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2023 METROLINA REGIONAL HOUSEHOLD TRAVEL SURVEY: FINAL REPORT

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Prepared for The City of Charlotte, NCDOT, and SCDOT

Report Title:

2023 Metrolina Regional Household Travel Survey: Final Report

Report Prepared by:

RSG

Report Prepared for:

The City of Charlotte, North Carolina Department of Transportation (NCDOT), and the South Carolina Department of Transportation (SCDOT)

For additional information regarding this report, or for questions about permissions or use of findings contained therein, please contact:

RSG (Headquarters)
55 Railroad Row
White River Junction, VT 05001
(802) 295-4999
www.rsginc.com

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LIST OF ABBREVIATIONS

ABS	Address-Based Sampling
ACS	American Community Survey
HH	Household
HTS	Household Travel Survey
MSG	Marketing Systems Group
NCDOT	North Carolina Department of Transportation
PUMA	Public Use Microdata Area
PUMS	Public Use Microdata Sample
SCDOT	South Carolina Department of Transportation

1.0 INTRODUCTION

RSG conducted the 2023 Metrolina Regional Household Travel Survey (HTS) to collect current information about household and individual travel patterns for residents throughout the greater Metrolina region. A total of 5,232 households (HHs) in the Metrolina region completed the survey. RSG served as the primary consultant for the 2023 HTS. Wilkins Research, the survey call center, assisted as a subconsultant to RSG.

1.1 SURVEY TIMELINE

Survey Design (Sample planning, programming, invitation development)	**June – September 2023**
Data Collection (Sending invitations, data monitoring and adjustments)	**September – November 2023**
Data Preparation (Data cleaning and weighting, final reporting)	**November 2023 – April 2024**

1.2 SURVEY OVERVIEW

The 2023 HTS collected data from September 20, 2023 through November 19, 2023. The survey objective was to collect data from at least 4,750 households in the 12-county Metrolina region. 530,038 households received invitation letters by mail. A total of 5,232 households completed the survey.

2.0 SURVEY DESIGN

2.1 OVERVIEW

An HTS seeks to obtain data that represents the travel behavior characteristics of the region and the demographics associated with travelers. This demographic information helps explain variations in travel patterns and allows for data weighting, as described in Chapter 6.0 of this report.

The 2023 survey included two sections:

- **Recruit survey**: This section collected key household-, person-, and vehicle-level information (e.g., number of household members, household member employment status, and vehicle make/model/year). Only one household member was required to complete the recruit survey (providing information on all other household members). After completing this section, eligible participants were offered the option to complete the travel diary online for one day or use the rMove™ smartphone app for seven days. Based on their selection, participants were then assigned a travel date or travel week.
- **Travel diary**: This section collected all location-based, trip-level, and travel-day information, as well as certain supplementary person- or household-level information (e.g., trip purpose and mode, telecommute time on travel day, residence type). All household members related to the member who completed the recruit survey ("person 1") were required to complete the travel diary to complete the survey. Persons whose relationship to person 1 was roommate, friend, or household help were not asked to complete a travel diary.

2.2 Travel Date Assignment

Households were assigned to a travel date or travel week after completing the recruit survey.

Households that participated via the one-day online travel diary were assigned to report travel on the next Tuesday, Wednesday, or Thursday (using a weighted probability to balance the travel days).

Households that participated via the seven-day smartphone app travel diary were assigned to report travel for a full, consecutive week beginning three days after completing the recruit survey (or one day after completing the recruit survey for one-person households). One adult in each rMove household was also selected to report children's travel for one day (reported "by proxy"). The proxy travel day for all rMove household children was the second weekday of the travel period.

2.3 Recruitment and Retrieval Methods

RSG used probability (address-based sampling or ABS) sampling methods to recruit respondents into the 2023 HTS. ABS respondents were recruited by invitation materials sent through the United States Postal Service.

In addition to the online and smartphone app participation methods, participants could also complete the survey by telephone. Wilkins Research was responsible for all telephone communications. Wilkins has highly trained staff to conduct objective, professional telephone surveys while capturing respondents' answers as fully as possible. RSG provided phone scripts for operators and training reference documents. Operators administered the survey verbally using the online survey instrument.

2.4 Survey Incentives

An incentive was offered to all households that completed the survey. Respondents who completed the survey via the online survey instrument received one $10 gift card per household, while respondents who completed the survey via the smartphone app received one $20 gift card per adult participant. Both amounts were printed on the invitation materials and were outlined in the question asking whether the household would like to complete the survey online or via rMove. Households could choose between Amazon, Visa, or Walmart gift cards. Alternatively, households could also opt not to receive any gift for participation.

3.0 SURVEY SAMPLING

The primary goal of the 2023 HTS was to collect travel behavior data from a representative set of households in the survey region. The sampling plan (in conjunction with post-data-collection weighting and expansion) supported that goal by 1) identifying key geographic, demographic, and travel characteristic segments and 2) determining sampling targets and response rates for these segments.

