3. Needs Analysis

The needs of Bakersfield bicyclists are diverse and depend on the individual level of experience, confidence, age, trip type and many other factors. This examination begins with a review of the types of bicyclists and typical trip purposes. It is followed by a review of trip attractors and generators to identify potential bicycle trip origins and destinations. Travel mode choice and typical travel time are then reviewed to understand the current and potential rates of bicycling. Bicycle related collisions are also reviewed to understand locations likely in need of bicycle related improvements. A closer look at the existing gaps in the bicycle network will help inform network development. The needs analysis concludes with a summary of community input gathered from a community survey and a workshop.

3.1. Types of Bicyclists

This Plan seeks to address the needs of current and potential bicyclists and therefore it is important to understand the needs and preferences of all types of bicyclists. Bicyclists' needs and preferences vary between skill levels and their trip types. Generally, bicycling typologies fall into four categories.[1] Figure 3-1 illustrates these bicyclist types in a bar chart relating to the proportion of the public estimated from surveys to identify with each typology.

- *Strong and Fearless* bicyclists will ride on almost any roadway despite the traffic volume, speed and lack of bikeway designation and are estimated to be less than 1% of the population.
- *Enthused and Confident* bicyclists will ride on most roadways if traffic volumes and speeds are not high. They are confident in positioning themselves to share the roadway with motorists and are estimated to be 7% of the population.
- *Interested but Concerned* bicyclists will ride if bicycle paths or lanes are provided on roadways with low traffic volumes and speeds. They are typically not confident cycling with motorists. Interested but Concerned bicyclists are estimated to be 60% of the total population and the primary target group that will bicycle more if encouraged to do so.
- *No Way, No How* are people that do not consider cycling part of their transportation or recreation options and are estimated to be about one-third of the population.

Typical Distribution of Types of Bicyclists

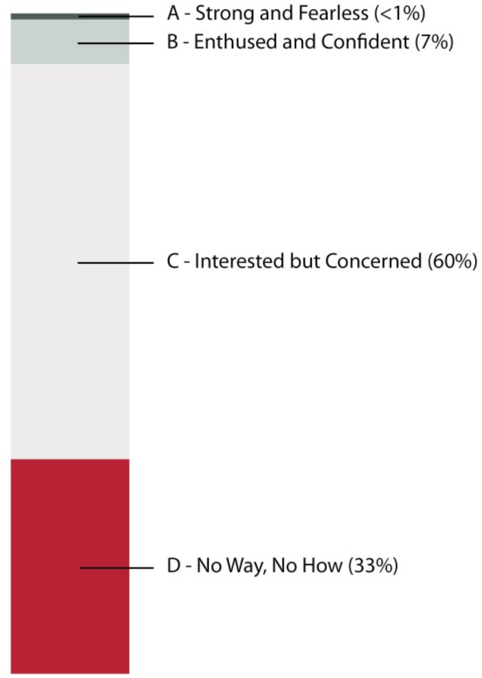

Figure 3-1: Typology of Existing and Potential Bicyclists

[1] Source: Roger Geller, Bicycle Coordinator, City of Portland, Oregon

The needs of bicyclists also vary between trip purposes. For example, people who bicycle for performance or recreational purposes may prefer long, straight, and un-signalized roadways while bicyclists who ride with their children to school may prefer direct roadways with lower vehicular volumes and speeds. The different types of bicyclists and their trip purposes include:

- Commuters: regularly bicycle between their residences and work
- Enthusiasts: ride for fitness or sport, and generally (but not always) have confidence and skills for riding in traffic
- Casual / Family / Elderly: people who use bicycles for running errands, leisure, or as a family activity
- Children: bicycle to school, activities and to visit friends

An effective bicycle network accommodates bicyclists of all abilities. Casual bicyclists generally prefer roadways with low traffic volumes and low speeds. They also prefer paths that are physically separated from roadways. Because enthusiasts typically ride to destinations or to achieve a goal, they generally choose the most direct route, which may include arterial roadways with or without bike lanes. Commuters generally prefer increased separation from automobile traffic, but will ride on arterial roadways if they need to in order to reach their destinations. Children are more comfortable riding on very low volume residential streets and separated pathways.

Bicyclists of all abilities and purposes ride every day in Bakersfield. Parents bicycle with their children to school, people bicycle to work in Bakersfield and adjacent unincorporated Kern County, community members bicycle to GET stations, and recreational bicyclists ride through Bakersfield on extended bicycle trips.

Bicyclists of all abilities and purposes ride every day in Bakersfield.

3.2. Bicycle Attractors and Generators

3.2.1 Parks and Community Centers

Bakersfield has 59 park facilities including playgrounds, ball fields, courts, and picnic areas that serve as recreational destinations for the community. These outdoor amenities attract individuals, families, local residents and tourists. Bakersfield's larger park destinations are described below and shown on Figure 3-2.

Aera Park and Baseball Fields: Aera Park is located at the intersection of Stockdale Highway and Jewetta Avenue, close to the Kern River. The park's 11 baseball fields host Bakersfield Southwest youth leagues. In addition, Aera Park has wi-fi available.

Centennial Park: Located on Montclair north of Stockdale Highway, Centennial Park has a wide variety of amenities, including playground equipment; picnic areas; facilities for basketball, volleyball, tennis, baseball, and soccer; and a no-leash zone for dogs.

Centennial Plaza: The Centennial Plaza is located at Truxton Avenue and N Street, near to the Rabobank Arena Theatre and Convention Center. It includes a fountain, waterfall, and stage.

Dr. Martin Luther King Jr. Community Center and Park: This park is located at the intersection of East California and South Owens and has a pool, summer spray park, basketball and tennis courts, and a full gym. The adjacent community center has a large multipurpose room with a kitchen, after school program for children, and free lunch program during the summer months.

Jastro Park: Located between Truxtun Avenue and 18th Street, Jastro Park has a bandstand, shade canopy, two picnic areas, facilities for a variety of sports, horseshoe pits, playground equipment, and a summer spray park.

Jefferson Park: Amenities at Jefferson Park include a spray park, sandlot style play area, amphitheater, and pool. It is located at Bernard Street and Beale Avenue.

Kern River Parkway Bike Path: The Kern River Bike Path covers more than 30 miles along the Kern River through Bakersfield. There are more than 6,000 acres of trails, parks, and waterways, including the paved shared-use path previously discussed.

McMurtrey Aquatic Center: Located in Downtown at the corner of 14^{th} and Q Streets, this aquatic facility features a large recreation pool and a 50-meter competition pool, as well as a double water slide.

The Park at River Walk: A 32 acre park adjacent to the Kern River at the junction of Stockdale Highway and Buena Vista Road, The Park at River Walk has an amphitheater, swimming facilities, and wi-fi access. It is behind The Shops at River Walk.

Planz Park: This park is located at Planz Road and South H Street, and provides three picnic areas, a baseball diamond, a basketball court, a spray park, and a pool. **Silver Creek Community Center and Park:** Located at Harris Road and Reliance Drive, the park and community center include a pavilion, a swimming pool, a multi-purpose room, a stage, lighted tennis courts, a disc golf course, horseshoe pits, an exercise course, two play areas, a multi-use sports field, and two large picnic areas.

Wayside Park: This park is located at Ming Ave and El Toro Drive. It offers two picnic areas, a softball diamond, basketball and tennis courts, and a spray park.

3.2.2 Schools

Children below driving age are a large population of existing and potential bicyclists. Schools in Bakersfield are listed in Table 3-1 and shown in Figure 3-2. Elementary and junior high/middle schools in Bakersfield are managed by the Bakersfield City School District, while high schools are managed by the Kern High School District.

Table 3-1: Bakersfield Public Schools

School Names			
Elementary Schools			
Almondale	Evergreen	Loudon	Planz
American	Franklin	McAuliffe	Quailwood
Berkshire	Frank West	McKinley	Reagan
Bill Williams	Fremont	Mount Vernon	Roosevelt
Bimat	Garza	Munsey	San Lauren
Buena Vista	Granite Pointe	Nichols	Sandrini
Casa Loma	Harding	Noble	Sandstone
Castle	Harris	Norris	Seibert
Chavez	Hart	Old River	Sing Lum
College Heights	Hills	Owens Primary	Stine
Columbia	Horizon	Owens Intermediate	Stockdale
Del Rio	Horace Mann	Palla	Suburu
Discovery	Jefferson	Patriot	Thorner
Douglas	Johnson Children's Center	Pauly	Valle Verde
Downtown	Kendrick	Penn	Valley Oaks Charter
Eissler	Laurelglen	Pioneer	Veterans
Endeavour	Longfellow	Plantation	Wayside
Junior High / Middle Schools			
Actis	Freedom	Sierra	Valley Oaks Charter
Chipman	Greenfield	Stiern	Warren
Compton	Ollivier	Stonecreek	Washington
Curran	Rafer Community Day	Tevis	
Emerson	Sequoia	Thompson	
High Schools			
Bakersfield	Frontier	Liberty	South
Centennial	Golden Valley	Mira Monte	Stockdale
East Bakersfield	Highland	North	West
Foothill	Independence	Ridgeview	

In addition to elementary, middle, junior high, and high schools, Bakersfield is also home to California State University (CSU) Bakersfield and Bakersfield College. As of the fall quarter 2012, CSU Bakersfield enrolled 8,520 total students[2]. Established in 1913, Bakersfield College is one of the nation's oldest continually-operating community colleges, today serving 15,000 students on the 153-acre main campus in northeast Bakersfield, at the Weill Institute in downtown Bakersfield, and at the Delano Center 35 miles north of Bakersfield[3].

[2] http://www.calstate.edu/as/stat_reports/2012-2013/f12_01.htm
[3] http://www.bakersfieldcollege.edu/about/facts/

3.2.3 Retail Centers

Located in the central portion of the city, Downtown Bakersfield is comprised of several blocks and features restaurants, retail shops, and entertainment uses, including the Rabobank Arena, Theatre, and Convention Center. There are Class II bike lanes on Chester Avenue, Q Street, and 21st Street that serve the downtown.

There are two major shopping centers in Bakersfield: Valley Plaza Mall and Northwest Promenade. Located in southwest Bakersfield adjacent to Highway 99, the Valley Plaza Mall has a wide variety of shops and restaurants, as well as a movie theatre. It can be accessed by Wible Road, which has Class II bike lanes. The Northwest Promenade is an outdoor shopping center located on the northwestern side of the Kern River. The Promenade fronts Rosedale Highway, which lacks bicycle facilities, but there are Class II bike lanes on Coffee Road, which runs along the property's eastern edge. The East Hills Mall, located in the northeast portion of the city, contains a United Artists Theatre. There are Class II bike lanes on Columbus Street to the north and Bernard Street to the south of the mall.

Smaller shopping and lifestyle centers, such as the Shops at Riverwalk and the Marketplace, are scattered throughout Bakersfield and are home to major chain stores and restaurants, such as Target, Costco, Wal-Mart, Family Dollar, P.F. Chang's, and BJ's Restaurant and Brewhouse.

3.2.4 Top Employers

Nearly 25,000 people are employed by Bakersfield's top ten employers. Making bicycling to work convenient through increased access to employment centers and City and privately sponsored encouragement programs would target this large pool of potential bicyclists. Table 3-2 lists the top ten employers, their location, and number of employees. They are also shown on Figure 3-2. This Plan's recommendations consider large employer locations.

