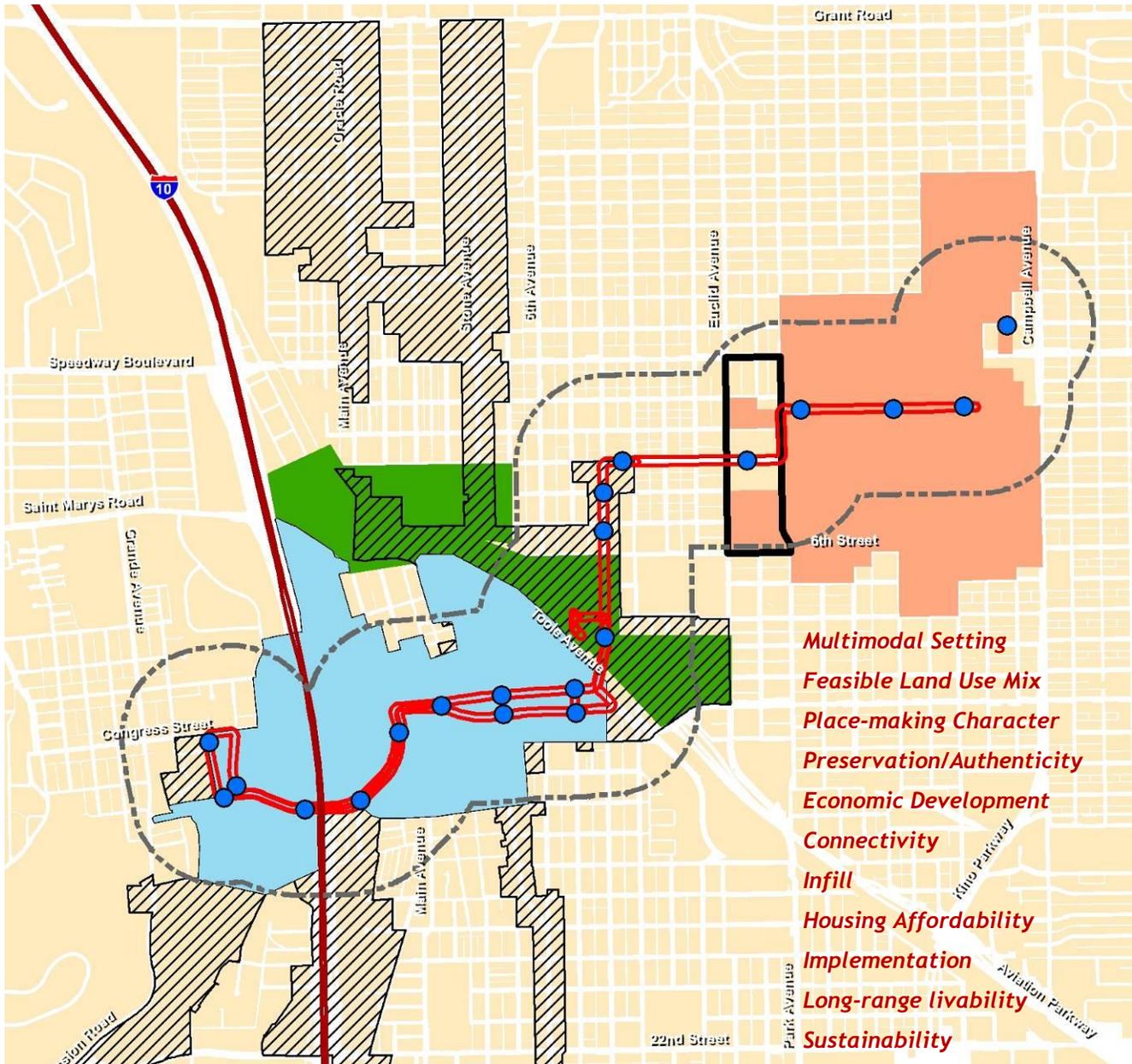




**West University Neighborhood Plan Transition Area  
Transportation Diagnostic Report**

## Tucson Modern Streetcar Land Use and Development Implementation Plan



## Tucson Modern Streetcar Land Use and Development Implementation Plan

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### West University Neighborhood Plan Transition Area Transportation Diagnostic Report

#### Introduction

##### *1.1. STREETCAR LAND USE AND DEVELOPMENT IMPLEMENTATION PLAN (SLUP)*

The Streetcar Land Use and Development Implementation Plan (SLUP) addresses the area within ¼-mile of the streetcar line. Compatible land uses were developed, as well as strategies to sustain a transit-oriented area. Several different character areas were identified along the corridor, and each has undergone analysis to develop specific ideas for development and mitigation.

The primary objectives of the SLUP include :

- Analyze properties within a ¼ mile focus area to best prepare them for appropriate land use plans, zoning, and design
- Incorporate suggestions from various stakeholders as well as best planning and design practices to prepare a land use approach and procedures which can ultimately influence development proposals along the streetcar line
- Prepare character area supplemental strategies on streetscapes and parking
- Identify financing mechanisms to implement the land use plan

In conjunction with the SLUP, it was determined that additional transportation analysis was needed for the West University Neighborhood Plan area due to several unique characteristics discussed in the following section.

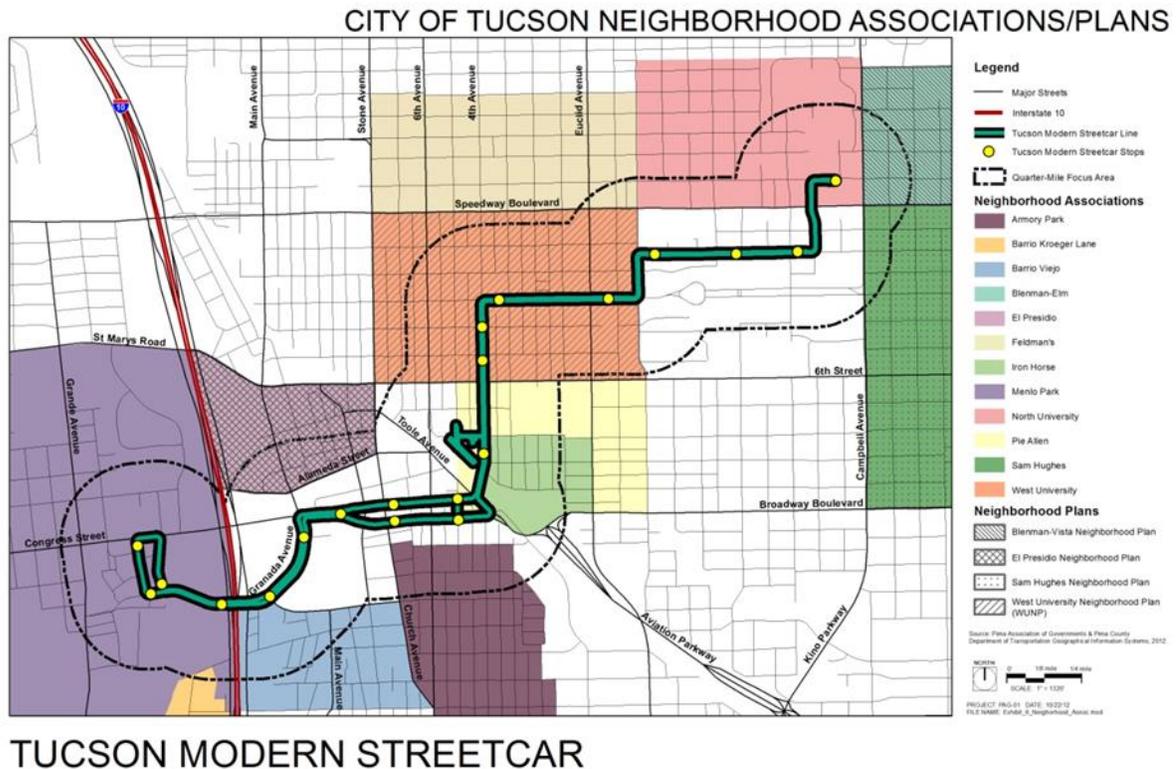
##### *1.2. WEST UNIVERSITY NEIGHBORHOOD PLAN (WUNP) TRANSITION AREA*

The West University Neighborhood Plan (WUNP) area is bounded by Stone Avenue on the west, Park Avenue on the east, Speedway Boulevard on the north, and 6th Street on the south. As shown in Figure 1, most of the WUNP area is included in the ¼-mile radius study area for the Streetcar Land Use study.