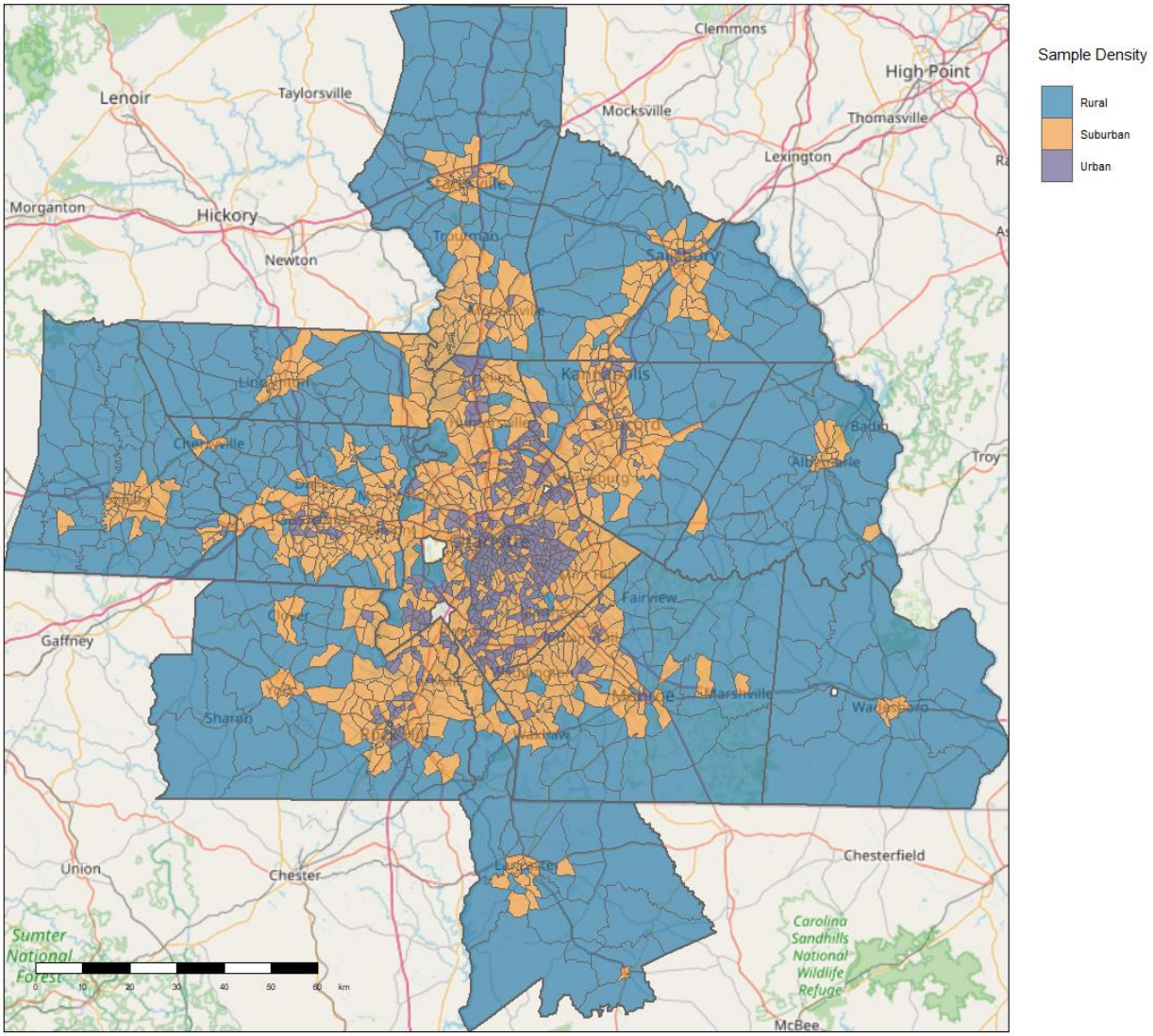
The sampling targets for certain segments were higher than those for the general population. This enabled sufficient data collection for households demonstrating certain behaviors (e.g., transit users) and ensured proper representation in the sample along various demographic factors relevant to modeling travel behavior.

3.1 SAMPLING METHODS AND EVALUATION

Sample Frame and Sample Area

The sampling frame for this survey was the list of all households in block groups within the survey region. RSG used address-based sampling to select households for participation. Address-based sampling involves drawing a random sample of addresses from all residential addresses in that area. Using this method, all households within each defined area had an equal chance of selection for the sample. RSG purchased household mailing addresses from Marketing Systems Group (MSG), which maintains the Computer Delivery Sequence file from the U.S. Postal Service. Figure 1 depicts the block groups sampled, stratified by sampling segment.

FIGURE 1: SAMPLE AREA AND SAMPLING SEGMENT LOCATIONS



3.2 SAMPLE METHODS AND RATES

The 2023 HTS aimed to collect complete data from 4,750 households. A representative sample was achieved through two primary oversampling methods in the probability sample, described below.

Targeted Oversampling

Targeted oversampling is designed to collect sufficient data from households that demonstrate harder-to-find (but important) travel behaviors and ensure enough representation in the final

sample to model these behaviors. The 2023 sample plan targeted households with no vehicles as a proxy for those who are more likely to use transit.

To achieve this greater representation in the final data, RSG used 2017-2021 American Community Survey (ACS) data – the most recently available ACS data at the time of the sample plan – to identify block groups that have a high prevalence of the targeted household characteristics. Block groups were identified for oversampling if at least 20% of the households had zero vehicles or the block group fell all or partially within a half mile of a light rail station or within Uptown Charlotte or South End. There were 176 block groups in total identified for this higher rate of sampling.

Compensatory Oversampling

Compensatory oversampling is designed to collect sufficient data from households that are known to respond to surveys at lower rates, regardless of their prevalence in a region. The 2023 sample plan included compensatory oversampling for low-income (less than $35,000 per year), non-White persons, and Hispanic persons.

Like the targeted oversampling, RSG used 2017-2021 ACS data to identify the proportion of these characteristics in each block group. Table 1 shows the targeted sample rates.

TABLE 1: TARGETED SAMPLE RATES BY SAMPLE SEGMENT

Sample Segment	Block Groups	2017-2021 ACS HHs	Invited HHs	Invitation Rate*	Target Complete HHs	Target Sample Rate** (Est.)
1 – Rural General	278	147,151	56,400	38.3%	620	0.4%
2 - Rural Anson	6	2,513	2,300	91.5%	25	1.0%
3 – Rural Compensatory	119	55,239	26,000	47.1%	260	0.5%
4 – Suburban General	528	357,319	106,600	29.8%	1,385	0.4%
6 – Suburban Compensatory	201	107,090	36,700	34.3%	440	0.4%
7 - Suburban Zero-Vehicle / Transit	69	35,823	23,100	64.5%	300	0.8%
8 – Urban General	236	173,512	52,200	30.1%	730	0.4%
9 – Urban Compensatory	134	95,978	30,800	32.1%	400	0.4%
10 - Urban Zero-Vehicle / Transit	107	74,935	42,200	56.3%	590	0.8%
Total	**1,678**	**1,049,560**	**376,300**	**35.9%**	**4,750**	**0.5%**

*Invitation Rate = Invited Households / Total Households
**Sample Rate = Complete Households / Total Households

Sample Plan Evaluation

Through the methods described above, the survey was ultimately successful in achieving (and surpassing) the survey targets. The final sample rates are shown in Table 2.

TABLE 2: FINAL SAMPLE RATES BY SAMPLE SEGMENT

Sample Segment	Target Complete Households	Actual Complete Households	Target Sample Rate	Actual Sample Rate
1 – Rural General	620	666	0.4%	0.4%
2 - Rural Anson	25	15	1.0%	0.6%
3 – Rural Compensatory	260	306	0.5%	0.6%
4 – Suburban General	1,385	1,720	0.4%	0.5%
6 – Suburban Compensatory	440	471	0.4%	0.4%
7 - Suburban Zero-Vehicle / Transit	300	284	0.8%	0.8%
8 – Urban General	730	821	0.4%	0.5%
9 – Urban Compensatory	400	404	0.4%	0.4%
10 - Urban Zero-Vehicle / Transit	590	545	0.8%	0.7%
Total	**4,750**	**5,232**	**0.5%**	**0.5%**

4.0 SURVEY BRANDING, MATERIALS, AND COMMUNICATION

4.1 Survey Branding

RSG coordinated with the project team to develop an engaging branding package comprised of a survey color scheme, logo, and imagery. These elements were used throughout the survey materials to present a consistent, cohesive survey presentation. The project logo is shown below in Figure 2.

