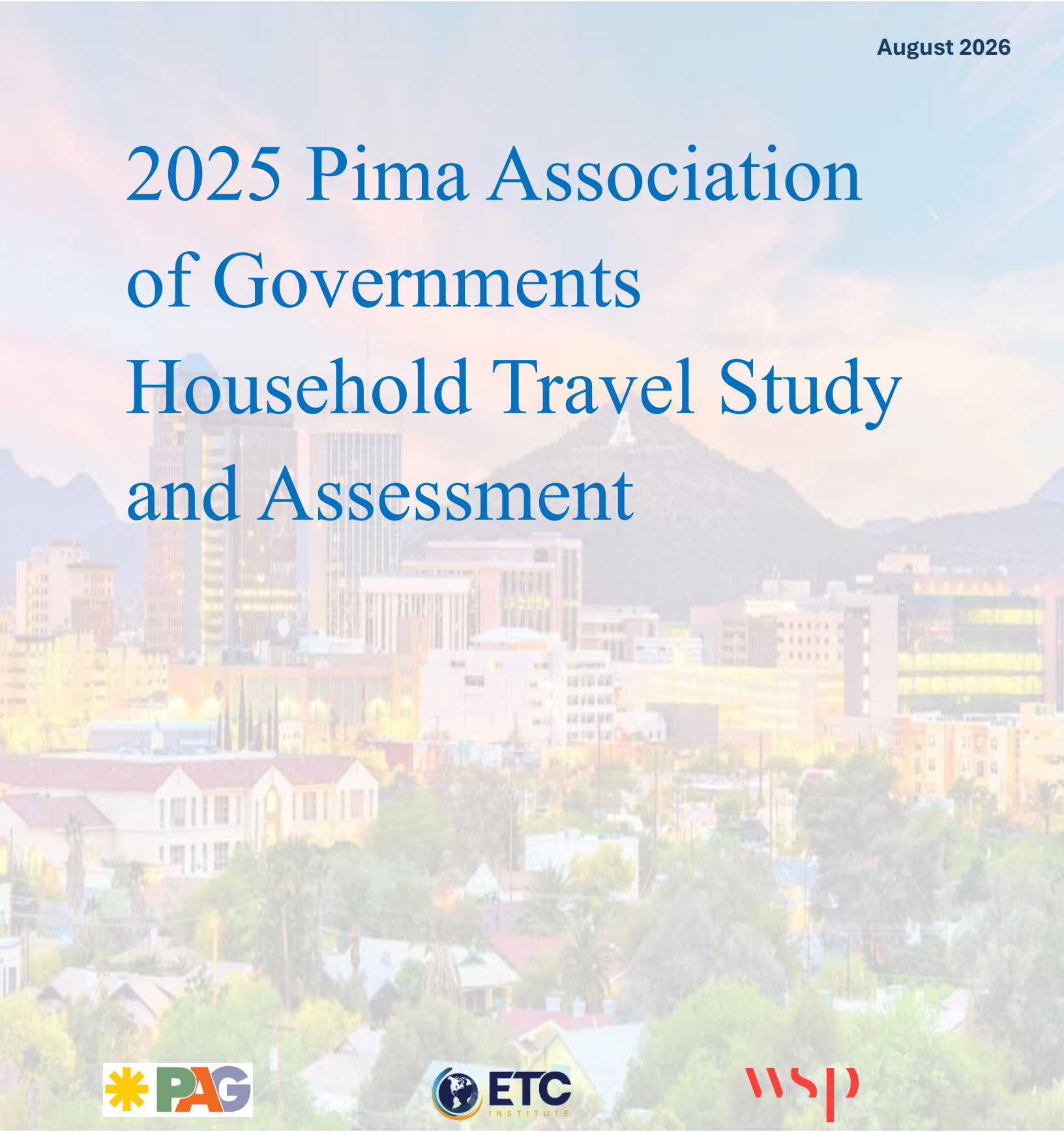
August 2026

2025 Pima Association of Governments Household Travel Study and Assessment



Prepared for:
Pima Association of Governments (PAG)
1 E. Broadway Blvd., Suite 401
Tucson, AZ 85701
(520) 792-1093

Prepared by:
ETC Institute
725 W. Frontier Ln,
Olathe, KS 66061
(913) 829-1215

In collaboration with:
WSP
1230 West Washington Street, Suite 405
Tempe, AZ 85288
(480) 966-8295

Table of Contents

Executive Summary **7**

1. Household Travel Survey Overview **18**

1.1. Household Travel Survey Design and Approach 18

1.2. Interviewer Management and Recruitment 25

1.3. Survey Data Collection Methodology 26

2. Data Quality Assurance and Control **29**

2.1. Verification of Collected Survey Data 29

2.2. Quality Assurance and Quality Control (QA/QC) 31

2.3. Weighting and Expansion 32

3. Household Travel Patterns and Analysis **36**

3.1. Descriptive Statistics 36

3.2. 2025 Regional Travel Patterns 56

3.3. VMT Metrics for Air Quality 75

3.4. Comparison in Travel Patterns and VMT 85

3.5. Travel Behavior Trends and Air Quality 88

4. References **90**

5, Appendices **91**

5.1. Recruitment Materials 91

5.2. Survey Instruments (online or CATI) 92

5.3. Survey Instruments (App) 105

5.4. Survey Questionnaire (Data Dictionary) 120

List of Figures

Figure 1-1: District Target Samples 19
Figure 1-2: Pilot Survey Locations 20
Figure 1-3: TRP Signup Page 25
Figure 1-4: QR Code 26
Figure 1-5: App Login Page 27
Figure 1-6: Flow Chart of Survey Process for Random Sample Households 28
Figure 1-7: Screenshot of Dashboard for Stratified Goals and Secondary Goals 29
Figure 2-1: Flow Chart of Survey Quality Assurance 30
Figure 2-2: Iterative Proportional Fitting (IPF) Weighting Process 35
Figure 3-1: Home Location of Completed Household for all Pima County 36
Figure 3-2: Heatmap of Home Location of Completed Households (Eastern Pima County) 37
Figure 3-3: Home Location of Completed Household for all Pima County 37
Figure 3-4: Trip Purpose by Trip Distance (in miles) 64
Figure 3-5: Trip Purpose by Trip Duration (in minutes) 64
Figure 3-6: Map of Telecommute Status (Unweighted) 73
Figure 3-7: Map of Daily Avg Kg GHG per HH 77
Figure 3-8: Map of Daily Avg VMT per HH 78
Figure 3-9: Household Vehicle Ownership Comparison 85
Figure 3-10: Mode of Travel Comparison 86
Figure 3-11: Trip Purpose Comparison 87
Figure 3-12: VMT Comparison 88
Figure 5-1: Front of Postcard (English) 91
Figure 5-2: Back of Postcard (Spanish) 91

List of Tables

Table 1-1: Targeted Goals 18
Table 1-2: Sampling Frame 19
Table 1-3: Distribution of Completed Households by Sample Group 21
Table 1-4: Distribution of Completed Households 21
Table 1-5: Percent Distribution of Completed Households 21
Table 1-6: Distribution of Completed Household by District 22
Table 1-7: Household Income Category by District 23
Table 1-8: Household Income Category by District (%) 23
Table 1-9: Age Category of Person by District 24
Table 1-10: Age Category of Person by District (%) 24
Table 2-1: Demographic Control Totals 33
Table 3-1: Household Size 38
Table 3-2: Number of Workers per Household 38
Table 3-3: Tenure 39
Table 3-4: Home Ownership 39
Table 3-5: Type of Residence 39
Table 3-6: Memberships 40
Table 3-7: Household Income (Stratified) 40
Table 3-8: Household Income 41
Table 3-9: Age of Survey Participants 42
Table 3-10: Ethnicity of Survey Participants 43
Table 3-11: Gender of Survey Participants 43
Table 3-12: Driver Status of Survey Participants 43
Table 3-13: Employment 44
Table 3-14: Employment Status by Type 44
Table 3-15: Why Not Employed 44
Table 3-16: Total Hours Worked (at all Jobs) 45
Table 3-17: Commercial Vehicle Driver 45
Table 3-18: Commercial Vehicle Type 45
Table 3-19: TNC Delivery of Pick-up in Last 7 Days 46
Table 3-20: Flex Time 46
Table 3-21: Home Office 46
Table 3-22: Self-Employed Status 46
Table 3-23: Workplace Type 47
Table 3-24: Primary Industry Classifications 48
Table 3-25: Primary Industry 48
Table 3-26: Primary Occupation Classifications 48
Table 3-27: Primary Occupation 49

Table 3-28: More than One Job 49
Table 3-29: Educational Attainment 49
Table 3-30: Student Status 50
Table 3-31: School Type 50
Table 3-32: Home Schooled 50
Table 3-33: Online Schooled 50
Table 3-34: Language Other than English Spoken at Home 51
Table 3-35: English Proficiency 51
Table 3-36: Participant Has Travel Data 51
Table 3-37: Type of Vehicle 52
Table 3-38: Top Chosen Makes of Vehicles 53
Table 3-39: Year of Vehicle 53
Table 3-40: Type of Fuel 54
Table 3-41: Miles per Gallon 54
Table 3-42: Commercial Use 54
Table 3-43: Type of Commercial Use 55
Table 3-44: Vehicle Ownership 55
Table 3-45: Number of Household Vehicles 56
Table 3-46: Electric Vehicle Ownership 57
Table 3-47: Why Purchase EV? 58
Table 3-48: Number of Household Bikes 58
Table 3-49: Purpose of Travel at Destination 59
Table 3-50: Extended Purpose of Travel at Destination 60
Table 3-51: Mode of Travel to Destination 61
Table 3-52: Extended Mode of Travel to Destination 61
Table 3-53: Travel Duration (in minutes) 62
Table 3-54: Travel Distance (in miles) 63
Table 3-55: Transit Use (past 6 months) 65
Table 3-56: Why No Transit Use for Commute Trips 66
Table 3-57: Why No Transit Use for Non commute Trips 67
Table 3-58: Bike Use (in past 7 days) 67
Table 3-59: Bike Purpose 68
Table 3-60: Why No Walk and Bike Use for Commute Trips 69
Table 3-61: Why No Walk and Bike Use for Noncommuter Trips 70
Table 3-62: Scooter Use (past 7 days) 71
Table 3-63: Scooter Purpose 71
Table 3-64: Residential Preference 72
Table 3-65: Telecommute Status 73
Table 3-66: Convenience of Telecommute (for Employee) 73
Table 3-67: Convenience of Telecommute (for Employer) 74
Table 3-68: Online Shopping 74

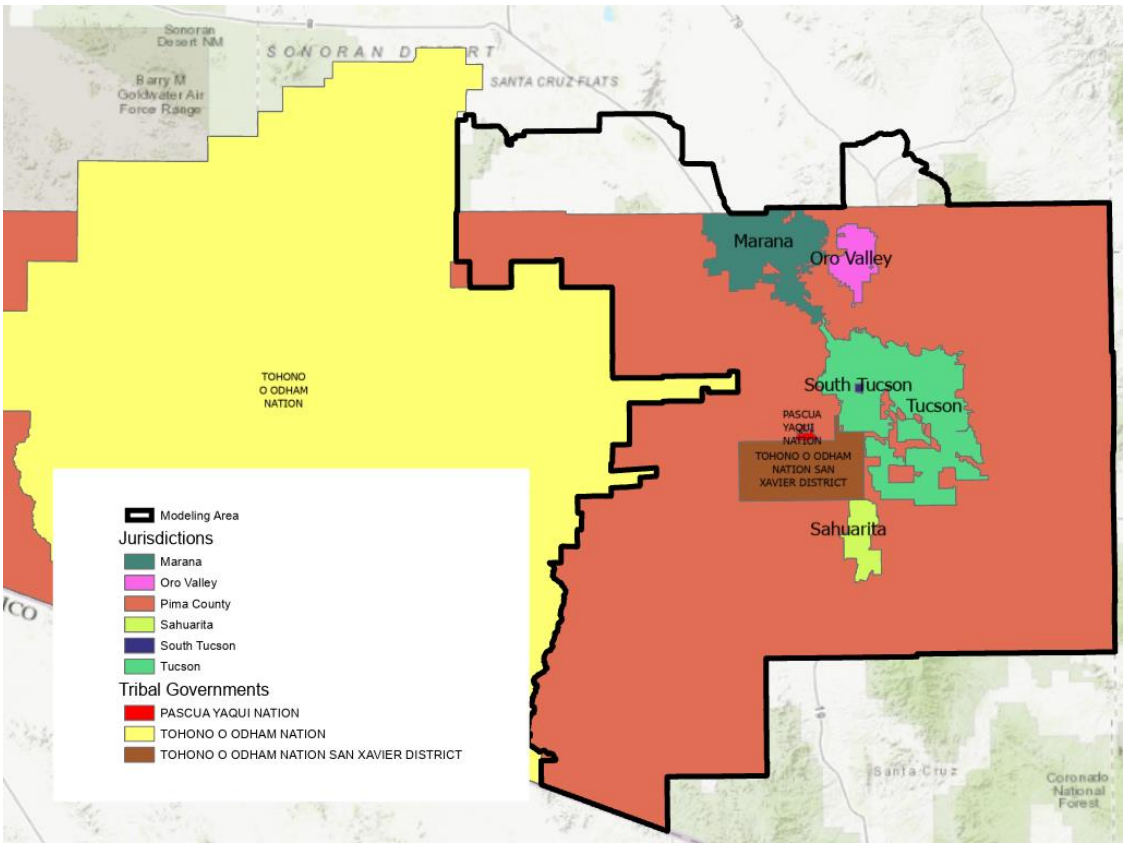
Table 3-69: Daily VMT at Household and Person Level....76
Table 3-70: Person Miles Traveled by Mode of Travel....79
Table 3-71: VMT by Ethnicity....79
Table 3-72: GHG by Ethnicity....80
Table 3-73: VMT by Fuel Type....80
Table 3-74: GHG by Fuel Type....81
Table 3-75: VMT by Household Income....81
Table 3-76: GHG by Household Income....82
Table 3-77: VMT by Household Size....82
Table 3-78: GHG by Household Size....83
Table 3-79: VMT by Vehicle Type....83
Table 3-80: GHG by Vehicle Type....84

Executive Summary

Transportation is one of the major sources of greenhouse gas emissions, and auto dependency of travel behavior has a significant impact on climate change. Daily travel behavior has been influenced by current technological advancements across various domains, including the working environment, transportation mode, e-commerce, and the adoption of electric vehicles. Furthermore, the COVID-19 pandemic transformed daily travel behavior in terms of change in mode choice and trip frequencies, and it influences current mobility pattern.

Since the 2009 national household travel survey (NHTS) add-on conducted, PAG has been focusing on travel behavior analysis and the maintenance of transportation models using crowdsourced and Census data. As updating the existing old travel patterns and incorporating the newly transformed post-COVID travel behaviors, this Household Travel Study and Assessment (HTSA) focus on collecting post-COVID travel behavior patterns to understand how regional travel has evolved and affected air quality and to improve PAG transportation planning models with the collected travel patterns for the area in Figure ES 1.

Figure ES 1: Map of PAG Modeling Area



This report outlines the methodologies, technologies, and analytical approaches used to conduct the household travel survey and analyze travel behavior. It presents the survey findings along with related analyses of travel patterns and their impact on air quality. The report concludes with an evaluation of the survey design and analytical methods, offering recommendations for improving future survey cycles.

Overview of the Household Travel Study and Assessment

The HTSA has two main components including (1) household travel survey and (2) travel behavior analysis providing feasible resolution on regional transportation planning and air quality improvement.

Objectives

To fulfill these two main blocks of this study, this report highlights the objectives below.

- Collect household travel samples to show representative regional travel patterns to help regional transportation modeling and planning.
- Highlight the key aspects of regional travel behavior that influence and enhance regional air quality.
- Comparative analysis of before and after COVID-19 travel patterns using data from the 2009 NHTS Add-on and the 2025 PAG HTSA survey.

For collecting the representative household travel samples, a household travel survey was targeted to collect a total of 4,200 randomly sampled completed household travel surveys. A stratified sampling plan was applied to collect data based on income level, household size, and number of workers. A secondary survey was to collect an additional 800 complete household surveys that targeted specialized groups including transit passengers and college students. This additional survey supplies crucial data needed to support transportation planning, travel demand modeling, and forecasting. In sum, the total planned sample size is 5,000 households. More details are discussed in Section 1.1.1.

Aligned with the objectives of the Carbon Reduction Program proposal, this study will examine the primary attributes of regional travel behavior that contribute to air quality improvement and identify barriers that hinder progress toward emission-free transportation communities. Using the responses collected through the survey, PAG will quantify and visualize changes in regional travel patterns, particularly in terms of vehicle miles traveled (VMT) and associated greenhouse gas (GHG) emissions. These analyses will illustrate how VMT generation and GHG emissions vary across demographic groups and travel characteristics, supporting more effective analysis of travel patterns, more informed regional transportation planning, and enhancements to advanced modeling efforts aimed at improving regional air quality.

Additionally, comparative analyses of pre- and post-COVID-19 travel behavior will provide insight into long-term shifts in mobility and VMT. Drawing on these findings, the report will present mitigation strategies aimed at reducing GHG emissions and VMT to support continued improvement in regional air quality.

Recruitment Methodology Summary

ETC employed multiple recruitment strategies throughout the survey process. The process began by mailing postcards shown in Figure ES 2 to randomly selected residential addresses within the study area. As the survey progressed, ETC refined the mailing approach to target neighborhoods with lower response rate.

Figure ES 2: Front and Back of Postcard (English and Spanish)



In addition, ETC worked with local news agencies (i.e. KGUN9 Morning Blend) shown in Figure ES 3 to have a commercial run to create further legitimacy for the mailed postcards being sent out. Postcards were sent out to approximately 550,000 households, or nearly all study area residents.

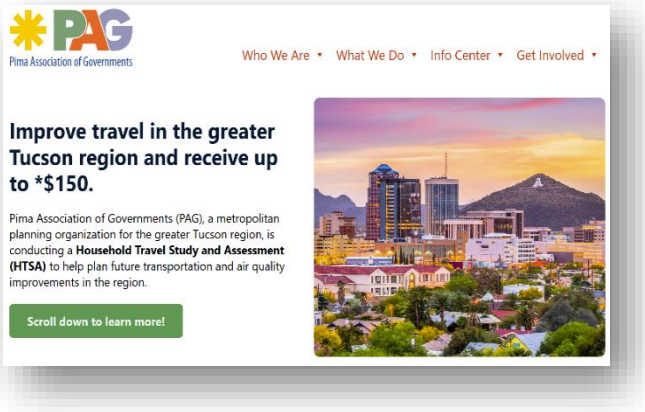
Figure ES 3: Screenshot of News Advertisement



Another form of recruitment that took place included sending out invites to local Travel Reduction Program (TRP) members to go to a website, shown in Figure ES 4, designed for them to sign up and have an ETC Interviewer contact them with further information about the survey process and various methods of participation.

The last recruitment method was social media campaigns set up to reach respondents in Pima County that had received a postcard in the mail. The respondents who saw the social media campaigns were directed to the project website as shown in Figure ES 4 to download the app via smartphone.

Figure ES 4: Project Website



Survey Methodology Summary

The survey on the HTSA was conducted in one of two ways, via the mobile app (preferred method) or over-the-phone (CATI) with an ETC Interviewer. A full methodology for each survey type is explained in Section 1.3. For those respondents that had received a random address-based mailed postcard, or had seen a social media advertisement, they were directed to scan a QR code that allowed them to download the app on their smartphone device.

After scanning the QR code, respondents completed eligibility screening and, if qualified, provided household demographic and vehicle information. Participants using the smartphone application allowed it to operate in the background on their assigned travel day, whereas others submitted their travel information the following day or, for CATI participants, for a previously designated travel day. Upon receipt of all demographic and trip data, a Dedicated Review Team (DRT) conducted a review, requesting clarification, when necessary, before forwarding the record to the DRT Supervisor for final approval.

For those households that were recruited via non-random-based recruitment, such as TRP sign-ups, they were directed to provide contact information for an ETC Interviewer to reach out to begin the survey process over the phone. If a respondent chose to participate via the app, the ETC Interviewer walked them through the process of downloading the app and entering their PIN, and for those that did not prefer to participate via the app, the ETC Interviewer would then conduct the survey via CATI for a previous weekday that school was in session.

Data Quality Assurance and Control

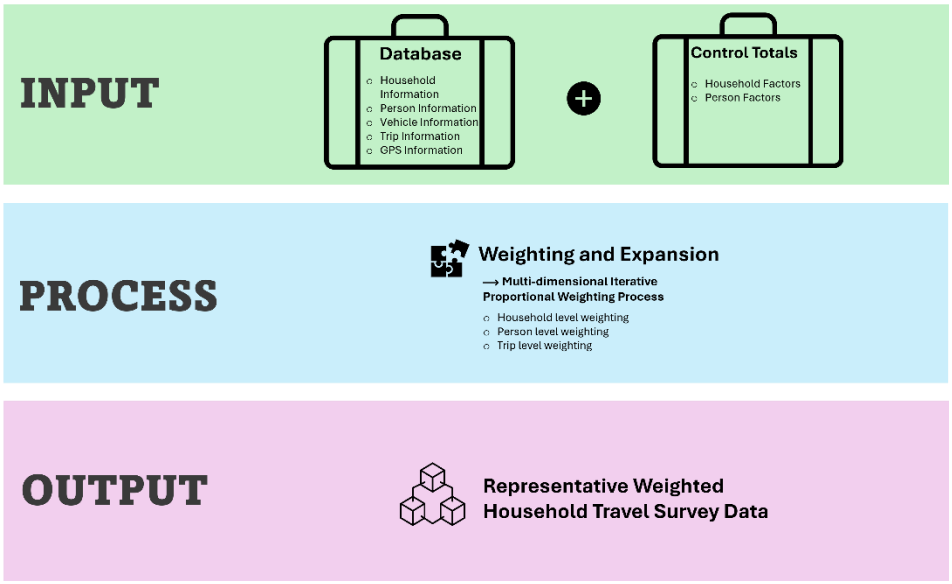
Data cleaning procedures include data cleaning, database preparation and the implementation of logic and consistency checks to ensure data quality.

During the data collection, the DRT conducted ongoing reviews of each household's records, including household, person, vehicle, and trip diary information. The DRT evaluated submissions for missing data and logical inconsistencies. When issues were identified, ETC interviewers contacted respondents to obtain missing information or to verify and correct inconsistencies.

After all records were reviewed, the data were compiled into five separate datasets: household, person, vehicle, trip, and GPS information. These datasets underwent an additional round of aggregate level quality checks. These checks examined logical consistency between travel times and distances, alignment of arrival and departure times, agreement among shared trips within households, completeness of reported information, consistency across household, person, vehicle and trip records, geocoding of incomplete addresses, and validating and transformation of spatial data using mapping, routing, and GIS services.

To ensure the survey accurately represented the regional population, a multi-dimensional iterative proportional fitting (IPF) procedure was applied. The expansion process occurred at three levels- household, person, and trip. Each aligns the survey distributions with external demographic and employment benchmarks. These control totals are defined at the district level, providing the spatial framework needed for the expansion process. Using these district-level benchmarks, the survey sample is expanded to achieve proportional geographic representation across Pima County.

Figure ES 5: Weighting and Expansion



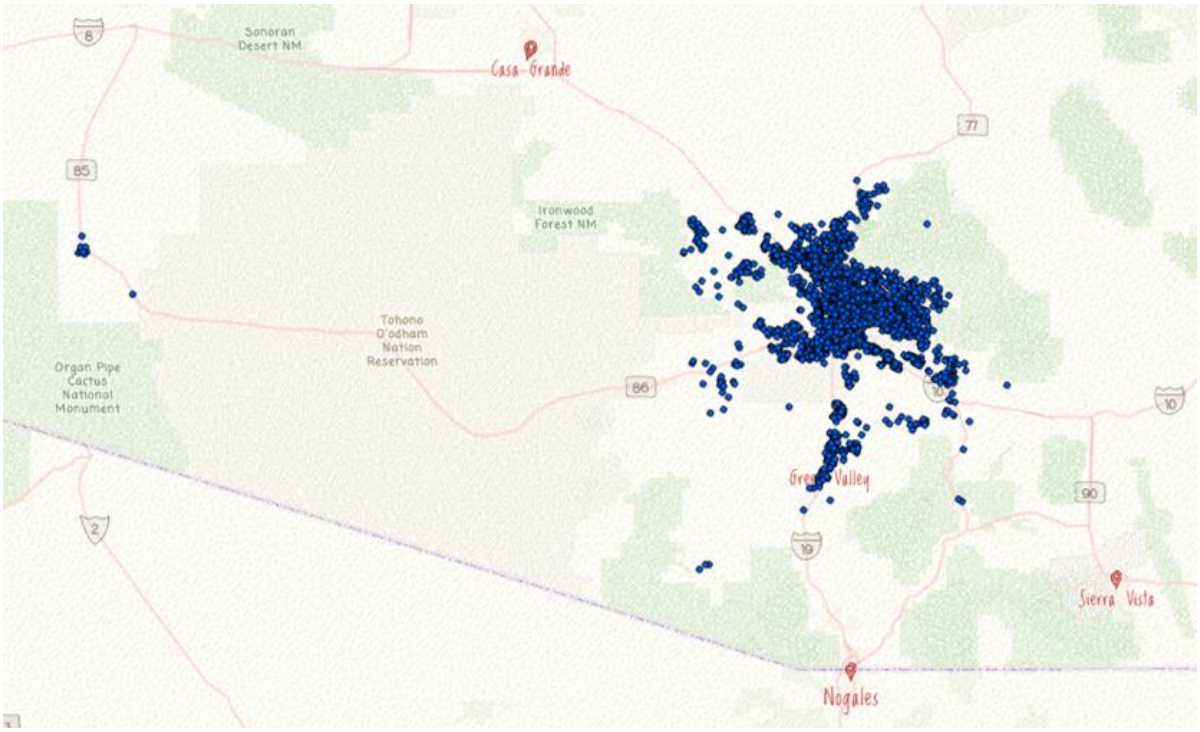
Outcomes and Key Findings

This section describes the major findings from the weighted HTSA data.

Outcomes and Assessment

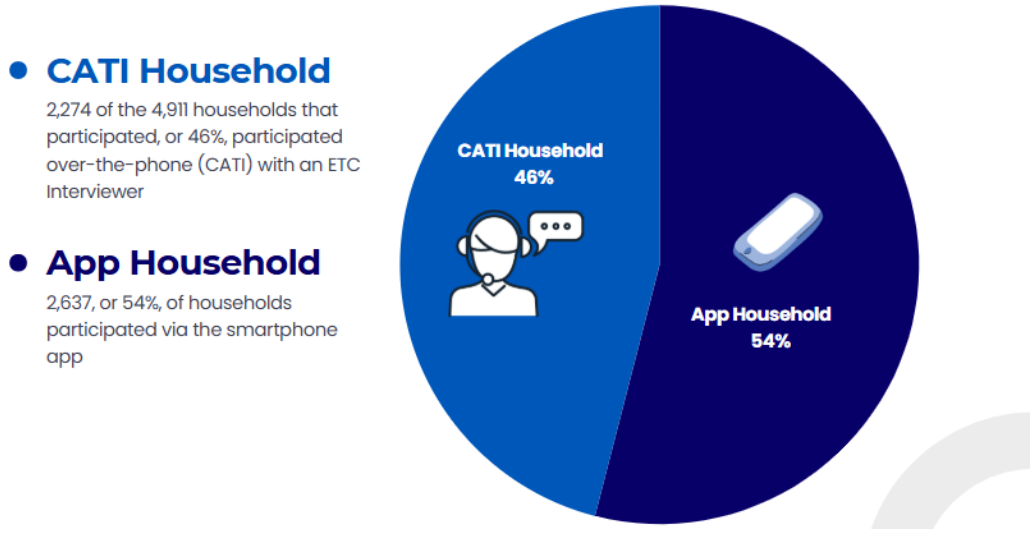
The main survey began in November 2024 and concluded in May 2025. A total of 4,911 households reported travel details including Western Pima County and Pinal County (SaddleBrooke) and met data quality requirements to be included in the final dataset as shown in Figure ES 6.

Figure ES 6: Main Survey Data Collection Locations



A breakdown of the survey method (app or CATI) can be found in Figure ES 7. The app collected 2,637 household samples (54%) and the CATI collected 2,274 household samples (46%).

Figure ES 7: Survey Participation Method



The primary goal of the data collection was to obtain 5,000 household samples including general stratified samples, special population group samples of college students, either University of Arizona or Pima Community College and household samples with transit users. The final count represented 98 percent of the overall objective (Table ES 1). Most categories reached or nearly reached their targets, with general stratified samples and special populations well represented, though the University of Arizona student subgroup fell below its target.

During the survey process, it was identified that certain demographic categories – such as unemployed one- and two-person households with incomes exceeding $150,000 – were difficult to populate (Table ES 2). Nevertheless, the overall distribution of completed surveys across the study area was satisfactory. More detailed data collection statistics can be found in Section 1.1.2.

Table ES 1: Distribution of Completed Households by Sample Group

Groups of Interest	Goal	Complete	Percentage
General Stratified Sample	4,200	4,154	99%
Households with at least one University of Arizona Student	200	157	79%
Households with at least one Pima Community College Student	100	100	100%
Households with at least one transit user	500	500	100%
Total	5,000	4,911	98%

Table ES 2: Percent Distribution of Completed Households

GOALS									
Income Range	Household Size 1		Household Size 2		Household Size 3		Household Size 4+		TOTALS
	# of Worders		# of Worders		# of Worders		# of Worders		
	0	1	0	1+	0	1+	0	1+	
$0-$24,999	108%	174%	152%	189%	107%	212%	80%	145%	**134%**
$25,000-$49,999	126%	153%	75%	148%	133%	179%	123%	111%	**113%**
$50,000-$99,999	115%	143%	66%	132%		121%		116%	
$100,000-$149,999	154%	192%	85%	117%	45%	139%		76%	
$150,000+	40%	116%	56%	107%		107%		89%	
TOTALS	**112%**	**157%**	**82%**	**132%**	**130%**		**103%**		**117%**

2025 Regional Travel Patterns

The comprehensive analysis of travel behavior and related attributes from the PAG Household Travel Survey is conducted to present post-pandemic regional travel patterns. It examines household mobility ownership including automobiles, bicycles, and electric vehicles alongside trip characteristics such as mode choice, trip purpose, travel time, and distance.

The followings are summary of travel behaviors:

- **Mobility Ownership**. Approximately 6.9% of households do not own a vehicle, and the average number of household vehicles is 1.8 vehicles.
- **Bicycle Ownership**. Bicycle ownership is relatively widespread among households with over 52.4% reporting ownership of at least one bicycle.
- **Trip Purposes**. About one-third of all trips are discretionary, while the remainder reflect routine daily needs. Home is the destination for 30.1% of all trips. Shopping, dining, and errands account for the largest share (34.5%), highlighting strong demand for discretionary and maintenance travel. Work trips account for 10.6%, and school trips for 4.7%. Social and leisure travel is smaller in comparison with visiting at 6.4% and recreation at 2.9%. Pick-up/drop-off travel represents another 5%.
- **Trip Mode**. Private automobiles dominate regional travel, with all other modes representing only small shares. About 91% of trips are made by auto, while public transit accounts for 1%, walking for 3.7% and bicycling for 1.2%. School buses contribute 1.9%, and ride-hailing services make up 0.7%.
- **Trip Duration**. Most regional travel is short, both in time and distance, pointing to highly localized mobility patterns. Over 90% of trips finish within 30 minutes, with the largest share under 6 minutes (25.3%) and 6-10 minutes (25.2%).
- **Travel Distance**. Travel distance patterns mirror travel time patterns: more than 80% of trips occur within 10 miles, including a strong concentration under 3 miles (43.2%

combined). These short, frequent trips suggest substantial potential for shifting some travel to walking, biking, and transit, and they provide a foundation for planning infrastructure investments and emissions-reduction strategies.

- **Alternative Modes: Transit**. About 67.3% of respondents did not use transit at all in the past six months, while another 14.2% used it only rarely and 3% about once per month. More regular riders include 5% who ride a few times per month, 6.7% who use transit weekly, and 3.9% who rely on it daily. This pattern reflects a large car-dependent majority alongside a smaller but important group of frequent transit-dependent and transportation disadvantaged individuals.
- **Alternative Modes: Bicycle.** About 81.6% of respondents did not bike at all in the past week, while small shares used once (4.3%) or twice (4.6%), showing limited overall use. Among those who did ride, 77.9% of trips were for recreation, with far fewer for shopping (7.5%), commuting (6.4%), or visiting friends or family (3.1%). This travel pattern suggests that while many households own bicycles, actual riding is generally low and rarely tied to daily transportation needs.
- **Alternative Modes: Personal Mobility Devices (PMD).** Only 4.8% of respondents used a PMD in the past week, and among those who did, over half of all trips were for recreation. This limited and leisure-oriented usage suggests PMDs are still emerging in the local travel landscape, with significant room for growth in short-distance, non-recreational trips.

2025 Regional Travel Behavior on Air Quality

One aspect of the PAG HTSA was to obtain information on the regional travel behavior on air quality. The analysis associated with air quality includes electric vehicle ownership, residential location preferences, telecommuting trends, and online shopping, why not alternative modes, derived environmental indicators such as vehicle miles traveled (VMT) and greenhouse gas (GHG) emissions.

- **Electric Vehicle (EV) Ownership**. Current EV ownership is low (3.6%), but roughly one-third of total household express interest in buying an EV within the next decade, even as 60.4% reports no plans. Environmental values (28.4%), long-term fuel savings (27.4%), and home solar ownership (11.4%) are the top motivations among current EV owners.
- **Residential Preferences**. Residential preferences shape where households choose to live, influencing commute distances, travel modes, and ultimately regional air-quality and transportation outcomes. Low crime stands out as the strongest residential priority, with 44.9% of respondents identifying it as a must-have. Preferences for single-family homes (38.1% must-have; 39.8% want) and backyards (35.2% must-have; 41% want) are also prominent, reflecting a continued desire for low-density, amenity-rich living.
- **Telecommuting Pattern**. About 18% of workers telecommute full-time and 12.2% hybrid, creating a combined telecommuting rate of 30.2%. Telecommuting is widespread but

underutilized potential for reducing work-related emissions through expanded remote-work options.

- **Online Shopping**. Pima County households show high engagement with e-commerce, and that activity is shaping both travel demand and emissions. Households receive about 0.5 online shopping deliveries per day, and 77.9% hold at least one membership subscription, which likely contributes to increased delivery frequency.
- **Why not Alternative Modes.** Most households face a consistent set of barriers that make walking or biking difficult for both commute and non-commute trips. Long travel distances are the most common deterrent, followed by extreme heat, time constraints, personal safety concerns, and heavy traffic, all of which limit the practicality and comfort of active travel. For non-commute purposes, respondents also point to poor personal health and missing or inadequate infrastructure such as absent sidewalks, unprotected bike lanes, or poorly maintained paths as major obstacles.
- **VMT Metrics for Air Quality.** Pima County households generate moderate daily travel and emissions, with clear geographic differences tied to urban form. Households average 38.4 VMT and 12.8 kg of CO_2e per day, while individuals average 18.4 VMT and 6 kg of CO_2e.

Changes in Travel Patterns and Policy Recommendations

A comparison between the 2009 National Household Travel Survey (NHTS) Add-on and the 2025 PAG Household Travel Study and Assessment (HTSA) was conducted to illustrate how travel behavior, highlighting temporal changes in travel patterns and modal shares, have evolved over time.

- Pima county households have become more vehicle-reliant over time, with zero-vehicle households declining and one-vehicle households increasing between 2009 and 2025. Mode choice shifted even more strongly toward driving, rising from 78.7% to 91%, while all non-auto modes declined-most notably walking and transit, despite fare-free service. Trip purposes also changed: work, school, home, recreation, and pick-up/drop-off trips all fell, reflecting telecommuting, demographic shifts, and more online entertainment. In contrast, shopping, dining, errands, and visiting trips grew substantially, and new paid delivery/chauffeuring trips emerged in the 2025 survey.
- According to the Census, Pima county's population grew by 8.2% and the number of households by 12.7% from 2010 to 2024, indicating a decline in average household sizes. Despite higher vehicle availability and greater auto dependence, both household and person VMT decreased significantly, suggesting more efficient travel patterns influenced by telecommuting, improved access to destinations, or lifestyle changes.

Drawing on insights from the survey data, the report identifies strategies to reduce emissions and enhance regional air quality, emphasizing sustainable mobility interventions and policy recommendations.

- Travel behavior in the PAG region shows several pathways for reducing vehicle miles traveled, including taking fewer trips, shortening trip distances, and shifting to lower-emission modes. Residents are making slightly fewer daily trips than in 2009, likely influenced by reduced commuting and online substitution for errands. Trip distances also matter while the average trip is 6.8 miles, more than 40% of all trips are under 3 miles, creating opportunities for non-auto modes. Reductions in long work trips have a large impact on total miles traveled, though telecommuters often make more short trips. A rebound effect that still tends to generate fewer emissions when those trips shift to walking, biking, or other low-emission modes.
- Mode shift remains challenging, however, as auto travel still accounts for 91% of trips and 96% of person-miles. Barriers to biking and transit such as distance, time, safety, convenience limit their use, even though many households own bikes and new mobility devices are more available than in 2009. At the same time, transitioning to lower-emission vehicles offers substantial GHG reductions, yet only 3.6% of households own an EV and roughly one-third of households have interests in purchasing one, because long trips are rarely made by low-emission modes, effective strategies must combine trip reduction, shorter travel distances, improved alternatives to driving, and long-term land-use decisions that enhance accessibility.

1. Household Travel Survey Overview

1.1. Household Travel Survey Design and Approach

1.1.1. Sample Design

This section describes the survey goals for the HTSA, focusing on stratified sampling, special population groups, and geographic distribution as a secondary goal.

The original target was to collect 4,200 completed household surveys. To better capture the travel behaviors of special population groups, and it was determined to collect an additional 800 completed households to focus on special population groups. In sum, the total planned sample size is 5,000 households. (Table 1-1)

The special population groups include households with college students either University of Arizona or Pima Community College and households with transit users. These special population groups have distinct travel patterns, and it is unlikely to be adequately represented through standard random sampling. It is important to know their travel behaviors so providing them with appropriate transportation services.

The stratified sampling plan was applied to collect data by income level, household size, and the number of workers. It also had geography goals on district level (Figure 1-1). Each district has unique characteristics of household, person and travel patterns, and it is designed to capture the differences over districts as a secondary goal. It was managed independently from the stratification.

During the planning process, ETC provided PAG with census data for the region and worked with PAG to develop the sampling plan for the 2025 HTSA. Table 1-1 shows the distribution of 5,000 households by survey goals. As shown in the table, the special population groups included households with at least 1 University of Arizona student, households with at least 1 Pima County Community College student, and households with at least 1 transit user.

Table 1-1: Targeted Goals

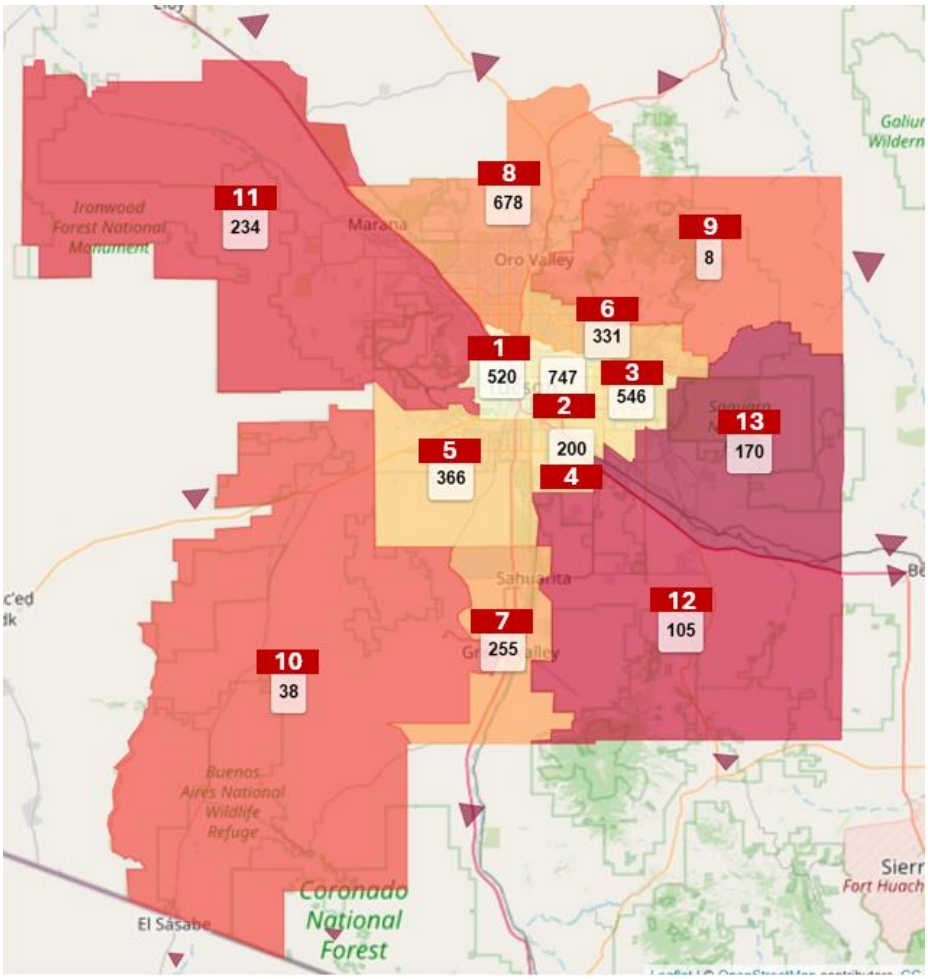
Groups of Interest	Goal
General Stratified Sample	4,200
Households with at least one University of Arizona Student	200
Households with at least one Pima Community College Student	100
Households with at least one transit user	500
Total	5,000

Table 1-2 presents the general sampling frame that was utilized for the survey. There was little targeting towards the special population groups as the goals were met naturally through the main survey collection process.

Table 1-2: Sampling Frame

Income Ranges	Household Size 1		Household Size 2		Household Size 3		Household Size 4+		Total
	# of Workers		# of Workers		# of Workers		# of Workers		
	0	1+	0	1+	0	1+	0	1+	
$0-$24,999	403	114	93	61	41	41	35	62	849
$25,000-$49,999	167	167	167	150	39	58	30	138	916
$50,000-$99,999	115	175	236	241		168		240	1,175
$100,000-$149,999	54	73	165	199	40	96		207	835
$150,000+	47	32	73	110		59		105	426
Total	787	561	734	762	119	422	65	752	4,200

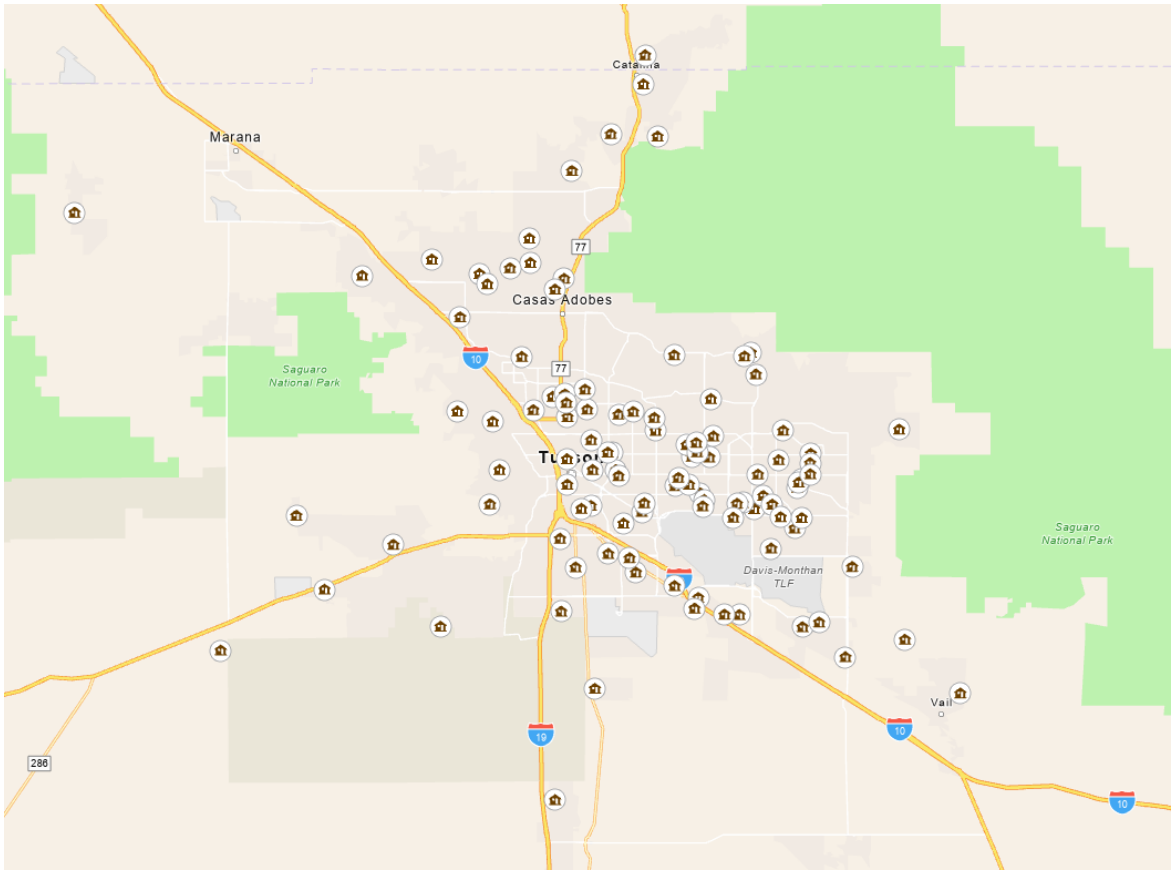
Figure 1-1: District Target Samples



1.1.2. Survey Performance

A pilot survey was conducted in the PAG region early November 2024, prior to the main survey collection. The pilot survey was to capture the response and representation of the app-based survey. For the survey, 100 households with 227 household members were collected with 1,031 stops as shown in Figure 1-2. In addition, the app-based survey shows good response including Spanish speakers (22%) and student household members (24.2%). And around 60% of working age household members were employed and the survey showed good representation of young (<18) and older (75+) population with 18% and 7% respectively.