The West University Neighborhood is adjacent to the University of Arizona, Pima Community College, and Tucson High School, as well as other residential areas including Dunbar Spring, Feldman's, Iron Horse, and Pie Allen. In addition to the large residential component, the Main Gate Square and the 4th Avenue shopping districts are included in the WUNP area. Recently, student housing projects have been constructed within the WUNP boundaries. The combination of a large residential area, academic uses, shopping districts, large-scale student housing projects, proximity to downtown, and the addition of the Modern Streetcar provides potential issues of traffic congestion, cut-through traffic/traffic intrusion into

the neighborhood, parking inadequacy, and conflicts between different modes of transportation. This report will address each area of concern and provide potential solutions.

Figure 1. City of Tucson Neighborhood Associations/Plans



## TRANSPORTATION FACILITIES AND TRAFFIC CHARACTERISTICS

### 2.1. ROADWAY NETWORK

The WUNP area is served by a comprehensive grid network of roadways. Speedway Boulevard, 6th Street, and Stone Avenue, three of the four roadways which border the area, are major arterials. In addition, Euclid Avenue, which passes through the area, is also a major arterial. It should be noted that there are several named alleys in the WUNP area, including:

- Echols Avenue
- Ferro Avenue
- Arizona Avenue
- Herbert Avenue

- Hoff Avenue
- Bean Avenue
- Jacobus Avenue

The alleys have a speed limit of 15 mph, allow parking on one or both sides (depending on the roadway width), and are often used for garbage and recyclables pick up. The alleys listed are all north-south roadways, and are stop controlled at each intersection. Table 1 provides some information about the WUNP roadways, not including the alleys.

As seen in the table, most of the roadways have a speed limit of 25 or 30 mph, with the exception of Speedway Boulevard. Most of the streets allow on-street parking as well. There were a number of signalized intersections in the area before the Streetcar construction, including the following:

- Speedway Boulevard at Stone Avenue, 6th Avenue, 4th Avenue, Euclid Avenue, and Park Avenue
- University Boulevard and Euclid Avenue
- 6th Street at Stone Avenue, 6th Avenue, 4th Avenue, Euclid Avenue, and Park Avenue

With the construction, traffic signals were also added at the University Boulevard/4th Avenue, University Boulevard/Park Avenue, and 2nd Street/Park Avenue intersections.

In addition, there is also a TOUCAN (Two groUps CAN cross) signal at the intersection of Stone Avenue and University Boulevard, which is a signalized bicycle and pedestrian crossing.

Table 1. Roadway Characteristics

North-South Roadway	Classification	Number of Lanes	Speed Limit (mph)	On-Street Parking	Traffic Control	On Streetcar Line?
Stone Avenue	Arterial	5	30	No	Signals at Speedway Blvd and 6th Street. TOUCAN at University Blvd.	No
7th Avenue	Local	2	25	Yes	Stop controlled at Speedway Blvd, University Blvd, and 6th Street. Traffic circles at 2nd St and 4th St.	No
6th Avenue	Arterial	3	30	Yes	Signals at Speedway Blvd and 6th Street. All-way stop at University Blvd.	No
5th Avenue	Local	2	25	Yes	Stop controlled at Speedway Blvd, 2nd St, University Blvd, 4th St, and 5th St.	No
4th Avenue	Local	3	25	Yes	Signals at Speedway Blvd and 6th Street. All-way stop at University Blvd.	Yes, S of University Blvd
3rd Avenue	Local	2	25	Yes	Stop controlled at Speedway Blvd, University Blvd, 4th St, and 6th St. All-way stop at 5th St.	No
2nd Avenue	Local	2	25	Yes	Stop controlled at Speedway Blvd, 1st St, 2nd St, University Blvd, 4th St, 5th St, and 6th St.	No
1st Avenue	Local	2	25	Yes	Stop controlled at Speedway Blvd, University Blvd, and 6th St.	No
Euclid Avenue	Arterial	5	30	No	Signals at Speedway Blvd, University Blvd, and 6th St.	No
Tyndall Avenue	Local	2	25	Yes	Stop controlled at Speedway Blvd, 1st St, 2nd St, University Blvd, 6th St.	No
Park Avenue	Local	2	25	No	Signals at Speedway Blvd and 6th Street. All-way stops at 2nd St (both intersections), University Blvd, 4th St.	Yes, between 2nd St and Univ. Blvd
East-West Roadway	Classification	Number of Lanes	Speed Limit (mph)	On-Street Parking	Traffic Control	On Streetcar Line?
Speedway Boulevard	Arterial	5*	35	No	Signals at Stone Ave, 6th Ave, 4th Ave, Euclid Ave, Park Ave.	No
1st Street	Local	2	25	Yes	All-way stop at Tyndall Ave. Stop controlled at Stone Ave, 7th Ave, 6th Ave, 5th Ave, 4th Ave, 3rd Ave, 1st Ave, Euclid Ave, and Park Ave.	No
2nd Street	Local	2	25	Yes	All-way stop at Tyndall Ave and Park Ave. Traffic circle at 7th Ave. Stop controlled at Stone Ave, 6th Ave, 4th Ave, 3rd Ave, 1st Ave, and Euclid Ave.	No
University Boulevard	Collector	3	25	Yes	Signal at Euclid Ave. TOUCAN at Stone Ave. All-way stop at 4th Ave and Park Ave. Stop controlled at 6th Ave.	Yes, between 4th Ave and Park Ave
4th Street	Local	2	25	Yes	Traffic circle at 7th Ave. Stop controlled at Stone Ave, 6th Ave, 4th Ave, 1st Ave, Euclid Ave, Tyndall Ave, and Park Ave.	No
5th Street	Local	2	25	Yes	All-way stop at 5th Ave and 3rd Ave. Stop controlled at Stone Ave, 7th Ave, 6th Ave, 4th Ave, 1st Ave, and Euclid Ave.	No
6th Street	Collector	5	30	No	Signals at Stone Ave, 6th Ave, 4th Ave, and Euclid Ave.	No

\*Widens to 3 lanes eastbound east of 1st Avenue

### 2.2. VEHICULAR TRAFFIC VOLUMES

Traffic congestion is a concern for each of the major roadways in the study area. Figure 2 shows the most recent available traffic volumes (from 2010-2013) on the major roadways within and adjacent to the West University area as well as the approximate capacity of each roadway. As seen in the figure, Speedway Boulevard is over capacity in the West University area, and Euclid Avenue between Speedway Boulevard and University Boulevard is close to capacity.

Figure 2. West University Area Traffic Volumes and Roadway Capacity



The WUNP area is relatively built-out which makes roadway widening difficult. However, new student housing projects in the area are expected to significantly increase the population in the area. The WUNP area is also directly affected by the University of Arizona population (students plus employees), which increased from 46,300 to 51,300 between 1996 and 2006 , and is expected to increase further to 75,000. As the University's population increases and more students and staff commute to campus via personal vehicle, traffic congestion will increase unless policies are put in place to encourage users to shift to other modes. Therefore, it is important to provide options for commuters, and continue to encourage alternate modes of travel.

### **2.3. ALTERNATE TRAVEL MODES**

The existing multi-modal infrastructure West University area serves higher-than-average volumes of pedestrians and cyclists, due in large part to its proximity to the University of Arizona. Some of the major roadways (i.e. Euclid Avenue and 6th Street) do not have bike lanes, but the 3rd Street/University Boulevard bike boulevard serves significant bicycle volumes. There are existing sidewalks throughout the area, but accessibility for all users can be improved. The one planned Streetcar stop in this area will be accessible for all users, and there are existing transit (Sun Tran and Cat Tran) stops. The following sections provide additional details about existing bicycle, pedestrian, and transit facilities, access, and use.