Table 3-2: Top 10 Employers (2010)

Employer	Address	Number of Employees
County of Kern	1115 Truxtun Avenue	7,475
Giumarra Farms	PO Box 1969	4,200
Grimmway Farms	N/A	3,500
Wm. Bolthouse Farms, Inc.	7200 E. Brundage Lane	2,000
Bakersfield Memorial Hospital	420 30th Street	1,400
City of Bakersfield	1600 Truxtun Avenue	1,300
Mercy Hospital	2215 Truxtun Avenue	1,200
ARB, Inc.	PO Box 1559	1,200
Kern Medical Center	1830 Flower Street	1,200
State Farm Insurance	900 Old River Road	1,045
Total		**24,520**

Source: Greater Bakersfield Chamber of Commerce

3.2.5 Transit

Public transit riders often face the "first mile, last mile" dilemma of how to connect their home and final destination with the actual transit route. For instance, a transit bus may take a passenger to within a mile of their employment site, but that might be outside the range of their walking capability or tolerance. Bicycle racks on buses and bicycle parking at transit stops ensure that bicycling is a complementary solution to the transit connectivity issue.

Approximately 1.2% of Bakersfield's working population report taking transit to work daily[4]. Three public transit agencies operate within the City: Golden Empire Transit (GET), Kern Regional Transit, and Amtrak.

GET has annual boardings of 7.2 million passengers.[5] There are two GET transit centers; one is downtown on 22nd Street between Eye Street and Chester Avenue, and the other is in southwest Bakersfield on Wible Road. GET operates bus routes throughout the City and provides front-loading bicycle racks. The racks can carry up to two bicycles, and bicycles are also allowed inside the bus if the rack is full and room is available.

Kern Regional Transit operates bus routes throughout Kern County. Nine of 12 bus routes traverse Bakersfield. Some Kern Regional Transit buses are equipped with bicycle racks that are available on a first-come first-served basis. The City has installed bicycle lanes and routes along major bus routes, including Chester Avenue.

Amtrak offers inter-city train and bus service to and from Bakersfield. The Bakersfield Amtrak station is located off Truxtun Avenue and S Street. Some buses are equipped with front bicycle racks, while others allow bicycles to be stored in luggage compartments below the vehicles. Most Amtrak trains permit bicycles to be walked onto train cars and secured to onboard bicycle racks. On older trains not equipped with racks, bicycles must be stored in a container and checked. There are no bikeways adjacent to the Amtrak station, though there are several nearby facilities through the downtown, such as Class II bike lanes to the east on Q Street.

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[4] American Community Survey, United States Census, 2007-2011.
[5] www.getbus.org/about/

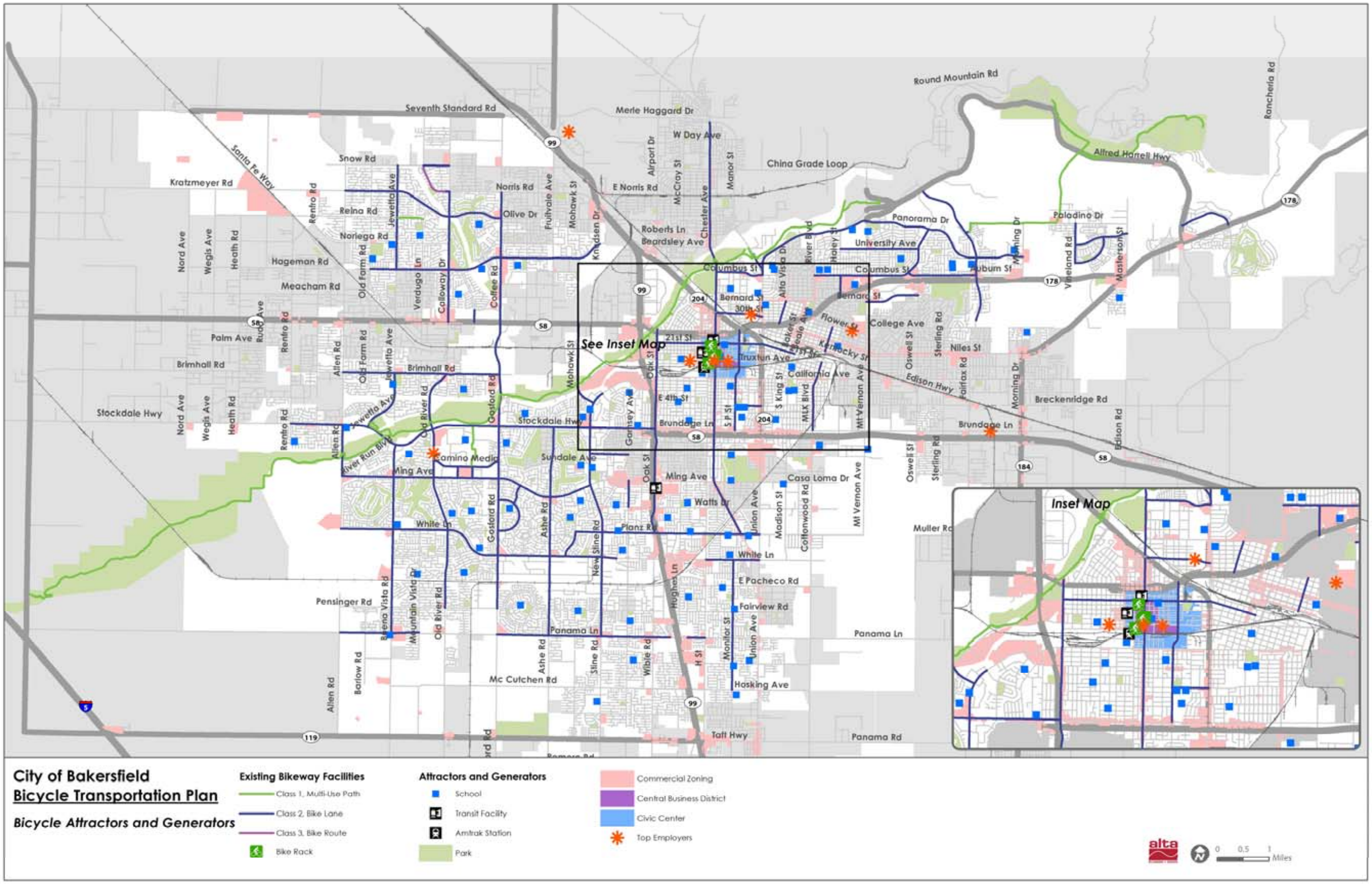

Figure 3-2: Bicycle Attractors and Generators

3.3. Commuter Travel

Monitoring the number of commuter bicyclists in the City provides a way to track the use of bicycle facilities. As bicycle facilities are built and education and encouragement programs are implemented, the data can be revisited to monitor changes in bicycling rates. The proportion of Bakersfield residents that bicycle to work is about 0.4%, which is slightly lower than Kern County and the United States as a whole, and less than half that of California (Table 3-3).

Table 3-3: Work Commute Mode Share by Geography

Mode	Bakersfield	Kern County	California	United States
Bicycle	0.4%	0.5%	1.1%	0.6%
Carpool	13.5%	15.4%	11.1%	9.7%
Drive Alone	79.4%	76.2%	73.3%	76.4%
Public Transit	1.2%	1.2%	5.2%	5.0%
Walked	2.2%	1.7%	2.8%	2.8%
Other	1.1%	2.1%	1.3%	1.2%
Worked from Home	2.3%	2.9%	5.3%	4.3%

Source: U.S. Census Bureau, 2011 American Community Survey, SFB08301

Review of travel time to work is important to estimate the potential number of bicycle commuters. Generally, a commute time of 15 minutes or less is equivalent to a 30 minute bicycle commute, assuming flat topography and light to moderate traffic. The example of communities nationwide demonstrates that it is possible for Bakersfield to shift a portion of the 31.5 % of the 15 minute or less commuters to bicycling. Table 3-4 compares average Bakersfield commute times with Kern County, California, and the United States.

Table 3-4: Travel Time to Work

Travel Time to Work	Bakersfield	Kern County	California	United States
Less than 15 minutes	31.5%	32.7%	24.5%	27.8%
15 to 29 minutes	43.0%	37.9%	35.8%	36.4%
30 to 44 minutes	14.8%	16.8%	21.6%	20.2%
45 to 59 minutes	4.9%	5.1%	8.0%	7.5%
60 minutes or more	5.8%	7.5%	10.1%	8.1%

Source: U.S. Census Bureau, 2011 American Community Survey, SF B08303

3.4. Bicycle Counts

As part of this Bicycle Transportation Plan effort, the City of Bakersfield with assistance from Bike Bakersfield volunteers conducted bicycle counts at 14 sites geographically dispersed throughout the city to gather information on the number and characteristics of existing bicyclists. The counts were conducted from 6:30am to 9:00am and 3:30pm to 6:00pm on Tuesday September 18, 2012 and 8:00am to 12:00pm on Saturday September 22, 2012, for a total of 9 hours of observations per site. Table 3-5 presents a summary of the data gathered as part of this effort.

Table 3-5: Summary of Bicycle Counts by Site

	Total Count				Avg. Count / Hour	
Location	AM	PM	Weekend	Total	Weekday	Weekend
Chester Ave & Class 1 Bike Path	118	121	382	621	48	96
Kern River Trail & Stockdale Hwy	134	103	371	608	47	93
Baker St & Sumner St	47	60	83	190	21	21
4th St & P St	30	65	94	189	19	24
Stockdale Highway & Don Hart (Near Cal State)	44	46	66	156	18	17
Paladino Dr & Morning Dr	41	9	86	136	10	22
21st St & Oak St	30	37	47	114	13	13
S. Chester Ave & Ming Ave	24	38	41	103	12	10
Riverlakes & Hageman	31	26	28	85	11	7
Brimhall Ave & Calloway	16	13	34	63	7	9
Ming Ave & Ashe Rd	22	19	18	59	8	5
Columbus St & Union Ave	19	10	23	52	6	6
Chester Ave & Truxtun Ave	14	14	19	47	6	5
University Ave & Mt Vernon Ave	4	11	5	20	3	1
Total for all sites	574	572	1297	2443	-	-
Average for each measure	41	41	93	175	16	23
Proportion of all observed bicyclists	23%	23%	53%	100%	-	-

The top two sites both featured an intersection with a bike path. This is likely due to the community preferences for bike paths, as described further in Section 3.8.

Across all sites, women and youth riders accounted for only 16% and 6% of the total bicyclists observed, respectively. Both of these measures suggest that the environment is not perceived by the general public as comfortable enough for bicycling.

This summary of the data should be regarded as indicative measures of bicycling activity levels. As with bicycle collision analysis, manual bicycle counting has high statistical variability due to low sample size (9 hours out of the 4380 daylight hours of the year) and observation numbers (average 16 riders per hour across all sites). Ideally, future comparisons should utilize rolling five year averages to minimize the effect of random variation in the data. Should Bakersfield adopt permanent automatic counting technology at some sites (whether stand-alone or as part of traffic signal detection), it would be possible to develop locally specific seasonal, day of the week, and time of day expansion factors for any future short-term manual count efforts.

3.5. Estimated Commuter and Utilitarian Bicyclists

A key goal of this Plan is to maximize the number of bicyclists in order to realize multiple benefits, such as improved health, less traffic congestion, and maintenance of ambient air quality levels. In order to achieve this, a better understanding of the number of existing bicyclists is needed. The US Census collects only the primary mode of travel to work and it does not consider bicycle use when bicyclists ride to transit or school. Alta Planning + Design has developed a bicycle model that estimates usage based on available empirical data.

This model uses Bakersfield specific data from the US Census American Community Survey (ACS); National Safe Routes to School survey; and Federal Highway Administration College Commute Survey. The calculation steps are outlined below.

