22nd Street between Kino Parkway and Tucson Boulevard

Environmental Design and Mitigation Report (Draft)

Prepared for

City of Tucson and
Regional Transportation Authority

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1.0 INTRODUCTION

A. Project Background

In May 2006, the Regional Transportation Authority (RTA) plan and sales tax were approved by the voters of Pima County. One of the 35 roadway improvement projects included in the RTA plan is 22nd Street from Interstate 10 (I-10) to Tucson Boulevard, RTA Project Number 19. The City of Tucson began planning efforts for the section of 22nd Street between Kino Parkway and Tucson Boulevard in 2006. Planning for the remaining section between I-10 and Kino Parkway recently began in 2008 and is being conducted under a separate contract. This Environmental Design and Mitigation Report (ED&MR) has been prepared for the section of 22nd Street between Kino Parkway and Tucson Boulevard (see Figure 1).

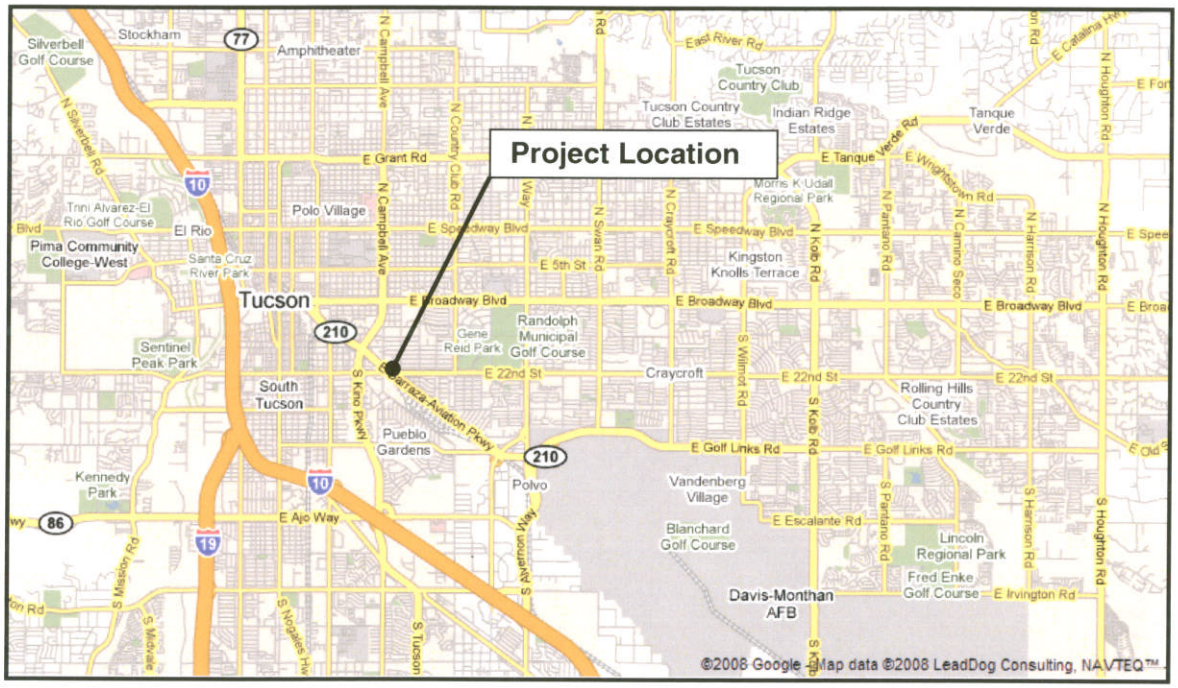


Figure 1: Project Vicinity Map

The section of 22nd Street, between Kino Parkway and Plumer Avenue and west of Tucson Boulevard, does not have sufficient capacity to carry the number of vehicles currently using the roadway during peak hours. This section of 22nd Street lacks capacity primarily due to having only 2 lanes in each direction. In addition, the City imposed weight restrictions on the existing 22nd Street Bridge that spans the Barraza-Aviation Parkway and the Union Pacific Railroad (UPRR), requiring that heavy trucks and buses detour around the bridge onto adjacent roadways. The improvements to 22nd Street are needed not only to increase roadway capacity and eliminate the detours caused by the weight restrictions, but to provide greater pedestrian and bicycle safety, and improve existing transit service.

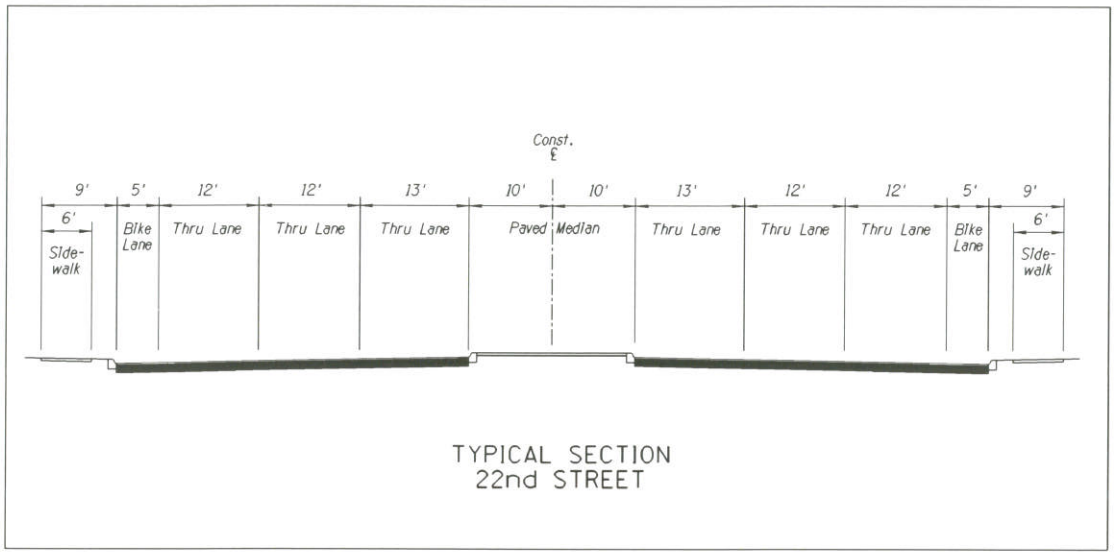
Planning for the improvements to 22nd Street has followed the process detailed in the City of Tucson's *Roadway Development Policies*. In keeping with these policies, an Advance Planning Report (APR) and an Alternative Alignment Report (AAR) have been prepared. The APR, which was approved by the Citizens Transportation Advisory Committee in December 2007, documented the need for the project, provided a general overview of the existing conditions, and briefly described three alternatives to be taken forward into the AAR. The AAR was prepared to evaluate the alternatives from the APR and to document the process for selecting the preferred alternative. The AAR was endorsed by the Technical Advisory Committee and Citizens Advisory Committee before being approved by the Mayor and Council on November 18, 2008.

B. Recommendation and Findings of the Alternative Alignment Report

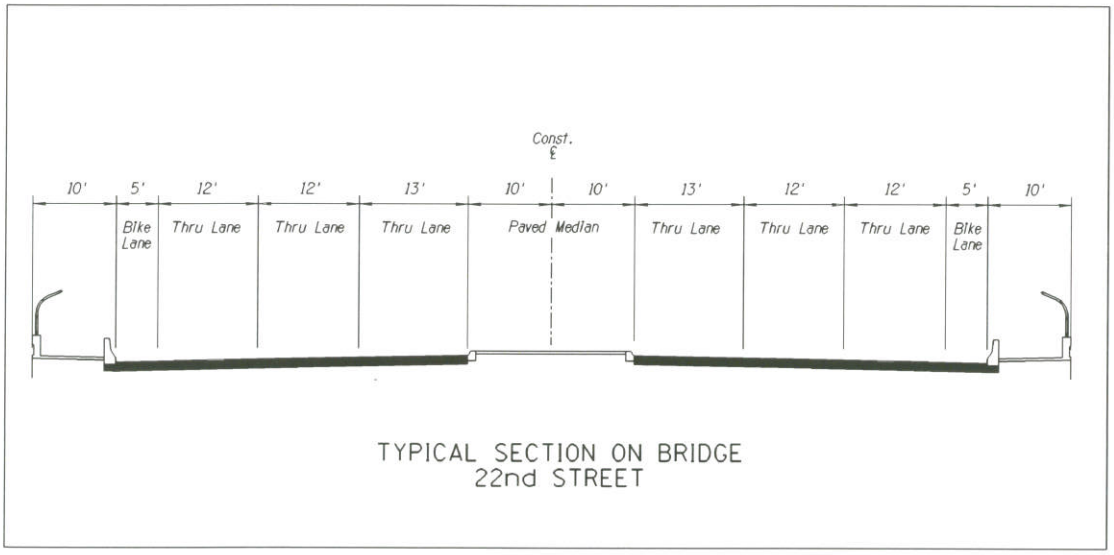
Three alternative alignment configurations were developed for the 22nd Street between Kino Parkway and Tucson Boulevard. The typical section for all three alignments widened the roadway to provide six travel lanes, a raised landscaped median, bicycle lanes, and sidewalks with American with Disabilities Act (ADA) access ramps. The original typical roadway section from the AAR is shown in Figure 2. (Note that these typical roadway sections have since been refined as shown in section 3.0 D Additional Design Elements) The three alternatives were:

- Maintain the existing alignment and widen symmetrically about the existing roadway centerline.
- Shift the alignment far enough to the south to avoid the existing bridge during construction.
- Shift the alignment far enough to the north to avoid the existing bridge during construction.

A comparative impact assessment of the alternatives was performed that considered several project elements including traffic operations during and after construction, alternative modes (bus and bike routes and pedestrian facilities), drainage, utilities, right-of-way, bridge structures, zoning, and land use opportunities. A decision matrix was used to evaluate which alternative provided the best overall solution for the roadway. Through the matrix evaluation process, it was determined that shifting the roadway to the north was the preferred alignment. A copy of the matrix evaluation is contained in Appendix A. This alignment was selected for the project and approved in November 2008 as described earlier.



TYPICAL SECTION
22nd STREET



TYPICAL SECTION ON BRIDGE
22nd STREET

Figure 2: Typical Sections

The selected alternative is shown in Figure 3. This alignment shifts the roadway far enough to the north to construct the north half (westbound 22nd Street) of the new bridge without impacting the existing bridge. This allows four lanes of traffic to continue operating on the existing bridge while the north half of the bridge is constructed. Once it is completed, the north half of the new bridge will be wide enough to provide two lanes of traffic in each direction while the existing bridge is demolished and the south half of the new bridge is built. This sequencing allows four lanes to be available for traffic throughout bridge construction.

After the AAR was made available, the public and the Citizens Advisory Committee provided comments. These comments were considered in preparing this ED&MR, and the 15% design plans. A representative summary of these comments included:

- If the first row of houses on 22nd Street is removed, consider screen walls or noise walls to protect the houses behind them.
- Minimize the design cost by using existing facilities wherever possible. Reduce median widths and use existing pavement where possible.
- If artistic treatments are included, consider having residents and/or kids participate in their design.
- Provide safe bike lane access off of the bridge.