#### ***Bicycles***

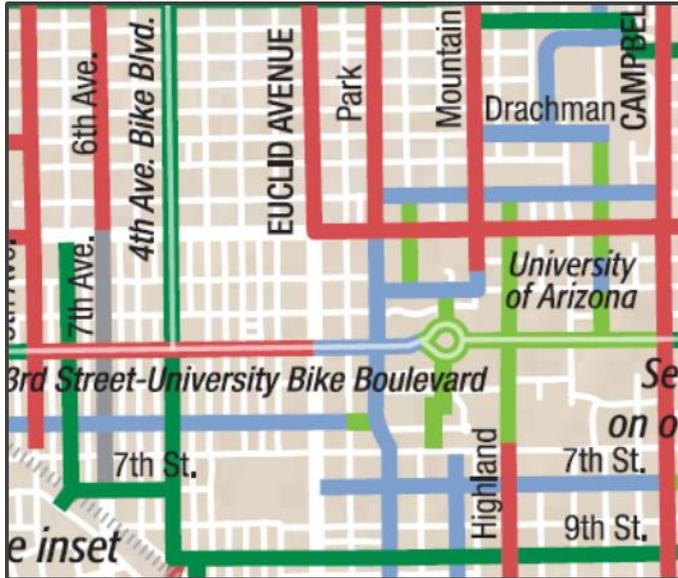
According to the 2011 Regional Bicycle/Pedestrian Count Summary , four of the top 13 intersections for bicycle traffic in the Tucson region are located in the WUNP area, including:

- University Boulevard (a designated bike boulevard) and Park Avenue with 995 cyclists in the combined weekday peak periods (7:00 – 9:00 AM and 4:00 – 6:00 PM). This is the second-highest volume overall.
- University Boulevard and Stone Avenue, with 313 cyclists in the combined peak periods (8th highest overall)
- Speedway Boulevard and Park Avenue, with 231 cyclists in the combined peak periods (11th highest overall)
- 6th Street/Park Avenue, with 168 cyclists in the combined peak periods (13th highest overall)

The University of Arizona has the highest bicycle and pedestrian activity of any area along the Streetcar line, and that activity spills over into the West University area. Many cyclists use the 3rd Street-University Bike Boulevard to access the University, and the 4th Avenue Bike Boulevard provides a connection to the north. Figure 3 shows the existing bike routes in the WUNP area, including the bike boulevards, bike routes with paved shoulders or shared lanes, and residential streets which are

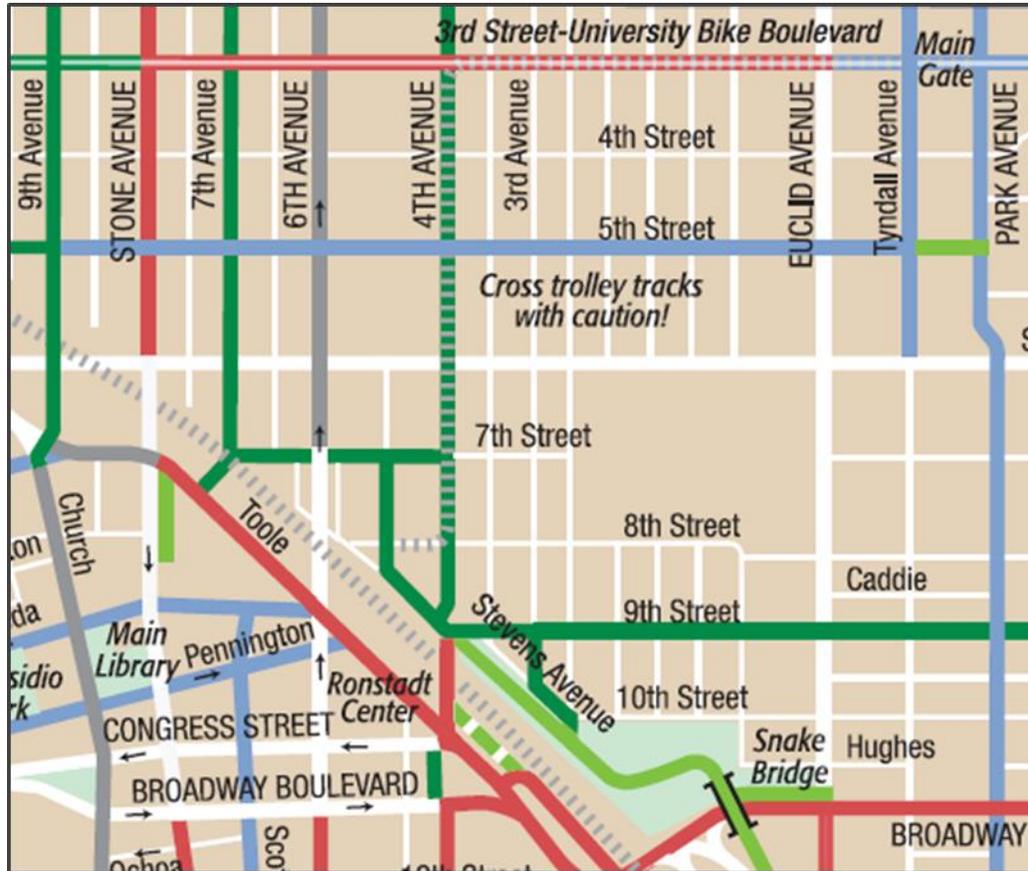
considered appropriate for cyclists based on posted speeds and other characteristics. In addition, Figure 4 shows how bike routes in the WUNP area provide connectivity to downtown.

Figure 3. WUNP Bike Routes



- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p> <b>Shared-use Path</b><br/>Paved 8 ft. to 12 ft. wide path, separated from street. Watch for equestrians, pedestrians and dogs. Suitable for slower speeds.</p> <p> <b>Bike Route</b><br/>On lower volume street, with "Bike Route" signs. Maximum speed limit of 30 mph.</p> <p> <b>Bike Route with Striped Shoulder</b><br/>On major street, with white edge line, approx. 4 ft. to 10 ft. wide paved shoulder, with speed limits of 25 mph or more. Some bikeways are marked with Shared Lane Markings (<i>sharrows</i>) and are a shared roadway space used by bicyclists and motorists.</p> | <p> <b>Residential Streets</b><br/>Selected bikable streets with maximum speed limit of 30 mph.</p> <p> <b>Key Connecting Streets</b><br/>Streets that provide connectivity on popular bicycling routes. May be appropriate for experienced riders. These streets have more traffic, higher speeds and less width.</p> <p> <b>Bus / Bike Lanes</b><br/>On major streets, 10-12 ft. bus and right turn lane, shared use with bicycles.</p> <p> <b>Major Streets</b><br/>Major streets with no bike lanes or paved shoulders.</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Figure 4. WUNP Bike Route Connectivity with Downtown



However, despite the plethora of existing bicycle facilities in the area, significant expansion and improvement will be needed to maintain safe and efficient operations for cyclists in the area. For example, although Park Avenue is a bike route, the segment from Speedway Boulevard to 6th Street does not have delineated bike lanes, so cyclists may ride on the sidewalks to reach bike parking areas, which would then create conflicts with pedestrians. As examples of this behavior, at the intersection of Park Avenue and 6th Street, 16% of cyclists rode on the sidewalk, and at Park Avenue and Speedway Boulevard, 28% of cyclists rode on the sidewalk.

In addition to the roadway infrastructure, there are also several free bicycle parking areas throughout the West University area as well as paid secured bicycle parking areas in the Main Gate and Tyndall Avenue garages. The University (adjacent to the WUNP area) has nearly 9,700 bike parking spaces overall (including approximately 2,400 shaded spaces), and operates a free bike share program. Figure 5 shows the existing bicycle parking in the University area. For cyclists who are concerned about bicycle theft, there are secure bike enclosures, bike lockers, and a free bike valet service.

### *Pedestrians*

The WUNP area not only serves significant bicycle volumes, but also serves a high number of pedestrians. For example, the intersection of Park Avenue and University Boulevard had the highest number of pedestrians for all locations included in the 2011 Regional Bicycle/Pedestrian Count Summary with 2,158 in the combined peak periods (7:00 – 9:00 AM and 4:00 – 6:00 PM). Two additional WUNP intersections were in the top seven locations for pedestrian traffic, as listed below:

- 4th Street and Tyndall Avenue – 1,070 pedestrians in the combined peak periods (4th overall)
- Speedway Boulevard and Park Avenue – 708 pedestrians in the combined peak periods (7th overall)

Based on field data that was collected for the University of Arizona Needs Assessment Study in 2007, the sidewalk network in the WUNP area east of Euclid Avenue is comprehensive. There are a few locations within that boundary that did not have a textured ramp and/or curb cut, but most areas have one or the other, providing accessibility for all users. However, in several cases, sidewalks are too narrow to provide an attractive pedestrian environment, or fail to meet the most current ADA standards. These concerns are present throughout the WUNP area, with several instances of both in the area west of Euclid Avenue.

