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A. Needs Analysis

A.1 Introduction

This chapter presents an overview of the needs of bicyclists and trail users in Albuquerque. Adequately identifying user needs enables system planners and policy-makers to develop cost-effective solutions for improving the region's bikeway and multi-use trail network. This report provides an overview of cyclist volumes and behaviors at many locations throughout the City, discusses public input gathered through an online user survey and examines cyclist safety by analyzing reported bicycle crash data. This information will be used in conjunction with field visits, input gathered at public meetings, stakeholder interviews and analysis of the existing bikeways and multi-use trail network to provide future project recommendations.

A.1.2 Importance of Non-motorized Transportation

Biking and trail use is important to Albuquerque's future due to its potential to address several interrelated challenges, including traffic, air quality, and public health. By planning a metropolitan area that is more accessible to non-motorized transportation, practitioners can affect all of these areas, which collectively can have a profound influence on existing and future quality of life in Albuquerque. As the state *Bicycle-Pedestrian-Equestrian Advisory Plan* states, walking and bicycling are already "significant modes of transportation in New Mexico." Significant opportunities and reasons remain to expand the non-motorized transportation network and improve the quality of the user experience.

A.1.2.1 Traffic and Air Quality

Each time an Albuquerque driver chooses to walk or bike, one less motor vehicle trip is made. As Albuquerque becomes more inviting to pedestrians and cyclists, increasing numbers of shopping, dining, school, and recreational trips will be made via multi-use trails and bikeways. Cumulatively, this pattern may reduce traffic in some neighborhoods, which can also improve air quality.

A.1.2.2 Potential User Base

Nearly one-third of Americans do not drive, this includes children under 16, about 20 percent of residents over 65 and other residents over 16 that cannot afford or choose not to own a motor vehicle. Also included in this user base are people that own cars but choose to walk or bike and people that would like to walk and bike but feel that significant barriers exist (e.g., physical barriers such as missing facilities or perceived barriers such as a lack of time).

A.1.2.3 Public Health

In recent years, public health professionals and urban planners have become increasingly aware that the impacts of motor vehicles on public health extend far beyond asthma and other respiratory conditions caused by air pollution. There is a much deeper understanding of the connection between the lack of physical activity resulting from auto-oriented community designs and various health-related problems such as obesity and other chronic diseases. Although diet and genetic predisposition contribute to these conditions, physical inactivity is now widely understood to play a significant role in the most common chronic diseases in the U.S., including coronary heart disease, stroke, and diabetes[1]. In response to these trends, the public health profession has begun to advocate for the creation of walkable and bikeable neighborhoods as one of the most effective ways to encourage active lifestyles. Studies show that 43 percent of people with safe places to walk within ten minutes of home meet recommended daily activity levels, compared to only 27 percent of those without safe places to walk[2].

Data collected by the Center for Disease Control (CDC) between 1995 and 2007 indicates that the percentage of New Mexican residents classified as obese has increased from the 10 to 14 percent range in 1995 to the 20 to 24 percent range in 2007. As Albuquerque becomes a more friendly to non-motorized transporta-

1 McKenna, M.T., Taylor, W.R., Marks, J.S., & Koplan, J.P., "Current issues and challenges in chronic disease and control" in Chronic Disease Epidemiology and Control, 2nd edition, American Public Health Assn., 1988.

2 Powell, K.E., Martin, L., Chowdhury, P.P., "Places to walk: Convenience and regular physical activity" in American Journal of Public Health, 2003.

tion, residents will have more opportunities to exercise, ideally resulting in a higher proportion of residents achieving recommended daily activity levels.

A.2 Types of System Users

A.2.1 Pedestrians

This group includes all travel that is primarily foot-powered including walkers, joggers, and in-line skaters. Pedestrians are typically looking for user facilities that provide connections to destinations for utilitarian trips, or for longer continuous facilities for exercise related trips. Key facilities for pedestrians include travelways with a smooth travel surface and infrastructure to enhance safety at roadway crossings.

A.2.2 Cyclists

It is important to understand that the needs and preferences of bicyclists vary depending on skill level, equipment, and/or trip purpose. For example, bicyclists who ride for recreational purposes may prefer scenic, winding, shared-use paths, while bicyclists who ride to work or for errands may prefer more direct on-street bicycle facilities. Child cyclists, seniors, and beginning adults may prefer shared-use paths, while experienced cyclists may prefer bicycle lanes. Also included are utilitarian cyclists who choose to live without a car and people who ride due to economic reasons. More detail on the types of cyclists and their needs is contained in Appendix A.

A.2.3 Equestrians

As with pedestrian and bicycle users, the needs of equestrian users vary with experience and relative levels of urbanization and trail development. In areas of higher use, equestrian users prefer facilities that provide adequate separation from other user types that may spook horses (e.g., cyclists or in-line skaters) and an unpaved trail tread. In the on-line survey approximately 10 percent of respondents reported riding Albuquerque's multi-use trails.

A.3 System Use

A.3.1 Albuquerque's Historic Cycling Activity

A.3.1.1 Bicycle Commuting

Data from the 1990 and 2000 US Census, shown in Table 1, indicates that bicycle use for commuting purposes has remained static for last 20 years. This stable trend is reflected in the percentage mode share for all journey to work trips captured by the U.S. census data. This provides one measure of bicycle usage, but does not indicated that bicycle use for other trips (e.g., social trips, exercise trips and trips for other errands has not increased over the same time period.)

Table 1: Historic Bicycle Commute Data for Albuquerque

Journey To Work Mode Splits	1990*	2000*	2006**
Drove Alone	78.0%	77.7%	78.0%
Carpool	12.1%	12.5%	11.4%
Transit	2.0%	1.7%	2.0%
Bicycle	1.2%	1.1%	1.2%
Walk	2.9%	2.7%	2.4%
Other	1.1%	0.7%	1.3%
Work at Home	2.7%	3.6%	3.8%

*U.S. Dicennieal Census
** U.S. 2006 – 2008 American Community Survey

Figure 1 shows Albuquerque's bicycle to work mode share in comparison to the national average and several other cities in the western United States. Approximately 1.1 percent of

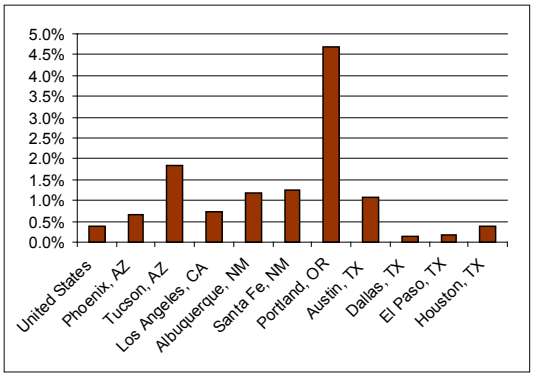


Figure 1. 2006 ACS Bicycle Commute Mode Share

Albuquerque's population commutes by bicycle. This is consistent with several other cities in the general vicinity including Austin, Texas and Santa Fe, New Mexico.

Additional bicycle to work statistics of note obtained from the 2006 - 2008 American Community Survey include:

- About 65 percent of Albuquerque's bicycle commuters are male. This is consistent with the male/female ratio reported in the online survey.
- The average journey to work trip for individuals traveling by taxi, motorcycle, bicycle or other means was about 23 minutes, with the most frequent travel time being 10 – 20 minutes3. This is consistent with a travel distance of two to three miles. This is slightly longer than the average 16 minute travel time reported in the 2000 census data. The aggregated mode type could account for some of the variation in reported average travel times.
- About 25 percent of people who reported traveling to work via motorcycle, bicycle, taxi or other means did not have a motor vehicle available for their use.
- The industry reporting the highest number of people commuting via motorcycle, bicycle, taxi or other means was the educational services, health care and social assistance sector, which accounted for 31 percent of tabulated response. A significant portion of this population is likely affiliated with the University of New Mexico.

A.3.2 College Bicycle Use

Current enrollment reported in at the University of New Mexico is about 26,000. Estimated bicycle mode share was not available for the University, but it is estimated the rates are about 10 percent, or about 2,500 bicycle commuters, which is consistent with rates reported by other universities across the United States[4].

