Tram Passenger Survey (TPS)

Autumn 2015

Technical report

transportfocus

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1. Background

Transport Focus is the official, independent consumer organisation representing the interests of train, bus, coach and tram users across England outside London. A key part of the Transport Focus mandate is to provide evidence-based research to support its stance on the views and priorities of passengers. To this end, Transport Focus (and its predecessors) established:

- The National Rail Passenger Survey (NRPS) in 1999 – this twice-yearly survey (Spring and Autumn) provides data for each Train Operating Company on its passengers' perceptions in regard to key measures of station and train performance
- The Bus Passenger Survey (BPS) in 2009 – this annual Autumn survey (with a smaller project in the late Spring) provides data for a number of PTE, unitary and county council areas on passengers' perceptions in regard to key bus stop, bus vehicle and bus driver measures
- The Tram Passenger Survey (TPS) in 2013 – a pilot study was undertaken in Spring 2013, followed by full Autumn waves in 2013, 2014 and 2015. The survey provides data for tram networks across Britain on passengers' perceptions in regard to tram journeys, vehicles and stops.

A number of different methodologies were tested in the initial TPS pilot. As well as the traditional paper self-completion approach used historically on the NRPS and BPS, passengers were offered the choice of a paper self-completion questionnaire or providing an email address. Those providing email addresses were sent an invitation to participate in an online version of the survey one to two days following contact. The pilot demonstrated that the 'choice' option generated a similar final sample size to the traditional paper self-completion approach at similar cost, but in addition did reduce the age bias present in undertaking just a paper self-completion approach and furthermore did not significantly affect the results. As a result, TPS uses this combined approach. (Indeed this approach is also now used for the BPS, and is being piloted for the NRPS).

This report describes the methodology used for the Autumn 2015 TPS in detail, including where this has differed at all from previous waves.

2. Summary of approach

Key features of the research methodology used in the TPS were:

- The TPS is a measure of experiences with tram journeys. Each individual response related to a single passenger journey (rather than to a passenger who may have made multiple individual journeys)

- The sampling unit was an individual tram service (e.g. the 06:15 from Birmingham Snow Hill on a specific Tuesday), in the same way that BPS sampling is based on bus services. (In NRPS, in contrast, most sampling is based on stations.) This is a more cost effective sampling unit than a tram stop, as passenger numbers are greater for a service over a given time period than for most stops over the same period

- The sampling frame thus needed was the list of all tram services that ran each week (which was downloaded from the published timetables)

- A core standard questionnaire was used across all networks, with the majority of questions remaining consistent from one annual survey to the next. As Transport for Greater Manchester (TfGM) already had its own passenger satisfaction survey previous to the establishment of the TPS, the questionnaire used for the Metrolink network was slightly longer than for other networks as it included questions specific to the previous TfGM survey. (TfGM funded these additional questions.)

The standard questionnaire used for the Autumn 2015 survey is given in Appendix 1.

A similar version of the questionnaire was used for both the paper and online respondents. To ensure online respondents answered specifically about the journey they were taking when recruited by the interviewer, the date and time they were approached was inserted into the wording of the online questionnaire they completed.

As indicated above, all passengers were approached and asked if they would provide feedback about the specific journey they were undertaking. If willing, they were offered the choice between a paper self-completion questionnaire and providing their email address so that they could be sent a link to an online version of the questionnaire.

3. Data Collection

Fieldwork took place between 17th September and 25th November 2015. There was a pause within this to avoid the school half-term holidays and also to allow for a review of the project's progress. In most areas this pause was between 17th October and 1st November, although there were some variations if school half term holidays were at a different time (as in Scotland for example).

The exceptions to this overall fieldwork period were:

- For Manchester Metrolink, where fieldwork ran from 28th September to 26th November, starting slightly later to accommodate the main impact of work taking place to build a direct link between St Peter's Square and Victoria, in the centre of the city. In addition, there was no fieldwork on 10th October due to three major sporting events taking place in the city on that day. This is in line with a general principle to avoid conducting fieldwork where it clusters heavily around very large sporting or entertainment events which could create atypical travel patterns (though usually it is not necessary to avoid all fieldwork for a whole day as in this case)
- For Midland Metro, where fieldwork paused for two additional weeks from 26th October and thereafter took place between Wolverhampton and St Paul's, rather than along the full line to Snow Hill, because of improvement works and the closure of Snow Hill.

3.1 Data collection method

Recruiting respondents

Before working their first shift on the project all fieldworkers received a detailed briefing from BDRC via regional supervisors. Fieldworkers boarded the tram services selected from the sampling process (see section 4) on the specified day and start time, and at the specified end of the route. They travelled to the final destination of the route and then made the first return trip possible on that route, returning to their start point. They repeated this process to make as many trips as possible within their three-hour shift. During this time fieldworkers approached as many passengers as possible who boarded the tram and gave them the opportunity to participate in the research.

Passengers were offered the choice to take a paper questionnaire, along with a post-paid envelope, or to complete the survey online. If they chose the latter, the

fieldworker took their email address and a survey invite was emailed to them as soon after the shift as possible[1]. Both the paper and the online option have been offered in all waves of the TPS (and the original pilot), and has been shown to increase the potential for participation among certain demographic groups (especially younger males) who are otherwise typically somewhat under-represented in this type of research. All those recruited were asked to complete their questionnaire after they had finished their journey. The usefulness of this dual data collection method in the TPS has led to its adoption on the Bus Passenger Survey, and pilots on the National Rail Passenger Survey.

In total, 19,207 paper questionnaires were distributed (an average of 56 per shift), and 5,934 email addresses were collected (an average of 17 per shift). In total therefore, 25,141 people were recruited to take part in the survey, an average of 73 per shift.

Further tasks performed during fieldwork

As described further in the later section on weighting, fieldworkers were issued with an "Observation Record Form" on which they recorded the total number of passengers on board at a given point in time, and the observed age and gender profile of those passengers at that time. This observation was conducted twice within a fieldworker shift: 20 minutes after the start of the shift and 20 minutes before the end. These details allowed the creation of a representative passenger demographic profile to be used for weighting purposes.

Fieldworkers were also issued with a "Respondent Record Form" on which they recorded gender and estimated age of all recruits, as well as contact details for a sample of people willing to provide this. This was used to enable standard quality control back-checks, as well as other validation measures on returned questionnaires.

Authorisation to work on board trams

Regarding permission to conduct recruitment on the trams, each of the tram network operators provided a letter which the fieldworker was able to show to any staff (or passengers, if requested) to vouch for the bona fides of the survey.

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[1] *In most cases (58%) this was within 2 days; 73% of recruits received their email invite within 3 days*

Monitoring fieldwork

Throughout fieldwork, fieldworkers reported the number of questionnaires they had handed out, and how many email addresses they had collected (i.e. how many people they had recruited). This was reported by the next working day after each shift, and these metrics were monitored by the team at BDRC.

As questionnaires were returned to BDRC's head office, their barcodes were scanned to provide immediate extra confirmation that a fieldwork shift took place, and a number of data fields from the questionnaire were recorded manually to enable a first stage of validation checks to take place. The same information from electronic surveys completed online was recorded automatically. The numbers of completed and validated questionnaires were matched with the reported recruitment figures, to allow the project team to monitor the overall productivity of the fieldwork. Several actions could be triggered by this information, including for example:

- If the sample sizes in certain areas appeared likely to fall below the target, additional 'top up' shifts could be scheduled to make up the shortfall
- If it was found that all of the questionnaires were routinely given out in certain areas or on certain routes, this was recorded and more questionnaires may be printed where relevant in future waves
- Steps could be taken to address lower productivity in certain fieldworkers if this was found to be the case.

BDRC carries out all fieldwork in accordance with the MRS Code of Conduct, the IQCS (Interviewer Quality Control Scheme) and ISO 20252. Exceeding normal industry standards, at least 10% of all TPS shifts were subject to unannounced spot-checks by BDRC supervisors and other project team staff. The majority of shifts to be spot-checked were selected at random, but some were chosen specifically, to monitor new or less productive fieldworkers or areas more closely, and indeed to observe more productive fieldworkers in order to study and pass on best practise techniques. Random unannounced spot-checks were also made by Transport Focus staff.

3.2 Questionnaire

For most tram networks, the paper questionnaire was an 8-page self-completion booklet that was handed out along with a reply-paid envelope to all passengers on the trams who were willing to take part. The online questionnaire was exactly the same in terms of question content, with small modifications in order to work appropriately depending on the type of device (desktop, smartphone, etc.) being used by the respondent.

The questionnaire had a core set of questions to provide consistent measurement of the components of journey experience. Some minor variations were present for the questionnaire used for each tram network, for example to allow for specific ticket types in use on some networks. The questionnaire used for Manchester Metrolink was 12 pages long (as also in 2013 and 2014), to include a number of additional questions useful for TfGM.

An example copy of the standard questionnaire is shown in Appendix 1.

3.3 Response rates and validation of returns

3.3.1 Response rates achieved

The metric of fieldwork outcome was the product of recruitment rates achieved and response rate achieved. The table below shows the metrics achieved from fieldwork in this wave.

Table 1: Fieldwork metrics: TPS Autumn 2015

Network	No. shifts	Recruits : paper	Respon-ses: paper	Response rate: paper	Recruits: online	Respon -ses: online	Response rate: online	Recruits: total	Respon -ses: total*	Response rate: total	Average responses per shift (total)
Blackpool	35	2060	425	21%	785	184	23%	2845	609	21%	17
Centro	27	1599	424	27%	410	71	17%	2009	495	25%	18
Edinburgh	22	887	608	69%	378	128	34%	1265	736	58%	33
Manchester - Total	210	11928	2289	19%	3668	769	21%	15596	3058	20%	15
Manchester - Altrincham	28	1926	394	20%	489	97	20%	2415	491	20%	18
Manchester - Ashton	36	2175	354	16%	690	148	21%	2865	502	18%	14
Manchester - Bury	30	1567	375	24%	525	105	20%	2092	480	23%	16
Manchester - East Didsbury	20	1242	264	21%	340	79	23%	1582	343	22%	17
Manchester - Eccles/MediaCity	34	1867	321	17%	615	133	22%	2482	454	18%	13
Manchester - Rochdale	31	1524	310	20%	576	104	18%	2100	414	20%	13
Manchester - Airport	31	1627	271	17%	433	103	24%	2060	374	18%	12
Nottingham - Total	14	829	294	35%	219	44	20%	1048	338	32%	24
Nottingham - Clifton	9	566	193	34%	110	18	16%	676	211	31%	23
Nottingham - Toton	5	263	101	38%	109	26	24%	372	127	34%	25
Sheffield - Total	31	1904	472	25%	474	142	30%	2378	614	26%	20
Sheffield - Blue/Purple	16	920	235	26%	237	72	30%	1157	307	27%	19
Sheffield - Yellow	15	984	237	24%	237	70	30%	1221	307	25%	20
Autumn 2015 total	***343***	***19207***	***4512***	***23%***	***5934***	***1338***	***23%***	***25141***	***5850***	***23%***	***17***

** Total number of responses shown is the total number received, before any further cleaning; a small number of responses were rejected during validation and analysis of the responses (see next section)*

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3.3.2 Validation of completed surveys

Completed questionnaires were subject to two stages of checks and validation; once before they were scanned electronically to pick up the tick-box responses (for paper questionnaires), and once afterwards.