Bicycle to work mode share:

- Number of bicycle commuters, derived from the ACS
- Work at home bicycle mode share
- Number of those who work from home and likely bicycle, derived from assumption that five percent of those who work at home make at least one bicycle trip daily.

Bicycle to school mode share:

- Number of students biking to school, derived from multiplying the K-8 student population by the national bike to school average rate of two percent
- Number of college students biking to the CSU Bakersfield and Bakersfield College, derived from an assumption that one percent of those students living in Bakersfield bike.

Number of those who bike to transit:

- Number of people who bicycle to GET and Kern Regional Transit Stations, assuming that five percent of transit patrons use bicycles to access the station and/or their destination.

As shown on Table 3-6, there are an estimated 5,564 existing daily bicycle commute trips in Bakersfield. This is an order-of-magnitude estimate based on available data and does not include recreational trips. Table 3-7 presents the estimated air quality benefits.

Table 3-6: Existing Bicycling Demand (Estimated)

Variable	Figure	Source
Existing study area population	352,429	2011 ACS, B01003 1-Year Estimates
Existing employed population	139,907	2011 ACS, B08301 1-Year Estimates
Existing bike-to-work mode share	0.4%	2011 ACS, B08301 1-Year Estimates
Existing number of bike-to-work commuters	560	Employed persons * by bike-to-work mode share
Existing work-at-home mode share	2.3%	2011 ACS, B08301 1-Year Estimates
Existing number of work-at-home bike commuters	161	Assumes 5% of population working at home makes at least one daily bicycle trip
Existing transit-to-work mode share	1.2%	2011 ACS, B08301 1-Year Estimates
Existing transit bicycle commuters	84	Employed persons multiplied by transit mode share. Assumes 5% of transit riders access transit by bicycle
Existing school children, ages 5-14 (grades K-8)	58,856	2011 ACS, S0101 1-Year Estimates
Existing school children bicycling mode share	2.0%	National Safe Routes to School surveys, 2003.
Existing school children bike commuters	1,177	School children population multiplied by school children bike mode share
Existing number of college students in study area	8,002	CSU Bakersfield 2011 Fast Facts
Existing estimated college bicycling mode share	10.0%	Review of bicycle commute share in seven university communities (source: National Bicycling & Walking Study, FHWA, Case Study No. 1, 1995).
Existing college bike commuters	800	College student population multiplied by college student bicycling mode share
Existing total number of bike commuters	2,782	Total bike-to-work, school, college and utilitarian bike trips. Does not include recreation.
Total daily bicycling trips	5,564	Total bicycle commuters x 2 (for round trips)

Table 3-7: Bicycling Air Quality Impact

Existing Vehicle Trips and Miles Reduction		
Vehicle Trips per Weekday	1,734	Assumes 73% of vehicle trips replaced by bicycle trips for adults/college students and 53% for school children
Vehicle Trips per Year	452,574	Reduced number of weekday vehicle trips multiplied by 261 (weekdays in a year)
Vehicle Miles per Weekday	9,505	Assumes average round trip travel length of 8 miles for adults/college students and 1 mile for schoolchildren
Vehicle Miles per Year	2,480,775	Reduced number of weekday vehicle miles multiplied by 261 (weekdays in a year)
		Existing Emissions Reduction
Hydrocarbons (lbs/weekday)	28	Daily mileage reduction multiplied by 1.36 grams per reduced mile
PM10 (lbs/weekday)	0	Daily mileage reduction multiplied by 0.0052 grams per reduced mile
PM2.5 (lbs/weekday)	0	Daily mileage reduction multiplied by 0.0049 grams per reduced mile
NOX (lbs/weekday)	20	Daily mileage reduction multiplied by 0.95 grams per reduced mile
CO (lbs/weekday)	260	Daily mileage reduction multiplied by 12.4 grams per reduced mile
C02 (lbs/weekday)	7,732	Daily mileage reduction multiplied by 369 grams per reduced mile
Hydrocarbons (lbs/year)	7,438	Yearly mileage reduction multiplied by 1.36 grams per reduced mile
PM10 (lbs/year)	28	Yearly mileage reduction multiplied by 0.0052 grams per reduced mile
PM2.5 (lbs/year)	27	Yearly mileage reduction multiplied by 0.0049 grams per reduced mile
NOX (lbs/year)	5,196	Yearly mileage reduction multiplied by 0.95 grams per reduced mile
CO (lbs/year)	67,818	Yearly mileage reduction multiplied by 12.4 grams per reduced mile
C02 (lbs/year)	2,018,125	Yearly mileage reduction multiplied by 369 grams per reduced mile

Source: Emissions rates from EPA report 420-F-05-022 "Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks." 2005.

3.6. Collision Analysis

Analysis of bicycle related collision data provides the city with a basis for infrastructure and programmatic recommendations that can improve safety. Collision data comes from the Statewide Integrated Traffic Report System (SWITRS). Because SWITRS is a repository for all police departments to submit traffic records, data is sometimes incomplete due to varying reporting methods. While collision data is sometimes incomplete and does not capture the "near misses," it does provide a general sense of the safety issues facing bicyclists in Bakersfield.

This chapter reviews collision data from the years 2006 through 2010 to identify where collisions frequently occur and what factors influenced the collisions.

Table 3-8: Annual Reported Bicycle Related Collisions (2006-2010)

Year	Total Collisions
2006	56
2007	54
2008	54
2009	43
2010	49
Total	**256**

Source: SWITRS

3.6.1 Annual Collision Totals

In this time period, there were 256 total reported collisions involving bicyclists. The number of bicycle related collisions remained fairly constant throughout the five-year period (Table 3-8) dipping slightly in 2009 and rising again in 2010. It should be noted, however, that many bicycle collisions go unreported and the true number may be higher than shown.

Compared to other California cities with populations over 250,000, Bakersfield ranked the lowest by average population.[6]

Figure 3-7 maps these collisions. The vast majority of collisions occurred in downtown Bakersfield or adjacent to downtown to the east and south.

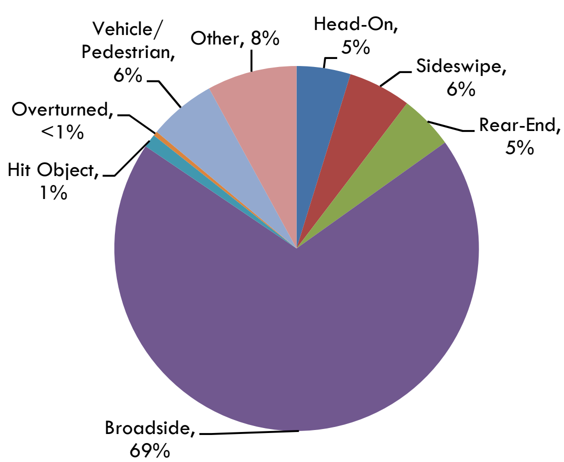

Figure 3-3: Type of Collision

3.6.2 Collision Types

Figure 3-3 breaks down the collision types by percentage The most typically reported collision type is a broadside collision. A broadside collision is a collision where the bicycle and the car were traveling at right angles to each other before the crash. .

This indicates those involved were either not obeying traffic control devices (e.g. signals, stop signs) or ensuring it was safe to cross. While SWITRS data does not note if the collision included sidewalk riding, sidewalk bicycling puts the bicyclist at risk because drivers do not expect a faster (relative to a pedestrian) bicyclist, particularly those riding against traffic.

[6] http://www.ots.ca.gov/media_and_research/Rankings/default.asp#what

3.6.3 Time of Day

As shown in Figure 3-4, the majority of collisions have historically occurred between 2pm and 8pm. Approximately 26% of the collisions occurred during typical school dismissal and after school activities times. This was only surpassed by collisions during the evening peak period (29% of collisions).

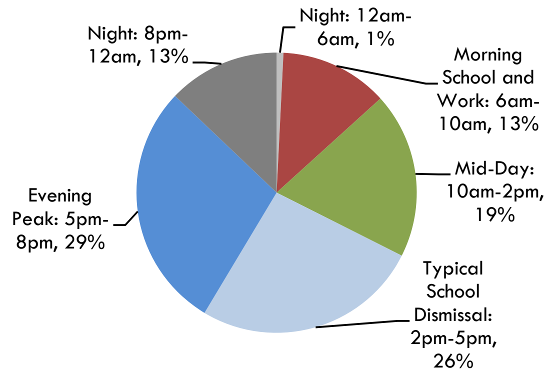

Figure 3-4: Time of Day

While most of the collisions occurred in the afternoon and evening, records show collisions typically occur during daylight hours (Figure 3-5)

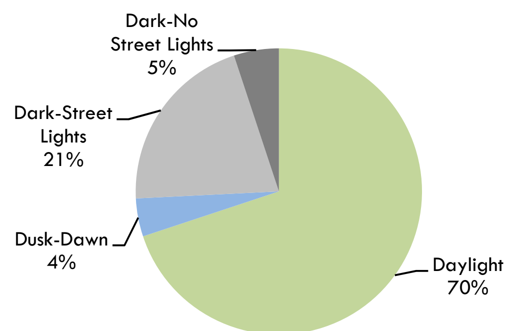

Figure 3-5: Bicycle Collisions - Lighting

3.6.4 Parties Involved

The most common age group involved in reported bicycle related collisions were children under 18 years old (Figure 3-6, 40%). Over 50% of reported collisions involved people under 25 years old. While these age groups may bicycle more than their seniors, collision rates are not possible to determine without more detailed exposure data. However, this may indicate a need for focused bicycling education for younger riders.

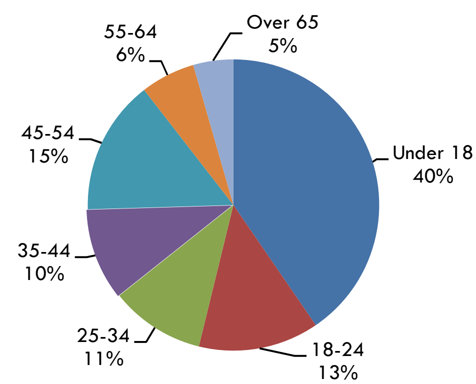

Figure 3-6: Age of Party Involved

3.6.5 Common Violations

Identification of the most common violations in bicycle-related collisions and the locations where they occurred can inform the City of possible engineering or education needs[7]. A specific recurring violation can be the result of unclear traffic controls or roadways not designed for bicycle use. It can also be the result of bicyclists not aware of or complying with the "rules of the road" or not feeling comfortable riding with traffic.

Table 3-9 lists the top five most common reported traffic violations and the specific locations where these violations most frequently occur.

Frequent traffic violations include riding on the wrong side of the road, automobile right of way, disobeying traffic signals and signs, and improper turning.

These violations suggest the need for bicycle and motorist education and direct and logical bikeways on or parallel to busy roadways.

Table 3-10 lists the traffic violations by the at fault party. Bicyclists were most commonly cited at fault for bicycle related collisions between 2006 and 2010. They were most at fault for riding on the wrong side of the road, disobeying traffic signals and signs, and failing to yield to right-of-way. Motorists, including truck drivers, were at fault for 18% of collisions, mostly for disobeying bicyclist right of way.

