2022 HOUSTON-GALVESTON AREA COUNCIL (H-GAC)

REGIONAL TRANSIT ONBOARD ORIGIN DESTINATION SURVEY

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PREPARED BY ETC INSTITUTE
IN ASSOCIATION WITH INSIGHT AND RSG

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EXECUTIVE SUMMARY

The Houston-Galveston Area Council (H-GAC) conducted the 2022 Regional Transit Onboard Origin-Destination (OD) Survey in partnership with the Metropolitan Transit Authority of Harris County (METRO). H-GAC contracted ETC Institute to conduct the onboard survey of local bus, commuter bus, and light rail passengers for each of the transit systems that operate within the H-GAC eight-county regional transportation planning area on weekdays:

- METRO
- Brazos Transit District (BTD)
- Gulf Coast Transit District (GCTD)
- Conroe Connection
- Fort Bend County Public Transportation
- Harris County Transit
- Galveston Island Transit
- The Woodlands Township

Objectives

The primary objectives for the survey were as follows:

- Compile statistically accurate information about transit passengers and how they use transit in the region.
- Generate reliable linked OD data needed by H-GAC and METRO to support travel demand modeling and transportation network simulation activities used for regional long-range transportation planning.
- Assess changes in trip characteristics and ridership profiles of transit riders by comparing the 2022 survey results with data from previous surveys by METRO and H-GAC.
- Meet the Title VI Civil Right Requirements per the latest FTA guidance.

COVID-19 Effects

The was an impact due to the 2020 Pandemic. Appendix A details the Pandemic Impact on the 2022 Origin-Destination Survey Results

Surveys Collected

The target sample size for the survey was 15,583 completed surveys across all transit services and modes. The actual number of completed surveys was 17,050. The following table documents the ridership, target sample size, and actual number of surveys collected for each transit agency.

TABLE 1: SURVEYS BY AGENCY

Transit Agency	Average Daily Ridership Feb 2022	Target Sample Size	Surveys Collected	Surveys as Percent of Average Daily Ridership
METRO Bus Local and BRT	109,839	8,201	9,206	8.4%
METRO Bus Park and Ride	9,369	1,215	1,333	14.2%
METRO Rail	32,882	4,990	5,351	16.3%
METRO Total	152,090	14,406	15,890	10.4%
BTD –The District	26	18	16	61.5%
Conroe Connection	75	60	63	84.0%
Fort Bend County Public Transportation	438	71	75	17.1%
Gulf Coast Transportation District GCTD	1,001	511	360	36.0%
Harris County Transit	379	164	200	52.8%
Galveston Island Transit	721	172	253	35.1%
The Woodlands	911	181	193	21.2%
Regional Transit Agencies Total	3,551	1,177	1,160	32.7%
All Systems Combined Total	155,641	15,583	17,050	11.0%

**BTD service within the H-GAC region*

Survey Methodology

ETC interviewers conducted the survey on local bus and rail by intercept interviews of passengers. Interviewers randomly selected passengers to participate in the interview while making a trip. If the passenger agreed, the interviewer conducted the survey using a tablet personal computer (tablet), recording responses in real-time. The tablet computers had on-screen mapping features that allowed for geocoding of addresses based on feedback from the passenger. The interviewer was available to answer any passenger questions to ensure the accuracy of the data collected. The passenger could also select the response to the demographic questions directly on the tablet, thus allowing for more privacy.

For non-English speaking riders, ETC employed multilingual interviewers. While some interviewers spoke Spanish, Chinese, Vietnamese, French, and Arabic, the majority of non-English interviews were conducted in Spanish. A total of 2,017 Spanish interviews were conducted, 12% of interviews, which is a 5.5% increase in Spanish surveys from the 2017 survey conducted.

The survey on park and ride commuter bus routes (PNR) was conducted using self-administered paper surveys. Interviewers distributed the paper surveys as passengers boarded the bus for the morning in-bound trip. The interviewer then rode the bus trip to be available to answer questions and collect completed surveys.

The final survey database of 17,050 completed surveys provides a 95% confidence interval (CI) with less than a 1% margin of error (ME) for the regional service as a whole.

Regional Transit Rider Profile

The following transit rider profile at the regional level was created from the survey.

- Over three-quarters (78.1%) of transit riders in the region are employed either full time (60.5%) or part time (17.5%).
- Less than one-quarter (16.9%) of transit riders in the region are students at a college or university (11.9%), a vocational / technical school (0.5%), or a kindergarten through 12th grade school (4.5%).
- Nearly three-quarters (67.7%) of transit riders in the region are between 20 and 50 years of age.
- The race/ethnicity of transit riders in the region are 43.1% African American, 30.6% Hispanic or Latino, 19.3% White, 6.8% Asian, 1.7% American Indian / American Native, and 0.4% Native Hawaiian / Pacific Islander.
- Nearly one-quarter (20.6%) of transit riders in the region report an annual household income of less than $16,000; 11.7% report an annual household income of $81,000 or more.
- Nearly one-quarter (24.2%) of transit riders in the region have been riding transit for 10 years or more. Almost one-quarter (23.9%) have been riding transit for less than one year as well.
- More than three-quarters (86.5%) of transit riders use transit at least three days a week, broken down as follows: 23.6% use transit 6 or 7 days per week, 38.9% use transit 5 days per week, and 24% use transit 3 or 4 days per week.

Regional Transit Trip Characteristics

These statistics focused on transit trip characteristics.

- Over half (53.2%) of all passenger trips came from home, 22.5% came from work, and 5.9% came from some personal business.
- Over three-quarters (86.5%) of passengers walked from their origin to their first transit stop.
- The main destination location for passengers was home (38.4%), 30.1% headed to work, and 9.3% headed to some personal business.
- Nearly all (90.2%) of passengers walked to their destination from their last transit stop.
- Over half (54.1%) of all passenger trips surveyed did not require a transfer, 34.8% required one transfer, and 11.1% required two or more transfers.

Other Key Findings

- The region's transit systems have a positive impact on traffic and air quality by reducing the number of trips that would otherwise have been completed by driving. If transit were not available, 20.7% of transit riders in the region would drive a household vehicle to make the same trip.
- Public transit in the region increases mobility and independence for those who cannot drive or have a vehicle. Nearly half (44.2%) of passengers do not possess a valid drivers' license and 42% of passengers have zero household vehicles.
- A high amount (38.9%) of passengers in the region live in households that make less than $23,999.00. By taking public transportation, individuals can eliminate a significant amount of spending each month in avoided gas costs, maintenance, and other expenses (insurance, registration, etc.).

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CHAPTER 1: SURVEY METHODOLOGY

Sampling Plan

In coordination with the H-GAC and METRO, ETC established sampling goals for each bus route and light rail station to ensure that the distribution of completed surveys mirrored the population distribution of riders on the region's transit systems which are shown in Appendix D. Table 2 shows the time periods for the weekday collection of this survey. Surveys were not conducted on weekends.

TABLE 2: PROJECT TIME PERIODS

Time Period	Time Range
Early AM	3:30 to 6:00 a.m.
AM Peak	6:00 to 9:00 a.m.
Midday	9:00 to 3:00 p.m.
PM Peak	3:00 to 6:00 p.m.
Late Night	6:00 to 12:00 a.m.

Sources of Ridership Data

The source of the ridership used to both plan for and expand the survey came from H-GAC, METRO, and other regional providers. The ridership used to draw the final sample and create a data collection plan was from February 2022. This data source was summarized by ETC by route, time-of-day, and direction in order to create cell level percentages (Route / Direction / Time-of-day). Using the route level sample sizes from the request for proposal, ETC created cell level (route/direction/time-of-day) ridership data by normalizing the daily ridership totals. The ridership used for the data expansion was the average weekday ridership from March to May 2022, the period during which the survey was conducted.

Sampling Plan for O2O Counts

On-to-Off (O2O) counts were collected on all METRO rail lines in order to capture passenger boarding and alighting pairs (stops individual passengers board and alight the rail line). This was done in order to expand the rail data by segmenting station on and offs. The sampling plan for the O2O counts was designed to obtain completed pairs from a minimum of 20% of the daily ridership on each rail line operated by METRO. The total goal across all lines was 6,576 and a total of 9,592 pairs were collected. Individually, 1,011 O2O pairs were collected on the METRO Green Line, 1,028 on the METRO Purple Line, and 7,553 on the METRO Red Line. See Appendix D for O2O Sample Plans and O2O counts collected.

Sampling Goals for OD Survey

H-GAC established route level and rail station level sample sizes using sampling strata shown in Table 3 using a combination of average 2019 ridership and November 2021 ridership. The strata were created for METRO Rail, Bus Rapid Transit (BRT), Local Bus / Streetcar, and Commuter Bus. Each strata (i.e., METRO Rail, BRT, Local Bus) contains average weekday daily ridership categories from high to low ridership. For example, there is one route (route 82) with a higher daily ridership than 7,500 weekday boardings. Using the sample strata shown in Table 3, route 82 was assigned a route level target sample of 367 which is a 95% confidence interval with a 5% margin of error.

TABLE 3: CONFIDENCE LEVEL/PRECISION LEVELS FOR DIFFERENT RIDERSHIP ROUTES

Mode / Line-Route	# Routes/ Stations in Strata	Target Sample (valid surveys)	Target Confidence Interval	Target Margin-of-error	2017 Target Margin of Error	Additional Strata
METRORail						
Lines >10,000	2	**1,677**	99	3	3	Direction / Time-of-Day
Lines >2,500 <10,000	2	**818**	95	3	3	Direction / Time-of-Day
Sub strata by station, does not duplicate strata by line						
Stations >1,000 ADR	14	**67**	90	10	10	Time-of-Day
Stations >750 <1,000 ADR	6	**64**	90	10	10	Time-of-Day
Stations >250 <750 ADR	19	**63**	90	15	15	Time-of-Day
Stations <250 ADR	5	**54**	90	15	15	Time-of-Day
Bus Rapid Transit						
All Routes	1	**261**	95	5	N/A	Direction / Time-of-Day
Local Bus/Streetcar						
High Growth/Future BOOST Routes	3	**356**	95	5	N/A	Direction / Time-of-Day
Routes >7,500 ADR	1	**367**	95	5	4.9	Direction / Time-of-Day
Routes >2,500 <7,500 ADR	13	**120**	90	7.5	7.9	Direction / Time-of-Day
Routes >1,000 <2,500 ADR	28	**67**	90	10	9.6	Direction / Time-of-Day
Routes >750 <1,000 ADR	7	**64**	90	10	10	Direction / Time-of-Day
Routes >500 <750 ADR	6	**30**	90	15	15	Direction / Time-of-Day
Routes >100 <500 ADR	34	**29**	90	15	15	Direction / Time-of-Day
Routes >50<100 ADR	13	**24**	90	15	15	Direction / Time-of-Day
Routes <50	21		90	15	15	Direction / Time-of-Day
Commuter Bus						
Perimeter (high growth, high ridership) routes	3	**204**	95	5	N/A	Inbound AM
Perimeter (high growth, low ridership) route	1	**49**	95	5	N/A	Inbound AM
Routes >1,000 AM Peak Riders	0	**211**	90	5	5	Inbound AM
Routes >500 <1,000 AM Peak Riders	9	**109**	90	7.5	7.9	Inbound AM
Routes >50 <500 AM Peak Riders	20	**61**	90	10	10	Inbound AM
Routes <50 AM Peak Riders	1		90	15		Inbound AM
Note: METRO operates 6 midday/evening commuter bus routes. These routes will be sampled using local bus sampling.						

ETC developed an OD sample plan from the H-GAC route level strata ensuring the completion of at least 15,583 OD surveys across all METRO services and the regional providers. Route level goals were provided by H-GAC which used the forementioned strata. Cell level goals were created by route, direction, and

time-of-day by utilizing METRO ridership data from February 8-10, 2022. The cell level goals were created off a combination of cell level (route/direction/time-of-day) boarding percentages.

ETC collected 17,050 surveys with 15,890 collected for METRO and 1,160 collected for other regional providers. Table 4 shows the sample sizes by system/mode, including individual rail lines. Appendix D shows all OD Sample Plans by route, direction, time-of-day, and OD completed surveys.

TABLE 4: SAMPLE SIZES BY SYSTEM/MODE

Provider/Mode/Line-Route	# Routes/ Stations	Average Daily Ridership (ADR) Feb 2022	Target Sample Size	Percent of ADR Sample Plan	Surveys Collected	Percent ADR Captured
METRO Rail Green Line	9	2,966	818	27.6%	923	31.1%
METRO Rail Purple Line	10	3,412	818	24.0%	907	26.6%
METRO Rail Red Line	25	26,504	3,354	12.7%	3,521	13.3%
METRO Bus Local and BRT	81	109,839	8,201	7.5%	9,206	8.4%
*METRO Bus P&R	21	9,369	1,215	13.0%	1,333	14.2%
METRO Total	146	152,090	14,406	9.5%	15,890	10.4%
BTD –The District	2	26	18	69.2%	16	61.5%
Conroe Connection	4	75	60	80.0%	63	84.0%
Fort Bend County Public Transportation	3	438	71	16.2%	75	17.1%
Gulf Coast Transportation District GCTD	13	1,001	511	51.0%	360	36.0%
Harris County Transit	11	379	164	43.3%	200	52.8%
Galveston Island Transit	10	721	172	23.9%	253	35.1%
The Woodlands	5	911	181	19.9%	193	21.2%
Regional Transit Agencies Total	48	3,551	1,177	33.1%	1,160	32.7%
All Systems Combined Total	194	155,641	15,583	10.0%	17,050	11.0%

Pilot Test

ETC conducted an OD Survey pilot test from March 7 through March 10, 2022. The purpose of the pilot test was to assess all aspects of the survey including survey design, the random passenger selection, implementation, and data processing tasks. The overall goal was to complete 100 OD interviews. A total of 276 completed interviews were collected. Completed records were defined as a trip that made logistical sense and all other variables answered.

Routes Involved

The pilot test was administered to transit riders on a mixture of bus routes and the Red Line between the hours of 4:00am and 10:00pm. A mixture of METRO routes, including express, rail, and local routes, and four routes from Conroe Connection were sampled during the pilot test. During the test, interviewers screened out rodeo attendees since the rodeo trips are not typical travel trips as the rodeo happens only once per year. Routes surveyed for the pilot were:

- Conroe Connection Routes 1, 2, 3, and 4
- METRO High Ridership Route 81
- METRO Mid-Level Ridership Routes 25, 54, and 56
- METRO Low Ridership Routes 48 and 51
- METRO Express Route 102
- METRO Rail Red Line

ETC tested the survey on the Red Line to evaluate effectiveness on the light rail system and on METRO Bus Routes to evaluate how the survey program performed on bus routes of low, mid, and high ridership. Conroe Connection was surveyed during the pilot since 1) ETC had additional experienced staff that could survey these routes since GTFS (General Transit Feed Specification which contains route and stop shapefiles) was not provided and staff had to select user stops rather than from a preloaded stop file and 2) ETC wanted to test response rates on other non-METRO providers. All pilot surveys collected are included in the final overall data set.

Pilot Test Results

Assessment of Survey Design

Overall, the survey design was good. Passengers were willing to participate in the survey and respondents did not seem to have difficulty understanding the questions. The average survey took 6.5 minutes to complete with the shortest amount of time being 4.5 minutes and the longest being 10.75 minutes.

Assessment of Survey Participation and Usability of Surveys

Limited English Proficient (LEP) Passengers

In total, four interviews were conducted in Spanish. Additionally, four Spanish-only speaking passengers refused to provide contact information in order to receive a callback to conduct the survey in Spanish. A

total of five bilingual (English/Spanish) interviewers conducted interviews in the pilot survey spread out among all pilot routes. It was determined that for the full survey, bilingual staff would focus more on the south Houston routes since interviewers informed field supervisors that these routes are high in Spanish speaking riders. For the full survey, Spanish speaking staff were deployed on those routes.

Refusals

A total of 36 passengers refused to participate in the survey out of the 312 passengers approached. Interviewers logged each respondent that refused to participate in the survey and observed of the rider's age, race, and gender.

Key Profile of Refusals

- 53% of the passengers that refused were observed as male while 47% were observed as female.
- 72% of passengers observed ages were between 20 and 50 years of age.
- 56% of the refusals were observed as Black / African American, while 33% were observed as Hispanic / Latino.

Survey Instrument

The tablet was the preferred survey method for all fixed route buses while a paper self-administer version was collected on park and ride (PNR) routes. The tablet version was preferred due to having on-screen mapping that allows for real-time geocoding of addresses and locations. The respondents would then confirm the geocoded location based on the on-screen map. In addition to using the mapping feature to collect the global positioning system (GPS) coordinates of major survey locations (home address, origin address, destination address, boarding location, and alighting location). The respondent could also select the answers to the questions directly on the tablet during the demographic section to allow for more privacy.

Respondents who did not have time to complete the survey during their bus or rail trip were also given the option of providing their phone numbers or e-mail address for an online self-administered survey or call back. Those who provided their phone numbers or e-mail were then texted or e-mailed a link to the self-administered survey or contacted by ETC's call center to complete the survey. Overall, twelve passengers completed the survey through these methods.

Figure 1 to Figure 4 show examples from the tablet survey.

FIGURE 1: TABLET SCREENSHOT FOR QUESTION: "WHAT TYPE OF PLACE ARE YOU COMING FROM NOW?"

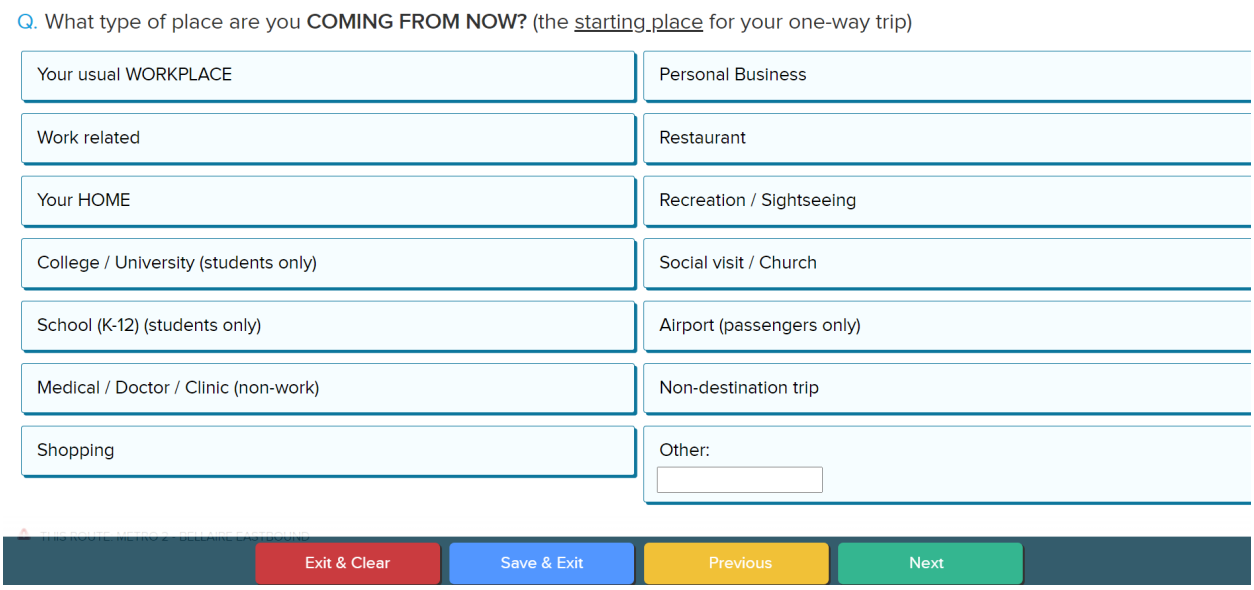


FIGURE 2: TABLET SCREENSHOT FOR QUESTION: "HOW DID YOU GET FROM YOUR ORIGIN TO YOUR VERY FIRST BUS/TRAIN ON THIS ONE-WAY TRIP?"

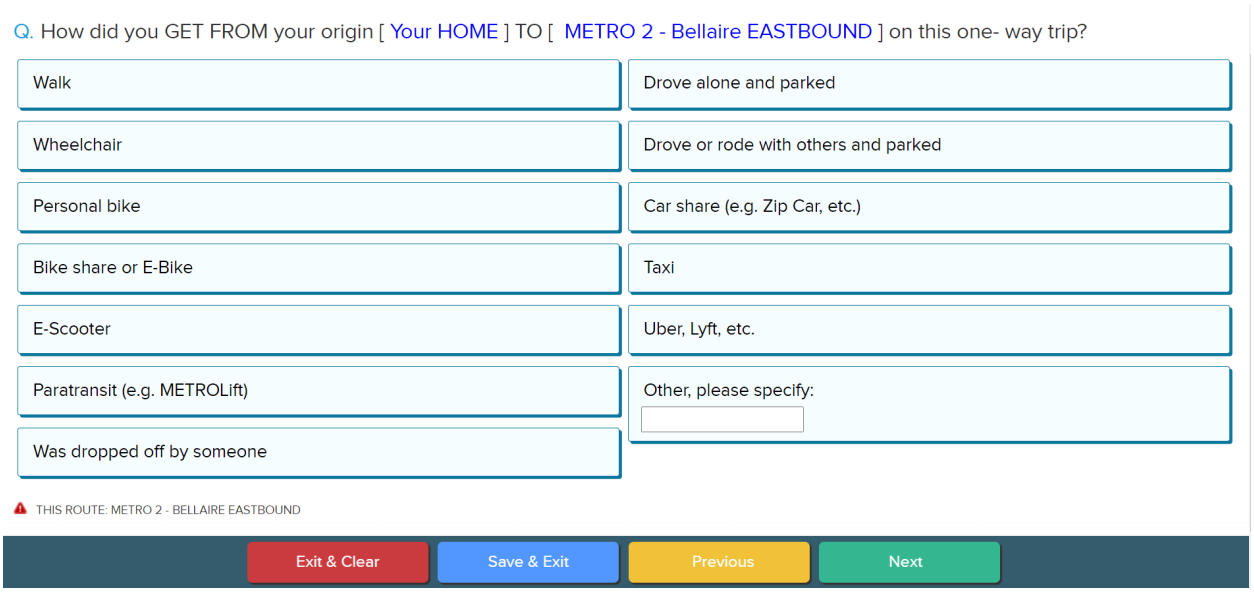


FIGURE 3: TABLET SCREENSHOT FOR QUESTION: "WHERE DID YOU GET ON THIS BUS?"

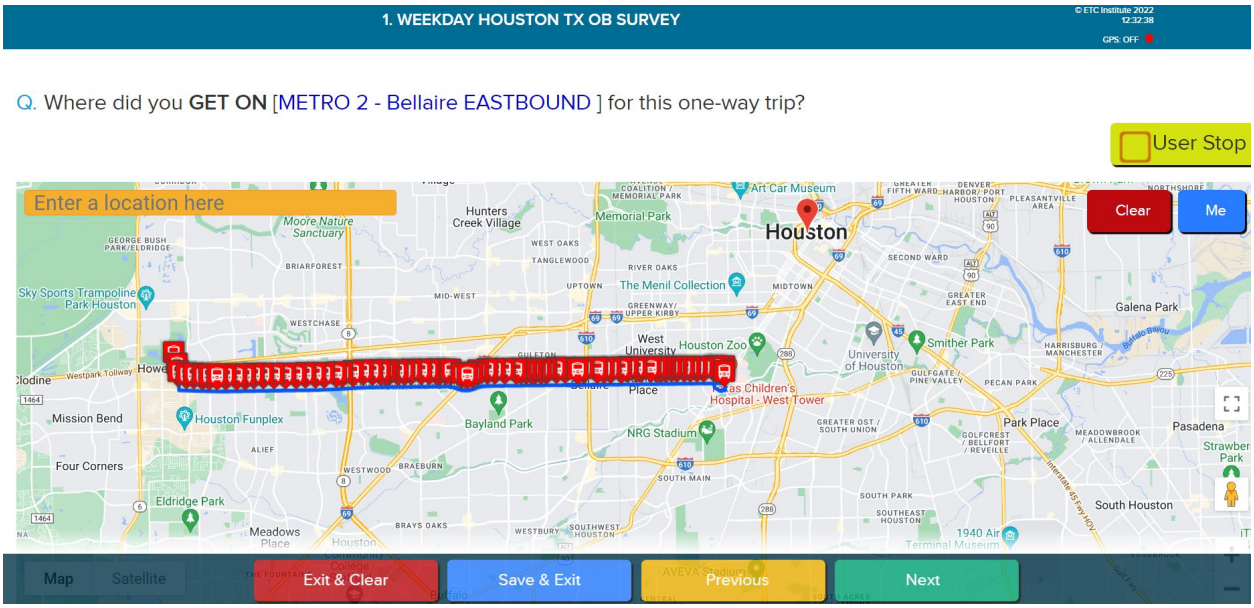
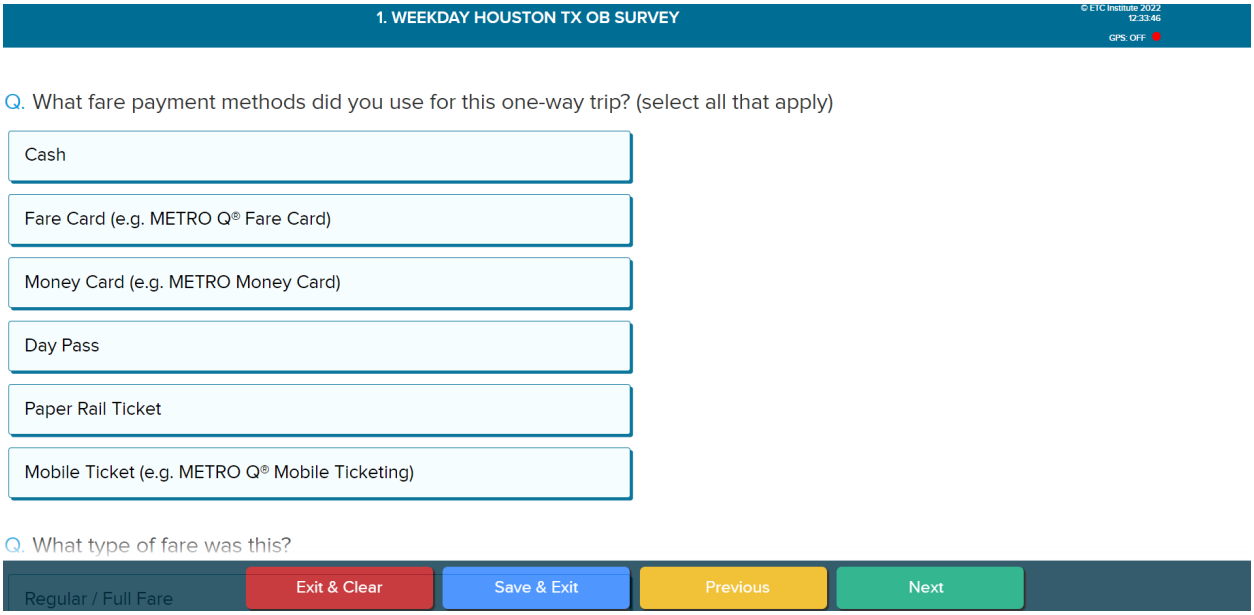


FIGURE 4: TABLET SCREENSHOT FOR QUESTIONS ABOUT FARE METHOD



For PNR routes, the respondent generally has a longer ride time and fewer transfers, allowing for the use of paper surveys. The distribution of paper surveys to all passengers on a PNR trip allowed a greater number of passengers to participate without sacrificing data quality. For the PNR routes, interviewers distributed the surveys, assisted riders as needed, and collected the paper questionnaire. The paper surveys that were collected on these routes were then entered into the online database with the tablet

surveys. The paper questionnaire is provided in Appendix B. The questions on the paper survey were the same as for the tablet surveys.

CHAPTER 2: SURVEY ADMINISTRATION

Data Collection Activities

Labor Recruitment and Training

Assembling a team of high-quality survey staff was one of the most important steps in both the O2O and OD administration process. ETC collaborated with the staffing firms ANIK and Stat Team Staffing to provide interviewers for the both the O2O and OD surveys.

ETC conducted two major training sessions for the data collection. The first major training session was for the O2O counts, and the second major training session was for the OD survey. There were additional training sessions conducted throughout the data collection process on an as-needed basis with smaller groups.

Training sessions focused on the study's purpose and objectives, the survey instruments, scripts on how to respond to passengers' questions, how to use data collection tools, instructions on how to conduct themselves when working with the public, and safety training. The survey staff were instructed to understand that while they were not H-GAC, METRO, or any of the other transit systems employees, they were representing all agencies while on transit vehicles or property and they needed to act in a manner that reflected positively.

Maximizing participation and legitimizing the survey among passengers depended on the public response to the survey staff. To support a good public image, ETC imposed strict dress code standards that required survey staff to wear clean appropriate clothing to present a casual, yet neat, appearance that ensured professionalism and comfort. Survey staff were provided with surveyor badges and vests, identifying interviewers to METRO and other transit agencies staff and passengers. The badge and dress code standards promoted a professional appearance and reinforced survey legitimacy, which increased passengers' trust in the interviewers and the process.

ETC provided an in-depth project-specific training to ensure a successful data collection. The training reviewed project specifics and field procedures and provided training on how to actively engage customers (passengers). Key highlights in the training included courtesy, professionalism, and person-to-person interactions.

Training O2O Surveyors

The ETC field manager created the necessary training materials and conducted the O2O training. The primary tool that was used for the training session was a PowerPoint presentation. The training discussed the following topics:

- Equipment use and set up
- Methodologies for collecting rail boarding and alighting pairs

- How to approach passengers
- How to manage refusals
- How to react in various situations that may be encountered
- Safety training

Surveyors were evaluated on their proficiency and were provided with additional coaching if needed. If the surveyor was deemed unable to perform the O2O count, they were replaced.

Training OD Interviewers

The ETC field manager created the necessary training materials and conducted the OD training. The classroom training session included a PowerPoint presentation to explain the purpose and objectives of the survey, questionnaire content, interviewer procedures and requirements, survey logistics, how to maximize response rates (including hard-to-survey passengers), and the data collection process in a step-by-step format. Other goals of the training included building interview staff confidence, helping interview staff feel that they are an important part of the survey's success, and helping them understand the importance of the survey and its benefits to the community.

ETC ensures that the training addressed the following details:

- Tips on intercepting/interacting with passengers with disabilities
- Tips on intercepting/interacting with limited English proficiency passengers
- Cultural sensitivity
- Importance of understanding the intent of the questions
- Importance of random selection and properly recording all refusals
- Importance of data confidentiality
- Overview of the participating transit systems
- Overview of the topics covered in tablet questionnaire
- How to manage passenger comments and complaints
- Instructions on conveying the purpose of the survey to passengers
- Safety training

Toward the end of training, interviewers conducted mock interviews using the tablets. This exercise allowed ETC staff to gauge each interviewer's comprehension of the survey instrument and provide feedback as needed. Following classroom training, interviewers conducted live interviews with passengers under the supervision of ETC supervisory staff. Supervisors oversaw interviewers and provided feedback on performance throughout the remainder of the training day.

Interviewers who were conducting the survey properly began field training. Interviewers who needed more help, but showed promise, were asked to spend a second day in the field under direct supervision. During this period, the interviewer's productivity and data quality were assessed by ETC staff.

Organization of Survey Team

O2O Surveyors Roles

The O2O surveyors were responsible for the collection of the O2O counts using the tablet program. Surveyors asked the riders at which stop they entered (if not observed) and at what stop they will exit the train.

OD Survey Interviewer Roles

For the OD Survey, interviewers boarded their assigned bus/train and selected riders at random to participate in the survey. While conducting the interview, interviewers asked the respondent each question from the survey tablet and recorded each response provided to them by the passenger.

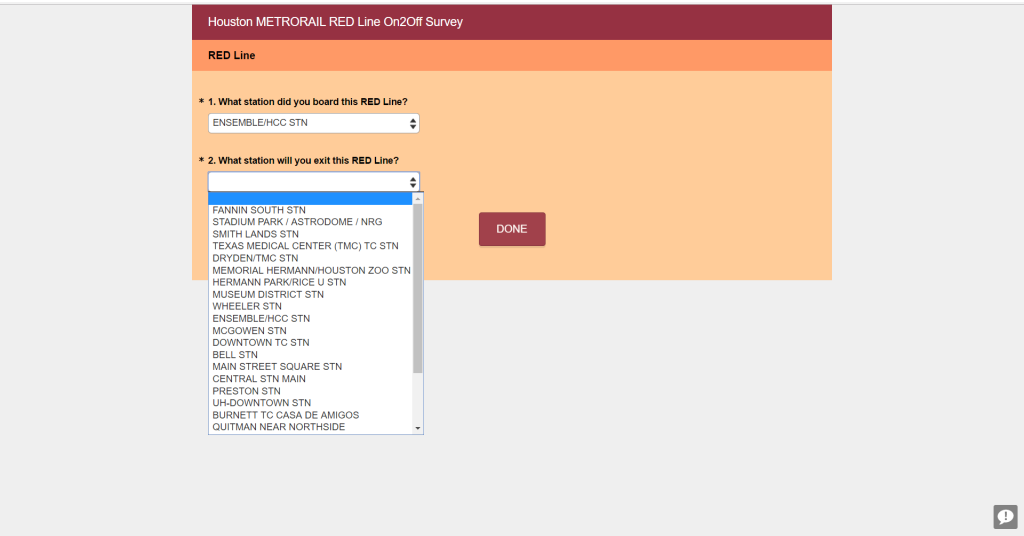
O2O Program Procedure

The O2O counts were collected using tablets equipped with a survey program consisting of two questions: "Where did you get on this rail line?" and "Where will you get off this rail line?". The riders' route, direction, boarding and alighting information, and time were captured with high degree of accuracy via the following process:

- Transit riders were asked to participate as they entered the rail vehicle.
- Each rider entering the rail line was asked where they got on that line (if not observed from the surveyor) and where they will get off the same rail line by a surveyor.
- The surveyor would select the boarding and alighting stops from a programmed drop-down menu, which was associated with rail line they were collecting O2Os.

The O2O software sent the entered data to the O2O server where a server-side processing system stored the data for review. Before any collection took place, surveyor staff were trained on every aspect of the onboard process. An example screenshot of the O2O software is shown in Figure 5.

FIGURE 5: O2O SOFTWARE INTERFACE SCREENSHOT

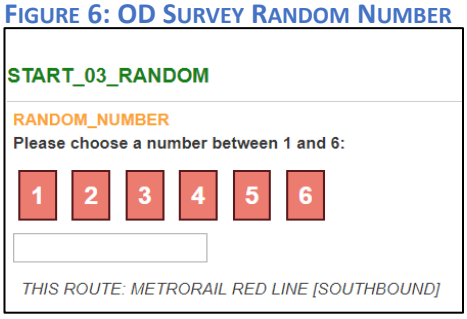


OD Survey Administration

Selection of Participants

For the OD tablet surveys, a random number generator was used to determine which passengers were asked to participate in the survey after boarding the surveying bus as shown in Figure 6.

FIGURE 6: OD SURVEY RANDOM NUMBER



If four people boarded a bus, the tablet randomly generated a number from 1 to 4. If the answer was 2, the second person who boarded the bus was asked to participate in the survey. If the answer was 1, the first person was asked to participate in the survey, and so forth. The selection was limited to the first six people who boarded a bus or train at any given stop to ensure the interviewer could keep track of the passengers as they boarded.

For example, if 20 people boarded a bus or train, the tablet program would randomly pick one of the first six people for the survey. If the interview is refused by the randomly selected rider, then the rider who boarded before the rider selected would be approached. For the PNR routes, a hard copy questionnaire was administered to all boarding passengers to maximize the number of returned complete surveys.

Respondents who did not have time to complete the survey during their trip or spoke a language other than the interviewers were given the option of providing their contact information to conduct the survey at another time. Those who provided their phone numbers for call back ability were then contacted by ETC's call center to complete the survey. Only 12 surveys were completed by phone. Those interviewers

that did speak the foreign language of the rider translated the English tablet version and indicated which language the interview was conducted in.

ETC tried to maintain bilingual (English/Spanish) interviewer staff throughout the entire project. At least 50% of the interview staff were bilingual. In addition to the English/Spanish interviewer staff, there were interviewers that spoke other languages such as French, Korean, Vietnamese, Chinese, Arabic, and other languages. The majority of interviews were conducted in English (87%) with 12% of the surveys being conducted in Spanish. Other languages the survey was conducted in made up less than 1% combined, including Hmong and Mandarin Chinese.

The routes with the highest number of interviews conducted in Spanish were the METRO Rail Green Line (308 Spanish surveys), METRO Rail Red Line (242 Spanish surveys), and METRO Bus route 65 (119 Spanish surveys). Table 5 shows the percentage of surveys conducted by language.

TABLE 5: SURVEYS CONDUCTED BY LANGUAGE

Provider/Mode/Line-Route	Language Survey was Conducted				Percent Conducted In Other Language
	ENGLISH	HMONG	MANDARIN	SPANISH	
METRO Rail	4,760	1	1		0.0%
METRO Bus Local and BRT	7,833	1	1	1,371	14.8%
METRO Bus Park and Ride	1,333			589	44.2%
METRO Total	13,926	2	2	1,960	14.1%
BTD –The District	16				0.0%
Conroe Connection	63				0.0%
Fort Bend County Public Transportation	75				0.0%
Gulf Coast Transportation District GCTD	349			11	3.2%
Harris County Transit	167			33	19.8%
Galveston Island Transit	241			12	5.0%
The Woodlands	192			1	0.5%
Regional Transit Agencies Total	1,103	0	0	57	5.2%
All Systems Combined Total	15,029	2	2	2,017	13.4%

OD Survey Procedure

Local Bus Routes, BRT, and Light Rail

All routes that were classified as local, BRT, or light rail were surveyed using tablets. Interviewers selected people for the survey in accordance with the sampling procedures described earlier in this subsection. Once an interviewer had selected a person for the survey, the interviewer did the following tasks:

- Approached the person who was selected and asked him or her to participate in the survey.
- If the person refused, the interviewer ended the survey.
- If the person agreed to participate, the interviewer asked the respondent if he or she had at least 5 minutes to complete the survey.

- If the person did not have at least 5 minutes on the bus, the interviewer asked the person to provide his/her name and contact information to send a link to a self-administered online version. A link was emailed or texted after the interviewer collected the passenger's information. If the passenger did not complete the survey, a phone interviewer from ETC's call center contacted the respondent and asked him/her to provide the information by phone. This methodology ensured that people who completed short trips on public transit were well represented. The vast majority of passengers were able to complete the surveys onboard.
- If the person had at least 5 minutes on the bus or rail, the interviewer began administering the survey to the respondent as a face-to-face interview using a tablet computer to record the answers.

PNR Routes Procedure

As previously described, on PNR routes the respondent generally has a longer ride time and less complicated trips. The combination of a simpler trip, longer ride time, and the ease of distributing the paper surveys to a larger number of passengers leads to more riders being able to participate than by selecting random passengers and doing interviews. Therefore, survey staff boarded these routes from their trip starting point and handed out self-administered paper surveys to each boarding passenger. When the passenger completed the survey, the surveyor would then collect the survey back and conduct a quick review of the returned survey to check for completeness. If the paper survey was missing fields, the surveyor would then ask the passenger to fill in the missing field. All paper surveys were entered into the survey program after being collected.

Timing of the Survey Administration

Data collection was performed on weekdays from February 21 through June 1, 2022. The Houston Livestock Show and Rodeo took place February 28 through March 20, 2022. During the time the rodeo took place, surveys were conducted on routes that did not access downtown or the rodeo venue and only routes selected by METRO were surveyed during these times. This was done in order to both keep data collection going rather than putting it at holt and to ensure that rodeo patrons would not be surveyed since these are not typical transit trips.

In-Field Quality Assurance/Quality Control

Each day, ETC's field supervisors reviewed interviewer's data for the following issues to assess whether the employee was conducting the survey properly:

- Distribution of surveys by demographics
- Distribution of surveys by trip characteristics
- Length of each survey in minutes
- Percentage of refusals
- Percentage of short trips

ETC's field supervisors also conducted checks on the locations where the interviews took place by viewing the surveys in real time using mapping visualization tool. The survey is programmed to project the location of where five of the survey's questions are asked which populates an "S" in the survey when viewing the mapping visualization tool. These checks ensured data integrity and identified if an interviewer was not onboard their vehicle conducting interviews.

Data Collection Dashboard

ETC created a dashboard for H-GAC to view both collection productivity and demographics collected. ETC Supervisors monitored data collection with a similar dashboard to monitor collection goals and conduct quality control on interviewers' data.

Data Quality Assurance and Processing

Many of the processes described in previous sections of this report were elements of the overall quality assurance/quality control (QA/QC) process that was implemented throughout survey administration. The establishment of sampling goals and procedures for managing the goals ensured that a representative sample was obtained from each bus/rail route. Training of interviewers and the high levels of oversight provided by the field manager and the field supervisors ensured that the survey was administered properly. Also, the use of the latest geocoding tools such as ETC's tablet survey with an embedded Google map search, ETC Elvis program, and Caliper® Maptitude Geographic Information System (GIS) software all contributed to the high quality of geocoding accuracy that was achieved.

The following subsections describe the QA/QC processes that were implemented after the data were collected.

O2O QA/QC Plan

Pre-Processing QA/QC

An analysis of the rail station stop list within the study area is conducted by ETC's GIS analyst before the survey. Effective stop geocoding depends on the initial quality of the stop data. Some of the specific checks that are conducted during the pre-processing phase include sorting and deleting low confidence records that were created. Confidence levels are created based on the O2O software's QA/QC algorithm.

Post-Processing QA/QC

After boardings/alightings were successfully geocoded, the next step in this process involved the application of a QA/QC check for direction.

Process for Identifying Complete Records

To classify a survey as being completed, the record must contain all elements of the one-way trip, including complete answers to the following:

- Route/direction
- Time of trip
- All transfer routes used
- Home address
- Origin address
- Destination address
- Origin place type
- Destination place type
- Access mode
- Egress mode
- Boarding location
- Alighting location

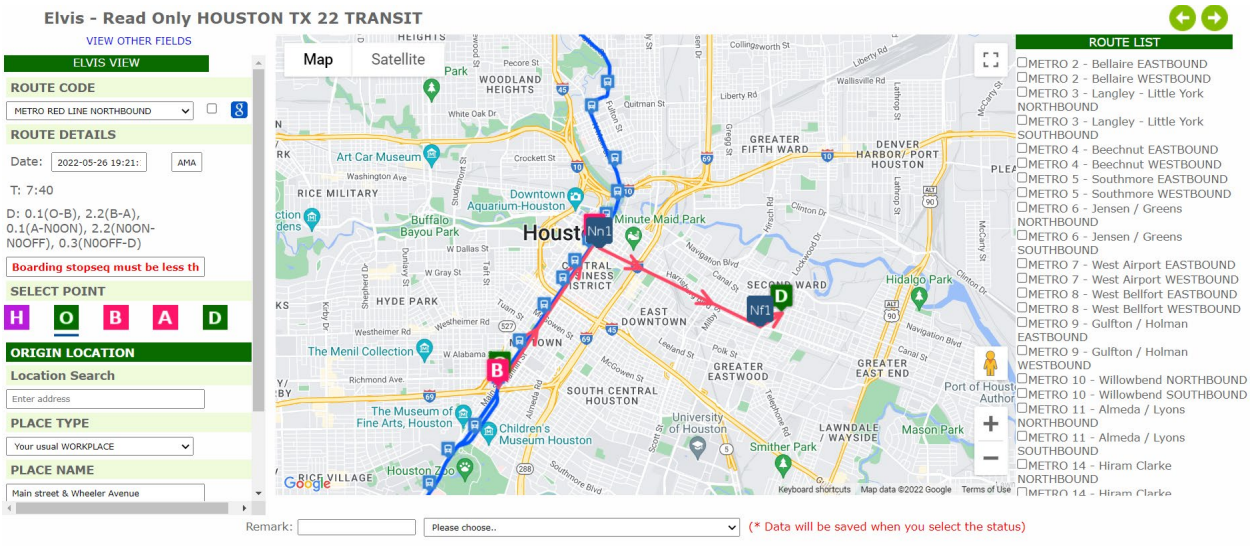
In addition to the required trip data questions, a survey must be marked as complete by the online survey program, which occurs only if the interviewer has navigated through every required question on the online survey instrument including demographic questions.

Online Visual Review Tool

ETC created an online visual review tool that allows for the review of all completed records within the database. This tool shows all components of each individual trip as well as a series of preprogrammed distance and ratio checks as described on subsequent pages. After directions were finalized, the next step was to run each record through the speed/distance/time checks.

Figure 7 shows an example of the online visual review tool.

FIGURE 7: ONLINE VISUAL REVIEW TOOL (EDITABLE VERSION)



Pre-Distance Checks

A series of distance and ratio checks are preprogrammed into the online visual review tool to allow for ETC's Transit Review Team (TRT) to take a more systematic approach in reviewing complete records. The TRT process for editing surveys is described later in this section. **Note: The distance and ratio checks described were meant to alert the reviewer that closer evaluation was needed. It did not necessarily indicate that the record was inaccurate or unusable.**

The distances used for the checks were created using the great-circle distance formula that is based on a straight line from point A to point B that considers the curvature of the earth. Some of the distance checks ran are listed below:

- Access/Egress Mode Distance Check (distances from origin to boarding and alighting to destination)

- Origin to Destination Check (distance from origin to destination)
- Boarding and Alighting Distance Check (distance checks from boarding to alighting location)

Pre-Ratio Checks

After all transfer checks were completed, the next step in this process involved the application of a series of QA/QC ratio checks.

Three ratio checks were conducted for each record. First, the distance between boarding and alighting was divided by the distance between origin and destination. If the rider had a high ratio, then the rider was on the bus for an extensive time compared to the origin to destination distance. If the check created an extremely low ratio, the use of transit seemed unnecessary.

Second, the distance between origin and boarding was divided by the distance between origin and destination. If the rider had a high ratio, the origin to boarding distance was excessive compared to the origin to destination.

Third, the distance between alighting and destination was divided by the distance between origin and destination. If the rider had a high ratio, the alighting to destination distance was excessive compared to the origin to destination.

Transit Review Team

ETC has a dedicated team whose priority is reviewing and editing completed records using an online visual review tool. The TRT reviewed all completed records collected for the survey, paying special attention to records that were automatically flagged automated distance checks. Typically, around 10% of all records receive an automatic flag. Table 6 is used which generally results in actions that allow about 30% of those records that are automatically flagged to be retained, or approximately 3% of all completed surveys.

TABLE 6: GENERAL ISSUES

Issue	Description of Issue	Action
Origin/Destination Condition 1	Origin/Destination appears incorrect because the wrong location of a multiple-location organization was selected	If for example, an Origin/Destination appears illogical based on the college campus that was selected, but an appropriate campus of the same college does appear logical given the other points and answer choices of the trip, then the appropriate campus will be selected.
Origin/Destination Condition 2	Origin/Destination appears to have been geocoded to the incorrect city/state	If for example, an Origin/Destination appears illogical based on the city/state that was geocoded, but the address/intersection is logical within the trip if the city/state are changed. This occurs occasionally because the interviewer selects the wrong choice from the list of possible address choices that appear in the online survey instrument, then the appropriate address information will be inserted.

Access/Egress Mode	Access/Egress Mode seems illogical based on trip	If the access/egress mode involves the use of a vehicle and the distance from either origin to boarding or alighting to destination is less than 0.2 miles, then the access/egress mode is recoded to walk/walked and that change will be reflected in the database.
Directionality of Record	Boarding and alighting locations indicate that the trip is going in the opposite direction of what was selected by the interviewer	Change direction of route selected and if necessary update boarding and alighting locations based on appropriate direction.

Post-Processing Additional Checks

After all records were reviewed by the TRT, the next step in this process involved the application of a series of QA/QC non-trip checks. Non-trip checks are described as anything not pertaining to the respondent's actual trip (i.e., demographic information).

Non-trip related checks included:

- Ensuring the time of day a survey was completed was reasonable given the published operating schedule for the route. If the time of day was collected by the interviewer was incorrect, the correct time of day was attributed using the time stamp on the survey.
- Ensuring that the appropriate fare type was used in response to the age of respondent. If the fare type was incorrect, the record was researched further in order to provide a correct fare type, if there was no logical explanation, the fare type was left how it was originally answered.
- Removing any personal contact information used for quality control purposes during the data collection portion of the project to protect the anonymity of the respondents. All responses containing the passengers name and phone number for the contest entry was removed.

Once all records had gone through the pre-processing and post-processing QA/QC checks, those that were deemed complete and usable were then used to update the completion report used by the field staff to ensure that all contractual goals had been met. After the final high-level review was completed, a codebook or data dictionary (contained in Appendix C) was created to suitably explain the data in the database.

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CHAPTER 3: Survey Weighting and Expansion

H-GAC transit interviews were expanded by route, direction, time-of-day, and by segments containing the boarding and corresponding alighting location of the rider. The following sections describe the methodology that was used to develop the unlinked expansion factors. Unlinked expansion factors are weights, when summed up, match the daily ridership of the system.

Data Expansion Overview

When survey quantity goals are created, they are typically based upon a percentage of the average weekday ridership for the routes in the system and desired confidence levels. These are further broken down by time periods and directions. If the route has been deemed a circular or loop route, the ridership is broken down into time periods only, as directional components cannot be obtained accurately. These routes are deemed circular or loop routes because many riders that will board going in one "direction" but alight going the other "direction" due to the functionality of the route. The time periods that are created (e.g., 6 a.m. to 9 a.m.) are based off the specific needs of H-GAC. Once a sample percentage is agreed upon, the goals for the survey collection are based off the ridership for each route by time period and direction then multiplied by the sampling percentage.

The purpose of developing survey quantity goals is to collect an appropriate number of survey records that will be expanded to represent the total average weekday ridership of each route by time period and direction. To further increase the specificity of the expansion process, segments were created for each route. Stops were grouped into segments along that route so that boarding segments could be paired with alighting segments when creating the expansion factor.

Routes with stop-level ridership data were separated based on direction then divided into two segments based on the total boardings. After approximately half of the route's total ridership was accounted for, a new segment was created. Table 7 is a simplified example of segmentation with stop-level ridership. The reason for that is you can only accurately determine the flows between two segments when you only have APC data. Those routes are segmented similarly to the process above with the main difference being that the second segment begins after approximately half of the route's total APC ridership has boarded. When a route is segmented in half, you have the possibility of three boarding to alighting cell combinations: board segment 1 to alight segment 1, board segment 1 to alight segment 2, board segment 2 to alight segment 2.

(Note: Iterative Proportional Fitting [IPF] is used in multiple types of expansion discussed later in this document. For IPF to work properly, the boarding totals must match the alighting totals. For this reason, through the process of normalization, ridership alightings are adjusted using a multiplying factor (% of alighting per station/stop) to make sure their totals match the boarding totals. These are typically nominal alterations; however, if there are significant differences in boarding and alighting totals by direction of a route, it may require additional review of the functionality of the route (removing directional components

and deeming the route circular or loop) to ensure that the surveys are both collected and expanded appropriately.)

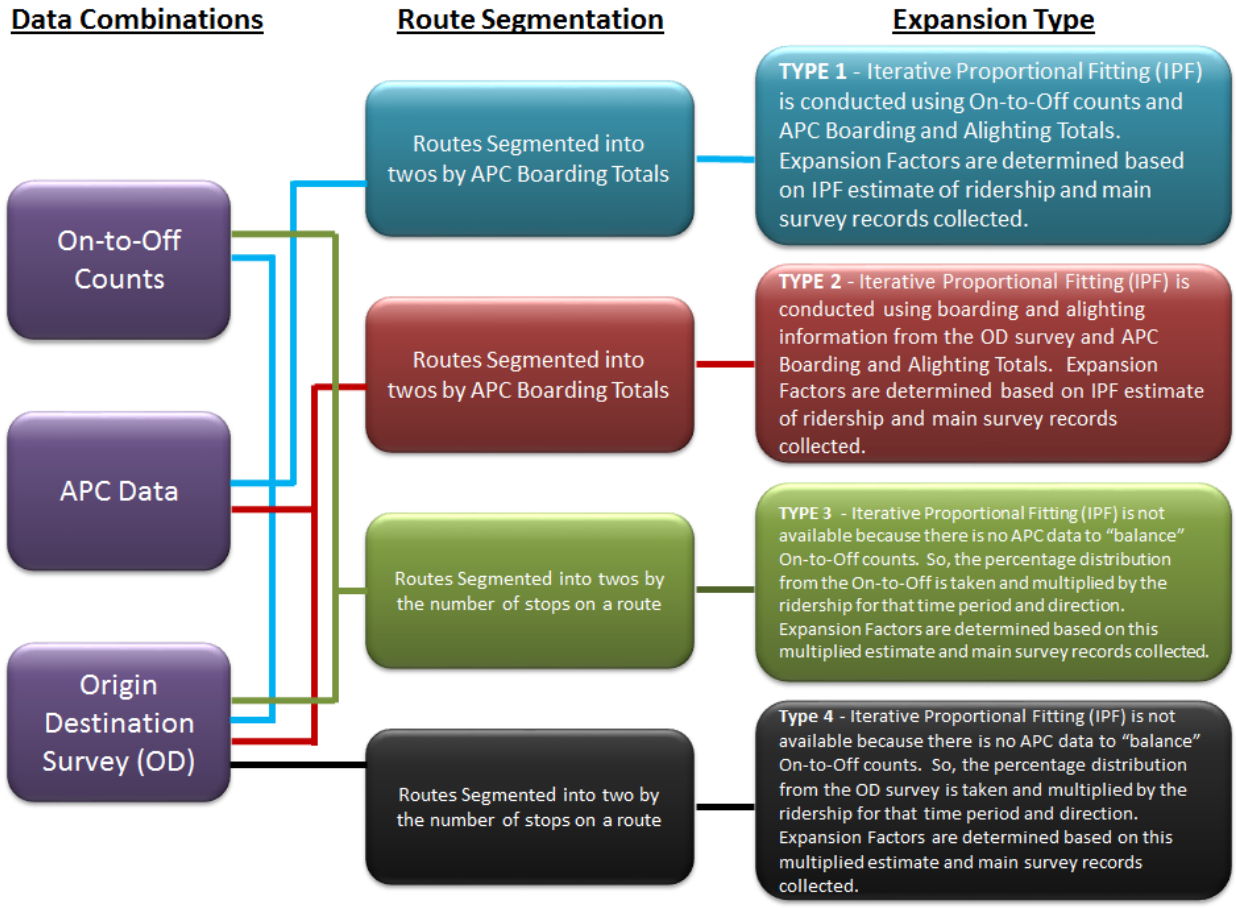
TABLE 7: SEGMENTATION WITH STOP-LEVEL RIDERSHIP EXAMPLE

Segmentation with APC Example					
Direction: Eastbound	APC DATA		Segmentation		
Stops	Boardings	Alightings	Running Total of Boardings	Running Percentage of Total Boardings	Segment
Stop 1	35	0	35	23.0%	1
Stop 2	5	10	40	26.3%	1
Stop 3	4	5	44	28.9%	1
Stop 4	19	10	63	41.4%	1
Stop 5	12	12	75	49.3%	1
Stop 6	20	4	95	62.5%	2
Stop 7	20	4	115	75.7%	2
Stop 8	15	3	130	85.5%	2
Stop 9	15	5	145	95.4%	2
Stop 10	3	10	148	97.4%	2
Stop 11	2	15	150	98.7%	2
Stop 12	2	11	152	100.0%	2
Stop 13	0	10	152	100.0%	2
Stop 14	0	15	152	100.0%	2
Stop 15	0	38	152	100.0%	2
	152	152			

Types of Data Expansion

The type of data expansion conducted depended on the data available for the specific route. There were three types of data that created the combinations that guided the type of expansion used: Stop-Level Ridership/APC Data (from H-GAC), O2O counts data (collected by ETC), and OD Survey Data (collected by ETC). Figure 8 shows the data combinations, the corresponding route segmentation, and type of expansion used.

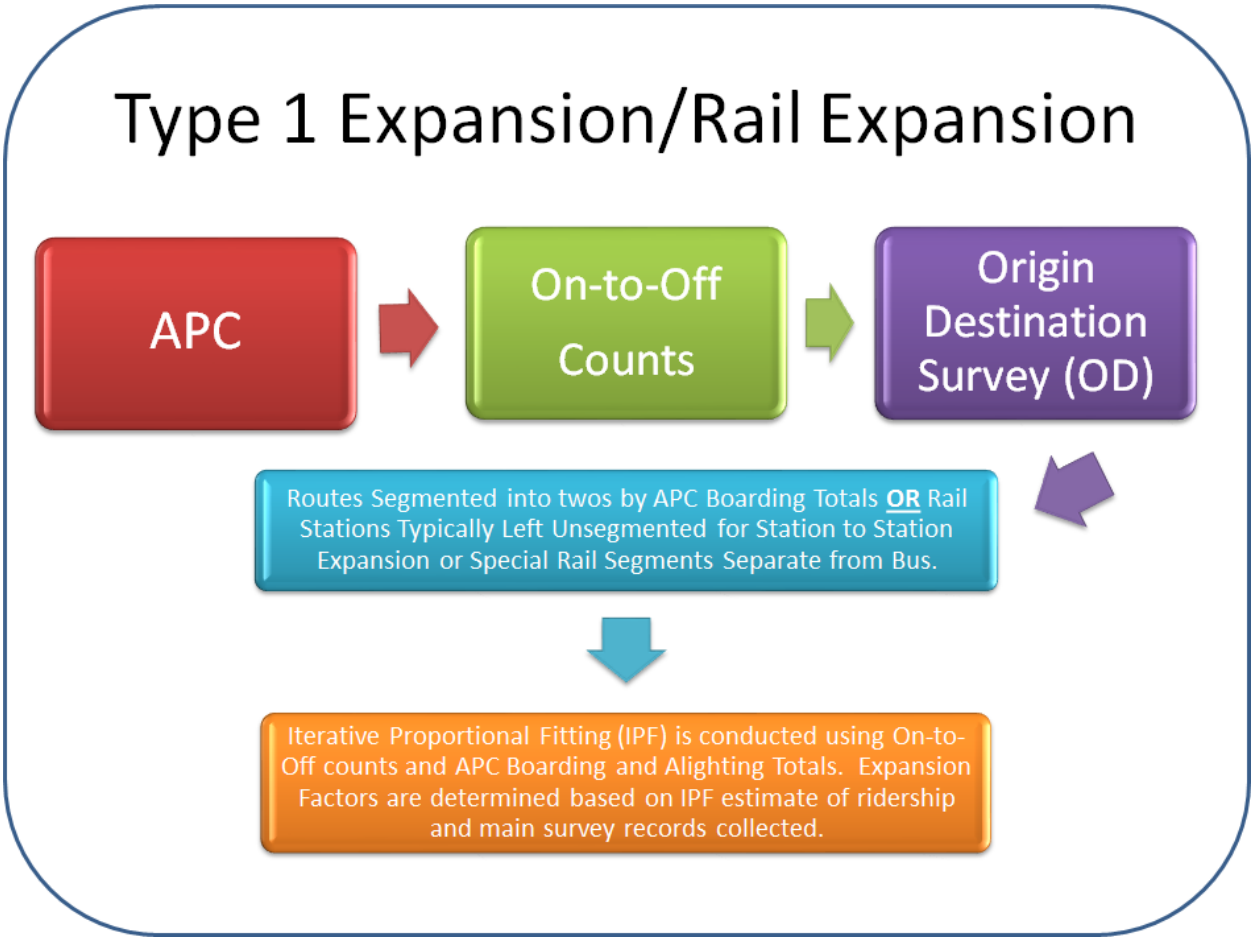
FIGURE 8: TYPES OF DATA EXPANSION



Type 1 Expansion: Rail Routes with APC Data, O2O Counts, and OD Survey Data

Of the four types of bus expansion discussed, Type 1 Expansion is the preferred method as it incorporates all three types of data that were available. Type 1 expansion was used for METRO rail. The rail segments were then appended to both the O2O and OD data based on the boarding and alighting locations. Figure 9 explains the methodology for Type 1 expansion.

FIGURE 9: TYPE 1 EXPANSION/RAIL EXPANSION



The process for how the data was expanded in Type 1 Expansion is explained below.

Table 9 shows Table 1 expansion process, the segmented results for the O2O counts that were administered for a route, station/stop, direction, and time period. Each row in the table identifies the segment where passengers boarded the route. The columns in the table identify the segments where people alighted the route. Table 8 shows an example of the boarding and alighting segment location of the tables within the expansion process.

TABLE 8: TABLE EXAMPLE FOR BOARDING/ALIGHTING SEGMENT LOCATIONS

	TABLE: EXAMPLE			
			Alighting Segments	
	Segment	Total	1	2
Boarding Segments	1	X	X	15
	2	X	X	X
	Total	X	X	X

For example, 15 of the O2O counts had riders board in segment 1 and alight in segment 2.

TABLE 9: RAIL DATA EXPANSION TABLE RESULTS OF O2O COUNTS

TABLE 1: RESULTS OF THE ON-TO-OFF SURVEY			
Route: Example Eastbound (6am-9am)		ACTUAL RIDERSHIP FROM ON/OFF SURVEY	
Segment	***Total***	1	2
1	***20***	5	15
2	***25***		25
Total	***45***	***5***	***40***

Table 10 shows the Table 2 expansion process, the distribution of the data in Table 9 [Table 1 Expansion Process] expressed as a percentage of all boardings for the specific time period and direction. Table 10 was created by dividing each O2O cell in Table 9 [Table 1 Expansion Process] by the sum of all O2O counts in Table 9 [Table 1 Expansion Process], which is 45. For example, 15/45 (33.3% of all trips boarded in segment 1 and alighted in segment 2 is shown in Table 10 [Table 2 Expansion Process].

TABLE 10: RAIL DATA EXPANSION TABLE DISTRIBUTION OF O2O COUNTS

TABLE 2: DISTRIBUTION OF THE ON-TO-OFF SURVEY			
Route: Example Eastbound (6am-9am)		PERCENTAGE OF THE DISTRIBUTION OF RIDERSHIP COUNTS FROM ON/OFF SURVEY	
Segment	***Total***	1	2
1	***44.4%***	11.1%	33.3%
2	***55.6%***		55.6%
Total	***100.0%***	***11.1%***	***88.9%***

The total ridership for the route, time period, and direction was applied to the O2O distribution percentages shown in Table 10 [Table 2 Expansion Process].

This produces an estimate of the ridership flow for the boarding segment to the alighting segment as shown in Table 11 [Table 3 Expansion Process]. Applying the actual ridership of 320, obtained from the APC data, creates an initial estimate of 107 trips (33.3% × 320) boarding in segment 1 and alighting in segment 2.

TABLE 11: RAIL DATA EXPANSION TABLE INITIAL ESTIMATE OF RIDERSHIP FLOWS BETWEEN SEGMENTS

TABLE 3: INITIAL ESTIMATE OF RIDERSHIP FLOWS BETWEEN STATION			
(PERCENTAGES IN TABLE 2 WERE APPLIED TO THE TOTAL BOARDINGS FOR THIS TIME PERIOD FOR THIS DIRECTION)			
Route: Example Eastbound (6am-9am)		PROJECTED RIDERSHIP BASE ON THE ON/OFF SURVEY	
Segment	***Total***	1	2
1	***142***	36	107
2	***178***		178
Total	***320***	***36***	***284***

In order to develop a more accurate estimate of the ridership flows between segments on each route, ETC developed an IPF algorithm to balance the differences between the ridership projected from the O2O counts (shown in Table 11 [Table 3 Expansion Process]) and the APC ridership for each segment (shown in Table 12 [Table 4 Expansion Process]). The IPF process is described below.

TABLE 12: STOP-LEVEL RIDERSHIP/APC DATA

TABLE 4: BOARDINGS AND ALIGHTINGS BY STATION			
Route: Example Eastbound (6am-9am)			
Average Weekday Ridership	Total	1	2
BOARDINGS	320	100	220
ALIGHTINGS	320	20	300
DIFFERENCE FROM PROJECTED			
BOARDINGS	0	-42	42
ALIGHTINGS	0	-16	16

Step 1: Correction for the Boardings. The estimated ridership from the O2O counts for each route (as shown in Table 11 [Table 3 Expansion Process]) was multiplied by the ratio of the actual boardings from Stop-Level Ridership/APC Data for each segment by the estimated boardings for each segment. For example, if the actual boardings for segment 1 were 120 and the estimated boardings were 100, each cell associated with segment 1 would have been multiplied by 1.2 (120/100) to adjust the estimated boardings to actual boardings.

Step 2: Correction for the Alightings. Once the correction in Step 1 was applied, the estimated boardings would be equal to the actual boardings. However, the adjustment to the boardings total may have changed the alighting estimates. To correct the alighting estimates, the new values calculated in Step 1 were adjusted by multiplying the ratio of the actual alightings from the Stop-Level Ridership/APC Data for each stop by the estimated alightings for each segment from Step 1. For example, if the actual alightings for segment 2 were 220 and the estimated alightings from Step 1 were 200, each cell associated with Segment 2 would have been multiplied by 1.1 (220/200) to adjust the estimated alightings from Step 1 to actual alightings.

The processes described in Steps 1 and Steps 2 were repeated sequentially until the difference between the actual and estimated boardings and alightings was zero. Table 13 [Table 5 Expansion Process] shows that after seven balancing iterations in this algorithm, there were no differences between the projected distribution and the actual boardings and alightings.

TABLE 13: ITERATIVE BALANCE PROCESS

TABLE 5: ITERATIVE BALANCING PROCESS

4th STEP of ITERATIVE BALANCING TO CORRECT DISTRIBUTION OF RIDERSHIP BY ALIGHTING LOCATION

Stop Name	Total	DIFFERENCE FROM ACTUAL BOARDINGS	1	2
1	***100***	0	20	80
2	***220***	0	0	220
Total	***320***	***0***	***20***	***300***
DIFFERENCE FROM ACTUAL ALIGHTINGS	0		0	0

4th STEP of ITERATIVE BALANCING TO CORRECT DISTRIBUTION OF RIDERSHIP BY BOARDING LOCATION

Stop Name	Total	DIFFERENCE FROM ACTUAL BOARDINGS	1	2
1	***100***	0	20	80
2	***220***	0	0	220
Total	***320***	***0***	***20***	***300***
DIFFERENCE FROM ACTUAL ALIGHTINGS	0		0	0

The final estimate for ridership flows is shown in Table 14 [Table 6 Expansion Process].

TABLE 14: FINAL ESTIMATE OF RIDERSHIP FLOWS BETWEEN STATIONS

TABLE 6: FINAL ESTIMATE OF RIDERSHIP FLOWS BETWEEN STATIONS

Route: Example Eastbound (6am-9am)

Segment	***Total***	1	2
1	***100***	20	80
2	***220***		220
Total	***320***	***20***	***300***

The actual number of OD records completed for each boarding to alighting segment pair is shown in Table 15 [Table 7 Expansion Process]. To calculate the expansion factors, the final estimate of ridership between segments shown in Table 14 [Table 6 Expansion Process] was divided by the actual number of OD records collected, as shown in Table 15 [Table 7 Expansion Process]. This calculation produces the expansion factors shown in Table 16 [Table 8 Expansion Process]. For example, the 80 estimated riders projected to board in segment 1 and alight in segment 2 were divided by the 9 OD records to produce an expansion factor of 8.89 to be applied to records who board in segment 1 and alighting in segment 2 during the example Eastbound (6–9 a.m.) Time Period as shown in Table 16 [Table 8 Expansion Process].

TABLE 15: NUMBER OF COMPLETED SURVEYS

TABLE 7: NUMBER OF COMPLETED SURVEYS			
Route: Example Eastbound (6am-9am)			
Segment	*Total*	1	2
1	*11*	2	9
2	*23*		23
Total	*34*	*2*	*32*

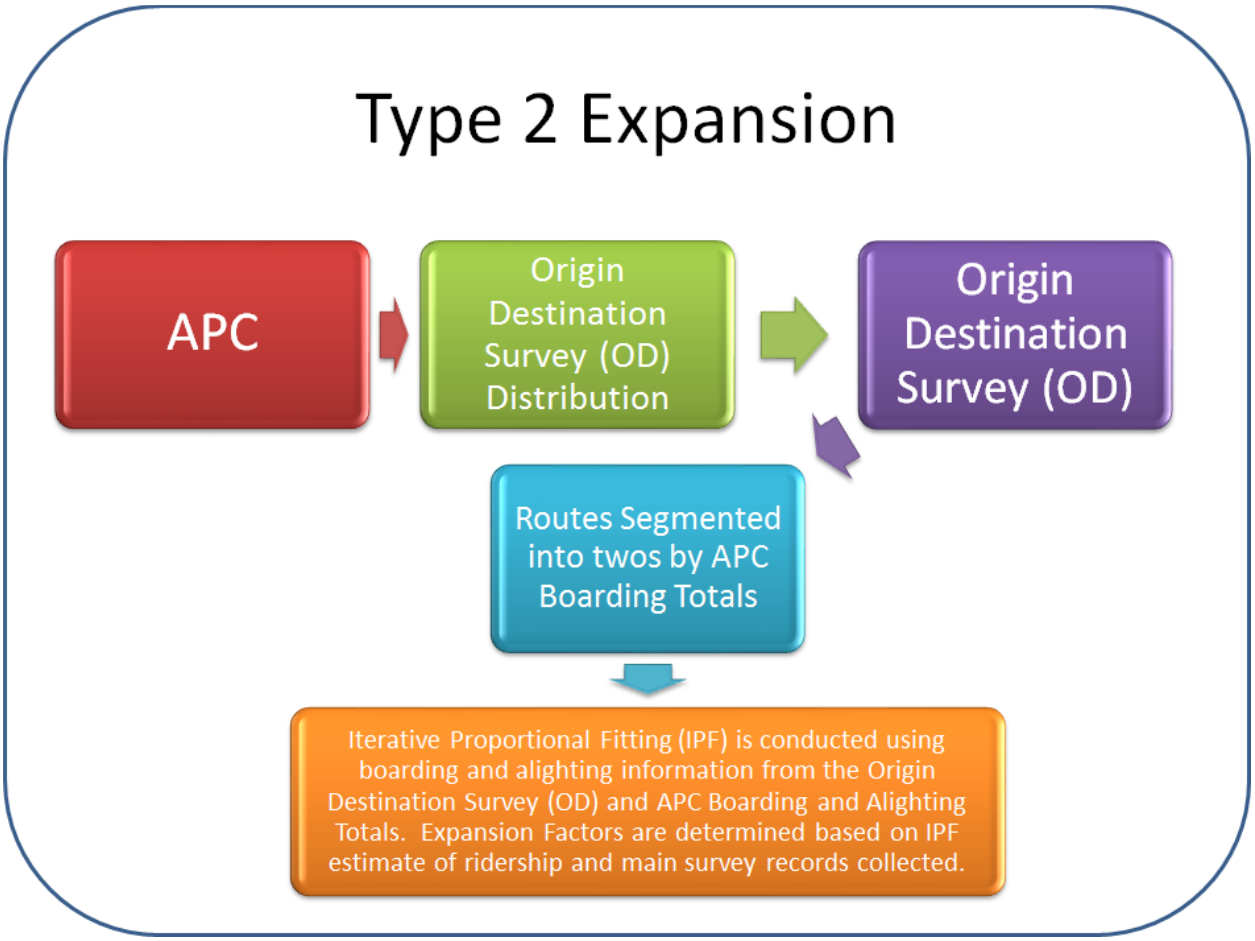
TABLE 16: WEIGHTING FACTORS

TABLE 8: WEIGHTING FACTORS			
Route: Example Eastbound (6am-9am)			
Segment	*Total*	1	2
1	*19*	10.00	8.89
2	*10*		9.57
Total	*28*	*10*	*18*

Type 2 Expansion: Bus Routes with APC Data, OD Survey Data, but No O2O Counts Data

Bus routes with no O2O counts but with APC data were expanding with Type 2 expansion. This type of expansion also divided stops into two segments based on total boarding distribution by direction. These segments were then appended to the OD records based on the boarding and alighting locations. The expansion method is exactly like Type 1 expansion, the only difference being that the distribution of OD records was substituted for the O2O counts data. The METRO Bus expansion was conducted this way. The figure below explains the methodology for Type 2 expansion.