The first stage took place immediately after completed questionnaires were received. Each questionnaire had a unique ID number; for paper questionnaires this was scanned from a barcode on the front page. The answers to certain questions were then entered into a database – these were the date (top right on the paper questionnaire and time/date stamped on the electronic questionnaire), the start and end points of the passenger's journey (Q1a and b, see questionnaire example in the Appendix) and the time they boarded (Q2). These were checked against the original details of the fieldwork shift, to check that the passenger filled in the questionnaire about a verified journey (this also served as a check that fieldwork had been carried out as intended). Questionnaires which did not tally with the expected journey details were investigated and could be rejected if they could not be verified as corresponding to the correct fieldworker shift.

It was useful to carry out this stage of the validation immediately (rather than later on alongside other DP checks), because it enabled more accurate monitoring of the real number of 'useable' responses which had been collected for each tram network.

At this stage, the answers to numeric questions were also recorded manually and/or checked. These are all about times (Q15, Q17 and Q25), and were recorded manually because sometimes respondents' handwriting is difficult to pick up via the electronic scanning data capture, or passengers incorrectly record route numbers or times which use the 24-hour clock. (Checks were built into the manual data entry system to avoid human error, such as a flag to alert the person if they have entered abnormally long time for waiting for the tram, etc. Also note that the answers to these questions were still scanned electronically, and a sample compared to the manually entered data, as a further check against human error at the data entry stage).

Validated paper questionnaires were then scanned electronically to record which answer boxes on the form had been ticked by respondents. (At this stage, the data capture itself was 100% validated, meaning that a person would check, for example, that the electronic process had picked up genuine ticks, rather than instances where a

respondent may have ticked one response and then crossed it out in favour of another, or where a mark may have been made accidentally in a box).

Once all of the responses to the questionnaire were recorded in a database, other data cleaning could take place. This included, for example, checks for multi-coded answers where a single-code was required, and responses to questions which the respondent should have routed around.

3.3.3 Data preparation and analysis

After the data was validated, coded and edited, an SPSS data file was provided to Transport Focus. Transport Focus also ran some checks on this file before it was ruled off as final.

Summary reports were then produced for each tram network, and an 'All Network' report showing aggregate results for the survey as a whole. Transport Focus invests time to share these reports and any further useful analysis with operators and relevant local and transport authorities.

4. Generating representative samples of passenger journeys

4.1 Route coverage

The Autumn 2015 TPS covered six different tram operators. Three of these have just one route, but the Sheffield network has three, Nottingham has two (with extensions to the south and south west of the city in 2015), and Manchester has seven (with a new line to the airport opening in late 2014).

For cost and logistical reasons, the blue and purple routes in Sheffield were merged and so this wave covered fourteen routes in total as follows:

- Blackpool
- Centro (Birmingham/Wolverhampton)
- Edinburgh
- Manchester – Altrincham
- Manchester – Ashton
- Manchester – Bury
- Manchester – East Didsbury
- Manchester – Eccles/Media City
- Manchester – Rochdale
- Manchester – Airport
- Nottingham – Clifton
- Nottingham – Toton
- Sheffield – Blue/Purple routes
- Sheffield – Yellow route.

The Manchester Metrolink Airport line was opened in November 2014, during the TPS fieldwork for Autumn 2014, and so was included in the survey for the first time in 2015. Nottingham Express Transit was previously surveyed as one single route and covered as two separate lines in 2015. All other routes above were surveyed in the same way in both 2014 and 2015. Edinburgh Trams was first launched at the end of May 2014 and so had been included in the survey for the first time in 2014; other networks had also been surveyed in 2013.

The sampling process described in section 4.3 below was applied in turn to each of these fourteen routes and a separate sample selected for each. Each route was also weighted according to passenger profile information on demographics and times of

travel, in order to provide results which were representative at route level; this is described in section 4.4. The routes were then also weighted according to their relative volume of passenger journeys, so that when looking at aggregated results at 'All Network' level in the overall dataset, the routes with the largest numbers of passengers have the greatest weight and each route contributes appropriately.

4.2 Sample sizes

The sample sizes specified for each network are shown in the table below. The sample sizes for Blackpool, Manchester and Centro were determined by boost funding from those authorities; Edinburgh Trams funded the full cost of the research on their network, this being outside the statutory remit of Transport Focus. These sample sizes were used to determine the number of fieldwork shifts required for each network and the shift numbers used to determine which tram services should be sampled. The sampling process is discussed in detail in section 4.3.

Table 2: Target and achieved sample size, Autumn 2015

Network/route	Sample size required	Sample size achieved
Blackpool	500	594
Centro	500	494
Edinburgh	500	734
Manchester – Altrincham	450	459
Manchester – Ashton	380	477
Manchester – Bury	450	471
Manchester – East Didsbury	380	337
Manchester – Eccles/MediaCity	380	425
Manchester – Rochdale	380	411
Manchester – Airport	380	374
Nottingham – Clifton	125	205
Nottingham – Toton	125	123
Sheffield – Blue/Purple routes	250	305
Sheffield – Yellow route	250	298

Within the Manchester sample a minimum quota was also applied of one hundred passenger journeys between tram stops located within the 'City Zone'. These journeys both started and ended within a group of seven tram stops in the centre of Manchester. In practice, 111 surveys were completed for the 'City Zone'.

4.3 Sampling process

For Autumn 2015, the sampling process followed that employed in previous waves, but with some enhancements (in line with similar enhancements made to the BPS method at the same time).

The process was as follows:

1. The tram timetable for each route was downloaded from the network's website

2. From this, a list was generated of the tram services which ran each day of the week including start point, start time, end point and end time

3. These lists were sorted by direction, the seven days of the week and the start time of the service – this generated a list of the tram services in a week. Because fieldworker shifts only operated between 6am and 10pm, services starting outside of these times were then removed from the lists[2]

4. The next stage was to systematically select services from this list which would form the basis of a fieldworker shift; i.e. the service which fieldworkers would board at the start of their shift. During this selection, steps were taken to minimise the level of weighting needed at the later analysis stage to produce an accurate time of day profile. These steps have been improved upon in each year of the TPS:

    i. In the first full wave of the TPS in Autumn 2013, a random start point was identified in the list of services, and from there every n^{th} journey was selected from the same list based on the total number of records. The selected journeys then formed the start of a fieldworker shift.

    ii. In Autumn 2014 this approach was adapted by taking into account the weights applied in the previous wave, to achieve a more accurate spread of shifts according to the different passenger volumes in different time

[2] *There are very few public transport services prior to 6am and the additional costs for running fieldwork at this time – hourly rates and transport to the start point – are not justified given the very small number of passengers. Although there are more journeys after 10pm, safety concerns rule out fieldworkers operating after this time – the only feasible option would be to ensure fieldworkers operate in pairs and again the cost of this and providing transport at the end of the shift is not justified given the relatively low number of passengers*

segments (weekday peak, weekday off peak and weekend). Each journey in the sample frame was allotted a 'passenger value' weight, based on the weight applied to each time segment within that tram network in Autumn 2013. For Edinburgh, where Autumn 2013 weights were not available, the passenger value was calculated using the average weight applied to each time segment across all networks. Selection of the sample was then made at intervals based on the passenger value rather than the total number of records, meaning that more services would be likely to be selected during busier times, to reflect passenger footfall throughout the day and week.

iii. In Autumn 2015, patronage data was supplied by each of the tram operators, indicating the proportion of all passenger journeys which were made in each of four 'dayparts'[3]. This enabled a passenger value weight to be applied to each journey in the same way as previously, but this time based on real data. An example of how the passenger value weight was calculated is shown below (this example uses illustrative data only since the data supplied by the operators is confidential to those organisations):

Table 3: Calculating passenger value weights, Autumn 2015

	Passenger journey profile *(supplied by operator)*	**Proportion of all weekly scheduled services** *(from lists generated from published timetables)*	**Weight applied to each timetabled journey**
Morning peak*	15%	12%	1.25
Off-peak	40%	52%	0.77
Evening peak	20%	13%	1.54
Weekend	25%	23%	1.09

**See definitions of these dayparts in footnote below*

A random start point in the list of timetabled services was identified, and from this point, as in 2014, services were selected at intervals based on the cumulative passenger value, rather than being selected at intervals based on the absolute number of scheduled service departures. In the example above (which is fairly typical), this would mean that morning and

[3] *'Dayparts' are: 'Morning peak' (weekdays 07:00-09:30), 'Evening peak' (weekdays 16:00-18:30), 'Off-peak' (weekdays at other times) and 'Weekends' (any time on Saturdays or Sundays).*

especially evening peak tram services would have a slightly higher chance of being selected, and weekday off-peak services a slightly lower chance, reflecting the overall profile of when passenger journeys are taking place.

5. The result of step 4 was a shortened list of tram journeys, which would form the basis of fieldwork shifts. In previous waves of the TPS, fieldworkers have boarded the tram selected during this process and made journeys all the way along the route and back from that time onwards, within a three hour period. However, in an independent consultant's review following the Autumn 2014 Bus Passenger Survey (which followed the same principle), a concern was raised that this approach skewed the overall survey coverage towards later journeys in the day. This is because, for example, passenger journeys happening at 6am could only ever be picked up by fieldwork shifts arranged to start at 6am, whereas journeys starting at 8am could be picked up by shifts starting at 6am, 7am, 8am, and anywhere in between. Therefore in Autumn 2015, a step was added here to correct for this: for every service selected at this point, the identical service 1.5 hours earlier was identified. That is, the tram service with the same start and end point and on the same day of the week but 1.5 hours earlier (or as close to this as possible). If the original selection was actually one of the earliest in the day and there was no alternative a whole 1.5 hours earlier (but still starting from 6am or later), then the first service of the day, from the same start point, was selected. This newly 'adjusted' journey then became the start point for the fieldworker's shift, meaning that, in practice, the originally selected start time became the mid point of the shift. This meant that the overall profile of fieldwork shifts (based on their mid point time) matched the passenger journey profiles supplied by operators, which gave a better opportunity than in previous waves, to represent passenger journeys across the day.

   A similar effect to this had been produced in 2013 and 2014, where a number of selected services (and therefore shifts) were moved manually to cover morning peak times a little more than in the natural sampling fall-out. This was done by moving some very late evening services (too late to cover in the fieldwork) to the early morning instead. While a sensible approach, this was improved upon in 2015 by being based on evidence (real patronage data) followed by a systematic adjustment, applied to all networks in the same way. Overall the 1.5 hour adjustment in 2015 resulted in fieldwork being shifted slightly earlier in the day than it had been in 2014, thereby leading to greater contribution, in the final weighted results, from daytime off-peak travellers in particular, and slightly less from weekends. Additionally, a lesser degree of weighting was required to

achieve the final sample profile. Encouragingly, the impact on survey findings (passenger satisfaction ratings) has been very little or none at all (this is covered in more detail in section 5). This means that this move to a more systematic and evidence-based start point for the sampling has improved the validity of the TPS method without causing any step change in its outcomes.

6. Fieldworker shifts were then scheduled based on the newly adjusted selected services: the time and day of the week that was selected dictated the beginning of the shift, and return journeys were made thereafter on the same vehicle for the duration of that shift, approximately three hours. The three hour shift length allowed for two return journeys in most shifts, adjusting as necessary to ensure this. A three hour shift length provides time for fieldworkers to encounter plenty of passengers for distributing questionnaires. A longer period than this can introduce more clustering – e.g. if a particular day is affected by service disruption.