The sidewalk infrastructure in the WUNP area between Stone Avenue and Euclid Avenue is somewhat less comprehensive. On most blocks, there is sidewalk on at least one side of the roadway. However, there are some areas where the sidewalk abruptly ends mid-block (see Figure 5), and other blocks where one side does not have any sidewalk. In addition, there are a number of locations which are not ADA accessible, such as the northwest and northeast corners of the intersection of 5th Street and 3rd Avenue as shown in Figure 6.

With the construction of the Streetcar and student housing developments in the area, it is expected that the number of pedestrians will only continue to increase. Existing sidewalks may need to be improved and/or widened, especially in areas where pedestrians are expected to travel to/from the Streetcar stop on University Boulevard. In addition, there are a number of crosswalks in the area as well as access to/from the University, but as volumes increase, crossings may need to be improved and additional crossings may need to be added, particularly near the new student housing developments.

Figure 5. Sidewalk Discontinuity



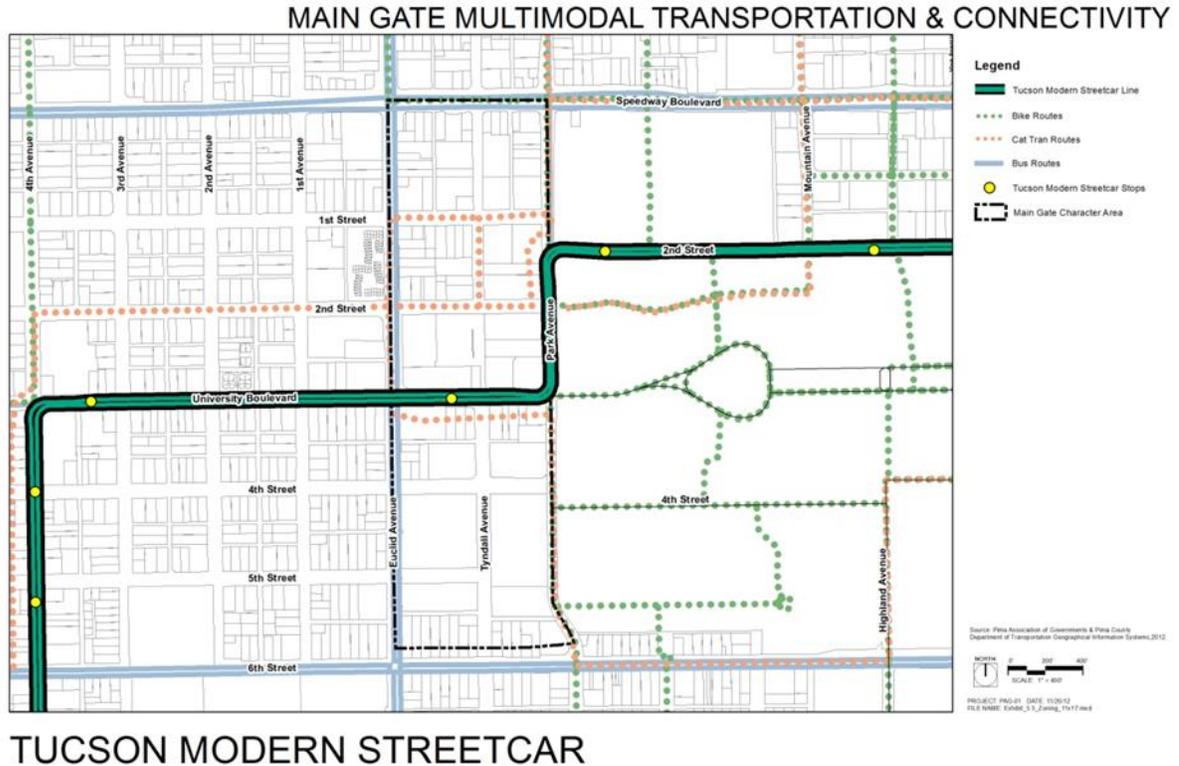
Figure 6. Non-ADA Accessible Sidewalks



### *Transit*

There are multiple existing transit services in the West University area, including Sun Tran and Cat Tran as shown in Figure 8. The Ronstadt Transit Center is the closest transit center to this area, and is served by a number of routes that connect all areas of Tucson as well as TICET, a local downtown circulator route. The University of Arizona also provides subsidized transit passes (U-Pass) for students and employees as one way to encourage transit use and reduce the number of personal vehicles on campus.

Figure 7. Existing Transit Routes



In the future, the Streetcar will include three stops in the WUNP area at the following locations:

- 4th Avenue between 4th Street and 5th Street
- University Boulevard at 3rd Avenue
- University Boulevard at Tyndall Avenue

The existing and future transit services provide comprehensive access to/from parking and residential areas throughout the WUNP area.

## NEIGHBORHOOD INTERACTION

### 3.1. PARKING

Parking has long been an area of concern in the West University area given its proximity to the University of Arizona. The following sections provide information about existing parking in the study area.

#### *University of Arizona Parking*

Based on information from a meeting with the University of Arizona Parking and Transportation Services (PTS), the University currently manages 18,000 spaces, including on-street metered parking and parking

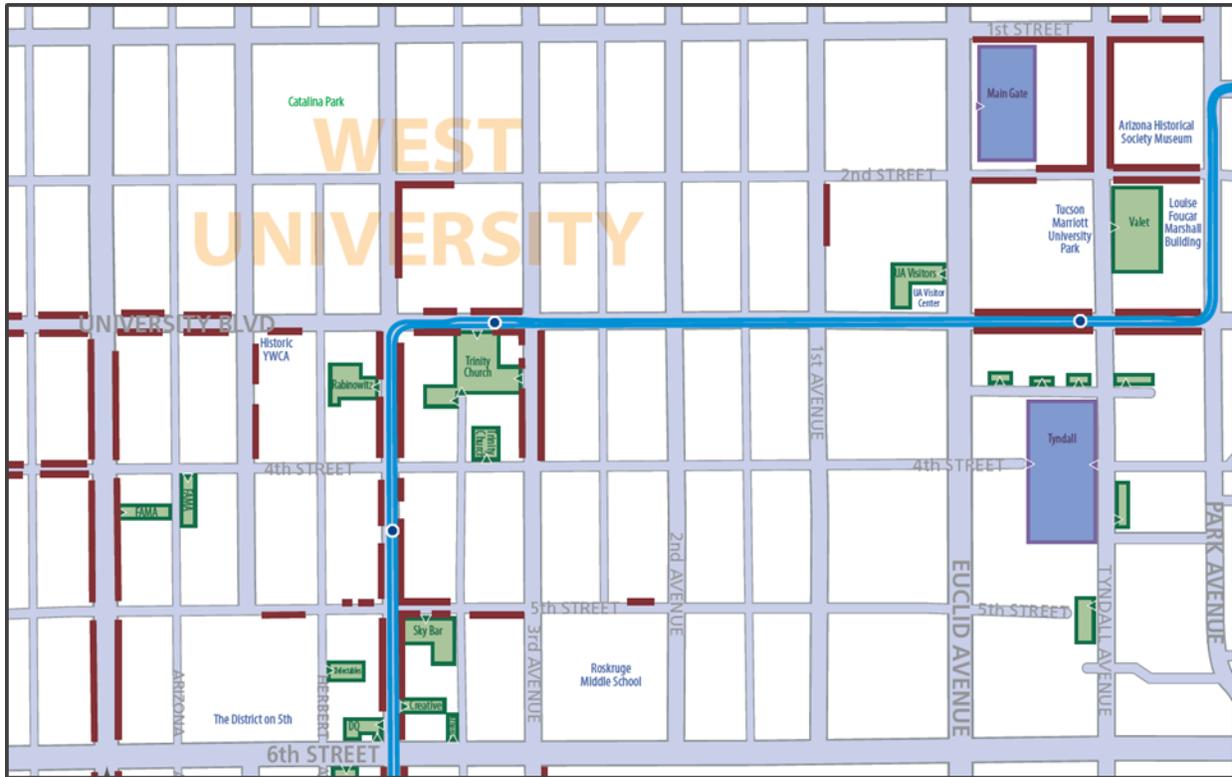
spaces in lots and garages. Two of the University-owned garages, the Main Gate Garage and the Tyndall Garage, are located within the WUNP boundaries. Both garages include visitor and permit parking.