A listing of all comments received at the Citizens Advisory Committee meetings is contained in Appendix B.

C. Mayor and Council Direction

In the public hearing that was held on November 18, 2008, the Mayor and Council gave direction to the team to investigate the use of 11-foot traffic lanes to slow traffic in an urban area, and to increase the bike lane width to 6 feet. In addition, they requested that, at a minimum, this project plan for providing a connection for pedestrians and bicycles on 22nd Street with the existing Barraza-Aviation Parkway multi-use path.

Figure 3: Preferred Alternative

2.0 INVENTORY OF EXISTING CONDITIONS

The proposed improvements extend along 22nd Street from Kino Parkway to Tucson Boulevard. For this report, the project area has been expanded beyond the existing right-of-way limits to include at least one block north and south of 22nd Street itself. This project area is shown in Figure 4.

A. Environmental

Topography

The topography of the area surrounding the project is generally flat with gentle slopes of less than 0.70%. A ridge runs southeast to northwest dividing the project area at about Cherry Avenue. On the east side of the ridge, the land falls to the northwest, and on the west side of the ridge, the land falls to the west. The 22nd Street Bridge over the UPRR and Barraza-Aviation Parkway and the Kino Parkway Murphy's Overpass are the only significant topographic features that rise above the surrounding area. The 22nd Street Bridge is approximately 30 feet above grade, and Murphy's Overpass is approximately 33 feet above grade.

Drainage

The City of Tucson has identified regional watersheds for the entire city. Each watershed has been classified as a balanced basin, a critical basin, or a non-designated basin. The majority of the project is located in the Tucson Arroyo watershed with the exception of the far west end, which is located in the 18th Street Wash watershed. Both of these watersheds are non-designated basins, meaning that detention/retention requirements may be waived for new development provided the new or existing stormwater conveyance facilities can safely convey the increased on-site runoff without increasing flood hazards to adjacent properties.

Three washes cross the project area: Railroad Wash, an unnamed wash tributary to Railroad Wash, and Lopez Wash. Railroad Wash is a major wash with a 100-year flow of over 1,000 cubic feet per second (cfs) where it crosses under 22nd Street immediately west of the UPRR. The tributary to Railroad Wash crosses 22nd Street on the east side of Barraza-Aviation Parkway with a 100-year flow of approximately 670 cfs. Lopez Wash crosses 22nd Street just west of Tucson Boulevard, and has a 100-year flow of almost 300 cfs. These flows were obtained from the City of Tucson website. Railroad Wash and its tributary have FEMA mapped floodplains associated with them, but Lopez Wash does not. Maps in Appendix C show the limits of the floodplains within the project area.

Drainage facilities are generally located near the three wash crossings (see Figure 5). Each of the three wash crossings has a cross culvert to convey flows under the roadway. In addition, catch basins are located near the cross culverts to collect pavement drainage, which has minimized the amount of storm drain pipe installed as shown on Figure 5. Downstream of the culverts, channels convey the flow out of the project area. Railroad Wash and Lopez Wash are earthen channels, and the tributary to Railroad Wash is a concrete-lined channel. Lopez Wash was realigned as part of the development for the Arroyo Chico neighborhood.

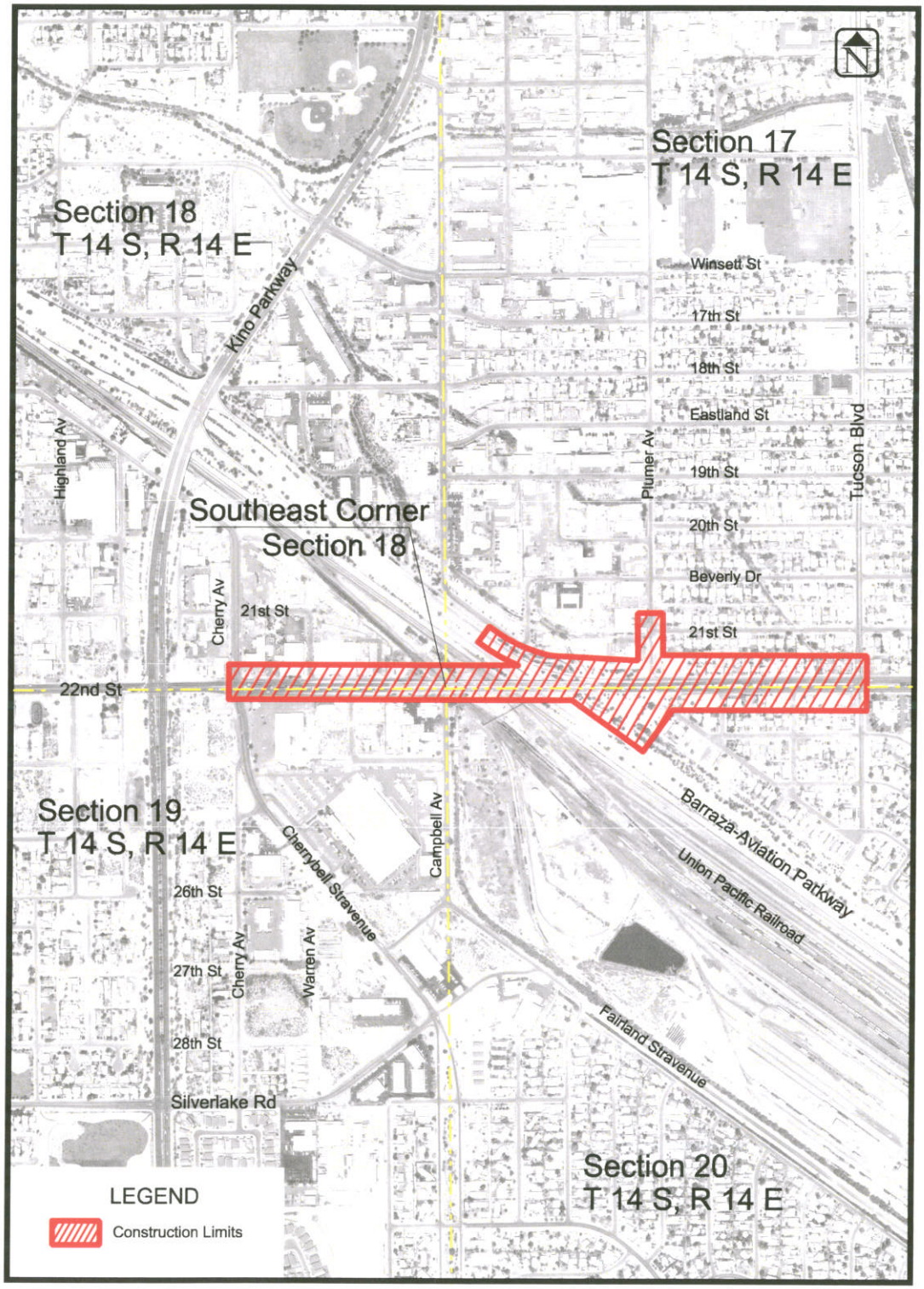


Figure 4: Project Location

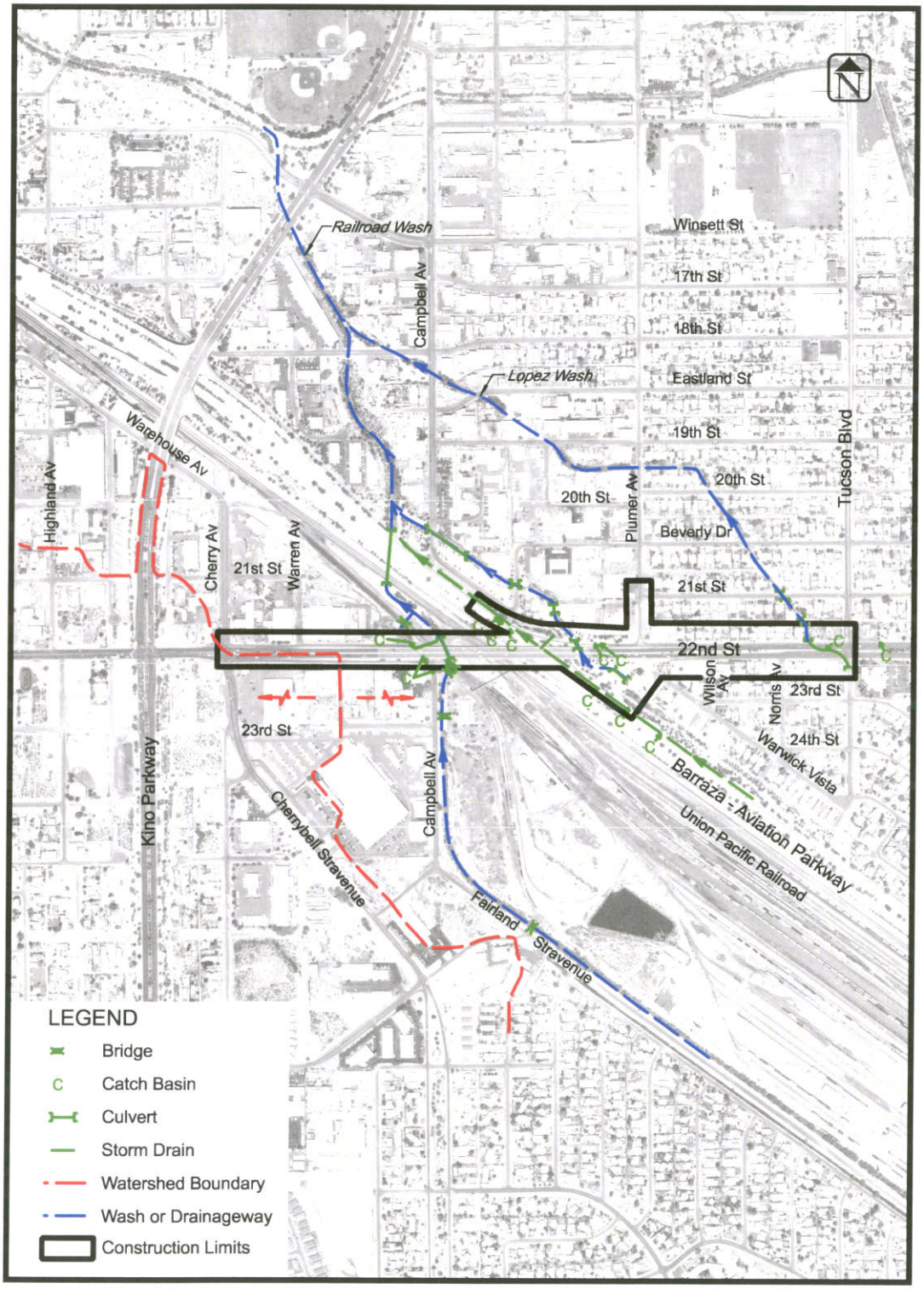


Figure 5: Existing Drainage Facilities

Floodplain Complaint and Field Investigation Reports were obtained from the City of Tucson. The records reviewed for this project covered the area bordered by Tucson Boulevard on the east, Park Avenue on the west, 18th Street on the north, and Silverlake Road on the south. A total of 25 complaints were received from residents and merchants in this area between March 18, 1984 and April 8, 2009. The nature of the complaints typically involved local flooding caused by clogged facilities or sheetflow breaking out of streets and impacting adjacent structures. Only one of the complaints occurred within the project limits on 22nd Street, near Tucson Boulevard. The flooding cited in the complaint was a direct result of the insufficient capacity of Lopez Wash at the east end of 22nd Street.