FIGURE 10: TYPE 2 EXPANSION/RAIL EXPANSION



Type 3 Expansion: Bus Routes with O2O Counts and OD Survey Data, but without Stop-Level Ridership/APC Data

Expansion Type 3 is used for routes where O2O counts are collected but Stop-Level Ridership/APC Data is not available. Routes without Stop-Level Ridership/APC Data are segmented into three segments based

on number of stops along a route. These segments were then appended to the O2O and OD Survey databases. The expansion method is less complex than the two previously discussed types of expansion. ***Type 3 expansion was not used for this project.***

Type 4 Expansion: Bus Routes with OD Survey Data, without O2O Counts Data or Stop-Level Ridership/APC Data

For routes that only have OD Survey data, Type 4 expansion is used. This method was used for all of the non-METRO systems. Routes in these systems were expanded at the route level based on daily ridership reported by the agencies.

Types of Data Expansion Breakdown

The table below shows the type of expansion used project routes. Appendix D contains a list containing each route and the type of expansion used.

TABLE 17: TYPES OF DATA EXPANSION

Expansion Type	Routes	(%) Routes
EXPANSION #1	3	1.9%
EXPANSION #2	112	71.8%
EXPANSION #3	0	0.0%
EXPANSION #4	41	26.3%
Grand Total	**156**	**100.0%**

General Rule for Expansion Factors

While there are no specific guidelines for the expansion factor values, ETC tries to keep expansion factors below three times the average expansion factor. This adjustment is made to keep any one record from representing a markedly high number of riders in the system. The formula for determining this guideline is:

Guideline Weight Factor = 1 / (Sampling percent) × 3

If the expansion factor for a boarding segment to alighting segment pair is greater than three times the average expansion factor, then it is aggregated into the adjacent boarding-to-alighting segment where it will have the least impact on the previously existing expansion factors. This guideline is used for all the expansion types.

Linked Trip Expansion Factors for All Records

The unlinked weight factor (unlinked passenger trips count each boarding as a separate trip regardless of transfers) matches the daily ridership on the system. The linked-trip expansion factor (transfers are included in the trip) helps to account for the number of transfers that were made by each passenger

reducing the daily ridership because a single passenger can account for multiple unlinked ridership. Linked expansion factors are generated after the unlinked expansion factors are created. The equation to create the Multiplying Factor that is used to calculate the linked trip expansion factor is shown below:

Linked Trip Multiplying Factor = [1 / (1 + # of transfers)]

If a passenger did not make a transfer, the linked trip multiplying factor would be 1.0 because the person would have only boarded one vehicle. If a person made two transfers, the linked trip expansion factor would be 0.33 because the person would have boarded three transit vehicles during his/her one-way trip. An example of how the linked trip expansion factors were calculated is provided in Figure 11.

FIGURE 11: SAMPLE CALCULATIONS OF LINKED TRIP MULTIPLYING FACTORS

Number of Transfers	Calculation [1/(1+Number of Transfers)]	Linked Trip Multiplying Factor
0	[1/(1+0)]	1
1	[1/(1+1)]	0.5
2	[1/(1+2)]	0.33
3	[1/(1+3)]	0.25

Once the linked trip multiplier is created, it is multiplied by the unlinked expansion factor to create the linked expansion factor.

Decomposition Analysis

Decomposition analysis measures the overall representativeness of the survey records relative to linked and unlinked trips on an individual route basis. Self-enumeration surveys, the action of the completion of survey questionnaires by the respondents themselves, have historically suffered from substantial errors in route level boarding levels when linked trips were determined by simply dividing the boarding factor by one plus the number of transfers.

The advent of the personal interview conducted by a trained surveyor, coupled with tablet technology obtaining more accurate locations, and more effective management of interviewers to provide a superior distribution of riders has reduced this issue. The decomposition analysis examines each record and the recorded sequence of routes and tabulates boardings for each route using this information. After all records have been examined, total boardings by route are summarized and compared with the observed level of boardings. The result of this analysis will help to determine the relationship between observed and estimated boardings by route.

The decomposition analysis below and on the following pages shows the summed link factors for the routes on which the survey was conducted. The findings from the decomposition analysis show that the overall results for the on-board survey do an excellent job of representing the system. In fact, at the overall level, there is 0.00% difference between the total boardings calculated from the summed linked weight factors and the observed ridership. The routes that deviate the farthest from the summed linked factors compared to the observed counts are typically low volume ridership routes and therefore have a higher error of probability.

Table 18 shows the difference between derived and observed boardings by transit provider.

TABLE 18: DECOMPOSITION BY TRANSIT PROVIDER

Provider / System	Route Surveyed	Transfer Route	Total Summed Linked	Observed Boardings	Total Difference	% Difference
BTD –The District	30.00	-	30.00	30.00	(0.00)	(0.00)
Conroe Connection	62.25	12.75	75.00	75.00	(0.00)	(0.00)
Fort Bend County Public Transportation	474.96	7.59	482.56	483.00	0.44	0.00
Gulf Coast Transportation District GCTD	689.03	221.97	911.00	911.00	(0.00)	(0.00)
Harris County Transit	360.69	111.36	472.04	492.00	19.96	0.04
Galveston Island Transit	752.58	160.42	913.00	913.00	(0.00)	(0.00)
METRO	118,970.90	39,720.52	158,691.42	158,677.70	(13.72)	(0.00)
The Woodlands	1,323.04	35.03	1,358.07	1,353.00	(5.07)	(0.00)
Total	122,663.46	40,269.63	162,933.09	162,934.70	1.61	0.00

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CHAPTER 4: Survey Findings

This section highlights demographic and trip-related findings from the project. The results for all questions on the survey were compared using two variable types: the agencies (METRO, The Woodlands, Fort Bend, Island Transit, GCTD, Conroe Connection, Harris County, and BTD) and the route type (METRO Rail, METRO Bus and BRT, METRO PNR, Regional Agency Bus, and Regional Agency PNR). Two major categories of survey findings are presented: (1) rider profile and (2) trip profile. The findings in this section were expanded using the Linked Secondary Expansion Weight Factors in the database.

Agency Ridership

FIGURE 12: PERCENT OF AGENCY RIDERSHIP

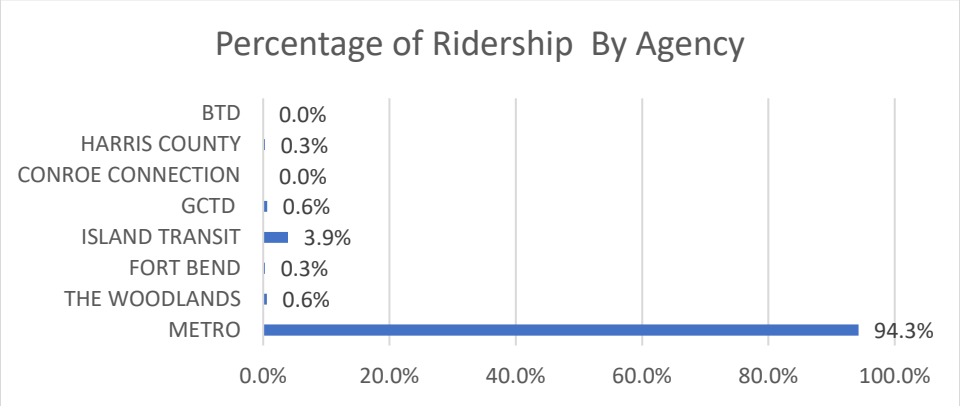
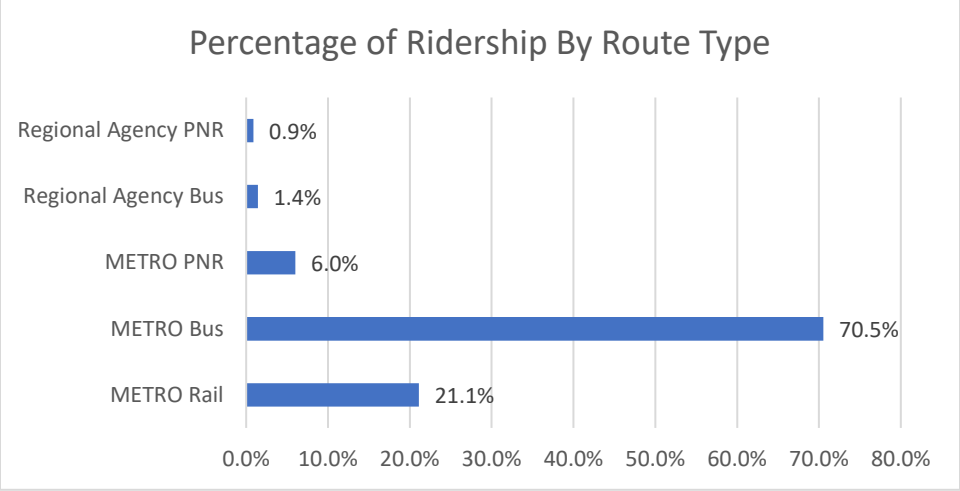


FIGURE 13: PERCENTAGE OF ROUTE TYPE RIDERSHIP



Rider Profile

TABLE 19: GENDER BY AGENCY

Gender	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
Male	44.2%	49.3%	43.5%	35.9%	53.2%	49.8%	55.3%	64.8%	55.3%
Female	55.8%	45.5%	52.9%	62.5%	45.6%	47.5%	44.5%	35.2%	44.5%
Other	0.0%	5.3%	3.7%	1.5%	1.2%	2.7%	0.2%	0.0%	0.2%

TABLE 20: GENDER BY ROUTE TYPE

Gender	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
Male	44.9%	56.2%	56.8%	50.2%	57.9%	55.3%
Female	54.3%	43.7%	43.0%	48.4%	39.6%	44.5%
Other	0.7%	0.1%	0.2%	1.5%	2.5%	0.2%

TABLE 21: AGE BY AGENCY

What is your age?	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
5 - 15	0.0%	2.0%	0.0%	0.0%	0.6%	0.4%	1.1%	0.0%	1.0%
16 - 19	7.0%	3.9%	3.7%	0.8%	4.5%	2.8%	6.6%	0.0%	6.5%
20 - 34	7.0%	20.9%	10.2%	20.6%	19.9%	13.5%	37.0%	20.6%	36.4%
35 - 50	32.5%	27.0%	22.4%	35.4%	28.1%	26.1%	31.2%	43.3%	31.2%
51 - 64	13.9%	36.1%	39.1%	36.6%	31.0%	25.2%	17.3%	31.0%	17.8%
65 - 69	30.2%	7.9%	15.4%	6.1%	9.6%	19.1%	4.6%	4.3%	4.8%
70 and older	9.3%	1.9%	9.2%	0.5%	6.3%	12.1%	2.0%	0.9%	2.1%
Prefer not to answer	0.0%	0.4%	0.0%	0.0%	0.0%	0.8%	0.2%	0.0%	0.2%

TABLE 22: AGE BY ROUTE TYPE

What is your age?	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
5 - 15	0.0%	1.4%	0.5%	0.9%	0.0%	1.0%
16 - 19	1.3%	8.1%	4.3%	3.3%	0.2%	6.5%
20 - 34	18.4%	37.5%	42.8%	20.3%	17.0%	36.4%
35 - 50	40.6%	29.9%	31.2%	29.5%	39.5%	31.2%
51 - 64	31.7%	16.1%	15.5%	26.2%	38.3%	17.8%
65 - 69	6.6%	4.7%	3.6%	12.6%	4.6%	4.8%
70 and older	1.2%	2.2%	1.8%	6.8%	0.4%	2.1%
Prefer not to answer	0.2%	0.2%	0.2%	0.4%	0.0%	0.2%

TABLE 23: RACE/ETHNICITY BY AGENCY

What is your Race / Ethnicity?	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
American Indian / Alaska Native	0.0%	2.5%	2.7%	0.0%	0.0%	3.1%	1.7%	0.3%	1.7%
Asian	0.0%	15.4%	0.0%	52.3%	0.3%	0.6%	6.6%	12.2%	6.8%
Black / African / African American	41.9%	35.4%	19.3%	18.2%	40.0%	29.4%	43.7%	8.9%	43.1%
Hispanic / Latino	0.0%	17.2%	27.7%	9.8%	29.7%	19.8%	31.0%	12.6%	30.6%
Middle Eastern or North African	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%
Native Hawaiian / Pacific Islander	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	0.4%
White / Caucasian	58.1%	29.5%	60.3%	17.7%	31.3%	50.4%	18.5%	66.7%	19.3%
Prefer not to answer	0.0%	0.8%	0.0%	3.5%	0.4%	0.5%	0.6%	0.8%	0.6%

TABLE 24: RACE/ETHNICITY BY ROUTE TYPE

What is your Race / Ethnicity?	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
American Indian / Alaska Native	0.5%	2.0%	1.6%	2.0%	0.2%	1.7%
Asian	20.8%	4.2%	7.9%	2.6%	28.9%	6.8%
Black / African / African American	22.1%	48.1%	39.4%	31.8%	10.8%	43.1%
Hispanic / Latino	18.6%	33.6%	28.5%	21.9%	9.2%	30.6%
Middle Eastern or North African	0.0%	0.1%	0.2%	0.1%	0.0%	0.1%
Native Hawaiian / Pacific Islander	0.3%	0.4%	0.4%	0.0%	0.0%	0.4%
White / Caucasian	37.2%	13.7%	24.9%	43.9%	50.1%	19.3%
Prefer not to answer	1.1%	0.6%	0.5%	0.5%	1.7%	0.6%

TABLE 25: ANNUAL HOUSEHOLD INCOME BY AGENCY

Which of the following BEST describes your TOTAL ANNUAL HOUSEHOLD INCOME in 2021 before taxes?	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
Less than $16,000	72.2%	39.6%	59.1%	0.0%	39.7%	41.3%	20.7%	0.9%	20.6%
$16,000 - $23,999	16.6%	15.1%	9.4%	0.0%	30.3%	11.2%	18.6%	1.7%	18.3%
$24,000 - $31,999	0.0%	7.9%	19.2%	3.1%	15.0%	8.1%	18.3%	3.7%	17.9%
$32,000 - $39,999	0.0%	6.1%	12.3%	3.1%	6.6%	2.6%	12.1%	0.3%	11.9%
$40,000 - $53,999	0.0%	6.0%	0.0%	6.8%	1.9%	4.5%	11.1%	2.7%	10.9%
$54,000 - $80,999	11.1%	11.3%	0.0%	25.9%	3.9%	13.0%	8.7%	7.5%	8.8%
$81,000 - $99,999	0.0%	6.6%	0.0%	18.3%	0.0%	8.7%	3.8%	12.6%	4.0%
Over $100,000	0.0%	7.3%	0.0%	42.8%	2.7%	10.6%	6.7%	70.6%	7.7%

TABLE 26: ANNUAL HOUSEHOLD INCOME BY ROUTE TYPE

Which of the following BEST describes your TOTAL ANNUAL HOUSEHOLD INCOME in 2021 before taxes?	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
Less than $16,000	2.2%	23.8%	19.7%	38.5%	0.6%	20.6%
$16,000 - $23,999	1.1%	22.0%	16.3%	15.5%	0.9%	18.3%
$24,000 - $31,999	2.5%	20.6%	18.6%	10.5%	2.2%	17.9%
$32,000 - $39,999	5.0%	13.4%	11.5%	3.5%	2.3%	11.9%
$40,000 - $53,999	10.0%	10.8%	12.5%	3.6%	4.5%	10.9%
$54,000 - $80,999	20.0%	5.9%	11.7%	9.1%	13.8%	8.8%
$81,000 - $99,999	14.7%	1.9%	4.4%	8.6%	12.1%	4.0%
Over $100,000	44.5%	1.5%	5.4%	10.6%	63.7%	7.7%

TABLE 27: HOUSEHOLD SIZE BY AGENCY

Including YOU, how many people live in your household?	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
One (1)	76.7%	24.6%	63.9%	5.4%	30.5%	32.9%	22.9%	7.4%	22.7%
Two (2)	11.6%	30.4%	27.6%	27.3%	23.8%	28.4%	25.4%	30.0%	25.5%
Three (3)	7.0%	21.4%	2.3%	24.5%	17.3%	12.2%	21.9%	25.0%	21.8%
Four (4)	4.7%	14.2%	6.2%	26.1%	10.9%	10.3%	16.4%	22.9%	16.4%
Five (5)	0.0%	5.9%	0.0%	15.2%	6.9%	7.7%	8.4%	10.7%	8.4%
Six (6)	0.0%	1.6%	0.0%	0.0%	4.2%	3.4%	3.1%	1.6%	3.1%
Seven (7)	0.0%	1.3%	0.0%	1.5%	0.8%	0.4%	1.0%	2.3%	1.0%
Eight (8)	0.0%	0.0%	0.0%	0.0%	0.2%	1.6%	0.4%	0.0%	0.4%
Nine (9)	0.0%	0.6%	0.0%	0.0%	0.3%	1.1%	0.1%	0.0%	0.1%
Ten or More (10+)	0.0%	0.0%	0.0%	0.0%	5.0%	2.0%	0.4%	0.0%	0.4%

TABLE 28: HOUSEHOLD SIZE BY ROUTE TYPE

Including YOU, how many people live in your household?	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
One (1)	14.0%	22.2%	28.2%	29.0%	6.8%	22.7%
Two (2)	27.5%	25.0%	25.9%	27.9%	29.6%	25.5%
Three (3)	21.9%	22.7%	19.4%	17.3%	24.4%	21.8%
Four (4)	23.4%	15.8%	15.2%	13.4%	23.0%	16.4%
Five (5)	7.6%	9.2%	6.5%	6.1%	13.0%	8.4%
Six (6)	4.1%	3.1%	2.8%	2.8%	0.9%	3.1%
Seven (7)	0.9%	1.1%	1.0%	0.7%	2.3%	1.0%
Eight (8)	0.3%	0.4%	0.4%	0.6%	0.0%	0.4%
Nine (9)	0.3%	0.1%	0.2%	0.6%	0.0%	0.1%
Ten or More (10+)	0.1%	0.4%	0.5%	1.6%	0.0%	0.4%

TABLE 29: EMPLOYMENT STATUS BY AGENCY

What is your employment status? (Check the one response that BEST describes you)	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
Employed full-time	11.6%	49.7%	9.2%	88.6%	41.7%	40.0%	60.5%	86.8%	60.6%
Employed part-time	7.0%	10.4%	22.6%	9.9%	7.6%	9.4%	17.9%	4.6%	17.6%
Not currently employed	18.6%	18.3%	19.6%	1.5%	26.3%	14.8%	14.1%	2.6%	13.9%
Disabled and unable to work	25.6%	13.5%	22.8%	0.0%	9.6%	7.6%	2.9%	0.9%	3.0%
Retired	37.2%	8.0%	18.5%	0.0%	11.3%	28.1%	4.0%	3.4%	4.2%
Homemaker	0.0%	0.1%	7.3%	0.0%	3.5%	0.2%	0.7%	1.7%	0.7%

TABLE 30: EMPLOYMENT STATUS BY ROUTE TYPE

What is your employment status? (Check the one response that BEST describes you)	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
Employed full-time	93.8%	56.7%	58.4%	40.8%	94.8%	60.6%
Employed part-time	2.7%	19.4%	19.4%	10.6%	4.4%	17.6%
Not currently employed	3.3%	15.4%	14.4%	18.2%	0.7%	13.9%
Disabled and unable to work	0.0%	3.2%	3.1%	10.4%	0.0%	3.0%
Retired	0.2%	4.5%	4.0%	18.0%	0.0%	4.2%
Homemaker	0.0%	0.9%	0.6%	2.0%	0.0%	0.7%

TABLE 31: STUDENT STATUS BY AGENCY

What is your student status? (check the one response that BEST describes you)	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
Not a student	100.0%	86.0%	91.7%	80.1%	93.7%	95.2%	82.6%	88.2%	82.8%
Yes - College / University / Community Colleg	0.0%	9.1%	8.3%	18.4%	3.9%	3.0%	12.0%	10.9%	11.9%
Yes - Vocational / Technical / Trade School	0.0%	0.2%	0.0%	0.0%	0.0%	0.1%	0.5%	0.0%	0.5%
Yes - K-12th grade	0.0%	4.5%	0.0%	1.5%	2.4%	1.7%	4.7%	0.8%	4.6%
Other	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.2%

TABLE 32: STUDENT STATUS BY ROUTE TYPE

What is your student status? (check the one response that BEST describes you)	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
Not a student	79.6%	83.8%	80.3%	92.3%	84.4%	82.8%
Yes - College / University / Community Colleg	16.9%	9.5%	17.4%	5.0%	14.4%	11.9%
Yes - Vocational / Technical / Trade School	0.4%	0.5%	0.6%	0.1%	0.0%	0.5%
Yes - K-12th grade	1.6%	6.1%	1.6%	2.5%	1.1%	4.6%
Other	1.4%	0.0%	0.2%	0.1%	0.0%	0.2%

TABLE 33: VISITOR STATUS BY AGENCY

Are you a visitor to the Houston-Galveston region?	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
No	100.0%	98.3%	100.0%	96.8%	99.2%	67.8%	97.7%	86.8%	97.4%
Yes	0.0%	1.7%	0.0%	3.2%	0.8%	32.2%	2.3%	13.2%	2.6%

TABLE 34: VISITOR STATUS BY ROUTE TYPE

Are you a visitor to the Houston-Galveston region?	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
Yes	4.2%	1.4%	3.9%	15.9%	7.2%	2.6%
No	95.8%	98.6%	96.1%	84.1%	92.8%	97.4%

TABLE 35: OTHER LANGUAGES SPOKEN AT HOME OTHER THAN ENGLISH BY AGENCY

Do you speak a language other than English at home?	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
Yes	4.7%	25.0%	28.1%	51.4%	23.6%	22.5%	36.2%	18.0%	35.8%
No	95.3%	75.0%	71.9%	48.6%	76.4%	77.5%	63.8%	82.0%	64.2%

TABLE 36: OTHER LANGUAGES SPOKEN AT HOME OTHER THAN ENGLISH BY ROUTE TYPE

Do you speak a language other than English at home?	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
Yes	30.6%	37.6%	34.1%	20.7%	30.7%	35.8%
No	69.4%	62.4%	65.9%	79.3%	69.3%	64.2%

TABLE 37: NUMBER OF VEHICLES IN HOUSEHOLD BY AGENCY

How many vehicles (cars, trucks, or motorcycles) are available to your household?	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
None (0)	81.4%	42.3%	77.9%	0.0%	59.9%	49.8%	42.4%	4.8%	42.0%
One (1)	18.6%	35.7%	20.5%	24.5%	19.2%	23.1%	32.9%	14.6%	32.6%
Two (2)	0.0%	16.2%	0.0%	52.6%	13.2%	17.8%	18.6%	60.0%	19.1%
Three (3)	0.0%	4.2%	1.5%	13.7%	3.8%	5.6%	4.5%	15.0%	4.7%
Four (4)	0.0%	1.6%	0.0%	7.6%	2.9%	3.1%	1.2%	4.0%	1.3%
Five (5)	0.0%	0.0%	0.0%	1.5%	1.0%	0.4%	0.3%	0.8%	0.3%
Six (6)	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%
Seven (7)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.8%	0.1%
Nine (9)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Ten or more (10+)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%

TABLE 38: NUMBER OF VEHICLES IN HOUSEHOLD BY ROUTE TYPE

How many vehicles (cars, trucks, or motorcycles) are available to your household?	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
None (0)	2.0%	49.3%	38.2%	48.2%	0.7%	42.0%
One (1)	23.2%	32.5%	37.8%	23.5%	20.3%	32.6%
Two (2)	49.2%	14.2%	19.3%	19.2%	58.6%	19.1%
Three (3)	18.4%	3.0%	3.5%	7.1%	12.6%	4.7%
Four (4)	5.4%	0.7%	1.0%	1.7%	6.1%	1.3%
Five (5)	1.1%	0.2%	0.1%	0.3%	1.1%	0.3%
Six (6)	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Seven (7)	0.5%	0.0%	0.0%	0.0%	0.6%	0.1%
Nine (9)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Ten or more (10+)	0.1%	0.0%	0.1%	0.0%	0.0%	0.1%

TABLE 39: WHETHER RESPONDENT HAS A DRIVER'S LICENSE BY ROUTE TYPE

Do you have a valid driver's license?	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
Yes	96.0%	45.9%	66.4%	56.2%	98.1%	55.8%
No	4.0%	54.1%	33.6%	43.8%	1.9%	44.2%

TABLE 40: WHETHER RESPONDENT HAS A DRIVER'S LICENSE BY AGENCY

Do you have a valid driver's license?	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
Yes	53.5%	51.8%	34.3%	97.0%	45.7%	59.1%	55.2%	96.9%	55.8%
No	46.5%	48.2%	65.7%	3.0%	54.3%	40.9%	44.8%	3.1%	44.2%

TABLE 41: WHETHER RESPONDENT COULD USE HOUSEHOLD VEHICLE FOR TRIP BY AGENCY

Could you have used one of these vehicles for this trip?	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
Yes	0.0%	39.6%	21.0%	80.9%	15.2%	57.3%	52.6%	89.6%	53.3%
No	100.0%	60.4%	79.0%	19.1%	84.8%	42.7%	47.4%	10.4%	46.7%

TABLE 42: WHETHER RESPONDENT COULD USE HOUSEHOLD VEHICLE FOR TRIP BY ROUTE TYPE

Could you have used one of these vehicles for this trip?	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
Yes	86.0%	38.1%	66.4%	49.1%	86.8%	53.3%
No	14.0%	61.9%	33.6%	50.9%	13.2%	46.7%

TABLE 43: IF TRANSIT WAS NOT AVAILABLE BY AGENCY

If transit service were not available, how would you have made this trip?	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
Walk	34.8%	15.6%	60.1%	0.0%	20.4%	25.7%	10.8%	19.7%	11.0%
Bicycle / Scooter	0.0%	0.5%	0.0%	0.0%	5.1%	3.2%	3.5%	0.0%	3.5%
Drove myself	0.0%	23.0%	4.6%	81.8%	3.5%	23.7%	20.0%	67.9%	20.7%
Ride with someone else	18.6%	26.0%	5.2%	9.1%	24.2%	15.6%	25.6%	6.5%	25.2%
Taxi	0.0%	0.9%	7.7%	3.0%	0.0%	4.5%	1.9%	0.3%	1.9%
TNC (e.g. Uber, Lyft)	0.0%	13.6%	4.6%	0.0%	21.5%	9.3%	24.9%	1.9%	24.4%
Car share (e.g. Zip Car)	0.0%	0.7%	0.0%	3.0%	0.0%	0.5%	1.1%	0.8%	1.1%
Would not make this trip	46.5%	19.8%	17.7%	3.0%	25.2%	17.5%	12.2%	2.9%	12.2%

TABLE 44: IF TRANSIT WAS NOT AVAILABLE BY ROUTE TYPE

If transit service were not available, how would you have made this trip?	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
Walk	0.3%	11.2%	13.8%	32.9%	0.0%	11.0%
Bicycle / Scooter	0.0%	3.2%	5.8%	2.2%	0.0%	3.5%
Drove myself	85.7%	9.0%	26.2%	13.8%	84.1%	20.7%
Ride with someone else	7.5%	30.0%	19.6%	19.1%	7.6%	25.2%
Taxi	0.2%	2.3%	1.6%	2.1%	1.1%	1.9%
TNC (e.g. Uber, Lyft)	2.0%	28.8%	22.6%	12.0%	1.1%	24.4%
Car share (e.g. Zip Car)	1.1%	1.1%	1.2%	0.3%	1.7%	1.1%
Would not make this trip	3.1%	14.5%	9.1%	17.6%	4.3%	12.2%

TABLE 45: RESPONDENT USE OF TRANSIT LENGTH BY AGENCY

How long have you been riding transit?	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
Less than 6 months	7.0%	16.8%	12.1%	14.7%	21.8%	7.1%	12.5%	16.1%	12.6%
6-12 months	4.7%	10.5%	11.3%	4.4%	23.0%	3.9%	9.8%	5.0%	9.8%
1-2 years	34.8%	16.2%	22.9%	11.7%	15.5%	6.6%	19.3%	8.4%	19.0%
3-6 years	18.6%	31.3%	27.0%	41.8%	25.4%	12.6%	22.5%	25.9%	22.6%
7-10 years	4.7%	10.2%	22.5%	20.7%	3.9%	1.3%	10.3%	13.2%	10.3%
More than 10 years	30.2%	13.9%	0.0%	6.7%	8.8%	33.2%	24.4%	20.8%	24.2%
First time riding	0.0%	1.1%	4.2%	0.0%	1.5%	35.3%	1.3%	10.6%	1.6%

TABLE 46: RESPONDENT USE OF TRANSIT LENGTH BY ROUTE TYPE

How long have you been riding transit?	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
Less than 6 months	13.0%	11.9%	14.2%	15.7%	13.3%	12.6%
6-12 months	7.5%	9.9%	10.5%	9.1%	5.7%	9.8%
1-2 years	7.5%	20.0%	21.7%	13.0%	8.5%	19.0%
3-6 years	25.6%	21.4%	24.3%	18.4%	36.1%	22.6%
7-10 years	14.6%	10.2%	8.6%	5.8%	16.3%	10.3%
More than 10 years	31.1%	25.7%	17.9%	18.0%	19.8%	24.2%
First time riding	0.6%	0.9%	2.7%	20.1%	0.2%	1.6%

TABLE 47: HOW OFTEN RESPONDENT RIDES BY AGENCY

How often do you ride transit?	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
6 or 7 days a week	0.0%	16.2%	3.0%	1.5%	19.9%	17.7%	24.0%	1.7%	23.6%
5 days a week	7.0%	35.8%	19.1%	38.3%	22.1%	13.3%	39.4%	25.4%	39.0%
3 or 4 days a week	46.5%	25.2%	36.8%	47.7%	28.6%	22.0%	23.6%	43.0%	24.0%
1 or 2 days a week	16.3%	12.4%	27.0%	1.9%	20.2%	4.6%	6.7%	11.0%	6.8%
1 or 2 days a month	30.2%	5.6%	9.9%	7.6%	3.2%	0.2%	1.2%	0.6%	1.2%
Once in a while	0.0%	2.5%	0.0%	3.0%	4.5%	6.9%	3.6%	8.0%	3.7%
First time riding	0.0%	2.3%	4.2%	0.0%	1.5%	35.3%	1.4%	10.3%	1.7%

TABLE 48: HOW OFTEN RESPONDENT RIDES BY ROUTE TYPE

How often do you ride transit?	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
6 or 7 days a week	2.6%	28.3%	20.1%	16.1%	0.7%	23.6%
5 days a week	49.1%	36.9%	43.0%	15.6%	39.3%	39.0%
3 or 4 days a week	41.2%	22.0%	21.4%	23.3%	49.1%	24.0%
1 or 2 days a week	5.4%	6.8%	7.0%	12.5%	6.8%	6.8%
1 or 2 days a month	0.9%	1.1%	1.6%	3.0%	3.0%	1.2%
Once in a while	0.4%	3.9%	4.1%	9.1%	1.1%	3.7%
First time riding	0.4%	1.0%	3.0%	20.5%	0.0%	1.7%

METRO Surveyed Riders

TABLE 49: ARE YOU RIDING METRO TRANSIT BECAUSE ADDITIONAL SERVICE ENHANCEMENTS THAT METRO IS OFFERING?

Are you riding METRO transit because the additional service enhancements that METRO is offering?(e.g. improved ADA accessibility, bus shelters, and the implementation of the METRORapid Silver Line, Light Rail, BOOST)	Grand Total
Yes	12.7%
No	69.9%
Don't know / Not sure	17.4%

*Only METRO Riders were asked due to the service enhancements only METRO offers.

Trip Profile

TABLE 50: ORIGIN LOCATION BY AGENCY

What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
Your usual WORKPLACE	4.7%	7.1%	5.4%	1.7%	11.1%	3.8%	23.1%	0.9%	22.5%
Your HOME	76.7%	65.4%	42.8%	98.3%	62.4%	55.3%	52.5%	85.4%	53.2%
College / University (students only)	0.0%	2.3%	1.5%	0.0%	2.1%	0.0%	3.0%	0.0%	3.0%
School (K-12) (students only)	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	2.1%	0.0%	2.1%
Medical / Doctor / Clinic (non-work)	0.0%	1.6%	6.6%	0.0%	1.9%	1.0%	2.5%	0.0%	2.4%
Shopping	11.6%	8.0%	26.6%	0.0%	11.7%	8.2%	4.0%	6.9%	4.1%
Personal Business	7.0%	6.1%	7.4%	0.0%	5.2%	4.5%	6.0%	0.0%	5.9%
Work related	0.0%	1.7%	4.2%	0.0%	1.3%	0.3%	2.5%	0.0%	2.5%
Social visit / Church	0.0%	2.9%	5.4%	0.0%	2.5%	6.2%	1.3%	0.0%	1.3%
Airport (passengers only)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%
Restaurant	0.0%	0.8%	0.0%	0.0%	0.3%	7.2%	1.2%	3.4%	1.2%
Recreation / Sightseeing	0.0%	1.3%	0.0%	0.0%	1.6%	11.7%	1.3%	3.4%	1.4%
Non-destination trip	0.0%	0.4%	0.0%	0.0%	0.0%	1.4%	0.2%	0.0%	0.2%
Other	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.1%	0.0%	0.1%

TABLE 51: ORIGIN LOCATION BY ROUTE TYPE

What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
Your usual WORKPLACE	46.7%	20.9%	20.4%	6.4%	0.5%	22.5%
Your HOME	49.9%	53.3%	51.4%	54.6%	99.5%	53.2%
College / University (students only)	2.6%	2.3%	5.4%	1.2%	0.0%	3.0%
School (K-12) (students only)	0.1%	2.9%	0.6%	0.8%	0.0%	2.1%
Medical / Doctor / Clinic (non-work)	0.2%	2.7%	2.6%	1.4%	0.0%	2.4%
Shopping	0.0%	5.1%	2.3%	13.0%	0.0%	4.1%
Personal Business	0.1%	6.7%	6.3%	4.8%	0.0%	5.9%
Work related	0.4%	2.5%	3.4%	1.0%	0.0%	2.5%
Social visit / Church	0.0%	1.5%	1.4%	3.8%	0.0%	1.3%
Airport (passengers only)	0.0%	0.2%	0.0%	0.0%	0.0%	0.1%
Restaurant	0.0%	0.9%	2.4%	5.2%	0.0%	1.2%
Recreation / Sightseeing	0.1%	0.9%	2.9%	7.1%	0.0%	1.4%
Non-destination trip	0.0%	0.2%	0.5%	0.6%	0.0%	0.2%
Other	0.0%	0.0%	0.2%	0.1%	0.0%	0.1%

TABLE 52: DESTINATION LOCATION BY AGENCY

What type of place are you GOING TO NOW? (the ending place for your one-way trip)	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
Your usual WORKPLACE	13.9%	38.5%	2.3%	89.2%	26.8%	14.0%	29.5%	71.5%	30.1%
Your HOME	23.3%	26.0%	44.1%	0.2%	30.7%	19.2%	39.1%	10.3%	38.4%
College / University (students only)	0.0%	2.5%	2.6%	7.6%	0.9%	0.0%	2.6%	1.0%	2.6%
School (K-12) (students only)	0.0%	1.6%	0.0%	0.0%	1.1%	0.0%	1.5%	0.0%	1.5%
Medical / Doctor / Clinic (non-work)	0.0%	1.9%	8.8%	3.0%	2.3%	1.5%	2.2%	0.0%	2.2%
Shopping	62.8%	13.7%	19.1%	0.0%	12.9%	16.1%	5.9%	2.6%	6.0%
Personal Business	0.0%	7.6%	13.2%	0.0%	13.5%	6.6%	9.4%	0.0%	9.3%
Work related	0.0%	2.1%	3.1%	0.0%	2.3%	0.0%	2.1%	0.8%	2.1%
Social visit / Church	0.0%	3.1%	4.6%	0.0%	2.8%	4.8%	2.6%	0.0%	2.6%
Airport (passengers only)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.2%
Restaurant	0.0%	1.7%	2.3%	0.0%	0.4%	7.3%	2.6%	5.2%	2.6%
Recreation / Sightseeing	0.0%	1.2%	0.0%	0.0%	6.4%	30.6%	1.9%	8.6%	2.2%
Other	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.2%

TABLE 53: DESTINATION LOCATION BY ROUTE TYPE

What type of place are you GOING TO NOW? (the ending place for your one-way trip)	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
Your usual WORKPLACE	47.3%	28.2%	26.3%	15.3%	94.7%	30.1%
Your HOME	49.4%	39.0%	35.3%	29.2%	0.1%	38.4%
College / University (students only)	2.2%	1.9%	5.0%	0.8%	3.4%	2.6%
School (K-12) (students only)	0.1%	2.2%	0.2%	0.7%	0.0%	1.5%
Medical / Doctor / Clinic (non-work)	0.3%	2.2%	3.2%	1.8%	0.9%	2.2%
Shopping	0.0%	7.3%	4.3%	15.6%	0.0%	6.0%
Personal Business	0.1%	10.7%	9.4%	7.6%	0.0%	9.3%
Work related	0.4%	1.9%	3.5%	1.2%	0.7%	2.1%
Social visit / Church	0.0%	2.7%	3.1%	3.1%	0.3%	2.6%
Airport (passengers only)	0.0%	0.2%	0.0%	0.0%	0.0%	0.2%
Restaurant	0.0%	2.2%	4.6%	6.6%	0.0%	2.6%
Recreation / Sightseeing	0.1%	1.1%	5.0%	17.9%	0.0%	2.2%
Other	0.0%	0.3%	0.1%	0.0%	0.0%	0.2%

TABLE 54: ACCESS MODE BY AGENCY

How did you GET FROM your origin	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
Walk	95.3%	68.3%	100.0%	1.7%	96.1%	93.8%	87.6%	18.0%	86.5%
Wheelchair	4.7%	1.7%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.2%
Personal bike	0.0%	1.8%	0.0%	0.0%	2.0%	0.5%	1.0%	1.5%	1.0%
Bike share or E-Bike	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%
E-Scooter	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Paratransit (e.g. METROLift)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%
Was dropped off by someone	0.0%	7.4%	0.0%	15.2%	1.9%	0.0%	3.4%	8.2%	3.5%
Drove alone and parked	0.0%	19.7%	0.0%	71.0%	0.0%	1.0%	6.7%	62.4%	7.6%
Drove or rode with others and parked	0.0%	0.7%	0.0%	9.1%	0.0%	4.8%	0.4%	6.6%	0.5%
Car share (e.g. Zip Car, etc.)	0.0%	0.0%	0.0%	1.5%	0.0%	0.0%	0.1%	1.3%	0.1%
Taxi	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Uber, Lyft, etc.	0.0%	0.4%	0.0%	1.5%	0.0%	0.0%	0.3%	2.0%	0.3%

TABLE 55: ACCESS MODE BY ROUTE TYPE

How did you GET FROM your origin	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
Walk	51.7%	94.4%	81.8%	88.7%	0.5%	86.5%
Wheelchair	0.0%	0.2%	0.3%	0.6%	0.0%	0.2%
Personal bike	0.1%	0.4%	3.3%	1.1%	1.2%	1.0%
Bike share or E-Bike	0.0%	0.1%	0.1%	0.0%	0.0%	0.1%
E-Scooter	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Paratransit (e.g. METROLift)	0.3%	0.1%	0.1%	0.0%	0.0%	0.1%
Was dropped off by someone	4.0%	3.4%	3.2%	0.7%	13.9%	3.5%
Drove alone and parked	41.4%	0.9%	10.0%	2.5%	78.2%	7.6%
Drove or rode with others and parked	1.3%	0.1%	0.8%	5.2%	4.0%	0.5%
Car share (e.g. Zip Car, etc.)	0.8%	0.0%	0.1%	0.0%	1.5%	0.1%
Taxi	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Uber, Lyft, etc.	0.4%	0.3%	0.2%	1.2%	0.7%	0.3%

TABLE 56: EGRESS MODE BY AGENCY

How will you GET TO your destination	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
Walk	95.3%	96.2%	100.0%	98.0%	97.8%	98.8%	90.0%	94.8%	90.2%
Wheelchair	4.7%	1.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.3%
Personal bike	0.0%	0.9%	0.0%	0.0%	2.0%	0.0%	0.9%	0.0%	0.9%
Bike share or E-Bike	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
E-Scooter	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Paratransit (e.g. METROLift)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%
Be picked up by someone	0.0%	0.6%	0.0%	0.0%	0.3%	0.1%	2.1%	0.1%	2.0%
Get in a parked vehicle & drive alone	0.0%	0.7%	0.0%	2.0%	0.0%	1.0%	5.7%	2.6%	5.5%
Get in a parked vehicle & drive/ride w/others	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	1.6%	0.4%
Car share (e.g. Zip Car, etc.)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%
Taxi	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Uber, Lyft, etc.	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.9%	0.3%

TABLE 57: EGRESS MODE BY ROUTE TYPE

How will you GET TO your destination	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
Walk	52.0%	96.2%	86.8%	95.3%	98.4%	90.2%
Wheelchair	0.0%	0.3%	0.4%	0.5%	0.0%	0.3%
Personal bike	0.1%	0.4%	2.9%	0.7%	0.0%	0.9%
Bike share or E-Bike	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
E-Scooter	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%
Paratransit (e.g. METROLift)	0.7%	0.0%	0.1%	0.0%	0.0%	0.1%
Be picked up by someone	4.1%	1.7%	2.2%	0.3%	0.1%	2.0%
Get in a parked vehicle & drive alone	40.9%	0.8%	6.1%	2.0%	0.9%	5.5%
Get in a parked vehicle & drive/ride w/others	0.9%	0.1%	1.1%	0.6%	0.6%	0.4%
Car share (e.g. Zip Car, etc.)	0.7%	0.0%	0.0%	0.0%	0.0%	0.1%
Taxi	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Uber, Lyft, etc.	0.4%	0.3%	0.2%	0.6%	0.0%	0.3%

TABLE 58: PAYMENT METHOD BY AGENCY

What fare payment methods did you use for this one-way trip? (select all that apply)	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
20 Ride Ticket Book commuter services	0.0%	0.0%	0.0%	60.9%	0.0%	0.0%	0.0%	0.0%	0.2%
20 Ticket Book ($260)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	49.9%	0.6%
40 Ride Ticket Book commuter services	0.0%	0.0%	0.0%	38.6%	0.0%	0.0%	0.0%	0.0%	0.2%
Adult	0.0%	0.0%	62.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cash	100.0%	0.0%	0.0%	0.0%	0.0%	72.4%	18.1%	0.0%	18.0%
Cash Elderly Half Fare	0.0%	0.0%	0.0%	0.0%	18.8%	0.0%	0.0%	0.0%	0.1%
Cash Fare (One way) commuter services	0.0%	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%
Cash Full Fare ($1.00)	0.0%	0.0%	0.0%	0.0%	67.7%	0.0%	0.0%	0.0%	0.2%
Cash Half Fare (Under 12, Medicaid, Medicare, primary school with current ID)	0.0%	0.0%	0.0%	0.0%	13.5%	0.0%	0.0%	0.0%	0.0%
Day Pass	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.4%	0.0%	1.4%
Fare Card (e.g. METRO QÂ® Fare Card)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	69.4%	0.0%	67.3%
Free (Trolley)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	27.6%	0.3%
Local cash fare: $1.00	0.0%	54.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%
Local coupon book: $15.00 for 20 adult coupons	0.0%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Local coupon book: $7.50 for 20 elderly, student, disabled coupons	0.0%	15.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Mobile Ticket (e.g. METRO QÂ® Mobile Ticketing)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.7%	0.0%	8.4%
Money Card (e.g. METRO Money Card)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	0.0%	1.6%
Monthly Pass	0.0%	0.0%	0.0%	0.0%	0.0%	18.6%	0.0%	0.0%	0.1%
P&R cash fare (League City to Galveston): $4.00	0.0%	6.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
P&R cash fare (Texas City to Galveston): $2.00	0.0%	1.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
P&R League City to Galveston coupon book: $150.00 for 50 coupons	0.0%	14.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
P&R Texas City to Galveston coupon book: $75.00 for 50 coupons	0.0%	4.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Paper Rail Ticket	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	0.5%
Persons with Disabilities	0.0%	0.0%	8.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Refused/No Answer	0.0%	0.4%	0.0%	0.0%	0.0%	4.1%	0.3%	0.0%	0.3%
Round Trip Ticket (P&R)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	22.5%	0.3%
Senior (Age 65 and older with ID)	0.0%	0.0%	22.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Tokens	0.0%	0.0%	0.0%	0.0%	0.0%	4.9%	0.0%	0.0%	0.0%
Veterans	0.0%	0.0%	6.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

TABLE 59: FARE TYPE (ALL-SYSTEMS)

What type of fare was this?	Grand Total
Child (6-18 years of age)	0.0%
Disabled with D Pass	0.0%
Free Fare: 70+ Lifetime Pass	0.9%
Free Fare: Freedom Q (METROLift)	0.4%
Free Fare: METRO Employee/Spouse/Retiree	2.3%
Free Fare: Student (College/University)	4.8%
Free Fare: Veterans Pass	0.4%
Reduced Fare: Disabled	2.3%
Reduced Fare: Senior (65-69)	2.1%
Reduced Fare: Student K-12	2.6%
Reduced Monthly Pass	0.0%
Regular	0.5%
Regular / Full Fare	83.5%
Senior 65 and over	0.0%
Senior or Disabled	0.1%

TABLE 60: NUMBER OF TRANSFERS BY AGENCY

Total number of in-system transfers [Unlinked]	Brazos Transit District	Connect Transit	Conroe Connection	Fort Bend County Public Transportation	Harris County Transit	Island Transit	Metropolitan Transit Authority of Harris County	The Woodlands	Grand Total
(00) None	100.0%	54.6%	66.0%	96.7%	52.2%	64.9%	53.5%	95.7%	54.1%
(01) One Transfer	0.0%	35.4%	34.0%	3.3%	33.0%	35.1%	35.2%	4.0%	34.8%
(02) Two Transfers	0.0%	10.0%	0.0%	0.0%	11.2%	0.0%	9.9%	0.2%	9.8%
(03) Three Transfers	0.0%	0.0%	0.0%	0.0%	3.6%	0.0%	1.2%	0.0%	1.2%
(04) Four Transfers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%
(05) Five Transfers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

TABLE 61: NUMBER OF TRANSFERS BY ROUTE TYPE

Total number of in-system transfers [Unlinked]	METRO PNR	METROBus	METRORAIL	Regional Agency Bus	Regional Agency PNR	Grand Total
(00) None	82.3%	49.2%	57.3%	62.0%	95.5%	54.1%
(01) One Transfer	15.2%	38.4%	32.1%	31.7%	4.3%	34.8%
(02) Two Transfers	2.4%	11.0%	9.2%	5.6%	0.2%	9.8%
(03) Three Transfers	0.0%	1.3%	1.2%	0.7%	0.0%	1.2%
(04) Four Transfers	0.0%	0.2%	0.1%	0.0%	0.0%	0.1%
(05) Five Transfers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

TABLE 62: TRIP PURPOSE BY HOUSEHOLD SIZE (ALL-SYSTEMS)

Cross Tab - Trip Purpose by Household Size	Home-Based Airpot	Home- Based Education College	Home- Based Education K-12	Home- Based Other	Home- Based Shopping	Home- Based Social Recreation	Home- Based Work	Non Home-Based Other	Non Home-Based Work
Zero (0)	0.0%	3.3%	1.7%	10.9%	10.8%	5.2%	57.7%	3.3%	7.0%
One (1)	0.1%	5.6%	3.9%	11.2%	7.0%	4.6%	60.5%	2.3%	4.8%
Two (2)	0.1%	5.2%	5.3%	7.9%	4.8%	4.8%	65.5%	2.6%	4.0%
Three (3)	0.5%	10.3%	4.6%	6.2%	2.1%	3.3%	65.5%	3.7%	4.3%
Four (4)	0.0%	13.7%	5.1%	8.6%	1.9%	4.8%	57.5%	6.3%	2.2%
Five (5)	0.0%	4.3%	0.9%	4.7%	13.4%	0.6%	68.6%	3.9%	3.6%
Six (6)	0.0%	2.5%	0.0%	6.2%	0.0%	0.0%	45.7%	0.0%	45.5%
Seven (7)	0.0%	21.9%	1.8%	16.3%	0.0%	0.0%	60.0%	0.0%	0.0%
Eight (8)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nine (9)	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
Ten or More (10+)	0.0%	0.0%	0.0%	3.6%	0.0%	54.0%	71.9%	0.0%	19.0%

TABLE 63: TRIP PURPOSE BY ANNUAL HOUSEHOLD INCOME (ALL-SYSTEMS)

Cross Tab - Trip Purpose by Annual Household Income	Home-Based Airpot	Home- Based Education College	Home- Based Education K-12	Home- Based Other	Home- Based Shopping	Home- Based Social Recreation	Home- Based Work	Non Home-Based Other	Non Home-Based Work
Less than $16,000	0.0%	6.0%	2.3%	12.7%	12.3%	5.9%	51.2%	2.7%	6.8%
$16,000 - $23,999	0.0%	5.0%	2.0%	11.1%	9.6%	4.1%	59.0%	2.8%	6.6%
$24,000 - $31,999	0.1%	4.4%	2.5%	10.3%	7.6%	4.2%	62.7%	3.1%	5.1%
$32,000 - $39,999	0.0%	4.4%	3.2%	9.5%	7.7%	3.4%	64.9%	2.4%	4.5%
$40,000 - $53,999	0.3%	4.4%	4.4%	9.8%	5.7%	3.9%	65.1%	2.0%	4.4%
$54,000 - $80,999	0.3%	5.2%	5.2%	8.8%	3.6%	4.2%	67.3%	2.7%	5.2%
$81,000 - $99,999	0.0%	5.2%	5.2%	4.6%	4.6%	4.1%	72.9%	2.9%	5.0%
Over $100,000	0.0%	2.2%	2.2%	3.9%	1.2%	1.9%	87.0%	2.2%	1.5%

Route Type Trend Comparisons

This section contains comparisons between the 2017 and 2022 H-GAC surveys. The 2017 Survey was conducted by ETC Institute in the same manner as the 2022 survey.

Travel Comparisons

TABLE 64: ORIGIN LOCATION (2017 – 2022)

	2022	2017	2022	2017	2022	2017	2022	2017	2022	2017	2022	2017
What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	METRO PNR	METRO PNR	METROBus	METROBus	METRORAIL	METRORAIL	Regional Agency Bus	Regional Agency Bus	Regional Agency PNR	Regional Agency PNR	Grand Total	Grand Total
Your usual WORKPLACE	46.7%	2.6%	20.9%	22.9%	20.4%	27.0%	6.4%	11.5%	0.5%	0.0%	22.5%	20.8%
Your HOME	49.9%	96.1%	53.3%	51.3%	51.4%	40.9%	54.6%	55.1%	99.5%	99.7%	53.2%	55.4%
College / University (students only)	2.6%	0.7%	2.3%	3.2%	5.4%	7.5%	1.2%	1.6%	0.0%	0.0%	3.0%	3.8%
School (K-12) (students only)	0.1%	0.1%	2.9%	2.3%	0.6%	0.6%	0.8%	0.8%	0.0%	0.0%	2.1%	1.6%
Medical / Doctor / Clinic (non-work)	0.2%	0.0%	2.7%	2.4%	2.6%	3.4%	1.4%	3.2%	0.0%	0.0%	2.4%	2.3%
Shopping	0.0%	0.0%	5.1%	5.4%	2.3%	3.4%	13.0%	14.5%	0.0%	0.0%	4.1%	4.3%
Personal Business	0.1%	0.3%	6.7%	6.9%	6.3%	8.3%	4.8%	5.8%	0.0%	0.3%	5.9%	6.3%
Work related	0.4%	0.0%	2.5%	1.2%	3.4%	1.5%	1.0%	0.4%	0.0%	0.0%	2.5%	1.1%
Social visit / Church	0.0%	0.1%	1.5%	1.9%	1.4%	2.0%	3.8%	0.9%	0.0%	0.0%	1.3%	1.6%
Airport (passengers only)	0.0%	0.1%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
Restaurant	0.0%	0.0%	0.9%	1.7%	2.4%	2.1%	5.2%	1.1%	0.0%	0.0%	1.2%	1.5%
Recreation / Sightseeing	0.1%	0.0%	0.9%	0.7%	2.9%	3.3%	7.1%	5.0%	0.0%	0.0%	1.4%	1.3%
Non-destination trip	0.0%	0.0%	0.2%	0.0%	0.5%	0.0%	0.6%	0.0%	0.0%	0.0%	0.2%	0.0%
Other	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%

TABLE 65: DESTINATION LOCATION (2017 – 2022)

What type of place are you GOING TO NOW? (the ending place for your one-way trip)	2022 METRO PNR	2017 METRO PNR	2022 METROBus	2017 METROBus	2022 METRORAIL	2017 METRORAIL	2022 Regional Agency Bus	2017 Regional Agency Bus	2022 Regional Agency PNR	2017 Regional Agency PNR	2022 Grand Total	2017 Grand Total
Your usual WORKPLACE	47.3%	90.6%	28.2%	27.2%	26.3%	24.3%	15.3%	22.9%	94.7%	99.1%	30.1%	35.6%
Your HOME	49.4%	3.6%	39.0%	41.0%	35.3%	39.1%	29.2%	30.6%	0.1%	0.0%	38.4%	35.1%
College / University (students only)	2.2%	3.4%	1.9%	3.1%	5.0%	6.1%	0.8%	0.8%	3.4%	0.3%	2.6%	3.8%
School (K-12) (students only)	0.1%	0.3%	2.2%	2.7%	0.2%	0.5%	0.7%	0.2%	0.0%	0.3%	1.5%	1.8%
Medical / Doctor / Clinic (non-work)	0.3%	0.6%	2.2%	2.3%	3.2%	4.4%	1.8%	4.3%	0.9%	0.0%	2.2%	2.6%
Shopping	0.0%	0.0%	7.3%	5.7%	4.3%	4.0%	15.6%	22.1%	0.0%	0.0%	6.0%	4.7%
Personal Business	0.1%	1.1%	10.7%	9.9%	9.4%	9.6%	7.6%	8.1%	0.0%	0.0%	9.3%	8.6%
Work related	0.4%	0.1%	1.9%	1.9%	3.5%	2.2%	1.2%	1.7%	0.7%	0.3%	2.1%	1.7%
Social visit / Church	0.0%	0.0%	2.7%	3.1%	3.1%	3.0%	3.1%	3.4%	0.3%	0.0%	2.6%	2.7%
Airport (passengers only)	0.0%	0.0%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.1%
Restaurant	0.0%	0.0%	2.2%	1.7%	4.6%	3.6%	6.6%	1.7%	0.0%	0.0%	2.6%	1.9%
Recreation / Sightseeing	0.1%	0.3%	1.1%	1.2%	5.0%	3.1%	17.9%	4.3%	0.0%	0.0%	2.2%	1.5%
Other	0.0%	0.0%	0.3%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%

TABLE 66: ACCESS MODE (2017 – 2022)

How did you GET FROM your origin	2022 METRO PNR	2017 METRO PNR	2022 METROBus	2017 METROBus	2022 METRORAIL	2017 METRORAIL	2022 Regional	2017 Regional	2022 Regional	2017 Regional	2022 Grand Total	2017 Grand Total
Walk	51.7%	5.4%	94.4%	93.1%	81.8%	79.4%	88.7%	92.9%	0.5%	1.9%	86.5%	77.5%
Wheelchair	0.0%	0.0%	0.2%	0.3%	0.3%	0.4%	0.6%	1.0%	0.0%	0.0%	0.2%	0.3%
Personal bike	0.1%	0.2%	0.4%	1.2%	3.3%	3.1%	1.1%	2.0%	1.2%	0.3%	1.0%	1.5%
Bike share or E-Bike	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
E-Scooter	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Paratransit (e.g. METROLift)	0.3%	0.1%	0.1%	0.0%	0.1%	0.0%	0.0%	0.7%	0.0%	0.0%	0.1%	0.1%
Was dropped off by someone	4.0%	9.0%	3.4%	3.6%	3.2%	4.1%	0.7%	1.9%	13.9%	5.0%	3.5%	4.4%
Drove alone and parked	41.4%	79.7%	0.9%	1.5%	10.0%	11.4%	2.5%	0.5%	78.2%	91.1%	7.6%	15.0%
Drove or rode with others and parked	1.3%	2.7%	0.1%	0.1%	0.8%	1.2%	5.2%	0.9%	4.0%	1.2%	0.5%	0.7%
Car share (e.g. Zip Car, etc.)	0.8%	1.9%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	1.5%	0.6%	0.1%	0.3%
Taxi	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.1%
Uber, Lyft, etc.	0.4%	0.4%	0.3%	0.0%	0.2%	0.2%	1.2%	0.0%	0.7%	0.0%	0.3%	0.1%
Other	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

TABLE 67: EGRESS MODE (2017 – 2022)

How will you GET TO your destination	2022 METRO PNR	2017 METRO PNR	2022 METROBus	2017 METROBus	2022 METRORAIL	2017 METRORAIL	2022 Regional Agency Bus	2017 Regional Agency Bus	2022 Regional Agency PNR	2017 Regional Agency PNR	2022 Grand Total	2017 Grand Total
Walk	52.0%	95.0%	96.2%	93.6%	86.8%	78.9%	95.3%	94.3%	98.4%	98.6%	90.2%	90.5%
Wheelchair	0.0%	0.0%	0.3%	0.3%	0.4%	0.3%	0.5%	0.6%	0.0%	0.0%	0.3%	0.3%
Personal bike	0.1%	0.5%	0.4%	1.6%	2.9%	3.4%	0.7%	3.0%	0.0%	0.9%	0.9%	1.9%
Bike share or E-Bike	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E-Scooter	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Paratransit (e.g. METROLift)	0.7%	0.2%	0.0%	0.0%	0.1%	0.1%	0.0%	0.6%	0.0%	0.0%	0.1%	0.1%
Be picked up by someone	4.1%	0.8%	1.7%	1.9%	2.2%	3.6%	0.3%	1.0%	0.1%	0.2%	2.0%	2.1%
Get in a parked vehicle & drive alone	40.9%	3.1%	0.8%	2.4%	6.1%	12.7%	2.0%	0.0%	0.9%	0.0%	5.5%	4.8%
Get in a parked vehicle & drive/ride w/others	0.9%	0.1%	0.1%	0.1%	1.1%	0.7%	0.6%	0.3%	0.6%	0.0%	0.4%	0.2%
Car share (e.g. Zip Car, etc.)	0.7%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
Taxi	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
Uber, Lyft, etc.	0.4%	0.1%	0.3%	0.1%	0.2%	0.2%	0.6%	0.0%	0.0%	0.0%	0.3%	0.1%
Other	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%

TABLE 68: IF TRANSIT WAS NOT AVAILABLE (2017 – 2022)

If transit service were not available, how would you have made this trip?	2022 METRO PNR	2017 METRO PNR	2022 METROBus	2017 METROBus	2022 METRORAIL	2017 METRORAIL	2022 Regional Agency Bus	2017 Regional Agency Bus	2022 Regional Agency PNR	2017 Regional Agency PNR	2022 Grand Total	2017 Grand Total
Walk	0.3%	0.5%	11.2%	9.9%	13.8%	11.2%	32.9%	18.7%	0.0%	0.3%	11.0%	9.0%
Bicycle / Scooter	0.0%	0.1%	3.2%	3.8%	5.8%	5.6%	2.2%	6.4%	0.0%	0.0%	3.5%	3.7%
Drove myself	85.7%	86.9%	9.0%	16.6%	26.2%	39.8%	13.8%	17.4%	84.1%	93.8%	20.7%	32.0%
Ride with someone else	7.5%	7.1%	30.0%	38.7%	19.6%	21.3%	19.1%	31.2%	7.6%	3.2%	25.2%	30.1%
Taxi	0.2%	0.3%	2.3%	3.2%	1.6%	2.3%	2.1%	7.3%	1.1%	0.3%	1.9%	2.6%
TNC (e.g. Uber, Lyft)	2.0%	1.2%	28.8%	9.7%	22.6%	7.6%	12.0%	1.2%	1.1%	0.0%	24.4%	7.9%
Car share (e.g. Zip Car)	1.1%	1.4%	1.1%	1.7%	1.2%	0.5%	0.3%	0.0%	1.7%	0.8%	1.1%	1.3%
Would not make this trip	3.1%	2.5%	14.5%	16.5%	9.1%	11.7%	17.6%	17.9%	4.3%	1.6%	12.2%	13.4%

TABLE 69: LENGTH OF TIME RESPONDENT HAS USED TRANSIT (2017 – 2022)

	2022	2017	2022	2017	2022	2017	2022	2017	2022	2017	2022	2017
How long have you been riding transit?	METRO PNR	METRO PNR	METROBus	METROBus	METRORAIL	METRORAIL	Regional Agency Bus	Regional Agency Bus	Regional Agency PNR	Regional Agency PNR	Grand Total	Grand Total
Less than 6 months	13.0%	8.2%	11.9%	7.7%	14.2%	13.4%	15.7%	10.9%	13.3%	7.0%	12.6%	9.0%
6-12 months	7.5%	10.2%	9.9%	8.6%	10.5%	10.1%	9.1%	10.7%	5.7%	10.0%	9.8%	9.2%
1-2 years	7.5%	16.6%	20.0%	20.1%	21.7%	25.4%	13.0%	33.8%	8.5%	17.7%	19.0%	21.0%
3-6 years	25.6%	26.0%	21.4%	25.1%	24.3%	24.5%	18.4%	26.9%	36.1%	35.4%	22.6%	25.2%
7-10 years	14.6%	11.9%	10.2%	11.0%	8.6%	7.3%	5.8%	5.3%	16.3%	3.6%	10.3%	10.1%
More than 10 years	31.1%	26.6%	25.7%	27.1%	17.9%	18.4%	18.0%	10.6%	19.8%	26.4%	24.2%	24.9%
First time riding	0.6%	0.6%	0.9%	0.5%	2.7%	0.8%	20.1%	1.8%	0.2%	0.0%	1.6%	0.6%

TABLE 70: HOW OFTEN RESPONDENT RIDES (2017 – 2022)

	2022	2017	2022	2017	2022	2017	2022	2017	2022	2017	2022	2017
How often do you ride transit?	METRO PNR	METRO PNR	METROBus	METROBus	METRORAIL	METRORAIL	Regional	Regional	Regional	Regional	Grand Total	Grand Total
6 or 7 days a week	2.6%	3.4%	28.3%	25.4%	20.1%	20.8%	16.1%	15.3%	0.7%	2.8%	23.6%	21.1%
5 days a week	49.1%	74.6%	36.9%	41.1%	43.0%	41.9%	15.6%	24.9%	39.3%	78.2%	39.0%	46.0%
3 or 4 days a week	41.2%	17.3%	22.0%	21.2%	21.4%	21.2%	23.3%	30.7%	49.1%	16.2%	24.0%	20.7%
1 or 2 days a week	5.4%	2.4%	6.8%	7.4%	7.0%	7.7%	12.5%	13.3%	6.8%	2.3%	6.8%	6.8%
1 or 2 days a month	0.9%	0.5%	1.1%	1.3%	1.6%	2.0%	3.0%	3.1%	3.0%	0.0%	1.2%	1.4%
Once in a while	0.4%	1.1%	3.9%	3.1%	4.1%	5.4%	9.1%	10.7%	1.1%	0.5%	3.7%	3.4%
First time riding	0.4%	0.7%	1.0%	0.5%	3.0%	1.0%	20.5%	2.0%	0.0%	0.0%	1.7%	0.7%

TABLE 71: NUMBER OF VEHICLES IN HOUSEHOLD (2017 – 2022)

	2022	2017	2022	2017	2022	2017	2022	2017	2022	2017	2022	2017
How many vehicles (cars, trucks, or motorcycles) are available to your household?	METRO PNR	METRO PNR	METROBus	METROBus	METRORAIL	METRORAIL	Regional Agency Bus	Regional Agency Bus	Regional Agency PNR	Regional Agency PNR	Grand Total	Grand Total
None (0)	2.0%	1.7%	49.3%	37.9%	38.2%	30.1%	48.2%	49.4%	0.7%	0.2%	42.0%	31.1%
One (1)	23.2%	19.1%	32.5%	37.1%	37.8%	35.4%	23.5%	26.8%	20.3%	14.6%	32.6%	33.9%
Two (2)	49.2%	52.8%	14.2%	19.8%	19.3%	24.5%	19.2%	18.6%	58.6%	53.9%	19.1%	25.6%
Three (3)	18.4%	18.0%	3.0%	4.1%	3.5%	7.0%	7.1%	4.2%	12.6%	22.7%	4.7%	6.8%
Four (4)	5.4%	7.2%	0.7%	0.9%	1.0%	2.3%	1.7%	0.9%	6.1%	6.1%	1.3%	2.1%
Five (5)	1.1%	1.0%	0.2%	0.2%	0.1%	0.5%	0.3%	0.0%	1.1%	1.7%	0.3%	0.4%
Six (6)	0.1%	0.2%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.8%	0.0%	0.1%
Seven (7)	0.5%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.6%	0.0%	0.1%	0.0%
Eight (8)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nine (9)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Ten or more (10+)	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%

TABLE 72: WHETHER RESPONDENT COULD USE HOUSEHOLD VEHICLE FOR TRIP (2017 – 2022)

	2022	2017	2022	2017	2022	2017	2022	2017	2022	2017	2022	2017
Could you have used one of these vehicles for this trip?	METRO PNR	METRO PNR	METROBus	METROBus	METRORAIL	METRORAIL	Regional Agency Bus	Regional Agency Bus	Regional Agency PNR	Regional Agency PNR	Grand Total	Grand Total
Yes	86.0%	88.9%	38.1%	43.7%	66.4%	80.7%	49.1%	58.4%	86.8%	96.2%	53.3%	61.8%
No	14.0%	11.1%	61.9%	56.3%	33.6%	19.3%	50.9%	41.6%	13.2%	3.8%	46.7%	38.2%

TABLE 73: HOUSEHOLD SIZE (2017 – 2022)

Including YOU, how many people live in your household?	2022 METRO PNR	2017 METRO PNR	2022 METROBus	2017 METROBus	2022 METRORAIL	2017 METRORAIL	2022 Regional Agency Bus	2017 Regional Agency Bus	2022 Regional Agency PNR	2017 Regional Agency PNR	2022 Grand Total	2017 Grand Total
One (1)	14.0%	9.8%	22.2%	16.5%	28.2%	25.3%	29.0%	19.9%	6.8%	7.8%	22.7%	17.5%
Two (2)	27.5%	29.8%	25.0%	23.5%	25.9%	27.9%	27.9%	24.8%	29.6%	28.9%	25.5%	25.4%
Three (3)	21.9%	21.1%	22.7%	23.1%	19.4%	19.5%	17.3%	23.5%	24.4%	20.5%	21.8%	22.0%
Four (4)	23.4%	24.2%	15.8%	19.9%	15.2%	15.1%	13.4%	16.6%	23.0%	29.9%	16.4%	19.5%
Five (5)	7.6%	10.2%	9.2%	10.6%	6.5%	7.1%	6.1%	10.2%	13.0%	8.6%	8.4%	9.7%
Six (6)	4.1%	3.5%	3.1%	3.9%	2.8%	2.7%	2.8%	3.4%	0.9%	3.1%	3.1%	3.6%
Seven (7)	0.9%	0.9%	1.1%	1.4%	1.0%	0.9%	0.7%	1.4%	2.3%	0.7%	1.0%	1.2%
Eight (8)	0.3%	0.3%	0.4%	0.4%	0.4%	0.5%	0.6%	0.2%	0.0%	0.5%	0.4%	0.4%
Nine (9)	0.3%	0.0%	0.1%	0.1%	0.2%	0.3%	0.6%	0.0%	0.0%	0.0%	0.1%	0.1%
Ten or More (10+)	0.1%	0.1%	0.4%	0.4%	0.5%	0.6%	1.6%	0.0%	0.0%	0.0%	0.4%	0.4%

TABLE 74: EMPLOYMENT STATUS (2017 – 2022)

What is your employment status? (Check the one response that BEST describes you)	2022 METRO PNR	2017 METRO PNR	2022 METROBus	2017 METROBus	2022 METRORAIL	2017 METRORAIL	2022 Regional Agency Bus	2017 Regional Agency Bus	2022 Regional Agency PNR	2017 Regional Agency PNR	2022 Grand Total	2017 Grand Total
Employed full-time	93.8%	93.6%	56.7%	57.6%	58.4%	61.7%	40.8%	51.4%	94.8%	97.4%	60.6%	63.7%
Employed part-time	2.7%	3.0%	19.4%	17.0%	19.4%	14.8%	10.6%	8.2%	4.4%	1.5%	17.6%	14.4%
Not currently employed	3.3%	3.0%	15.4%	17.0%	14.4%	16.7%	18.2%	19.4%	0.7%	0.7%	13.9%	15.0%
Disabled and unable to work	0.0%	0.1%	3.2%	3.9%	3.1%	2.9%	10.4%	10.1%	0.0%	0.3%	3.0%	3.2%
Retired	0.2%	0.1%	4.5%	3.6%	4.0%	3.1%	18.0%	9.7%	0.0%	0.0%	4.2%	3.0%
Homemaker	0.0%	0.2%	0.9%	0.9%	0.6%	0.7%	2.0%	1.3%	0.0%	0.0%	0.7%	0.7%

TABLE 75: STUDENT STATUS (2017 – 2022)

What is your student status? (check the one response that BEST describes you)	2022 METRO PNR	2017 METRO PNR	2022 METROBus	2017 METROBus	2022 METRORAIL	2017 METRORAIL	2022 Regional Agency Bus	2017 Regional Agency Bus	2022 Regional Agency PNR	2017 Regional Agency PNR	2022 Grand Total	2017 Grand Total
Not a student	79.6%	79.8%	83.8%	81.5%	80.3%	77.0%	92.3%	92.7%	84.4%	91.3%	82.8%	80.6%
Yes - College / University / Community College	16.9%	18.5%	9.5%	12.0%	17.4%	21.0%	5.0%	4.0%	14.4%	7.8%	11.9%	14.7%
Yes - Vocational / Technical / Trade School	0.4%	0.9%	0.5%	0.7%	0.6%	0.2%	0.1%	0.0%	0.0%	0.0%	0.5%	0.6%
Yes - K-12th grade	1.6%	0.9%	6.1%	5.8%	1.6%	1.8%	2.5%	3.2%	1.1%	0.9%	4.6%	4.1%
Other	1.4%	0.0%	0.0%	0.0%	0.2%	0.0%	0.1%	0.0%	0.0%	0.0%	0.2%	0.0%

TABLE 76: WHETHER RESPONDENT HAS A DRIVER'S LICENSE (2017 – 2022)

Do you have a valid driver's license?	2022 METRO PNR	2017 METRO PNR	2022 METROBus	2017 METROBus	2022 METRORAIL	2017 METRORAIL	2022 Regional Agency Bus	2017 Regional Agency Bus	2022 Regional Agency PNR	2017 Regional Agency PNR	2022 Grand Total	2017 Grand Total
Yes	96.0%	96.8%	45.9%	55.6%	66.4%	72.8%	56.2%	48.4%	98.1%	96.2%	55.8%	65.3%
No	4.0%	3.2%	54.1%	44.4%	33.6%	27.2%	43.8%	51.6%	1.9%	3.8%	44.2%	34.7%

TABLE 77: AGE (2017 – 2022)

What is your age?	2022 METRO PNR	2017 METRO PNR	2022 METROBus	2017 METROBus	2022 METRORAIL	2017 METRORAIL	2022 Regional	2017 Regional	2022 Regional	2017 Regional	2022 Grand Total	2017 Grand Total
5 - 15	0.0%	0.2%	1.4%	2.1%	0.5%	0.4%	0.9%	1.6%	0.0%	0.3%	1.0%	1.4%
16 - 19	1.3%	1.2%	8.1%	8.8%	4.3%	5.2%	3.3%	5.8%	0.2%	0.3%	6.5%	6.9%
20 - 34	18.4%	22.6%	37.5%	40.8%	42.8%	45.4%	20.3%	30.2%	17.0%	12.2%	36.4%	38.9%
35 - 50	40.6%	41.3%	29.9%	31.5%	31.2%	30.3%	29.5%	39.0%	39.5%	47.0%	31.2%	32.8%
51 - 64	31.7%	31.3%	16.1%	12.2%	15.5%	13.9%	26.2%	14.3%	38.3%	36.0%	17.8%	15.4%
65 - 69	6.6%	2.9%	4.7%	3.8%	3.6%	3.9%	12.6%	7.0%	4.6%	3.5%	4.8%	3.7%
70 and older	1.2%	0.6%	2.2%	0.8%	1.8%	1.0%	6.8%	2.2%	0.4%	0.7%	2.1%	0.9%
Prefer not to answer	0.2%	0.0%	0.2%	0.0%	0.2%	0.0%	0.4%	0.0%	0.0%	0.0%	0.2%	0.0%

TABLE 78: GENDER (2017 – 2022)

Gender	2022 METRO PNR	2017 METRO PNR	2022 METROBus	2017 METROBus	2022 METRORAIL	2017 METRORAIL	2022 Regional Agency Bus	2017 Regional Agency Bus	2022 Regional Agency PNR	2017 Regional Agency PNR	2022 Grand Total	2017 Grand Total
Male	44.9%	43.8%	56.2%	53.0%	56.8%	55.8%	50.2%	41.1%	57.9%	60.7%	55.3%	52.5%
Female	54.3%	55.7%	43.7%	46.9%	43.0%	44.2%	48.4%	58.9%	39.6%	39.3%	44.5%	47.4%
Other	0.7%	0.0%	0.1%	0.1%	0.2%	0.0%	1.5%	0.0%	2.5%	0.0%	0.2%	0.1%

TABLE 79: OTHER LANGUAGES SPOKEN AT HOME OTHER THAN ENGLISH (2017 – 2022)

Do you speak a language other than English at home?	2022 METRO PNR	2017 METRO PNR	2022 METROBus	2017 METROBus	2022 METRORAIL	2017 METRORAIL	2022 Regional Agency Bus	2017 Regional Agency Bus	2022 Regional Agency PNR	2017 Regional Agency PNR	2022 Grand Total	2017 Grand Total
Yes	30.6%	29.5%	37.6%	28.6%	34.1%	26.1%	20.7%	16.1%	30.7%	22.2%	35.8%	27.9%
No	69.4%	70.5%	62.4%	71.4%	65.9%	73.9%	79.3%	83.9%	69.3%	77.8%	64.2%	72.1%

TABLE 80: ANNUAL HOUSEHOLD INCOME (2017 – 2022)

Which of the following BEST describes your TOTAL ANNUAL HOUSEHOLD INCOME in 2021 before taxes?	2022 METRO PNR	2017 METRO PNR	2022 METROBus	2017 METROBus	2022 METRORAIL	2017 METRORAIL	2022 Regional Agency Bus	2017 Regional Agency Bus	2022 Regional Agency PNR	2017 Regional Agency PNR	2022 Grand Total	2017 Grand Total
Less than $16,000	2.2%	1.5%	23.8%	21.0%	19.7%	22.6%	38.5%	40.8%	0.6%	0.5%	20.6%	18.7%
$16,000 - $23,999	1.1%	1.9%	22.0%	17.5%	16.3%	13.1%	15.5%	18.5%	0.9%	0.3%	18.3%	14.1%
$24,000 - $31,999	2.5%	3.0%	20.6%	17.3%	18.6%	12.8%	10.5%	11.4%	2.2%	0.9%	17.9%	14.0%
$32,000 - $39,999	5.0%	4.2%	13.4%	14.0%	11.5%	12.1%	3.5%	9.4%	2.3%	0.9%	11.9%	12.0%
$40,000 - $53,999	10.0%	10.0%	10.8%	14.7%	12.5%	14.1%	3.6%	9.7%	4.5%	5.0%	10.9%	13.8%
$54,000 - $80,999	20.0%	22.2%	5.9%	10.4%	11.7%	13.1%	9.1%	4.5%	13.8%	13.4%	8.8%	12.5%
$81,000 - $99,999	14.7%	13.4%	1.9%	2.8%	4.4%	5.0%	8.6%	2.5%	12.1%	13.3%	4.0%	4.9%
Over $100,000	44.5%	43.8%	1.5%	2.4%	5.4%	7.3%	10.6%	3.1%	63.7%	65.7%	7.7%	10.1%

CHAPTER 5: Origin-Destination Mapping

The weighted OD data can be visualized using RSG's TransitMapper software. A special version of TransitMapper was developed and published online for use by H-GAC or others. It is available at https://rsginc.shinyapps.io/h-gac/. In contrast to previous iterations, this version of the TransitMapper tool includes METRO's light rail and bus lines as well as routes run by other transit agencies in the region. Please note that red indicates hot zones with green and then blue showing a cooling of the zones.