Table 3-9: Common Collision Related Violations and Location

Violation	% of Collisions	Frequently Occurs At
Wrong Side of Road	32.0%	Akers Road California Avenue Columbus Street
Automobile Right of Way	23.8%	21st Street 30th Street California Avenue
Disobeying Traffic Signals and Signs	10.9%	Baker Street (at Truxtun Avenue and Sumner Street) Brundage Lane Ming Avenue
Improper Turning	10.5%	Gage Street Ming Avenue
Unknown	5.9%	34th Street

Table 3-10: Traffic Violation by Party at Fault

Violation	Bicycle	Vehicle	Not Stated	Total
Wrong Side of Road	78	1	3	82
Vehicle Right of Way	40	17	4	61
Other or Unknown	12	3	15	30
Traffic Signals and Signs	23	3	2	28
Improper Turning	14	6	7	27
Under the influence	5	5		10
Unsafe Starting / Backing		7	1	8
Unsafe Speed	3	2	2	7
Improper Passing	1	1		2
Pedestrian Right of Way		1	1	2
Unsafe Lane Change	1			1
Lights / Brakes	1	1		2
Total	178	47	31	256
% Party at Fault	**70%**	**18%**	**12%**	100%

Wrong way riding may be due to a number of factors.

Table 3-11: Corridors Where Bicycle Related Collisions

[7] The violation data may be subject to systemic officer judgment biases.

Violators may not know the rules of the road or may not feel comfortable bicycling with traffic or crossing major roadways. For example, Columbus Street is a five-lane roadway with limited controlled intersections. Many bicyclists will ride against traffic for short distances rather than navigate complex intersections. Table 3-11 lists the most frequent corridors where wrong way riding was listed as a factor in the reported bicycle involved collision.

Involved Wrong Way Riding

Corridor	No. of Collisions
Columbus Street	4
Union Avenue	3
California Avenue	3
Old River Road	3
S H Street	3
White Lane	3
Ming Avenue	3

3.6.6 Frequent Collision Locations

Table 3-12 lists the corridors with the most collisions as well as roadway and bikeway descriptions.

Table 3-12: Top Collision Corridors

Corridor	No. of Collisions	Roadway Type	Speed Limit[8]	No. Travel Lanes[9]	Bikeway Type
White Lane	11	Arterial	55	8	Bike lanes
Ming Avenue	9	Arterial	45	8	Bike lanes
California Avenue	9	Arterial	45	8	Bike lanes
21st Street	7	Local	35	5	Bike lanes
Union Avenue	7	Arterial	45	8	None
S H Street	6	Arterial	45	3	None
H Street	6	Collector	40	5	None
RT 178	5	Freeway	varies	4	Shoulder
New Stine Road	5	Arterial	45	8	Bike Lanes
34th Street	5	Collector	40	6	Wide curbside lane
Baker Street	5	Collector	40	5*	None
Brundage Lane	5	Arterial	40	6	None

** with parallel parking*

These roadways may have more collisions than others because they:

- May carry more bicycle traffic as they provide logical and direct north/south connections, and are near attractor or popular destinations.
- Have higher traffic volumes and speeds, leading many bicyclists to ride either on sidewalks or against the flow of traffic (like runners often do, to observe oncoming vehicles) because they don't feel comfortable taking the lane. Both behaviors increase crash risk.

Table 3-13 lists the intersections with the most collisions as well as roadway and bikeway types. With a few exceptions (e.g. Gage Street / Kentucky Street), bicycle-involved collisions were more often at intersections with higher speed limits and numbers of travel lanes.

[8] Highest speed limit is listed when this criteria differs along the corridor.
[9] The number of lanes identified is the highest number along the corridor.

Table 3-13: Top Collision Intersections

Intersection	No. of Collisions	Roadway Type[10]	Speed Limit[11]	No. Travel Lanes[12]	Bikeway Class[13]
1. Ming Avenue / New Stine Road	4	Arterial / Arterial	45 / 45	8 / 8	2 / 2
2. Monitor Street / White Lane	3	Collector / Arterial	40 / 40	4 / 5	2 / 2
3. 19th Street / Union Avenue	2	Local / Arterial	25 / 50	2 / 7	None / None
4. 24th Street / Beech Street	2	Arterial / Local	40 / 25	5 / 2	None / None
5. 30th Street / Union Avenue	2	Local / Arterial	30 / 45	3 / 0	3 / None
6. 34th Street / Chester Avenue	2	Collector / Arterial	40 / 35-40	5 / 6	None / 2
7. 34th Street / Union Avenue	2	Collector / Arterial	40 / 45	6 / 7	None / None
8. Akers Road / White Lane	2	Collector / Arterial	45 / 50	4 / 7	3 / 3
9. Ashe Road / White Lane	2	Arterial / Arterial	50 / 50-55	7 / 8	2 / 2
10. Baker Street / E Truxtun Avenue	2	Collector / Arterial	25 / 40	4 / 6	None / None
11. Baker Street/ Sumner Street	2	Collector/Collector	25/35	4 / 3	None / None
12. Benton Street / Ming Avenue	2	Local / Arterial	25 / 45	2 / 5	None / None
13. Brundage Lane / H Street	2	Arterial / Collector	40 / 40-45	5 / 5	3 / None
14. Brundage Lane / P Street	2	Arterial / Collector	40 / 40	5 / 4	3 / 2
15. California Avenue / Chester Lane	2	Arterial / Local	40 / 25	6 / 3	None / None
16. California Avenue / Oak Street	2	Arterial / Arterial	40 / 40	8 / 7	None / 2
17. California Avenue / Stockdale Hwy / New Stine Road	2	Arterial / Arterial / Arterial	40 / 45 / 45	9 / 8 / 9	2 / 2 / 2
18. East California Avenue / Haley Street	2	Arterial / Collector	40 / 35	7 / 4	None / None
19. Gage Street / Kentucky Street	2	Local / Local	25 / 25	2 / 3	None / None
20. Golden State Avenue / M Street	2	Highway / Local	45 / 25	7 / 2	None / None
21. Kyner Avenue / Monitor Street	2	Local / Collector	25 / 40	2 / 3	None / 2
22. McDonald Way / Ming Avenue	2	Local / Arterial	25 / 45	2 / 7	None / None

For both corridors and intersections, no obvious correlation exists between collisions and the presence of bikeways.

[10] The highest roadway type is listed when this criteria differs on either side of the intersection
[11] Highest speed limit is listed when this criteria differs on either side of the intersection
[12] The number of lanes identified is the maximum number at the approach/departure of the intersection (i.e., thru + right turn + left turn lanes)
[13] When bikeway class changes on either side, the class with this highest level of separation is noted

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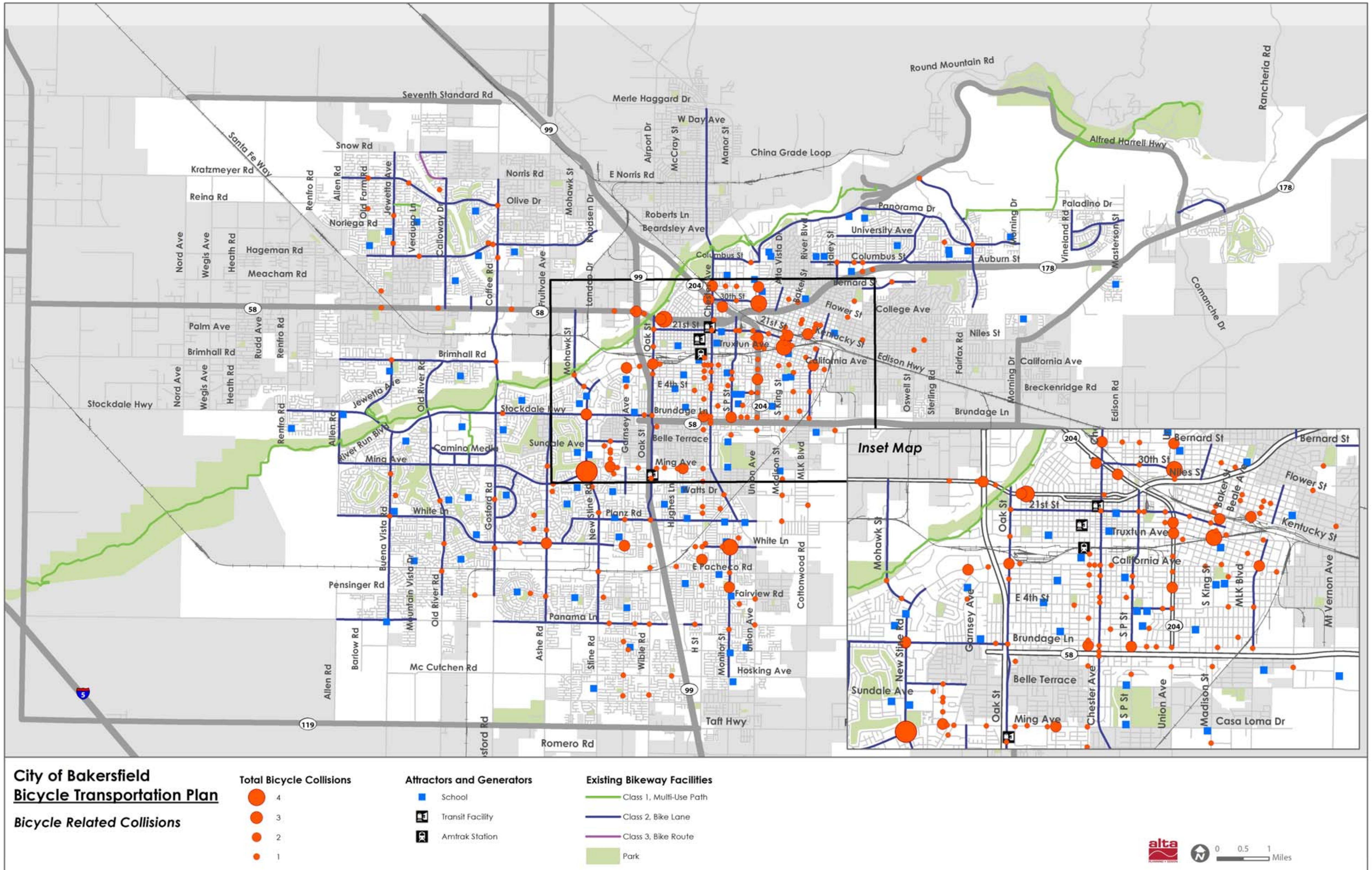

Figure 3-7: Reported Bicyclist-Involved Collision Map

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3.7. Gap Analysis

This section describes the five types of gaps that can occur in a bikeway network and organizes gaps in Bakersfield into these categories. The gaps are then mapped and help inform the network recommendations.

3.7.1 Gap Types

Spot Gaps

Spot gaps refer to point-specific locations lacking dedicated bicycle facilities or other treatments to accommodate safe and comfortable bicycle travel. Spot gaps primarily include intersections and other vehicle/bicycle conflict areas posing challenges for riders. Examples include bike lanes on a major street "dropping" to make way for right turn lanes at intersection, or a lack of intersection crossing treatments for bicyclists on a bikeway as they cross a major street.

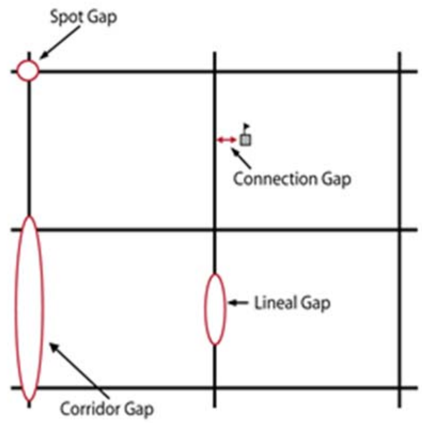

Figure 3-8: Bikeway Gap Types

Connection Gaps

Connection gaps are missing segments (1/4 mile long or less) on a clearly-defined and otherwise well-connected bikeway. Major barriers standing between bicycle destinations and clearly defined routes also represent connection gaps. Examples include bike lanes on a major street "dropping" for several blocks to make way for on-street parking; a discontinuous off-street path; or a freeway standing between a major bikeway and a school.

