Active Transportation Monitoring Plan

Initial Evaluation of Bicycling and Walking Baseline & Planned Traffic Counts through 2015

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16. Abstract

Active Transportation in the form of bicycle and pedestrian traffic, is monitored for the Austin-Round Rock-San Marcos, TX region by the Capital Area Metropolitan Planning Organization using a variety of methods: automatic, manual and surveyed. This report compiles the region's first systematic recording of active transportation in the region following methods recommended by a previous study with the Texas Transportation Institute. Annual monitoring of sites within the region representing a variety of land uses and infrastructure types is proposed. Finally, a loan agreement with local jurisdictions is offered to encourage monitoring of additional sites and times.

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Acknowledgements

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Introduction

This initial work to establish an active transportation monitoring program is meant to address three primary questions:

1. When does bicycling and walking fluctuate in the region, relative to the school season, time of day, special events and weather?
2. Which infrastructure facilities and land uses have a positive impact in the number of people bicycling and walking?
3. How will bicycling and walking change over time, as land use densities change and new facilities are implemented?

Why should bicycle and pedestrian counts be performed?

Shawn Turner, P.E. of the Texas Transportation Institute has identified several reasons[1]:

- Support policy decisions/changes
- Plan for cost-effective investments
- Design safe facilities and infrastructure
- Measure performance and progress toward goals
- What gets measured, gets done. If you're not counted, you don't count.

Active transportation includes bicycling and walking, but it also includes a number of "emerging road users" that are increasingly considered in transportation planning[2], such as inline skating, skateboarding, electric-assisted bicycles, kick scooters and others. In a region as dynamic and health-oriented as ours, bicycling

The City of San Jose, California cites their trail counting program as helpful in securing $973,000 in 2007, and $1,377,000 in 2008.
http://www.sjparks.org/Trails/TrailCount.asp

[1] Turner, Shawn. (February 5, 2010) *Calculating Present and Future Trail Demand*. Presentation. Austin, TX: Texas Trails and Active Transportation Conference.
[2] Federal Highway Administration. (2004) *Characteristics of Emerging Road Users and Their Safety*. McLean, VA: Turner-Fairbank Highway Research Center. Publication No. FHWA-HRT-04-103.

and walking in the strictest sense no longer include the breadth of similar modes using the transportation system.

Finally, research on the topic is growing quickly, but is still limited. A landmark meta-analysis of studies on travel and the built environment by Ewing and Cervero[3] identified several studies relating walking mode choice to urban form variables, but cited a "dearth" of studies providing the same information for bicycling mode choice. By recording and disseminating bicycle and pedestrian counts around the region using standardized methods, this work will contribute to local and national knowledge of active transportation trends.

Three main data sources are utilized in this report:

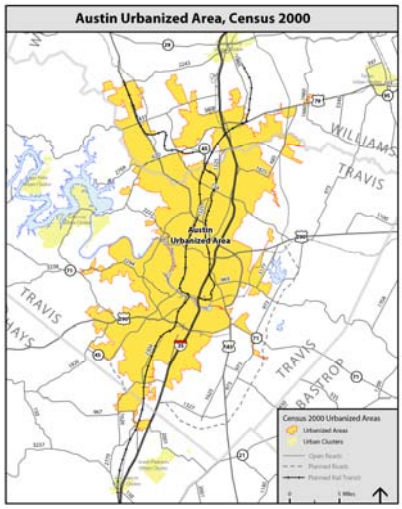
1. **U.S. American Community Survey** journey-to-work provides an annual snapshot of commuting at multiple geographic levels, but does not include other trip types.
2. **Automatic counting equipment** is used for counts for 24-hours or longer, but is subject to specific location requirements for counts to be accurate.
3. **Manual counts** are used where automatic counts may not be accurate or available, and can include gender and helmet use.

[3] Ewing, R. and R. Cervero (2010). Travel and the built environment - a Meta-Analysis. Journal of the American Planning Association 76 (3), 265-294.

