

2012

Omaha Metro On-Board Survey

Final Report March 2013



**Texas A&M
Transportation
Institute**

in partnership with
HDR Engineering, Inc.



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Disclaimer

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Section 1. Introduction

Metro conducted an on-board transit passenger survey in October 2012. The survey gathered information about bus passengers and their transit trips. Transit agencies use this type of passenger survey (often called an origin/destination survey) to gather information about transit passengers, trip characteristics, and travel patterns.

The survey fieldwork began on Monday, October 1 and concluded on Wednesday, October 10, 2012. Metro will use the information gathered in service planning and market analysis; as well as for regional visioning and outreach efforts.

Description of Responsibilities

Metro sponsored the on-board survey, and HDR, Inc. (HDR) was the lead consultant, responsible for overall project management. HDR contracted with Texas A&M Transportation Institute (TTI) to provide technical assistance to complete the on-board survey. TTI recommended a methodology for selecting a survey sample, trained the surveyors, administered the two-week survey effort according to established procedures, data-entered all survey responses, post-processed the survey data, and created this report documentation. MAPA geocoded and mapped all addresses returned by survey respondents. HDR contracted with Associated Staffing Inc. to recruit a team of temporary workers as surveyors; many of whom excelled at generating high-quality survey responses.

Survey Instrument

Metro and TTI staff reviewed several example survey instruments from other transit agencies. The goal was to select a limited number of key questions that could capture the most critical information in a brief survey. TTI worked with Metro to identify any additional questions necessary to meet all essential information needs. The survey instrument was designed in English on one side of the form, and translated in Spanish on the opposite side of the form.

A sample of the survey instrument is on the next page:

metro 2012 Rider Survey

How are we doing? We hope you will tell us what you think about the transit services you use. Your opinion is important to us! Metro will use the information from this survey to improve transit services and to plan new transit projects in the future.

This is a voluntary survey. If you agree to take the survey, please answer all questions and return the form to the surveyor today or to your bus driver on your next Metro ride! **Thanks for your help!**



1. What type of place are you COMING FROM now? Mark one box

<input type="checkbox"/> Medical / hospital visit / doctor	<input type="checkbox"/> Work
<input type="checkbox"/> College / university	<input type="checkbox"/> School (K-12)
<input type="checkbox"/> Home	<input type="checkbox"/> Shopping
<input type="checkbox"/> Personal / social / recreational	<input type="checkbox"/> Other: _____

2. What is the LOCATION of the PLACE you are COMING FROM now?

If you are under age 18 and the place is your home, please enter only the nearest intersection and city.

Address: Street # _____ Direction N,S,E,W _____ Street Name _____

Or Nearest Intersection: Street 1 _____ & Street 2 _____

In the City of: _____ Zip Code, if known: _____

What is the name of the place or building? Example: "Westroads Mall"

3. How did you GET FROM that place to the FIRST BUS you rode on this ONE-WAY trip?

<input type="checkbox"/> Walked / wheelchair / other device _____ blocks
<input type="checkbox"/> Bicycled _____ blocks
<input type="checkbox"/> Drove _____ miles
<input type="checkbox"/> Rode _____ miles with someone else who parked
<input type="checkbox"/> Dropped off or taxi

4. Will you transfer FROM or TO another bus route as a part of this ONE-WAY trip?

No

Yes, list in exact order each bus route you will use to make this trip:

Route # of 1st bus → Route # of 2nd bus → Route # of 3rd bus

5. What type of place are you GOING TO now? Mark one box

<input type="checkbox"/> Medical / hospital visit / doctor	<input type="checkbox"/> Work
<input type="checkbox"/> College / university	<input type="checkbox"/> School (K-12)
<input type="checkbox"/> Home	<input type="checkbox"/> Shopping
<input type="checkbox"/> Personal / social / recreational	<input type="checkbox"/> Other: _____

6. What is the LOCATION of the PLACE you are GOING TO now?

If you are under age 18 and the place is your home, please enter only the nearest intersection and city.

Address: Street # _____ Direction N,S,E,W _____ Street Name _____

Or Nearest Intersection: Street 1 _____ & Street 2 _____

In the City of: _____ Zip Code, if known: _____

What is the name of the place or building? Example: "Westroads Mall"

7. How will you GET FROM the LAST BUS you will ride to the place you are GOING TO now?

<input type="checkbox"/> Walk / wheelchair / other device _____ blocks
<input type="checkbox"/> Bicycle _____ blocks
<input type="checkbox"/> Drive _____ miles
<input type="checkbox"/> Ride _____ miles with someone else who parked
<input type="checkbox"/> Will be picked up or take a taxi

8. How many working vehicles (cars, trucks, and motorcycles) are available in your household?

0 1 2 3 or more

9. Could you have used one of these vehicles to make THIS TRIP today, instead of riding the bus?

No Yes

10. If bus service was NOT AVAILABLE, how would you make THIS TRIP?

<input type="checkbox"/> Drive	<input type="checkbox"/> Walk / wheelchair / other device
<input type="checkbox"/> Bicycle	<input type="checkbox"/> Ride with someone else
<input type="checkbox"/> Taxi	<input type="checkbox"/> I would not make this trip

11. Including YOURSELF, how many people live in your household?

1 2 3 4 5 or more

12. What is the combined annual income for your household?

<input type="checkbox"/> Less than \$10,000	<input type="checkbox"/> \$70,000 to \$99,999
<input type="checkbox"/> \$10,000 to \$29,999	<input type="checkbox"/> \$100,000 or more
<input type="checkbox"/> \$30,000 to \$49,999	<input type="checkbox"/> Do not know / prefer not to answer
<input type="checkbox"/> \$50,000 to \$69,999	

13. What is your age?

<input type="checkbox"/> 17 or under	<input type="checkbox"/> 25 to 34	<input type="checkbox"/> 55 to 64
<input type="checkbox"/> 18 to 24	<input type="checkbox"/> 35 to 54	<input type="checkbox"/> 65 or over

14. Are you?

Male Female

15. Are you? Mark all that apply

<input type="checkbox"/> Black / African American	<input type="checkbox"/> Asian
<input type="checkbox"/> White / Non-Hispanic	<input type="checkbox"/> American Indian
<input type="checkbox"/> Hispanic / Latino(a)	<input type="checkbox"/> Other: _____

16. How long have you been riding Metro in the Omaha area? Mark one box

<input type="checkbox"/> Less than 6 months	<input type="checkbox"/> 3 to 5 years
<input type="checkbox"/> 6 to 12 months	<input type="checkbox"/> More than 5 years
<input type="checkbox"/> 1 to 2 years	

17. How often do you ride Metro in the Omaha area? Mark one box

<input type="checkbox"/> 6 or 7 days per week	<input type="checkbox"/> 1 or 2 days per month
<input type="checkbox"/> 5 days per week	<input type="checkbox"/> Less than once per month
<input type="checkbox"/> 3 or 4 days per week	<input type="checkbox"/> This is my first time
<input type="checkbox"/> 1 or 2 days per week	

18. How do you usually pay your fare? Mark one box

Cash Fare	10 Ride Card	30 Day Pass	University Pass
<input type="checkbox"/> Adult	<input type="checkbox"/> Adult	<input type="checkbox"/> Regular	<input type="checkbox"/> MCC Pass-to-Class
<input type="checkbox"/> Student	<input type="checkbox"/> Student	<input type="checkbox"/> Half-fare	<input type="checkbox"/> UNO MavRide
<input type="checkbox"/> Child	<input type="checkbox"/> Child		<input type="checkbox"/> Clarkson College
<input type="checkbox"/> Senior/Disability	<input type="checkbox"/> Senior/Disability		
<input type="checkbox"/> One Ride Card with Transfer			

19. Which ONE of the following do you think is the most important to improve Metro's service? Mark one box

<input type="checkbox"/> Make transferring easier	<input type="checkbox"/> Improve pedestrian / bike access
<input type="checkbox"/> Start service earlier on weekdays	<input type="checkbox"/> More service on weekends
<input type="checkbox"/> End service later on weekdays	<input type="checkbox"/> More information/route numbers at bus stops
<input type="checkbox"/> More frequent service on weekdays	
<input type="checkbox"/> Add new route from: _____ to _____	
<input type="checkbox"/> More direct route from: _____ to _____	

20. Do you agree or disagree with the following statements?

	Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
Metro takes me where I need to go.	<input type="checkbox"/>				
Schedule information is easy to use.	<input type="checkbox"/>				
I feel safe riding the bus.	<input type="checkbox"/>				
Buses are clean.	<input type="checkbox"/>				
Drivers are helpful and friendly.	<input type="checkbox"/>				
Buses are on time.	<input type="checkbox"/>				

21. How can Metro make transit service better for you?

The survey consisted of 21 questions designed to gather enough information to follow a person's trip origin to destination. In addition, the survey gathered several types of demographic information useful for transportation planning and travel demand modeling efforts, such as household size, household income, age, gender, and race/ethnicity.

The survey print order included 9,300 color surveys in bundles of 50 with rubber bands and shrink-wrap (for protection from inclement weather). The white card stock used was heavy enough for passenger to print answers directly on the survey while riding the bus. A serial number marked each survey; so TTI staff could identify the survey's bus route, direction, day and time (amongst other related information).

Section 2. Sample Plan and Administration

The size of the survey sample was determined based on about 700 total surveyor hours allocated for the passenger survey and the desired sample size based on statistical representation of each route's average daily ridership. The survey was conducted on weekdays between Monday and Thursday only to optimize the most productive times for data collection.

The approximately 700 surveyor hours included time for training, reporting to gather materials, travel to/from the actual survey assignments, time to return materials, and about 455 productive surveyor hours on the transit vehicle actually conducting the survey.



TTI estimated on average 5 completed surveys per productive on-board transit surveyor hour, or about 2,275 completed surveys. The number of available surveyor hours (and therefore the goal for number of surveys) was allocated to each route roughly in proportion to ridership. The goal for the final origin-destination database was about 1,404 survey records.

The survey goals were set based on ridership by bus route based on data for April 2012. The results tabulated later in this report include ridership numbers from October 2012 to match the survey administration period. Average weekday ridership in April 2012 was 13,982 whereas in October 2012 ridership was 16,191—a 16 percent increase.

The survey target for the highest-ridership routes was to receive at least 150 quality survey records. The table below contains information about the survey goals for routes by ridership category (excluding express routes); notice that the goal for each route is roughly proportional to ridership.

Table 1. Local Routes Survey Sample Goal

Local Routes, Ridership Category	Number of Routes	Weekday Passengers	Target Surveys per Route	Total Survey Sample Goal
Routes >1,500	2	3,018	150	300
Routes >750 <1,500	3	2,774	75	225
Routes >500 <750	8	4,939	60	480
Routes >250 <500	5	1,814	25	125
Routes >100 <250	6	846	15	90
Routes <100	2	45	5	10
Totals	26	13,436		1,230

Note: only applied to local bus routes, express targets were half of all express riders.

The table above documents the survey sample for local (non-express) bus routes in Omaha. The survey sample for Metro's seven express routes was offering a survey to each A.M. express rider and obtaining surveys from half of average daily ridership. Metro operates seven express routes from suburban areas of Omaha into downtown Monday to Friday with each route having several stops and one or two trips in the morning and again in the afternoon. The total average daily ridership on the express buses in April 2012 was 546; the target sample for returned, high-fidelity surveys was 219.

The target for high-fidelity surveys from both general public and express bus routes was 1,449. TTI used the sample goal for each local and express route to identify the approximate number of surveyor hours necessary.