7. A small number of manual amendments were made at this point, in particular:

   i. To ensure that the profile of fieldwork shifts did match operators' original journey volume profiles well and that the survey responses generated were likely to be useful. For example in Manchester, on one of the routes with a smaller sample size (and therefore a smaller number of fieldwork shifts) the final result was for an atypically small number of shifts taking place in the evening peak time compared to other times. It was felt that this was likely to generate too few survey responses for this time of day, which, while reasonably representative of actual passenger volumes, would not enable meaningful analysis if this was needed at a later point. Therefore a small number of fieldworker shifts were moved from the morning peak to the evening peak in this case.

   ii. To address instances where some selected services still fell towards the end of the day, meaning that a full three hour shift would have run beyond 10pm, which is the usual latest reasonable time for fieldworkers to finish. In these cases, all such selected services were replaced by an identical one starting at 7pm (or as close this time as possible), so the fieldwork shift would cover the period 7pm-10pm. (NB. In previous waves, half of such shifts were moved forward to begin at around 7pm, and the other half were moved so that they covered the same or a similar tram journey, starting at 6am. This also addressed the issue of under-sampling earlier

times in the day, which was no longer relevant in Autumn 2015 thanks to the 1.5 hour adjustment described above.)

iii. In some cases, if a return journey from one end of a route to the other did not fit well within a standard three-hour shift, that shift would take place over up to four hours instead. 22% of all fieldworker shifts were four hours long. In addition, five shifts which were conducted at tram stops in central Manchester (rather than on board trams) were six hours long. These were specifically targeted at ensuring a good sample size of passengers boarding trams in TfGM's CityZone, and covered all times of day between them.

8. A final manual amendment was made, to deal with the presence of double-carriage trams in Manchester, where many services are doubled up with a second carriage during busy times to create extra capacity. While it can be possible for a fieldworker to move between carriages in quieter times of the day, to make sure that passengers in both carriages have the opportunity to take part in the survey, this is difficult in busy periods where both carriages may be full. To address this, some shifts involving double trams were assigned two fieldworkers – one for each carriage. This ensured that the views of passengers on busier services were better represented. In 2014 the process for this was:
   i. Shifts affected by double tram services were identified; there were 22 in total
   ii. Two thirds of the double tram shifts were assigned two fieldworkers. Only two thirds were so treated to avoid over-clustering the sample, while also gaining the benefit of some double tram shifts
   iii. To maintain the total number of interviewer shifts, the same number of shifts was then removed at random from the rest of the sample.

The same process was initially used in 2015; however due to a large increase in the incidence of double-carriage trams this year, including during the off-peak, this resulted in a large number of double-interviewer shifts and therefore significantly fewer shifts overall, presenting a greater risk of sample clustering. It was therefore decided that the same number of fieldworker shifts should be doubled up with two interviewers in 2015 as in 2014, despite the increased number of double-carriage services, and that these would be focussed at peak times only. In addition, one double-fieldworker shift was assigned to each of the Eccles/Media City and Ashton routes, which had not had any double-carriage trams in 2014 but did by 2015. The shifts where two interviewers would work

simultaneously were selected at random from within the peak-time shifts, and as before the same number of shifts were removed from the schedule, at random from other day-parts.

9. On almost all routes, additional 'top up' fieldwork was needed to ensure that targets had a good chance of being met, where the strike rate was lower than expected. Extra shifts were added throughout the fieldwork period based on its productivity up to that point. In total, 73 top up shifts were conducted on top of an original 266. The only routes which did not require any top up fieldwork were Edinburgh, Manchester Rochdale and Nottingham Toton.

10. Once travelling on the selected tram services, fieldworkers approached all passengers (except those apparently under 16 years of age) as soon as possible after they boarded, to offer them a paper questionnaire or the opportunity to provide an email address to which a link to an online version could be sent; thus all passengers over 16 had the opportunity to be included in the sample. (Interviewing those under 16 requires consent from a responsible adult.)

4.4 Weighting

The final survey data was weighted to correct for imbalance in response rate by age and gender, and by day-part. This weighting was applied within each of the fourteen sampled tram lines, in order that results were representative at line level (rather than at overall network level, where a network is divided into several lines).

The lines were also weighted appropriately within each network, and each network was weighted appropriately within a total survey dataset so that in any 'All Networks' results, each network contributed to the results in relative proportion to the number of passenger journeys it carries.

The sources for each of these weights, and the process for each, are described below.

4.4.1 Demographic and day-part weights

No known source of information exists to detail the demographic of journeys by age and gender consistently for each network; therefore this information was collected during the fieldwork via 'passenger counts'.

Passenger counts were completed during each interviewer shift to establish a passenger profile with which to weight the data. They were conducted as follows:

- Passenger counts were undertaken twice during the shift to record passenger characteristics (gender and observable age). For Blackpool, Centro, Edinburgh, Nottingham and Sheffield the fieldworker was given times at which to start these counts:
  - i. After 20 minutes
  - ii. After two hours 40 minutes
- In most cases this ensured one count on an outward journey and one count on an inward journey. For Manchester, due to the high number of shifts, interviewers were given times that ensured one outward and one inward count
- If necessary, these times were varied to ensure the time coincided with the fieldworker being on board the tram
- In a few cases, where the tram was too busy to undertake a count at peak times, estimates of passenger numbers were made. – see below for more details on this).

- The data produced by the counts was used to weight responses to a more representative gender and age profile for each line. The time at which passenger counts took place was recorded, meaning that an age and gender profile was actually created for each day-part, within each line. In 2013 and 2014 the day-parts were: 'weekday peak', 'weekday off-peak' and 'weekend'. In 2015 the peak day-part was split in two to provide 'weekday morning peak' and 'weekday evening peak'.
- Profiles by age were recorded in three bands: 16-25, 26-59 and 60+.
- The passenger counts were used to compile the weighting matrix (shown in section 4.4.3) used at the data analysis stage.

Of the total 686 planned passenger counts, 566 were completed and used to inform the weighting. There were 120 passenger counts that were not completed or not used to inform the weighting:

- 48 of these were at off-peak times and it was assumed the total counts and demographic profile of passengers on these shifts would have been the same as the average for that route and time of day
- 62 were in peak hours when the tram was full and this prevented the fieldworker moving around the tram to effect the count; in these cases we could not assume that the count was the same as the average for the route. In the first full wave of the TPS, Autumn 2013, we investigated an appropriate assumption to use for these missing counts and found that using the crush capacity of the trams (which can be provided by operators) in place of missing counts was the best approach. This approach was further verified in Autumn 2014 and was therefore also used in Autumn 2015. More on this use of crush capacity is given in Appendix 2. Where the crush capacity figure was used to estimate the total number of passengers, the split between the three age groups and between males and females was based on the profile for other peak shifts on that route. For example, if the crush capacity for Manchester Bury morning peak is 200 and the average gender breakdown from all Manchester Bury morning peak observations was 60/40 Male/Female, it was assumed that the full tram had 120 men and 80 women on board
- A further 10 passenger counts were completed but information was not sent back to the office by fieldworkers in time or was not of sufficient quality for the data to be used to inform the weights
- In the case of a double-carriage tram, the count would usually have been taken twice due to there being two fieldworkers present. Where the count was taken only once, this was doubled; similarly where the count was not undertaken at

peak hours for a double tram, the estimated passenger numbers using crush capacity figures provided by the operator were doubled.

Using the sum of all observations (including those estimated using the crush capacity), an overall age and gender profile was then derived for each line for each of the four day-part segments. The six tram operators involved in the 2015 survey provided information about how their total passenger journeys would break down by day-part in a typical week. This was the same information as used earlier in the sampling. (Note that this was an enhancement compared to the previous waves of the TPS, where the breakdown by day-part was determined via the passenger counts made during the fieldwork. Sourcing this information directly from the operators was therefore more accurate. The result of this change was that weights were typically a little higher for peak times in 2015 compared to previous waves. This, combined with the more systematic emphasis on morning peak times through the sampling, as described earlier, meant that overall morning peak times contributed more (and correctly so) in 2015 than previously. The impact of this on results is discussed in section 5.

Therefore at this point we had established target profiles for age, gender and day-part for each line, which would be used as the basis for rim weights. The next section describes the way that weights were estimated to ensure that each line contributed proportionately to the overall network, and that each network contributed proportionately to any aggregated 'All Network' results. The subsequent section summarises how all of these weights (demographic, day-part, line and network) were brought together and applied to the final dataset.

4.4.2 Line and network weights

Annual passenger journeys for 2014/15 were used, as published by the DfT[4], for each of the tram networks. This data was used directly as published for Blackpool, Centro, Nottingham and Sheffield. Data was sourced from the networks for Edinburgh and Manchester, because a full year's worth of data had not yet been published by the DfT for Edinburgh at the time of this analysis, and because Manchester's Airport line had not yet been open for a full year.

[4] *https://www.gov.uk/government/statistical-data-sets/lrt01-ocupancy-journeys-and-passenger-miles, table LRT0101*

The data published by the DfT is at total network level only. Therefore for networks with more than one line, operators provided information about how the total annual passenger journey data should be split by line.

4.4.3 Creating rim weights

These passenger journey numbers established for each line were now split according to the age, gender and day-part profiles determined earlier. This provided an estimated total number of passenger journeys being made on each line, in each day-part, by each of the three age groups and by males and females.

Weights were applied to the final responses as one overall set of rim weights. In order to determine these rim weights, the absolute passenger journey numbers as established above for each cell were divided by the total number of passenger journeys across all networks in the survey, to create a percentage for each cell.

In practice, some respondents did not answer the questions on the survey about age and / or gender. The percentages for each cell were therefore adjusted slightly to account for this, resulting in the final set of rim weights as shown in the table below.