FIGURE 2: TRIANGLE TRAVEL SURVEY BRANDING

4.2 Print Materials

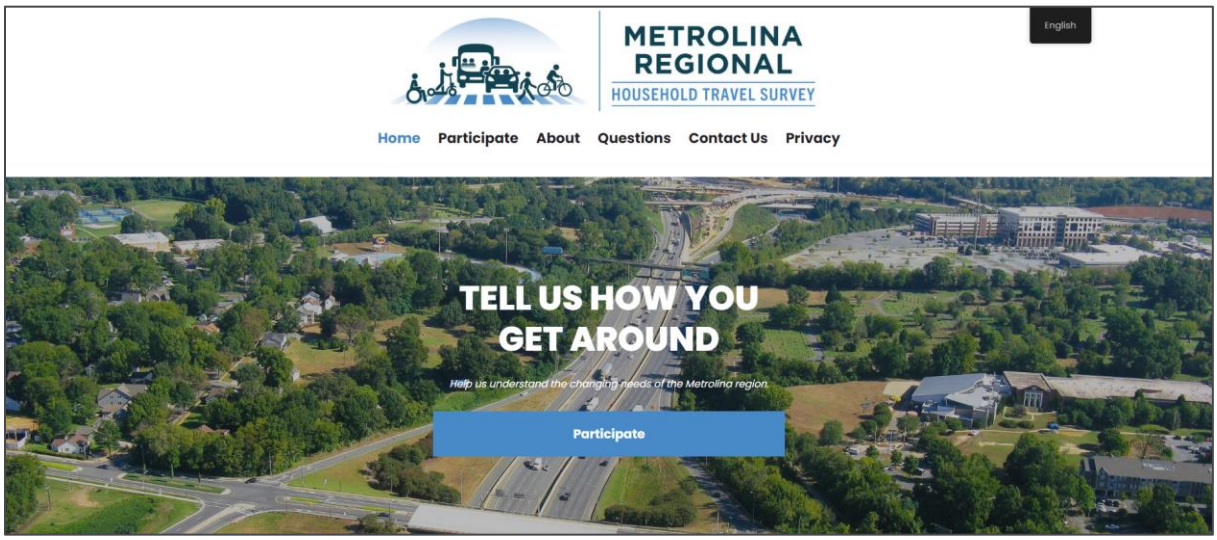
Each ABS household invited to participate received two mailings:

- **Letter Invitation**: A formal letter invitation invited households to the survey. The cover letter (branded with the HTS banner letterhead) explained the survey purpose, described the steps necessary to complete the survey, repeated the household-specific code, and included logos and signatures from the sponsor agencies.
- **Reminder Postcard**: A reminder postcard arrived after the formal letter to encourage every household to complete the travel diary. The reminder included the survey phone number, website address, and participant login information.

4.3 Project Website

RSG developed a survey website that leveraged the survey branding and included information about how to participate, survey context, answers to frequently asked questions, and links to contact the survey team. The top portion of the website homepage is shown below in Figure 3.

FIGURE 3: SURVEY WEBSITE



4.4 Participant Reminders

Respondents were asked to provide an email address in the recruitment survey. Reminder emails were sent throughout the travel period for smartphone app respondents, and on and after the assigned travel day for online respondents. The emails were branded with the survey logo and maintained a consistent design.

5.0 DATA QUALITY CONTROL AND PREPARATION

The survey team placed high importance on transparency in design, data preparation, scripting, and quality control throughout the HTS to ensure high-quality data and consistency across survey waves. This section summarizes key quality control steps throughout the project.

5.1 Quality Control and Review

Survey Instrument Design

To ensure seamless data integration across data collection methods, the online and smartphone questionnaires were aligned as closely as possible during the design and programming phase. During collection, all data flowed into a single dataset, removing the need for formal data combination.

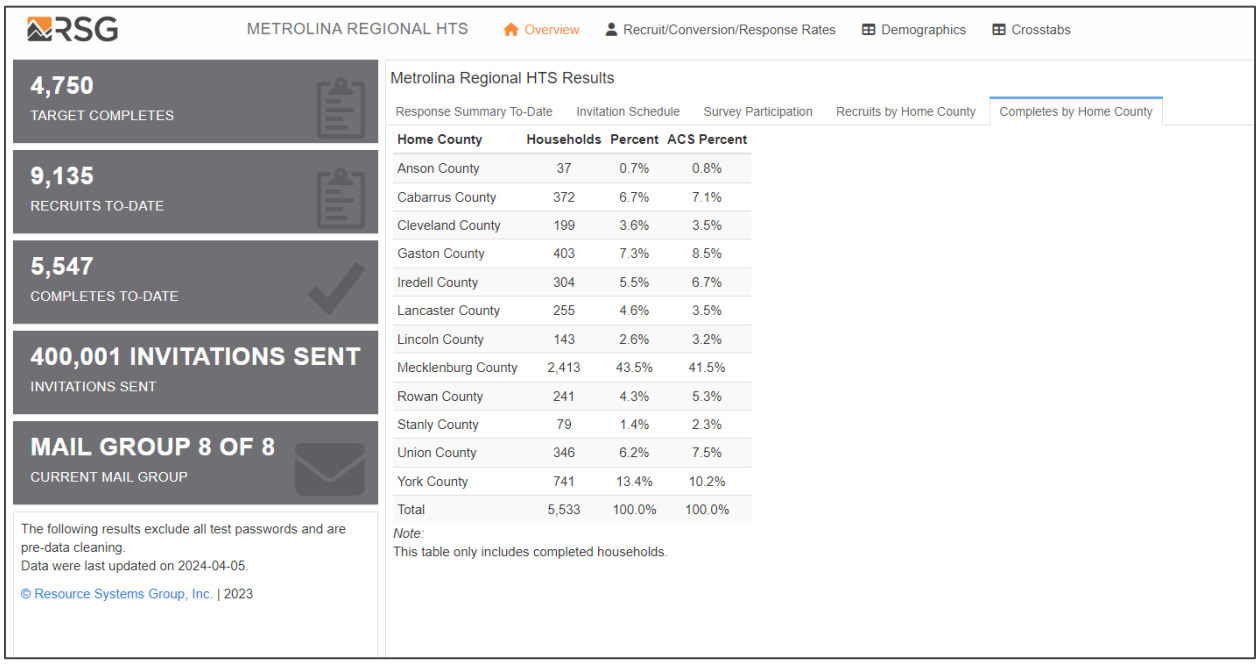
RSG applied a blend of human-driven and automated testing and validation to the survey instruments before collecting participant data. This testing helped ensure that question and answer logic worked as intended, question and answer choices were identified and labeled correctly, and that all data was captured in the desired way (e.g., home location geocoders worked as desired, no data fields were missing).