Approximately 16,000 permits are sold for 9,000 spaces in parking garages, lots, and along streets controlled by the University, and are oversold in all cases to allow for high utilization of available parking spaces. The number of permits that have been sold had recently been flat, and permits have not sold out in five years. In addition, the University does not plan to increase the number of spaces in the near future, but surface parking will be replaced with parking garages. For example, a new parking garage south of 6th Street is being considered to replace surface street parking that will be lost due to other construction projects (including the Streetcar).

### *West University Neighborhood Parking*

With the exception of the University-owned parking garages, parking in the WUNP area includes public and private surface lots, on-street permit parking, and both metered and unmetered public on-street parking. Figure 8 shows the existing parking facilities for much of the WUNP area. Note that the figure shows lots which are both public and private, but only shows public on-street parking. Areas where no on-street parking is shown are typically the locations of on-street permit parking, which is reserved for residents and their visitors. While most of the roadways in the WUNP area do include on-street parking, there is no on-street parking along Speedway Boulevard, Stone Avenue, 6th Street, Euclid Avenue, or Park Avenue.

Figure 8. Existing Parking



Because of the projected increase in parking demand, ParkWise has begun to evaluate some changes and additions for parking in the WUNP area, including:

- Institute managed on-street parking in the 4th Avenue Business District, such as:
  - Parking meters on 4th Avenue between 2nd Street and 9th Street
  - Parking meters on side streets that are not in residential permit-restricted areas
  - Additional on-street general permit parking in peripheral commercial areas (will largely serve employees of area businesses)
- Purchase/lease one floor of the future Trinity Church parking garage
- Consider the construction of one or more parking structures, incorporated with mixed-use, transit-oriented development, to serve current and future additional demand and replace surface lot parking that is anticipated to be removed for development

ParkWise is also exploring the feasibility for developing a shared-use area, where certain blocks would have permit parking for residents as needed, but would also have permit parking for employees and some customer parking as well. ParkWise is working with the Office of Integrated Planning on identifying an area for a pilot project.

### *Parking for New Student Housing Residents*

As previously discussed, the existing student housing within and immediately adjacent to the West University area is expanding with the addition of a 14-story student apartment complex (Level), which opened for the 2013-2014 school year at 1020 North Tyndall Avenue (between Speedway Boulevard and 1st Street). The building has 588 beds and only 98 parking spaces, which is a parking ratio of 0.17 spaces per bed. According to a recent study, a parking ratio of approximately 0.86 spaces per bed is appropriate for off-campus residential projects (based on data collected at The District, located at 550 North 5th Avenue). However, the study also states that even though the parking ratio for Level is much lower than the ratio at The District, the project is not expected to have an impact on parking in the area. Information provided by the Campus Acquisitions (the property management company for Level) in April 2014 indicates that all of the parking spaces are accounted for via permits purchased by students, and 570 of the 588 beds are occupied. Some additional parking is provided by Level, but the number and location of those additional spaces was not available.

A second development by Campus Acquisitions, Next, is under construction. Next is just east of Level, and will have 8,154 square feet of ground floor retail and 389 beds. In addition, the development will have 107 parking spaces, which results in a parking ratio of 0.28 spaces per bed, higher than what was provided for Level. However, the low parking ratio may be a cause for concern for the University because this development also includes retail space, which may attract additional drivers to the area.

To better understand the habits of students living in student housing complexes near the University, Psomas conducted a short survey of students at Level in April 2014. The survey included questions about current travel characteristics and how students expect to change the way they travel once the Streetcar is in operation. Of those surveyed,

- 30% own a car and a bicycle
- 30% only own a car
- 5% only own a bicycle
- 35% own neither

Of those that own a car, 43% park overnight at Level, but 36% park overnight in University of Arizona parking. However, more than half of respondents who plan to return to Level next school year do not plan to bring a car with them, including 38% of students who currently own a car. Additional survey results are included in Section 4, and the complete data is in Appendix A.

### *Potential Traffic Intrusion*

The West University Neighborhood Plan is shown is bordered by the Pie Allen neighborhood on the south and Feldman's on the north (see Figure 10). The grid network of streets in these neighborhoods can be conducive to cut-through traffic, but there are treatments that can be implemented to minimize that behavior. In addition, some of the streets have wide pavement widths, which can lead to increased speeds

and may be more attractive to drivers wishing to avoid delays. For example, Figure 10 shows 4th Street near 6th Avenue, looking east. As seen in the figure, even with the presence of on-street parking along both sides of the roadway, the roadway appears wide open, with very clear visibility over one-half mile.

There are several existing traffic calming devices in the WUNP neighborhood, as shown in Figure 11. Devices include traffic circles and speed humps. In addition, each of the east-west roadways is stop controlled at Stone Avenue, 6th Avenue, 4th Avenue, and Euclid Avenue. Some east-west streets are also stop controlled at other intersections such as those with 1st Avenue, 3rd Avenue, 5th Avenue, or 7th Avenue. Smaller north-south streets in the area are generally stop controlled at University Boulevard, and some have additional traffic control devices such as traffic circles or speed humps.

A number of additional traffic control devices have been requested for the WUNP area through the City of Tucson's Neighborhood Traffic Management Program. As seen in Figure 12, speed humps/tables, traffic circles, and other traffic calming devices have been requested. The traffic circles shown on 1st Avenue at 1st Street and 2nd Street are planned by Campus Acquisitions to minimize cut-through traffic that may be generated by their new student housing development on Tyndall Avenue.

Figure 9. Neighborhood Associations/Plans

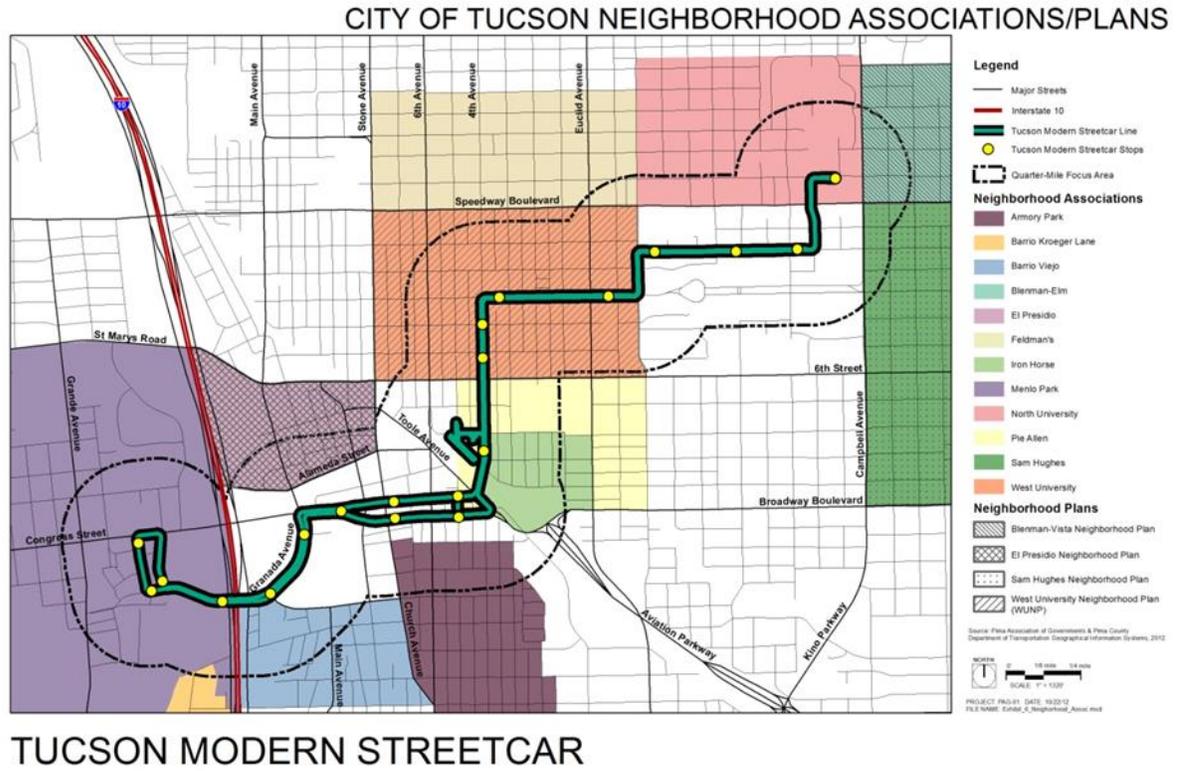


Figure 10. WUNP Roadway (4th Street)