Table 4: Autumn 2015 target rim weights

Line	16-25	26-59	60+	NA	Male	Fe-male	NA
Blackpool AM peak	0.12%	0.31%	0.04%	0.00%	0.26%	0.22%	0.00%
Blackpool offpeak	0.53%	1.01%	1.10%	0.02%	1.25%	1.32%	0.09%
Blackpool PM peak	0.30%	0.50%	0.28%	0.01%	0.55%	0.50%	0.04%
Blackpool Weekend	0.28%	0.96%	0.71%	0.02%	0.85%	1.05%	0.07%
Centro AM peak	0.39%	0.59%	0.09%	0.06%	0.55%	0.50%	0.08%
Centro offpeak	0.67%	1.01%	0.71%	0.14%	1.24%	1.13%	0.17%
Centro PM peak	0.48%	1.02%	0.34%	0.11%	1.05%	0.77%	0.13%
Centro Weekend	0.22%	0.41%	0.34%	0.06%	0.41%	0.55%	0.07%
Edinburgh AM peak	0.09%	0.67%	0.03%	0.03%	0.57%	0.22%	0.04%
Edinburgh offpeak	0.61%	2.00%	0.61%	0.13%	1.74%	1.45%	0.15%
Edinburgh PM peak	0.23%	0.64%	0.18%	0.04%	0.53%	0.51%	0.05%
Edinburgh Weekend	0.50%	1.24%	0.35%	0.08%	1.16%	0.92%	0.10%
Manchester - Airport AM peak	0.15%	0.28%	0.03%	0.00%	0.25%	0.21%	0.01%
Manchester - Airport offpeak	0.43%	0.93%	0.29%	0.01%	0.93%	0.69%	0.04%
Manchester - Airport PM peak	0.08%	0.27%	0.05%	0.00%	0.19%	0.19%	0.01%
Manchester - Airport Weekend	0.14%	0.33%	0.06%	0.00%	0.35%	0.17%	0.01%
Manchester - Altrincham AM peak	1.01%	1.51%	0.04%	0.08%	1.40%	1.14%	0.10%
Manchester - Altrincham offpeak	2.18%	2.94%	1.16%	0.20%	3.07%	3.15%	0.25%
Manchester - Altrincham PM peak	0.56%	0.74%	0.31%	0.05%	0.88%	0.72%	0.06%
Manchester - Altrincham Weekend	0.47%	1.20%	0.54%	0.07%	0.96%	1.24%	0.09%
Manchester - Ashton AM peak	0.18%	0.25%	0.03%	0.01%	0.27%	0.18%	0.01%
Manchester - Ashton offpeak	0.56%	1.01%	0.49%	0.04%	1.08%	0.96%	0.06%
Manchester - Ashton PM peak	0.15%	0.15%	0.04%	0.01%	0.18%	0.15%	0.01%
Manchester - Ashton Weekend	0.16%	0.29%	0.16%	0.01%	0.31%	0.29%	0.02%
Manchester - Bury AM peak	0.57%	0.89%	0.24%	0.06%	1.03%	0.66%	0.06%
Manchester - Bury offpeak	1.80%	2.88%	1.69%	0.22%	3.48%	2.88%	0.24%
Manchester - Bury PM peak	0.25%	0.58%	0.17%	0.03%	0.58%	0.41%	0.04%
Manchester - Bury Weekend	0.84%	0.72%	0.36%	0.07%	1.04%	0.88%	0.07%
Manchester - East Didsbury AM peak	0.36%	0.95%	0.07%	0.03%	0.83%	0.54%	0.03%
Manchester - East Didsbury offpeak	0.67%	1.57%	0.50%	0.07%	1.40%	1.34%	0.07%
Manchester - East Didsbury PM peak	0.17%	0.40%	0.10%	0.02%	0.36%	0.30%	0.02%
Manchester - East Didsbury Weekend	0.32%	0.58%	0.14%	0.00%	0.57%	0.47%	0.00%
Manchester - Eccles/Media City AM peak	0.27%	0.50%	0.04%	0.00%	0.41%	0.38%	0.01%
Manchester - Eccles/Media City offpeak	0.98%	1.88%	0.58%	0.02%	1.81%	1.58%	0.06%
Manchester - Eccles/Media City PM peak	0.32%	0.48%	0.17%	0.00%	0.53%	0.45%	0.00%
Manchester - Eccles/Media City Weekend	0.30%	0.62%	0.19%	0.01%	0.55%	0.54%	0.02%

Manchester - Rochdale AM peak	0.36%	0.59%	0.07%	0.03%	0.61%	0.40%	0.04%
Manchester - Rochdale offpeak	1.36%	1.60%	0.79%	0.10%	2.08%	1.64%	0.13%
Manchester - Rochdale PM peak	0.27%	0.25%	0.18%	0.00%	0.40%	0.28%	0.02%
Manchester - Rochdale Weekend	0.45%	0.57%	0.17%	0.00%	0.57%	0.61%	0.00%
Nottingham - Clifton AM peak	0.32%	0.65%	0.04%	0.04%	0.47%	0.54%	0.05%
Nottingham - Clifton offpeak	0.57%	1.12%	0.60%	0.09%	1.11%	1.17%	0.10%
Nottingham - Clifton PM peak	0.30%	0.62%	0.17%	0.00%	0.48%	0.56%	0.05%
Nottingham - Clifton Weekend	0.19%	0.59%	0.19%	0.04%	0.45%	0.52%	0.04%
Nottingham - Toton AM peak	0.36%	0.71%	0.19%	0.03%	0.57%	0.66%	0.05%
Nottingham - Toton offpeak	1.06%	1.48%	0.35%	0.00%	1.23%	1.66%	0.00%
Nottingham - Toton PM peak	0.37%	0.73%	0.19%	0.03%	0.59%	0.68%	0.05%
Nottingham - Toton Weekend	0.35%	0.70%	0.18%	0.00%	0.57%	0.66%	0.00%
Sheffield - Blue AM peak	0.33%	0.50%	0.19%	0.01%	0.50%	0.51%	0.02%
Sheffield - Blue offpeak	1.15%	2.01%	1.08%	0.06%	2.09%	2.13%	0.08%
Sheffield - Blue PM peak	0.78%	0.58%	0.26%	0.02%	0.74%	0.87%	0.03%
Sheffield - Blue Weekend	0.47%	0.71%	0.43%	0.02%	0.80%	0.81%	0.03%
Sheffield - Yellow AM peak	0.36%	0.61%	0.06%	0.02%	0.55%	0.48%	0.02%
Sheffield - Yellow offpeak	1.08%	2.11%	1.13%	0.07%	1.91%	2.38%	0.10%
Sheffield - Yellow PM peak	0.58%	0.90%	0.16%	0.03%	0.80%	0.83%	0.04%
Sheffield - Yellow Weekend	0.68%	0.71%	0.27%	0.00%	0.74%	0.89%	0.04%

Note that in a small number of cases, there were only a few passenger counts on which to base the age and gender profiles. This was usually due to small target sample sizes in some cells and therefore a small number of fieldwork shifts taking place during which to observe the profile of passengers. In cases where three or fewer passenger counts were made, the cells were collapsed for the purpose of defining the above weights. These were:

- Nottingham Toton PM peak (used Nottingham network total for robustness)
- Nottingham Toton AM peak (used Nottingham network total for robustness)
- Nottingham Toton weekend (used Nottingham network total for robustness)
- Manchester East Didsbury PM peak (used total East Didsbury profile)
- Sheffield Blue/Purple AM peak (used total Sheffield Blue/Purple profile).

The actual average weights for respondents in each cell are given below, for information.

Table 5: Autumn 2015 average weights

Line	Daypart	16-25	26-59	60+	NA	Male	Fe-male	NA
Blackpool	Weekend	1.60	0.63	0.62	1.14	0.71	0.69	0.50
	Off peak	0.95	0.51	0.50	0.57	0.60	0.52	0.51
	Peak AM	0.78	0.62	0.17	NA	0.82	0.37	NA
	Peak PM	0.61	0.65	0.50	0.29	0.67	0.51	0.76
Centro	Weekend	1.80	1.17	0.97	1.69	0.98	1.43	1.33
	Off peak	1.07	0.59	0.78	0.47	0.92	0.62	0.42
	Peak AM	0.59	0.31	1.01	0.57	0.50	0.33	0.76
	Peak PM	1.44	1.29	0.97	6.26	1.82	0.88	3.71
Edinburgh	Weekend	0.55	0.54	1.06	0.33	0.65	0.53	0.41
	Off peak	1.51	0.80	2.17	1.23	1.03	1.00	1.07
	Peak AM	0.19	0.27	0.25	0.25	0.34	0.15	0.25
	Peak PM	0.69	0.35	0.54	2.28	0.39	0.45	1.43
Manchester - Airport	Weekend	2.66	0.55	0.20	NA	0.69	0.40	0.57
	Off peak	1.64	0.66	0.20	0.19	0.58	0.48	0.38
	Peak AM	0.67	0.26	0.22	NA	0.43	0.24	0.57
	Peak PM	0.64	0.40	0.23	NA	0.52	0.31	0.57
Manchester - Altrincham	Weekend	6.74	3.44	1.47	1.00	3.22	2.62	1.03
	Off peak	6.20	1.92	0.76	1.97	1.77	1.91	2.04
	Peak AM	4.80	1.10	0.25	4.57	1.86	1.18	2.85
	Peak PM	2.28	0.61	0.74	0.95	0.97	0.76	0.86
Manchester – Ashton-under-Lyne	Weekend	1.80	0.45	0.41	1.14	0.59	0.50	1.14
	Off peak	2.28	0.64	0.19	0.38	0.60	0.37	0.38
	Peak AM	0.46	0.18	0.17	0.28	0.48	0.14	0.29
	Peak PM	1.19	0.36	0.16	0.52	0.68	0.31	0.29
Manchester - Bury	Weekend	5.99	1.33	1.21	1.33	2.47	1.57	1.33
	Off peak	3.96	1.51	0.93	1.81	1.71	1.35	1.71
	Peak AM	1.54	0.61	1.14	0.68	1.13	0.59	0.68
	Peak PM	1.57	1.26	1.07	2.28	1.84	0.90	2.28
Manchester – East Didsbury	Weekend	1.83	0.81	0.57	NA	1.20	0.71	NA
	Off peak	4.79	1.04	0.40	1.27	1.11	0.82	1.00
	Peak AM	2.04	1.22	0.44	0.45	1.75	0.83	0.57
	Peak PM	3.19	1.07	0.51	1.14	1.28	0.90	1.14
Manchester – Eccles/MediaCityUK	Weekend	2.83	0.97	0.60	0.57	1.01	1.14	0.38
	Off peak	2.07	1.11	0.46	1.14	1.04	0.97	1.14
	Peak AM	0.85	0.41	0.75	NA	0.54	0.48	0.57
	Peak PM	1.68	0.54	0.54	NA	0.78	0.63	NA

Manchester – Rochdale	Weekend	4.24	1.70	0.34	NA	1.30	1.24	NA
	Off peak	2.16	1.11	0.45	0.95	1.36	0.72	0.93
	Peak AM	1.07	0.51	0.66	0.46	0.81	0.48	0.46
	Peak PM	3.85	0.59	1.14	NA	1.34	0.84	1.14
Nottingham - Clifton	Weekend	5.42	1.30	0.54	1.14	1.17	1.14	1.14
	Off peak	32.58	3.05	2.28	1.66	7.92	2.38	1.43
	Peak AM	1.14	0.48	0.18	0.95	0.71	0.54	1.43
	Peak PM	NA	3.26	4.46	NA	3.91	3.20	2.85
Nottingham - Toton	Weekend	2.85	2.22	1.71	NA	2.32	2.22	NA
	Off peak	6.05	3.02	1.25	NA	3.34	2.87	NA
	Peak AM	6.80	2.51	10.76	1.70	8.13	2.51	1.43
	Peak PM	7.04	4.17	5.42	0.85	8.42	3.88	0.95
Sheffield - Blue Line	Weekend	3.83	1.56	1.07	1.71	1.83	1.49	1.71
	Off peak	3.63	1.68	1.23	4.57	2.21	1.48	4.57
	Peak AM	1.88	1.02	1.55	0.57	2.38	0.91	0.57
	Peak PM	4.05	0.87	0.99	1.14	1.84	1.24	0.86
Sheffield - Yellow Line	Weekend	6.51	2.40	0.70	NA	3.52	1.59	2.28
	Off peak	4.11	2.19	0.87	1.33	2.42	1.39	1.43
	Peak AM	1.71	0.99	0.57	1.14	2.41	0.68	1.14
	Peak PM	5.48	1.65	0.65	2.28	2.40	1.48	2.28

The main reason for variation in the weights applied to different cells is that, in addition to controls for age, gender and day-part, each network will have been either over or under-sampled relative to the others depending on the need for robust sample sizes on different routes and whether or not local authorities or operators wished to boost the survey on their own routes.

It is important to acknowledge that, where there are very high weights in some cells, this means that a small number of individuals will be contributing strongly to the overall results within that cell, and if those individuals had a particularly good or poor experience this will be reflected in satisfaction levels. The main example of this is for 16-25 year olds travelling during weekday off-peak times on the Nottingham Clifton route: as shown above, the average weight applied to these specific respondents is 32.58 (meaning each individual respondents in this cell accounts for 32.58 people in the results). At an overall level this will have little material consequence since this is a very small part of the overall results for Nottingham, and indeed for the Clifton route specifically. However when very details subgroup analysis is performed, for example to

look at results among off-peak travellers on the Clifton route, the results would be less stable and in this case would be inadvisable.