Active Transportation Trends and Baseline

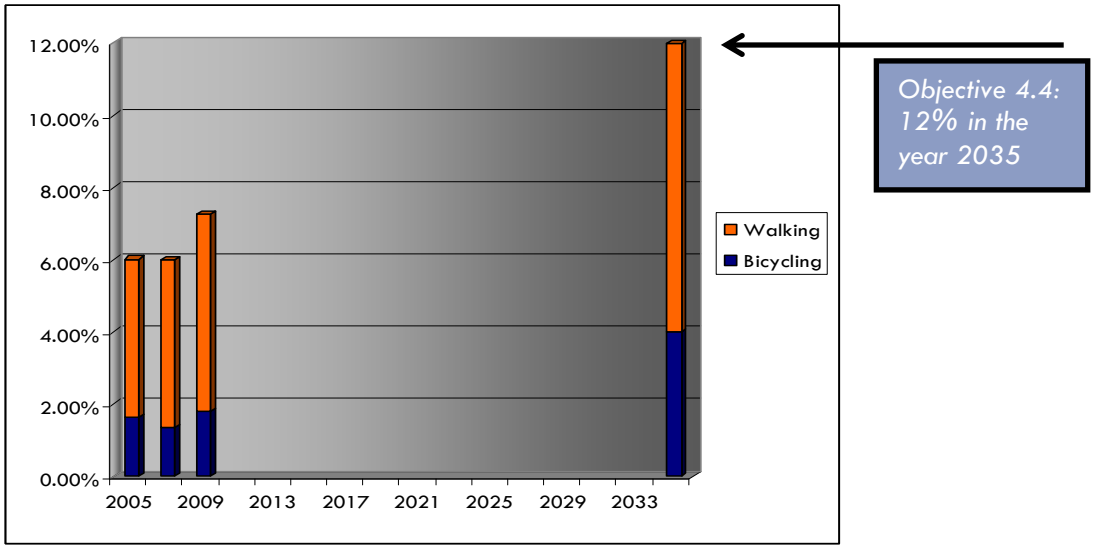
American Community Survey Trends

American Community Survey data is used to monitor CAMPO 2035 Regional Transportation Plan **Objective 4.4:** ***Increase bicycle and pedestrian mode share to at least 12% of all peak period trips within the urbanized area by 2035***[4]. The Austin urbanized area (map at right) is defined by the U.S. Census bureau, and generally includes the region's central city and contiguous suburbs, based on density. Since American Community Survey only tracks commute trips, non-work trips are imputed based on available pedestrian[5] and bicycle[6] factors:



- All pedestrian trips = 2.57 x pedestrian commute share
- All bicycle trips = 0.3% + 1.5 * bicycle commute share

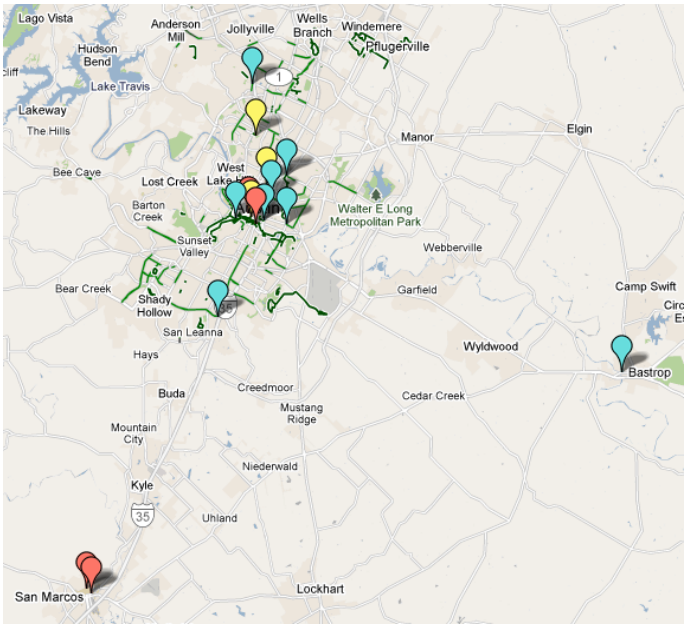
Because American Community Survey methods varied regarding bicycling and walking to work questions before 2005, comparable data is only presented since that time.



[4] Capital Area Metropolitan Planning Organization (2010, May). *CAMPO 2035 regional transportation plan appendices*. page 6. http://campotexas.org/pdfs/CAMPO2035_Appendices.pdf
[5] East West Gateway Council of Governments. (2005). *St. Louis Bicycling and Walking Transportaiton Plan*. page 27. http://www.ewgateway.org/pdffiles/library/trans/bike-ped/bikeplan-05/BikePlan-CompleteDoc.pdf
[6] Krizek, K. J. and et al (2006). *NCHRP report 552 guidelines for analysis of investments in bicycle facilities*. Technical report, The National Academies Transportation Research Board.

Spring 2010 Baseline by the Texas Transportation Institute

As part of *Forecasting Bicycle and Pedestrian Usage and Researching Data Collection Equipment*[7], the Texas Transportation Institute used videography to perform an accurate count at 15 locations chosen to represent a diversity of popular pedestrian and bicycle locations within the CAMPO region.