The formula to estimate requisite surveyor hours by route:

$$H_R = S_R / (P_R / RH_R)$$

Where:

H_R = Estimate surveyors hours to meet sample goal

S_R = Sample goal

P_R = Average daily passengers

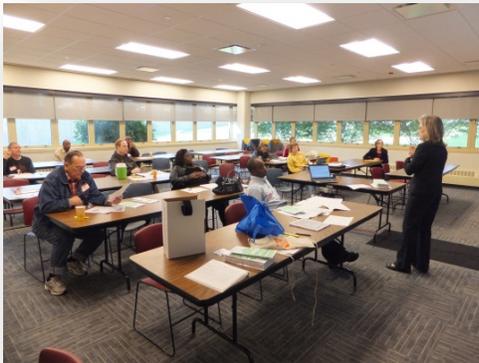
RH_R = Average daily revenue hours

Next, TTI and Metro pulled a recommended sample of bus trips based on the estimated surveyor hours by route. TTI compiled the sample bus trips into surveyor assignments. Surveyor assignments sampled ridership throughout the day from early morning to early evening; the largest share of bus trips surveyed began at the A.M. bus pullout around 4:00 A.M. Passenger surveys are generally more productive in the morning when passengers are making their first transit trip of the day.

The April 2012 average weekday ridership of 13,982 was the basis of the survey sample, hours, and assignments. Actual average weekday ridership during the survey effort in early October was 16,191 passengers. Later sections of this report summarize survey results using the more current ridership number.

Surveyors and Materials

Surveyors



Metro hosted training for potential surveyors at their offices on September 28 and 29, 2012. A Metro staff member kicked off each training session by describing the purpose and importance of the survey effort. TTI then led the remainder of the surveyor-training course and administration of the final exam.

TTI reviewed the exams and identified the surveyors with acceptable level of understanding and capacity. Then TTI confirmed assignments for the following Monday, the first day of the survey administration period. About 35 surveyors attended training, 32 actively

participated in the administration of the survey, and 20 surveyors completed survey assignments on the last day of the survey period (note: including boarding and alighting or passenger survey assignments).

Surveyor Quick Reference Guide

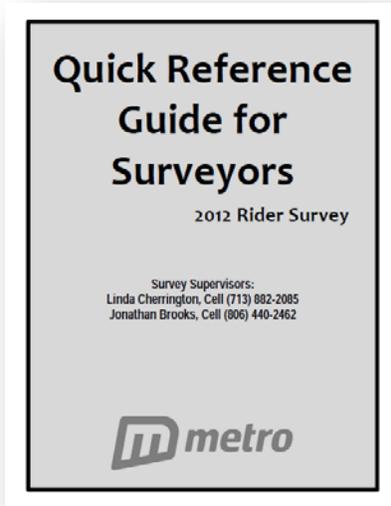
As part of the training, surveyors received a quick reference guide tailored to the Metro 2012 On-Board Survey. The intent of the guide was to acquaint surveyors with essential knowledge and background to aid them in their understanding, motivation, and professionalism. Surveyors are the



single-most critical element for quality survey results.

The surveyor's quick reference guide included the following information:

- General Information
- Terminology/Glossary
- Surveyor Candidate Responsibilities and Qualifications
 - Surveyor Responsibilities
 - Surveyor Performance
- Survey Procedures
 - Survey Assignment Bags
 - Getting To and From Your Survey Assignment
 - Relief
- Data Collection Procedures
 - Beginning of Assignment
 - Beginning of Trip
 - End of Trip
 - Beginning of Next Trip
 - Interlined Routes
- Goals for Passenger Response
- Tips on Getting People to Fill Out the Survey Form
- Frequently Asked Questions
- Surveyors Must be Prompt Reliable and Professional
- Hard to Survey Passengers
 - Language and Cultural Barriers
 - Age Bias
 - Literacy and Disability Barriers
 - Adults Traveling with Children and Packages



Assignment Materials

Two TTI staff members administered the fieldwork. They created surveyor assignments, organized materials, and managed survey logistics. The first surveyor typically reported between 4:00 and 4:30 A.M. and the last surveyor returned between 7:30 and 9:00 P.M. Each surveyor received an assignment most of the seven days the survey effort. The assignment was comprised of an Assignment Sheet and a Trip Log.

Assignment Sheet

The assignment sheet contained the information the surveyor needed to find the correct bus and when to start and stop handing out surveys. The assignment sheet (example at left) contained the following information:

- Surveyor name;
- Assignment number;
- Assignment date;
- Route number and name;
- Block number;
- Number of trips (the total number of trips in the assignment sheet);

- Starting survey serial number (the beginning serial number for each deck of surveys provided for the assignment);
- Report time and location;
- Instructions to transfer from Metro offices to the survey bus (if required);
- Board survey bus time and location;
- Start work instructions;
- Exit survey bus time and location;
- Instructions to transfer from the survey bus to Metro office (if required);
- Check out time and location; and
- End work instructions

Trip Log

Surveyors used the trip log to record the time and the serial numbers of the surveys distributed on each bus trip of their assignment. TTI recorded trip log information in a trip log database and used the information to tie each returned survey to the appropriate bus trip. Each trip log contains space to record information for three trips. Surveyors assigned to distribute surveys on more than three bus routes received as many trip log sheets as necessary. The surveyor filled out the serial number by trip and recorded actual trip times on the trip logs during the assignment. The image at right depicts the general layout of a trip log sheet.

Field Administration

Surveyors encouraged Metro riders to voluntarily complete the survey and return the form either to them or in one of the boxes near the bus doors. The survey fieldwork spanned seven weekdays:

- Monday, October 1, 2012
- Tuesday, October 2, 2012
- Wednesday, October 3, 2012
- Thursday, October 4, 2012
- Monday, October 8, 2012
- Tuesday, October 9, 2012
- Wednesday, October 10, 2012



Section 3. Summary of Survey Participation

The survey resulted in a successful response rate from participating Metro transit riders with over 4,400 returned surveys. The average number of returned surveys per on-vehicle surveyor hour was about 9.7 surveys; and about 90% of all returned surveys contained responses to most questions.

Surveyor Hours

The total number of surveyor hours over the term of the survey was:

- Hours for training 84
- Hours for assignments 539
- Hours for field edits 40
- Total hours paid time 663

Of the 539 surveyor hours on assignments:

- Approximately 20 percent of time spent on reporting before and after assignments
- Approximately 80 percent of time spent on-board surveying

Sample of Routes and Trips

Surveyors completed 102 assignments, an average of 15 per day, on 33 bus routes resulting in an overall system sample of 600 bus trips.

Raw Survey Response by Day

The October average weekday ridership in 2012 was 16,191. There were 8,474 total passenger boardings counted by surveyors during assignments. Just over half of Metro riders experienced a surveyor's effort to distribute and collect a survey. The total number of returned surveys was 4,415—meaning that 52 percent of all passengers who were offered a survey accepted and returned the survey. In addition, more than 3,000 respondents included origin and destination addresses in their response—36 percent of average weekday ridership. Table 1 summarizes the survey response by day.

Table 2. Summary of Survey Response by Day

	Riders Offered Survey	Total Surveys Returned	Percent of Riders	Surveys Returned with OD Addresses	Percent of Riders
Monday, 10/1	570	400	70%	264	46%
Tuesday, 10/2	1,676	840	50%	515	31%
Wednesday, 10/3	1,478	795	54%	518	35%
Thursday, 10/4	1,073	603	56%	454	42%
Monday, 10/8	1,109	568	51%	405	37%
Tuesday, 10/9	1,408	633	45%	469	33%
Wednesday, 10/10	1,160	477	41%	338	29%
Loose Returns		99		74	
Total	8,474	4,415	52%	3,037	36%
October 2012 Avg Weekday Riders:	16,191				
Percent of Avg Weekday Riders:	52%	27%		19%	

Refined Survey Response by Route

Later sections of this report document the detailed data processing steps used by TTI, with help from MAPA, to create two final databases—one for all responses and another for only survey records with origin and destination addresses. The target sample size was 1,449. The total number of surveys in the final All Responses Database is 4,391 – 303 percent of the target. The number of surveys in the OD Responses database is 2,328 – 161 percent of the target. The high response rate is indicative of both surveyor effort and the interest of Metro riders in providing information in hopes of protecting service levels and improving service. Table 2 summarizes the survey responses in the final two databases as compared to the survey sample goals.

Table 3. Refined Survey Response by Route

Category / Route Number	Survey Sample Goal	Surveys in All Responses Database		Surveys in OD Responses Database	
		Number	% of Goal	Number	% of Goal
LOCAL ROUTES					
2	150	392	261%	230	153%
3	60	168	280%	89	148%
4	60	219	365%	115	192%
5	60	203	338%	113	188%
7	75	317	423%	145	193%
8	25	64	256%	31	124%
9	15	170	1133%	99	660%
11	25	136	544%	55	220%
13	75	264	352%	126	168%
14	60	178	297%	79	132%
15	60	244	407%	136	227%
16	15	46	307%	20	133%
18	150	481	321%	234	156%
(200) Green	15	98	653%	56	373%
22	15	41	273%	23	153%
24	60	109	182%	66	110%
25	15	40	267%	18	120%
26	15	84	560%	36	240%
30	75	201	268%	98	131%
32	25	62	248%	34	136%
34	5	16	320%	3	60%
35	60	127	212%	69	115%
(41) Blue	25	100	400%	47	188%
(43) Yellow	25	86	344%	32	128%
48	5	27	540%	13	260%
55	60	221	368%	137	228%
EXPRESS ROUTES					
92	75	95	127%	63	84%
93	12	12	100%	7	58%
94	18	32	178%	29	161%
95	20	21	105%	13	65%
96	17	33	194%	27	159%
97	59	71	120%	61	103%
98	18	33	183%	24	133%
Total	1,449	4,391	303%	2,328	161%

Section 4. Data Processing

Data processing refers to the process by which transportation planners prepare data for analysis. Metro riders provided 4,415 raw survey responses. TTI used a five-step process to prepare the responses for use by Metro and other stakeholders in the Omaha, NE region:

1. Data entry
2. Geocode addresses
3. Create databases
4. Clean survey responses
5. Create unlinked and linked trip factors

Each of the five sections of this chapter documents one of the five steps.

Step 1. Data Entry

The first step in preparing the physical survey forms for use by Metro was to create electronic versions of the data in a usable format. The basic components of this first step included digitally recording each survey response, documenting surveyor assignments, and merging the two types of data.

Data Entry

Data entry involved systematically entering each survey response verbatim into SurveyMonkey. Every survey was marked with a serial number between 10,000 and 19,300. The serial number allowed TTI to link each survey response to additional information recorded by surveyors on assignment sheets and trip logs. The result was two interim datasets: one for assignment information and another for electronic survey data.

Assignment Database is the master record for assignment sheets and trip logs, including the range of serial numbers distributed on each bus trip. The survey supervisors created the assignment record database during the fieldwork in Omaha in October 2012.

Survey Record Database is the record of survey responses for each completed survey.

Merging of Assignment and Survey Records

TTI merged the assignment and survey record databases in order to have both the survey respondent's answers and assignment records in the same database. Individual survey serial numbers matched a survey to the appropriate assignment record.

The process of merging was not successful for all surveys. Some survey serial numbers did not match any particular survey assignment. Surveys whose serial number did not match a range of values in the assignment database are not in the final survey databases. The number of surveys successfully merged was 4,391; the number not successfully merged was 24, or about 0.005%. In other words, TTI made great effort to preserve every survey response possible.

Step 2. Geocode Addresses

The second step in data processing was to attempt to geocode each address provided by a respondent. Geocoding is the process of taking raw address information and identifying the location of each—in this case by latitude/longitude and then Census Traffic Analysis Zone (TAZ).

Purpose of Geocoding

A common key aspect to on-board transit surveys is to provide representative travel behavior information for calibrating a regional travel demand model. To support that objective, there are four location questions typically asked on OBAD surveys:

- Origin
- Boarding location
- Alighting location
- Destination

Calibrating the travel demand model of MAPA was a secondary objective of the Metro survey effort. As a result, the project team decided to direct the limited resources of the survey to more customer satisfaction questions and fewer location questions. The two location questions included in the survey were:

- Origin
- Destination

Respondents had the opportunity to indicate one or more different pieces of information, such as place name, address, and/or nearest intersection, which identified their trip origin or destination.