Water Quality

The Railroad and Lopez Washes, both ephemeral streams, cross the project. No other body of water exists within the project area. The project area drainage facilities currently do not provide water quality treatment of stormwater runoff entering these water bodies.

Vegetation and Wildlife

The project is located within a previously disturbed urban environment. Vegetation on vacant parcels is sparse and comprised of a mix of upland and lowland Sonoran Desert scrub. Landscaped areas include the Barraza-Aviation Parkway median, shared-use path, and pocket park; the 22nd Street roadway median; and areas adjacent to the roadway on private property in the residential area on the east side of the project. Most of the landscape vegetation within public right-of-way is comprised of irrigated, drought tolerant native, near-native, and non-native plants. The vegetation on private property varies.

Native plants listed as protected native plants are present within the project limit. These plants are part of the existing streetscape landscape. No naturally occurring native plants are present within the project limit.

Xeroriparian Low Habitat is present in the vicinity of the project area along Railroad Wash which crosses under the UPRR bridge at Campbell Avenue. Railroad Wash is included in the list of watercourses identified in the City of Tucson's Watercourse Amenities Safety and Habitat Ordinance.

Wildlife within the area includes species such as songbirds, voles, and other small mammals that have adapted to human presence. The maintained urban landscape vegetation does not typically provide habitat for a large diversity of species. Use of these areas by small birds and mammals can attract predators to these areas.

A formal biological review has not been performed for the project. However, a search of the Heritage Data Management System (HDMS) database was conducted to determine if any Special Status Species are located in the vicinity of the project area. The search indicated that there are Special Status Species located within three miles of the project vicinity. The special status species include the Giant Spotted Whiptail, Western Burrowing Owl, Yellow-billed Cuckoo, Great Plains Narrow-mouthed Toad, Cave Myotis, and Tumamoc Globeberry. A copy of the HDMS project review is contained in Appendix D.

The Sonoran Desert Conservation Plan (SDCP) GIS map shows neither priority plant conservation areas nor priority wildlife conservation areas in or near the project. The project does not contain riparian habitat as defined in Pima County Ordinance 2005-FC2.

View Sheds – Visual Analysis

The project is located in south central Tucson in the midst of an industrialized urban area. Local view sheds are typical for that type of land use. Because of the central location, most locations within the project area have views of the Tucson Mountains, Santa Catalina Mountains, and the Rincon Mountains. The Santa Rita Mountains to the south are less visible due to their proximity to the project. The existing bridge over the UPRR is a significant feature and restricts views from the properties close to the bridge. The bridge itself is a functional steel structure built in the 1960s, and has no amenities to enhance its appearance. However, the view shed from atop the 22nd Street Bridge over the UPRR allows a 360-degree view of downtown Tucson and the surrounding mountain ranges, and provides panoramic views.

This section of 22nd Street has six billboards located adjacent to the roadway on private property. Four of the billboards are also within the limits of the adjacent Kino Parkway/22nd Street intersection project.

Historical, Cultural and Archaeological

As of April 8, 2009 the National Register of Historic Places website listed no registered sites within the study area. All listings were reviewed for Pima County, Arizona. The City of Tucson conducted a records search to determine if the proposed improvements would have any impact on a previously recorded significant archaeological or historical site. The search found that to date no previous recorded sites have been documented within the project area (see Appendix E). Due to the highly urban and developed nature of the project area, the probability of encountering any previously unrecorded cultural or archaeological resources are low.

Air Quality

The Tucson region is in attainment for all criteria pollutants. Additionally, the U.S. Environmental Protection Agency has determined Pima County to be in attainment with the National Ambient Air Quality Standards for carbon monoxide in July 2000.

Hazardous Waste

According to the Arizona Department of Environmental Quality (ADEQ) website, the UPRR yard south of the 22nd Street alignment is a designated brownfield site with diesel fuel being the main contaminant in the soil. The site is participating in the ADEQ voluntary remediation program and is still considered active. The website indicates that the site is located within the UPRR Gila sub-yard. The UPRR sub-yard is upslope and south of the 22nd Street alignment and outside of the limits of construction (see Figure 6).

In addition to the UPRR brownfield site, three underground storage tanks were identified on the west side of the UPRR tracks. These are located within a block of 22nd Street, but are outside the confines of the proposed alignment. Also, the ADEQ website identified one leaking underground storage tank. The tank is located at the northwest corner of 22nd Street and Tucson Boulevard (see Figure 6).

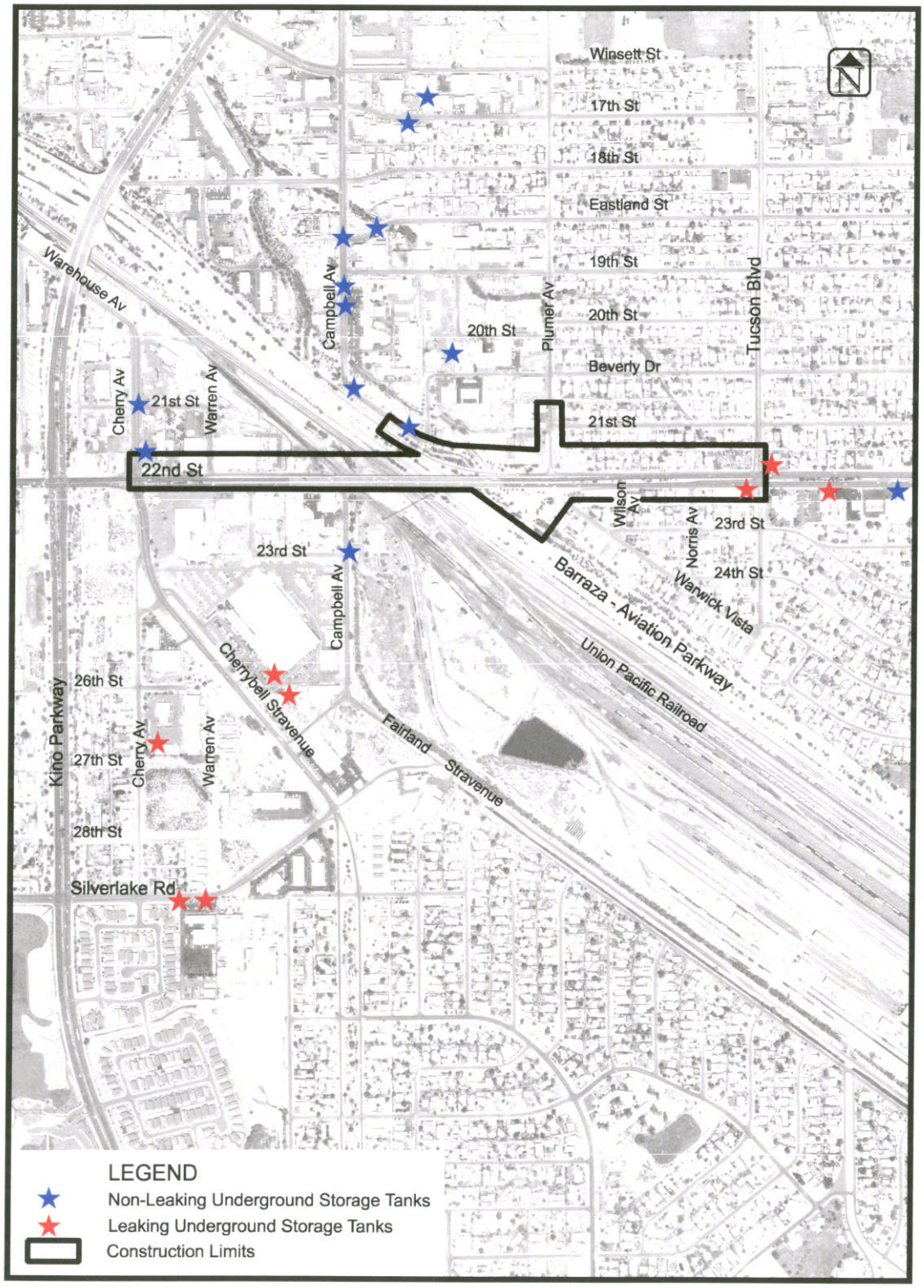


Figure 6: Location of Identified Hazardous Waste Sites

Additional potential for encountering hazardous waste exists in the buildings that will be demolished to provide right-of-way for roadway improvements. Given the age of the older buildings in the project vicinity, it is possible that lead based paints and asbestos could be found during the demolition process. A survey of the structures has not been performed and the extent of asbestos and/or lead contamination, if present, is not known.

B. Neighborhood

Adjoining Land Uses and Property Values

The project area falls within four neighborhoods: Arroyo Chico Neighborhood and Parkway Terrace Neighborhood on the east side, and Pueblo Gardens Neighborhood and Millville Neighborhood on the west side (see Figure 7). All three neighborhoods have active neighborhood associations. Two Neighborhood and Area Plans have been prepared that apply to the project area. The Greater South Park Plan covers the area west of Barraza-Aviation Parkway and north and south of 22nd Street, and the Arroyo Chico Plan covers the area east of Barraza-Aviation Parkway and north and south of 22nd Street.

Existing land use in the project area falls into four general groups: industrial/commercial, residential, private vacant land, and public vacant land (see Figure 8). Generally, the land use east of the UPRR and Plumer Avenue is residential, although some businesses are located on the south side of 22nd Street, at the corner of 22nd Street and Tucson Boulevard. The remaining land use to the west is generally industrial. The major facilities in the area include a bottling company, petroleum sales, construction goods manufacturing, and warehouse storage. The neighborhood has no grocery stores or health centers in the immediate vicinity of the project.

The larger industrial parcels in the project vicinity include the UPRR Gila sub-yard and the United States Postal Service (USPS) main post office. The UPRR maintenance yard is located south of 22nd Street, and extends over one and a half miles to the southeast. The USPS is located just south of 22nd Street adjacent to the UPRR maintenance yard. The USPS facility serves as the city's main post office, and is also a distribution center for southern Arizona.

According to the *City of Tucson Land Use Code*, several different zoning types occur in the project area (see Figure 9). The predominant zoning between Kino Parkway and Plumer Avenue is industrial (I-1) with small pockets of residential (R-2) and commercial (C-1, C-2, and C-3) scattered throughout. East of Plumer Avenue, the predominant zoning is residential (R-1 and R-2) with some commercial (C-1, C-2, and C-3) and office uses (O-3) on 22nd Street itself.