The maps below were developed using the H-GAC version of TransitMapper. These heat maps examine production and attraction locations for trips taken on each of METRO's three light rail lines, respectively. Figure 14 shows trip production for all Red Line trips, which is fairly disperse across much of Houston, but with particular concentrations along the central and southern segments of the line. Conversely, trip attraction from the Red Line is much more concentrated at key nodes along the rail line, including the CBD and TMC areas (Figure 15).

Compared to that of the Red Line, trip production for Green Line trips is much more concentrated around the light rail stations, except for trips produced in residential neighborhoods along Broadway Street corridor between the Magnolia Park Transit Center terminus and Hobby Airport (Figure 16). Figure 17 shows that Green Line trip attractions are largely also along the Green Line, as well as to the north and northeast of the CBD.

As with the Green Line, Purple Line trip production is largely concentrated around the rail stations, with the exception of trips produced in residential neighborhoods along the Martin Luther King Jr. Boulevard corridor south of the Palm Center Transit Center terminus (Figure 18). Purple Line trip attractions, again like the Green Line, are largely along the Purple Line itself, as well as the southern section of the Red Line (Figure 19).

Figures to follow are graphical representation of production/attraction using colors to indicate the level of activity, the lighter green colors indicate lower activity, and brighter red colors to indicate high activity.

FIGURE 14: RED LINE TRIP PRODUCTION

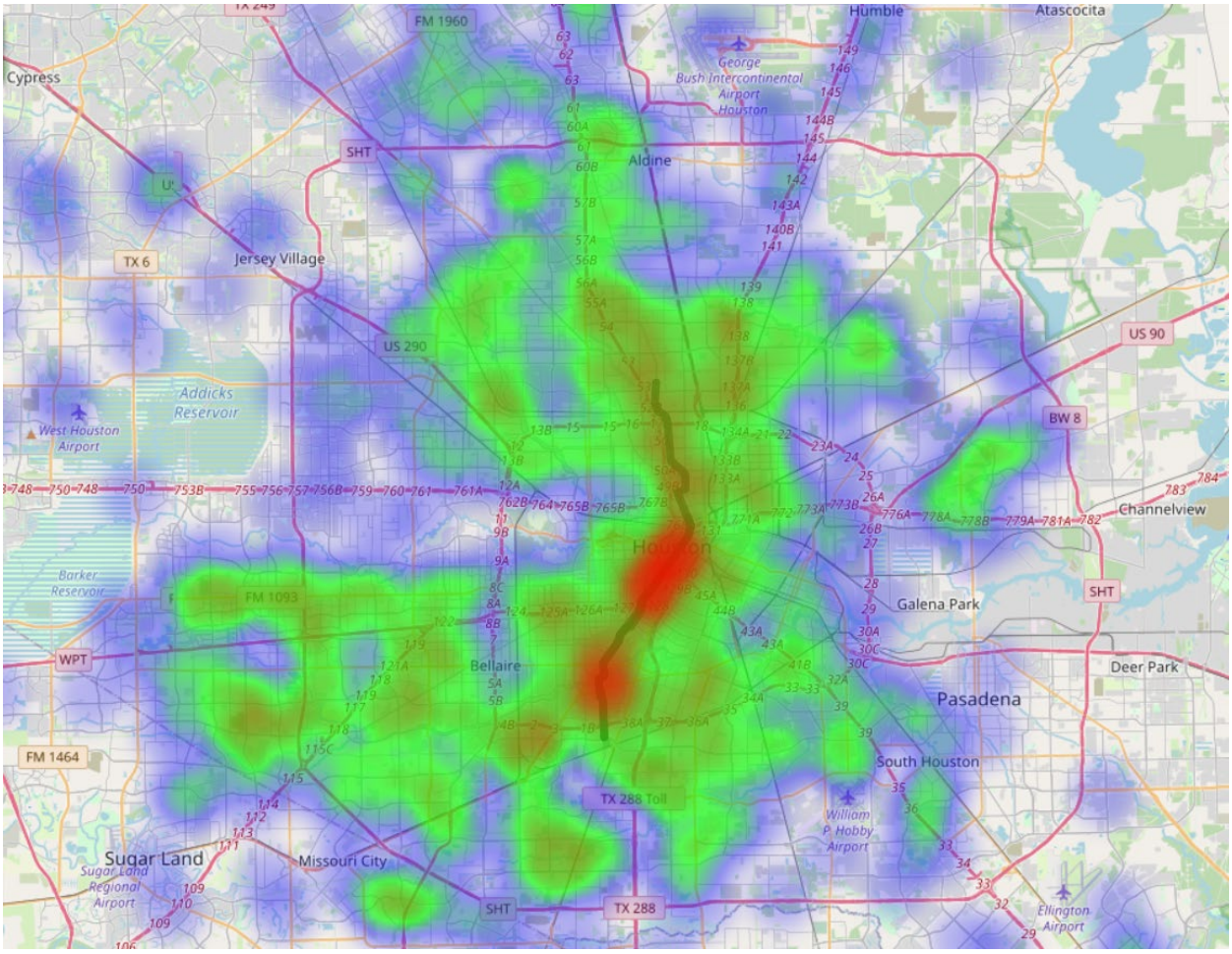


FIGURE 15: RED LINE TRIP ATTRACTION

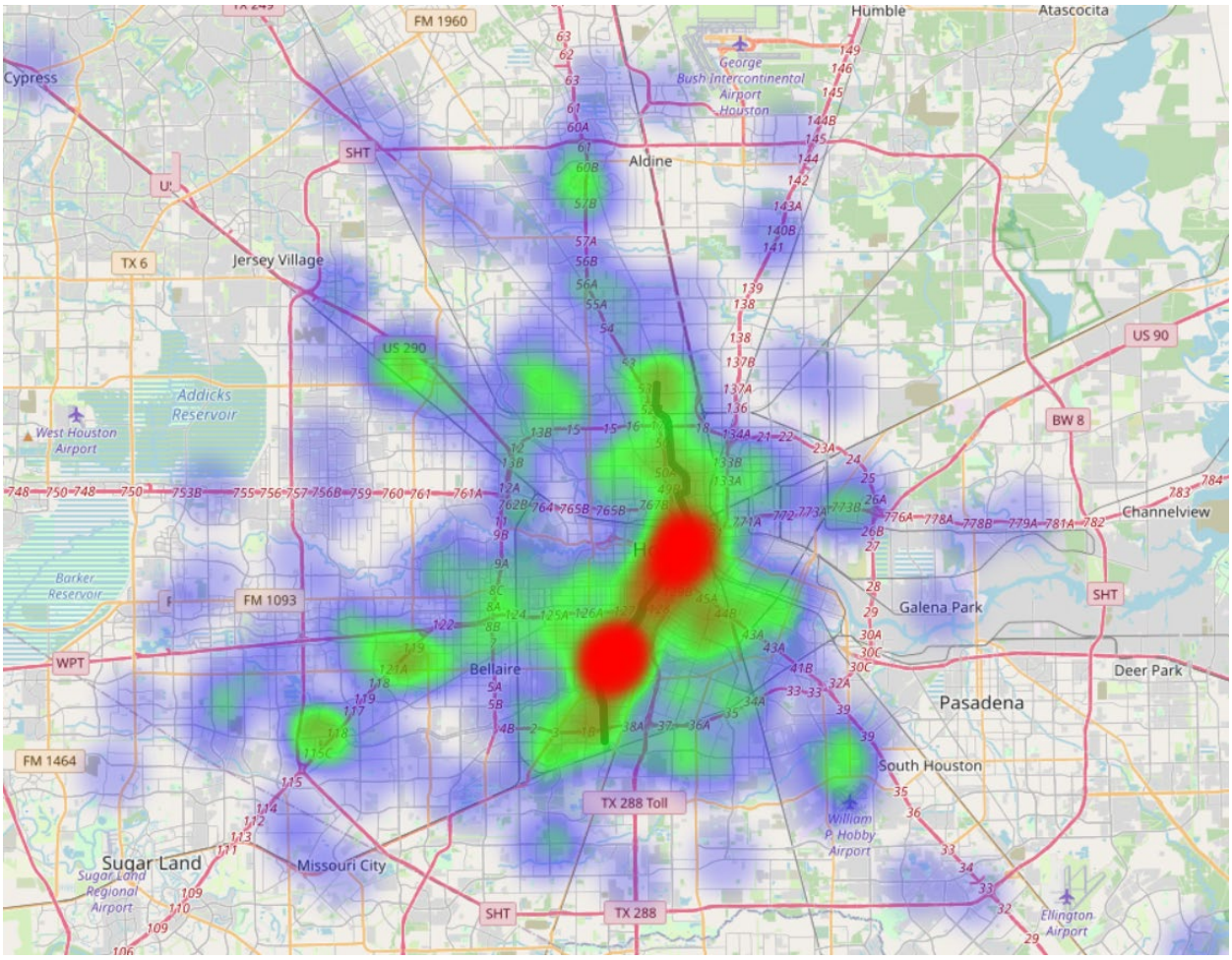


FIGURE 16: GREEN LINE TRIP PRODUCTION

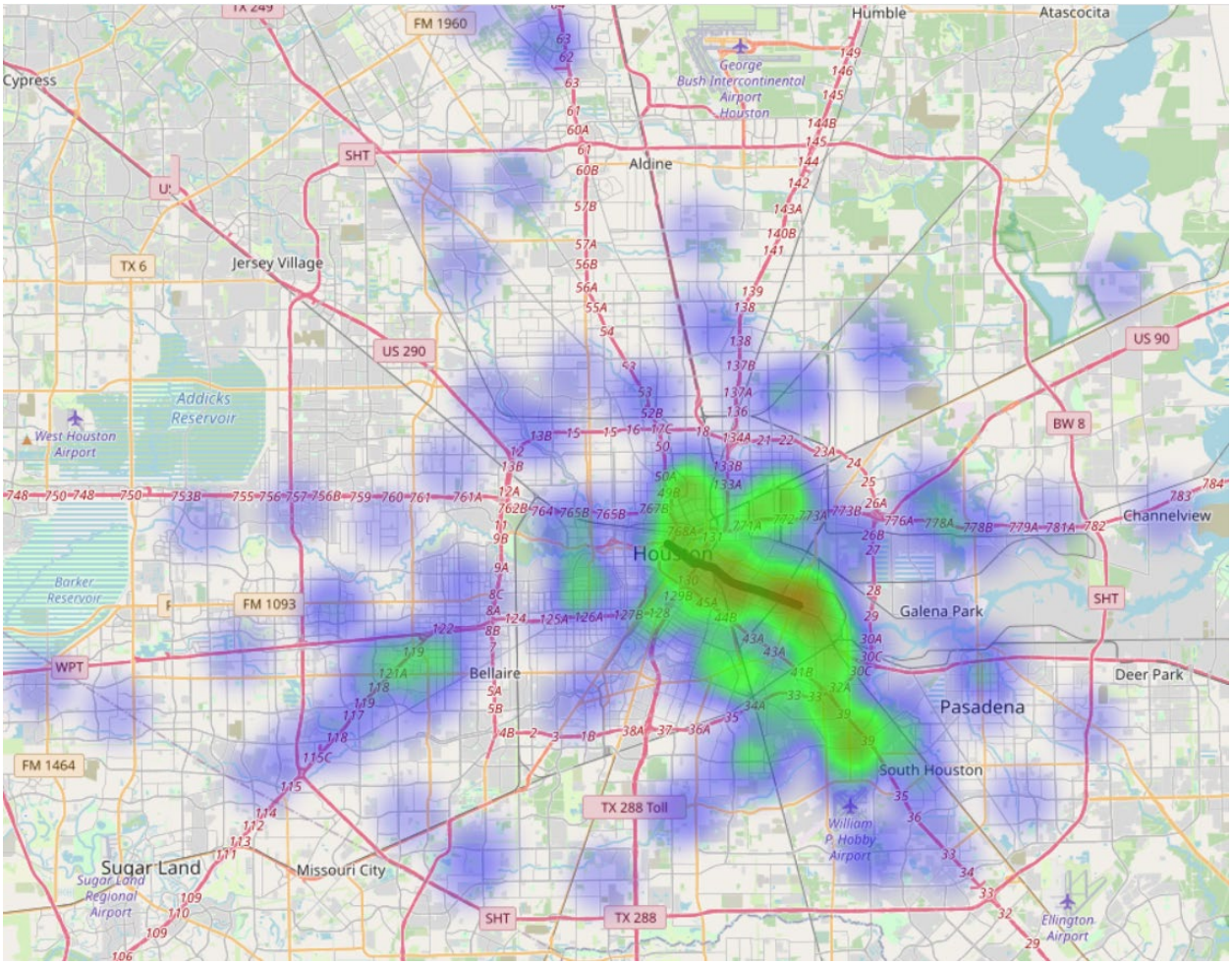


FIGURE 17: GREEN LINE TRIP ATTRACTION

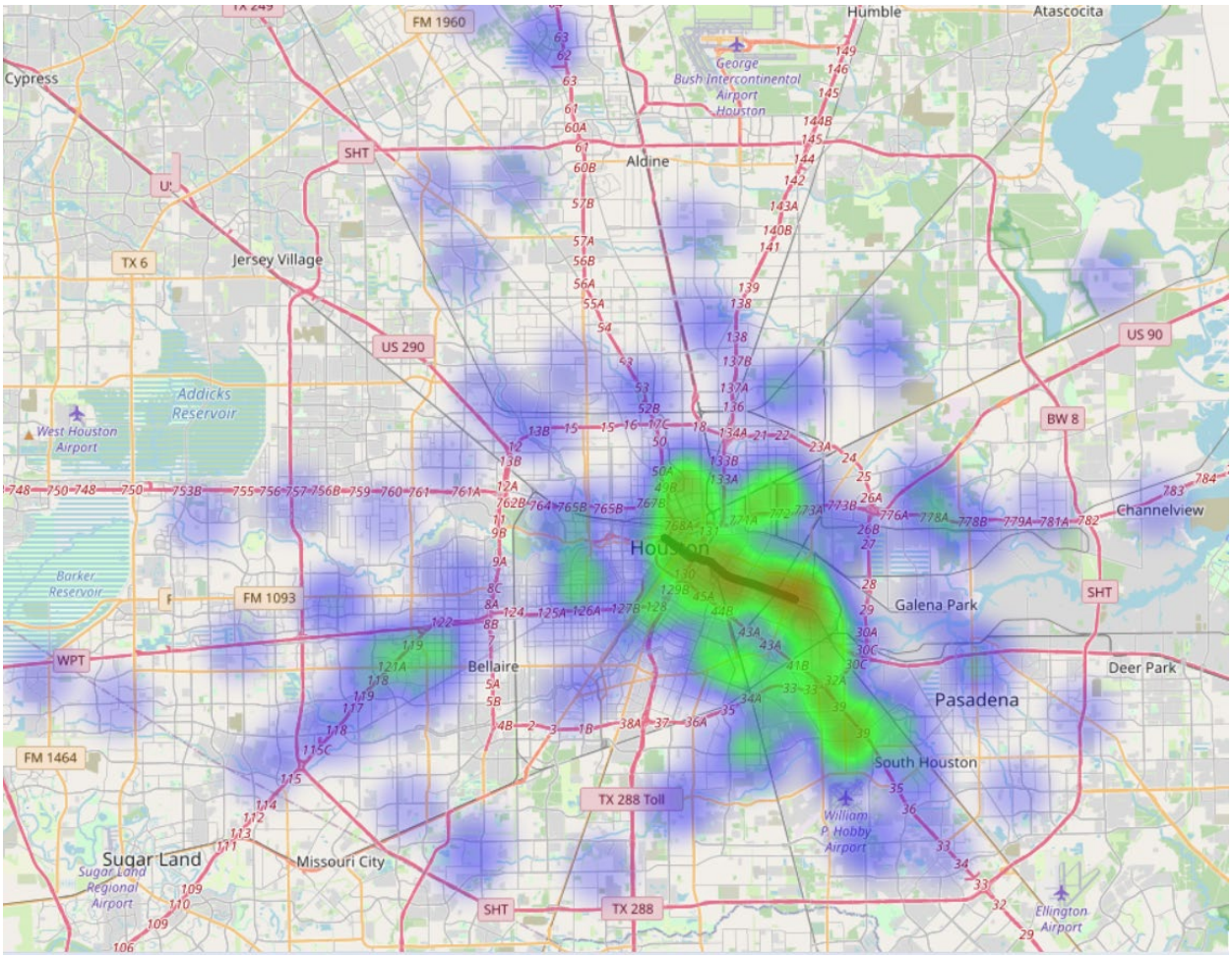


FIGURE 18: PURPLE LINE TRIP PRODUCTION

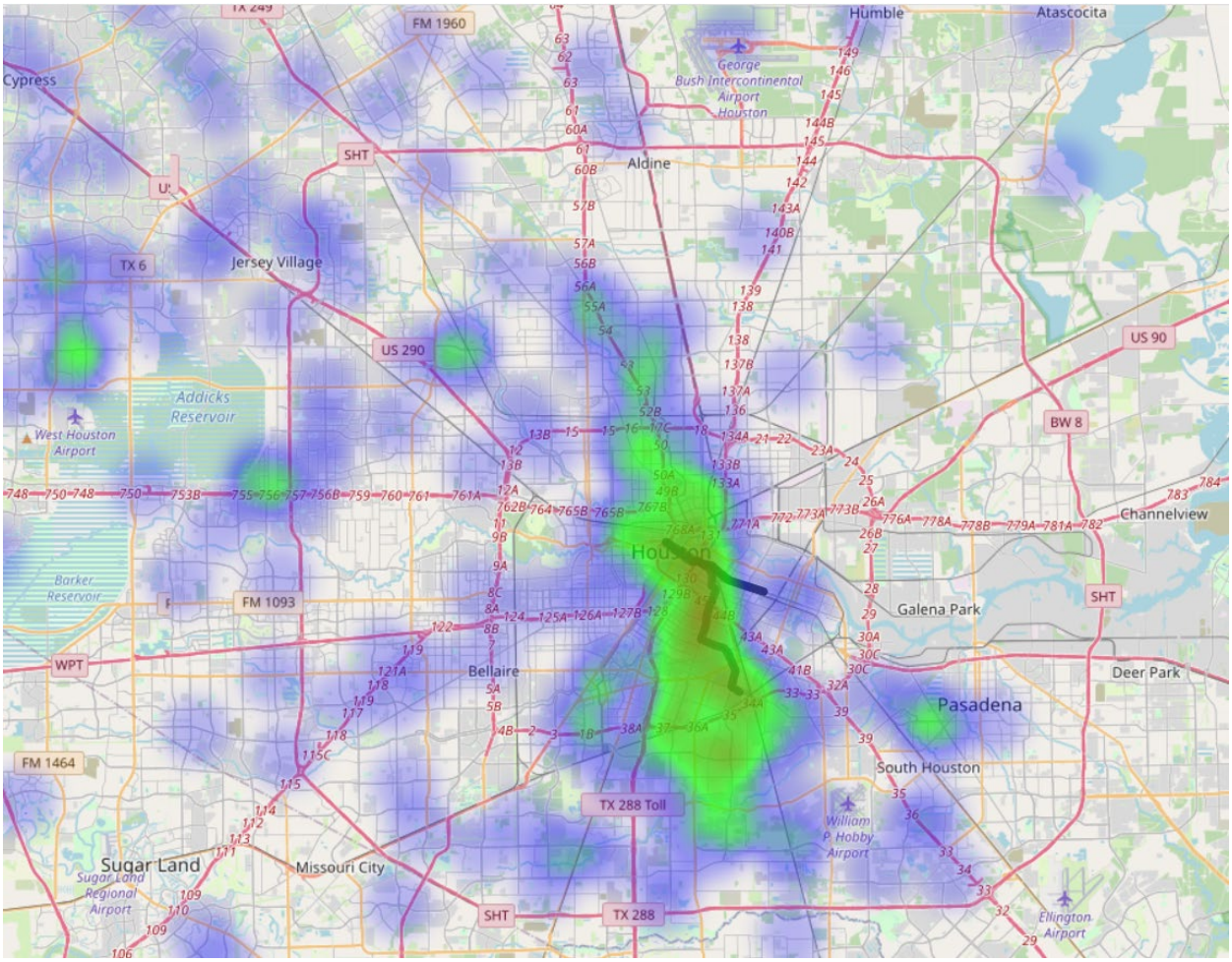
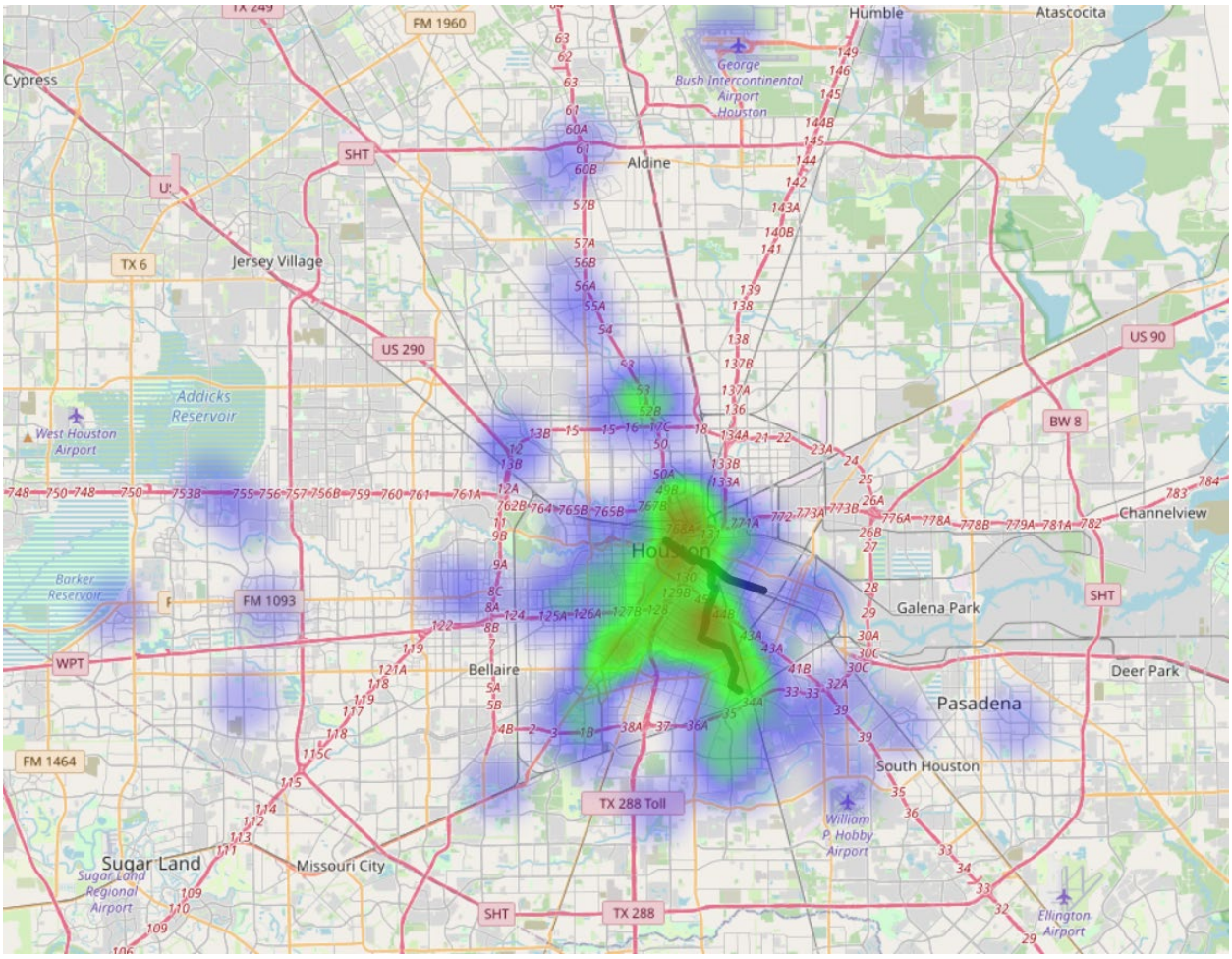


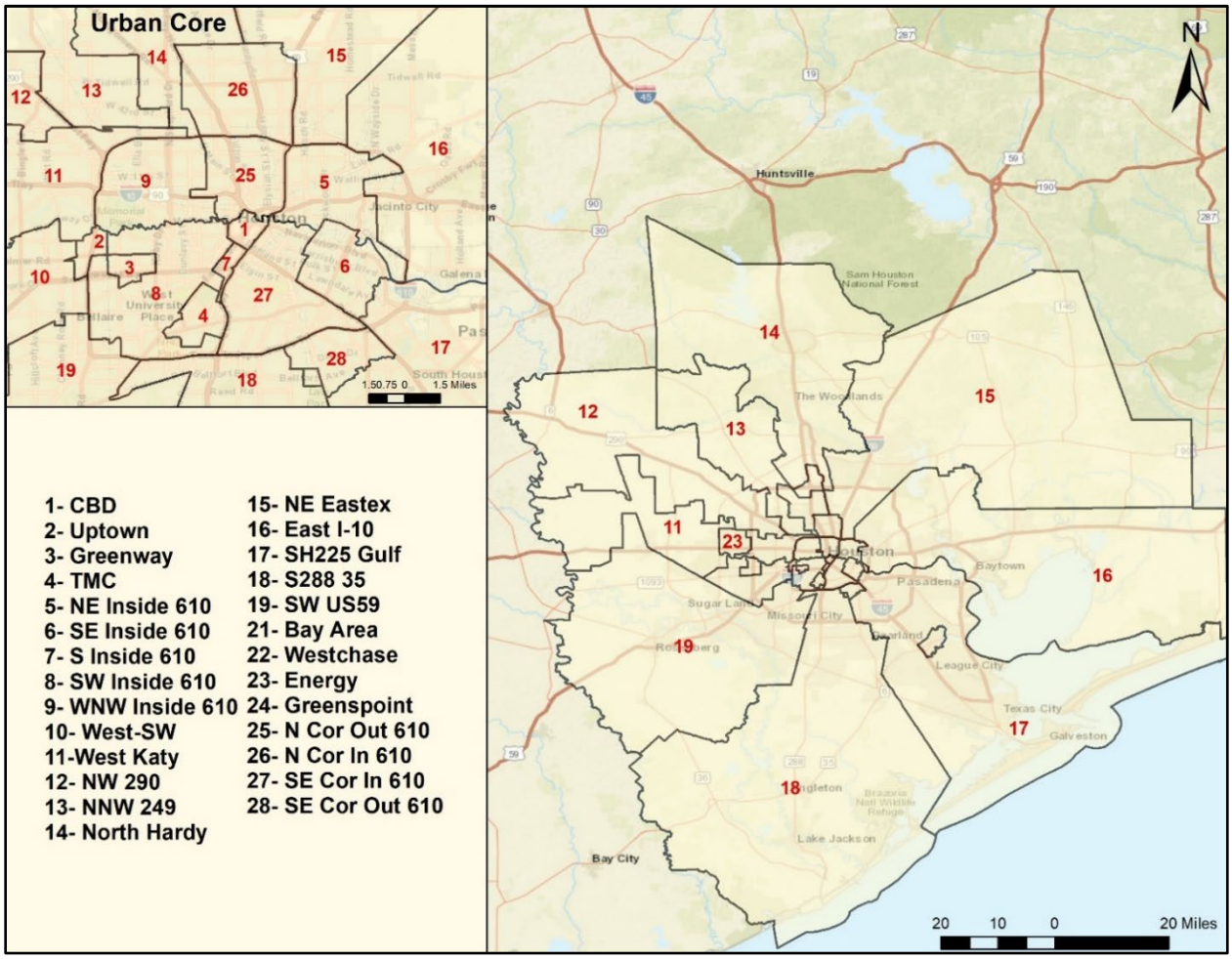
FIGURE 19: PURPLE LINE TRIP ATTRACTION



Analysis Zones

For the following section, geographical data are assigned to analysis zones within the study area. Figure 20 maps these zones.

FIGURE 20: ANALYSIS ZONES



The following matrices show district to district Linked Ridership by Trip Purpose, Access Mode, and number of Vehicles in Household. The production district is on the left axis and the attraction district is on the upper axis.

FIGURE 21: ANALYSIS ZONES (ALL PURPOSE-WEIGHTED)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: All Trips (PA format)

Year 2022 Average Weekday Transit Trips, All Trips: Linked Trips (Weighted Trips)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	860	35	0	520	22	61	105	660	73	174	91	5	0	67	125	57	20	82	10	0	67	0	29	186	117	382	6	3753
2 = Uptown	56	80	12	8	0	6	0	148	0	239	30	5	0	0	2	0	4	10	17	0	55	9	0	1	4	37	0	723
3 = Greenway	25	26	47	97	0	1	6	106	0	68	5	0	0	0	0	0	0	0	21	0	13	0	0	0	0	45	5	466
4 = TMC	444	13	0	1762	29	30	136	596	55	175	23	2	13	18	6	18	15	108	126	0	2	0	17	43	37	301	7	3975
5 = NE Inside 610	467	36	24	186	275	224	30	129	118	47	43	17	27	79	94	68	27	29	29	0	17	0	10	180	190	199	0	2547
6 = SE Inside 610	778	24	6	182	56	588	44	127	46	90	17	1	9	24	27	9	125	12	7	0	5	2	5	61	66	470	12	2792
7 = S Inside 610	266	1	34	234	4	7	112	189	22	62	8	9	6	0	20	12	0	40	22	0	5	0	0	23	73	133	5	1285
8 = SW Inside 610	1472	171	251	2603	11	40	200	1517	152	660	47	14	6	83	23	20	64	103	415	0	46	3	34	119	79	483	2	8619
9 = WNW Inside 610	309	27	24	160	17	1	31	171	237	15	139	37	33	96	24	1	1	2	3	0	1	0	15	67	34	38	5	1489
10 = West SW	1642	1248	611	1729	16	82	206	2179	187	9821	1331	230	40	43	128	57	88	107	1947	0	1110	107	17	176	53	531	22	23708
11 = West Katy	1501	67	20	587	0	5	45	219	123	245	1134	221	73	76	35	19	9	19	49	0	73	98	1	65	23	141	0	4848
12 = NW 290	1363	43	11	365	11	1	6	89	53	129	301	131	58	75	33	18	38	2	43	3	32	6	48	43	112	175	1	3192
13 = NNW 249	1040	65	19	266	12	9	57	144	178	37	233	244	604	615	113	21	3	23	29	0	0	11	157	65	156	101	0	4201
14 = North Hardy	1904	18	54	448	20	32	33	273	178	75	177	76	577	1704	264	65	54	18	35	0	5	52	489	90	406	110	5	7163
15 = NE Eastex	945	11	5	216	72	33	70	147	54	83	57	30	34	86	565	88	33	26	17	0	0	4	92	164	361	97	0	3288
16 = East I-10	467	27	6	266	166	30	51	217	16	61	48	59	45	52	178	808	19	43	49	0	4	0	42	78	158	103	3	2997
17 = SH225 Gulf	1074	40	36	969	33	248	24	295	7	144	47	17	6	17	45	18	2115	221	47	0	6	0	15	24	52	471	70	6043
18 = S288 35	413	58	24	749	9	42	100	336	39	173	40	8	23	20	35	19	171	970	188	0	6	4	19	78	79	636	79	4317
19 = SW US59	2780	158	47	2391	6	19	85	1012	37	1715	132	41	32	74	45	64	48	224	1727	0	70	8	4	94	49	611	30	11502
21 = Bay Area	23	0	0	13	0	0	0	2	0	3	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	54
22 = Westchase	277	259	42	164	11	10	42	282	9	998	251	61	17	2	32	37	0	23	72	0	236	36	5	2	11	82	0	2963
23 = Energy	45	7	0	31	2	0	0	48	3	61	98	0	3	0	0	0	0	0	0	0	14	9	0	0	0	20	1	343
24 = Greenspoint	198	7	9	164	11	0	34	68	35	41	45	32	97	573	599	20	4	1	2	0	3	0	454	19	220	58	0	2694
25 = N Cor Out 610	1375	14	14	444	21	35	126	271	165	82	70	25	29	28	119	79	7	11	41	0	13	0	23	753	744	123	0	4612
26 = N Cor In 610	734	28	14	254	39	15	89	230	133	125	64	54	105	290	302	79	0	60	22	0	1	7	106	380	600	198	24	3951
27 = SE Cor In 610	1665	95	124	764	171	379	358	699	68	194	68	18	17	104	83	42	251	451	166	3	50	6	23	205	167	2205	108	8483
28 = SE Cor Out 610	91	12	2	85	2	37	25	72	2	16	4	3	0	8	4	3	101	75	12	0	0	0	4	5	12	96	74	745
Total	22215	2570	1435	15656	1014	1935	2017	10226	1990	15533	4505	1339	1853	4135	2900	1623	3210	2660	5096	7	1833	363	1607	2919	3804	7847	462	120753

FIGURE 22: ANALYSIS ZONES (ALL PURPOSE-UNWEIGHTED SURVEYS)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: All Trips (PA format)

Year 2022 Average Weekday Transit Trips, All Trips: Linked Trips (Survey Records)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	78	3	0	74	4	22	12	61	7	16	10	1	0	13	15	4	7	17	2	0	4	0	2	19	27	59	3	460
2 = Uptown	6	15	2	1	0	2	0	15	0	19	7	2	0	0	1	0	1	3	3	0	5	2	0	1	1	3	0	89
3 = Greenway	1	2	3	9	0	1	1	9	0	7	2	0	0	0	0	0	0	0	3	0	1	0	0	0	0	3	2	44
4 = TMC	61	1	0	115	2	9	12	52	4	24	4	1	2	4	2	2	3	15	18	0	1	0	2	8	14	35	2	393
5 = NE Inside 610	54	5	2	34	28	19	6	26	16	14	10	4	7	14	10	6	10	5	6	0	3	0	4	20	24	28	0	355
6 = SE Inside 610	204	5	2	55	5	90	11	37	12	16	7	1	3	9	5	2	20	3	4	0	4	2	3	20	31	80	1	632
7 = S Inside 610	31	1	2	26	1	4	8	20	2	9	2	5	1	0	4	2	1	6	4	0	1	0	0	3	20	18	1	172
8 = SW Inside 610	149	20	15	223	4	8	20	134	26	67	11	4	3	10	5	5	14	16	40	0	6	1	6	25	25	63	1	901
9 = WNW Inside 610	29	6	2	20	2	1	3	25	21	7	18	5	6	9	4	1	1	2	1	0	1	1	2	9	5	9	2	192
10 = West SW	244	171	44	222	8	23	28	253	43	762	144	38	13	13	23	13	23	20	167	0	83	15	5	43	22	78	5	2503
11 = West Katy	297	35	5	90	0	3	11	47	15	43	138	26	10	11	9	5	2	6	10	0	11	13	1	14	4	50	0	856
12 = NW 290	357	19	4	75	2	1	1	24	9	30	39	17	12	8	7	4	6	1	8	2	3	1	4	12	16	78	1	741
13 = NNW 249	201	18	3	64	2	3	9	25	16	12	20	27	44	50	17	5	1	6	5	0	0	7	10	13	21	31	0	610
14 = North Hardy	346	10	12	96	6	10	10	50	22	19	28	12	57	234	46	11	7	9	7	0	2	18	52	16	50	31	2	1163
15 = NE Eastex	154	4	1	56	6	5	13	37	13	22	13	4	9	17	79	14	9	8	4	0	0	2	15	22	41	23	0	571
16 = East I-10	126	5	2	82	21	9	11	38	5	19	12	9	6	9	32	220	11	11	10	0	2	0	13	14	25	28	2	722
17 = SH225 Gulf	299	12	5	166	4	37	8	55	4	33	13	4	2	11	12	7	552	34	15	1	1	0	5	14	14	66	6	1380
18 = S288 35	100	13	4	109	4	8	14	72	9	33	11	4	6	6	10	6	26	198	30	0	2	3	3	18	17	87	7	800
19 = SW US59	595	28	10	374	2	4	16	130	9	168	24	6	11	15	12	7	17	35	151	0	13	1	1	25	15	108	5	1782
21 = Bay Area	5	0	0	3	0	0	0	1	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	13
22 = Westchase	33	24	3	20	2	2	5	39	3	76	26	7	3	2	4	5	0	5	12	0	16	3	1	1	4	11	1	308
23 = Energy	8	6	0	8	1	0	0	6	3	9	20	0	1	0	0	0	0	0	0	0	3	2	0	0	0	5	1	73
24 = Greenspoint	28	1	1	27	3	0	3	11	6	8	9	5	9	50	44	4	2	1	1	0	1	0	38	5	24	12	0	293
25 = N Cor Out 610	168	6	3	114	4	12	17	76	22	17	14	7	10	10	19	8	6	4	9	0	1	0	8	79	134	38	1	787
26 = N Cor In 610	143	8	1	71	8	6	21	56	19	29	16	5	17	31	38	8	0	12	6	0	1	2	12	68	67	48	3	696
27 = SE Cor In 610	348	20	11	105	20	84	43	116	14	37	23	6	5	18	17	11	38	60	29	1	9	2	7	39	62	325	16	1466
28 = SE Cor Out 610	35	5	1	20	1	1	6	13	3	4	1	1	0	3	1	2	11	9	2	0	0	0	2	4	3	16	4	148
Total	4100	443	138	2259	140	364	289	1428	303	1501	622	201	237	547	416	352	771	486	547	4	174	75	196	492	666	1333	66	18150

FIGURE 23: ANALYSIS ZONES (HBW-WEIGHTED)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: HBW (PA format)

Year 2022 Average Weekday Transit Trips, Home-Based Work Purpose: Linked Trips (Weighted Trips)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	127	0	0	131	3	4	17	25	13	13	63	0	0	38	20	0	10	2	0	0	0	0	27	11	0	35	0	538
2 = Uptown	5	28	0	0	0	0	0	78	0	4	17	4	0	0	0	0	4	0	0	0	1	3	0	1	4	0	0	150
3 = Greenway	25	1	0	76	0	1	0	71	0	48	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	230
4 = TMC	118	0	0	1248	0	6	12	57	0	28	19	2	0	5	0	14	0	22	0	0	0	0	0	4	0	55	0	1591
5 = NE Inside 610	280	8	22	113	23	60	4	44	53	11	40	17	8	56	39	26	21	25	8	0	10	0	7	32	57	85	0	1047
6 = SE Inside 610	435	23	6	57	55	98	23	60	22	46	8	1	5	4	23	9	31	5	6	0	2	2	0	20	28	213	0	1179
7 = S Inside 610	88	0	8	77	0	0	50	37	22	10	0	2	0	0	0	12	0	0	11	0	0	0	0	7	5	8	0	337
8 = SW Inside 610	690	56	80	1702	10	11	55	519	64	253	34	8	0	31	13	8	35	6	167	0	33	3	20	53	15	161	0	4027
9 = WNW Inside 610	220	27	12	128	0	1	0	56	58	7	116	10	21	32	3	0	0	0	3	0	0	0	0	24	8	8	5	739
10 = West SW	1096	793	425	1293	7	14	97	1314	140	4579	674	179	26	35	75	31	42	79	1086	0	496	58	9	79	29	115	12	12783
11 = West Katy	1205	44	15	493	0	0	12	86	59	166	624	98	56	30	7	10	7	11	37	0	54	51	1	33	12	39	0	3151
12 = NW 290	1235	38	5	329	0	0	0	64	48	73	153	92	7	23	17	0	11	0	7	3	9	6	1	30	31	29	1	2212
13 = NNW 249	847	43	19	206	0	6	5	101	119	17	130	165	239	304	70	18	0	8	15	0	0	9	49	36	41	30	0	2476
14 = North Hardy	1629	5	39	365	9	11	3	185	66	41	110	63	284	624	156	19	8	6	13	0	1	52	248	25	100	36	5	4101
15 = NE Eastex	748	4	5	153	0	15	20	122	46	65	26	20	20	56	237	30	22	9	2	0	0	4	38	87	126	42	0	1898
16 = East I-10	289	13	6	180	39	18	10	132	16	25	31	41	9	4	60	269	2	28	9	0	0	0	28	21	45	36	3	1315
17 = SH225 Gulf	836	16	28	878	7	94	11	196	7	68	40	2	5	3	23	12	644	74	9	0	0	0	2	6	29	115	34	3139
18 = S288 35	256	16	17	611	0	10	12	209	21	103	24	6	15	19	17	9	77	240	55	0	4	3	12	15	28	154	0	1934
19 = SW US59	2394	133	8	1945	3	0	45	580	35	694	105	25	31	17	31	21	31	97	594	0	45	8	4	37	31	170	22	7107
21 = Bay Area	18	0	0	9	0	0	0	2	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	43
22 = Westchase	172	99	42	118	11	0	0	145	9	477	139	61	0	2	32	19	0	23	25	0	87	0	5	0	3	29	0	1499
23 = Energy	44	6	0	28	0	0	0	31	3	25	59	0	0	0	0	0	0	0	0	0	4	9	0	0	0	14	1	224
24 = Greenspoint	128	0	9	124	0	0	2	31	26	29	36	29	65	232	465	12	3	0	2	0	3	0	155	9	51	19	0	1431
25 = N Cor Out 610	661	6	9	277	9	19	37	113	73	54	55	16	22	11	43	33	4	6	7	0	0	0	4	205	174	13	0	1853
26 = N Cor In 610	259	20	14	152	8	1	43	116	49	33	38	29	81	70	94	19	0	19	17	0	1	7	9	72	222	62	2	1434
27 = SE Cor In 610	597	63	53	480	19	66	63	372	34	74	18	17	7	69	34	33	66	129	74	3	38	6	14	84	57	527	35	3031
28 = SE Cor Out 610	37	11	0	61	0	0	10	22	0	1	4	0	0	1	0	3	23	13	9	0	0	0	0	3	1	12	61	272
Total	14439	1454	821	11238	202	435	531	4767	984	6943	2564	886	900	1667	1458	606	1053	800	2153	7	789	222	632	895	1098	2008	187	59740

FIGURE 24: ANALYSIS ZONES (HBW- UNWEIGHTED SURVEYS)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: HBW (PA format)

Year 2022 Average Weekday Transit Trips, Home-Based Work Purpose: Linked Trips (Survey Records)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	14	0	0	18	1	1	1	6	2	1	6	0	0	8	2	0	3	3	0	0	0	0	1	1	0	7	0	75
2 = Uptown	2	8	0	0	0	0	0	7	0	2	3	1	0	0	0	0	1	0	0	0	1	1	0	1	1	0	0	28
3 = Greenway	1	1	0	6	0	1	0	4	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	19
4 = TMC	13	0	0	73	0	3	2	6	0	3	2	1	0	1	0	1	0	3	0	0	0	0	0	1	0	5	0	114
5 = NE Inside 610	26	2	1	20	6	6	1	10	9	4	8	4	2	9	4	3	7	3	2	0	1	0	2	6	6	13	0	155
6 = SE Inside 610	94	3	2	18	4	19	6	17	6	8	4	1	1	2	4	2	7	2	3	0	1	2	0	10	13	28	0	257
7 = S Inside 610	11	0	1	7	0	0	3	7	2	3	0	2	0	0	0	2	0	0	2	0	0	0	0	1	3	2	0	46
8 = SW Inside 610	60	10	5	144	3	3	7	55	12	30	7	2	0	2	3	3	7	2	15	0	5	1	3	10	6	15	0	410
9 = WNW Inside 610	19	6	1	15	0	1	0	7	7	2	15	3	5	2	1	0	0	0	1	0	0	1	0	2	2	1	1	92
10 = West SW	145	121	29	163	3	6	11	158	32	374	85	33	7	9	10	6	11	11	89	0	38	10	3	17	9	19	2	1401
11 = West Katy	246	23	2	71	0	0	4	17	8	28	83	12	5	7	2	2	1	4	6	0	8	6	1	7	2	9	0	554
12 = NW 290	324	14	3	64	0	0	0	18	8	19	23	12	2	2	3	0	5	0	2	2	1	1	1	8	1	9	1	523
13 = NNW 249	176	11	3	51	0	1	2	15	10	5	13	16	19	25	10	4	0	2	3	0	0	5	6	7	6	5	0	395
14 = North Hardy	298	5	9	76	2	2	1	31	9	10	17	10	26	67	27	5	1	3	4	0	1	18	26	5	14	9	2	678
15 = NE Eastex	119	2	1	35	0	2	3	27	11	18	5	3	4	10	31	6	4	2	1	0	0	2	6	11	15	9	0	327
16 = East I-10	95	3	2	54	5	5	3	22	5	9	9	7	2	3	11	73	2	7	4	0	0	0	8	5	8	8	2	352
17 = SH225 Gulf	221	6	4	145	1	10	3	35	4	19	10	1	1	3	6	4	148	17	5	1	0	0	2	5	5	21	2	679
18 = S288 35	52	6	2	81	0	2	2	42	6	18	8	3	4	4	5	2	10	56	11	0	1	1	2	5	6	21	0	350
19 = SW US59	518	22	5	308	1	0	6	81	8	78	18	3	10	2	7	3	11	13	58	0	8	1	1	13	8	28	4	1215
21 = Bay Area	4	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	10
22 = Westchase	18	13	3	13	2	0	0	22	3	36	18	7	0	2	4	2	0	5	5	0	5	0	1	0	1	3	1	164
23 = Energy	7	5	0	4	0	0	0	5	3	4	12	0	0	0	0	0	0	0	0	0	1	2	0	0	0	2	1	46
24 = Greenspoint	17	0	1	20	1	0	1	5	4	4	6	4	6	19	30	2	1	0	1	0	1	0	14	2	8	4	0	151
25 = N Cor Out 610	69	4	2	62	2	5	5	36	11	10	12	4	6	3	6	4	4	3	3	0	0	0	2	23	34	5	0	315
26 = N Cor In 610	48	6	1	37	2	1	8	26	7	8	9	3	12	6	13	2	0	5	3	0	1	2	2	14	20	11	1	248
27 = SE Cor In 610	130	11	4	61	3	19	11	64	9	15	6	5	2	10	7	6	14	17	13	1	5	2	4	15	14	77	6	531
28 = SE Cor Out 610	13	4	0	14	0	0	2	4	0	1	1	0	0	1	0	2	3	3	1	0	0	0	0	2	1	2	3	57
Total	2740	286	81	1562	36	87	82	728	176	712	381	137	114	197	186	134	243	161	232	4	78	55	85	171	183	313	28	9192

FIGURE 25: ANALYSIS ZONES (HBO-WEIGHTED)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: HBO (PA format)

Year 2022 Average Weekday Transit Trips, Home-Based Other Purpose: Linked Trips (Weighted Trips)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	215	22	0	208	0	18	39	315	30	42	22	5	0	12	56	28	3	40	0	0	55	0	0	107	65	176	1	1460
2 = Uptown	26	50	0	0	0	0	0	34	0	141	8	0	0	0	2	0	0	0	11	0	10	0	0	0	0	19	0	301
3 = Greenway	0	0	47	20	0	0	0	8	0	11	3	0	0	0	0	0	0	0	21	0	13	0	0	0	0	27	0	150
4 = TMC	151	0	0	359	29	10	67	223	50	64	0	0	0	3	0	0	0	49	61	0	2	0	10	26	4	137	3	1247
5 = NE Inside 610	144	28	3	73	216	136	27	85	56	36	3	0	20	23	56	43	6	4	21	0	7	0	3	148	133	109	0	1380
6 = SE Inside 610	306	1	0	102	0	454	19	45	16	43	9	0	4	18	4	0	78	8	0	0	3	0	4	24	33	235	12	1419
7 = S Inside 610	124	1	25	120	0	7	26	116	0	21	8	0	0	0	13	0	0	34	11	0	5	0	0	0	63	105	5	686
8 = SW Inside 610	646	110	162	838	1	28	106	712	74	233	13	1	4	45	11	2	18	60	180	0	0	0	12	57	50	270	0	3634
9 = WNW Inside 610	84	0	13	32	4	0	23	79	179	3	7	13	11	63	0	1	1	1	0	0	1	0	15	43	25	21	0	619
10 = West SW	523	382	154	419	9	63	83	767	42	4646	592	52	7	8	52	15	46	22	715	0	542	39	8	85	15	360	2	9647
11 = West Katy	264	21	5	94	0	3	19	113	63	74	489	110	15	35	22	9	2	8	11	0	7	41	0	16	3	102	0	1525
12 = NW 290	124	5	6	31	7	1	6	25	5	41	138	39	49	52	12	10	27	2	34	0	15	0	25	13	67	145	0	880
13 = NNW 249	193	22	0	58	12	4	51	43	59	13	103	80	343	239	29	3	3	15	14	0	0	2	107	29	102	71	0	1595
14 = North Hardy	260	7	15	82	12	10	30	64	112	25	59	12	271	967	95	46	46	12	22	0	4	0	231	59	278	74	0	2793
15 = NE Eastex	183	6	0	59	68	18	36	24	9	5	30	10	14	26	303	53	9	17	15	0	0	0	42	77	205	54	0	1261
16 = East I-10	150	14	0	86	115	13	40	85	0	25	17	18	36	48	106	490	17	16	23	0	4	0	13	57	82	55	0	1509
17 = SH225 Gulf	205	19	8	92	19	147	14	86	0	73	7	15	1	8	21	6	1191	121	30	0	6	0	11	16	20	352	30	2497
18 = S288 35	144	42	8	118	9	16	82	121	17	70	15	1	8	2	19	10	94	627	100	0	0	1	0	48	23	469	79	2123
19 = SW US59	345	15	30	402	3	19	40	420	0	883	13	16	0	51	13	43	17	109	1095	0	10	0	0	55	18	414	8	4024
21 = Bay Area	5	0	0	3	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
22 = Westchase	97	71	0	40	0	10	32	120	0	398	112	0	17	0	0	16	0	0	31	0	137	30	0	2	7	40	0	1162
23 = Energy	1	0	0	1	2	0	0	0	0	36	39	0	3	0	0	0	0	0	0	0	10	0	0	0	0	7	0	99
24 = Greenspoint	48	7	0	40	11	0	32	37	2	12	5	3	31	324	122	8	1	1	0	0	0	0	295	10	153	35	0	1179
25 = N Cor Out 610	631	8	4	163	12	10	66	136	77	24	15	9	5	14	76	39	2	4	10	0	0	0	19	485	517	100	0	2428
26 = N Cor In 610	422	8	0	94	22	12	28	92	74	89	19	9	16	180	177	60	0	34	6	0	0	0	81	244	373	107	22	2167
27 = SE Cor In 610	960	15	57	241	142	285	280	290	34	99	36	1	10	28	24	8	148	289	77	0	12	0	6	109	94	1505	71	4823
28 = SE Cor Out 610	54	1	2	24	2	37	14	45	2	12	0	3	0	6	4	0	78	62	3	0	0	0	1	2	10	84	13	461
Total	6305	855	539	3799	694	1301	1162	4085	902	7125	1762	397	865	2152	1217	891	1789	1534	2491	0	843	113	884	1712	2339	5073	248	51076

FIGURE 26: ANALYSIS ZONES (HBO-UNWEIGHTED SURVEYS)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: HBO (PA format)

Year 2022 Average Weekday Transit Trips, Home-Based Other Purpose: Linked Trips (Survey Records)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	23	2	0	28	0	9	5	33	2	4	3	1	0	3	8	2	1	6	0	0	2	0	0	11	14	27	1	185
2 = Uptown	2	6	0	0	0	0	0	4	0	7	2	0	0	0	1	0	0	0	1	0	2	0	0	0	0	2	0	27
3 = Greenway	0	0	3	3	0	0	0	2	0	2	1	0	0	0	0	0	0	0	3	0	1	0	0	0	0	2	0	17
4 = TMC	27	0	0	29	2	3	4	22	3	11	0	0	0	1	0	0	0	7	8	0	1	0	1	4	3	18	1	145
5 = NE Inside 610	26	3	1	14	19	10	5	16	6	10	2	0	5	5	6	3	3	2	4	0	2	0	2	14	18	14	0	190
6 = SE Inside 610	94	1	0	32	0	65	4	17	4	7	3	0	2	5	1	0	9	1	0	0	3	0	2	6	15	44	1	316
7 = S Inside 610	13	1	1	13	0	4	2	9	0	3	2	1	0	0	3	0	1	5	2	0	1	0	0	0	16	12	1	90
8 = SW Inside 610	70	9	9	73	1	4	9	61	11	21	4	1	2	7	2	1	5	11	18	0	0	0	2	13	16	36	0	386
9 = WNW Inside 610	8	0	1	5	1	0	2	9	14	3	2	1	1	6	0	1	1	1	0	0	1	0	2	7	3	7	0	76
10 = West SW	92	43	13	55	5	14	13	85	9	338	51	5	4	4	12	5	12	7	65	0	41	4	2	22	9	50	1	961
11 = West Katy	47	10	3	19	0	2	6	26	7	13	52	11	4	3	5	3	1	2	3	0	2	5	0	6	1	41	0	272
12 = NW 290	32	5	1	9	1	1	1	6	1	8	15	5	9	6	3	3	1	1	5	0	1	0	2	4	14	68	0	202
13 = NNW 249	25	7	0	12	2	2	7	10	6	6	7	11	23	20	5	1	1	4	2	0	0	2	4	6	13	26	0	202
14 = North Hardy	45	3	3	19	4	5	8	17	13	7	9	1	28	146	16	6	6	6	3	0	1	0	25	10	33	22	0	436
15 = NE Eastex	32	2	0	20	5	3	9	9	2	2	8	1	5	6	46	7	4	6	3	0	0	0	8	11	23	13	0	225
16 = East I-10	27	2	0	28	15	4	8	16	0	8	3	2	4	6	19	134	9	4	5	0	2	0	5	9	13	16	0	339
17 = SH225 Gulf	67	5	1	21	2	24	5	19	0	13	3	3	1	6	5	3	325	14	7	0	1	0	2	8	8	44	3	590
18 = S288 35	43	7	2	25	4	4	11	27	3	15	3	1	2	2	5	4	16	121	15	0	0	2	0	11	9	63	7	402
19 = SW US59	70	5	4	54	1	4	10	46	0	78	4	3	1	11	5	4	6	19	87	0	2	0	0	11	7	77	1	510
21 = Bay Area	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
22 = Westchase	14	6	0	6	0	2	3	14	0	31	8	0	3	0	0	2	0	0	6	0	10	2	0	1	2	5	0	115
23 = Energy	1	0	0	3	1	0	0	0	0	5	8	0	1	0	0	0	0	0	0	0	2	0	0	0	0	3	0	24
24 = Greenspoint	8	1	0	7	2	0	2	6	1	4	1	1	3	29	13	2	1	1	0	0	0	0	23	3	14	7	0	129
25 = N Cor Out 610	87	2	1	49	2	4	10	36	9	5	2	3	3	6	13	3	2	1	4	0	0	0	6	52	89	29	1	419
26 = N Cor In 610	82	2	0	32	4	4	7	25	10	20	5	1	4	22	22	6	0	4	3	0	0	0	9	42	46	32	2	384
27 = SE Cor In 610	193	6	6	36	15	56	30	46	5	18	14	1	3	7	7	4	19	38	14	0	4	0	2	21	41	221	9	816
28 = SE Cor Out 610	22	1	1	6	1	1	3	8	3	2	0	1	0	2	1	0	8	6	1	0	0	0	1	2	1	14	1	86
Total	1151	129	50	599	87	225	164	569	109	642	212	54	108	303	198	194	431	267	259	0	79	15	98	274	408	893	29	7547

FIGURE 27: ANALYSIS ZONES (NHB-WEIGHTED)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: NHB (PA format)

Year 2022 Average Weekday Transit Trips, Non-Home-Based Purpose: Linked Trips (Weighted Trips)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	518	13	0	181	19	38	49	319	31	118	7	0	0	17	49	29	6	41	10	0	12	0	2	68	52	171	5	1756
2 = Uptown	25	2	12	8	0	6	0	36	0	93	5	1	0	0	0	0	0	10	6	0	44	6	0	0	0	19	0	272
3 = Greenway	0	25	0	0	0	0	6	28	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	85
4 = TMC	176	13	0	154	0	14	57	316	6	83	4	0	13	10	6	4	15	37	65	0	0	0	7	12	33	109	4	1138
5 = NE Inside 610	44	0	0	0	35	27	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	120
6 = SE Inside 610	37	0	0	23	2	36	2	22	8	1	0	0	0	1	0	0	16	0	2	0	0	0	0	17	6	22	0	194
7 = S Inside 610	53	0	0	37	4	0	36	36	0	31	0	7	6	0	7	0	0	6	0	0	0	0	0	16	4	20	0	263
8 = SW Inside 610	137	4	9	62	0	1	39	285	14	175	0	5	2	6	0	11	11	37	69	0	13	0	1	8	14	53	2	958
9 = WNW Inside 610	6	0	0	0	14	0	8	35	0	5	17	14	0	2	21	0	0	1	0	0	0	0	0	0	0	9	1	131
10 = West SW	23	73	32	16	0	6	26	99	5	597	65	0	7	0	1	10	0	7	147	0	72	9	0	12	9	55	8	1278
11 = West Katy	31	3	0	0	0	2	14	21	0	5	22	13	2	11	6	0	0	0	1	0	11	6	0	16	7	0	0	171
12 = NW 290	4	0	0	5	4	0	0	0	0	16	11	0	3	0	4	8	0	0	2	0	8	0	22	0	14	1	0	101
13 = NNW 249	0	0	0	2	0	0	0	0	0	6	0	0	23	72	14	0	0	0	0	0	0	0	0	0	13	0	0	130
14 = North Hardy	15	6	0	1	0	12	0	24	0	9	9	1	22	114	13	0	0	0	0	0	0	0	10	5	28	0	0	269
15 = NE Eastex	15	0	0	4	4	0	14	1	0	12	0	0	0	4	25	5	2	0	0	0	0	0	12	0	30	1	0	129
16 = East I-10	28	0	0	0	12	0	0	0	0	12	0	0	0	0	11	49	0	0	17	0	0	0	0	0	32	13	0	173
17 = SH225 Gulf	34	5	0	0	7	6	0	13	0	3	0	0	0	6	1	0	280	26	9	0	0	0	1	2	3	5	6	407
18 = S288 35	13	0	0	19	0	15	5	7	0	0	0	0	0	0	0	0	0	103	33	0	1	0	7	15	27	12	0	260
19 = SW US59	41	10	8	45	0	0	0	12	2	137	14	0	0	6	0	0	0	18	37	0	15	0	0	1	0	26	0	371
21 = Bay Area	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 = Westchase	7	90	0	6	0	0	10	17	0	123	0	0	0	0	0	2	0	0	16	0	11	6	0	0	1	13	0	302
23 = Energy	0	1	0	2	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
24 = Greenspoint	22	0	0	0	0	0	0	0	6	0	4	0	0	17	12	0	0	0	0	0	0	0	4	0	16	4	0	85
25 = N Cor Out 610	83	0	0	4	0	5	23	22	14	4	0	0	2	3	0	7	0	0	24	0	13	0	0	63	54	10	0	332
26 = N Cor In 610	53	0	0	8	9	2	18	22	11	3	7	15	8	40	32	0	0	7	0	0	0	0	16	64	6	28	0	351
27 = SE Cor In 610	107	17	13	43	10	28	15	38	0	20	14	0	0	7	24	2	37	33	15	0	0	0	3	12	16	173	2	629
28 = SE Cor Out 610	0	0	0	0	0	0	1	5	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	12
Total	1471	261	74	620	119	198	324	1374	104	1464	179	56	88	315	225	126	368	325	453	0	201	28	90	312	367	767	27	9937

FIGURE 28: ANALYSIS ZONES (NHB- UNWEIGHTED SURVEYS)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: NHB (PA format)

