

## **TfGM Travel Diary Surveys (TRADS) Expansion Note**

## 1. Introduction

1. This note documents the method of expanding the household data collected during the Greater Manchester Travel Diary Survey (TRADS). The examples used and figures quoted are all from the Year 1 data set. For technical information regarding the sampling and data collection approach, please see the "Year 5 Technical Report".
2. The GM TRADS survey is a rolling year on year program that covers all days of the week across all seasons of the year.
3. The expansion was undertaken to make the sample representative of the whole of Greater Manchester, and to minimise sampling bias.
4. The fieldwork was undertaken by AECOM. Interviews were conducted face-to-face in person where possible, and if not then over the phone. Answers were recorded manually on paper copies of the questionnaire. A stratified random probability sample was used. Stratification was done by District, with further weighting by district to account for the different population levels. Table 1 shows the proposed sampling numbers by output area by district.

Table 1 Sampling numbers by District. Source: AECOM Sampling Document

Name	No of Households	% of Households	No of OAs	No of OAs to sample (random)	No of Addresses to sample (random)	No of Household interviews
Bolton	108,031	10%	865	42	415	208
Bury	74,322	7%	598	29	286	143
Manchester	167,515	16%	1,341	64	644	322
Oldham	87,817	8%	710	34	338	169
Rochdale	83,413	8%	673	32	321	160
Salford	94,225	9%	756	36	362	181
Stockport	120,423	12%	962	46	463	232
Tameside	90,027	9%	725	35	346	173
Trafford	89,356	9%	717	34	344	172
Wigan	125,144	12%	1,011	48	481	241
Total	1,040,273	100%	8,358	400	4,000	2,000

5. Past experience and inspection of the data shows that the interviews would be biased towards households that travel less than average, as they are more likely to be at home and available for interview.
6. The factors most influencing the level of household travel are:
  - car ownership level
  - number of household members
  - age structure of the household members
  - employment status of the household members

The questionnaire covered all of these factors to ensure that any high or low levels of travel could be cross-checked against these factors.

### **Factors Used for Expansion**

7. The factors used for expansion were
  - Household Type
  - Age
  - Work Status
  - National Travel Survey Trips

### **Household type**

8. Due to differences in the sample size for the different household categories, and variances by weekday and weekend, separate expansion factors were calculated for household category, weekdays, Saturdays and Sundays. In addition a combined expansion factor was calculated for when assessing the data as a whole.
9. The different household categories are shown in Table 2;

Table 2: Household categories used in the calculation of expansion factors

Cat.	Category Description
1	One person aged 65 and over, no cars
2	One person aged under 65, no cars
3	No adults or one adult and one or more children, no cars
4	One adult aged 16 to 64 and one aged 65 and over and no children or two adults
5	Two aged 16-64 adults or more adults, no children, no cars
6	Two or more adults and one or more children, no cars
7	One person aged 65 and over, one car
8	One person aged under 65, one car
9	No adults or one adult and one or more children, one car
10	One adult aged 16 to 64 and one aged 65 and over and no children or two adults
11	Two aged 16-64 adults or more adults, no children, one car
12	Two or more adults and one or more children, no cars
13	One person aged under 65, two or more cars
14	One adult aged 16 to 64 and one aged 65 and over and no children or two adults
15	Two aged 16-64 adults or more adults, no children, two or more cars
16	Two or more adults and one or more children, two or more cars

### **Age**

10. Age Group weights were applied for those under 16 and over 74, with separate factors calculated for weekdays, Saturdays and Sundays.

### **Work Status**

11. Work status factors were applied for those in the 16 to 74 age range, with separate factors calculated for weekdays, Saturdays and Sundays.
12. Some of the categories from the TRADS data were combined for the purpose of calculating the weighting.
- The two working full time categories were combined as the hours were different than those in the census data.
  - The two part time categories were combined to allow a weekday/weekend split to be undertaken.
  - Part time and full time student categories were combined as there is no part-time student option in the census data
  - Voluntary work was added to part-time work as there was no data for voluntary work for Saturdays.
  - Other was added to Looking after home/family as there was no other category in the census data.
  - Only those in the 16-74 age range were considered as this was the only data available from the census.

13. The categories used were;
- Working full time 30+ hours
  - Working part time + voluntary work
  - Retired
  - In education (full time and part time)
  - Looking after home/family + other
  - Unemployed
  - Long term sick or disabled
14. The Age and Work Status factors were used together to correct to Census 2011 data.

### **National Travel Survey Trips**

15. Underreporting of trips varied by journey purpose. A factor was applied across all days to account for this. This factor did not use census data.
16. The expansion factors can be applied individually or together, to allow for expansions just for weekdays, Saturdays or Sundays or for all days of the week together.
17. The purpose categories used were
- Commuting
  - Business
  - Education
  - Shopping
  - Personal Business
  - Escort education
  - Escort other
  - Visiting friends
  - Sport and entertainment
  - Holidays and day trips

However, it was found that the numbers of commuting, business and education trips were accurate enough not to need expanding, so an expansion factor of 1.0 was used.