Geocoding Process

MAPA geocoded the address responses using an iterative process in order to georeference as many locations as possible. Some addresses inevitably cannot be successfully geocoded due to geographic data limitations or most often because the response information is incomplete. The following is a brief outline describing MAPA's geocode process and the steps taken to increase the rate of address matches:

Each origin and destination was initially geocoded following a similar method for both origin and destination:

- a. Both Origins and Destinations had 3 spatial address fields (Address, nearest intersection, and place or building name)
- b. First geocoded the full address field.
- c. All unmatched results sent through geocoding using the intersection field.
- d. Addresses still not matched were geocoded using the place or building name.

At the conclusion of the initial geocoding phase, the origin and destination fields had approximately 2,600 matches total—or approximately 2,100 survey records with both origin and destination georeferenced.

To increase the match rate for surveys with one or both addresses not geocoded, MAPA identified surveys missing address geocodes and manually reviewed survey records to apply their staff's expert knowledge of Omaha. The additional effort yielded 200 more surveys with both origin and destination located.

Geocoding Results

MAPA successfully geocoded both origin and destination for 2,328 survey records – a 77 percent success rate (3,073 surveys provided address information). MAPA recorded the latitude and the longitude for each

address. MAPA next paired the geocoded addresses with TAZ geographies using Geographic Information Systems software. MAPA's final step was to process the data into a single database file to return to TTI alongside spatial shapefiles created at the end of the geocoding process.

Step 3. Create Databases

Step 1 saw surveys converted into electronic form. Step 2 identified the origin and destination locations of respondents' trips. Step 3 describes why TTI created two databases for Metro instead of one.

The final products of the survey effort are two databases. The larger of the two databases, called the "All Responses Database", contains 4,391 survey records. The smaller database, called the "OD Responses Database", contains only the most complete and geographically useful 2,328 surveys.

Description of Two Databases

If all surveys contained geocodable addresses then there would be only one database. However, geocoding cannot match all addresses and many survey respondents did not provide addresses to begin with. Therefore, in order to make the most survey data possible available to Metro for future analysis, two separate databases were created before the final two steps of data processing.

All Responses Database

- Database containing all survey responses successfully merged in step 1
- 4,391 surveys

OD Responses Database

- Database containing surveys for which MAPA geocoded both origin and destination and that contained responses to key trip questions (questions 1-7)
- 2,328 surveys

Purpose of Two Databases

TTI created the two different databases because:

- Each database is suited to different types of analysis
- Maximize the utility of survey respondents' willing participation

The All Responses Database contains more survey responses and therefore allows for more statistically confident analysis of trip characteristics and passenger demographics. On the other hand, the OD Responses Database contains uniform, complete responses with addresses and is therefore suited to analysis of trip patterns, transfers, or any other analysis with a geographic component premise.

Each of the two databases underwent two final stages of processing prior to being ready for distribution and analysis: the first stage was cleaning and the second was weighting and factoring.

Step 4. Clean Survey Responses

Transportation planners cleaned raw survey responses to ensure that anomalies and inconsistencies do not adversely affect analysis using the data. A self-administered survey has a risk of responses to questions that do not necessarily seem logical. Errors in response can be due to (1) passenger misunderstanding of the question or choice of response, (2) inadvertent error by the passenger, and/or (3) intentional answering questions incorrectly.

TTI wrote the specifications described in this section to ensure data cleaning was systematic and uniform. The specifications resulted in clean databases suitable for the types of analysis for which the data are likely to be used for by Metro and stakeholders in the Omaha, NE region.

General Processing for All records

The data deliverable for the project was three databases; a database of raw survey records, a cleaned and factored database with all survey records, and a database of cleaned and factored OD valid records. The first database is a raw database and was provided to Metro for their own records. The two databases provided for use in transportation planning were processed according to the documentation as described in this report. TTI conducted some general cleaning on all survey records before creating the two processed databases as provided to Metro. The following steps document the process that TTI used to prepare survey responses for detailed cleaning and splitting into two databases prior to data weighting and expansion:

1. All questions, replaced text string answers with “1” placeholders
2. All questions, added a “Q?_NoResponse” column for each question and then marked each record with no response to the respective question with a “1”
3. Questions 3 and 7, cleaned text and miscellaneous values out of distance (miles/blocks) answers in survey responses; used an “x” as placeholder if there is a value that is not a number
4. Questions 3 and 7, converted all walking and biking distance values listed as miles into blocks—assumed 12 blocks per mile
5. Question 4, added an additional column “Q4_NumberofTransfers”, populated the column with a number representing the number of unique bus routes listed as used for transferring on the trip, if Q4 response is ‘yes’ but no routes are listed then assume “2” routes (i.e. one for the current bus route and one for a transfer bus route).

Records with Multiple Responses to Questions

Some survey respondents provided multiple responses to questions specifically asking for one answer. Leaving records with multiple responses skews analysis results due to the miss-application of survey weights and factors. For example, if a customer satisfaction question asks for one response and one person provides one response (value of 1) but another provides two (a value of 1+1=2) then later analysis does not accurately represent the first respondents opinion. Multiple responses could not be allowed to weight one respondent’s opinion above another’s. Therefore, it was necessary for TTI to employ the following cleaning process to refine survey records prior to producing weights and factors:

1. Questions 1-10:
 - a. Processed records with multiple responses based on answer priority as listed below (if multiple responses were present the answer with highest priority was preserved):
 - i. Origin/Destination Purpose (Q1 and Q5)
Work, Medical, School, College/University, Recreation, Shopping/Errands, Other, Home
 - ii. Access/Egress Mode and Distance (Q3 and Q7)
Bicycle, Walk, Dropped off or taxi, Rode with someone else who parked, Drove personal car
 - iii. Access/Egress Transfers (Q4)
Yes, No
 - iv. Working Vehicles in Household (Q8)
3 or more, 2, 1, 0
 - v. Could Use Vehicle to Make Trip (Q9)
No, Yes
 - vi. No Bus Service, Available Options (Q10)
I would not make this trip, Bike, Taxi, Walk, Ride with someone else, Drive
2. Questions 11-14, 16-17:
 - a. Processed records with multiple responses using one of three methods:

- i. If two responses marked, use an alternating pattern of selecting a higher value and then a lower value for records with two answers present for each question
 - ii. If three responses marked, select the middle response based on the order of possible responses to the question
 - iii. If four or more answers or all answer choices are marked then clear all responses and mark the record as ‘no response’
3. Questions 15, 18-20
 - a. Replaced “1” placeholders with portions of one per each of multiple responses
 - b. For example, if two answers given then number changed from “1” in each column to “0.5” in each of the two columns
4. All questions
 - a. For each survey record affected by steps 1, 2 or 3 place a ‘1’ marker in the “Altered_by_GeneralCleaning” column; as record of the change

Additional Data Cleaning for OD Responses Database

The OD Responses Database contains only survey records with two geocoded location responses *AND* responses to questions 1-7 of the survey. TTI researchers refined the survey records in the OD database to remove potential round-trip records; records that indicated the same ‘trip purpose’ or location in origin and destination . For example, both origin and destination are shown as either ‘home’ or ‘work’. A person typically has only one home but may have multiple work locations. The following summarizes the cleaning steps as applied to the OD database by TTI:

1. If the geographic location of the origin and destination are the same, removed record from database entirely
2. If purpose at origin and destination were both ‘work’ but origin and destination locations were different, assume the trip purpose information is correct—not a round trip
3. If purpose at origin and destination were both ‘home’ but origin and destination locations were different, apply the two rules below except in such cases where either the origin or the destination is obviously an educational institution (e.g. UNO, MCC, Westside High School, etc); in which case the origin and destination purpose is marked as either ‘ College/University’ or ‘School (K-12)’:
 - a. If no business landmark is given as a location and the trip originates in the morning, the origin trip purpose remained ‘home’ but the destination trip purpose changed to ‘work’
 - b. If no business landmark is given as a location and if the trip originates in the afternoon/evening, the origin trip purpose changed to ‘work’ but the destination trip purpose remained as ‘home’
4. Identified each survey record affected by step 3 by placing a ‘1’ marker in the “Altered_by_ODCleaning” column; as record of the change

Step 5. Create Unlinked and Linked Trip Factors

To ensure that data were representative of Metro average weekday ridership, the survey records in each of the two resulting databases were factored based on unlinked and linked trip volumes. To conduct appropriate data weighting and expansion via factors, Metro provided TTI with average weekday ridership totals by route and time period for the month of October 2012. Factoring each survey response in both databases balances any over- or under-representation in the data by any one route or time-of-day.

Strata for Factors

Metro documents average weekday ridership by route and time period. Therefore, the strata for factoring of survey responses were route and time period. Time-period was a stratum only for routes with more

than 500 average daily riders and more than 100 survey responses in the database. The time-periods Metro uses in record keeping are:

- **Early AM** Before 6:00 AM
- **AM Peak** 6:00 AM to 8:29 AM
- **Mid Day** 8:30 AM to 3:29 PM
- **PM Peak** 3:30 PM to 6:29 PM
- **Evening** After 6:30 PM

Only surveys from a few, high-ridership routes were factored based on route ridership by time-period. To aggregate strata that are most similar to each other in terms of ridership and demographics, the following rules of aggregation for strata with no observations (either no trips sampled or no valid surveys returned) are:

- **Early AM** time strata aggregated with midday trips
- **AM Peak** time strata aggregated with PM peak trips (in opposite direction when data available)
- **Mid Day** time strata aggregated with Evening trips
- **PM Peak** time strata aggregated with AM peak trips (in opposite direction when data available)
- **Evening** time strata aggregated with midday trips

Calculation of Expansion Factors

Response Rate Factor for Unlinked Trips

The response rate factor for unlinked trips accounts for the fact that this was a sample survey and fewer than 100% of the offered surveys in the trips sampled for each stratum are accepted and returned completed. The formula for calculating the response rate factor is:

$$RF_A = \frac{P_A}{CS_A}$$

Where:

- RF_H** = Response Rate Factor for Unlinked Trips for stratum A
P_H = Passengers for stratum A
CS_H = Completed surveys in stratum A

In words, the response rate factor for unlinked trips is the inverse of the response rate. For example, if the number of passengers boarding Route A inbound in the AM peak on a weekday is 360 and the number of valid returned surveys is 180 then the response rate is 50% and the response rate factor is 2. In other words, the weight of each survey in the final database for Route A inbound AM Peak is 2.

Analysis totals based on the response rate factor for unlinked trips will total the number of unlinked trips in the Metro system on the average October 2012 weekday – 16,191 unlinked trips.

Linked Trip Factor

The linked trip factor accounts for the fact that a person who transfers from one route to another route has multiple chances of being intercepted by a surveyor.

The formula for the linked trip factor is:

$$LF_{12345} = \frac{1}{NB_{12345}}$$

Where:

LF₁₂₃₄₅ = Linked Trip Factor for survey 12345

NB₁₂₃₄₅ = Number of routes used by survey 12345 during one-way trip

Question four of the survey asked, “Will you transfer from or to another bus route as a part of this one-way trip?”. The answer choices were:

- No
- Yes, list in exact order each bus route you will use to make this trip
 - Route # of 1st bus
 - Route # of 2nd bus
 - Route # of 3rd bus

TTI used the response to question four to determine for each survey the number of bus routes used during the one-way trip. Possible values were 1 (no transfer), 2, and 3 or more. If no transfer was made the linked trip factor is 1. If two routes were used the linked trip factor is 0.50. If a respondent indicated three routes then the linked trip factor is 0.33. Trips that required more than three buses carry the maximum linked trip factor of 0.33. Each survey response has a unique linked trip factor.