Figure 1-2: Pilot Survey Locations



The main survey was conducted from November 2024 to May 2025. A total of 4,911 complete household samples were collected. A “complete sample” means that all 4,911 household samples met the data quality standards required for inclusion in the final dataset. Details on data quality assurance and control are provided in Chapter 3.

The primary objective of the data collection was to obtain 5,000 household samples, including 200 households with at least one University of Arizona student, 100 households with at least one Pima Community College student, and 500 households with at least one daily transit user. A total of 4,911 samples were collected, representing 98 percent of the overall target. More specifically, general stratified samples collected 4,154 samples, achieving 99 percent of the goal. The number of

households with University of Arizona students totaled 157, corresponding to 79 percent of the target. For households with Pima Community College students or transit users, 100 percent of the target was met, as presented in Table 1-3 .

Table 1-3: Distribution of Completed Households by Sample Group

Groups of Interest	Goal	Complete	Percentage
General Stratified Sample	4,200	4,154	99%
Households with at least one University of Arizona Student	200	157	79%
Households with at least one Pima Community College Student	100	100	100%
Households with at least one transit user	500	500	100%
Total	5,000	4,911	98%

Table 1-4 presents the distribution of completed samples by household size, income level and number of workers. The 4,911 households represent a mix of general stratified samples and special population households. The overall distribution of completed surveys across the study was satisfactory but it still has some limitations.

Table 1-4: Distribution of Completed Households

Income Ranges	Household Size 1		Household Size 2		Household Size 3		Household Size 4+		Total
	# of Workers		# of Workers		# of Workers		# of Workers		
	0	1+	0	1+	0	1+	0	1+	
$0-$24,999	434	198	141	115	44	87	28	90	1,137
$25,000-$49,999	210	256	126	222	52	104	37	153	3,774
$50,000-$99,999	132	251	156	317		203		279	
$100,000-$149,999	83	140	141	232	18	133		158	
$150,000+	19	37	41	118		63		93	
Total	878	882	605	1,004	114	590	65	773	4,911

During the survey process, participation among certain demographic categories was lower compared to others. Especially for households of two people without employees shows a lower percentage of completed samples to the goals. Also, households with high household income ($150,000+) also had lower participation, referred to Table 1-5.

Table 1-5: Percent Distribution of Completed Households

Income Ranges	Household Size 1		Household Size 2		Household Size 3		Household Size 4+		Total
	# of Workers		# of Workers		# of Workers		# of Workers		
	0	1+	0	1+	0	1+	0	1+	
$0-$24,999	108%	174%	151%	189%	108%	213%	81%	146%	134%
$25,000-$49,999	126%	153%	75%	148%	135%	179%	122%	111%	113%
$50,000-$99,999	115%	143%	66%	132%		121%		116%	
$100,000-$149,999	153%	192%	85%	116%	45%	139%		76%	
$150,000+	40%	116%	57%	107%		107%		88%	
Total	112%	157%	82%	132%	96%	140%	100%	103%	117%

Geographic targeting was a secondary goal of the survey sampling plan. It aims to collect samples proportionally to the population by district. Table 1-6 shows the distribution of completed samples by district. Among the 4,911 households, 18 were in western Pima County outside the specified district so that the total number of samples collected in table 9 is 4,893 instead of 4,911. Districts with high senior populations such as Foothills (district 6), Green Valley (district 7), and Oro Valley (district 8) had lower participation. These areas also have higher average household incomes, providing additional insight into where participation was limited. Also, district twelve and thirteen, located in the eastern suburban area, showed relatively lower participation rates.

Table 1-6: Distribution of Completed Household by District

District	Goal	Complete	Difference	Performance (%)
1	520	980	460	188.5%
2	747	1,265	518	169.3%
3	546	678	132	124.2%
4	200	173	-27	86.5%
5	366	384	18	104.9%
6	331	287	-44	86.7%
7	255	167	-88	65.5%
8	678	486	-192	71.7%
9	8	1	-7	12.5%
10	38	38	0	100.0%
11	234	225	-9	96.2%
12	105	70	-35	66.7%
13	170	139	-31	81.8%
Total	4,198[a]	4,893[b]	695	116.6%

Note.

[a] *The total goal value (4,198) contains a rounding error.*

[b] *The total completions value (4,893) includes complete samples from special population groups.*

Table 1-7 and Table 1-8 present the distribution of samples by household income over districts, reported by counts and percentages, respectively. Based on Table 1-7, the highest overall participation is observed among households with incomes between $50,000 and $99,999, followed by lower- income households earning less than $24,999 and those earning between $25,000 and $49,999. At the district level, according to Table 1-8, District 2,4 and 10 have the highest participation among households earning less than $49,999. For household with incomes between $50,000 and $99,999, the highest participation is found in District 8, 9 and 13. District 6, 7, and 13 show the strongest participation among household earning $100,000 to $149,999. For households earning $150,000 or more, Districts 6, 12 and 13 exhibit the highest level of involvement.

Table 1-7: Household Income Category by District

Income Category by District	$0-$24,999	$25,000-$49,999	$50,000-$99,999	$100,000-$149,999	$150,000+	Grand Total
1	274	239	202	213	52	980
2	391	333	329	160	52	1,265
3	134	154	226	128	36	678
4	67	47	36	19	4	173
5	84	92	107	88	13	384
6	23	50	85	71	58	287
7	21	33	58	40	15	167
8	63	76	174	93	80	486
9			1			1
10	15	12	6	5		38
11	39	42	71	38	35	225
12	10	12	21	15	12	70
13	10	13	52	41	23	139
Grand Total	**1,131**	**1,103**	**1,368**	**911**	**380**	**4,893**

Table 1-8: Household Income Category by District (%)

Income Category by District	$0-$24,999	$25,000-$49,999	$50,000-$99,999	$100,000-$149,999	$150,000+	Grand Total
1	28.0%	24.4%	20.6%	21.7%	5.3%	100.0%
2	30.9%	26.3%	26.0%	12.6%	4.1%	100.0%
3	19.8%	22.7%	33.3%	18.9%	5.3%	100.0%
4	38.7%	27.2%	20.8%	11.0%	2.3%	100.0%
5	21.9%	24.0%	27.9%	22.9%	3.4%	100.0%
6	8.0%	17.4%	29.6%	24.7%	20.2%	100.0%
7	12.6%	19.8%	34.7%	24.0%	9.0%	100.0%
8	13.0%	15.6%	35.8%	19.1%	16.5%	100.0%
9	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%
10	39.5%	31.6%	15.8%	13.2%	0.0%	100.0%
11	17.3%	18.7%	31.6%	16.9%	15.6%	100.0%
12	14.3%	17.1%	30.0%	21.4%	17.1%	100.0%
13	7.2%	9.4%	37.4%	29.5%	16.5%	100.0%
Grand Total	**23.1%**	**22.5%**	**28.0%**	**18.6%**	**7.8%**	**100.0%**

Table 1-9 and Table 1-10 present the distribution of samples by age group across districts. According to Table 1-10, the average percentage of age groups 0 to 4, 5 to 6, 16 to 19, 20 to 64, and 65 years old or older are 3.3%, 1.5%, 8.9%, 4.5%, 66.7% and 15.1% respectively. Participation varies across age groups and districts. Among children ages 0 to 4, District 4,5,7, and 13 show higher participation. For those ages 5 to 6, participation is strongest in District 5,12, and 13. In the 7 to 15 age range, Districts 10, 11, and 12 emerge as the top participants. District 5,10, and 13 lead participation among youth

ages 16 to 19. For adults ages 20 to 64, Districts 1,2, and 4 record the highest levels of participation. Finally, among residents ages 65 and older, Districts 6, 7, and 9 show the greatest involvement.

Table 1-9: Age Category of Person by District

Age Category by District	0 to 4 years old	5 to 6 years old	7 to 15 years old	16 to 19 years old	20 to 64 years old	65 years old or older	Grand Total
1	43	25	138	71	1,569	224	2,070
2	93	43	211	107	1,827	297	2,578
3	45	18	153	65	962	256	1,499
4	20	5	38	24	299	35	421
5	45	21	92	64	642	128	992
6	22	11	51	23	389	159	655
7	17	3	32	11	179	129	371
8	30	14	111	47	682	224	1,108
9						2	2
10	1	1	13	7	63	13	98
11	23	10	64	33	331	90	551
12		6	24	12	106	39	187
13	24	12	44	26	237	50	393
Grand Total	**363**	**169**	**971**	**490**	**7,286**	**1,646**	**10,925**

Table 1-10: Age Category of Person by District (%)

Age Category by District	0 to 4 years old	5 to 6 years old	7 to 15 years old	16 to 19 years old	20 to 64 years old	65 years old or older	Grand Total
1	2.1%	1.2%	6.7%	3.4%	75.8%	10.8%	100.0%
2	3.6%	1.7%	8.2%	4.2%	70.9%	11.5%	100.0%
3	3.0%	1.2%	10.2%	4.3%	64.2%	17.1%	100.0%
4	4.8%	1.2%	9.0%	5.7%	71.0%	8.3%	100.0%
5	4.5%	2.1%	9.3%	6.5%	64.7%	12.9%	100.0%
6	3.4%	1.7%	7.8%	3.5%	59.4%	24.3%	100.0%
7	4.6%	0.8%	8.6%	3.0%	48.2%	34.8%	100.0%
8	2.7%	1.3%	10.0%	4.2%	61.6%	20.2%	100.0%
9	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
10	1.0%	1.0%	13.3%	7.1%	64.3%	13.3%	100.0%
11	4.2%	1.8%	11.6%	6.0%	60.1%	16.3%	100.0%
12	0.0%	3.2%	12.8%	6.4%	56.7%	20.9%	100.0%
13	6.1%	3.1%	11.2%	6.6%	60.3%	12.7%	100.0%
Grand Total	**3.3%**	**1.5%**	**8.9%**	**4.5%**	**66.7%**	**15.1%**	**100.0%**

1.2. Interviewer Management and Recruitment

1.2.1. Interviewer Section and Training

ETC employs a team of in-house call center interviewers trained to collect sensitive household and demographic information from respondents across the nation. The interviewers have extensive experience conducting interviews over-the-phone with respondents. They are able to build rapport with them and collect information such as annual household income, ages of family members, and required locations such as home, school, and work addresses.

Initial training began two weeks prior to the pilot with a team of interviewers who were trained on the specifics of the project.

Following a pilot test and prior to the main survey fielding, the team of interviewers along with ETC supervisors conducted a review of the pilot survey outcomes to discuss what worked well and what areas may need improvement. Items that were revised after the pilot data included the telecommute questions.

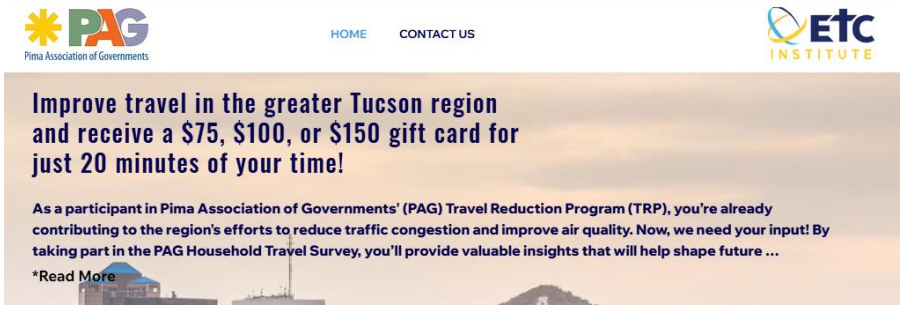
Additional training occurred as needed throughout the main survey collection.

Through the app and the project website, a support phone number and LiveChat feature were available to any respondent who needed further assistance. The ETC call center was available to assist with respondents daily from 9am to 9pm Arizona time. Calls outside this time period were routed to voice mail and ETC interviewers called respondents back the next business day.

1.2.2. Recruitment and Outreach

ETC utilized several different recruitment techniques throughout the survey process. Initially, ETC began by mailing postcards to a randomly selected group of residential addresses in the study area. As the survey continued, the mailings were adjusted to focus on those areas where the response rates were lower.

Figure 1-3: TRP Signup Page



PAG worked with ETC to send out emails to a list of local Travel Reduction Program (TRP) members that were directed to go to the website designed specifically for TRP participants (Figure 1-3). On the website, TRP members could sign up and an ETC Interviewer would reach out to them to begin the survey process. For those members that were willing to use the app, the ETC Interviewer would work with them to download the app on their smartphone device. For those members that preferred to conduct the interview via the CATI method, the ETC Interviewer would ask them to provide travel for a recent weekday that school was in session.

Local television commercials and news interviews were utilized to raise awareness of the ongoing survey within the study area and to enhance the perceived legitimacy of the project among households that had received a postcard or encountered the social media campaigns.

The last recruitment method was social media campaigns, which were targeted to those households that had been mailed a postcard. The respondents who saw the social media campaigns were directed to the project website to scan the QR code provided based on their mobile device and sign up directly through the app.

Figure 1-4: QR Code

1.2.3. Administration of Incentives

Once a household was marked as approved by an ETC review team supervisor, an incentive was issued to the completed household in varying amounts. Initially, as the project began, the incentive structure was set then an app user would receive $20, and a non-app user would receive $5. For example, a household of 4 people where 2 people used the app would receive $50 in total. The incentive was sent to the primary household member, often the one who initially signed up for the survey. For those households that chose not to participate via app, a flat rate of $20 was sent to completed households.

During the last 2 months of survey collection, it was decided that the incentives would be raised to try and help with harder to fill cells. The updated incentive structure was set up so that non-app households, or those households that chose to participate via CATI, would receive $75 regardless of size. For those households with 3 or fewer household members, where at least 1 person used the app, they received $100. Finally, for those households with 4 or more members, where at least 1 person used the app, they received $150 upon completion.

Incentives were sent out within 7-10 business days upon completion of the survey.

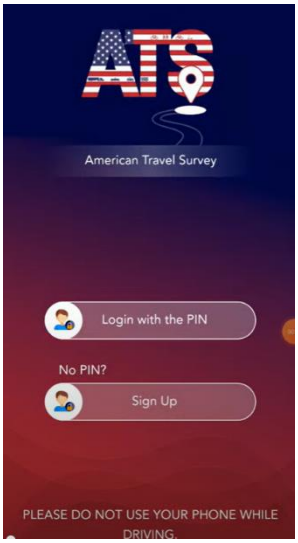
1.3. Survey Data Collection Methodology

1.3.1. Tools for Travel Diary Data Collection

Data collection started with the postcard mailout. The postcards included a QR code to download the app on a smartphone device where the respondent could fill out qualifying information before receiving a PIN and setting permission settings to allow the app to collect GPS information.

Additional family members that also wished to use the app could also download the app on their smartphone device and simply sign in with the PIN that was created for the primary household member.

Figure 1-5: App Login Page



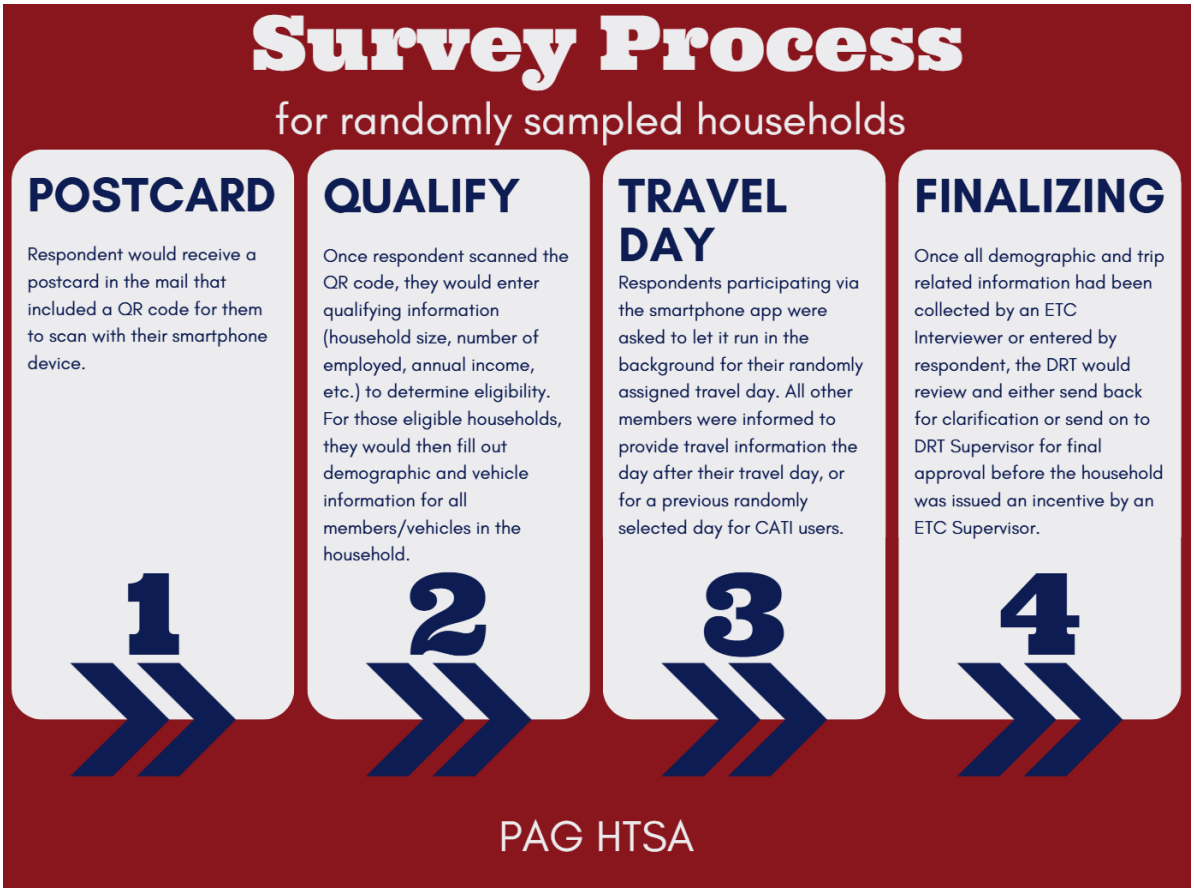
In cases where additional household members were either unable or unwilling to use the app, the respondent could fill out their family member's demographic and trip information through the external website, accessed through the app, or an ETC interviewer collected the necessary demographic information through CATI interviews with the respondent.

For households recruited though non-random-based methods, such as TRP sign-ups, participants were asked to provide their contact information so an ETC interviewer could reach out and begin the survey by phone. If a respondent opted to participate using the app, the interviewer guided them through downloading the app and entering their PIN. For those who preferred not to use the app, the interviewer conducted the survey via CATI for a previous weekday that school was in session.

After all household demographic information had collected by an ETC Interviewer or entered by the respondent(s), households were then randomly assigned a travel date, typically the next business day that school was in session. For those contacts that were participating using the app, they were instructed to allow the app to run in the background and were advised to wait until after their assigned travel date had ended before going back into the app to answer all relevant questions.

The day after each household's travel day, an ETC Interviewer assigned to that household would check and make sure all demographic and trip related information had been entered. For those households with missing demographic or trip related information, the ETC Interviewer would attempt to contact the respondent to obtain the missing information. Once all information had been collected, it was then sent on to a Dedicated Review Team (DRT) to check through the trip information. The DRT would look at each individual household member's trip information to ensure that trips were logical and that companion trips, or trips where 2 or more household members made the same trip, made sense. For those households with inconsistent or illogical information, it was sent back to the ETC Interviewer assigned to that household to follow up for clarification with the respondent, which started the process over. For those households that met all logic checks, it was then passed on to a supervisor for final approval before an incentive was issued to the household.

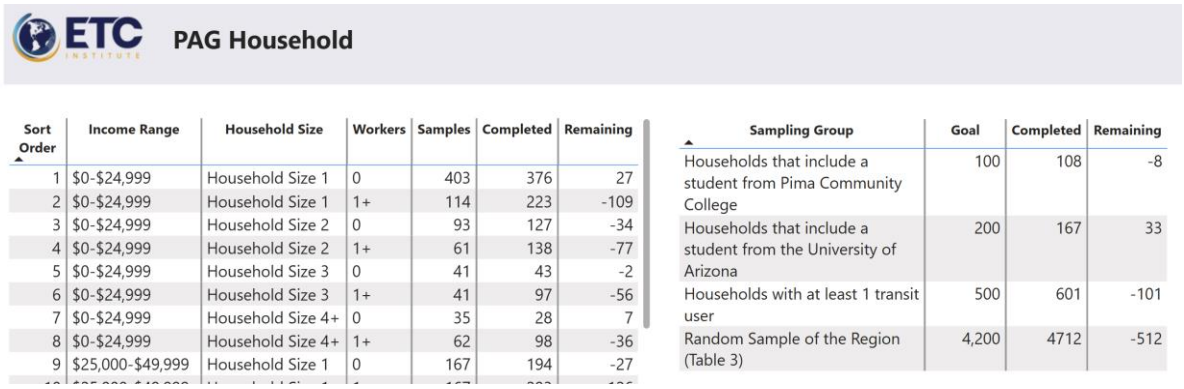
Figure 1-6: Flow Chart of Survey Process for Random Sample Households



1.3.2. Data Collection Monitoring

Throughout data collection, ETC summarized data collection status using an online dashboard. The dashboard summarized the number of completed households based on household size, number of workers, income group, sampling group (including secondary goals), and by district. All the numbers shown here have gone through the survey process and have been approved by a DRT Supervisor. Figure 1-7 shows a screenshot of the dashboard utilized to monitor completion efforts for both the stratified goals and the secondary goals, as shown under Sampling Group.

Figure 1-7: Screenshot of Dashboard for Stratified Goals and Secondary Goals



Sort Order	Income Range	Household Size	Workers	Samples	Completed	Remaining
1	$0-$24,999	Household Size 1	0	403	376	27
2	$0-$24,999	Household Size 1	1+	114	223	-109
3	$0-$24,999	Household Size 2	0	93	127	-34
4	$0-$24,999	Household Size 2	1+	61	138	-77
5	$0-$24,999	Household Size 3	0	41	43	-2
6	$0-$24,999	Household Size 3	1+	41	97	-56
7	$0-$24,999	Household Size 4+	0	35	28	7
8	$0-$24,999	Household Size 4+	1+	62	98	-36
9	$25,000-$49,999	Household Size 1	0	167	194	-27

Sampling Group	Goal	Completed	Remaining
Households that include a student from Pima Community College	100	108	-8
Households that include a student from the University of Arizona	200	167	33
Households with at least 1 transit user	500	601	-101
Random Sample of the Region (Table 3)	4,200	4712	-512

The progress of data collection was monitored, which helped develop effective strategies for survey recruitment. These strategies aim to boost participation among populations with low survey engagement.

2. Data Quality Assurance and Control

This chapter summarizes the data cleaning procedures and quality control measures employed in conducting the survey.

2.1. Verification of Collected Survey Data

Data cleaning procedures include data cleaning and database preparation as well as the logic and consistency checks. Details regarding these procedures are documented in this section.

2.1.1. Definition of a Complete

ETC defined a complete survey as one where all sections have been fully completed and verified with the household by an ETC interviewer and member of the DRT. The four sections of the survey include:

- Household demographics, such as the number of people living in the household, number of employed, number of vehicles available to household, and annual household income.
- Personal demographics, such as employment status, student status, and air quality analysis questions.
- Vehicle characteristics, such as type of vehicle, make, model, and year of vehicle.
- Trip characteristics, such as trips made on the scheduled travel day, mode of transportation, if any other household members were traveling with them, and arrival and departure times.

2.1.2. Logic and Consistency Checks for Quality Control

ETC Institute conducted data processing and geocoding activities concurrently with the data collection task. This resulted in a higher level of control over the quality of the completed data, since the daily attention to completed households allowed for quicker identification of where interviewer training may need to be strengthened.

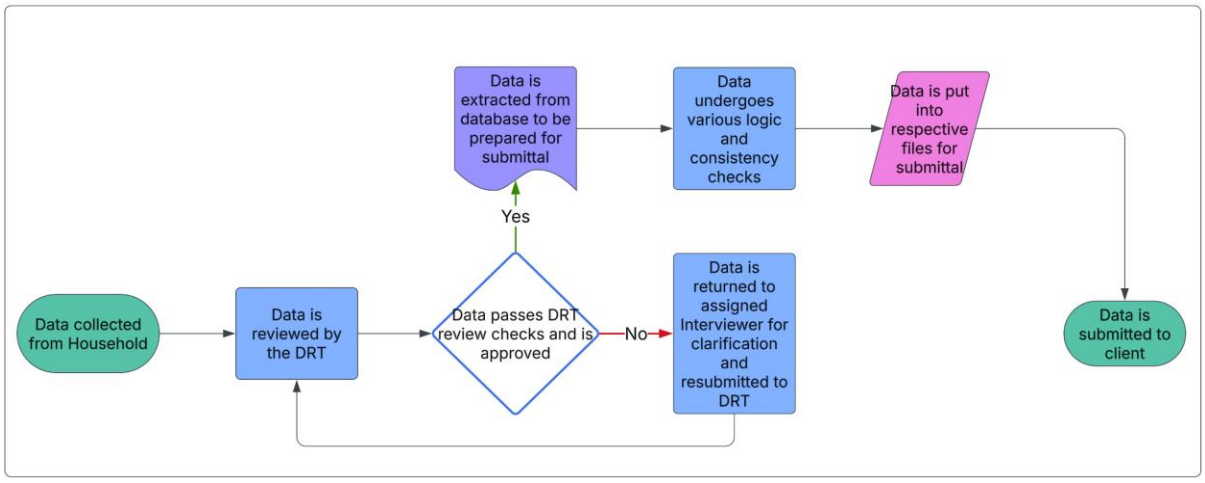
As data were compiled, they were edited and corrected. A data analyst from ETC conducted ongoing verification of the aggregate, cumulative data file. ETC used a specialized program to perform routine and customized quality checks on the data to confirm that submitted data met project requirements. A selection of the items checked using the edit check program include:

- Data range checks to ensure data is not outside the expected range. For example:
  - Times between locations were logical
  - Distance between locations were logical
- Data checks for missing data, including a flag for people who report no travel (this was performed by a combination of computerized queries and direct data viewing).
- Inter-file consistency (household size matches number of person records, etc.)
- Consistency between arrival and departure times.
- Consistency among shared trips within the household, specifically drivers and passengers in carpools.

If a record was indicated as illogical or needed further clarification, the ETC analyst sent the household back to the call center staff. The interviewers would reach out to the household to verify or update the information, and then it was sent back to the analyst to confirm.

A flow chart of the survey quality assurance is shown in Figure 2-1.

Figure 2-1: Flow Chart of Survey Quality Assurance



2.2. Quality Assurance and Quality Control (QA/QC)

In this section, two topics are detailed: QA/QC Summary and a summary of reasons why some complete cases were not delivered.

2.2.1. Assurance Process

ETC's DRT conducted data reviews within 48 hours of the completion of each survey. The DRT visually checked each individual trip diary for logic and accuracy of trip data. For those respondents who used the app, there was extra attention focused on making sure all trips were captured by the app.

Any households flagged as potentially missing trip data or that had any other misunderstandings were flagged and were sent back to the ETC Interviewer assigned to that household so that they could re-contact the household for further clarification. In addition, special attention was paid to "companion trips" (i.e., those trips where the respondent indicated they traveled with 1 or more household members) to ensure that co-traveling household members reported traveling to the same location at the same time.

2.2.2. Data Cleaning and Database Preparation

Once all records were reviewed and received supervisory approval, data was intermittently extracted from the database and ran through a series of logic and consistency checks to ensure data accuracy was met. Once all checks had been run, the data was then input into a template designed to create one submittal file containing five separate sheets:

- Household information would go into Rec 1 file
- Person information would go into Rec 2 file
- Vehicle information would go into Rec 3 file
- Trip information would go into Rec 4 file
- GPS information would go into Rec 5 file

These transformation processes were implemented using the R programming language. The data cleanup workflow included supplementary steps, such as geocoding incomplete location addresses, integrating data from mapping and routing API services, and performing GIS data transformations. Other automated processes included confirming the household locations to be in the study area, checking for duplicated home addresses, extracting and filtering trip data to ensure scheduled and reported travel date aligned correctly, and validating companion trips to ensure consistency among trip details.

Any open-ended "Other" responses were reviewed and updated accordingly for inappropriate language but otherwise did not undergo any further processes prior to submission.

2.2.3. QA/QC Summary

Overall, there were a total of 5,009 household surveys completed during the main survey collection. Of those 5,009, 4,911 were submitted to PAG. Reasons for the 98 not to be submitted include duplicate household participation, such as family members that try to participate but their address is flagged as a household that has already participated, and households outside of the study area.

2.3. Weighting and Expansion

This section presents control total data for the weighting process, and the weighting and expansion methods.

2.3.1. Control Totals for Weighting and Expansion

Before initiating the weighting and expansion process for the collected survey samples, it is essential to establish control totals for selected variables. Control totals serve as benchmark values that ensure survey results accurately represent the population. These variables are defined at the district level, providing a spatial framework for adjustment. Using district-level control totals, the survey samples will be expanded to achieve proportional geographic representation across the Pima County area.

Several data sources were utilized to establish district-level control totals. These include population estimated from the Arizona Office of Economic Opportunity (AOEO), demographic estimates from the Census American Community Survey (ACS), employment data from the PAG employment database, and employment ratio provided by the University of Arizona Eller Economic and Business Research Center (EBRC).

As household demographics, the selected variables comprise household income, household size, home ownership, employment, type of occupancy, and vehicle ownership, as presented in Table 2-1. The population was projected for 2025 based on AOEO's 2024 estimates, while the control totals of household demographic variables were from the 2024 ACS one-year estimates.

Person factors include age, gender, race, employment, industry, occupation, students, language, and educational attainment, also referenced in Table 2-1. The majority of control total values were from the 2024 ACS one-year estimates, except for employment, industry and occupation. The regional employment job-population ratio was obtained from EBRC Economic Outlook (1st Quarter 2025), and industry and occupation were validated using the PAG employment database.

Table 2-1: Demographic Control Totals

	Control Total Variables
Household Factors	Income, household size, home ownership, employment, type of occupancy, vehicle ownership
Person Factors	Age, gender, race, employment, industry, occupation, students, language, education

2.3.2. Weighting and Expansion Methods

This section details the weighting and expansion methods used for the PAG HTSA.

Weighting is necessary to ensure results are representative of the broader population. Survey responses are rarely perfectly proportional across all groups, and certain populations may be overrepresented or underrepresented due to response patterns and sampling strategies. The weighting process corrects for these differences, allowing overall results to reflect true population distributions while still supporting reliable subgroup analysis.

To ensure that household travel survey data accurately reflects the population of a study area, a multi-dimensional iterative proportional fitting (IPF) weighting method, also known as raking, is applied. This statistical approach adjusts survey sample weights to align with known population distributions, supporting the production of representative estimates at both the household and individual level.

In IPF, a set of variables for which the population distribution is known is selected, and the procedure repeatedly adjusts the weights to match each target population until the sample distribution converges with the population distribution by minimizing the total difference between the sum of each of the variables' sample weights and the target distributions with each iteration.

The weighting approach occurs in three stages:

1. Household level weighting
2. Person level weighting
3. Trip level weighting

Each stage uses iterative proportional fitting to align the survey data with selected demographic control totals. The process is conducted at the district geographic level. Also, separate weightings were conducted at household-level, individual-level and trip-level.

Household level weighting adjusts the base survey weights to reflect the distribution of household characteristics in the population. Once household level weights are established, person level weights are applied to individuals within each household to maintain consistency across levels. Records collected for oversampling to support subgroup analysis were excluded from the weighting process to avoid distorting it.

Using IPF, weights were computed by sequentially adjusting weights across the selected variables and calibrating each variable's weights to the known population distribution. Weights are adjusted

across selected dimensions through an iterative process until the marginal totals match the external population benchmarks within an acceptable tolerance. This process is repeated in cycles, often converging within 5 to 15 iterations. Once the adjustment process converged, the final weights were applied to the dataset.

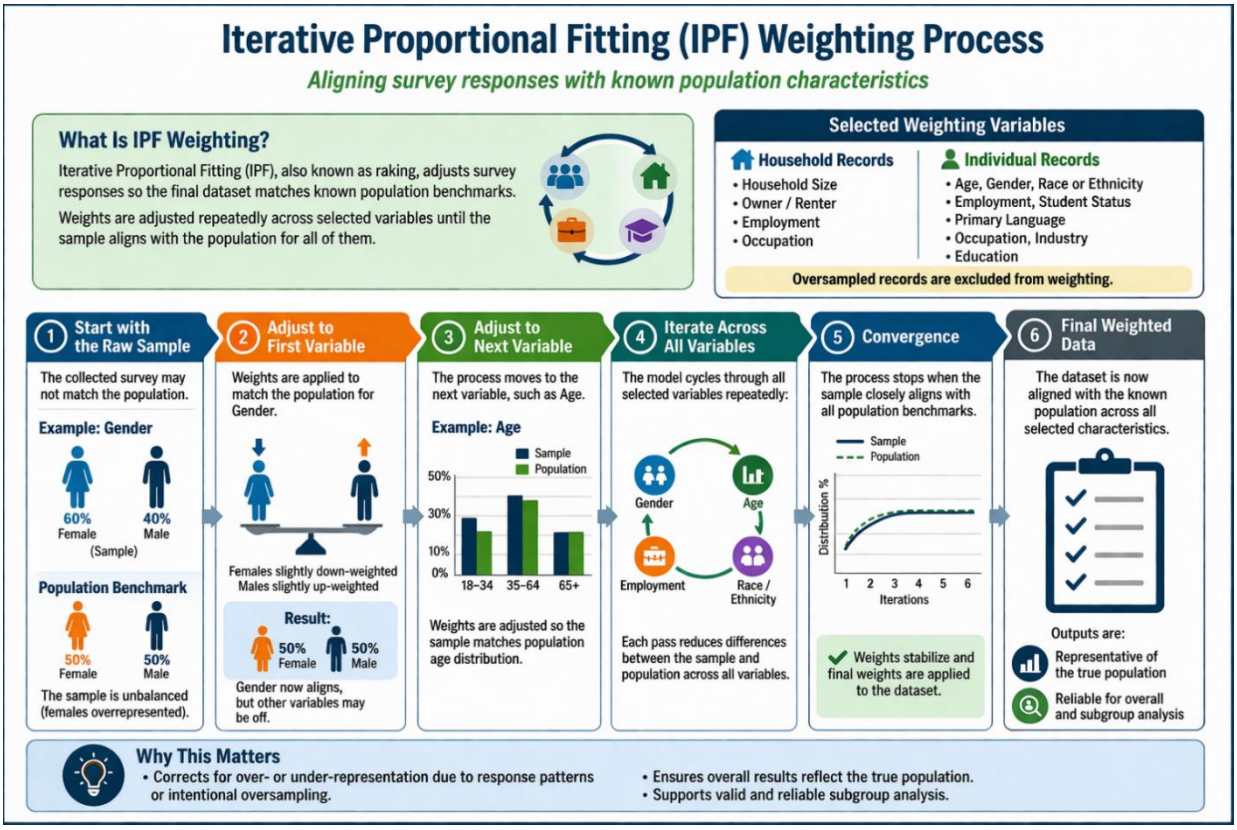
After the household and person level weights were developed using iterative proportional fitting, a final adjustment was made at the trip level to account for differences in trip reporting between households that used the smartphone app and households that did not. Trip level weighting considers the person level weights and then looks further at whether 1) the individual respondent made any trips and 2) if they did make any trips, if they recorded those trips via app or through another method.

Once the final person weights were applied to the trip dataset, average trip rates were compared by household size for app-user and non-app-user households. Because households with no app users generally reported fewer trips, the person weight factor on the trip file was multiplied by the appropriate factor so that their trip rates were more closely aligned with those observed for app-user households. The adjustment factor was based on household size. The factors used were ~1.53 for one-person households, ~1.41 for two-person households, ~1.43 for three-person households, and ~1.51 for households of four or more persons. For non-app households, this final adjustment improved the accuracy of the weighted trip totals and helped ensure the results better represent daily travel across the region.

The following describes the summary of how trip rates were applied:

- The trip weight factor for persons who did not complete trips on their travel day is 0;
- The trip expansion factor is the person weight factor for households using app applied to each trip record for households using the app;
- And the trip expansion factor is the person weight factor multiplied by the under-reporting of trips for each trip in household not using the app.

Figure 2-2: Iterative Proportional Fitting (IPF) Weighting Process



3. Household Travel Patterns and Analysis

This chapter presents a summary of the 2025 PAG Household Travel Study and Assessment (HTSA). The data presented includes both unweighted and weighted results from the household, person, vehicle, and trip demographics. The analysis excludes "Don't Know" and "Refused" responses unless otherwise noted.

3.1. Descriptive Statistics

This section provides detailed characteristics of households, persons and vehicles captured in the PAG HTSA. To begin, the home location of completed households is shown to illustrate the spatial distribution of the samples and demonstrate the survey's geographic representativeness. Selected household attributes are then summarized, including household size, number of workers, home tenure and ownership, residence type, online shopping membership, and household income. At the person level, the analysis highlights key demographic and workforce characteristics, educational attainment and student enrollment details, as well as language use. Finally, the vehicle section examines a range of vehicle attributes, including vehicle type, make, model year, fuel type, fuel efficiency, commercial use, and overall vehicle ownership patterns.

3.1.1. Households

The Figure 3-1 , Figure 3-2 and Figure 3-3 illustrate the geographic distribution of 4,911 households with completed survey in Pima County. It reflects a good representation of households across the PAG region.

Figure 3-1: Home Location of Completed Household for all Pima County

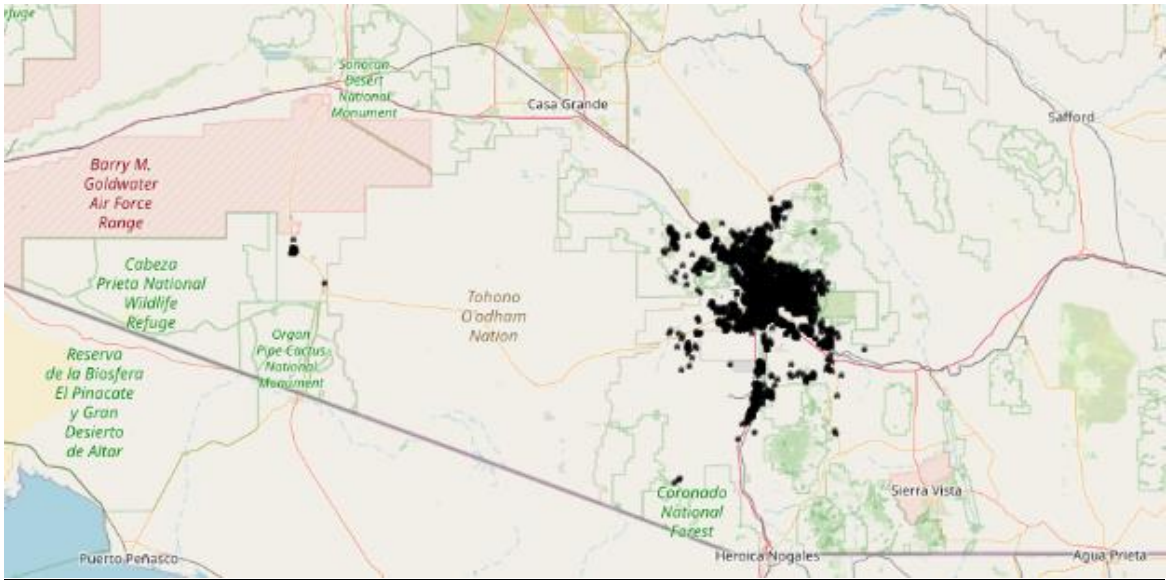


Figure 3-2: Heatmap of Home Location of Completed Households (Eastern Pima County)

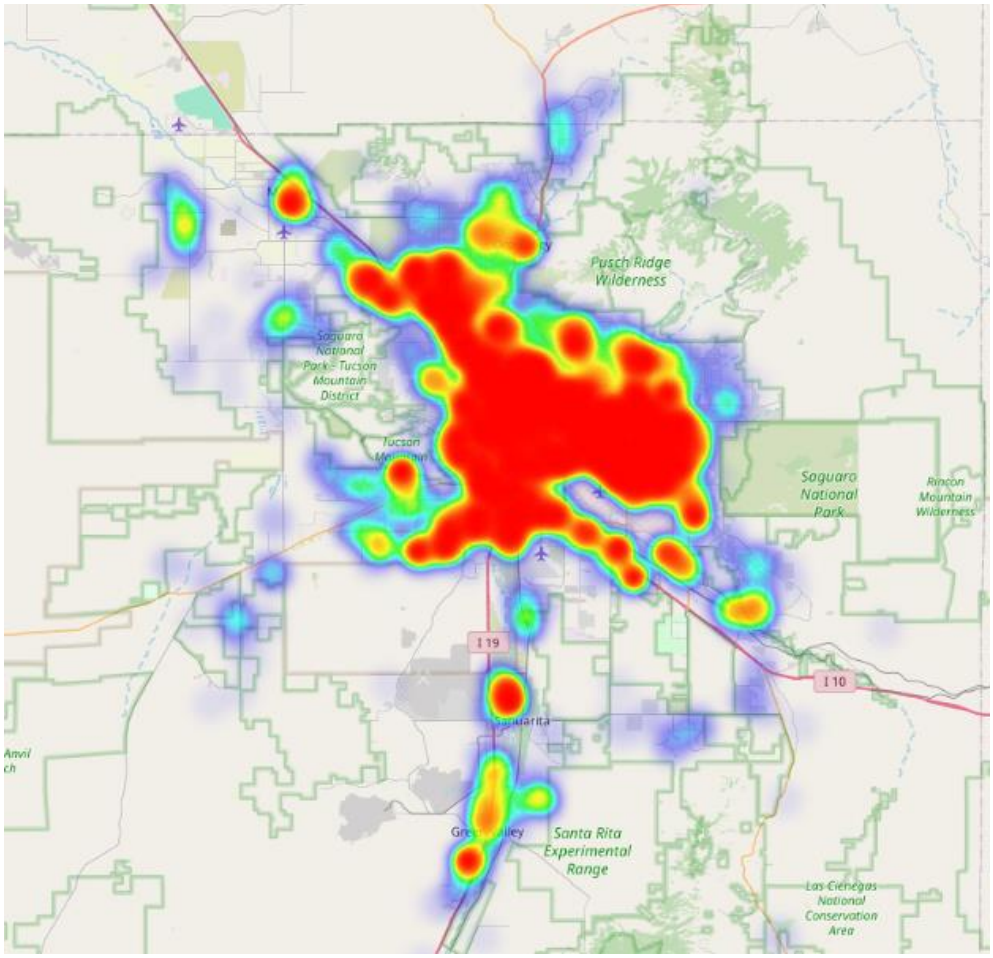
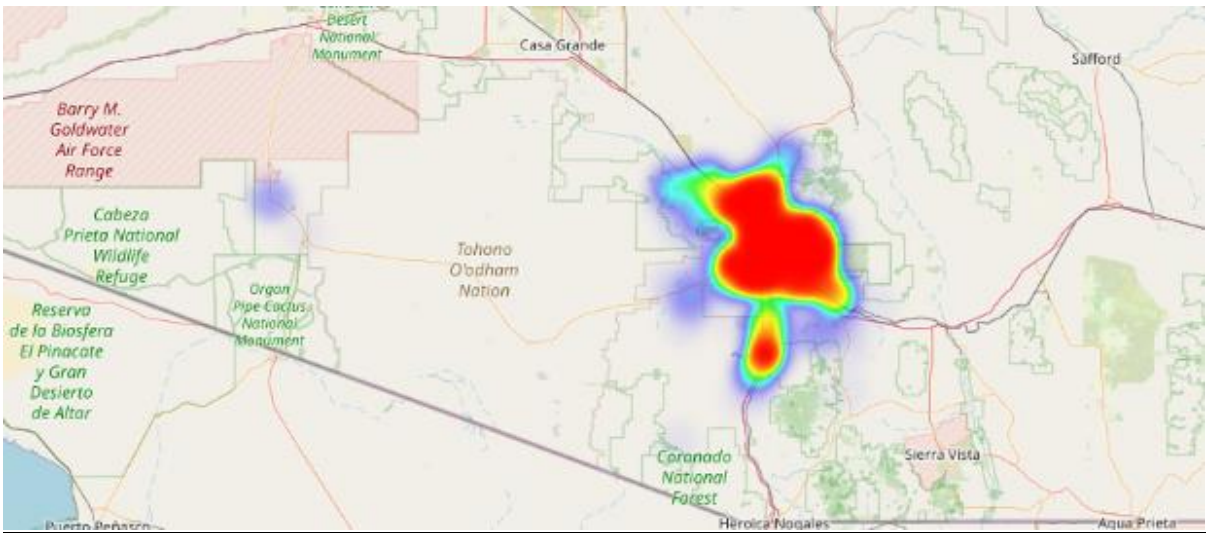


Figure 3-3: Home Location of Completed Household for all Pima County



This section summarizes key household characteristics based on weighted survey data.