A.4 Current System Use Counts

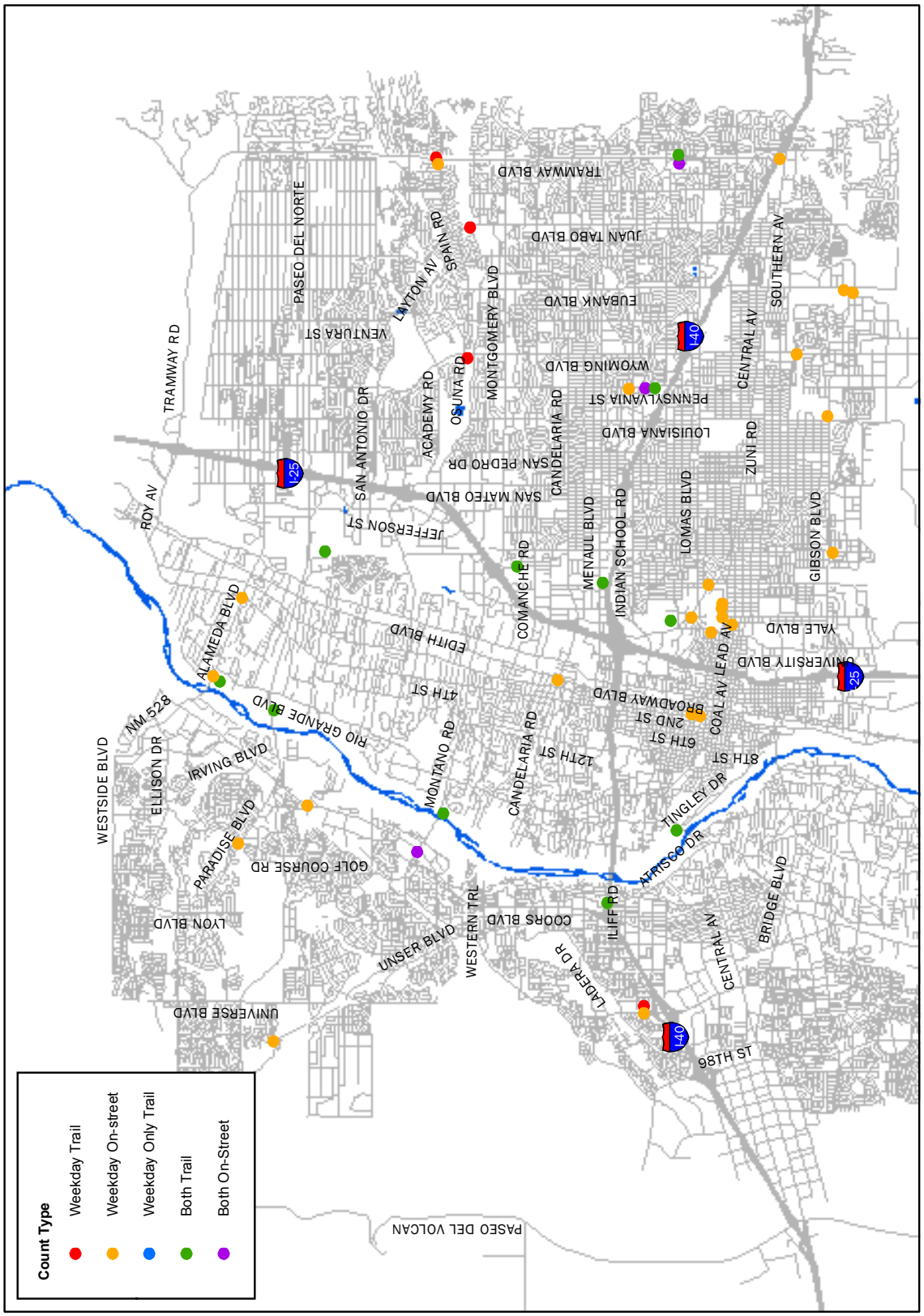
A.4.1 Count Data

Non-motorized user counts were conducted on the Albuquerque area streets and trails to quantify utilization on both weekdays and weekends. These counts were collected at 37 weekday locations and 14 weekend locations between April 27, 2010 and May 22, 2010, and these locations are shown in Figure 2 and listed in Table 2. The counts resulted in volumes at 45 weekday locations and 18 weekend sites. (A number of locations counted both trails and on-street facilities.) The weekday locations were collected for two hours during both the AM (7:00 to 9:00 am) and PM (4:00 to 6:00 pm) peak commute periods. The weekend data was gathered for three hours from 9:00 am to 12:00 pm, primarily along trails. There were 13 sites where both weekday and weekend data were gathered.

The count locations for the on-street and trails systems were selected based upon the following criteria:

1. Previous count data from 1997 was available for comparison.
2. On-street intersection locations that are known to have numerous cyclists. This included most access locations to the University of New Mexico and Kirtland Air Force Base.
3. Intersections along key on-street commuter routes
4. Trail locations along key commuter trails such as the Bosque Trail, Paseo del Nordeste/Diversion Channel Trail, and Tramway Trail
5. Intersections in developing areas that will act as baseline data for future counts
6. Nodes near areas that have poor non-motorized connectivity (Coors Blvd at Eagle Ranch Rd and Montaño Rd)

3 Travel time for bicycle commute to work trips is aggregated in results reported by the U.S. Census Bureau in 2006 ACS data.
4 Estimate is based on 2009-2010 enrollment figures of about 25,000 students. This 10 percent mode share estimate is based on assessments of bicycle mode share at universities across the US.



Map 1 - 2010 Count Locations

City of Albuquerque
Albuquerque Bicycle Master Plan - User Needs Analysis

Table 2: 2010 Bicycle Counts

No.	Locations	1997 Count	Weekday	Weekend
1	Bear Canyon Trail @ Morris	N	X	
2	Bear Canyon Trail @ Wyoming	Y	X	
3	Pennsylvania @ Indian School	N	X	
4	Pennsylvania @ Embudo Trail	N	X	X
5	UNM - Yale @ Lomas	Y	X	
6	UNM - Campus @ Girard	Y	X	
7	UNM - MLK @ University	Y	X	
8	UNM - Paseo del Nordeste @ Tucker	N	X	X
9	UNM - Yale @ Central	Y	X	
10	UNM - Stanford @ Central	Y	X	
11	UNM - Cornell @ Central	N	X	
12	Silver Ave @ Buena Vista	Y	X	
13	KAFB Wyoming Gate	Y	X	
14	KAFB Eubank Gate	N	X	
15	KAFB Louisiana Gate	N	X	
16	KAFB Carlisle Gate	N	X	
17	Tramway Blvd @ Central Ave	N	X	X
18	Tramway Blvd @ Spain	N	X	
19	Tramway Blvd @ Embudo Trail	N	X	X
20	Bosque Trail @ Central Ave	Y	X	X
21	Bosque Trail @ Montaño	Y	X	X
22	Bosque Trail @ Paseo del Norte	N	X	X
23	Bosque Trail @ Alameda	N	X	X
24	Bosque Trail @ Rio Bravo Blvd	N		X
25	Paseo del Nordeste @ N Diversion Channel Trail	N	X	X
26	North Diversion Channel @ Paseo del Norte	N	X	X
27	Paseo del Nordeste @ East I-40 Trail	N	X	X
28	Atrisco Rd @ I-40 Overcrossing	Y	X	X
29	Unser Blvd @ I-40 Trail	N	X	
30	Coors Blvd @ Montaño Rd	N	X	X
31	Coors Blvd @ Eagle Ranch Rd	N	X	
32	Paradise Blvd @ Golf Course Rd	N	X	
33	Marquette @ 2nd St	N	X	
34	Bridge Blvd @ Isleta Blvd	N	X	
35	Arenal Rd @ Unser Blvd	N	X	
36	Alameda Blvd @ 4th St	N	X	
37	Candelaria Rd West of Edith	N	X	
38	Woodmont Ave @ Rainbow Blvd	N	X	

The weekday counts were collected to quantify commuter cycling traffic within the Albuquerque area. That traffic uses both the on-street and trail systems, and a large number of count locations were selected to determine what areas of the city experience commuter cyclists. The weekend counts were primarily collected to assess the number of recreational users of the trail system, thus the major non-motorized trail users were counted. Some on-street counts were gathered at strategic locations with on-street bike lanes or shoulders along common recreational routes, or at key locations with limited non-motorized facilities.

On-street facilities collected data only for cyclists, while off-street trails quantified all non-motorized users. All intersection counts were collected as standard turning movement counts in 15 minute increments, with each turning movement counted separately. Mid-block and trail locations were collected in 15 minute increments with directional or turning movements collected depending upon the location.

Bicycle counts included both volumes and a number of additional characteristics. Each cyclist was identified as wearing or not wearing a helmet. For on-street locations, cyclists were also noted where they rode on sidewalks rather than in the street. Traffic violations were quantified for on-street cyclists. The traffic violations were limited to non-compliance with traffic signal indications, running stop signs without slowing, and riding the incorrect direction within a bicycle lane (for instance, riding eastbound in an westbound lane). Cyclists who slowed considerably and looked for oncoming traffic at stop signs without a full stop were not considered to violate the traffic control, nor were cyclists who slowed without stopping to make a right turn at a traffic signal. The violations recorded were primarily traffic control violations. Because most of the on-street locations were signalized intersections, the violations at these intersections were running red lights. Few cyclists were seen running a red signal indication without first stopping at the approach. The second most common violation was riding on the wrong side of the street in a bike lane. Complete raw count data are provided in AppendixB.

The trail system counted each user that passed the specific location or intersection. The users were categorized as:

1. Bicyclists
2. Runners/Joggers
3. Walkers
4. Roller Bladers/Skateboarders
5. Equestrians

Bicyclists were identified as wearing or not wearing helmets on trails as well. Some trail users had pets, primarily dogs, and each user with a pet was noted. A few users had multiple pets, but only the number of users with pets was counted, not the number of actual pets. Note that no user was observed with more then two pets. All pets were observed on leashes except for a few in the Bosque walking on the opposite side of the Riverside drain from the paved trail.

A series of summary tables contain the results of the counts. The weekday data are summarized by the AM and PM peak periods, each period representing two hours of data. The weekday on-street data quantify the approach and departure volumes (two-direction) at each intersection, resulting in double counting each user (an approach and a departure). The double counting results in accurate link volumes for each leg of the intersection.

The trail volumes were summarized considering all users. Link volumes were generated for each of the trail locations and major intersecting connectors. These link volumes quantify the bi-directional traffic during each two-hour data collection period. The weekend volumes, primarily counted on trails, quantify the three-hour count periods for each link listed. The weekend intersection locations have summary data only for bicycles.

Albuquerque has a number of unique employment areas, and the data for two of these areas, the University of New Mexico (UNM) and Kirtland Air Force Base (KAFB), have been separated from the other locations in the volume tables. The reason for the segregation is that in each case, most of the primary entry/exit points for each facility were counted to quantify the overall bicycle demand for that facility. This permits summary data for these locations.

Table 3: University of New Mexico Access Weekday Bicycle Volumes

Intersection	West Approach		East Approach		North Approach		South Approach		Helmet	Sidewalk	Violation
	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit			
AM Peak Period											
Central @ Yale	4	8	18	11	9	53	49	8	23	39	11
Central @ Cornell	6	5	17	17	10	31	29	9	26	11	1
Central @ Stanford	3	4	12	9	3	32	30	3	15	7	2
Campus @ Girard	10	10	87	97	14	4	4	4	69	6	24
Lomas @ Yale	2	0	2	2	44	34	32	44	49	5	2
MLK @ University	27	33	12	14	2	2	9	1	34	11	2
AM Subtotal	52	60	148	150	82	156	153	69	216	79	42
PM Peak Period											
Central @ Yale	23	32	20	16	71	41	42	67	38	91	8
Central @ Cornell	30	37	27	33	73	59	57	58	45	57	7
Central @ Stanford	34	30	24	23	50	30	20	45	39	35	0
Campus @ Girard	103	100	36	41	11	7	5	7	92	4	13
Lomas @ Yale	4	7	4	6	43	70	71	39	79	17	8
MLK @ University	25	29	33	31	3	2	5	4	29	17	6
PM Subtotal	219	235	144	150	251	209	200	220	322	221	42

Summary Statistics:	AM Peak	PM Peak	Total
Total Entering Volume:	435	814	1249
Percent Wearing Helmets:	49.7%	39.6%	43.1%
Percent on Sidewalk:	18.2%	27.1%	24.0%
Percent Committing Violations:	9.7%	5.2%	6.7%

Collectively, the UNM area has the greatest amount of cycling traffic in the Albuquerque area. The university area also experiences the highest percentage of cyclists not wearing helmets and cyclists utilizing the sidewalks, primarily along Central Ave.