Total Factor for Linked Trips

The response factor and the linked trip factor are multiplied together to create the total factor for linked trips. Every survey has a unique total factor for linked trips. The formula for Total Factor for Linked Trips is:

$$TFLT_{12345} = RFA \times LF_{12345}$$

Where:

TFLT₁₂₃₄₅ = Total Factor for Linked Trip for survey 12345

RF_A = Response Rate Factor for Unlinked Trips for stratum A that applies to survey 12345

LF₁₂₃₄₅ = Linked Trip Factor for survey 12345

After the total factor for linked trips is applied, the number of responses in the database equals the number of linked trips in the system based on survey data.

Section 5. Summary of Survey Results

This chapter summarizes the results of survey based on the survey records in the All Responses Database. The sections of this chapter are:

- Introductory results
- Statistical confidence and accuracy
- Summary results by subject

Introductory Results

Tables 4-7 summarize the overall survey response based on time-period, route, question, and language.

Table 4. Survey Response by Time-period

Time-period	Survey Responses		Unlinked Trips	
	Number	Percent	Number	Percent
Early AM (before 6:00 am)	271	6%	584	4%
AM Peak (6:00 - 8:29 am)	1,429	33%	4,206	26%
Mid Day (8:30 am - 3:39 pm)	2,002	46%	8,134	50%
PM Peak (3:30 - 6:29 pm)	658	15%	2,993	18%
Evening (after 6:30 pm)	31	1%	274	2%
Total	4,391	100%	16,191	100%

Table 5. Survey Response by Route

CATEGORY / Route	Survey Responses	Average Response Rate Factor	Unlinked Trips
LOCAL ROUTES			
2	392	4.46	1,749
3	168	4.64	780
4	219	3.78	827
5	203	3.20	650
7	317	2.72	863
8	64	6.95	445
9	170	0.89	152
11	136	3.97	540
13	264	4.05	1,069
14	178	4.53	807
15	244	3.05	743
16	46	3.33	153
18	481	3.62	1,740
200 (Green)	98	1.99	195
22	41	3.54	145
24	109	5.03	548
25	40	3.48	139
26	84	3.13	263
30	201	6.08	1,223
32	62	6.34	393
34	16	2.06	33
35	127	4.49	570
41 (Blue)	100	4.13	413
43 (Yellow)	86	3.98	342
48	27	1.78	48
55	221	3.57	788
EXPRESS ROUTES			
92	95	1.77	168
93	12	2.58	31
94	32	1.78	57
95	21	2.38	50
96	33	1.85	61
97	71	2.23	158
98	33	1.45	48
Total	4,391	3.69	16,191

Table 6. Response Rate by Question

Question Number	Valid Responses	Survey Responses	Response Rate
Q1	4,265	4,391	97%
Q2	2,520	4,391	57%
Q3a	4,242	4,391	97%
Q3b	2,166	4,391	49%
Q4a	4,244	4,391	97%
Q4b	1,727	4,391	39%
Q5	4,305	4,391	98%
Q6	2,520	4,391	57%
Q7a	3,902	4,391	89%
Q7b	1,768	4,391	40%
Q8	4,135	4,391	94%
Q9	3,966	4,391	90%
Q10	4,116	4,391	94%
Q11	3,963	4,391	90%
Q12	3,766	4,391	86%
Q13	3,902	4,391	89%
A14	3,877	4,391	88%
Q15	3,873	4,391	88%
Q16	3,842	4,391	87%
Q17	3,810	4,391	87%
Q18	3,790	4,391	86%
Q19	3,472	4,391	79%
Q20a	3,653	4,391	83%
Q20b	3,513	4,391	80%
Q20c	3,555	4,391	81%
Q20d	3,518	4,391	80%
Q20e	3,540	4,391	81%
Q20f	3,533	4,391	80%
Q21	1,867	4,391	43%

Table 7. English / Spanish Response by Route

CATEGORY / Route	Survey Responses				Unlinked Trips			
	Number		Percent		Number		Percent	
	English	Spanish	English	Spanish	English	Spanish	English	Spanish
LOCAL ROUTES								
2	389	3	99.2%	0.8%	1,738	11	99.3%	0.7%
3	167	1	99.4%	0.6%	775	5	99.4%	0.6%
4	219		100%		827		100%	
5	202	1	99.5%	0.5%	648	2	99.7%	0.3%
7	292	25	92.1%	7.9%	794	69	92.0%	8.0%
8	64		100%		445		100%	
9	164	6	96.5%	3.5%	147	5	96.5%	3.5%
11	129	7	94.9%	5.1%	513	27	95.1%	4.9%
13	259	5	98.1%	1.9%	1,051	18	98.3%	1.7%
14	176	2	98.9%	1.1%	797	10	98.8%	1.2%
15	239	5	98.0%	2.0%	730	13	98.2%	1.8%
16	45	1	97.8%	2.2%	150	3	97.8%	2.2%
18	478	3	99.4%	0.6%	1,729	11	99.3%	0.7%
200 (Green)	98		100%		195		100%	
22	40	1	97.6%	2.4%	141	4	97.6%	2.4%
24	108	1	99.1%	0.9%	545	3	99.5%	0.5%
25	40		100%		139		100%	
26	84		100%		263		100%	
30	201		100%		1,223		100%	
32	57	5	91.9%	8.1%	361	32	91.9%	8.1%
34	15	1	93.8%	6.3%	31	2	93.8%	6.3%
35	126	1	99.2%	0.8%	568	2	99.6%	0.4%
41 (Blue)	98	2	98.0%	2.0%	405	8	98.0%	2.0%
43 (Yellow)	86		100%		342		100%	
48	27		100%		48		100%	
55	220	1	99.5%	0.5%	785	3	99.6%	0.4%
EXPRESS ROUTES								
92	94	1	98.9%	1.1%	166	2	98.9%	1.1%
93	12		100%		31		100%	
94	32		100%		57		100%	
95	21		100%		50		100%	
96	33		100%		61		100%	
97	71		100%		158		100%	
98	33		100%		48		100%	
Total	4,319	72	98.4%	1.6%	15,961	230	98.6%	1.4%

Statistical Confidence and Accuracy

Table 8 contains the statistical validity of the survey response by route based on a 95 percent confidence level. The survey response is valid within a margin-of-error plus or minus 1.32 percent for local routes, 3.95 percent for express routes, and 1.26 percent system-wide. The validity of individual routes varies from zero percent (meaning sample exceeded average ridership) on the low end to 22.51 percent on the high end. Margins-of-error for routes with lower average ridership are higher due to the smaller population—regardless of whether or not the sample is large compared to ridership.

Table 8. Statistical Confidence by Category, Route, and System Total

CATEGORY / Route	Survey Responses	Unlinked Trips	Confidence Level	Confidence Interval (margin of error +/-)
LOCAL ROUTES	4,094	15,618	95%	1.32%
2	392	1,749	95%	4.36%
3	168	780	95%	6.70%
4	219	827	95%	6.62%
5	203	650	95%	5.71%
7	317	863	95%	4.38%
8	64	445	95%	11.35%
9	170	152	95%	0%
11	136	540	95%	7.28%
13	264	1,069	95%	5.24%
14	178	807	95%	6.49%
15	244	743	95%	5.14%
16	46	153	95%	12.12%
18	481	1,740	95%	3.80%
200 (Green)	98	195	95%	7.00%
22	41	145	95%	13.01%
24	109	548	95%	8.41%
25	40	139	95%	13.12%
26	84	263	95%	8.84%
30	201	1,223	95%	6.32%
32	62	393	95%	11.44%
34	16	33	95%	17.86%
35	127	570	95%	7.67%
41 (Blue)	100	413	95%	8.54%
43 (Yellow)	86	342	95%	9.16%
48	27	48	95%	12.61%
55	221	788	95%	5.60%
EXPRESS ROUTES	297	573	95%	3.95%
92	95	168	95%	6.65%
93	12	31	95%	22.51%
94	32	57	95%	11.58%
95	21	50	95%	16.45%
96	33	61	95%	11.65%
97	71	158	95%	8.66%
98	33	48	95%	9.64%
Total	4,391	16,191	95%	1.26%

Summary Results by Subject

This section contains narrative, figures and tables to summarize the overall results of the survey. Summaries of results continue as follows:

- Trip purpose
- Trip location
- Travel mode and transfers
- Vehicle availability
- Metro rider demographics
- Experience riding Metro
- Customer satisfaction
- Written comments

Appendix A provides a series of tables with detailed results by question; including the open-ended comments provided to the final survey question, “How can Metro make transit service better for you?”.

Note: all percentages displayed in figures in this section represent unlinked trips—meaning each percent value is weighted based on the number of surveys received compared to average daily ridership in October 2012.

Summary of Trip Purpose

Figure 1 documents purpose at origin, purpose at destination, and the overall trip purposes of Metro users (excluding “home”). Work was the purpose for 42 percent of all non-home trips; purposes are fairly evenly split between the other possible answer choices.

Metro passengers may take trips for other trip purposes that do not fall in the provided trip categories; for trips with these purposes the most probable answer marked by respondents was “other”.

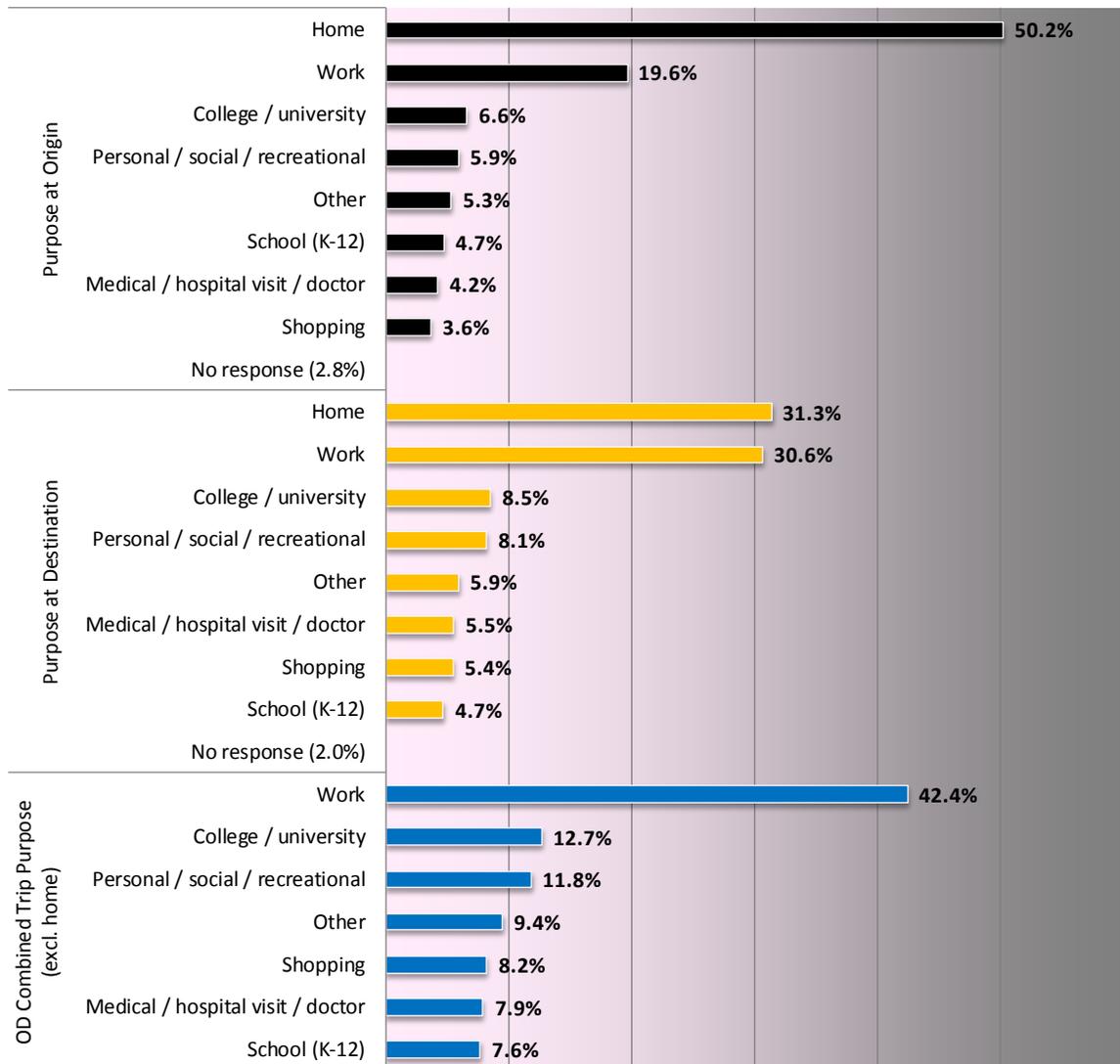


Figure 1. Summary of Trip Purpose

Summary of Trip Location

Home Location

Survey respondents voluntarily provide two locations—trip origin and destination. TTI analyzed responses to identify all locations described as “home”. Figure 2 depicts with black dots the relative home location in the survey response. The blue color variant underneath indicates the relative concentration of home sites based on the response factor for unlinked trips.