Lineal Gaps

Similar to connection gaps, lineal gaps are 1/4 mile to one-mile long missing link segments on a clearly defined and otherwise well-connected bikeway.

Corridor Gaps

On clearly-defined and otherwise well-connected bikeways, corridor gaps are missing links longer than one mile. These gaps will sometimes encompass an entire street corridor where bicycle facilities are desired but do not currently exist.

System Gaps

Larger geographic areas (e.g., a neighborhood or business district) where few or no bikeways exist are identified as system gaps. System gaps exist in areas where a minimum of two intersecting bikeways would be required to achieve the target network density. Gaps typically exist where physical or other constraints impede bicycle network development.

3.7.2 Gap Analysis Findings

Bakersfield's bikeway network gaps fall into all five types presented above. Gaps are mapped in Figure 3-9. Additional gaps not included in the tables are system gaps in southwest, southeast, and northeast Bakersfield, where bikeways are generally not present.

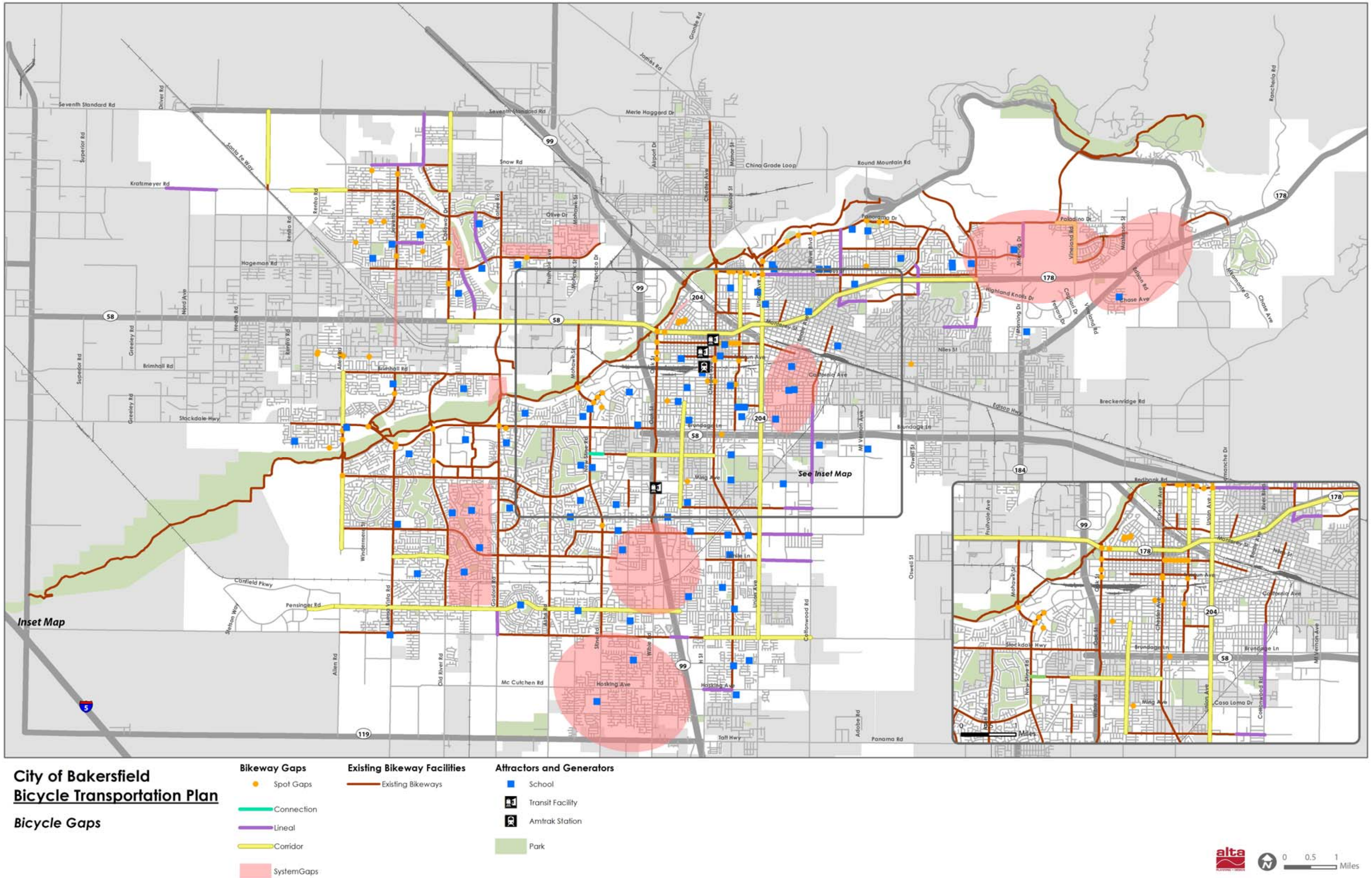

Figure 3-9: Bikeway Gaps

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3.8. Community Identified Needs

Community input was sought through an online survey, direct liaison with advocacy groups, and an advertised public workshop.

3.8.1 Community Survey

The City of Bakersfield solicited community input through an online survey on desired types and locations of bicycle improvements. The survey was open from September 24 to December 20, 2012. A total of 431 community members responded.

Respondent Characteristics and Behaviors

As shown in Figure 3-10, the majority of respondents (approximately one-fourth) were between the ages of 45-54; the next highest age range was 25-34 years (one-fifth of respondents). Gender equality has been shown to be an indicator of the perceived safety of bicycling in a given transportation system[14]. The survey respondents were 62 percent male and 38 percent female.

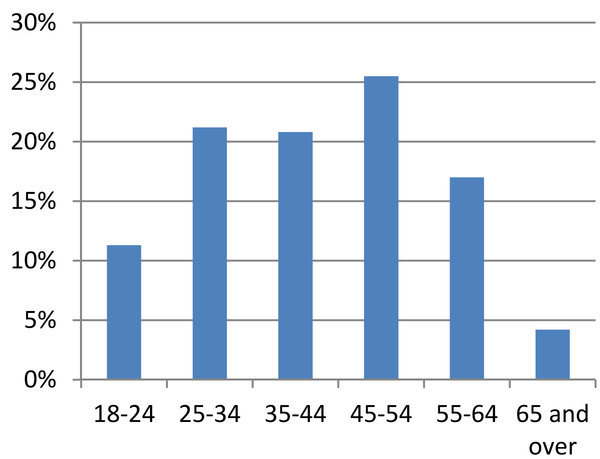


Figure 3-10: Age Distribution of Survey Respondents

Almost half of survey respondents typically drive alone for distances less than one mile (Figure 3-11). This group could potentially shift their drive alone trips to bicycle trips as this is a reasonably easy distance to commute by bike. About one-fourth of survey respondents walk and bike respectively for distances less than one mile.

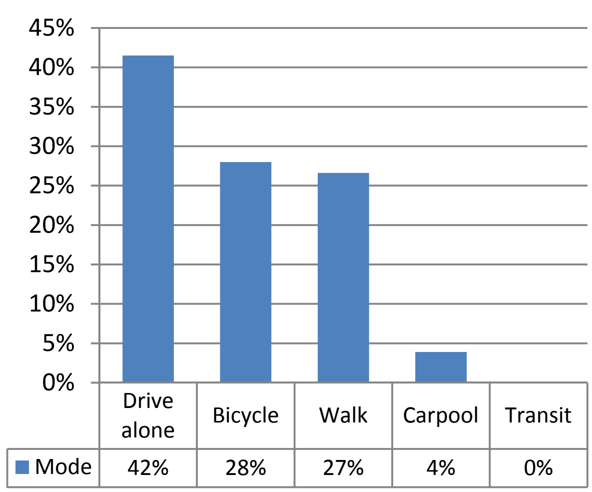


Figure 3-11: Mode Share for Trips Under 1 Mile

[14] http://policy.rutgers.edu/faculty/pucher/irresistible.pdf

The proportion of respondents that drive alone jumps up to two-thirds when trips are up to five miles (Figure 3-12). Bicycling and carpooling mode shares remain constant, but the proportion of people walking declines.

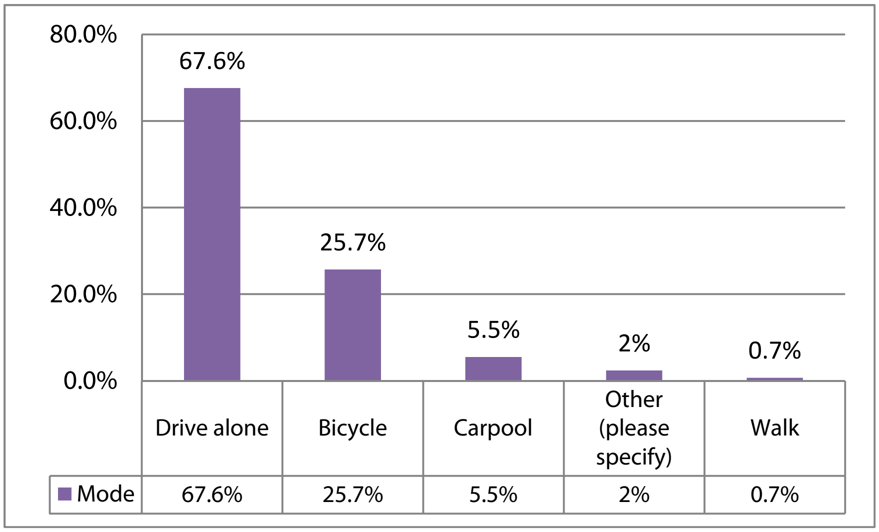


Figure 3-12: Mode Share for Trips Under 5 Miles

Two-thirds of respondents do not take children to school, but of the respondents that do, most drive their children to school and then continue on to another location. The next largest group of respondents drives to school and then back home.

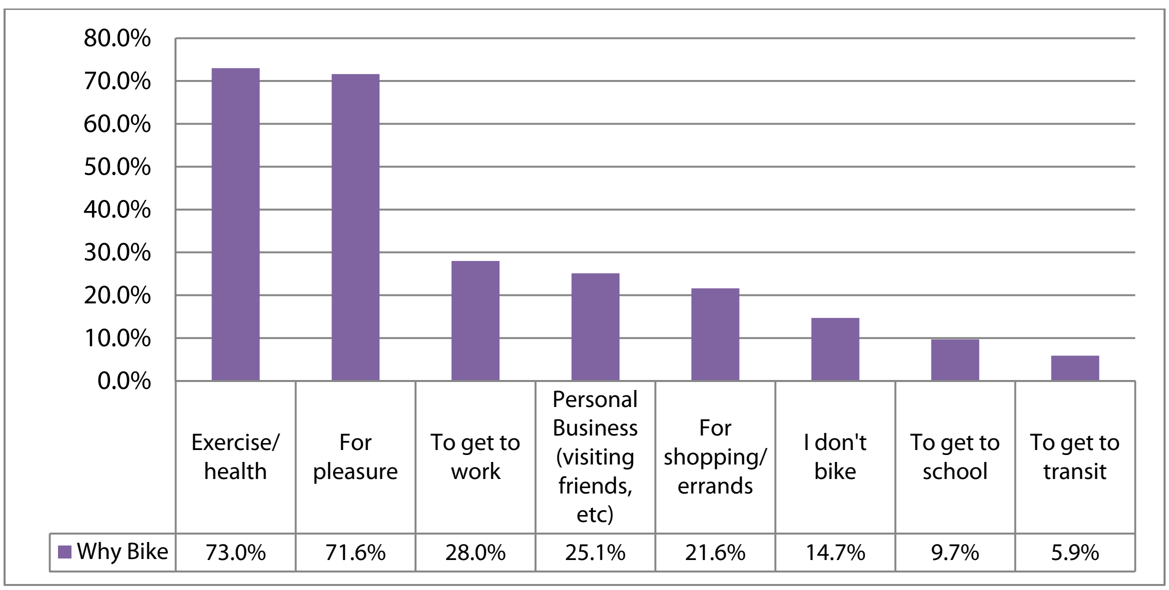


Figure 3-13: Respondents' Reasons for Bicycling

Three-fourths of respondents reported that they ride bicycles for pleasure and exercise/health (Figure 3-13). These were the most frequently selected reasons by a large margin as compared with other reasons for biking. The next most popular reason to bike was to get to work (28% of respondents). With additional educational programs for commuters, it is likely that recreational bicyclists may shift some of their commute trips to bicycle trips. Providing existing recreational bicyclists with route planning tips and information about gear, such as panniers to carry large loads, may give them the tools they need to try commuting by bike.