- As shown in Table 3-1, two-person households represent the largest share at 35.8%, followed by single-person households at 31.7%. Together, one and two person households account for nearly 67% of all households.
- In terms of workers per household, approximately 34% of households have no workers, 37.9% have one worker, and 22.3% have two workers meaning that households with one or two workers make up about 60% of all households (Table 3-2).
- Regarding housing tenure, nearly 60 % households have lived in their current residence for five or more years, while 17.4% have lived there for one year or less (Table 3-3).
- Homeownership is also prevalent. About 66% of households own their homes, while 33.2% rent (Table 3-4).
- In addition, 60.5 % of households live in single-family homes, 20.8 % live in apartments and 9.5% live in mobile homes (Table 3-5).
- In Table 3-6, online shopping memberships is widespread, with 77.9% of households (349,165 out of 448,321) holding at least one subscription. The three most common memberships are Amazon Prime (34.3%), Walmart+(11.5%), and Instacart (8.8%).
- Household income levels show that nearly 37% of households earn less than $50,000 annually, while 33.1 % report incomes above $100,000 and 16.2% report incomes above $150,000 (Table 3-7).

Table 3-1: Household Size

	Household Size	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	1	1,760	141,910	35.8%	31.7%
	2	1,609	160,548	32.8%	35.8%
	3	704	58,520	14.3%	13.1%
	4+	838	87,342	17.1%	19.5%
Total	—	4,911	448,321	—	—

Table 3-2: Number of Workers per Household

	Workers	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	0	1,778	151,872	36.2%	33.9%
	1	1,913	169,825	39.0%	37.9%
	2	983	100,104	20.0%	22.3%
	3+	237	26,521	4.8%	5.9%
Total	—	4,911	448,322	—	—

Table 3-3: Tenure

	Tenure	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	One year or less	845	77,783	19.1%	17.4%
	Two years	457	44,327	10.4%	9.9%
	Three years	325	32,735	7.4%	7.3%
	Four years	231	24,781	5.2%	5.6%
	Five or more years	2,555	266,612	57.9%	59.7%
Total	—	4,413	446,238	—	—

Table 3-4: Home Ownership

	Home Ownership	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Own / Paying Mortgage	2,516	292,710	57.1%	65.6%
	Rent	1,821	147,919	41.3%	33.2%
	Provided by job or military	15	1,191	0.3%	0.3%
	Other	54	4,056	1.2%	0.9%
Total	—	4,406	445,876	—	—

Table 3-5: Type of Residence

	Housing Type	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Single Family Home (unattached)	2,500	271,027	56.4%	60.5%
	Apartment	1,257	93,421	28.4%	20.8%
	Mobile Home	222	42,382	5.0%	9.5%
	Townhouse	176	22,778	4.0%	5.1%
	Condo	92	9,590	2.1%	2.1%
	Duplex	143	7,675	3.2%	1.7%
	Other	43	1,304	1.0%	0.3%
Total	—	4,433	448,177	—	—

Table 3-6: Memberships

	Membership	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Amazon Prime	2,781	291,653	32.1%	34.3%
	Walmart+	1,033	98,091	11.9%	11.5%
	Sam's Club Plus	516	50,618	6.0%	5.9%
	Target Circle 360	527	48,220	6.1%	5.7%
	Doordash	793	74,690	9.2%	8.8%
	Instacart	508	46,659	5.9%	5.5%
	UberEats	711	65,729	8.2%	7.7%
	Grubhub	382	33,534	4.4%	3.9%
	Other	1,410	141,560	16.3%	16.6%
Total	—	8,661	850,753	—	—

Table 3-7: Household Income (Stratified)

	Income Range	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	$0 to $24,999	1,137	74,778	23.2%	16.7%
	$25,000 to $49,999	1,109	92,814	22.6%	20.7%
	$50,000 to $74,999	856	80,005	17.4%	17.8%
	$75,000 to $99,999	516	52,673	10.5%	11.7%
	$100,000 to $149,999	913	75,574	18.6%	16.9%
	$150,000 or more	380	72,477	7.7%	16.2%
Total	—	4,911	448,321	—	—

Table 3-8: Household Income

	Income Range	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Less than $9,999	348	20,430	7.1%	4.6%
	$10,000 to $14,999	283	18,124	5.8%	4.0%
	$15,000 to $19,999	217	16,059	4.4%	3.6%
	$20,000 to $24,999	289	20,165	5.9%	4.5%
	$25,000 to $29,999	258	20,857	5.3%	4.7%
	$30,000 to $34,999	249	19,908	5.1%	4.4%
	$35,000 to $39,999	222	19,525	4.5%	4.4%
	$40,000 to $44,999	189	15,600	3.8%	3.5%
	$45,000 to $49,999	191	16,925	3.9%	3.8%
	$50,000 to $54,999	266	24,135	5.4%	5.4%
	$55,000 to $59,999	149	14,057	3.0%	3.1%
	$60,000 to $64,999	159	15,391	3.2%	3.4%
	$65,000 to $69,999	117	10,386	2.4%	2.3%
	$70,000 to $74,999	165	16,036	3.4%	3.6%
	$75,000 to $79,999	132	13,172	2.7%	2.9%
	$80,000 to $84,999	103	10,418	2.1%	2.3%
	$85,000 to $89,999	84	9,298	1.7%	2.1%
	$90,000 to $94,999	96	9,919	2.0%	2.2%
	$95,000 to $99,999	101	9,865	2.1%	2.2%
	$100,000 to $104,999	415	30,405	8.5%	6.8%
	$105,000 to $114,999	130	11,295	2.6%	2.5%
	$115,000 to $124,999	120	10,367	2.4%	2.3%
	$125,000 to $134,999	128	10,477	2.6%	2.3%
	$135,000 to $149,999	120	13,029	2.4%	2.9%
	$150,000 to $199,999	211	40,281	4.3%	9.0%
	$200,000 or more	169	32,196	3.4%	7.2%
Total	—	4,911	448,321	—	—

3.1.2. Persons

This section summarizes the characteristics of person information.

- According to the weighted results (Table 3-9), 22.4% of population is age of 20 or younger, and 56.3% are between ages 20 and 64, totaling 78.6% of the population is under age 65, while 21.4 % are 65 or older. Nationally, people aged 65 and older make up about 18% of the U.S population in 2024 according to the Census ACS 1 year estimate. Compared with this national share, Pima county has a higher proportion of older adults. Conversely, 22.4% of population is under age 20, which is lower than the national share of 24.1% in 2024, showing that Pima county has relatively fewer younger people compared with the U.S. overall.
- Table 3-10 presents the ethnicity composition. The largest share is by White (52%), followed by the Hispanic population (36.1%).
- Shown on Table 3-11, gender distribution is nearly even, with 50.4% male and between females and males at 50.4% of male and 49.6% of female.
- Additionally, 73.6% of the population are licensed drivers (Table 3-12).

Table 3-9: Age of Survey Participants

	Age Range	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	0 - 4 years	305	49,489	3.1%	4.7%
	5 - 9 years	433	59,934	4.5%	5.7%
	10 - 14 years	492	56,490	5.1%	5.4%
	15 - 19 years	492	68,580	5.1%	6.6%
	20 - 24 years	522	88,172	5.4%	8.5%
	25 - 34 years	1,727	136,675	17.8%	13.1%
	35 - 44 years	1,741	117,428	18.0%	11.3%
	45 - 54 years	1,219	114,397	12.6%	11.0%
	55 - 64 years	1,198	129,208	12.4%	12.4%
	65 or older	1,560	222,928	16.1%	21.4%
Total	—	9,689	1,043,301	—	—

Table 3-10: Ethnicity of Survey Participants

Ethnicity	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
Hispanic Any Race	2,397	384,262	24.6%	36.1%
Black / African American Not Hispanic	830	34,745	8.5%	3.3%
Asian Not Hispanic	227	31,883	2.3%	3.0%
Indian and Alaska Native Not Hispanic	212	15,779	2.2%	1.5%
White Not Hispanic	5,702	553,688	58.6%	52.0%
Other Not Hispanic	52	3,040	0.5%	0.3%
Multiple Races Not Hispanic	312	40,381	3.2%	3.8%
Total	–	9,732	1,063,779	–	–

Table 3-11: Gender of Survey Participants

Gender	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
Male	9,156	528,068	47.0%	50.4%
Female	10,318	520,004	53.0%	49.6%
Total	–	19,474	1,048,072	–	–

Table 3-12: Driver Status of Survey Participants

Licended Driver	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
Yes	7,513	785,216	75.6%	73.6%
No	2,421	281,602	24.4%	26.4%
Total	–	9,934	1,066,818	–	–

- Employment data show that 38.1% of individuals are employed, while 61.9% are not currently working (Table 3-13).
- Among those employed, nearly 75% work full time and 16.5% work part time. In addition, self-employed workers account for 5.3% full-time and 3.4% part-time (Table 3-14).
- In Table 3-15, the primary reasons for not being employed are retirement (43.5%), actively seeking work (18.6%), and being under working age (16.7%).
- The most common weekly working hours are 40 to 49 hours (59.7%), followed by 30 to 39 hours (13.1%), while 6.5% work is fewer than 20 hours (Table 3-16).

Table 3-13: Employment

	Employment	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Yes	4,204	403,670	42.9%	38.1%
	No	5,602	654,734	57.1%	61.9%
Total	—	9,806	1,058,404	—	—

Table 3-14: Employment Status by Type

	Employment Status	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Employed full time 30 or more hours per week	3,225	300,892	77.2%	74.8%
	Employed part time less than 30 hours per week	603	66,360	14.4%	16.5%
	Self employed full time 30 or more hours per week	202	21,476	4.8%	5.3%
	Self employed part time less than 30 hours per week	145	13,767	3.5%	3.4%
Total	—	4,175	402,495	—	—

Table 3-15: Why Not Employed

	Reason	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Retired	1,478	208,974	34.9%	43.5%
	Volunteer	26	2,865	0.6%	0.6%
	Disability Status	531	43,914	12.6%	9.1%
	Homemaker	299	28,967	7.1%	6.0%
	Looking for Work	1,079	89,125	25.5%	18.6%
	Not Looking for Work	247	21,089	5.8%	4.4%
	Student (any age)	525	80,413	12.4%	16.7%
	Other	45	5,012	1.1%	1.0%
Total	—	4,230	480,359	—	—

Table 3-16: Total Hours Worked (at all Jobs)

	Hours Range	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	0-9	69	6,748	2.0%	2.0%
	10-19	111	15,341	3.2%	4.5%
	20-29	323	34,152	9.3%	10.1%
	30-39	575	44,476	16.6%	13.1%
	40-49	2,079	202,644	59.9%	59.7%
	50-59	212	27,057	6.1%	8.0%
	60+	103	9,162	3.0%	2.7%
Total	–	3,472	339,581	–	–

- Commercial vehicle drivers make up 3% of employed persons (Table 3-17).
- Among them, 63.6% drive commercial service vehicles, and 10.8% operate cargo transport vehicles (Table 3-18).
- Additionally, 6.7% of the population made a delivery or pick up in the past seven days for a Transportation Network Company (TNC) including Uber, Lyft, Doordash, Instacart and etc. (Table 3-19).

Table 3-17: Commercial Vehicle Driver

	Response	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Yes	112	11,868	2.7%	3.0%
	No	4,052	390,365	97.3%	97.0%
Total	–	4,164	402,233	–	–

Table 3-18: Commercial Vehicle Type

	Vehicle Type	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Cargo transport vehicle	18	1,230	16.7%	10.8%
	Commercial service vehicle	61	7,247	56.5%	63.6%
	Cargo transport and Service vehicle	7	727	6.5%	6.4%
	Other	22	2,198	20.4%	19.3%
Total	–	108	11,402	–	–

Table 3-19: TNC Delivery of Pick-up in Last 7 Days

	Response	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Yes	787	71,213	8.1%	6.7%
	No	8,938	986,829	91.9%	93.3%
Total	—	9,725	1,058,042	—	—

- About 52.5% of workers have flexible work schedules (Table 3-20).
- Furthermore, 28.1% of work from a home office (Table 3-21).
- And 17.7% identify as self-employed (Table 3-22).
- The top three workplace types include home offices (18.1%), non-government offices (17.8%), and medical offices (7%). Also, 5.5% of the population hold more than one job (Table 3-23).

Table 3-20: Flex Time

	Flexible Work Schedule	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Flexible / Variable	2,124	209,724	51.4%	52.5%
	Fixed / Unchanging	2,007	189,498	48.6%	47.5%
Total	—	4,131	399,222	—	—

Table 3-21: Home Office

	Response	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Yes	1,156	112,772	27.7%	28.1%
	No	3,019	288,199	72.3%	71.9%
Total	—	4,175	400,971	—	—

Table 3-22: Self-Employed Status

	Response	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Yes	697	71,201	16.8%	17.7%
	No	3,460	330,431	83.2%	82.3%
Total	—	4,157	401,632	—	—

Table 3-23: Workplace Type

	Type	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Office (non-government)	678	71,808	16.3%	17.8%
	Office (government)	332	32,598	8.0%	8.1%
	Home Office / Residential Workplace	690	73,009	16.6%	18.1%
	Casino Hotel	18	3,718	0.4%	0.9%
	Hotel / Motel / Campsite (No Casino)	35	2,451	0.8%	0.6%
	Coworking Space	27	4,564	0.6%	1.1%
	Industrial Warehouse / Manufacturing	190	25,559	4.6%	6.4%
	Medical Offices / Hospital	413	28,254	9.9%	7.0%
	School; Daycare / Preschool	21	1,207	0.5%	0.3%
	School; Elementary	108	6,132	2.6%	1.5%
	School; Middle / Junior High	56	2,365	1.3%	0.6%
	School; High School	82	6,071	2.0%	1.5%
	School; College / University / Trade School	195	18,682	4.7%	4.6%
	Restaurant / Fast Food, Café, Bar & Grill	228	17,122	5.5%	4.3%
	Convenience / Drug Store / Gas Station	38	5,065	0.9%	1.3%
	Grocery Store	96	10,830	2.3%	2.7%
	Recreational facility / Fitness Club	40	5,241	1.0%	1.3%
	Other Retail / Shopping	202	25,553	4.9%	6.3%
	Other Personal Business (i.e. Bank, Automotive Dealer, Beauty Salon, etc.)	171	12,441	4.1%	3.1%
	Outdoor Park / Beach / Sports Field / Open Space	45	5,575	1.1%	1.4%
	Airport	20	1,833	0.5%	0.5%
	Other	470	42,396	11.3%	10.5%
Total	—	4,155	402,471	—	—

Because of limited records for primary industry, industry sectors were grouped into three categories including primary/industrial, commercial/service and social/public, as referenced in Table 3-24.

Table 3-24: Primary Industry Classifications

	Primary Industry
Primary and Industrial Sectors	agriculture, forestry, fishing and hunting, and mining; construction; manufacturing; transportation and warehousing, and utilities; wholesale trade
Commercial and Service Sectors	retail trade; information; finance and insurance, and real estate and rental and leasing; professional, scientific, and management, and administrative and waste management services; other services, except public administration
Social and Public Sectors	educational services, and health care and social assistance; arts, entertainment, and recreation, and accommodation and food services; public administration

- As shown in Table 3-25, social and public industries represent the largest share at 44.7%, followed by commercial and service industries (30.1%).

Table 3-25: Primary Industry

	Primary Industry	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Primary/Industrial	615	95,281	17.2%	25.2%
	Commercal/Service	1,322	113,903	36.9%	30.1%
	Social/Public	1,643	169,170	45.9%	44.7%
Total	—	3,580	378,354	—	—

Primary Occupations are categorized into professional/creative, support/service, and technical/manual, referred to Table 3-26.

Table 3-26: Primary Occupation Classifications

	Primary Occupation
Professional and Creative	Management, business, science, and art occupations
Support and Service	Service occupations and sales and office occupations
Technical and Manual	Natural resources, construction and maintenance occupations and production, transportation, and material moving occupations

- Professional and creative occupations constitute 51.1%, followed by support and service occupations at 30.5% (Table 3-27). And 94.5% highlighted a single job (Table 3-28).

Table 3-27: Primary Occupation

	Occupation	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Professional/Creative	1,910	198,998	52.7%	51.1%
	Support/Service	1,281	118,695	35.3%	30.5%
	Technical/Manual	436	71,609	12.0%	18.4%
Total	—	3,627	389,302	—	—

Table 3-28: More than One Job

	Response	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Yes	242	21,930	5.8%	5.5%
	No	3,910	379,644	94.2%	94.5%
Total	—	4,152	401,574	—	—

- Regarding education attainment (Table 3-29), 33.3% have some college or an associate degree, and 31.4% have a high school diploma or less including 21% with less than a high school education and 10.4% who are high school graduate or GED holders. In addition, 35.3% hold a bachelor's degree or higher.
- A total of 24.8% of the population are students (Table 3-30). Of these students, 31.7% attend post-secondary or trade school, 28.2% attend elementary school, 18% attend high school (Table 3-31).
- 7.8% of students are home schooled (Table 3-32), and 16.5% take online classes (Table 3-33).

Table 3-29: Educational Attainment

	Level	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Less than a high school graduate	1,824	223,294	18.7%	21.0%
	High school graduate or GED	1,872	110,044	19.2%	10.4%
	Some college or Associate's degree	2,355	353,278	24.1%	33.3%
	Bachelor's degree	2,067	214,551	21.2%	20.2%
	Graduate degree or professional degree	1,650	160,457	16.9%	15.1%
Total	—	9,768	1,061,624	—	—

Table 3-30: Student Status

	Response	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Yes	1,876	259,509	19.3%	24.8%
	No	7,823	786,529	80.7%	75.2%
Total	—	9,699	1,046,038	—	—

Table 3-31: School Type

	Type	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Daycare / Preschool	118	17,994	6.5%	7.1%
	Elementary School	539	71,173	29.6%	28.2%
	Middle School / Junior High	289	33,322	15.9%	13.2%
	High School	379	45,403	20.8%	18.0%
	Post Secondary / College / Trade	465	79,832	25.6%	31.7%
	Other	29	4,272	1.6%	1.7%
Total	—	1,819	251,996	—	—

Table 3-32: Home Schooled

	Response	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Yes	161	20,342	8.6%	7.8%
	No	1,715	240,381	91.4%	92.2%
Total	—	1,876	260,723	—	—

Table 3-33: Online Schooled

	Response	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Yes	311	41,942	16.9%	16.5%
	No	1,526	212,163	83.1%	83.5%
Total	—	1,837	254,105	—	—

- Moreover, 25.2% of the population speak a language other than English at home (Table 3-34), 89.9% report very good English proficiency (Table 3-35).
- According to Table 3-36, 82% of the survey participants provided travel information.

Table 3-34: Language Other than English Spoken at Home

	Response	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Yes	1,714	254,192	18.0%	25.2%
	No	7,800	756,397	82.0%	74.8%
Total	—	9,514	1,010,590	—	—

Table 3-35: English Proficiency

	Level	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Very Well	1,510	228,602	88.1%	89.9%
	Well	142	17,743	8.3%	7.0%
	Not Well	51	6,481	3.0%	2.5%
	Not at All	11	1,367	0.6%	0.5%
Total	—	1,714	254,192	—	—

Table 3-36: Participant Has Travel Data

	Has Travel	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Yes	8,109	874,894	81.6%	82.0%
	No	1,825	191,924	18.4%	18.0%
Total	—	9,934	1,066,818	—	—

3.1.3. Vehicles

This section presents the characteristics of vehicle attributes.

- Regarding vehicle types, almost half of all vehicles are cars, accounting for 53.3%. The second largest share is sport utility vehicles at 24.6%, followed by pickup trucks at 13.8%. Together, these three vehicle types make up total 91.7% of the total fleet (Table 3-37).
- In Table 3-38, the most common vehicle makes are Toyota (17.6%), Ford (11.4%), Honda (10.1%), General Motors (8.5%) and Nissan (5.2%).
- With respect to vehicle model year (Table 3-39), 47.3% of vehicles were manufactured between 2010 and 2019, 23.1% between 2020 and 2024, and 22.2% between 2000 and 2009.
- In terms of fuel type (Table 3-40), nearly 89% of vehicles use gasoline, while hybrid account for 4.4%, and diesel vehicles make up 3.2%. All electric plugin represent 2.5% which shows a larger share than propane, natural gas, or plug-in hybrid vehicles.

- Regarding fuel efficiency (Table 3-41), 47.5% is vehicles achieve 15-25 miles per gallon, and 38.8% achieve 25-35 miles per gallon.
- Approximately 2.1 % of all vehicles are used for commercial purposes, including services such as Uber, Lyft, Doordash, and Instacart (Table 3-42).
- Among vehicles used commercially (Table 3-43), the largest share is food and grocery delivery (25.7%), followed closely by service vehicles such as electricians, plumbers, HVAC, construction, and lawn care at 25.2%. Passenger transport services, such as Uber, Lyft, taxi and limousines, represent 13.3% of commercial vehicle use.
- Finally, 98% of vehicles are owned or leased by a household member (Table 3-44).

Table 3-37: Type of Vehicle

	Type of Vehicle	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Motorcycle (includes mopeds)	165	22,089	2.4%	2.8%
	Car (includes station wagons)	3,951	421,056	56.4%	53.3%
	Van (mini and passenger)	238	27,123	3.4%	3.4%
	Sport Utility Vehicle	1,652	194,556	23.6%	24.6%
	Pickup Truck	881	109,079	12.6%	13.8%
	Cargo Van	20	2,082	0.3%	0.3%
	Service Vehicle	11	1,876	0.2%	0.2%
	Other	93	12,350	1.3%	1.6%
Total	—	7,011	790,212	—	—

Table 3-38: Top Chosen Makes of Vehicles

Make	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
Toyota	1,312	139,387	18.7%	17.6%
Ford	733	90,542	10.4%	11.4%
Honda	766	80,399	10.9%	10.1%
General Motors	561	67,152	8.0%	8.5%
Nissan	405	40,969	5.8%	5.2%
Hyundai	350	40,003	5.0%	5.0%
Dodge (Chrysler)	318	34,819	4.5%	4.4%
Kia	315	34,088	4.5%	4.3%
Subaru	248	28,608	3.5%	3.6%
Jeep (Stellantis; Fiat Chrysler Automobiles)	218	26,361	3.1%	3.3%
Mazda	169	18,007	2.4%	2.3%
BMW	143	16,316	2.0%	2.1%
All Other Makes	1,495	175,836	21.3%	22.2%
Total	—	7,033	792,486	—	—

Table 3-39: Year of Vehicle

Year	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
1970-1979	48	6,499	0.7%	0.9%
1980-1989	54	7,038	0.8%	0.9%
1990-1999	299	33,672	4.4%	4.4%
2000-2009	1,465	168,206	21.7%	22.2%
2010-2019	3,274	358,677	48.5%	47.3%
2020-2024	1,539	175,367	22.8%	23.1%
2025+	75	9,124	1.1%	1.2%
Total	—	6,754	758,583	—	—

Table 3-40: Type of Fuel

	Type of Fuel	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Gasoline	6,206	688,949	90.0%	88.9%
	Diesel	213	25,160	3.1%	3.2%
	Propane	3	443	0.0%	0.1%
	Natural Gas	9	564	0.1%	0.1%
	All Electric Plugin	144	19,516	2.1%	2.5%
	Hybrid	282	34,136	4.1%	4.4%
	Hybrid Plugin	36	5,458	0.5%	0.7%
	Other	4	320	0.1%	0.0%
Total	—	6,897	774,545	—	—

Table 3-41: Miles per Gallon

	MPG Range	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	0-15 mpg (e)	337	37,890	6.4%	6.5%
	15-25 mpg (e)	2,513	278,471	47.6%	47.5%
	25-35 mpg (e)	2,088	227,806	39.5%	38.8%
	35+ mpg (e)	344	42,377	6.5%	7.2%
Total	—	5,282	586,544	—	—

Table 3-42: Commercial Use

	Response	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Yes	160	16,164	2.3%	2.1%
	No	6,727	758,545	97.7%	97.9%
Total	—	6,887	774,709	—	—

Table 3-43: Type of Commercial Use

	Type	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	School / Transit Bus	1	172	0.6%	1.1%
	Chauffeur Passenger(s) (Uber, Lyft, taxi, limo, etc.)	28	2,108	17.8%	13.3%
	Food / Grocery Delivery (DoorDash, UberEats, Instacart, etc.)	46	4,075	29.3%	25.7%
	Parcel Delivery (mail, UPS, FedEx, Amazon, etc.)	4	279	2.5%	1.8%
	Other Home Delivery (furniture, appliances, etc.)	2	68	1.3%	0.4%
	Other Local Commercial Delivery (delivery of inventory to businesses)	10	724	6.4%	4.6%
	Long-haul / OTR / Regional Trucking	2	199	1.3%	1.3%
	Service Vehicle (electricians, plumbers, HV / AC, construction, lawn care, etc.)	30	3,982	19.1%	25.2%
	Real Estate Showings	2	442	1.3%	2.8%
	Moving Van	1	59	0.6%	0.4%
	Tow Truck	1	108	0.6%	0.7%
	Food Truck	1	103	0.6%	0.6%
	Other (specify)	29	3,510	18.5%	22.2%
Total	—	157	15,829	—	—

Table 3-44: Vehicle Ownership

	Response	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	Owned or leased by a member of HH	6,689	754,560	97.9%	98.0%
	Owned or leased by a non-household member or business	144	15,249	2.1%	2.0%
Total	—	6,833	769,809	—	—

3.2. 2025 Regional Travel Patterns

This section presents a comprehensive analysis of travel behavior and related attributes derived from the PAG HTSA, with results shown both with and without the application of survey weights to ensure representativeness. The analysis encompasses a range of dimensions including household mobility ownership – covering private automobiles, bicycles, and electric vehicles – as well as detailed trip-level characteristics such as mode choice distribution, trip purposes, durations, and travel distances.

In addition, the section explores residential location preferences and telecommuting patterns, which are increasingly relevant in the context of post-pandemic travel behavior shifts. It also includes derived metrics such as vehicles miles traveled (VMT) and associated greenhouse gas (GHG) emissions, enabling a quantitative assessment of environmental impacts.

To contextualize the findings, comparisons are made with the 2009 National Household Travel Survey (NHTS) Add-on sample, highlighting temporal changes in travel patterns and modal shares. The section concludes with an evaluation of Pima County's current air quality indicators, identifying key transportation-related contributors to GHG emissions. Based on these insights, the report outlines evidence-based strategies for reducing emissions and improving regional air quality, with a focus on sustainable mobility interventions and policy recommendations.

3.2.1. Mobility Ownership

Table 3-45 presents the weighted frequency distribution of household vehicle ownership based on the survey. The data indicates that approximately 6.9% of households surveyed do not own a vehicle, highlighting a segment of the population potentially reliant on alternative modes of transportation. The largest share, 37.3% of households, own a single vehicle, suggesting a predominance of single-driver or car-sharing households. About 36.8% of households report owning two vehicles, while the remaining 19% own three or more vehicles, reflecting higher levels of vehicle access and potentially greater travel flexibility. The average number of household vehicles is 1.8 vehicles.

Table 3-45: Number of Household Vehicles

	Household Vehicles	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	0	660	31,148	13.4%	6.9%
	1	2,289	167,049	46.6%	37.3%
	2	1,400	165,006	28.5%	36.8%
	3	378	56,628	7.7%	12.6%
	4+	184	28,489	3.7%	6.4%
Total	—	4,911	448,321	—	—

Table 3-46 indicates that about 3.6% of households currently own an electric vehicle (EV), reflecting early-state adoption within the region. An additional 4.7% of respondents report plans to purchase an EV in the immediate future, suggesting a near-term increase in EV uptake. Medium-term interest is also notable, with 13.9% of households indicating plans to acquire an EV within five years, and 12.9% within ten years. However, a significant majority – 60.4% of respondents – report no current plans to purchase an EV. This distribution highlights both the growing interest in EV technology and the persistent barriers to adoption, such as cost, charging infrastructure, and vehicle availability. These insights are critical for forecasting future EV penetration rates and for informing regional transportation planning, infrastructure, investment, and emissions reduction strategies.

Table 3-46: Electric Vehicle Ownership

	Electric Vehicle Ownership	Unweighted Freq	Weighted Trip Freq	Unweighted %	Weighted %
	Owner	129	16,318	2.6%	3.6%
	Plan to buy as soon as possible	293	21,180	6.0%	4.7%
	Plan to buy within 5 years	731	62,142	14.9%	13.9%
	Plan to buy within 10 years	653	57,663	13.3%	12.9%
	No plans to buy	2,863	270,665	58.3%	60.4%
	Prefer not to answer	242	20,353	4.9%	4.5%
Total	–	4,911	448,321	–	–

As shown in Table 3-47, among surveyed current electric vehicle (EV) owners, the leading motivation for EV adoption is environmental concern (28.4%), with many respondents emphasizing a desire to reduce their carbon footprint and contribute to sustainability efforts. This is followed closely by economic considerations (27.4%), particularly long-term savings on fuel. Another notable factor is home solar panel ownership (11.4%), which makes at-home EV charging more convenient and cost-effective. Overall, these findings underscore the multifaceted appeal of EVs, combining ecological responsibility with financial and technological benefits.

Table 3-47: Why Purchase EV?

	Why purchase EV?	Unweighted HH Freq	Weighted HH Freq	Unweighted %	Weighted %
	I can help save the environment and improve air quality by using an EV.	80	10,604	28.5%	28.4%
	I can save fuel costs because overall gasoline price is higher than electricity cost.	76	10,244	27.0%	27.4%
	I have solar panels installed at my home which can be used to charge my EV.	29	4,250	10.3%	11.4%
	It is more convenient to charge my EV at home instead of frequent trips to the gas station.	28	3,670	10.0%	9.8%
	EV's have lower maintenance costs.	22	2,747	7.8%	7.4%
	EV engines have better performance than combustion engine vehicles.	16	2,111	5.7%	5.7%
	I got tax credits as financial incentives for purchasing my EV.	18	2,095	6.4%	5.6%
	I got a good discount from the dealer/manufacturer for purchasing my EV.	7	987	2.5%	2.6%
	I think driving in an EV is very trendy and catchy these days.	3	425	1.1%	1.1%
	I expect a better resale price on EV's.	2	209	0.7%	0.6%
Total	–	281	37,341	–	–

Table 3-48 reveals that bicycle ownership is relatively widespread among households in the region, with over 52.4% reporting ownership of at least one bicycle. Specifically, 20.8% of households own a single bicycle, 15.2% own two bicycles, and 16.4% report owning three or more. This distribution suggests a moderate to strong presence of active transportation infrastructure and interest. These findings are relevant for planning investments in bike infrastructure, mixed land-use planning, as well as for evaluating the potential for mode shift from short vehicle trips to cycling.

Table 3-48: Number of Household Bikes

	Household Bikes	Unweighted Freq	Weighted Freq	Unweighted %	Weighted %
	0	2,365	213,189	48.2%	47.6%
	1	1,120	93,342	22.8%	20.8%
	2	661	68,200	13.5%	15.2%
	3	268	25,502	5.5%	5.7%
	4+	497	48,088	10.1%	10.7%
Total	–	4,911	448,321	–	–

3.2.2. Trip Purposes

The distribution of trip purposes at destinations reveals diverse travel behavior among surveyed households (Table 3-49 and Table 3-50). 30.1% of trips terminate at home, reflecting return travel and

the cyclical nature of daily activity patterns. Work-related travel accounts for 10.6% of trips, while 4.7% are to educational institutions across all grade levels including college and preschool levels. The largest share (34.5%) is attributed to shopping, dining, and errands, indicating a strong presence of discretionary and maintenance travel. Recreational trips comprise 2.9%, and social visits account for another 6.4%. Additionally, 5% of trips are for pick-up or drop-off purposes, which may include transporting household members or dependents. These insights are essential for understanding travel demand by purpose and for informing land use, transportation planning, and service allocation.

Table 3-49: Purpose of Travel at Destination

	Purpose of Travel at Destination	Unweighted Trip Freq	Weighted Trip Freq	Unweighted %	Weighted %
	Home	10,829	1,243,042	28.9%	30.1%
	Work	4,443	435,599	11.9%	10.6%
	School	1,407	194,220	3.8%	4.7%
	Shopping/Dining/Errands	12,407	1,423,942	33.1%	34.5%
	Recreation/Entertainment	1,146	121,460	3.1%	2.9%
	Visiting	2,623	263,535	7.0%	6.4%
	Chauffeuring/Delivery-forpay	384	27,982	1.0%	0.7%
	Pick-up/Drop-off	1,960	205,278	5.2%	5.0%
	Other	2,228	213,389	6.0%	5.2%
Total	—	37,427	4,128,446	—	—

Table 3-50: Extended Purpose of Travel at Destination

	Extended Purpose of Travel at Destination	Unweighted Trip Freq	Weighted Trip Freq	Unweighted %	Weighted %
	Home	10,829	1,243,042	28.9%	30.1%
	Work	4,443	435,599	11.9%	10.6%
	School-PreK	165	23,385	0.4%	0.6%
	School-K12	951	117,302	2.5%	2.8%
	School-College	291	53,532	0.8%	1.3%
	Shopping	4,892	583,704	13.1%	14.1%
	Errands	4,879	536,650	13.0%	13.0%
	Dining	2,636	303,589	7.0%	7.4%
	Recreation/Entertainment	1,146	121,460	3.1%	2.9%
	Civic/Religous	309	29,663	0.8%	0.7%
	Visiting	2,623	263,535	7.0%	6.4%
	Chauffeuring/Delivery-forpay	384	27,982	1.0%	0.7%
	Pick-up/Drop-off	1,960	205,278	5.2%	5.0%
	Campus Business	27	4,788	0.1%	0.1%
	Other	1,892	178,939	5.1%	4.3%
Total	—	37,427	4,128,446	—	—

3.2.3. Trip Mode

The modal split of trips reported in the PAG HTSA indicates a strong reliance on private automobiles, which account for approximately 91% of all trips (Table 3-51and Table 3-52). Public transit usage represents 1% of trips, while walking comprises 3.7%, reflecting a modest share of active transportation. Bicycle travel accounts for just under 1.2% of trips, suggesting limited but present cycling activity. School bus usage contributes 1.9% of trips, primarily among student populations. Finally, less than 0.7% of trips are made using ride-hailing services such as taxis, Uber, or Lyft. This distribution underscores the automobile-dominant nature of regional travel, while also highlighting opportunities for expanding multimodal infrastructure and improving access to alternative transportation options.

Table 3-51: Mode of Travel to Destination

Mode of Travel	Unweighted Trip Freq	Weighted Trip Freq	Unweighted %	Weighted %
Auto	31,689	3,762,314	84.5%	91.0%
Public Transportation	2,000	39,582	5.3%	1.0%
Walk	2,081	153,294	5.5%	3.7%
Bike	487	48,873	1.3%	1.2%
School Bus	600	79,619	1.6%	1.9%
Taxi/Uber/Lyft	334	26,898	0.9%	0.7%
Other	310	23,836	0.8%	0.6%
Total	—	37,501	4,134,416	—	—

Table 3-52: Extended Mode of Travel to Destination

Extended Mode of Travel	Unweighted Trip Freq	Weighted Trip Freq	Unweighted %	Weighted %
Driver (Car/Truck/Van)	21,909	2,578,978	58.42%	62.38%
Passenger (Car/Truck/Van)	8,868	1,114,354	23.65%	26.95%
Walk	2,081	153,294	5.55%	3.71%
Bike (Tugo)	15	719	0.04%	0.02%
Bike (Personal)	472	48,154	1.26%	1.16%
Commercial Vehicle	912	68,982	2.43%	1.67%
School Bus	600	79,619	1.60%	1.93%
Bus (Sun Tran/Sun Express)	1,657	34,232	4.42%	0.83%
FlexRide (Sun On Demand)	56	474	0.15%	0.01%
Vanpool/Paratransit (SunVan/Sun Shuttle)	209	3,290	0.56%	0.08%
Streetcar (Sun Link)	78	1,586	0.21%	0.04%
Taxi/Limo/Uber/Lyft	334	26,898	0.89%	0.65%
Motorcycle/Moped	56	4,626	0.15%	0.11%
E-Scooter (Spin or Personal)	22	927	0.06%	0.02%
Private Bus/Shuttle	68	7,856	0.18%	0.19%
Other	164	10,427	0.44%	0.25%
Total	—	37,501	4,134,416	—	—

3.2.4. Trip Durations and Distances

The analysis of trip duration and distance distributions provides valuable insight into the temporal and spatial characteristics of travel behavior in the region. According to the Table 3-53, the majority of trips are relatively short in both time and distance. In terms of duration, 25.3% of trips last less than 6 minutes, 25.2 % fall within 6 to 10 minutes, 17.9% range from 11 to 15 minutes, and 24% extend between 16 and 30 minutes. This indicates that over 90% of trips are completed within half an hour, suggesting a high concentration of localized travel activity.

Table 3-53: Travel Duration (in minutes)

	Travel Duration (min)	Unweighted Trip Freq	Weighted Trip Freq	Unweighted %	Weighted %
	Less than 6	10,358	1,049,254	27.5%	25.3%
	6 to 10	9,678	1,043,664	25.7%	25.2%
	11 to 15	6,614	742,796	17.6%	17.9%
	16 to 30	8,273	994,292	22.0%	24.0%
	31 to 60	1,985	247,128	5.3%	6.0%
	61 to 90	300	26,364	0.8%	0.6%
	91 to 120	160	14,419	0.4%	0.3%
	More than 121	303	27,863	0.8%	0.7%
Total	—	37,671	4,145,780	—	—

Similarly, the distance distribution shows that 18.8% of trips are under 1 mile, 24.4% fall within 1 to 3 miles, 15.9% range from 3 to 5 miles, 10.7% from 5 to 7 miles, and 11% from 7 to 10 miles (Table 3-54). These figures reveal that a substantial share of trips, over 80%, occur within a 10-mile radius, with a notable concentration in the 1 to 3-mile range.

Table 3-54: Travel Distance (in miles)

	Travel Distance (mi)	Unweighted Trip Freq	Weighted Trip Freq	Unweighted %	Weighted %
	Less than 1	8,249	774,066	22.1%	18.8%
	1 to 3	9,612	1,007,582	25.8%	24.4%
	3 to 5	6,097	656,694	16.3%	15.9%
	5 to 7	3,882	440,895	10.4%	10.7%
	7 to 10	3,647	454,777	9.8%	11.0%
	10 to 15	2,950	393,831	7.9%	9.6%
	15 to 20	1,276	162,070	3.4%	3.9%
	20 to 30	971	155,138	2.6%	3.8%
	More than 30	613	76,265	1.6%	1.9%
Total	—	37,297	4,121,319	—	—

Together, these patterns suggest that a significant portion of regional travel is short-distance and short-duration, which presents opportunities for mode shift toward active and low-emission transportation options such as walking, biking, and transit. These insights are critical for informing infrastructure investment, travel demand management strategies, and emission reduction planning.

The following Figure 3-4 and Figure 3-5 present cross-tabulations of trip purpose by both trip distance and trip duration. These tables provide a multidimensional view of travel behavior, enabling analysis of how different travel purposes and transportation modes vary across temporal and spatial dimensions. This information is essential for understanding mode choice dynamics and for identifying opportunities to promote more efficient and sustainable travel patterns.