### PLANNED AND RECOMMENDED IMPROVEMENTS

#### 4.1. PROMOTE MULTI-MODAL TRAVEL

As previously discussed, many of the traditional vehicular facilities are at or nearing capacity, and there is not much room for growth or expansion. However, the University and nearby areas are expected to continue to attract more users, so it is vital to provide well-designed and accessible facilities for alternate modes of travel. In addition, education campaigns and other programs can be developed to aid in getting users to travel via modes other than their personal vehicles.

##### *Bicycle Facilities*

In order to entice drivers out of their vehicles and onto bicycles, it is critical to have a complete network of bicycle facilities which provide safe and comfortable travel for a wide range of comfort levels. For example, as seen in Figure 11 (taken from the UA Bicycle and Pedestrian Plan), cyclists are most comfortable on separate bicycle facilities and residential streets with low traffic volumes. Therefore, it is important to evaluate not only bicycle facilities overall, but a network of bicycle boulevards and other low-stress facilities.

The City of Tucson is working to establish a network of bike boulevards to provide comprehensive connectivity throughout the area, allowing less-experienced (or less-comfortable) riders to travel to all areas of the City. The 2009 Regional Bicycle Plan Update identifies over 150 miles on 40 streets to be turned into bike boulevards. These facilities are typically low-speed and low-volume roadways, and include intersection crossing treatments. Figure 15 shows a typical bike boulevard in Tucson, including several of the tools that can be and are used to enhance safety and comfort.

Figure 11. Bicycle Route Preference

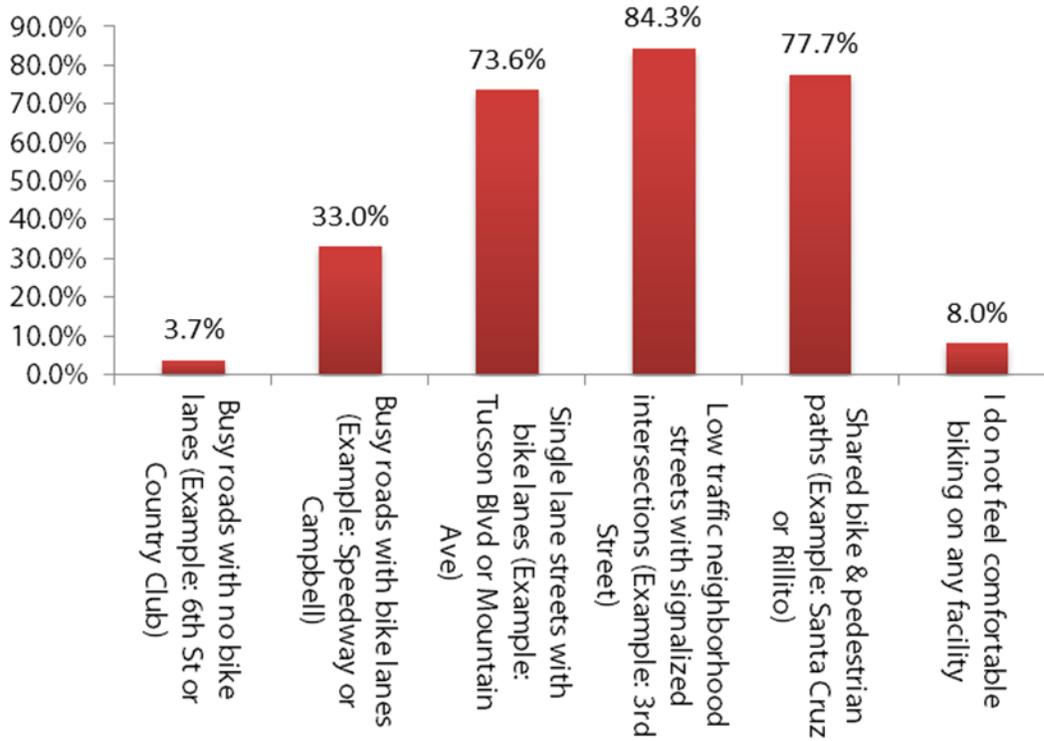
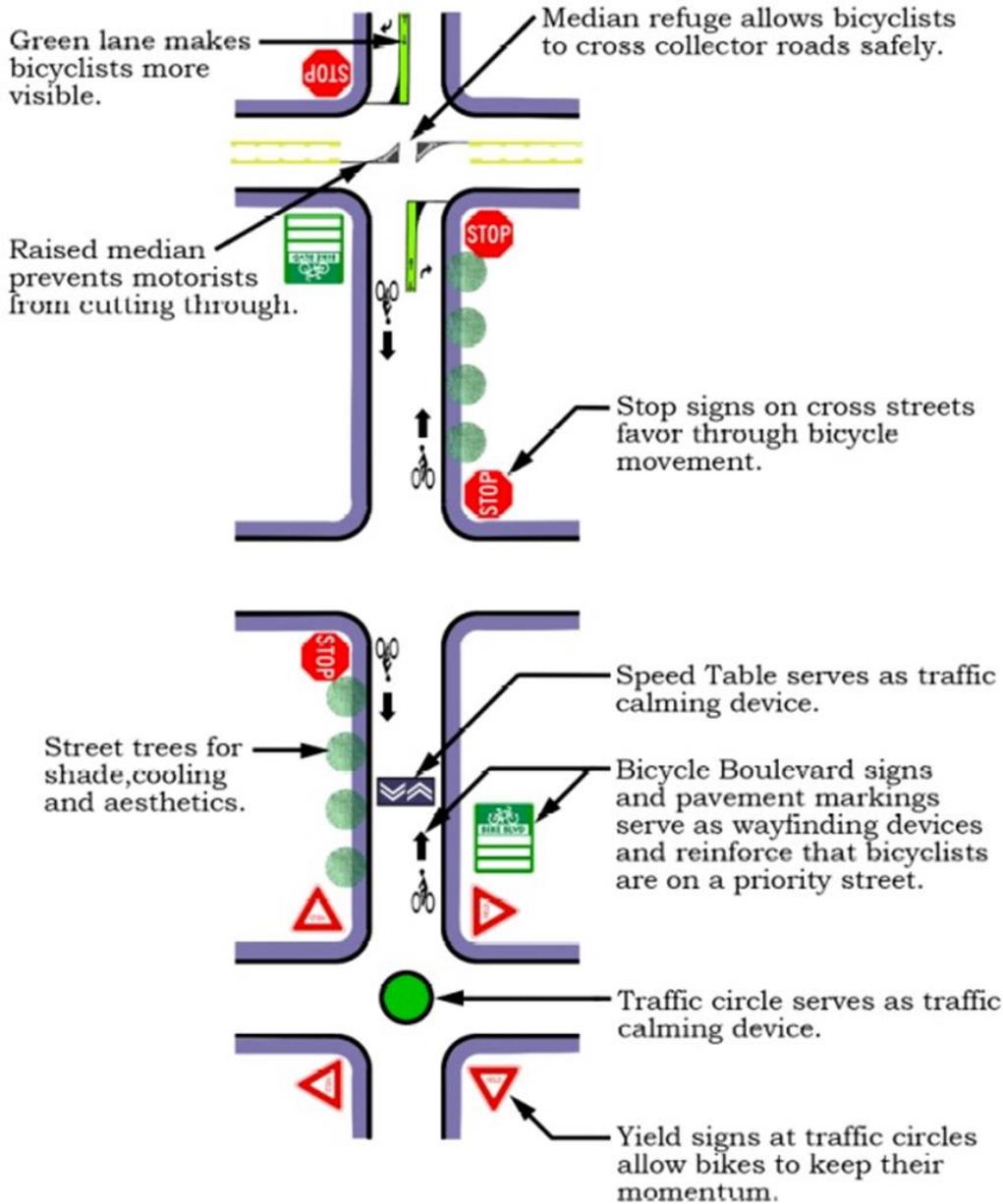


Figure 12. Example of Bike Boulevard Design Tools

## TYPICAL BIKE BOULEVARD IN TUCSON



Whether through the construction of bike boulevards or other bicycle facilities, it is important to fill in the existing gaps in the bicycle infrastructure. Figure 16, taken from the UA Bicycle and Pedestrian Plan, shows the location of those gaps. Such gaps may prevent cyclists from choosing to ride their bike to campus or from campus to reach nearby destinations, resulting in additional and possibly unnecessary vehicle trips, and increasing the need for vehicle parking. There are a number of recommended improvements throughout the area (Figure 17), including a vital link between the University and West University areas via 5th Street.