To help deal with this, it is important to test for statistical confidence when reading results, and for this reason statistical significance notation has been included in all standard report outputs which have been produced for the TPS. Understanding statistical robustness involves determining the margin for error around any result. The table below shows some typical margins for error, when analysing results at route level. This does show that results for the Nottingham Clifton route have a high margin for error; this is partly due to the relatively small sample size for this route in the first place, and (related to this) the relatively high weights applied to some individuals. Note that margins for error are higher for scores closer to 50% and lower for scores closer to 0% and 100%. The example margins for error given here are for a typical overall journey satisfaction score of around 90%.

Network/route	Margin for error (+/-)
Blackpool	2.6%
Centro	3.2%
Edinburgh	2.6%
Manchester (total)	1.5%
Manchester – Airport	4.0%
Manchester – Altrincham	3.7%
Manchester – Ashton-under-Lyne	4.0%
Manchester – Bury	3.3%
Manchester – East Didsbury	4.2%
Manchester – Eccles/MediaCityUK	3.3%
Manchester – Rochdale	3.9%
Nottingham (total)	5.2%
Nottingham - Clifton	8.3%
Nottingham - Toton	6.5%
Sheffield (total)	3.0%
Sheffield - Blue Line	4.0%
Sheffield - Yellow Line	4.5%
Overall 'All Networks' results	**1.2%**

5. Implications of the changes to sampling in Autumn 2015

Some changes were made to the basis on which tram services were sampled in Autumn 2015, compared to previous years. In summary these were:

- As previously, tram services were selected with probability proportional to the volume of passengers they carry. Up to and including the 2014 survey, the number of services running at different times of the day was used as a proxy for the number of passenger journeys taking place at these times. This was changed in 2015 to be based on actual passenger journey information as supplied by operators
- As part of this, sampling (and therefore weighting) took into account the differences between morning and evening peaks, rather than 'total' peak as previously
- Shift start times were set so that they started 1.5 hours earlier than the tram services selected at the sampling stage, effectively making those selected services the mid-point of shifts rather than the start point. (Previously, manual adjustments were made so that a proportion of late-evening shifts were actually conducted in the early morning, and in some cases based on further judgement).

In theory, these changes could mean that greater fieldwork emphasis has been put on earlier times in the day, than in previous years – particularly morning peak times. In turn this could mean that more peak-time travellers (particularly commuters) might be included in the survey, which could impact on the level of satisfaction recorded with tram journeys. This section looks at how these points have worked in practice.

Impact on profile of fieldwork shifts

The following table shows the proportion of fieldwork shifts which took place in each day-part (based on the time at the mid-point of the shift):

Table 6: Fieldwork shift profile by day-part, 2014 vs 2015

	Autumn 2014	Autumn 2015
Morning peak	22%	21%
Off-peak	40%	45%
Evening peak	20%	16%
Weekend	17%	18%

In fact, the overall profile of the 2015 fieldwork contained a slightly lower proportion of peak time shifts than in 2014, although within this there was a little more emphasis on morning peak times than evening peak times. This is because some manual adjustments were made to the fieldwork shifts in 2014; it is simply that the method to arrive at this fieldwork profile was more evidence-based and more systematic in 2015.

(Note: the table above is based on all shifts which took place in each year. For 2015, this includes the Airport line for Manchester Metrolink which was not covered in previous waves, and includes the split between Nottingham's Clifton and Toton lines, where Nottingham Express Transit was surveyed at network level in 2014. We have also compared the data above, based on like-for-like fieldwork only, and similar minor differences are seen between 2014 and 2015 in this scenario).

The next table shows how the shift profile compares to the universe that was used for sampling in each year. In 2014 (and 2013) this universe was the proportion of all tram services; in 2015 this was patronage data supplied by network operators.

Table 7: Universe and fieldwork shift profiles by day-part, 2014 vs 2015

	Autumn 2014		Autumn 2015	
	Universe profile	Fieldwork profile	Universe profile	Fieldwork profile
Morning peak	25%	22%	15%	21%
Evening peak		20%	16%	16%
Off-peak	50%	40%	49%	45%
Weekend	25%	17%	20%	18%

The fieldwork profile for 2015 is much closer to the universe profile than in 2014. The reason for the larger difference in 2014 is because the universe profile used then was not such an accurate start point in the first place. This confirms that the adjustments made to the fieldwork profile in 2014 (and previous) were sensible, but also that the use of patronage data as the start point in 2015 was an improvement.

Impact on respondent profile

The following table shows how the un-weighted profile of survey respondents compared to the universe and fieldwork profiles, and then how this changed when the results were weighted:

Table 8: Un-weighted and weighted response profiles, 2014 vs 2015

<table>
<tr><th></th><th colspan="4">Autumn 2014</th><th colspan="4">Autumn 2015</th></tr>
<tr><th></th><th>Universe profile</th><th>FW profile</th><th>Un-weighted response</th><th>Weighted response</th><th>Universe profile</th><th>FW profile</th><th>Un-weighted response</th><th>Weighted response</th></tr>
<tr><td>Morning peak</td><td rowspan="2">25%</td><td>22%</td><td rowspan="2">44%</td><td rowspan="2">38%</td><td>15%</td><td>21%</td><td>22%</td><td>15%</td></tr>
<tr><td>Evening peak</td><td>20%</td><td>16%</td><td>16%</td><td>16%</td><td>16%</td></tr>
<tr><td>Off-peak</td><td>50%</td><td>40%</td><td>43%</td><td>40%</td><td>49%</td><td>45%</td><td>44%</td><td>49%</td></tr>
<tr><td>Week-end</td><td>25%</td><td>17%</td><td>14%</td><td>23%</td><td>20%</td><td>18%</td><td>18%</td><td>19%</td></tr>
</table>

In both years, the un-weighted response profile was similar to the fieldwork profile (indicating that, on average, response rate was similar at different times of the day). In both years, weighting resulted in a down-weighting of peak times (by approximately the same factor), particularly in the morning peak. This indicates that, when the survey is repeated again in future years, any manual adjustments following the initial sample selection (like those described in section 4.3, steps 7 and 8) should focus slightly less on morning peak times[5]. Conversely there was significantly less weighting required for weekends in 2015, indicating that overall the newer sampling and weighting process has been a little more efficient than in 2014.

[5] *Note, this suggested change to the way manual adjustments are made in future is very minor change overall, relating to the isolated incidents where manual changes are made. This should not therefore be seen as a fundamental change to the survey methodology; we are still proposing that a sense check is made on the sample selection before fieldwork begins and making small adjustments to that sample selection if needed, but this sense check is continually informed by learning and experience from the previous waves so will become better over time.*

Impact on survey results

The overall effect of the above points is that the weighted profile of survey respondents was actually weighted a little more towards off-peak journeys in 2015 than in 2014, with a smaller proportion of both weekend and peak time journeys. The next few tables show how this impacted on the profile of respondents, and the answers given.

Tables 9 and 10 show the breakdown of survey respondents by journey purpose, age and method of survey completion, factors which typically have some influence on the way someone answers the questions (younger people and commuters are typically more negative).

These tables show that

- The purpose of journeys being undertaken at different times of the day varied very little from one year to the next, and thus that the overall journey purpose profile changed very little between 2014 and 2015
- There was a slightly older age profile across the survey compared to 2014 (with fewer people aged 16-34 and more aged 35-59). This was a result of having slightly fewer in the younger age group within all day-parts, rather than as a function of a slight shift in the day-part profile itself (where 2015 sees slightly more off-peak journeys and slightly fewer peak and weekend journeys).

Table 9: Journey purpose by day-part, 2014 vs 2015

	Commuter	Business	Leisure
Total 2014	**50**	**2**	**48**
Total 2015	**50**	**3**	**47**
Peak 2014	75	2	23
Peak 2015	75	3	22
Off-peak 2014	43	3	54
Off-peak 2015	45	4	51
Weekend 2014	21	1	78
Weekend 2015	24	1	76

Table 10: Age by day-part, 2014 vs 2015

	16-34	35-59	60+
Total 2014	**48**	**32**	**19**
Total 2015	**42**	**37**	**19**
Peak 2014	55	33	12
Peak 2015	47	39	12
Off-peak 2014	42	30	28
Off-peak 2015	40	36	22
Weekend 2014	47	33	20
Weekend 2015	39	38	21

Therefore, the change in the sampling process has not impacted on the profile of respondents who took part in the 2015 survey, compared to 2014.

The next tables show a selection of key satisfaction rating measures, again split by day-part. These results do show some increases in passenger satisfaction at the overall level, for some measures, since 2014. In all cases, these can be explained by increases in satisfaction within one or more of the day-parts, rather than simply as a function that there are more off-peak journeys (which are typically rated more positively) covered in the survey. Other factors also being equal, these improvements in passenger satisfaction at the 'All Network' level, are therefore genuine.

Table 11: Key measures by day-part: tram stop, 2014 vs 2015

	Tram stop: General condition	Tram stop: Information provision	Tram stop: Overall rating
Total 2014	**86**	**78**	**91**
Total 2015	**86**	**80**	**91**
Peak 2014	84	75	90
Peak 2015	84	78	90
Off-peak 2014	87	79	90
Off-peak 2015	86	79	90
Weekend 2014	89	80	92
Weekend 2015	90	84	94

Table 12: Key measures by day-part: service timings, 2014 vs 2015

	Length of time waited	Punctuality	Journey length
Total 2014	**82**	**83**	**84**
Total 2015	**84**	**86**	**87**
Peak 2014	78	79	80
Peak 2015	80	80	82
Off-peak 2014	83	82	86
Off-peak 2015	85	87	90
Weekend 2014	87	89	89
Weekend 2015	88	91	90

Table 13: Key measures by day-part: on board the tram, 2014 vs 2015

	Cleanliness inside	Information provided inside	Sufficient room for all to sit / stand	Helpfulness of any staff
Total 2014	**88**	**82**	**74**	**84**
Total 2015	**90**	**84**	**79**	**87**
Peak 2014	87	81	63	79
Peak 2015	87	81	67	84
Off-peak 2014	89	84	80	84
Off-peak 2015	90	84	84	88
Weekend 2014	89	80	83	88
Weekend 2015	93	91	88	91

Table 14: Key measures by day-part: overall journey ratings, 2014 vs 2015

	Overall journey satisfaction	Value for money
Total 2014	**90**	**61**
Total 2015	**92**	**69**
Peak 2014	86	59
Peak 2015	88	64
Off-peak 2014	91	58
Off-peak 2015	93	69
Weekend 2014	94	71
Weekend 2015	94	76

In conclusion, then, we see that the change in the sampling methods in 2015 have not made any notable impact on the results of the TPS. By making the sampling process more systematic and evidence-based however, they have enhanced the credibility of the survey, therefore bringing a net improvement overall. The recommendation is therefore to continue with the sampling and weighting procedures used in 2015, in future waves of the survey.

6. Implications of using dual modes of completion

In the original pilot for the TPS, and in both the 2013 and 2014 waves of the survey, it was shown that the method of completion (online or paper) may have a very small influence on the way people respond to the questions, and therefore on the satisfaction results – but that this was extremely minor in comparison to other factors, particularly age, which the use of an online method in addition to paper is designed to help control.

By way of summary of this previous work, the table below shows the relative strength of influence that a number of factors were found to have on how positively or negatively people answer the questions. These relative levels of influence were determined by a key driver analysis on overall journey satisfaction, using gender, age, route and mode of interviewing as the potential drivers of satisfaction. As shown in the table below, age, route and gender are significant drivers of overall journey satisfaction, and while mode of interviewing does have a small impact, this is not statistically significant. Age is by far the most significant driver of overall journey satisfaction.