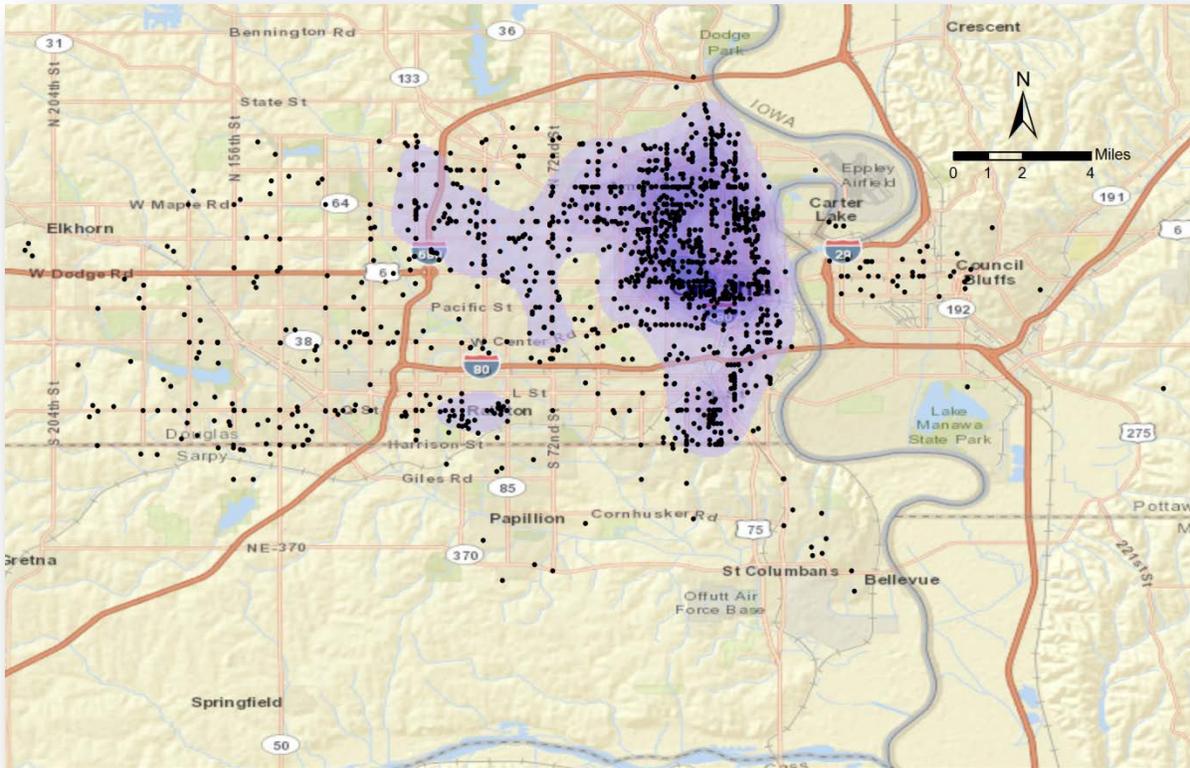


Figure 2. Map of Relative Home Locations

Non-home Locations

Figure 3 depicts all locations not listed as home by respondents. In other words, the black dots indicate locations where Metro riders are traveling to from their home. Again, the blue variant underneath indicates non-home destinations are more concentrated than home locations (depicted in map above).

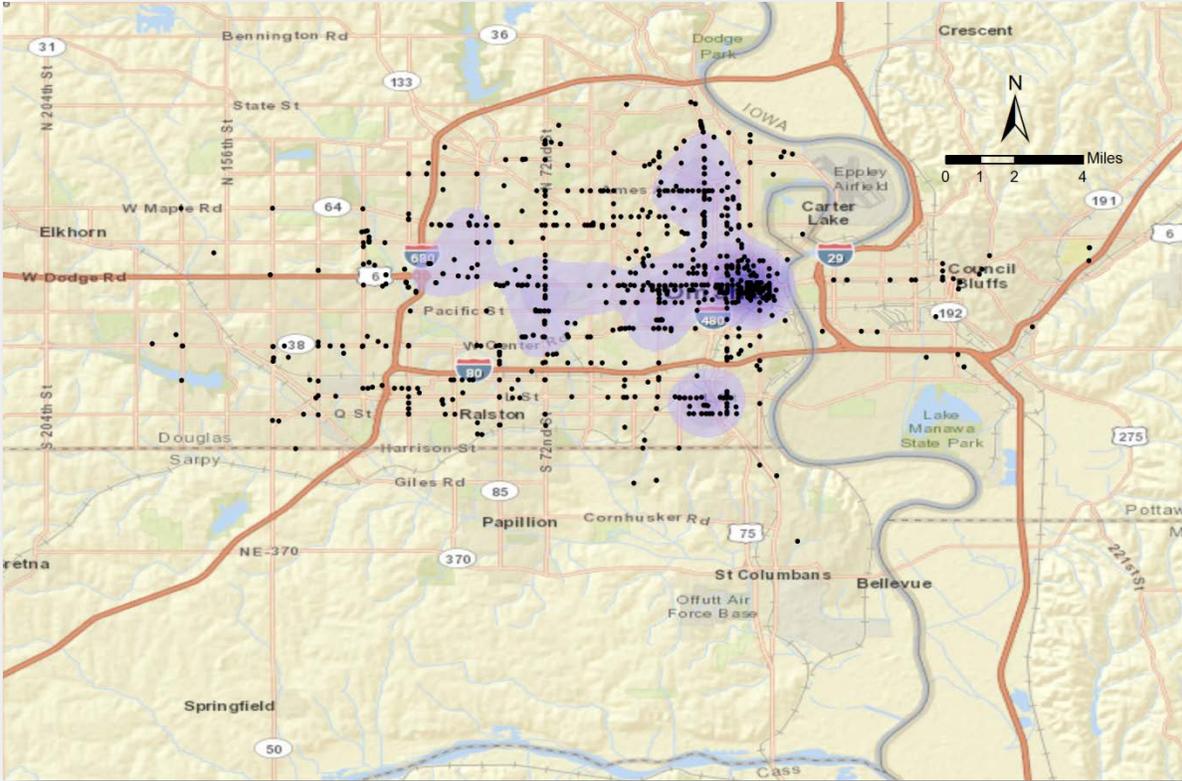


Figure 3. Map of Non-Home Destinations

Summary of Travel Mode and Transfers

Figure 4 documents Metro riders’ travel mode before boarding their first bus, number of transfers during the one-way trip, and travel mode after alighting the final bus of the trip. The most common travel mode before and after a trip was walking—over 87 percent and 91 percent respectively. Most riders used one or two bus routes to complete their one-way trip. Riders walking to their first bus stop walked an average 3.1 blocks – or about 0.26 miles. Bicyclists were riding an average 10.8 blocks to where they met the bus – or about 0.9 miles. Metro riders driving or riding with someone else traveled about 6 miles to the location where they met their first bus route.

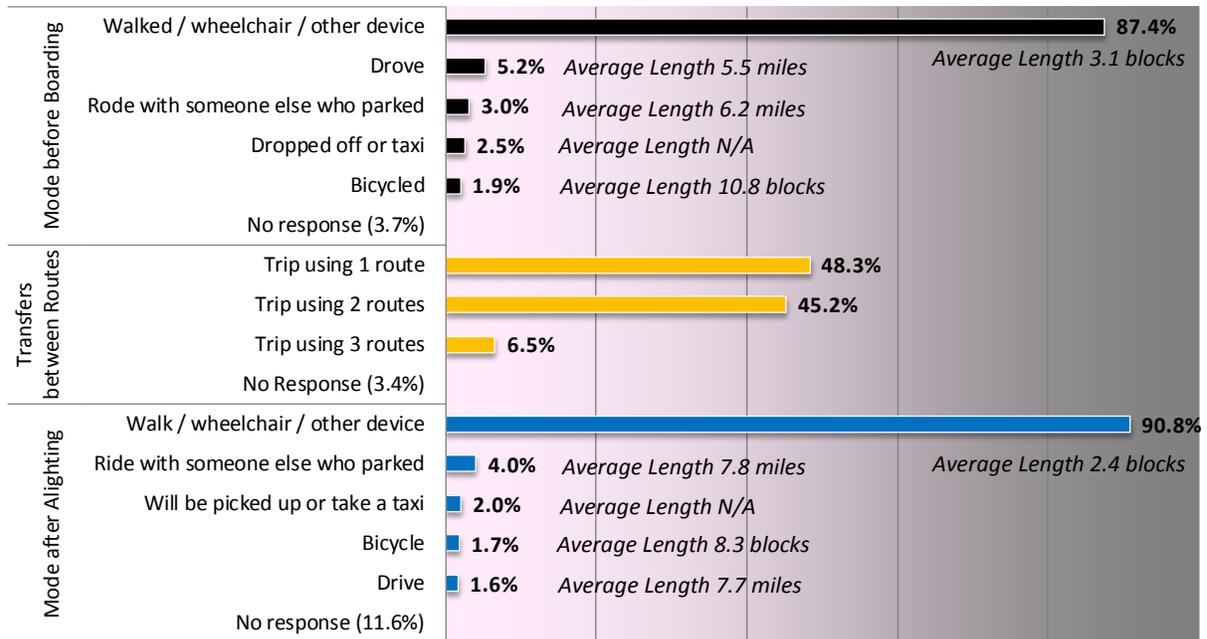


Figure 4. Summary of Travel Mode and Transfers

Summary of Vehicle Availability

Figure 5 documents the number of household vehicles available, vehicle availability for making a trip instead of using Metro and each rider’s alternatives for making the trip in the case that Metro service was not available. A majority, 58 percent, of riders lived in households with zero vehicles. Approximately 21 percent of riders chose to ride Metro when a household vehicle was available. The three most common travel alternatives for respondents were “I would not make this trip” (27 percent), “Ride with someone else” (25 percent), and walking (22 percent).