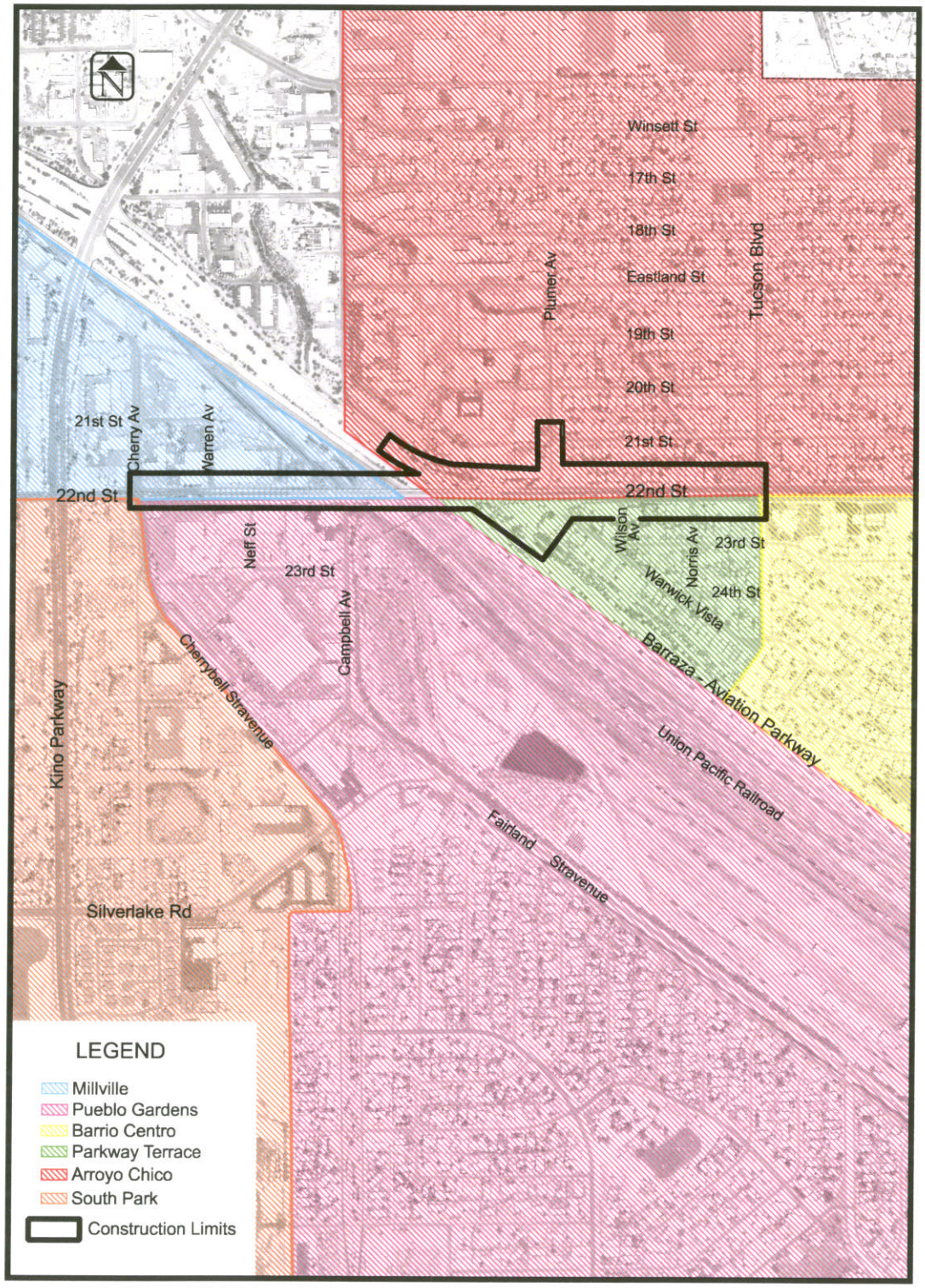


Figure 7: Neighborhoods within the Project Area

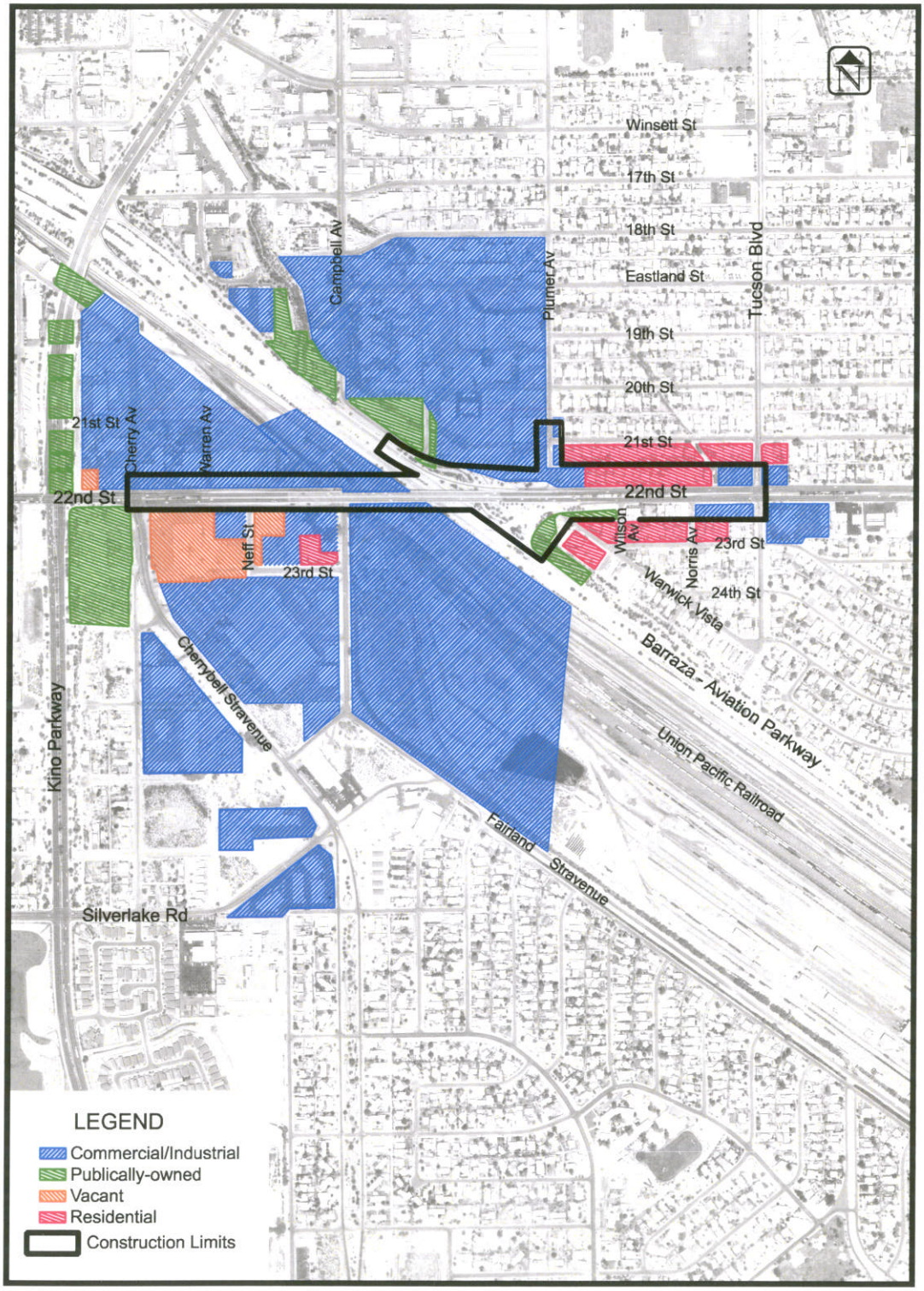


Figure 8: Existing Land Use within the Project Area

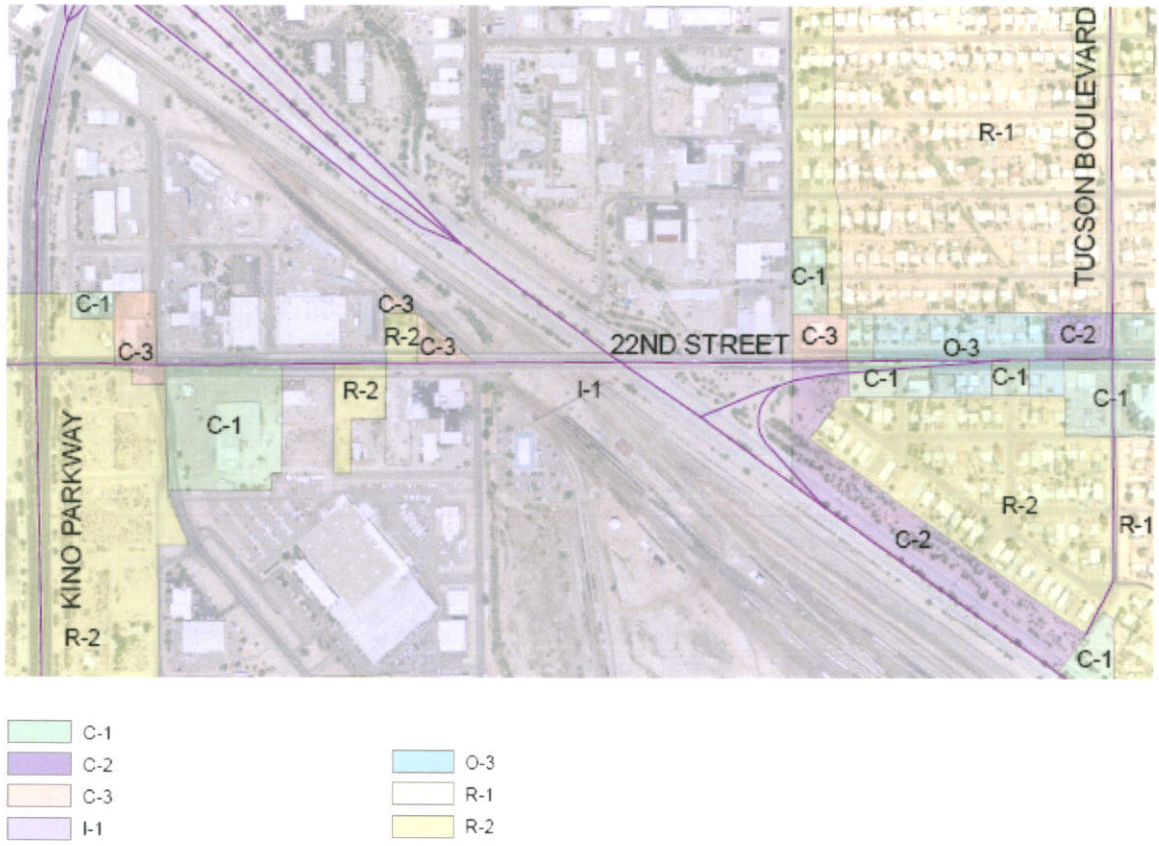


Figure 9: Existing Zoning within the Project Area

Recreation

Recreational facilities in the project area are limited to a shared-use path and a small pocket park, both of which are associated with the Barraza-Aviation Parkway. The shared-use path runs adjacent to the Barraza-Aviation Parkway on its east side, and passes underneath the 22nd Street Bridge and Barraza-Aviation Parkway entrance ramp on the north side of 22nd Street. The shared-use path is a part of the major path that extends from Escalante Road and Kolb Road to downtown Tucson. The "rattlesnake" bridge and the "basket" bridge, both significant landmarks, are located on the path north of the project area towards the central business district.