Spring, 2010 Counts (Source: Texas Transportation Institute, Daily averaging by Greg Griffin, AICP using National Bicycle and Pedestrian Documentation Project method)	**Ped 2hr**	**Bike 2hr**	**Average Daily Pedestrian Traffic (ADPT)**	**Average Daily Bicycle Traffic (ADBT)**	**Average Daily Active Transportation (ADAT) Total**
51st Street at IH-35	21	60	158	450	608
Ann Richards Bridge (Congress Ave at Lady Bird Lake)	275	89	2,063	668	2,731
Barton Springs Road at Zilker Park	20	64	140	448	588
Dean Keeton St. east of Red River St.	38	62	285	465	750
Jollyville Rd. north of Braker Ln	57	42	428	315	743
Lamar Blvd. at W. 6th St.	304	69	2,280	518	2,798
Lance Armstrong Bikeway & 3rd Street	56	85	420	638	1,058
Lance Armstrong Bikeway at IH-35	16	48	120	360	480
N. LBJ at Sessom Dr	403	27	3,023	203	3,225
Pleasant Valley Rd. north of E. 7th St.	70	34	525	36	561
SH 150 at Colorado River Bridge	50	13	375	98	473
Shoal Creek Blvd. at Stoneway Dr.	55	172	444	1,389	1,833
Slaughter Ln. west of S. Congress	3	3	35	35	70
Speedway & 38th St.	49	136	396	1,098	1,494
University Drive at Sewell Park pedestrian signal	430	31	3,225	233	3,458
median	55	60	420	448	868

[7] Hudson, J., T.-B. Qu, and S. Turner (2010, December). *Forecasting bicycle and pedestrian usage and researching data collection equipment*. Technical Report TTI No. P200933, Texas Transportation Institute. http://tti.tamu.edu/documents/TTI-P2009330.pdf

1st Quarter, 2011 Bicycling and Walking

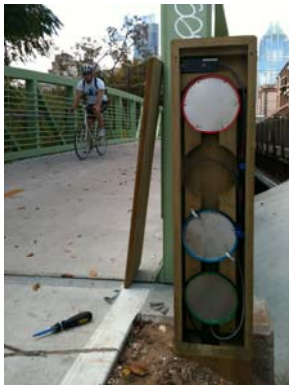
CAMPO and its partner organizations have implemented three types of active transportation counts: continuous automatic counters, mobile automatic counters, and manual counts (including videography). Each counting method has its advantages:

- Permanent automatic counters provide very detailed counts of bicyclists and pedestrians on a 24-hour basis in 15-minute increments all year long. These counts are needed to show detail for time-of-day, school seasons, and infrastructure changes, but cannot be installed in all sites.
- Mobile automatic counters can provide the same temporal detail, but are portable to meet individual site needs. Pneumatic tubes can be measured to fit wide roads if needed. They cannot be left in place long, as the pneumatic tubes wear with automobile impacts, and are subject to theft despite chains and padlocks.
- Manual counts fit where equipment does not; complicated roadway or park settings, or when permission to install equipment cannot be obtained. Despite the staff time needed, manual counts usually include recording gender, helmet use or other statistics not recorded by machines. Use of two or more staff persons can enable personal intercept surveys to be administered.

In the first quarter of 2011, bicycle and pedestrian counts have been recorded using the 2 permanent and mobile counters acquired through the TTI study, and with manual counts.

Permanent Automatic Counters

CAMPO and the City of Austin have installed 2 Eco-counter brand "Eco-combo" devices, which monitor bicycle and pedestrian counts and direction. Bicycles are detected using an inductive loop mounted in the pavement. Pedestrians are counted with two infrared sensors to allow detection of direction. All of the sensor and logger hardware is encased in an un-assuming wooden post (at right, with cover removed).