The Kirtland Air Force Base access was unique in that it accounts only for entering and exiting traffic. The KAFB gates also differed in that the count periods were moved forward a half hour from the count periods throughout the rest of the study area. The KAFB counts were collected from 6:30 to 8:30 am and from 3:30 to 5:30 pm. Observation at the Eubank gate began at 6:15 am and concluded at 5:45, confirming that the peaks occurred within the data collection period. There was not an issue concerning traffic violations at the gate accesses, therefore that column was deleted. The Eubank Gate has two access points for cyclists – the vehicle gate and a new pedestrian-bicycle gate located to the south. Counts were conducted for each gate to establish utilization.

Table 4: Kirtland Air Force Base Access Weekday Bicycle Volumes

Intersection	East-West Approach		North-South Approach		Helmet	Sidewalk
	Enter	Exit	Enter	Exit		
AM Peak Period						
Eubank Gate			51	3	54	0
Eubank Ped/Bike Gate			40	1	40	0
Wyoming Gate			16	0	16	8
Louisiana Gate	2	0			1	0
Carlisle Gate			8	1	8	1
AM Subtotal	2	0	115	5	119	9
PM Peak Period						
Eubank Gate			2	79	79	
Eubank Ped/Bike Gate			1	9	8	1
Wyoming Gate			0	14	14	6
Louisiana Gate	0	1			1	0
Carlisle Gate			0	12	11	0
PM Subtotal	0	1	3	114	113	7

Summary Statistics:	AM Peak	PM Peak	Total
Total Entering Volume:	117	4	121
Total Exiting Volume:	3	115	118
Percent Wearing Helmets:	97.5%	95.8%	97.1%
Percent on Sidewalk:	7.4%	5.9%	6.7%

This area exhibited the highest helmet usage in the Albuquerque area. The volumes reflect the commute patterns with heavy entering AM volumes and heavy exiting PM traffic. It is interesting to note that the Eubank gates accounted for 77 percent of the bicycle traffic to/from the base.

The weekday counts at the remaining intersection locations are contained in the following two tables. The data reflect directional bicycle traffic for each intersection leg counted.

Table 5: Albuquerque Count Locations - Weekday On-Street Bicycle Volumes

Intersection	West Approach		East Approach		North Approach		South Approach		Helmet	Sidewalk	Violation
	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit			
AM Peak Period											
P.d. Nordeste @ Tucker	5	8	15	2	37	27	12	32	47	0	0
Silver @ Buena Vista	6	10	22	17	16	20	17	14	27	0	27
Unser Bl @ I-40	-	-	-	-	1	1	1	1	2	0	N/A
Unser Bl @ Arenal Rd	1	0	0	1	0	0	0	0	0	0	0
Bridge Bl @ Isleta Bl	1	8	6	4	-	-	7	2	5	2	0
Alameda Bl @ Bosque	11	4	4	11	-	-	-	-	11	8	N/A
Alameda Bl @ 4th St	5	2	6	4	1	1	0	5	6	6	0
Coors Bl @ Montaño	9	13	2	0	2	1	3	2	15	2	0
Coors Bl @ Eagle Ranch	5	0	2	2	2	5	1	3	7	3	2
Golf Course @ Paradise	3	1	0	0	1	0	0	3	3	2	0
Rainbow @ Woodmont	0	1	0	0	13	0	0	12	3	13	7
Tramway @ Central Ave	1	6	3	4	36	9	8	29	43	14	1
Tramway @ P.d. Montañas	-	-	-	-	16	8	8	16	22	N/A	N/A
Tramway @ Spain	9	2	9	4	14	20	17	23	44	0	0
Morris @ Bear Arroyo	-	3	-	0	9	0	1	7	9	1	0
Wyoming @ Bear Arroyo	-	-	-	-	3	3	4	4	5	7	N/A
Penna. @ Ind. School	1	2	5	9	18	6	7	14	27	4	1
Penna. @ P.d. Montañas	-	-	-	-	19	-	13	-	30	2	3
2nd St @ Marquette/Tijeras		1	9	8	2	3	3	2	9	3	1
Candelaria Rd @ Arno St	3	2	2	3	-	-	-	-	2	1	0

Table 6: Albuquerque Count Locations - Weekday On-Street Bicycle Volumes

Intersection	West Approach		East Approach		North Approach		South Approach		Helmet	Sidewalk	Violation
	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit			
PM Peak Period											
P.d. Nordeste @ Tucker	2	13	46	1	32	85	41	22	96	0	3
Silver @ Buena Vista	11	16	17	13	44	33	31	41	46	1	21
Unser Bl @ I-40						2	2		0	0	N/A
Unser Bl @ Arenal Rd	0	0	0	0	0	0	0	0	0	0	0
Bridge Bl @ Isleta Bl	4	6	7	5	0	0	2	2	1	10	0
Alameda Bl @ Bosque	3	8	8	3					8	5	N/A
Alameda Bl @ 4th St	7	2	5	8	6	7	2	3	15	5	0
Coors Bl @ Montaño	4	6	15	9	4	4	0	4	14	6	0
Coors Bl @ Eagle Ranch	5	2	3	15	13	7	3	0	17	15	0
Golf Course @ Paradise	3	1	3	8	1	2	6	2	5	8	1
Rainbow @ Woodmont	0	0	1	0	1	3	2	1	4	1	0
Tramway @ Central Ave	3	1	4	7	6	34	31	2	39	10	0
Tramway @ P.d. Montañas	-	-	-	-	10	9	9	10	16	N/A	N/A
Tramway @ Spain	7	7	6	3	13	22	22	16	44	0	0
Morris @ Bear Arroyo	-	0	-	16	3	6	21	2	22	1	0
Wyoming @ Bear Arroyo	-	-	-	-	4	8	8	4	10	11	N/A
Penna. @ Ind. School	3	1	2	1	12	15	13	13	22	2	0
Penna. @ P.d. Montañas	-	-	-	-	16	10	10	16	23	2	6
2nd St @ Marquette/Tijeras	7	8	0	0	1	2	3	1	8	0	0
Candelaria Rd @ Arno St	5	7	7	5	-	-	-	-	4	4	1

A number of items are noteworthy from this data. The Silver Ave-Buena Vista Dr intersection experienced the highest number of traffic violations. This intersection is the only count site located on the existing Bicycle Boulevard, and has all-way stop traffic control. The high violation rate, 29.3 percent of all entering vehicles, is a concern. A second concern was for the high violation and low helmet usage at the Rainbow Blvd-Woodmont Ave intersection. The AM peak reflects middle school children traveling to school and it yielded a violation rate of 53.9 percent and helmet usage of 23.1 percent. It appears that an educational program should focus on this area and age group.

Table 7: Albuquerque Count Locations - Weekday Trail Volumes

Intersection	Bicycles	Runner/ Jogger	Walker	Skater	Equestrian	Helmet	Pets
AM Peak Period							
Bosque Tr N of Alameda Bl	16	0	13	0	0	15	2
Bosque Tr S of Alameda Bl	56	6	19	2	0	51	3
Bosque Tr N of Paseo del Norte	52	7	21	0	1	40	6
Bosque Tr S of Paseo del Norte	63	15	22	0	1	51	3
Paseo del Norte Connector	23	3	7	0	0	19	3
Bosque Tr N of Montaño Rd	60	7	9	0	0	48	0
Bosque Tr S of Montaño Rd	70	9	3	0	0	58	2
Montaño Rd Connector	26	4	10	0	0	20	2
Bosque Tr N of Central Ave	51	5	14	0	0	47	1
Tramway Tr N of P.d. Montañas	17	5	17	0	0	10	7
Tramway Tr S of P.d. Montañas	14	11	23	0	0	7	11
P.d. Montañas W of Tramway Tr	5	2	16	0	0	3	8
Tramway Tr N of Spain	25	11	11	0	0	21	0
Tramway Tr S of Spain	27	9	14	1	0	23	0
Bear Arroyo E of Morris	12	9	29	0	0	11	17
Bear Arroyo W of Morris	16	6	13	0	0	15	10
Bear Arroyo E of Wyoming	3	3	6	0	0	2	1
Bear Arroyo W of Wyoming	2	1	1	0	0	1	2
P.d.I. Montañas E of Penna.	13	3	9	0	0	12	1
P.d.I. Montañas W of Penna.	30	3	7	0	0	29	2
I-40 Trail E of Unser Blvd	4	0	0	0	0	2	0
I-40/Atrisco Overcrossing	7	0	26	0	0	2	0
I-40 Trail E of Atrisco	3	0	7	0	0	1	0
I-40 Tr E of Paseo del Nordeste	10	0	2	0	0	8	0
Paseo del Nordeste N of I-40 Tr	84	4	3	0	0	68	0
Paseo del Nordeste S of I-40 Tr	82	4	3	0	0	66	0
P.d. Nordeste S of Div Chan Tr	76	4	13	0	0	64	0
P.d. Nordeste E of Div Chan Tr	43	4	17	1	0	43	0
Div. Channel Tr N of P.d. Nord.	69	4	14	1	0	57	0
Div. Channel Tr N of P.d. Norte	14	3	2	0	0	14	0
Div. Channel Tr S of P.d. Norte	41	6	6	0	0	38	0
Paseo del Norte Tr Connector.	35	5	4	0	0	32	0

Table 8: Albuquerque Count Locations - Weekday Trail Volumes

Intersection	Bicycles	Runner/ Jogger	Walker	Skater	Equestrian	Helmet	Pets
PM Peak Period							
Bosque Tr N of Alameda Bl	32	0	24	0	0	26	3
Bosque Tr S of Alameda Bl	97	7	32	0	0	79	4
Bosque Tr N of Paseo del Norte	90	26	4	0	2	64	0
Bosque Tr S of Paseo del Norte	101	25	4	1	2	73	0
Paseo del Norte Connector	47	1	0	1	0	35	0
Bosque Tr N of Montaño Rd	100	15	7	3	1	72	2
Bosque Tr S of Montaño Rd	112	17	11	2	1	81	4
Montaño Rd Connector	56	16	10	1	0	41	2
Bosque Tr N of Central Ave	70	1	10	1	0	54	0
Tramway Tr N of P.d. Montañas	17	5	16	0	0	12	6
Tramway Tr S of P.d. Montañas	18	5	16	0	0	13	5
P.d. Montañas W of Tramway Tr	11	0	4	0	0	7	1
Tramway Tr N of Spain	20	7	2	3	0	17	3
Tramway Tr S of Spain	16	7	6	1	0	13	2
Bear Arroyo E of Morris	38	9	12	0	0	36	9
Bear Arroyo W of Morris	8	3	3	0	0	7	5
Bear Arroyo E of Wyoming	12	3	13	0	0	7	4
Bear Arroyo W of Wyoming	1	0	4	0	0	1	2
P.d.I. Montañas E of Penna.	36	2	17	0	0	31	1
P.d.I. Montañas W of Penna.	44	9	17	0	0	39	2
I-40 Trail E of Unser Blvd	1	1	6	1	0	1	3
I-40/Atrisco Overcrossing	6	0	13	1	0	3	2
I-40 Trail E of Atrisco	2	0	0	0	0	1	0
I-40 Tr E of Paseo del Nordeste	20	5	1	0	0	15	0
Paseo del Nordeste N of I-40 Tr	80	5	3	0	0	60	0
Paseo del Nordeste S of I-40 Tr	70	0	2	0	0	53	0
P.d. Nordeste S of Div Chan Tr	68	4	5	0	0	58	3
P.d. Nordeste E of Div Chan Tr	47	4	22	1	0	37	5
Div. Channel Tr N of P.d. Nord.	57	4	21	1	0	47	6
Div. Channel Tr N of P.d. Norte	25	0	2	0	0	25	1
Div. Channel Tr S of P.d. Norte	41	3	4	0	0	40	1
Paseo del Norte Tr Connector.	40	3	2	0	0	39	1

The weekend data in Table 8 reflect three-hour link volumes at each location. The on-street locations contain only bicycle information while the trail locations quantify all system users. Helmet usage was collected for all cyclists.