The survey instruments also had built-in validation to ensure high-quality data. In rMove, these features included advanced programming to ensure that trips were correctly identified, minimizing both false-positive and false-negatives (e.g., confirming movement with accelerometer to reduce false-positives from tower switching). In the online survey, these features include logic checks on trip lengths and geocoded origins and destinations. Both instruments also employed skip logic to minimize respondent burden and validate responses. Implementing rigorous survey instrument testing and design protocols ensured that the final dataset meets quality standards.

Data Collection Monitoring

RSG provided the survey sponsors with a live web-based dashboard of survey results throughout the data collection period. This allowed the survey team to identify problems and make critical adjustments or updates as needed. Figure 4 shows the monitoring dashboard.

FIGURE 4: METROLINA REGIONAL HTS MONITORING DASHBOARD



RSG Data Review and Quality Controls

Following data collection, RSG again applied both human-driven and automated data cleaning processes. For example, smartphone trip path data was overlaid onto maps to ensure the trip segments, paths, and times were all correct. RSG has developed proprietary machine learning algorithms to assist in this process, helping to identify the trips most likely to require splitting into two trips (e.g., passenger drop-offs with a short stop period), merging with adjacent trips (e.g., trip split at long light in traffic), cleaning (e.g., spurious location jumps from urban canyon effect), or dropping from the dataset (e.g., spurious trips resulting from movement in a building). Analysts carefully reviewed many of the actions recommended by RSG's algorithms to add a secondary level of quality control to the process.

RSG also outlined all data processing steps in the dataset user's guide, provided alongside the final dataset.

5.2 Dataset Preparation

During and after data collection, responses were cleaned to assure the quality of the final data. Readers can view the dataset user's guide (provided separately) to learn more about the data cleaning processes.

Integrating Data from Multiple Retrieval Modes

The survey used three modes of travel data collection (online, call center, and smartphone). Given close programming alignment between the instruments, all data was collected in a single database, removing the need for RSG to recode or combine variables during data processing and preparation.

Inclusion Criteria

Of the households invited to participate in the 2022 survey, 5,232 completed both the recruit survey and travel diary reporting portions of the survey and reported home locations within the survey area. A household was considered complete when it met the following conditions:

1. The household completed the recruit survey by answering all questions.
2. All participating household members provided complete travel diary information on at least one concurrent weekday (Tuesday – Thursday) during their travel period.

Final Dataset

The final dataset included eight tables:

- A household table with one row for each complete household.
- A person table with one row for each person in each household.
- A vehicle table with one row for each vehicle in each household.
- A day table one row for each travel day for each participating member.
- An unlinked trip table with one row for each unlinked trip (or trip leg).
- A linked trip table with one row for each linked trip.
- A tour table with one row for each tour.
- A location table with one row for each location points within GPS-collected trip traces.

6.0 EXPANSION AND WEIGHTING

While the survey's sampling methods aimed to collect a roughly representative fraction of the population in the unweighted sample, data expansion and weighting is always still necessary to ensure that the resulting datasets represent the entire population. The sample plan (which informs survey invitation strategies) addresses some of the population inconsistencies upfront, as do adjustments while the survey is in the field. The post-data-collection expansion and weighting processes address any remaining inconsistencies.

The weighting process compares selected demographics in the survey to external control data, then adjusts the survey dataset to improve its representativeness. The 2023 survey used the following geographic groupings (Figure 5) and demographic targets (Table 3 and Table 4). Readers may review the survey weighting memo, provided separately, for full details about the HTS weighting process.

FIGURE 5: PUBLIC USE MICRODATA AREAS (PUMAS) GROUPED FOR WEIGHTING

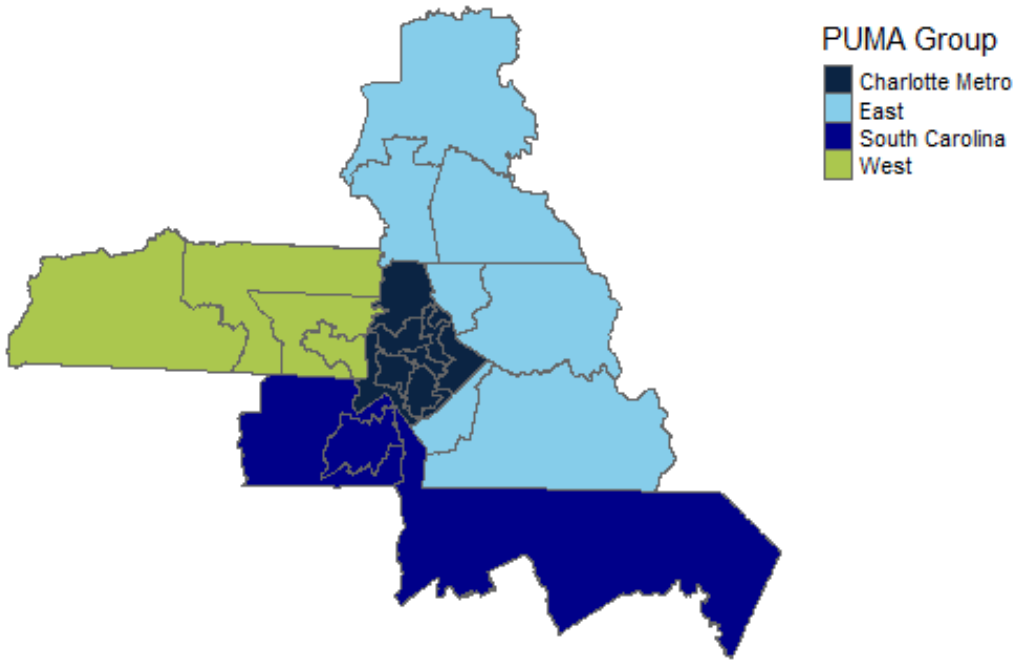


TABLE 3: HOUSEHOLD-LEVEL TARGETS

Variable	Categories
Household Size	1-person 2-person 3-person 4-person 5-person or more
Income ***(Imputed if non-response)***	Under $20,000 $20,000–$49,999 $50,000–$74,999 $75,000–$99,999 $100,000–$199,999 $200,000 or more
Workers	0 workers 1 worker 2 workers 3 workers or more
Vehicles	No vehicles Fewer vehicles than drivers Vehicles greater than or equal to drivers
Presence of Children	0 children 1 or more children
Total Households per PUMA	*Not applicable*
Total Households	*Not applicable*

TABLE 4: PERSON-LEVEL TARGETS

Variable	Categories
Gender *(Imputed if non-response)*	Male Female
Age	Under 5 5–17 years 18–34 years 35–64 years 65 years or older
Worker Status	Worker Non-worker
Commute Mode[1]	Telecommute Walk Bike Transit Other Not applicable
University Student Status	University student Not a university student
Educational Attainment	Some college education No college education
Race *(Imputed if non-response)*	African American White Other
Ethnicity *(Imputed if non-response)*	Hispanic Non-Hispanic
Total Persons	*Not applicable*

[1] *Due to low sample sizes, the West PUMA group combined walk and bike.*

7.0 SURVEY RESULTS

The final survey dataset comprises seven different “levels” of data:

- Household-level data.
- Person-level data.
- Vehicle-level data.
- Trip-level data (linked and unlinked).
- Tour-level data.
- Day-level data.
- Location-level data.