The small pocket park that is associated with Barraza-Aviation Parkway is located on the south side of 22nd Street at the Barraza-Aviation Parkway off-ramp at Wilson Avenue. The park is overgrown, and does not appear to be used.

Access

Access within the project area is constrained by the UPRR and Barraza-Aviation Parkway. The 22nd Street Bridge provides the only connection between the residential area on the east and the industrial/commercial area on the west. Access into and out of the adjacent neighborhoods and industrial areas is limited to right-turn-in and right-turn-out at the following five intersections:

- 22nd Street and Plumer Avenue
- 22nd Street and Wilson Avenue
- 22nd Street and Norton Avenue
- 22nd Street and Warren Avenue
- 22nd Street and Neff Street

The absence of median openings on 22nd Street between Tucson Boulevard and Cherry Avenue prohibits left-turn movements into or out of the adjacent properties and side streets. Also, residential properties on the north side of 22nd Street have driveways that give access directly onto this arterial. Currently, residents can back out onto 22nd Street using a lane dedicated to this activity. The properties to the south have parking with circular driveways.

On the west side of the project, two roadways provide a connection between the industrial areas north and south of 22nd Street. The 22nd Street and Cherry Avenue/Cherrybell Stravenue intersection has a traffic signal that allows traffic to cross 22nd Street. In addition, Campbell Avenue passes underneath the existing 22nd Street Bridge and connects to a one-way, westbound slip ramp running immediately adjacent to 22nd Street. The slip ramp ends at Warren Avenue, allowing traffic the option of either turning right onto Warren Avenue or entering 22nd Street.

Traffic Operations

A separate traffic report detailing the existing traffic operations of 22nd Street, between Park Avenue and Tucson Boulevard, has been prepared for the project. According to that report, the average daily traffic (ADT) volume on 22nd Street is 41,000 vehicles per day (vpd) between Kino Parkway and Barraza-Aviation Parkway, and 49,700 vpd between Barraza-Aviation Parkway and Tucson Boulevard. It is projected that 22nd Street volumes will increase to 73,000 vpd by 2030. The existing four-lane section between Kino Parkway and Plumer Avenue does not have sufficient capacity for the 41,000 vehicles per day, and operates at level of service F (LOS F). The six-lane section between Plumer Avenue and Tucson Boulevard, however, better accommodates traffic and operates at LOS E.

Character

The character along 22nd Street within the project limits varies from an industrial/commercial arterial on the west side to an established residential area on the east side. The project area is home to the UPRR's Tucson Division Gila sub-yard. The railroad operates a very active switchyard and maintenance facility 24 hours every day. In addition, truck traffic is common on the west side of the project area where the industrial/commercial sites are located.

In the established residential area on the east side of the project area, the neighborhoods are generally made up of well-maintained houses that were built in the 1940s through the 1960s. Traffic calming devices have been used in the Arroyo Chico neighborhood to discourage truck traffic from using the residential streets.

Demographics

The section of 22nd Street between Barraza-Aviation Parkway and Tucson Boulevard is the only portion within the project limits that contains neighborhoods with single-family residences immediately adjacent to the proposed improvements. The demographics of these residences help to further define the neighborhood character. The U.S. Census Bureau records provided information regarding race, gender, age, and income for the area. The 2000 U.S. census data are organized by block groups within the census tracts. The project area falls within block group 5, census tract 20. Block group 5 comprises blocks 5006, 5007, 5014, and 5015 (see Figure 10). Information regarding race, gender and age was available from the individual blocks, but data for income were only available at the census block group level. Table 1 summarizes the census data by individual block and block group.

Table 1: Demographics by Block Area

Demographic	Block 5006	Block 5007	Block 5014	Block 5015	Block Group
Race					
Not Hispanic or Latino (%)	1	18	2	9	383
Hispanic or Latino (%)	14	60	3	14	707
Gender					
Male (%)	8	42	2	14	557
Female (%)	7	36	3	9	533
Age					
Less than 30 (%)	7	34	0	10	566
30-49 (%)	5	18	0	11	254
50-69 (%)	3	9	3	0	158
70 and over (%)	0	17	2	2	112
Average Household Size	3.00	2.60	1.67	2.30	2.84
Household Income					
Less than $15,000	-	-	-	-	58
$15,000 - $29,999	-	-	-	-	96
$30,000 - $44,999	-	-	-	-	82
$45,000 – $59,999	-	-	-	-	58
$60,000 and over	-	-	-	-	38

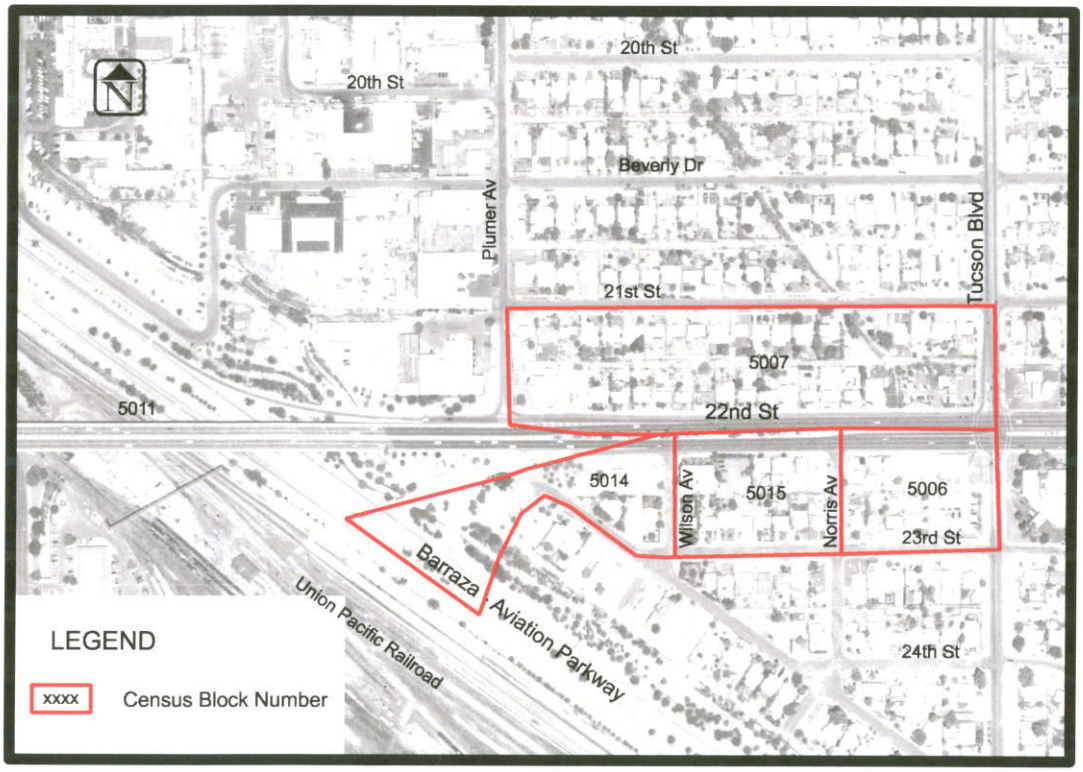


Figure 10: Demographics within the Project Area

Utilities

As-built roadway plans indicate that several utilities are located on the east and west side of the bridge over the UPRR. However, the majority of utilities do not cross the railroad property. Sanitary sewer, gas, and water are located on both sides of the bridge. Overhead power is limited to the 22nd Street/Cherrybell Stravenue intersection. Small diameter utilities include gas, water and sewer west of the railroad, and sewer east of the railroad. The large diameter utilities include a 27-inch-diameter sanitary sewer and a 24-inch-diameter water line located near the east side of the bridge, and a 30-inch-diameter water line that runs east-west in 22nd Street east of the bridge, and veers to the south as it crosses the railroad property to the west. The sanitary sewer continues to the north prior to reaching the railroad property. Consequently, the 30-inch water line is the only utility that crosses UPRR property at the 22nd Street overpass.

Street lights are located on Barraza-Aviation Parkway and 22nd Street. Light pole spacing on 22nd Street is approximately 200 feet apart on either side of the roadway. On Barraza-Aviation Parkway, street lights are located on either side of the roadway, and are spaced approximately 300 feet apart.

Noise

A qualitative analysis found that noise levels from 22nd Street within the project area are typical of those on arterial roadways throughout the Tucson area. The existing roadway has two lanes in each direction from Kino Parkway through to the east end of the UPRR bridge, and three lanes in each direction from the east end of the existing UPRR bridge to Tucson Boulevard. Noise from the UPRR maintenance yard also adds to the noise levels experienced by the adjacent areas. No quantitative analyses are being performed for this report.

C. Alternative Modes

Bikeway Facilities

According to the Tucson Metro Bike Map (updated September 2006), 22nd Street, from 4th Avenue to Cherrybell Stravenue, is a designated bike route with striped shoulders (see Figure 11). The remainder of 22nd Street within the project limits does not have any bike route designations as the limited roadway width does not accommodate bike lanes.

In addition to bike routes, a shared-use path is located on the east side of the Barraza-Aviation Parkway. As mentioned previously, the path extends from Escalante Road and Kolb Road to downtown Tucson, and serves a significant role in providing a connection between these two points. The width of the path varies between 10 feet and 16 feet in the project vicinity.

Pedestrian Facilities

Within the project limits, pedestrian facilities on 22nd Street are currently limited to sidewalks on the existing 22nd Street Bridge over the UPRR facilities. The sidewalks on the bridge are approximately 4 feet wide, and are protected from the adjacent traffic by a concrete barrier. In addition, a short segment of 4-foot-wide sidewalk runs across a single property at the northeast corner of Plumer Avenue and 22nd Street. The adjacent shared-use path on Barraza-Aviation Parkway is a separate facility and is not connected to the pedestrian facilities on 22nd Street.