Table 9: Albuquerque Count Locations – Weekend Trail and On-Street Volumes

Intersection	Bicycles	Runner/ Jogger	Walker	Skater	Equestrian	Helmet	Pets
Weekend Peak Period							
Alameda Bl @ Bosque - EB	14	-	-	-	-	12	N/A
Alameda Bl @ Bosque - WB	17	-	-	-	-	14	N/A
Bosque Tr N of Alameda Bl	88	11	69	0	0	78	19
Bosque Tr S of Alameda Bl	327	37	162	5	3	287	42
Bosque Tr N of Paseo del Norte	335	53	74	3	0	274	16
Bosque Tr S of Paseo del Norte	374	63	73	4	0	306	13
Paseo del Norte Connector	145	14	9	1	0	118	5
Bosque Tr N of Montaño Rd	345	55	19	4	0	286	2
Bosque Tr S of Montaño Rd	397	63	20	4	0	329	2
Montaño Rd Connector	144	22	13	4	0	119	0
Bosque Tr N of Central Ave	261	42	375	5	0	190	8
Bosque Tr N of Rio Bravo Bl	184	2	20	1	0	61	6
Tramway Tr N of P.d. Montañas	20	14	22	0	0	19	19
Tramway Tr S of P.d. Montañas	23	16	35	0	0	21	24
P.d. Montañas W of Tramway Tr	11	4	13	0	0	10	5
Tramway @ P.d. Montañas - NB	29	-	-	-	-	29	N/A
Tramway @ P.d. Montañas - SB	46	-	-	-	-	46	N/A
Tramway Bl N of Central Ave	47	-	-	-	-	43	N/A
Tramway Bl S of Central Ave	29	-	-	-	-	27	N/A
Central Ave E of Tramway Bl	31	-	-	-	-	19	N/A
Central Ave W of Tramway Bl	5					5	N/A
P.d. Montañas E of Penna.	13	1	3	0	0	12	1
P.d. Montañas W of Penna.	21	7	4	0	0	20	2
Penna. @ P.d. Montañas - NB.	5	-	-	-	-	5	N/A
Penna. @ P.d. Montañas - SB.	3	-	-	-	-	3	N/A
I-40/Atrisco Overcrossing	11	0	6	2	0	5	0
I-40 Trail E of Atrisco	5	0	1	0	0	3	0
Coors Bl N of Montaño Rd	1	-	-	-	-	1	N/A
Coors Bl S of Montaño Rd	5	-	-	-	-	5	N/A
Montaño Rd E of Coors Bl	27	-	-	-	-	15	N/A
Montaño Rd W of Coors Bl	25	-	-	-	-	13	N/A
Paseo del Nordeste N of Tucker	36	-	-	-	-	29	N/A
I-40 Tr E of Paseo del Nordeste	16	23	2	0	0	11	0
Paseo del Nordeste N of I-40 Tr	105	21	2	0	0	75	0
Paseo del Nordeste S of I-40 Tr	89	10	0	0	0	64	0
P.d. Nordeste S of Div Chan Tr	110	11	13	0	0	92	0
P.d. Nordeste E of Div Chan Tr	51	9	9	0	0	43	0
Div. Channel Tr N of P.d. Nord.	105	2	12	0	0	88	0
Div. Channel Tr N of P.d. Norte	42	7	0	0	0	40	1
Div. Channel Tr S of P.d. Norte	114	6	1	0	0	107	0
Paseo del Norte Tr Connector	82	9	1	0	0	77	1

The highest weekday cycling usage occurred at the University of New Mexico. The highest weekend usage was along the Rio Grande Bosque Trail with an average of more than 200 users per hour per link at three locations.

The Bosque Trail experiences the highest utilization in the Albuquerque area. Based upon observation, it is assumed that the majority of the Bosque Trail users were recreational users. Some cyclists during the

weekday counts appeared to be commuters; however, the overwhelming majority appeared to be recreational. The Bosque trail is unique in that you can travel over 13 miles without encountering an at-grade intersection, leading to high recreational usage. The second most frequently used trail for cyclists was the combined trails Paseo del Nordeste and the Diversion Channel Trail. The original Paseo del Nordeste Trail started at UNM, and went north to the Hahn Arroyo, then east to Pennsylvania St. The trail utilization has changed since the Diversion Channel Trail was completed and connected to Paseo del Nordeste, resulting in primarily north-south movements within the corridor. The reason for this change may be that the Diversion Channel Trail connects to the Bosque Trail via the Paseo del Norte Trail with minimal at-grade crossings. These trails carry regional cycling traffic, not just local traffic.

Cyclists were the most frequently counted trail users, who generally out numbered the second most frequent, walking and jogging. Cyclists generally outnumbered walkers and joggers by ratios ranging from 1:1 (in only a few locations) to 5:1. The least common trail users were equestrian and they were observed more frequently on weekdays than weekends. One reason for this trend could be the need to mix with other user types in conditions that may scare or startle horses. Another possible cause is a lack of dedicated equestrian parking and suitable trail connections in the north valley area. This is consistent with feedback received during stakeholder interviews.

The previous on-street bicycle plan collected counts in 1997 at 11 comparable locations. The 1997 weekday counts were conducted for two hours during the AM peak period and three hours during the PM peak period, therefore adjustments were necessary to normalize the PM data. Raw data was available for 7½ of the 1997 locations, and only locations with raw 1997 data were compared. Table 10 contains the peak period entering volumes from each year, while Figure 2 shows a percentage change at each location.

Table 10: 1997 – 2010 Volume Comparison

	1997				2010			
Intersection	Bicycles	Helmet	Sidewalk	Violation	Bicycles	Helmet	Sidewalk	Violation
AM Peak Period								
Bosque Tr @ Central Ave	26	51%	-	-	51	92%	-	-
Bosque Tr @ Montaño Rd	41	84%	-	-	70	83%	-	-
Campus Bl @ Girard Bl	164	41%	0%	14%	115	60%	5%	21%
Central Ave @ Yale Bl	117	21%	43%	15%	80	29%	49%	14%
Central Ave @ Stanford Dr	161	27%	15%	26%	48	31%	15%	4%
Lomas Bl @ Yale Bl	109	39%	1%	3%	80	61%	6%	3%
MLK Bl @ University Bl	78	50%	18%	21%	50	68%	22%	4%
Wyoming Gate	72	100%	0%	-	16	100%	50%	-
PM Peak Period								
Bosque Tr @ Central Ave	73	50%	-	-	70	77%	-	-
Bosque Tr @ Montaño Rd	65	66%	-	-	112	72%	-	-
Campus Bl @ Girard Bl	141	35%	2%	11%	155	59%	3%	8%
Central Ave @ Yale Bl	155	26%	58%	16%	156	24%	58%	5%
Central Ave @ Stanford Dr	145	16%	28%	25%	128	30%	27%	0%
Lomas Bl @ Yale Bl	86	40%	2%	0%	122	65%	14%	7%
MLK Bl @ University Bl	86	44%	20%	13%	66	44%	26%	9%
Wyoming Gate	-	-	-	-	14	100%	43%	-

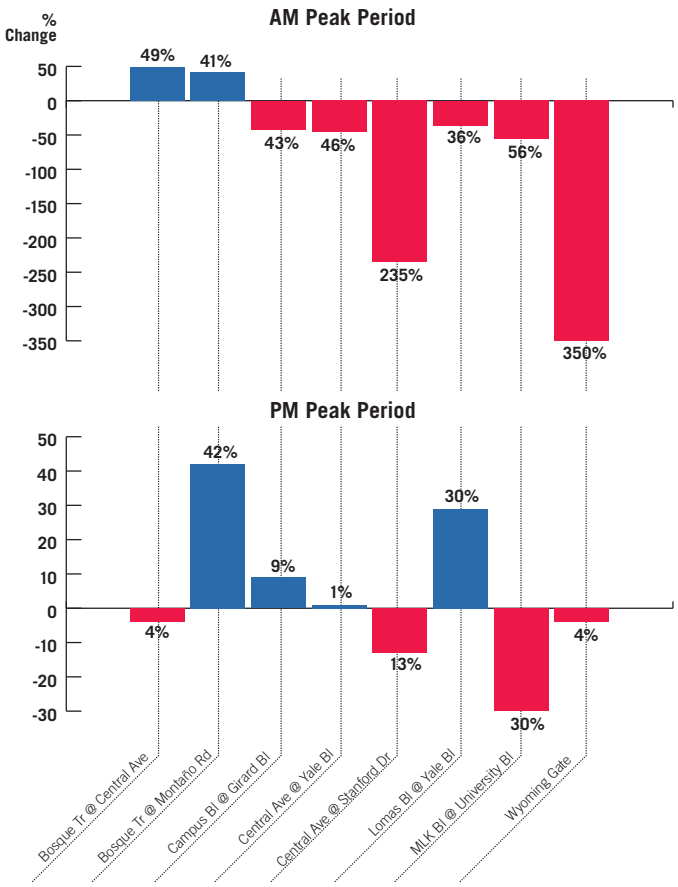


Figure 2. Percent Change at Count Locations 1997 - 2010

The Rio Grande Bosque trail locations show a moderate increase in weekday activity, and increases in helmet usage. The Wyoming gate at KAFB shows a significant decrease in volume, however, additional detail from the previous plan indicates that much of the cycling traffic has shifted to the Eubank gates. The UNM area had significantly lower volumes during the AM peak period at each site counted, though the PM peak is slightly higher. The counts also indicate that helmet usage has increased and violations are less frequent in the university area.