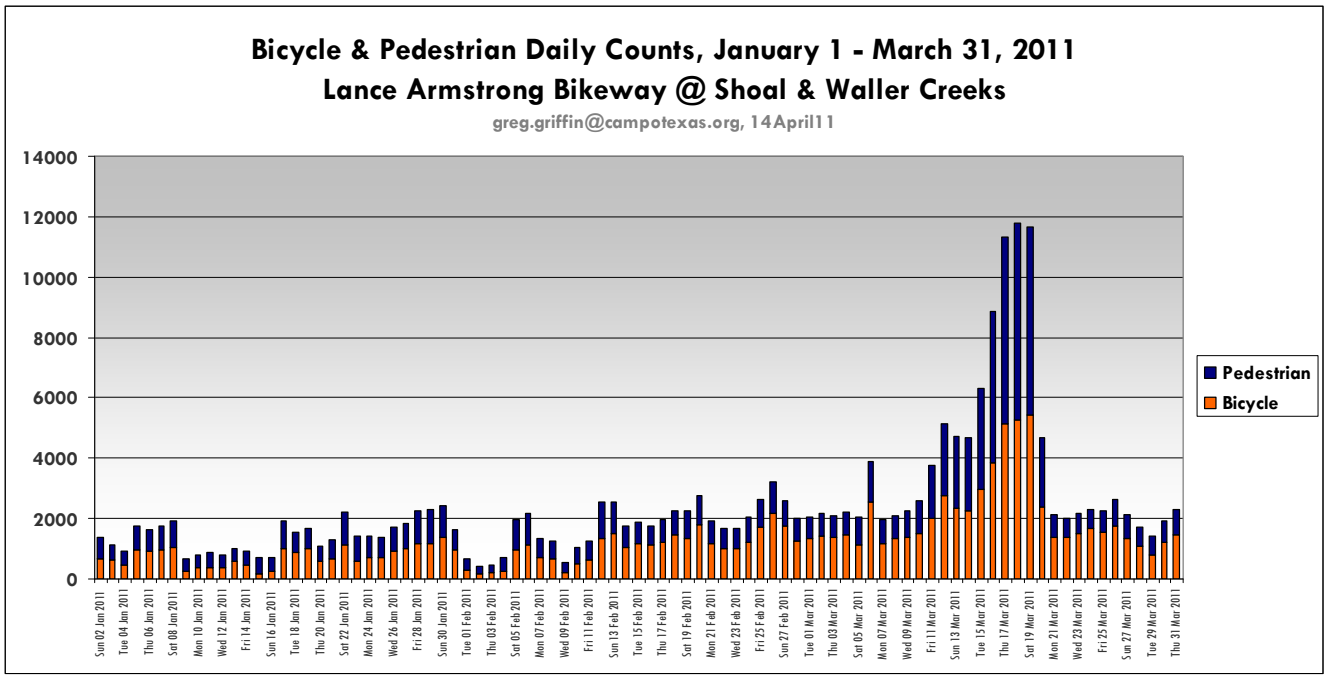
The automatic counters are located on the Lance Armstrong Bikeway, west and east of downtown at the Shoal Creek crossing, and at the Waller creek crossing near IH-35. Both sites were located to function as a cordon count of bicycle

traffic in two directions of downtown, and to include all trip purposes (recreational, commute, shopping, etc.).

1st quarter of 2011 results at both sites experienced high bicycle and pedestrian traffic. The following statistics have not been adjusted, and preliminary analysis indicates they likely under-count (described in "Permanent Counter Accuracy" section below).

- Peak day: Saturday
- Hourly average bike + ped. traffic, including both sites: 99
- Daily average bike + ped traffic, including both sites: 2,394
- Monthly average bike + ped traffic, including both sites: 71,031

Graphing the entire 3-month period by day shows an overall trend that is fairly consistent, with a significant increase over the SXSW event.



Permanent Counter Accuracy

The Eco-Combo counter locations were validated by Jean françois Rheault of Eco-Counter before installation to reduce inaccuracies caused by site conditions such as non-pathway human movements or magnetic interference. The Eco-counter PYRO pedestrian counter (part of the Eco-Combo) was tested by the Texas Transportation Institute as having better results than three other products evaluated[8]. However, several regular pathway situations are known to cause under-counting:

77% of bicyclists at Shoal Creek were male, and 71% of all riders wore helmets during a 1-hour count on April 1, 2011.

- Pedestrians walking in close proximity may be counted as one.
- Bicyclists riding very close to the edge of the pavement, or exactly in the center of the detection loop may not be counted.
- Bicycle trailers for children, and pedicabs register as one bicycle, though manual counting could include two pedestrian passengers.

The accuracy of an automatic counter can be compared with a manual count to assess its accuracy. The following equation is used to find the relative difference between the counts[9]:

$$Error = \frac{NPx - NPv}{NPv} \quad (1)$$

where *NPx* is the number of pedestrians (or bicyclists) counted by the automatic counter, and *NPv* is the volume counted by a manual count. Results of a single comparison on April 1, 2011 by the author at the Shoal Creek site estimated undercounting of pedestrians by 35%, and bicycles by 31%. The Shoal Creek site should also be evaluated, and both sites further tested at a variety of times to confirm these factors before using them to impute the counts to increase accuracy.

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[8] Hudson, J., T.-B. Qu, and S. Turner (2010, December). *Forecasting bicycle and pedestrian usage and researching data collection equipment*. Technical Report TTI No. P200933, Texas Transportation Institute. page 12. http://tti.tamu.edu/documents/TTI-P2009330.pdf

[9] Diógenes, M. C., R. Greene-Roesel, D. R. Ragland, and L. A. Lindau (2008). *Effectiveness of a commercially available automated pedestrian counting device in urban environments: Comparison with manual count*. TRB 2008 Annual Meeting CD-ROM. Washington, D.C.: Transportation Research Board.