Table 15: Relative strength of influence on overall journey satisfaction ratings

Source	
Age group	205.799
Gender	30.091
Route	21.860
Mode of interviewing	3.075

Although the influence of interviewing mode is extremely small, the 2015 survey saw a smaller contribution from online respondents compared to paper respondents, than in previous waves (see table 16 below). Online respondents are usually more negative in their responses (which is almost entirely linked to the fact that online respondents are typically younger). Therefore, given that overall the survey results have improved in 2015, it was worthwhile to check again whether this improvement was real, or influenced by the fact that paper respondents (who are typically more positive) contributed more to the results in 2015.

Table 16: proportion of (un-weighted) response from online vs. paper

Mode	Autumn 2013	Autumn 2014	Autumn 2015
Online – total	27.0%	33.6%	22.5%
Online – desktop	*19.9%*	*21.9%*	*12.8%*
Online – touch (smartphone / tablet)	*6.2%*	*10.5%*	*9.6%*
Online – other	*0.9%*	*0.2%*	*0.1%*
Paper	73.0%	67.4%	77.5%

This section looks firstly at the degree to which mode of interviewing impacted on survey results in 2015, and then at how results have changed over time among online versus paper respondents separately from each other. Finally, some observations are given which might help to explain the drop in the contribution that online responses have made to the overall dataset.

Impact of mode of interview completion

From analysing un-weighted data, comparing online responses with those from the paper self-completion questionnaire, there are some differences which are significant. For example, the table below shows the Autumn 2015 results for overall journey satisfaction for each mode of completion. There are significant differences between paper and online for those who are 'satisfied' (either very satisfied or fairly satisfied) as well as for those who are 'very satisfied':

Table 17: Overall journey satisfaction by mode of interviewing

Mode	% satisfied	% very satisfied
Online	91%	55%
Paper	93%	64%
Total	92%	62%

However, those responding online tend to have a younger profile than those responding on paper (see table 18 below), and younger people tend to be less satisfied with their overall journey experience, as shown in table 19:

Table 18: Profile of respondents, online vs. paper (un-weighted)

	Online	Paper	Total
16-25	21%	12%	14%
26-59	63%	53%	55%
60+	17%	32%	29%
Not stated	0%	3%	3%

Table 19: Overall journey satisfaction by age (un-weighted)

Age group	% satisfied	% very satisfied
16-25	89%	49%
26-59	91%	56%
60+	97%	79%
Total	92%	62%

Given that satisfaction varies by age, and that the online sample has a different age profile from the paper self-completion sample, the question arises of whether there is a real mode effect, or whether the apparently lower satisfaction seen in the online sample comes entirely from the younger age profile.

To test this we have looked at the overall satisfaction levels by age for each mode of data collection, as shown in the table below:

Table 20: overall journey satisfaction by age and interviewing mode (un-weighted)

Age group	Mode	% satisfied	% very satisfied
16-18	Online	80%	35%
	Paper	86%	55%
	Total	84%	47%
19-25	Online	90%	41%
	Paper	91%	54%
	Total	91%	50%
26-34	Online	86%	46%
	Paper	90%	51%
	Total	89%	49%
35-44	Online	90%	51%
	Paper	90%	51%
	Total	90%	51%
45-54	Online	92%	62%
	Paper	92%	62%
	Total	92%	62%
55-59	Online	97%	67%
	Paper	94%	63%
	Total	95%	64%
60-64	Online	96%	73%
	Paper	94%	69%
	Total	94%	69%
65-69	Online	99%	70%
	Paper	99%	82%
	Total	99%	81%
70-79	Online	98%	90%
	Paper	97%	84%
	Total	97%	85%
80+	Online	100%	75%
	Paper	100%	90%
	Total	100%	89%
Total	Online	91%	55%
	Paper	93%	64%
	Total	92%	62%

As can be seen in Table 20, within most age groups there is very little variation in satisfaction, when combining both 'very' and 'fairly satisfied' responses as in the majority of reporting on TPS, by mode of interviewing. Notable differences only occur

for 16-18 and 26-34 year olds, where satisfaction is both lower in general, and appears to be more so among those completing the survey online.

There are some more differences between the positivity of online and paper responses, for 'very satisfied'. Lower ratings occur among online respondents for half of the age groupings reported here (16-18, 19-25, 26-34, 65-69 and 80+). However, because half of the age groupings here do not show this trend (or indeed show the opposite), we cannot say there is a pattern here. This therefore supports the previous findings: i.e. that online respondents are typically more negative than paper respondents, but this is mainly a function of their age, and while the mode of completion itself can have a small impact on satisfaction this is relatively insignificant compared to the impact of age.

Online and paper satisfaction results over time

The graph below (Figure 1) shows how overall journey satisfaction has changed over the three years in which the TPS has run, for online and paper respondents. The proportion of respondents in each mode is also shown. The following graph (Figure 2) shows the same analysis, for three different age bands.

Figure 1: overall journey satisfaction by interviewing mode (un-weighted)

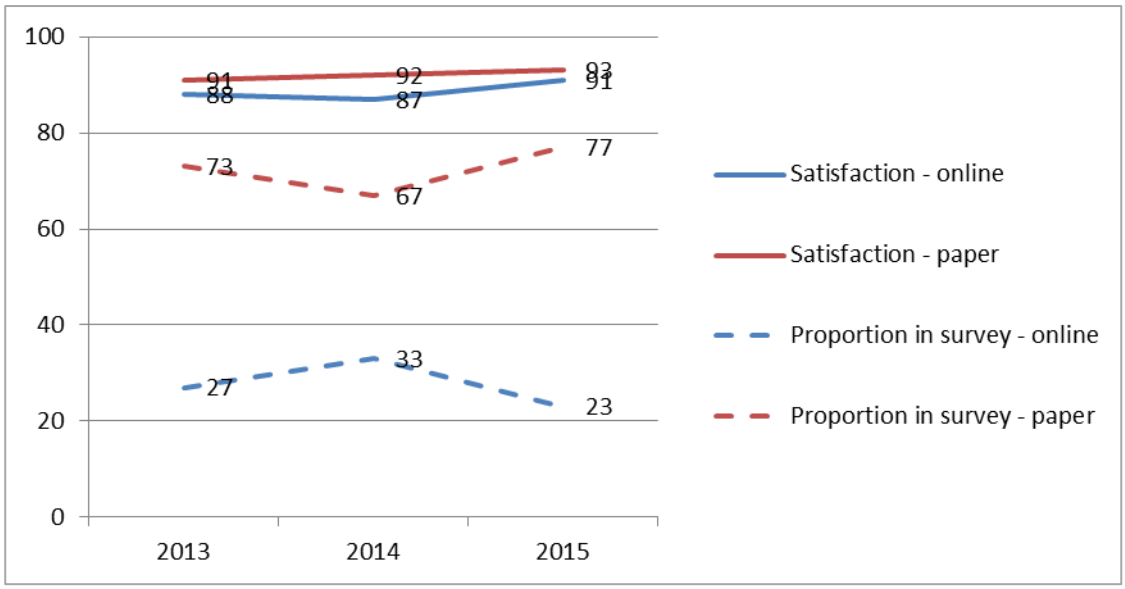
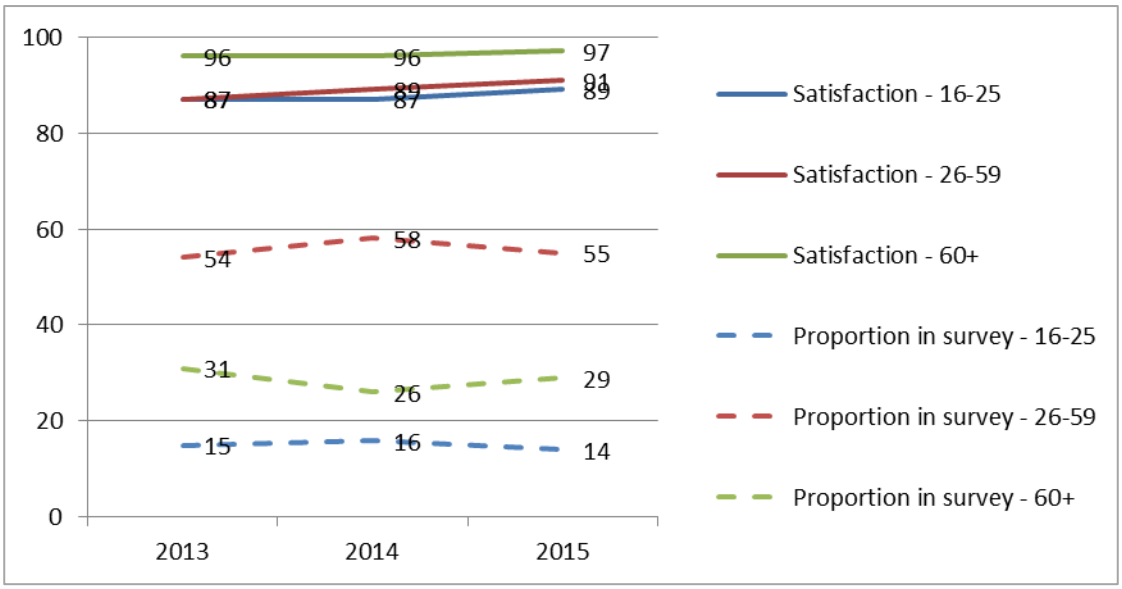


Figure 2: overall journey satisfaction by age (un-weighted)



At the total sample level, (un-weighted) overall journey satisfaction increased from 90% in 2013, to 91% in 2014, to 92% in 2015. The two graphs above show that:

- There is no relationship between the trend in satisfaction rating and the proportion of surveys which are completed online or on paper, nor between satisfaction and proportion of surveys completed by any particular age group
- Satisfaction has increased within each of these groupings. It is therefore a real improvement over this time.

From these various analyses we can conclude that:

- Mode of interviewing might have an effect on the percentage of passengers who report that they are satisfied; however this effect is very small
- Other factors have a much greater effect on passenger satisfaction, particularly age
- The multi-modal data collection method remains valid. While mode of interviewing has a minor impact on satisfaction, this is offset by the benefit of reducing age and gender bias.

The contribution of online versus paper responses

At the beginning of this section (6), it was reported that online responses had contributed a little less to the overall (un-weighted) dataset than in previous waves. One reason for this could be the increasing preference that respondents have to enter the survey via a touch device (mainly smartphones but also includes tablets), rather than on a desktop computer or laptop, and the higher likelihood that touch device respondents have to drop out.

Table 21 below shows the proportion of all online survey starters who did so using a touch device versus a desktop (and others, which are primarily non-touchscreen mobile devices which are connected to the internet, such as older models of Blackberrys). There is a clear trend towards more people attempting the survey on a touch device over time as these become more and more popular and 'everyday'. However, as the table also shows, the proportion of those completing the survey using the different devices is different, with consistently fewer touch (and other) device users going all the way to the end of the survey, indicating that the likelihood to drop out at some point during the survey is consistently higher among touch device users compared to desktop users. Recent work for all three Passenger Surveys has shown that there are certain questions where online respondents tend to be more or less likely to drop out of the survey, and where this effect is more extreme for smartphone users in particular compared to desktop and tablet users. This learning can be used to inform changes – where possible – to the presentation and layout of questions from Autumn 2016, to reduce the level of drop-out and therefore increase the overall contribution of online responses to the survey as a whole.