In the month prior to the survey, the majority of respondents (30%) biked one to five times, which averaged to approximately once a week or so, and about one-fifth of respondents bike 11 to 20 times per month. 37% of respondents ride 11 miles or more on average while 16% don't ride, suggesting that respondents have a wide range of bicycling abilities.

Community Identified Challenge and Opportunity Areas

Survey respondents identified specific problem areas they avoid when bicycling. These challenge areas are shown in Figure 3-14. The largest words are the challenge areas that respondents identified the most and include Rosedale, Stockdale, Coffee, Calloway, California, Gosford, and Ming. With the exception of the latter two and the addition of downtown, these same streets were nominated when asked where they would ride if facilities were available.

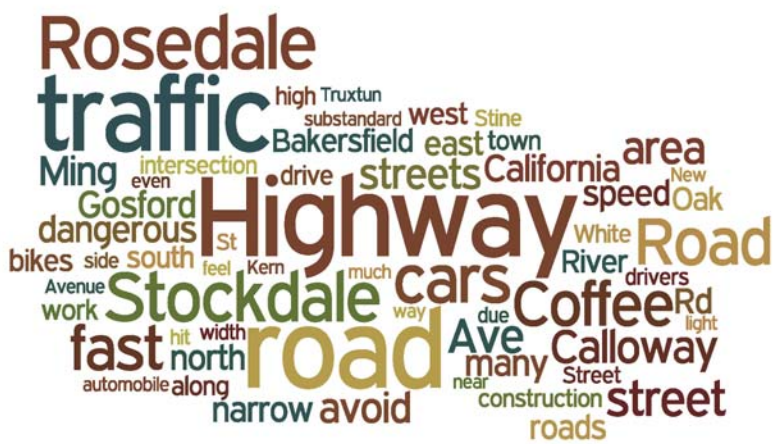
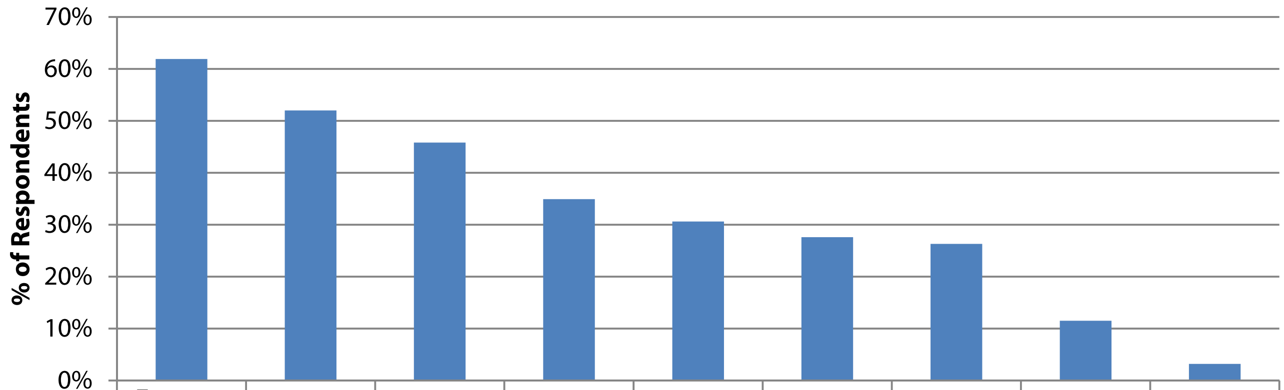


Figure 3-14: Location Bicyclists Avoid in Bakersfield

The survey also asked respondents what prevents them from bicycling more often (Figure 3-15). The most common responses included too many/too fast cars, no bikeways, and poor road conditions. This indicates that survey respondents aren't comfortable biking on higher volume and higher speed roads and the existing bikeways may not connect them to their destinations.



	Too many cars/ cars drive too fast	No bikeways	Poor road conditions	Destinations are too far away	I have to carry things	No bike parking	Insufficient lighting	I travel with small children	Health reasons
Response	62%	52%	46%	35%	31%	28%	26%	12%	3%

Figure 3-15: Issues that Prevent Respondents from Riding More Often

Bicycling Preferences

Most respondents would prefer off-street paved bike paths and low volume, traffic-calmed bicycle boulevards (Figure 3-16), reiterating that vehicle volumes and speeds are of a concern to residents. This is in line with respondent's favorite places to bike, which include the Kern River Bike Path, Panorama, and Downtown Bakersfield.

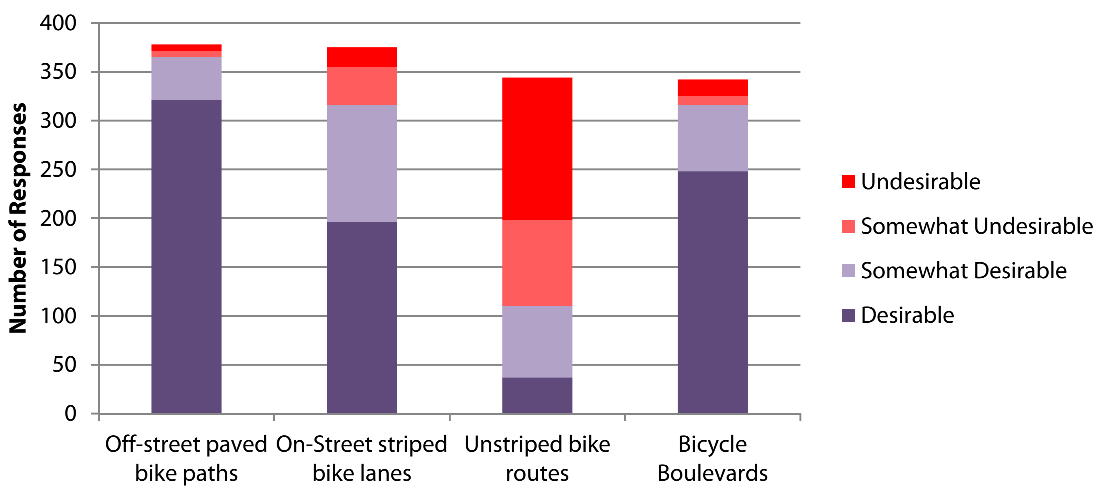


Figure 3-16: Bicycle Facility Preferences

Respondents noted that more bike paths and improved safety from cars are the most important methods of encouraging them to bicycle more often (Figure 3-17).

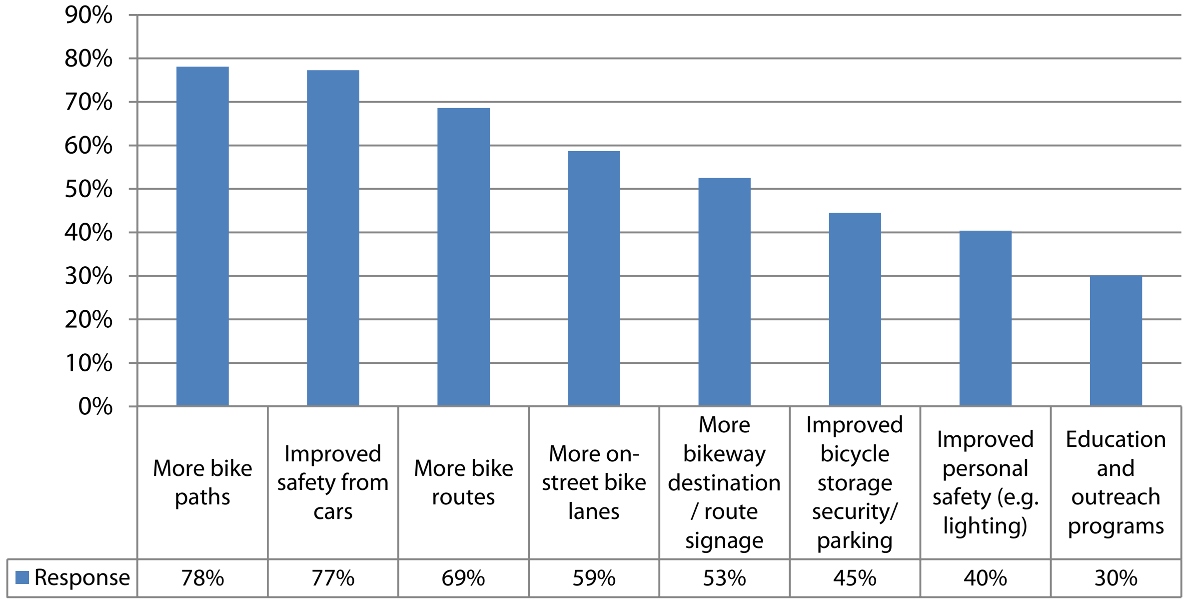


Figure 3-17: Ways to Encourage More Bicycling in Bakersfield

Bikeway destination and route signage is also a priority. As shown in Figure 3-18, more Bakersfield residents would bike to work, parks, community centers, libraries, grocery stores, and for other errands if these improvements were implemented.