This section of the report summarizes survey responses at household-, person-, and trip-level, presenting unexpanded/unweighted (“sample”) and expanded/weighted (“2023 expanded”) survey results side-by-side. Some tables also include corresponding PUMS data (1-year, 2022, the most recent available). The 2022 PUMS data were also used in creating the expansion targets, as described in the weighting memo. Note that the expanded counts may vary slightly between tables due to rounding.

Table 5 summarizes the unweighted samples and expanded counts across key dimensions. Note that all trip rates throughout this section are calculated by taking the average of trips taken on weekdays (Tuesdays – Thursdays) on which the entire household is complete.

TABLE 5: 2023 HTS RESULTS SUMMARY

Metric	Sample	2023 Expanded
Households	5,232	1,047,847
Mean HH Size	2.22	2.38
Persons	11,624	2,434,007
Vehicles	9,371	1,772,192
Mean Vehicles per HH	1.79	1.69
Unlinked Trips	74,618	8,686,944
Linked Trips	73,166	8,506,161
HH Unlinked Trip Rate	7.17	8.29
Person Unlinked Trip Rate	3.50	3.57
HH Linked Trip Rate	7.03	8.12
Person Linked Trip Rate	3.44	3.49

Household travel survey data collected via rMove tend to exhibit different characteristics compared to those collected via online surveys. For example, trip rates tend to be higher among rMove participants because each trip is collected in real-time whereas trips reported in the online survey are recalled after the travel day. Table 6 shows the differences between rMove households and online households among select dimensions.

TABLE 6: 2023 HTS RESULTS, BY DIARY DATA COLLECTION METHOD (UNWEIGHTED)

Metric	Total Sample	rMove HHs	Online/Telephone HHs
Households	5,232	863	4,369
% of Sample HHs	100%	16.5%	83.5%
Linked Trips	73,166	46,592	26,574
Unlinked Trips	74,618	47,444	27,174
% of Sample Trips	100%	63.6%	36.4%
HH Linked Trip Rate	7.03	7.71	6.08
HH Unlinked Trip Rate	7.17	7.85	6.22
Person Linked Trip Rate	3.44	4.00	2.75
Person Unlinked Trip Rate	3.50	4.07	2.82

7.1 HOUSEHOLD-LEVEL DATA

Table 7 shows household (HH) counts by county in the study area. Note that the expanded households by county vary slightly from the census data by county because the block groups used for weighting were aggregated to regions larger than counties during expansion. Please see the weighting memo for additional details.

TABLE 7: 2023 HTS HOUSEHOLDS, BY COUNTY

County	Sample HHs	% of Sample HHs	2023 Expanded HHs	% of 2023 Expanded HHs	2022 HHs (PUMS)	% of 2022 HHs (PUMS)
Anson, NC	35	0.7%	6,385	0.6%	8,381	0.8%
Cabarrus, NC	351	6.7%	77,634	7.4%	74,967	7.1%
Cleveland, NC	181	3.5%	41,211	3.9%	36,665	3.5%
Gaston, NC	375	7.2%	88,626	8.5%	88,710	8.5%
Iredell, NC	283	5.4%	70,357	6.7%	70,654	6.7%
Lancaster, SC	252	4.8%	36,525	3.5%	36,597	3.5%
Lincoln, NC	140	2.7%	29,465	2.8%	33,863	3.2%
Mecklenburg, NC	2,295	43.9%	434,589	41.5%	435,562	41.5%
Rowan, NC	217	4.1%	55,889	5.3%	55,485	5.3%
Stanly, NC	75	1.4%	20,753	2.0%	23,633	2.3%
Union, NC	326	6.2%	79,818	7.6%	78,473	7.5%
York, SC	702	13.4%	106,593	10.2%	106,570	10.2%
Total	**5,232**	**100%**	**1,047,847**	**100%**	**1,049,560**	**100%**

Household size, income, and vehicle ownership typically affect travel behavior and are key weighting dimensions. Table 8 through Table 10 show survey results and PUMS estimates of households for these three variables. The observable differences between the survey results and the PUMS data are typical of household travel studies.

Compared to the general population, the survey sample has a smaller proportion of low-income and large households. Low-income households are frequently underrepresented in household travel surveys and larger households can be difficult to recruit and retain due to the additional burden per respondent for the household overall. To ensure burden was not disproportionate for large households who participated via rMove, children's travel was only reported on a single travel day. The original sample plan included compensatory oversampling to improve the overall sample rate of households with incomes below $35,000.

TABLE 8: HOUSEHOLD SIZE

HH Size	Sample HHs	% of Sample HHs	2023 Expanded HHs	% of 2023 Expanded HHs	2022 HHs (PUMS)	% of 2022 HHs (PUMS)
1 person	1,578	30.2%	330,441	31.5%	354,046	33.7%
2 people	2,152	41.1%	353,051	33.7%	335,365	32.0%
3 people	716	13.7%	155,656	14.9%	160,187	15.3%
4 people	493	9.4%	118,051	11.3%	117,341	11.2%
5+ people	293	5.6%	90,648	8.7%	82,620	7.9%
Total	**5,232**	**100%**	**1,047,847**	**100%**	**1,049,560**	**100%**

TABLE 9: HOUSEHOLD INCOME (REPORTED OR IMPUTED IF NOT REPORTED)

HH Income	Sample HHs	% of Sample HHs	2023 Expanded HHs	% of 2023 Expanded HHs	2022HHs (PUMS)	% of 2022 HHs (PUMS)
Under $20,000	381	7.3%	115,163	11.0%	117,009	11.1%
$20,000–$49,999	1,112	21.2%	240,378	23.0%	242,202	23.1%
$50,000–$74,999	990	18.9%	184,398	17.6%	184,037	17.5%
$75,000–$99,999	703	13.4%	140,940	13.5%	141,347	13.5%
$100,000–$199,999	1,587	30.3%	256,529	24.5%	255,015	24.3%
$200,000+	459	8.8%	87,865	10.5%	109,951	10.5%
Total	**5,232**	**100%**	**1,047,847**	**100%**	**1,049,560**	**100%**

TABLE 10: VEHICLE OWNERSHIP

HH Vehicles	Sample HHs	% of Sample HHs	2023 Expanded HHs	% of 2023 Expanded HHs	2022 HHs (PUMS)	% of 2022 HHs (PUMS)
0 vehicles	233	4.5%	55,443	5.3%	55,692	5.3%
1 vehicle	1,963	37.5%	438,988	41.9%	380,589	36.3%
2 vehicles	2,084	39.8%	387,756	37.0%	376,473	35.9%
3+ vehicles	952	18.2%	165,660	15.8%	236,806	22.6%
Total	**5,232**	**100%**	**1,047,847**	**100%**	**1,049,560**	**100%**

7.2 PERSON-LEVEL DATA

Table 11 through Table 15 show person-level study results. Persons aged 55+ years old participated at higher rates than their share of the general population, while the sample contains a smaller share of children under 18 years old than the general population. By race, the most significant difference between sample participation rates and the general population is the underrepresentation of persons who are African American or Black.