Table 21: survey starters and completers by online device

	Autumn 2013	Autumn 2014	Autumn 2015
Device used by online survey starters			
Desktop	65%	57%	47%
Touch	31%	41%	53%
Other	4%	1%	0.8%
Device used by online survey completers			
Desktop	74%	67%	57%
Touch	23%	32%	43%
Other	3%	0.7%	0.2%

7. Key driver analysis

The 'Key Driver Analysis' looked at the relationship between overall journey satisfaction and the other 'ratings' measures which were covered in the survey. This gives a useful indication of where improvements to individual service aspects would be most influential in driving satisfaction further in the future. The analysis was conducted on fare payers only so value for money could be included.

The analysis used Multiple Linear Regression and was performed in two stages. First, the drivers of satisfaction were identified. 'Satisfied' passengers were defined as those who were either very or fairly satisfied with their journey. Dissatisfied customers were classified as those saying either very/fairly dissatisfied or those saying neither/nor (thus this latter group are perhaps more accurately described as 'not satisfied'). The regression took into account all five points of the satisfaction scale, and was run using scalar driver variables (sometimes called independent variables) – this means that moving any one point up the five point scale is assumed to have the same impact.

Once the drivers of satisfaction had been determined, the 'non-satisfied' (very dissatisfied, fairly dissatisfied and neither/nor respondents) were removed, and a new regression analysis was run to determine which factors drive people to be very satisfied (rather than either fairly or very satisfied), again using scalar driver variables.

The two parts of the analysis therefore indicate, firstly, which service aspects should be improved in order to provide an adequate overall journey experience (i.e. one which is at least satisfactory) and secondly, which service aspects should be improved in order to provide a genuinely good experience.

For Autumn 2015, the key driver analysis typically explained just over a third of the variance in overall journey satisfaction, with a small amount of variation for individual networks. (The R^2 value was, on average, 0.35 for the drivers of satisfaction and 0.37 on average for the drivers of very satisfied).

Appendix 1: Typical Questionnaire

(Midland Metro Centro version shown as example from following page)

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transportfocus

Tram Passenger Survey (Centro)

Shift ☐ Date D D M M Y Y 1 5

Thank you for agreeing to take part in our survey.

Transport Focus is the official, independent consumer watchdog that represents rail, bus, and tram passengers.

To help us represent the views of passengers in your area we would appreciate a little of your time to complete this survey. It asks about the tram journey you made when given this questionnaire.

Tram companies, local authorities and governments pay close attention to the survey's results. These results provide Transport Focus with the evidence to seek improvements on behalf of passengers.

Please fill in the questionnaire after you have completed your journey with Midland Metro.

Please tick only one box per question, unless that question requests otherwise.

After completing the questionnaire, please return it using the postage paid envelope provided.

1. About your journey on Midland Metro

Q1a. At which stop did you board this tram?

☐

Q1b. At which stop did you leave this tram?

☐

Q2. Please fill in the time that you boarded the tram today:

☐☐ Hour ☐☐ Mins *(Please use 24 hour clock e.g. 5.25pm should be written as 17:25)*

Q3a. What type of ticket or pass did you use for this journey on Midland Metro? ***(Please tick one box only)***

Season Ticket/Midland Metro Card/Student
- 1 day ☐
- 3 day/weekend ☐
- 5 days/1 week ☐
- 10 days/2 weeks ☐
- 4 weeks/1 month ☐
- Quarterly/3 months ☐
- 1 year ☐
- Other time period (please write in) ☐

Single/return ticket
- Single ticket ☐
- Return ticket ☐

A free pass or free journey
- Elderly person's pass ☐
- Disabled person's pass ☐
- Complimentary/free ticket ☐

Other ticket
- Park and Ride ☐
- Family/Group ticket ☐
- Other ☐

Q3b. What modes of transport does your ticket allow you to travel on?
- Metro only ☐
- Train and Metro ☐
- Bus and Metro ☐
- Train, Bus and Metro ☐

1001001

Q4. In what format was your ticket?
- A standard paper ticket/pass ☐
- A photo card ticket/pass ☐
- A plastic card you touched on to the fare machine ☐
- An m-ticket (sent to your mobile phone) ☐
- Other format ☐

Q5. How did you buy that ticket or pass?
- From Conductor ☐
- Direct from Network West Midlands (website/phone) ☐
- Travel shop ☐
- Rail/bus company ☐
- From a local shop or post office ☐
- You had a free pass ☐
- Direct debit through work/college ☐
- Other ☐

Q6. What is the main purpose of your journey on Midland Metro today?
- Travelling to/from work ☐
- Travelling to/from education (e.g. college, school) ☐
- On company business (or own if self-employed) ☐
- On personal business (job interview, bank, post office) ☐
- Health visit (Doctor/hospital/dentist) ☐
- Shopping trip ☐
- Visiting friends or relatives ☐
- Leisure trip (e.g. day out) ☐
- Other ☐

Q7. Were you on your outward or return journey when you were given a questionnaire?
- Outward ☐
- Return ☐
- One way trip only ☐

Q8. Were you travelling with...? ***(Please tick all that apply)***
- Children in a buggy or pushchair ☐
- Children (under 12) who were walking ☐
- A wheelchair/mobility scooter ☐
- A carer ☐
- Lots of bags or luggage ☐
- None of these ☐

Q9. How did you get to the Midland Metro stop where you boarded this tram today?
- On foot/walked ☐
- Cycled ☐
- Car - dropped off ☐
- Car - and used Park and Ride ☐
- Car - parked elsewhere ☐
- Bus ☐
- Train ☐
- Tram ☐
- Other ☐

Q10. Which means of transport did you use when you got off this tram today?
- On foot/walked ☐
- Cycled ☐
- Car - picked up ☐
- Car - and used Park and Ride ☐
- Car - parked elsewhere ☐
- Bus ☐
- Train ☐
- Tram ☐
- Other ☐

Q11. What was the main reason you chose to take Midland Metro for this journey?
(Please tick one box only)
- Cheaper than the car ☐
- Cheaper than other transport ☐
- More convenient than the car (e.g. parking) ☐
- Didn't have the option of travelling by another means ☐
- Quicker than other transport ☐
- Best way to get where I am going ☐
- Tram more comfortable than other transport ☐
- For the experience of riding the tram ☐
- Other (please write in) ☐

Q12. What was the weather like when you made your journey, was it?
- Dry ☐
- Light rain ☐
- Heavy rain ☐
- Foggy ☐
- Snow ☐
- Icy ☐

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2. About the tram stop where you boarded this Midland Metro tram

Q13. Thinking about the tram stop itself, how satisfied were you with the following?

	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
Its distance from your journey start e.g. home, shops	☐	☐	☐	☐	☐	☐
The convenience/accessibility of its location	☐	☐	☐	☐	☐	☐
Its general condition/standard of maintenance	☐	☐	☐	☐	☐	☐
Its freedom from graffiti/vandalism	☐	☐	☐	☐	☐	☐
Its freedom from litter	☐	☐	☐	☐	☐	☐
Behaviour of fellow passengers waiting at the stop	☐	☐	☐	☐	☐	☐
The information provided at the tram stop	☐	☐	☐	☐	☐	☐
Your personal safety whilst at the tram stop	☐	☐	☐	☐	☐	☐

Q14. Overall, how satisfied were you with the tram stop?

- Very satisfied ☐
- Fairly satisfied ☐
- Neither satisfied nor dissatisfied ☐
- Fairly dissatisfied ☐
- Very dissatisfied ☐
- Don't know/No opinion ☐

3. Waiting for the tram

Q15. Approximately, how long did you wait for your tram?

(Please write in the time in minutes) ☐☐

Q16a. Did you check any of the following to find out when the tram was meant to arrive?
(Please tick all that apply)

Before leaving for the tram stop
- Leaflet/paper timetable ☐
- Online tram times ☐
- Live tram locator/timings (e.g. via mobile app/web) ☐
- Disruption updates (e.g. on Twitter/Facebook) ☐
- Other ☐

At the tram stop
- Electronic display at the stop ☐
- Information posters at the stop ☐
- Online tram times ☐
- Live tram locator/timings (e.g. via mobile app/web) ☐
- Disruption updates (e.g. on Twitter/Facebook) ☐
- Other ☐

Q16b. If you did not check to find out when the tram was meant to arrive, why was this?
(Please tick all that apply)

- Knew the trams ran frequently on this route ☐
- Already knew arrival times ☐
- Could not find the information ☐
- Didn't have time ☐
- Did not know when the tram was meant to arrive ☐
- Other ☐

Q17. Approximately how long did you expect to wait for the tram?

(Please write in the time in minutes) ☐☐

Q18a. Thinking about the time you waited for the tram today, was it...

- Much longer than expected ☐
- A little longer than you expected ☐
- About the length of time you expected ☐
- A little less time than you expected ☐
- Much less time than you expected ☐

Q18b. Were you able to board the first tram you wanted to travel on?

- Yes ☐
- No ☐

Q19. How satisfied were you with each of the following?

	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
The length of time you had to wait for the tram	☐	☐	☐	☐	☐	☐
The punctuality of the tram	☐	☐	☐	☐	☐	☐

4. On the tram

Q20. Thinking about when the tram arrived, please indicate how satisfied you were with the following:

	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
Route/destination information on the outside of the tram	☐	☐	☐	☐	☐	☐
The cleanliness and condition of the outside of the tram	☐	☐	☐	☐	☐	☐
The ease of getting on to and off of the tram	☐	☐	☐	☐	☐	☐
The length of time it took to board the tram	☐	☐	☐	☐	☐	☐

Q21. Thinking about whilst you were on the tram, please indicate how satisfied you were with the following:

	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
The cleanliness and condition of the inside of the tram	☐	☐	☐	☐	☐	☐
The information provided inside the tram	☐	☐	☐	☐	☐	☐
Sufficient room for all the passengers to sit/stand	☐	☐	☐	☐	☐	☐
The comfort of the seats	☐	☐	☐	☐	☐	☐
The amount of personal space you had around you	☐	☐	☐	☐	☐	☐
Provision of grab rails to hold on to when standing/moving about the tram	☐	☐	☐	☐	☐	☐
The temperature inside the tram	☐	☐	☐	☐	☐	☐
Your personal security whilst on the tram	☐	☐	☐	☐	☐	☐
The amount of time the journey took	☐	☐	☐	☐	☐	☐
Smoothness/freedom from jolting during the journey	☐	☐	☐	☐	☐	☐

Q22. Did you get a seat on the tram?

- Yes – for all of the journey ☐
- Yes – for part of the journey ☐
- No – but you were happy to stand ☐
- No – but you would have liked a seat ☐

Q23a. Did other passengers' behaviour give you cause to worry or make you feel uncomfortable during your journey?