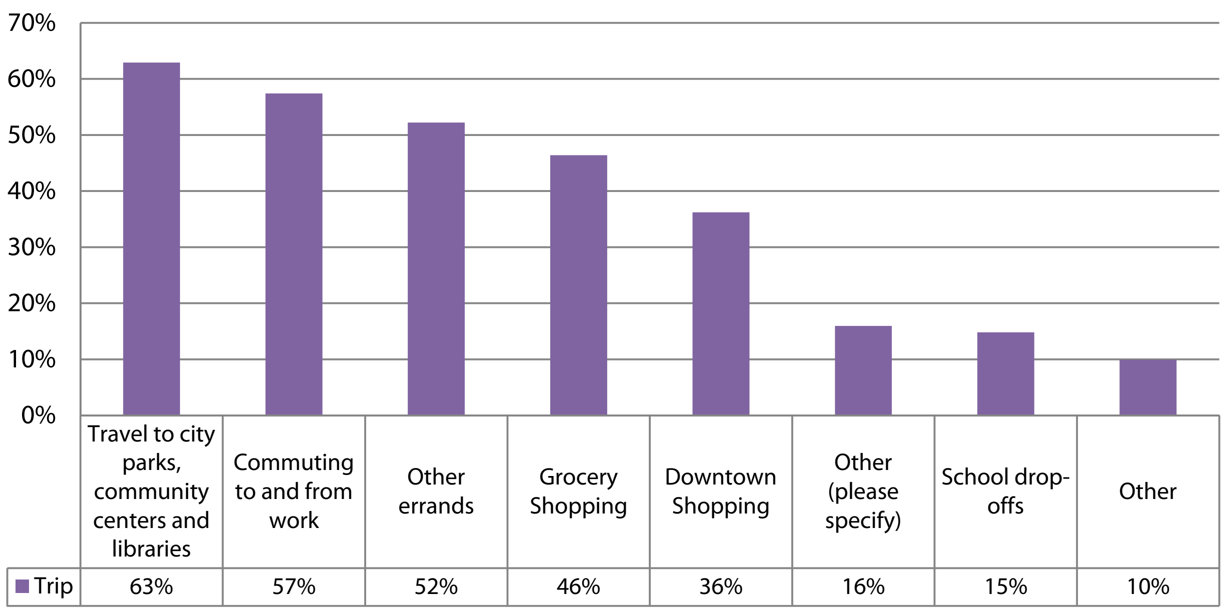


Figure 3-18: Driving Trips Perceived to be Feasible by Bike with Existing Facilities

3.8.2 Public Workshop

A public workshop was held on December 12, 2012 to solicit input on the Bicycle Transportation Plan development. Themes identified in the workshop included:

- Existing bicycle lanes are too narrow for safety or comfort, and frequently "drop" whenever additional motor traffic lanes are squeezed in
- Due to the high motor vehicle travel speeds in Bakersfield, members of the public interested in bicycling will only be convinced to ride by providing facilities with greater separation
- There are many routes which regular bicycling enthusiasts know to ride, especially routes utilizing less trafficked local streets. These routes are not apparent to the general public who otherwise might be inclined to try riding. Several such routes were identified through neighborhoods, especially in the southwest
- The southeast is a social justice area which features many people who are "captive bicyclists" without access to motor vehicles. This area has few bicycle facilities yet high existing and possibly latent demand for bicycling. Future efforts should consider Spanish language outreach to engage this community.

The workshop attendees were given markers and pens to highlight and write on large format maps of the city. Community comments are summarized in Figures 3-19 through 3-23. The "Planned Bikeways" shown on these figures are those from the General Plan and adopted Specific Plans. These were included to determine the community's support for these facilities and are not necessarily the recommendations of this Plan.