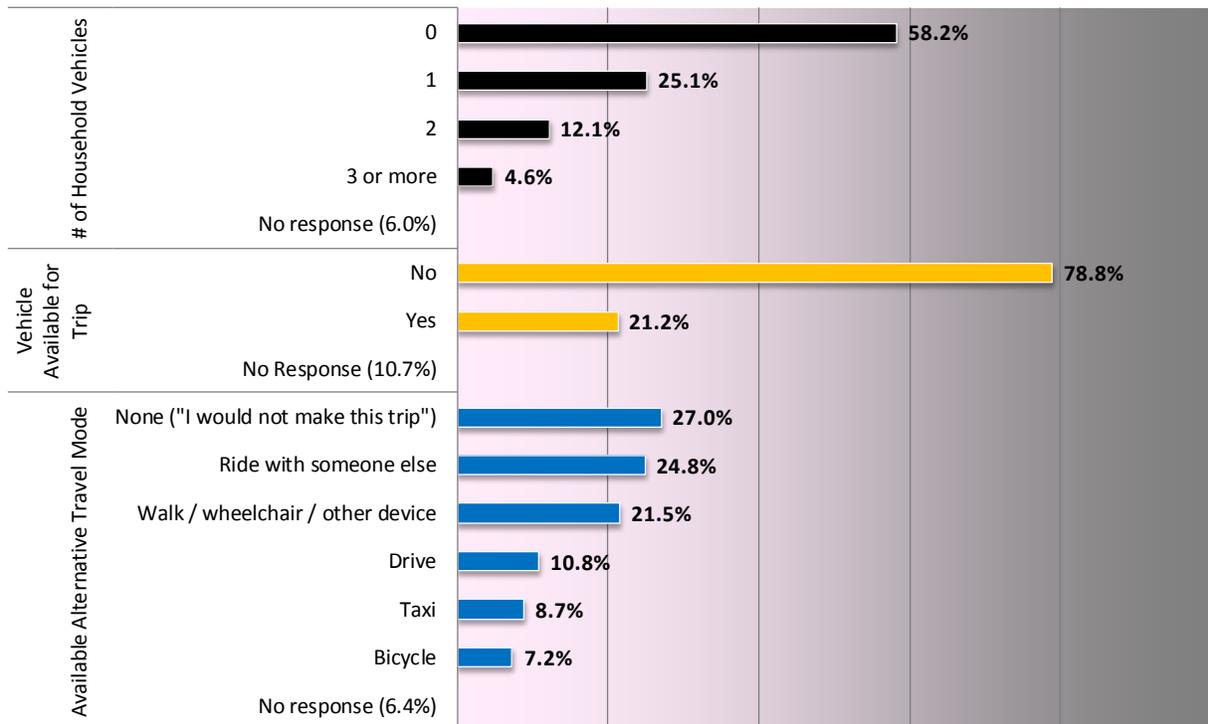


Figure 5. Summary of Vehicle Availability

Summary of Metro Rider Demographics

Figure 6 documents demographic characteristics of Metro riders, including age, gender, race or ethnicity, household size and annual income. Overall, the age of Metro riders is split smoothly between age cohorts. Gender responses indicate equal ridership by men and women (taking into account the margin-of-error of +/- 1.26 percent). The race / ethnicity of Metro riders varies, but is primarily “Black / African American” (47 percent) and “White / Non-Hispanic” (39 percent). A majority of Metro riders live in households on their own or with one other person – 51 percent. Most, 57 percent, Metro riders live in households with incomes of \$29,999 or less per year.

Note: the on-board survey included only fixed route transit services provided by Metro (local and express routes). Metro provides complimentary paratransit for qualifying residents. Figure 6 only documents the characteristics of fixed-route riders in Omaha.

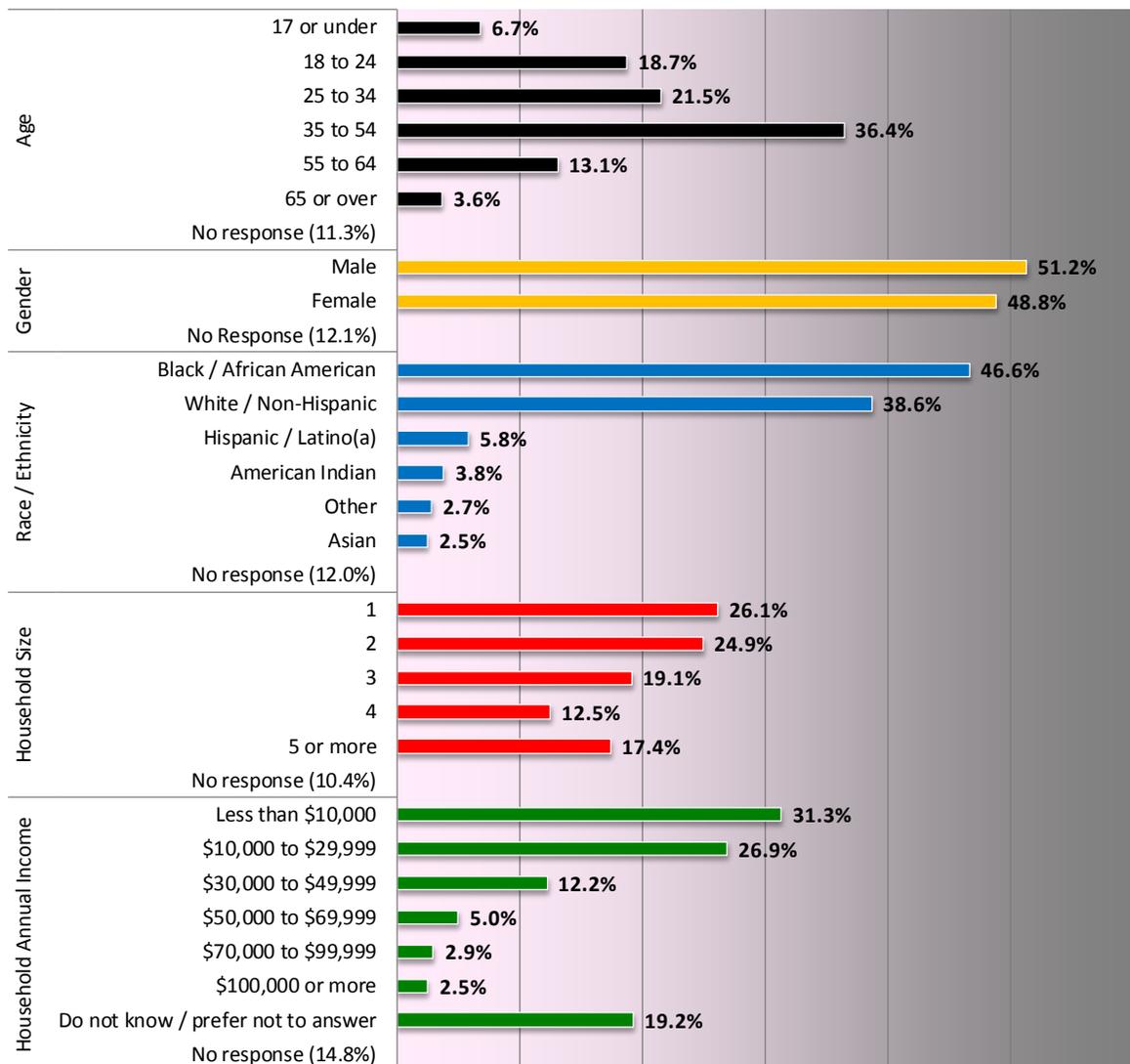


Figure 6. Summary of Metro Rider Demographics

Summary of Experience Riding Metro

Figure 7 documents riders' experience using Metro in the Omaha area, frequency of use, and typical fare medium. More than 40 percent of riders have used Metro for more than 5 years; the other 60 percent of riders are split between the remaining categories (18 percent are recent adopters of Metro service). About 70 percent of riders use Metro 5 to 7 days each week. Half of riders pay their fare with cash, another 25 percent pay with a 10 Ride Card, 13 percent use a 30 Day Pass, 8 percent use University Passes, and about 4 percent use a transfer card.

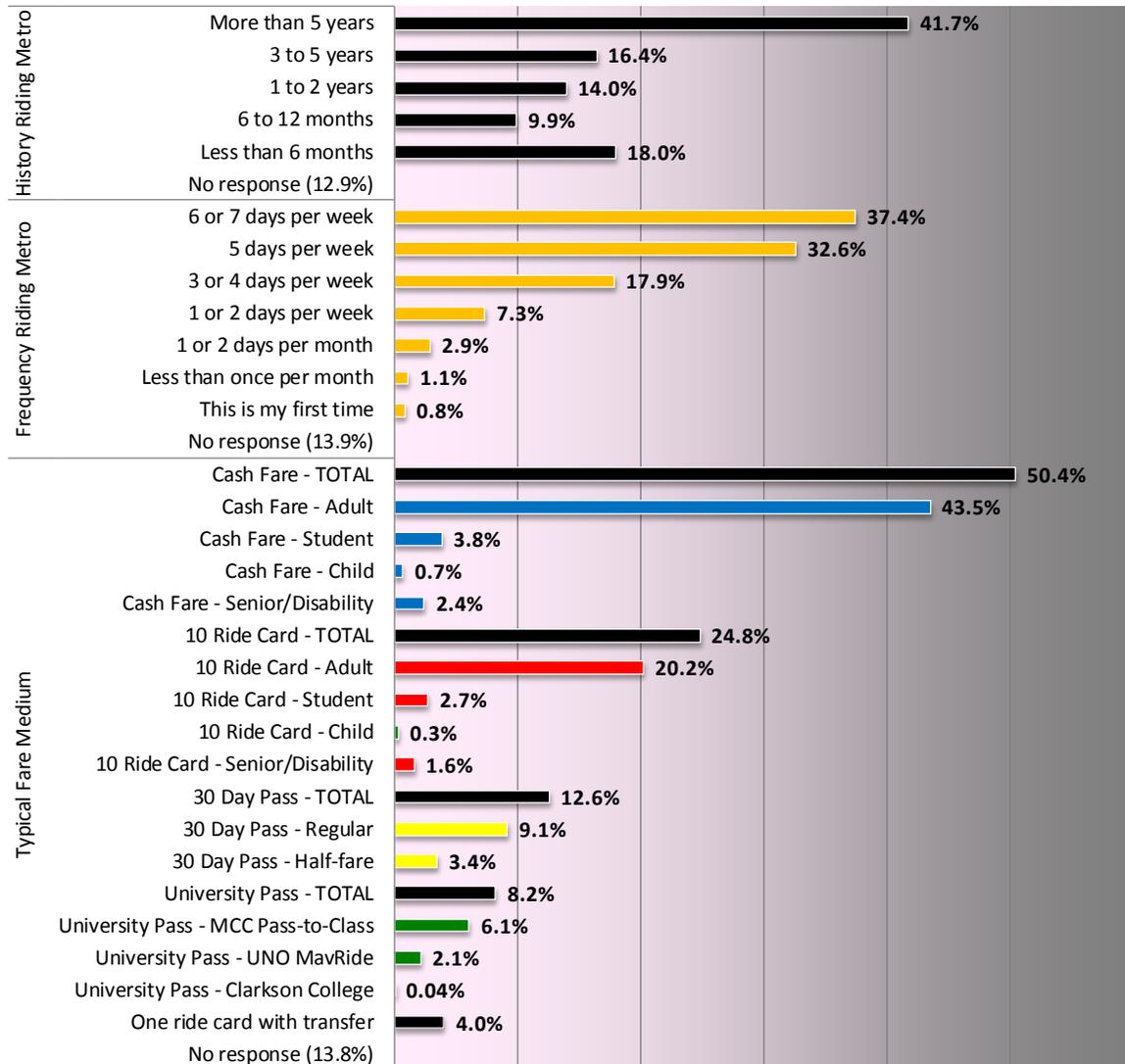


Figure 7. Summary of Experience Riding Metro

Summary of Customer Satisfaction

Figure 8 documents Metro riders preferred system improvements. The standout response was “more service on weekends”, marked by 33 percent of riders. About 29 percent marked a response related to improving service on weekdays via ending service later (16 percent) or offering more frequent service on existing routes during the weekday (14 percent).