Mobile Automatic and Manual Counts

The following counts were taken in the 1st quarter of 2011 through partnerships with Brooks Andrews, a Texas State University student in San Marcos, and Sam Cortez of the University of Texas Parking and Transportation Services with Tim Dietrich of the City of Austin Bicycle Program. The San Marcos count was a 2-hour manual count extrapolated using the National Bicycle and Pedestrian Documentation Project method to match an average daily comparison with other sites. The Speedway and 38th Street and Blanton Museum locations were recorded with Eco-counter TUBES automatic counters, and are un-adjusted. The average is from 3 days of 24-hour data.

	Count date	Average Daily Bicycle Traffic (ADBT)	Average Daily Pedestrian Traffic (ADPT)
770 Aquarena Springs Dr., San Marcos, TX 78666	March 3, 2011	394	5,473
Speedway and 38th St., Austin, TX	March 28-30, 2011	1,497	*not recorded*
Blanton Museum, MLK & Congress, Austin, TX	March 28-30, 2011	168	*not recorded*

The Aquarena Springs Drive site in San Marcos is in close proximity to Texas State University, and a grate deal of the traffic were students headed to and from classes. Only 2 out of 30 bicyclists observed in the 2-hour count wore helmets (7%). 23% of bicyclists were female, whereas 52% of pedestrians were female. Since the other 2 sites used automatic counters, helmet use or gender is not available. These counts were submitted to the National Bicycle and Pedestrian Documentation Project[10] for national use on April 12, 2011.

[10] Alta Planning & Design, Institute of Transportation Engineers (ITE) Pedestrian and Bicycle Council. *National Bicycle and Pedestrian Documentation Project*. [Accessed April 15, 2011]. http://bikepeddocumentation.org/

Active Transportation Monitoring Plan, 2011-2015

Annual Site Monitoring Goal Dates

The exact dates listed below are goals to attempt, depending on available staff and equipment resources. If possible, all counts should be taken on a Tuesday, Wednesday or Thursday avoiding holidays and school breaks. Partnerships with local jurisdictions are preferable to use automatic counting equipment, due to needs at some sites to stop traffic for installation.

- **Priority 1: Use Automatic Counters.** Counts taken with automatic equipment should be taken for 24 or 48 hours (installing at 11 am and picking up the at that time). If the equipment is not available, or any needed traffic control cannot be obtained for equipment installation, manual counts should be performed.
- **Priority 2: Manual Counts.** Manual counts should be taken for two-hour peak travel increments: generally 7-9 am, and 4-6 pm. Although the 2010 counts were performed for both AM and PM peak periods, only AM or PM counts are likely feasible with existing staffing and resources. 2-hour counts should follow the National Bicycle and Pedestrian Documentation Project's process[11] to extrapolate to daily counts.

[11] Alta Planning & Design (2009, March). National bicycle & pedestrian documentation project count adjustment factors. Technical report, Institute of Transportation Engineers (ITE) Pedestrian and Bicycle Council. http://bikepeddocumentation.org/