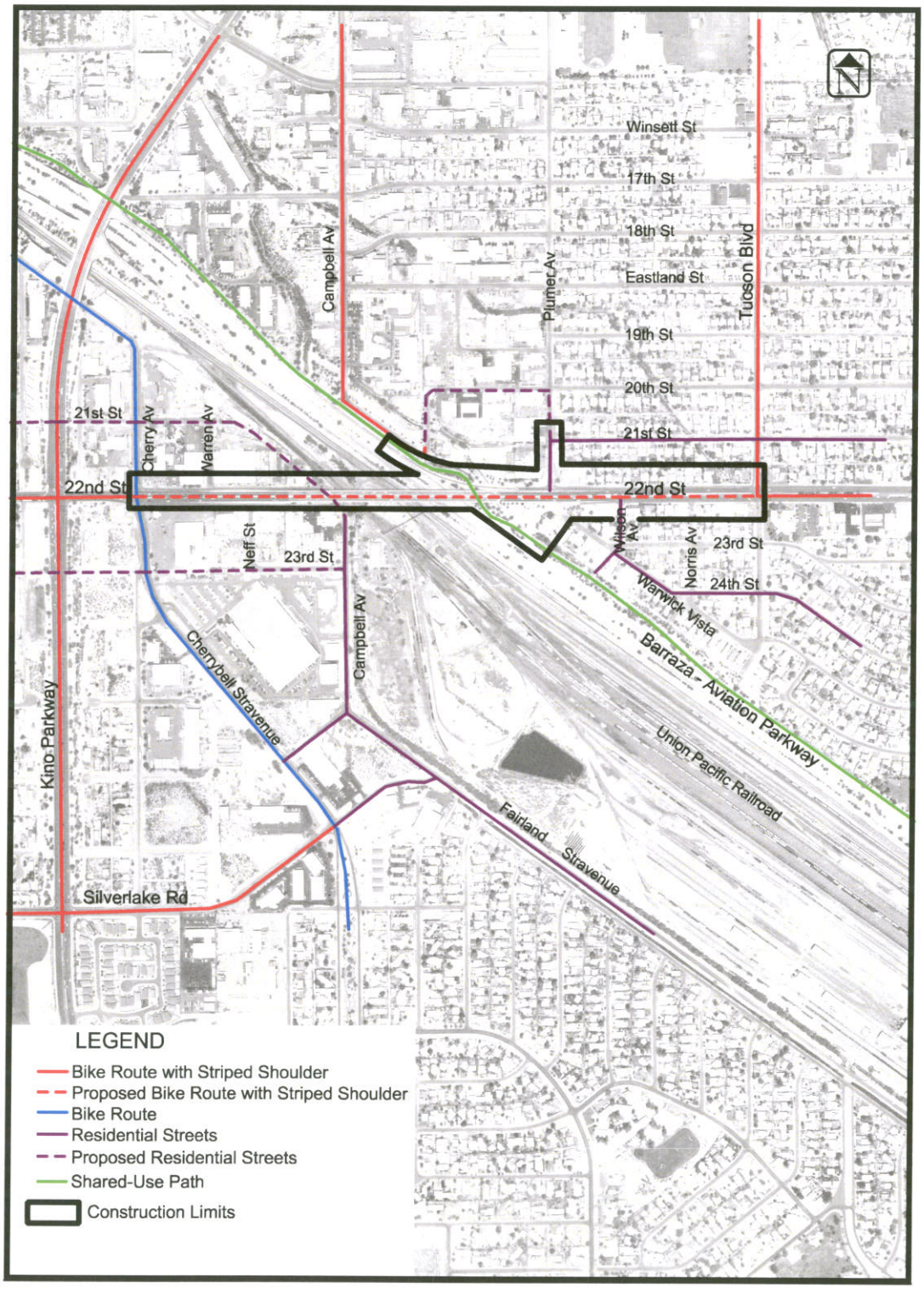


Figure 11: Alternate Modes

Public Transit Facilities

Transit service along the 22nd Street corridor between Kino Parkway and Tucson Boulevard is provided by three separate SunTran routes as shown in Table 2. Currently, SunTran Routes 2 and 7 serve the Kino Parkway/22nd Street intersection and SunTran Routes 7 and 15 serve the 22nd Street/Tucson Boulevard intersection (see Figure 12).

Table 2: SunTran Weekday Service within Study Area

Route	Direction	Start	End	Trips per weekday	Peak hour headway	Hours of Operation	
						Begin	End
2	Northbound	Laos Transit Center	Ronstadt Transit Center	28	30 min	5:15 AM	7:45 PM
	Southbound	Ronstadt Transit Center	Laos Transit Center	27	30 min	6:00 AM	7:30 PM
7	Westbound	Harrison at Golf Links	Ronstadt Transit Center	30	30 min	6:06 AM	10:39 PM
	Eastbound	Ronstadt Transit Center	Harrison at Golf Links	31	30 min	6:05 AM	10:30 PM
15	Northbound	Country Club at 22nd St.	Tohono Transit Center	57	15 min	5:34 AM	11:37 PM
	Southbound	Tohono Transit Center	Country Club at 22nd St.	54	15 min	5:36 AM	11:27 PM

Note: The Laos Transit Center is located at 6th Avenue and Irvington Road (South Tucson).
The Ronstadt Transit Center is located at 6th Avenue and Congress Street (Downtown Tucson).
The Tohono Transit Center is located at Stone Avenue north of Wetmore Road (at the Tucson Mall).

Route 2, named "Cherrybell/Country Club," connects the Laos Transit Center in South Tucson with the Downtown Ronstadt Transit Center (see Figure 12). This route uses 22nd Street between Park Avenue and Cherrybell Stravenue, and has a scheduled stop located at the 22nd Street/Cherry Avenue/Cherrybell Stravenue intersection.

Route 7, named "22nd Street," begins at the Golf Links Road/Harrison Road intersection and ends at the Downtown Ronstadt Transit Center. This route runs on 22nd Street from Harrison Road to 10th Avenue, except for a detour to avoid the 22nd Street Bridge over Barraza-Aviation Parkway and UPRR due to weight restrictions on the structure. Route 7 does not have a scheduled stop along 22nd Street between Kino Parkway and Tucson Boulevard. The closest stop to the study area is on 22nd Street at Park Avenue (approximately three-tenths of a mile west of Kino Parkway).

Route 15, named "Campbell" begins at the 22nd Street/Country Club Road intersection and ends at the Tohono Transit Center at the Tucson Mall. After winding around local streets at the southern end of the route, this route primarily uses Campbell Road, Roger Road, and Stone Avenue. Route 15 does not have a scheduled stop along 22nd Street within the project limits on this route. The nearest stop to the study area is located on 22nd Street at Country Club Road (approximately 0.5 mile east of Tucson Boulevard).

Within the project limits, SunTran does not have any bus pullouts, but bus shelters are located on the northwest and southwest corners of 22nd Street at its intersection with Cherry Avenue. Figure 12 shows the bus shelter at the northwest corner of the 22nd Street/Cherry Avenue intersection.

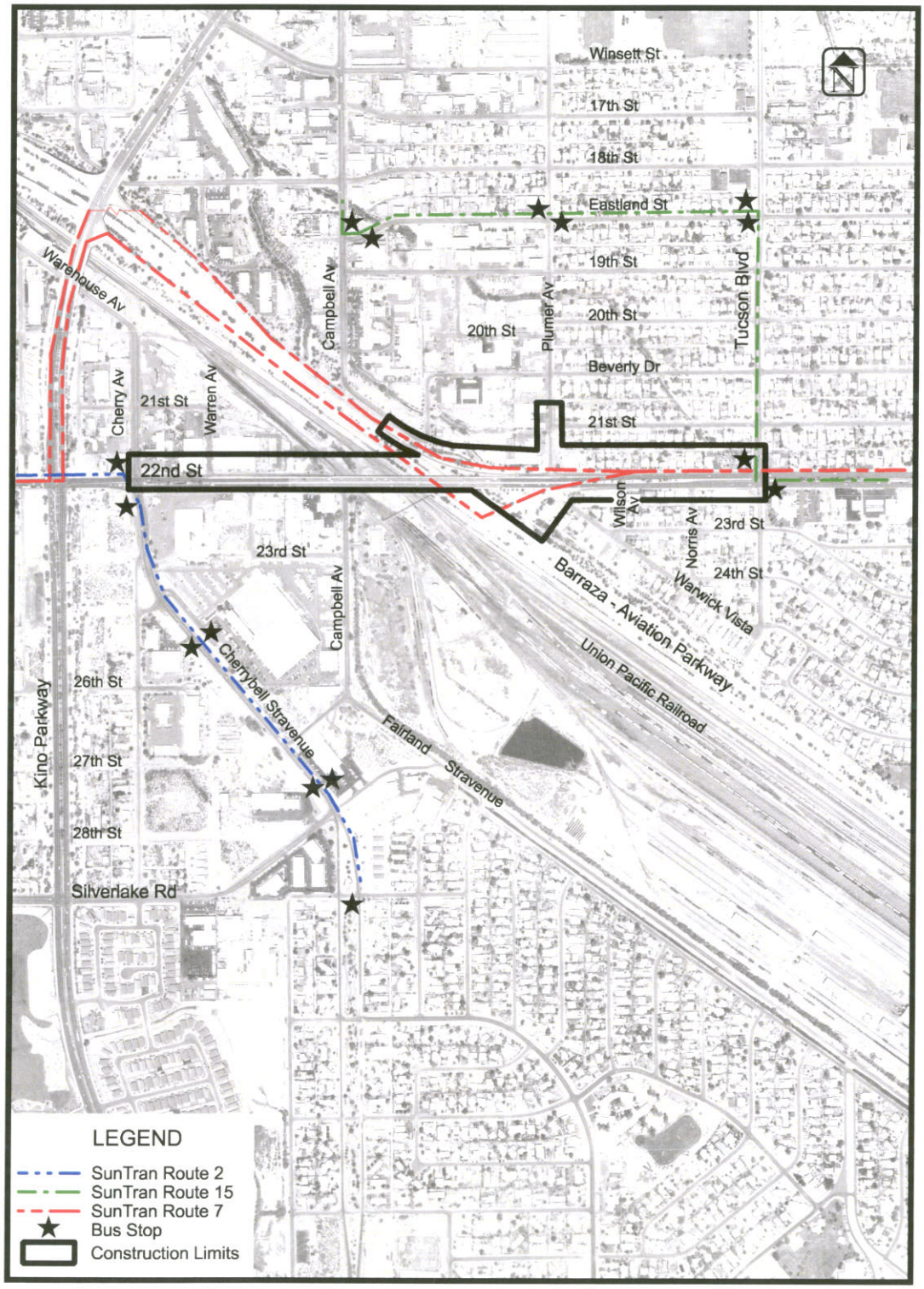


Figure 12: Transit Routes Map

3.0 Proposed Design Features

A. Design Standards and Criteria

The following lists the design criteria to be used on 22nd Street and the associated ramps to and from Barraza-Aviation Parkway. Any deviation from the criteria must be approved by the City project manager.

Roadway Design Criteria

▪ Geometrics	AASHTO *A Policy on Geometric Design of Highways and Streets*, 2004 Edition
	Arizona Department of Transportation (ADOT) Roadway Design Guidelines, 2007
▪ Standards	Pima County & City of Tucson Standard Specifications and Details for Public Improvements, 2004
▪ Pavement Design	4" AC / 5" AB (exclusive of bridge), ½" ARAC
▪ Design Speed	45 mph – 22nd Street
	25 mph – Barraza-Aviation off-ramp
	45 mph – Barraza-Aviation on-ramp
▪ Travel Lanes	Three through lanes in each direction, single left-turn lane at Tucson Boulevard
▪ Bike Lanes	One bike lane in each direction
▪ Through Lane Width	11 feet
▪ Turn Lane Width	12 feet
▪ Median Width	20 feet
▪ Bike Lane Width	6 feet
▪ Sidewalk Width	8 feet on bridge
▪ Bus Pullouts	New pullout at northwest corner of 22nd Street and Tucson Boulevard.
▪ Structures	Cast-in-place bridge over UPRR and Barraza-Aviation Parkway
▪ Handicap Ramps	ADA Compliant

Drainage Criteria

- Cross drainage — 100-year event
- Pavement drainage — 10-year event contained in the roadway (no higher than top of curb)

  10-year event - one lane in each direction clear of flow.