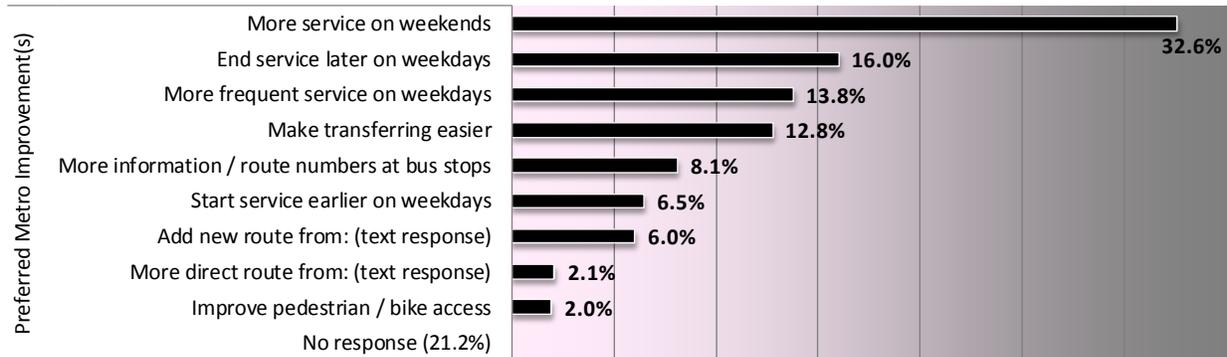


Figure 8. Preferred Metro Improvements

Figure 9 documents riders’ agreement or disagreement with six statements describing aspects of Metro’s service (figure is on next page). Nearly 90 percent of riders agree that Metro takes them where they need to go. Safety, schedule information, and bus cleanliness also receive positive marks – more than 70 percent of riders agree. Riders agree drivers are helpful and friendly, but less so than with the previous four aspects of customer satisfaction. The least favorably rated category is on-time performance; where 25 percent of riders indicated they disagree or strongly disagree with the statement.

Although scores for these types of questions are typically high, understanding customer satisfaction levels assists Metro prioritizing service improvements that best meet the needs of its customers.

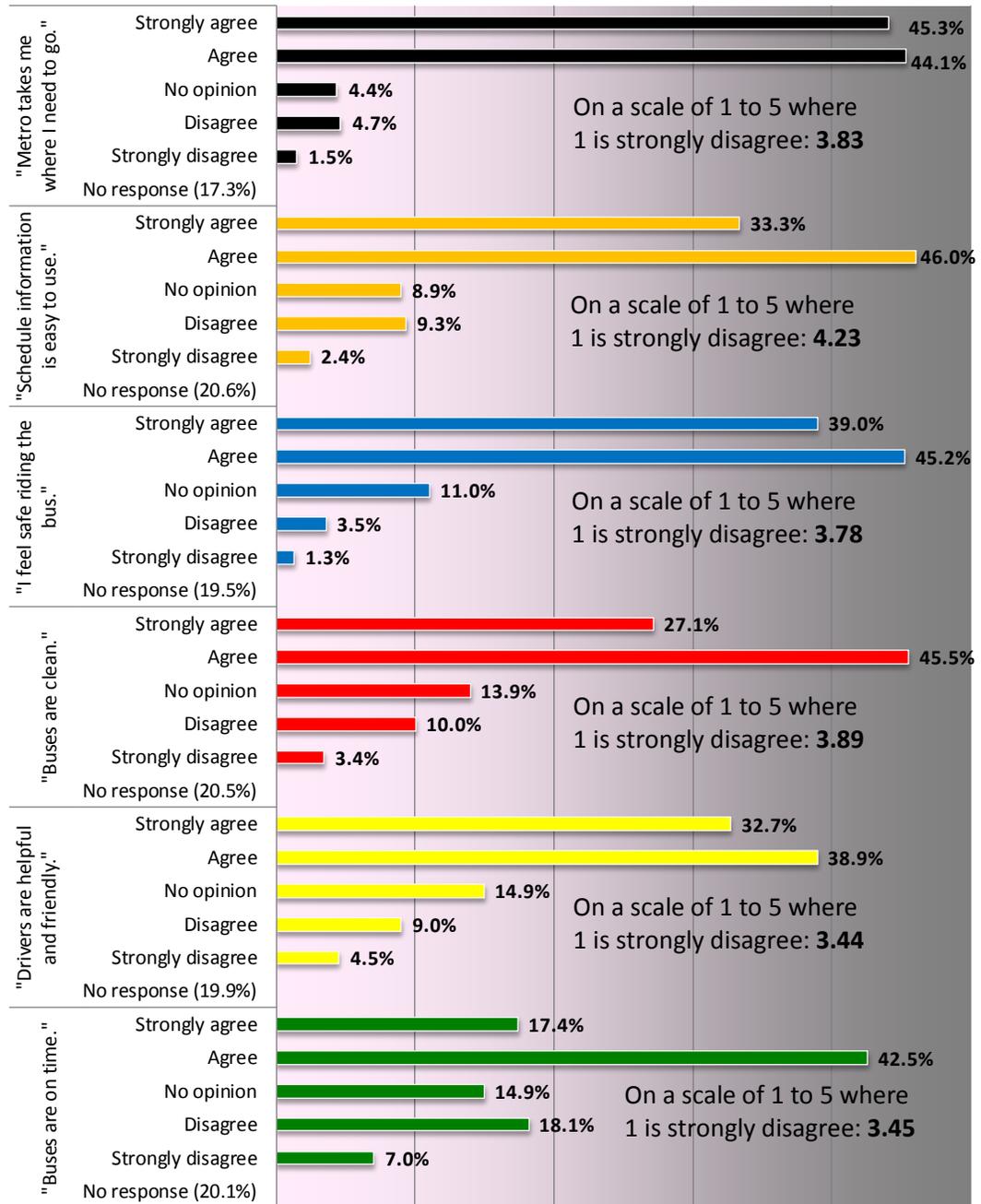


Figure 9. Do you agree or disagree with the following statements?

Summary of Written Comments

Table 9 documents that 1,867 riders provided comments about how Metro can improve transit service – or about 43 percent of respondents representing a total of nearly 7,000 unlinked trips on average each day.

Table 9. How can Metro make transit service better for you?

Open-ended comment box	Survey Responses	Percent	Unlinked Trips	Percent
Comment (text response)	1,867	42.5%	6,986	43.1%
<i>No response</i>	2,524	57.5%	9,205	56.9%
Total	4,391	100%	16,191	100%

The bulleted list below lists five common themes mentioned by responding Metro passengers:

- Gratitude for Metro service
- Request for more evening service
- Request for more weekend service
- Comment regarding customer service quality (mix of positive and negative comments)
- Request to improve on-time performance and transfers between routes

The most effective way to evaluate open-ended responses is to refer to Appendix A. Appendix A includes the verbatim comments of survey respondents, listed by route for additional context.

Section 6. Database Variable Dictionary

Each of the two final databases contains a different number of surveys, but both databases contain 205 identical column variables. This section provides a database dictionary that defines each variable in the databases. Variables are in the exact order as in the databases; categories are included to clarify the meaning of groups of variables.

Pattern of Data Dictionary Entries

Name of Group of Columns: Wording of Question 1

Column_Name – definition and/or description (description of value in cell)

Column_Name – definition and/or description (description of value in cell)

List of Variables

Survey Identification Variables

SurveyID – PS*****, where ***** is the survey serial number (survey identifier)

SerialNumber – *****, where ***** is the survey serial number (serial number)

DataEntryTime – duration of time used to data-enter survey response (time duration)

Spanish – record of whether or not survey respondent used English or Spanish side (Y=Yes or N=No)

Survey Assignment Variables

TripID – assignment ID with “-” appended, where * indicates the bus trip during the assignment (text)

Date – date of survey distribution (text)

DayofWeek – day of the week, Monday thru Thursday (text)

Assignment – surveyor assignment ID (text)

Block – Trapeze block paddle number of bus trip, surveyor assignment (number)

Assign_Period – either AM or PM, indicates general time period of surveyor assignment (text)

Vehicle – number of Metro vehicle, four digits (number)

Total_Trips – number of bus trips in survey assignment (number)

Trip_Number – trip in assignment when survey was handed out (number)

Route_Number – number of bus route (number)

Trip_Start_Period – time period of bus trip when survey was handed out, 1-5, 5 being “evening” (text)

Sched_Start_Time – time bus trip scheduled to start (time)

Start_Location – location bus trip started (text)

Route_Direction – direction of bus trip, terminology varies by route (text)

Actual_Start_Time – time bus trip actually started as recorded by surveyor (time or blank)

Actual_End_Time – time bus trip actually ended as recorded by surveyor (time or blank)

Survey Weight and Factor Variables

Response_Rate_Factor_for_Unlinked_Trips – represents number of unlinked passenger trips the survey is weighted to represent (number)

Linked_Trip_Factor – indicates a factor of 1, 0.5, or 0.33 based on if the respondent marked 1, 2, or 3 bus routes used during the surveyed one-way trip (number)

Total_Factor_for_Linked_Trips – represents the number of linked passenger trips the survey is weighted to represent (number)

Survey Origin and Destination Geocode Variables

Geocode – indicates if a survey record includes geocode information for both origin and destination address information (Y=Yes or N=No)

OTAZ – identification number for origin Traffic Analysis Zone (ID number or blank)

DTAZ – identification number for destination Traffic Analysis Zone (ID number or blank)

Record of Surveys Affected by Data Cleaning

Altered_by_GeneralCleaning – indicates with a 1 all survey records affected by one or more steps of data processing (1 or blank)

Altered_by_ODCleaning – indicates with a 1 all survey records affected by one or more steps of further data processing (1 or blank)

Question 1: What type of place are you COMING FROM now? Mark one box

Q1_From_Work – work (1 or blank)

Q1_From_Medical – medical / hospital visit / doctor (1 or blank)

Q1_From_School – school (K-12) (1 or blank)

Q1_From_College – college / university (1 or blank)

Q1_From_Personal – personal / social / recreational (1 or blank)

Q1_From_Shopping – shopping (1 or blank)

Q1_From_Other – other: (1 or blank)

Q1_From_Home – home (1 or blank)

Q1_From_Other_Text – text responses in “Other:” response box (text response or blank)

Q1_NoResponse – marks survey records with no response (1 or blank)

Question 3: How did you GET FROM that place to the FIRST BUS you rode on this ONE-WAY trip?

Q3a_Origin_Bike – bicycled (1 or blank)

Q3a_Origin_Walk – walked / wheelchair / other device (1 or blank)

Q3a_Origin_DropOff_Taxi – dropped off or taxi (1 or blank)

Q3a_Origin_RideSomeoneParked – rode with someone else who parked (1 or blank)

Q3a_Origin_Drive – drove (1 or blank)

Q3a_NoResponse – marks survey records with no response (1 or blank)

Q3b_WalkDistance – number of blocks walked (distance in blocks or blank)

Q3b_BikeDistance – number of blocks bicycled (distance in blocks or blank)

Q3b_DriveDistance – number of miles driven (distance in miles or blank)

Q3b_RideDistance – number of miles riding with someone else (distance in miles or blank)

Q3b_NoResponse – marks survey records with no response (1 or blank)

Question 4: Will you transfer FROM or TO another bus route as a part of this ONE-WAY trip?

Q4a_YesTransfer – yes (1 or blank)

Q4a_NoTransfer – no (1 or blank)

Q4a_NoResponse – marks survey records with no response (1 or blank)

Q4b_1stRoute – number of first bus route used on this trip (number or blank)

Q4b_2ndRoute – number of second bus route used on this trip (number or blank)

Q4b_3rdRoute – number of third bus route used on this trip (number or blank)

Q4b_NoResponse – marks survey records with no response (1 or blank)

Number_BusRoutes_Used_ieTransfers – number of bus routes used on trip (number or blank)

Question 5: What type of place are you GOING TO now? Mark one box

- Q5_To_Work** – work (1 or blank)
- Q5_To_Medical** – medical / hospital visit / doctor (1 or blank)
- Q5_To_School** – school (K-12) (1 or blank)
- Q5_To_College** – college / university (1 or blank)
- Q5_To_Personal** – personal / social / recreational (1 or blank)
- Q5_To_Shopping** – shopping (1 or blank)
- Q5_To_Other** – other: (1 or blank)
- Q5_To_Home** – home (1 or blank)
- Q5_To_OtherText** – text responses in “Other:” response box (text response or blank)
- Q5_NoResponse** – marks survey records with no response (1 or blank)

Question 7: How will you GET FROM the LAST BUS you will ride to the place you are GOING TO now?