City	Planned Type	Site	*2010 (complete)*	*Target Bicycle & Pedestrian Monitoring Dates* 2011	2012	2013	2014	2015
Austin	Manual	51st Street at IH-35	*April 20*	May 12	May 15	May 15	May 15	May 12
Austin	Manual	Ann Richards Bridge (Congress Ave at Lady Bird Lake)	*April 22*	Sept. 13	Sept. 11	Sept. 10	Sept. 10	Sept. 8
Austin	Auto. bike	Barton Springs Road at Zilker Park	*March 11*	end of April	end of April	end of April	end of April	end of April
Austin	Auto. bike	Dean Keeton St. east of Red River St.	*April 20 & 27*	end of April	end of April	end of April	end of April	end of April
Austin	Auto. bike	Escarpment Blvd. north of Convict Hill	-	April 20	end of April	end of April	end of April	end of April
Austin	Auto. B/P	Jollyville Rd. north of Braker Ln (moved to Loop 360 in 2011)	*April 20*	May 10	May 8	May 8	May 8	May 5
Austin	Auto. B/P	Lamar Blvd. at W. 6th St. (moved to Lamar Blvd & Sandra Muraida 2011)	*April 21 & 22*	April 26	April 24	April 24	April 23	April 22
Austin	Auto. B/P	Lance Armstrong Bikeway at IH-35 (moved to Waller Creek 2011)	*July 22 & August 25*	July 5	July 3	July 3	July 2	July 2
Austin	Auto. B/P	Lance Armstrong Bikeway at Shoal Cr.	*August 10*	Sept. 13	Sept. 11	Sept. 10	Sept. 10	Sept. 8
Austin	Auto. B/P	Pfluger Bridge over Lady Bird Lake	-	end of April	end of April	end of April	end of April	end of April
Austin	Auto. bike	Pleasant Valley Rd. north of E. 7th St.	*April 27 & 28*	end of April	end of April	end of April	end of April	end of April
Austin	Auto. bike	Shoal Creek Blvd. at Stoneway Dr.	*March 10*	end of April	end of April	end of April	end of April	end of April
Austin	Manual	Slaughter Ln. west of S. Congress	*April 21*	May 11	Sept. 13	Sept. 12	Sept. 11	Sept. 9
Austin	Auto. bike	Speedway & 38th St.	*March 25*	end of April	end of April	end of April	end of April	end of April
City	**Type**	**Site**	***2010 (complete)***	***Target Bicycle & Pedestrian Monitoring Dates* 2011**	**2012**	**2013**	**2014**	**2015**
Bastrop	Auto.	SH 150 at Colorado River Bridge	*July 22*	July 6	July 3	July 3	July 3	July 2
Lockhart	Manual	217 South Main Street	*not counted*	May 11				
San Marcos	Manual	University Drive at Sewell Park pedestrian signal	*April 8*	Sept. 15	Sept. 13	Sept. 12	Sept. 11	Sept. 10
San Marcos	Manual	N. LBJ at Sessom Dr	*April 29*	Sept. 15	Sept. 13	Sept. 12	Sept. 11	Sept. 10

Appendix A: Loan of Bicycle and Pedestrian Monitoring Equipment Agreement

LOAN OF BICYCLE AND PEDESTRIAN MONITORING EQUIPMENT AGREEMENT

1. PARTIES. This agreement is made DATE between the Capital Area Metropolitan Planning Organization, herein called "Owner," and PERSON, of ORGANIZATION, who must be an authorized representative of a governmental jurisdiction or transportation provider, herein called "Borrower."

LOAN OF EQUIPMENT. For and in consideration of the covenants and agreements hereinafter contained, to be kept and performed by Borrower, Owner has loaned and does hereby loan to borrower the personal property known and described as follows: EQUIPMENT LIST hereafter designated as "equipment," to have and to hold the same unto Borrower for the period of # OF WEEKS weeks commencing from DATE.

2. DELIVERY AND RETURN OF PROPERTY. Borrower shall pick up the equipment at the owner's place of business, 505 Barton Springs Road, Suite 700, Austin, TX 78704, or at another location agreed to by both parties. At the end of the term, Borrower shall return equipment to Owner in as good condition as exists at the commencement of the term, reasonable wear and tear in respect thereto expected.

3. PAYMENT AND LATE FEES. No payment is required for use of the equipment within the period stated in this agreement. Late fees will be charged to Borrower if the equipment is not returned within this period under the following schedule: $20 per calendar day.

4. DAMAGES. If the Borrower damages, or loses possession of the equipment at any time, full costs of repair or replacement, shipping and late fees will be due to the Owner.

5. REPOSSESSION. If Borrower shall lose possession of the equipment or any interest therein, or if Borrower defaults in any of the covenants, conditions or provisions of this agreement, it is agreed that Owner may immediately and without notice take possession of equipment whereinsoever found and to remove and keep or dispose of the same and any unpaid late fees shall at once become due and payable.

6. LOCATION AND USE. Borrower shall use equipment only in Bastrop, Caldwell, Hays, Travis, and Williamson Counties in Texas and shall not at any time remove the same bicycle and pedestrian monitoring equipment from the place Bastrop, Caldwell, Hays, Travis, and Williamson Counties in Texas except as may be permitted by Owner by consent thereto in writing.

7. INDEMNIFICATION OF OWNER. Borrower shall and does hereby agree to protect and save Owner harmless against any and all losses or damage to equipment by fire, flood, explosion, tornado or theft and Borrower shall and does hereby assume all liability to any person whomsoever arising from the location, condition or use of equipment, and shall indemnify Owner of and from all liability, claim and demand whatsoever arising from the location, condition, or use of equipment whether in operation or not, and growing out of any cause, and from every other liability, claim and demand whatsoever during the term of this Loan or arising while equipment is in the possession of Borrower.

8. TIME OF ESSENCE. Time is the essence of this agreement.

9. NO ASSIGNMENT. Neither this Loan and agreement nor any right or interest thereunder shall be assigned by Borrower in any respect whatsoever.