## Accuracy of Expansion

18. To check how the accuracy of the expansion process, compared to the census data, a series of comparison tables were produced for the following categories.
19. Table 3 shows that the total number of cars and vans available came out as exactly the same as the census figures. The only differences are in the number of households with 2 cars and 3 or more cars. The TRADS data estimates a slightly higher percentage of households with 2 cars or vans, and underestimates the percentage of households with 3 or more cars and vans.

Table 3: Car Availability

Number of Cars & Vans	TRADS		Census 2011	
	No	%	No	%
0	345475	30.6	345475	30.6
1	481516	42.7	481516	42.7
2	266613.2	23.6	245405	21.8
3 or more	34461.84	3.1	55670	4.9
Total	1128066	100.0	1128066	100

20. Table 4 shows that the TRADS data overestimates the number of English/Welsh/Scottish/ Northern Irish British people and Pakistanis in Greater Manchester, whilst underestimating the number of Irish, White and Black Caribbean, White and Asian, Indian, Chinese, and people of Other Asian background. However, overall the estimates are fairly good. Some over and under representations is to be expected due to the fact that there are concentrations of smaller ethnic groups in some parts of Greater Manchester.

Table 4: Ethnicity

Ethnicity	TRADS		Census 2011	
	No	%	No	%
English/Welsh/ Scottish/ Northern Irish British	2064337	83.6	2141687	79.8
Irish	14024	0.6	36022	1.3
Any other White background	51286	2.1	70414	2.6
White and Black Caribbean	2777	0.1	23131	0.9
White and Black African	3155	0.1	9997	0.4
White and Asian	1552	0.1	15657	0.6
Any other Mixed / multiple ethnic background	1797	0.1	11925	0.4
Indian	28486	1.2	53461	2.0
Pakistani	166916	6.8	130012	4.8
Bangladeshi	42414	1.7	34186	1.3
Chinese	4522	0.2	26079	1.0
Any other Asian background	2243	0.1	28435	1.1
African	42465	1.7	44691	1.7
Caribbean	15994	0.6	17767	0.7
Any other Black background	6717	0.3	11639	0.4
Arab	7841	0.3	15026	0.6
Any other Ethnic group	13678	0.6	12399	0.5
Total	2470205	100	2682528	100

21. Table 5 shows that the estimate for the number of household members compares well with the census data. There is a slight overestimate of 2 person households. The number of 6, 7 and 8 person households is underestimated.

Table 5: Number of Household Members

Residents in household	TRADS		Census	
	No	%	No	%
1	363564	32.2	364137	32.3
2	408092	36.2	364604	32.3
3	169793	15.1	180646	16.0
4	116290	10.3	137422	12.2
5	49879	4.4	51051	4.5
6	17346	1.5	20368	1.8
7	2673	0.2	5475	0.5
8	429	0.0	4363	0.4
All Households	1128066	100	1128066	100

22. Table 6 shows that TRADS over estimates people walking to work and travelling to work by car. However, it underestimates people who travel to work by train, bus/coach/minibus, work mainly at home and other. Generally it is a good estimate.

Table 6: Main mode of Travel to Work

Mode	TRADS %	Census %
Walk	11.7	9.9
Cycle	2.1	2.1
Motorcycle etc.	0.3	-
Car/Van Driver	64.1	57.8
Car/Van Passenger	6.0	5.7
Train	1.7	2.5
Metrolink	1.0	1.3
Bus, Coach, minibus	7.2	10.5
Taxi/Minicab	0.4	-
Work mainly at home	5.5	8.5
Other	0.1	1.8
Total	100	100

23. Table 7 shows that the TRADS data makes a good estimate for the gender split, being only 1% under for males and 1% over for females compared to the Census data.

Table 7: Gender

Gender	TRADS		Census 2011	
	No	%	No	%
Male	1211067	48	1337140	49
Female	1290216	52	1365069	51
Total	2501283	100	2702209	100

24. Table 8 shows that the TRADS data is a good estimate for trip purpose, when compared to the National Travel Survey data, except for Visiting friends, which is under estimated, and Sport and Entertainment which is over estimated. However, combining these two categories would give very similar results in both data sets.

Table 8: Trip Purpose

Journey Purpose	TRADS 2011-2012		NTS 2010-2012	
	No.	%	No.	%
Commuting	152	15.5	139	14.6
Business	34	3.5	20	2.1
Education	80	8.1	72	7.6
Shopping	204	20.8	206	21.7
Personal Business	95	9.7	93	9.8
Visiting friends	110	11.2	155	16.3
Sport and entertainment	96	9.8	56	5.9
Holidays and round trips	60	6.1	61	6.4
Escort education	54	5.5	55	5.8
Escort other	95	9.7	93	9.8
Total	980	100	950	100

25. Overall the results show that the expanded TRADS data makes a good estimate of the census data, so the expanded results can be used as an accurate representation of the travel behaviour of Greater Manchester.