Year 2022 Average Weekday Transit Trips, Non-Home-Based Purpose: Linked Trips (Survey Records)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	41	1	0	28	3	12	6	22	3	11	1	0	0	2	5	2	3	8	2	0	2	0	1	7	13	25	2	200
2 = Uptown	2	1	2	1	0	2	0	4	0	10	2	1	0	0	0	0	0	3	2	0	2	1	0	0	0	1	0	34
3 = Greenway	0	1	0	0	0	0	1	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	8
4 = TMC	21	1	0	13	0	3	6	24	1	10	2	0	2	2	2	1	3	5	10	0	0	0	1	3	11	12	1	134
5 = NE Inside 610	2	0	0	0	3	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	10
6 = SE Inside 610	16	1	0	5	1	6	1	3	2	1	0	0	0	2	0	0	4	0	1	0	0	0	1	4	3	8	0	59
7 = S Inside 610	7	0	0	6	1	0	3	4	0	3	0	2	1	0	1	0	0	1	0	0	0	0	0	2	1	4	0	36
8 = SW Inside 610	19	1	1	6	0	1	4	18	3	16	0	1	1	1	0	1	2	3	7	0	1	0	1	2	3	12	1	105
9 = WNW Inside 610	2	0	0	0	1	0	1	9	0	2	1	1	0	1	3	0	0	1	0	0	0	0	0	0	0	1	1	24
10 = West SW	7	7	2	4	0	3	4	10	2	50	8	0	2	0	1	2	0	2	13	0	4	1	0	4	4	9	2	141
11 = West Katy	4	2	0	0	0	1	1	4	0	2	3	3	1	1	2	0	0	0	1	0	1	2	0	1	1	0	0	30
12 = NW 290	1	0	0	2	1	0	0	0	0	3	1	0	1	0	1	1	0	0	1	0	1	0	1	0	1	1	0	16
13 = NNW 249	0	0	0	1	0	0	0	0	0	1	0	0	2	5	2	0	0	0	0	0	0	0	0	0	2	0	0	13
14 = North Hardy	3	2	0	1	0	3	1	2	0	2	2	1	3	21	3	0	0	0	0	0	0	0	1	1	3	0	0	49
15 = NE Eastex	3	0	0	1	1	0	1	1	0	2	0	0	0	1	2	1	1	0	0	0	0	0	1	0	3	1	0	19
16 = East I-10	4	0	0	0	1	0	0	0	0	2	0	0	0	0	2	13	0	0	1	0	0	0	0	0	4	4	0	31
17 = SH225 Gulf	11	1	0	0	1	3	0	1	0	1	0	0	0	2	1	0	79	3	3	0	0	0	1	1	1	1	1	111
18 = S288 35	5	0	0	3	0	2	1	3	0	0	0	0	0	0	0	0	0	21	4	0	1	0	1	2	2	3	0	48
19 = SW US59	7	1	1	12	0	0	0	3	1	12	2	0	0	2	0	0	0	3	6	0	3	0	0	1	0	3	0	57
21 = Bay Area	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 = Westchase	1	5	0	1	0	0	2	3	0	9	0	0	0	0	0	1	0	0	1	0	1	1	0	0	1	3	0	29
23 = Energy	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
24 = Greenspoint	3	0	0	0	0	0	0	0	1	0	2	0	0	2	1	0	0	0	0	0	0	0	1	0	2	1	0	13
25 = N Cor Out 610	12	0	0	3	0	3	2	4	2	2	0	0	1	1	0	1	0	0	2	0	1	0	0	4	11	4	0	53
26 = N Cor In 610	13	0	0	2	2	1	6	5	2	1	2	1	1	3	3	0	0	3	0	0	0	0	1	12	1	5	0	64
27 = SE Cor In 610	25	3	1	8	2	9	2	6	0	4	3	0	0	1	3	1	5	5	2	0	0	0	1	3	7	27	1	119
28 = SE Cor Out 610	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	5
Total	209	28	7	98	17	52	43	131	18	147	29	10	15	47	32	24	97	58	56	0	17	5	13	47	75	127	9	1411

FIGURE 29: ANALYSIS ZONES (WALK ACCESS-WEIGHTED)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: Walk (PA format)

Year 2022 Average Weekday Transit Trips, Walk Access: Linked Trips (Weighted Trips)*

** Walk Access includes Walk, Wheelchair and Skateboard*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	849	35	0	520	22	61	105	648	73	174	89	5	0	48	125	43	14	75	7	0	67	0	29	186	113	378	6	3672
2 = Uptown	50	78	12	8	0	6	0	148	0	239	27	5	0	0	2	0	4	10	17	0	55	9	0	1	4	37	0	712
3 = Greenway	25	26	47	47	0	1	6	106	0	64	5	0	0	0	0	0	0	0	17	0	13	0	0	0	0	45	4	406
4 = TMC	436	13	0	1629	29	27	136	580	9	136	20	2	11	13	5	18	12	95	117	0	2	0	17	42	35	281	7	3672
5 = NE Inside 610	414	15	24	130	275	224	26	129	105	47	40	15	25	65	94	58	27	27	29	0	17	0	6	167	190	169	0	2318
6 = SE Inside 610	659	24	6	166	56	579	36	108	44	90	10	1	9	23	21	3	111	11	7	0	5	2	5	60	60	452	12	2560
7 = S Inside 610	242	1	34	185	4	4	78	150	22	53	4	8	6	0	20	12	0	40	22	0	5	0	0	23	73	117	5	1108
8 = SW Inside 610	1410	171	251	2305	10	29	143	1484	152	649	47	8	6	83	22	17	55	103	357	0	46	0	32	106	78	476	2	8042
9 = WNW Inside 610	303	23	12	119	17	0	31	162	237	14	90	18	33	96	24	1	1	2	3	0	1	0	15	66	34	29	5	1336
10 = West SW	1374	1211	611	1360	14	73	183	2113	181	9665	1296	183	36	41	77	48	78	89	1801	0	1104	107	17	163	50	488	22	22385
11 = West Katy	917	57	19	309	0	5	34	132	123	196	1070	219	73	41	33	19	9	14	30	0	67	98	1	44	23	82	0	3615
12 = NW 290	692	22	9	170	4	1	6	48	48	96	286	130	58	41	29	18	35	0	19	2	32	6	48	31	109	103	0	2043
13 = NNW 249	632	48	0	172	12	9	57	125	170	30	225	183	604	531	111	14	0	12	23	0	0	1	157	55	154	76	0	3401
14 = North Hardy	771	13	14	243	20	32	28	240	153	60	153	60	531	1616	220	48	46	15	35	0	5	22	477	85	393	82	4	5366
15 = NE Eastex	571	11	5	133	72	33	59	109	54	62	54	28	22	86	542	73	33	26	10	0	0	0	91	149	342	92	0	2657
16 = East I-10	395	27	6	171	149	30	46	172	15	56	42	42	43	52	156	761	13	42	47	0	4	0	42	73	158	91	3	2636
17 = SH225 Gulf	670	35	36	442	20	243	13	230	7	137	43	17	6	16	43	17	1876	214	47	0	6	0	9	23	47	406	70	4673
18 = S288 35	326	53	15	432	9	32	87	255	39	161	26	3	17	15	35	19	165	944	182	0	1	4	11	78	75	562	79	3625
19 = SW US59	1594	131	38	1337	3	16	71	808	37	1609	109	33	21	60	38	64	39	204	1670	0	63	8	4	86	42	480	27	8592
21 = Bay Area	7	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
22 = Westchase	255	252	42	129	11	10	42	281	9	950	251	56	17	2	14	37	0	18	72	0	203	36	5	2	11	61	0	2766
23 = Energy	35	7	0	23	2	0	0	47	3	58	98	0	3	0	0	0	0	0	0	0	14	9	0	0	0	19	1	319
24 = Greenspoint	170	7	0	105	11	0	32	68	35	27	38	18	97	491	580	12	4	1	2	0	3	0	454	19	220	57	0	2451
25 = N Cor Out 610	1280	14	14	413	21	35	98	255	159	78	64	25	29	26	100	72	5	11	41	0	13	0	23	714	707	116	0	4313
26 = N Cor In 610	650	28	14	210	39	15	81	196	133	93	62	54	94	284	302	79	0	50	8	0	1	2	106	365	600	190	24	3680
27 = SE Cor In 610	1610	91	124	649	169	372	335	589	46	186	49	18	16	94	74	40	251	440	150	3	50	6	11	188	161	2142	104	7968
28 = SE Cor Out 610	70	12	2	54	2	37	25	72	2	16	4	3	0	8	4	3	101	69	12	0	0	0	4	5	12	79	74	670
Total	16407	2405	1335	11461	971	1874	1758	9255	1856	14949	4202	1134	1757	3732	2671	1476	2879	2512	4725	5	1777	310	1564	2731	3691	7110	449	104996

FIGURE 30: ANALYSIS ZONES (WALK ACCESS- UNWEIGHTED SURVEYS)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: Walk (PA format)

Year 2022 Average Weekday Transit Trips, Walk Access: Linked Trips (Survey Records)*

** Walk Access includes Walk, Wheelchair and Skateboard*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	75	3	0	74	4	22	12	59	7	16	9	1	0	9	15	3	5	13	1	0	4	0	2	19	26	58	3	440
2 = Uptown	5	14	2	1	0	2	0	15	0	19	6	2	0	0	1	0	1	3	3	0	5	2	0	1	1	3	0	86
3 = Greenway	1	2	3	6	0	1	1	9	0	6	2	0	0	0	0	0	0	0	2	0	1	0	0	0	0	3	1	38
4 = TMC	58	1	0	108	2	6	12	50	2	20	3	1	1	3	1	2	2	14	15	0	1	0	2	7	13	33	2	359
5 = NE Inside 610	46	4	2	28	28	19	5	26	14	14	9	3	6	12	10	4	10	4	6	0	3	0	3	19	24	24	0	323
6 = SE Inside 610	178	5	2	48	5	86	9	32	11	16	5	1	3	8	3	1	19	2	4	0	4	2	3	19	27	76	1	570
7 = S Inside 610	28	1	2	23	1	3	6	18	2	8	1	4	1	0	4	2	1	6	4	0	1	0	0	3	20	16	1	156
8 = SW Inside 610	140	20	15	201	3	7	15	127	26	65	11	3	3	10	4	4	11	16	35	0	6	0	5	23	23	61	1	835
9 = WNW Inside 610	27	4	1	16	2	0	3	23	21	5	10	3	6	9	4	1	1	2	1	0	1	0	2	8	5	8	2	165
10 = West SW	213	166	44	180	7	20	24	239	40	737	139	30	12	12	19	10	21	18	152	0	81	15	5	41	20	72	5	2322
11 = West Katy	169	29	4	51	0	3	8	31	15	35	133	25	10	8	8	5	2	5	8	0	9	13	1	9	4	33	0	618
12 = NW 290	173	11	3	43	1	1	1	12	7	20	36	16	12	5	5	4	5	0	4	1	3	1	4	10	14	46	0	438
13 = NNW 249	105	13	0	38	2	3	9	20	14	10	18	22	44	45	16	3	0	5	4	0	0	2	10	11	20	22	0	436
14 = North Hardy	148	7	2	60	6	10	9	41	20	16	24	10	49	227	44	7	6	7	7	0	2	4	47	15	48	22	1	839
15 = NE Eastex	88	4	1	39	6	5	10	28	13	19	12	3	6	17	77	12	9	8	3	0	0	0	14	19	39	21	0	453
16 = East I-10	90	5	2	63	19	9	10	32	4	17	8	6	5	9	28	207	10	10	8	0	2	0	13	12	25	24	2	620
17 = SH225 Gulf	188	11	5	85	3	36	4	43	4	31	10	4	2	10	11	6	498	32	15	1	1	0	4	13	13	51	6	1087
18 = S288 35	80	11	2	75	4	6	12	60	9	30	9	3	5	5	10	6	23	190	28	0	1	3	2	18	16	70	7	685
19 = SW US59	330	22	5	198	1	3	13	99	9	154	20	5	9	13	10	7	13	31	146	0	10	1	1	22	13	77	4	1216
21 = Bay Area	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
22 = Westchase	30	23	3	19	2	2	5	38	3	73	26	6	3	2	3	5	0	4	12	0	13	3	1	1	4	10	1	292
23 = Energy	7	6	0	7	1	0	0	5	3	8	20	0	1	0	0	0	0	0	0	0	3	2	0	0	0	4	1	68
24 = Greenspoint	21	1	0	22	3	0	2	11	6	6	8	3	9	45	42	2	2	1	1	0	1	0	38	5	24	11	0	264
25 = N Cor Out 610	154	6	3	104	4	12	14	71	21	15	13	7	10	9	17	6	5	4	9	0	1	0	8	75	127	34	0	729
26 = N Cor In 610	128	8	1	59	8	6	20	51	19	26	15	5	15	30	38	8	0	10	3	0	1	1	12	64	67	44	3	642
27 = SE Cor In 610	331	19	11	98	19	82	39	107	12	35	18	6	4	15	15	10	38	57	25	1	8	2	4	36	58	307	15	1372
28 = SE Cor Out 610	28	5	1	15	1	1	6	13	3	4	1	1	0	3	1	2	11	8	2	0	0	0	2	4	3	10	4	129
Total	2843	401	114	1661	132	345	249	1260	285	1406	566	170	216	506	386	317	693	450	498	3	162	51	183	454	634	1140	60	15185

FIGURE 31: ANALYSIS ZONES (BIKE ACCESS-WEIGHTED)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: Bike (PA format)

Year 2022 Average Weekday Transit Trips, Bike Access: Linked Trips (Weighted Trips)*

** Bike Access include Personal Bike and Bike share*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	4	0	9
2 = Uptown	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
3 = Greenway	0	0	0	8	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	13
4 = TMC	3	0	0	73	0	2	0	5	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	129
5 = NE Inside 610	5	0	0	15	0	0	0	0	0	0	3	2	0	0	0	0	0	2	0	0	0	0	0	0	0	9	0	36
6 = SE Inside 610	36	0	0	2	0	9	8	5	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	2	3	17	0	86
7 = S Inside 610	24	0	0	49	0	3	33	39	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	165
8 = SW Inside 610	14	0	0	49	0	11	7	10	0	0	0	0	0	0	2	4	0	0	26	0	0	0	1	0	2	3	0	128
9 = WNW Inside 610	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	9	0	14
10 = West SW	3	3	0	15	0	2	14	12	0	30	0	3	0	0	1	0	0	0	13	0	7	0	0	0	0	4	0	106
11 = West Katy	3	0	0	1	0	0	0	3	0	1	0	2	0	0	3	0	0	0	0	0	1	0	0	1	0	0	0	15
12 = NW 290	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
13 = NNW 249	9	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	6	2	3	0	23
14 = North Hardy	20	0	0	0	0	0	5	0	0	0	0	1	21	8	0	0	0	3	0	0	0	0	3	0	0	0	0	61
15 = NE Eastex	15	0	0	1	0	0	0	1	0	0	0	2	1	0	0	2	0	0	0	0	0	0	0	6	0	0	0	27
16 = East I-10	2	0	0	2	0	0	0	2	0	0	0	0	0	0	1	16	6	0	0	0	0	0	0	0	0	0	0	29
17 = SH225 Gulf	1	0	0	0	0	5	4	0	0	2	0	0	0	0	0	0	14	0	0	0	0	0	6	0	0	0	0	33
18 = S288 35	2	0	0	7	0	5	0	1	0	2	0	0	0	0	0	0	0	6	0	0	0	0	0	0	4	4	0	31
19 = SW US59	2	0	0	14	0	0	1	10	0	13	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	42
21 = Bay Area	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 = Westchase	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	4
23 = Energy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24 = Greenspoint	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3
25 = N Cor Out 610	82	0	0	17	0	0	20	11	6	0	0	0	0	2	2	0	0	0	0	0	0	0	0	30	28	1	0	199
26 = N Cor In 610	21	0	0	13	0	0	0	0	0	0	2	0	0	0	0	0	0	1	1	0	0	4	0	6	0	0	0	49
27 = SE Cor In 610	25	0	0	2	2	7	0	11	4	0	3	0	1	0	0	0	0	0	0	0	0	0	0	17	5	37	4	119
28 = SE Cor Out 610	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	3	0	10
Total	275	3	0	268	2	43	93	116	56	53	13	15	23	11	9	22	20	23	40	0	11	4	10	69	45	110	5	1338

FIGURE 32: ANALYSIS ZONES (BIKE ACCESS- UNWEIGHTED SURVEYS)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: Bike (PA format)

Year 2022 Average Weekday Transit Trips, Bike Access: Linked Trips (Survey Records)*

** Bike Access include Personal Bike and Bike share*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	4
2 = Uptown	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3 = Greenway	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3
4 = TMC	2	0	0	3	0	2	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	12
5 = NE Inside 610	2	0	0	1	0	0	0	0	0	0	1	1	0	0	0	1	0	1	0	0	0	0	0	0	0	2	0	9
6 = SE Inside 610	14	0	0	1	0	4	2	2	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	2	4	0	32
7 = S Inside 610	3	0	0	3	0	1	2	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	14
8 = SW Inside 610	3	0	0	4	0	1	1	2	0	0	0	0	0	0	1	1	0	0	2	0	0	0	1	0	2	1	0	19
9 = WNW Inside 610	1	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	8
10 = West SW	1	1	0	5	0	2	3	5	0	15	0	2	0	0	1	0	0	0	4	0	2	0	0	0	0	1	0	42
11 = West Katy	2	1	0	1	0	0	0	1	0	1	1	1	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	11
12 = NW 290	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
13 = NNW 249	2	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	8
14 = North Hardy	2	0	0	0	0	1	0	0	0	0	0	1	5	1	0	0	0	2	0	0	0	0	3	0	0	0	0	15
15 = NE Eastex	4	0	0	1	0	0	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	10
16 = East I-10	1	0	0	2	0	0	0	1	0	0	1	0	0	0	1	7	1	0	0	0	0	0	0	0	0	0	0	14
17 = SH225 Gulf	2	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	11
18 = S288 35	2	0	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	5	0	0	0	0	0	0	1	2	0	14
19 = SW US59	2	0	0	4	0	0	1	3	0	3	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	15
21 = Bay Area	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 = Westchase	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
23 = Energy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24 = Greenspoint	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
25 = N Cor Out 610	11	0	0	3	0	0	2	3	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	3	5	1	0	32
26 = N Cor In 610	5	0	0	5	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1	0	2	0	0	0	16
27 = SE Cor In 610	9	0	0	1	1	2	0	4	1	0	2	0	1	0	0	0	0	0	0	0	1	0	0	3	4	9	1	39
28 = SE Cor Out 610	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	3
Total	69	2	0	38	1	14	13	29	4	26	10	10	7	3	5	10	6	14	7	0	5	2	5	14	16	26	2	338

FIGURE 33: ANALYSIS ZONES (KNR ACCESS-WEIGHTED)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: KNR (PA format)

Year 2022 Average Weekday Transit Trips, Kiss-Ride Access: Linked Trips (Weighted Trips)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	0	0	0	0	0	0	0	8	0	0	2	0	0	10	0	14	0	2	3	0	0	0	0	0	0	0	0	40
2 = Uptown	0	2	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
3 = Greenway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 = TMC	0	0	0	32	0	2	0	0	0	21	0	0	0	5	1	0	0	13	0	0	0	0	0	0	1	3	0	79
5 = NE Inside 610	14	21	0	8	0	0	0	0	4	0	0	0	2	3	0	10	0	0	0	0	0	0	0	13	0	0	0	74
6 = SE Inside 610	13	0	0	8	0	0	0	13	2	0	4	0	0	1	6	6	0	0	0	0	0	0	0	0	3	0	0	56
7 = S Inside 610	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 = SW Inside 610	1	0	0	48	1	0	24	9	0	0	0	5	0	0	0	0	2	0	4	0	0	3	0	13	0	4	0	115
9 = WNW Inside 610	5	4	0	0	0	0	0	5	0	0	46	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73
10 = West SW	35	31	0	19	1	7	9	47	6	92	33	40	4	2	50	9	9	18	130	0	0	0	0	10	1	24	0	574
11 = West Katy	74	5	0	18	0	0	6	57	0	27	59	0	0	0	0	0	0	0	14	0	0	0	0	0	0	11	0	270
12 = NW 290	58	12	0	15	7	0	0	5	0	8	8	0	0	0	3	0	4	2	11	0	0	0	0	0	0	34	1	168
13 = NNW 249	22	7	0	15	0	0	0	0	0	0	2	60	0	71	2	7	0	12	0	0	0	6	0	0	0	11	0	214
14 = North Hardy	117	3	0	31	0	0	0	26	25	11	9	0	25	45	0	17	8	0	0	0	0	0	9	0	13	13	1	354
15 = NE Eastex	51	0	0	6	0	0	2	3	0	11	2	0	11	0	6	12	0	0	7	0	0	0	0	6	19	1	0	140
16 = East I-10	16	0	0	20	17	0	5	42	1	5	5	2	3	0	21	31	0	0	1	0	0	0	0	5	0	10	0	185
17 = SH225 Gulf	41	5	0	8	12	0	6	22	0	5	5	0	0	2	2	1	72	3	0	0	0	0	0	0	5	40	0	229
18 = S288 35	10	5	9	13	0	5	0	45	0	10	2	4	6	6	0	0	0	8	2	0	4	0	8	0	0	23	0	160
19 = SW US59	71	15	0	195	3	3	13	81	0	71	23	8	2	0	5	0	5	17	43	0	5	0	0	0	6	27	3	597
21 = Bay Area	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	8
22 = Westchase	16	0	0	0	0	0	0	0	0	40	0	5	0	0	19	0	0	5	0	0	29	0	0	0	0	21	0	136
23 = Energy	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
24 = Greenspoint	2	0	0	24	0	0	0	0	0	14	0	12	0	58	17	8	0	0	0	0	0	0	0	0	0	2	0	137
25 = N Cor Out 610	7	0	0	8	0	0	0	0	0	0	0	0	0	0	17	8	0	0	0	0	0	0	0	9	10	3	0	63
26 = N Cor In 610	36	0	0	8	0	0	9	21	0	29	0	0	11	6	0	0	0	9	13	0	0	0	0	8	0	7	0	156
27 = SE Cor In 610	21	3	0	37	0	0	0	47	18	8	8	0	0	10	6	2	0	11	16	0	0	0	4	0	0	22	0	213
28 = SE Cor Out 610	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	15
Total	620	113	9	517	42	17	73	431	55	358	211	151	63	219	154	126	103	99	245	0	39	9	21	64	58	262	6	4065

FIGURE 34: ANALYSIS ZONES (KNR ACCESS- UNWEIGHTED SURVEYS)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: KNR (PA format)

Year 2022 Average Weekday Transit Trips, Kiss-Ride Access: Linked Trips (Survey Records)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	0	0	0	0	0	0	0	1	0	0	1	0	0	3	0	1	0	1	1	0	0	0	0	0	0	0	0	8
2 = Uptown	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
3 = Greenway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 = TMC	0	0	0	2	0	1	0	0	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	1	1	0	9
5 = NE Inside 610	3	1	0	1	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	0	0	0	1	0	0	0	10
6 = SE Inside 610	5	0	0	3	0	0	0	3	1	0	1	0	0	1	2	1	0	0	0	0	0	0	0	0	2	0	0	19
7 = S Inside 610	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 = SW Inside 610	1	0	0	6	1	0	2	2	0	0	0	1	0	0	0	0	1	0	1	0	0	1	0	2	0	1	0	19
9 = WNW Inside 610	1	2	0	0	0	0	0	1	0	0	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
10 = West SW	5	3	0	5	1	1	1	7	3	6	4	5	1	1	3	3	2	2	10	0	0	0	0	1	1	4	0	69
11 = West Katy	13	2	0	4	0	0	1	8	0	3	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4	0	39
12 = NW 290	13	4	0	4	1	0	0	2	0	4	1	0	0	0	2	0	1	1	2	0	0	0	0	0	0	10	1	46
13 = NNW 249	3	3	0	3	0	0	0	0	0	0	1	4	0	3	1	2	0	1	0	0	0	3	0	0	0	3	0	27
14 = North Hardy	23	1	0	5	0	0	0	6	2	1	2	0	3	3	0	4	1	0	0	0	0	0	2	0	2	4	1	60
15 = NE Eastex	8	0	0	3	0	0	2	1	0	1	1	0	2	0	1	1	0	0	1	0	0	0	0	1	2	1	0	25
16 = East I-10	7	0	0	5	2	0	1	4	1	2	1	2	1	0	3	6	0	0	1	0	0	0	0	2	0	3	0	41
17 = SH225 Gulf	12	1	0	2	1	0	3	3	0	1	3	0	0	1	1	1	15	1	0	0	0	0	0	0	1	7	0	53
18 = S288 35	4	2	2	3	0	1	0	5	0	2	1	1	1	1	0	0	0	2	1	0	1	0	1	0	0	3	0	31
19 = SW US59	21	1	0	34	1	1	2	9	0	9	3	1	1	0	1	0	1	3	3	0	2	0	0	0	1	7	1	102
21 = Bay Area	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
22 = Westchase	2	0	0	0	0	0	0	0	0	2	0	1	0	0	1	0	0	1	0	0	2	0	0	0	0	1	0	10
23 = Energy	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
24 = Greenspoint	1	0	0	2	0	0	0	0	0	2	0	1	0	3	1	2	0	0	0	0	0	0	0	0	0	1	0	13
25 = N Cor Out 610	1	0	0	5	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	1	2	2	1	15
26 = N Cor In 610	7	0	0	1	0	0	1	3	0	2	0	0	2	1	0	0	0	1	2	0	0	0	0	2	0	4	0	26
27 = SE Cor In 610	6	1	0	2	0	0	0	3	1	2	1	0	0	3	1	1	0	3	4	0	0	0	2	0	0	7	0	37
28 = SE Cor Out 610	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4
Total	139	22	2	91	7	4	13	58	9	39	29	17	12	22	19	25	22	17	27	0	5	4	5	10	12	64	4	678

FIGURE 35: ANALYSIS ZONES (PNR ACCESS-WEIGHTED)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: PNR (PA format)

Year 2022 Average Weekday Transit Trips, Park-Ride Access: Linked Trips (Weighted Trips)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	11	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	4	5	0	0	0	0	0	0	0	0	0	30
2 = Uptown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 = Greenway	0	0	0	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	46
4 = TMC	4	0	0	24	0	0	0	11	0	9	0	0	2	0	0	0	0	0	9	0	0	0	0	0	0	0	0	59
5 = NE Inside 610	35	0	0	33	0	0	4	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	102
6 = SE Inside 610	69	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75
7 = S Inside 610	0	0	0	0	0	0	0	0	0	10	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
8 = SW Inside 610	46	0	0	193	0	0	27	5	0	11	0	0	0	0	0	0	7	0	7	0	0	0	0	0	0	0	0	296
9 = WNW Inside 610	0	0	13	39	0	1	0	4	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58
10 = West SW	230	3	0	330	0	0	0	8	0	26	3	4	0	0	0	0	0	0	4	0	0	0	0	3	2	15	0	628
11 = West Katy	489	6	1	254	0	0	6	25	0	15	5	0	0	23	0	0	0	0	5	0	5	0	0	20	0	39	0	895
12 = NW 290	576	5	1	179	0	0	0	36	2	3	8	0	0	35	0	0	0	0	13	1	0	0	0	0	2	37	0	898
13 = NNW 249	372	9	19	73	0	0	0	18	2	4	5	0	0	12	0	0	0	0	6	0	0	4	0	4	0	11	0	541
14 = North Hardy	987	3	40	168	0	0	0	7	0	4	11	0	0	23	43	0	0	0	0	0	0	30	0	5	0	14	0	1334
15 = NE Eastex	267	0	0	75	0	0	0	21	0	10	0	0	0	0	0	0	0	0	0	0	0	4	0	2	0	3	0	383
16 = East I-10	50	0	0	68	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2	0	123
17 = SH225 Gulf	353	0	0	520	0	0	0	34	0	0	0	0	0	0	0	0	151	3	0	0	0	0	0	1	0	26	0	1088
18 = S288 35	75	0	0	295	0	0	13	31	0	0	11	0	0	0	0	0	5	0	4	0	0	0	0	0	0	46	0	480
19 = SW US59	1091	10	8	820	0	0	0	113	0	3	0	0	9	0	1	0	4	0	7	0	2	0	0	6	2	100	0	2177
21 = Bay Area	16	0	0	9	0	0	0	2	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	36
22 = Westchase	5	0	0	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41
23 = Energy	10	0	0	8	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	20
24 = Greenspoint	26	0	0	35	0	0	2	0	0	0	7	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	92
25 = N Cor Out 610	6	0	0	6	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	25
26 = N Cor In 610	27	0	0	22	0	0	0	8	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59
27 = SE Cor In 610	9	0	0	76	0	0	13	49	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	158
28 = SE Cor Out 610	11	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	49
Total	4766	35	83	3340	0	1	65	378	13	98	70	4	11	124	45	0	181	9	61	1	8	38	0	40	6	331	0	9708

FIGURE 36: ANALYSIS ZONES (PNR ACCESS- UNWEIGHTED SURVEYS)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: PNR (PA format)

Year 2022 Average Weekday Transit Trips, Park-Ride Access: Linked Trips (Survey Records)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	6
2 = Uptown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 = Greenway	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3
4 = TMC	1	0	0	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	8
5 = NE Inside 610	3	0	0	4	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	11
6 = SE Inside 610	6	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
7 = S Inside 610	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8 = SW Inside 610	4	0	0	10	0	0	2	1	0	2	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	22
9 = WNW Inside 610	0	0	1	3	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
10 = West SW	25	1	0	31	0	0	0	2	0	2	1	1	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	67
11 = West Katy	107	3	1	32	0	0	2	6	0	3	1	0	0	2	0	0	0	0	1	0	1	0	0	4	0	12	0	175
12 = NW 290	166	2	1	27	0	0	0	10	1	1	2	0	0	3	0	0	0	0	2	1	0	0	0	0	1	21	0	238
13 = NNW 249	90	2	3	20	0	0	0	4	1	1	1	0	0	1	0	0	0	0	1	0	0	2	0	1	0	5	0	132
14 = North Hardy	171	2	10	29	0	0	0	3	0	1	1	0	0	2	2	0	0	0	0	0	0	14	0	1	0	4	0	240
15 = NE Eastex	47	0	0	12	0	0	0	5	0	2	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	1	0	71
16 = East I-10	26	0	0	11	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	41
17 = SH225 Gulf	94	0	0	79	0	0	0	7	0	0	0	0	0	0	0	0	33	1	0	0	0	0	0	1	0	8	0	223
18 = S288 35	14	0	0	29	0	0	2	5	0	0	1	0	0	0	0	0	3	0	1	0	0	0	0	0	0	12	0	67
19 = SW US59	236	4	5	132	0	0	0	19	0	1	0	0	1	0	1	0	3	0	1	0	1	0	0	2	1	22	0	429
21 = Bay Area	3	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	8
22 = Westchase	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
23 = Energy	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4
24 = Greenspoint	6	0	0	3	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	12
25 = N Cor Out 610	2	0	0	2	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	8
26 = N Cor In 610	3	0	0	6	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
27 = SE Cor In 610	2	0	0	4	0	0	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	12
28 = SE Cor Out 610	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	12
Total	1015	14	21	448	0	1	11	71	3	16	12	1	2	10	3	0	44	3	13	1	2	18	1	11	3	96	0	1820

FIGURE 37: ANALYSIS ZONES (0 VEHICLES-WEIGHTED)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: O Veh (PA format)

Year 2022 Average Weekday Transit Trips, Trips from 0 car Householdss: Linked Trips (Weighted Trips)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	342	35	0	185	22	43	51	355	27	111	39	0	0	44	13	43	8	47	0	0	0	0	29	120	72	217	1	1803
2 = Uptown	36	35	12	0	0	6	0	50	0	143	19	5	0	0	2	0	0	3	4	0	53	0	0	0	0	0	0	369
3 = Greenway	0	25	13	24	0	1	0	65	0	16	2	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	4	167
4 = TMC	129	0	0	485	29	9	57	220	49	95	23	2	0	10	6	14	4	72	104	0	2	0	0	36	30	182	7	1563
5 = NE Inside 610	171	15	22	85	222	138	22	85	38	23	10	17	14	55	39	37	15	4	21	0	2	0	3	89	73	73	0	1270
6 = SE Inside 610	291	7	0	81	34	253	23	71	31	51	10	0	1	5	27	6	48	12	6	0	3	2	2	20	47	186	0	1214
7 = S Inside 610	138	1	0	55	4	5	65	93	22	11	5	5	6	0	10	1	0	32	19	0	0	0	0	7	60	81	0	620
8 = SW Inside 610	630	79	20	726	6	31	79	660	105	285	15	4	3	30	6	5	40	58	149	0	44	3	17	77	36	242	2	3351
9 = WNW Inside 610	102	22	24	41	0	1	24	46	136	9	41	17	21	75	3	1	0	1	3	0	1	0	5	42	5	27	5	654
10 = West SW	571	562	280	517	11	41	129	1155	87	4700	609	150	33	23	85	26	55	74	996	0	444	55	10	88	32	187	19	10936
11 = West Katy	102	24	2	46	0	3	32	67	77	126	479	112	57	26	29	17	7	14	20	0	27	75	1	27	15	18	0	1406
12 = NW 290	19	14	2	36	11	1	6	9	45	57	105	72	42	28	8	16	28	2	19	0	23	0	12	20	61	26	0	659
13 = NNW 249	134	30	0	45	12	9	32	100	99	23	108	129	353	269	46	19	0	5	14	0	0	0	109	28	113	33	0	1710
14 = North Hardy	112	13	6	37	16	17	22	121	62	41	104	40	323	697	133	18	27	15	25	0	5	1	260	63	276	40	4	2478
15 = NE Eastex	140	6	0	46	52	28	40	40	30	42	42	12	27	62	319	52	9	17	8	0	0	0	65	85	170	51	0	1341
16 = East I-10	160	22	6	47	85	20	32	159	8	13	12	8	9	36	118	516	7	20	5	0	3	0	25	42	94	72	3	1520
17 = SH225 Gulf	131	25	12	145	26	133	19	104	6	72	38	14	6	9	27	13	1028	156	20	0	0	0	12	8	23	228	30	2285
18 = S288 35	109	13	1	160	7	20	23	158	27	90	16	2	16	14	20	8	103	562	110	0	1	4	12	66	69	288	44	1941
19 = SW US59	232	100	23	300	0	19	48	376	19	813	61	8	14	29	12	25	24	117	827	0	42	8	4	21	32	241	3	3400
21 = Bay Area	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
22 = Westchase	103	180	42	44	0	0	15	153	6	547	106	38	16	2	0	24	0	20	51	0	117	0	5	0	5	30	0	1503
23 = Energy	0	1	0	3	2	0	0	33	2	27	31	0	3	0	0	0	0	0	0	0	4	4	0	0	0	2	0	113
24 = Greenspoint	39	0	9	58	11	0	32	36	24	18	20	16	47	317	341	20	3	0	2	0	3	0	191	15	166	20	0	1388
25 = N Cor Out 610	575	7	10	99	9	20	81	79	52	49	10	23	19	11	36	47	6	3	31	0	0	0	19	351	396	40	0	1969
26 = N Cor In 610	332	12	0	121	35	6	67	81	60	60	35	29	45	172	183	49	0	18	10	0	0	0	33	190	264	123	24	1950
27 = SE Cor In 610	805	39	84	277	64	238	201	369	46	110	27	17	12	57	56	21	141	273	109	3	30	5	22	128	131	1231	81	4578
28 = SE Cor Out 610	38	6	0	18	0	0	20	33	0	6	4	0	0	1	4	0	86	63	0	0	0	0	4	4	12	31	61	390
Total	5438	1273	570	3682	657	1041	1120	4718	1060	7539	1974	719	1065	1971	1522	977	1636	1586	2573	4	804	155	839	1525	2179	3666	290	50583

FIGURE 38: ANALYSIS ZONES (0 VEHICLES- UNWEIGHTED SURVEYS)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: O Veh (PA format)

Year 2022 Average Weekday Transit Trips, Trips from 0 car Householdss: Linked Trips (Survey Records)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	27	3	0	29	4	16	6	28	3	11	5	0	0	9	4	3	4	12	0	0	0	0	2	13	17	28	1	225
2 = Uptown	4	8	2	0	0	2	0	5	0	11	4	2	0	0	1	0	0	1	1	0	4	0	0	0	0	1	0	46
3 = Greenway	0	1	1	4	0	1	0	4	0	4	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	19
4 = TMC	26	0	0	36	2	4	5	26	2	12	4	1	0	2	2	1	1	10	13	0	1	0	0	6	10	21	2	187
5 = NE Inside 610	25	4	1	14	20	11	4	17	7	6	5	4	3	10	4	4	7	2	4	0	1	0	2	9	11	12	0	187
6 = SE Inside 610	84	3	0	24	3	42	6	19	9	11	5	0	1	3	5	1	11	3	3	0	3	2	2	11	22	33	0	306
7 = S Inside 610	16	1	0	7	1	2	5	9	2	3	1	2	1	0	3	1	1	5	3	0	0	0	0	1	17	11	0	92
8 = SW Inside 610	65	8	2	75	3	6	7	63	19	32	2	2	2	5	1	2	9	10	16	0	5	1	4	14	13	36	1	403
9 = WNW Inside 610	9	3	2	7	0	1	2	8	13	6	6	2	5	6	1	1	0	1	1	0	1	1	1	6	1	6	2	92
10 = West SW	91	88	20	80	6	11	16	139	25	372	72	22	8	7	12	6	16	14	88	0	36	7	3	25	13	34	4	1215
11 = West Katy	21	13	2	12	0	2	6	15	10	23	59	13	7	5	7	4	1	5	5	0	4	8	1	5	3	7	0	238
12 = NW 290	4	7	1	9	2	1	1	3	6	12	12	11	8	3	1	3	2	1	4	0	2	0	2	6	6	5	0	112
13 = NNW 249	15	8	0	14	2	3	6	13	8	8	10	14	25	23	10	4	0	3	2	0	0	0	5	6	14	9	0	202
14 = North Hardy	21	6	1	11	5	4	5	20	7	11	15	7	33	129	25	2	4	7	4	0	2	1	25	10	36	12	1	404
15 = NE Eastex	21	2	0	15	4	3	8	11	8	11	10	2	6	11	49	9	5	6	2	0	0	0	9	11	19	9	0	231
16 = East I-10	36	4	2	18	11	5	8	21	1	6	5	2	2	6	19	128	6	6	3	0	1	0	5	9	16	16	2	338
17 = SH225 Gulf	47	5	2	23	3	16	6	21	3	17	8	2	2	8	6	5	283	21	6	1	0	0	3	7	8	28	3	534
18 = S288 35	30	5	1	31	3	4	6	33	5	17	5	2	4	4	4	3	14	106	19	0	1	2	2	11	12	38	4	366
19 = SW US59	50	12	2	46	0	4	10	48	4	75	14	3	6	5	5	5	7	19	69	0	7	1	1	7	10	33	1	444
21 = Bay Area	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
22 = Westchase	12	14	3	8	0	0	2	24	2	39	12	4	2	1	0	3	0	4	9	0	7	0	1	0	2	6	1	156
23 = Energy	0	1	0	3	1	0	0	4	2	3	8	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	0	26
24 = Greenspoint	6	0	1	9	2	0	2	7	4	4	5	3	4	26	23	4	1	0	1	0	1	0	18	4	17	4	0	146
25 = N Cor Out 610	72	3	2	30	2	6	10	26	11	11	3	6	6	5	6	5	5	1	5	0	0	0	6	40	73	13	1	348
26 = N Cor In 610	69	4	0	26	7	4	15	20	10	19	10	3	8	16	18	5	0	7	4	0	0	0	4	30	28	28	3	338
27 = SE Cor In 610	172	10	7	50	10	50	23	62	10	26	15	5	4	11	10	6	22	36	18	1	6	1	6	22	44	176	12	815
28 = SE Cor Out 610	11	3	0	5	0	0	5	6	0	3	1	0	0	1	1	0	8	6	0	0	0	0	2	3	3	4	3	65
Total	934	216	52	587	91	198	164	652	171	753	297	112	138	296	217	205	407	286	282	2	83	25	104	256	395	571	42	7536

FIGURE 39: ANALYSIS ZONES (1 VEHICLES-WEIGHTED)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: 1 Veh (PA format)

Year 2022 Average Weekday Transit Trips, Trips from 1 car Householdss: Linked Trips (Weighted Trips)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	227	0	0	219	0	10	39	122	43	17	48	5	0	10	19	0	0	3	3	0	67	0	0	55	31	72	5	994
2 = Uptown	20	43	0	8	0	0	0	67	0	23	6	0	0	0	0	0	4	5	12	0	0	3	0	1	4	37	0	234
3 = Greenway	25	1	0	65	0	0	6	38	0	41	0	0	0	0	0	0	0	0	4	0	13	0	0	0	0	45	1	241
4 = TMC	117	0	0	881	0	21	67	189	4	56	0	0	0	3	0	4	12	28	2	0	0	0	0	7	6	90	0	1487
5 = NE Inside 610	173	0	0	55	33	62	8	14	40	9	18	0	4	24	41	31	11	6	7	0	15	0	7	23	80	66	0	729
6 = SE Inside 610	251	5	6	56	7	269	5	39	11	34	6	0	5	1	0	0	30	0	1	0	2	0	0	19	19	201	12	981
7 = S Inside 610	60	0	8	82	0	1	47	55	0	28	4	4	0	0	10	10	0	0	3	0	0	0	0	8	9	14	5	348
8 = SW Inside 610	584	45	167	1214	5	9	70	429	39	282	25	10	0	21	0	12	8	15	110	0	2	0	17	38	38	211	0	3350
9 = WNW Inside 610	116	4	0	109	14	0	8	80	70	5	87	20	0	21	6	0	1	1	0	0	0	0	11	21	14	11	0	597
10 = West SW	574	445	242	716	5	22	48	618	49	3398	430	61	4	19	27	21	14	31	441	0	411	30	0	48	15	159	3	7835
11 = West Katy	420	19	18	213	0	2	7	63	31	76	343	82	8	26	0	2	2	5	0	0	40	21	0	24	8	30	0	1441
12 = NW 290	344	16	9	148	0	0	0	46	3	58	127	43	17	1	22	2	5	0	13	3	0	6	36	13	32	40	1	985
13 = NNW 249	208	24	0	93	0	0	5	8	74	5	59	64	128	200	57	2	3	19	15	0	0	1	4	17	26	17	0	1028
14 = North Hardy	569	6	4	182	4	12	4	92	88	30	43	23	187	636	88	26	4	3	6	0	0	1	181	18	92	50	1	2352
15 = NE Eastex	287	3	0	56	16	5	20	58	24	27	15	15	7	16	179	32	14	9	8	0	0	0	4	47	115	30	0	987
16 = East I-10	117	5	0	145	63	4	18	19	8	23	12	49	37	1	48	162	3	15	36	0	1	0	2	36	19	4	0	827
17 = SH225 Gulf	309	13	4	376	7	58	0	92	0	51	6	2	0	8	5	4	729	32	18	0	6	0	1	12	17	168	40	1960
18 = S288 35	120	40	23	447	2	15	63	121	6	54	21	5	1	1	10	6	36	332	17	0	0	0	0	6	10	200	7	1543
19 = SW US59	636	26	2	809	0	0	15	350	15	558	60	19	0	37	20	39	12	79	640	0	14	0	0	24	8	122	23	3509
21 = Bay Area	11	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	19
22 = Westchase	126	61	0	66	11	10	22	49	3	345	59	11	0	0	30	2	0	3	18	0	57	30	0	2	3	52	0	959
23 = Energy	12	5	0	9	0	0	0	0	1	26	24	0	0	0	0	0	0	0	0	0	10	5	0	0	0	5	0	97
24 = Greenspoint	82	7	0	38	0	0	2	15	11	0	18	4	49	221	181	0	1	1	0	0	0	0	189	0	45	35	0	899
25 = N Cor Out 610	533	2	0	153	0	3	29	124	93	14	43	3	6	14	21	32	1	3	6	0	0	0	2	267	243	49	0	1641
26 = N Cor In 610	284	10	14	72	4	9	17	91	64	24	21	15	45	91	102	18	0	33	12	0	1	4	43	93	211	39	0	1319
27 = SE Cor In 610	612	31	19	383	59	96	91	197	20	36	25	0	6	45	19	16	97	134	50	0	0	1	1	49	23	714	25	2746
28 = SE Cor Out 610	28	1	2	51	2	37	0	28	1	10	0	0	0	6	0	1	13	2	3	0	0	0	0	0	0	41	13	241
Total	6845	812	517	6648	231	644	591	3004	699	5231	1501	437	504	1403	885	424	1005	761	1425	3	640	103	497	828	1071	2504	136	39349

FIGURE 40: ANALYSIS ZONES (1 VEHICLES- UNWEIGHTED SURVEYS)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: 1 Veh (PA format)

Year 2022 Average Weekday Transit Trips, Trips from 1 car Householdss: Linked Trips (Survey Records)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	25	0	0	28	0	4	4	15	3	2	4	1	0	2	2	0	0	1	1	0	4	0	0	5	7	18	2	128
2 = Uptown	2	6	0	1	0	0	0	7	0	4	1	0	0	0	0	0	1	1	2	0	0	1	0	1	1	2	0	30
3 = Greenway	1	1	0	4	0	0	1	4	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	3	1	18
4 = TMC	20	0	0	55	0	5	4	13	1	8	0	0	0	1	0	1	2	4	1	0	0	0	0	2	3	10	0	130
5 = NE Inside 610	20	0	0	10	7	7	2	4	6	3	3	0	3	4	4	2	2	2	2	0	2	0	2	4	7	9	0	105
6 = SE Inside 610	78	1	2	21	1	34	2	12	2	4	2	0	1	2	0	0	5	0	1	0	1	0	0	4	9	29	1	212
7 = S Inside 610	7	0	1	11	0	1	3	5	0	4	1	3	0	0	1	1	0	0	1	0	0	0	0	1	2	4	1	47
8 = SW Inside 610	58	8	8	91	1	2	8	38	6	26	8	2	0	3	0	2	2	3	10	0	1	0	2	9	10	25	0	323
9 = WNW Inside 610	11	2	0	10	1	0	1	10	4	1	11	3	0	3	1	0	1	1	0	0	0	0	1	2	3	3	0	69
10 = West SW	86	58	16	80	2	6	7	68	9	261	44	13	3	5	7	4	4	5	41	0	29	4	0	11	6	19	1	789
11 = West Katy	78	11	3	30	0	1	3	15	2	11	39	10	2	3	0	1	1	1	0	0	6	4	0	7	1	7	0	236
12 = NW 290	73	6	3	28	0	0	0	10	1	14	18	4	4	1	5	1	2	0	2	2	0	1	2	3	3	12	1	196
13 = NNW 249	32	7	0	22	0	0	1	4	7	1	6	7	11	16	6	1	1	3	3	0	0	1	1	3	5	8	0	146
14 = North Hardy	95	4	2	40	1	5	2	13	11	7	7	4	19	71	15	7	1	2	2	0	0	1	22	4	6	12	1	354
15 = NE Eastex	37	1	0	19	1	1	3	13	5	7	3	1	3	4	24	4	2	2	2	0	0	0	3	8	14	9	0	166
16 = East I-10	29	1	0	37	8	2	3	8	4	6	4	5	4	1	10	46	2	4	5	0	1	0	3	5	3	4	0	195
17 = SH225 Gulf	89	4	1	47	1	11	0	16	0	12	4	1	0	3	3	1	169	7	6	0	1	0	1	6	2	28	3	416
18 = S288 35	34	7	3	51	1	3	5	27	3	10	4	2	1	1	3	2	6	68	3	0	0	0	0	4	4	28	1	271
19 = SW US59	121	6	1	113	0	0	3	47	3	60	6	2	0	7	4	2	3	11	56	0	4	0	0	6	3	20	3	481
21 = Bay Area	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4
22 = Westchase	15	7	0	6	2	2	2	8	1	28	8	1	0	1	3	1	0	1	2	0	5	2	0	1	1	5	0	102
23 = Energy	3	4	0	1	0	0	0	0	1	4	4	0	0	0	0	0	0	0	0	0	2	1	0	0	0	2	0	22
24 = Greenspoint	8	1	0	8	0	0	1	2	2	0	3	1	5	21	17	0	1	1	0	0	0	0	16	0	6	5	0	98
25 = N Cor Out 610	61	1	0	47	0	4	4	34	8	3	7	1	2	4	5	3	1	2	2	0	0	0	1	26	42	13	0	271
26 = N Cor In 610	50	3	1	26	1	2	3	17	8	6	4	1	6	11	16	2	0	3	2	0	1	1	3	18	22	8	0	215
27 = SE Cor In 610	118	7	3	47	6	24	12	33	3	4	5	0	1	5	4	4	14	16	10	0	0	1	1	12	11	99	3	443
28 = SE Cor Out 610	15	1	1	8	1	1	0	6	2	1	0	0	0	2	0	1	2	2	1	0	0	0	0	0	0	9	1	54
Total	1168	147	45	841	34	115	74	429	92	489	196	62	65	171	130	86	223	140	156	2	58	17	58	142	171	391	19	5521

FIGURE 41: ANALYSIS ZONES (2+ VEHICLES-WEIGHTED)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: 2+ Veh (PA format)

Year 2022 Average Weekday Transit Trips, Trips from 2+ car Householdss: Linked Trips (Weighted Trips)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	292	0	0	116	0	8	15	183	2	46	4	0	0	13	93	14	12	32	7	0	0	0	0	11	14	94	0	956
2 = Uptown	0	2	0	0	0	0	0	32	0	73	5	0	0	0	0	0	0	2	0	0	1	6	0	0	0	0	0	120
3 = Greenway	0	0	33	8	0	0	0	3	0	10	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58
4 = TMC	198	13	0	397	0	0	12	186	3	23	0	0	13	5	0	0	0	8	20	0	0	0	17	0	2	29	0	925
5 = NE Inside 610	123	21	3	46	20	24	0	29	40	15	15	0	10	0	14	0	2	19	0	0	0	0	0	69	36	61	0	548
6 = SE Inside 610	237	12	0	45	15	67	16	17	4	4	0	1	3	17	0	3	47	0	0	0	0	0	3	22	0	83	0	597
7 = S Inside 610	68	0	25	96	0	1	0	40	0	23	0	0	0	0	0	0	0	7	0	0	5	0	0	8	4	39	0	317
8 = SW Inside 610	258	47	64	662	0	0	52	429	8	94	7	0	3	31	17	4	15	31	156	0	0	0	0	5	6	30	0	1918
9 = WNW Inside 610	92	1	0	9	4	0	0	44	32	0	11	0	11	0	15	0	0	0	0	0	0	0	0	4	14	0	0	237
10 = West SW	497	240	89	495	0	19	28	407	52	1723	292	19	3	1	16	10	18	2	511	0	255	22	7	40	6	185	0	4936
11 = West Katy	978	25	0	328	0	0	6	88	14	42	311	27	8	24	7	0	0	0	29	0	5	3	0	13	0	92	0	2001
12 = NW 290	1001	13	0	181	0	0	0	34	5	15	70	16	0	46	3	0	6	0	11	0	9	0	0	10	19	109	0	1547
13 = NNW 249	698	11	19	128	0	0	20	36	5	9	66	51	123	146	10	0	0	0	0	0	0	10	44	20	17	51	0	1463
14 = North Hardy	1223	0	44	229	0	4	8	60	28	4	30	13	67	370	42	21	22	0	4	0	0	50	47	9	38	20	0	2333
15 = NE Eastex	519	1	5	115	4	1	9	50	0	14	0	2	0	8	67	3	10	0	0	0	0	4	23	32	76	16	0	960
16 = East I-10	190	0	0	74	19	6	0	39	0	26	24	2	0	15	12	130	9	8	8	0	0	0	15	0	45	27	0	650
17 = SH225 Gulf	634	2	20	448	0	57	5	100	1	20	3	1	0	0	13	1	359	33	9	0	0	0	1	3	12	75	0	1798
18 = S288 35	185	5	0	142	0	8	14	58	5	29	2	0	6	6	5	5	32	77	61	0	4	1	7	6	1	148	29	833
19 = SW US59	1912	31	22	1282	6	0	23	285	3	344	11	14	17	8	12	0	13	27	259	0	14	0	0	49	9	247	3	4592
21 = Bay Area	12	0	0	9	0	0	0	2	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	32
22 = Westchase	48	18	0	55	0	0	5	80	0	106	86	13	1	0	3	11	0	0	3	0	62	6	0	0	3	0	0	501
23 = Energy	33	1	0	19	0	0	0	15	0	9	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	1	134
24 = Greenspoint	77	0	0	69	0	0	0	18	0	23	7	12	0	35	77	0	0	0	0	0	0	0	74	4	8	4	0	408
25 = N Cor Out 610	267	6	4	193	12	11	16	69	20	20	17	0	4	3	62	0	0	4	4	0	13	0	2	135	106	34	0	1003
26 = N Cor In 610	118	5	0	60	0	0	5	57	9	41	8	9	15	28	17	13	0	8	0	0	0	2	30	97	125	36	0	682
27 = SE Cor In 610	248	25	21	105	47	45	67	132	2	48	16	1	0	3	8	6	13	44	7	0	20	0	0	28	12	261	2	1159
28 = SE Cor Out 610	25	6	0	16	0	0	5	11	1	0	0	3	0	0	0	2	2	10	9	0	0	0	0	1	0	24	0	114
Total	9932	484	348	5327	127	250	306	2503	232	2763	1030	183	284	761	493	222	569	314	1098	0	389	104	271	565	553	1677	35	30821

FIGURE 42: ANALYSIS ZONES (2+ VEHICLES- UNWEIGHTED SURVEYS)

H-GAC 2022 Regional Transit OnBoard Origin Destination Survey: 2+ Veh (PA format)

Year 2022 Average Weekday Transit Trips, Trips from 2+ car Householdss: Linked Trips (Survey Records)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26	27	28	Total
1 = CBD	26	0	0	17	0	2	2	18	1	3	1	0	0	2	9	1	3	4	1	0	0	0	0	1	3	13	0	107
2 = Uptown	0	1	0	0	0	0	0	3	0	4	2	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	13
3 = Greenway	0	0	2	1	0	0	0	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
4 = TMC	15	1	0	24	0	0	3	13	1	4	0	0	2	1	0	0	0	1	4	0	0	0	2	0	1	4	0	76
5 = NE Inside 610	9	1	1	10	1	1	0	5	3	5	2	0	1	0	2	0	1	1	0	0	0	0	0	7	6	7	0	63
6 = SE Inside 610	42	1	0	10	1	14	3	6	1	1	0	1	1	4	0	1	4	0	0	0	0	0	1	5	0	18	0	114
7 = S Inside 610	8	0	1	8	0	1	0	6	0	2	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	3	0	33
8 = SW Inside 610	26	4	5	57	0	0	5	33	1	9	1	0	1	2	4	1	3	3	14	0	0	0	0	2	2	2	0	175
9 = WNW Inside 610	9	1	0	3	1	0	0	7	4	0	1	0	1	0	2	0	0	0	0	0	0	0	0	1	1	0	0	31
10 = West SW	67	25	8	62	0	6	5	46	9	129	28	3	2	1	4	3	3	1	38	0	18	4	2	7	3	25	0	499
11 = West Katy	198	11	0	48	0	0	2	17	3	9	40	3	1	3	2	0	0	0	5	0	1	1	0	2	0	36	0	382
12 = NW 290	280	6	0	38	0	0	0	11	2	4	9	2	0	4	1	0	2	0	2	0	1	0	0	3	7	61	0	433
13 = NNW 249	154	3	3	28	0	0	2	8	1	3	4	6	8	11	1	0	0	0	0	0	0	6	4	4	2	14	0	262
14 = North Hardy	230	0	9	45	0	1	3	17	4	1	6	1	5	34	6	2	2	0	1	0	0	16	5	2	8	7	0	405
15 = NE Eastex	96	1	1	22	1	1	2	13	0	4	0	1	0	2	6	1	2	0	0	0	0	2	3	3	8	5	0	174
16 = East I-10	61	0	0	27	2	2	0	9	0	7	3	2	0	2	3	46	3	1	2	0	0	0	5	0	6	8	0	189
17 = SH225 Gulf	163	3	2	96	0	10	2	18	1	4	1	1	0	0	3	1	100	6	3	0	0	0	1	1	4	10	0	430
18 = S288 35	36	1	0	27	0	1	3	12	1	6	2	0	1	1	3	1	6	24	8	0	1	1	1	3	1	21	2	163
19 = SW US59	424	10	7	215	2	0	3	35	2	33	4	1	5	3	3	0	7	5	26	0	2	0	0	12	2	55	1	857
21 = Bay Area	3	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	8
22 = Westchase	6	3	0	6	0	0	1	7	0	9	6	2	1	0	1	1	0	0	1	0	4	1	0	0	1	0	0	50
23 = Energy	5	1	0	4	0	0	0	2	0	2	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	25
24 = Greenspoint	14	0	0	10	1	0	0	2	0	4	1	1	0	3	4	0	0	0	0	0	0	0	4	1	1	3	0	49
25 = N Cor Out 610	35	2	1	37	2	2	3	16	3	3	4	0	2	1	8	0	0	1	2	0	1	0	1	13	19	12	0	168
26 = N Cor In 610	24	1	0	19	0	0	3	19	1	4	2	1	3	4	4	1	0	2	0	0	0	1	5	20	17	12	0	143
27 = SE Cor In 610	58	3	1	8	4	10	8	21	1	7	3	1	0	2	3	1	2	8	1	0	3	0	0	5	7	50	1	208
28 = SE Cor Out 610	9	1	0	7	0	0	1	1	1	0	0	1	0	0	0	1	1	1	1	0	0	0	0	1	0	3	0	29
Total	1998	80	41	831	15	51	51	347	40	259	129	27	34	80	69	61	141	60	109	0	33	33	34	94	100	371	5	5093

APPENDICES

APPENDIX A: PANDEMIC IMPACT ON 2022 ORIGIN-DESTINATION SURVEY RESULTS

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Discussion of Pandemic Impact on 2022 Origin-Destination Survey Results

4-21-2023

Introduction

In the spring of 2022, the Houston-Galveston Area Council (H-GAC) conducted an on-board origin-destination (OD) survey of all fixed-route transit agencies in the eight-county Houston-Galveston region. The survey was originally scheduled for the fall of 2020 but was postponed due to the disruptions to both transit service and typical travel patterns arising from the coronavirus that started spreading locally in the spring of 2020. The survey was ultimately conducted in the spring of 2022. While transit ridership was beginning to rebound and travel patterns were starting to normalize by that time, they had not returned to 2019 levels. The following paper is intended to help frame interpretation of the survey results--especially when comparing results from the 2017 OD survey to the 2022 OD survey--given the changes in transit ridership levels and patterns over the past few years.

Changes in Ridership Levels

Nationally, transit ridership dropped by 79% in 2020 from 2019 due to the coronavirus pandemic. At the onset of the pandemic in March 2020, individuals were encouraged to stay at home to reduce the transmission of the virus, prompting a transition to work-from-home for many commuters and remote learning modes for students. Others no longer commuted to work as pandemic conditions led to furloughs and layoffs. On top of reduced commuting trips, communities were instructed to limit transit ridership to essential trips.

Personal safety concerns beyond formal restrictions also may have inhibited transit ridership. Not all riders were comfortable with the basic component of public transit: close proximity to others in an enclosed space. Reduced trip demand and fears related to transmission had a dampening effect on overall transit ridership. Transit ridership has been rebounding but remains much lower than pre-pandemic levels. According to the American Public Transportation Association (APTA), as of August 2021, total ridership across all modes of transit in the US was down by 33% compared to the same period in 2019, though usage is slowly increasing.

Locally, the ridership story was much the same. The total average daily boardings for all agencies used to create sampling for the 2022 OD survey (data from November 2021) was 121,882 lower than the ridership used to create the sample for the 2017 OD survey, a decrease of 56%. In general, while all of the region's providers suffered from low ridership over the past three years, the effect was especially strong on agencies that dedicate a larger proportion of their operations to park-and-ride (PNR) service, such as The Woodlands Express and Fort Bend County Public Transportation. The Woodlands Express, which offers commuter service from The Woodlands to downtown Houston, the Texas Medical Center, and the Energy Corridor District, is still carrying only about half the ridership today that it carried in 2019. Agencies with

a higher proportion of local riders, such as Gulf Coast Transit District and Harris County Transit, rebounded more quickly.

METRO weekday ridership comprises 98% of the regional total, so its trends determine the regional trends as well. Table 1 below shows the trends in average weekday ridership for METRO for each of its three major fixed-route services from immediately before the epidemic (February 2020) to the most current data available (February 2023).

Table 1
METRO Fixed-Route Average Weekday Boardings
2020-2023

Date	*Local/BRT*	*Light Rail*	*PNR*	*System*
Feb 2020	189,832	62,567	33,846	286,245
Feb 2021	97,066	23,417	5,155	125,638
Feb 2022	121,755	34,185	10,316	166,256
Feb 2023	151,093	39,202	13,163	203,459
2022 as % of 2020	64.1%	54.6%	30.5%	58.1%
2023 as % of 2020	79.6%	62.7%	38.9%	71.1%

Source: METRO Monthly Ridership Reports

Two comparisons are presented in Table 1: February 2022 ridership (approximately the time of the survey) vs February 2020 (before the disruptions) and February 2023 (current) vs February 2020. At the time the survey was conducted, METRO's systemwide ridership was just 58% of the early 2020 levels, with significant differences across the modes. Local bus ridership returned far more quickly than light rail and PNR services, resulting in a very different mix of ridership in the system totals than before. In early 2020, for example, PNR ridership comprised 12% of METRO's average daily boardings, while in 2022 that figure was only 6.2%. Therefore, any systemwide changes in demographics or trip characteristics between the 2017 and 2022 OD surveys will be partially the result of the changed mix of riders and not just a reflection of true changes in rider or trip profiles. By 2023, ridership has returned to about 71% of early 2020 levels, but the story is still very different across modes. PNR ridership now represents about 6.5% of systemwide ridership.

The pattern of ridership recovery is similar at other agencies operating fixed-route service in the Houston-Galveston region. Ridership from 2020 through 2023 is presented in Table 2 for five of the fixed-route providers other than METRO.

Table 2

Fixed-Route Average Weekday Boardings for Other Regional Agencies
2020-2023

Date	*The Woodlands Township*	*Fort Bend County Transit*	*Galveston Island Transit*	*Harris County Transit*	*Connect (Galveston County)*
Feb 2020	62,125	21,057	19,210	12,481	15,432
Feb 2021	9,474	4,331	7,951	10,507	5,334
Feb 2022	21,612	7,988	11,659	8,698	20,843
Feb 2023	33,886	12,191	14,760	9,713	22,914
2022 as % of 2020	34.8%	37.9%	60.7%	69.7%	135.1%
2023 as % of 2020	54.5%	57.9%	76.8%	77.8%	148.5%

Source: National Transit Database, except Connect (self-reported to H-GAC)

The Woodlands Township provides commuter services to major activity centers in Houston as well as bus trolley service within the Township. Fort Bend County Transit's fixed-route services are all commuter routes to major activity centers in Houston. The vast majority of Galveston Island Transit's fixed-route service is local service within the city, while a small portion is a steel-wheel trolley that circulates in the historic district. Harris County Transit's entire fixed-route system is local service in the smaller communities of east Harris Country. Most of Connect Transit's service is local, with only one commuter-oriented route. Connect Transit's recovery is notable, with ridership higher today than three years ago. Connect serves a rapidly growing area that has traditionally lacked transit options, and it appears to be increasing penetration into its market.

The only other regional providers that were included in the 2022 OD survey but not in Table 2 were Brazos Transit District (BTD) and Conroe Connection. While BTD is a significant sized agency, only a tiny portion of its service lies in the Houston-Galveston area. It was not included in this table due to lack of data for February of the key years of 2020 and 2023. Conroe Connection's service changed significantly in 2022, making comparisons between the pre- and post-pandemic periods difficult. With the lack of comparability in the service and lack of detailed data to allow comparisons only on the services that were operated both before and after the pandemic, the Conroe Connection data were not included in Table 2.

Reasons for Continued Reduction in Transit Ridership

Varied factors influenced the extent to which regional providers rebounded from the drop in riders. Dynamic elements included prevalence of return to in-person work and school activities, pervasiveness of transit ridership within the region prior to the pandemic, and amount of transit service offered.

Many employers shifted to a hybrid schedule in 2020, meaning some or all work may be performed remotely, but are gradually returning to more activity in offices. However, even as workers are returned to in-office work, days in the office continue to be fewer than in the past meaning fewer commuter trips. Recent METRO PNR data show that Friday ridership is less than half of Tuesday ridership. In 2019 and before, the decline on Fridays was about 10%. Similarly, the current decline in PNR ridership on Mondays is about 30% compared to 1% before 2020. In addition, while all schools are now conducting in-person learning, this shift did not occur fully at area universities until spring of 2022, overlapping with the survey data collection period.

Not all regions of the country have the same extensive network of public transit and engrained use of public transit. The Houston-Galveston region is more car-centric than many other parts of the country. When the pandemic disrupted that behavior, it posed challenges to a return to pre-pandemic commute patterns. Transit agencies will need to again demonstrate to these commuters why they should ride the bus or train.

Exacerbating the challenge of getting riders to return to pre-pandemic transit behaviors is the reduced level of transit service offered by METRO. Service levels have been reduced both to better match demand with supply, as well as due to shortages of both bus operators and buses. Less frequent service then creates a less attractive transit experience, further dampening demand. As METRO restores more and more of its service, ridership should continue to grow.

Conclusion

As this discussion highlights, all forms of transportation were impacted by the global coronavirus pandemic – from cars on roads to public transit involving buses, trains, and planes. Multiple factors contributed to the decline in demand for public transit. Pervasive societal changes make it difficult to predict when the Houston-Galveston region will return to pre-pandemic travel patterns, if ever. Nonetheless, this study provides a snapshot of the recovery effort, indicating which trip purposes and demographic sectors relied on public transit the most during this transition period. It also provides an indicator of what public transit in the region will look like in the next few years.

APPENDIX B: SURVEY INSTRUMENT

Houston-Galveston Area 2022 Transit On Board Survey

Metro PNR Please take a few minutes to answer a few questions to help us plan for your transit needs.

All personal information will be kept strictly confidential and WILL NOT be shared or sold.

What is your HOME ADDRESS (please be specific, ex: 123 W. Main St):
*(If you are visiting the Houston – Galveston area, please list the **hotel name** or address where you are staying)*

Street Address _____ City _____ State _____ Zip Code _____

COMING FROM?

1. What type of place are you COMING FROM NOW?
(the starting place for your one-way trip)

O Work
O Work related
O College / University (students only)
O School K-12 (students only)
O Medical / Doctor / Clinic / (non-work)
O Shopping
O Personal Business
O Restaurant
O Recreation / Sightseeing
O Social Visit / Church
O Airport (passengers only)
O Your **HOME** → *Go to Question #4*
O Add in Non-destination trip
O Other: _____

2. What is the NAME of the place you are coming from now?

_____

3. What is the EXACT ADDRESS of this place? (OR Intersection if you do not know the exact address:)

_____

City: _____ State: _____ Zip: _____

4. How did you GET FROM your origin (the place in Question #1) TO THE VERY FIRST bus / train you used for this one-way trip?

O Walk
O Personal Bike
O Paratransit (e.g. METROLift)
O Was dropped off by someone
O Drove alone and parked
O Drove or rode with others and parked
O Car share (e.g. Zip Car, etc.)
O Taxi
O Uber, Lyft, etc.
O Wheelchair
O Bike share or E-Bike
O E-scooter
O Other_____

5. Where did you get ON this bus? Please provide the nearest intersection / transit center / Station Name / Park & Ride lot:

_____

GOING TO?

6. What type of place are you GOING TO NOW?
(the ending place for your one-way trip)

O Work
O Work related
O College / University (students only)
O School K-12 (students only)
O Medical / Doctor / Clinic / (non-work)
O Shopping
O Personal Business
O Restaurant
O Recreation / Sightseeing
O Social Visit / Church
O Airport (passengers only)
O Your **HOME** → *Go to Question #9*
O Other: _____

7. What is the NAME of the place you are going to now?

_____

8. What is the EXACT ADDRESS of this place? (OR Intersection if you do not know the exact address:)

_____

City: _____ State: _____ Zip: _____

9. How will you GET TO your destination (listed in Question #6) after you get off the LAST bus / train you will use for this one-way trip?

O Walk
O Personal Bike
O Paratransit (e.g. METROLift)
O Be picked up by someone
O Get in a parked vehicle & drive alone
O Get in a parked vehicle & drive/ride w/others
O Car share (e.g. Zip Car, etc.)
O Taxi
O Uber, Lyft, etc.
O Wheelchair
O Bike share or E-Bike
O E-scooter
O Other_____

10. Where will you get OFF this bus? Please provide the nearest intersection / Transit Center / Station Name / Park & Ride lot:

_____

11a. Did you transfer FROM another bus/train BEFORE getting on this bus/train? O Yes O No

11b. Will you transfer TO another bus/train AFTER getting off this bus/train? O Yes O No

11c. Please list the BUS / TRAIN ROUTES in the exact order you use them for this one-way trip

START → [1st Route] → [2nd Route] → [3rd Route] → [4th Route] → END

Continue

OTHER INFORMATION ABOUT THIS TRIP

12. What time did you BOARD this bus / train? _____ : _____ **am / pm (circle one)**

13. Will you (or did you) make this same trip in exactly the opposite direction today?
O No O Yes - **At what time did / will you leave for this trip in the opposite direction?** _____:_____ am/pm (circle one)

14. What fare payment methods did you use for this one-way trip? ***(select all that apply)***
O Cash O Fare Card (e.g. METRO Q® Fare Card) O Money Card (e.g. METRO Money Card)
O Day Pass O Paper Rail Ticket Or O Mobile Ticket (e.g. METRO Q® Mobile Ticketing)
O Other_____

15. What type of fare was this? O Regular / Full Fare
Reduced Fare: O Disabled O Senior (age 65-69) O Student (K-12)
Free Fare: O 70+ Lifetime Pass O Veterans Pass O Student (College/University)
O METRO Employee/Spouse/Retiree O Freedom Q (METROLift)
O Other_____

16. If transit service were not available, how would you have made this trip?
O Walk O Bicycle / Scooter O Drove myself O Ride with someone else
O Taxi O TNC (e.g. Uber, Lyft) O Car share (e.g. Zip Car) O Would not make this trip

ABOUT YOU AND YOUR HOUSEHOLD

17. Are you a visitor to the Houston-Galveston region? ONo O Yes

18. How long have you been riding transit?
O First time riding O Less than 6 months O 6 – 12 months O 1 – 2 years
O 3 – 6 years O 7 – 10 years O More than 10 years

19. How often do you ride transit?
O 6 or 7 days a week O 5 days a week O 3 or 4 days a week O 1 or 2 days a week
O 1 or 2 days a month O Once in a while O First time riding

20. How many vehicles (cars, trucks, or motorcycles) are available to your household? _____ vehicles
20a. [If #20 is more than NONE] Could you have used one of these vehicles for this trip? OYes ONo

21. Including YOU, how many people live in your household? _____ people

22. Including YOU, how many members of your household are age 16 and older? _____ people

23. What is your employment status? (check the one response that BEST describes you)
O Employed full-time O Not currently employed O Retired
O Employed part-time O Disabled and unable to work O Homemaker

24. What is your student status? (check the one response that BEST describes you)
O Not a student O Yes – College / University / Community College
O Yes – K - 12th grade O Yes – Vocational / Technical / Trade School O Other _____

25. Do you have a valid driver's license? O Yes O No

26. What is your AGE?
O 5-15 O 16-19 O 20-34 O 35-50 O 51-64 O 65-69 O 70 and older

27. What is your race / ethnicity? (check all that apply)
O American Indian/Alaska Native O Asian O Black/African/African American O Hispanic/Latino
O Native Hawaiian/Pacific Islander O White/Caucasian O Other: _____

28. Do you speak a language other than English at home? O No OYes - **Which language?** _____
28a. [If #28 is Yes] How well do you speak English? O Very Well O Well O Less than well O Not at all

30. What is your gender? O Male O Female O Other

31. Which of the following BEST describes your TOTAL ANNUAL HOUSEHOLD INCOME in 2021 before taxes?
O Less than $16,000 O $24,000 - $31,999 O $40,000 - $53,999 O $81,000 - $99,999
O $16,000 - $23,999 O $32,000 - $39,999 O $54,000 - $80,999 O Over $100,000

32. Are you riding METRO transit because the additional service enhancements that METRO is offering (e.g. improved ADA accessibility, bus shelters, and the implementation of the METRORapid Silver Line, Light Rail, BOOST) O Yes O No O Don't know / Not sure

REGISTER TO WIN $100

People who submit an accurately completed survey will be entered in a random drawing for one of five $100 gift cards You must provide your home address at the beginning of the survey and answer all questions to be eligible.

