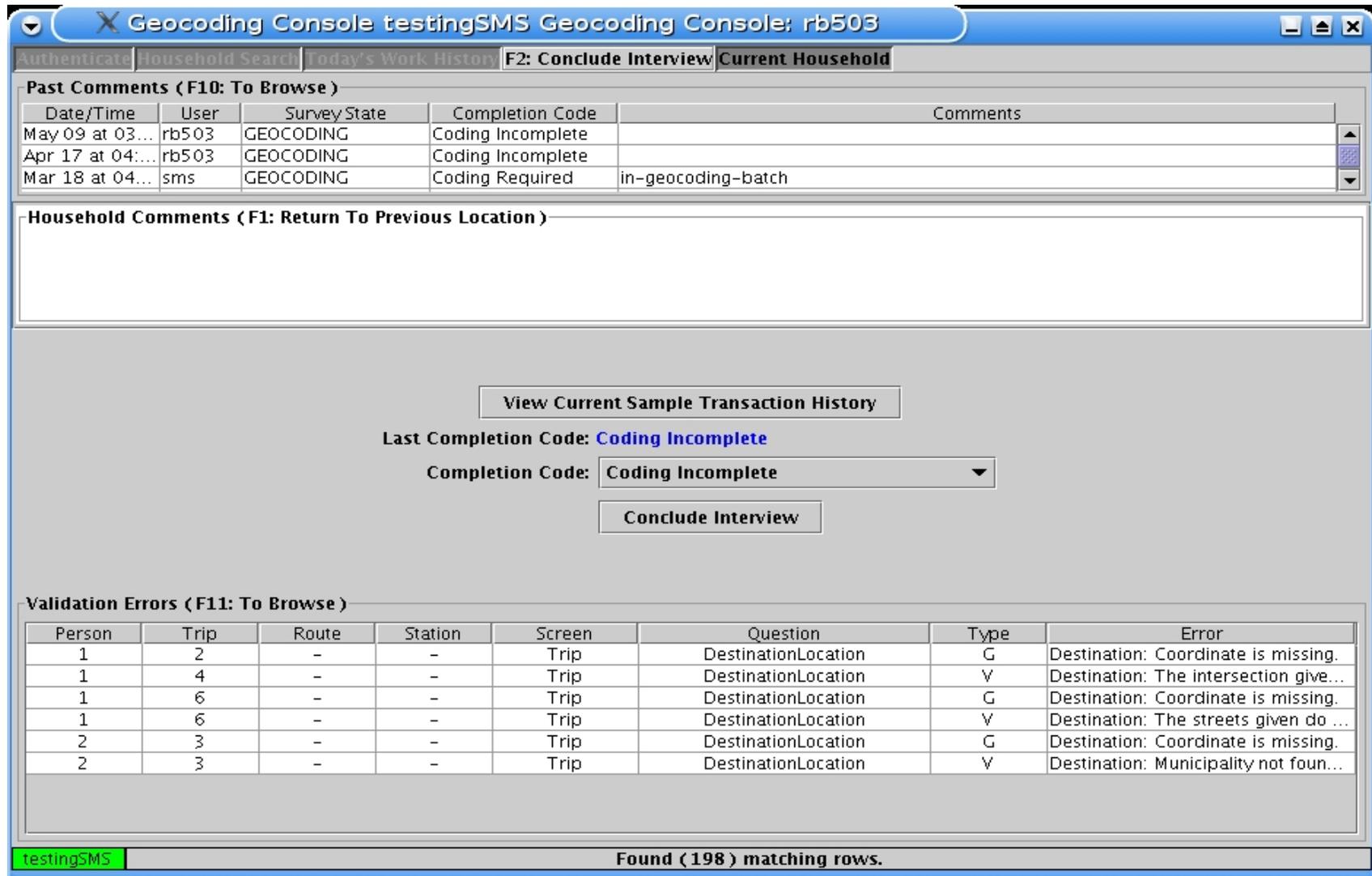
Figure 4 – Conclude Interview

5.0 Geocoding Process

The process of geocoding a household using the geocoding console is as follows:

- At the **Household search** tab either enter a household number into the search tab or hit the **Get Household** button.
- All locations which require coding show up in the **Trips** tab of the **Current Household** page as blue text on a white background.
- Select the first location that needs to be coded using the F8 function key. This location will then be shown within the **New Current Location** box.
- Use the New Current Location box to change the location type if necessary and enter the correct location information.
- Use the fill in option to get this information to the reference databases in the bottom segment.
- Use the List of Monuments, schools, intersections, street range, places within and beyond the Survey Area to get valid coordinates for the location.
- Use update to get this data into the Trips tab. If a monument, address, school or intersection for which a valid coordinate exists has been chosen the text in the Trip tab will change from blue to black signifying a successful geocode.
- Move on to the next location that needs geocoding using the F8 function key.
- When all coding has been completed go to the **Conclude Interview** tab to enter the correct completion code and close household.
- If the household's locations cannot be all coded then code the household as incomplete, reference update required or send it to callback to get further information for coding.
- Conclude household and move on to the next household.