Figure 3-4: Trip Purpose by Trip Distance (in miles)

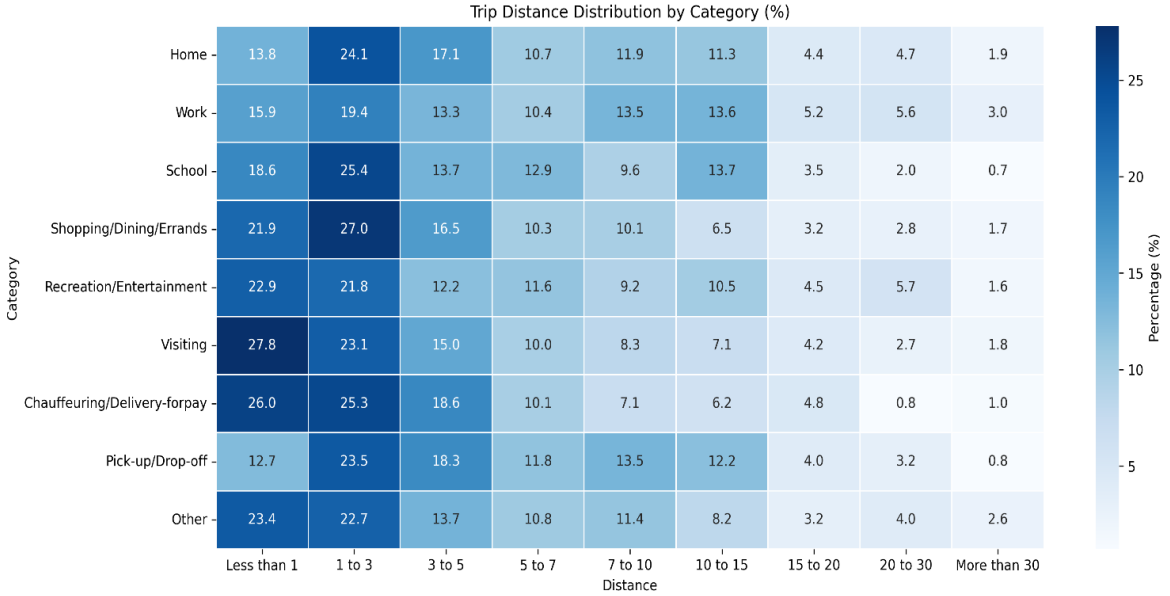
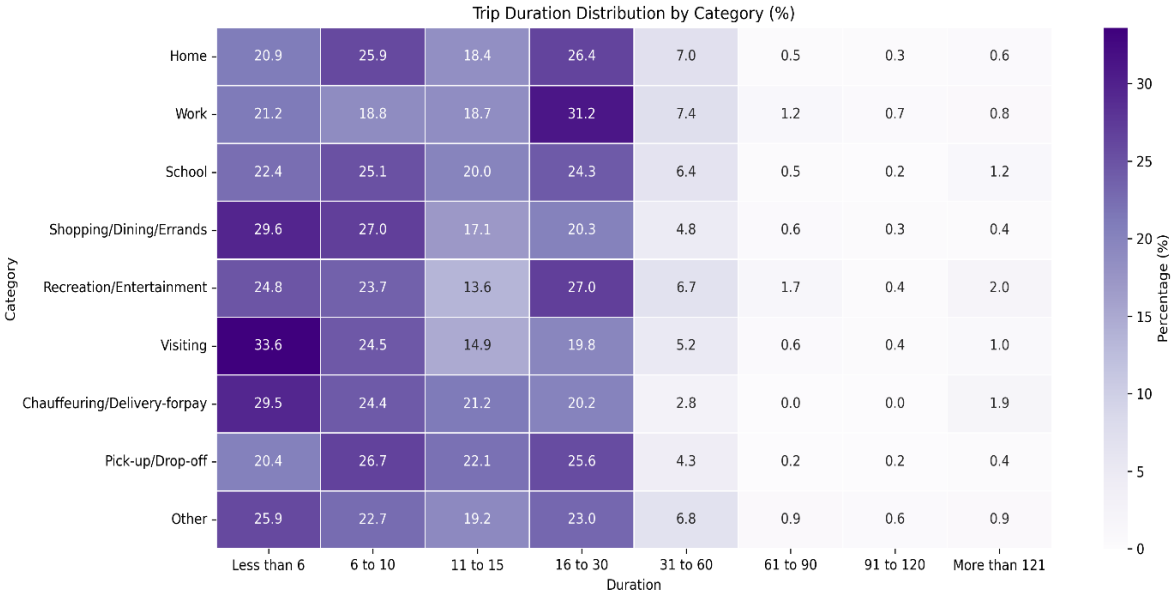


Figure 3-5: Trip Purpose by Trip Duration (in minutes)



3.2.5. Alternative Modes

Transit usage patterns over the past six months reveal a wide range of engagement levels among survey respondents (Table 3-55). A majority, 67.3%, reported not using public transit at all during this period, indicating a substantial portion of the population that is either car-dependent or lacks access to transit services. Among those who did use transit, 14.2% did so rarely, and 3% reported using it approximately once per month. More frequent usage was observed among 5% of respondents who used transit a few times per month, 6.7% who used it weekly, and another 3.9% who reported daily use. These findings highlight both the limited use of transit for many households and the critical role it plays for a smaller, transit-dependent segment of the population. Understanding these usage patterns is essential for evaluating service coverage, identifying equity gaps, and planning future transit investments.

Table 3-55: Transit Use (past 6 months)

	Transit Use (past 6 months)	Unweighted Person Freq	Weighted Person Freq	Unweighted %	Weighted %
	Never	6,119	711,927	56.4%	67.3%
	Rarely	1,755	150,524	16.2%	14.2%
	Once per month	358	31,259	3.3%	3.0%
	Two three times per month	736	52,560	6.8%	5.0%
	Weekly basis	1,093	70,915	10.1%	6.7%
	Daily basis	784	40,750	7.2%	3.9%
Total	—	10,845	1,057,936	—	—

When asked about reasons for not using public transit for commuting (Table 3-56), respondents most frequently cited the lack of convenient transit service as the primary barrier. Other commonly reported deterrents include longer travel times compared to driving, unreliable arrival or departure times, and the distance between transit access points and the respondent's home or work location.

Table 3-56: Why No Transit Use for Commute Trips

	Why no transit use for commute?	Unweighted Person Freq	Weighted Person Freq	Unweighted %	Weighted %
	There is no convenient transit service for commute	1,740	179,056	20.5%	22.8%
	Using transit takes much longer travel time than driving	1,634	151,803	19.3%	19.3%
	Transit travel time or arrival time are not reliable compared to driving	1,094	99,430	12.9%	12.7%
	Transit stops are too far from my work or home locations	685	71,304	8.1%	9.1%
	I do not feel safe in a transit vehicle	559	53,749	6.6%	6.8%
	I do not feel safe at transit stops	572	50,323	6.8%	6.4%
	I don't like waiting at transit stops	474	40,411	5.6%	5.1%
	I have too many things to carry	332	31,883	3.9%	4.1%
	The hot weather condition prohibits me from using transit	336	26,958	4.0%	3.4%
	There are too many transfers to get to work or back home	331	26,622	3.9%	3.4%
	There are no sidewalks between transit stops and my work or home locations, or sidewalks are in poor condition	354	23,715	4.2%	3.0%
	The weather condition prohibits me from using transit	226	20,294	2.7%	2.6%
	I have small children along	132	9,966	1.6%	1.3%
Total	–	8,469	785,514	–	–

These same factors were also cited as key reasons for not using transit for non-commute trips, such as shopping, errands, or social visits (Table 3-57). The consistency of these responses across trip purposes suggests systemic limitations in the transit network's accessibility, reliability, and competitiveness with private vehicle travel. These insights are critical for identifying service gaps and prioritizing improvements in transit planning, such as expanding coverage, increasing frequency, and enhancing schedule reliability.

Table 3-57: Why No Transit Use for Non commute Trips

Why no transit use for noncommute?	Unweighted Person Freq	Weighted Person Freq	Unweighted %	Weighted %
There is no convenient transit service for my frequent destinations	1,431	177,396	19.1%	21.4%
Using transit takes much longer travel time than driving	1,122	132,943	14.9%	16.1%
Transit travel time or arrival time are not reliable compared to driving	756	86,844	10.1%	10.5%
Transit stops are too far from my work or home locations	651	80,997	8.7%	9.8%
I do not feel safe at transit stops	562	58,937	7.5%	7.1%
I do not feel safe in a transit vehicle	543	55,341	7.2%	6.7%
I don't like waiting at transit stops	438	46,204	5.8%	5.6%
The hot weather condition prohibits me from using transit	434	43,224	5.8%	5.2%
There are no sidewalks between transit stops and my work or home locations, or sidewalks are in poor condition	540	41,362	7.2%	5.0%
There are too many transfers to get to my destinations	352	31,948	4.7%	3.9%
I have too many things to carry	266	29,888	3.5%	3.6%
The weather condition prohibits me from using transit	252	28,017	3.4%	3.4%
I have small children along	160	15,128	2.1%	1.8%
Total –	7,507	828,229	–	–

Bicycle usage over the past seven days appears limited among survey respondents, with 81.6% reporting no bike use during that period, 4.3% did so once, and 4.6% rode twice, indicating relatively infrequent use overall (Table 3-58).

Table 3-58: Bike Use (in past 7 days)

Bike Use (7days)	Unweighted Person Freq	Weighted Trip Freq	Unweighted %	Weighted %
0	7,992	829,031	79.0%	81.6%
1	524	43,912	5.2%	4.3%
2	517	46,890	5.1%	4.6%
3	378	33,412	3.7%	3.3%
4	179	17,689	1.8%	1.7%
5+	525	44,858	5.2%	4.4%
Total –	10,115	1,015,793	–	–

When examining the purpose of bicycle trips (Table 3-59), the majority, 77.9%, were for recreational purposes, underscoring the role of cycling as a leisure activity rather than a primary mode of

transportation. Commuting to work accounted for 6.4% of bike trips, while 7.5% were for shopping and 3.1% for visiting friends or family.

These findings suggest that while bicycle ownership is relatively common, actual usage remains low and is predominantly recreational. This highlights the need for targeted infrastructure, land use, and policy interventions, such as improved bike lanes, end-of-trip facilities, and safety enhancements, to encourage more utilitarian cycling for commuting and errands.

Table 3-59: Bike Purpose

	Bike Use Purpose	Unweighted Person Freq	Weighted Person Freq	Unweighted %	Weighted %
	Work	178	11,877	8.4%	6.4%
	School	75	7,013	3.5%	3.8%
	Shopping	217	14,093	10.2%	7.5%
	Visiting	113	5,761	5.3%	3.1%
	Recreation	1,497	145,401	70.5%	77.9%
	Other	43	2,616	2.0%	1.4%
Total	—	2,123	186,762	—	—

When asked why they do not walk or bike for commuting (Table 3-60), respondents most frequently cited the long distance between home and workplace as the primary deterrent. This was followed by discomfort associated with hot weather conditions, time constraints due to busy schedules, concerns about personal safety, and high volumes of vehicular traffic. These factors collectively highlight the structural and environmental challenges that limit the feasibility of active commuting for many households.

Table 3-60: Why No Walk and Bike Use for Commute Trips

	Why no walk and bike use for commute?	Unweighted Person Freq	Weighted Person Freq	Unweighted %	Weighted %
	The distance between your home to work/school is too long to walk or bike	2,525	230,043	24.4%	26.3%
	It is too hot to walk or bike	852	80,213	8.2%	9.2%
	You're too busy	848	69,880	8.2%	8.0%
	You are afraid of fast traffic	525	50,384	5.1%	5.8%
	Street crossings are unsafe	563	48,622	5.5%	5.6%
	There are too many cars	470	46,438	4.6%	5.3%
	You fear street crime	521	44,759	5.0%	5.1%
	You have too many things to carry	483	43,895	4.7%	5.0%
	There are no sidewalks from/to home or the sidewalks from/to home are in poor condition	561	40,429	5.4%	4.6%
	There are no nearby paths or trails from/to home	393	32,695	3.8%	3.7%
	You have poor health	335	28,567	3.2%	3.3%
	There are not enough bike or wide curb lanes from/to home	405	27,303	3.9%	3.1%
	There is not enough light at night	265	22,166	2.6%	2.5%
	There are no sidewalks from/to work or the sidewalks are in poor condition	240	20,146	2.3%	2.3%
	You have no one to walk or bike with	306	19,934	3.0%	2.3%
	There are no nearby paths or trails from/to work or school	272	17,627	2.6%	2.0%
	There are not enough bike or wide curb lanes from/to work or school	255	15,612	2.5%	1.8%
	There are no shops or other interesting places along the way to or from work or school	160	11,747	1.5%	1.3%
	You have small children along	116	8,556	1.1%	1.0%
	There are not enough people walking or biking around	104	8,453	1.0%	1.0%
	You have concerns about air pollution along sidewalks or bike lanes	129	7,869	1.2%	0.9%
Total	–	10,328	875,336	–	–

Similar reasons were reported for not walking or biking for non-commute trips, such as shopping, recreation, or social visits (Table 3-61). In addition to the previously mentioned barriers, respondents also frequently cited poor personal health and the lack or poor condition of pedestrian and bike infrastructure, such as missing sidewalks or bike lanes, as significant obstacles.

These findings highlight the need for integrated planning approaches that address both physical infrastructure and environmental conditions to support active transportation. Strategies may include improving land use mix to reduce trip distances, enhancing pedestrian and cycling infrastructure, implementing traffic calming measures, and addressing safety and comfort concerns through urban design and shading solutions.

Table 3-61: Why No Walk and Bike Use for Noncommuter Trips

	Why no walk and bike use for noncommute?	Unweighted Person Freq	Weighted Person Freq	Unweighted %	Weighted %
	The distance between your home to work/school is too long to walk or bike	1,962	194,500	21.0%	21.5%
	You have poor health	978	96,834	10.5%	10.7%
	It is too hot to walk or bike	822	82,673	8.8%	9.1%
	There are no sidewalks from/to home or the sidewalks from/to home are in poor condition	591	54,171	6.3%	6.0%
	Street crossings are unsafe	452	43,256	4.8%	4.8%
	You are afraid of fast traffic	407	41,549	4.4%	4.6%
	You're too busy	402	39,140	4.3%	4.3%
	There are no nearby paths or trails from/to home	374	36,898	4.0%	4.1%
	You have too many things to carry	325	33,823	3.5%	3.7%
	There are not enough bike or wide curb lanes from/to home	375	32,980	4.0%	3.6%
	There are too many cars	315	32,844	3.4%	3.6%
	You fear street crime	373	31,397	4.0%	3.5%
	There are no sidewalks from/to destinations or the sidewalks are in poor condition	331	30,614	3.5%	3.4%
	You have no one to walk or bike with	309	28,076	3.3%	3.1%
	There is not enough light at night	275	26,238	2.9%	2.9%
	There are no nearby paths or trails from/to destinations	265	25,435	2.8%	2.8%
	There are no shops or other interesting places along the way to or from destinations	226	25,089	2.4%	2.8%
	There are not enough bike or wide curb lanes from/to destinations	230	20,508	2.5%	2.3%
	You have concerns about air pollution along sidewalks or bike lanes	143	13,357	1.5%	1.5%
	You have small children along	103	8,906	1.1%	1.0%
	There are not enough people walking or biking around	81	7,817	0.9%	0.9%
Total	–	9,339	906,105	–	–

Usage of personal mobility devices (PMD), such as electric scooters and similar micromobility options, remains relatively limited among survey respondents. Only about 4.8% reported using a PMD within the past seven days according to Table 3-62.

Table 3-62: Scooter Use (past 7 days)

	Scooter Use (7days)	Unweighted Person Freq	Weighted Person Freq	Unweighted %	Weighted %
	0	9,457	962,748	93.9%	95.2%
	1	194	13,433	1.9%	1.3%
	2	118	10,982	1.2%	1.1%
	3	88	6,568	0.9%	0.6%
	4	38	3,389	0.4%	0.3%
	5+	181	14,655	1.8%	1.4%
Total	—	10,076	1,011,775	—	—

Among those users, the most common purpose—accounting for over half of all PMD trips—was recreation (Table 3-63). The low adoption rate and recreational focus highlight both the emerging nature of PMDs in the local travel landscape and the potential for growth in their use for short-distance, non-recreational trips. Expanding safe and accessible micromobility infrastructure, such as protected lanes and designated parking areas, may help support broader adoption and integration into the regional transportation system.

Table 3-63: Scooter Purpose

	Scooter Use Purpose	Unweighted Person Freq	Weighted Person Freq	Unweighted %	Weighted %
	Work	58	4,417	9.4%	9.0%
	School	24	3,567	3.9%	7.3%
	Shopping	98	6,836	15.8%	13.9%
	Visiting	47	3,168	7.6%	6.5%
	Recreation	338	26,787	54.5%	54.6%
	Other	55	4,255	8.9%	8.7%
Total	—	620	49,031	—	—

3.2.6. Residential Preferences

Regarding residential preferences, Table 3-64 indicates that the top residential priority is low crime, with 44.9% of respondents identifying it as a must-have. Single-family homes (38.1% must-have, 39.87% wanted) and Backyards (35.2% must-have, 41% wanted) are also key preferences. Features like proximity to nature, shops, short commutes, and bike/ped-friendly design are widely desired, though fewer respondents list them as must-haves. Interestingly, large homes are only mentioned as must-have for 10.7% of the respondents. These preferences influence travel behavior and have implications for residential planning and its impact on air quality, as they shape location choices, commute lengths, and mode of travel.

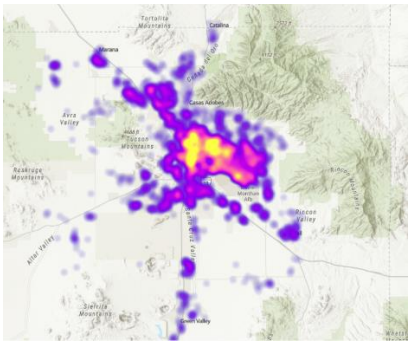
Table 3-64: Residential Preference

Residential Preference	Did not Want	Did not Care	No Influence	Wanted	Must Have
Low Crime	0.8%	2.8%	8.3%	43.2%	44.9%
Single Family Home	3.6%	8.6%	10.0%	39.8%	38.1%
Backyard	3.0%	10.3%	10.5%	41.0%	35.2%
Near Nature	2.4%	14.5%	16.7%	45.0%	21.5%
Near Shops	2.1%	16.1%	16.0%	47.4%	18.4%
Short Commute	1.9%	18.9%	20.4%	40.7%	18.0%
Bike Ped Friendly	2.2%	17.4%	23.2%	39.0%	18.3%
Near Family Friends	3.5%	17.9%	23.4%	37.7%	17.5%
Transit Access	4.2%	22.2%	27.1%	30.2%	16.1%
Good Schools	2.8%	20.0%	31.1%	25.0%	21.2%
Large Home	15.6%	19.3%	20.7%	33.8%	10.7%

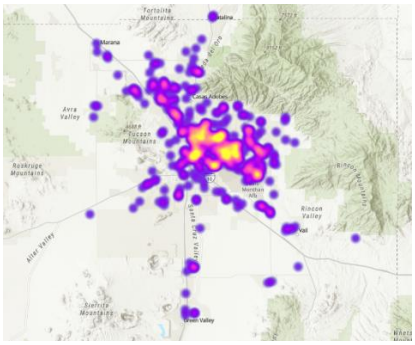
3.2.7. Telecommuting Pattern

Telecommuting patterns among workers in Pima County show that 18% always work remotely exclusively, while 12.2% work remotely on some days shown in Table 3-65. The spatial distribution of these telecommuters does not reveal a strong geographic pattern compared to no-telecommute workers (Figure 3-6), suggesting remote work is spread relatively evenly across the region. As of early 2025, approximately 13% of U.S. workers are employed in fully remote positions, according to data from Robert Half (Half, 2024). This marks an increase from 10% in the first quarter of 2023. In contrast, about 30% of workers engage in hybrid work arrangements, splitting their time between remote and in-office work.

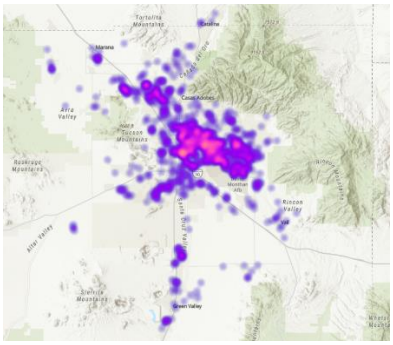
Figure 3-6: Map of Telecommute Status (Unweighted)



No Remote



Yes, Hybrid



Yes, Only Remote

Combining full-time and hybrid remote workers, about 30.2% of Pima County's workforce telecommutes, which is lower than the national average of 43% (Half, 2024). This suggests that expanding telecommuting policies in the region has potential to further reduce GHG emissions from work-related travel.

Table 3-65: Telecommute Status

	Telecommute Status	Unweighted Worker Freq	Weighted Worker Freq	Unweighted %	Weighted %
	No	3,417	282,067	73.6%	69.9%
	Yes, only remote	776	72,470	16.7%	18.0%
	Yes, hybrid	447	49,095	9.6%	12.2%
Total	—	4,640	403,632	—	—

Regarding telecommuting convenience (Table 3-66), 47.9% of employees find it easy while 38% find it difficult. From the employer perspective (*Table 3-67*), 43.6% report it as easy and 42.9% as difficult. This nearly even split suggests there is room to improve telecommuting adoption in the region by addressing challenges perceived by both employees and employers.

Table 3-66: Convenience of Telecommute (for Employee)

	Convenience of Telecommute Employee	Unweighted Worker Freq	Weighted Worker Freq	Unweighted %	Weighted %
	Easy	1,254	126,357	46.0%	47.9%
	Moderate	379	37,189	13.9%	14.1%
	Difficult	1,095	100,031	40.1%	38.0%
Total	—	2,728	263,577	—	—

Table 3-67: Convenience of Telecommute (for Employer)

	Convenience of Telecommute Employer	Unweighted Worker Freq	Weighted Worker Freq	Unweighted %	Weighted %
	Easy	1,103	109,062	42.3%	43.6%
	Moderate	345	33,826	13.2%	13.5%
	Difficult	1,158	107,156	44.4%	42.9%
Total	—	2,606	250,044	—	—

3.2.8. Online Shopping

The Table 3-68 shows that Pima County households receive an average of 0.5 online shopping deliveries per day, highlighting the growing role of e-commerce in daily life. Additionally, 77.9% of households (349,165 out of 448,321) report having membership subscriptions (e.g., Amazon Prime), which likely contributes to increased delivery frequency. These patterns have direct implications for travel demand, freight movement, and air quality in the region. Air quality benefits depend on the delivery fleet (electric vs. gas), delivery density, and trip consolidation. Efficient, electrified deliveries can reduce emissions per package by 60–90% compared to individual car trips (Heinrich, 2025; Maxwell Woody, 2022).

Table 3-68: Online Shopping

Weight	Daily Trips for Packages Delivered	Daily Average Trips for Packages Delivered	Daily Number of Packages Delivered	Daily Average Packages Delivered	Household Ecommerce Membership	Household Freq
unweighted	1,838	0.37	2,252	0.46	3,736	4,911
weighted	180,216	0.40	222,385	0.50	349,165	448,321

3.3. VMT Metrics for Air Quality

Daily vehicle miles traveled (VMT) and greenhouse gas (GHG) emissions are estimated on both a household and per-person basis using 2025 PAG HTSA data and emission rates by vehicle and fuel type sourced from the regional air quality tool, EPA MOVES. Daily household VMT is calculated by dividing the total household VMT by the number of households. Daily household GHG emissions are calculated by dividing total GHG emissions summed across households, vehicle types, and fuel types by the total number of households, as shown below.

$$Average\ VMT = \frac{\sum_h \sum_t VMT_{h,t}}{\sum_h H}$$

$$Average\ GHG = \frac{\sum_h \sum_t GHG_{h,t}/1000}{\sum_h H}$$

Where $t : trip$

$h : household$

$v : type\ of\ vehicle\ (driver,\ passenger,\ taxi,\ motorcycle)$

$f : type\ of\ fuel$

$$VMT_{h,t} = \frac{PMT_{h,t}}{hh_vehicle_occupancy_{h,t}}$$

$$GHG_{h,t} = VMT_{h,t} * Emission\ Rate_{v,f}$$

In Pima County, households travel an average of 38.4 vehicle miles per day and emit 12.8 kg of CO_2e daily as shown in Table 3-69. On a per-person basis, individuals average 18.4 VMT and 6 kg CO_2e per day. According to the 2024 annual GHG emission estimates from MOVES 4 for the 2055 Regional Mobility and Accessibility Plan (RMAP), using the same source types of emissions, the average daily GHG emissions are 12.5 kg CO_2e per household and 5.9 kg CO_2e per person. Overall, the GHG emission estimates derived from the HTSA data are consistent with those produced by the MOVES 4 model.

Table 3-69: Daily VMT at Household and Person Level

Weight	Daily VMT	Daily Kg GHG	Freq
Household - Average			
Unweighted	31.0	10.1	-
Weighted	38.4	12.8	-
Household - Total			
Unweighted	152,423	49,604	4,911
Weighted	17,195,594	5,730,744	448,321
Person - Average			
Unweighted	15.4	4.9	-
Weighted	18.4	6.0	-
Person - Total			
Unweighted	-	-	11,015
Weighted	-	-	1,066,818

The maps below illustrate the geographic distribution of VMT and GHG emissions across the region, summarized by Traffic Analysis Zones (TAZs) (Figure 3-7 and Figure 3-8). As expected, households located closer to the urban core, with better access to employment and shopping, tend to have lower VMT and GHG production, while those in outlying areas generate more. Gray TAZs indicates areas where survey observations were insufficient to report reliable estimates.

Figure 3-7: Map of Daily Avg Kg GHG per HH

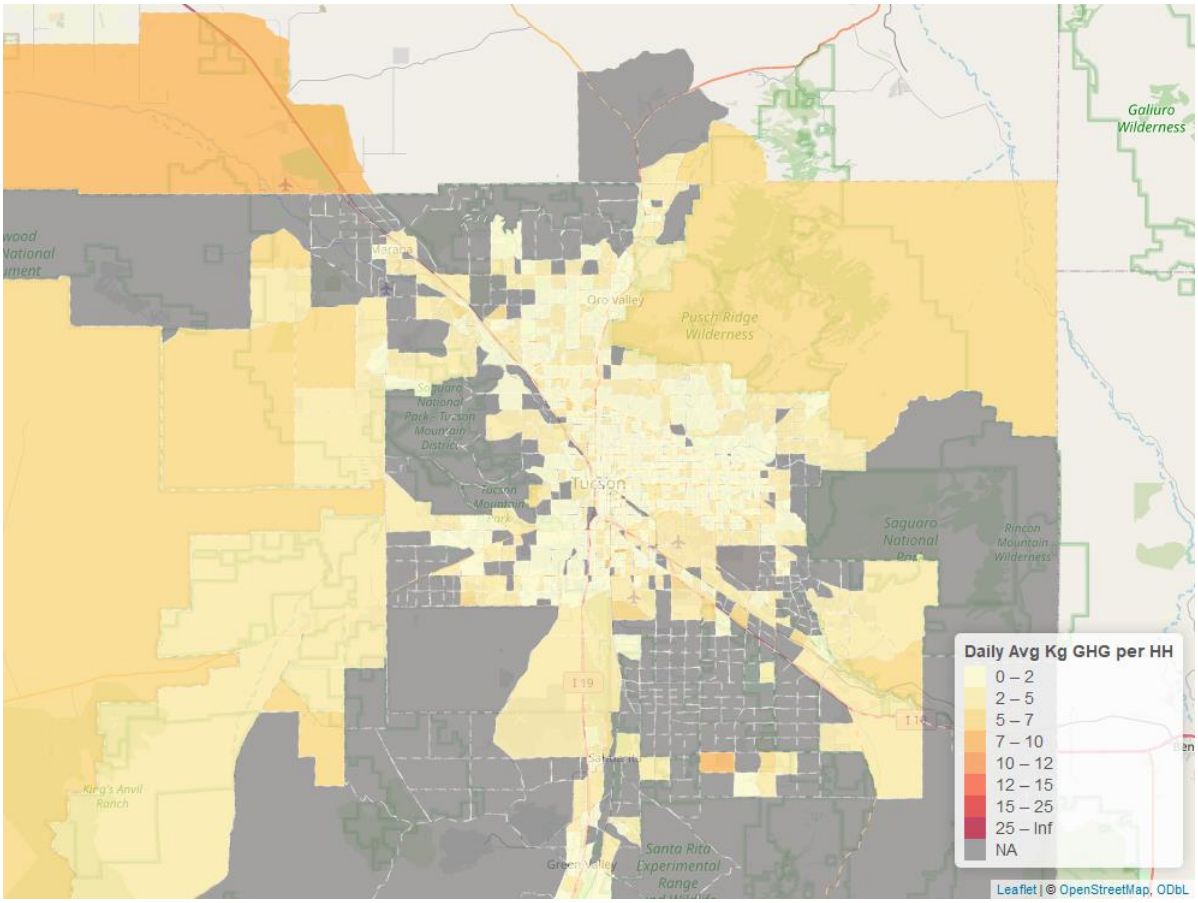
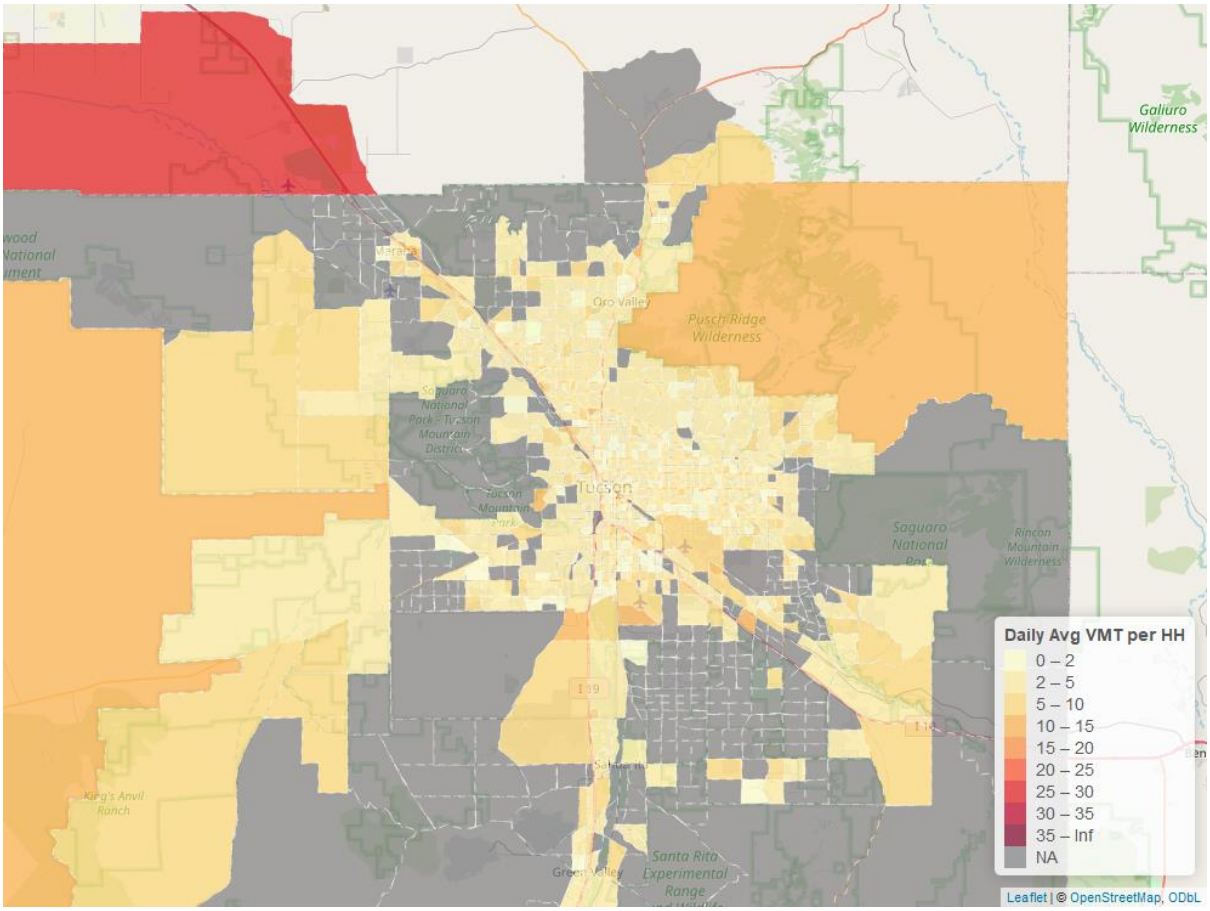


Figure 3-8: Map of Daily Avg VMT per HH



The following summaries break down VMT and GHG emissions by travel mode, vehicle type, fuel type, household ethnicity, household size, and income, providing insights into how VMT generation intersects with key demographic, vehicle choice, and behavioral attributes. Auto travel accounts for 95.5% of all person-miles traveled (Table 3-70), making it by far the dominant travel mode.

Table 3-70: Person Miles Traveled by Mode of Travel

Mode of Travel	Unweighted Person Miles Travelled	Weighted Person Miles Travelled	Unweighted %	Weighted %
Auto	197,169	25,627,584	91.5%	95.5%
Public Transportation	8,762	162,737	4.1%	0.6%
Walk	1,658	115,185	0.8%	0.4%
Bike	1,157	112,440	0.5%	0.4%
School Bus	3,639	486,969	1.7%	1.8%
Taxi/Uber/Lyft	1,939	134,972	0.9%	0.5%
Other	1,149	196,951	0.5%	0.7%
Total	–	215,473	26,836,837	–	–

Among ethnic groups, White/Caucasian generate the highest share of total daily VMT (57.1%) and GHG emissions (57.6%), followed by Hispanic/Mexican American 24.9% of VMT and 25.6% of GHG (Table 3-71 and Table 3-72). Given that the weighted data's ethnic composition is 52% of White (non-Hispanic) and 36.1% of Hispanic (any race) according to Table 3-10, these results indicate that White/Caucasian drive more and produce GHG emissions on average than Hispanic/Mexican American.

Table 3-71: VMT by Ethnicity

Ethnicity Name	Avg Daily VMT	Unweighted Total Daily VMT	Weighted Total Daily VMT	Unweighted %	Weighted %
Black / African American	9.9	9,323	533,067	6.1%	2.7%
Hispanic / Mexican American	13.5	26,652	4,946,851	17.5%	24.9%
Asian / Pacific Islander	14	3,257	498,462	2.1%	2.5%
Native American	11.5	3,251	245,418	2.1%	1.2%
White / Caucasian	15.1	93,768	11,340,148	61.5%	57.1%
Mixed Ethnicity	10.8	11,678	2,164,953	7.7%	10.9%
Other	14.9	4,428	117,841	2.9%	0.6%
Total	–	–	–	19,846,740	–	–

Table 3-72: GHG by Ethnicity

	Ethnicity Name	Avg Daily GHG	Unweighted Total Daily GHG	Weighted Total Daily GHG	Unweighted %	Weighted %
	Black / African American	3	2,834	175,158	5.7%	2.6%
	Hispanic / Mexican American	4.5	8,823	1,693,129	17.8%	25.6%
	Asian / Pacific Islander	4.6	1,065	161,144	2.1%	2.4%
	Native American	3.4	949	56,757	1.9%	0.9%
	White / Caucasian	5	30,938	3,816,324	62.4%	57.6%
	Mixed Ethnicity	3.5	3,787	688,934	7.6%	10.4%
	Other	4	1,187	34,997	2.4%	0.5%
Total	–	–	–	6,626,443	–	–

Gasoline vehicles account for the largest share of total daily VMT (87.7%) of daily VMT and daily GHG (92.4%) (Table 3-73 and Table 3-74). Table 3-40 shows that gasoline vehicles make up 88.9% of the fleet, reinforcing that gasoline vehicles emit more GHG per day on average than other fuel type vehicles.

Table 3-73: VMT by Fuel Type

	Fuel Type	Avg Daily VMT	Unweighted Total Daily VMT	Weighted Total Daily VMT	Unweighted %	Weighted %
	Gasoline	19.7	122,126	13,882,314	88.9%	87.7%
	Diesel	14.1	2,993	357,036	2.2%	2.3%
	All Electric Plugin	23.3	3,357	455,864	2.4%	2.9%
	Hybrid	24.6	6,942	878,010	5.1%	5.5%
	Hybrid Plugin	15.3	552	93,087	0.4%	0.6%
	Other	8.7	1,338	170,242	1.0%	1.1%
Total	–	–	–	15,836,553	–	–

Table 3-74: GHG by Fuel Type

Fuel Type	Avg Daily GHG	Unweighted Total Daily GHG	Weighted Total Daily GHG	Unweighted %	Weighted %
Gasoline	7.4	46,134	5,297,406	93.0%	92.4%
Diesel	8.1	1,729	210,257	3.5%	3.7%
All Electric Plugin	0	0	0	0.0%	0.0%
Hybrid	6.2	1,741	223,081	3.5%	3.9%
Hybrid Plugin	0	0	0	0.0%	0.0%
Other	0	0	0	0.0%	0.0%
Total	—	—	5,730,744	—	—

Households with high income ($150,000 or more) also generate the longest daily VMT (19.9%) and the highest GHG emissions (19.3%) (Table 3-75 and Table 3-76). However, **Error! Reference source not found.** Table 3-7 shows that the largest household income group is $25,000 - $49,999 (20.7%), followed by $50,000 - $74,999 (17.8%). The highest income group represents only 16.2% of households, indicating that higher-income households tend to travel more and emit more GHG.

Table 3-75: VMT by Household Income

Household Income	Avg Daily VMT	Unweighted Total Daily VMT	Weighted Total Daily VMT	Unweighted %	Weighted %
$0 to $34,999	21	34,535	3,085,757	22.7%	17.9%
$35,000 to $54,999	31	26,878	2,734,940	17.6%	15.9%
$55,000 to $74,999	37.3	21,998	2,379,999	14.4%	13.8%
$75,000 to $99,999	39.8	20,527	2,232,553	13.5%	13.0%
$100,000 to $149,999	34.5	31,515	3,336,371	20.7%	19.4%
$150,000 or more	44.7	16,971	3,425,972	11.1%	19.9%
Total	—	—	17,195,592	—	—

Table 3-76: GHG by Household Income

	Household Income	Avg Daily GHG	Unweighted Total Daily GHG	Weighted Total Daily GHG	Unweighted %	Weighted %
	$0 to $34,999	6.1	9,963	921,582	20.1%	16.1%
	$35,000 to $54,999	10.4	9,022	934,505	18.2%	16.3%
	$55,000 to $74,999	12.1	7,123	750,637	14.4%	13.1%
	$75,000 to $99,999	13.9	7,198	802,834	14.5%	14.0%
	$100,000 to $149,999	11.9	10,908	1,217,856	22.0%	21.3%
	$150,000 or more	14.2	5,390	1,103,330	10.9%	19.3%
Total	—	—	—	5,730,744	—	—

Two person households generate the largest share of VMT (32.8%) and GHG (33.6%), followed by households with four or more members (31.4% of VMT and 31.6% of GHG). (Table 3-77 and Table 3-78). Table 3-1 presents that two-person households also represent the largest share at 35.8%, while four-plus households represent only 19.5%. This suggests that although large households are less common, they travel relatively long distances and therefore contribute disproportionately to total GHG emissions.

Table 3-77: VMT by Household Size

	Household Size	Avg Daily VMT	Unweighted Total Daily VMT	Weighted Total Daily VMT	Unweighted %	Weighted %
	1	18.6	32,798	3,285,297	21.5%	19.1%
	2	29.9	48,165	5,641,075	31.6%	32.8%
	3	39.5	27,824	2,859,192	18.3%	16.6%
	4	48.1	22,799	2,636,814	15.0%	15.3%
	5+	57.2	20,838	2,773,216	13.7%	16.1%
Total	—	—	—	17,195,594	—	—

Table 3-78: GHG by Household Size

Household Size	Avg Daily GHG	Unweighted Total Daily GHG	Weighted Total Daily GHG	Unweighted %	Weighted %
1	5.7	10,105	1,017,440	20.4%	17.8%
2	9.9	15,943	1,922,714	32.1%	33.6%
3	13.1	9,237	979,064	18.6%	17.1%
4	15.6	7,409	857,781	14.9%	15.0%
5+	19	6,910	953,745	13.9%	16.6%
Total	–	–	5,730,744	–	–

By vehicle type, cars (sedan) account for the largest share of VMT (54%) and GHG (45.5%) (Table 3-79 and Table 3-80). The second largest share is sport utility vehicles (SUVs) at 28% of VMT and 31.6% of GHG. Motorcycles represent 0.4% of VMT and 0.3% of GHG, which are lower than their 2.8% share of vehicles (Table 3-37), indicating that motorcycles are used for relatively short trips and produce less GHG than their fleet share. Cars have similar shares of VMT (54%) and vehicle type (53.3% of Table 3-37), though their GHG share (45.5%) is lower than their vehicle type share (53.3%). Vans and SUVs generate higher shares of VMT (3.9% of Van and 28% of SUVs) and GHG (4.5% of Van and 31.6% of SUVs) than their representation (3.4% of Van and 24.6% of SUVs) in the fleet (Table 3-37), while pickup trucks produce a higher share of GHG (17.7%) relative to their vehicle share (13.8%) (Table 3-37). Overall, these patterns show that vehicle type strongly influences both VMT generation and GHG emissions.

Table 3-79: VMT by Vehicle Type

Vehicle Type	Avg Daily VMT	Unweighted Total Daily VMT	Weighted Total Daily VMT	Unweighted %	Weighted %
Motorcycle (includes mopeds)	3.7	614	66,136	0.4%	0.4%
Car (includes station wagons)	19.7	77,714	8,547,358	56.6%	54.0%
Van (mini and passenger)	23.3	5,548	624,452	4.0%	3.9%
Sport Utility Vehicle	22	36,412	4,432,809	26.5%	28.0%
Pickup Truck	18.3	16,166	2,091,835	11.8%	13.2%
Other	5.8	854	73,963	0.6%	0.5%
Total	–	–	15,836,553	–	–

Table 3-80: GHG by Vehicle Type

	Vehicle Type	Avg Daily GHG	Unweighted Total Daily GHG	Weighted Total Daily GHG	Unweighted %	Weighted %
	Motorcycle (includes mopeds)	1.1	181	19,474	0.4%	0.3%
	Car (includes station wagons)	6.1	24,062	2,606,729	48.5%	45.5%
	Van (mini and passenger)	9.8	2,324	258,639	4.7%	4.5%
	Sport Utility Vehicle	9.1	15,003	1,809,382	30.2%	31.6%
	Pickup Truck	8.9	7,856	1,016,730	15.8%	17.7%
	Other	1.2	179	19,790	0.4%	0.3%
Total	—	—	—	5,730,744	—	—

3.4. Comparison in Travel Patterns and VMT

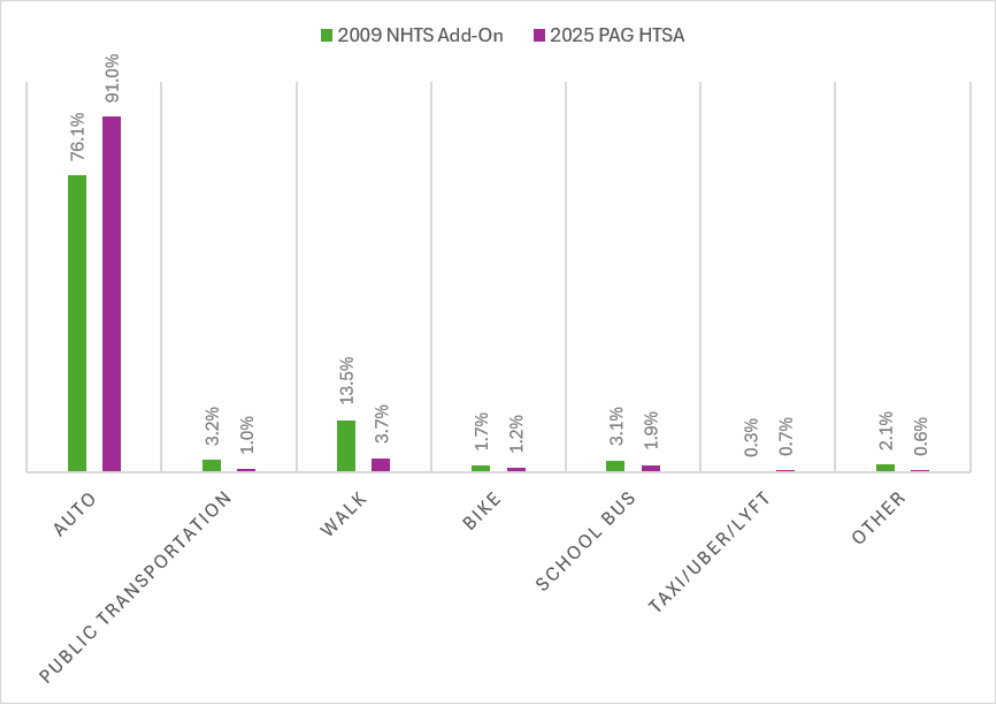
This section compares vehicle ownership and travel behavior between the 2009 NHTS Add-On and the 2025 PAG HTSA. The results show a clear shift toward higher vehicle availability in Pima County over time. The share of zero-vehicle households declined from 9.1% in 2009 to 6.9% in 2025, while one-vehicle households increased from 34.3% to 37.3% (Figure 3-9).

Figure 3-9: Household Vehicle Ownership Comparison



Mode choice patterns also shifted toward even greater auto dependence (Figure 3-10). Auto travel, already dominant in 2009, increased from 76.1% to 91% in 2025. All other modes decline, including public transportation (from 3.2% to 1%), despite providing fare-free transit services in 2025. Walking experienced the steepest drop, from 13.5% to 3.7%, while bicycling decreased slightly from 1.7% to 1.2%. School bus use fell from 3.1% to 1.9%, consistent with a shrinking school-age population. Taxi and ride-hailing increased slightly from 0.3% to 0.7%.