- Q7a_Dest_Bike** – bicycled (1 or blank)
- Q7a_Dest_Walk** – walk / wheelchair / other device (1 or blank)
- Q7a_Dest_DropOfforTaxi** – will be picked up or take a taxi (1 or blank)
- Q7a_Dest_RideSomeoneParked** – ride with someone else who parked (1 or blank)
- Q7a_Dest_Drive** – drive (1 or blank)
- Q7a_NoResponse** – marks survey records with no response (1 or blank)
- Q7b_Dest_WalkDistance** – number of blocks will walk (distance in blocks or blank)
- Q7b_Dest_BikeDistance** – number of blocks will bike (distance in blocks or blank)
- Q7b_Dest_DriveDistance** – number of miles will drive (distance in miles or blank)
- Q7b_Dest_RideDistance** – number of miles will drive (distance in miles or blank)
- Q7b_NoResponse** – marks survey records with no response (1 or blank)

Question 8: How many working vehicles (cars, trucks, and motorcycles) are available in your household?

- Q8_Vehicles_3more** – 3 or more (1 or blank)
- Q8_Vehicles_2** – 2 (1 or blank)
- Q8_Vehicles_1** – 1 (1 or blank)
- Q8_Vehicles_0** – 0 (1 or blank)
- Q8_NoResponse** – marks survey records with no response (1 or blank)

Question 9: Could you have used one of these vehicles to make THIS TRIP today, instead of riding the bus?

- Q9_UseVehicle_No** – no (1 or blank)
- Q9_UseVehicle_Yes** – yes (1 or blank)
- Q9_NoResponse** – marks survey records with no response (1 or blank)

Question 10: If bus service was NOT AVAILABLE, how would you make THIS TRIP?

- Q10_IfNoBus_NoTrip** – I would not make this trip (1 or blank)
- Q10_IfNoBus_Bike** – bicycle (1 or blank)
- Q10_IfNoBus_Taxi** – taxi (1 or blank)
- Q10_IfNoBus_Walk** – walk / wheelchair / other device (1 or blank)
- Q10_IfNoBus_Ride** – ride with someone else (1 or blank)
- Q10_IfNoBus_Drive** – drive (1 or blank)
- Q10_NoResponse** – marks survey records with no response (1 or blank)

Question 11: Including YOURSELF, how many people live in your household?

- Q11_HH_1 – 1 (1 or blank)
- Q11_HH_2 – 2 (1 or blank)
- Q11_HH_3 – 3 (1 or blank)
- Q11_HH_4 – 4 (1 or blank)
- Q11_HH_5more – 5 or more (1 or blank)
- Q11_NoResponse – marks survey records with no response (1 or blank)

Question 12: What is the combined annual income for your household?

- Q12_Income_Less10k – less than \$10,000 (1 or blank)
- Q12_Income_10k30k – \$10,000 to \$29,999 (1 or blank)
- Q12_Income_30k50k – \$30,000 to \$49,999 (1 or blank)
- Q12_Income_50k70k – \$50,000 to \$69,999 (1 or blank)
- Q12_Income_70k100k – \$70,000 to \$99,999 (1 or blank)
- Q12_Income_100kmore – \$100,000 or more (1 or blank)
- Q12_Income_PreferNoAnswer – do not know / prefer not to answer (1 or blank)
- Q12_NoResponse – marks survey records with no response (1 or blank)

Question 13: What is your age?

- Q13_Age_under17 – 17 or under (1 or blank)
- Q13_Age_18to24 – 18 to 24 (1 or blank)
- Q13_Age_25to34 – 15 to 34 (1 or blank)
- Q13_Age_35to54 – 35 to 54 (1 or blank)
- Q13_Age_55to64 – 55 to 64 (1 or blank)
- Q13_Age_65over – 65 or over (1 or blank)
- Q13_NoResponse – marks survey records with no response (1 or blank)

Question 14: Are you?

- Q14_Male – male (1 or blank)
- Q14_Female – female (1 or blank)
- Q14_NoResponse – marks survey records with no response (1 or blank)

Question 15: Are you? Mark all that apply

- Q15_Black – Black / African American (1 or blank)
- Q15_White – White / Non-Hispanic (1 or blank)
- Q15_Hispanic – Hispanic / Latino(a) (1 or blank)
- Q15_Asian – Asian (1 or blank)
- Q15_AmerIndian – American Indian (1 or blank)
- Q15_Other – Other: (1 or blank)
- Q15_OtherText – text responses to “Other:” (text response or blank)
- Q15_NoResponse – marks survey records with no response (1 or blank)

Question 16: How long have you been riding Metro in the Omaha area? Mark one box

- Q16_Riding_Less6months – less than 6 months (1 or blank)
- Q16_Riding_6to12 – 6 to 12 months (1 or blank)
- Q16_Riding_1to2years – 1 to 2 years (1 or blank)
- Q16_Riding_3to5years – 3 to 5 years (1 or blank)
- Q16_Riding_5yearsoremore – more than 5 years (1 or blank)

Q16_NoResponse – marks survey records with no response (1 or blank)

Question 17: How often do you ride Metro in the Omaha Area? Mark one box

Q17_Often_6to7days – 6 or 7 days per week (1 or blank)

Q17_Often_5days – 5 days per week (1 or blank)

Q17_Often_3to4days – 3 or 4 days per week (1 or blank)

Q17_Often_1to2days – 1 or 2 days per week (1 or blank)

Q17_Often_1to2daysmonth – 1 or 2 days per month (1 or blank)

Q17_Often_LessOnceMonth – less than once per month (1 or blank)

Q17_Often_FirstTime – this is my first time (1 or blank)

Q17_NoResponse – marks survey records with no response (1 or blank)

Question 18: How do you usually pay your fare? Mark one box

Q18_CashFare_Adult – adult cash fare (1 or blank)

Q18_CashFare_Student – student cash fare (1 or blank)

Q18_CashFare_Child – child cash fare (1 or blank)

Q18_CashFare_Senior – senior/disability cash fare (1 or blank)

Q18_10Ride_Adult – adult 10 ride card (1 or blank)

Q18_10Ride_Student – student 10 ride card (1 or blank)

Q18_10Ride_Child – child 10 ride card (1 or blank)

Q18_10Ride_Senior – senior/disability 10 ride card (1 or blank)

Q18_30day_Regular – regular 30 day pass (1 or blank)

Q18_30day_Half – half-fare 30 day pass (1 or blank)

Q18_MCC – MCC pass-to-class (1 or blank)

Q18_UNO – UNO MavRide (1 or blank)

Q18_Clarkson – Clarkson College (1 or blank)

Q18_TransferCard – one ride card with transfer (1 or blank)

Q18_NoResponse – marks survey records with no response (1 or blank)

Question 19: Which ONE of the following do you think is the most important to improve Metro's service? Mark one box

Q19_Improve_TransferEasier – make transferring easier (1, portion of 1 if multiple answers present, or blank)

Q19_Improve_StartEarlier – start service earlier on weekdays (1, portion of 1 if multiple answers present, or blank)

Q19_Improve_EndLater – end service later on weekdays (1, portion of 1 if multiple answers present, or blank)

Q19_Improve_MoreFrequent – more frequent service on weekdays (1, portion of 1 if multiple answers present, or blank)

Q19_Improve_BikePed – improve pedestrian / bike access (1, portion of 1 if multiple answers present, or blank)

Q19_Improve_WkndService – more service on weekends (1, portion of 1 if multiple answers present, or blank)

Q19_Improve_InformationStops – more information / route numbers at bus stops (1, portion of 1 if multiple answers present, or blank)

Q19_Improve_NewRouteCheckBox – add new route from: ___ to: ___ (1, portion of 1 if multiple answers present, or blank)

Q19_Improve_NewRouteText – text responses to new route from: to: (text response or blank)

Q19_Improve_DirectRouteCheckBox – more direct route from: ___ to: ___ (1, portion of 1 if multiple answers present, or blank)

Q19_Improve_DirectRouteText – text responses to more direct route from: to: (text response or blank)

Q19_NoResponse – marks survey records with no response (1 or blank)

Question 20: Do you agree or disagree with the following statements?

“Metro takes me where I need to go.”

Q20a_MetroTakesMeWhereINeedToGo_StronglyAgree – strongly agree (1 or blank)

Q20a_MetroTakesMeWhereINeedToGo_Agree – agree (1 or blank)

Q20a_MetroTakesMeWhereINeedToGo_NoOpinion – no opinion (1 or blank)

Q20a_MetroTakesMeWhereINeedToGo_Disagree – disagree (1 or blank)

Q20a_MetroTakesMeWhereINeedToGo_StronglyDisagree – strongly disagree (1 or blank)

Q20a_NoResponse – marks survey records with no response (1 or blank)

Question 20: Do you agree or disagree with the following statements?

“Schedule information is easy to use.”

Q20b_ScheduleInformationIsEasyToUse_StronglyAgree – strongly agree (1 or blank)

Q20b_ScheduleInformationIsEasyToUse_Agree – agree (1 or blank)

Q20b_ScheduleInformationIsEasyToUse_NoOpinion – no opinion (1 or blank)

Q20b_ScheduleInformationIsEasyToUse_Disagree – disagree (1 or blank)

Q20b_ScheduleInformationIsEasyToUse_StronglyDisagree – strongly disagree (1 or blank)

Q20b_NoResponse – marks survey records with no response (1 or blank)

Question 20: Do you agree or disagree with the following statements?

“I feel safe riding the bus.”

Q20c_IFeelSafeRidingTheBus_StronglyAgree – strongly agree (1 or blank)

Q20c_IFeelSafeRidingTheBus_Agree – agree (1 or blank)

Q20c_IFeelSafeRidingTheBus_NoOpinion – no opinion (1 or blank)

Q20c_IFeelSafeRidingTheBus_Disagree – disagree (1 or blank)

Q20c_IFeelSafeRidingTheBus_StronglyDisagree – strongly disagree (1 or blank)

Q20c_NoResponse – marks survey records with no response (1 or blank)

Question 20: Do you agree or disagree with the following statements?

“Buses are clean.”

Q20d_BusesAreClean_StronglyAgree – strongly agree (1 or blank)

Q20d_BusesAreClean_Agree – agree (1 or blank)

Q20d_BusesAreClean_NoOpinion – no opinion (1 or blank)

Q20d_BusesAreClean_Disagree – disagree (1 or blank)

Q20d_BusesAreClean_StronglyDisagree – strongly disagree (1 or blank)

Q20d_NoResponse – marks survey records with no response (1 or blank)

Question 20: Do you agree or disagree with the following statements?

“Drivers are helpful and friendly.”

Q20e_DriversAreHelpfulAndFriendly_StronglyAgree – strongly agree (1 or blank)

Q20e_DriversAreHelpfulAndFriendly_Agree – agree (1 or blank)

Q20e_DriversAreHelpfulAndFriendly_NoOpinion – no opinion (1 or blank)

Q20e_DriversAreHelpfulAndFriendly_Disagree – disagree (1 or blank)

Q20e_DriversAreHelpfulAndFriendly_StronglyDisagree – strongly disagree (1 or blank)

Q20e_NoResponse – marks survey records with no response (1 or blank)

Question 20: Do you agree or disagree with the following statements?

“Buses are on time.”

Q20f_BusesAreOnTime_StronglyAgree – strongly agree (1 or blank)

Q20f_BusesAreOnTime_Agree – agree (1 or blank)

Q20f_BusesAreOnTime_NoOpinion – no opinion (1 or blank)

Q20f_BusesAreOnTime_Disagree – disagree (1 or blank)

Q20f_BusesAreOnTime_StronglyDisagree – strongly disagree (1 or blank)

Q20f_NoResponse – marks survey records with no response (1 or blank)

Question 21: How can Metro make transit service better for you?

Q21_Improve – indicator if comment provided by respondent (1 or blank)

Q21_Improve_TextResponse – verbatim comment, minus expletives (text response or blank)

Q21_NoResponse – marks survey records with no response (1 or blank)