TABLE 11: AGE DISTRIBUTION

Person Age	Sample Persons	% of Sample Persons	2023 Expanded Persons	% of 2023 Expanded Persons	2022 Persons (PUMS)	% of 2022 Persons (PUMS)
Under 18 years	2,138	18.4%	544,795	22.4%	314,992	12.9%
18–24 years	609	5.2%	156,568	6.4%	221,026	9.1%
25–34 years	1,629	14.0%	379,564	15.6%	373,274	15.3%
35–44 years	1,759	15.1%	391,356	16.1%	361,089	14.8%
45–54 years	1,405	12.1%	301,170	12.4%	361,109	14.8%
55–64 years	1,669	14.4%	289,809	11.9%	341,462	14.0%
65 years+	2,415	20.8%	370,746	15.2%	461,937	19.0%
Total	**11,624**	**100%**	**2,434,007**	**100%**	**2,434,887**	**100%**

TABLE 12: GENDER DISTRIBUTION (AMONG RELATED MEMBERS)

Person Gender	Sample Persons	% of Sample Persons	2023 Expanded Persons	% of 2023 Expanded Persons	2022 Persons (PUMS)	% of 2022 Persons (PUMS)
Female	5,741	50.7%	1,203,322	49.4%	1,258,569	51.7%
Male	5,195	45.9%	1,120,166	46.0%	1,176,318	48.3%
Nonbinary	35	0.3%	14,238	0.6%	-	-
Other/prefer to self-describe	13	0.1%	2,864	0.1%	-	-
Prefer not to answer	330	2.9%	93,418	3.8%	-	-
Total	**11,314**	**100%**	**2,434,007**	**100%**	**2,434,887**	**100%**

TABLE 13: RACE DISTRIBUTION (AMONG RELATED MEMBERS AGE 18+)

Person Race	Sample Persons	% of Sample Persons	2022 Expanded Persons	% of 2022 Expanded Persons	2022 Persons (PUMS)	% of 2022 Persons (PUMS)
African American or Black	1,110	12.1%	329,062	17.4%	520,256	21.4%
American Indian or Alaska Native	29	0.3%	11,122	0.6%	11,906	0.5%
Asian	389	4.2%	128,309	6.8%	102,500	4.2%
Native Hawaiian or other Pacific Islander	11	0.1%	3,220	0.2%	1,463	0.1%
Other	162	1.8%	63,197	3.3%	141,295	5.8%
White	6,570	71.4%	1,123,340	59.5%	1,459,091	59.9%
Two or more races	165	1.8%	57,904	3.1%	198,377	8.1%
Prefer not to answer	760	8.3%	171,230	9.1%	-	-
Total	**9,196**	**100%**	**887,385**	**100%**	**2,434,887**	**100%**

TABLE 14: ETHNICITY DISTRIBUTION (AMONG RELATED MEMBERS AGE 18+)

Person Ethnicity	Sample Persons	% of Sample Persons	2023 Expanded Persons	% of 2023 Expanded Persons	2022 Persons (PUMS)	% of 2022 Persons (PUMS)
Not of Hispanic, Latino, or Spanish origin	7,930	86.2%	1,535,615	81.4%	2,161,258	88.8%
Hispanic, Latino, or Spanish origin	482	5.2%	171,137	9.1%	273,629	11.2%
Prefer not to answer	784	8.5%	180,632	9.6%	-	-
Total	**9,196**	**100%**	**1,887,385**	**100%**	**2,434,887**	**100%**

TABLE 15: EMPLOYMENT STATUS (AMONG MEMBERS AGE 16+)

Person Employment Status	Sample Persons	% of Sample Persons	2023 Expanded Persons	% of 2023 Expanded Persons	2022 Persons (PUMS)	% of 2022 Persons (PUMS)
Employed full-time (paid)	4,497	46.3%	1,023,577	52.7%	1,340,958	55.1%
Employed part-time (paid)	853	8.8%	206,615	10.6%	-	-
Self-employed	516	5.3%	42,269	2.2%	156,887	6.4%
Work-for-pay Total	**5,866**	**60.4%**	**1,272,461**	**65.5%**	**1,497,845**	**61.5%**
Not employed and not looking for work (e.g., retired, stay-at-home parent, student)	3,330	34.3%	544,445	28.0%	937,042	38.5%
Unemployed and looking for work	371	3.8%	81,858	4.2%		
Unpaid volunteer or intern	65	0.7%	19,920	1.0%	-	-
Employed, but not currently working (e.g., on leave, furloughed 100%)	80	0.8%	23,991	1.2%	-	-
Total	**9,712**	**100%**	**1,942,675**	**100%**	**2,434,887**	**100%**

7.3 TRIP-LEVEL DATA

Overall trip rates were calculated by taking the average of trips taken on weekdays (Tuesdays – Thursdays) on which the entire household is “complete.” Households were only included in the final dataset if all members had completed all surveys on a single consecutive weekday. Most households that participated via rMove completed more than one day (up to seven), and these additional data are included in the dataset. Therefore, to ensure trip rates only reflect trips on days where travel is known to be “complete,” trip rates are calculated using complete household weekdays. Readers can refer to the dataset user’s guide for more information on “complete” travel days. There are 41,120 linked trips included in the dataset on 13,147 complete household

weekdays (Tuesday – Thursday), while there are 73,166 total trips and 21,298 total days in the dataset.

Approximately 18.8% of complete person-days are days on which the person reported making no trips on that travel day; these person-days were included in average trip rate calculations, regardless.

Readers should interpret patterns in the following tables as correlative rather than causal. For example, travel differences among different ages or races may be tied to other factors like income, employment status, or home locations.