Figure 3-10: Mode of Travel Comparison

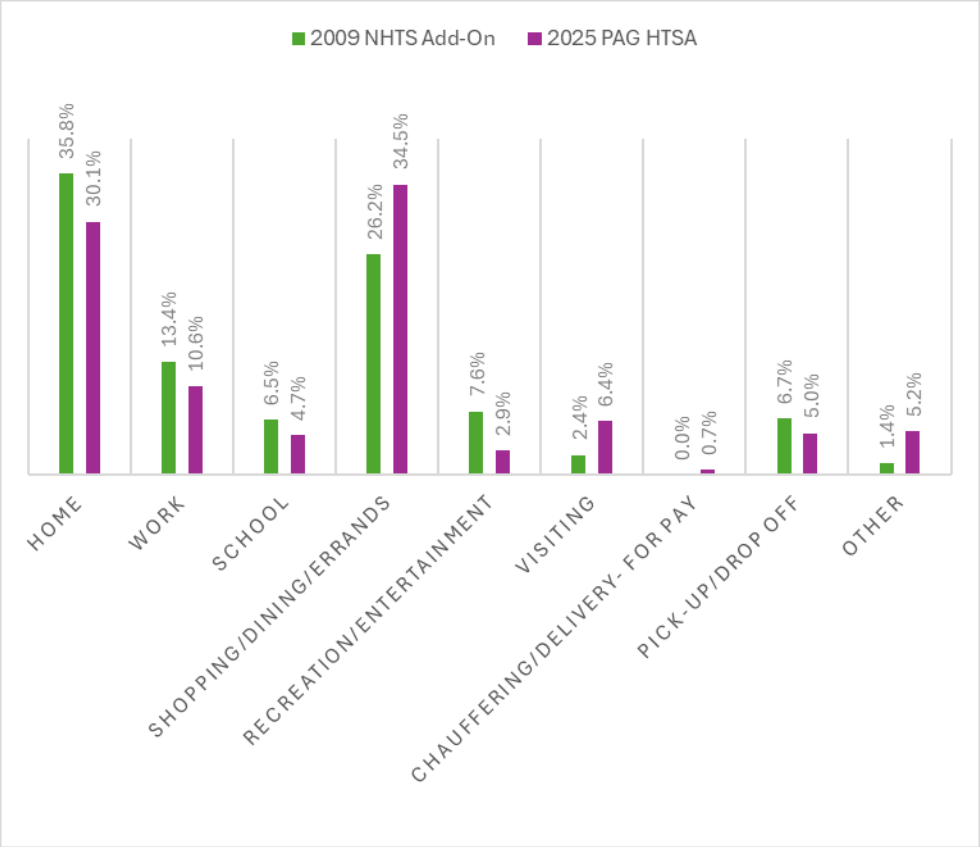


Trip purpose distributions changed noticeably, shifting away from mandatory and recreational travel toward maintenance and social activities (Figure 3-11). The shares of home, work, school, recreation/entertainment, and pick-up/drop-off trips all declined. On the other hand, shopping, dining, errands, visiting, chauffeuring for pay, and other trips grew substantially.

Home trips fell from 35.8% to 30.1%, and work trips decreased from 13.4% to 10.6%. It is likely reflecting increased telecommuting after the COVID-19 pandemic and evolving trip-chaining patterns associated with home trips. School trips also decreased from 6.5% to 4.7%, and pick-up/drop-off trips were reduced from 6.7% to 5%, aligning with the decline in school age population. Recreation and entertainment trips dropped sharply from 7.6% to 2.9%, possibly due to increased time spent on online entertainment rather than in-person activities.

In contrast, shopping, dining, and errand trips grew substantially, rising from 26.2% to 34.5%, suggesting changes in travel priorities or behavior, or greater accessibility to these destinations. Also, visiting trips increased their share from 2.4% to 6.4%, and the 2025 survey newly captures paid delivery or chauffeuring trips (0.7%), which were not reported in the earlier dataset.

Figure 3-11: Trip Purpose Comparison



Pima County's population grew by about 8.2%, increasing from 980,263 in 2010 (2010 Census) to 1,060,490 in 2024 (2024 ACS 5 yr). Over the same period, the number of households rose by approximately 12.7%, from 388,660 in 2010 (2010 Census) to 437,827 (2024 ACS 5 yr) in 2024, indicating little change in average household size, which remained stable at 2.46 in 2010 (2010 Census) and 2.36 in 2024 (2024 ACS 5 yr). From 2010 to 2025, average household VMT declined from 52 to 38.4 miles per day, and average person VMT dropped from 27.2 to 18.4 miles per day (Figure 3-12), indicating more efficient travel patterns, possibly due to better access to destinations, telecommuting, or changes in lifestyle and mobility options.

Figure 3-12: VMT Comparison



3.5. Travel Behavior Trends and Air Quality

There are several ways to reduce VMT: including making fewer trips, making shorter trips, and changing the mode of travel.

- ***Making fewer trips***. After the pandemic, virtual activities became more widespread and normalized, leading to lasting reductions in travel for many routine purposes. Work-related activities such as telework online meetings, and virtual conferences shifted significantly online, as did education through remote schooling and digital learning platforms. Shopping and errands increasingly moved to online retail and service delivery, while maintenance activities such as medical appointments and administrative services expanded through telehealth and other virtual options. Entertainment also shifted toward social media, streaming, and online gaming. These changes were not merely temporary. For many activities, they represent permanent structural shifts in how people participate in daily life. To support and sustain these travel-reducing behaviors, policies that encourage telework can play a meaningful role in lowering trip frequency. Likewise, shifting from suburban, low-density development to compact or transit-oriented land-use development improves accessibility and reduces the need for multiple trips. Shorter distances make it easier to combine discretionary activities, and walkable, mixed-use environments support more walking and biking trips in place of vehicle travel.
- ***Making short trips***. The average trip distance in PAG is 6.8 miles. Work-related travel has the highest share of trips that are greater than 30 miles. Reducing commuting trips would not only decrease the number of trips but also those trips contributing a high share of the miles traveled. With decreased commuting trips, telecommuters and remote workers are observed

to an increase in other, shorter trips (sometimes referred to as the "rebound effect.") However, these shorter trips may be more feasible in non-auto modes, which generally have much lower emission rates. Over 40% of trips are less than 3 miles.

- ***Changing mode of travel***. Traveling by auto continues to be the most frequently used mode of transportation, almost 91% of trips and 96% of the person miles traveled. Shifting trips to bike and walk modes are limited due to the distance of the trip, the time required, environmental factors, and safety (Section 3.2.5). While over 50% of households have a bike, almost 80% of people have not used a bike in the last 7 days. People who do use bikes are primarily using them for recreation (77.9%) and not their mobility needs. Shifting trips to transit are limited due to inconvenience, longer travel times, reliability issues, and low accessibility (Section 3.2.5). Over 60% of residents never use transit. While 3.9% of people reported using transit daily, transit trips make even less of the total travel (1%). However, new mobility options, including personal mobility devices, have been more widely available since 2008. While they have been used less frequently than bikes, they are serving niche marks cover various trip purposes. About 50% of e-scooter trips were made for recreational purposes.
- In addition to reducing VMT, shifting VMT to lower emission vehicles provides the highest reduction in GHG emissions. Approximately 93% of households have access to a vehicle, and only 3.6% own electric vehicles (EVs). For those who own EVs, environmental impacts and cost savings were primary motivations.

Shifting travel to lower-emission modes can reduce VMT and GHG emissions, but the data show that very few long trips are made using these modes. This underscores the need for strategies that both reduce how often and how far people travel and improve the convenience and viability of alternatives to driving. Long-term decisions, such as where households choose to live, strongly influence access to destinations (affecting trip distance) as well as available mobility options (affecting mode choice). Even with significant mode shifts, some long-distance auto travel will remain. Electric, plug-in hybrid, and hybrid vehicles are used for longer trips on average (7.7 miles) than gasoline and diesel vehicles (7.1 miles), indicating that when people adopt alternative-fuel vehicles, they tend to rely on them for longer-distance travel.

4. References

Half, R. (2024, 12 12). Retrieved from BARRON'S: https://www.barrons.com/articles/work-from-home-office-return-economy-productivity-726403ac

Heinrich, C. (2025, 7 17). Retrieved from https://traton.com/en/newsroom/stories/scania-lca-study.html.

Maxwell Woody, M. T. (2022). Optimzing Future Cost and Emissionsof Electric Delivery Vehicles. *Journal of Industrial Ecology Wiley*, 1108-1122.

Michigan, U. o. (2026, 3 27). *Carbon Footprint Factsheet*. Retrieved from Center for Sustainable Systems: https://css.umich.edu/publications/factsheets/sustainability-indicators/carbon-footprint-factsheet

5. Appendices

5.1. Recruitment Materials

5.1.1. Postcard Samples in English and Spanish

The postcards shown here illustrate the front in the English version and the back in the Spanish version. Both postcards offered up to $100 per household depending on participation method.

Figure 5-1: Front of Postcard (English)



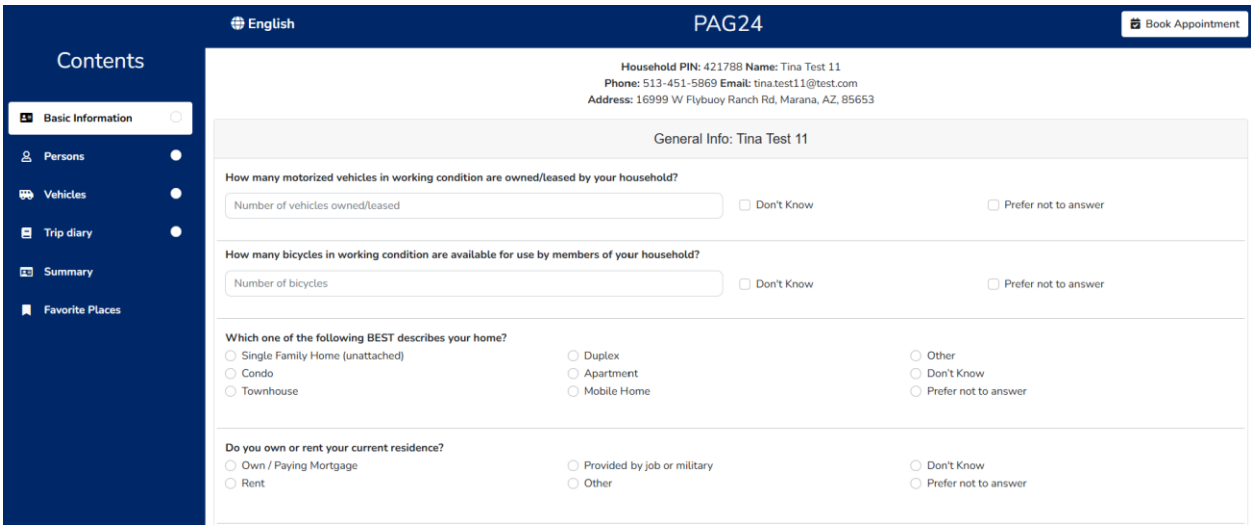
Figure 5-2: Back of Postcard (Spanish)

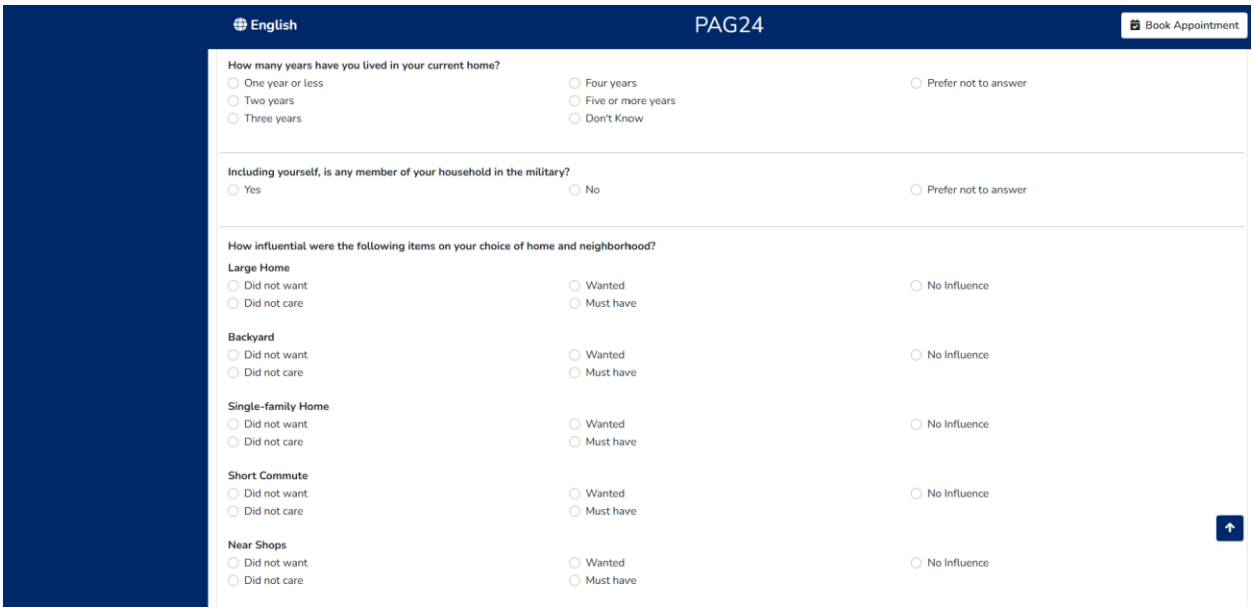


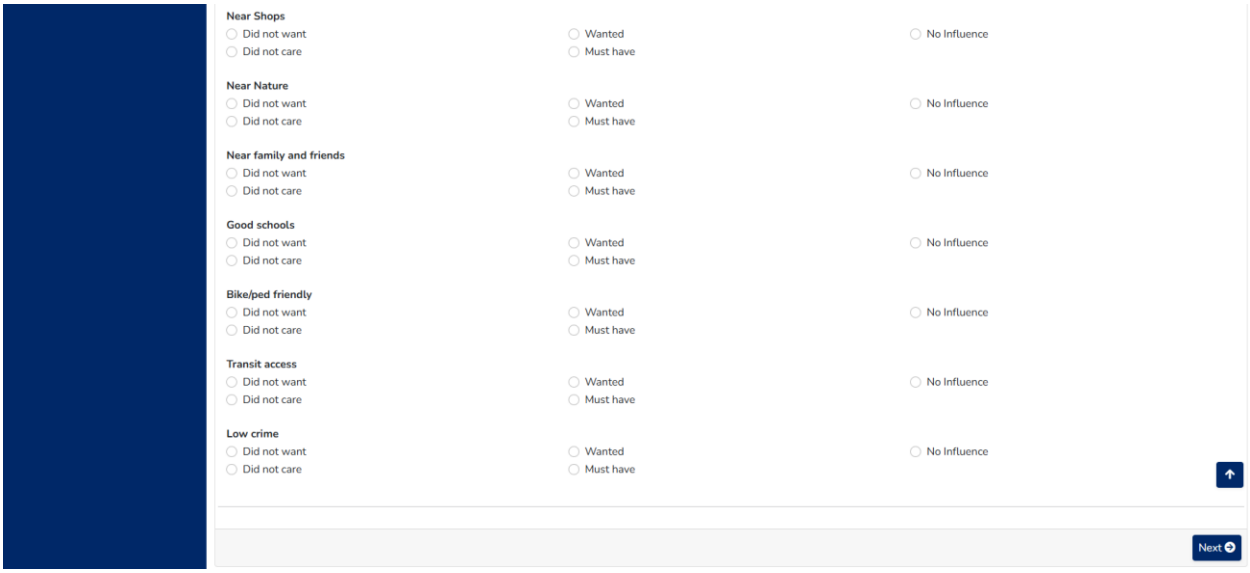
5.2. Survey Instruments (online or CATI)

The following section shows a selection of screenshots from the online version of the survey once a household has been qualified. These questions were accessible by the respondent after downloading the app, or by an ETC Interviewer during the CATI process.

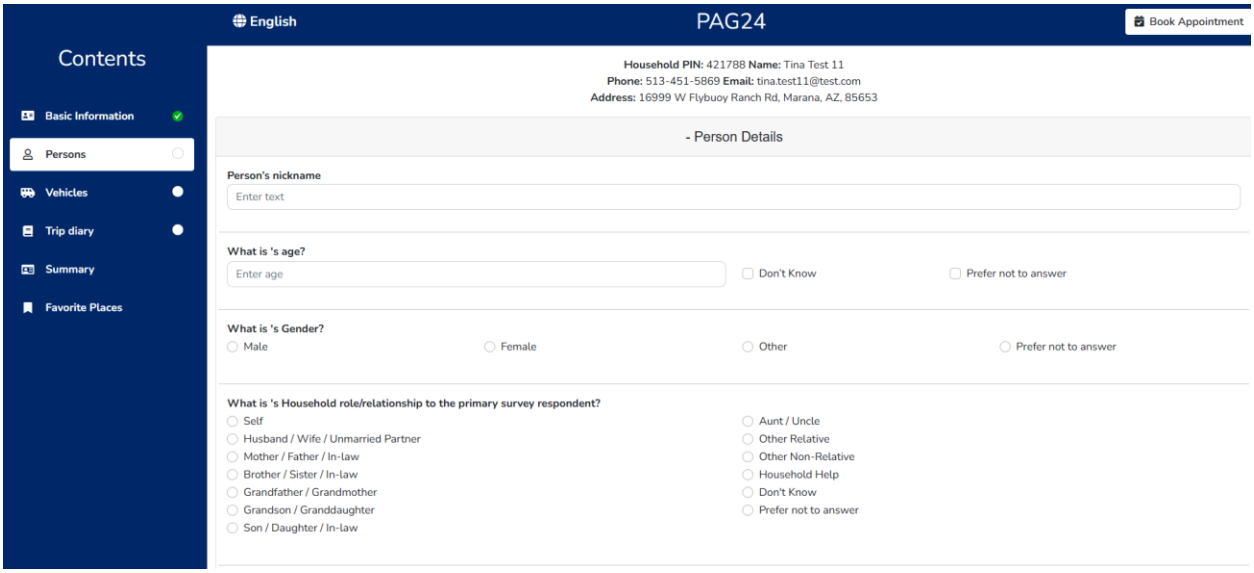
5.2.1. Household Level Questionnaire

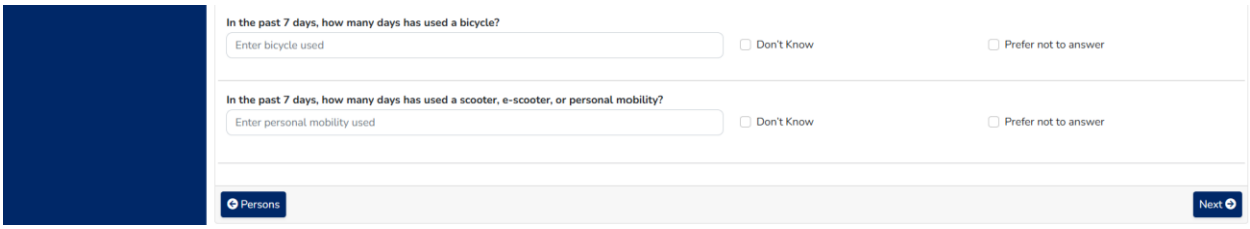


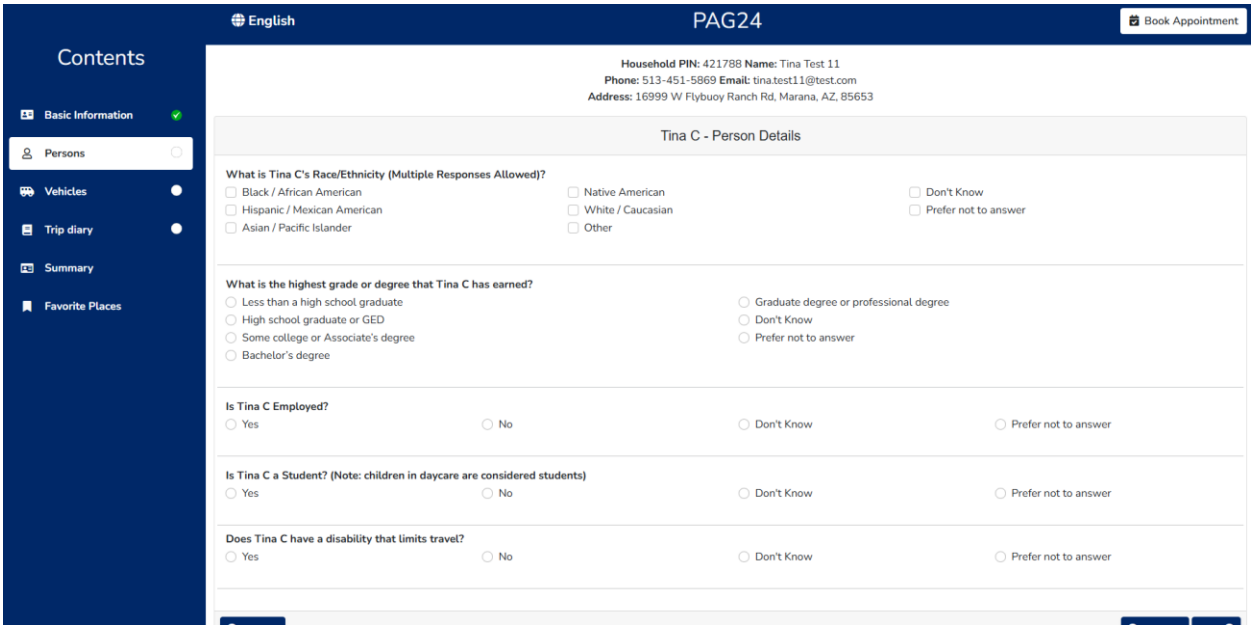


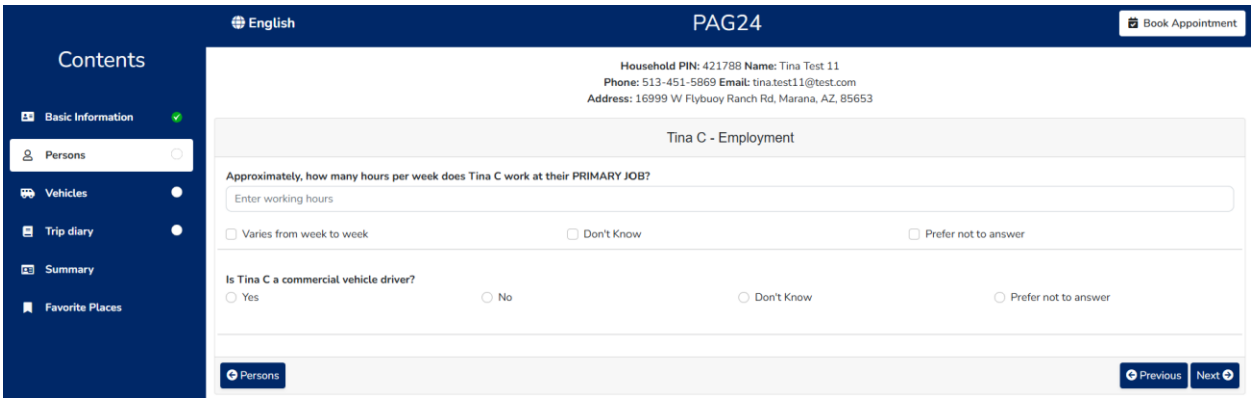


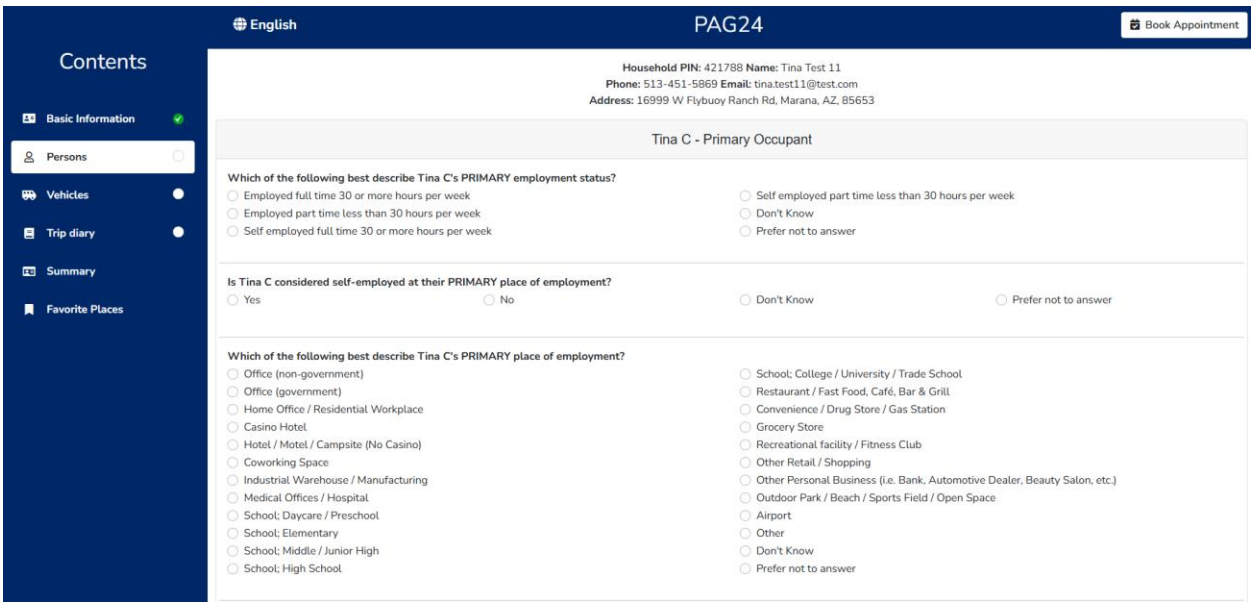
5.2.2. Person Level Questionnaire






English
PAG24
Book Appointment
Contents
Basic Information
Persons
Vehicles
Trip diary
Summary
Favorite Places
Household PIN: 421788 Name: Tina Test 11
Phone: 513-451-5869 Email: tina.test11@test.com
Address: 16999 W Flybuoy Ranch Rd, Marana, AZ, 85653
Tina C - Person Details
What is Tina C's Race/Ethnicity (Multiple Responses Allowed)?
Black / African American
Hispanic / Mexican American
Asian / Pacific Islander
Native American
White / Caucasian
Other
Don't Know
Prefer not to answer
What is the highest grade or degree that Tina C has earned?
Less than a high school graduate
High school graduate or GED
Some college or Associate's degree
Bachelor's degree
Graduate degree or professional degree
Don't Know
Prefer not to answer
Is Tina C Employed?
Yes
No
Don't Know
Prefer not to answer
Is Tina C a Student? (Note: children in daycare are considered students)
Yes
No
Don't Know
Prefer not to answer
Does Tina C have a disability that limits travel?
Yes
No
Don't Know
Prefer not to answer


English
PAG24
Book Appointment
Contents
Basic Information
Persons
Vehicles
Trip diary
Summary
Favorite Places
Household PIN: 421788 Name: Tina Test 11
Phone: 513-451-5869 Email: tina.test11@test.com
Address: 16999 W Flybuoy Ranch Rd, Marana, AZ, 85653
Tina C - Employment
Approximately, how many hours per week does Tina C work at their PRIMARY JOB?
Enter working hours
Varies from week to week
Don't Know
Prefer not to answer
Is Tina C a commercial vehicle driver?
Yes
No
Don't Know
Prefer not to answer
Persons
Previous
Next


English
PAG24
Book Appointment
Contents
Basic Information
Persons
Vehicles
Trip diary
Summary
Favorite Places
Household PIN: 421788 Name: Tina Test 11
Phone: 513-451-5869 Email: tina.test11@test.com
Address: 16999 W Flybuoy Ranch Rd, Marana, AZ, 85653
Tina C - Primary Occupant
Which of the following best describe Tina C's PRIMARY employment status?
Employed full time 30 or more hours per week
Employed part time less than 30 hours per week
Self employed full time 30 or more hours per week
Self employed part time less than 30 hours per week
Don't Know
Prefer not to answer
Is Tina C considered self-employed at their PRIMARY place of employment?
Yes
No
Don't Know
Prefer not to answer
Which of the following best describe Tina C's PRIMARY place of employment?
Office (non-government)
Office (government)
Home Office / Residential Workplace
Casino Hotel
Hotel / Motel / Campsite (No Casino)
Coworking Space
Industrial Warehouse / Manufacturing
Medical Offices / Hospital
School; Daycare / Preschool
School; Elementary
School; Middle / Junior High
School; High School
School; College / University / Trade School
Restaurant / Fast Food, Café, Bar & Grill
Convenience / Drug Store / Gas Station
Grocery Store
Recreational facility / Fitness Club
Other Retail / Shopping
Other Personal Business (i.e. Bank, Automotive Dealer, Beauty Salon, etc.)
Outdoor Park / Beach / Sports Field / Open Space
Airport
Other
Don't Know
Prefer not to answer

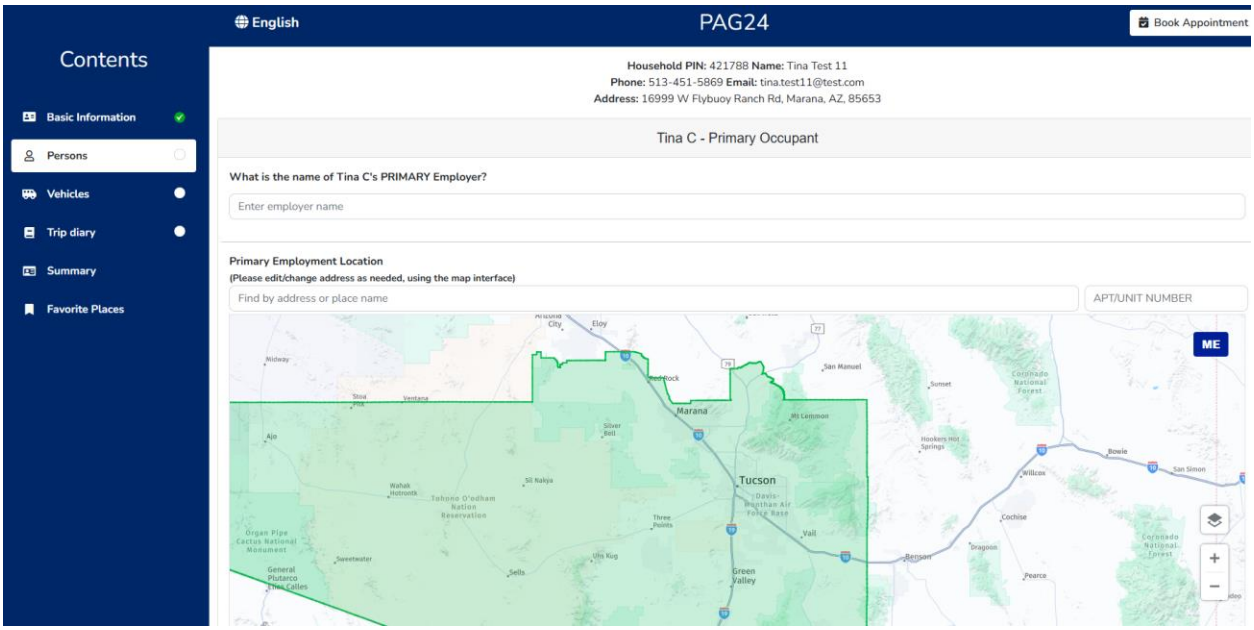
Which of the following best describe Tina C's PRIMARY occupation?

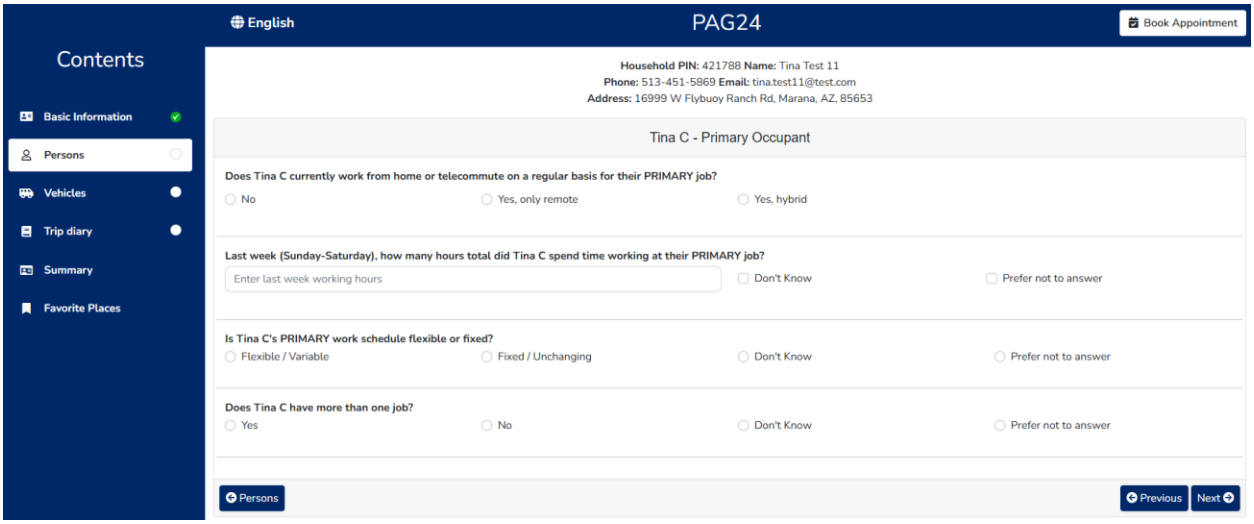
- ○ Management Occupations
- ○ Business and Financial Operations Occupations
- ○ Computer and Mathematical Occupations
- ○ Architecture and Engineering Occupations
- ○ Life, Physical, and Social Science Occupations
- ○ Community and Social Service Occupations
- ○ Legal Occupations
- ○ Educational Instruction and Library Occupations
- ○ Arts, Design, Entertainment, Sports, and Media Occupations
- ○ Healthcare Practitioners and Technical Occupations
- ○ Healthcare Support Occupations
- ○ Protective Service Occupations
- ○ Food Preparation and Serving Related Occupations
- ○ Building and Grounds Cleaning and Maintenance Occupations
- ○ Personal Care and Service Occupations
- ○ Sales and Related Occupations
- ○ Office and Administrative Support Occupations
- ○ Farming, Fishing, and Forestry Occupations
- ○ Construction and Extraction Occupations
- ○ Installation, Maintenance, and Repair Occupations
- ○ Production Occupations
- ○ Transportation and Material Moving Occupations
- ○ Military Specific Occupations
- ○ Something else
- ○ Other / Not applicable (unemployed / student / retired)
- ○ Don't Know
- ○ Prefer not to answer

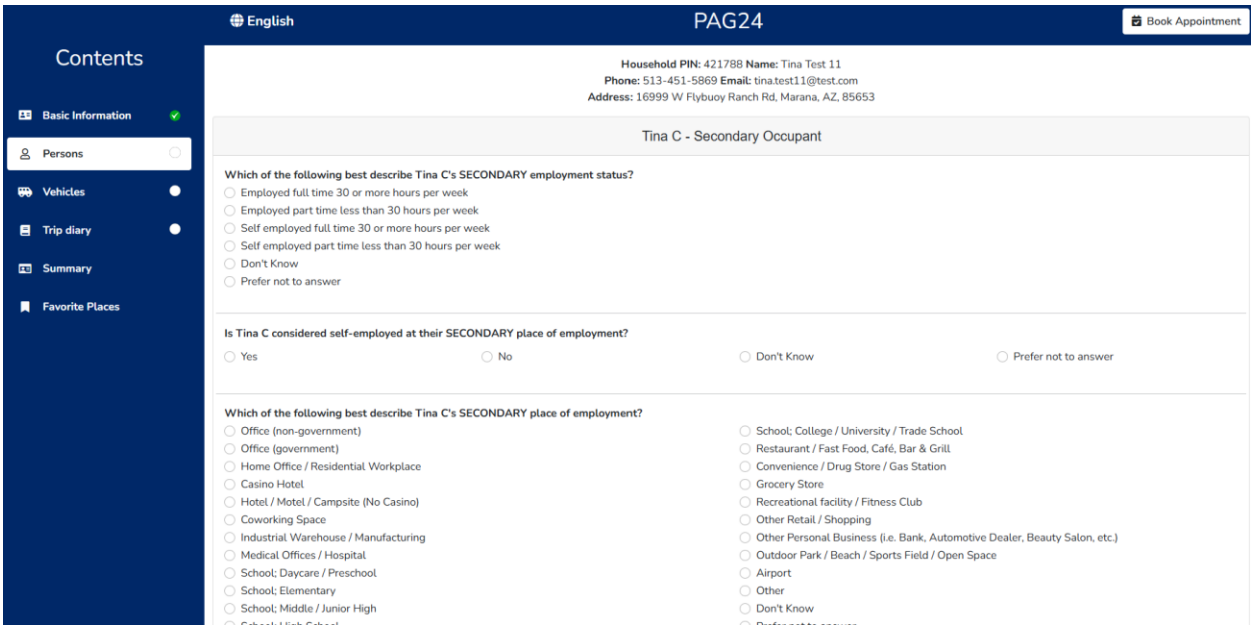
Which of the following best describes the type of industry of Tina C's PRIMARY occupation?

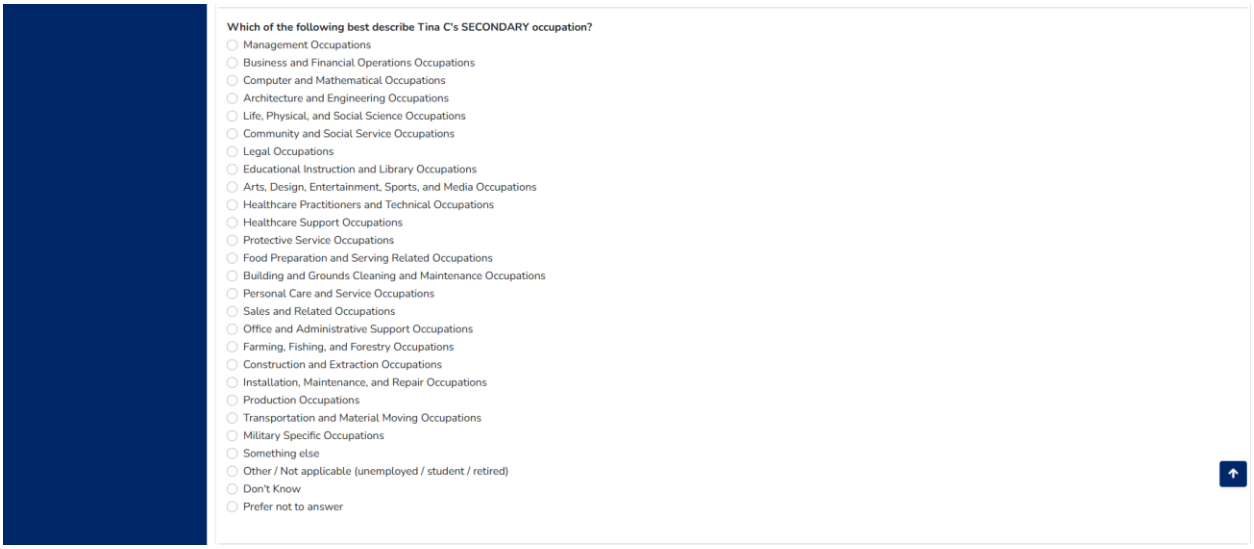
- ○ Agriculture, Forestry, Fishing and Hunting
- ○ Mining, Quarrying, and Oil and Gas Extraction
- ○ Utilities
- ○ Construction
- ○ Manufacturing
- ○ Wholesale Trade
- ○ Retail Trade
- ○ Transportation and Warehousing
- ○ Information
- ○ Finance and Insurance
- ○ Real Estate and Rental and Leasing
- ○ Professional, Scientific, and Technical Services
- ○ Management of Companies and Enterprises
- ○ Administrative and Support and Waste Management and Remediation Services
- ○ Educational Services
- ○ Health Care and Social Assistance
- ○ Arts, Entertainment, and Recreation
- ○ Accommodation and Food Services
- ○ Other Services (except Public Administration)
- ○ Public Administration
- ○ Something else
- ○ Not applicable (unemployed / student / retired)
- ○ Don't Know
- ○ Prefer not to answer

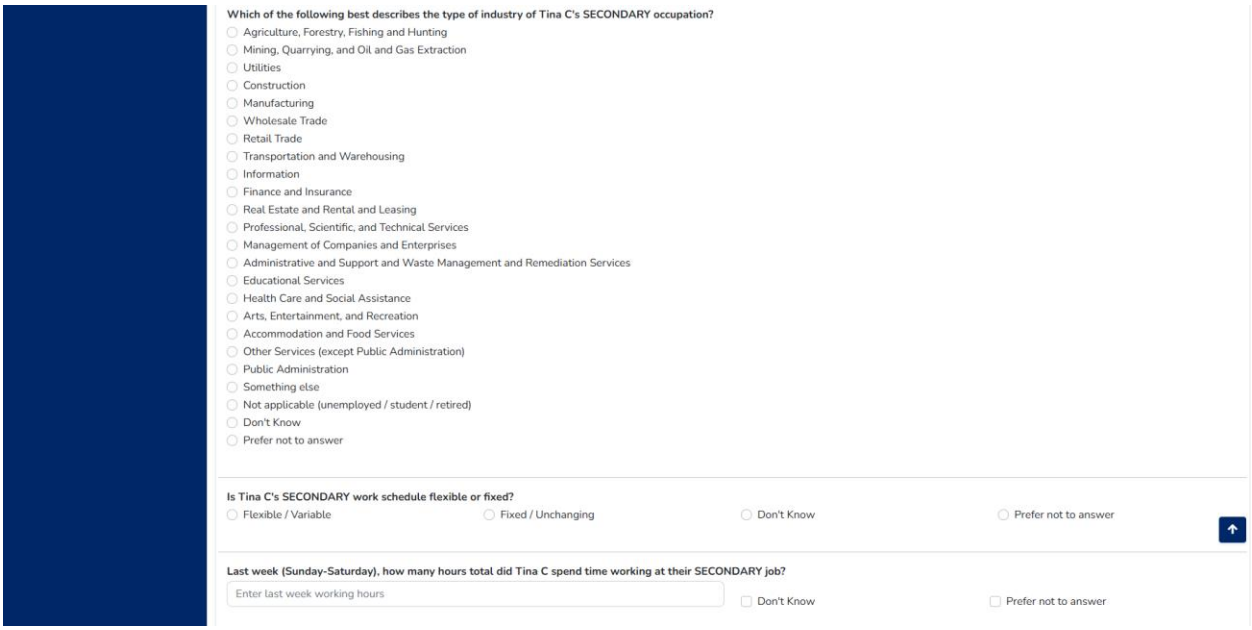
Persons | Previous | Next

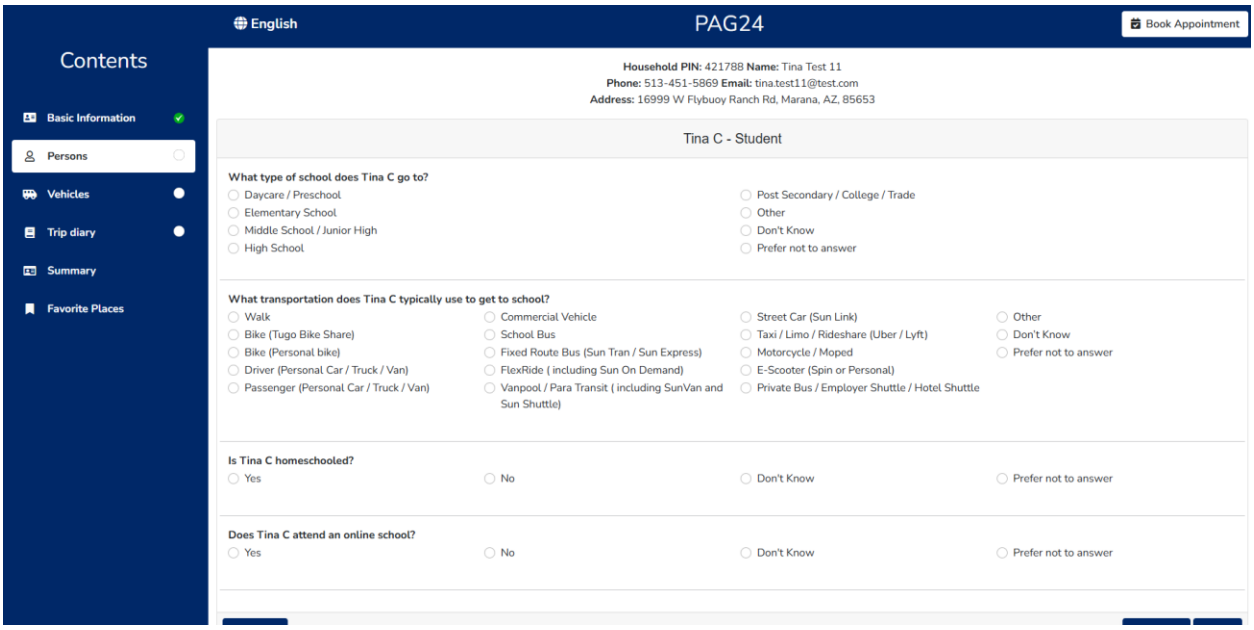

English
PAG24
Book Appointment
Contents
Basic Information
Persons
Vehicles
Trip diary
Summary
Favorite Places
Household PIN: 421788 Name: Tina Test 11
Phone: 513-451-5869 Email: tina.test11@test.com
Address: 16999 W Flybuoy Ranch Rd, Marana, AZ, 85653
Tina C - Primary Occupant
What is the name of Tina C's PRIMARY Employer?
Enter employer name
Primary Employment Location
(Please edit/change address as needed, using the map interface)
Find by address or place name
APT/UNIT NUMBER
ME
Marana
Tucson
Is Tina C's PRIMARY job performed at a home office or business operated from home?
Yes
No
Don't Know
Prefer not to answer
Persons
Previous
Next