B. Roadway Improvements

The 22nd Street improvements will meet the goals of the RTA by increasing capacity, safety, and mobility within the project limits. These goals will be met by replacing the 22nd Street Bridge, and widening the roadway to three lanes in each direction between Kino Parkway and the east end of the bridge. Traffic lane widths will be reduced to 11 feet for through traffic, and bike lane widths will be increased to 6 feet. In addition, a raised median will control access along 22nd Street and further promote safety. This project will construct sidewalks and bike lanes on each side of the roadway, provide a connection to the Barraza-Aviation Parkway shared-use path, and construct a bus pull-out at the northwest corner of 22nd Street and Tucson Boulevard. These improvements will increase the access to alternate modes of transportation in this portion of the 22nd Street corridor. The 15% plans showing the roadway improvements are contained in Appendix F.

C. Land Planning

The land planning component of the project has looked at the existing land uses and the trends within the residential and industrial/commercial areas to develop a framework for future land use planning. The existing land uses along 22nd Street are very definite at specific locations along this segment. Land use is entirely industrial/commercial between Kino Parkway and Plumer Avenue, and is almost entirely residential east of Plumer Avenue.

In keeping with the existing land use, the framework plan designates the area between Kino Parkway and Plumer Avenue as Employment Areas. The intent for the employment areas is to maintain the existing industrial/commercial uses and to introduce future new employment opportunities as new businesses move into the area.

To accommodate the reconstruction of 22nd Street, the first row of structures will be removed, leaving remnant areas for another use. The framework plan for the residential area east of Plumer designates a landscaped buffer area within the areas to be acquired for the project. The framework plan also recommends that this area be used as a buffer for the homes on 21st Street and 23rd Street as compensation for the lost buffering provided by the houses planned for removal. The buffer area also provides delineation between the urban arterial and the residential area.

A separate Land Use Planning document is being prepared for the section of 22nd Street between Park Avenue and Tucson Boulevard. More detailed information on the plan and the recommendations will be available in that document.

D. Additional Design Elements

Pedestrian/Bicycle Circulation

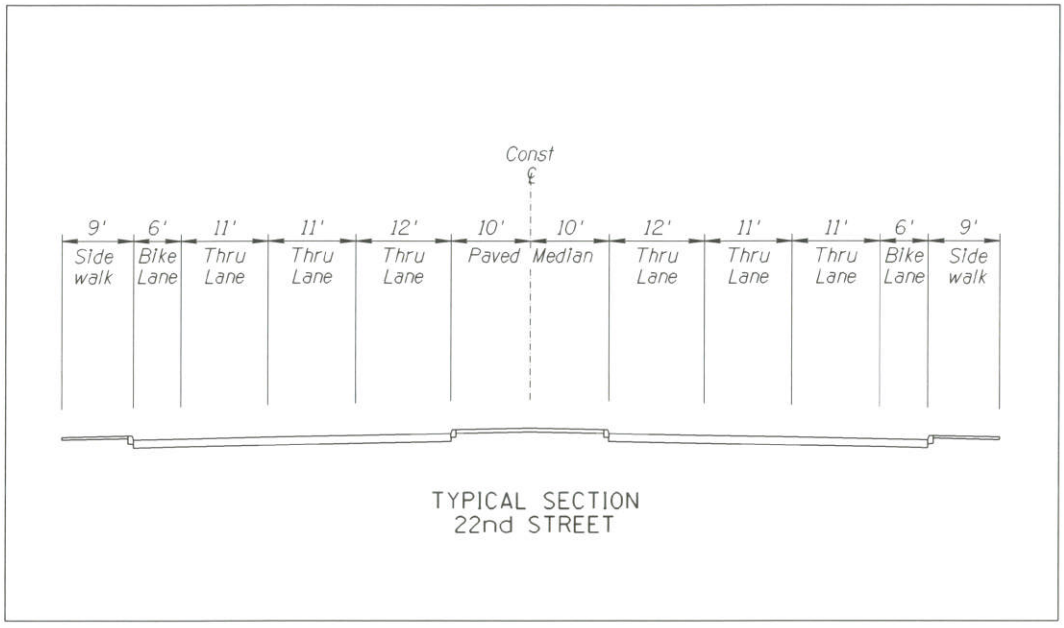
Pedestrian and bicycle circulation is an important element, particularly with respect to safety and connectivity. This project has the opportunity to provide a connection between the 22nd Street pedestrian and bike facilities and the Barraza-Aviation Parkway multi-use path. However, with on-ramps and off-ramps for vehicular traffic on 22nd Street and Barraza-Aviation Parkway, safety for pedestrians and bikes crossing these ramps becomes an issue. A concept that uses the area between the eastbound and westbound bridge segments is being explored to address these issues. With this concept, pedestrians and bikes use a ramp system at the bridge abutments to access a pedestrian/bicycle bridge that rises over the UPRR tracks and Barraza-Aviation Parkway between the eastbound and westbound 22nd Street bridges. On the west end, pedestrians and bikes are kept to the outside of 22nd Street, which allows pedestrians and bicycles to cross the eastbound slip ramp at a safer location away from 22nd Street. On the east side, the pedestrian/bike ramp system connects to the existing Barraza-Aviation Parkway multi-use path. Additional connections from the Barraza-Aviation Parkway path will be needed to allow pedestrians and bikes access from the multi-use path to the new sidewalks adjacent to 22nd Street east of the UPRR bridge.

This concept has been through a 'safety-by-design' review with the Tucson Police Department, and the idea was well received. The TPD representative recommended that emergency phones be made available at strategic locations, and that emergency access from the 22nd Street bridge be made available where the pedestrian/bicycle bridge and the roadway are at the same elevation. This concept has also received strong support from the Technical Advisory Committee and Citizens Advisory Committee. Conceptual renderings are included in the design charette summary contained in Appendix G. This concept along with the direction received from Mayor and Council on decreasing travel lane widths has reduced the total bridge width in the roadway typical section. The new typical sections are shown in Figure 13.

Barraza-Aviation Parkway Connection

The RTA plan includes a connection between the 22nd Street and the Barraza-Aviation Parkway. The main intent of the connection is to provide an alternative route via 22nd Street for northbound traffic to get to I-10. This will help reduce the volume of traffic going through downtown to get to I-10. The City is also moving forward with a plan for improving Stevens Avenue to the north of downtown. These improvements will provide another route around downtown to further reduce pass-through traffic in the downtown area. It should be noted that the traffic report prepared for this project showed a low peak volume for the northwest bound to west bound movement. The a.m. peak and p.m. peak volumes are 269 and 356, respectively.

Fifteen percent drawings prepared to show the concept are included in Appendix F. Note that the bridge type selected for the UPRR Bridge will not preclude construction of this connection concept.



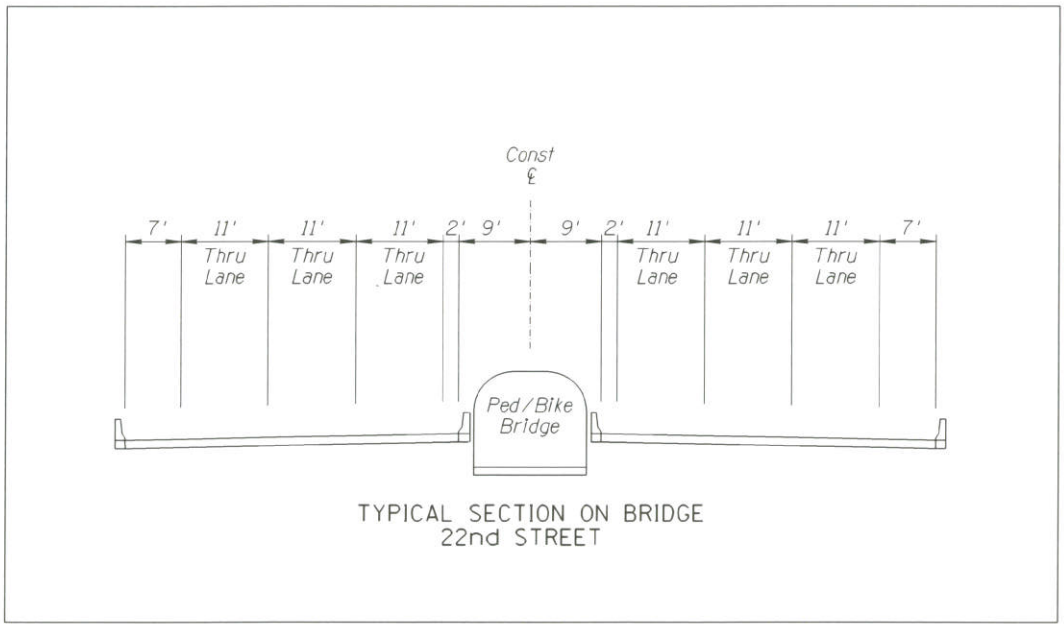


Figure 13: New Roadway Typical Sections

Wilson Avenue at Parkway Terrace

The Parkway Terrace Neighborhood Association advised the design team that accessing 22nd Street from the right-in, right-out intersection at Wilson Avenue is difficult due to the traffic exiting from Barraza Aviation Parkway ramp. They requested that the Wilson Avenue connection to 22nd Street be removed, and a cul-de-sac be provided for turn-around traffic on Wilson. The configuration of the cul-de-sac will be finalized during design.

Coordination with UPRR and ADOT

Close coordination with both UPRR and ADOT will be required during the design phase. Several permits will be required from both agencies for data gathering purposes including survey, geotechnical investigations, and utility locating. Both agencies will review and approve the structure selection report and the construction drawings for the bridge structure. Additionally, with the roadway shift to the north, the northbound Barraza-Aviation Parkway ramp connection will be shifted north, and control of access limits for ADOT's ramps will be altered with that shift. Utility modifications may be required to remove the existing 24-inch water line and the sewer lines adjacent to the existing 22nd Street bridge from the new control of access limits. Permitting to remove these utilities from the new ADOT right-of-way will also be required.

Design Charette Summary

The Citizens Advisory Committee worked through the a number of principle project elements in a design charette held April 30, 2009. The elements included traffic and roadway, landscape architecture and urban desing/land planning, bridge engineering/architecture, and art. The format of the charette was generally as a discussion venue for the principle, and allowed for concerns to be voiced, and questions and review comments to be discussed. The intent of the discussions was to obtain direction from the Citizens Advisory Committee on the project elements. The summary of the discussions are included in Appendix G.

4.0 DETAILED ENVIRONMENTAL IMPACT ASSESSMENT

A. Environmental

Topography

The proposed roadway improvements will not significantly impact the topography of the area. The 22nd Street Bridge over the UPRR, however, will be roughly 5 feet higher due to the new clearance requirements over the tracks and the change in structure type for the new bridge. UPRR now requires 23'-4" of clearance. Required clearances over the Barraza-Aviation Parkway are significantly less at 16'-6", and maintaining the clearance over UPRR facilities ensures required clearances over the Barraza-Aviation Parkway are met as well. In addition, the new structure type will likely be cast-in-place, which requires a deeper structure than the existing steel structure.