TABLE 16: LINKED TRIP RATES, BY HOUSEHOLD SIZE

HH Size	Trip Records	Raw Trip Rate (HH)	2023 Expanded Trips	2023 Expanded Trip Rate (HH)
1 person	15,489	4.27	1,481,932	4.48
2 people	27,545	6.69	2,646,875	7.50
3 people	11,609	9.20	1,529,006	9.82
4 people	11,969	12.77	1,524,959	12.92
5+ people	6,554	14.11	1,323,390	14.60
Total	**73,166**	**7.03**	**8,506,161**	**8.12**

TABLE 17: UNLINKED TRIP RATES, BY HOUSEHOLD SIZE

HH Size	Trip Records	Raw Trip Rate (HH)	2023 Expanded Trips	2023 Expanded Trip Rate (HH)
1 person	16,071	4.43	1,534,091	4.64
2 people	27,984	6.79	2,665,612	7.55
3 people	11,748	9.31	1,574,468	10.12
4 people	12,175	12.99	1,570,432	13.30
5+ people	6,640	14.40	1,342,342	14.81
Total	**74,618**	**7.17**	**8,686,944**	**8.29**

TABLE 18: LINKED TRIP RATES, BY GENDER

Person Gender	Trip Records	Raw Trip Rate (Person)	2023 Expanded Trips	2023 Expanded Trip Rate (Person)
Female	37,036	3.43	4,273,376	3.55
Male	34,412	3.49	3,906,080	3.49
Non-binary	236	2.84	65,249	4.58
Other/prefer to self-describe	148	3.44	8,063	2.82
Prefer not to answer	1,334	2.59	253,393	2.71
Total	**73,166**	**3.44**	**8,506,161**	**3.49**

TABLE 19: UNLINKED TRIP RATES, BY GENDER

Person Gender	Trip Records	Raw Trip Rate (Person)	2023 Expanded Trips	2023 Expanded Trip Rate (Person)
Female	37,645	3.49	4,360,327	3.62
Male	35,139	3.56	3,990.838	3.56
Non-binary	249	3.00	69,349	4.87
Other/prefer to self-describe	175	4.07	8,173	2.85
Prefer not to answer	1,410	2.73	258,257	2.76
Total	**74,618**	**3.50**	**8,686,944**	**3.57**

TABLE 20: LINKED TRIP RATES, BY AGE

Person Age	Trip Records	Raw Trip Rate (Person)	2023 Expanded Trips	2023 Expanded Trip Rate (Person)
Under 18 years	8,511	2.14	1,073,769	1.97
18–24 years	3,610	3.57	474,818	3.03
25–34 years	12,185	3.70	1,401,280	3.69
35–44 years	13,831	4.01	1,688,841	4.32
45–54 years	10,177	3.99	1,227,144	4.07
55–64 years	11,320	3.81	1,217,145	4.20
65 years+	13,532	3.34	1,423,164	3.84
Total	**73,166**	**3.44**	**8,506,161**	**3.49**

TABLE 21: UNLINKED TRIP RATES, BY AGE

Person Age	Trip Records	Raw Trip Rate (Person)	2023 Expanded Trips	2023 Expanded Trip Rate (Person)
Under 18 years	8,609	2.17	1,109,033	2.04
18–24 years	3,779	3.74	496,023	3.17
25–34 years	12,627	3.83	1,443,107	3.80
35–44 years	14,078	4.09	1,710,987	4.37
45–54 years	10,356	4.06	1,241,366	4.12
55–64 years	11,470	3.86	1,235,182	4.26
65 years+	13,699	3.38	1,451,246	3.91
Total	**74,618**	**3.50**	**8,686,944**	**3.57**

TABLE 22: LINKED TRIP RATES, BY RACE

Person Race	Trip Records	Raw Trip Rate (Person)	2023 Expanded Trips	2023 Expanded Trip Rate (Person)
African American or Black	5,776	3.46	1,196,295	3.64
American Indian or Alaska Native	219	3.71	33,453	3.01
Asian	2,352	3.02	391,099	3.05
Native Hawaiian or other Pacific Islander	23	1.35	3,888	1.21
Other	1,194	4.15	218,168	3.45
White	50,299	3.86	4,831,405	4.30
Two or more races	1,024	3.45	208,449	3.60
Prefer not to answer	3,654	3.10	539,577	3.15
Total	**64,541**	**3.73**	**7,422,334**	**3.93**

TABLE 23: UNLINKED TRIP RATES, BY RACE

Person Race	Trip Records	Raw Trip Rate (Person)	2023 Expanded Trips	2023 Expanded Trip Rate (Person)
African American or Black	6,041	3.62	1,260,889	3.83
American Indian or Alaska Native	224	3.80	34,287	3.08
Asian	2,411	3.09	400,008	3.12
Native Hawaiian or other Pacific Islander	23	1.35	3,888	1.21
Other	1,231	4.27	220,089	3.48
White	51,131	3.93	4,873,153	4.34
Two or more races	1,060	3.57	209,216	3.61
Prefer not to answer	3,774	3.20	566.321	3.31
Total	**65,895**	**3.81**	**7,567,853**	**4.01**

TABLE 24: LINKED TRIP RATES, BY ETHNICITY

Person Ethnicity	Trip Records	Raw Trip Rate (Person)	2023 Expanded Trips	2023 Expanded Trip Rate (Person)
Not of Hispanic, Latino, or Spanish origin	57,443	3.80	6,244,222	4.07
Hispanic, Latino, or Spanish origin	3,350	3.53	611,660	3.57
Prefer not to answer	3,748	3.05	566,453	3.13
Total	**64,541**	**3.73**	**7,422,334**	**3.93**

TABLE 25: UNLINKED TRIP RATES, BY ETHNICITY

Person Ethnicity	Trip Records	Raw Trip Rate (Person)	2023 Expanded Trips	2023 Expanded Trip Rate (Person)
Not of Hispanic, Latino, or Spanish origin	58,579	3.87	6,358,276	4.14
Hispanic, Latino, or Spanish origin	3,477	3.66	623,143	3.64
Prefer not to answer	3,839	3.13	586,435	3.25
Total	**65,895**	**3.81**	**7,567,853**	**4.01**

TABLE 26: LINKED TRIP RATES, BY DRIVING STATUS (AMONG RELATED MEMBERS AGE 16+)

Person Licensure	Trip Records	Raw Trip Rate (Person)	2023 Expanded Trips	2023 Expanded Trip Rate (Person)
Yes, drives	63,006	3.81	7,082,405	4.08
No, does not drive	2,350	1.98	461,111	2.23
Total	**65,356**	**3.69**	**7,543,516**	**3.88**

TABLE 27: UNLINKED TRIP RATES, BY DRIVING STATUS (AMONG RELATED MEMBERS AGE 16+)

Person Licensure	Trip Records	Raw Trip Rate (Person)	2023 Expanded Trips	2023 Expanded Trip Rate (Person)
Yes, drives	63,969	3.87	7,146,439	4.12
No, does not drive	2,754	2.32	545,990	2.65
Total	**66,723**	**3.77**	**7,692,428**	**3.96**