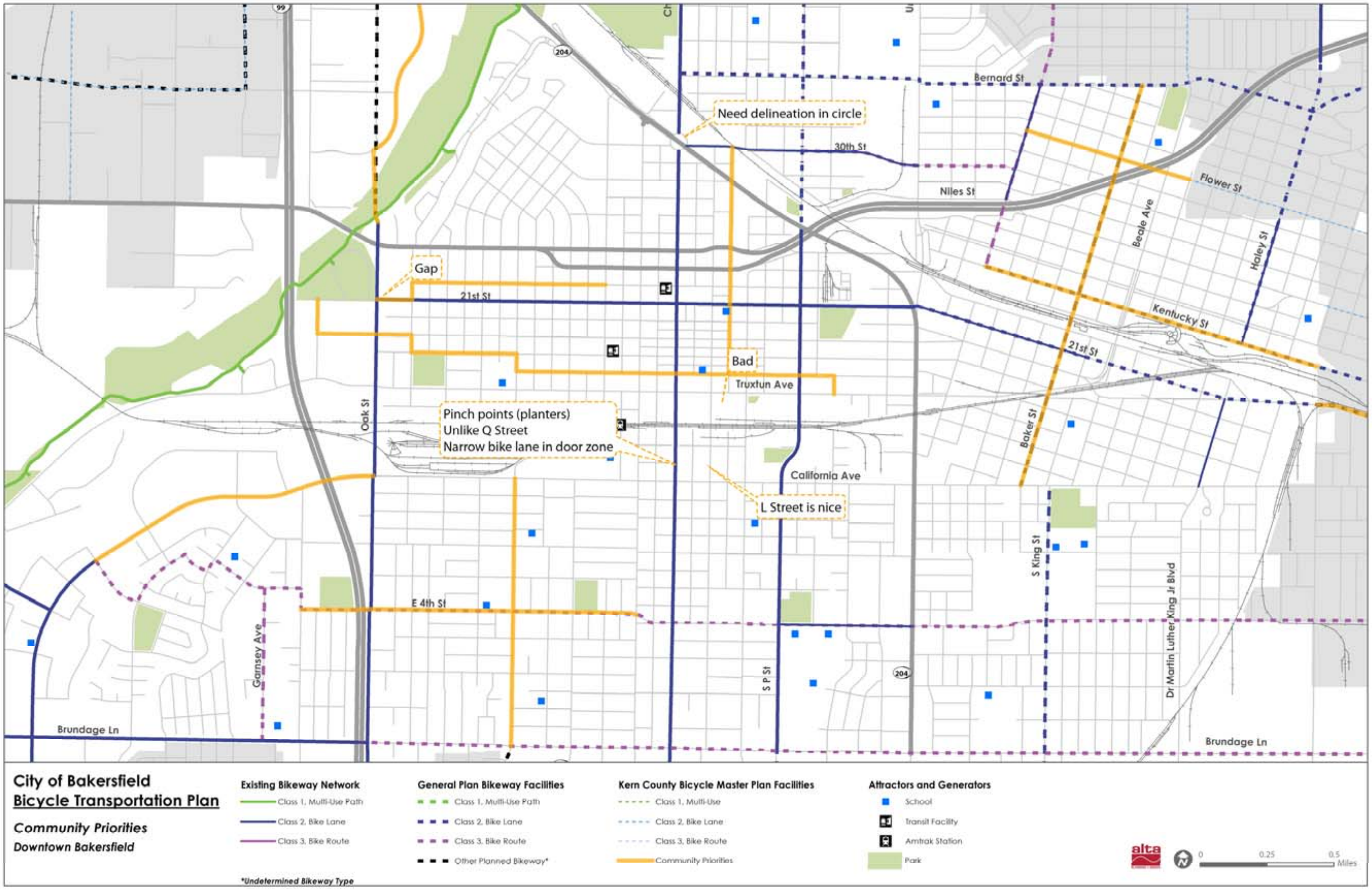


Figure 3-19: Community Priorities - Downtown

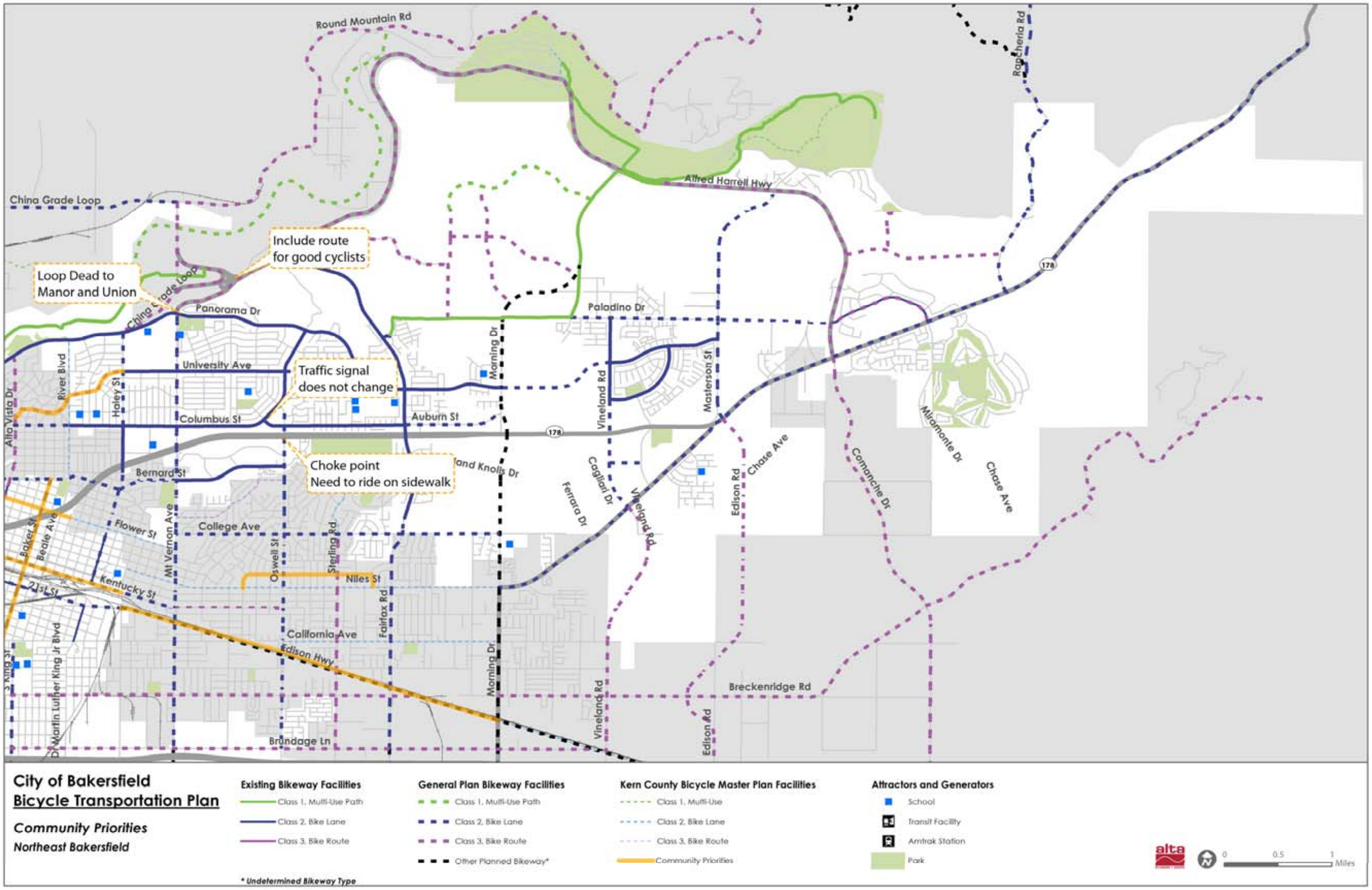


Figure 3-20: Community Priorities - Northeast

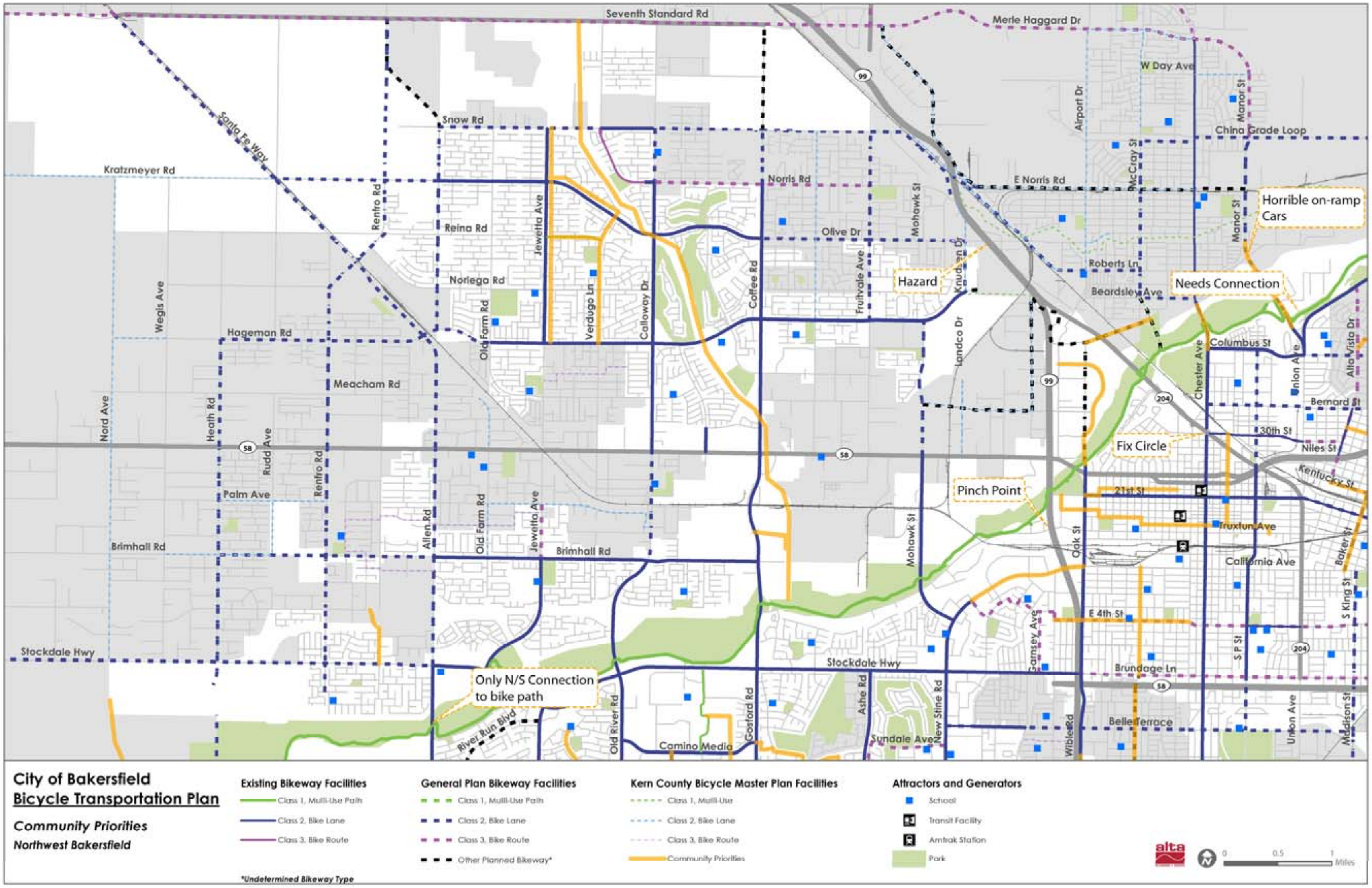


Figure 3-21: Community Priorities Northwest

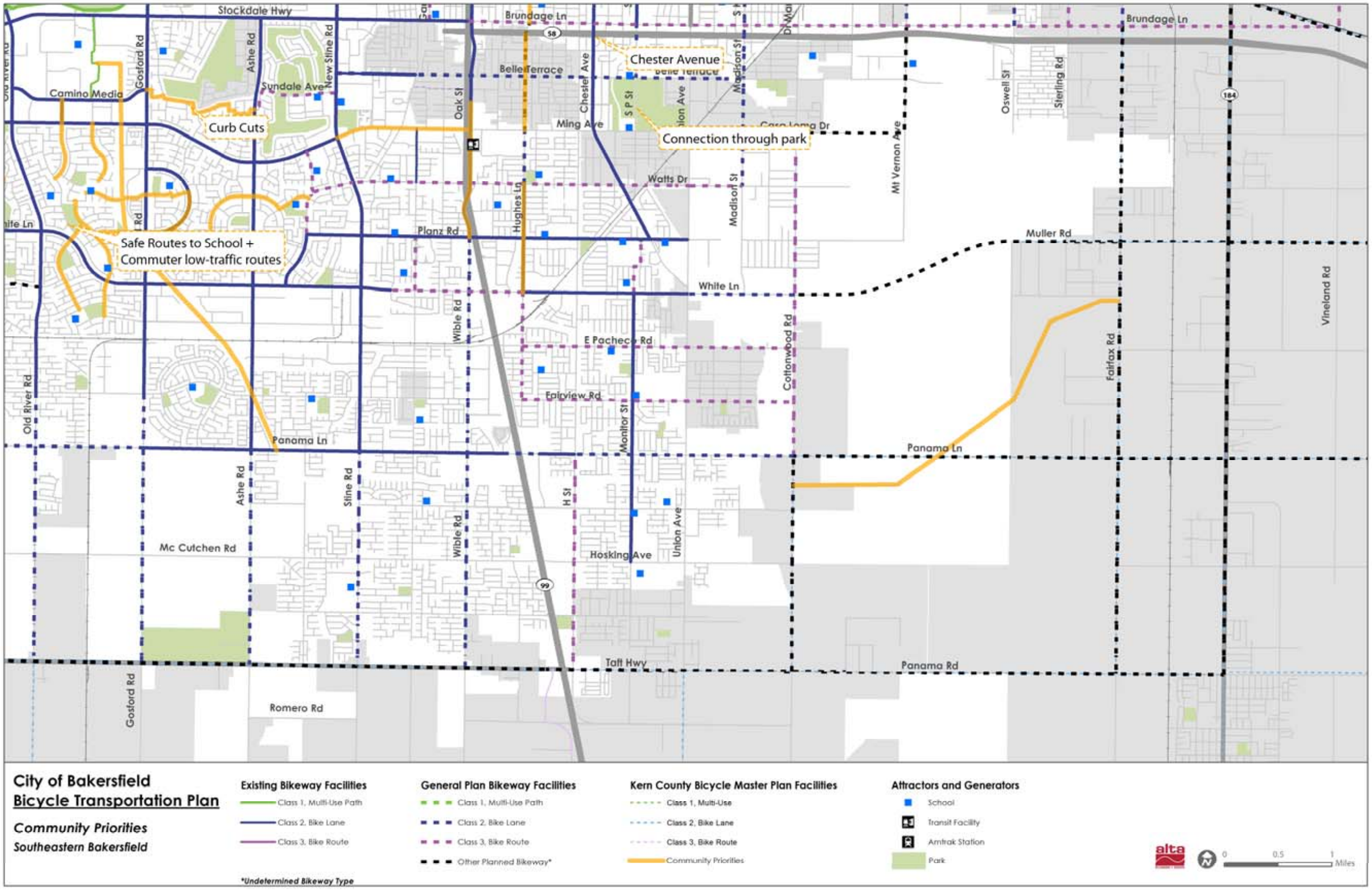


Figure 3-22: Community Priorities Southeast

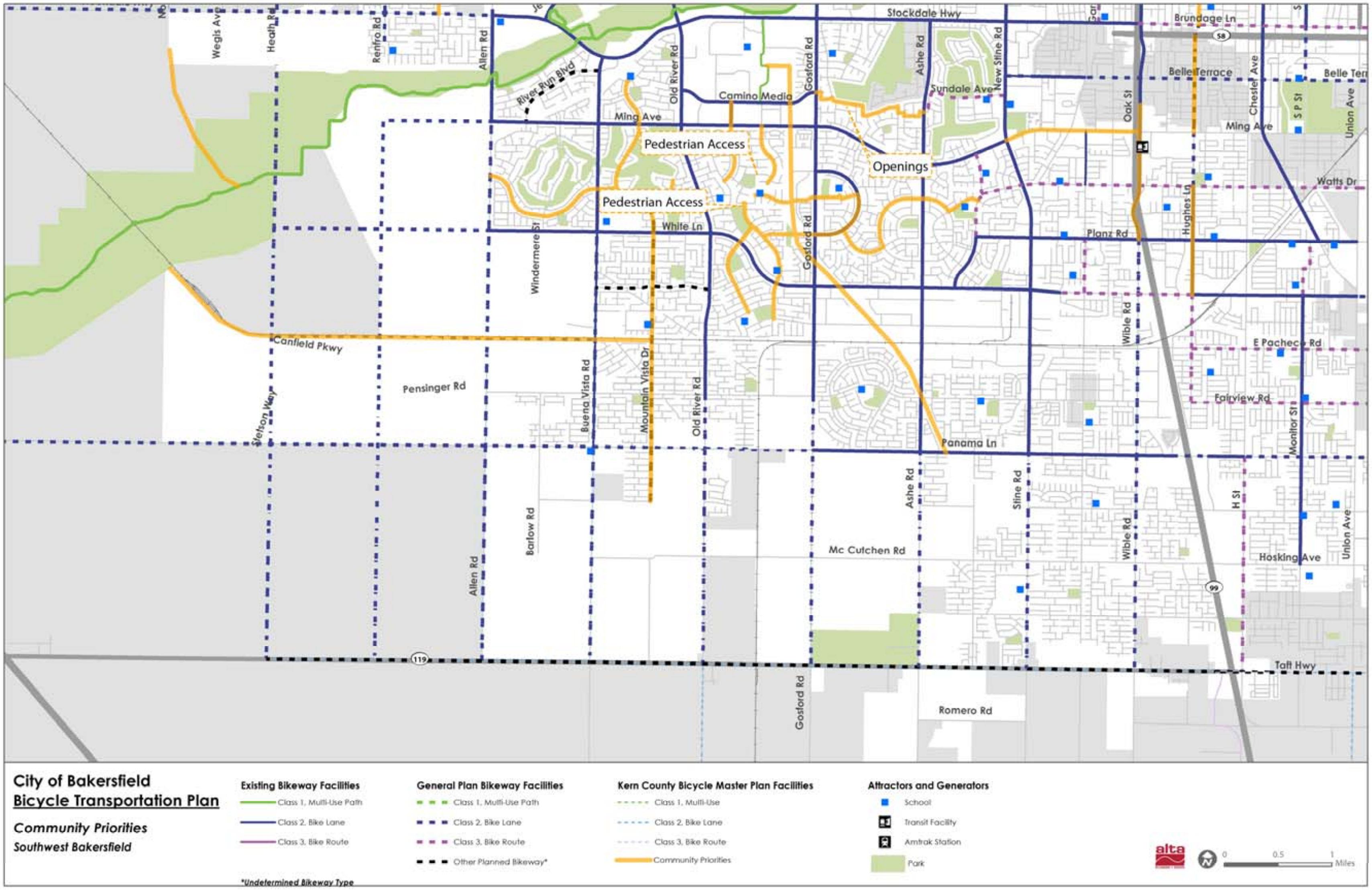


Figure 3-23: Community Priorities Southwest

3.9. Summary of Bicyclist Needs

Infrastructure improvements such as bikeways are needed to connect attractors and generators, improve safety at high collision areas and provide a greater measure of protection for interested but concerned bicyclists. Other infrastructure improvements including signage and parking will support the on-street network. Programmatic improvements such as education, outreach and encouragement may help reduce conflict and encourage more bicycling.

Bicycle attractors and generators such as parks, schools, event centers, retail and major employers need better connections to bikeways. While the City of Bakersfield has invested in its arterial roadway bicycle network, additional routes on lower speed collectors and neighborhood streets are needed to improve access to community destinations.

The collision analysis suggests the need for additional investment in bikeways and/or reductions in vehicle operating speeds in the downtown area and at major intersections through increased enforcement. The analysis reveals a need for bicycle education for both drivers and bicyclists about rights, responsibilities and the rules of the road. As Bakersfield's bikeway network is developed, a bikeway map and distinctive wayfinding signage program will help bicyclists travel on less heavily travelled bicycle priority streets.

Identified Needs and Sources

- Connections to commercial centers *(collision analysis)*
- Connections to parks, community centers, and libraries *(community survey)*
- Bikeway improvements on major corridors including: White Lane, Ming Ave, California Ave, 21st St, and Union Ave *(collision analysis)*
- Bikeway connections on local roadways *(collision analysis/community surve*y)
- Bikeway gap closures *(gap analysis)*
- Bike paths and bike boulevards *(community survey)*
- Education programs *(collision analysis)*
- Wayfinding signage *(community survey)*