The recommended improvements shown in Figures 18 and 19 would provide a dedicated bicycle facility for riders of all levels between 4th Avenue and the center of campus, providing an improved crossing at Euclid Avenue, which currently serves as the major barrier between campus and the West University neighborhood and other points west. As seen in Figure 18, 5th Street would become a bike boulevard and areas east of Euclid Avenue would include shared lane markings to guide cyclists through campus. Figure 19 shows the long-term plan to construct a signalized bike and pedestrian crossing (TOUCAN) at Euclid Avenue.

### *Bicycle Parking*

As previously mentioned, the University has a total of 9,699 bicycle parking spaces, including 2,388 shaded parking spaces for bikes. Bicycle parking facilities have been included at Level (Figure 20), and should be included in other new student housing developments in the area. Other highly-traveled areas (such as University Boulevard between Euclid Avenue and Park Avenue) should be evaluated to determine if additional bicycle parking can be incorporated.

Figure 13. Bike Parking at Level





In addition to standard bike racks, other types of bike parking such as secured parking, bike lockers, and bike corrals (Figure 14) may be provided. Secured parking may attract cyclists who would otherwise be concerned with leaving their bike parked for a significant period of time. Bike corrals not only provide safe parking with efficient access, but also promote the cycling culture by providing bicycle parking in place of vehicle parking. In addition, on-street bike corrals used in place of sidewalk bike racks allow sidewalks to remain unobstructed, which improves the pedestrian environment as well. The City of Tucson has plans for constructing bike corrals, and also has a temporary corral which can be used to test the design (and use) to determine if a permanent corral would be beneficial in a particular location.

Figure 14. Bike Corral



### *Bike and Car Share Programs*

The University currently operates both car share and bike share programs. The existing bike share program at the University of Arizona currently includes 55 bikes, and is free for students. Bicycles can be checked out at multiple locations on campus, and can be taken home overnight.

The bike share program may be used by students who drive to campus, then use the bike to get around campus or areas nearby. While this type of use does not reduce vehicular commuter trips, it may encourage drivers to use a bike for shorter trips in the area during their day on campus as opposed to driving to each destination. However, the existence of a bike share program may also encourage users to travel to campus via transit, knowing that once they are in the area, they will have a way to easily (and inexpensively) move around.

The car share program currently includes 10-15 vehicles in the Hertz car-sharing program, and charges \$8 per hour. Cars are available at four locations around campus. Expanding the program by including additional cars at additional locations at and around campus (perhaps in the parking garages in the West University area, or even near student housing developments in the Downtown area) could help reduce the parking demand. For example, if a car share location were to be added in the Main Gate garage, it could serve Marriott hotel guests, 40% of whom do not rent cars. With an easily accessible car share program, that percentage could increase even further.

In addition to serving visitors, students may be inclined to live on or near campus without a car if they know that they will have access to one for a relatively low price. While those students would still use a car from time to time for longer trips, or perhaps even weekly shopping trips, they would also be more likely to walk, bike, or use transit for a majority of their shorter trips at and around the University area.

Aside from owning their own car, students surveyed at Level indicated that cost was the main reason for not using the car-sharing service (only 20% of respondents had ever used the service). Others stated that they were unaware of the service. Therefore, it is important for Hertz (and other potential car-sharing providers), the University, and student housing owners to work together to not only promote the service, but to communicate how the cost is comparable (and potentially less expensive over time) to owning a personal vehicle.

In addition to the Hertz car-sharing program, Zipcar for Universities will be available for students 18 years and older at the University of Arizona beginning this fall (August 2014). This additional service may further reduce the need for students to bring a car with them to school. Faculty and staff may be more inclined to commute to campus via alternate modes if they know that a car will be available to them if a need arises at the last minute.

### *Pedestrian Access*

In addition to improving bicycle access and safety, pedestrian accessibility should also be improved in the area. Pedestrian trips are typically shorter than bicycle trips, but providing safe, complete, and attractive pedestrian facilities can help to promote pedestrian travel. Sidewalk gaps and non-ADA compliant facilities throughout the WUNP area should be addressed and improved wherever possible. However, where funds are limited, it may be prudent to focus improvement efforts in areas with the highest current and potential pedestrian use, such as the Main Gate area.

Recommended crossing enhancements are shown at several locations on Euclid Avenue, which serves as the major barrier between the West University neighborhood and the Main Gate and campus areas. Just as bicycle facilities should be improved to serve users of all comfort levels, pedestrian connections should be improved to serve users of all abilities and comfort levels as well.

As discussed in the Plan, unsignalized crossing enhancements may include the following:

- Raised intersections
- Raised crosswalks
- Advance yield markings
- Pedestrian signals
- Flashing lights (in-pavement or in conjunction with crosswalk warning signs)

Signalized crossing enhancements were also discussed, and include the following:

- High visibility crosswalks
- Leading pedestrian intervals
- Pedestrian scramble phase
- Pedestrian countdown timers
- “Yield to Pedestrian” signs for right-turning vehicles
- Curb extensions (to effectively reduce the crossing distance and slow turning vehicles)

The listed crossing enhancements can improve the pedestrian experience by increasing safety through improved visibility and control. Many of the tools listed can help to reduce conflicts between vehicles and pedestrians, which can provide a more inviting atmosphere.

In addition to crossing enhancements, streetscape is important to provide an inviting environment for pedestrians. Sidewalk width, lighting, trees and other landscaping, public benches, water fountains, and public art can all work to attract more pedestrians with an improved walking experience. In addition, well developed streetscapes can help to reduce modal conflicts, providing clearly separate areas for pedestrians and cyclists.

## *Transit*

There are several high-density residential developments as well as a number of commercial properties in the area (many immediately adjacent to the Streetcar alignment), which provide both a base of users for the Streetcar and destinations for riders to travel from other areas into the West University area. Transit Cooperative Research Program (TCRP) Report 128 – Effects of TOD on Housing, Parking, and Travel studied transit-oriented developments in four cities, and found that overall, the vehicular trip generation rate is between 38% and 50% lower than the ITE rates for typical developments of a similar size, which indicates that tenants in similar developments tend to use alternate modes of travel at a high rate.

The addition of the Streetcar will facilitate travel between downtown Tucson, the West University area, and the University of Arizona, since the Streetcar line travels through all three areas. The Streetcar will provide a third transit option in the area in addition to the existing Sun Tran and Cat Tran routes that serve the area. In addition, the University of Arizona will be subsidizing Streetcar passes for students and staff, providing semester or annual SunGO passes at half price. This could help increase ridership and further reduce vehicle trips in the area. The University is also providing passes for students and employees to ride the Streetcar for free for 30 days, August 15 through September 14, 2014 (fall semester classes start August 25th).

A majority of the students at Level who responded to the survey conducted in April 2014 indicated that they plan to ride the Streetcar, especially when traveling to/from Downtown and/or 4th Avenue. Students indicated that the Streetcar schedule (frequency and hours of operation) would be the most important factor in determining whether or not they ride the Streetcar, followed by ease of fare purchase. The cost of riding the Streetcar was the next most important factor, with 70% of respondents rating it as important or very important.