Your Name: _____

Phone Number: (_____) _____

Thank you for your help!

This question is mandatory.
If you choose 'Other:' please also specify your choice in the accompanying text field.

Hmoob (HMONG)	हिन्दी (HINDI)
Soomaali (SOMALI)	ગુજરાતી (GUJARATI)
ကညီ (KAREN)	русском (RUSSIAN)
ESPAÑOL (SPANISH)	فارسی (PERSIAN)
普通话 (CHINESE - MANDARIN)	اردو (URDU)
廣東話 (CHINESE - CANTONESE)	Tagalog (FILIPINO)
Tiếng Việt (VIETNAMESE)	REFUSED
한국어 (KOREAN)	Other:
Français (FRENCH)	

Exit & Clear | Save & Exit | Previous | Next

1. WEEKDAY HOUSTON TX OB SURVEY

Google Translate

Q. Estamos haciendo una breve encuesta para Houston Area Transit para ayudar a planificar mejoras en el transporte. ¿Desea realizar la encuesta por teléfono más tarde?

We're doing a short survey for Houston Area Transit today in order to help plan transportation improvements. Would you like do the survey over the phone later?
This question is mandatory.

- Telefono (PHONE)
- No acepta hacer la encuesta (NO, DOES NOT WISH TO DO THE SURVEY)

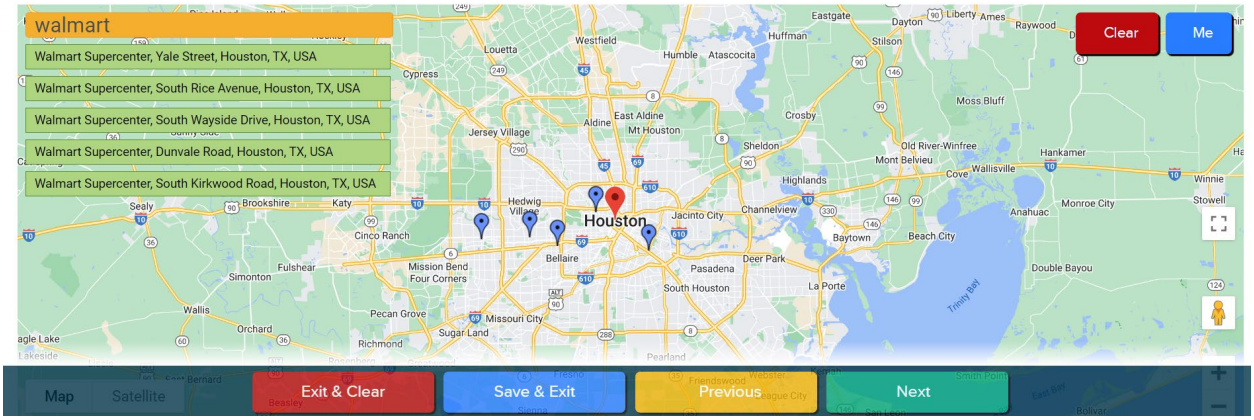
THIS ROUTE: METRO 2 - BELLAIRE EASTBOUND

Exit & Clear | Save & Exit | Previous | Next

1. WEEKDAY HOUSTON TX OB SURVEY

© ETC Institute 2022
10:24:26
GPS: OFF

Q. What is the EXACT STREET ADDRESS of this place [**Work related**]? (or nearest intersection or landmark)

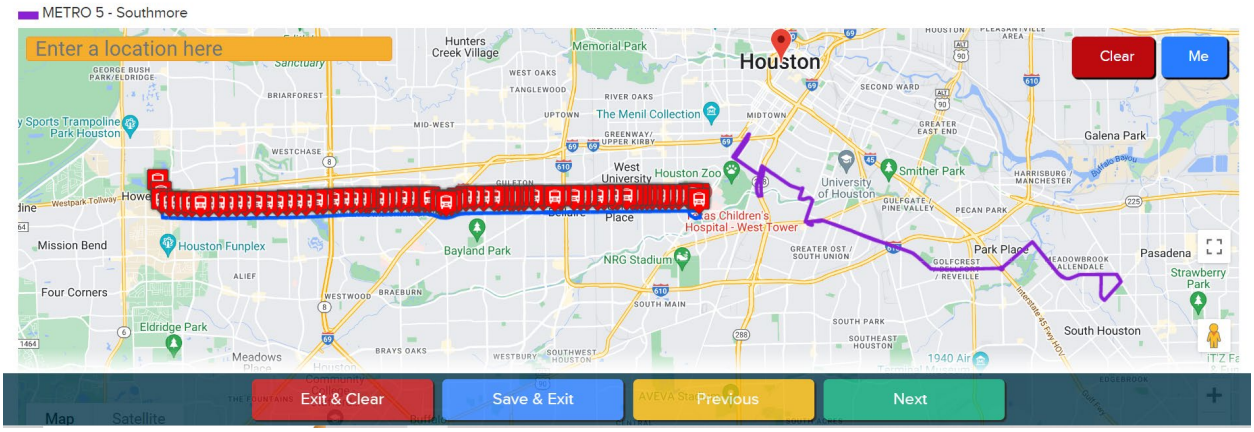


1. WEEKDAY HOUSTON TX OB SURVEY

© ETC Institute 2022
10:25:23
GPS: OFF

Q. Where did you **GET ON** [METRO 2 - Bellaire EASTBOUND] for this one-way trip?

User Stop



APPENDIX C: DATA DICTIONARY

FIELD NAME	DESCRIPTION	CODE VALUES
ID	Unique Identifier for each record	Actual Value
ROUTE_DIRECTION	Route survey was conducted on	Actual Value
HOME_ADDRESS [ADDR]	Respondent's home address	Actual Value
HOME_ADDRESS [CITY]	Respondent's home city	Actual Value
HOME_ADDRESS [STATE]	Respondent's home state	Actual Value
HOME_ADDRESS [ZIP]	Respondent's home zip code	Actual Value
HOME_ADDRESS [LAT]	Respondent's home latitude	Actual Value
HOME_ADDRESS [LONG]	Respondent's home longitude	Actual Value
ORIGIN_PLACE_TYPE	What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	1 = Your usual WORKPLACE
ORIGIN_PLACE_TYPE	What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	2 = Your HOME
ORIGIN_PLACE_TYPE	What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	5 = College / University (students only)
ORIGIN_PLACE_TYPE	What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	6 = School (K-12) (students only)
ORIGIN_PLACE_TYPE	What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	7 = Medical / Doctor / Clinic (non-work)
ORIGIN_PLACE_TYPE	What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	8 = Shopping
ORIGIN_PLACE_TYPE	What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	9 = Personal Business
ORIGIN_PLACE_TYPE	What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	10 = Work related
ORIGIN_PLACE_TYPE	What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	11 = Social visit / Church
ORIGIN_PLACE_TYPE	What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	12 = Airport (passengers only)
ORIGIN_PLACE_TYPE	What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	13 = Restaurant
ORIGIN_PLACE_TYPE	What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	14 = Recreation / Sightseeing
ORIGIN_PLACE_TYPE	What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	15 = Non-destination trip
ORIGIN_PLACE_TYPE	What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	98 = Other
ORIGIN_PLACE_TYPE	What type of place are you COMING FROM NOW? (the starting place for your one-way trip)	99 = Refused/No Answer
ORIGIN_ADDRESS [ADDR]	Respondent's origin address	Actual Value
ORIGIN_ADDRESS [CITY]	Respondent's origin city	Actual Value
ORIGIN_ADDRESS [STATE]	Respondent's origin state	Actual Value
ORIGIN_ADDRESS [ZIP]	Respondent's origin zip code	Actual Value
ORIGIN_ADDRESS [LAT]	Respondent's origin latitude	Actual Value
ORIGIN_ADDRESS [LONG]	Respondent's origin longitude	Actual Value
PREV_TRANSFERS	How many buses/trains did you travel on BEFORE you boarded	0 = (0) None
PREV_TRANSFERS	How many buses/trains did you travel on BEFORE you boarded	1 = (1) One
PREV_TRANSFERS	How many buses/trains did you travel on BEFORE you boarded	2 = (2) Two
PREV_TRANSFERS	How many buses/trains did you travel on BEFORE you boarded	3 = (3) Three
PREV_TRANSFERS	How many buses/trains did you travel on BEFORE you boarded	4 = (4+) Four or more
PREV_TRANSFERS	How many buses/trains did you travel on BEFORE you boarded	98 = Other
PREV_TRANSFERS	How many buses/trains did you travel on BEFORE you boarded	99 = Refused/No Answer

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FIELD NAME	DESCRIPTION	CODE VALUES
TRIP_FIRST_ROUTE	First transfer respondent took from origin	Actual Value
TRIP_SECOND_ROUTE	Second transfer respondent took from origin	Actual Value
TRIP_THIRD_ROUTE	Third transfer respondent took from origin	Actual Value
TRIP_FOURTH_ROUTE	Fourth transfer respondent took from origin	Actual Value
FIRSTWAITTIME	How long did you wait for the very first bus/train you used for this one-way trip?	98 = Other
FIRSTWAITTIME	How long did you wait for the very first bus/train you used for this one-way trip?	99 = Refused/No Answer
ORIGIN_TRANSPORT	How did you GET FROM your origin	1 = Walk
ORIGIN_TRANSPORT	How did you GET FROM your origin	2 = Wheelchair
ORIGIN_TRANSPORT	How did you GET FROM your origin	3 = Personal bike
ORIGIN_TRANSPORT	How did you GET FROM your origin	4 = Bike share or E-Bike
ORIGIN_TRANSPORT	How did you GET FROM your origin	5 = E-Scooter
ORIGIN_TRANSPORT	How did you GET FROM your origin	6 = Paratransit (e.g. METROLift)
ORIGIN_TRANSPORT	How did you GET FROM your origin	7 = Was dropped off by someone
ORIGIN_TRANSPORT	How did you GET FROM your origin	8 = Drove alone and parked
ORIGIN_TRANSPORT	How did you GET FROM your origin	9 = Drove or rode with others and parked
ORIGIN_TRANSPORT	How did you GET FROM your origin	10 = Car share (e.g. Zip Car, etc.)
ORIGIN_TRANSPORT	How did you GET FROM your origin	11 = Taxi
ORIGIN_TRANSPORT	How did you GET FROM your origin	12 = Uber, Lyft, etc.
ORIGIN_TRANSPORT	How did you GET FROM your origin	98 = Other
ORIGIN_TRANSPORT	How did you GET FROM your origin	99 = Refused/No Answer
DESTIN_PLACE_TYPE	What type of place are you GOING TO NOW? (the ending place for your one-way trip)	1 = Your usual WORKPLACE
DESTIN_PLACE_TYPE	What type of place are you GOING TO NOW? (the ending place for your one-way trip)	2 = Your HOME
DESTIN_PLACE_TYPE	What type of place are you GOING TO NOW? (the ending place for your one-way trip)	5 = College / University (students only)
DESTIN_PLACE_TYPE	What type of place are you GOING TO NOW? (the ending place for your one-way trip)	6 = School (K-12) (students only)
DESTIN_PLACE_TYPE	What type of place are you GOING TO NOW? (the ending place for your one-way trip)	7 = Medical / Doctor / Clinic (non-work)
DESTIN_PLACE_TYPE	What type of place are you GOING TO NOW? (the ending place for your one-way trip)	8 = Shopping
DESTIN_PLACE_TYPE	What type of place are you GOING TO NOW? (the ending place for your one-way trip)	9 = Personal Business
DESTIN_PLACE_TYPE	What type of place are you GOING TO NOW? (the ending place for your one-way trip)	10 = Work related
DESTIN_PLACE_TYPE	What type of place are you GOING TO NOW? (the ending place for your one-way trip)	11 = Social visit / Church
DESTIN_PLACE_TYPE	What type of place are you GOING TO NOW? (the ending place for your one-way trip)	12 = Airport (passengers only)
DESTIN_PLACE_TYPE	What type of place are you GOING TO NOW? (the ending place for your one-way trip)	13 = Restaurant
DESTIN_PLACE_TYPE	What type of place are you GOING TO NOW? (the ending place for your one-way trip)	14 = Recreation / Sightseeing
DESTIN_PLACE_TYPE	What type of place are you GOING TO NOW? (the ending place for your one-way trip)	98 = Other
DESTIN_PLACE_TYPE	What type of place are you GOING TO NOW? (the ending place for your one-way trip)	99 = Refused/No Answer
DESTIN_ADDRESS [ADDR]	Respondent's destination address	Actual Value
DESTIN_ADDRESS [CITY]	Respondent's destination city	Actual Value
DESTIN_ADDRESS [STATE]	Respondent's destination state	Actual Value
DESTIN_ADDRESS [ZIP]	Respondent's destination zip code	Actual Value
DESTIN_ADDRESS [LAT]	Respondent's destination latitude	Actual Value
DESTIN_ADDRESS [LONG]	Respondent's destination longitude	Actual Value
NEXT_TRANSFERS	How many buses/trains will you ride AFTER you get off	0 = (0) None
NEXT_TRANSFERS	How many buses/trains will you ride AFTER you get off	1 = (1) One
NEXT_TRANSFERS	How many buses/trains will you ride AFTER you get off	2 = (2) Two
NEXT_TRANSFERS	How many buses/trains will you ride AFTER you get off	3 = (3) Three
NEXT_TRANSFERS	How many buses/trains will you ride AFTER you get off	4 = (4+) Four or more
NEXT_TRANSFERS	How many buses/trains will you ride AFTER you get off	98 = Other
NEXT_TRANSFERS	How many buses/trains will you ride AFTER you get off	99 = Refused/No Answer

FIELD NAME	DESCRIPTION	CODE VALUES
TRIP_NEXT_ROUTE	First transfer respondent took to destination	Actual Value
TRIP_AFTER_ROUTE	Second transfer respondent took to destination	Actual Value
TRIP_3RD_ROUTE	Third transfer respondent took to destination	Actual Value
TRIP_LAST4TH_RTE	Fourth transfer respondent took to destination	Actual Value
DESTIN_TRANSPORT	How will you GET TO your destination	1 = Walk
DESTIN_TRANSPORT	How will you GET TO your destination	2 = Wheelchair
DESTIN_TRANSPORT	How will you GET TO your destination	3 = Personal bike
DESTIN_TRANSPORT	How will you GET TO your destination	4 = Bike share or E-Bike
DESTIN_TRANSPORT	How will you GET TO your destination	5 = E-Scooter
DESTIN_TRANSPORT	How will you GET TO your destination	6 = Paratransit (e.g. METROLift)
DESTIN_TRANSPORT	How will you GET TO your destination	7 = Be picked up by someone
DESTIN_TRANSPORT	How will you GET TO your destination	8 = Get in a parked vehicle & drive alone
DESTIN_TRANSPORT	How will you GET TO your destination	9 = Get in a parked vehicle & drive/ride w/others
DESTIN_TRANSPORT	How will you GET TO your destination	10 = Car share (e.g. Zip Car, etc.)
DESTIN_TRANSPORT	How will you GET TO your destination	11 = Taxi
DESTIN_TRANSPORT	How will you GET TO your destination	12 = Uber, Lyft, etc.
DESTIN_TRANSPORT	How will you GET TO your destination	98 = Other
DESTIN_TRANSPORT	How will you GET TO your destination	99 = Refused/No Answer
STOP_ON [ADDR]	Respondent's boarding address	Actual Value
STOP_ON [CLNTID]	Stop ID of respondent's boarding address	Actual Value
STOP_ON [LAT]	Latitude for respondent's boarding address	Actual Value
STOP_ON [LONG]	Longitude for respondent's boarding address	Actual Value
STOP_OFF [ADDR]	Respondent's alighting address	Actual Value
STOP_OFF [CLNTID]	Stop ID of respondent's alighting address	Actual Value
STOP_OFF [LAT]	Latitude for respondent's alighting address	Actual Value
STOP_OFF [LONG]	Longitude for respondent's alighting address	Actual Value
PREV_TRAN_1_ON_BUS [LAT]	Latitude of respondent's boarding location for their first transfer from origin	Actual Value
PREV_TRAN_1_ON_BUS [LONG]	Longitude of respondent's boarding location for their first transfer from origin	Actual Value
PREV_TRAN_1_OFF_BUS [LAT]	Latitude of respondent's alighting location for their first transfer from origin	Actual Value
PREV_TRAN_1_OFF_BUS [LONG]	Longitude of respondent's alighting location for their first transfer from origin	Actual Value
PREV_TRAN_2_ON_BUS [LAT]	Latitude of respondent's boarding location for their second transfer from origin	Actual Value
PREV_TRAN_2_ON_BUS [LONG]	Longitude of respondent's boarding location for their second transfer from origin	Actual Value
PREV_TRAN_2_OFF_BUS [LAT]	Latitude of respondent's alighting location for their second transfer from origin	Actual Value
PREV_TRAN_2_OFF_BUS [LONG]	Longitude of respondent's alighting location for their second transfer from origin	Actual Value
PREV_TRAN_3_ON_BUS [LAT]	Latitude of respondent's boarding location for their third transfer from origin	Actual Value
PREV_TRAN_3_ON_BUS [LONG]	Longitude of respondent's boarding location for their third transfer from origin	Actual Value
PREV_TRAN_3_OFF_BUS [LAT]	Latitude of respondent's alighting location for their third transfer from origin	Actual Value
PREV_TRAN_3_OFF_BUS [LONG]	Longitude of respondent's alighting location for their third transfer from origin	Actual Value
PREV_TRAN_4_ON_BUS [LAT]	Latitude of respondent's boarding location for their fourth transfer from origin	Actual Value
PREV_TRAN_4_ON_BUS [LONG]	Longitude of respondent's boarding location for their fourth transfer from origin	Actual Value
PREV_TRAN_4_OFF_BUS [LAT]	Latitude of respondent's alighting location for their fourth transfer from origin	Actual Value
PREV_TRAN_4_OFF_BUS [LONG]	Longitude of respondent's alighting location for their fourth transfer from origin	Actual Value
NEXT_TRAN_1_ON_BUS [LAT]	Latitude of respondent's boarding location for their first transfer to destination	Actual Value
NEXT_TRAN_1_ON_BUS [LONG]	Longitude of respondent's boarding location for their first transfer to destination	Actual Value
NEXT_TRAN_1_OFF_BUS [LAT]	Latitude of respondent's alighting location for their first transfer to destination	Actual Value
NEXT_TRAN_1_OFF_BUS [LONG]	Longitude of respondent's alighting location for their first transfer to destination	Actual Value
NEXT_TRAN_2_ON_BUS [LAT]	Latitude of respondent's boarding location for their second transfer to destination	Actual Value
NEXT_TRAN_2_ON_BUS [LONG]	Longitude of respondent's boarding location for their second transfer to destination	Actual Value
NEXT_TRAN_2_OFF_BUS [LAT]	Latitude of respondent's alighting location for their second transfer to destination	Actual Value
NEXT_TRAN_2_OFF_BUS [LONG]	Longitude of respondent's alighting location for their second transfer to destination	Actual Value
NEXT_TRAN_3_ON_BUS [LAT]	Latitude of respondent's boarding location for their third transfer to destination	Actual Value
NEXT_TRAN_3_ON_BUS [LONG]	Longitude of respondent's boarding location for their third transfer to destination	Actual Value
NEXT_TRAN_3_OFF_BUS [LAT]	Latitude of respondent's alighting location for their third transfer to destination	Actual Value
NEXT_TRAN_3_OFF_BUS [LONG]	Longitude of respondent's alighting location for their third transfer to destination	Actual Value
NEXT_TRAN_4_ON_BUS [LAT]	Latitude of respondent's boarding location for their fourth transfer to destination	Actual Value
NEXT_TRAN_4_ON_BUS [LONG]	Longitude of respondent's boarding location for their fourth transfer to destination	Actual Value
NEXT_TRAN_4_OFF_BUS [LAT]	Latitude of respondent's alighting location for their fourth transfer to destination	Actual Value
NEXT_TRAN_4_OFF_BUS [LONG]	Longitude of respondent's alighting location for their fourth transfer to destination	Actual Value

FIELD NAME	DESCRIPTION	CODE VALUES
TIME_ON	What time did you BOARD this bus/train	98 = Other
TIME_ON	What time did you BOARD this bus/train	99 = Refused/No Answer
TIME_ON	What time did you BOARD this bus/train	AM1 = Before 6:00 am
TIME_ON	What time did you BOARD this bus/train	AM2 = 6:00 am - 7:00 am
TIME_ON	What time did you BOARD this bus/train	AM3 = 7:00 am - 8:00 am
TIME_ON	What time did you BOARD this bus/train	AM4 = 8:00 am - 9:00 am
TIME_ON	What time did you BOARD this bus/train	MID1 = 9:01 am - 10:00 am
TIME_ON	What time did you BOARD this bus/train	MID2 = 10:00 am - 11:00 am
TIME_ON	What time did you BOARD this bus/train	MID3 = 11:00 am - 12:00 pm
TIME_ON	What time did you BOARD this bus/train	MID4 = 12:00 pm - 1:00 pm
TIME_ON	What time did you BOARD this bus/train	MID5 = 1:00 pm - 2:00 pm
TIME_ON	What time did you BOARD this bus/train	MID6 = 2:00 pm - 3:00 pm
TIME_ON	What time did you BOARD this bus/train	PM1 = 3:01 pm - 4:00 pm
TIME_ON	What time did you BOARD this bus/train	PM2 = 4:00 pm - 5:00 pm
TIME_ON	What time did you BOARD this bus/train	PM3 = 5:00 pm - 6:00 pm
TIME_ON	What time did you BOARD this bus/train	PM4 = 6:01 pm - 7:00 pm
TIME_ON	What time did you BOARD this bus/train	PM5 = 7:00 pm - 8:00 pm
TIME_ON	What time did you BOARD this bus/train	PM6 = 8:00 pm - 9:00 pm
TIME_ON	What time did you BOARD this bus/train	PM7 = After 9:00 pm
TIME_PERIOD	Time period respondent boarded this bus/rail	98 = Other
TIME_PERIOD	Time period respondent boarded this bus/rail	99 = Refused/No Answer
TIME_PERIOD	Time period respondent boarded this bus/rail	Actual Value
TRIP_IN_OPPO_DIR	Will you (or did you) make this same trip in exactly the opposite direction today?	1 = Yes
TRIP_IN_OPPO_DIR	Will you (or did you) make this same trip in exactly the opposite direction today?	2 = No
TRIP_IN_OPPO_DIR	Will you (or did you) make this same trip in exactly the opposite direction today?	3 = Yes - but will not use the bus/rail
TRIP_IN_OPPO_DIR	Will you (or did you) make this same trip in exactly the opposite direction today?	98 = Other
TRIP_IN_OPPO_DIR	Will you (or did you) make this same trip in exactly the opposite direction today?	99 = Refused/No Answer
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	98 = Other
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	99 = Refused/No Answer
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	AM1 = Before 6:00 am
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	AM2 = 6:00 am - 7:00 am
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	AM3 = 7:00 am - 8:00 am
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	AM4 = 8:00 am - 9:00 am
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	MID1 = 9:01 am - 10:00 am
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	MID2 = 10:00 am - 11:00 am
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	MID3 = 11:00 am - 12:00 pm
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	MID4 = 12:00 pm - 1:00 pm
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	MID5 = 1:00 pm - 2:00 pm
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	MID6 = 2:00 pm - 3:00 pm
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	PM1 = 3:01 pm - 4:00 pm
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	PM2 = 4:00 pm - 5:00 pm
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	PM3 = 5:00 pm - 6:00 pm
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	PM4 = 6:01 pm - 7:00 pm
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	PM5 = 7:00 pm - 8:00 pm
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	PM6 = 8:00 pm - 9:00 pm
OPPO_DIR_TRIP_TIME	At what time did/will you leave for this trip in the opposite direction?	PM7 = After 9:00 pm

FIELD NAME	DESCRIPTION	CODE VALUES
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	98 = Other
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	99 = Refused/No Answer
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	BRAZOS_1 = Cash
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	BRAZOS_2 = Day Pass
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	BRAZOS_3 = Weekly Pass
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	BRAZOS_4 = Multi Ride Pass (42 one way trips)
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	BRAZOS_5 = Ticket Book (40 one way trips)
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	BRAZOS_6 = S&D Punch Pass (40 one way trips)
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	CONNECT_1 = Local cash fare: $1.00
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	CONNECT_10 = P&R League City to Galveston coupon book: $150.00 for 50 coupons
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	CONNECT_2 = Local coupon book: $15.00 for 20 adult coupons
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	CONNECT_3 = Local coupon book: $7.50 for 20 elderly, student, disabled coupons
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	CONNECT_7 = P&R cash fare (Texas City to Galveston): $2.00
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	CONNECT_8 = P&R cash fare (League City to Galveston): $4.00
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	CONNECT_9 = P&R Texas City to Galveston coupon book: $75.00 for 50 coupons
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	CONROE_1 = Adult
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	CONROE_2 = Senior (Age 65 and older with ID)
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	CONROE_3 = Veterans
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	CONROE_4 = Medicare Cardholder
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	CONROE_5 = Persons with Disabilities
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	CONROE_6 = Students (13-18)
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	CONROE_7 = Children (6-12)
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	CONROE_8 = Children under 6 with Adult (Free)
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	FORT_1 = Cash Fare (One way) commuter services
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	FORT_2 = 20 Ride Ticket Book commuter services
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	FORT_3 = 40 Ride Ticket Book commuter services
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	HARRIS_1 = Cash Full Fare ($1.00)
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	HARRIS_2 = Cash Half Fare (Under 12, Medicaid, Medicare, primary school with current ID)
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	HARRIS_3 = Cash Elderly Half Fare
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	HARRIS_4 = ADA Paratransit $2.00 (2x adult fare)
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	ISLAND_1 = Cash
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	ISLAND_2 = Monthly Pass
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	ISLAND_3 = Student Pass
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	ISLAND_4 = Tokens
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	METRO_1 = Cash
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	METRO_2 = Fare Card (e.g. METRO Q® Fare Card)
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	METRO_3 = Money Card (e.g. METRO Money Card)
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	METRO_4 = Day Pass
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	METRO_5 = Paper Rail Ticket
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	METRO_6 = Mobile Ticket (e.g. METRO Q® Mobile Ticketing)
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	WOOD_1 = Round Trip Ticket (P&R)
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	WOOD_2 = 20 Ticket Book ($260)
PAYMENT_METHODS	What fare payment methods did you use for this one-way trip? (select all that apply)	WOOD_3 = Free (Trolley)

FIELD NAME	DESCRIPTION	CODE VALUES
TYPE_OF_FARE	What type of fare was this?	98 = Other
TYPE_OF_FARE	What type of fare was this?	99 = Refused/No Answer
TYPE_OF_FARE	What type of fare was this?	BRAZOS_1 = Regular
TYPE_OF_FARE	What type of fare was this?	BRAZOS_2 = Children 6-12
TYPE_OF_FARE	What type of fare was this?	BRAZOS_3 = Children under 6 with paying customer
TYPE_OF_FARE	What type of fare was this?	BRAZOS_4 = Senior 65 and over
TYPE_OF_FARE	What type of fare was this?	BRAZOS_5 = Disabled with D Pass
TYPE_OF_FARE	What type of fare was this?	BRAZOS_6 = Medicare with Medicare card
TYPE_OF_FARE	What type of fare was this?	ISLAND_1 = Regular
TYPE_OF_FARE	What type of fare was this?	ISLAND_2 = Senior or Disabled
TYPE_OF_FARE	What type of fare was this?	ISLAND_3 = Children under 6 with Adult
TYPE_OF_FARE	What type of fare was this?	ISLAND_4 = Child (6-18 years of age)
TYPE_OF_FARE	What type of fare was this?	ISLAND_5 = Reduced Monthly Pass
TYPE_OF_FARE	What type of fare was this?	METRO_1 = Regular / Full Fare
TYPE_OF_FARE	What type of fare was this?	METRO_2 = Reduced Fare: Student K-12
TYPE_OF_FARE	What type of fare was this?	METRO_3 = Reduced Fare: Senior (65-69)
TYPE_OF_FARE	What type of fare was this?	METRO_4 = Reduced Fare: Disabled
TYPE_OF_FARE	What type of fare was this?	METRO_5 = Free Fare: 70+ Lifetime Pass
TYPE_OF_FARE	What type of fare was this?	METRO_6 = Free Fare: Veterans Pass
TYPE_OF_FARE	What type of fare was this?	METRO_7 = Free Fare: Student (College/University)
TYPE_OF_FARE	What type of fare was this?	METRO_8 = Free Fare: METRO Employee/Spouse/Retiree
TYPE_OF_FARE	What type of fare was this?	METRO_9 = Free Fare: Freedom Q (METROLift)
MAKE_TRIP	If transit service were not available, how would you have made this trip?	98 = Other
MAKE_TRIP	If transit service were not available, how would you have made this trip?	99 = Refused/No Answer
MAKE_TRIP	If transit service were not available, how would you have made this trip?	A1 = Walk
MAKE_TRIP	If transit service were not available, how would you have made this trip?	A2 = Bicycle / Scooter
MAKE_TRIP	If transit service were not available, how would you have made this trip?	A3 = Drove myself
MAKE_TRIP	If transit service were not available, how would you have made this trip?	A4 = Ride with someone else
MAKE_TRIP	If transit service were not available, how would you have made this trip?	A5 = Taxi
MAKE_TRIP	If transit service were not available, how would you have made this trip?	A6 = TNC (e.g. Uber, Lyft)
MAKE_TRIP	If transit service were not available, how would you have made this trip?	A7 = Car share (e.g. Zip Car)
MAKE_TRIP	If transit service were not available, how would you have made this trip?	A8 = Would not make this trip
RESIDENT_VISITOR	Are you a visitor to the Houston-Galveston region?	1 = No
RESIDENT_VISITOR	Are you a visitor to the Houston-Galveston region?	2 = Yes
RESIDENT_VISITOR	Are you a visitor to the Houston-Galveston region?	98 = Other
RESIDENT_VISITOR	Are you a visitor to the Houston-Galveston region?	99 = Refused/No Answer
HOW_LONG_RIDE	How long have you been riding transit?	98 = Other
HOW_LONG_RIDE	How long have you been riding transit?	99 = Refused/No Answer
HOW_LONG_RIDE	How long have you been riding transit?	A1 = Less than 6 months
HOW_LONG_RIDE	How long have you been riding transit?	A2 = 6-12 months
HOW_LONG_RIDE	How long have you been riding transit?	A3 = 1-2 years
HOW_LONG_RIDE	How long have you been riding transit?	A4 = 3-6 years
HOW_LONG_RIDE	How long have you been riding transit?	A5 = 7-10 years
HOW_LONG_RIDE	How long have you been riding transit?	A6 = More than 10 years
HOW_LONG_RIDE	How long have you been riding transit?	A7 = First time riding

FIELD NAME	DESCRIPTION	CODE VALUES
HOW_OFTEN_RIDE	How often do you ride transit?	98 = Other
HOW_OFTEN_RIDE	How often do you ride transit?	99 = Refused/No Answer
HOW_OFTEN_RIDE	How often do you ride transit?	A1 = 6 or 7 days a week
HOW_OFTEN_RIDE	How often do you ride transit?	A2 = 5 days a week
HOW_OFTEN_RIDE	How often do you ride transit?	A3 = 3 or 4 days a week
HOW_OFTEN_RIDE	How often do you ride transit?	A4 = 1 or 2 days a week
HOW_OFTEN_RIDE	How often do you ride transit?	A5 = 1 or 2 days a month
HOW_OFTEN_RIDE	How often do you ride transit?	A6 = Once in a while
HOW_OFTEN_RIDE	How often do you ride transit?	A7 = First time riding
COUNT_VH_HH	How many vehicles (cars, trucks, or motorcycles) are available to your household?	0 = None (0)
COUNT_VH_HH	How many vehicles (cars, trucks, or motorcycles) are available to your household?	1 = One (1)
COUNT_VH_HH	How many vehicles (cars, trucks, or motorcycles) are available to your household?	2 = Two (2)
COUNT_VH_HH	How many vehicles (cars, trucks, or motorcycles) are available to your household?	3 = Three (3)
COUNT_VH_HH	How many vehicles (cars, trucks, or motorcycles) are available to your household?	4 = Four (4)
COUNT_VH_HH	How many vehicles (cars, trucks, or motorcycles) are available to your household?	5 = Five (5)
COUNT_VH_HH	How many vehicles (cars, trucks, or motorcycles) are available to your household?	6 = Six (6)
COUNT_VH_HH	How many vehicles (cars, trucks, or motorcycles) are available to your household?	7 = Seven (7)
COUNT_VH_HH	How many vehicles (cars, trucks, or motorcycles) are available to your household?	8 = Eight (8)
COUNT_VH_HH	How many vehicles (cars, trucks, or motorcycles) are available to your household?	9 = Nine (9)
COUNT_VH_HH	How many vehicles (cars, trucks, or motorcycles) are available to your household?	10 = Ten or more (10+)
COUNT_VH_HH	How many vehicles (cars, trucks, or motorcycles) are available to your household?	98 = Other
COUNT_VH_HH	How many vehicles (cars, trucks, or motorcycles) are available to your household?	99 = Refused/No Answer
USED_VEH_TRIP	Could you have used one of these vehicles for this trip?	98 = Other
USED_VEH_TRIP	Could you have used one of these vehicles for this trip?	99 = Refused/No Answer
USED_VEH_TRIP	Could you have used one of these vehicles for this trip?	NO = No
USED_VEH_TRIP	Could you have used one of these vehicles for this trip?	YES = Yes
HH_SIZE	Including YOU, how many people live in your household?	1 = One (1)
HH_SIZE	Including YOU, how many people live in your household?	2 = Two (2)
HH_SIZE	Including YOU, how many people live in your household?	3 = Three (3)
HH_SIZE	Including YOU, how many people live in your household?	4 = Four (4)
HH_SIZE	Including YOU, how many people live in your household?	5 = Five (5)
HH_SIZE	Including YOU, how many people live in your household?	6 = Six (6)
HH_SIZE	Including YOU, how many people live in your household?	7 = Seven (7)
HH_SIZE	Including YOU, how many people live in your household?	8 = Eight (8)
HH_SIZE	Including YOU, how many people live in your household?	9 = Nine (9)
HH_SIZE	Including YOU, how many people live in your household?	10 = Ten or more (10+)
HH_SIZE	Including YOU, how many people live in your household?	98 = Other
HH_SIZE	Including YOU, how many people live in your household?	99 = Refused/No Answer
HH_SIZE_18UP	Including YOU, how many members of your household are age 16 and older?	1 = One (1)
HH_SIZE_18UP	Including YOU, how many members of your household are age 16 and older?	2 = Two (2)
HH_SIZE_18UP	Including YOU, how many members of your household are age 16 and older?	3 = Three (3)
HH_SIZE_18UP	Including YOU, how many members of your household are age 16 and older?	4 = Four (4)
HH_SIZE_18UP	Including YOU, how many members of your household are age 16 and older?	5 = Five (5)
HH_SIZE_18UP	Including YOU, how many members of your household are age 16 and older?	6 = Six (6)
HH_SIZE_18UP	Including YOU, how many members of your household are age 16 and older?	7 = Seven (7)
HH_SIZE_18UP	Including YOU, how many members of your household are age 16 and older?	8 = Eight (8)
HH_SIZE_18UP	Including YOU, how many members of your household are age 16 and older?	9 = Nine (9)
HH_SIZE_18UP	Including YOU, how many members of your household are age 16 and older?	10 = Ten or more (10+)
HH_SIZE_18UP	Including YOU, how many members of your household are age 16 and older?	98 = Other
HH_SIZE_18UP	Including YOU, how many members of your household are age 16 and older?	99 = Refused/No Answer

FIELD NAME	DESCRIPTION	CODE VALUES
EMPLOYMENT_STATUS	What is your employment status? (Check the one response that BEST describes you)	1 = Employed full-time
EMPLOYMENT_STATUS	What is your employment status? (Check the one response that BEST describes you)	2 = Employed part-time
EMPLOYMENT_STATUS	What is your employment status? (Check the one response that BEST describes you)	3 = Not currently employed
EMPLOYMENT_STATUS	What is your employment status? (Check the one response that BEST describes you)	4 = Disabled and unable to work
EMPLOYMENT_STATUS	What is your employment status? (Check the one response that BEST describes you)	5 = Retired
EMPLOYMENT_STATUS	What is your employment status? (Check the one response that BEST describes you)	6 = Homemaker
EMPLOYMENT_STATUS	What is your employment status? (Check the one response that BEST describes you)	98 = Other
EMPLOYMENT_STATUS	What is your employment status? (Check the one response that BEST describes you)	99 = Refused/No Answer
STUDENT_STATUS	What is your student status? (check the one response that BEST describes you)	1 = Not a student
STUDENT_STATUS	What is your student status? (check the one response that BEST describes you)	2 = Yes - College / University / Community College
STUDENT_STATUS	What is your student status? (check the one response that BEST describes you)	3 = Yes - Vocational / Technical / Trade School
STUDENT_STATUS	What is your student status? (check the one response that BEST describes you)	4 = Yes - K-12th grade
STUDENT_STATUS	What is your student status? (check the one response that BEST describes you)	98 = Other
STUDENT_STATUS	What is your student status? (check the one response that BEST describes you)	99 = Refused/No Answer
HAVE_DL	Do you have a valid driver's license?	1 = Yes
HAVE_DL	Do you have a valid driver's license?	2 = No
HAVE_DL	Do you have a valid driver's license?	98 = Other
HAVE_DL	Do you have a valid driver's license?	99 = Refused/No Answer
YOUR_AGE	What is your age?	1 = 5 - 15
YOUR_AGE	What is your age?	2 = 16 - 19
YOUR_AGE	What is your age?	3 = 20 - 34
YOUR_AGE	What is your age?	4 = 35 - 50
YOUR_AGE	What is your age?	5 = 51 - 64
YOUR_AGE	What is your age?	6 = 65 - 69
YOUR_AGE	What is your age?	7 = 70 and older
YOUR_AGE	What is your age?	8 = Prefer not to answer
YOUR_AGE	What is your age?	98 = Other
YOUR_AGE	What is your age?	99 = Refused/No Answer
RACE [1]	What is your Race / Ethnicity?...American Indian / Alaska Native	Actual Value
RACE [3]	What is your Race / Ethnicity?...Asian	Actual Value
RACE [2]	What is your Race / Ethnicity?...Black / African / African American	Actual Value
RACE [6]	What is your Race / Ethnicity?...Hispanic / Latino	Actual Value
RACE [7]	What is your Race / Ethnicity?...Middle Eastern or North African	Actual Value
RACE [5]	What is your Race / Ethnicity?...Native Hawaiian / Pacific Islander	Actual Value
RACE [4]	What is your Race / Ethnicity?...White / Caucasian	Actual Value
RACE [8]	What is your Race / Ethnicity?...Prefer not to answer	Actual Value
HOME_LANG_OTHER	Do you speak a language other than English at home?	1 = Yes
HOME_LANG_OTHER	Do you speak a language other than English at home?	2 = No
HOME_LANG_OTHER	Do you speak a language other than English at home?	98 = Other
HOME_LANG_OTHER	Do you speak a language other than English at home?	99 = Refused/No Answer
HOME_OTHER_LANG	Language respondent speaks at home other than English	Actual Value
ENGLISH_ABILITY	How well do you speak English?	1 = Very well
ENGLISH_ABILITY	How well do you speak English?	2 = Well
ENGLISH_ABILITY	How well do you speak English?	3 = Less than well
ENGLISH_ABILITY	How well do you speak English?	4 = Not at all
ENGLISH_ABILITY	How well do you speak English?	98 = Other
ENGLISH_ABILITY	How well do you speak English?	99 = Refused/No Answer
INCOME	Which of the following BEST describes your TOTAL ANNUAL HOUSEHOLD INCOME in 2021	1 = Less than $16,000
INCOME	Which of the following BEST describes your TOTAL ANNUAL HOUSEHOLD INCOME in 2021	2 = $16,000 - $23,999
INCOME	Which of the following BEST describes your TOTAL ANNUAL HOUSEHOLD INCOME in 2021	3 = $24,000 - $31,999
INCOME	Which of the following BEST describes your TOTAL ANNUAL HOUSEHOLD INCOME in 2021	4 = $32,000 - $39,999
INCOME	Which of the following BEST describes your TOTAL ANNUAL HOUSEHOLD INCOME in 2021	5 = $40,000 - $53,999
INCOME	Which of the following BEST describes your TOTAL ANNUAL HOUSEHOLD INCOME in 2021	6 = $54,000 - $80,999
INCOME	Which of the following BEST describes your TOTAL ANNUAL HOUSEHOLD INCOME in 2021	7 = $81,000 - $99,999
INCOME	Which of the following BEST describes your TOTAL ANNUAL HOUSEHOLD INCOME in 2021	8 = Over $100,000
INCOME	Which of the following BEST describes your TOTAL ANNUAL HOUSEHOLD INCOME in 2021	98 = Other
INCOME	Which of the following BEST describes your TOTAL ANNUAL HOUSEHOLD INCOME in 2021	99 = Refused/No Answer

FIELD NAME	DESCRIPTION	CODE VALUES
SERVICE_ENHANCEMENT	Are you riding METRO transit because the additional service enhancements that METRO is offering? (e.g. improved ADA accessibility, bus shelters, and the implementation of the METRORapid Silver Line, Light Rail, BOOST)	98 = Other
SERVICE_ENHANCEMENT	Are you riding METRO transit because the additional service enhancements that METRO is offering? (e.g. improved ADA accessibility, bus shelters, and the implementation of the METRORapid Silver Line, Light Rail, BOOST)	99 = Refused/No Answer
SERVICE_ENHANCEMENT	Are you riding METRO transit because the additional service enhancements that METRO is offering? (e.g. improved ADA accessibility, bus shelters, and the implementation of the METRORapid Silver Line, Light Rail, BOOST)	A1 = Yes
SERVICE_ENHANCEMENT	Are you riding METRO transit because the additional service enhancements that METRO is offering? (e.g. improved ADA accessibility, bus shelters, and the implementation of the METRORapid Silver Line, Light Rail, BOOST)	A2 = No
SERVICE_ENHANCEMENT	Are you riding METRO transit because the additional service enhancements that METRO is offering? (e.g. improved ADA accessibility, bus shelters, and the implementation of the METRORapid Silver Line, Light Rail, BOOST)	A3 = Don't know / Not sure
GENDER	INTERVIEWER: Observed gender	1 = Male
GENDER	INTERVIEWER: Observed gender	2 = Female
GENDER	INTERVIEWER: Observed gender	3 = Other
GENDER	INTERVIEWER: Observed gender	98 = Other
GENDER	INTERVIEWER: Observed gender	99 = Refused/No Answer
SURVEY_LANGUAGE	INTERVIEWER: In which language was this survey conducted?	98 = Other
SURVEY_LANGUAGE	INTERVIEWER: In which language was this survey conducted?	99 = Refused/No Answer
SURVEY_LANGUAGE	INTERVIEWER: In which language was this survey conducted?	ARABIC = ARABIC
SURVEY_LANGUAGE	INTERVIEWER: In which language was this survey conducted?	CANTONESE = CANTONESE
SURVEY_LANGUAGE	INTERVIEWER: In which language was this survey conducted?	ENGLISH = ENGLISH
SURVEY_LANGUAGE	INTERVIEWER: In which language was this survey conducted?	HMONG = HMONG
SURVEY_LANGUAGE	INTERVIEWER: In which language was this survey conducted?	KAREN = KAREN
SURVEY_LANGUAGE	INTERVIEWER: In which language was this survey conducted?	KOREAN = KOREAN
SURVEY_LANGUAGE	INTERVIEWER: In which language was this survey conducted?	MANDARIN = MANDARIN
SURVEY_LANGUAGE	INTERVIEWER: In which language was this survey conducted?	RUSSI = RUSSIAN
SURVEY_LANGUAGE	INTERVIEWER: In which language was this survey conducted?	SOMA = SOMALI
SURVEY_LANGUAGE	INTERVIEWER: In which language was this survey conducted?	SPANI = SPANISH
SURVEY_LANGUAGE	INTERVIEWER: In which language was this survey conducted?	TAGAL = TAGALOG/FILIPINO
SURVEY_LANGUAGE	INTERVIEWER: In which language was this survey conducted?	VIET = VIETNAMESE
ROUTE_DIR_TIME_CODE	ID given for specific route/direction/time period	Actual Value
UNLINKED_WGHT_FCTR	Weight factor given to each record based off expansion	Actual Value
SYSTEM_TRANSFERS	Total number of in-system transfers	Actual Value
LINKED_MULTP	Mulitplier used to get the linked weight factor	Actual Value
LINKED_WGHT_FCTR	Linked weight factor given to each record based off unlinked weight factor and multiplier	Actual Value
Final_unlinked_weight	Weight factor given to each record based off secondary expansion	Estimated in Secondary Expansion
Final_linked_weight	Linked weight factor given to each record based off final unlinked weight factor and multiplier	Estimated in Secondary Expansion

APPENDIX D: TYPES OF DATA EXPANSION

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ROUTE_DIRECTION	Expansion Type	ROUTE_DIRECTION	Expansion Type	ROUTE_DIRECTION	Expansion Type
BTD-Cleveland Fixed Route [Circulator] LOOP	4	METRO 214/216 - NW Station / WL York P&R INBOUND	2	METRO 59 - Aldine Mail EASTBOUND	2
BTD-Liberty County Circulator [Circulator] LOOP	4	METRO 217 - Cypress P&R INBOUND	2	METRO 59 - Aldine Mail WESTBOUND	2
Conroe Connection Route 1 North LOOP	4	METRO 222 - Grand Parkway P&R INBOUND	2	METRO 6 - Jensen / Greens NORTHBOUND	2
Conroe Connection Route 2 South LOOP	4	METRO 228 - Kingsland / Addicks P&R INBOUND	2	METRO 6 - Jensen / Greens SOUTHBOUND	2
Conroe Connection Route 3 West LOOP	4	METRO 23 - Clay - W 43rd EASTBOUND	2	METRO 60 - Cambridge NORTHBOUND	2
Conroe Connection Route 4 Northeast LOOP	4	METRO 23 - Clay - W 43rd WESTBOUND	2	METRO 60 - Cambridge SOUTHBOUND	2
Fort Bend Transit Galleria LOOP	4	METRO 236/237 - Maxey P&R INBOUND	2	METRO 63 - Fondren NORTHBOUND	2
Fort Bend Transit Greenway Plaza LOOP	4	METRO 244 - El Dorado / Monroe P&R INBOUND	2	METRO 63 - Fondren SOUTHBOUND	2
Fort Bend Transit Texas Medical Center LOOP	4	METRO 246/247 - Fuqua / Bay Area P&R INBOUND	2	METRO 64 - Lincoln City NORTHBOUND	2
GCTD 101 La Marque North LOOP	4	METRO 25 - Richmond EASTBOUND	2	METRO 64 - Lincoln City SOUTHBOUND	2
GCTD 102 La Marque South LOOP	4	METRO 25 - Richmond WESTBOUND	2	METRO 65 - Bissonnet EASTBOUND	2
GCTD 103 Texas City North LOOP	4	METRO 259 - Eastex / Townsen / Kingwood P&R INBOUND	2	METRO 65 - Bissonnet WESTBOUND	2
GCTD 104 Texas City South LOOP	4	METRO 26 - Long Point / Cavalcade EASTBOUND	2	METRO 66 - Quitman EASTBOUND	2
GCTD 105 Dickinson [Circulator] LOOP	4	METRO 26 - Long Point / Cavalcade WESTBOUND	2	METRO 66 - Quitman WESTBOUND	2
GCTD 106 Texas City Express [Circulator] LOOP	4	METRO 269 - Hillcroft / Westwood / W. Bellfort P&R INBOUND	2	METRO 67 - Dairy Ashford NORTHBOUND	2
GCTD 107 Bacliff / San Leon [Circulator] LOOP	4	METRO 27 - Shepherd NORTHBOUND	2	METRO 67 - Dairy Ashford SOUTHBOUND	2
GCTD Angleton Purple [Circulator] LOOP	4	METRO 27 - Shepherd SOUTHBOUND	2	METRO 68 - Braeswood EASTBOUND	2
GCTD Angleton Purple [Circulator] LOOP	4	METRO 28 - OST - Wayside EASTBOUND	2	METRO 68 - Braeswood WESTBOUND	2
GCTD Lake Jackson / Clute Blue [Circulator] LOOP	4	METRO 28 - OST - Wayside WESTBOUND	2	METRO 7 - West Airport EASTBOUND	2
GCTD Clute / Lake Jackson Green [Circulator] LOOP	4	METRO 29 - Cullen / Hirsch NORTHBOUND	2	METRO 7 - West Airport WESTBOUND	2
GCTD Freeport Red [Circulator] LOOP	4	METRO 29 - Cullen / Hirsch SOUTHBOUND	2	METRO 70 - Memorial EASTBOUND	2
GCTD Island Transit League City Park & Ride [Circulator] LOOP	4	METRO 291 - Conroe P&R INBOUND	2	METRO 70 - Memorial WESTBOUND	2
GCTD Regional Gold [Circulator] LOOP	4	METRO 292 - West Bellfort / Westwood / TMC P&R INBOUND	2	METRO RED LINE SOUTHBOUND	1
Harris County Transit Route 1 Garth Road [Circulator] LOOP	4	METRO 297 - South Point / Monroe / TMC P&R INBOUND	2	METRO RED LINE NORTHBOUND	1
Harris County Transit Route 11 Cloverleaf [Circulator]	4	METRO 298 - Kingsland / Addicks / NWTC / TMC P&R INBOUND	2	METRO 72 - Westview EASTBOUND	2
Harris County Transit Route 12 Channelview [Circulator]	4	METRO 3 - Langley - Little York NORTHBOUND	2	METRO 72 - Westview WESTBOUND	2
Harris County Transit Route 14 Sheldon West [Circulator] LOOP	4	METRO 3 - Langley - Little York SOUTHBOUND	2	METRO 73 - Bellfort EASTBOUND	2
Harris County Transit Route 2 Baytown Central [Circulator] LOOP	4	METRO 30 - Clinton / Ella EASTBOUND	2	METRO 73 - Bellfort WESTBOUND	2
Harris County Transit Route 3 N Alexander / Cedar Bayou [Circulator] LOOP	4	METRO 30 - Clinton / Ella WESTBOUND	2	METRO 75 - Eldridge NORTHBOUND	2
Harris County Transit Route 4 Baytown / Decker Loop [Circulator] LOOP	4	METRO 309 - Gulfton Circulator LOOP	2	METRO 75 - Eldridge SOUTHBOUND	2
Harris County Transit Route 5 La Porte City [Circulator] LOOP	4	METRO 310 - Gulfton Circulator Counterclockwise LOOP	2	METRO 76 - Evergreen NORTHBOUND	2
Harris County Transit Route 6 Baytown / Highlands / Crosby [Circulator] LOOP	4	METRO 32 - Renwick / San Felipe EASTBOUND	2	METRO 76 - Evergreen SOUTHBOUND	2
Harris County Transit Route Baytown/LaPorte Shuttle [Eastbound]	4	METRO 32 - Renwick / San Felipe WESTBOUND	2	METRO 77 - Homestead NORTHBOUND	2
Harris County Transit Route Baytown/LaPorte Shuttle [Westbound]	4	METRO 36 - Kempwood EASTBOUND	2	METRO 77 - Homestead SOUTHBOUND	2
Harris County Transit Route 13 Baytown/Sheldon Shuttle [Eastbound]	4	METRO 36 - Kempwood WESTBOUND	2	METRO 78 - Wayside NORTHBOUND	2
Harris County Transit Route 13 Baytown/Sheldon Shuttle [Westbound]	4	METRO 360 - Peerless Shuttle NORTHBOUND	2	METRO 78 - Wayside SOUTHBOUND	2
Island Transit Route 1 61st Via Market & Broadway [Circulator] LOOP	4	METRO 360 - Peerless Shuttle SOUTHBOUND	2	METRO 79 - Irvington SOUTHBOUND	2
Island Transit Route 2 UTMB-Ferry Road [Circulator] LOOP	4	METRO 38 - Manchester-Lawndale EASTBOUND	2	METRO 79 - Irvington NORTHBOUND	2
Island Transit Route 3 81st - W Broadway Via Ave M [Circulator] LOOP	4	METRO 38 - Manchester-Lawndale WESTBOUND	2	METRO 8 - West Bellfort EASTBOUND	2

ROUTE_DIRECTION	Expansion Type	ROUTE_DIRECTION	Expansion Type	ROUTE_DIRECTION	Expansion Type
Island Transit Route 4 Broadway - 8th St [Circulator] LOOP	4	METRO 39 - Katy Freeway EASTBOUND	2	METRO 8 - West Bellfort WESTBOUND	2
Island Transit Route 5 Ave S - Stewart Road [Circulator]	4	METRO 39 - Katy Freeway WESTBOUND	2	METRO 80 - MLK / Lockwood NORTHBOUND	2
Island Transit Route 6 Ave S 61st Via Ave O [Circulator] LOOP	4	METRO 399 - Kuykendahl Shuttle NORTHBOUND	2	METRO 80 - MLK / Lockwood SOUTHBOUND	2
Island Transit Seawall Route [Circulator]	4	METRO 399 - Kuykendahl Shuttle SOUTHBOUND	2	METRO GREEN LINE WESTBOUND	1
Island Transit Downtown Route [Circulator] LOOP	4	METRO 4 - Beechnut EASTBOUND	2	METRO GREEN LINE EASTBOUND	1
Island Transit Rail 1 [Circulator]	4	METRO 4 - Beechnut WESTBOUND	2	METRO 82 - Westheimer EASTBOUND	2
Island Transit Rail 2 [Circulator] LOOP	4	METRO 40 - Telephone / Heights NORTHBOUND	2	METRO 82 - Westheimer WESTBOUND	2
METRO 10 - Willowbend NORTHBOUND	2	METRO 40 - Telephone / Heights SOUTHBOUND	2	METRO 83 - Lee Road - JFK NORTHBOUND	2
METRO 10 - Willowbend SOUTHBOUND	2	METRO 402 - Bellaire Quickline WESTBOUND	2	METRO 83 - Lee Road - JFK SOUTHBOUND	2
METRO 102 - Bush Iah Express INBOUND	2	METRO 402 - Bellaire Quickline EASTBOUND	2	METRO 84 - Buffalo Speedway NORTHBOUND	2
METRO 102 - Bush Iah Express OUTBOUND	2	METRO 41 - Kirby / Polk EASTBOUND	2	METRO 84 - Buffalo Speedway SOUTHBOUND	2
METRO 108 - Veterans Memorial Express INBOUND	2	METRO 41 - Kirby / Polk WESTBOUND	2	METRO 85 - Antoine / Washington NORTHBOUND	2
METRO 108 - Veterans Memorial Express OUTBOUND	2	METRO 433 - Silver Line NORTHBOUND	2	METRO 85 - Antoine / Washington SOUTHBOUND	2
METRO 11 - Almeda / Lyons NORTHBOUND	2	METRO 433 - Silver Line SOUTHBOUND	2	METRO 86 - FM 1960 / Imperial Valley EASTBOUND	2
METRO 11 - Almeda / Lyons SOUTHBOUND	2	METRO 44 - Acres Homes NORTHBOUND	2	METRO 86 - FM 1960 / Imperial Valley WESTBOUND	2
METRO 137 - Northshore Express EASTBOUND	2	METRO 44 - Acres Homes SOUTHBOUND	2	METRO 87 - Sunnyside NORTHBOUND	2
METRO 137 - Northshore Express WESTBOUND	2	METRO 45 - Tidwell EASTBOUND	2	METRO 87 - Sunnyside SOUTHBOUND	2
METRO 14 - Hiram Clarke NORTHBOUND	2	METRO 45 - Tidwell WESTBOUND	2	METRO 88 - Sagemont NORTHBOUND	2
METRO 14 - Hiram Clarke SOUTHBOUND	2	METRO 46 - Gessner NORTHBOUND	2	METRO 88 - Sagemont SOUTHBOUND	2
METRO 151 - Westpark Express EASTBOUND	2	METRO 46 - Gessner SOUTHBOUND	2	METRO 89 - Dacoma NORTHBOUND	2
METRO 151 - Westpark Express WESTBOUND	2	METRO 47 - Hillcroft NORTHBOUND	2	METRO 89 - Dacoma SOUTHBOUND	2
METRO 152 - Harwin Express EASTBOUND	2	METRO 47 - Hillcroft SOUTHBOUND	2	METRO 9 - Gulfton / Holman EASTBOUND	2
METRO 152 - Harwin Express WESTBOUND	2	METRO 48 - Market EASTBOUND	2	METRO 9 - Gulfton / Holman WESTBOUND	2
METRO 153 - Harwin Express EASTBOUND	2	METRO 48 - Market WESTBOUND	2	METRO PURPLE LINE NORTHBOUND	1
METRO 153 - Harwin Express WESTBOUND	2	METRO 49 - Chimney Rock / S Post Oak NORTHBOUND	2	METRO PURPLE LINE SOUTHBOUND	1
METRO 160 - Memorial City Express EASTBOUND	2	METRO 49 - Chimney Rock / S Post Oak SOUTHBOUND	2	METRO 96 - Veterans Memorial NORTHBOUND	2
METRO 160 - Memorial City Express WESTBOUND	2	METRO 5 - Southmore EASTBOUND	2	METRO 96 - Veterans Memorial SOUTHBOUND	2
METRO 161 - Wilcrest Express EASTBOUND	2	METRO 5 - Southmore WESTBOUND	2	METRO 97 - Settegast EASTBOUND	2
METRO 161 - Wilcrest Express WESTBOUND	2	METRO 50 - Broadway NORTHBOUND	2	METRO 97 - Settegast WESTBOUND	2
METRO 162 - Memorial Express EASTBOUND	2	METRO 50 - Broadway SOUTHBOUND	2	METRO 98 - Briargate EASTBOUND	2
METRO 162 - Memorial Express WESTBOUND	2	METRO 51 - Hardy- Kelley NORTHBOUND	2	METRO 98 - Briargate WESTBOUND	2
METRO 170/171 - Missouri City Express INBOUND	2	METRO 51 - Hardy- Kelley SOUTHBOUND	2	METRO 99 - Ella - FM 1960 NORTHBOUND	2
METRO 2 - Bellaire EASTBOUND	2	METRO 52 - Hardy- Ley NORTHBOUND	2	METRO 99 - Ella - FM 1960 SOUTHBOUND	2
METRO 2 - Bellaire WESTBOUND	2	METRO 52 - Hardy- Ley SOUTHBOUND	2	The Woodlands Energy Corridor Commuter [Inbound]	4
METRO 20 - Canal / Memorial EASTBOUND	2	METRO 54 - Scott NORTHBOUND	2	The Woodlands Route 299 Research Forest [Southbound]	4
METRO 20 - Canal / Memorial WESTBOUND	2	METRO 54 - Scott SOUTHBOUND	2	The Woodlands Route 299 Sawdust [Southbound]	4
METRO 202 - Kuykendahl P&R INBOUND	2	METRO 56 - Airline / Montrose NORTHBOUND	2	The Woodlands Route 299 Sterling Ridge [Southbound]	4
METRO 204 - Spring P&R INBOUND	2	METRO 56 - Airline / Montrose SOUTHBOUND	2	The Woodlands Trolley [Circulator] LOOP	4
METRO 214/216 - NW Station / WL York P&R INBOUND	2	METRO 58 - Hammerly EASTBOUND	2		
M+A1:F41ETRO 217 - Cypress P&R INBOUND	2	METRO 58 - Hammerly WESTBOUND	2		

APPENDIX E: SAMPLE PLANS

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OD Sample Spreadsheet by Route Level Boardings

H-GAC Route level minimum Sample Sizes Green Line

Agency	Mode	Category	Rte #	Route or Station Name	Weekday Boardings 2019	Weekday Boardings Nov 21	Nov 21 wkd brdgs as % of 2019 bdgs	Adjusted Weekday Boardings [1]	Adjusted wkd brdgs as % of 2019 bdgs	Assume 50% of ADR are AM Inbound	Minimum Sample per RFP	Minimum Sample for Confidence/Accuracy	% of Boardings Sampled
METRO	Light Rail	**GREEN LINE**	Green	**Line**	5,041	3,032	60.1%	3,762	74.6%		**874**	**818**	27.0%
METRO	Light Rail	Light Rail Station	Green	Central Station	1,189	693	58.3%	867	72.9%		**64**	**63**	9.1%
METRO	Light Rail	Light Rail Station	Green	Magnolia Park TC	1,007	615	61.1%	786	78.0%		**64**	**63**	10.2%
METRO	Light Rail	Light Rail Station	Green	Lockwood / Eastwood	499	274	54.9%	367	73.5%		**63**	**63**	23.0%
METRO	Light Rail	Light Rail Station	Green	EaDo / Stadium	407	270	66.3%	313	76.9%		**63**	**63**	23.3%
METRO	Light Rail	Light Rail Station	Green	Altic / Howard Hughes	428	268	62.6%	320	74.8%		**63**	**63**	23.5%
METRO	Light Rail	Light Rail Station	Green	Theater District	493	260	52.7%	333	67.5%		**63**	**63**	24.2%
METRO	Light Rail	Light Rail Station	Green	Cesar Chavez/67th Street	317	251	79.2%	259	81.5%		**63**	**63**	25.1%
METRO	Light Rail	Light Rail Station	Green	Coffee Plant / Second Ward	399	246	61.7%	302	75.7%		**63**	**54**	22.0%
METRO	Light Rail	Light Rail Station	Green	Convention District	302	155	51.3%	216	71.4%		**54**	**54**	34.8%
				Subtotal Stations	**5,041**	**3,032**	60.1%	**3,762**	74.6%		**560**	**549**	
				Additional Surveys Required							**314**	**269**	

H-GAC Route level minimum Sample Sizes Purple Line

Agency	Mode	Category	Rte #	Route or Station Name	Weekday Boardings 2019	Weekday Boardings Nov 21	Nov 21 wkd brdgs as % of 2019 bdgs	Adjusted Weekday Boardings [1]	Adjusted wkd brdgs as % of 2019 bdgs	Assume 50% of ADR are AM Inbound	Minimum Sample per RFP	Minimum Sample for Confidence/Accuracy	% of Boardings Sampled
METRO	Light Rail	**PURPLE LINE**	Purple	**Line**	7,415	3,499	47.2%	4,728	63.8%		**874**	**818**	23.4%
METRO	Light Rail	Light Rail Station	Purple	Central Station	1,173	589	50.2%	804	68.5%		**64**	**63**	10.7%
METRO	Light Rail	Light Rail Station	Purple	Palm Center TC	1,124	507	45.1%	626	55.7%		**63**	**63**	12.4%
METRO	Light Rail	Light Rail Station	Purple	UH South / University Oaks	1,079	468	43.4%	617	57.2%		**63**	**63**	13.5%
METRO	Light Rail	Light Rail Station	Purple	Robertson Stadium / UH / TSU	1,150	434	37.7%	680	59.1%		**63**	**63**	14.5%
METRO	Light Rail	Light Rail Station	Purple	Theater District	920	394	42.8%	610	66.3%		**63**	**63**	16.0%
METRO	Light Rail	Light Rail Station	Purple	Elgin / Third Ward	545	325	59.6%	384	70.4%		**63**	**63**	19.4%
METRO	Light Rail	Light Rail Station	Purple	EaDo / Stadium	459	265	57.7%	330	71.8%		**63**	**63**	23.8%
METRO	Light Rail	Light Rail Station	Purple	MacGregor Park / MLK, Jr.	449	214	47.7%	300	66.7%		**63**	**54**	25.2%
METRO	Light Rail	Light Rail Station	Purple	Leeland / Third Ward	209	163	78.0%	169	80.6%		**54**	**54**	33.1%
METRO	Light Rail	Light Rail Station	Purple	Convention District	307	140	45.6%	210	68.4%		**54**	**54**	38.6%
				Subtotal Stations	**7,415**	**3,499**	47.2%	**4,728**	63.8%		**613**	**603**	
				Additional Surveys Required							**261**	**215**	

H-GAC Route level minimum Sample Sizes Red Line

Agency	Mode	Category	Rte #	Route or Station Name	Weekday Boardings 2019	Weekday Boardings Nov 21	Nov 21 wkd brdgs as % of 2019 bdgs	Adjusted Weekday Boardings [1]	Adjusted wkd brdgs as % of 2019 bdgs	Assume 50% of ADR are AM Inbound	Minimum Sample per RFP	Minimum Sample for Confidence/Accuracy	% of Boardings Sampled
METRO	Light Rail	**RED LINE**	Red	**Line**	33,359	17,828	53.4%	23,084	69.2%		**1,712**	**1,677**	9.4%
METRO	Light Rail	Light Rail Station	Red	Dryden/TMC	5,154	3,059	59.4%	3,602	69.9%		**67**	**67**	2.2%
METRO	Light Rail	Light Rail Station	Red	Smith Lands	3,907	2,231	57.1%	2,763	70.7%		**67**	**67**	3.0%
METRO	Light Rail	Light Rail Station	Red	Fannin South	3,061	2,059	67.3%	2,122	69.3%		**67**	**67**	3.3%
METRO	Light Rail	Light Rail Station	Red	Memorial Hermann / Zoo	3,672	1,892	51.5%	2,626	71.5%		**67**	**67**	3.5%
METRO	Light Rail	Light Rail Station	Red	Downtown TC	3,612	1,841	51.0%	2,578	71.4%		**67**	**67**	3.6%
METRO	Light Rail	Light Rail Station	Red	TMC TC	3,564	1,720	48.3%	2,538	71.2%		**67**	**67**	3.9%
METRO	Light Rail	Light Rail Station	Red	Wheeler TC	3,449	1,500	43.5%	2,158	62.6%		**67**	**67**	4.5%
METRO	Light Rail	Light Rail Station	Red	Ensemble / HCC	2,474	1,202	48.6%	1,691	68.4%		**67**	**67**	5.6%
METRO	Light Rail	Light Rail Station	Red	McGowen	1,470	811	55.2%	1,062	72.2%		**67**	**64**	7.9%
METRO	Light Rail	Light Rail Station	Red	Museum District	1,466	725	49.5%	1,001	68.2%		**67**	**63**	8.7%
METRO	Light Rail	Light Rail Station	Red	Reliant Park	947	482	50.9%	530	56.0%		**63**	**63**	13.1%
METRO	Light Rail	Light Rail Station	Red	Herman Park / Rice U	583	306	52.5%	414	71.0%		**63**	**63**	20.6%
				Subtotal Stations	**33,359**	**17,828**	53.4%	**23,084**	69.2%		**796**	**789**	
				Additional Surveys Required							**916**	**888**	
METRO	Light Rail	**RED NORTHLINE L**	Red Northli	**Line**	19,638	10,659	54.3%	13,988	71.2%		**1,712**	**1,677**	12.2%
METRO	Light Rail	Light Rail Station	Red Northli	Northline TC / HCC	3,235	1,904	58.9%	2,513	77.7%		**67**	**67**	2.7%
METRO	Light Rail	Light Rail Station	Red Northli	Burnett TC / Casa De Amigos	1,407	1,651	117.3%	904	64.3%		**64**	**67**	7.1%
METRO	Light Rail	Light Rail Station	Red Northli	Central Station	3,038	1,462	48.1%	2,039	67.1%		**67**	**67**	3.3%
METRO	Light Rail	Light Rail Station	Red Northli	Preston	3,215	1,443	44.9%	2,240	69.7%		**67**	**67**	3.0%
METRO	Light Rail	Light Rail Station	Red Northli	Main Street Square	2,988	1,268	42.4%	2,019	67.6%		**67**	**67**	3.3%
METRO	Light Rail	Light Rail Station	Red Northli	Fulton / North Central	1,149	655	57.0%	853	74.2%		**64**	**63**	7.5%
METRO	Light Rail	Light Rail Station	Red Northli	UH-Downtown	1,100	503	45.7%	786	71.5%		**64**	**63**	8.1%
METRO	Light Rail	Light Rail Station	Red Northli	Bell	954	467	49.0%	733	76.8%		**63**	**63**	8.6%
METRO	Light Rail	Light Rail Station	Red Northli	Cavalcade	821	423	51.5%	601	73.2%		**63**	**63**	10.5%
METRO	Light Rail	Light Rail Station	Red Northli	Quitman / Near Northside	656	336	51.2%	487	74.2%		**63**	**63**	12.9%
METRO	Light Rail	Light Rail Station	Red Northli	Moody Park	555	290	52.3%	429	77.3%		**63**	**63**	14.7%
METRO	Light Rail	Light Rail Station	Red Northli	Melbourne / North Lindale	303	156	51.5%	227	74.8%		**54**	**54**	23.8%
METRO	Light Rail	Light Rail Station	Red Northli	Lindale Park	217	101	46.5%	158	72.8%		**54**	**54**	34.2%
				Subtotal Stations	**19,638**	**10,659**	54.3%	**13,988**	71.2%		820	821	
				Additional Surveys Required							**892**	**856**	