10. CHOICE OF LAW. This Loan and agreement shall be deemed to have been executed and entered into in the State of Texas and shall be construed, enforced and performed in accordance with the laws thereof.

11. EXCLUSION OF ORAL STATEMENTS. This instrument contains all of the agreements of the parties. No oral or other statements shall be binding on either of the parties hereto.

By _____ By _____

Owner Borrower

_____ _____

Title Title

Appendix B: Standard Screenline Count Form

STANDARD SCREENLINE COUNT FORM

Name: _____ Location: _____

Date: _____ Start Time: _____ End Time: _____

Weather: _____

Please fill in your name, count location, date, time period, and weather conditions (fair, rainy, very cold). Count all bicyclists and pedestrians crossing your screen line under the appropriate categories.

- Count for two hours in 15 minute increments.
- Count bicyclists who ride on the sidewalk.
- Count the number of people on the bicycle, not the number of bicycles.
- Pedestrians include people in wheelchairs or others using assistive devices, children in strollers, etc.
- People using equipment such as skateboards or rollerblades should be included in the "Other" category.

	Bicycles		**Pedestrians**		**Others**
	Female	**Male**	**Female**	**Male**	
00-:15					
15-:30					
30-:45					
45-1:00					
1:00-1:15					
1:15-1:30					
1:30-1:45					
1:45-2:00					
Total					

Appendix C: American Community Survey Tables, 2005, 2007, 2009

Note: Tables are truncated to fit a single page by removing

- Place of Work
- Time Leaving Home to Go to Work
- Travel Time to Work
- Percent Imputed

S0801: Commuting Characteristics by Sex
Data Set: 2005 American Community Survey
Survey: American Community Survey
Geographic Area: Austin, TX Urbanized Area

NOTE. Data are limited to the household population and exclude the population living in institutions, college dormitories, and other group quarters. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see Survey Methodology.

Subject	Total	Margin of Error (+/-)	Male	Margin of Error (+/-)	Female	Margin of Error (+/-)
Workers 16 years and over	500,283	8,852	290,631	6,252	209,652	5,284
MEANS OF TRANSPORTATION TO WORK						
Car, truck, or van	87.4%	1.2	86.1%	1.6	89.2%	1.6
Drove alone	76.5%	1.5	74.1%	2.0	79.8%	1.9
Carpooled	10.9%	1.2	12.1%	1.8	9.4%	1.0
In 2-person carpool	8.1%	1.1	8.4%	1.5	7.7%	1.1
In 3-person carpool	1.3%	0.4	1.5%	0.6	1.1%	0.3
In 4-or-more person carpool	1.5%	0.4	2.1%	0.7	0.6%	0.2
Workers per car, truck, or van	1.23	0.02	1.26	0.03	1.19	0.02
Public transportation (excluding taxicab)	3.8%	0.8	4.4%	1.3	2.9%	0.6
Walked	1.6%	0.4	1.4%	0.3	1.7%	0.7
Bicycle	0.9%	0.3	1.3%	0.4	0.5%	0.3
Taxicab, motorcycle, or other means	1.4%	0.4	1.7%	0.5	1.1%	0.6
Worked at home	4.9%	0.6	5.1%	0.9	4.6%	0.7
Workers 16 years and over who did not work at home	475,872	8,755	275,805	6,292	200,067	5,245
VEHICLES AVAILABLE						
Workers 16 years and over in households	500,283	8,852	290,631	6,252	209,652	5,284
No vehicle available	3.4%	0.8	4.0%	1.2	2.5%	0.6
1 vehicle available	27.5%	1.4	25.9%	1.7	29.6%	1.8
2 vehicles available	47.2%	1.9	48.0%	2.2	46.0%	2.2
3 or more vehicles available	22.0%	1.8	22.1%	2.1	21.8%	2.1

Source: U.S. Census Bureau, 2005 American Community Survey

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see http://www.census.gov/acs/www/Downloads/ACS/accuracy2005.pdfAccuracy of the Data). The effect of nonsampling error is not represented in these tables.

Notes:
·Workers include members of the Armed Forces and civilians who were at work last week.

S0801: Commuting Characteristics by Sex
Data Set: 2007 American Community Survey 1-Year Estimates
Survey: American Community Survey
Geographic Area: Austin, TX Urbanized Area

NOTE. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see Survey Methodology.