It is important to continue to promote the transit services and provide easy access to schedules, routes, and other information in order to increase ridership. In addition, transit stops should be easily accessible by all users, and should be well lit for nighttime safety and provide shade for continued use through the summer months. The Streetcar schedule should take into consideration the use by students; for example, extended hours on weekends may be beneficial to serve the student population traveling to and from Downtown/4th Avenue in the evenings.

## *Multi-Modal Connectivity*

The characteristics of the West University area provide a strong opportunity to shift trips from vehicles to other modes, such as walking, cycling, or transit. The University of Arizona Needs Assessment Study found that approximately 89% of students living within one mile of the University travel to campus via bike, transit, or by walking. Within two miles, approximately 84% travel to campus via alternate modes. At Level, 86% of students walk to campus (for school-related trips), 10% ride a bike, and 1% ride a bus or shuttle.

This shows that the area already has a significant presence of alternate modes of travel (including transit, cycling, and walking). However, for those living between two and five miles from campus, only 41% travel to campus via alternate modes (12% on bicycles). Therefore, in addition to maintaining those who currently use alternate modes, the focus should be on improving connectivity to areas within five miles of campus and providing ample opportunities for those who commute longer distances to use alternate modes once they are in the area.

In general, bicycle and pedestrian facilities should all be intertwined to create a seamless network for users. Transit vehicles should continue to provide bike racks, and bike parking facilities may also be provided near transit stops. Pedestrian facilities should provide safe and comfortable access to all areas for all users, and transit stops and bike parking should not hinder pedestrians. Travelers will be more likely to use alternate modes if they are certain that they will be able to easily and safely access their destinations, so lighting, enforcement, and aesthetics must be taken into consideration. In addition, education campaigns may be used to ensure that students and staff of the University as well as any others who may travel to the area are aware of the different travel options that are available.

Education and incentive programs may be developed to reduce the number of residents in the area who feel the need to own a vehicle. As previously discussed, bike and car share programs can help reduce the need for vehicle ownership, and such programs could be expanded to include non-University users. In addition, it may be helpful for the new student housing developments adjacent to the University to charge tenants for parking as a fee separate from their rent. In addition, student housing and/or on-campus parking passes should be priced similarly to (or more expensive than) a transit pass to encourage transit ridership and discourage personal vehicle ownership and/or travel. Student housing developments may also consider secure bike parking and/or incentives for transit use to encourage alternate modes of travel.

For those who commute significant distances and/or for those who it is infeasible to travel the West University area using a method other than personal vehicle, a complete network of pedestrian, bicycle, and transit facilities may still be of great use. For example, if a park-and-ride facility is constructed at the west end of the Streetcar line (west of Interstate 10), a commuter may choose to park there and ride the Streetcar to get to the University. Once on or near campus, if they know that they have access to a bicycle through the bike share program, they may choose to use that to travel around campus. Commuters may also travel to the area for shopping or dining, choosing to walk if the area feels safe and inviting for pedestrians.

## **4.2. PARKING**

As discussed in the previous section, the main area of focus for transportation in the WUNP area should be on multi-modal travel and mode shift, rather than trying to provide facilities for additional motor vehicles. However, parking is still an integral part of the area. Land owners in the area do not have plans to add parking at this time, but the public-use garages and several areas of on-street parking are available. In the residential areas off-campus, neighborhood parking permits are required in most areas, and it is not expected for that to change.

While there are not any plans to add stand-alone parking structures immediately adjacent to campus, the new student housing developments are expected to include some parking for their residents. Although the developer will encourage tenants to leave their cars at home and make use of the car share vehicles, walking, cycling, or the Streetcar (all of which are or will be located within steps of the front door), the University of Arizona Parking and Transportation Services (PTS) has expressed concerns that tenants may use campus parking lots and/or garages for vehicle storage. As found in the survey conducted at Level, some students are indeed parking overnight in campus parking lots/garages. Enforcement and monitoring will be crucial, particularly in the early years of the development and Streetcar operation. In addition, PTS may also consider differential parking rates for overnight parking or proximity to campus.

Further west in the WUNP area (near 4th Avenue), it may be necessary to increase parking rates for on-street parking, particularly along the Streetcar line. This can help increase turnover, which is beneficial for businesses. In addition, higher parking rates can reduce demand and may further encourage travelers to use other methods of transportation. For example, if it becomes cheaper to park in a downtown garage and use the Streetcar than it is to park on the street or near campus, people may change their habits. As previously mentioned, ParkWise is currently evaluating the parking situation in the 4th Avenue Business District area and is developing plans for installing parking meters and other permit parking.

## **4.3. TRAFFIC CALMING**

Many traffic calming devices already exist in the West University area. Additional traffic circles, speed humps, speed tables, bump-outs, and other devices may also be installed to make neighborhood streets less attractive to drivers wishing to avoid delays on the major streets in the area.

In addition to standard traffic calming devices, other methods such as providing a physically separated cycle track could also aid in traffic calming while providing additional infrastructure for cyclists. This type of facility would not only narrow the width of the roadway, but may encourage more cyclists to use the designated bicycle facility, which may reduce vehicle congestion and lessen the desire for drivers to cut through the neighborhood.

## **4.4. SUMMARY OF RECOMMENDATIONS**

Several recommendations have been presented in detail in the preceding sections to address vehicular, pedestrian, bicycle, and transit traffic in the WUNP neighborhood, particularly as the area changes with the construction of the Modern Streetcar. Those recommendations are summarized below, and may

potentially contribute to a reduction in parking demand in the area. Note that potential future improvements are not limited to the recommendations discussed in this report.

#### Car Sharing Services:

- Continue expanding and promoting car share programs
  - Provide information to new/incoming students to allow them to decide whether or not to bring a car to campus
  - Communicate potential cost savings to students (when compared to owning a car and having to pay for parking)
  - Consider adding vehicles in new locations, possibly closer to off-campus student housing
  - Bicycle Infrastructure
- Address gaps in bicycle network in the University area (lack of bike lanes, connections across major roadways or between facilities, etc.)
- Construct planned bike boulevard and associated crossing treatments on 5th Street between 4th Avenue and Euclid
- Provide adequate bike parking at dorms and other student housing developments on and near campus
  - Can include traditional bike racks and/or secured bike parking
- Provide bike parking at destination locations (on campus, shopping areas, 4th Avenue, Downtown, etc.)
  - Can include traditional bike racks, secured bike parking, bike corrals
  - City should make use of temporary bike corral to evaluate locations for potential permanent bike corrals
- Evaluate potential for expanding bike share program on campus
  - May include check-out locations at off-campus student housing facilities
  - Pedestrian Infrastructure
- Address gaps in sidewalk network in the WUNP area
- Address/improve non-ADA compliant facilities
- Improve streetscape (wider sidewalks, more shade trees, lighting, etc.) to promote walkable environment
- Evaluate major crossings and consider use of raised crosswalks, raised intersections, pedestrian signals, etc.

#### Transit:

- Provide easy access for all users to transit stops (clearly marked stops, lighting at stops and along main paths between stop and pedestrian destinations, ADA-compliant sidewalks, shade trees and/or structures, etc.)
- Ensure that schedules meet users' needs (i.e. shorter headways during peak travel times, extended hours on weekends, etc.)
- Continue to promote and advertise Streetcar and other transit services
- Provide subsidized passes for University of Arizona students, faculty, and staff
- Ensure fare purchase is straightforward for all users
- Provide reliable service

#### Parking:

- Student housing management should separate parking and rent fees and encourage tenants to leave their cars at home

- Parking fees should be set to entice students to use alternate modes of travel (walking, bicycle, transit)
- May require coordination with the University to ensure that students do not buy a University parking pass to store their vehicles if it is less expensive than parking at their place of residence
- Adequate bicycle parking/secured bicycle parking should be provided
- University of Arizona Parking and Transportation Services can consider overnight parking fees, increased enforcement
  - May include prohibiting students who live in specified off-campus student housing facilities (i.e. those adjacent to campus or possibly those along the Streetcar route) from purchasing an on-campus parking pass
- Consider constructing one or more parking structures (namely in the 4th Avenue Business District area) incorporated with mixed-use, transit-oriented development(s)
- Consider shared use parking areas, where residential and employee parking will be provided, but customer/visitor parking may also be allowed

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