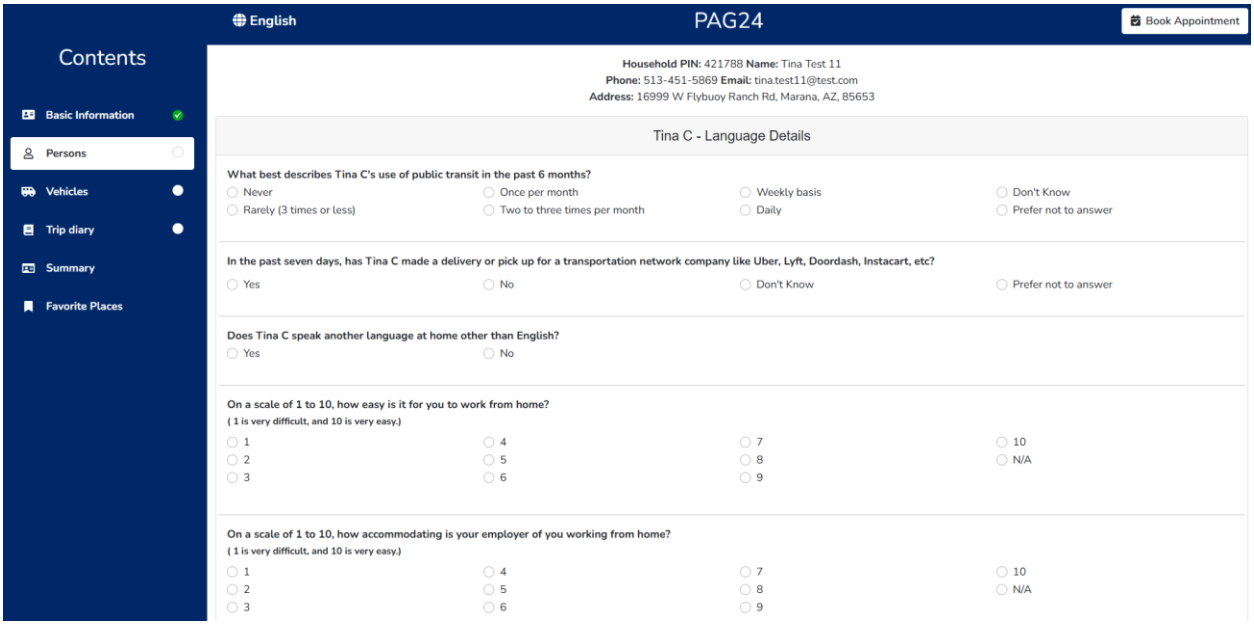

English
PAG24
Book Appointment
Contents
Basic Information
Persons
Vehicles
Trip diary
Summary
Favorite Places
Household PIN: 421788 Name: Tina Test 11
Phone: 513-451-5869 Email: tina.test11@test.com
Address: 16999 W Flybuoy Ranch Rd, Marana, AZ, 85653
Tina C - Primary Occupant
Does Tina C currently work from home or telecommute on a regular basis for their PRIMARY job?
No
Yes, only remote
Yes, hybrid
Last week (Sunday-Saturday), how many hours total did Tina C spend time working at their PRIMARY job?
Enter last week working hours
Don't Know
Prefer not to answer
Is Tina C's PRIMARY work schedule flexible or fixed?
Flexible / Variable
Fixed / Unchanging
Don't Know
Prefer not to answer
Does Tina C have more than one job?
Yes
No
Don't Know
Prefer not to answer
Persons
Previous
Next


English
PAG24
Book Appointment
Contents
Basic Information
Persons
Vehicles
Trip diary
Summary
Favorite Places
Household PIN: 421788 Name: Tina Test 11
Phone: 513-451-5869 Email: tina.test11@test.com
Address: 16999 W Flybuoy Ranch Rd, Marana, AZ, 85653
Tina C - Secondary Occupant
Which of the following best describe Tina C's SECONDARY employment status?
Employed full time 30 or more hours per week
Employed part time less than 30 hours per week
Self employed full time 30 or more hours per week
Self employed part time less than 30 hours per week
Don't Know
Prefer not to answer
Is Tina C considered self-employed at their SECONDARY place of employment?
Yes
No
Don't Know
Prefer not to answer
Which of the following best describe Tina C's SECONDARY place of employment?
Office (non-government)
Office (government)
Home Office / Residential Workplace
Casino Hotel
Hotel / Motel / Campsite (No Casino)
Coworking Space
Industrial Warehouse / Manufacturing
Medical Offices / Hospital
School; Daycare / Preschool
School; Elementary
School; Middle / Junior High
School; College / University / Trade School
Restaurant / Fast Food, Café, Bar & Grill
Convenience / Drug Store / Gas Station
Grocery Store
Recreational facility / Fitness Club
Other Retail / Shopping
Other Personal Business (i.e. Bank, Automotive Dealer, Beauty Salon, etc.)
Outdoor Park / Beach / Sports Field / Open Space
Airport
Other
Don't Know

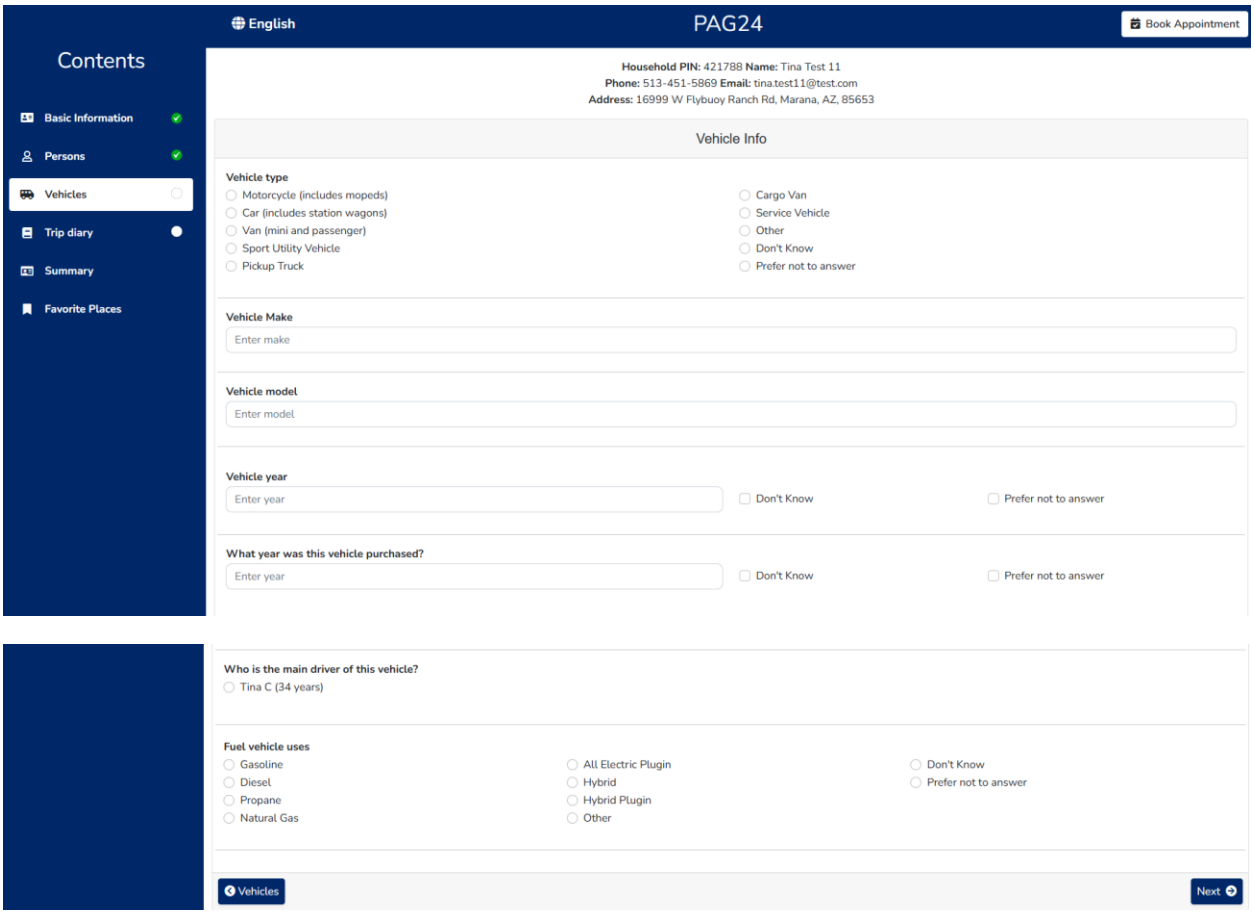

Which of the following best describe Tina C's SECONDARY occupation?
Management Occupations
Business and Financial Operations Occupations
Computer and Mathematical Occupations
Architecture and Engineering Occupations
Life, Physical, and Social Science Occupations
Community and Social Service Occupations
Legal Occupations
Educational Instruction and Library Occupations
Arts, Design, Entertainment, Sports, and Media Occupations
Healthcare Practitioners and Technical Occupations
Healthcare Support Occupations
Protective Service Occupations
Food Preparation and Serving Related Occupations
Building and Grounds Cleaning and Maintenance Occupations
Personal Care and Service Occupations
Sales and Related Occupations
Office and Administrative Support Occupations
Farming, Fishing, and Forestry Occupations
Construction and Extraction Occupations
Installation, Maintenance, and Repair Occupations
Production Occupations
Transportation and Material Moving Occupations
Military Specific Occupations
Something else
Other / Not applicable (unemployed / student / retired)
Don't Know
Prefer not to answer

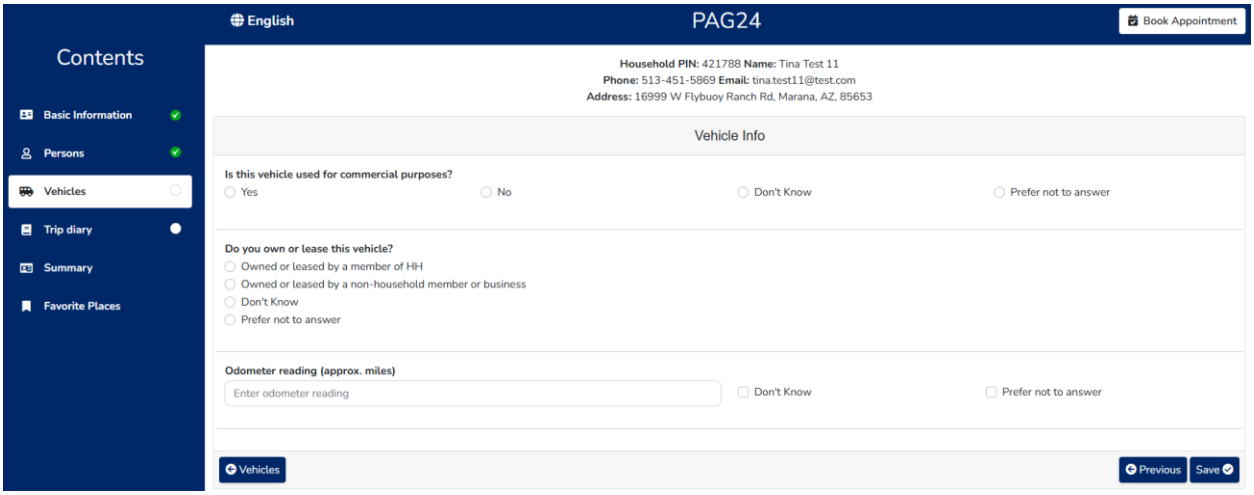

Which of the following best describes the type of industry of Tina C's SECONDARY occupation?
Agriculture, Forestry, Fishing and Hunting
Mining, Quarrying, and Oil and Gas Extraction
Utilities
Construction
Manufacturing
Wholesale Trade
Retail Trade
Transportation and Warehousing
Information
Finance and Insurance
Real Estate and Rental and Leasing
Professional, Scientific, and Technical Services
Management of Companies and Enterprises
Administrative and Support and Waste Management and Remediation Services
Educational Services
Health Care and Social Assistance
Arts, Entertainment, and Recreation
Accommodation and Food Services
Other Services (except Public Administration)
Public Administration
Something else
Not applicable (unemployed / student / retired)
Don't Know
Prefer not to answer
Is Tina C's SECONDARY work schedule flexible or fixed?
Flexible / Variable
Fixed / Unchanging
Don't Know
Prefer not to answer
Last week (Sunday-Saturday), how many hours total did Tina C spend time working at their SECONDARY job?
Enter last week working hours
Don't Know
Prefer not to answer


English
PAG24
Book Appointment
Contents
Basic Information
Persons
Vehicles
Trip diary
Summary
Favorite Places
Household PIN: 421788 Name: Tina Test 11
Phone: 513-451-5869 Email: tina.test11@test.com
Address: 16999 W Flybuoy Ranch Rd, Marana, AZ, 85653
Tina C - Student
What type of school does Tina C go to?
Daycare / Preschool
Elementary School
Middle School / Junior High
High School
Post Secondary / College / Trade
Other
Don't Know
Prefer not to answer
What transportation does Tina C typically use to get to school?
Walk
Bike (Tugo Bike Share)
Bike (Personal bike)
Driver (Personal Car / Truck / Van)
Passenger (Personal Car / Truck / Van)
Commercial Vehicle
School Bus
Fixed Route Bus (Sun Tran / Sun Express)
FlexRide (including Sun On Demand)
Vanpool / Para Transit (including SunVan and Sun Shuttle)
Street Car (Sun Link)
Taxi / Limo / Rideshare (Uber / Lyft)
Motorcycle / Moped
E-Scooter (Spin or Personal)
Private Bus / Employer Shuttle / Hotel Shuttle
Other
Don't Know
Prefer not to answer
Is Tina C homeschooled?
Yes
No
Don't Know
Prefer not to answer
Does Tina C attend an online school?
Yes
No
Don't Know
Prefer not to answer



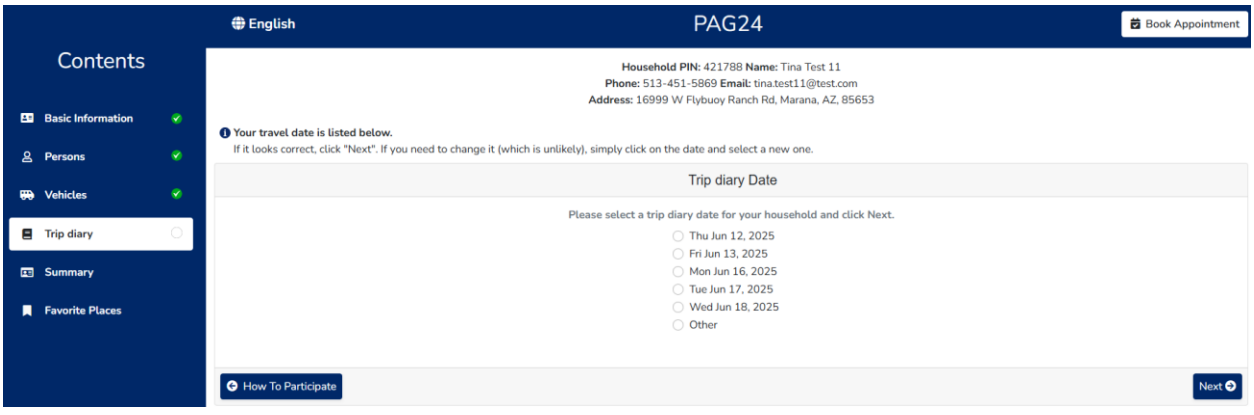
5.2.3. Vehicle Level Questionnaire



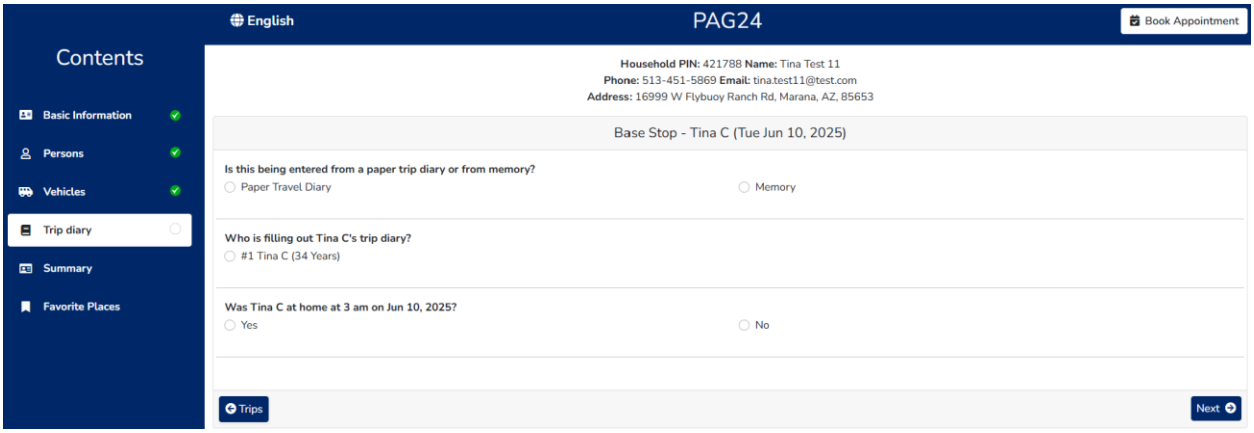


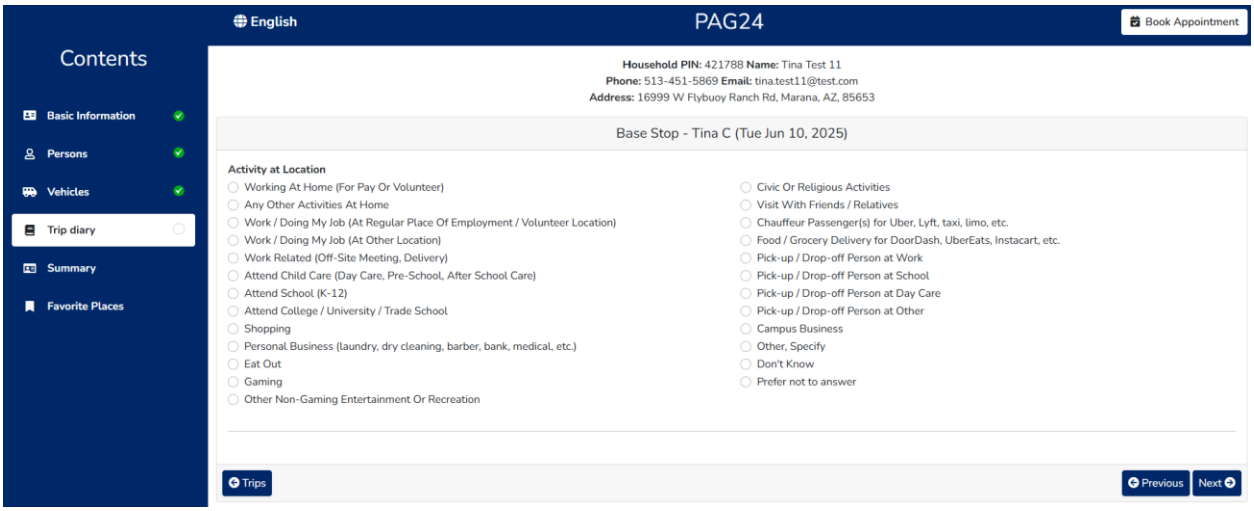
5.2.4. How to Participate and Travel Date Setup

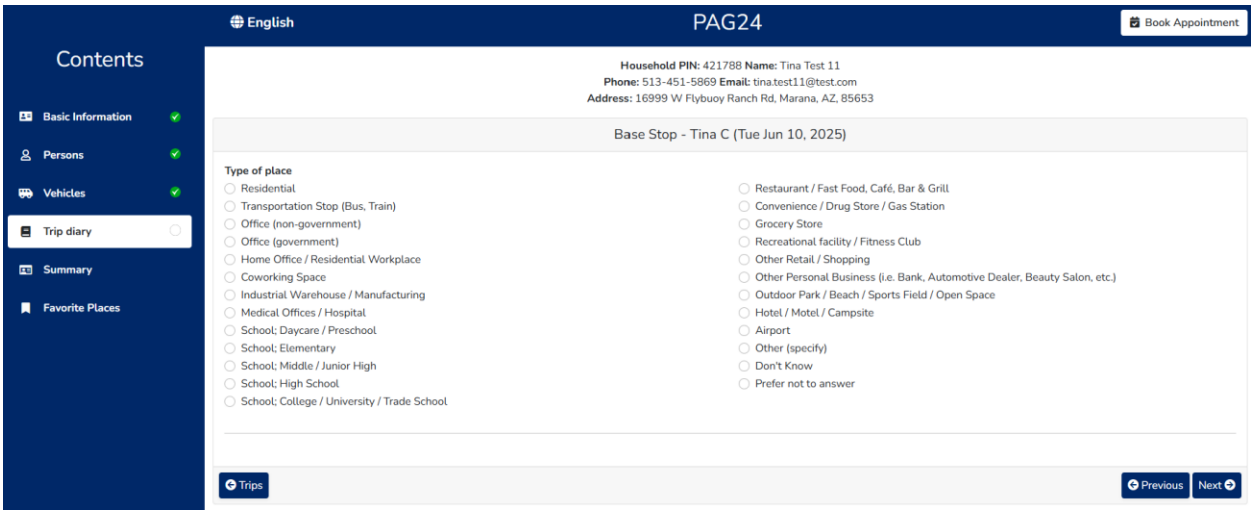


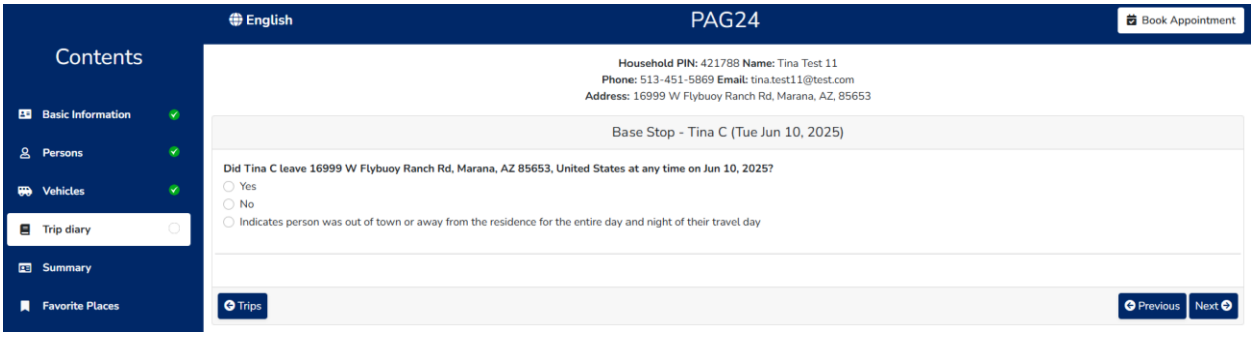


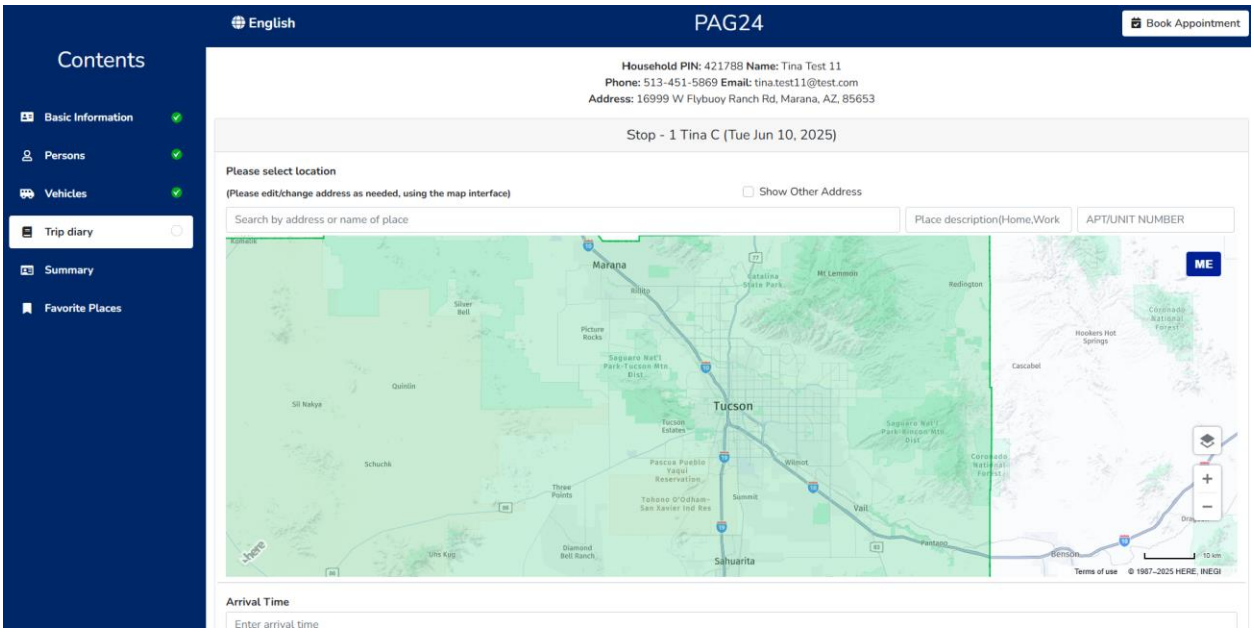
5.2.5. Trip Level Questionnaire

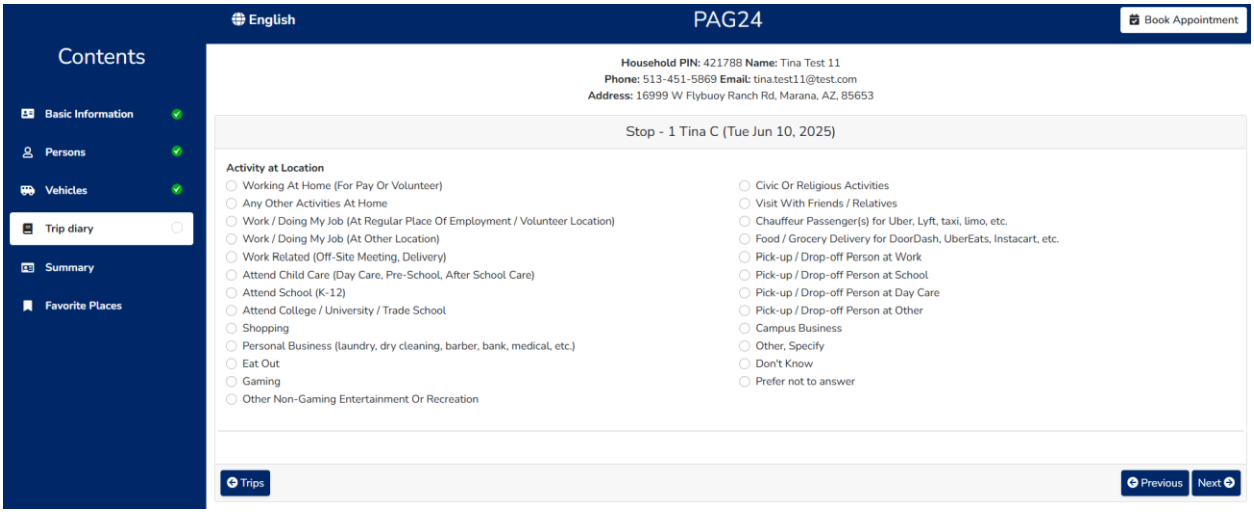


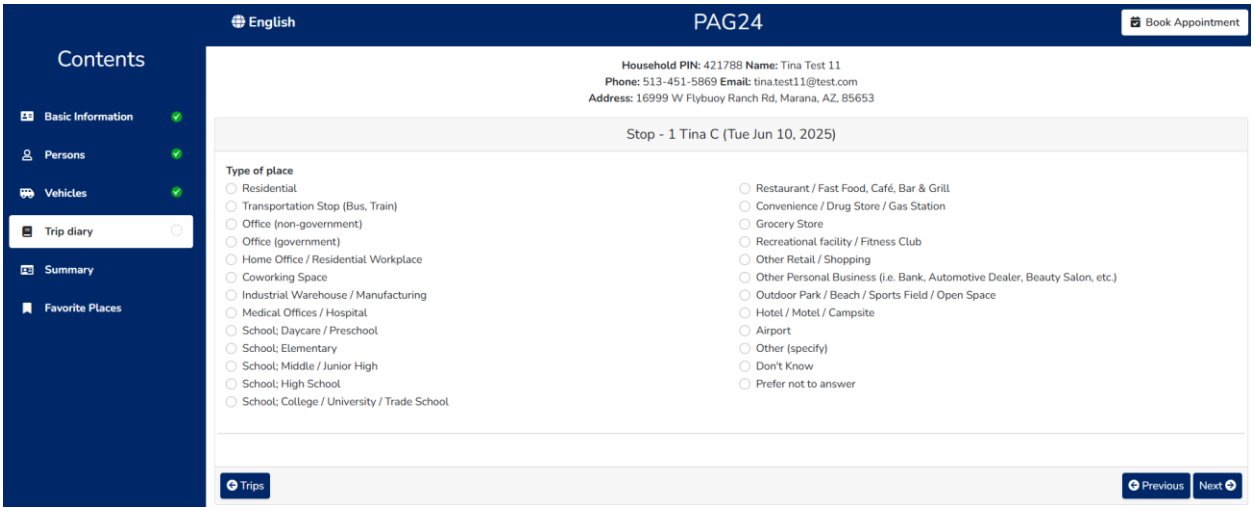




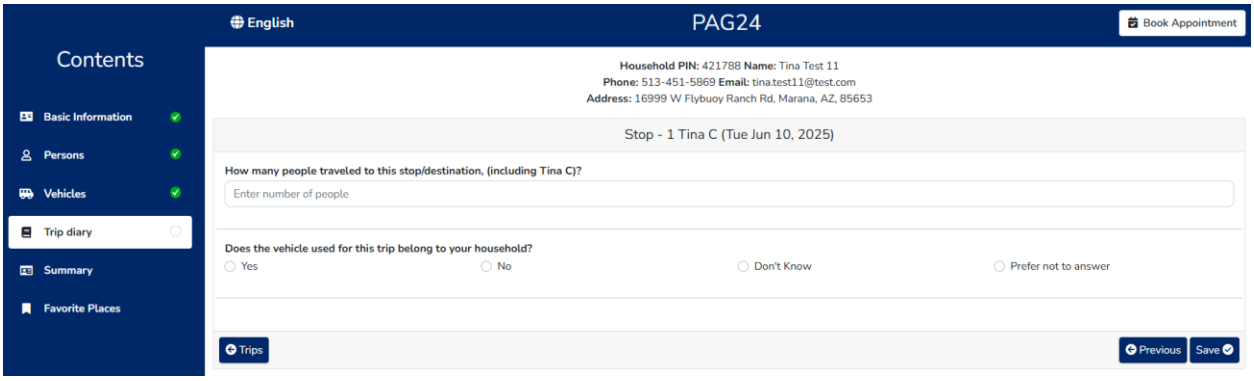

English
PAG24
Book Appointment
Contents
Basic Information
Persons
Vehicles
Trip diary
Summary
Favorite Places
Household PIN: 421788 Name: Tina Test 11
Phone: 513-451-5869 Email: tina.test11@test.com
Address: 16999 W Flybuoy Ranch Rd, Marana, AZ, 85653
Base Stop - Tina C (Tue Jun 10, 2025)
Did Tina C leave 16999 W Flybuoy Ranch Rd, Marana, AZ 85653, United States at any time on Jun 10, 2025?
Yes
No
Indicates person was out of town or away from the residence for the entire day and night of their travel day
Trips
Previous
Next


English
PAG24
Book Appointment
Contents
Basic Information
Persons
Vehicles
Trip diary
Summary
Favorite Places
Household PIN: 421788 Name: Tina Test 11
Phone: 513-451-5869 Email: tina.test11@test.com
Address: 16999 W Flybuoy Ranch Rd, Marana, AZ, 85653
Stop - 1 Tina C (Tue Jun 10, 2025)
Please select location
(Please edit/change address as needed, using the map interface)
Show Other Address
Search by address or name of place
Place description(Home,Work
APT/UNIT NUMBER
Marana
Tucson
Sahuarita
ME
Arrival Time
Enter arrival time

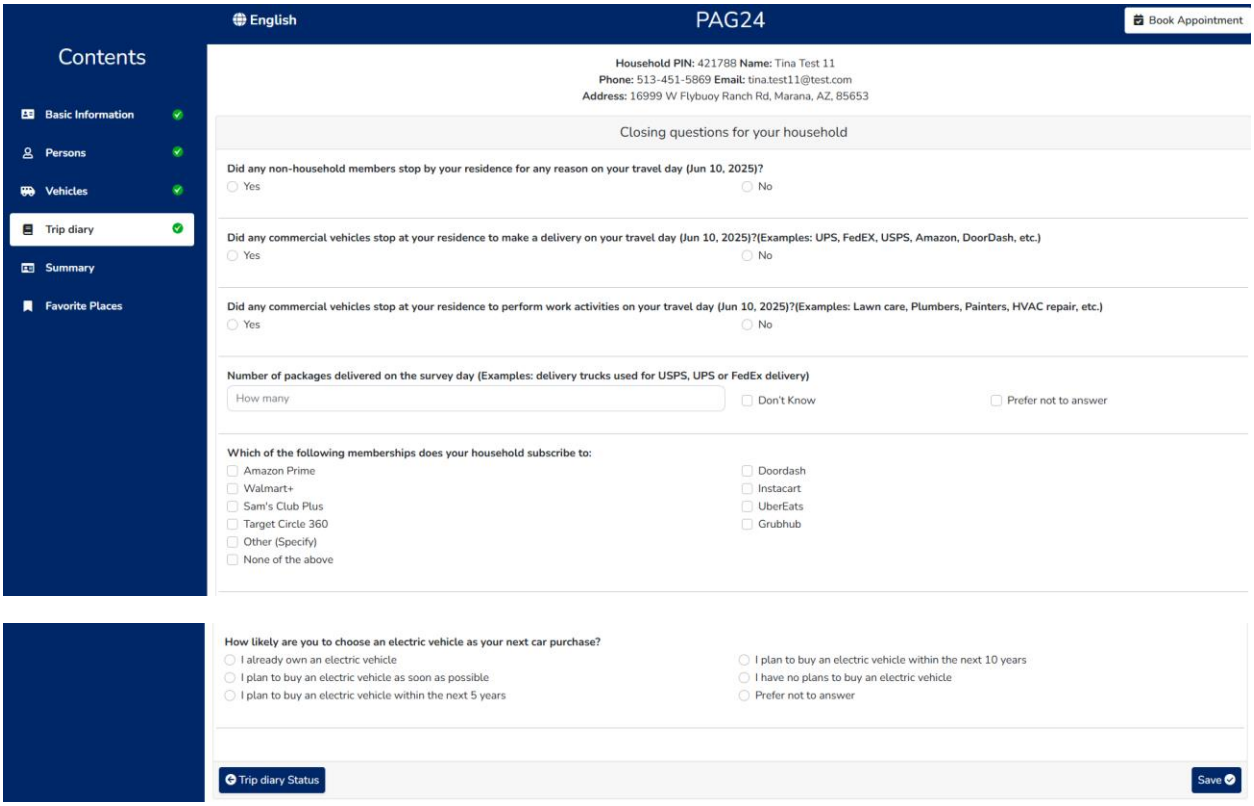

English
PAG24
Book Appointment
Contents
Basic Information
Persons
Vehicles
Trip diary
Summary
Favorite Places
Household PIN: 421788 Name: Tina Test 11
Phone: 513-451-5869 Email: tina.test11@test.com
Address: 16999 W Flybuoy Ranch Rd, Marana, AZ, 85653
Stop - 1 Tina C (Tue Jun 10, 2025)
Activity at Location
Working At Home (For Pay Or Volunteer)
Any Other Activities At Home
Work / Doing My Job (At Regular Place Of Employment / Volunteer Location)
Work / Doing My Job (At Other Location)
Work Related (Off-Site Meeting, Delivery)
Attend Child Care (Day Care, Pre-School, After School Care)
Attend School (K-12)
Attend College / University / Trade School
Shopping
Personal Business (laundry, dry cleaning, barber, bank, medical, etc.)
Eat Out
Gaming
Other Non-Gaming Entertainment Or Recreation
Civic Or Religious Activities
Visit With Friends / Relatives
Chauffeur Passenger(s) for Uber, Lyft, taxi, limo, etc.
Food / Grocery Delivery for DoorDash, UberEats, Instacart, etc.
Pick-up / Drop-off Person at Work
Pick-up / Drop-off Person at School
Pick-up / Drop-off Person at Day Care
Pick-up / Drop-off Person at Other
Campus Business
Other, Specify
Don't Know
Prefer not to answer
Trips
Previous
Next


English
PAG24
Book Appointment
Contents
Basic Information
Persons
Vehicles
Trip diary
Summary
Favorite Places
Household PIN: 421788 Name: Tina Test 11
Phone: 513-451-5869 Email: tina.test11@test.com
Address: 16999 W Flybuoy Ranch Rd, Marana, AZ, 85653
Stop - 1 Tina C (Tue Jun 10, 2025)
Type of place
Residential
Transportation Stop (Bus, Train)
Office (non-government)
Office (government)
Home Office / Residential Workplace
Coworking Space
Industrial Warehouse / Manufacturing
Medical Offices / Hospital
School; Daycare / Preschool
School; Elementary
School; Middle / Junior High
School; High School
School; College / University / Trade School
Restaurant / Fast Food, Café, Bar & Grill
Convenience / Drug Store / Gas Station
Grocery Store
Recreational facility / Fitness Club
Other Retail / Shopping
Other Personal Business (i.e. Bank, Automotive Dealer, Beauty Salon, etc.)
Outdoor Park / Beach / Sports Field / Open Space
Hotel / Motel / Campsite
Airport
Other (specify)
Don't Know
Prefer not to answer
Trips
Previous
Next

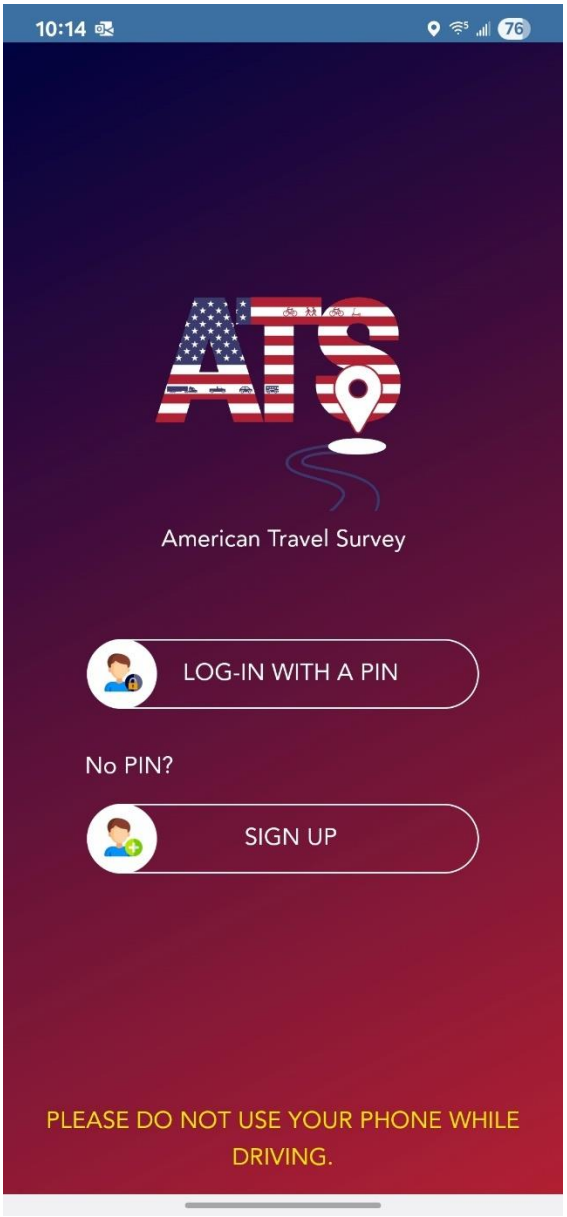

English
PAG24
Book Appointment
Contents
Basic Information
Persons
Vehicles
Trip diary
Summary
Favorite Places
Household PIN: 421788 Name: Tina Test 11
Phone: 513-451-5869 Email: tina.test11@test.com
Address: 16999 W Flybuoy Ranch Rd, Marana, AZ, 85653
Stop - 1 Tina C (Tue Jun 10, 2025)
Mode of travel to arrive here
Walk
Bike (Tugo Bike Share)
Bike (Personal bike)
Driver (Personal Car / Truck / Van)
Passenger (Personal Car / Truck / Van)
Commercial Vehicle
School Bus
Fixed Route Bus (Sun Tran / Sun Express)
FlexRide (including Sun On Demand)
Vanpool / Para Transit (including SunVan and Sun Shuttle)
Street Car (Sun Link)
Taxi / Limo / Rideshare (Uber / Lyft)
Motorcycle / Moped
E-Scooter (Spin or Personal)
Private Bus / Employer Shuttle / Hotel Shuttle
Other
Don't Know
Prefer not to answer
Trips
Previous
Next

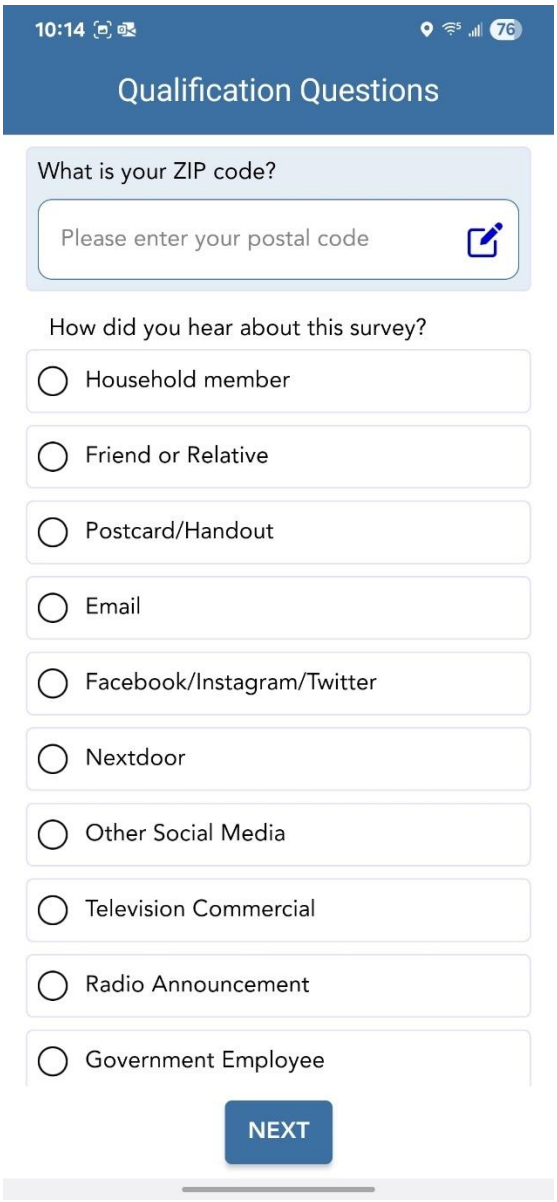

English
PAG24
Book Appointment
Contents
Basic Information
Persons
Vehicles
Trip diary
Summary
Favorite Places
Household PIN: 421788 Name: Tina Test 11
Phone: 513-451-5869 Email: tina.test11@test.com
Address: 16999 W Flybuoy Ranch Rd, Marana, AZ, 85653
Stop - 1 Tina C (Tue Jun 10, 2025)
How many people traveled to this stop/destination, (including Tina C)?
Enter number of people
Does the vehicle used for this trip belong to your household?
Yes
No
Don't Know
Prefer not to answer
Trips
Previous
Save

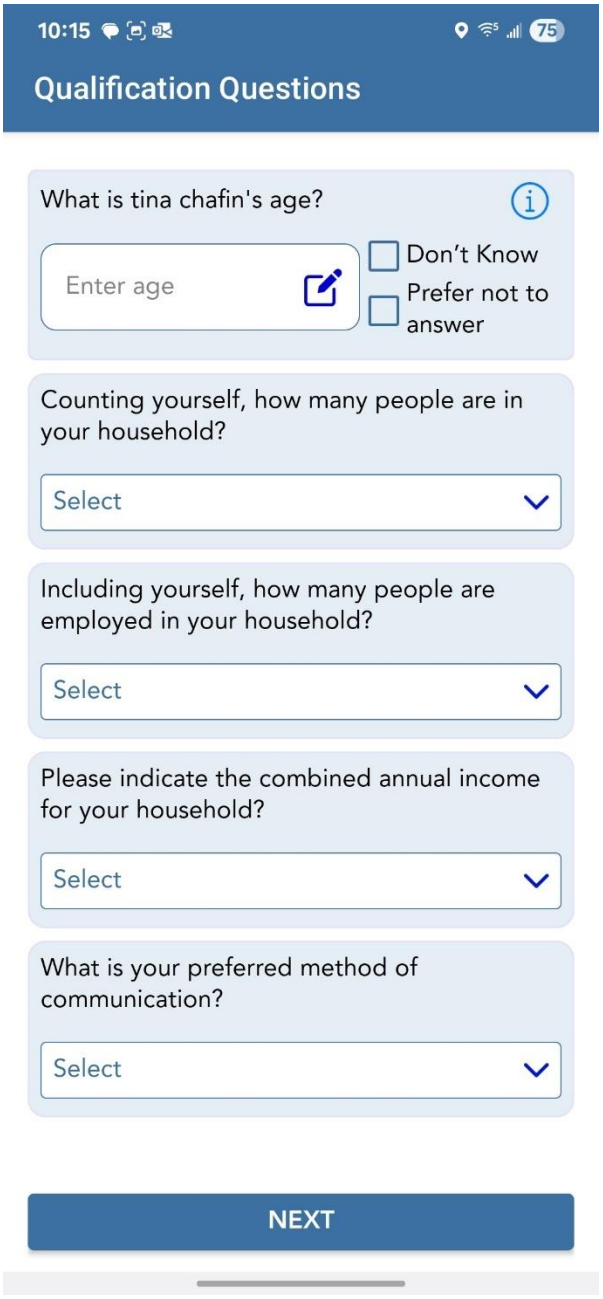
5.2.6. Closing Questionnaire

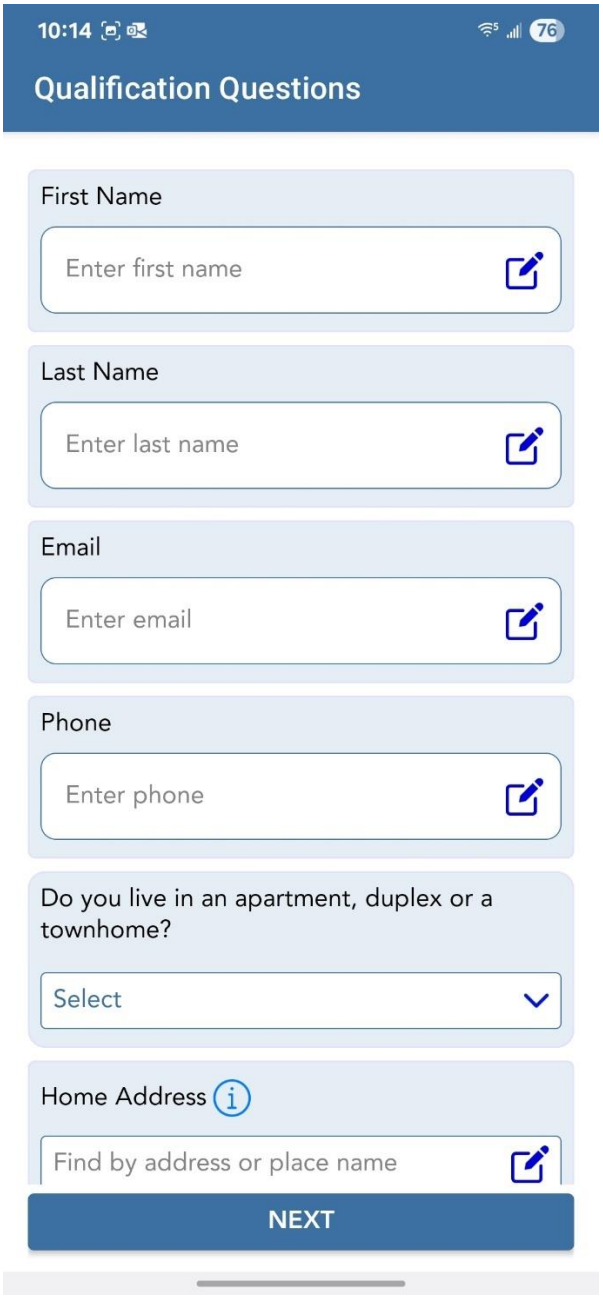


5.3. Survey Instruments (App)






10:15
75
Qualification Questions
What is tina chafin's age?
Enter age
Don't Know
Prefer not to answer
Counting yourself, how many people are in your household?
Select
Including yourself, how many people are employed in your household?
Select
Please indicate the combined annual income for your household?
Select
What is your preferred method of communication?
Select
NEXT


10:14
76
Qualification Questions
First Name
Enter first name
Last Name
Enter last name
Email
Enter email
Phone
Enter phone
Do you live in an apartment, duplex or a townhome?
Select
Home Address
Find by address or place name
NEXT

10:16 ☆ • 75

Congratulations



Congratulations! Your household qualified!