Subject	Total	Margin of Error (+/-)	Male	Margin of Error (+/-)	Female	Margin of Error (+/-)
Workers 16 years and over	559,707	8,755	322,885	6,172	236,822	6,101
MEANS OF TRANSPORTATION TO WORK						
Car, truck, or van	87.4%	0.9	87.6%	1.1	87.2%	1.2
Drove alone	74.1%	1.4	73.1%	1.8	75.5%	1.7
Carpooled	13.3%	1.2	14.5%	1.5	11.7%	1.3
In 2-person carpool	9.1%	0.9	8.9%	1.1	9.5%	1.3
In 3-person carpool	2.0%	0.5	2.2%	0.7	1.7%	0.5
In 4-or-more person carpool	2.2%	0.6	3.5%	1.0	0.5%	0.3
Workers per car, truck, or van	1.25	0.02	1.27	0.02	1.24	0.02
Public transportation (excluding taxicab)	4.0%	0.6	3.7%	0.7	4.3%	0.9
Walked	1.7%	0.4	1.7%	0.5	1.8%	0.5
Bicycle	0.7%	0.3	0.8%	0.4	0.6%	0.2
Taxicab, motorcycle, or other means	1.9%	0.4	2.5%	0.6	1.1%	0.3
Worked at home	4.3%	0.4	3.8%	0.5	5.0%	0.6
VEHICLES AVAILABLE						
Workers 16 years and over in households	556,602	8,755	321,549	6,223	235,053	5,995
No vehicle available	3.2%	0.5	3.2%	0.6	3.1%	0.8
1 vehicle available	27.8%	1.7	27.0%	2.2	28.9%	1.8
2 vehicles available	46.7%	1.9	46.1%	2.3	47.4%	1.9
3 or more vehicles available	22.4%	1.5	23.6%	1.8	20.7%	1.7

Source: U.S. Census Bureau, 2007 American Community Survey
Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see http://www.census.gov/acs/www/Downloads/ACS/accuracy2007.pdfAccuracy of the Data). The effect of nonsampling error is not represented in these tables.

Notes:
·Workers include members of the Armed Forces and civilians who were at work last week.
·While the 2007 American Community Survey (ACS) data generally reflect the December 2006 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities. The 2007 Puerto Rico Community Survey (PRCS) data generally reflect the December 2005 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in PRCS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.
·Estimates of urban and rural population, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2000 data. Boundaries for urban areas have not been updated since Census 2000. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

S0801: Commuting Characteristics by Sex
Data Set: 2009 American Community Survey 1-Year Estimates
Survey: American Community Survey
Geographic Area: Austin, TX Urbanized Area

NOTE. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see Survey Methodology.

Subject	Total	Margin of Error (+/-)	Male	Margin of Error (+/-)	Female	Margin of Error (+/-)
Workers 16 years and over	570,549	9,918	321,461	6,126	249,088	6,390
MEANS OF TRANSPORTATION TO WORK						
Car, truck, or van	84.7%	1.0	83.7%	1.5	86.1%	1.3
Drove alone	74.7%	1.1	72.8%	1.5	77.2%	1.4
Carpooled	10.0%	0.8	10.9%	1.2	8.9%	1.0
In 2-person carpool	7.6%	0.8	7.9%	1.1	7.3%	0.8
In 3-person carpool	1.4%	0.4	1.6%	0.6	1.1%	0.4
In 4-or-more person carpool	1.0%	0.3	1.3%	0.5	0.5%	0.2
Workers per car, truck, or van	1.07	0.01	1.08	0.01	1.06	0.01
Public transportation (excluding taxicab)	3.8%	0.6	3.5%	0.8	4.3%	0.8
Walked	2.0%	0.4	2.1%	0.5	1.8%	0.6
Bicycle	1.0%	0.3	1.4%	0.5	0.4%	0.2
Taxicab, motorcycle, or other means	2.8%	0.6	3.8%	1.0	1.5%	0.5
Worked at home	5.7%	0.6	5.5%	0.8	5.9%	0.7
VEHICLES AVAILABLE						
Workers 16 years and over in households	567,733	10,013	319,985	6,152	247,748	6,394
No vehicle available	2.9%	0.5	3.0%	0.7	2.7%	0.7
1 vehicle available	28.5%	1.3	26.7%	1.5	30.9%	1.6
2 vehicles available	46.6%	1.6	47.4%	1.8	45.5%	1.7
3 or more vehicles available	22.0%	1.6	22.8%	1.9	21.0%	1.7

Source: U.S. Census Bureau, 2009 American Community Survey
Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see http://www.census.gov/acs/www/data_documentation/documentation_main/Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

Notes:
·Workers include members of the Armed Forces and civilians who were at work last week.
·Number of workers per car, truck, or van was calculated incorrectly for 2005 ACS to 2008 ACS. See Errata Note #55.
·While the 2009 American Community Survey (ACS) data generally reflect the November 2008 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.
·Estimates of urban and rural population, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2000 data. Boundaries for urban areas have not been updated since Census 2000. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

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