H-GAC Route level minimum Sample Sizes Metro Fixed Route Bus

Agency	Mode	Category	Rte #	Route or Station Name	Weekday Boardings 2019	Weekday Boardings Nov 21	Nov 21 wkd brdgs as % of 2019 bdgs	Adjusted Weekday Boardings [1]	Adjusted wkd brdgs as % of 2019 bdgs	Assume 50% of ADR are AM Inbound	Minimum Sample per RFP	Minimum Sample for Confidence/Accuracy	% of Boardings Sampled
METRO	Local Bus		**82**	Westheimer	13,427	8,173	60.9%	10,334	77.0%		**371**	**367**	4.5%
METRO	Local Bus		**4**	Beechnut	8,738	5,351	61.2%	6,466	74.0%		**120**	**120**	2.2%
METRO	Local Bus		**46**	Gessner	7,156	4,811	67.2%	5,553	77.6%		**360**	**356**	7.4%
METRO	Local Bus		**2**	Bellaire	7,463	4,688	62.8%	5,907	79.2%		**120**	**120**	2.6%
METRO	Local Bus		**25**	Richmond	6,881	4,314	62.7%	5,228	76.0%		**120**	**120**	2.8%
METRO	Local Bus		**54**	Scott	6,940	4,221	60.8%	5,391	77.7%		**360**	**356**	8.4%
METRO	Local Bus		**65**	Bissonnet	6,597	4,119	62.4%	4,971	75.4%		**120**	**120**	2.9%
METRO	Local Bus		**85**	Antoine / Washington	6,777	3,984	58.8%	5,075	74.9%		**120**	**120**	3.0%
METRO	Local Bus		**56**	Airline / Montrose	6,239	3,981	63.8%	4,927	79.0%		**360**	**356**	8.9%
METRO	Local Bus		**73**	Bellfort	5,581	3,430	61.5%	4,035	72.3%		**120**	**120**	3.5%
METRO	Local Bus		**45**	Tidwell	4,609	2,886	62.6%	3,499	75.9%		**120**	**120**	4.2%
METRO	Local Bus		**40**	Telephone / Heights	4,379	2,877	65.7%	3,422	78.1%		**120**	**120**	4.2%
METRO	Local Bus		**63**	Fondren	4,683	2,849	60.8%	3,500	74.7%		**120**	**120**	4.2%
METRO	Local Bus		**80**	MLK / Lockwood	5,217	2,843	54.5%	3,864	74.1%		**120**	**120**	4.2%
METRO	Local Bus		**26**	Long Point / Cavalcade	4,009	2,574	64.2%	3,147	78.5%		**120**	**120**	4.7%
METRO	Local Bus		**47**	Hillcroft	3,330	2,435	73.1%	2,599	78.0%		**67**	**67**	2.8%
METRO	Local Bus		**29**	Cullen / Hirsch	3,526	2,373	67.3%	2,815	79.8%		**120**	**67**	2.8%
METRO	Local Bus		**6**	Jensen / Greens	3,247	2,292	70.6%	2,487	76.6%		**67**	**67**	2.9%
METRO	Local Bus		**8**	West Bellfort	3,264	2,211	67.7%	2,558	78.4%		**67**	**67**	3.0%
METRO	Local Bus		**27**	Shepherd	3,126	2,084	66.7%	2,396	76.6%		**67**	**67**	3.2%
METRO	Local Bus		**102**	Bush IAH Express	3,895	2,059	52.9%	2,873	73.7%		**120**	**67**	3.3%
METRO	Local Bus		**49**	Chimney Rock / S Post Oak	2,995	2,054	68.6%	2,245	75.0%		**67**	**67**	3.3%
METRO	Local Bus		**137**	Northshore Express	3,030	1,934	63.8%	2,376	78.4%		**67**	**67**	3.5%
METRO	Local Bus		**28**	OST - Wayside	2,858	1,893	66.2%	2,064	72.2%		**67**	**67**	3.5%
METRO	Local Bus		**161**	Wilcrest Express	2,929	1,857	63.4%	2,229	76.1%		**67**	**67**	3.6%
METRO	Local Bus		**86**	FM 1960 / Imperial Valley	2,934	1,833	62.5%	2,239	76.3%		**67**	**67**	3.7%
METRO	Local Bus		**44**	Acres Homes	2,918	1,712	58.7%	2,121	72.7%		**67**	**67**	3.9%
METRO	Local Bus		**153**	Harwin Express	2,832	1,671	59.0%	2,057	72.6%		**67**	**67**	4.0%
METRO	Local Bus		**11**	Almeda / Lyons	3,020	1,588	52.6%	2,318	76.7%		**67**	**67**	4.2%
METRO	Local Bus		**52**	Hardy - Ley	2,445	1,578	64.5%	1,894	77.5%		**67**	**67**	4.2%
METRO	Local Bus		**9**	Gulfton / Holman	2,567	1,575	61.4%	1,959	76.3%		**67**	**67**	4.3%
METRO	Local Bus		**99**	Ella - FM 1960	2,543	1,531	60.2%	1,914	75.3%		**67**	**67**	4.4%
METRO	Local Bus		**20**	Canal / Memorial	2,298	1,463	63.7%	1,744	75.9%		**67**	**67**	4.6%
METRO	Local Bus		**50**	Broadway	2,721	1,390	51.1%	2,025	74.4%		**67**	**67**	4.8%
METRO	Local Bus		**68**	Braeswood	2,628	1,375	52.3%	1,986	75.6%		**67**	**67**	4.9%
METRO	Local Bus		**36**	Kempwood	2,295	1,283	55.9%	1,741	75.8%		**67**	**67**	5.2%
METRO	Local Bus		**14**	Hiram Clarke	2,106	1,208	57.4%	1,616	76.7%		**67**	**67**	5.5%
METRO	Local Bus		**32**	Renwick / San Felipe	2,107	1,115	52.9%	1,635	77.6%		**67**	**67**	6.0%
METRO	Local Bus		**152**	Harwin Express	2,067	1,106	53.5%	1,398	67.6%		**67**	**67**	6.1%
METRO	Local Bus		**60**	Cambridge	2,157	1,068	49.5%	1,638	75.9%		**67**	**67**	6.3%
METRO	Local Bus		**3**	Langley	1,682	960	57.1%	1,206	71.7%		**67**	**64**	6.7%
METRO	Local Bus		**88**	Sagemont	1,168	954	81.7%	827	70.8%		**64**	**64**	6.7%
METRO	Local Bus		**84**	Buffalo Speedway	1,854	952	51.3%	1,359	73.3%		**67**	**64**	6.7%

Agency	Mode	Category	Rte #	Route or Station Name	Weekday Boardings 2019	Weekday Boardings Nov 21	Nov 21 wkd brdgs as % of 2019 bdgs	Adjusted Weekday Boardings [1]	Adjusted wkd brdgs as % of 2019 bdgs	Assume 50% of ADR are AM Inbound	Minimum Sample per RFP	Minimum Sample for Confidence/Accuracy	% of Boardings Sampled
METRO	Local Bus		**96**	Veterans Memorial	1,116	923	82.7%	825	73.9%		**64**	**64**	6.9%
METRO	Local Bus		**76**	Evergreen	1,457	849	58.3%	1,055	72.4%		**67**	**64**	7.5%
METRO	Local Bus		**5**	Southmore	1,399	827	59.1%	925	66.1%		**64**	**64**	7.7%
METRO	BRT		**33**	Post Oak/ Uptown BRT	1,833	806	44.0%	1,296	70.7%		**297**	**261**	32.4%
METRO	Local Bus		**41**	Kirby / Polk	1,794	762	42.5%	1,216	67.8%		**67**	**64**	8.4%
METRO	Local Bus		**7**	West Airport	1,029	589	57.2%	774	75.2%		**64**	**30**	5.1%
METRO	Local Bus		**51**	Hardy - Kelley	965	586	60.7%	744	77.0%		**30**	**30**	5.1%
METRO	Local Bus		**87**	Sunnyside	1,224	570	46.6%	898	73.4%		**64**	**30**	5.3%
METRO	Local Bus		**402**	Bellaire Quickline	1,403	518	36.9%	954	68.0%		**64**	**30**	5.8%
METRO	Local Bus		**30**	Clinton / Ella	957	509	53.2%	682	71.2%		**30**	**30**	5.9%
METRO	Local Bus		**162**	Memorial Express	1,074	479	44.6%	819	76.3%		**64**	**29**	6.1%
METRO	Local Bus		**10**	Willowbend	822	442	53.8%	613	74.5%		**30**	**29**	6.6%
METRO	Local Bus		**23**	Clay - W 43rd	685	390	56.9%	511	74.6%		**29**	**29**	7.4%
METRO	Local Bus		**75**	Eldridge	820	376	45.9%	590	71.9%		**29**	**29**	7.7%
METRO	Local Bus		**48**	Market	779	352	45.2%	547	70.2%		**29**	**29**	8.2%
METRO	Local Bus		**77**	Homestead	570	339	59.5%	432	75.7%		**29**	**29**	8.6%
METRO	Local Bus		**58**	Hammerly	583	336	57.6%	443	75.9%		**29**	**29**	8.6%
METRO	Local Bus		**108**	Veterans Memorial Express	834	334	40.0%	672	80.6%		**30**	**29**	8.7%
METRO	Local Bus		**97**	Settegast	546	325	59.5%	420	76.8%		**29**	**29**	8.9%
METRO	Local Bus		**66**	Quitman	527	311	59.0%	396	75.0%		**29**	**29**	9.3%
METRO	Local Bus		**78**	Wayside	546	306	56.0%	410	75.0%		**29**	**29**	9.5%
METRO	Local Bus		**79**	West Little York	563	295	52.4%	424	75.2%		**29**	**29**	9.8%
METRO	Local Bus		**67**	Dairy Ashford	544	292	53.7%	408	75.0%		**29**	**29**	9.9%
METRO	Local Bus		**309**	Gulfton Circulator (clockwise)	0	279	N/A					**29**	10.4%
METRO	Local Bus		**310**	Gulfton Circulator (counter clo	0	279	N/A					**29**	10.4%
METRO	Local Bus		**59**	Aldine Mail	420	258	61.4%	315	74.9%		**29**	**29**	11.2%
METRO	Local Bus		**72**	Westview	462	249	53.9%	318	68.7%		**29**	**29**	11.6%
METRO	Local Bus		**363**	Missouri City Connector	208	226	108.7%	169	81.3%		**29**	**29**	12.8%
METRO	Local Bus		**160**	Memorial City Express	128	213	166.4%	130	101.2%		**29**	**29**	13.6%
METRO	Local Bus		**98**	Briargate	522	212	40.6%	355	68.0%		**29**	**29**	13.7%
METRO	Local Bus		**83**	Lee Road - JFK	407	203	49.9%	311	76.3%		**29**	**29**	14.3%
METRO	Local Bus		**70**	Memorial	402	198	49.3%	278	69.0%		**29**	**29**	14.6%
METRO	Local Bus		**360**	Peerless Shuttle	317	192	60.6%	231	72.7%		**29**	**29**	15.1%
METRO	Local Bus		**151**	Westpark Express	1,569	189	12.0%	1,143	72.8%		**67**	**29**	15.3%
METRO	Local Bus		**39**	Katy Freeway	328	155	47.3%	237	72.3%		**29**	**29**	18.7%
METRO	Local Bus		**344**	Acres Homes Connector	516	140	27.1%	324	62.8%		**29**	**29**	20.7%
METRO	Local Bus		**416**	Juror Shuttle	365	119	32.6%	246	67.3%		**29**	**29**	24.4%
METRO	Local Bus		**89**	Dacoma	230	118	51.3%	172	74.6%		**29**	**29**	24.6%
METRO	Local Bus		**399**	Kuykendahl Shuttle	163	105	64.4%	141	86.2%		**29**	**29**	27.6%
METRO	Local Bus		**38**	Manchester / Lawndale	93	99	106.5%	106	114.0%		**29**	**29**	29.3%
METRO	Local Bus		**64**	Lincoln City	82	46	56.1%	68	82.3%		**24**	**24**	52.2%
METRO	Local Bus		**71**	Cottage Grove	36	8	22.2%	25	69.4%		**14**	**7**	87.5%

H-GAC Route level minimum Sample Sizes Metro Park and Ride Bus

Agency	Mode	Category	Rte #	Route or Station Name	Weekday Boardings 2019	Weekday Boardings Nov 21	Nov 21 wkd brdgs as % of 2019 bdgs	Adjusted Weekday Boardings [1]	Adjusted wkd brdgs as % of 2019 bdgs	Assume 50% of ADR are AM Inbound	Minimum Sample per RFP	Minimum Sample for Confidence/Accuracy	% of Boardings Sampled
METRO	Local Bus	Park & Ride Off-peak	**229**	Katy Corridor Midday/Evening	837	0	0.0%	670	80.0%		**30**	**0**	
METRO	Local Bus	Park & Ride Off-peak	**209**	North Corridor Midday/Evening	637	0	0.0%	510	80.0%		**30**	**0**	
METRO	Local Bus	Park & Ride Off-peak	**219**	Northwest Corridor Midday/Even	437	0	0.0%	350	80.0%		**29**	**0**	
METRO	Local Bus	Park & Ride Off-peak	**249**	Gulf Corridor Midday/Evening	370	0	0.0%	296	80.0%		**29**	**0**	
METRO	Local Bus	Park & Ride Off-peak	**259**	Eastex Corridor Midday/Evening	297	0	0.0%	238	80.0%		**29**	**0**	
METRO	Local Bus	Park & Ride Off-peak	**269**	Southwest Corridor Midday/Even	295	0	0.0%	236	80.0%		**29**	**0**	
METRO	Park & Ride	Park & Ride Peak	**298**	Katy Corridor - TMC	1,512	907	60.0%	1,210	80.0%	454	**109**	**61**	6.7%
METRO	Park & Ride	Park & Ride Peak	**259**	Eastex Freeway Corridor	0	864				432		**61**	7.1%
METRO	Park & Ride	Park & Ride Peak	**222**	Grand Parkway	3,276	860	26.3%	2,621	80.0%	430	**298**	**204**	23.7%
METRO	Park & Ride	Park & Ride Peak	**221/228**	Kingsland/Addicks	0	834				417		**61**	7.3%
METRO	Park & Ride	Park & Ride Peak	**269**	Southwest Freeway Corridor	0	751				376		**61**	8.1%
METRO	Park & Ride	Park & Ride Peak	**217**	Cypress	2,442	718	29.4%	1,954	80.0%	359	**298**	**204**	28.4%
METRO	Park & Ride	Park & Ride Peak	**214/216**	NW Station/ W. Little York		601				301		**61**	10.1%
METRO	Park & Ride	Park & Ride Peak	**297**	Gulf Corridor - TMC	1,090	572	52.5%	872	80.0%	286	**61**	**61**	10.7%
METRO	Park & Ride	Park & Ride Peak	**202**	Kuykendahl	1,805	543	30.1%	1,444	80.0%	272	**109**	**61**	11.2%
METRO	Park & Ride	Park & Ride Peak	**246/247**	Bay Area/Fuqua	0	522				261		**61**	11.7%
METRO	Park & Ride	Park & Ride Peak	**204**	Spring	1,368	496	36.3%	1,094	80.0%	248	**109**	**61**	12.3%
METRO	Park & Ride	Park & Ride Peak	**170/171**	Missouri City Express	793	477	60.2%	634	80.0%	239	**61**	**61**	12.8%
METRO	Park & Ride	Park & Ride Peak	**244/248**	Monroe/El Dorado	0	393				197		**61**	15.5%
METRO	Park & Ride	Park & Ride Peak	**292**	Southwest Corridor - TMC	566	268	47.3%	453	80.0%	134	**61**	**61**	22.8%
METRO	Park & Ride	Park & Ride Peak	**236/237**	Maxey Road / Baytown	504	186	36.9%	403	80.0%	93	**61**	**61**	32.8%
METRO	Park & Ride	Park & Ride Peak	**291**	Conroe	91	45	49.5%	73	80.0%	23	**17**	**14**	31.1%
METRO	Park & Ride	Park & Ride Peak	**221**	Kingsland	2,305	0	0.0%	1,844	80.0%	0	**109**	**0**	
METRO	Park & Ride	Park & Ride Peak	**228**	Addicks	2,017	0	0.0%	1,614	80.0%	0	**109**	**0**	
METRO	Park & Ride	Park & Ride Peak	**214**	Northwest Station	1,924	0	0.0%	1,539	80.0%	0	**109**	**0**	
METRO	Park & Ride	Park & Ride Peak	**246**	Bay Area	1,278	0	0.0%	1,022	80.0%	0	**109**	**0**	
METRO	Park & Ride	Park & Ride Peak	**212**	Seton Lake	1,089	0	0.0%	871	80.0%	0	**61**	**0**	
METRO	Park & Ride	Park & Ride Peak	**257**	Townsen	10,530	0	0.0%	842	8.0%	0	**61**	**0**	
METRO	Park & Ride	Park & Ride Peak	**256**	Eastex	999	0	0.0%	799	80.0%	0	**61**	**0**	
METRO	Park & Ride	Park & Ride Peak	**247**	Fuqua	873	0	0.0%	698	80.0%	0	**61**	**0**	
METRO	Park & Ride	Park & Ride Peak	**255**	Kingwood	851	0	0.0%	681	80.0%	0	**61**	**0**	
METRO	Park & Ride	Park & Ride Peak	**248**	El Dorado	664	0	0.0%	531	80.0%	0	**61**	**0**	
METRO	Park & Ride	Park & Ride Peak	**262**	Westwood	648	0	0.0%	518	80.0%	0	**61**	**0**	
METRO	Park & Ride	Park & Ride Peak	**216**	West Little York	530	0	0.0%	424	80.0%	0	**61**	**0**	
METRO	Park & Ride	Park & Ride Peak	**244**	Monroe	470	0	0.0%	376	80.0%	0	**61**	**0**	
METRO	Park & Ride	Park & Ride Peak	**283**	Kuykendahl - Greenway/Uptown	340	0	0.0%	272	80.0%	0	**61**	**0**	
METRO	Park & Ride	Park & Ride Peak	**261**	West Loop	254	0	0.0%	203	80.0%	0	**61**	**0**	
METRO	Park & Ride	Park & Ride Peak	**171**	Fort Bend Town Center Express	139	0	0.0%	111	80.0%	0	**49**	**0**	
METRO	Park & Ride	Park & Ride Peak	**265**	West Bellfort	3,054	0	0.0%	2,443	80.0%	0	**298**	**0**	

H-GAC Route level minimum Sample Sizes Other Transit Providers

Agency	Mode	Category	Rte #	Route or Station Name	Weekday Boardings 2019	Weekday Boardings Nov 21	Nov 21 wkd brdgs as % of 2019 bdgs	Adjusted Weekday Boardings [1]	Adjusted wkd brdgs as % of 2019 bdgs	Assume 50% of ADR are AM Inbound	Minimum Sample per RFP	Minimum Sample for Confidence/Accuracy	% of Boardings Sampled
BTD - The District	Local bus	NA	NA	Liberty County Circulator	11	7	63.6%	12	104.5%		9	6	85.7%
BTD - The District	Local bus	NA	NA	Cleveland	33	19	57.6%	28	84.8%		15	12	63.2%
Conroe Connection	Local bus	NA	1	North	64		0.0%	64	100.0%		24	24	
Conroe Connection	Local bus	NA	2	South	52		0.0%	52	100.0%		24	24	
Conroe Connection	Local bus	NA	3	West	9		0.0%	9	100.0%		6	6	
Conroe Connection	Local bus	NA	4	Northeast	6		0.0%	6	100.0%		6	6	
Fort Bend Transit - Fort Bend Express [2]	Park & ride	NA	NA	Texas Medical Center	668	418	62.6%	534	80.0%	209	109	61	14.6%
Fort Bend Transit - Fort Bend Express	Park & ride	NA	NA	Greenway Plaza	238	10	4.2%	190	80.0%	5	61	5	50.0%
Fort Bend Transit - Fort Bend Express	Park & ride	NA	NA	Galleria	147	10	6.8%	118	80.0%	5	61	5	50.0%
GCC - Connect Transit - Mainland Transit	Local bus	NA	101	La Marque North	56	107	191.1%	49	87.5%		19	29	27.1%
GCC - Connect Transit - Mainland Transit	Local bus	NA	102	La Marque South	46	31	67.4%	43	92.4%		19	16	51.6%
GCC - Connect Transit - Mainland Transit	local bus	NA	103	Texas City North	64	101	157.8%	71	110.2%		24	29	28.7%
GCC - Connect Transit - Mainland Transit	Local bus	NA	104	Texas City South	106	89	84.0%	95	89.6%		24	24	27.0%
GCC - Connect Transit - Mainland Transit	Local bus	NA	105	Dickinson	48	49	102.1%	46	94.8%		19	19	38.8%
GCC - Connect Transit - Mainland Transit	Local bus	NA	106	Texas City Express	52	53	101.9%	40	76.0%		18	24	45.3%
GCC - Connect Transit - Mainland Transit	Local bus	NA	107	San Leon/Bacliff	18	24	133.3%	19	105.6%		12	14	58.3%
GCC - Connect Transit - Southern Brazoria County Transit	Local bus	NA	NA	Regional (Gold)	87	76	87.4%	91	104.0%		24	24	31.6%
GCC - Connect Transit - Southern Brazoria County Transit	Local bus	NA	NA	Angleton (Purple)	73	49	67.1%	73	100.0%		24	19	38.8%
GCC - Connect Transit - Southern Brazoria County Transit	Local bus	NA	NA	Freeport (Red)	52	59	113.5%	52	100.0%		24	24	40.7%
GCC - Connect Transit - Southern Brazoria County Transit	Local bus	NA	NA	Lake Jackson/Clute (Blue)	53	63	118.9%	43	81.1%		19	24	38.1%
GCC - Connect Transit - Southern Brazoria County Transit	Local bus	NA	NA	Clute/Lake Jackson (Green)	29	51	175.9%	41	141.4%		18	24	47.1%
GCC - Connect Transit	Park & ride	NA	NA	League City Park & Ride	198	249	125.8%	178	90.0%	125	61	61	24.5%
Harris County Transit	Local bus	NA	1	Garth Road	101	102	101.0%	107	105.9%		29	29	28.4%
Harris County Transit	Local bus	NA	2	Baytown Central	65	57	87.7%	60	92.3%		24	24	42.1%
Harris County Transit	Local bus	NA	3	N Alexander / Cedar Bayou	63	77	122.2%	68	107.9%		24	24	31.2%
Harris County Transit	Local bus	NA	4	Decker Loop	47	45	95.7%	45	94.7%		19	19	42.2%
Harris County Transit	Local bus	NA	5	City of La Porte	20	12	60.0%	16	77.5%		11	9	75.0%
Harris County Transit	Local bus	NA	6-1, 6-2	Baytown / Highlands / Crosby	37	32	86.5%	28	74.3%		15	16	50.0%
Harris County Transit	Local bus	NA	11	Cloverleaf	13	35	269.2%	19	142.3%		12	17	48.6%
Harris County Transit	Local bus	NA	12	Channelview	24	21	87.5%	21	87.5%		13	13	61.9%
Harris County Transit	Local bus	NA	13	Baytown/Sheldon Shuttle	21	39	185.7%	23	107.1%		14	18	46.2%
Harris County Transit	Local bus	NA	14	Sheldon West	17	20	117.6%	15	85.3%		12	13	65.0%
Harris County Transit	Local bus	NA	NA	Baytown/LaPorte Shuttle	17	16	94.1%	15	85.3%		12	11	68.8%
Island Transit	Local bus	NA	1&2	63rd Via Market & Broadway/ UTMB-Ferry Road	250	124	49.7%	172	68.8%		29	29	23.3%
Island Transit	Local bus	NA	3&4	81st - W Broadway Via Ave M/ Broadway - 8th Via Ave M	133	70	52.7%	95	71.1%		24	24	34.3%
Island Transit	Local bus	NA	5&6	Ave S - Stewart Road/ 61st Via Ave O	439	264	60.0%	380	86.4%		29	29	11.0%
Island Transit	Local bus [4]	NA	Trolley	Seawall Loop	305	91	29.9%	183	59.8%		29	24	26.3%
Island Transit	Local bus [4]	NA	Trolley	Downtown Loop	109	56	51.6%	85	77.5%		24	24	42.7%
Island Transit	Streetcar [4]	NA	Rail	Route 1	0	40		85			24	18	45.0%
Island Transit	Streetcar [4]	NA	Rail	Route 2	0	76		183			29	24	31.6%
The Woodlands Express	Park & ride	NA	299	Research Forest	1,391	422	30.3%	1,113	80.0%	211	109	61	14.5%
The Woodlands Express	Park & ride	NA	299	Sawdust	679	188	27.7%	543	80.0%	94	61	61	32.4%
The Woodlands Express	Park & ride	NA	299	Sterling Ridge	541	99	18.3%	433	80.0%	50	61	20	20.2%
The Woodlands Express	Park & ride	NA		Energy Corridor		28		433		14	0	10	35.7%
The Woodlands Express	Local bus	NA	Trolley	Trolley	272	174	64.0%	157	57.5%		29	29	16.7%

OD Sample Plans and OD Survey Completed by Time of Day and Direction

METRO Bus Local OD Sampling Plan and OD Surveys Completed by Time of Day and Direction

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METRO 2 - Bellaire EASTBOUND	7	20	34	17	14	**92**	**281**	12	26	44	47	30	**159**	**307**
METRO 2 - Bellaire WESTBOUND	2	18	36	24	17	**97**		5	25	44	36	38	**148**	
METRO 3 - Langley - Little York NORTHBOUND	1	3	9	5	2	**20**	**64**	3	6	11	11	5	**36**	**72**
METRO 3 - Langley - Little York SOUTHBOUND	2	4	10	4	2	**22**		6	8	12	6	4	**36**	
METRO 4 - Beechnut EASTBOUND	7	27	40	19	13	**106**	**321**	9	31	75	31	22	**168**	**343**
METRO 4 - Beechnut WESTBOUND	5	15	36	33	20	**109**		8	25	44	49	49	**175**	
METRO 5 - Southmore EASTBOUND	1	5	8	4	2	**20**	**64**	3	9	10	11	4	**37**	**74**
METRO 5 - Southmore WESTBOUND	2	5	9	4	1	**21**		4	10	11	9	3	**37**	
METRO 6 - Jensen / Greens NORTHBOUND	2	7	18	13	7	**47**	**138**	4	22	37	20	24	**107**	**206**
METRO 6 - Jensen / Greens SOUTHBOUND	4	9	17	9	6	**45**		5	9	48	20	17	**99**	
METRO 7 - West Airport EASTBOUND	0	3	3	2	1	**9**	**35**	0	5	6	7	4	**22**	**51**
METRO 7 - West Airport WESTBOUND	0	1	3	6	3	**13**		0	4	7	9	9	**29**	
METRO 8 - West Bellfort EASTBOUND	2	10	16	10	5	**43**	**133**	4	15	19	19	18	**75**	**153**
METRO 8 - West Bellfort WESTBOUND	1	9	15	12	8	**45**		6	10	20	27	15	**78**	
METRO 9 - Gulfton / Holman EASTBOUND	1	8	11	7	5	**32**	**95**	2	11	19	8	5	**45**	**112**
METRO 9 - Gulfton / Holman WESTBOUND	1	5	11	9	6	**32**		5	11	19	15	17	**67**	
METRO 10 - Willowbend NORTHBOUND	0	3	2	2	1	**8**	**29**	0	6	7	3	2	**18**	**41**
METRO 10 - Willowbend SOUTHBOUND	0	2	2	4	2	**10**		0	4	7	6	6	**23**	
METRO 11 - Almeda / Lyons NORTHBOUND	2	5	10	8	7	**32**	**95**	4	11	23	12	9	**59**	**115**
METRO 11 - Almeda / Lyons SOUTHBOUND	3	5	12	7	4	**31**		4	14	21	13	4	**56**	
METRO 14 - Hiram Clarke NORTHBOUND	2	7	7	3	3	**22**	**72**	3	9	13	5	4	**34**	**79**
METRO 14 - Hiram Clarke SOUTHBOUND	0	3	7	9	6	**25**		1	9	14	13	8	**45**	
METRO 20 - Canal / Memorial EASTBOUND	1	5	11	6	4	**27**	**88**	2	8	19	11	6	**46**	**94**
METRO 20 - Canal / Memorial WESTBOUND	2	6	11	7	4	**30**		4	9	13	11	11	**48**	
METRO 23 - Clay - W 43rd EASTBOUND	0	1	3	2	3	**9**	**29**	0	4	12	9	6	**31**	**63**
METRO 23 - Clay - W 43rd WESTBOUND	1	1	4	2	1	**9**		2	4	14	5	7	**32**	
METRO 25 - Richmond EASTBOUND	5	21	31	21	8	**86**	**259**	8	28	66	32	16	**150**	**270**
METRO 25 - Richmond WESTBOUND	4	13	31	25	14	**87**		9	16	34	30	31	**120**	
METRO 26 - Long Point / Cavalcade EASTBOUND	3	9	19	12	9	**52**	**154**	7	19	29	12	16	**83**	**175**
METRO 26 - Long Point / Cavalcade WESTBOUND	3	10	19	11	7	**50**		10	16	42	13	11	**92**	
METRO 27 - Shepherd NORTHBOUND	2	8	17	11	6	**44**	**125**	2	10	22	26	15	**75**	**139**
METRO 27 - Shepherd SOUTHBOUND	2	8	16	8	8	**42**		4	14	19	16	11	**64**	
METRO 28 - OST - Wayside EASTBOUND	1	8	16	8	5	**38**	**114**	6	16	29	16	7	**74**	**143**
METRO 28 - OST - Wayside WESTBOUND	2	7	18	8	4	**39**		2	18	32	9	8	**69**	
METRO 29 - Cullen / Hirsch NORTHBOUND	3	9	22	9	6	**49**	**142**	3	12	29	15	18	**77**	**158**
METRO 29 - Cullen / Hirsch SOUTHBOUND	2	7	17	11	8	**45**		2	16	32	14	17	**81**	
METRO 30 - Clinton / Ella EASTBOUND	1	2	4	3	1	**11**	**31**	2	5	10	5	1	**23**	**50**
METRO 30 - Clinton / Ella WESTBOUND	1	2	3	3	1	**10**		1	5	7	12	2	**27**	

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METRO 32 - Renwick / San Felipe EASTBOUND	1	7	8	5	3	**24**	**67**	4	13	10	13	7	**47**	**110**
METRO 32 - Renwick / San Felipe WESTBOUND	1	3	8	6	4	**22**		2	5	21	20	15	**63**	
METRO 36 - Kempwood EASTBOUND	1	6	10	6	4	**27**	**77**	2	8	13	17	8	**48**	**96**
METRO 36 - Kempwood WESTBOUND	1	5	8	5	3	**22**		3	7	21	10	7	**48**	
METRO 38 - Manchester-Lawndale EASTBOUND	1	3	3	3	2	**12**	**29**	1	3	7	9	5	**25**	**48**
METRO 38 - Manchester-Lawndale WESTBOUND	0	3	3	2	2	**10**		0	7	6	7	3	**23**	
METRO 39 - Katy Freeway EASTBOUND	0	3	2	2	1	**8**	**29**	1	5	4	3	2	**15**	**41**
METRO 39 - Katy Freeway WESTBOUND	0	7	4	0	0	**11**		0	11	12	2	1	**26**	
METRO 40 - Telephone / Heights NORTHBOUND	5	14	22	10	7	**58**	**173**	6	15	29	25	17	**92**	**190**
METRO 40 - Telephone / Heights SOUTHBOUND	4	13	21	12	8	**58**		5	27	28	26	12	**98**	
METRO 41 - Kirby / Polk EASTBOUND	2	5	7	6	3	**23**	**64**	4	8	10	8	5	**35**	**67**
METRO 41 - Kirby / Polk WESTBOUND	0	5	7	4	3	**19**		1	7	9	10	5	**32**	
METRO 44 - Acres Homes NORTHBOUND	1	7	10	9	8	**35**	**103**	4	9	14	18	11	**56**	**110**
METRO 44 - Acres Homes SOUTHBOUND	3	6	11	7	6	**33**		6	8	18	11	11	**54**	
METRO 45 - Tidwell EASTBOUND	2	9	21	14	11	**57**	**173**	3	16	32	19	16	**86**	**179**
METRO 45 - Tidwell WESTBOUND	4	12	20	12	9	**57**		5	16	30	29	13	**93**	
METRO 46 - Gessner NORTHBOUND	7	25	43	29	18	**122**	**356**	8	33	61	35	27	**164**	**360**
METRO 46 - Gessner SOUTHBOUND	6	24	41	30	16	**117**		8	36	81	48	23	**196**	
METRO 47 - Hillcroft NORTHBOUND	2	14	16	12	6	**50**	**146**	2	16	18	25	13	**74**	**150**
METRO 47 - Hillcroft SOUTHBOUND	1	8	15	18	7	**49**		1	11	29	22	13	**76**	
METRO 48 - Market EASTBOUND	0	1	5	3	2	**11**	**29**	0	3	7	5	4	**19**	**34**
METRO 48 - Market WESTBOUND	0	2	3	2	1	**8**		1	4	4	3	3	**15**	
METRO 49 - Chimney Rock / S Post Oak NORTHBOUND	3	10	14	10	4	**41**	**123**	3	14	29	12	15	**73**	**149**
METRO 49 - Chimney Rock / S Post Oak SOUTHBOUND	2	9	13	12	7	**43**		6	11	32	19	8	**76**	
METRO 50 - Broadway NORTHBOUND	3	6	9	6	3	**27**	**83**	3	9	18	9	10	**49**	**91**
METRO 50 - Broadway SOUTHBOUND	1	5	9	9	6	**30**		2	7	14	10	9	**42**	
METRO 51 - Hardy- Kelley NORTHBOUND	1	2	5	2	1	**11**	**35**	1	6	13	7	4	**31**	**67**
METRO 51 - Hardy- Kelley SOUTHBOUND	0	2	5	3	2	**12**		0	8	13	12	3	**36**	
METRO 52 - Hardy- Ley NORTHBOUND	1	4	10	9	8	**32**	**95**	2	10	24	13	9	**58**	**117**
METRO 52 - Hardy- Ley SOUTHBOUND	4	7	11	5	4	**31**		4	17	16	13	9	**59**	
METRO 54 - Scott NORTHBOUND	6	26	43	26	14	**115**	**356**	8	45	80	32	19	**184**	**364**
METRO 54 - Scott SOUTHBOUND	3	21	42	31	26	**123**		19	34	58	36	33	**180**	
METRO 56 - Airline / Montrose NORTHBOUND	3	18	48	31	20	**120**	**356**	5	33	72	55	23	**188**	**360**
METRO 56 - Airline / Montrose SOUTHBOUND	7	25	48	23	15	**118**		9	36	51	45	31	**172**	
METRO 58 - Hammerly EASTBOUND	0	2	3	3	1	**9**	**29**	0	3	4	5	2	**14**	**38**
METRO 58 - Hammerly WESTBOUND	0	2	3	3	2	**10**		0	5	10	6	3	**24**	
METRO 59 - Aldine Mail EASTBOUND	0	1	5	4	2	**12**	**29**	1	1	5	5	5	**17**	**34**
METRO 59 - Aldine Mail WESTBOUND	0	1	2	2	2	**7**		0	3	4	6	4	**17**	
METRO 60 - Cambridge NORTHBOUND	1	7	12	3	1	**24**	**67**	4	13	18	5	2	**42**	**76**
METRO 60 - Cambridge SOUTHBOUND	0	3	6	8	4	**21**		1	5	14	9	5	**34**	
METRO 63 - Fondren NORTHBOUND	2	14	20	14	8	**58**	**171**	2	18	36	15	16	**87**	**175**
METRO 63 - Fondren SOUTHBOUND	1	10	20	17	9	**57**		4	14	37	17	16	**88**	
METRO 64 - Lincoln City NORTHBOUND	0	1	2	2	1	**6**	**24**	0	2	5	4	1	**12**	**26**
METRO 64 - Lincoln City SOUTHBOUND	0	2	4	2	2	**10**		0	3	5	4	2	**14**	
METRO 65 - Bissonnet EASTBOUND	6	26	31	14	9	**86**	**247**	6	27	49	31	21	**134**	**278**
METRO 65 - Bissonnet WESTBOUND	2	14	27	25	12	**80**		6	28	54	28	28	**144**	
METRO 66 - Quitman EASTBOUND	0	1	3	3	2	**9**	**29**	0	3	3	5	2	**13**	**33**
METRO 66 - Quitman WESTBOUND	0	4	3	1	1	**9**		1	5	7	4	3	**20**	

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METRO 67 - Dairy Ashford NORTHBOUND	0	2	3	2	2	**9**	**29**	0	4	5	5	4	**18**	**33**
METRO 67 - Dairy Ashford SOUTHBOUND	0	2	3	2	2	**9**		0	3	5	5	2	**15**	
METRO 68 - Braeswood EASTBOUND	2	6	12	5	3	**28**	**83**	3	15	19	10	3	**50**	**97**
METRO 68 - Braeswood WESTBOUND	0	4	10	8	7	**29**		2	12	14	12	7	**47**	
METRO 70 - Memorial EASTBOUND	0	3	2	2	1	**8**	**29**	0	4	4	5	4	**17**	**39**
METRO 70 - Memorial WESTBOUND	0	4	3	3	1	**11**		0	5	5	8	4	**22**	
METRO 72 - Westview EASTBOUND	1	2	4	3	1	**11**	**29**	1	3	6	6	2	**18**	**31**
METRO 72 - Westview WESTBOUND	0	2	3	2	2	**9**		0	3	4	2	4	**13**	
METRO 73 - Bellfort EASTBOUND	2	12	26	20	14	**74**	**206**	3	16	41	36	16	**112**	**231**
METRO 73 - Bellfort WESTBOUND	3	15	25	14	9	**66**		20	24	30	24	21	**119**	
METRO 75 - Eldridge NORTHBOUND	1	3	4	2	1	**11**	**29**	1	6	6	4	1	**18**	**33**
METRO 75 - Eldridge SOUTHBOUND	0	2	4	2	1	**9**		0	3	8	3	1	**15**	
METRO 76 - Evergreen NORTHBOUND	1	3	10	4	2	**20**	**64**	1	4	13	10	11	**39**	**75**
METRO 76 - Evergreen SOUTHBOUND	1	4	10	6	2	**23**		1	6	11	10	8	**36**	
METRO 77 - Homestead NORTHBOUND	0	1	3	3	3	**10**	**29**	0	6	6	4	4	**20**	**35**
METRO 77 - Homestead SOUTHBOUND	1	2	4	1	1	**9**		3	2	6	2	2	**15**	
METRO 78 - Wayside NORTHBOUND	1	1	4	2	2	**10**	**29**	2	2	8	6	5	**23**	**50**
METRO 78 - Wayside SOUTHBOUND	1	2	4	2	2	**11**		3	5	8	7	4	**27**	
METRO 79 - Irvington SOUTHBOUND	0	2	3	2	2	**9**	**29**	0	7	6	3	3	**19**	**45**
METRO 79 - Irvington NORTHBOUND	0	2	3	4	2	**11**		0	4	6	11	5	**26**	
METRO 80 - MLK / Lockwood NORTHBOUND	4	12	19	14	8	**57**	**171**	5	22	38	16	8	**89**	**185**
METRO 80 - MLK / Lockwood SOUTHBOUND	2	12	20	11	13	**58**		5	26	31	19	15	**96**	
METRO 82 - Westheimer EASTBOUND	7	37	62	35	25	**166**	**490**	12	44	116	57	39	**268**	**504**
METRO 82 - Westheimer WESTBOUND	7	23	55	45	31	**161**		9	31	83	58	55	**236**	
METRO 83 - Lee Road - JFK NORTHBOUND	0	2	5	2	2	**11**	**29**	1	5	7	3	4	**20**	**32**
METRO 83 - Lee Road - JFK SOUTHBOUND	1	1	2	2	2	**8**		2	1	4	2	3	**12**	
METRO 84 - Buffalo Speedway NORTHBOUND	1	4	8	6	4	**23**	**64**	1	6	10	8	6	**31**	**67**
METRO 84 - Buffalo Speedway SOUTHBOUND	0	5	8	4	3	**20**		0	7	13	10	6	**36**	
METRO 85 - Antoine / Washington NORTHBOUND	6	12	27	21	13	**79**	**239**	9	26	41	31	17	**124**	**251**
METRO 85 - Antoine / Washington SOUTHBOUND	7	18	29	17	10	**81**		8	22	61	18	18	**127**	
METRO 86 - FM 1960 / Imperial Valley EASTBOUND	1	6	12	8	9	**36**	**110**	4	16	16	10	15	**61**	**118**
METRO 86 - FM 1960 / Imperial Valley WESTBOUND	1	7	16	7	7	**38**		6	10	20	12	9	**57**	
METRO 87 - Sunnyside NORTHBOUND	0	2	5	3	2	**12**	**34**	2	8	9	4	2	**25**	**50**
METRO 87 - Sunnyside SOUTHBOUND	1	2	4	2	1	**10**		1	6	12	4	2	**25**	
METRO 88 - Sagemont NORTHBOUND	1	4	7	5	4	**21**	**64**	3	5	12	17	4	**41**	**67**
METRO 88 - Sagemont SOUTHBOUND	0	3	6	5	6	**20**		0	3	7	10	6	**26**	
METRO 89 - Dacoma NORTHBOUND	0	4	6	3	1	**14**	**29**	0	6	10	6	1	**23**	**41**
METRO 89 - Dacoma SOUTHBOUND	0	1	2	1	0	**4**		0	6	6	4	2	**18**	
METRO 96 - Veterans Memorial NORTHBOUND	1	3	11	5	3	**23**	**64**	2	4	14	12	7	**39**	**79**
METRO 96 - Veterans Memorial SOUTHBOUND	1	4	8	4	3	**20**		3	6	10	9	12	**40**	

ROUTE_SURVEYED[Code]	hgac_sample_goals							hgac_overall_weight_submittal						
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METRO 97 - Settegast EASTBOUND	1	2	4	2	1	**10**	**29**	3	4	4	3	5	**19**	**39**
METRO 97 - Settegast WESTBOUND	1	3	4	2	1	**11**		2	6	6	2	4	**20**	
METRO 98 - Briargate EASTBOUND	0	3	4	2	1	**10**	**29**	0	3	6	2	2	**13**	**29**
METRO 98 - Briargate WESTBOUND	0	2	3	3	2	**10**		0	5	5	3	3	**16**	
METRO 99 - Ella - FM 1960 NORTHBOUND	1	6	10	7	7	**31**	**92**	6	10	18	9	8	**51**	**96**
METRO 99 - Ella - FM 1960 SOUTHBOUND	2	6	12	6	5	**31**		3	8	14	11	9	**45**	
METRO 102 - Bush Iah Express INBOUND	4	8	14	7	9	**42**	**124**	4	17	30	8	10	**69**	**132**
METRO 102 - Bush Iah Express OUTBOUND	3	6	14	6	11	**40**		4	14	21	13	11	**63**	
METRO 108 - Veterans Memorial Express INBOUND	2	6	0	1	1	**10**	**29**	3	7	2	4	2	**18**	**39**
METRO 108 - Veterans Memorial Express OUTBOUND	0	1	0	7	1	**9**		1	3	0	16	1	**21**	
METRO 137 - Northshore Express EASTBOUND	1	5	14	9	13	**42**	**116**	1	15	29	11	15	**71**	**130**
METRO 137 - Northshore Express WESTBOUND	3	9	14	6	3	**35**		3	12	31	6	7	**59**	
METRO 151 - Westpark Express EASTBOUND	2	8	0	1	1	**12**	**29**	2	9	1	4	4	**20**	**37**
METRO 151 - Westpark Express WESTBOUND	0	1	0	6	0	**7**		1	3	0	8	5	**17**	
METRO 152 - Harwin Express EASTBOUND	2	7	9	4	1	**23**	**67**	5	8	18	10	4	**45**	**83**
METRO 152 - Harwin Express WESTBOUND	1	3	8	7	2	**21**		2	4	9	14	9	**38**	
METRO 153 - Harwin Express EASTBOUND	2	6	10	11	4	**33**	**100**	2	10	17	15	6	**50**	**104**
METRO 153 - Harwin Express WESTBOUND	1	8	8	8	8	**33**		2	12	17	8	15	**54**	
METRO 160 - Memorial City Express EASTBOUND	0	3	3	3	2	**11**	**29**	1	3	5	6	2	**17**	**37**
METRO 160 - Memorial City Express WESTBOUND	0	2	4	2	1	**9**		0	4	6	7	3	**20**	
METRO 161 - Wilcrest Express EASTBOUND	2	8	14	8	6	**38**	**111**	5	15	20	8	11	**59**	**113**
METRO 161 - Wilcrest Express WESTBOUND	2	6	13	10	7	**38**		3	8	18	14	11	**54**	
METRO 162 - Memorial Express EASTBOUND	1	2	3	2	2	**10**	**29**	2	7	11	4	3	**27**	**44**
METRO 162 - Memorial Express WESTBOUND	0	2	4	2	1	**9**		2	3	7	3	2	**17**	
METRO 309 - Gulfton Circulator LOOP	1	2	7	6	4	**20**	**29**	1	6	8	10	5	**30**	**30**
METRO 310 - Gulfton Circulator Counterclockwise LOO	1	3	9	5	2	**20**	**29**	2	5	11	11	4	**33**	**33**
METRO 360 - Peerless Shuttle NORTHBOUND	0	2	3	2	1	**8**	**29**	0	2	3	5	3	**13**	**31**
METRO 360 - Peerless Shuttle SOUTHBOUND	0	3	4	3	3	**13**		0	3	7	4	4	**18**	
METRO 399 - Kuykendahl Shuttle NORTHBOUND	1	1	3	2	1	**8**	**29**	1	3	3	2	3	**12**	**31**
METRO 399 - Kuykendahl Shuttle SOUTHBOUND	0	2	6	2	1	**11**		2	3	6	4	4	**19**	
METRO 402 - Bellaire Quickline WESTBOUND	0	1	5	4	0	**10**	**31**	0	3	13	5	0	**21**	**35**
METRO 402 - Bellaire Quickline EASTBOUND	0	3	4	3	0	**10**		0	3	8	3	0	**14**	
METRO 433 - Silver Line NORTHBOUND	4	16	26	22	19	**87**	**261**	5	19	35	42	22	**123**	**262**
METRO 433 - Silver Line SOUTHBOUND	4	18	27	22	18	**89**		7	23	42	36	31	**139**	
METRO TOTALS	**263**	**1096**	**1959**	**1305**	**860**	**5483**	**8201**	**494**	**1762**	**3217**	**2179**	**1554**	**9206**	**9206**

METRO Park and rides OD Sampling Plan and OD Surveys Completed by Time of Day and Direction

ROUTE_SURVEYED[Code]	hgac_sample_goals							hgac_overall_weight_submittal						
	1 = EARLY AM [Before 6am]	2 = AM [6am-9am]	3 = MIDDAY [9am-3pm]	4 = PM [3pm - 6pm]	5 = EVE [After 6pm]	Direction Total	Route Total	1 = EARLY AM [Before 6am]	2 = AM [6am-9am]	3 = MIDDAY [9am-3pm]	4 = PM [3pm - 6pm]	5 = EVE [After 6pm]	Direction Total	Route Total
METRO 170/171 - Missouri City Express OUTBOUND	0	0	0	0	0	**0**	**61**	0	0	0	0	0	**0**	**61**
METRO 170/171 - Missouri City Express INBOUND	0	0	0	0	0	**0**		1	60	0	0	0	**61**	
METRO 202 - Kuykendahl P&R OUTBOUND	0	0	0	0	0	**0**	**61**	0	0	0	0	0	**0**	**70**
METRO 202 - Kuykendahl P&R INBOUND	0	0	0	0	0	**0**		10	60	0	0	0	**70**	
METRO 204 - Spring P&R OUTBOUND	0	0	0	0	0	**0**	**61**	0	0	0	0	0	**0**	**61**
METRO 204 - Spring P&R INBOUND	0	0	0	0	0	**0**		2	59	0	0	0	**61**	
METRO 214/216 - NW Station / WL York P&R OUTBOU	0	0	0	0	0	**0**	**61**	0	0	0	0	0	**0**	**67**
METRO 214/216 - NW Station / WL York P&R INBOUNI	0	0	0	0	0	**0**		12	55	0	0	0	**67**	
METRO 217 - Cypress P&R INBOUND	0	0	0	0	0	**0**	**204**	47	173	0	0	0	**220**	**220**
METRO 217 - Cypress P&R OUTBOUND	0	0	0	0	0	**0**		0	0	0	0	0	**0**	
METRO 222 - Grand Parkway P&R OUTBOUND	0	0	0	0	0	**0**	**204**	0	0	0	0	0	**0**	**215**
METRO 222 - Grand Parkway P&R INBOUND	0	0	0	0	0	**0**		26	189	0	0	0	**215**	
METRO 228 - Kingsland / Addicks P&R OUTBOUND	0	0	0	0	0	**0**	**61**	0	0	0	0	0	**0**	**106**
METRO 228 - Kingsland / Addicks P&R INBOUND	0	0	0	0	0	**0**		0	106	0	0	0	**106**	
METRO 236/237 - Maxey P&R OUTBOUND	0	0	0	0	0	**0**	**61**	0	0	0	0	0	**0**	**52**
METRO 236/237 - Maxey P&R INBOUND	0	0	0	0	0	**0**		1	51	0	0	0	**52**	
METRO 244 - El Dorado / Monroe P&R OUTBOUND	0	0	0	0	0	**0**	**61**	0	0	0	0	0	**0**	**62**
METRO 244 - El Dorado / Monroe P&R INBOUND	0	0	0	0	0	**0**		8	54	0	0	0	**62**	
METRO 246/247 - Fuqua / Bay Area P&R OUTBOUND	0	0	0	0	0	**0**	**61**	0	0	0	0	0	**0**	**69**
METRO 246/247 - Fuqua / Bay Area P&R INBOUND	0	0	0	0	0	**0**		21	48	0	0	0	**69**	
METRO 259 - Eastex / Townsen / Kingwood P&R OUTB	0	0	0	0	0	**0**	**61**	0	0	0	0	0	**0**	**68**
METRO 259 - Eastex / Townsen / Kingwood P&R INBOU	0	0	0	0	0	**0**		2	66	0	0	0	**68**	
METRO 269 - Hillcroft / Westwood / W. Bellfort P&R O	0	0	0	0	0	**0**	**61**	0	0	0	0	0	**0**	**69**
METRO 269 - Hillcroft / Westwood / W. Bellfort P&R IN	0	0	0	0	0	**0**		21	48	0	0	0	**69**	
METRO 291 - Conroe P&R OUTBOUND	0	0	0	0	0	**0**	**14**	0	0	0	0	0	**0**	**21**
METRO 291 - Conroe P&R INBOUND	0	0	0	0	0	**0**		0	21	0	0	0	**21**	
METRO 292 - West Bellfort / Westwood / TMC P&R OU	0	0	0	0	0	**0**	**61**	0	0	0	0	0	**0**	**60**
METRO 292 - West Bellfort / Westwood / TMC P&R INE	0	0	0	0	0	**0**		0	60	0	0	0	**60**	
METRO 297 - South Point / Monroe / TMC P&R INBOUI	0	0	0	0	0	**0**	**61**	5	64	0	0	0	**69**	**69**
METRO 297 - South Point / Monroe / TMC P&R OUTBO	0	0	0	0	0	**0**		0	0	0	0	0	**0**	
METRO 298 - Kingsland / Addicks / NWTC / TMC P&R IN	0	0	0	0	0	**0**	**61**	1	62	0	0	0	**63**	**63**
METRO 298 - Kingsland / Addicks / NWTC / TMC P&R O	0	0	0	0	0	**0**		0	0	0	0	0	**0**	
METRO PNR TOTALS	**0**	**0**	**0**	**0**	**0**	**0**	**1215**	**157**	**1176**	**0**	**0**	**0**	**1333**	**1333**

METRO Rail OD Sampling Plan and OD Surveys Completed by Time of Day and Direction

ROUTE_SURVEYED[Code]	hgac_sample_goals							hgac_overall_weight_submittal						
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METRO RED LINE SOUTHBOUND	20	113	211	139	95	**578**	**3354**	52	271	698	376	375	**1772**	**3521**
METRO RED LINE NORTHBOUND	28	98	187	114	74	**501**		67	273	663	344	402	**1749**	
METRO GREEN LINE WESTBOUND	10	33	63	39	29	**175**	**818**	13	57	152	142	103	**467**	**923**
METRO GREEN LINE EASTBOUND	4	23	63	53	50	**193**		8	39	139	147	123	**456**	
METRO PURPLE LINE NORTHBOUND	8	30	77	53	37	**205**	**818**	13	73	177	123	91	**477**	**907**
METRO PURPLE LINE SOUTHBOUND	5	36	75	42	41	**199**		11	56	143	124	96	**430**	
METRO RAIL TOTALS	**74**	**333**	**676**	**441**	**327**	**1851**	**4990**	**164**	**769**	**1972**	**1256**	**1190**	**5351**	**5351**

Other Regional Bus Providers OD Sampling Plan and OD Surveys Completed by Time of Day and Direction (The Woodlands)

ROUTE_SURVEYED[Code]	hgac_sample_goals							hgac_overall_weight_submittal						
	1 = EARLY AM [Before 6am]	2 = AM [6am-9am]	3 = MIDDAY [9am-3pm]	4 = PM [3pm-6pm]	5 = EVE [After 6pm]	Direction Total	Route Total	1 = EARLY AM [Before 6am]	2 = AM [6am-9am]	3 = MIDDAY [9am-3pm]	4 = PM [3pm-6pm]	5 = EVE [After 6pm]	Direction Total	Route Total
The Woodlands Route 299 Research Forest [Southbou	-	-	-	-	-	-	**61**	27	29	1	0	0	**57**	**57**
The Woodlands Route 299 Sawdust [Southbound]	-	-	-	-	-	-	**61**	28	45	1	0	0	**74**	**74**
The Woodlands Route 299 Sterling Ridge [Southbound]	-	-	-	-	-	-	**20**	2	19	0	0	0	**21**	**21**
The Woodlands Trolley [Circulator] LOOP	-	-	-	-	-	-	**29**	0	0	16	14	1	**31**	**31**
The Woodlands Energy Corridor Commuter [Inbound]	-	-	-	-	-	-	**10**	0	10	0	0	0	**10**	**10**
THE WOODLANDS TOTALS	**0**	**0**	**0**	**0**	**0**	**0**	**181**	**57**	**103**	**18**	**14**	**1**	**193**	**193**

Other Regional Bus Providers OD Sampling Plan and OD Surveys Completed by Time of Day and Direction (Fort Bend Transit)

ROUTE_SURVEYED[Code]	hgac_sample_goals							hgac_overall_weight_submittal						
	1 = EARLY AM [Before 6am]	2 = AM [6am-9am]	3 = MIDDAY [9am-3pm]	4 = PM [3pm-6pm]	5 = EVE [After 6pm]	Direction Total	Route Total	1 = EARLY AM [Before 6am]	2 = AM [6am-9am]	3 = MIDDAY [9am-3pm]	4 = PM [3pm-6pm]	5 = EVE [After 6pm]	Direction Total	Route Total
Fort Bend Transit Galleria LOOP	-	-	-	-	-	-	**5**	0	5	0	0	0	**5**	**5**
Fort Bend Transit Greenway Plaza LOOP	-	-	-	-	-	-	**5**	2	3	0	1	0	**6**	**6**
Fort Bend Transit Texas Medical Center LOOP	-	-	-	-	-	-	**61**	8	56	0	0	0	**64**	**64**
FORT BEND TRANSIT TOTALS	**0**	**0**	**0**	**0**	**0**	**0**	**71**	**10**	**64**	**0**	**1**	**0**	**75**	**75**

Other Regional Bus Providers OD Sampling Plan and OD Surveys Completed by Time of Day and Direction (Island Transit)

ROUTE_SURVEYED[Code]	hgac_sample_goals							hgac_overall_weight_submittal						
	1 = EARLY AM [Before 6am]	2 = AM [6am-9am]	3 = MIDDAY [9am-3pm]	4 = PM [3pm-6pm]	5 = EVE [After 6pm]	Direction Total	Route Total	1 = EARLY AM [Before 6am]	2 = AM [6am-9am]	3 = MIDDAY [9am-3pm]	4 = PM [3pm-6pm]	5 = EVE [After 6pm]	Direction Total	Route Total
Island Transit Route 1 61st Via Market & Broadway [Cir	-	-	-	-	-	-	**15**	0	4	5	4	2	**15**	**15**
Island Transit Route 2 UTMB-Ferry Road [Circulator] LO	-	-	-	-	-	-	**15**	0	5	7	8	0	**20**	**20**
Island Transit Route 3 81st - W Broadway Via Ave M [C	-	-	-	-	-	-	**12**	0	7	10	4	0	**21**	**21**
Island Transit Route 4 Broadway - 8th St [Circulator] LO	-	-	-	-	-	-	**12**	0	2	12	4	0	**18**	**18**
Island Transit Route 5 Ave S - Stewart Road [Circulator	-	-	-	-	-	-	**15**	0	6	11	1	0	**18**	**18**
Island Transit Route 6 Ave S 61st Via Ave O [Circulator]	-	-	-	-	-	-	**15**	0	7	12	0	0	**19**	**19**
Island Transit Seawall Route [Circulator]	-	-	-	-	-	-	**24**	0	0	28	14	2	**44**	**44**
Island Transit Downtown Route [Circulator] LOOP	-	-	-	-	-	-	**24**	0	0	8	11	18	**37**	**37**
Island Transit Rail 1 [Circulator]	-	-	-	-	-	-	**18**	0	0	31	4	0	**35**	**35**
Island Transit Rail 2 [Circulator] LOOP	-	-	-	-	-	-	**24**	0	0	20	6	0	**26**	**26**
ISLAND TRANSIT TOTALS	**0**	**0**	**0**	**0**	**0**	**0**	**174**	**0**	**31**	**144**	**56**	**22**	**253**	**253**

Other Regional Bus Providers OD Sampling Plan and OD Surveys Completed by Time of Day and Direction (GCTD)

ROUTE_SURVEYED[Code]	hgac_sample_goals							hgac_overall_weight_submittal						
	1 = EARLY AM [Before 6am]	2 = AM [6am-9am]	3 = MIDDAY [9am-3pm]	4 = PM [3pm-6pm]	5 = EVE [After 6pm]	Direction Total	Route Total	1 = EARLY AM [Before 6am]	2 = AM [6am-9am]	3 = MIDDAY [9am-3pm]	4 = PM [3pm-6pm]	5 = EVE [After 6pm]	Direction Total	Route Total
GCTD 101 La Marque North LOOP	-	-	-	-	-	-	**29**	0	10	19	1	0	**30**	**30**
GCTD 102 La Marque South LOOP	-	-	-	-	-	-	**16**	0	2	16	6	0	**24**	**24**
GCTD 103 Texas City North LOOP	-	-	-	-	-	-	**29**	0	9	18	6	0	**33**	**33**
GCTD 104 Texas City South LOOP	-	-	-	-	-	-	**24**	0	6	20	7	0	**33**	**33**
GCTD 105 Dickinson [Circulator] LOOP	-	-	-	-	-	-	**19**	0	6	12	11	0	**29**	**29**
GCTD 106 Texas City Express [Circulator] LOOP	-	-	-	-	-	-	**24**	0	8	10	6	0	**24**	**24**
GCTD 107 Bacliff / San Leon [Circulator] LOOP	-	-	-	-	-	-	**14**	0	8	9	2	0	**19**	**19**
GCTD Angleton Purple [Circulator] LOOP	-	-	-	-	-	-	**19**	0	4	17	2	0	**23**	**23**
GCTD Lake Jackson / Clute Blue [Circulator] LOOP	-	-	-	-	-	-	**24**	0	5	21	6	0	**32**	**32**
GCTD Clute / Lake Jackson Green [Circulator] LOOP	-	-	-	-	-	-	**24**	0	8	10	4	0	**22**	**22**
GCTD Freeport Red [Circulator] LOOP	-	-	-	-	-	-	**24**	0	7	12	6	0	**25**	**25**
GCTD Island Transit League City Park & Ride [Circulator	-	-	-	-	-	-	**61**	4	36	0	0	0	**40**	**40**
GCTD Regional Gold [Circulator] LOOP	-	-	-	-	-	-	**24**	0	7	12	7	0	**26**	**26**
GCTD TOTALS	**0**	**0**	**0**	**0**	**0**	**0**	**331**	**4**	**116**	**176**	**64**	**0**	**360**	**360**

Other Regional Bus Providers OD Sampling Plan and OD Surveys Completed by Time of Day and Direction (Conroe Connection)

ROUTE_SURVEYED[Code]	hgac_sample_goals							hgac_overall_weight_submittal						
	1 = EARLY AM [Before 6am]	2 = AM [6am-9am]	3 = MIDDAY [9am-3pm]	4 = PM [3pm-6pm]	5 = EVE [After 6pm]	Direction Total	Route Total	1 = EARLY AM [Before 6am]	2 = AM [6am-9am]	3 = MIDDAY [9am-3pm]	4 = PM [3pm-6pm]	5 = EVE [After 6pm]	Direction Total	Route Total
Conroe Connection Route 1 North LOOP	-	-	-	-	-	-	**24**	0	9	12	4	0	**25**	**25**
Conroe Connection Route 2 South LOOP	-	-	-	-	-	-	**24**	0	8	11	5	0	**24**	**24**
Conroe Connection Route 3 West LOOP	-	-	-	-	-	-	**6**	0	1	5	1	0	**7**	**7**
Conroe Connection Route 4 Northeast LOOP	-	-	-	-	-	-	**6**	0	1	5	1	0	**7**	**7**
CONROE CONNECTION TOTALS	**0**	**0**	**0**	**0**	**0**	**0**	**60**	**0**	**19**	**33**	**11**	**0**	**63**	**63**

Other Regional Bus Providers OD Sampling Plan and OD Surveys Completed by Time of Day and Direction (Harris County)

ROUTE_SURVEYED[Code]	hgac_sample_goals							hgac_overall_weight_submittal						
	1 = EARLY AM [Before 6am]	2 = AM [6am-9am]	3 = MIDDAY [9am-3pm]	4 = PM [3pm-6pm]	5 = EVE [After 6pm]	Direction Total	Route Total	1 = EARLY AM [Before 6am]	2 = AM [6am-9am]	3 = MIDDAY [9am-3pm]	4 = PM [3pm-6pm]	5 = EVE [After 6pm]	Direction Total	Route Total
Harris County Transit Route 1 Garth Road [Circulator] L	-	-	-	-	-	-	**29**	0	12	17	1	0	**30**	**30**
Harris County Transit Route 11 Cloverleaf [Circulator]	-	-	-	-	-	-	**17**	0	7	7	4	0	**18**	**18**
Harris County Transit Route 12 Channelview [Circulator	-	-	-	-	-	-	**13**	0	5	7	2	0	**14**	**14**
Harris County Transit Route 14 Sheldon West [Circulato	-	-	-	-	-	-	**13**	0	2	9	3	0	**14**	**14**
Harris County Transit Route 2 Baytown Central [Circula	-	-	-	-	-	-	**24**	0	6	14	5	0	**25**	**25**
Harris County Transit Route 3 N Alexander / Cedar Bayo	-	-	-	-	-	-	**24**	0	10	21	3	0	**34**	**34**
Harris County Transit Route 4 Baytown / Decker Loop	-	-	-	-	-	-	**19**	0	2	8	10	0	**20**	**20**
Harris County Transit Route 5 La Porte City [Circulator]	-	-	-	-	-	-	**9**	0	2	4	3	0	**9**	**9**
Harris County Transit Route 6 Baytown / Highlands / Cr	-	-	-	-	-	-	**16**	0	4	8	5	0	**17**	**17**
Harris County Transit Route Baytown/LaPorte Shuttle	-	-	-	-	-	-	**11**	0	1	4	1	0	**6**	**9**
Harris County Transit Route Baytown/LaPorte Shuttle	-	-	-	-	-	-		0	0	3	0	0	**3**	
Harris County Transit Route 13 Baytown/Sheldon Shutt	-	-	-	-	-	-	**18**	0	1	3	1	0	**5**	**10**
Harris County Transit Route 13 Baytown/Sheldon Shutt	-	-	-	-	-	-		0	0	3	2	0	**5**	
HARRIS COUNTY TRANSIT TOTALS	**0**	**0**	**0**	**0**	**0**	**0**	**193**	**0**	**52**	**108**	**40**	**0**	**200**	**200**

OTHER REGIONAL BUS PROVIDERS OD SAMPLING PLAN AND OD SURVEYS COMPLETED BY TIME OF DAY AND DIRECTION (BTD)

ROUTE_SURVEYED[Code]	hgac_sample_goals							hgac_overall_weight_submittal						
	1 = EARLY AM [Before 6am]	2 = AM [6am-9am]	3 = MIDDAY [9am-3pm]	4 = PM [3pm-6pm]	5 = EVE [After 6pm]	Direction Total	Route Total	1 = EARLY AM [Before 6am]	2 = AM [6am-9am]	3 = MIDDAY [9am-3pm]	4 = PM [3pm-6pm]	5 = EVE [After 6pm]	Direction Total	Route Total
BTD-Cleveland Fixed Route [Circulator] LOOP	-	-	-	-	-	-	**12**	0	0	8	3	0	**11**	**11**
BTD-Liberty County Circulator [Circulator] LOOP	-	-	-	-	-	-	**6**	0	0	5	0	0	**5**	**5**
BTD TOTALS	**0**	**0**	**0**	**0**	**0**	**0**	**18**	**0**	**0**	**13**	**3**	**0**	**16**	**16**

O2O Sample Plans and O2O Survey Completed by Time of Day and Direction

METRO Red Line O2O Sampling Plan and O2O Surveys Completed by Station, Time of Day, and Direction

		Sampling Goals							COMPLETED						
Station	Dir	Early AM (3:30-6:00am)	AM Peak (6:01-9:00am)	Midday (9:01am-3:00pm)	PM Peak (3:01-6:00pm)	Late Night (6:01pm-12:00am)	Total	Total Surveys	Early AM (3:30-6:00am)	AM Peak (6:01-9:00am)	Midday (9:01am-3:00pm)	PM Peak (3:01-6:00pm)	Late Night (6:01pm-12:00am)	Total	Total Surveys
Fannin South Transit Center	NORTHBOUND	23	84	99	46	36	289	**385**	24	169	234	62	46	**535**	**535**
Stadium Park / Astrodome	NORTHBOUND	5	15	22	12	10	64	**101**	6	32	83	28	26	**175**	**211**
	SOUTHBOUND	0	1	4	4	4	12		0	3	15	12	6	**36**	
Smith Lands	NORTHBOUND	58	151	76	11	4	300	**421**	59	233	182	22	39	**535**	**564**
	SOUTHBOUND	0	1	4	6	5	16		0	2	11	11	5	**29**	
TMC Transit Center	NORTHBOUND	13	49	67	38	19	185	**332**	14	156	132	59	41	**402**	**534**
	SOUTHBOUND	1	6	21	23	13	64		2	16	59	34	21	**132**	
Dryden / TMC	NORTHBOUND	2	10	31	61	21	125	**577**	2	19	92	69	43	**225**	**835**
	SOUTHBOUND	1	8	56	171	72	308		2	18	135	237	218	**610**	
Memorial Hermann Hospital / Zoo	NORTHBOUND	2	7	27	49	17	103	**353**	3	15	74	52	22	**166**	**446**
	SOUTHBOUND	1	7	40	74	40	162		1	15	86	109	69	**280**	
Herman Park / Rice U	NORTHBOUND	1	2	8	8	5	24	**59**	1	8	24	9	9	**51**	**104**
	SOUTHBOUND	0	3	10	4	3	20		0	7	24	16	6	**53**	
Museum District	NORTHBOUND	1	6	27	12	6	52	**128**	1	18	63	17	11	**110**	**202**
	SOUTHBOUND	1	14	18	7	3	44		1	19	45	19	8	**92**	
Wheeler Transit Center	NORTHBOUND	6	30	45	28	19	128	**280**	22	35	117	32	24	**230**	**356**
	SOUTHBOUND	4	21	26	15	15	82		6	22	51	28	19	**126**	
Ensemble / HCC	NORTHBOUND	3	17	47	17	11	94	**228**	6	23	94	20	14	**157**	**304**
	SOUTHBOUND	1	22	33	11	10	77		3	23	65	17	39	**147**	
McGowen	NORTHBOUND	2	9	20	10	9	49	**154**	2	23	30	14	15	**84**	**185**
	SOUTHBOUND	1	17	26	12	11	67		3	18	47	16	17	**101**	
Downtown Transit Center	NORTHBOUND	5	15	47	22	15	104	**352**	5	26	72	25	17	**145**	**373**
	SOUTHBOUND	5	39	60	27	28	160		6	40	92	58	32	**228**	
Bell	NORTHBOUND	2	5	10	6	7	30	**87**	3	11	17	11	8	**50**	**122**
	SOUTHBOUND	1	8	9	9	8	35		2	12	23	19	16	**72**	
Main Street Square	NORTHBOUND	2	7	21	17	12	58	**224**	2	13	54	19	12	**100**	**259**
	SOUTHBOUND	2	15	41	31	21	110		2	16	66	46	29	**159**	
Central Station	NORTHBOUND	3	9	23	18	14	67	**275**	3	22	55	25	14	**119**	**345**
	SOUTHBOUND	3	24	49	40	24	140		4	33	87	48	54	**226**	
Preston	NORTHBOUND	3	8	21	14	9	55	**253**	4	13	43	17	10	**87**	**303**
	SOUTHBOUND	8	38	48	21	20	134		15	57	87	31	26	**216**	
UH-Downtown	NORTHBOUND	0	1	12	6	3	23	**111**	0	7	41	12	9	**69**	**173**
	SOUTHBOUND	0	4	30	18	8	60		2	13	59	20	10	**104**	
Burnett Transit Center / Casa De Amigos	NORTHBOUND	3	12	45	27	7	94	**276**	3	34	143	79	16	**275**	**436**
	SOUTHBOUND	5	27	50	22	9	113		7	34	64	40	16	**161**	
Quitman / Near Northside	NORTHBOUND	0	2	7	4	3	15	**59**	0	8	21	12	5	**46**	**111**
	SOUTHBOUND	2	8	11	5	3	29		5	20	27	7	6	**65**	
Fulton / North Central	NORTHBOUND	1	4	13	15	7	41	**109**	1	5	28	17	7	**58**	**160**
	SOUTHBOUND	2	7	15	9	8	41		3	15	55	16	13	**102**	
Moody Park	NORTHBOUND	0	1	6	4	4	15	**54**	0	3	16	7	7	**33**	**107**
	SOUTHBOUND	1	5	11	4	5	26		8	12	30	17	7	**74**	
Cavalcade	NORTHBOUND	1	2	7	3	3	16	**73**	1	7	19	3	3	**33**	**160**
	SOUTHBOUND	2	9	16	7	5	39		13	29	60	16	9	**127**	
Lindale Park	NORTHBOUND	0	1	1	1	1	3	**19**	0	3	6	5	1	**15**	**41**
	SOUTHBOUND	0	3	4	2	1	11		1	6	12	5	2	**26**	
Melbourne / North Lindale	NORTHBOUND	0	2	3	1	2	8	**32**	0	4	14	3	6	**27**	**75**
	SOUTHBOUND	1	5	5	3	2	16		3	9	20	11	5	**48**	
Northline Transit Center / HCC	SOUTHBOUND	18	47	101	53	50	269	**359**	37	115	282	107	71	**612**	**612**
TOTAL		197	786	1,372	1,010	611	3,976	5,301	288	1,441	3,156	1,559	1,109	7,553	7,553

METRO Green Line O2O Sampling Plan and O2O Surveys Completed by Station, Time of Day, and Direction

Station	Dir	Sampling Goals							COMPLETED						
		Early AM (3:30-6:00am)	AM Peak (6:01-9:00am)	Midday (9:01am-3:00pm)	PM Peak (3:01-6:00pm)	Late Night (6:01pm-12:00am)	Total	Total Surveys	Early AM (3:30-6:00am)	AM Peak (6:01-9:00am)	Midday (9:01am-3:00pm)	PM Peak (3:01-6:00pm)	Late Night (6:01pm-12:00am)	Total	Total Surveys
Theater District	EASTBOUND	1	6	8	12	11	38	**51**	3	29	23	13	14	**82**	**82**
Central Station	EASTBOUND	2	9	33	26	23	92	**135**	3	44	85	44	34	**210**	**227**
	WESTBOUND	0	2	3	2	2	9		0	4	8	2	3	**17**	
Convention District	EASTBOUND	0	1	3	4	4	13	**27**	2	4	13	7	6	**32**	**47**
	WESTBOUND	1	1	2	2	2	7		0	2	7	3	3	**15**	
EaDo / Stadium	EASTBOUND	0	3	11	5	7	26	**48**	2	8	11	7	9	**37**	**62**
	WESTBOUND	0	2	5	2	1	10		0	5	10	3	7	**25**	
Coffee Plant / Second Ward	EASTBOUND	1	2	8	4	5	20	**55**	2	10	10	4	11	**37**	**90**
	WESTBOUND	1	4	9	4	3	21		3	17	22	4	7	**53**	
Lockwood / Eastwood	EASTBOUND	0	2	6	4	3	16	**53**	2	5	10	5	3	**25**	**87**
	WESTBOUND	2	6	9	5	3	24		2	18	24	5	13	**62**	
Altic / Howard Hughes	EASTBOUND	0	2	6	5	3	16	**52**	0	5	10	6	6	**27**	**86**
	WESTBOUND	2	4	9	5	3	23		2	16	23	7	11	**59**	
Cesar Chavez / 67th St.	EASTBOUND	0	0	2	2	2	6	**49**	2	0	2	3	2	**9**	**97**
	WESTBOUND	0	5	11	8	7	32		2	28	35	11	12	**88**	
Magnolia Park Transit Center	WESTBOUND	6	21	32	18	15	92	**123**	11	89	93	24	16	**233**	233
	TOTAL	18	70	155	109	93	445	593	36	284	386	148	157	1,011	1,011

METRO Purple Line O2O Sampling Plan and O2O Surveys Completed by Station, Time of Day, and Direction

			Sampling Goals							COMPLETED						
Station	Station Unmerged	Dir	Early AM (3:30-6:00am)	AM Peak (6:01-9:00am)	Midday (9:01am-3:00pm)	PM Peak (3:01-6:00pm)	Late Night (6:01pm-12:00am)	Total	Total Surveys	Early AM (3:30-6:00am)	AM Peak (6:01-9:00am)	Midday (9:01am-3:00pm)	PM Peak (3:01-6:00pm)	Late Night (6:01pm-12:00am)	Total	Total Surveys
Theater District	Theater District	SOUTHBOUND	1	26	27	7	10	71	**94**	0	71	36	10	3	**120**	**120**
Central Station	Central Station	NORTHBOUND	0	1	2	2	2	7	**109**	0	2	4	3	4	**13**	**162**
	Central Station	SOUTHBOUND	2	12	31	13	16	74		2	42	51	35	19	**149**	
Convention District	Convention District	NORTHBOUND	0	1	3	2	2	8	**26**	0	1	4	10	2	**17**	**33**
	Convention District	SOUTHBOUND	0	2	4	3	3	12		0	4	1	7	4	**16**	
EaDo / Stadium	EaDo / Stadium	NORTHBOUND	0	1	3	3	1	9	**45**	0	2	7	10	4	**23**	**72**
	EaDo / Stadium	SOUTHBOUND	1	3	11	5	5	25		2	3	16	21	7	**49**	
Leeland / Third Ward	Leeland / Third Ward	NORTHBOUND	1	3	6	2	2	15	**31**	1	9	8	5	5	**28**	**46**
	Leeland / Third Ward	SOUTHBOUND	0	2	3	2	2	9		0	2	4	5	7	**18**	
Elgin / Third Ward	Elgin / Third Ward	NORTHBOUND	1	3	8	4	7	23	**56**	2	6	22	6	9	**45**	**72**
	Elgin / Third Ward	SOUTHBOUND	0	3	7	4	5	20		0	5	10	7	5	**27**	
TSU / UH ATHLETICS DISTRICT	Robertson Stadium / UH / TSU	NORTHBOUND	1	3	13	15	6	39	**81**	1	6	24	35	12	**78**	**173**
	Robertson Stadium / UH / TSU	SOUTHBOUND	0	2	6	10	3	22		1	3	4	80	7	**95**	
UH South / University Oaks	UH South / University Oaks	NORTHBOUND	0	3	18	23	12	55	**101**	1	7	35	46	16	**105**	**156**
	UH South / University Oaks	SOUTHBOUND	0	1	7	6	6	21		0	1	11	21	18	**51**	
MacGregor Park / MLK Jr.	MacGregor Park / MLK Jr.	NORTHBOUND	1	4	10	5	4	24	**37**	1	9	23	18	4	**55**	**61**
	MacGregor Park / MLK Jr.	SOUTHBOUND	0	0	1	2	0	4		0	1	1	2	2	**6**	
Palm Center Transit Center	Palm Center Transit Center	NORTHBOUND	5	18	32	12	10	77	**103**	6	36	59	26	6	**133**	133
		TOTAL	16	87	193	121	96	512	682	17	210	320	347	134	1,028	1,028

APPENDIX F: SECONDARY EXPANSION REPORT

Houston-Galveston Area Council (H-GAC)

2022 Regional Transit On-Board Survey SECONDARY EXPANSION TECHNICAL MEMORANDUM

February 2023

Final Draft

Prepared By:

Insight Transportation Consulting, Inc.