Your Household PIN is: 427221

Please complete the survey promptly. Delays may jeopardize your household's qualification as project goals are nearing completion every day.

Warning: Your household can only participate once. If it is determined your household has already participated or your qualification responses are not accurate, you may not receive payment upon completion.

Continue

10:17 ☆ • 75

Your Travel Date

✓ Location Permission

✓ Motion Permission

If any permission above does not have a green checkmark, it may affect your incentive amount.

A valid travel date starts at 3:00 a.m. This is why today's date may be unavailable.

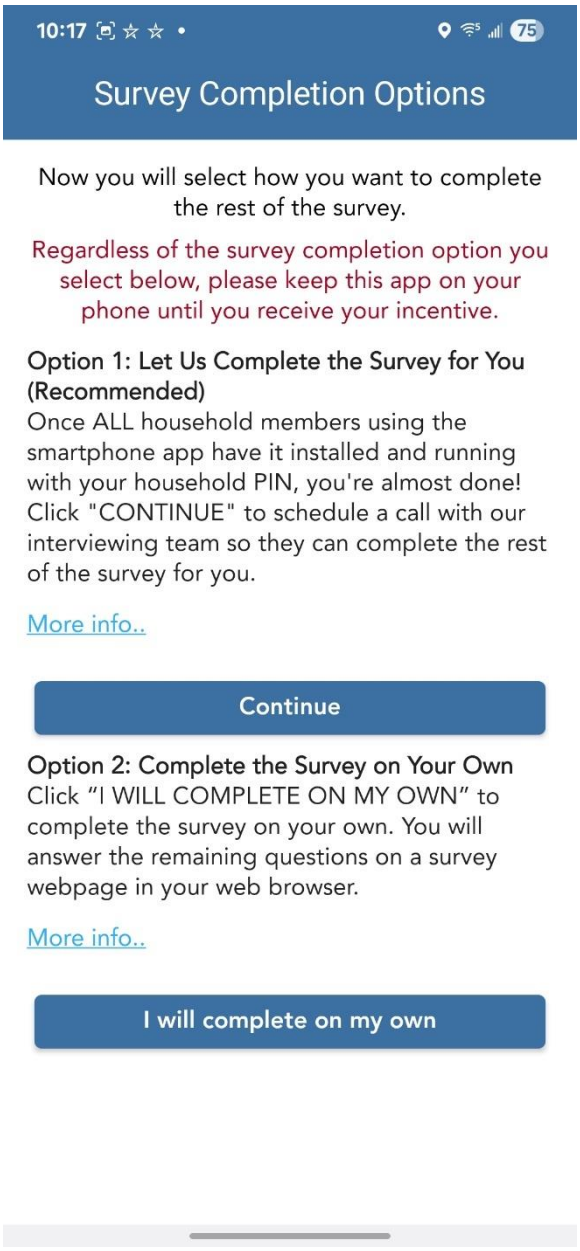
Your household's travel date is listed below. You can change this date, but please **only** do so if it falls on a school district holiday or a weekend.

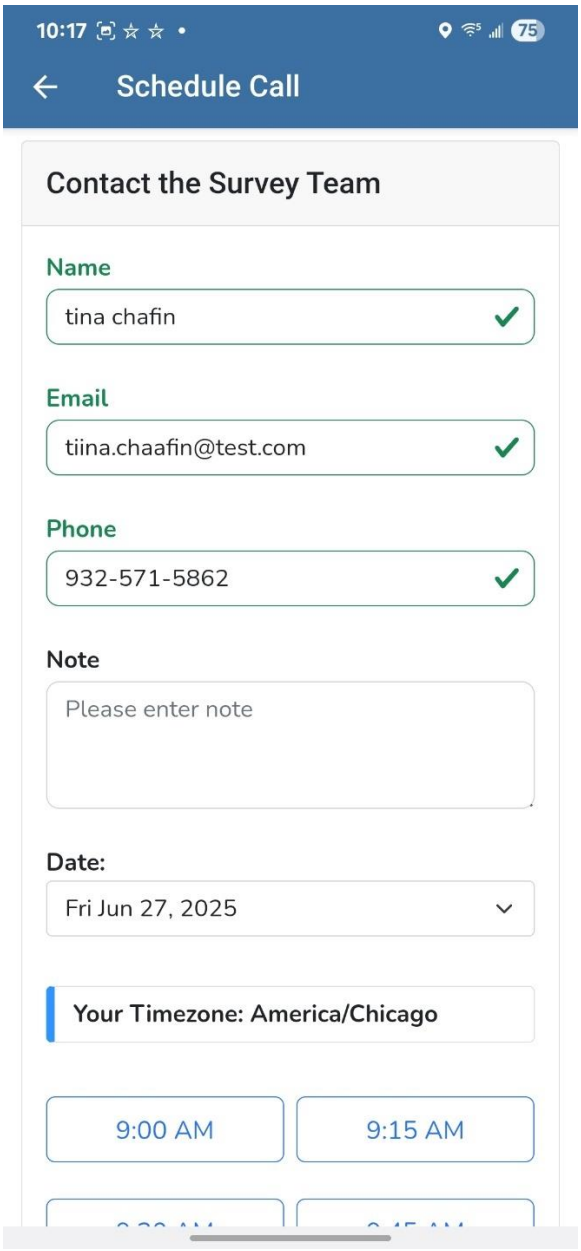
JUL 01 2025, TUESDAY

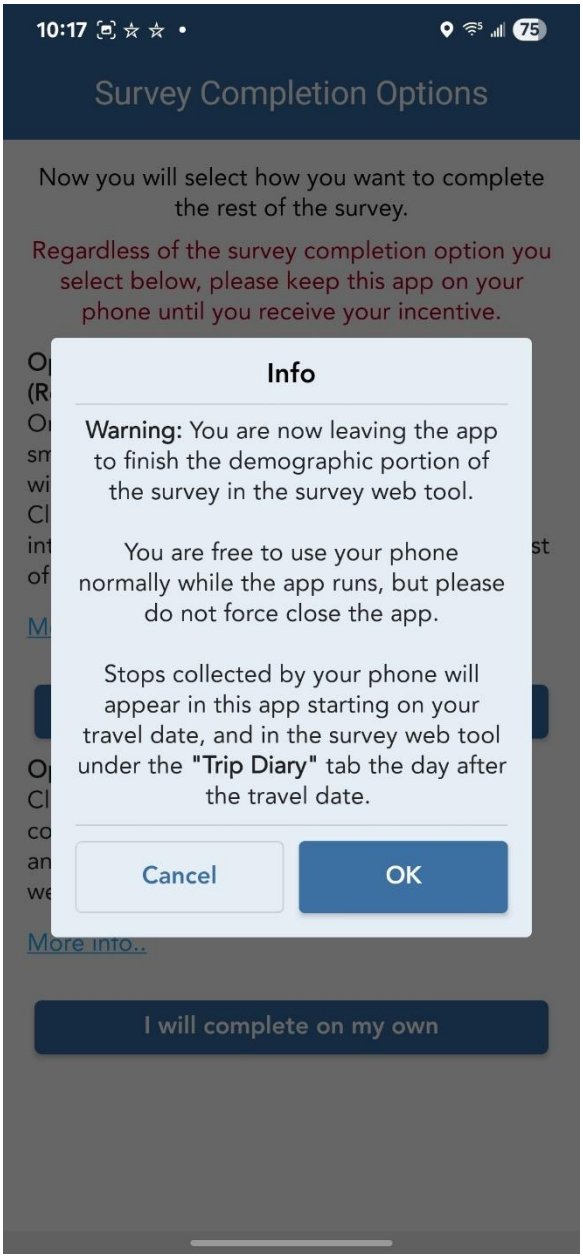
CHANGE

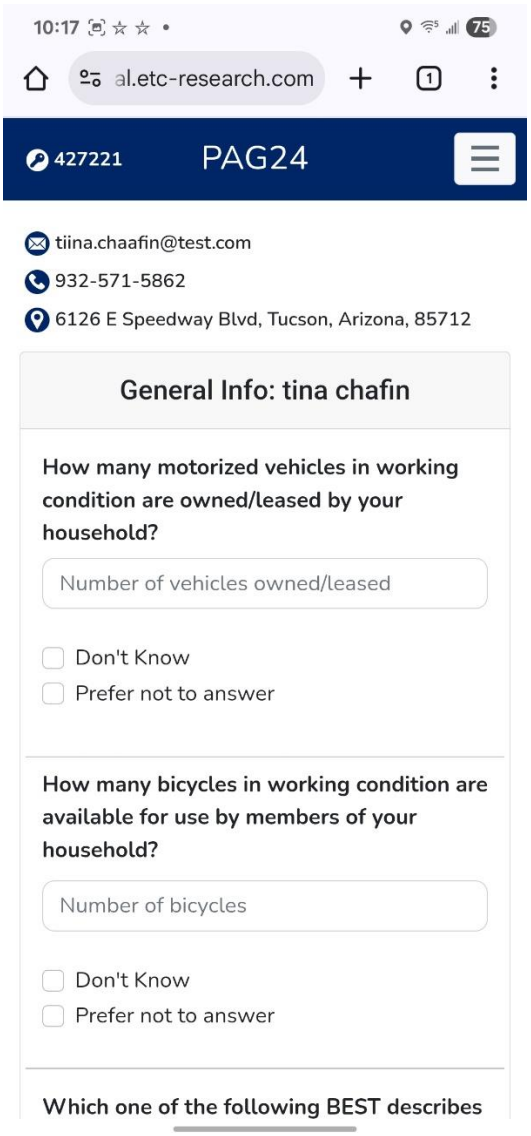
OK

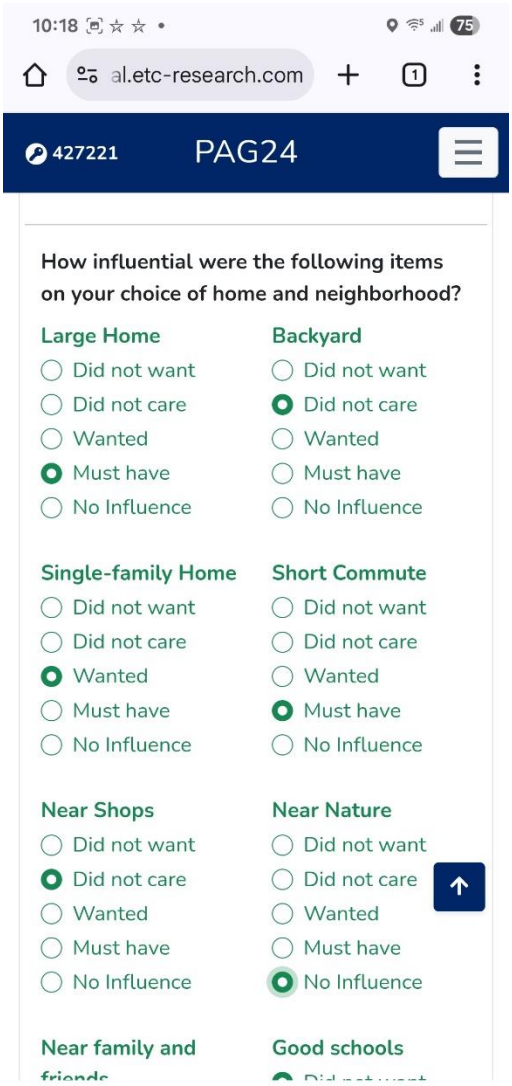

10:17
Household Members
Your total number of household members: 1.
Please list all members of your household:
1
tina chafin (20 to 64 years old)
ADD HOUSEHOLD MEMBERS
CONTINUE

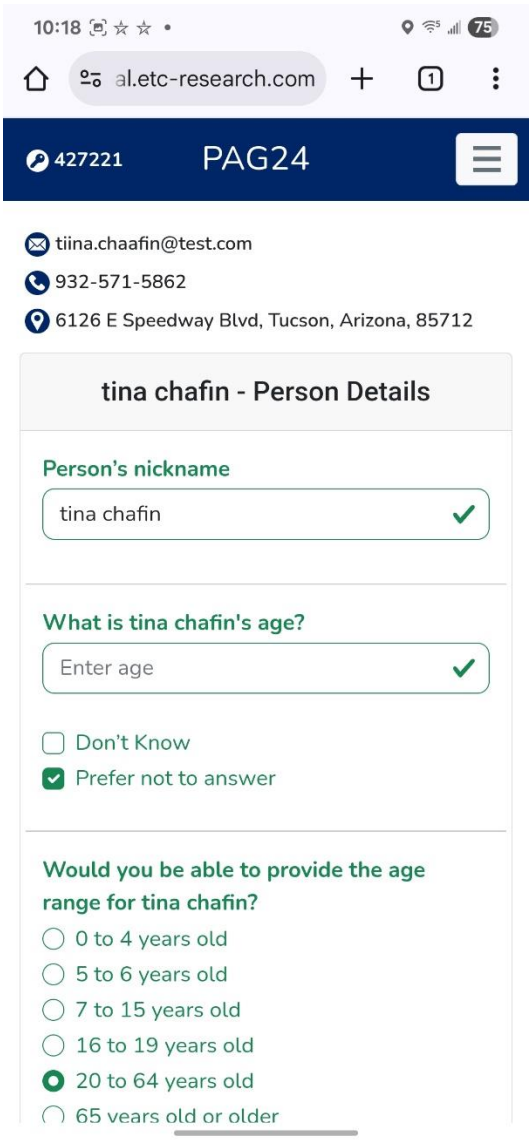

10:17
Survey Completion Options
Now you will select how you want to complete the rest of the survey.
Regardless of the survey completion option you select below, please keep this app on your phone until you receive your incentive.
Option 1: Let Us Complete the Survey for You (Recommended)
Once ALL household members using the smartphone app have it installed and running with your household PIN, you're almost done! Click "CONTINUE" to schedule a call with our interviewing team so they can complete the rest of the survey for you.
More info..
Continue
Option 2: Complete the Survey on Your Own
Click "I WILL COMPLETE ON MY OWN" to complete the survey on your own. You will answer the remaining questions on a survey webpage in your web browser.
More info..
I will complete on my own

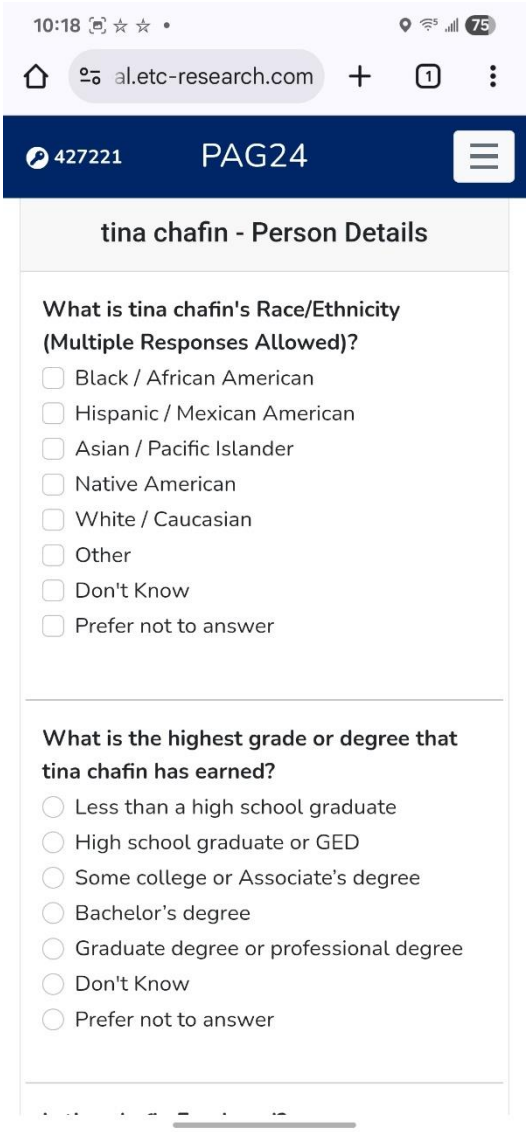

10:17
Schedule Call
Contact the Survey Team
Name
tina chafin
Email
tiina.chaafin@test.com
Phone
932-571-5862
Note
Please enter note
Date:
Fri Jun 27, 2025
Your Timezone: America/Chicago
9:00 AM
9:15 AM

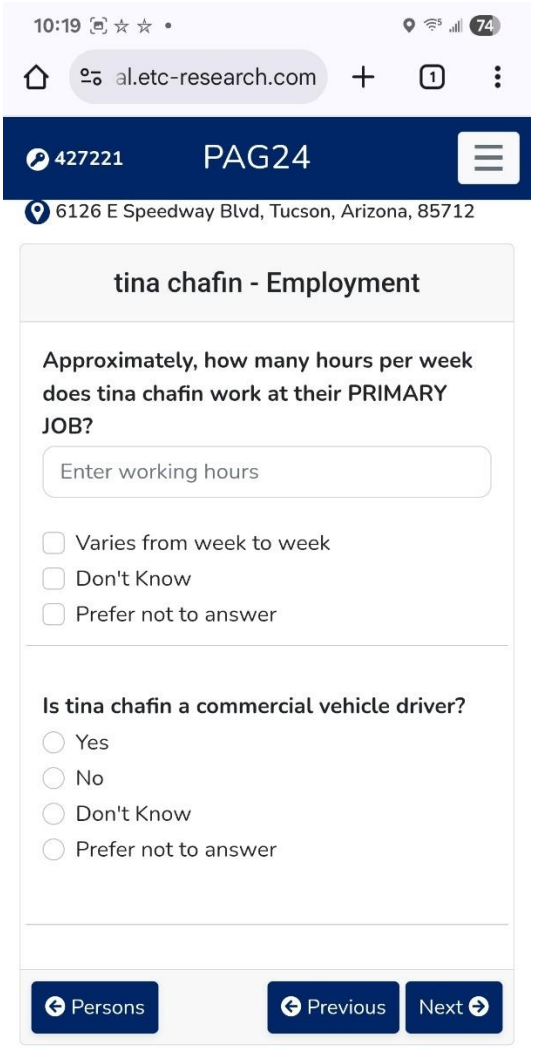

10:17
Survey Completion Options
Now you will select how you want to complete the rest of the survey.
Regardless of the survey completion option you select below, please keep this app on your phone until you receive your incentive.
Info
Warning: You are now leaving the app to finish the demographic portion of the survey in the survey web tool.
You are free to use your phone normally while the app runs, but please do not force close the app.
Stops collected by your phone will appear in this app starting on your travel date, and in the survey web tool under the "Trip Diary" tab the day after the travel date.
Cancel
OK
More info..
I will complete on my own

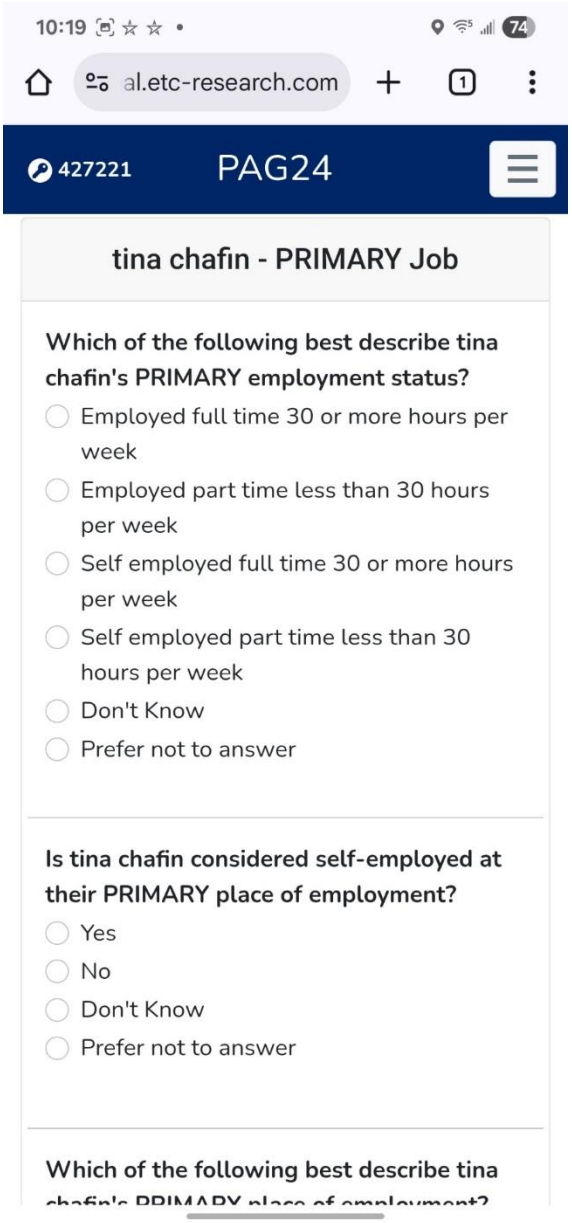

10:17
al.etc-research.com
427221
PAG24
tiina.chaafin@test.com
932-571-5862
6126 E Speedway Blvd, Tucson, Arizona, 85712
General Info: tina chafin
How many motorized vehicles in working condition are owned/leased by your household?
Number of vehicles owned/leased
Don't Know
Prefer not to answer
How many bicycles in working condition are available for use by members of your household?
Number of bicycles
Don't Know
Prefer not to answer
Which one of the following BEST describes

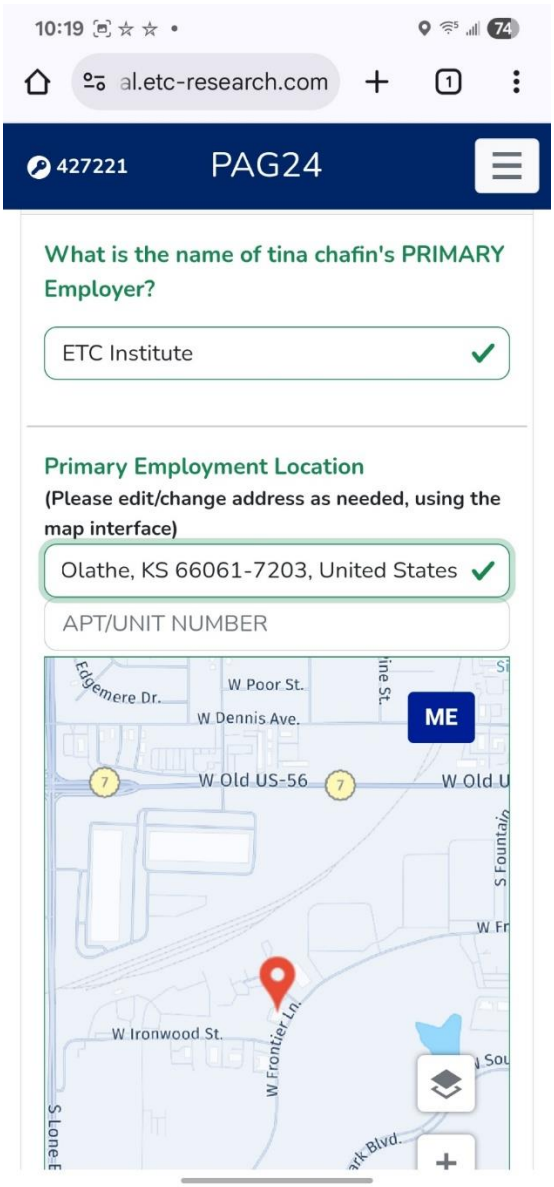

10:18
al.etc-research.com
427221
PAG24
How influential were the following items on your choice of home and neighborhood?
Large Home
Did not want
Did not care
Wanted
Must have
No Influence
Backyard
Did not want
Did not care
Wanted
Must have
No Influence
Single-family Home
Did not want
Did not care
Wanted
Must have
No Influence
Short Commute
Did not want
Did not care
Wanted
Must have
No Influence
Near Shops
Did not want
Did not care
Wanted
Must have
No Influence
Near Nature
Did not want
Did not care
Wanted
Must have
No Influence
Near family and
Good schools

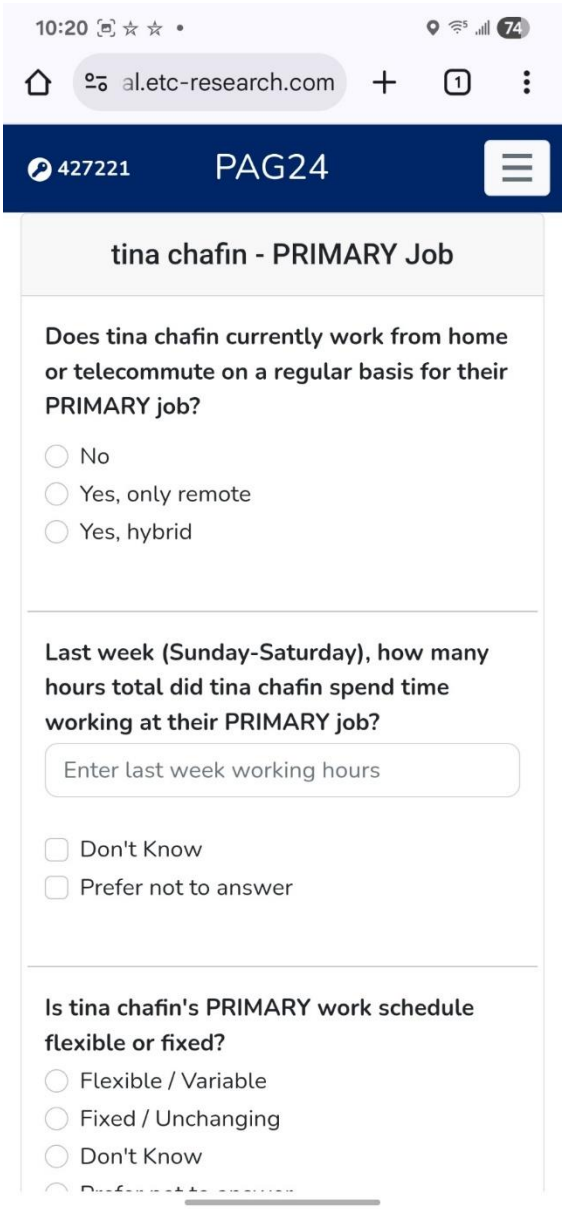

10:18
al.etc-research.com
427221
PAG24
tiina.chaafin@test.com
932-571-5862
6126 E Speedway Blvd, Tucson, Arizona, 85712
tina chafin - Person Details
Person's nickname
tina chafin
What is tina chafin's age?
Enter age
Don't Know
Prefer not to answer
Would you be able to provide the age range for tina chafin?
0 to 4 years old
5 to 6 years old
7 to 15 years old
16 to 19 years old
20 to 64 years old
65 years old or older

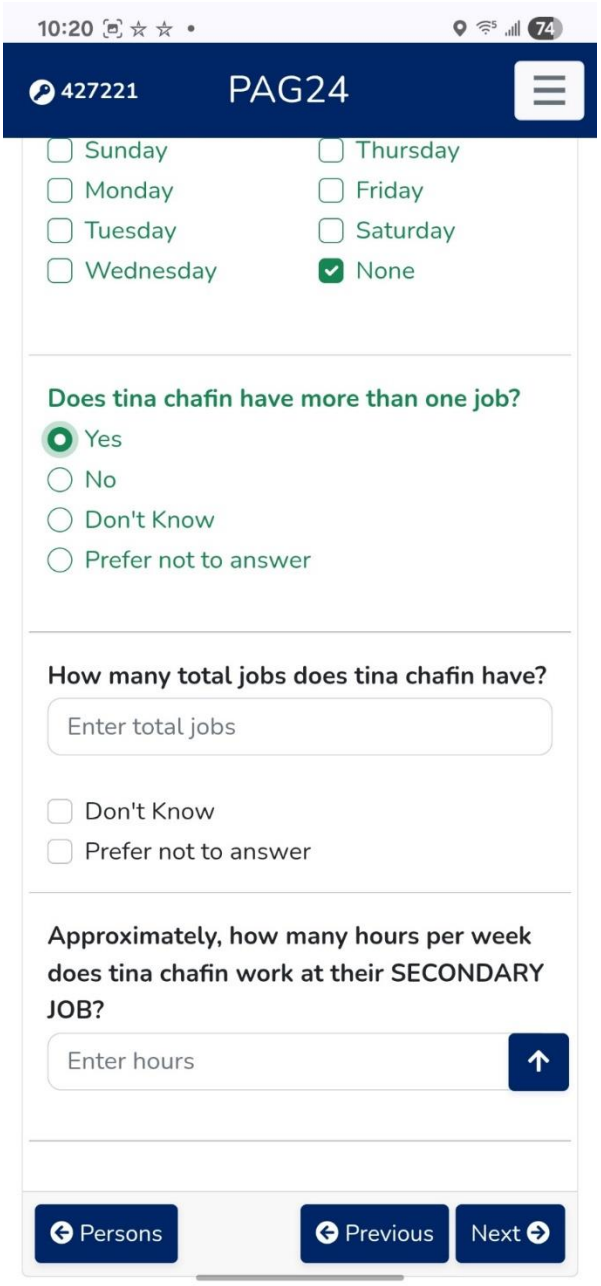

10:18
al.etc-research.com
427221
PAG24
tina chafin - Person Details
What is tina chafin's Race/Ethnicity (Multiple Responses Allowed)?
Black / African American
Hispanic / Mexican American
Asian / Pacific Islander
Native American
White / Caucasian
Other
Don't Know
Prefer not to answer
What is the highest grade or degree that tina chafin has earned?
Less than a high school graduate
High school graduate or GED
Some college or Associate's degree
Bachelor's degree
Graduate degree or professional degree
Don't Know
Prefer not to answer

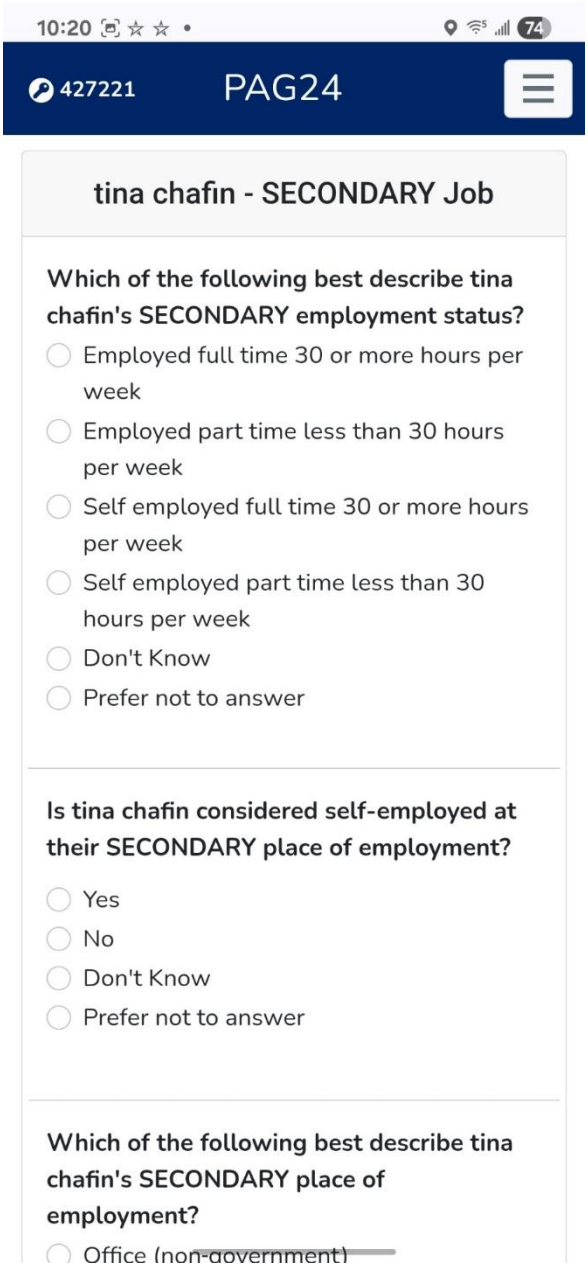

10:19
al.etc-research.com
427221
PAG24
6126 E Speedway Blvd, Tucson, Arizona, 85712
tina chafin - Employment
Approximately, how many hours per week does tina chafin work at their PRIMARY JOB?
Enter working hours
Varies from week to week
Don't Know
Prefer not to answer
Is tina chafin a commercial vehicle driver?
Yes
No
Don't Know
Prefer not to answer
Persons
Previous
Next

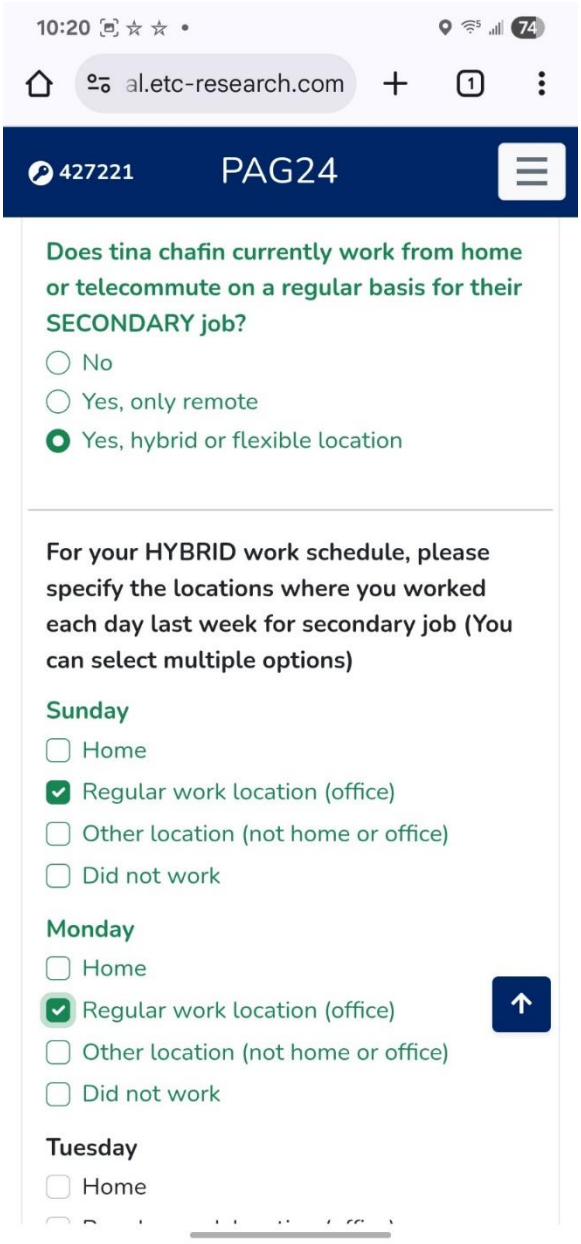

10:19
al.etc-research.com
427221
PAG24
tina chafin - PRIMARY Job
Which of the following best describe tina chafin's PRIMARY employment status?
Employed full time 30 or more hours per week
Employed part time less than 30 hours per week
Self employed full time 30 or more hours per week
Self employed part time less than 30 hours per week
Don't Know
Prefer not to answer
Is tina chafin considered self-employed at their PRIMARY place of employment?
Yes
No
Don't Know
Prefer not to answer
Which of the following best describe tina

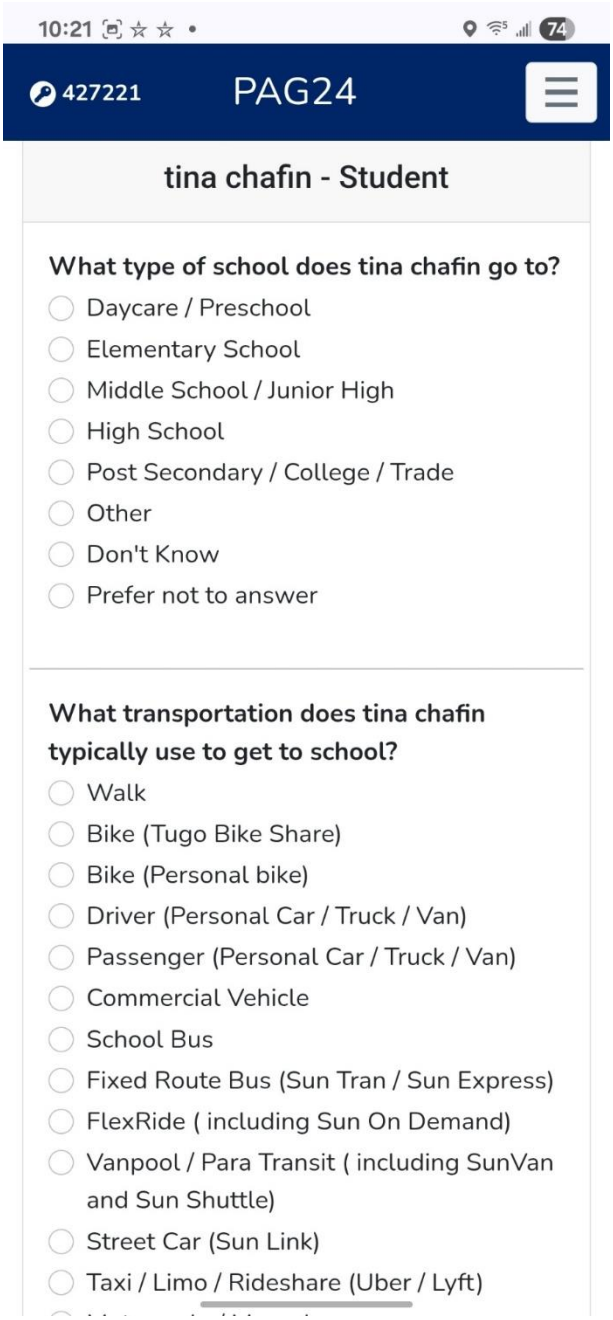

10:19
al.etc-research.com
427221
PAG24
What is the name of tina chafin's PRIMARY Employer?
ETC Institute
Primary Employment Location
(Please edit/change address as needed, using the map interface)
Olathe, KS 66061-7203, United States
APT/UNIT NUMBER
Edgemere Dr.
W Poor St.
W Dennis Ave.
ME
W Old US-56
W Ironwood St.
W Frontier Ln.