TABLE 28: LINKED TRIP RATES, BY EMPLOYMENT STATUS

Person Employment	Trip Records	Raw Trip Rate (Person)	2023 Expanded Trips	2023 Expanded Trip Rate (Person)
Worker (Paid: full-time, part-time, self-employed)	45,115	3.93	5,232,082	3.97
Not a worker	20,241	3.24	2,311,434	3.69
Total	**65,356**	**3.69**	**7,543,516**	**3.88**

TABLE 29: UNLIKED TRIP RATES, BY EMPLOYMENT STATUS

Person Employment	Trip Records	Raw Trip Rate (Person)	2023 Expanded Trips	2023 Expanded Trip Rate (Person)
Worker (Paid: full-time, part-time, self-employed)	46,100	4.02	5,310,910	4.03
Not a worker	20,623	3.30	2,381,519	3.80
Total	**66,723**	**3.77**	**7,692,428**	**3.96**

TABLE 30: LINKED TRIP RATES, BY UNIVERSITY/COLLEGE STUDENT STATUS

Person University Student Status	Trip Records	Raw Trip Rate (Person)	2023 Expanded Trips	2023 Expanded Trip Rate (Person)
University student (2-year college, 4-year college, graduate or professional school)	3,048	3.93	257,744	3.39
Not university student	70,118	3.42	8,248,418	3.50
Total	**73,166**	**3.44**	**8,506,161**	**3.49**

TABLE 31: UNLINKED TRIP RATES, BY UNIVERSITY/COLLEGE STUDENT STATUS

Person University Student Status	Trip Records	Raw Trip Rate (Person)	2023 Expanded Trips	2023 Expanded Trip Rate (Person)
University student (2-year college, 4-year college, graduate or professional school)	3,193	4.12	273,461	3.60
Not university student	71,425	3.48	8,413,484	3.57
Total	**74,618**	**3.50**	**8,686,944**	**3.57**

TABLE 32: LINKED TRIPS, BY DESTINATION PURPOSE

Trip Purpose	Trip Records (N)	Trip Records (%)	2023 Expanded Trips (N)	2023 Expanded Trips (%)
Home	22,754	31.2%	3,301,615	38.8%
Work	4,644	6.4%	724,890	8.5%
Work-related	3,967	5.4%	474,199	5.6%
School	1,778	2.4%	366,283	4.3%
School-related	108	0.1%	18,904	0.2%
Escort	6,276	8.6%	799,789	9.4%
Shop	9,752	13.4%	893,824	10.5%
Meal	6,430	8.8%	520,056	6.1%
Social/recreation	8,835	12.1%	616,311	7.2%
Errand	4,159	5.7%	403,378	4.7%
Change mode	12	0.2%	3,429	0.0%
Spent the night at non-home location	2,601	3.6%	188,527	2.2%
Other	1,524	2.1%	193,043	2.3%
Total	**73,166**	**100%**	**8,506,161**	**100%**

TABLE 33: UNLINKED TRIPS, BY DESTINATION PURPOSE

Trip Purpose	Trip Records (N)	Trip Records (%)	2023 Expanded Trips (N)	2023 Expanded Trips (%)
Home	22,754	30.6%	3,301,615	38.0%
Work	4,650	6.3%	725,053	8.3%
Work-related	3,964	5.3%	474,262	5.5%
School	1,778	2.4%	366,283	4.2%
School-related	108	0.1%	18,904	0.2%
Escort	6,278	8.5%	801,058	9.2%
Shop	9,753	13.1%	893,824	10.3%
Meal	6,433	8.7%	520,429	6.0%
Social/recreation	8,838	11.9%	616,311	7.1%
Errand	4,159	5.6%	403,378	4.6%
Change mode	1,452	2.0%	182,344	2.1%
Spent the night at non-home location	2,601	3.5%	188,527	2.2%
Other	1,524	2.1%	193,043	2.2%
Total	**74,292**	**100%**	**8,685,033**	**100%**

TABLE 34: LINKED TRIPS, BY MODE TYPE

Trip Mode	Trip Records (N)	Trip Records (%)	2023 Expanded Trips (N)	2023 Expanded Trips (%)
Walk	6,522	9.1%	578,857	6.8%
Bicycle	645	0.9%	49,734	0.6%
Micromobility	44	0.1%	11,604	0.1%
Taxi	22	0.0%	4,688	0.1%
Ride-hailing service	270	0.4%	28,215	0.3%
SOV	32,897	45.7%	4,244,989	50.2%
HOV (2 people)	18,994	26.4%	1,992,510	23.5%
HOV (3+ people)	11,335	15.7%	1,333,139	15.8%
Drive to rail	80	0.1%	10,005	0.1%
Walk to rail	195	0.3%	6,369	0.1%
Drive to bus	121	0.2%	12,340	0.1%
Walk to bus	247	0.3%	52,956	0.6%
Long distance passenger mode	60	0.1%	4,088	0.0%
School bus	595	0.8%	133,667	1.6%
Total	**56,081***	**100%**	**7,861,151**	**100%**

** This table only includes trips for which mode was reported.*

TABLE 35: UNLINKED TRIPS, BY MODE TYPE

Trip Mode	Trip Records (N)	Trip Records (%)	2023 Expanded Trips (N)	2023 Expanded Trips (%)
Walk	7,550	10.3%	717,580	8.4%
Bicycle	660	0.9%	49,952	0.6%
Micromobility	18	0.0%	257	0.0%
Taxi	21	0.0%	4,367	0.1%
Ride-hailing service	286	0.4%	30,412	0.4%
SOV	32,888	45.0%	4,217,382	49.3%
HOV (2 people)	18,942	25.9%	1,987,677	23.2%
HOV (3+ people)	11,269	15.4%	1,318,001	15.4%
Drive to rail	47	0.1%	8,062	0.1%
Walk to rail	243	0.3%	9,028	0.1%
Drive to bus	56	0.1%	4,934	0.1%
Walk to bus	366	0.5%	65,131	0.8%
Long distance passenger mode	113	0.2%	6,935	0.1%
School bus	597	0.8%	135,348	1.6%
Total	**73,056***	**100%**	**8,555,067**	**100%**

** This table only includes trips for which mode was reported. Trips using bicycles, micromobility, etc to get to rail/bus are include in drive to rail/bus.*

8.0 SUMMARY

The 2023 Metrolina Regional Household Travel Survey collected current information about household and individual travel patterns for residents throughout the 12-county Metrolina region. The survey was conducted using the most current household travel survey methods for survey design, sampling, questionnaire design, data collection, and data weighting. A total of 5,232 households completed the survey, exceeding the survey target of 4,750 households.

9.0 APPENDICES

9.1 Questionnaire

9.2 Printed Materials

9.3 Dataset Users' Guide

9.4 Weighting Memo