Insight
Transportation Consulting

Acronyms and Initialisms

Acronym / Initialism	Description
AM	Ante Meridiem (before morning)
APC	Automated Passenger Counts
ETC	ETC Institute
GTFS	General Transit Feed Specification
HBO	Home Based Other
HBW	Home Based Work
H-GAC	Houston-Galveston Area Council
HH	Household
Insight	Insight Transportation Consulting, Inc.
K&R	Kiss and Ride
METRO	Houston METRO (Mass Transportation System Operator)
NHB	Non-Home Based
O/D (or OD)	Origin/Destination
P&R	Park & ride or park & ride facility
PM	Post Meridiem (afternoon)
STOPS	Simplified Trips on Project Software
TAZ	Traffic Analysis Zone

Executive Summary

The Houston-Galveston Area Council (H-GAC) contracted ETC Institute (ETC) in 2021 to conduct a systemwide survey of transit services within its service region. ETC surveyed transit riders in 2022 on the eight transit agencies in the H-GAC area. ETC performed a primary expansion of the surveyed sample. Insight Transportation Consulting, Inc. (Insight) was tasked with performing a secondary expansion and review of the survey datasets.

Based on the survey-independent datasets provided by Houston METRO (METRO), secondary expansion could be performed in two areas: bike-access trips and Park & Ride (P&R) routes. The primary expansion produces 3.84 times the number of bike trips compared to counts collected by METRO. The expansion weights of bike trips are adjusted to match the observed bike counts for each route. The weights of non-bike records are adjusted so that the combined weight of all the survey records matches the total boardings for each route.

The P&R routes were surveyed in AM period only, representing inbound trips only, and the survey records were expanded to daily boardings. This process resulted in an incorrect representation of trips by direction, time period, and commuter trips. Therefore, new survey records, based on the AM period records, were created by "flipping" the inbound trip sequence. The PM period commuter trips were created by flipping the AM commuter trips. The weights of the survey records representing P&R routes adjusted to the time period. The secondary expansion provides a better representation of travel patterns by time period, direction, and commuter trip.

The secondary expansion is validated with a series of tests. First, the STOPS model provided by Houston METRO was updated with the 2022 onboard survey data and other current data, namely transit network (General Transit Feed Specification, or GTFS), P&R locations, ridership (route and stop level boardings), and onboard survey data. The transit level trips by Trip Purpose, Auto Ownership, and Access Mode from the secondary expansion of the onboard survey were compared with the results from the updated STOPS model with automated calibration procedures turned off. The purpose of this test is to verify that the survey dataset can produce reasonable representations of transit travel patterns, but not to develop a STOPS model ready for use in Capital Investment Grant studies. The regional calibration factor for the 2022 STOPS model is 0.96, indicating that the model overestimates transit trips by 4%. This is a very good result considering many other input files, such as population and employment data and auto travel times, were not updated to 2022.

The second test is to check whether the secondary expansion by bike-access/egress trips had significantly altered the surveyed distances of bike-access lengths. This issue is significant as the STOPS software does not differentiate bike-access trips from walk, P&R, or Kiss and Ride (K&R) access trips. The straight-line distance between the origin location and the first boarding stop is estimated for all the bike-access trips from the survey. The secondary expansion corrected the overestimation of the bike trips in the primary expansion while maintaining the bike-access length

distribution.

Finally, decomposition analysis is carried out on the onboard survey from secondary expansion. Decomposition analysis is the process of evaluating onboard survey expansion by breaking down the transit trips into segments, each representing a part of the trip on different route. This analysis evaluates the accuracy of transfer activity to assess sampling bias that might understate transfers on some routes while overstating on other routes. The decomposition analysis shows that the route-level boardings after expansion vary from the observed boardings, but the system-level transfer trips were not affected by the secondary expansion. Similar decomposition analysis is conducted on the METRO P&R routes for the AM period, as the primary expansion of the P&R routes is focused on AM period inbound boardings. The decomposition analysis shows that boardings on the P&R routes are two percent less than the observed AM boardings on the P&R routes, indicating that the transfer boardings are not adversely affected by the secondary expansion.

(1) Survey Expansion Overview

The Houston-Galveston Area Council (H-GAC) contracted ETC in 2021 to conduct a systemwide survey of transit services within its service region. ETC conducted the survey in 2022 covering the eight transit agencies in the H-GAC area. ETC performed a primary expansion of the surveyed sample and Insight Transportation Consulting, Inc. (Insight) was tasked with performing a secondary expansion of the sample.

Table 1.1 presents the list of transit agencies in H-GAC area and the summary of the survey conducted by ETC.

Table 1.1 Summary of Surveys Conducted by ETC

#	Transit Agency	Number of Survey Responses	Number of Boardings from Primary expansion	Percentage of Systemwide Boardings
1	Brazos Transit District	16	30	0.02%
2	Conroe Connection	63	75	0.05%
3	Fort Bend Transit	75	483	0.30%
4	Gulf Coast Transit District	360	911	0.56%
5	Harris County Transit	200	492	0.30%
6	Island Transit	253	913	0.56%
7	Houston METRO (METRO)	15,890	158,678	97.37%
8	The Woodlands	193	1,379	0.85%
Total		17,050	162,961	100.00%

What is Sample Expansion?

Sample expansion is the process of weighting the sample to match observed counts, as expressed in the following formula:

$$Weight_{xyz} = \frac{Count_{xyz}}{Sample_{xyz}}$$

Where $Count_{xyz}$ is the observed count for attributes x, y, and z (an attribute could be a route, direction, time of day period, etc.), $Sample_{xyz}$ is the number of samples (records) collected given the attributes x, y, and z and the $Weight_{xyz}$ is the computed weight (expansion factor) applied to the samples with attributes x, y, and z.

During survey fieldwork, samples are collected in a manner that reduces the likelihood of response bias. Response bias occurs when samples are collected at different participation rates. While great strides have been made by ETC in reducing response bias, it cannot be eliminated due to logistical constraints, rider response (e.g., some riders systematically prefer not to answer surveys), random chance (e.g., some riders who would respond to the survey are sick during the survey fieldwork), and other reasons.

What is Secondary Expansion?

A secondary expansion builds upon the primary expansion by re-expanding the sample across additional dimensions such as mode of access/egress, Park & Ride (P&R) trips, students, etc. This correction helps the survey dataset to represent known travel patterns more closely. The secondary expansion corrects for differences in response rates across markets that are not easily addressed in other ways. A common example is university students, who generally participate in surveys at a higher rate than the general population. Consequently, a traditional expansion of the survey records would typically overestimate university student ridership. Essentially, a secondary expansion "fine-tunes" the primary expansion to more accurately reflect the travel markets misrepresented by the primary expansion.

Insight uses one of three methods as part of the secondary expansion process depending on the issues found in the primary expansion and available auxiliary datasets. The preferred method can depend on:

(2) The desired breakdown of rider and/or trip types that the survey records should match,
(3) The extent of response bias in the collected dataset, and
(4) The ancillary data available for use for the rider/trip types.

The method used for the H-GAC 2022 survey follows the first method of expansion, which is dividing counts by the number of records collected. Table 1.2 presents an example of this process, where a route with 800 boardings per average weekday is surveyed. Assuming the route has counts by student/non-student via electronic fare card data, this method can correct the over-sampling of university students (typically an over-estimated group for routes near major universities) and the route can be expanded to the correct number of trips by rider type. In this example, the transit riders are categorized to university students and others who are expected to have their respective fares.

Table 1.2 Example explaining Standard Expansion Process

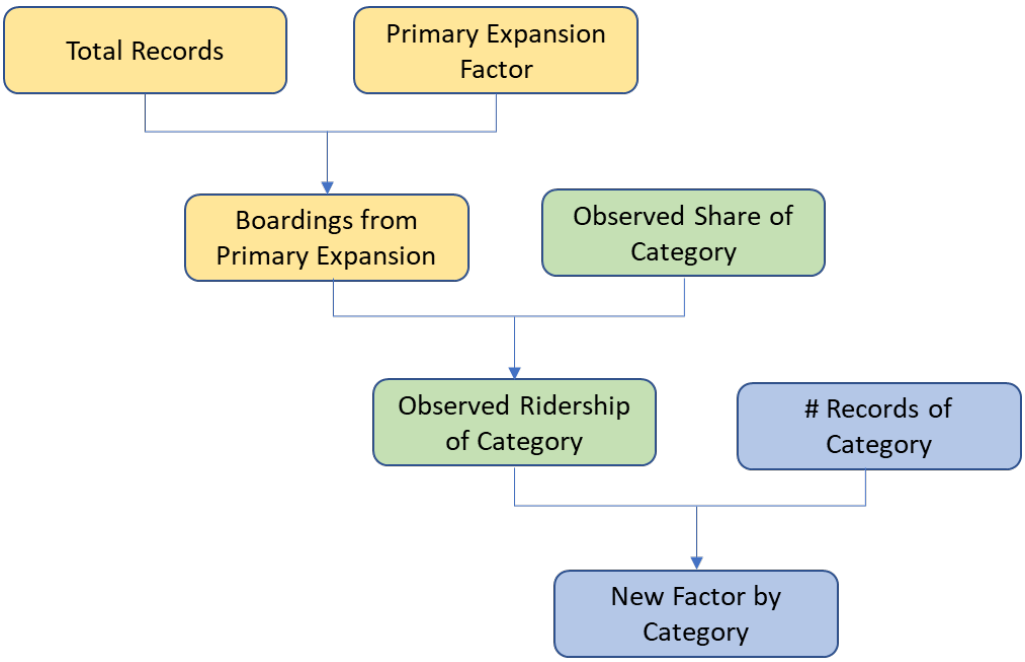
	Survey Records in Collected Dataset	Primary Expansion Factor	Estimated Boardings (from Primary Expansion)	Fare Card Counts	Expansion Factors	Estimated Boardings (Secondary Expansion)
University Students	50	10.0 (= 800 / 80)	500	250	5.0 (=250/50)	250
All Other Rider Types	30		300	550	18.3 (=550/30)	550
Total	80		800	800		800

The method is straightforward and easy to apply. However, it assumes that all rider/trip types are present in the collected dataset, since expansion weights cannot be computed for the rider/trip categories that do not exist in the dataset. Also, these computations can become unwieldy with more than 3-4 rider/trip types beyond those used in the primary expansion.

In some cases, the available auxiliary datasets (like fare card data) are from different time periods than the data used during primary expansion. So, we use the auxiliary datasets to establish the share of different rider categories, while maintaining total ridership unchanged. In such a case, the ridership by category (same as fare card counts in Table 1.1) is obtained by multiplying total ridership with the observed shares by category type from the auxiliary dataset.

Figure 1.1 summarizes this process of expansion.

Figure 1.1 Secondary Expansion Workflow



(2) Methodology

The following steps were performed to successfully conduct a secondary expansion:

(1) Collect data independent of survey on routes, travel patterns, or rider types of interest,
(2) Calculate the number of observed trips from the independent dataset,
(3) Calculate the number of corresponding trips from the survey's primary expansion,
(4) Compare the results of steps (2) and (3) and determine if a secondary expansion adjustment is warranted,
(5) Modify expansion weights to reflect the travel patterns or rider types more accurately (i.e., perform secondary expansion), and
(6) Compare primary and secondary results to verify that the secondary expansion was performed correctly.

Based on the survey-independent datasets provided by Houston METRO (METRO), it was determined that a secondary expansion could be performed in two areas: bike-access/egress trips and P&R routes. Bike-access/egress trips are those that travel by bicycle between the bus (or transit vehicle) and their origin/destination. P&R routes operate between P&R lots and major employment areas with some interim stops in-between.

The detailed methodology of conducting the secondary expansions for these two markets in described in this chapter.

Bicycle Trips

METRO provided bike trip counts by bus route for each month between August 2015 and July 2022, inclusive. Operators count riders who board buses reached by bicycle.

The average daily bike-access counts by route are estimated by averaging the monthly bike-access counts between March to May 2022 and by applying prorated annualization factor[1] for

[1] The Annualization factor is a parameter to convert annual ridership to average daily ridership. In transit studies, it implies the number of average days the transit agency should be operational to achieve annual ridership. The annualization factors can be obtained from the transit agency profiles published by National Transit Database (NTD). In this study, as the bike-access data is available for three months, the prorated annualization factor is estimated for those three months (92 days).

the same period. These months are the same months the survey fieldwork was conducted. The total number of bicycle trip counts for the three months is 41,713, which equates to 543 average weekday bike-access trips on all METRO bus routes. The combined weighted boardings on all records from the primary expansion with bike-access/egress were 2,084. This indicated that bike-access trips are over-stated significantly – 3.84 times actual counts – in the primary expansion and should be corrected to match the observed counts.

Table 2.1 provides the average weekday bike counts on all the METRO bus routes.

Table 2.1 Observed Average Weekday Bike Boardings from Bike Count Data

Route	Ridership		
	Total Boardings (APC) [1]	**Bike Trip Boardings (from METRO Counts) [2]**	**Non-Bike Trip Boardings [3] = [1] – [2]**
2	4,374	14	4,360
3	795	5	790
4	5,258	27	5,232
5	797	3	794
6	2,127	16	2,111
7	538	1	536
8	2,143	7	2,136
9	1,493	4	1,490
10	513	1	512
11	1,566	10	1,556
14	1,239	3	1,236
20	1,278	4	1,274
23	258	1	256
25	4,504	19	4,485
26	2,074	16	2,058
27	1,727	7	1,720
28	1,758	8	1,750
29	2,016	16	2,001
30	465	2	463
32	1,231	4	1,227
36	1,085	7	1,078
38	108	0	107
39	135	0	134
40	2,417	22	2,395
41	868	2	866
44	1,372	11	1,361

Route	Ridership		
	Total Boardings (APC) [1]	Bike Trip Boardings (from METRO Counts) [2]	Non-Bike Trip Boardings [3] = [1] – [2]
45	2,571	12	2,559
46	4,284	20	4,264
47	2,047	2	2,045
48	345	1	344
49	1,651	5	1,646
50	1,309	6	1,303
51	399	1	397
52	1,313	9	1,304
54	3,583	17	3,566
56	3,658	23	3,635
58	341	2	339
59	284	1	282
60	1,009	1	1,009
63	2,559	11	2,548
64	51	0	51
65	4,075	13	4,062
66	212	1	211
67	312	1	311
68	1,430	8	1,422
70	168	0	168
72	223	0	223
73	2,709	17	2,692
75	369	2	367
76	748	3	745
77	323	1	322
78	275	1	275
79	326	0	326
80	2,397	18	2,379
82	7,765	44	7,721
83	210	2	208
84	840	1	839
85	3,927	20	3,907
86	1,659	12	1,647
87	441	1	440
88	838	4	834
89	143	1	142
96	724	5	719

Route	Ridership		
	Total Boardings (APC) [1]	Bike Trip Boardings (from METRO Counts) [2]	Non-Bike Trip Boardings [3] = [1] – [2]
97	299	2	297
98	218	0	218
99	1,237	8	1,229
102	2,062	8	2,054
108	396	1	395
137	1,683	14	1,669
151	276	0	276
152	1,145	6	1,138
153	1,928	8	1,920
160	240	0	239
161	1,827	12	1,815
162	581	1	580
170/171	539	0	539
202	624	0	623
204	548	0	548
216	890	0	889
217	1,091	0	1,091
222	1,542	0	1,542
228	1,204	0	1,204
236/237	191	0	191
244	472	0	472
247	634	0	634
259	832	0	832
269	1,229	0	1,229
291	52	0	52
292	304	0	304
297	624	0	624
298	972	0	971
309	235	0	234
310	190	0	190
344	40	0	40
360	149	0	149
363	11	0	11
399	135	0	134
402	296	1	294
418	112	0	112
433	729	0	728

Route	Ridership		
	Total Boardings (APC) [1]	Bike Trip Boardings (from METRO Counts) [2]	Non-Bike Trip Boardings [3] = [1] – [2]
Total	123,191	543	122,648

Adjustments to the survey record weights are performed to both the bike-access and non-bike-access trip records. First, the weights of the bike-access survey records are adjusted to match the observed route-level bike trip counts. Next, the weights of the non-bike survey records are adjusted to match the remainder of the Automated Passenger Counts (APC counts). The adjusted weights are estimated for the bike and non-bike trip records using the following formulae:

$$Adjusted\ Weight_{RBi} = \frac{Bike\ count_R}{\sum Initial\ Factor_{RB}}\ x\ Initial\ Weight_{RBi}\ (1)$$

$$Adjusted\ Weight_{RNi} = \frac{(APC_R - \sum Adjusted\ Weight_{RB})}{APC_{RN}}\ x\ Initial\ Weight_{RNi}\ (2)$$

Where $'\boldsymbol{R}'$ is the route, $'\boldsymbol{B}'$ is a bike trip, $'\boldsymbol{N}'$ is a non-bike trip, $'\boldsymbol{i}'$ is survey record, $'\boldsymbol{Initial\ Weight}'$ is the primary expansion weight, and $'\boldsymbol{Adjusted\ Weight}'$ is the revised expansion weight.

As a result, the weights are adjusted so that the total weight boardings of bike trip records match the observed bike counts for each route. The weights of non-bike trip records are adjusted correspondingly so that the combined weight of all survey records matches the total boardings for each route.

Table 2.2 provides an example of the step-by-step process of the secondary expansion process for bike trips. The primary expansion weights are the ratio of APC boardings and the number of survey records representing route, direction, and time of day. In the secondary expansion, the boardings are split into bike and non-bike boardings categories, by using bike counts. The non-bike counts are the difference between APC boardings and bike counts. The secondary weights

are the ratio of the bike (or non-bike counts) to the corresponding number of records representing the segment.

Table 2.2 Example of Secondary Expansion Methodology Adopted for METRO Routes

For each Route	APC Boardings (1)	# Survey records (2)	Primary Expansion Weight (3) = (1) / (2)	Adjustment of Boardings using Bike Counts (4)	Secondary Expansion Weight (5) = equation (1 & 2)
Bike	100	4	5 (=100/ (4+16))	10 (Observed count)	2.5 (= 5 x10/(4x5))
Non-Bike (Total – Bike)		16		90 (100-10) (Adjusted count)	5.625 (= 5 x 90 / (16x5))

The secondary expansion is carried out on non-P&R METRO routes with survey records that recorded bike as the access or egress mode. Table 2.3 presents the comparison of survey boardings by primary and secondary expansion for the non-P&R routes expanded by using the bike counts.

Table 2.3 Comparison of Survey Boardings by Primary and Secondary Expansions

Route	APC Boardings	Primary Expansion			Bike Trip Counts	Secondary Expansion		
		Bike Boardings	Non-Bike Boardings	Total Boardings		Bike Boardings	Non-Bike Boardings	Total Boardings
Routes Adjusted by Bike Counts								
2	4,374	95	4,279	4,374	14	14	4,360	4,374
3	795	9	786	795	5	5	790	795
4	5,258	90	5,169	5,258	27	27	5,232	5,258
5	797	11	786	797	3	3	794	797
6	2,127	56	2,071	2,127	16	16	2,111	2,127
8	2,143	69	2,074	2,142	7	7	2,136	2,143
9	1,493	9	1,484	1,493	4	4	1,490	1,493
10	513	30	483	513	1	1	512	513
20	1,278	16	1,262	1,278	4	4	1,274	1,278
25	4,504	78	4,426	4,504	19	19	4,485	4,504
26	2,074	60	2,013	2,074	16	16	2,058	2,074
28	1,758	50	1,707	1,757	8	8	1,750	1,758
29	2,016	34	1,982	2,016	16	16	2,001	2,016
30	465	15	450	465	2	2	463	465
32	1,231	32	1,199	1,231	4	4	1,227	1,231
36	1,085	19	1,066	1,085	7	7	1,078	1,085
40	2,417	79	2,337	2,417	22	22	2,395	2,417
44	1,372	44	1,328	1,372	11	11	1,361	1,372

Route	APC Boardings	Primary Expansion			Bike Trip Counts	Secondary Expansion		
		Bike Boardings	Non-Bike Boardings	Total Boardings		Bike Boardings	Non-Bike Boardings	Total Boardings
45	2,571	77	2,494	2,571	12	12	2,559	2,571
46	4,284	135	4,149	4,284	20	20	4,264	4,284
47	2,047	41	2,006	2,047	2	2	2,045	2,047
48	345	8	337	345	1	1	344	345
49	1,651	9	1,643	1,651	5	5	1,646	1,651
50	1,309	18	1,290	1,309	6	6	1,303	1,309
52	1,313	24	1,288	1,313	9	9	1,304	1,313
54	3,583	91	3,492	3,583	17	17	3,566	3,583
56	3,658	21	3,637	3,658	23	23	3,635	3,658
58	341	6	336	341	2	2	339	341
63	2,559	4	2,555	2,559	11	11	2,548	2,559
65	4,075	43	4,032	4,075	13	13	4,062	4,075
68	1,430	11	1,419	1,430	8	8	1,422	1,430
70	168	3	165	168	-	-	168	168
72	223	5	219	223	-	-	223	223
73	2,709	60	2,649	2,709	17	17	2,692	2,709
76	748	3	745	748	3	3	745	748
78	275	6	269	275	1	1	275	275
79	326	23	304	326	-	-	326	326
80	2,397	7	2,390	2,397	18	18	2,379	2,397
82	7,765	179	7,586	7,765	44	44	7,721	7,765
84	840	14	826	840	1	1	839	840
85	3,927	105	3,822	3,927	20	20	3,907	3,927
86	1,659	77	1,582	1,659	12	12	1,647	1,659
88	838	29	809	838	4	4	834	838
89	143	2	141	143	1	1	142	143
97	299	9	290	299	2	2	297	299
98	218	5	213	218	-	-	218	218
99	1,237	34	1,203	1,237	8	8	1,229	1,237
102	2,062	38	2,024	2,062	8	8	2,054	2,062
152	1,145	64	1,080	1,145	6	6	1,138	1,145
160	240	14	226	239	-	-	239	240
161	1,827	50	1,777	1,827	12	12	1,815	1,827
162	581	9	573	581	1	1	580	581
309	235	6	228	235	-	-	234	235
402	296	16	279	296	1	1	294	296
433	729	11	718	729	-	-	728	729

Route	APC Boardings	Primary Expansion			Bike Trip Counts	Secondary Expansion		
		Bike Boardings	Non-Bike Boardings	Total Boardings		Bike Boardings	Non-Bike Boardings	Total Boardings
Other Non-P&R Routes								
7	538	-	538	538	1	-	538	538
11	1,566	-	1,566	1,566	10	-	1,566	1,566
14	1,239	-	1,239	1,239	3	-	1,239	1,239
23	258	-	257	257	1	-	257	257
27	1,727	-	1,727	1,727	7	-	1,727	1,727
38	108	-	108	108	-	-	108	108
39	135	-	135	135	-	-	135	135
41	868	-	868	868	2	-	868	868
51	399	-	399	399	1	-	399	399
59	284	-	284	284	1	-	284	284
60	1,009	-	1,009	1,009	1	-	1,009	1,009
64	51	-	51	51	-	-	51	51
66	212	-	212	212	1	-	212	212
67	312	-	312	312	1	-	312	312
75	369	-	369	369	2	-	369	369
77	323	-	323	323	1	-	323	323
83	210	-	210	210	2	-	210	210
87	441	-	441	441	1	-	441	441
96	724	-	724	724	5	-	724	724
108	396	-	396	396	1	-	396	396
137	1,683	-	1,683	1,683	14	-	1,683	1,683
151	276	-	276	276	-	-	276	276
153	1,928	-	1,928	1,928	8	-	1,928	1,928
310	190	-	190	190	-	-	190	190
360	149	-	149	149	-	-	149	149
399	135	-	135	135	-	-	135	135
Total	111,280	2,052	109,228	111,280	541	476	110,804	111,280

Park & Ride (P&R) Routes

The P&R routes were surveyed in the AM period only (i.e., Early AM and AM peak periods), and the resulting survey records were expanded to daily boardings in the primary expansion. This process causes

an incorrect representation of trips by direction and by commuter[2] trips:

- By direction: because the surveys were collected in the AM period only, virtually all surveyed records reflect movements in the inbound direction only. APC data strongly indicates that P&R trips travel predominantly inbound in the morning and outbound in the evening.
- By time period: because the surveys, collected in the AM period, were expanded to average weekday counts, the survey dataset shows that 100% of trips on P&R routes occur in the AM period. APC counts indicate that under 50% of all P&R trips occur in the AM period.
- By commuter trips[2]: because the surveys were collected in the AM period, the sample contains a larger proportion of commuter trips (i.e., work trips) than the APC data indicates. This overstates the amount of commuter trips in the primary expansion by 7%.

Adjustments to survey records from P&R records is warranted given these findings. Two adjustments were made. First, outbound survey records were created by "flipping" the inbound AM period records. Essentially, the origin location, access mode, route sequence, egress mode, and destination locations in the AM peak period inbound direction are used as the (in order) the destination location, egress mode, reversed route sequence, access mode, and origin location of the outbound (return) direction of the trip in the PM peak period. The bus stops in the inbound and outbound directions are also "flipped" as the bus route passes through the one-way segments in the urban areas. If a stop is on a one-way road, urban boardings and alighting locations are assigned the nearest stop in the opposite direction. These outbound records ("flipped records") are assumed to occur in the PM period. The survey record identifiers of the "flipped" trip records are represented with "_R" suffix. Any socio-demographic information is unchanged.

Next, the weights of the survey records were adjusted to reflect APC boardings by time period (AM), stop, and route. The adjusted factors are estimated using the following formula:

$$Adjusted\ Weight_{RTS} = \frac{Boardings_{RTS}}{Number\ of\ Records_{RTS}}$$

Where '$\boldsymbol{R}$' is the route, '$\boldsymbol{T}$' is time of day, '$\boldsymbol{S}$' is boarding stop/station, and '$\boldsymbol{Adjusted\ Weight}$' is the revised expansion factor.

Next, the weights of the "flipped" outbound trips in the PM peak period are adjusted to match the observed boardings of PM peak period commuter trips, by using the following formula:

$$Adjusted\ New\ Weight_{RPS} = \frac{Adjusted\ Weight_{RPS}\ x\ Total\ PM\ Commuter\ Boardings}{\sum_{RPS} Adjusted\ Weight_{RPS}}$$

[2] Trips boarding or alighting at a P&R lot are considered as commuter trips.

Where '$\boldsymbol{R}$' is the route, '$\boldsymbol{P}$' is PM period, '$\boldsymbol{S}$' is boarding station, and '$\boldsymbol{Adjusted\ Weight}$' is the expansion factor from previous step, '$\boldsymbol{Total\ PM\ Commuter\ Boardings}$' is the total number of PM commuter boardings observed from the APC data.

The on-board survey has similar constraint for the short trips[3] in the AM and PM period. The survey does not capture all the O/D pairs between the non-P&R and non-major activity centers. So, the non-commuter trips are also adjusted to match the observed number of short trips.

$$Adjusted\ New\ Weight_{RS} = \frac{Adjusted\ Weight_{RSS}\ x\ Total\ Short\ Trips}{\sum_{RPS} Adjusted\ Weight_{RS}}$$

Where '$\boldsymbol{R}$' is the route, '$\boldsymbol{S}$' is boarding station, and '$\boldsymbol{Adjusted\ Weight}$' is the expansion factor from previous step, '$\boldsymbol{Total\ Short\ Trips}$' are the total number of observed boardings that does not count as commuter trips.

Table 2.4 presents the summary of P&R observed boardings, primary expansion boardings, and secondary expansion boardings by time period and trip type. The secondary expansion provides a better representation of travel patterns by time period, direction, and commuter trip. However, two gaps are maintained due to the absence of survey records in selected segments: (1) the absence of midday commuter trips and (2) the mid-day short trips are allocated to the AM and PM periods.

Table 2.4 P&R Route Ridership by Market

Ridership Segment	Observed Boardings (APC data)	Primary Expansion	Adjustments in Secondary Expansion
Commuter Market			
AM period trips	5,360 (Boardings at P&R lot)	11,485	5,376 (Boarding or Alighting at P&R lot)
Midday period trips	37	--	--
PM period (or reverse) trips[4]	5,293	--	5,293
Total Commuter trips	**10,690**	**11,485**	**10,669**
Short Trip[3] Market			

[3] Trips other than the commuter trips are defined as short trips because they mostly occur between P&Rs and major activity centers, which are much shorter-distance trips than the commuter trips using the P&R routes.
[4] AM period commuter trips are reversed to represent PM period commuter trips in the secondary expansion.

Ridership Segment	Observed Boardings (APC data)	Primary Expansion	Adjustments in Secondary Expansion
AM period trips	510	263[5]	529[5]
Midday	257	--	--
PM period (or reverse) trips	291	--	529[5]
Total non-commute trips	**1,058**	**263**	**1,058**
Total boardings	**11,748**	**11,748**	**11,727**

Table 2.5 presents the comparison of P&R route boardings before and after the secondary expansion.

Table 2.5 Comparison of P&R route boardings Before and After Secondary Expansion

Route	APC Boardings (Average Weekday)	Primary Expansion			Secondary Expansion			Difference in Total Boardings
		Commuter Boardings	Short Trip Boardings	Total Boardings	Commuter Boardings	Short Trip Boardings	Total Boardings	
202	624	552	71	623	552	71	623	0
204	548	459	90	548	366	148	514	34
216	890	704	186	890	795	274	1,070	(180)
217	1,091	987	104	1,091	965	137	1,102	(11)
222	1,542	1,377	165	1,542	1,319	226	1,545	(3)
228	1,204	1,057	148	1,204	1,056	170	1,226	(22)
244	472	350	122	472	303	210	513	(41)
247	634	542	92	634	477	60	537	97
259	832	636	196	832	592	357	949	(117)
269	1,229	1,158	71	1,229	1,013	60	1,074	155
291	52	45	7	52	43	8	51	1
292	304	248	56	304	246	50	296	8
297	624	596	27	624	383	152	535	89
298	972	756	216	972	628	241	869	103

[5] The survey does not have records representing all the short trips. So, the total short trips are adjusted within the available short trip records.

Route	APC Boardings (Average Weekday)	Primary Expansion			Secondary Expansion			Difference in Total Boardings
		Commuter Boardings	Short Trip Boardings	Total Boardings	Commuter Boardings	Short Trip Boardings	Total Boardings	
170/171	539	380	159	539	435	208	643	(104)
236/237	191	118	73	191	104	76	180	11
Total	**11,748**	**9,965**	**1,783**	**11,748**	9,277	2,450	11,727	20

(3) Validation

This chapter presents a series of tests to verify that the 2022 survey dataset can produce reasonable representations of transit travel patterns in the Houston region, and that secondary expansion adjustments did not adversely distort the travel patterns observed in the primary expansion.

Applying the 2022 Dataset to the METRO STOPS model

METRO provided Insight with the existing Simplified Trips on Project Software (STOPS) model of the Houston region. This model uses STOPS version 2.51-02/25/2022 and was based on 2019 transit operations and ridership.

Insight updated this model to include:

- A trip table reflecting the 2022 survey dataset after the secondary expansion,
- Transit networks reflecting the survey period, and
- Stop-level counts from the survey period.

The purpose of this update is to verify that the survey dataset can produce reasonable representations of transit travel patterns in the Houston region without significant adjustments. This update is focused on assessing the reasonableness of the 2022 survey trip table, not developing a STOPS model ready for use in Capital Investment Grant studies.

Table 3.1 presents the summary of updates made by Insight to the STOPS model provided by the Houston METRO.

Table 3.1 Summary of Changes to Update STOPS Model

Data / Parameter	STOPS Model from METRO ["2019 STOPS Model"]	STOPS model from METRO with 2022 Ridership and Survey Trip Table ["2022 STOPS Model"]
STOPS Version	Version 2.51 – 02/05/2022	Version 2.51 – 02/05/2022
GTFS Network	October 2019	April 2022
P&R Locations	From 2019 data received from METRO	Retained the P&R lots observed in the survey. 16 P&R lots from 2019 were removed.
Route level counts	From 2019 data received from METRO	Route level APC boardings used in the survey expansion (Average of March to May 2022)
Stop stations shapefile	From 2019 data received from METRO	Updated to match GTFS network and stop level boardings used in survey expansion (APC boardings used for secondary expansion)

Data / Parameter	STOPS Model from METRO ["2019 STOPS Model"]	STOPS model from METRO with 2022 Ridership and Survey Trip Table ["2022 STOPS Model"]
Trip table	Trip table from the secondary expansion of older on-board survey, probably 2018 or 2019	Trip table from the Secondary expansion of the onboard survey
Target unlinked trips	301,992	161,350
Target trips by market segment*		
HBW – 0Car	29,569	23,677
HBW – 1Car	43,370	24,170
HBW – 2Car	49,595	21,855
HBW – All Car	122,534	69,702
HBO – 0Car	33,353	21,913
HBO – 1Car	26,590	12,393
HBO – 2Car	22,323	6,819
HBO – All Car	82,265	41,125
NHB – 0Car	8,058	4,993
NHB – 1Car	6,498	2,792
NHB – 2Car	5,743	2,152
NHB – All Car	20,379	9,937
Total	225,099	120,764

** HBO – Home Based Other, HBW – Home Based Work, NHB – Non Home Based*

To assess whether the 2022 trip table and other transit data can be used effectively, the 2022 STOPS model was run with the automated calibration procedures turned off. When STOPS is run with these procedures turned off, the STOPS model results reflect only the accuracy of the trip table and the associated transit data.

With automated calibration procedures turned off, the 2022 STOPS model procedures the following results (in part summarized in Table 3.2):

- The regional calibration factor estimated by STOPS, represents the extent of the STOPS results matches with the observed conditions. A regional calibration of 1.00 is preferred. The regional calibration factor of the 2019 STOPS model with automated calibration procedures turned off is 1.00, indicating that the model results are close to the 2019 conditions after, presumably, manual calibration efforts have succeeded to improve results. The regional calibration factor from the 2022 STOPS model is 0.96 with automated calibration procedures turned off, indicating the model overestimates regional transit boardings by 4%. This is a very good result without calibration procedures, without manual calibration efforts, and without updating the other input data (like walk links, zoning system, demographic information, TAZ to TAZ auto travel

times and travel costs) to accurately represent 2022 conditions.

- Understates walk-access trips by approximately 14,000 trips (~14%) compared to the survey. This is not an uncommon result with calibration procedures turned off.

- Produces nearly the identical number of K&R-access trips as the survey. This is an exceptionally good result.

- Overstates P&R-access trips by approximately 6,500 trips (~75%) compared to the survey. This is not a bad result with calibration procedures turned off.

Overall, these results are very good given that calibration procedures turned off. They indicate that the STOPS model can be easily calibrated for Capital Investment Grant or other planning studies. Further calibration of the 2022 STOPS model will need to be completed by those conducting those studies.

Table 3.2 Comparison of Transit Trip Breakdown by Trip Purpose, Auto Ownership of Household (HH) and Access Mode

Purpose	Market Segment	Access Mode	Transit Trips	
			Secondary expansion of onboard survey	2022 STOPS model (Automated Calibration Turned Off)
HBW	0 car HH	Walk Access	22,393	21,064
		K&R Access	902	457
		P&R Access	141	316
		All Access	23,436	21,836
	1 car HH	Walk Access	19,821	16,931
		K&R Access	1,028	1,144
		P&R Access	2,869	4,169
		All Access	23,718	22,245
	2+ car HH	Walk Access	14,935	9,304
		K&R Access	1,031	779
		P&R Access	4,540	9,572
		All Access	20,506	19,656
	All car HH	Walk Access	57,148	47,299
		K&R Access	2,961	2,380
		P&R Access	7,551	14,058
		All Access	67,660	63,737
HBO	0 car HH	Walk Access	20,700	19,411
		K&R Access	523	644
		P&R Access	43	106

Purpose	Market Segment	Access Mode	Transit Trips	
			Secondary expansion of onboard survey	2022 STOPS model (Automated Calibration Turned Off)
		All Access	21,266	20,161
	1 car HH	Walk Access	11,353	10,742
		K&R Access	420	756
		P&R Access	325	264
		All Access	12,099	11,762
	2+ car HH	Walk Access	6,035	5,243
		K&R Access	234	489
		P&R Access	206	291
		All Access	6,474	6,023
	All car HH	Walk Access	38,088	35,396
		K&R Access	1,176	1,889
		P&R Access	574	662
		All Access	39,839	37,947
NHB	0 car HH	Walk Access	4,951	4,447
		K&R Access	171	197
		P&R Access	21	20
		All Access	5,142	4,663
	1 car HH	Walk Access	2,600	2,353
		K&R Access	129	192
		P&R Access	74	36
		All Access	2,804	2,580
	2+ car HH	Walk Access	1,860	5,243
		K&R Access	67	489
		P&R Access	85	291
		All Access	2,012	6,023
	All car HH	Walk Access	9,412	8,050
		K&R Access	367	460
		P&R Access	180	101
		All Access	9,958	8,612
Total	0 car HH	Walk Access	48,044	44,922
		K&R Access	1,596	1,298
		P&R Access	205	442
		All Access	49,845	46,660
	1 car HH	Walk Access	33,775	30,026
		K&R Access	1,577	2,092
		P&R Access	3,269	4,469
		All Access	38,620	36,587

Purpose	Market Segment	Access Mode	Transit Trips	
			Secondary expansion of onboard survey	2022 STOPS model (Automated Calibration Turned Off)
	2+ car HH	Walk Access	22,830	19,790
		K&R Access	1,331	1,757
		P&R Access	4,831	10,154
		All Access	28,992	31,702
	All car HH	Walk Access	104,648	90,745
		K&R Access	4,504	4,729
		P&R Access	8,305	14,821
		All Access	117,457	110,296

Bike-Access Lengths

The purpose of this test is to assess whether the adjustments to bike-access trips described in Section 2.1 significantly altered the surveyed distances of bike-access trips. This test also informs future decisions on how to classify bike-access trips in STOPS. STOPS currently does not have customized features to differentiate bike-access trips from walk, K&R, or P&R trips in model calibration and forecasting. Reviewing the distances of bike-access trips can help determine whether they should be classified as walk-access trips (with a maximum distance of 1.5 miles) or K&R-access trips (up to 3 miles).

The straight-line distance between the origin location and the first boarding stop is computed for all the bike-access trips from the survey. Table 3.3 presents the distribution of bike-access/egress lengths. It shows that the secondary expansion maintains the distribution of bike-access lengths.

Table 3.3 shows that over 90% of bike-access trips have an access length of 1.5 miles or less. Since the STOPS' maximum walk-access distance is 1.5 miles, bike-access trips could be allocated to walk-access trips for STOPS model development and calibration.

Table 3.3 Distribution of Bike Trip (Access/Egress) Lengths

Bike-Access/Egress Length (in miles)		Primary expansion		Secondary expansion	
		Bike Boardings	Share of Bike Boardings	Bike Boardings	Share of Bike Boardings
0	0.25	1,141	56%	269	57%
0.25	0.5	299	15%	83	17%
0.5	1	374	18%	83	17%
1	1.5	84	4%	17	4%
1.5	2	36	2%	5	1%

Bike-Access/Egress Length (in miles)		Primary expansion		Secondary expansion	
		Bike Boardings	Share of Bike Boardings	Bike Boardings	Share of Bike Boardings
2	3	22	1%	3	1%
3	5	33	2%	2	0%
5	10	47	2%	11	2%
10	20	16	1%	4	1%
20	25	0	0%	0	0%
25	30	0	0%	0	0%
Total		2,052	100%	476	100%

Decomposition Analysis

A decomposition analysis is the process of breaking down the transit trips into components, representing trip segments on different route called link-level segments. In ideal case, an expanded onboard survey should provide similar ridership with decomposition. However, due to the sampling bias it is almost impossible to have same ridership after decomposition. So, a systemwide ridership difference less than 5% is preferred and less than 10% is acceptable in decomposition analysis. This analysis is used to evaluate the accuracy of transfer activity to assess sampling bias that might understate transfers on some routes while overstating the other routes. This test is performed to ensure the secondary expansion procedures were correctly executed. It serves as a procedural quality control check on the secondary expansion computations and procedures.

In the survey expansion, unlinked weights for each record are estimated to represent the system-wide boardings. The survey captures all the legs of the trip that a rider takes before and after the route on which the survey was recorded. The route on which the survey is conducted is called surveyed route and the route from which the rider transferred on to the surveyed route is called the transfer route. The total boardings (sum of surveyed route boardings and transferred route boardings) are compared to the observed APC boardings.

Table 3.4 presents the decomposition analysis of the H-GAC onboard survey after secondary expansion. The route-level boardings after expansion vary from the observed boardings, which is to be expected with onboard surveys, but the system-wide boardings are 2% less than the observed boardings. This is typical of most decomposition analysis results.

Next, the decomposition analysis of the secondary expansion (shown in Table 3.4) is compared with the decomposition analysis of the primary expansion provided by the ETC (provided as reference in the Technical Appendix).

Table 3.5 presents the comparison of the two decomposition analyses. Almost all the differences between the two decomposition analyses are less than ±5%. Differences larger than ±5% are mostly from routes with ≤1,000 boardings except for Route 269. These results indicate that the secondary expansion did not impact the survey's representation of transfers.

A final decomposition analysis is conducted for the METRO P&R routes for the AM peak period, since the primary expansion of the P&R routes is focused on AM period inbound boardings. Table 3.6 presents the decomposition analysis on the METRO P&R routes for the AM peak period. Table 3.6 shows that boardings on the P&R routes are two percent less than the observed AM boardings on the P&R routes, with minor differences on individual routes. This also indicates that the transfer boardings on P&R trips in the AM peak period are not adversely affected by the secondary expansion.

Table 3.4 Decomposition Analysis of METRO Routes after Secondary Expansion

METRO Route	Observed Boardings (APC) (1)	Surveyed Boardings (2)	Transfer Boardings (3)	Total Boardings (4) = (2) + (3)	Total Difference (5) = (1) – (4)	% Difference (6) = (5) / (1)
Routes Expanded by Bike Counts						
2	4,374	3,080	976	4,057	317	7%
3	795	532	322	854	-59	-7%
4	5,258	3,988	1,232	5,219	39	1%
5	797	594	286	880	-83	-10%
6	2,127	1,570	618	2,187	-60	-3%
8	2,143	1,267	801	2,068	75	3%
9	1,493	1,036	216	1,252	241	16%
10	513	348	100	449	64	13%
20	1,278	945	346	1,291	-13	-1%
25	4,504	3,357	1,218	4,575	-71	-2%
26	2,074	1,408	601	2,009	65	3%
28	1,758	1,230	582	1,813	-55	-3%
29	2,016	1,534	556	2,090	-74	-4%
30	465	356	159	515	-50	-11%
32	1,231	923	364	1,287	-56	-5%
36	1,085	776	369	1,145	-60	-6%
40	2,417	1,701	878	2,578	-161	-7%
44	1,372	918	445	1,363	9	1%
45	2,571	1,569	731	2,300	271	11%
46	4,284	2,605	1,038	3,643	641	15%
47	2,047	1,474	527	2,002	45	2%
48	345	277	109	386	-41	-12%
49	1,651	1,174	394	1,568	83	5%
50	1,309	928	370	1,297	12	1%
52	1,313	955	433	1,388	-75	-6%
54	3,583	2,471	789	3,260	323	9%
56	3,658	2,936	701	3,637	21	1%
58	341	230	113	342	-1	0%
63	2,559	1,764	688	2,452	107	4%
65	4,075	3,096	787	3,883	192	5%
68	1,430	1,011	330	1,342	88	6%
70	168	131	47	178	-10	-6%
72	223	177	49	225	-2	-1%
73	2,709	1,421	1,184	2,605	104	4%

METRO Route	Observed Boardings (APC) (1)	Surveyed Boardings (2)	Transfer Boardings (3)	Total Boardings (4) = (2) + (3)	Total Difference (5) = (1) – (4)	% Difference (6) = (5) / (1)
76	748	536	229	766	-18	-2%
78	275	172	78	249	26	9%
79	326	201	39	239	87	27%
80	2,397	1,560	783	2,343	54	2%
82	7,765	6,503	1,973	8,476	-711	-9%
84	840	565	286	852	-12	-1%
85	3,927	2,797	1,081	3,878	49	1%
86	1,659	1,307	334	1,641	18	1%
88	838	562	354	916	-78	-9%
89	143	91	19	110	33	23%
97	299	165	92	258	41	14%
98	218	108	206	314	-96	-44%
99	1,237	936	309	1,245	-8	-1%
102	2,062	1,520	534	2,054	8	0%
152	1,145	780	201	981	164	14%
160	239	189	97	285	-46	-19%
161	1,827	1,255	577	1,832	-5	0%
162	581	394	156	550	31	5%
309	235	140	60	199	36	15%
402	296	182	52	234	62	21%
433	729	384	173	557	172	24%
P&R Routes						
202	624	573	66	639	-15	-2%
204	548	493	72	565	-17	-3%
216	890	961	97	1,058	-168	-19%
217	1,091	1,005	123	1,128	-37	-3%
222	1,542	1,462	52	1,514	28	2%
228	1,204	1,128	74	1,201	3	0%
244	472	435	43	478	-6	-1%
247	634	506	22	528	106	17%
259	832	772	45	817	15	2%
269	1,229	1,074	47	1,121	108	9%
291	52	51	10	61	-9	-18%
292	304	284	1	285	19	6%
297	624	461	3	463	161	26%
298	972	780	164	943	29	3%

METRO Route	Observed Boardings (APC) (1)	Surveyed Boardings (2)	Transfer Boardings (3)	Total Boardings (4) = (2) + (3)	Total Difference (5) = (1) – (4)	% Difference (6) = (5) / (1)
170/171	440	517	71	588	-148	-34%
236/237	191	142	35	177	14	7%
Total	107,401	78,769	26,917	105,686	1,715	2%

Table 3.5 Comparison of Decomposition Analysis from Primary Expansion and Secondary Expansion

Route	Observed Boardings (APC)	Total Boardings from Decomposition Analysis			
		Primary Expansion	Secondary Expansion	Difference	% Difference
Routes Expanded by Bike Counts					
2	4,374	4,152	4,057	95	2%
3	795	856	854	2	0%
4	5,258	5,271	5,219	52	1%
5	797	884	880	4	0%
6	2,127	2,238	2,187	51	2%
8	2,143	2,126	2,068	58	3%
9	1,493	1,261	1,252	9	1%
10	513	477	449	28	6%
20	1,278	1,305	1,291	14	1%
25	4,504	4,636	4,575	61	1%
26	2,074	2,039	2,009	30	1%
28	1,758	1,848	1,813	35	2%
29	2,016	2,111	2,090	21	1%
30	465	528	515	13	2%
32	1,231	1,310	1,287	23	2%
36	1,085	1,155	1,145	10	1%
40	2,417	2,570	2,578	-8	0%
44	1,372	1,393	1,363	30	2%
45	2,571	2,339	2,300	39	2%
46	4,284	3,728	3,643	85	2%
47	2,047	2,020	2,002	18	1%
48	345	393	386	7	2%
49	1,651	1,572	1,568	4	0%
50	1,309	1,312	1,297	15	1%
52	1,313	1,404	1,388	16	1%
54	3,583	3,317	3,260	57	2%
56	3,658	3,588	3,637	-49	-1%
58	341	347	342	5	1%
63	2,559	2,464	2,452	12	0%
65	4,075	3,921	3,883	38	1%
68	1,430	1,347	1,342	5	0%
70	168	185	178	7	4%
72	223	230	225	5	2%
73	2,709	2,622	2,605	17	1%
76	748	767	766	1	0%

Route	Observed Boardings (APC)	Total Boardings from Decomposition Analysis			
		Primary Expansion	Secondary Expansion	Difference	% Difference
78	275	253	249	4	1%
79	326	256	239	17	7%
80	2,397	2,293	2,343	-50	-2%
82	7,765	8,602	8,476	126	1%
84	840	854	852	2	0%
85	3,927	3,975	3,878	97	2%
86	1,659	1,709	1,641	68	4%
88	838	949	916	33	3%
89	143	111	110	1	1%
97	299	265	258	7	3%
98	218	323	314	9	3%
99	1,237	1,278	1,245	33	3%
102	2,062	2,085	2,054	31	1%
152	1,145	1,024	981	43	4%
160	239	300	285	15	5%
161	1,827	1,857	1,832	25	1%
162	581	559	550	9	2%
309	235	208	199	9	4%
402	296	249	234	15	6%
433	729	566	557	9	2%
P&R Routes					
202	624	628	639	-11	-2%
204	548	588	565	23	4%
216	890	917	1,058	-141	-15%
217	1,091	1,094	1,128	-34	-3%
222	1,542	1,527	1,514	13	1%
228	1,204	1,168	1,201	-33	-3%
244	472	473	478	-5	-1%
247	634	605	528	77	13%
259	832	800	817	-17	-2%
269	1,229	1,276	1,121	155	12%
291	52	62	61	1	1%
292	304	296	285	11	4%
297	624	617	463	154	25%
298	972	1,017	943	74	7%
170/171	440	512	588	-76	-15%
236/237	191	185	177	8	4%
Total	**107,401**	**107,197**	**105,686**	**1,511**	**1%**

Table 3.6 Decomposition Analysis of METRO P&R Routes (AM Peak Period)

METRO P&R Route	Observed Boardings (APC) (1)	Surveyed Boardings (2)	Transfer Boardings (3)	Total Boardings (4) = (2) + (3)	Total Difference (5) = (1) – (4)	% Difference (6) = (5) / (1)
202	307	259	35	294	13	4%
204	286	240	23	263	23	8%
216	436	462	24	487	-51	-12%
217	561	488	68	555	6	1%
222	778	710	25	735	43	5%
228	585	527	24	552	33	6%
244	235	222	22	244	-9	-4%
247	313	273	4	277	36	11%
259	410	379	19	398	12	3%
269	619	552	12	564	55	9%
291	26	26	10	36	-10	-37%
292	144	152	0	152	-8	-6%
297	309	308	0	308	1	0%
298	504	416	72	488	16	3%
170/171	260	258	36	295	-35	-13%
236/237	97	70	13	82	15	15%
Total	**5,870**	**5,343**	**387**	**5,730**	**140**	**2%**

(4) Technical Appendix

Updated OD Survey

The expanded weights are added to the H-GAC Survey data. The file is named "*HGAC_OBS_Secondary_Exp_2022_11_29.xlsx"* is same as the primary OD survey received from ETC except the columns "*Final_unlinked_weight"* that represent the updated unlinked weight factors and *"Final_linked_weight"* that represent the updated linked weight factors.

Updated STOPS Model

The data from the secondary expansion is converted to STOPS compatible file trip table. The STOPS model is updated to represent the transit network and operations during the survey period. This section presents the files used to update the STOPS model and the results from the 2022 STOPS model.

4.1.1 STOPS Incremental Trip Table

The updated OD survey data is used to develop a STOPS compatible input trip table for METRO's incremental STOPS model. The file is named *"STOPS_Import_Trip_Table.csv"*. The file has Traffic Analysis Zone (TAZ) to TAZ trips by market segments (combinations of trip purpose and auto ownership)

4.1.2 Data used in 2022 STOPS Model

Table 4.1 presents the list of data used in updating some key files in METRO's STOPS model. The model is enclosed with the report.

Table 4.1 Summary of Changes to Update STOPS Model

Data / Parameter	Description	File name
GTFS Network	GTFS representing the transit network conditions during the survey period. (April 2022)	EXST_APRIL_2022
P&R Locations	Retained the P&R lots observed in the survey. 16 P&R lots from 2019 were removed.	Pnr.txt (enclosed in the GTFS network)
Route level counts	Route-level APC boardings used in the survey expansion (Average of March to May 2022)	Rount_count.txt
Stop Stations Shapefile	Updated to match GTFS network and stop level boardings used in survey expansion (APC boardings used for secondary expansion)	Stopsstations_shp

4.1.3 STOPS Output File

The results from the STOPS model run are enclosed electronically with this report. Insight ran the STOPS models with Group calibration 0 (without any group calibration) and 12 (calibration by route and stop group). The STOPS output for these model runs are named *"HGAC2022_STOPS_Result_0.prn"* and *"HGAC2022_STOPS_Result_12.prn"* respectively.

Decomposition Analysis of Primary Expansion

The decomposition analysis of the primary expansion of the onboard survey was provided to Insight by ETC. Table 4.2 presents the decomposition analysis of the primary expansion of the onboard survey, received by Insight.

Table 4.2 Decomposition Analysis of Primary Expansion

Route Name	Agency Name	Route Surveyed	Transfer Route	Total Summed Linked	Observed Boardings	Total Difference	% Difference
METRO 10 - Willowbend	METRO	377.41	100.04	477.44	512.61	35.17	6.9%
METRO 102 - Bush IAH Express	METRO	1546.41	538.59	2085.00	2062.39	-22.61	-1.1%
METRO 108 - Veterans Memorial Express	METRO	308.93	131.60	440.53	396.00	-44.53	-11.2%
METRO 11 - Almeda / Lyons	METRO	1183.70	662.16	1845.86	1565.72	-280.14	-17.9%
METRO 137 - Northshore Express	METRO	1276.20	425.64	1701.84	1683.11	-18.73	-1.1%
METRO 14 - Hiram Clarke	METRO	793.90	453.81	1247.71	1239.22	-8.49	-0.7%
METRO 151 - Westpark Express	METRO	236.79	48.41	285.21	275.89	-9.32	-3.4%
METRO 152 - Harwin Express	METRO	820.61	203.30	1023.91	1144.67	120.75	10.5%
METRO 153 - Harwin Express	METRO	1510.70	329.68	1840.38	1927.61	87.23	4.5%
METRO 160 - Memorial City Express	METRO	202.14	98.13	300.27	239.50	-60.77	-25.4%
METRO 161 - Wilcrest Express	METRO	1279.62	577.02	1856.63	1827.00	-29.63	-1.6%
METRO 162 - Memorial Express	METRO	401.25	158.15	559.40	581.33	21.93	3.8%
METRO 170/171 - Missouri City Express	METRO	440.15	71.47	511.62	538.78	27.16	5.0%
METRO 2 - Bellaire	METRO	3161.00	990.88	4151.87	4373.78	221.91	5.1%
METRO 20 - Canal / Memorial	METRO	951.06	353.59	1304.64	1277.78	-26.86	-2.1%
METRO 202 - Kuykendahl P&R	METRO	561.89	65.91	627.80	623.50	-4.30	-0.7%
METRO 204 - Spring P&R	METRO	515.48	72.12	587.60	548.44	-39.15	-7.1%
METRO 214/216 - NW Station / WL York P&R	METRO	823.33	93.21	916.54	889.72	-26.81	-3.0%
METRO 217 - Cypress P&R	METRO	992.17	101.81	1093.98	1091.39	-2.59	-0.2%
METRO 222 - Grand Parkway P&R	METRO	1474.95	51.94	1526.89	1541.89	14.99	1.0%

Route Name	Agency Name	Route Surveyed	Transfer Route	Total Summed Linked	Observed Boardings	Total Difference	% Difference
METRO 228 - Kingsland / Addicks P&R	METRO	1094.50	73.70	1168.21	1204.33	36.12	3.0%
METRO 23 - Clay - W 43rd	METRO	165.95	121.57	287.52	257.50	-30.02	-11.7%
METRO 236/237 - Maxey P&R	METRO	152.43	32.85	185.28	191.00	5.72	3.0%
METRO 244 - El Dorado / Monroe P&R	METRO	430.13	43.24	473.37	472.00	-1.37	-0.3%
METRO 246/247 - Fuqua / Bay Area P&R	METRO	583.72	21.41	605.13	634.28	29.15	4.6%
METRO 25 - Richmond	METRO	3415.88	1220.22	4636.10	4504.06	-132.04	-2.9%
METRO 259 - Eastex / Townsen / Kingwood P&R	METRO	754.56	45.09	799.65	832.06	32.40	3.9%
METRO 26 - Long Point / Cavalcade	METRO	1435.95	603.33	2039.28	2073.83	34.55	1.7%
METRO 269 - Hillcroft / Westwood / W. Bellfort P&R	METRO	1229.22	47.10	1276.32	1229.22	-47.10	-3.8%
METRO 27 - Shepherd	METRO	1222.60	595.80	1818.39	1726.89	-91.50	-5.3%
METRO 28 - OST - Wayside	METRO	1263.42	584.24	1847.66	1757.50	-90.16	-5.1%
METRO 29 - Cullen / Hirsch	METRO	1552.15	558.89	2111.04	2016.39	-94.65	-4.7%
METRO 291 - Conroe P&R	METRO	52.28	9.84	62.12	52.28	-9.84	-18.8%
METRO 292 - West Bellfort / Westwood / TMC P&R	METRO	295.39	0.83	296.23	303.83	7.61	2.5%
METRO 297 - South Point / Monroe / TMC P&R	METRO	614.57	2.55	617.12	623.61	6.49	1.0%
METRO 298 - Kingsland / Addicks / NWTC / TMC P&R	METRO	902.16	115.27	1017.43	971.56	-45.87	-4.7%
METRO 3 - Langley - Little York	METRO	534.22	321.70	855.92	794.83	-61.08	-7.7%
METRO 30 - Clinton / Ella	METRO	369.53	158.88	528.41	464.72	-63.68	-13.7%
METRO 309 - Gulfton Circulator	METRO	142.80	65.53	208.33	234.67	26.33	11.2%
METRO 310 - Gulfton Circulator	METRO	104.27	21.74	126.01	189.83	63.82	33.6%
METRO 32 - Renwick / San Felipe	METRO	946.77	363.57	1310.34	1230.89	-79.45	-6.5%
METRO 36 - Kempwood	METRO	782.04	372.54	1154.58	1085.28	-69.30	-6.4%
METRO 360 - Peerless Shuttle	METRO	97.85	33.10	130.94	149.39	18.44	12.3%
METRO 38 - Manchester-Lawndale	METRO	78.06	14.43	92.49	107.50	15.01	14.0%
METRO 39 - Katy Freeway	METRO	75.46	113.55	189.02	134.61	-54.41	-40.4%
METRO 399 - Kuykendahl Shuttle	METRO	92.30	15.82	108.11	134.56	26.44	19.7%
METRO 4 - Beechnut	METRO	4031.08	1240.41	5271.49	5258.33	-13.16	-0.3%
METRO 40 - Telephone / Heights	METRO	1750.38	819.96	2570.34	2416.67	-153.67	-6.4%
METRO 402 - Bellaire Quickline	METRO	196.81	51.94	248.75	295.61	46.86	15.9%
METRO 41 - Kirby / Polk	METRO	602.58	152.59	755.17	868.11	112.94	13.0%
METRO 433 - Silver Line	METRO	387.05	179.15	566.20	728.72	162.52	22.3%

Route Name	Agency Name	Route Surveyed	Transfer Route	Total Summed Linked	Observed Boardings	Total Difference	% Difference
METRO 44 - Acres Homes	METRO	938.88	453.82	1392.70	1372.44	-20.26	-1.5%
METRO 45 - Tidwell	METRO	1608.10	730.78	2338.87	2571.28	232.41	9.0%
METRO 46 - Gessner	METRO	2678.60	1049.18	3727.77	4284.22	556.45	13.0%
METRO 47 - Hillcroft	METRO	1492.92	527.41	2020.33	2047.06	26.73	1.3%
METRO 48 - Market	METRO	284.20	108.79	392.99	344.83	-48.16	-14.0%
METRO 49 - Chimney Rock / S Post Oak	METRO	1176.94	394.83	1571.77	1651.11	79.34	4.8%
METRO 5 - Southmore	METRO	600.94	282.66	883.61	797.06	-86.55	-10.9%
METRO 50 - Broadway	METRO	939.83	372.37	1312.20	1308.83	-3.37	-0.3%
METRO 51 - Hardy- Kelley	METRO	254.92	152.49	407.41	398.67	-8.74	-2.2%
METRO 52 - Hardy- Ley	METRO	971.00	433.07	1404.07	1312.61	-91.46	-7.0%
METRO 54 - Scott	METRO	2523.91	793.18	3317.09	3582.83	265.75	7.4%
METRO 56 - Airline / Montrose	METRO	2934.46	653.36	3587.82	3657.89	70.07	1.9%
METRO 58 - Hammerly	METRO	233.37	113.52	346.89	341.44	-5.45	-1.6%
METRO 59 - Aldine Mail	METRO	201.82	59.25	261.07	283.56	22.48	7.9%
METRO 6 - Jensen / Greens	METRO	1596.94	641.20	2238.13	2127.06	-111.08	-5.2%
METRO 60 - Cambridge	METRO	910.86	215.08	1125.94	1009.44	-116.50	-11.5%
METRO 63 - Fondren	METRO	1760.41	703.70	2464.11	2558.72	94.61	3.7%
METRO 64 - Lincoln City	METRO	44.15	14.32	58.47	50.94	-7.52	-14.8%
METRO 65 - Bissonnet	METRO	3123.82	796.71	3920.53	4075.11	154.58	3.8%
METRO 66 - Quitman	METRO	138.61	86.38	224.99	211.89	-13.10	-6.2%
METRO 67 - Dairy Ashford	METRO	249.62	123.31	372.92	311.67	-61.26	-19.7%
METRO 68 - Braeswood	METRO	1014.09	332.56	1346.65	1430.00	83.35	5.8%
METRO 7 - West Airport	METRO	426.52	165.28	591.81	537.61	-54.19	-10.1%
METRO 70 - Memorial	METRO	134.34	50.83	185.17	167.83	-17.33	-10.3%
METRO 72 - Westview	METRO	181.21	48.68	229.90	223.28	-6.62	-3.0%
METRO 73 - Bellfort	METRO	1439.89	1182.29	2622.19	2709.22	87.04	3.2%
METRO 75 - Eldridge	METRO	279.76	273.18	552.93	368.67	-184.27	-50.0%
METRO 76 - Evergreen	METRO	536.21	230.31	766.52	748.06	-18.46	-2.5%
METRO 77 - Homestead	METRO	156.47	133.38	289.84	323.22	33.38	10.3%
METRO 78 - Wayside	METRO	175.45	77.65	253.10	275.22	22.12	8.0%
METRO 79 - Irvington	METRO	217.65	38.51	256.17	326.28	70.11	21.5%
METRO 8 - West Bellfort	METRO	1303.81	822.07	2125.88	2142.50	16.62	0.8%
METRO 80 - MLK / Lockwood	METRO	1556.66	736.73	2293.38	2397.11	103.73	4.3%
METRO 82 - Westheimer	METRO	6606.92	1995.28	8602.20	7765.06	-837.14	-10.8%
METRO 83 - Lee Road - JFK	METRO	130.47	50.51	180.98	210.17	29.19	13.9%
METRO 84 - Buffalo Speedway	METRO	569.38	285.10	854.48	840.22	-14.26	-1.7%
METRO 85 - Antoine / Washington	METRO	2882.46	1092.19	3974.64	3926.94	-47.70	-1.2%

Route Name	Agency Name	Route Surveyed	Transfer Route	Total Summed Linked	Observed Boardings	Total Difference	% Difference
METRO 86 - FM 1960 / Imperial Valley	METRO	1369.31	339.63	1708.94	1659.00	-49.94	-3.0%
METRO 87 - Sunnyside	METRO	282.40	274.31	556.71	441.17	-115.54	-26.2%
METRO 88 - Sagemont	METRO	587.43	361.95	949.38	838.28	-111.10	-13.3%
METRO 89 - Dacoma	METRO	91.18	19.43	110.61	143.00	32.39	22.6%
METRO 9 - Gulfton / Holman	METRO	1041.97	218.97	1260.95	1493.39	232.44	15.6%
METRO 96 - Veterans Memorial	METRO	483.17	240.06	723.23	724.11	0.88	0.1%
METRO 97 - Settegast	METRO	172.58	92.29	264.88	299.33	34.46	11.5%
METRO 98 - Briargate	METRO	112.61	210.46	323.07	218.00	-105.07	-48.2%
METRO 99 - Ella - FM 1960	METRO	961.40	316.65	1278.04	1237.17	-40.88	-3.3%
METRO GREEN LINE	METRO	2328.72	701.62	3030.33	3287.00	256.67	7.8%
METRO PURPLE LINE	METRO	2787.18	929.21	3716.39	3710.44	-5.95	-0.2%
METRO RED LINE	METRO	22263.56	6267.71	28531.27	28652.38	121.11	0.4%
BTD-Cleveland Fixed Route [Circulator]	BTD	23.00	0.00	23.00	23.00	0.00	0.0%
BTD-Liberty County Circulator [Circulator]	BTD	7.00	0.00	7.00	7.00	0.00	0.0%
Conroe Connection Route 1 North	CONROE CONNECTION	30.24	4.98	35.22	36.00	0.78	2.2%
Conroe Connection Route 2 South	CONROE CONNECTION	17.73	5.04	22.77	23.00	0.23	1.0%
Conroe Connection Route 3 West	CONROE CONNECTION	6.86	1.29	8.15	8.00	-0.15	-1.9%
Conroe Connection Route 4 Northeast	CONROE CONNECTION	7.43	1.44	8.87	8.00	-0.87	-10.8%
Fort Bend Transit Galleria	FORT BEND	12.00	0.00	12.00	12.00	0.00	0.0%
Fort Bend Transit Greenway Plaza	FORT BEND	9.17	7.59	16.76	10.00	-6.76	-67.6%
Fort Bend Transit Texas Medical Center	FORT BEND	453.80	0.00	453.80	461.00	7.20	1.6%
GCTD 101 La Marque North [Northbound]	GCTD	65.10	13.74	78.84	93.00	14.16	15.2%
GCTD 102 La Marque South [Southbound]	GCTD	13.88	5.63	19.50	18.00	-1.50	-8.3%
GCTD 103 Texas City North [Northbound]	GCTD	66.97	26.38	93.35	85.00	-8.35	-9.8%
GCTD 104 Texas City South [Southbound]	GCTD	50.22	30.16	80.37	61.00	-19.37	-31.8%
GCTD 105 Dickinson [Circulator]	GCTD	10.66	24.69	35.35	18.00	-17.35	-96.4%
GCTD 106 Texas City Express [Circulator]	GCTD	85.55	14.12	99.67	127.00	27.33	21.5%
GCTD 107 Bacliff / San Leon [Circulator]	GCTD	20.12	5.79	25.92	31.00	5.08	16.4%
GCTD Angleton Purple [Circulator]	GCTD	36.22	16.36	52.58	49.00	-3.58	-7.3%

Route Name	Agency Name	Route Surveyed	Transfer Route	Total Summed Linked	Observed Boardings	Total Difference	% Difference
GCTD Clute / Lake Jackson Green [Circulator]	GCTD	66.84	36.45	103.29	92.00	-11.29	-12.3%
GCTD Freeport Red [Circulator]	GCTD	40.69	15.20	55.89	56.00	0.11	0.2%
GCTD Island Transit League City Park & Ride [Circulator]	GCTD	187.00	0.00	187.00	187.00	0.00	0.0%
GCTD Regional Gold [Circulator]	GCTD	45.79	33.45	79.24	94.00	14.76	15.7%
Harris County Transit Route 4 Baytown / Decker Loop [Circulator]	HARRIS COUNTY	35.48	9.45	44.93	43.00	-1.93	-4.5%
Harris County Transit Route Baytown/LaPorte Shuttle	HARRIS COUNTY	8.17	6.47	14.64	14.00	-0.64	-4.5%
Harris County Transit Route 1 Garth Road [Circulator]	HARRIS COUNTY	96.37	36.02	132.38	118.00	-14.38	-12.2%
Harris County Transit Route 11 Cloverleaf [Circulator]	HARRIS COUNTY	30.35	2.98	33.33	44.00	10.67	24.3%
Harris County Transit Route 12 Channelview [Circulator]	HARRIS COUNTY	17.86	2.68	20.54	25.00	4.46	17.9%
Harris County Transit Route 13 Baytown/Sheldon Shuttle	HARRIS COUNTY	16.13	8.52	24.65	44.00	19.35	44.0%
Harris County Transit Route 14 Sheldon West [Circulator]	HARRIS COUNTY	15.77	4.51	20.29	25.00	4.71	18.9%
Harris County Transit Route 2 Baytown Central [Circulator]	HARRIS COUNTY	47.12	12.15	59.27	62.00	2.73	4.4%
Harris County Transit Route 3 N Alexander / Cedar Bayou [Circulator]	HARRIS COUNTY	64.24	21.38	85.61	78.00	-7.61	-9.8%
Harris County Transit Route 5 La Porte City [Circulator]	HARRIS COUNTY	12.00	0.00	12.00	12.00	0.00	0.0%
Harris County Transit Route 6 Baytown / Highlands / Crosby [Circulator]	HARRIS COUNTY	17.21	7.21	24.42	27.00	2.58	9.6%
Island Transit Downtown Route [Circulator]	ISLAND TRANSIT	13.62	0.00	13.62	14.00	0.38	2.7%
Island Transit Rail 1 [Circulator]	ISLAND TRANSIT	110.57	10.90	121.47	129.00	7.53	5.8%
Island Transit Rail 2 [Circulator]	ISLAND TRANSIT	123.44	35.81	159.25	131.00	-28.25	-21.6%
Island Transit Route 6 Ave S 61st Via Ave O [Circulator]	ISLAND TRANSIT	132.32	16.86	149.18	139.68	-9.51	-6.8%
Island Transit Route 1 61st Via Market & Broadway [Circulator]	ISLAND TRANSIT	48.30	32.22	80.52	63.00	-17.52	-27.8%
Island Transit Route 2 UTMB-Ferry Road [Circulator]	ISLAND TRANSIT	48.30	21.57	69.87	84.00	14.13	16.8%
Island Transit Route 3 81st - W Broadway Via Ave M [Circulator]	ISLAND TRANSIT	36.18	5.32	41.50	44.69	3.19	7.1%
Island Transit Route 4 Broadway - 8th St [Circulator]	ISLAND TRANSIT	31.92	3.68	35.60	38.31	2.71	7.1%
Island Transit Route 5 Ave S - Stewart Road [Circulator]	ISLAND TRANSIT	117.62	11.78	129.40	132.32	2.92	2.2%

Route Name	Agency Name	Route Surveyed	Transfer Route	Total Summed Linked	Observed Boardings	Total Difference	% Difference
Island Transit Seawall Route [Circulator]	ISLAND TRANSIT	90.30	22.30	112.60	137.00	24.40	17.8%
The Woodlands Route 299 Research Forest	WOODLANDS	573.92	10.13	584.05	579.00	-5.05	-0.9%
The Woodlands Route 299 Sawdust	WOODLANDS	231.00	24.90	255.90	252.00	-3.90	-1.5%
The Woodlands Route 299 Sterling Ridge	WOODLANDS	159.12	0.00	159.12	163.00	3.88	2.4%
The Woodlands Trolley [Circulator]	WOODLANDS	359.00	0.00	359.00	359.00	0.00	0.0%
	Total	122663.46	40269.63	162933.09	162934.70	1.61	0.0%

APPENDIX G: ACTIVITY BASED MODEL ONE-DAY TRAVEL SURVEY

Activity-Based Model One-Day Travel Survey

Submitted to Houston-Galveston Area Council (H-GAC)

Presented by ETC Institute

Overview

Between the months of April-November 2022, ETC Institute recruited transit riders from each of the transit systems that were included in Houston-Galveston Area Council's (H-GAC) 2022 on-board Origin-Destination survey to participate in a one-day travel survey. The purpose of the survey was to learn more about the types of locations transit riders visit during a typical day. The survey was designed to collect demographic information, activity information, and location data from the various locations the respondent visited along with additional travel-related information. The survey was only meant for the individual respondent and was not intended to be a household travel survey.