A.5 Bicycle Crash Analysis

This section provides a summary of crash data involving bicycles in Albuquerque for 1995-2005. Data for 2006 – 2009 was not available at the time this analysis was completed. Crash data is a valuable source of information that can help identify difficult or dangerous areas for bicycles. However, certain caveats should be clearly understood when interpreting crash data. Bicycle crashes are generally considered to be significantly under-reported worldwide, particularly for crashes that do not result in serious injury. Therefore, a street or intersection that did not see a crash over the ten years examined in this analysis is not an indication that people are not bicycling there or that hazards are not present in those areas.

The state of New Mexico has one of the highest nationwide fatality rates for non-motorized transportation users; a signficant number of these incidents occur in the greater Albuquerque area. Table 11 provides a summary of the crash data. There were a total of 1,529 crashes involving bicycles over the ten years studied. These crashes resulted in 1,315 bicycle injuries and 20 fatalities[5]. This extremely high injury rate highlights the importance of taking measures to improve safety for bicyclists in Albuquerque, but may also indicate that non-injury bicycle crashes often go unreported.

5 Note that the number of fatalities recorded in the data is likely to be under-reported, as a fatality is only recorded if a person is declared dead at the scene of the crash. Fatalities that result later in the ambulance or at the hospital are not recorded in the crash data.

Table 11: Bicycle Crashes, 1995-2005

Year	Bicycle Crashes	Bicycle Injuries	Bicycle Fatalities
1995	189	177	2
1996	179	160	2
1997	145	124	3
1998	144	124	1
1999	110	96	3
2000	133	116	2
2001	130	111	3
2002	126	102	3
2003	78	64	0
2004	155	128	1
2005	140	113	0
Total	1529	1315	20

Figure 3 shows the number of bicycle crashes reported in Albuquerque over time, which display a downward trend from 1995 to 2005.

A.5.1 Bicycle Crashes By Time of Day/Week/Year

Figure 4 shows the number of crashes per month involving bicycles. Higher numbers of crashes involving bicycles in the summer months likely indicates that cycling is more prevalent during these good weather months. However, it should be noted that there are crashes involving bicycles throughout the year, indicating that people in Albuquerque continue to cycle during the winter months. Bicycle counts performed by the City of Portland suggest that winter bicycle ridership levels are approximately half of the summer levels[6].

Figure 5 shows the number of bicycle-involved crashes by day of week. Bicycle crashes are concentrated during weekdays, and on weekends crashes appear to be significantly more common on Saturdays than on Sundays. This trend may reflect the days of the week when bicycle traffic is highest. Recreational trips on off-street bicycle facilities are likely to be more common on weekends, and the lower weekend crash rate may also represent combined lower traffic volumes of both bicycles and vehicles on surface streets.

Figure 6 shows the number of crashes by time of day for bicycles. Again, this data may give some indication as to the hours that people bicycle in Albuquerque and also those times when crashes are most likely. Crashes are concentrated in the afternoon and evening hours, though there are crashes during the morning peak period as well. The evening peak period is an especially common time for bicycle-involved crashes; 40 percent of all bicycle crashes happened between 3 pm and 6 pm. High numbers of crashes in the late afternoon/early evening reflect both the increased level of bicycle and vehicular traffic during the evening peak and reduced visibility during the darker hours.

6 Portland Bicycle Counts 2008, Portland Bureau of Transportation

http://www.portlandonline.com/shared/cfm/image.cfm?id=217489

A.5.2 Crashes by Street and Intersection

A high number of crashes do not necessarily make a street or intersection a prime candidate for bicycle improvements. For example, because crashes tend to be infrequent events, the intersections with multiple crashes from 1995 to 2005 may or may not present particularly difficult conditions for bicycles. Furthermore, difficult intersections not listed in the following figures and tables may serve as important connections along current or proposed bicycle routes and therefore be a higher priority for improvements. However, bicycle crash data presents an objective look at bicycle safety along different corridors, validating known issues or revealing other trends that may not be discovered by other methods such as through surveys or public meetings. With these points in mind, the following figures and tables highlighting the number of crashes on different streets serve as a useful starting point for evaluating the current and future bicycle network in Albuquerque.

A.5.2.1 High Crash Streets

Figure 7 shows street corridors in Albuquerque with 20 or more bicycle-involved crashes from 1995 to 2005 (Map 2). Of these corridors, Central Avenue E had the highest number of crashes at 143, more than double the number of any other street. Table 12 shows the distribution of fatal and injury crashes on these streets. Eight fatal bicycle crashes occurred on these high crash corridors during the ten year period. Lomas Boulevard E and on San Pedro Drive NE were each the site of two fatal crashes. Many of the streets with the highest number of crashes are characterized as roadways with 4 – 6 travel lanes, a center turn lane or raised median and no dedicated bicycle facilities.

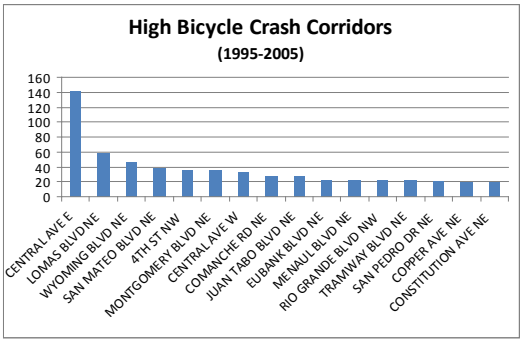


Figure 7: High Bicycle Crash Corridors

Table 12: High Bicycle Crash Corridors, 1995-2005

Street	Fatal Crashes	Injury Crashes	Non-Injury Crashes	Total Crashes	Bicycle Facilities	Posted Speed (MPH)	Travel Lanes
Central Ave E	1	123	19	143	None	54	4
Lomas Blvd NE	2	46	11	59	None	35	4
Wyoming Blvd NE	1	38	8	47	Bike lanes between Academy Rd and Osuna Rd	25	6
San Mateo Blvd NE	1	31	8	40	None	25	6
4Th St NW	1	25	11	37	None	25	2-4
Montgomery Blvd NE	0	35	2	37	None	25-35	6
Central Ave W	0	28	5	33	None	45	4
Comanche Rd NE	0	22	5	27	Bike lanes/ Bike Route	25	4
Juan Tabo Blvd NE	0	26	1	27	None	35	6
Eubank Blvd NE	0	18	6	24	Sporadic bike lane north of Academy Rd and south of Central Ave	35	6
Menaul Blvd NE	0	23	1	24	None	35	6
Rio Grande Blvd NW	0	22	2	24	Bike lanes south of Montano Rd and north of Chavez Rd	45	2
Tramway Blvd NE	0	19	5	24	None	35	4
San Pedro Dr NE	2	17	3	22	Intermittent bike lanes	25	6
Copper Ave NE	0	21	0	21	Bike route	25	4
Constitution Ave NE	0	18	2	20	Bike lanes	25	2

A.5.2.2 High Crash Intersections

While bicycle crashes appear to be concentrated on certain street corridors as detailed above, crashes at individual intersections in Albuquerque are more evenly distributed. Table 13 lists intersections in Albuquerque that were the site of four or more bicycle crashes from 1995 to 2005 (Map 3). None of these intersections was the site of a fatal crash.

Table 13: High Bicycle Crash Intersections, 1995-2005

Intersection	No. Crashes
Central Ave E / Yale Blvd SE	7
Central Ave E / Dorado Pl SE	6
Central Ave E / Stanford Dr NE	6
Central Ave W / New York Ave NW	6
Central Ave E / Cornell Dr NE	5
Central Ave E / Girard Blvd NE	5
Central Ave E / Juan Tabo Blvd NE	5
Montgomery Blvd NE / Tramway Blvd NE	5
San Mateo Blvd NE / Indian School Rd NE	5
University Blvd SE / Gold Ave SE	5
Wyoming Blvd NE / Constitution Ave NE	5
Wyoming Blvd NE / Montgomery Blvd NE	5
Bridge Blvd SW / 8th St SW	4
Central Ave W / Sunset Rd SW	4
Indian School Rd NE / Constitution Ave NE	4
Lomas Blvd NE / Vassar Dr NE	4
Louisiana Blvd NE / Central Ave E	4
Montgomery Blvd NE / San Mateo Blvd NE	4
Rio Grande Blvd NW / Candelaria Rd NW	4
San Mateo Blvd NE / Pan American East Hy NE	4
Tennessee St NE / Lomas Blvd NE	4
Tramway Blvd NE / Spain Rd NE	4
Wyoming Blvd NE / Candelaria Rd NE	4
Wyoming Blvd NE / Comanche Rd NE	4
Wyoming Blvd NE / Spain Rd NE	4

The majority of these high crash intersections are located along streets that also have high numbers of bicycle crashes along their entire length, such as Central Avenue and Lomas Boulevard.

A.5.2.3 Types of Bicycle Crashes

The available data also includes some information about the geometry of the reported crashes. Figure 8 shows the number of crashes of each type.

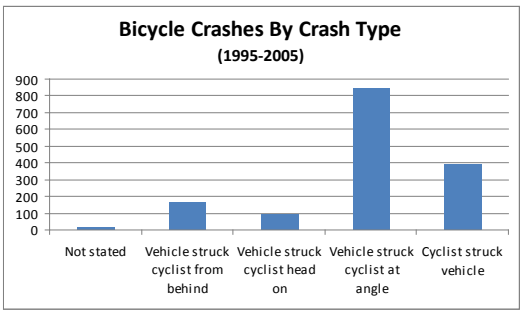


Figure 8: Bicycle Crashes by Crash Type

In over half of all bicycle crashes, the vehicle struck the cyclist at an angle, implying that most bicycle crashes occur during some type of turning movement. Note that although this data shows the movement of each party during a crash, it does not indicate causation to indicate which party was at fault, or if any citations were given as a result of the crash.

A.5.2.4 Demographics

As shown in Figure 9, most bicyclists involved in crashes in Albuquerque are male. This is common in other cities, and represents a number of factors including that there are more male than female bicyclists in the United States, and that males often take more risks which may also apply to bicycling behavior.