- Yes ☐
- No ☐

Q23b. ***If yes:*** **Which of the following were the reason(s) for this?** ***(Please tick all that apply)***

- Passengers drinking/under the influence of alcohol ☐
- Passengers taking/under the influence of drugs ☐
- Abusive or threatening behaviour ☐
- Rowdy behaviour ☐
- Passengers not moving out of priority seats ☐
- Passengers not paying their fares ☐
- Feet on seats ☐
- Music being played loudly ☐
- Smoking ☐
- Graffiti or vandalism ☐
- Loud use of mobile phones ☐
- Other (please write in)

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Q23c. ***If yes:*** **What local area was the tram travelling through or at which stop was it when you were worried or concerned?**

Q24a. **Was your journey with Midland Metro today delayed at all?**

Yes ☐ No ☐

Q24b. ***If yes:*** **Why was this?** ***(Please tick all that apply)***

- Due to a signal/points failure ☐
- Road congestion/traffic jam ☐
- Due to a tram failure ☐
- Planned engineering works ☐
- Poor weather conditions ☐
- The tram waiting too long at stops ☐
- The tram waiting too long at signals ☐
- Time it took passengers to board/ pay for tickets ☐
- Had to use bus replacement service ☐
- Other (please write in)
- No reason given ☐
- Don't know ☐

Q25. ***If yes:*** **By approximately how long was your journey today delayed?**

(Please write in the time in minutes) ☐☐

Q26. **Were any of these items of information present on the tram?**

	Yes	No	Don't know
A map of the tram route/journey times	☐	☐	☐
Audio announcements e.g. saying the next tram stop	☐	☐	☐
An electronic display e.g. showing the next tram stop	☐	☐	☐
Information about tickets/fares	☐	☐	☐
A timetable	☐	☐	☐
Details of how to make a complaint, if you had one	☐	☐	☐

Q27. **Thinking about any Midland Metro staff you encountered on your journey, please indicate how satisfied you were with each of the following:**

	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
The appearance of any staff	☐	☐	☐	☐	☐	☐
Any greeting/welcome you got from the staff	☐	☐	☐	☐	☐	☐
The helpfulness and attitude of the staff	☐	☐	☐	☐	☐	☐
The safety of the driving (i.e. appropriateness of speed, driver concentrating)	☐	☐	☐	☐	☐	☐

5. Your overall opinion of the Midland Metro journey you made when given this questionnaire

Q28. **Overall, taking everything into account from start to end of this journey, how satisfied were you with your journey on Midland Metro today?**

- Very satisfied ☐
- Fairly satisfied ☐
- Neither satisfied nor dissatisfied ☐
- Fairly dissatisfied ☐
- Very dissatisfied ☐
- Don't know/No opinion ☐

Q29. **If something could have been improved on your journey on Midland Metro today, what would it have been?**

Q30. **How satisfied were you with the value for money of your journey on Midland Metro?**

- Very satisfied ☐
- Fairly satisfied ☐
- Neither satisfied nor dissatisfied ☐
- Fairly dissatisfied ☐
- Very dissatisfied ☐
- Don't know/No opinion ☐

Q31. **What had the biggest influence on the 'value for money' rating you gave in the previous question?**

- The cost for the distance travelled ☐
- The cost of the tram versus other modes of transport ☐
- The fare in comparison to the cost of everyday items ☐
- Comfort/journey quality for the fare paid ☐
- A reason not mentioned above (please write in box) ☐

6. Your opinion of trams generally

Q32a. **How would you rate Midland Metro services for the following:**

	Very good	Good	Neither good nor poor	Poor	Very poor	Don't know/no opinion
Ease of getting to local amenities (e.g. shops, hospitals, leisure facilities)	☐	☐	☐	☐	☐	☐
Connection with other forms of public transport (e.g. trains/buses)	☐	☐	☐	☐	☐	☐

Q32b. **And how satisfied are you overall with Midland Metro services for the following:**

	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
Ease of buying your ticket	☐	☐	☐	☐	☐	☐
Punctuality (running on time)	☐	☐	☐	☐	☐	☐
Frequency (how often the trams run)	☐	☐	☐	☐	☐	☐
Range of tickets available	☐	☐	☐	☐	☐	☐

Q33. **If you needed information about your local tram services, e.g. times, fares, where would you obtain that information?** ***(Please tick all that apply)***

- Phone: Centro ☐
- Phone: Traveline ☐
- Internet: Centro website ☐
- Internet: The Metro website ☐
- Internet: Network West Midlands website ☐
- Internet: Other travel website ☐
- Travel shop ☐
- Ask friend/relative ☐
- From a Park and Ride kiosk ☐
- Smartphone app ☐
- Ask tram staff ☐
- Other ☐
- Not sure ☐

Q34. **How often do you typically travel by Midland Metro?**
(Please tick the closest to your frequency of tram use)

- 5 or more days a week ☐
- 3 or 4 days a week ☐
- Once or twice a week ☐
- Once a fortnight ☐
- Once a month ☐
- Less frequently ☐
- This is the first time I have used Midland Metro ☐

Q35. **If you have used Midland Metro before, how typical would you say today's experience was? Was it...**

- Much better than usual ☐
- A little better than usual ☐
- About the same as usual ☐
- A little worse than usual ☐
- Much worse than usual ☐

Trials/Support Initials/Date

Q36. Have any of the following frequently stopped you making journeys by tram? ***(Please tick all that apply)***

- The places you can reach by Midland Metro ☐
- The frequency of trams in the area ☐
- The reliability of the trams ☐
- The cost of using Midland Metro ☐
- Understanding the fares ☐
- Understanding the ticket machines ☐
- How long journeys take when going by Midland Metro ☐
- The comfort of the trams ☐
- The level of crowding on the trams ☐
- A concern for your personal safety on Midland Metro ☐
- Tram network improvement works ☐

Q37a. Are you aware that the tram is being extended into Birmingham City Centre?

(Further information is available at www.centro.org.uk/transport/metro)

Yes ☐ No ☐

Q37b. Which of the new stops would you be most likely to use for your journey to Birmingham?

- Snowhill ☐
- Bull Street ☐
- Corporation Street ☐
- Grand Central (for New Street Station) ☐
- Unsure ☐

Q37c. Do you think dogs (beyond guide dogs) should be allowed on the tram?

- Yes ☐
- Unsure ☐
- No ☐

7. About you

QA. Are you...?

Male ☐ Female ☐

QB. In which age group are you?

- 16-18 ☐
- 19-25 ☐
- 26-34 ☐
- 35-44 ☐
- 45-54 ☐
- 55-59 ☐
- 60-64 ☐
- 65-69 ☐
- 70-79 ☐
- 80+ ☐

QC. Are you...?

- Working full time (30+ hours) ☐
- Working part time (under 30 hours) ☐
- Not working – seeking work ☐
- Retired ☐
- Full time student ☐
- Other ☐

QDa. Are you affected by any physical or mental health conditions or illnesses lasting or expected to last 12 months or more? ***(Please tick all that apply)***

- No - None ☐
- Yes – Vision (e.g. blindness or partial sight) ☐
- Yes – Hearing (e.g. deafness or partial hearing) ☐
- Yes – Mobility (e.g. only able to walk short distances or difficulty dimbing stairs) ☐
- Yes – Dexterity (e.g. difficulty lifting and carrying objects or using a keyboard) ☐
- Yes – Learning or understanding or concentrating ☐
- Yes – Memory ☐
- Yes – Mental health ☐
- Yes – Stamina or breathing fatigue ☐
- Yes – Socially or behaviourally (for example associated with autism, attention deficit disorder or Asperger's syndrome) ☐
- A condition not mentioned above ☐

QDb. Does your condition or illness have an adverse effect on your ability to make journeys by tram?

- Yes, a lot ☐
- Yes, a little ☐
- Not at all ☐

QE. Which of the following best describes your ethnic background?

- White ☐
- Mixed ☐
- Black or Black British ☐
- Chinese ☐
- Asian or Asian British ☐
- Other ethnic group ☐

QF. In terms of having a car to drive, which of the following applies?

- You have a car available and don't mind driving ☐
- You don't have a car available ☐
- You have a car available but prefer not to drive ☐

QG. How often are you able to ask someone else to drive you for local journeys?

- All or most of the time ☐
- Some of the time ☐
- You don't have anybody you can ask ☐
- Not applicable ☐

QH. To help us get a better picture of tram services at a local level, it would be helpful if you could provide us with your home postcode. ***(If you provide it, this will be used to help understand tram usage and make improvements locally. Your postcode will not be used to identify you personally and will only be used for research purposes)***

Please write in your home postcode here:

☐☐☐☐ ☐☐☐ Live outside the UK ☐

This survey is being undertaken for Transport Focus by BDRC Continental, an independent market research agency which adheres to the Market Research Society's code of conduct. You were handed this questionnaire by an interviewer working for Perspective Research Services, a part of BDRC Continental.

The information that you have provided on this questionnaire is subject to the Data Protection Act 1998 and will not be used to identify you personally. The data will only be used for research purposes. Any organisations receiving the data will also be subject to the same restrictions and obligations under the Data Protection Act 1998.

If you have any queries about this survey or how your data will be used please contact Nick Grigg at BDRC Continental on 020 7490 9166.

If you would like to check that this survey is genuine, you can contact the Market Research Society on 0500 396999 or www.mrs.org.uk who will verify BDRC Continental's status as a legitimate market research organisation.

To find out more about the Tram Passenger Survey or Transport Focus' work visit our website or follow us on Twitter.
Web: www.transportfocus.org.uk
Twitter: @transportfocus

If you would be happy to participate in future research projects about the tram industry please complete the contact details below (this will only be available to Transport Focus)

Name: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Email address: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Thank you for completing this questionnaire.

Please return it in the envelope provided or use the following Freepost address:

Tram Passenger Survey
Perspective Research Services Ltd
FREEPOST (RTLU-YLTS-TGYY)
12-20 Baron Street
Angel, London N1 9LL

bdrc continental

transportfocus

itials/Support Initials/Date

Appendix 2: Using crush capacity information to estimate passenger profiles

Section 4 explained that demographic weights were established based upon counts made by fieldworkers during their shifts, and that in some cases these counts were not able to be completed, or in isolated cases the data collected may have been discounted for quality reasons.

Where counts were missing for off-peak times or weekends, it was assumed that the demographic profile and approximate number of passengers on board these services was the same as the average for that route in that day-part.

Where the missing counts were from peak time shifts, this was usually because the tram would have been too full for the fieldworker to move around and effectively observe all the people on board. In these cases, while we might reasonably assume that passengers' age and gender profile would be similar to the average for that route at other peak times, we could not assume that the total number on board would be the same as the average – rather, it should be closer to the maximum full capacity of the vehicle.

In the first full wave of the TPS (Autumn 2013), three different data types were investigated as possible sources of information to use in place of fieldworkers' counts where these did not take place:

- The maximum count that fieldworkers had taken in other peak times on that route
- The tram's crush capacity (as provided by operators)
- The tram's maximum capacity (as provided by operators).

Substituting each of these for missing count data produced the following overall day-part profiles for the Midland Metro network in 2013. These derived profiles were compared to separate day-part profiles provided by Centro[6]. As the table below shows, using the crush capacity information to to estimate the number of passengers when the tram is full clearly provided a much closer correspondence to the network's own profile information; using other estimates of passenger numbers understates the peak percentage. Thus, crush capacity information was used rather than the other available sources.

[6] *This analysis was conducted using the Midland Metro network and data from Centro, since Centro had been involved in the development of the TPS more generally, and had been the 'test case' in the original pilot*

Table 21: 2013 passenger profile information, 2013

	Peak passengers	Offpeak weekday passengers	Weekend passengers
Profile information provided by Centro (2013)	44%	40%	16%
Profile derived from fieldworkers' passenger counts, supplemented with:			
Crush capacity information	44%	41%	16%
Full capacity information	40%	43%	17%
Fieldworkers' own maximum count	37%	46%	18%

Data supplemented by crush capacity information was also annualised and compared with annual passenger journey volume data for each network, as published by the DfT. Again this was closer to the external source, than either the 'full capacity' or the 'maximum count' information.

This exercise was repeated again following the Autumn 2014 survey and confirmed that the crush capacity is the most appropriate information source to use where fieldworkers' on board passenger counts are not available. This approach has therefore also been used in 2015.