Purpose

The purpose of the One Day Tour Travel Diary Survey will be to better understand "tours" completed by transit riders, which will enhance H-GAC's ability to conduct Activity-Based Modeling (ABM) with a better understanding of transit tour travel in the future.

Recruitment

There were two separate recruitment phases for the One Day Tour Survey. The first phase was conducted during the Origin and Destination (OD) survey which was conducted on board all Metro routes and rail lines. Passengers who participated in the OD survey were asked if they would be willing to participate in an additional survey and if the passenger answered yes, then their name and phone number were collected. The second phase of recruitment involved a separate individual recruitment survey that was administered on higher ridership bus routes, on rail vehicles, at rail platforms, and transit centers. The second phase's survey only asked for passengers home address, number of household vehicles, number of household members, number of employed household members, employment and student status, drivers' license status, age, ethnicity, other languages spoken at home, and household income prior to collecting contact information. All of the listed questions were necessary for capture since these passengers did not participate in the OD survey and this information is not asked in the travel dairy survey application.

If the respondents indicated they would be willing to participate, they were then asked whether they preferred to receive SMS text or email communications for the duration of the survey. Those respondents who indicated they would prefer to communicate via email were emailed links to download either an Android or iOS version of a mobile app designed specifically for the project. They were also provided with a link to an online survey where they could enter their stops manually for a typical day if they did not have access to a smartphone. Those who indicated they had a smartphone and preferred to receive SMS text communications were texted a similar message. H-GAC was updated weekly during the collection process as to how many respondents had been recruited.

Recording of Stop Locations

The mobile apps used the activity of the cell phone's inertial sensors along with time-based algorithms to determine and record the individual user's stops. The mobile app users were informed through the app that the survey required them to select a day during the upcoming week (weekdays only) and provide a 24-hour period of their travels from 3am to 3am the following day on a valid travel date (Monday through Thursday excluding holidays). The user was able to answer questions regarding their stops as the app collected them, or they could wait until the 24-hour period had ended and then answer all the stop-related questions. Some of the stop-related questions included how the respondent traveled to the stop location, the purpose of traveling to that stop, and how many household and non-household members traveled with them. Respondents were also able to review, edit, delete, or add stops in case the app had not perfectly captured all details of their stops correctly. Respondents who chose to participate online were asked to manually enter their stops for the previous valid travel date. A support number was also available for any respondents who had technical support questions.

Reminders

Participants that had downloaded the app but had not completed the survey were sent reminders via email or text (depending on their communication preference) to complete the survey. Those that were recruited but had not yet downloaded the app were sent reminders to download and participate in the survey. Users were able to opt-out of reminders at any time. If email and text reminders were not successful in getting the respondent to participate, ETC Institute call center staff members assigned to the project would conduct phone call reminders where they would provide the individuals the links to complete the survey themselves or they provided the option of filling out the survey over the phone using the online desktop platform of the survey. A prepaid gift was available as an incentive to all participants who completed the survey, beginning in the amount of $15 and increasing to $20 throughout the project.

The goal was to obtain 1,000 participants to complete a 24-hour valid travel survey. After the QA/QC process was complete, a total of 968 participants fully completed one 24-hour travel survey. Ultimately, 122 respondents completed the survey using one of the mobile apps and 846 respondents either entered their trips on the online desktop platform of the survey or had their trips entered on the online desktop platform of the survey by an ETC Institute call center employee.

Tours

There are references to "Tours" in the following report. A tour is defined in this report as starting when a respondent leaves home and ending when a respondent returns home. For example, if a respondent left home in the morning, went to work, and then returned home, that was considered the first tour. If that same person, then left home again to go spend the night at a relative's house, that was considered the second tour even if the trip home was not on the surveyed travel date. As long as a respondent returned home on their travel day it was considered a tour, so for example if a person started their day

at work but then ended their day at home, that was also considered a tour. If a respondent stayed at home all day or did not start the travel day at home and correspondingly never returned home, then they were indicated to have zero tours.

The average number of tours for all respondents was 1.00 tours and the average number of stops per tour for all respondents was 1.52.

Major Findings – Demographic Related Information

The subsequent tables include some of the findings from the demographic portion of the survey. Any "Other" responses may be provided upon request. All findings from the demographic related information is overall, and does not strictly pertain to the travel date of the respondent.

Table 1: Age of Respondents

Age of Respondents

	Count	Percentage
16-19	60	6.2%
20-34	372	38.4%
35-50	308	31.8%
51-64	161	16.6%
65-69	46	4.8%
70 and older	21	2.2%
Grand Total	**968**	**100.0%**

It was not anticipated that the demographics of those who participated in the one-day travel survey would necessarily match up with demographics of the on-board destination survey due to the higher volume of surveys conducted on the on-board destination survey, but for comparison, 34.0% of respondents in the origin-destination on-board survey were also between the ages of 25 to 34, again followed closely by the 35-50 age category (31.4%).

Table 2: Employment Status

Employment Status

	Count	Percentage
No	289	29.9%
Yes	679	70.1%
Grand Total	**968**	**100.00%**

For the H-GAC One-Day Travel Survey, respondents were asked whether they were employed or not. Just under three quarters of respondents (70.1%) indicated they do have a job, while under thirty percent (29.9%) indicated they do not.

For comparison, 76.5% of respondents in the origin-destination on-board survey were employed either full-time or part-time.

Table 3 below shows the number of jobs for employed respondents.

Table 3: Number of Jobs

Number of Jobs

	Count	Percentage
1	599	88.2%
2	68	10.0%
3	8	1.2%
4	2	0.3%
5	0	0.0%
6	2	0.3%
Grand Total	**679**	**100.0%**

Table 4 below asks employed respondents for their usual work locations.

Table 4: Job Location

Job Location

	Count	Percentage
Only one work location (outside of home, may also telework)	448	66.0%
Work location regularly varies (different offices/jobsites)	161	23.7%
Drive/travel for work (driver, sales)	38	5.6%
Work at home ONLY (telework, self-employed)	32	4.7%
Grand Total	**679**	**100.0%**

Table 5 below asks employed respondents how they typically travel to their usual workplace.

Table 5: Work Travel Mode

Work Travel Mode

	Count	Percentage
Bus (public transit)	436	64.2%
Drive alone	66	9.7%
Light rail	64	9.4%
Other	28	4.1%
Walk, jog, or roll (using a mobility device)	20	2.9%
Carpool with only family/household member(s)	16	2.4%
Subway	14	2.1%
Bicycle	12	1.8%
Uber, Lyft, or other smartphone-app ride service	11	1.6%
Carpool with at least one person not in household	7	1.0%
Motorcycle/moped/scooter	3	0.4%
Private shuttle bus (e.g., employer)	1	0.1%
Intercity rail (e.g., Amtrak)	1	0.1%
Grand Total	**679**	**100.0%**

Table 6 below asks employed respondents if the season affects how they travel to and from work.

Table 6: Work Travel Mode Seasonality

Work Mode Seasonality

	Count	Percentage
Yes	149	21.9%
No	530	78.1%
Grand Total	**679**	**100.0%**

Table 7 below asks employed respondents how many hours per week they work.

Table 7: Work Hours

Work Hours

	Count	Percentage
50 or more	87	12.8%
40-49	322	47.4%
35-39	91	13.4%
30-34	54	8.0%
20-29	52	7.7%
10-19	25	3.7%
Fewer than 10	18	2.7%
Hours vary greatly week to week	30	4.4%
Grand Total	**679**	**100.0%**

Table 8 below asks employed respondents how often they telecommute for work d.

Table 8: Telework Frequency

Telework Frequency

	Count	Percentage
6-7 days a week	96	14.1%
5 days a week	218	32.1%
4 days a week	35	5.2%
2-3 days a week	68	10.0%
1 day a week	16	2.4%
1-3 days per month	25	3.7%
Less than monthly	29	4.3%
Never	192	28.3%
Grand Total	**679**	**100.0%**

Table 9 below asks if respondents consider themselves a student or not.

Table 9: Student Status

Student Status

	Count	Percentage
No	759	78.4%
Yes	209	21.6%
Grand Total	**968**	**100.00%**

Of those 209 respondents who indicated they are a student, the majority (50.7%) indicate they use "Bus (public transit)" to get to and from school, and that the season does not typically affect how they travel to school (61.2%).

For comparison, 83.2% of respondents in the origin-destination on-board survey were not students.

Table 10 below asks respondents how they travel to and from school if they indicated they are students.

Table 10: Travel to School Mode

School Mode

	Count	Percentage
Bus (public transit)	106	50.7%
Light rail	38	18.2%
Other	24	11.5%
Carpool with only family/household member(s)	10	4.8%
Bicycle	9	4.3%
Drive alone	7	3.3%
Walk, job, or roll (using a mobility device)	6	2.9%
School Bus	5	2.4%
Uber, Lyft, or other smartphone-app ride service	2	1.0%
Motorcycle/moped/scooter	1	0.5%
Carpool with at least one person not in household	1	0.5%
Grand Total	**209**	**100.0%**

Table 11 below asks respondents if the season affects how they travel to and from school if they indicated they are students.

Table 11: School Travel Mode Seasonality

School Mode Seasonality

	Count	Percentage
Yes	54	25.8%
No	128	61.2%
Only take online classes	27	12.9%
Grand Total	**209**	**100.0%**

Table 12 below asks respondents the type of place of their current residence.

Table 12: Residence Type

Residence Type

	Count	Percentage
Single-family house (detached house)	395	40.8%
Building with 5 or more apartments or condos	391	40.4%
Building with 2-4 units (duplexes, triplexes, quads)	86	8.9%
Townhouse (single-family attached)	39	4.0%
Other	24	2.5%
Dorm, group quarters, or institutional facility	18	1.9%
Senior or age-restricted apts/condos	11	1.1%
Manufactured home/mobile home/trailer	4	0.4%
Grand Total	**968**	**100.0%**

Table 13 below asks respondents how long they have lived at their current residences (in years).

Table 13: Residence Duration (in Years)

Residence Duration (in Years)

	Count	Percentage
Less than a year	286	29.5%
Between 1 and 2 years	208	21.5%
Between 2 and 3 years	116	12.0%
Between 3 and 5 years	124	12.8%
Between 5 and 10 years	80	8.3%
Between 10 and 20 years	87	9.0%
More than 20 years	67	6.9%
Grand Total	**968**	**100.0%**

Table 14 below asks respondents how many months of the year they live at their residence.

Table 14: Residence Duration (in Months)

Residence Duration (in Months)

	Count	Percentage
12 months (all year long)	455	47.0%
10-11 months	72	7.4%
7-9 months	215	22.2%
4-6 months	85	8.8%
Up to 3 months of the year	102	10.5%
Prefer not to answer	39	4.0%
Grand Total	**968**	**100.0%**

Table 15 below asks respondents if they rent or own their residence.

Table 15: Rent/Own

Rent/Own

	Count	Percentage
Rent	715	73.9%
Own (includes paying a mortgage)	138	14.3%
Prefer not to answer	60	6.2%
Other	42	4.3%
Housing provided by job or military	13	1.3%
Grand Total	**968**	**100.0%**

Table 16 below asks respondents what their cost of rent/mortgage per month is.

Table 16: Rent Cost

Rent Cost

	Count	Percentage
$0-$499	147	15.2%
$500-$749	124	12.8%
$750-$999	236	24.4%
$1,000-$1,249	133	13.7%
$1,250-$1,499	92	9.5%
$1,500-$1,749	61	6.3%
$1,750-$1,999	28	2.9%
$2,000-$2,499	23	2.4%
$2,500-$2,999	8	0.8%
$3,000-$3,999	7	0.7%

$4,000 or more	2	0.2%
Prefer not to answer	107	11.1%
Grand Total	**968**	**100.0%**

Table 17 below asks respondents how many adults (18+) live in the household.

Table 17: Number of Adults

Number of Adults

	Count	Percentage
1	311	32.1%
2	358	37.0%
3	182	18.8%
4	71	7.3%
5	23	2.4%
6	6	0.6%
7	6	0.6%
8	0	0.0%
9	1	0.1%
10	1	0.1%
11	9	0.9%
Grand Total	**968**	**100.0%**

Table 18 below asks respondents how many children (ages 0-17) live in the household.

Table 18: Number of Children

Number of Children

	Count	Percentage
0	657	67.9%
1	139	14.4%
2	93	9.6%
3	38	3.9%
4	23	2.4%
5	13	1.3%
6	3	0.3%
7	0	0.0%
8	2	0.2%
Grand Total	**968**	**100.0%**

Table 19 below asks respondents how many students live in the household.

Table 19: Number of Students

Number of Students

	Count	Percentage
0	535	55.3%
1	210	21.7%
2	112	11.6%
3	59	6.1%
4	31	3.2%
5	12	1.2%
6	5	0.5%
7	3	0.3%
8	1	0.1%
Grand Total	**968**	**100.0%**

Table 20 below asks respondent if they own a vehicle.

Table 20: Vehicle Ownership

Vehicle Ownership

	Count	Percentage
Yes	271	28.0%
No	697	72.0%
Grand Total	**968**	**100.0%**

For comparison, 55.6% of respondents in the origin-destination on-board survey indicated they own one or more vehicles.

Table 21 below asks respondents if they typically use any rideshare or driver services.

Table 21: Rideshare

Rideshare

	Count	Percentage
Uber, Lyft, or other smartphone-app ride service	373	38.5%
I drive for Uber, Lyft, or other smartphone-app ride service	25	2.6%
Bikeshare	10	1.0%
Vanpool	8	0.8%
Carshare (e.g., Car2Go, ZipCar)	5	0.5%
Peer-to-peer car rental (e.g., Turo, Getaround)	3	0.3%
None of the above share services	544	56.2%

Grand Total	**968**	**100.0%**

Table 22 below asks student respondents how often they use a bicycle to travel to school.

Table 22: Bike Frequency by Students

Bike Frequency by Students

	Count	Percentage
6-7 days a week	2	1.0%
5 days a week	8	3.9%
4 days a week	7	3.4%
2-3 days a week	9	4.4%
1 day a week	6	3.0%
1-3 days a month	1	0.5%
Less than monthly	1	0.5%
Never	169	83.3%
Grand Total	**203**	**100.0%**

Table 23 below asks student respondents how often they use public transit to travel to school .

Table 23: Transit Frequency by Students

Transit Frequency by Students

	Count	Percentage
6-7 days a week	15	7.4%
5 days a week	41	20.2%
4 days a week	24	11.8%
2-3 days a week	33	16.3%
1 day a week	6	3.0%
1-3 days a month	4	2.0%
1-3 times a year	1	0.5%
Only when attending an event (e.g., State Fair, sporting event, concert)	4	2.0%
Never	75	36.9%
Grand Total	**203**	**100.0%**

Table 24 below asks respondents how often they use a smartphone-app ride service (e.g., Lyft, Uber).

Table 24: Rideshare Frequency

Rideshare Frequency

	Count	Percentage
6-7 days a week	23	5.8%
5 days a week	13	3.3%
4 days a week	12	3.0%
2-3 days a week	80	20.1%
1 day a week	51	12.8%
1-3 days a month	126	31.7%
Less than monthly	93	23.4%
Grand Total	**398**	**100.0%**

Table 25 below asks respondents if any type of delivery occurred on their travel date. Multiple responses were possible.

Table 25: Delivery

Delivery

	Count	Percentage
Received packages at home (e.g., FedEx, UPS, USPS)	95	9.8%
Food was delivered to home (e.g., take-out, groceries)	61	6.3%
Multiple Delivery Options Selected	29	3.0%
Someone came to home to do work (e.g., landscaping, plumber, housecleaning)	20	2.1%
Received packages at offsite locker (e.g., Amazon locker)	7	0.7%
Received personal packages at work (e.g., FedEx, UPS, USPS)	5	0.5%
None of the above	751	77.6%
Grand Total	**968**	**100.0%**

Major Findings – Trip Related Information

The subsequent tables include some of the other findings from the trip portion of the survey. All responses in the trip related information pertain to the travel date of the respondent.

The table below shows the percentage breakdown of purpose at stop for all respondents. The most common purpose for the stop was "Home" (35.6%), followed by "Work" or "Work Related" (19.7%). *Note: These figures include the activity at the base location, which is where the respondent began their travel day, and return trip home.*

Table 26: Purpose at Stop (Including Base Location and Return Trip Home)

Purpose at Stop

	Count	Percentage
Home	848	35.6%
Work	413	17.3%
Personal	304	12.8%
Change Travel Mode (e.g., from walk to bus)	238	10.0%
Shopping	147	6.2%
School Post-Secondary	102	4.3%
Social/Recreation	88	3.7%
Meal/Eat	71	3.0%
Pick-up/Drop-off	66	2.8%
Work Related	57	2.4%
School K thru 12	30	1.3%
Other	19	0.8%
Grand Total	**2383**	**100.0%**

Table 27 below shows the breakdown of travel mode respondents indicated they took during their travel date. Travel mode was a multiple choice response, and those respondents that indicated they took more than one travel mode were broken down into two categories, one that included the use of bus/rail and one that did not.

Since the participants for the survey were recruited while using transit it is not a surprise that public transit (either "Any bus or shuttle (e.g., local, school bus, vanpool, Metro Mobility)", "Any rail (e.g., train, light rail, trolley)", or "Multiple Travel Modes (including Bus/Rail)") (75.2%) was the most common mode of travel used by respondents to travel to and from their stops.

Table 27: Travel Mode

Travel Mode

	Count	Percentage
Any bus or shuttle (e.g., local, school bus, vanpool, Metro Mobility)	982	42.1%
Multiple Travel Modes (including Bus/Rail)	489	20.9%
In a household vehicle (or motorcycle)	285	12.2%
Any rail (e.g., train, light rail, trolley)	284	12.2%
Walk, jog, or roll using a mobility device	169	7.2%
Any taxi or ride service (e.g., Uber/Lyft)	53	2.3%
In other personal vehicle (e.g., rental, carshare, work car)	43	1.8%
Bicycle	19	0.8%
Multiple Travel Modes	6	0.3%
Medical transportation service (non-emergency)	3	0.1%
Scooter, moped, or similar (e.g., Segway)	2	0.1%
Grand Total	**2335**	**100.0%**

Table 28 below asks respondents if their base stop was at home. The majority (95.1%) indicated they began their day from home.

Table 28: Base Stop

Base Stop

	Count	Percentage
Yes	921	95.1%
No	47	4.9%
Grand Total	**968**	**100.0%**

Table 29 below asks respondents how many household members were traveling with them on their travel date.

Table 29: Number of Household Members

Number of Household Members

	Count	Percentage
0	2032	87.0%
1	217	9.3%
2	51	2.2%
3	19	0.8%
4	8	0.3%
5	4	0.2%
6	0	0.0%
7	0	0.0%
8	0	0.0%
9	1	0.0%
10	0	0.0%
11	3	0.1%
Grand Total	**2335**	**100.0%**

Table 30 below asks respondents how many non-household members were traveling with them on their travel date.

Table 30: Number of Non-Household Members

Number of Non-Household Members

	Count	Percentage
0	1708	73.1%
1	124	5.3%
2	40	1.7%
3	21	0.9%
4	18	0.8%
5	18	0.8%
6	13	0.6%
7	17	0.7%
8	20	0.9%
9	15	0.6%
10	30	1.3%
11	311	13.3%
Grand Total	**2335**	**100.0%**

Table 31 below asks respondents the type of payment they used if they indicated they traveled via bus or rail.

Table 31: Bus Payment Type

Bus Payment Type

	Count	Percentage
Used transit Q card or pass (any type)	1150	81.6%
Cash, credit card, token(s), or ticket(s)	224	15.9%
Free (no cost at all)	34	2.4%
Don't know	2	0.1%
Grand Total	**1410**	**100.0%**

Table 32 below asks respondents if they were the driver of a household vehicle.

Table 32: Household Vehicle Driver

Household Vehicle Driver

	Count	Percentage
Yes	239	76.8%
No	72	23.2%
Grand Total	**311**	**100.0%**

Table 33 below asks respondents if they were the driver of another vehicle.

Table 33: Other Vehicle Driver

Other Vehicle Driver

	Count	Percentage
Yes	12	21.4%
No	44	78.6%
Grand Total	**56**	**100.0%**

Table 34 below asks respondents if they were the driver of a taxi vehicle.

Table 34: Taxi Vehicle Driver

Taxi Vehicle Driver

	Count	Percentage
Yes	2	2.9%
No	68	97.1%
Grand Total	**70**	**100.0%**

Table 35 below asks respondents if they were the driver of a bus vehicle.

Table 35: Bus Vehicle Driver

Bus Vehicle Driver

	Count	Percentage
Yes	8	0.6%
No	1433	99.4%
Grand Total	**1441**	**100.0%**

Table 36 below asks respondents if they were the driver of a rail vehicle.

Table 36: Rail Vehicle Driver

Rail Vehicle Driver

	Count	Percentage
Yes	2	0.4%
No	564	99.6%
Grand Total	**566**	**100.0%**

Table 37 below asks respondents if they were the driver of a bicycle.

Table 37: Bicycle Driver

Bicycle Driver

	Count	Percentage
Yes	32	82.1%
No	7	17.9%
Grand Total	**39**	**100.0%**

Table 38 below asks respondents if they were the driver of a medical transport vehicle.

Table 38: Medical Transport Vehicle Driver

Medical Transport Vehicle Driver

	Count	Percentage
Yes	1	16.7%
No	5	83.3%
Grand Total	**6**	**100.0%**

Of those 968 respondents who participated in the 24hr travel survey, 12 did not travel for various reasons, or 1.2%.

Maps of Trip Data

In this section there are some geographic information system (GIS) maps that display various location-based data from the survey. Some of the subsequent maps have additional layers that are simply meant to provide some extra information that may be of interest. *Note: some maps were "zoomed in" which occasionally caused a nominal number of points to not be displayed. This was done to improve the visualization experience of the viewer. Additionally, for some maps, the coordinates were reduced to 3 decimal spots to aggregate some locations that were very close to one another for illustration purposes.*

Maps of Activity Types

The following maps show the locations of the top five trip purposes chosen by respondents on their travel date.

Figure 1: "Home" Trip Purpose

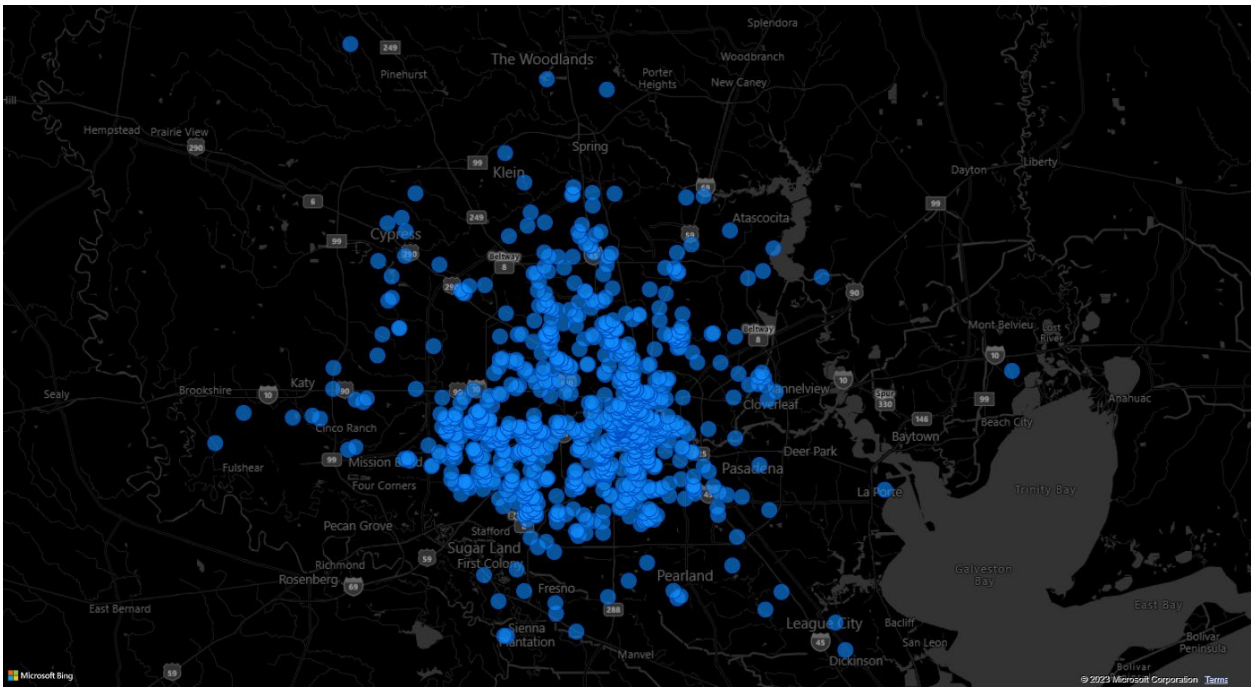


Figure 2: "Work" Trip Purpose (Coordinates fixed to three decimals – Sized Based on Count)

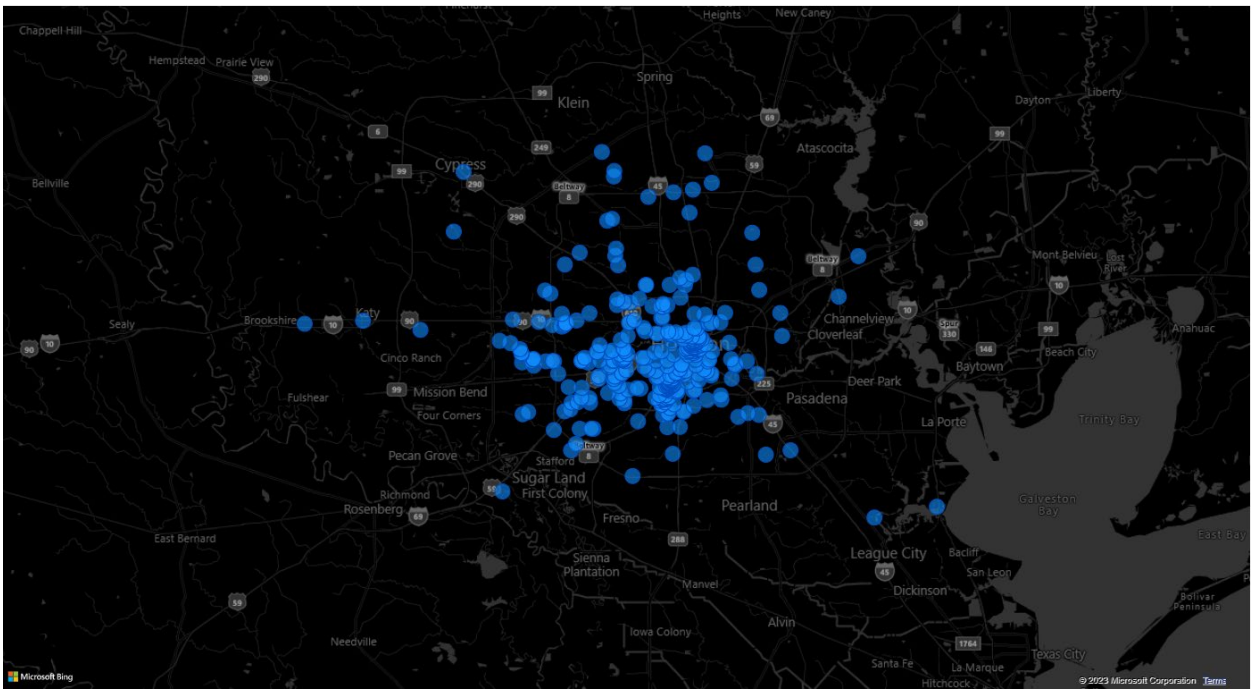


Figure 3: "Personal" Trip Purpose (Coordinates fixed to three decimals – Sized Based on Count)

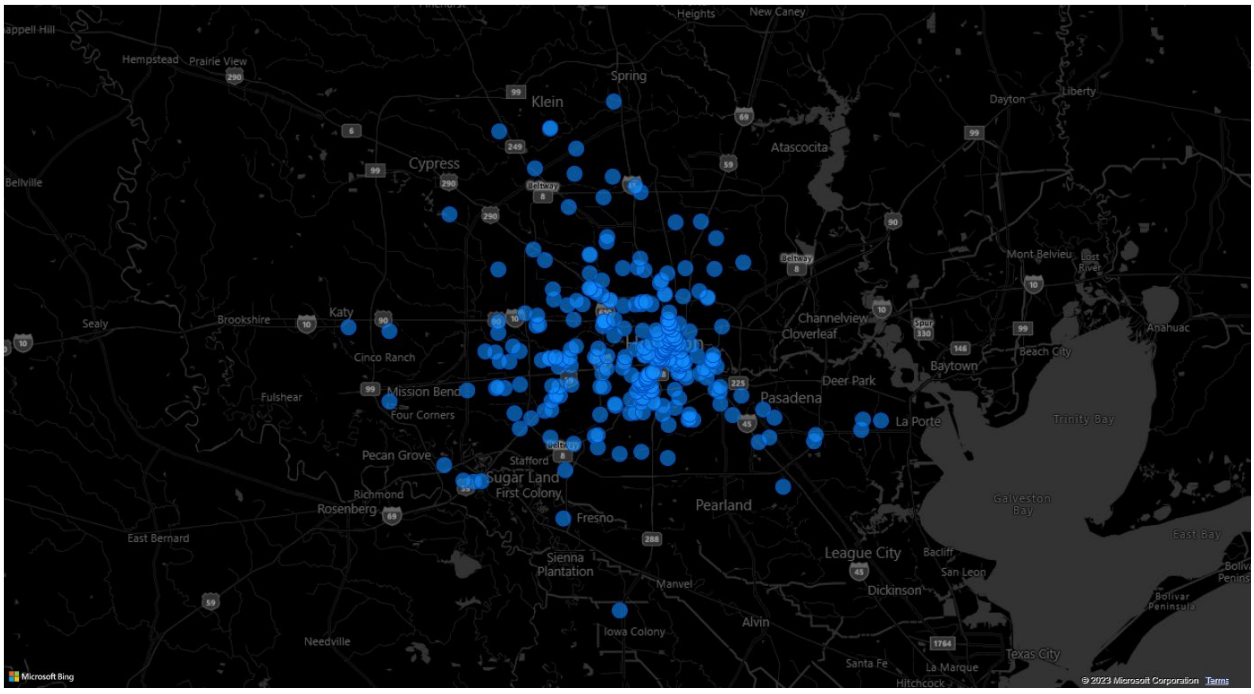


Figure 4: "Change Travel Mode (e.g. from walk to bus)" Trip Purpose (Coordinates fixed to three decimals – Sized Based on Count)

For further clarification, "Change Travel Mode" would be when a respondent changes from a bus to walking to their next location. For example, their stop could be at a bus stop, and they are changing from riding the bus to walking to their next location.

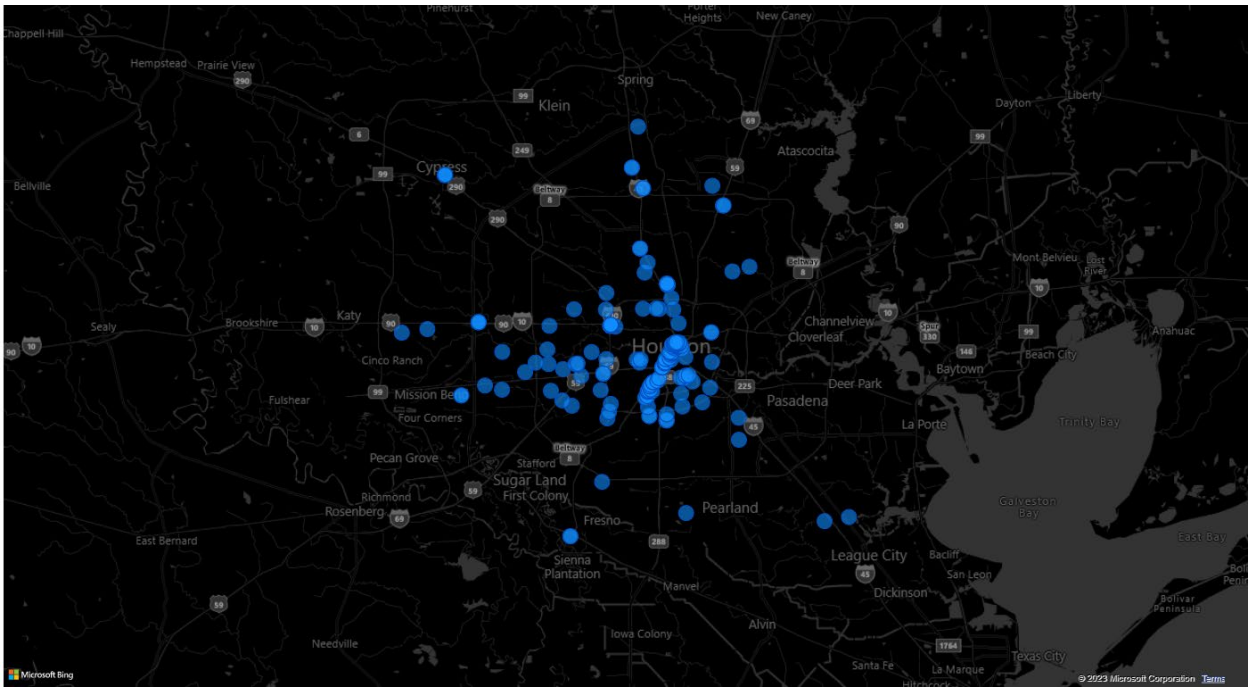
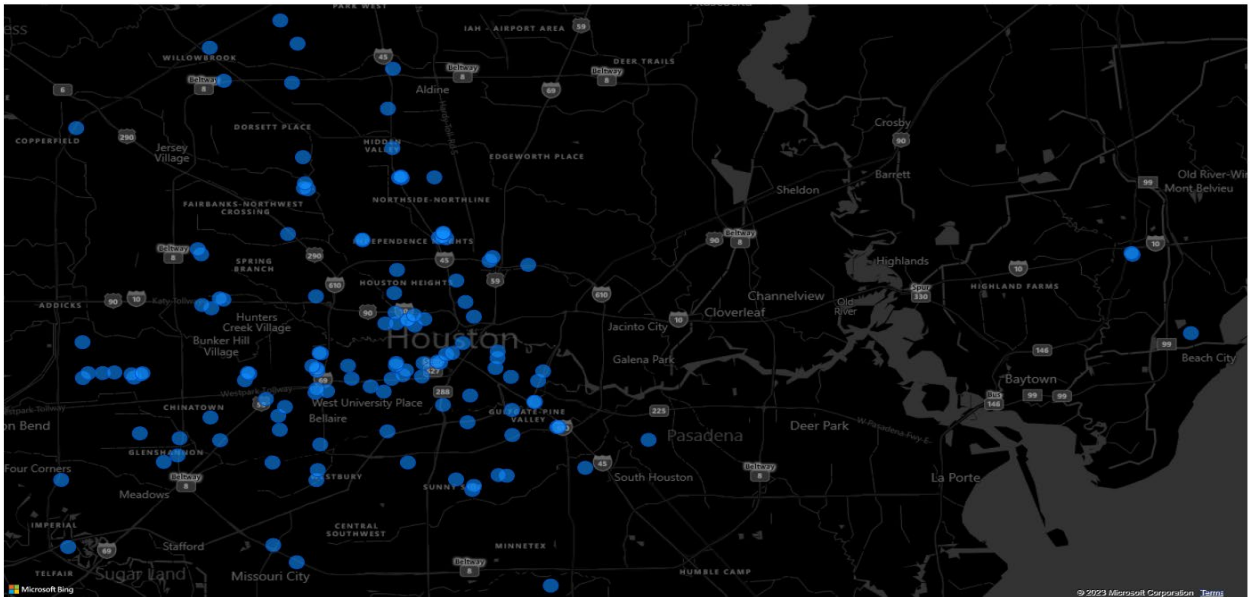


Figure 5: "Shopping" Trip Purpose (Coordinates fixed to three decimals – Sized Based on Count)



APPENDIX H: ACTIVITY BASED MODEL ONE-DAY TRAVEL SURVEY ADDITIONAL ANALYSIS

Activity-Based Model One-Day Travel Survey

Submitted to Houston-Galveston Area Council (H-GAC)

Presented by ETC Institute

Major Findings – Trips per Tour

The subsequent table and charts include some of the findings generated from the combination of trip and demographic data. This includes the number of trips taken per tour by modes used on tours, by purposes of tours, and by various demographics. The number of trips per tour was defined as the number of stops in a given tour minus one; thus, a tour of home-work-home is defined as two trips (home to work, work to home). Overall, tours included an average of 2.42 trips. Tours that included a work trip included slightly more trips (2.55 for tours with a work trip versus 2.31 for tours without a work trip).

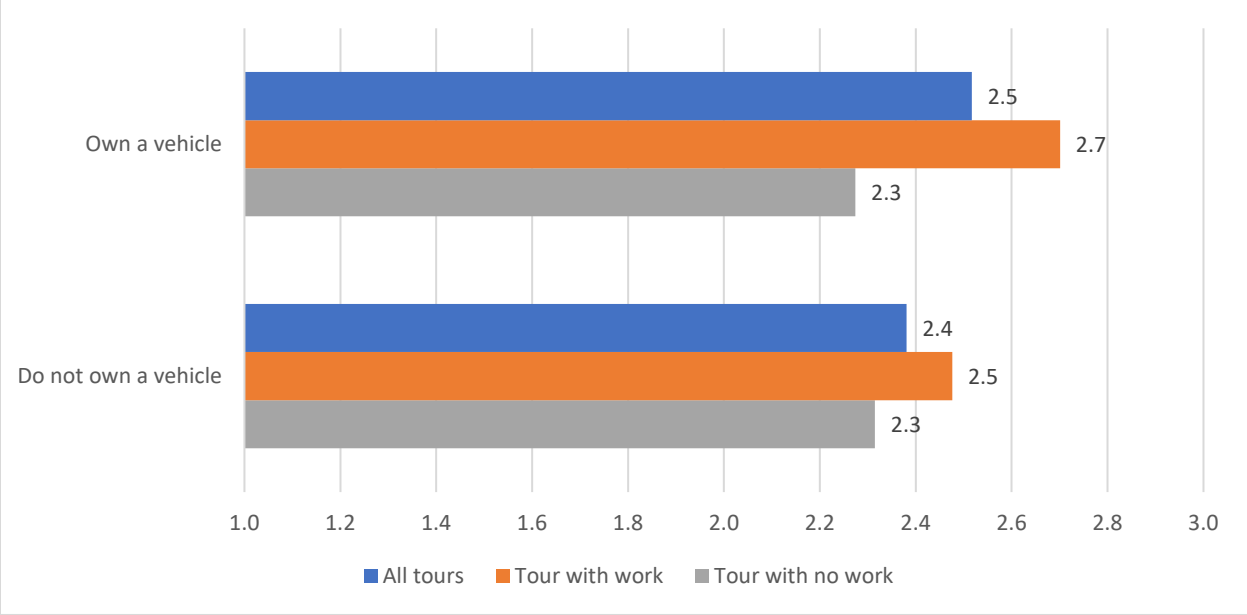
Table 1 details the average number of trips taken per tour based on various characteristics of tours. Tours where the respondent used transit or walked/biked for at least one trip included more trips than tours not involving these modes, with a difference of more than a full trip in either case. Tours where respondents indicated they used transit for at least one trip and used an automobile for at least one trip made more trips than tours using other modes.

Table 1: Average trips per tour by modes used

	Tour Including Mode	Tour NOT Including Mode
Tour with at least one trip taken by transit	2.62	1.55
Tour with at least one trip taken by walking/biking	3.13	2.12
Tour with at least one trip taken by auto	3.06	2.23
Tour with at least one trip taken by transit and at least one trip by auto	3.49	2.25

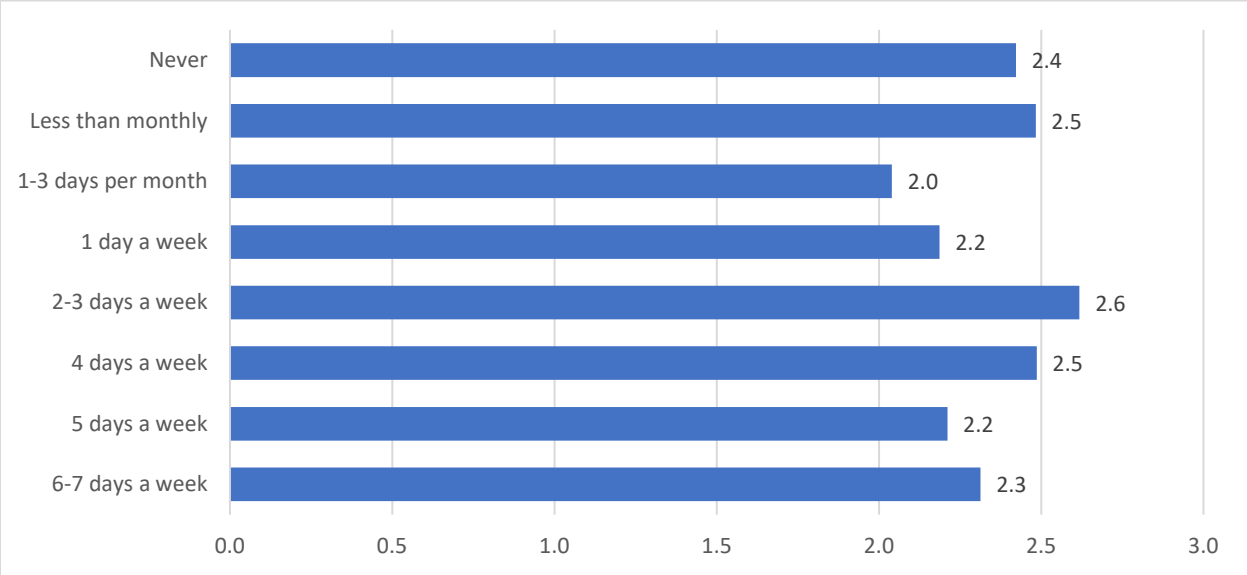
As shown in Figure 1, tours made by respondents who indicate that they own a vehicle had slightly more trips on average than tours made by respondents who don't own a vehicle, taking around 2.5 and 2.4 trips per tour, respectively. Tours made by vehicle owners that involved work also had more trips by a somewhat larger margin than those tours made by respondents who do not own vehicles, taking 2.7 and 2.5 trips.

Figure 1. Trips per tour by vehicle ownership



As detailed in Figure 2, the number of trips taken per tour varied to a large extent when compared by frequency of teleworking, ranging from 2.0 trips per tour for those teleworking between one and three days per month to more than 2.6 trips per tour for those teleworking two or three days per week. Respondents teleworking never or less than monthly had longer tours on average, between 2.4 and 2.5 trips per tour, with a high degree of variation between the remaining categories.

Figure 2. Trips per tour by frequency of telework



As Figure 3 illustrates, the average length of tours remained largely static across age groups, within a small range of 2.3 trips to 2.6 trips per tour. The only age group to fall outside this range was the 25 – 34 age group, making an average of 1.8 trips per tour.

Figure 3. Trips per tour by age of respondent

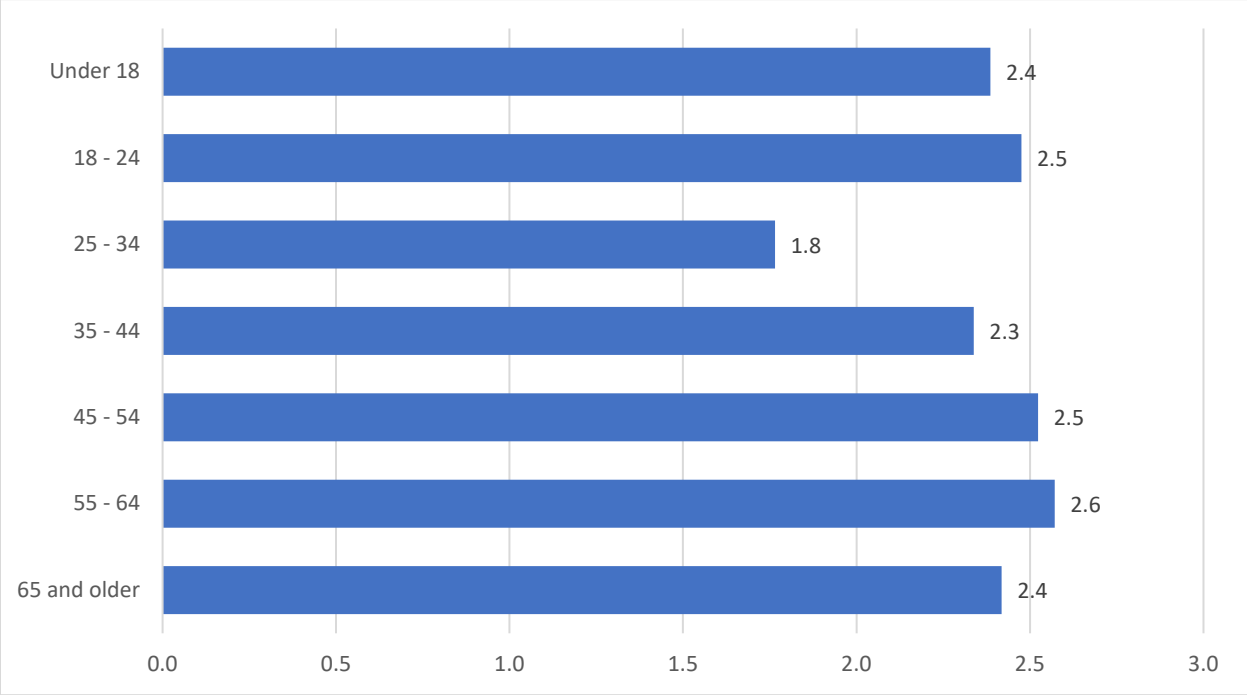
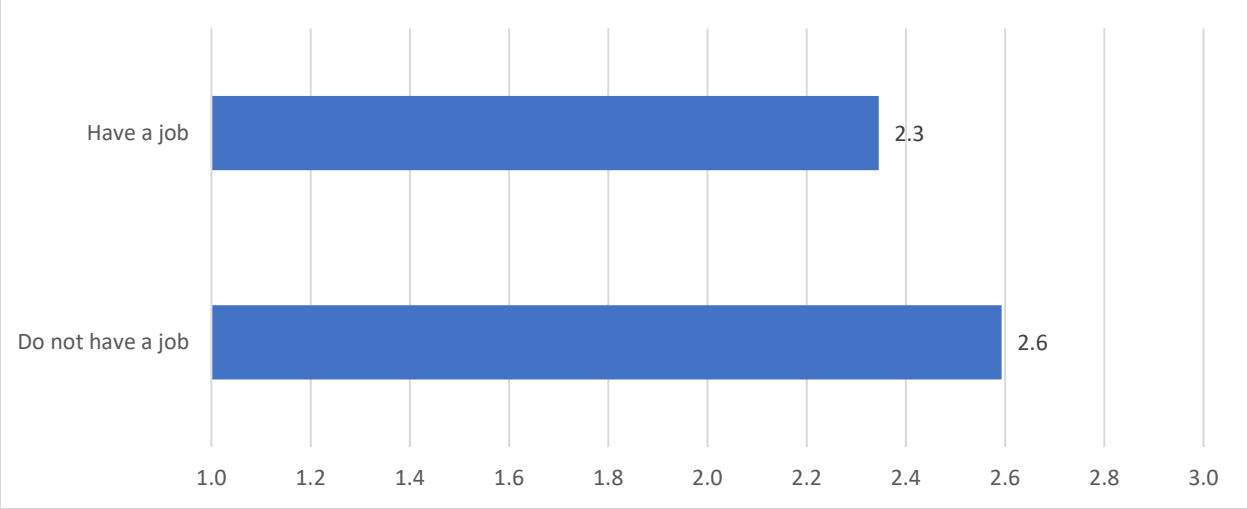


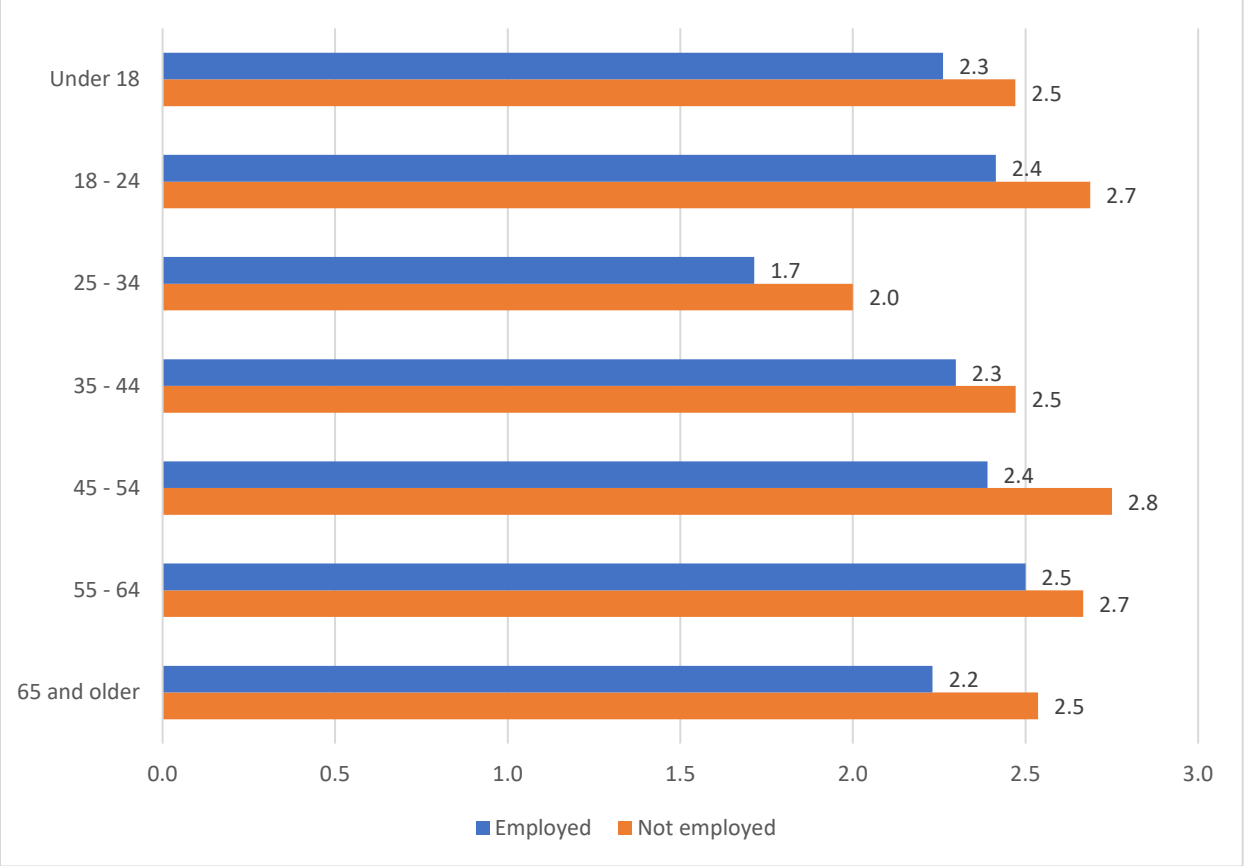
Figure 4 details the average number of trips per tour made by respondents based on their employment status. Those without a job took more trips per tour on average than those who do have a job, at 2.6 trips per tour and 2.3 trips per tour respectively.

Figure 4. Trips per tour by employment status



When combining age and employment status, illustrated in Figure 5 below, results largely follow the patterns described previously. Across all age groups, respondents who were not employed indicated more trips per tour on average than respondents who were employed, and respondents within the 25 – 34 age group took less trips per tour than any other age group, regardless of employment status.

Figure 5. Trips per tour by age and employment status



As illustrated by Figure 6, students on average took slightly longer tours than non-students, taking 2.7 trips per tour as compared to 2.4 trips per tour among non-students.

Figure 6. Trips per tour by student status

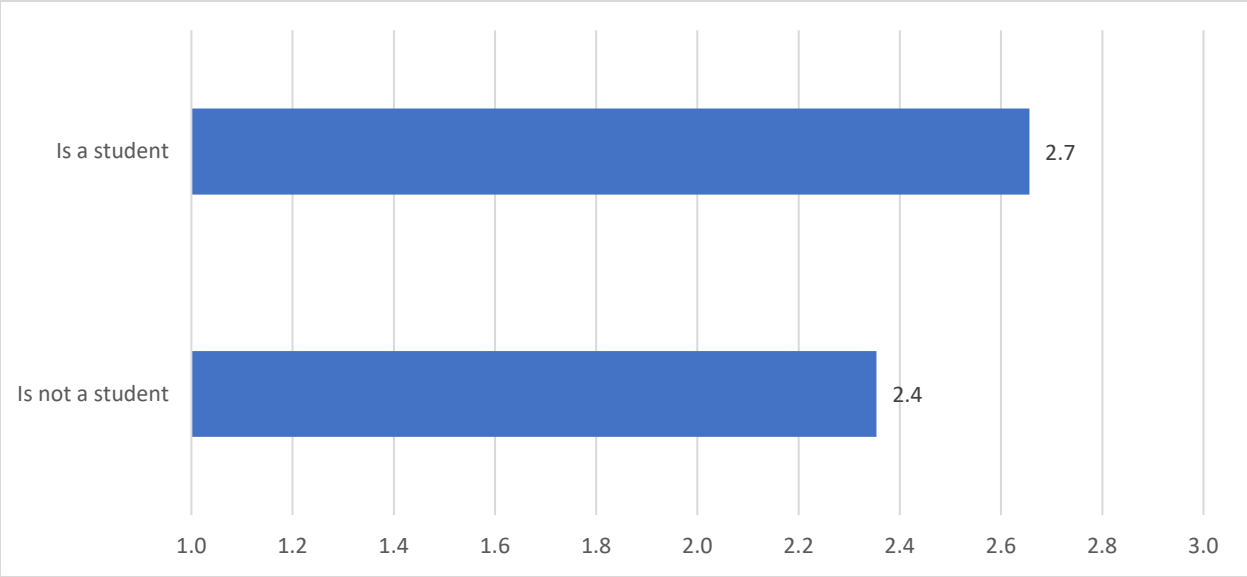
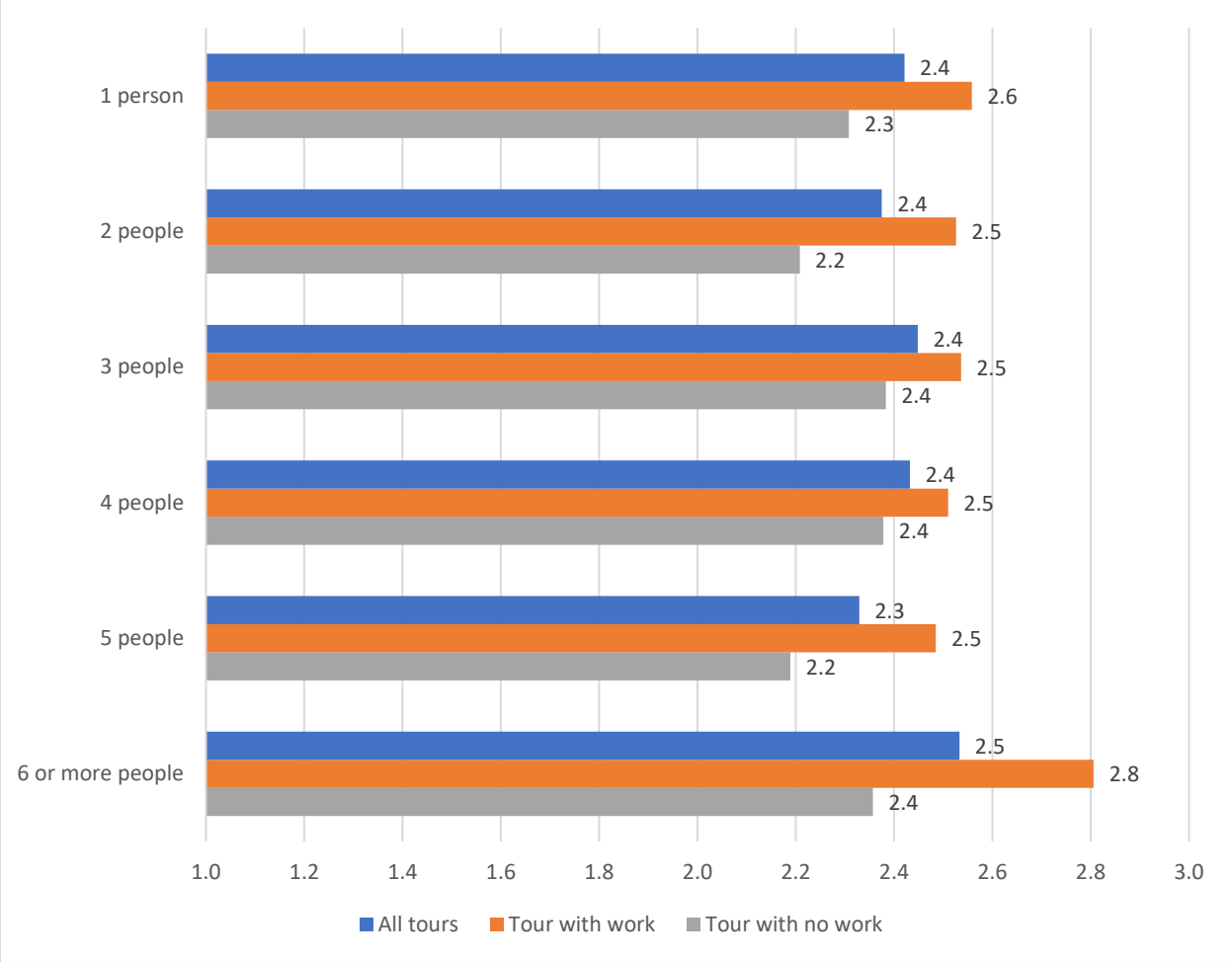


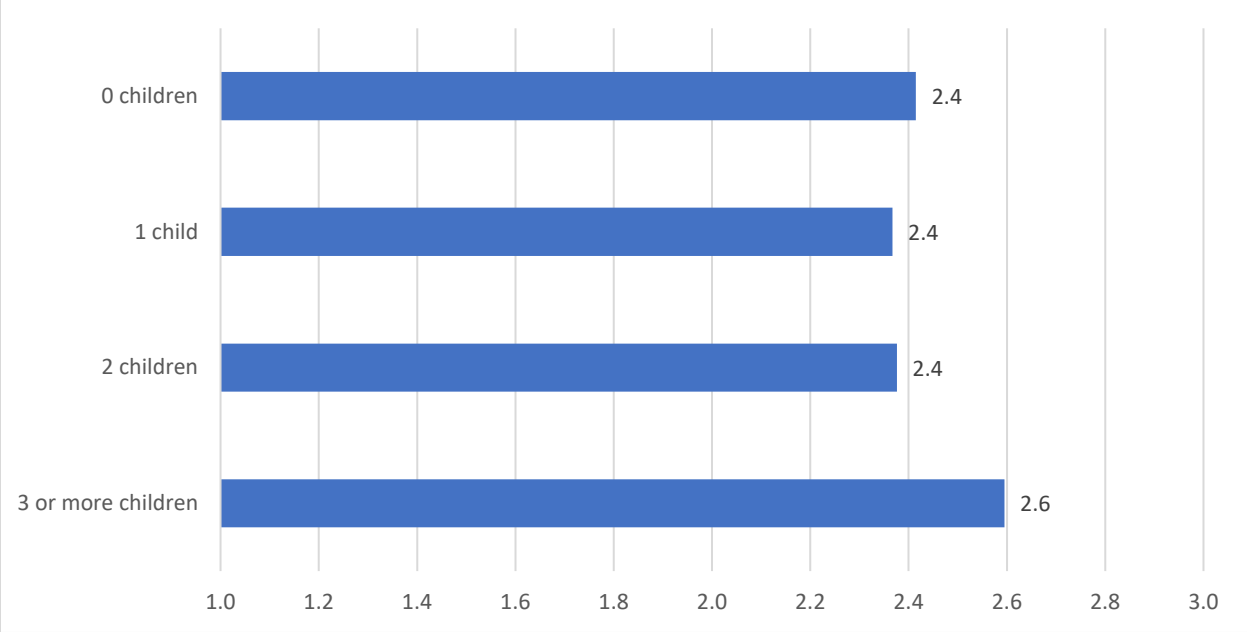
Figure 7 details the average number of trips per tour based on overall household size. Overall and including only tours that involved work, large households of 6 or more people made the most trips per tour, making 2.5 trips per tour overall and 2.8 trips for every tour involving work. Smaller households varied little in the number of trips made per tour overall (ranging from around 2.3 to 2.4 trips per tour), among only tours involving work (ranging from around 2.5 to 2.6 trips per tour), and among tours not involving work (ranging from around 2.2 to 2.4 trips per tour).

Figure 7. Trips per tour by household size



As Figure 8 illustrates, households with 3 or more children made more trips on average, taking 2.6 trips per tour compared to 2.4 trips among households with less children.

Figure 8. Trips per tour by number of children in household



Similar to the figures shown comparing trips taken based on number of children in the household, Figure 9 illustrates the number of trips taken per tour based on the number of adults in the household. While larger households of three or more adults took more trips on average than smaller households, this difference was only very slight, from around 2.4 to just under 2.5 trips per tour.

Figure 9. Trips per tour by number of adults