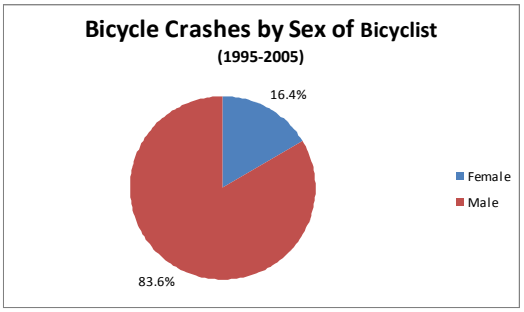


Figure 9: Bicycle Crashes by Gender

Bicycle crash data also reveals that 27 percent of bicycle-involved crashes involved bicyclists under the age of 18, including approximately 10 percent of crashes where the bicyclists was age 11 or younger. Figure 10 shows the age distribution of bicyclists in bicycle crashes. This emphasizes the importance of creating bicycle facilities that are safe for all ages and abilities of bicyclists in Albuquerque. Note that age data was not available for approximately one in eight bicycle crashes.

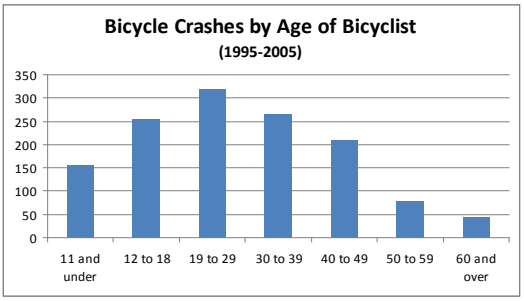


Figure 10: Bicycle Crashes by Age of Bicyclist

A.6 Online Survey

The following section summarizes the results of the Albuquerque Bikeways and Trails Master Plan online survey. The survey gathered information on preferred facility types, current transportation and travel behavior, and concerns about traffic safety. The detailed survey results are provided in Appendix C. People who selected to take the survey displayed a strong desire for a dedicated network of off-street trails for recreation. Respondents also indicated that improved connectivity through on-street dedicated facilities (i.e. bike lanes and bicycle boulevards) would enhance the biking environment and lead to increased bike trips in Albuquerque. It should be noted however that the vast majority (91 percent) of the respondents who took this survey are current bicyclists. The views and opinions of people who may be interested in bicycling, but who do not currently bike for transportation or recreation, are not well-represented in this sample.

A.6.1 Demographics

Over 1,200 individual responses were collected between the end of April 2010 and mid-June 2010. This high response rate demonstrates that there is a significant level of interest in local bicycle infrastructure issues, as well as a large community of existing bicyclists (72 percent responded that they are members of a bicycle advocacy group). More than half of all respondents are frequent riders (ride almost daily), while another one-third are regular riders, logging one or two weekly bike trips.

Of the individuals who answered the survey, over half (55 percent) are between the ages 41 and 60 and persons under the age of 30 may be underrepresented in this sample. The results of the survey also indicate that people who choose to bicycle for both recreation and transportation are well-educated. Eighty-five percent of respondents completed college or a post graduate program.

The ratio of men to women who choose to bicycle is commonly used as a rough measure of the adequacy and perceived safety of a city's bicycle network. Cities that routinely achieve 50/50 splits between both sexes for bicycle commute trips are often regarded as some of the best cities for bicycling. The results of the Albuquerque survey indicate a somewhat more uneven ratio between the sexes; 64 percent are men and 36 percent women.

A.6.2 Bicycle Habits and Travel Behavior

In the survey, respondents were first asked how they identify themselves as a bicyclist. The survey presented three choices: an advanced, confident rider who is comfortable riding in most traffic situations, an intermediate rider who is somewhat comfortable riding in some traffic situations, and a beginner rider who prefers to stick to the bike path. The majority (53 percent) identified as advanced riders, 10 percent placed themselves in the beginner category, and the remainder (37 percent) selected intermediate (See Figure 11). Despite the high ratio of intermediate and advanced riders who are comfortable riding in mixed traffic, more than half (55 percent) of the respondents prefer to ride on multi-use trails and paths over other facility types. However, this preferred facility is often unavailable—two-thirds of respondents felt that there are not enough bike lanes or multi-use trails that connect to the destinations they need to access.

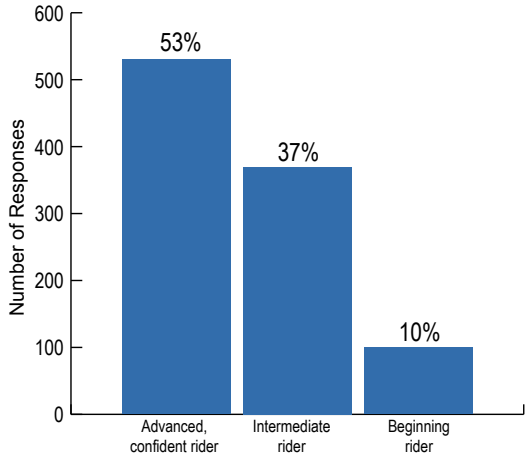


Figure 11: Types of Cyclists

When asked what kind of bicycle riding the individual chooses to do, the respondent was able to select multiple answers. Recreation/fitness received the largest share of response at 897, commuting to work/school received 590, and errands or other local destinations garnered 390 (Figure 11a). These results indicate that bicyclists are routinely engaging in more than one type of bicycle riding which may include commuting some days of the week and doing some recreational riding as well. Indeed, 43 percent responded that they use multi-use trails 1-3 times per week (Figure 12).

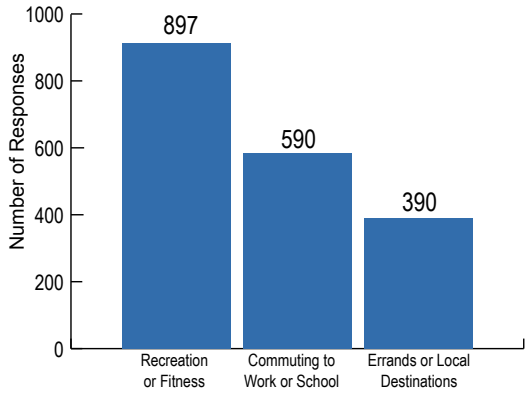


Figure 11a: Trip Purpose

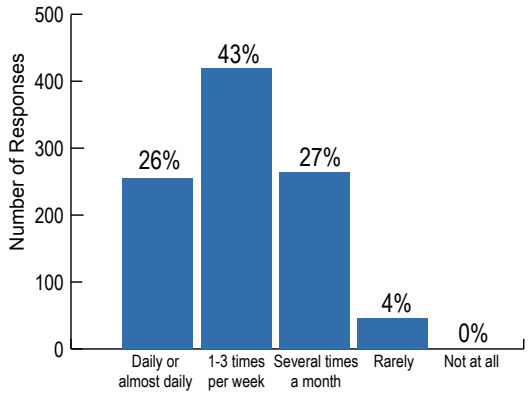


Figure 12: Frequency of Multi-Use Trail Activity

A.6.3 Infrastructure Preferences

When asked what kind of roads are preferred to ride on nearly half (48 percent) chose collectors that may be less direct and have medium levels of traffic. Low traffic, local and residential streets were selected by 43 percent, possibly due to the these roadways being the least direct. Finally, less than 10 percent selected major roadways, which are generally high traffic but the most direct (Figure 13). A follow-up question asked respondents to select the type of road they need to ride on to reach their destination—44 percent of the responses indicated major roadways.

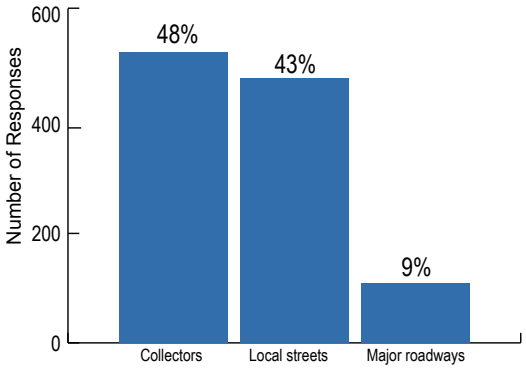


Figure 13: Preferred Roadway Type

This finding is consistent with bicyclists' main traffic safety concern, that motorists are not considerate of bicyclists. Major roadways are designed primarily for motorized travel, and the inclusion of bicyclists to the mix commonly introduces conflicts between the two users. This holds especially true when there are insufficient or inadequate bikeway facilities. For example, in a question that asked respondents to select statements regarding infrastructure problems that limit bike riding or trail use, 51 percent agreed that bike lanes are in poor condition or poorly maintained. Half of respondents also agreed that there are no direct bike lanes and/or multi-use trails that connect them to the destinations they need to access and 41 percent cited this as a reason for not using trails more frequently. Infrastructure problems that were less important to respondents included: not enough lighting (19 percent), no bike parking (19 percent), and no showers or lockers (20 percent).

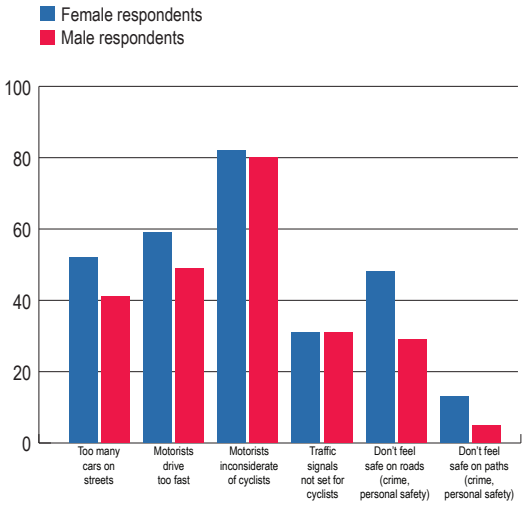
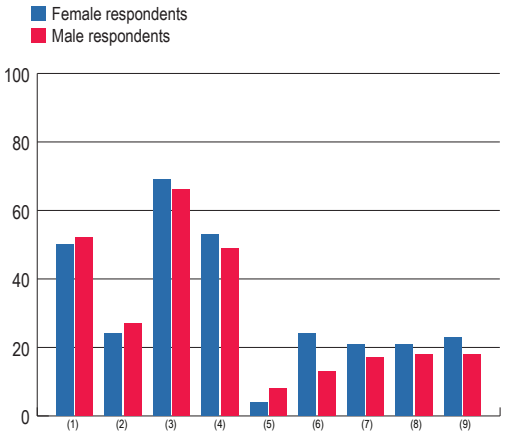


Figure 14A: Traffic and Safety Concerns

When asked to select the bikeway facility improvements that would most likely influence increases in on-street and off-street bicycle trips the findings show that more on-the-ground infrastructure is desired above all else. Trails, bike lanes, bike routes, and Bike Boulevards were all rated as highly likely to encourage additional bike trips. Less important to respondents were trail amenities or additional wayfinding or other bicycle on-street bicycle signage.