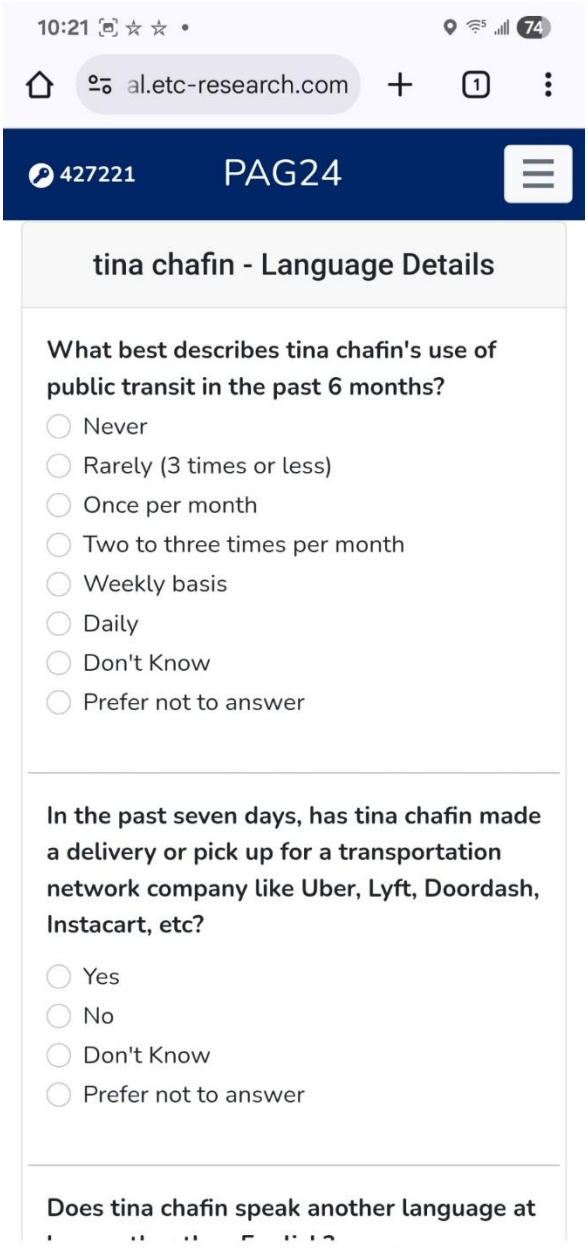

10:20
al.etc-research.com
427221
PAG24
tina chafin - PRIMARY Job
Does tina chafin currently work from home or telecommute on a regular basis for their PRIMARY job?
No
Yes, only remote
Yes, hybrid
Last week (Sunday-Saturday), how many hours total did tina chafin spend time working at their PRIMARY job?
Enter last week working hours
Don't Know
Prefer not to answer
Is tina chafin's PRIMARY work schedule flexible or fixed?
Flexible / Variable
Fixed / Unchanging
Don't Know

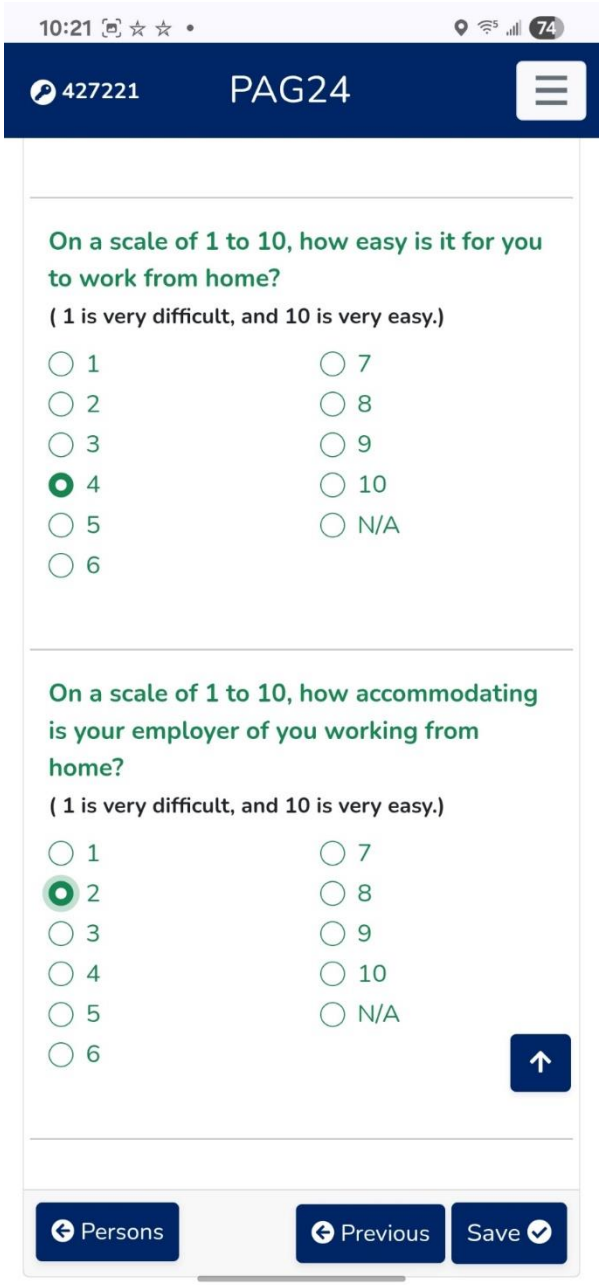

10:20
427221
PAG24
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
None
Does tina chafin have more than one job?
Yes
No
Don't Know
Prefer not to answer
How many total jobs does tina chafin have?
Enter total jobs
Don't Know
Prefer not to answer
Approximately, how many hours per week does tina chafin work at their SECONDARY JOB?
Enter hours
Persons
Previous
Next

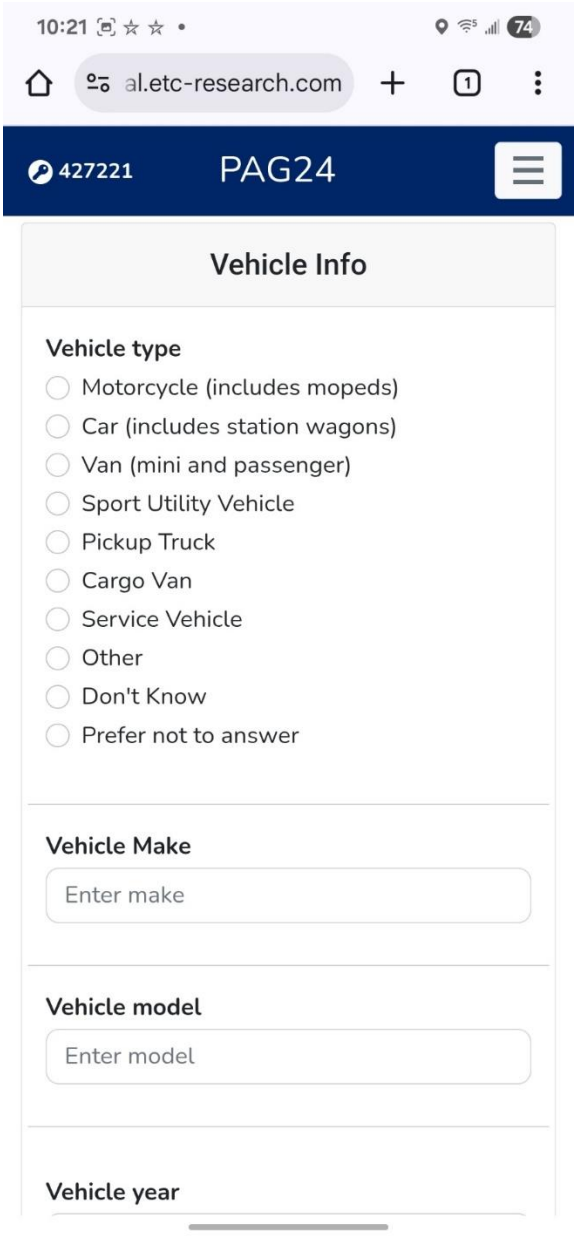

10:20
427221
PAG24
tina chafin - SECONDARY Job
Which of the following best describe tina chafin's SECONDARY employment status?
Employed full time 30 or more hours per week
Employed part time less than 30 hours per week
Self employed full time 30 or more hours per week
Self employed part time less than 30 hours per week
Don't Know
Prefer not to answer
Is tina chafin considered self-employed at their SECONDARY place of employment?
Yes
No
Don't Know
Prefer not to answer
Which of the following best describe tina chafin's SECONDARY place of employment?
Office (non-government)

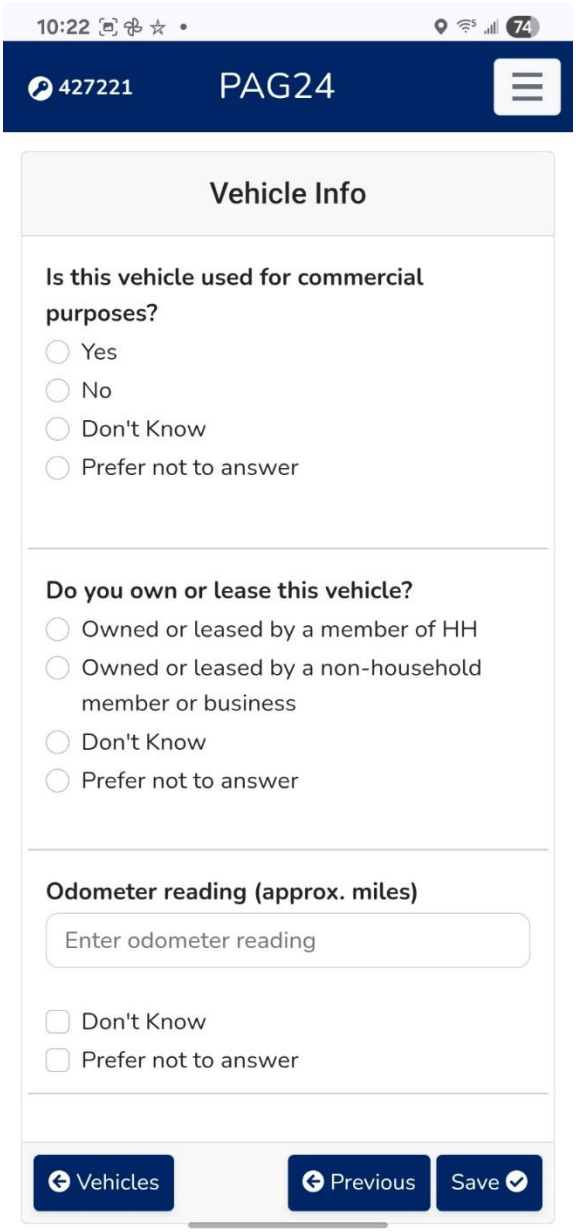

10:20
al.etc-research.com
427221
PAG24
Does tina chafin currently work from home or telecommute on a regular basis for their SECONDARY job?
No
Yes, only remote
Yes, hybrid or flexible location
For your HYBRID work schedule, please specify the locations where you worked each day last week for secondary job (You can select multiple options)
Sunday
Home
Regular work location (office)
Other location (not home or office)
Did not work
Monday
Home
Regular work location (office)
Other location (not home or office)
Did not work
Tuesday
Home

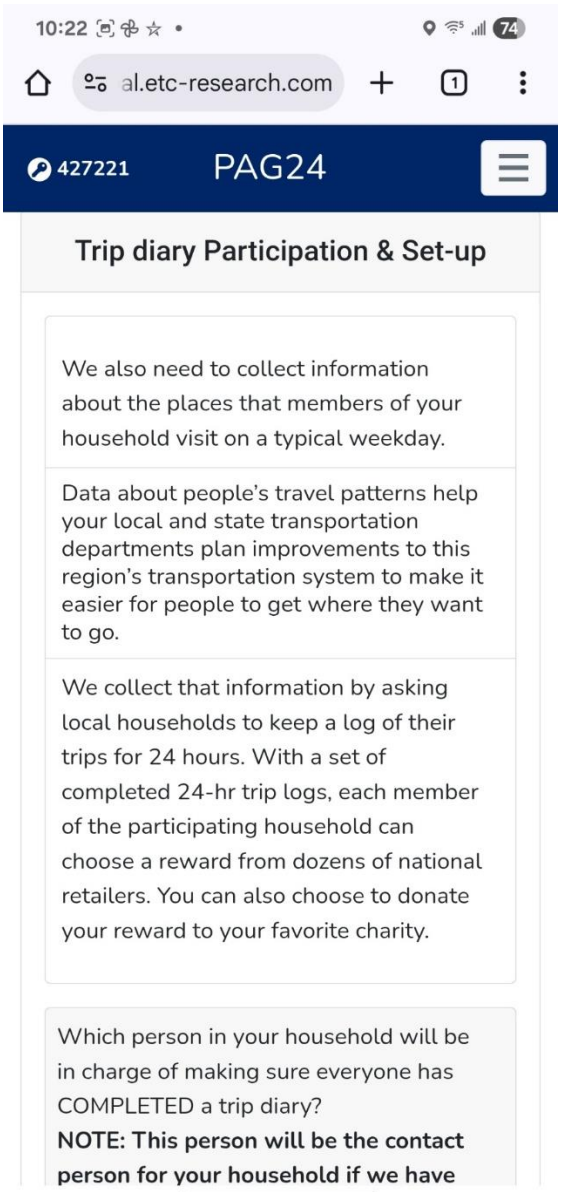

10:21
427221
PAG24
tina chafin - Student
What type of school does tina chafin go to?
Daycare / Preschool
Elementary School
Middle School / Junior High
High School
Post Secondary / College / Trade
Other
Don't Know
Prefer not to answer
What transportation does tina chafin typically use to get to school?
Walk
Bike (Tugo Bike Share)
Bike (Personal bike)
Driver (Personal Car / Truck / Van)
Passenger (Personal Car / Truck / Van)
Commercial Vehicle
School Bus
Fixed Route Bus (Sun Tran / Sun Express)
FlexRide (including Sun On Demand)
Vanpool / Para Transit (including SunVan and Sun Shuttle)
Street Car (Sun Link)
Taxi / Limo / Rideshare (Uber / Lyft)

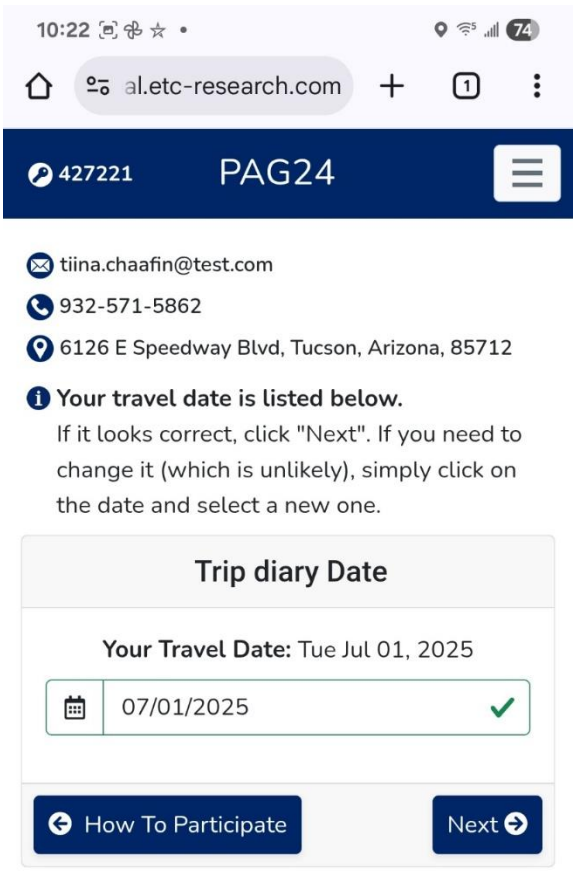

10:21
al.etc-research.com
427221
PAG24
tina chafin - Language Details
What best describes tina chafin's use of public transit in the past 6 months?
Never
Rarely (3 times or less)
Once per month
Two to three times per month
Weekly basis
Daily
Don't Know
Prefer not to answer
In the past seven days, has tina chafin made a delivery or pick up for a transportation network company like Uber, Lyft, Doordash, Instacart, etc?
Yes
No
Don't Know
Prefer not to answer
Does tina chafin speak another language at

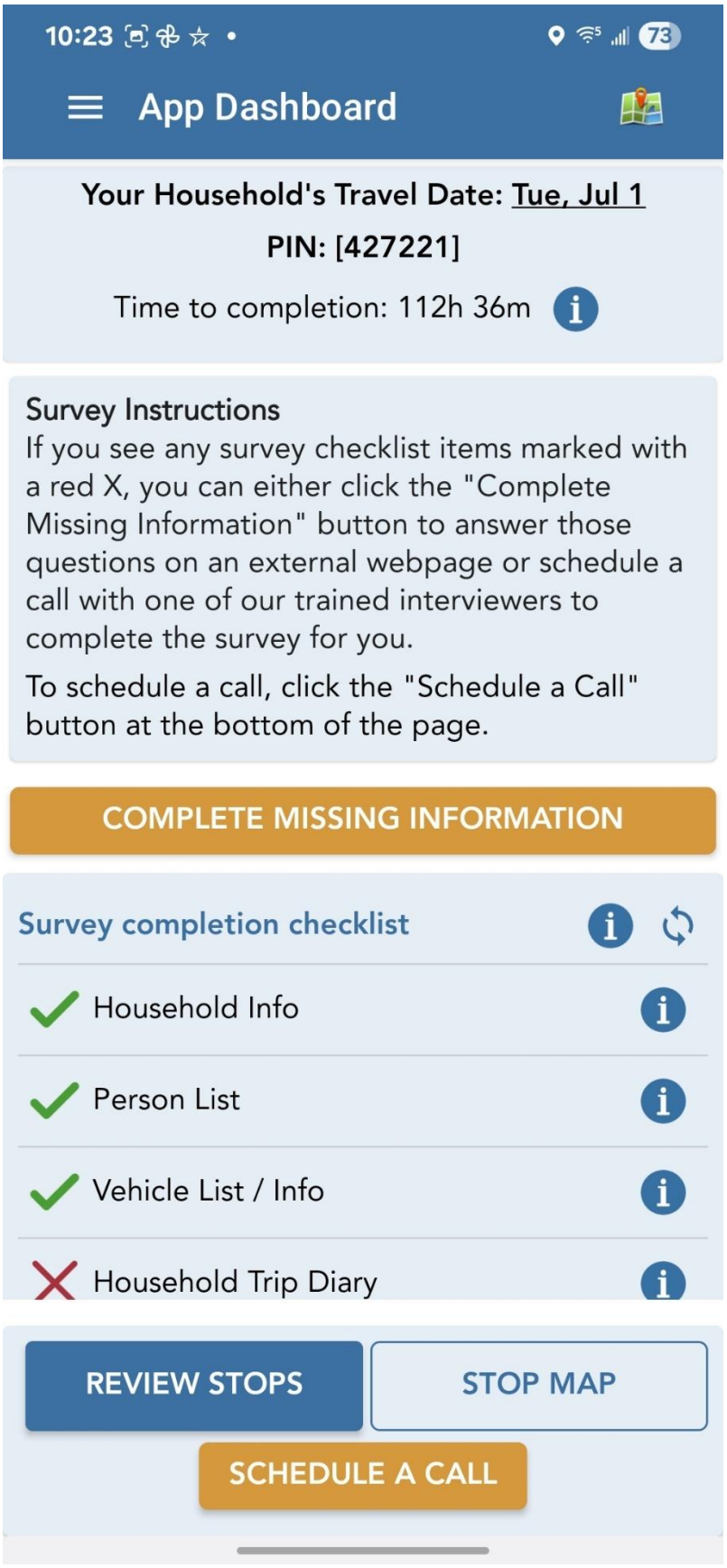

10:21
427221
PAG24
On a scale of 1 to 10, how easy is it for you to work from home?
(1 is very difficult, and 10 is very easy.)
1
2
3
4
5
6
7
8
9
10
N/A
On a scale of 1 to 10, how accommodating is your employer of you working from home?
(1 is very difficult, and 10 is very easy.)
1
2
3
4
5
6
7
8
9
10
N/A
Persons
Previous
Save


10:21
al.etc-research.com
427221
PAG24
Vehicle Info
Vehicle type
Motorcycle (includes mopeds)
Car (includes station wagons)
Van (mini and passenger)
Sport Utility Vehicle
Pickup Truck
Cargo Van
Service Vehicle
Other
Don't Know
Prefer not to answer
Vehicle Make
Enter make
Vehicle model
Enter model
Vehicle year


10:22
427221
PAG24
Vehicle Info
Is this vehicle used for commercial purposes?
Yes
No
Don't Know
Prefer not to answer
Do you own or lease this vehicle?
Owned or leased by a member of HH
Owned or leased by a non-household member or business
Don't Know
Prefer not to answer
Odometer reading (approx. miles)
Enter odometer reading
Don't Know
Prefer not to answer
Vehicles
Previous
Save


10:22
al.etc-research.com
427221
PAG24
Trip diary Participation & Set-up
We also need to collect information about the places that members of your household visit on a typical weekday.
Data about people's travel patterns help your local and state transportation departments plan improvements to this region's transportation system to make it easier for people to get where they want to go.
We collect that information by asking local households to keep a log of their trips for 24 hours. With a set of completed 24-hr trip logs, each member of the participating household can choose a reward from dozens of national retailers. You can also choose to donate your reward to your favorite charity.
Which person in your household will be in charge of making sure everyone has COMPLETED a trip diary?
NOTE: This person will be the contact person for your household if we have


10:22
al.etc-research.com
427221
PAG24
tiina.chaafin@test.com
932-571-5862
6126 E Speedway Blvd, Tucson, Arizona, 85712
Your travel date is listed below.
If it looks correct, click "Next". If you need to change it (which is unlikely), simply click on the date and select a new one.
Trip diary Date
Your Travel Date: Tue Jul 01, 2025
07/01/2025
How To Participate
Next


10:23
App Dashboard
Your Household's Travel Date: Tue, Jul 1
PIN: [427221]
Time to completion: 112h 36m
Survey Instructions
If you see any survey checklist items marked with a red X, you can either click the "Complete Missing Information" button to answer those questions on an external webpage or schedule a call with one of our trained interviewers to complete the survey for you.
To schedule a call, click the "Schedule a Call" button at the bottom of the page.
COMPLETE MISSING INFORMATION
Survey completion checklist
Household Info
Person List
Vehicle List / Info
Household Trip Diary
REVIEW STOPS
STOP MAP
SCHEDULE A CALL

5.4. Survey Questionnaire (Data Dictionary)

Sheet	Record Name	Column #	Column Name	Description
Household Level				
Rec 1	Household Data	1	Record Type	Code indicating type of record. Here it should be 1.
Rec 1	Household Data	2	HH Sample Number	Unique number assigned to each household participating in survey. This number should match the sample number used for this household in all other files.
Rec 1	Household Data	3	Date of Household Survey	Eight-digit calendar date (MMDDYYYY) of the Household survey.
Rec 1	Household Data	4	HH address	Street address of the household.
Rec 1	Household Data	5	HH City	City where household is located.
Rec 1	Household Data	6	HH State	State where household is located.
Rec 1	Household Data	7	HH Zip Code	Zip code of household address.
Rec 1	Household Data	8	HH Longitude	Longitude of household address to six decimal places.
Rec 1	Household Data	9	HH Latitude	Latitude of household address to six decimal places.
Rec 1	Household Data	10	Number Persons	Number of persons living in residence (the following should not be included: military personnel on deployment, students living outside of the home at college or university, incarcerated household members, former household members that moved out before the travel day).
Rec 1	Household Data	11	Number Employed	Number of persons in household that are employed either full or part time.

Rec 1	Household Data	12	Income	Code indicating combined annual income of all household members.
Rec 1	Household Data	13	Vehicles Available	Number of cars, vans, light trucks, motorcycles available for use by the HH. 98-Don't Know, 99-Refused
Rec 1	Household Data	14	Vehicles Owned/Leased	Combined number of cars, vans, light trucks, motorcycles owned or leased by members of the household. 98-Don't know, 99-Refused
Rec 1	Household Data	15	Bikes	Number of working bicycles available for use by members of the household. 98-Don't know, 99-Refused
Rec 1	Household Data	16	Residence	Code indicating the type of residence.
Rec 1	Household Data	17	Other Residence	If residence is coded as "other", this field contains a description of the type of residence.
Rec 1	Household Data	18	Rent or Own Residence	Code indicating if household rents or owns their current residence.
Rec 1	Household Data	19	Other Rent or Own Residence	If rent or own residence is coded as "other", this field contains a description of the type of residence.
Rec 1	Household Data	20	Tenure	Code indicating number of years at residence:
Rec 1	Household Data	21	Previous Residence	If tenure was less than five years, this code indicates if previous residence was in the study area in question
Rec 1	Household Data	22	Previous Zip Code	If tenure was less than five years, this is the zip code of the previous residence. Use 99998 for Don't Know or 99999 for Refused.
Rec 1	Household Data	23	residential preference large home	
Rec 1	Household Data	24	residential preference backyard	
Rec 1	Household Data	25	residential preference single family home	

Rec 1	Household Data	26	residential preference short commute	
Rec 1	Household Data	27	residential preference near shops	
Rec 1	Household Data	28	residential preference near nature	
Rec 1	Household Data	29	residential preference near family friends	
Rec 1	Household Data	30	residential preference good schools	
Rec 1	Household Data	31	residential preference bike ped friendly	
Rec 1	Household Data	32	residential preference transit access	
Rec 1	Household Data	33	residential preference low crime	
Rec 1	Household Data	34	Military HH Members	Including yourself, is any member of your household in the military?
Rec 1	Household Data	35	Method of Survey Awareness	Code indicating how household learned about the survey:
Rec 1	Household Data	36	Other Method of Survey Awareness	If Method of Survey Awareness is coded as "other", this field contains a description of how the household learned about the survey.
Rec 1	Household Data	37	Non-Household Member Stops	Code indicating if any non-household members stopped by resident's household on travel date.
Rec 1	Household Data	38	Number of Non-Household Member Stops	Code indicating number of non-household members visited on assigned travel date.
Rec 1	Household Data	39	Commercial Vehicle Stops	
Rec 1	Household Data	40	Number of Commercial Vehicle Stops	Code indicating number of commercial vehicle stops on assigned travel date.
Rec 1	Household Data	41	Commercial Vehicle Stops for Work Activities	Code indicating if any commercial vehicls stopped by resident's household on travel date.
Rec 1	Household Data	42	Number of Commercial Vehicle Stops for Work Activities	Code indicating number of commercial vehicle stops on assigned travel date.

Rec 1	Household Data	43	Trips for Packages Delivered	(If there were deliveries) If you hadn't received these packages, how many trips would have been necessary to obtain all the items that were delivered to you?
Rec 1	Household Data	44	Number of Packages Delivered	Code indicating the number of packages delivered on the survey day (examples: delivery trucks used for USPS, UPS or FedEx delivery).
Rec 1	Household Data	45	Amazon Walmart	Which of the following memberships does your household subscribe to (Select All that Apply)
Rec 1	Household Data	46	Amazon Walmart Other	If memberships is coded as "other", this field contains a description of the other response.
Rec 1	Household Data	47	Purchase Electric	How likely are you to choose an electric vehicle as your next car purchase?
Rec 1	Household Data	48	Why Electric Vehicle Purchase	
Rec 1	Household Data	49	Secondary Goal Category	
Person Level				
Rec 2	Person Data	1	Record Type	Code indicating type of record, here it should be 2.
Rec 2	Person Data	2	Sample Number	Unique number assigned to each household participating in survey.
Rec 2	Person Data	3	Person Number	Number assigned to each person in the household.
Rec 2	Person Data	4	Age	Age of person
Rec 2	Person Data	5	Age Category	Code indicating age category if age is refused.
Rec 2	Person Data	6	Gender	Gender of person:
Rec 2	Person Data	7	Other Gender	Description of gender if it is coded as "other"

Rec 2	Person Data	8	Relationship	Code indicating relationship of person to the primary survey respondent of household.
Rec 2	Person Data	9	Licensed Driver	Code indicating if person is a licensed driver (regardless of age):
Rec 2	Person Data	10	Smartphone Ownership	Code indicateding if person owns a smartphone (regardless of age):
Rec 2	Person Data	11	Bike Use	Number of days person rode bike in last seven days
Rec 2	Person Data	12	Bike Purpose	Code indicating the most common trip purpose for person's bike trips
Rec 2	Person Data	13	Other Bike Purpose	Description of bike purpose if it is coded as "other"
Rec 2	Person Data	14	Personal Mobility Use	Number of days person rode scooter, e-scooter, or personal mobility in last seven days
Rec 2	Person Data	15	Personal Mobility Purpose	Code indicating the most common trip purpose for person's scooter, e-scooter, or personal mobility trips
Rec 2	Person Data	16	Other Personal Mobility Purpose	Description of scooter, e-scooter, or personal mobility purpose if it is coded as "other"
Rec 2	Person Data	17	Ethnicity	Race or ethnicity of person
Rec 2	Person Data	18	Other Ethnicity	Description of ethnicity if it is coded as "other"
Rec 2	Person Data	19	Employment	Code indicating if person is employed in a paying job (regardless of age):
Rec 2	Person Data	20	Not Employed	Code indicating status if person is not employed.
Rec 2	Person Data	21	Other Not Employed	Description of not employed status if coded as "other".
Rec 2	Person Data	22	Educational Attainment	Code indicating the highest grade or degree that the person has earned

Rec 2	Person Data	23	Student Status	Code indicating if person is enrolled in any type of school:
Rec 2	Person Data	24	Disability	Code indicating if person has transportation disability:
Rec 2	Person Data	25	Public Transit Use	What best describes {name}'s use of public transit in the past 6 months?
Rec 2	Person Data	26	TNC Driver	In the past seven days, has {name} made a delivery or pick up for a transportation network company like Uber, Lyft, Doordash, Instacart, etc?
Rec 2	Person Data	27	Employment Status	If person is employed, this is a code indicating the person's employment status.
Rec 2	Person Data	28	Total Hours Worked	On average, the total number of hours worked per week at PRIMARY job:
Rec 2	Person Data	29	Commercial Vehicle Driver	Code indicating if person is a commercial vehicle driver:
Rec 2	Person Data	30	Commercial Vehicle Type	If person drives a commercial vehicle, enter code identifying type of vehicle. If person does not drive a commercial vehicle, this field should be blank.
Rec 2	Person Data	31	Other Commercial Vehicle Type	If commercial vehicle type is coded as "other", this field contains a description of the type of commercial vehicle.
Rec 2	Person Data	32	Self-Employed	If person indicates they are self-employed at PRIMARY place of employment:
Rec 2	Person Data	33	Workplace Type	Code indicating type of workplace where person is employed:
Rec 2	Person Data	34	Other Workplace	Description if workplace type is coded as "other".
Rec 2	Person Data	35	Primary Occupation	Code indicating the type of occupation for primary job:

Rec 2	Person Data	36	Other Primary Occupation	Description if PRIMARY OCCUPATION is coded as "Something else (specify)".
Rec 2	Person Data	37	Primary Industry	Code indicating the type of industry worked in for primary job:
Rec 2	Person Data	38	Other Primary Industry	Description if PRIMARY Industry is coded as "Other".
Rec 2	Person Data	39	Employer Name	Name of person's primary employer.
Rec 2	Person Data	40	Workplace Address	Street address of workplace or nearest cross streets. If nearest intersecting streets are provided, both street names must be listed, separated by "&" or "and". The address should correspond to the local place where the person goes to work or works out of (if they travel the area). A headquarters or alternative employer location in another area or state should not be entered unless the person physically goes to that place when they work.
Rec 2	Person Data	41	Workplace City	City where workplace is located.
Rec 2	Person Data	42	Workplace State	State where workplace is located.
Rec 2	Person Data	43	Workplace Zip Code	Zip code of workplace address.
Rec 2	Person Data	44	Workplace Longitude	Longitude of workplace location to six decimal places.
Rec 2	Person Data	45	Workplace Latitude	Latitude of workplace location to six decimal places.
Rec 2	Person Data	46	Home Office	Code indicating if workplace is a home office or business operated out of the home:
Rec 2	Person Data	47	Flex Time	Code indicating if person's employer allows them to work flexible hours or the hours are fixed:
Rec 2	Person Data	48	Hours Worked Last Week at PRIMARY Job	The total number of hours worked last week at PRIMARY job:

Rec 2	Person Data	49	Primary Telecommute	Does participant currently work from home or telecommute on a regular basis for their PRIMARY job?
Rec 2	Person Data	50	Primary No Telecommute Schedule Other Location	
Rec 2	Person Data	51	Primary No Telecommute Schedule Work Location	
Rec 2	Person Data	52	PRIMARY Only Remote Home	
Rec 2	Person Data	53	PRIMARY Only Remote Other	
Rec 2	Person Data	54	PRIMARY Hybrid Sun	
Rec 2	Person Data	55	PRIMARY Hybrid Mon	
Rec 2	Person Data	56	PRIMARY Hybrid Tue	
Rec 2	Person Data	57	PRIMARY Hybrid Wed	
Rec 2	Person Data	58	PRIMARY Hybrid Thu	
Rec 2	Person Data	59	PRIMARY Hybrid Fri	
Rec 2	Person Data	60	PRIMARY Hybrid Sat	
Rec 2	Person Data	61	More than One Job	Code indicating if person has more than one paying job:
Rec 2	Person Data	62	Number of Jobs	Number of paying jobs worked by person:
Rec 2	Person Data	63	Hours Worked at Second Job	Total hours on average that person works at second job:
Rec 2	Person Data	64	Second Job Employment Status	If person is employed in a second job, this is a code indicating the person's employment status related to the second job:
Rec 2	Person Data	65	Secondary Self-Employed	If person indicates they are self-employed at SECONDARY place of employment:
Rec 2	Person Data	66	Second Job Type	Code indicating type of workplace where person is employed (second job):
Rec 2	Person Data	67	Other Second Job	Description of workplace type for second job if it is coded as "other".
Rec 2	Person Data	68	Secondary Occupation	Code indicating the type of occupation for secondary job:

Rec 2	Person Data	69	Other Secondary Occupation	Description of occupation for second job if it is coded as "Something else (specify)".
Rec 2	Person Data	70	Secondary Industry	Code indicating the type of industry worked in for secondary job:
Rec 2	Person Data	71	Other Secondary Industry	Description if SECONDARY industry is coded as "Other(specify)"
Rec 2	Person Data	72	Secondary Flex Time	Code indicating if person's employer allows them to work flexible hours or the hours are fixed:
Rec 2	Person Data	73	Hours Worked Last Week at SECONDARY Job	The total number of hours worked last week week at SECONDARY job:
Rec 2	Person Data	74	Secondary Telecommute	Does participant currently work from home or telecommute on a regular basis for their SECONDARY job?
Rec 2	Person Data	75	SECONDARY No Telecommute Schedule Other Location	
Rec 2	Person Data	76	SECONDARY No Telecommute Schedule Work Location	
Rec 2	Person Data	77	SECONDARY Only Remote Home	
Rec 2	Person Data	78	SECONDARY Only Remote Other	
Rec 2	Person Data	79	SECONDARY Hybrid Sun	
Rec 2	Person Data	80	SECONDARY Hybrid Mon	
Rec 2	Person Data	81	SECONDARY Hybrid Tue	
Rec 2	Person Data	82	SECONDARY Hybrid Wed	
Rec 2	Person Data	83	SECONDARY Hybrid Thu	
Rec 2	Person Data	84	SECONDARY Hybrid Fri	
Rec 2	Person Data	85	SECONDARY Hybrid Sat	
Rec 2	Person Data	86	School Type	Code indicating type of school attended:
Rec 2	Person Data	87	Other School Type	Description of school type if coded as "other".
Rec 2	Person Data	88	School Travel Mode	School Travel Mode

Rec 2	Person Data	89	School Travel Mode Other	School Travel Mode Other
Rec 2	Person Data	90	Home Schooled	Code indicating if the person is home schooled:
Rec 2	Person Data	91	Online School	Code indicating if the person attends an online only school: 1-Yes, 2-No, 98-Don't Know, 99-Refused
Rec 2	Person Data	92	School Name	Name of school, if person is a current student.
Rec 2	Person Data	93	School Address	Street address or nearest cross streets of school, if person is a current student. If nearest intersecting streets are provided, both street names must be listed, separated by "&" or "and". The address should correspond to the local place where the person goes to school. If homeschooled or taking classes from home via the internet, please enter information for the home address.
Rec 2	Person Data	94	School City	City where school is located.
Rec 2	Person Data	95	School State	State where school is located.
Rec 2	Person Data	96	School Zip	Zip code of school address.
Rec 2	Person Data	97	School Longitude	Longitude of school location to six decimal places.
Rec 2	Person Data	98	School Latitude	Latitude of school location to six decimal places.
Rec 2	Person Data	99	Travel Data Retrieval Mode	Code indicating travel data retrieval (reporting) method:
Rec 2	Person Data	100	Retrieval ID	This item identifies the person by person number who provided the information.
Rec 2	Person Data	101	Travel	Code indicating if person traveled on the designated travel day:

Rec 2	Person Data	102	Why No Travel	Code(s) indicating why the person did not make any trips on the travel day (if applicable). Multiple selections are permitted and should be separated by a semicolon (e.g. 2;3).
Rec 2	Person Data	103	Other, Why No Travel	If no travel is coded as "other", this field contains a description of why the person did not travel.
Rec 2	Person Data	104	Language Other Than English	If household member speaks another language at home other than English.
Rec 2	Person Data	105	English Proficiency	How well household member speaks English?
Rec 2	Person Data	106	Language Spoken	The language other than English that is spoken at home (if applicable)
Rec 2	Person Data	107	Why NOT Walking and Biking for Commute Trips	Why NOT Walking and Biking for Commute Trips
Rec 2	Person Data	108	Why NOT Walking and Biking for Non-commute Trips	Why NOT Walking and Biking for Non-commute Trips
Rec 2	Person Data	109	Why NOT Transit for Commute Trips	Why NOT Transit for Commute Trips
Rec 2	Person Data	110	Why NOT Transit for Non-Commute Trips	Why NOT Transit for Non-Commute Trips
Rec 2	Person Data	111	Convenience of Telecommute Employee	(1 is very difficult, and 10 is very easy.)
Rec 2	Person Data	112	Convenience of Telecommute Employer	(1 is very difficult, and 10 is very easy.)
Vehicle Level				
Rec 3	Vehicle Data	1	Record Type	Code indicating type of record, here it should be 3.
Rec 3	Vehicle Data	2	Sample Number	Unique number assigned to each household participating in survey.
Rec 3	Vehicle Data	3	Vehicle Number	Unique number assigned to each household vehicle in survey.
Rec 3	Vehicle Data	4	Type of Vehicle	Code indicating type of vehicle:

Rec 3	Vehicle Data	5	Other Vehicle Type	Description of type of vehicle if coded as "other".
Rec 3	Vehicle Data	6	Make	Make of vehicle. See codes in list below.
Rec 3	Vehicle Data	7	Other Make	Make of vehicle if coded as "other".
Rec 3	Vehicle Data	8	Model	Model of vehicle.
Rec 3	Vehicle Data	9	Year	Four-digit year vehicle was manufactured. 9998-Don’t Know, 9999-Refused
Rec 3	Vehicle Data	10	Year Purchased	Four-digit year vehicle was purchased. 9998-Don’t Know, 9999-Refused
Rec 3	Vehicle Data	11	Type of Fuel	Type of fuel used by vehicle:
Rec 3	Vehicle Data	12	Other Fuel Type	Description of fuel type if coded as "other".
Rec 3	Vehicle Data	13	MPG	What is the fuel efficiency of your vehicle? Please provide miles per gallon (MPG) for gasoline vehicles, miles per gallon equivalent (MPGe) for electric vehicles, or both for hybrid vehicles.
Rec 3	Vehicle Data	14	Commercial Use	Is this vehicle used for ANY commercial purposes? (Note: This includes personal vehicles used for Uber, Lyft, Doordash, Instacart, etc)
Rec 3	Vehicle Data	15	Commercial Type of Use	If vehicle is used for commercial purposes, this field contains a code indicating the type of commercial use:
Rec 3	Vehicle Data	16	Other Commercial Type of Use	If commercial type of use is coded as "other", this field contains a description of the type of commercial use.
Rec 3	Vehicle Data	17	Ownership	Code indicating ownership of this vehicle:
Rec 3	Vehicle Data	18	Odometer	Odometer reading on vehicle at beginning of travel day:

Trip Level				
Rec 4	Trip Data	1	Record Type	Code indicating type of record. Here it should be 4.
Rec 4	Trip Data	2	Sample Number	Unique number assigned to each household participating in survey.
Rec 4	Trip Data	3	Date	Eight-digit date (MMDDYYYY) survey travel occurred.
Rec 4	Trip Data	4	Person Number	Number assigned to the person doing this activity.
Rec 4	Trip Data	5	Activity/Trip Number	The first trip/activity for each person will be recorded as 0 for where their day began. Each subsequent trip/activity should be numbered sequentially as 1, 2, 3, etc.
Rec 4	Trip Data	6	Location	Name of location where activity took place.
Rec 4	Trip Data	7	Location Address	Street address of location or nearest cross streets. If nearest intersecting streets are provided, both street names must be listed, separated by "&" or "and".
Rec 4	Trip Data	8	Location City	City where activity took place.
Rec 4	Trip Data	9	Location State	State where activity took place.
Rec 4	Trip Data	10	Location Zip Code	Zip code of location address.
Rec 4	Trip Data	11	Location Longitude	Longitude of location to six decimal places.
Rec 4	Trip Data	12	Location Latitude	Latitude of location to six decimal places.
Rec 4	Trip Data	13	Arrival Time	Military hour and minute of arrival, separated by a colon (HH:MM). For the person's starting location for the day, this field should be left blank.

Rec 4	Trip Data	14	Departure Time	Military hour and minute of departure, separated by a colon (HH:MM). If this was the person's last location of the day, this field should be blank.
Rec 4	Trip Data	15	Activity Type Code	Code indicating the type of activity. For activity 0 (where day began), this should be coded as 1, 2 or 3 if the day began at home, 4 if the day began at work, or as 96 if the day began at another location.
Rec 4	Trip Data	16	Other Activity Description	Description of activity if coded as "other activity".
Rec 4	Trip Data	17	Type of Place	Code indicating the type of place at this location.
Rec 4	Trip Data	18	Other Type of Place	Description of type of place where activity occurred if coded as "other".
Rec 4	Trip Data	19	Mode of Travel	Code indicating mode used to travel to this location.
Rec 4	Trip Data	20	Other Mode of Travel	Description of mode of travel if coded as "other".
Rec 4	Trip Data	21	Transit Access	Code indicating mode used to travel to this location.
Rec 4	Trip Data	22	Transit Egress	Code indicating mode used to travel to this location.
Rec 4	Trip Data	23	Ridershare Wait	IF Ridershare or Taxi/Limo - How long did you have to wait for the vehicle to arrive?
Rec 4	Trip Data	24	Ridershare Cost	IF Ridershare or Taxi/Limo - What was the cost of the trip?
Rec 4	Trip Data	25	Scooter Cost	IF Tugo Bike Share/Spin E-Scooter - What was the cost of this service?
Rec 4	Trip Data	26	Pay to Park	IF Driver/Passenger/Motorcycle/Commerc

				ial Vehicle - Did you have to pay for parking?
Rec 4	Trip Data	27	Amount Paid to Park	IF Driver/Passenger/Motorcycle/Commercial Vehicle - How much did you have to pay?
Rec 4	Trip Data	28	Number of People	This is the number of people traveling to this stop (including the participant)
Rec 4	Trip Data	29	HH Members	Of those in the vehicle, how many were household members. Field should be blank if number of people was coded 96.
Rec 4	Trip Data	30	Persons on Trip	Who was/were the household member(s) traveling with you? Code person numbers separated by semicolons (e.g. 2;3).
Rec 4	Trip Data	31	Non HH Members	Compute non household members as number of people minus number of household members. If number of people is coded as 96, this field should be blank.
Rec 4	Trip Data	32	HH Vehicle	Was a HH vehicle used to make this trip?
Rec 4	Trip Data	33	Vehicle Used	If a household vehicle was used for travel, this is the vehicle number (this number should match the number used for corresponding vehicle in Record Type 3.). If other vehicle is used, this should be coded as 96.
Rec 4	Trip Data	34	Non-HH Vehicle Used	
Rec 4	Trip Data	35	Commercial Use of Other Vehicle	Code indicating if other vehicle is used for commercial purposes: 1-Yes, 2-No, 98-Don't Know, 99-Refused.

Rec 4	Trip Data	36	Commercial Type of Use of Other Vehicle	If other vehicle is used for commercial purposes (travel mode 5), this field indicates the type of commercial use.
Rec 4	Trip Data	37	Other Commercial Type of Use	If commercial type of use code above is coded as "other", this field contains a description of the commercial type of use.