(1) Bike lanes are in poor condition or poorly maintained (broken glass, road debris, bad pavement)
(2) Multi-use trails are in poor condition or poorly maintained (broken glass, road debris, bad pavement)
(3) Not enough bike lanes/multi-use trails to my destinations
(4) No direct bike lanes/multi-use trails to my destinations
(5) No mountain bike trails
(6) Destinations are too far away
(7) Not enough lighting (on road or multi-use trail or lane)
(8) No bike parking
(9) No showers, lockers

Figure 14B: Infrastructure

A.6.4 Bicycle Parking

Developing additional bicycle parking was not rated as a high priority for most respondents. Just 19 percent felt that more bike parking would influence them to ride their bike more often. However, the results indicate a bicycle parking shortage at grocery stores, shopping centers, and restaurants.

A.6.5 Female Cyclists

Research on men and women's cycling preferences has become a common discussion topic. Studies estimate that in the U.S. men's cycling trips surpass women's by at least 2:1, the ratio reported in both online survey results and the 2006-2008 American Community Survey cycling commute ratios. Studies show that women are more risk averse, and are more willing to detour out of their way to travel on lower traffic streets. Research has also state that women typically attend to more daily

household chores, and would benefit from lower speed and volume routes to "practical urban destinations." [7]

The online survey included responses from nearly 390 women[8]. When analyzed these results create a profile that demonstrates many of Albuquerque's female riders share characteristics common to female riders across the US. This does not imply that women are not confident, fearless cyclists simply that different facilities may appeal to different types of riders. These characteristics may offer insight into infrastructure treatments and programmatic strategies that will encourage more cycling among women and other groups that have similar riding habits. It should be noted that the responses of respondents who identified as 'intermediate' or 'beginner' cyclists were very similar to results reported by the majority of women. The respondents who identified as 'intermediate' and 'beginner' riders were split nearly evenly between the genders.

A.6.5.1 Comparison of 'Female Respondents' in Relation to 'All Surveyed Respondents' or 'Male Respondants' in Albuquerque

- The majority of women characterized themselves as intermediate riders, who are "somewhat comfortable riding in some traffic situations."
- The majority of women prefer riding on local or residential roads. This is consistent with results from all riders who identified themselves as "intermediate riders."
- There was no variation in preferred facility (multi-use trail), common ride frequency (3-4 days a week for commuting and 1-2 days for exercise), or primary ride purpose (exercise/fitness).
- Men and women agree that grocery stores are the type of destination most in need of increased bicycle parking. Women state that other top locations in need of bike parking are shopping centers, restaurants and civic centers. Men's top choices include shopping centers, work sites and restaurants.
- Nearly 86 percent of women reported walking or jogging as a trail use as compared to 70 percent of men. Both groups reported the same frequency of trail use, most commonly one to three times per week.
- The most frequently stated traffic safety concern for both men and women was that "Motorists are not considerate of cyclists." However, there was significant variation in the second and third most popular responses.
- The only variation in concerns related to infrastructure was that nearly twice as many women as men, 25 percent of respondents, stated that destinations were too far away.
- Both men and women stated that their top three concerns for not bicycling more was the need to carry items or equipment, time constraints, or the need to dress up for work.
- A greater share of men and women commonly thought that multi-use trails, more bike lanes, bike routes and bike boulevards were the improvements that would encourage them to use the system more frequently. Female response was commonly greater than male's by about five percent (e.g., 68 percent of women and 63 percent of men felt that more paved multi-use trails was very likely to increase their system use). Women also tended to express stronger support for increased education, encouragement and enforcement programs.

7 Baker, Linda, "How to Get More Bicyclists on the Road," *Scientific American*. Accessed July 15, 2010. (www.scientificamerican.com/article.cfm?id=getting-more-bicyclists-on-the-road).

8 About ½ of survey respondents did not identify themselves as either male or female.

Would the following improvements influence you to bike and/or use the multi-use trail system more often? Please rate each improvement by likelihood of influencing you to bike and use the multi-use trail system more often.

BLUE numbers indicate female respondents **RED** numbers indicate male respondents	VERY LIKELY	LIKELY	SOMEWHAT LIKELY	SOMEWHAT UNLIKELY	UNLIKELY	VERY UNLIKELY	NOT SURE
More Paved (off-street) Multi-Use Trails	63.4% 68.0%						
More Amenities Along Multi-Use Trails (e.g., mile markers, trash receptacles and lighting)	33.7%		27.2%				
Create Mountain Bike Trails	23.6% 19.7%						
Increased Maintenance (sweeping/repairs to bike lanes, routes, paths, and landscape trimming, etc.)	41.2% 42.7%						
More Bike Lanes (Separate Lanes for bikes) on Major Streets	56.5% 62.9%						
More Bike Routes	52.8% 60.9%						
More Bike Boulevards (Bike Priority Streets) on Smaller Streets	47.8% 51.9%						
Widen Outside/Curb Lanes on Major Streets (easier to share lanes with cars)	40.5% 47.4%						
Narrow Outside/Curb Lanes on Major Streets (easier to control lane)			19.7%				17.5%
Implement Shared Use Lane Pavement Markings for Bicyclist Positioning in Traffic Lanes ("Sharrow")	27.2% 31.0%						
More On-Road Bike Signage	63.4% 36.4%						
Bicycle Signs Indicating Major Attractions			18.8% 19.9%		18.8%		
More Bicycle Parking			33.6% 25.6%				
Education or Promotional Programs for **Drivers**	39.5% 46.1%						
Education or Promotional Programs for **Cyclists**	29.6% 36.9%						
Projects to Reduce Motor Vehicle Speed	32.6% 38.0%						
More Recreational Programs/Events for Bicyclists	26.8%		24.3%				
Increase Enforcement of Traffic Violations by **Motor Vehicles** (e.g. speeding, red light running, parking violations)	48.9% 46.9%						
Increase Enforcement of Traffic Violations by **Bicyclists** (e.g. red light running, riding against traffic)	31.7% 28.1%						

Figure 15: Men's and Women's Assessment of Improvements that Would Encourage More Cycling

A.6.6 Geographic Analysis

The following survey variables were geocoded by zip code to examine the spatial distribution of survey results:

- What type of cyclist are you? (Question 2)
- What type of facility do you prefer to ride on? (Question 5)
- How frequently do you use trails? (Question 20)
- Please check your traffic and safety concerns? (Question 24)

- In general, what type of riding to you tend to do? (Question 10)

There was little variation in the spatial distribution of the majority answer for most questions. The exception was the percent of people who do errands while they bike (Question 10). The greatest percentage of respondents that report they ride to work live in the south central portion of the city where they are close to many destinations including the UNM and Kirtland Air Force Base. Areas where fewer people ride for utilitarian purposes include the north valley, the predominately residential eastern portion of the city, and areas west of the Rio Grande. It should be noted that these results are likely impacted by the relative variation in zip code size and relative number of response obtained in throughout the city.

5.6.7 Key Findings From the Analysis

- A disproportionate number of reported bicycle crashes, 83 percent, involve males who make up about 65 percent of Albuquerque's reported bicycle population. This is consistent with findings from other U.S. cities.
- The average bicycle commute trip is about 23 minutes. This is consistent with the idea of the 20-minute neighborhood and idea that the average bicycle trip in the U.S. is two to three miles.
- Albuquerque's reported bicycle commute to work mode share has been static for about 20 years.
- A comparison of 1997 counts to 2010 counts found the highest AM peak on-street volumes at the Central Avenue and Yale Boulevard intersection. In 2010, 115 cyclists were counted here during the AM peak. This is a drop from the 164 cyclists observed at the same intersection in 1997. These drops in the AM counts are consistent with other count locations. This trend is not consistent with PM counts at the same locations where, in many cases, the numbers of cyclists increased slightly or remained the same. Potential reasons for these shifts could include a variation in the AM peak times or a shift in facility usage patterns.
- The highest on-street cyclist count volumes were found around the University of New Mexico and Kirtland Air Force Base (AFB). There was a significant shift of cycling traffic from the Wyoming gate to the new Eubank Gate. The greatest number of legal infractions (e.g., running a red light) were observed around UNM, while the greatest rates of compliance with roadway laws and helmet use were observed around Kirtland AFB.
- The highest weekday cycling usage occurred at the University of New Mexico. The highest weekend usage was along the Rio Grande Bosque Trail with an average of more than 200 users per hour per link at three locations. The lowest weekday cycling usage occurred along Unser Boulevard, the lowest weekend usage occurred along Coors Boulevard north of Montaño Road.
- Trail counts indicated that there is significant off-street cycling activity for recreation and utilitarian purposes that is not captured in the census commute mode share.
- Cyclists were the most commonly counted trail users; they were generally noted in ratios of 1:1 to 5:1 when compared to walkers and joggers, the second most prevalent trail users.
- Streets with the greatest number of reported crashes and highest reported crash rates per mile were 4-6 lane roads without bicycle facilities. The roadways with the greatest number of crashes per mile included East Central Avenue, Lomas Boulevard and San Mateo Boulevard.
- The seven intersections with the greatest number of reported crashes were all located along Central Avenue. Count data was available at one intersection, Yale Boulevard, and indicated significant bicycle traffic during AM and PM peak hours.
- Nearly 2/3 of cyclists feel that bicycle lanes and multi-use trails do not connect to all the places they want to go.
- There is some evidence that bicycle trips are replacing car commute trips when gasoline prices increase.
- Women responding to the survey generally identified as intermediate riders who prefer to ride on low traffic streets, while both genders indicated that bicycle routes and boulevards would 'very likely' increase their cycling. A greater percentage of women indicated strong support for this statement.
- Both men and women agreed that grocery stores were the land use most in need of increased bicycle parking. Other high-priority land uses included the work place, civic destinations (e.g., parks), shopping malls and restaurants.

A.6.8 Conclusions and Recommendations

These conclusions and recommendations will be used to inform the development of the bikeways and multi-use trail network.

A.6.8.1 Count Related

- Consider day-long counts at along key corridors to determine daily citywide use.
- Consider counts along high crash corridors without existing bicycle facilities to determine current level of use.

- Conduct annual or semi-annual counts at selected locations on bikeways and multi-use trails across the city.

5.6.8.2 Crash Related

- The detailed crash analysis presented in this report should be repeated every few years to identify high crash locations and solutions to improve safety for non-motorized transportation users. This could be done as a part of a periodic bikeway and multi-use trails 'report card' that documents relevant metrics, including new bikeway miles, new trails and crossings, major completed projects, number of bicycles and other trail users, crash analysis, user satisfaction, public perception of safety, etc. This periodic review could be used to create updates to the *Albuquerque Bikeways and Trails Master Plan* that can tune the Plan's implementation strategies to respond to changing safety, walking and bicycling patterns.
- The city should consider education or enforcement programs that address specific causes of crashes involving bicycles and other non-motorized transportation users. The most frequent type of crashes were instances where a car hit a bicycle at an angle.
- The City should consider a detailed analysis of conditions along top crash corridors and at top intersections. This analysis should help the city determine whether the higher numbers of crashes are related to difficult conditions or higher numbers of cyclists using the corridor.
- The majority of reported bicycle crashes have occurred on major roadways with 4 – 6 travel lanes, no dedicated bicycle facilities and posted speeds of at least 35 mph. Future roadway design and corridor retrofit of these corridors should focus on increasing safety by through increased separation and enhanced crossing treatments.

5.6.8.3 Survey Related

- Focus high priority network improvements on closing small bikeway and trails gaps to destinations.
- Consider programs to increase bicycle parking at high priority locations across the city.
- Continue and when possible expand education, encouragement and enforcement programs. Target these programs to key groups that are under represented in the city's current cycling demographic including women and groups that would benefit from education such as school age children.
- Consider placing high priority on filling gaps in the multi-use trail network.

B. Bicycle Counts and Survey Responses

B.1 Review of Online Survey

Several questions in the online survey relate to end-of-trip facilities and are reviewed below. Questions 16 and 17 explicitly asked respondents about locations where they would like to see more bicycle parking and locker facilities. Question 28 asked respondents to indicate whether additional bicycle parking would influence them to bicycle or use the trail system more often. Three other questions contained select responses relevant to bicycle end-of-trip facilities.

B.1.1 Question 16 - Where would you like to see more bike racks or bike lockers? (check all that apply)

The top responses to question 16 are presented in Figure 3 below.

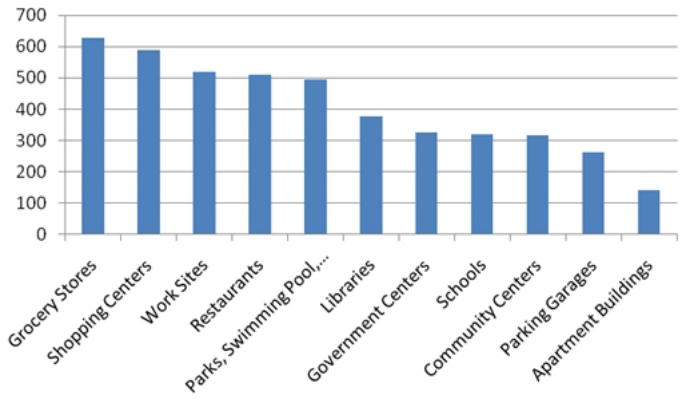


Figure 3 - Question 16 - Where would you like to see more bike racks or bike lockers? (check all that apply)

B.1.2 Question 17 - Are there any specific locations where you think bicycle racks are needed?

The next survey question followed up on Question 16, asking respondents to provide specific locations in where they thought more bicycle racks were needed. The top responses are found in Table 5:

Table 5 –Question 17 - Are there any specific locations where you think bicycle racks are needed?

Location	Number of Responses	Location	Number of Responses
Downtown	31	Rail Runner	4
Nob Hill	30	Whole Foods	4
Central Ave	24	Transit stops	3
UNM Hospital	10	Government buildings	3
Grocery	9	City Hall	3
Albertsons	9	Malls	3
Bus	7	Cottonwood Mall	2
Old Town	7	Winrock Mall	2
UNM	7	Coronado Mall	2
Movie Theaters	7	Costco	2
Uptown	7	Zoo	2
Trails	6	Airport	2
4th Ave	5	Heart Hospital	2
Post office	4	Civic Plaza	2

B.1.3 Question 25 - Infrastructure

When asked to indicate infrastructure concerns, 20% of respondents indicated 'no showers, lockers' while 19% indicated 'no bike parking.' As indicated in Figure 4 below, these were the 5th and 7th most common infrastructure concerns, respectively.

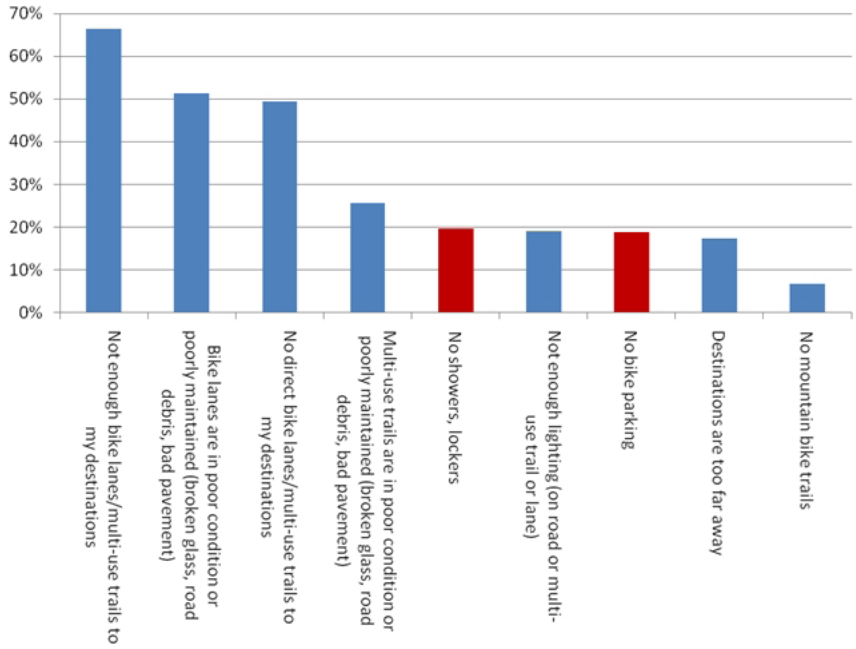


Figure 4- Question 25 – Infrastructure Concerns

B.1.4 Question 26 - Personal Concerns

While question 26 (Personal concerns) did not include a choice related to end of trip facilities, seven respondents selected 'other' and indicated a concern for the security of their bicycle.

- Not a safe place to store my $1000 bike.
- Many bikes have been stolen from the hospital
- Need safe locker for nice bike
- Don't have a safe place to leave my bike
- Don't want my bicycle to get stolen
- My bicycle was stolen last fall and I haven't replaced it.
- Concerned with bike security

B.1.5 Question 40 - Ideas, comments or suggestions for the City of Albuquerque

In response to the final survey question which asked respondents for 'ideas, comments or suggestions for the City of Albuquerque', two people provided suggestions related to end of trip facilities:

- Encourage new business construction to include bike parking/shower/locker room facilities!!
- Secure indoor parking

C. Safe Routes to School

D. Street Plan

E. Bicycle Friendly Community Action Plan Reference

Action Plan Point	Plan Reference	Section
1. Adopt a target level of bicycle use (e.g. percent of trips) and safety to be achieved within a specific timeframe, and improve data collection necessary to monitor progress.	Chapter 3	3.2.1,
	Chapter 6	6.1.3.2
	Chapter 7	7.1, 7.5.1
	Appendix D	
2. Provide safe and convenient bicycle access to all parts of the community through a signed network of on and off-street facilities, low-speed streets, and secure parking. Local cyclists should be involved in identifying maintenance needs and ongoing improvements.	Chapter 3	3.3.2, 3.3.3, 3.3.4, 3.3.9
	Chapter 6	6.2, 6.3, 6.4, 6.6
	Chapter 7	7.6, 7.7.3
	Appendix C, Appendix F	
3. Establish information programs to promote bicycling for all purposes, and to communicate the many benefits of bicycling to residents and businesses (e.g. with bicycle maps, public relations campaigns, neighborhood rides, a ride with the Mayor)	Chapter 3	3.3.5, 3.3.6, 3.3.7
	Chapter 6	6.1.1.3, 6.1.3.2
	Chapter 7	7.2, 7.3, 7.4
4. Make the City a model employer by encouraging bicycle use among its employees (e.g. by providing parking, showers and lockers, and establishing a city bicycle fleet).	Chapter 6	6.1.1.3
	Appendix F	
5. Ensure all city policies, plans, codes, and programs are updated and implemented to take advantage of every opportunity to create a more bicycle-friendly community. Staff in all departments should be offered training to better enable them to complete this task.	Chapter 3	3.3.2, 3.3.3, 3.3.4, 3.3.9
	Chapter 6	6.5, 6.6
	Chapter 7	7.2,7.4
6. Educate all road users to share the road and interact safely. Road design and education programs should combine to increase the confidence of bicyclists.	Chapter 3	3.3.5, 3.3.6, 3.3.7, 3.3.8,
	Chapter 6	6.1.3.1, 6.1.3.2, 6.5, 6.6
	Chapter 7	7.2
7. Enforce traffic laws to improve the safety and comfort of all road users, with a particular focus on behaviors and attitudes that cause may contribute to motor vehicle/bicycle crashes.	Chapter 3	3.3.6, 3.3.8, 3.3.9
	Chapter 6	6.1.3.1, 6.1.3.2, 6.5, 6.6
	Chapter 7	7.2, 7.3, 7.4
8. Develop special programs to encourage bicycle use in communities where significant segments of the population do not drive (e.g. through Safe Routes to Schools programs) and where short trips are most common.	Chapter 3	3.3.2, 3.3.7
	Chapter 6	6.1.3.1, 6.1.3.2
	Chapter 7	7.2, 7.3
	Appendix E	
9. Promote intermodal travel between public transport and bicycles, e.g. by putting bike racks on buses, improving parking at transit, and improving access to rail and public transport vehicles.	Chapter 6	6.1.1.3, 6.2
	Appendix C, Appendix F	
10. Establish a citywide, multi-disciplinary committee for nonmotorized mobility to submit to the Mayor/Council a regular evaluation and action plan for completing the items in this Charter.	Chapter 3	3.3
	Chapter 6	6.1.3.1, 6.1.3.2
	Chapter 7	

F. Public Meetings

G. Stakeholder Workshops

H. Interviews