Some minor changes in topography will occur at the intersections of 22nd Street and its intersecting minor streets. The vertical profiles of the minor streets will need to be adjusted to match into the existing grade as quickly as possible to provide required sight distance without compromising traffic safety.

Drainage

The proposed roadway improvements will not significantly impact the existing drainage features, and will not change the existing drainage patterns. The cross drainage culverts may be extended to avoid impacts from the new roadway elements, but the capacity of the culverts will remain the same. If needed, the culverts will be widened to ensure any extension does not reduce capacity. At the Railroad Wash and the tributary to the east, any modifications to existing culverts will be compared with the FEMA floodplain elevations (see maps in Appendix C) to make sure the 100-year water surface elevation is not increased more that 0.1 foot. In addition, an Army Corps of Engineers 401/404 permit will be required for any extension.

Water Quality

The potential impacts to groundwater resources is expected to be minimal. Consequently, the project will not change long-term water quality. During construction, however, water quality may be impacted as the ground is exposed by construction activities and the potential for runoff to carry sediment off of the project site is increased.

It is anticipated that the culvert at the Railroad Wash will need to be extended, and that the area of impact will be less than one-tenth of an acre. As such, construction can occur under a 404 nationwide permit without pre-construction notification. However, if the area of impact increases beyond the anticipated one-tenth of an acre, a pre-construction notification will be required. No modifications will be required at Lopez Wash.

Vegetation and Wildlife

Protected native plants impacted by the project have been planted as public streetscape landscape or private residential or business landscape. The vegetation located along the Barraza-Aviation Parkway will not be significantly impacted by the project. Limited clearing will be done to construct the new bridge piers, bridge abutment, and Barraza-Aviation Parkway entrance ramp. Existing vegetation outside the construction footprint of these improvements will not be affected.

The vegetation in the 22nd Street median will be removed to reconstruct 22nd Street. In addition, the vegetation on the adjacent property east of the UPRR will also be removed as part of the reconstruction. The city's Native Plant Preservation Ordinance (NPPO) provides guidance on the size and species of plants that require mitigation. The NPPO takes precedence over the SDCP, and the guidelines presented in the ordinance will be followed for this project.

The project will not affect any priority Sonoran desert vegetation or wildlife. Impacts to existing Xeroriparian Low Habitat at the Railroad Wash will be limited to that required for modifications to the existing culvert.

View Sheds – Visual Analysis

As mentioned earlier, the new bridge over the UPRR will be approximately 5 feet higher than the existing bridge. The additional height will slightly change the view sheds to the north and south depending on where a viewer is located. The further away viewers are from the new bridge, the less the change in bridge height will affect the view shed. The improved bridge, however, will provide wider sidewalks and a safer view point than under current conditions. Pedestrians and motorists traveling across the bridge will continue to have excellent views of the surrounding mountains.

One billboard will be directly impacted by the proposed improvements. The billboard is located on UPRR property at the northwest corner of Campbell Avenue and 22nd Street. No other billboards are directly impacted by the proposed improvements.

Historical, Cultural and Archaeological

Given the highly urbanized and developed nature of the area, the project is not expected to impact historical, cultural, or archaeological sites in the area.

Air Quality

Although an additional lane in each direction is being added to the roadway, it is anticipated that air quality will improve. The addition of two more travel lanes will increase the efficiency and capacity of the roadway, and decrease the time for idling automobiles. Short-term impacts such as increased dust and odors could be experienced during construction.

It is anticipated that the limits of ground disturbance will exceed one acre, and an Air Quality Activity Permit will be required. In addition, adherence with the National Emissions Standards for Hazardous Air Pollutants (NESHAPS) will be required for the demolition of existing structures (see discussion in the following Hazardous Waste section).

Hazardous Waste

The estimated area of impact for construction and construction-related activities is outside of the known areas of contamination from the brownfield area on UPRR property and the leaking underground storage tank at the corner of 22nd Street and Tucson Boulevard. However, as the brownfield is upslope of the construction area for the new bridge piers and abutments, it is possible that some contaminated soil may be encountered. Monitoring during geotechnical investigations as well as bridge construction activities is recommended.

The National Emissions Standards for Hazardous Air Pollutants (NESHAPS) has specific requirements for removal of asbestos and lead from structures being demolished. A survey of the structures to be demolished must be performed prior to beginning demolition so that an inventory of hazardous materials present can be logged. The results of the survey will be made know to the demolition contractor, and necessary steps will be taken to ensure compliance with NESHAPS.

B. Neighborhood

Adjoining Land Uses and Property Values

The first row of properties on both sides of 22nd Street east of the UPRR will be directly impacted by the project. These properties are mostly residential single-family homes, although some commercial properties exist on the south side of the roadway and at the intersections of 22nd Street with Tucson Boulevard and Plumer Avenue. The properties along this section of 22nd Street have driveways with access directly onto 22nd Street. The dedicated back-out lane along the north side of 22nd Street that currently allows vehicles to safely back out of the driveways will be eliminated by the roadway improvements. Due to the loss of access to these properties, the properties will need to be acquired and the structures demolished. Demolition of the structures will need to comply with the condition of the NESHAPS as discussed previously.

West of the UPRR, three properties on the north side of 22nd Street will be directly impacted by the shift in alignment. The structures or portions of the structures on these parcels will need to be removed. Although these properties are impacted, the adjoining land uses will not be changed as a result of the project.

The City of Tucson follows the Uniform Relocation Assistance and Real Property Acquisition Policies Act for property acquisition. These guidelines not only ensure a fair market value for the property, but they also provide relocation assistance to property owners and tenants who are displaced by the roadway improvements. The relocation assistance program helps residential owners find a new residence of comparable value in a comparable neighborhood, and provides moving expenses as well. Similar benefits are also available to residential tenants. Businesses are also covered by the Act, and receive moving expense benefits.

Removal of the structures on the properties east of the UPRR will leave the row of houses on the south side of 21st Street and the north side of 23rd Street with no buffer between the backs of their properties and 22nd Street. A land use planning analysis is being performed to determine uses for the vacant area between the remaining homes and 22nd Street. Uses are discussed in Section 3.0, Proposed Design Features of this document. Although the project will affect some properties through acquisition, the adjoining land uses will not be changed as a result of the project.

The improvements benefit the adjacent community in that new sidewalks will be provided along the entire project length with better access to improved transit service. The new bike lanes and connection to the shared-use path will also support connectivity to the adjacent neighborhoods, offering better access to other services in Tucson and the surrounding area. In addition, improvements to this section of 22nd Street combined with those for the corridor to the west will provide improved access to I-10.

Recreation

The existing pocket park at Wilson Avenue and the Barraza-Aviation Parkway off ramp just east of the shared-use path along the Barraza-Aviation Parkway will likely be impacted in the short term by the construction activities associated with the project. However, in the long term, impacts are anticipated to be positive because this project will provide a connection between the existing shared-use path and 22nd Street. Access to the park will not be altered as a result of the project.

Access

Generally, access within the project area will remain the same with right-turn-in and right-turn-out only at the side street intersections from Cherry Avenue/Cherrybell Stravenue to Tucson Boulevard. However, Wilson Avenue will become a cul-de-sac and will no longer have direct access onto 22nd Street. Norton Avenue is less than 200 feet from the gore between 22nd Street and the Barraza-Aviation Parkway off-ramp. Allowing a right turn for 22nd Street traffic onto Norton creates a safety issue for traffic merging onto 22nd Street from the Barraza-Aviation Parkway off-ramp. Consequently, this access point will be removed. The Parkway Terrace Neighborhood Association requested this action be taken and supports the decision to remove the access point.

It should be noted that access at the west end of the project will change in two locations, but these changes will occur as part of the adjacent intersection improvements at Kino Parkway and 22nd Street that will be completed prior to construction of this project. As part of the Kino Parkway project, the existing traffic signal at 22nd Street and Cherry Avenue/Cherrybell Stravenue will be removed and a raised median will be installed to eliminate through movements at this intersection. The only movements that will be allowed at the intersection include a right-turn-in and right-turn-out on Cherry Avenue and Cherry Bell Stravenue, and a westbound left turn off 22nd Street onto Cherrybell Stravenue for access to the main post office. In addition to the change at Cherry Avenue/Cherrybell Stravenue, the Kino Parkway project will remove the slip-ramp connection from Campbell Avenue to 22nd Street and will replace it with a connection between Campbell Avenue and the intersection of 21st Street and Warren Avenue.

Traffic Operations

Traffic operations for 22nd Street will improve between Kino Parkway and Tucson Boulevard with the new six-lane roadway section and access control. During construction, temporary impacts will occur as detours and/or lane-width reductions occur. However, two lanes of traffic in each direction will be maintained during construction.

Character

The overall character of the surrounding area will not change as a result of the project. However, with the first row of structures on the east end of 22nd Street being removed, the local character in this segment will change as determined by the future land use. As mentioned previously, a land use plan is being prepared for the project and is discussed in more detail in Section 3.0, Proposed Design Features.

Demographics

Demographics for the area will not change significantly with the relocation of the residential homes on 22nd Street. Additionally, the project will not have a disproportionate impact on a specific element of the population. All of the alternatives considered in the AAR impacted the adjacent residential properties with equal results, and no other alternative could meet the intent of the improvements mandated by the RTA plan for the 22nd Street corridor. The residents and businesses in this corridor will all benefit from improved traffic operations, better sidewalks, a connection to the shared-use path adjacent to Barraza-Aviation Parkway for pedestrians/bicyclists, and improved transit service.

Utilities

Impacts on utilities will be typical of those in roadway reconstruction projects. It is anticipated that the existing small diameter water mains and possibly the gas lines on the west side of the bridge will need to be replaced, and sewer manhole covers will require adjustment. No impacts are anticipated on the larger diameter water mains in the area with the exception of the short length of 24-inch water line near the east side of the bridge. The location of the new bridge abutment may conflict with this line.

The overhead power at the corner of Cherry Avenue and 22nd Street will not be impacted by this project. That intersection will be improved as part of the adjacent Kino Parkway/22nd Street intersection improvement project, and any impacts will be as a result of that project.

Impacts on the UPRR maintenance yard will be short term and will occur only during construction of the 22nd Street Bridge over the yard. Placement of the piers will be in accordance with the offsets stipulated by the UPRR design requirements. Coordination with the corporate and local UPRR representatives will be needed during the design and construction of the new bridge.

Noise

The sensitive land uses potentially affected by changes in noise are the residential areas between Plumer Avenue and Tucson Boulevard. The residences directly behind those removed along 22nd Street will lose a buffer from traffic noise on the arterial. These residences will continue to be affected by noise from the UPRR operations.

C. Alternative Modes

Bikeway Facilities

As mentioned previously, the project will improve existing bikeway facilities by adding a separate bridge structure over the UPRR track and Barraza-Aviation Parkway that will support a

shared-use bike/pedestrian facility between the eastbound and westbound bridges for 22nd Street. In addition, bike lanes will be provided in 22nd Street east and west of the shared use facility to transition back to typical roadway bike lanes. Renderings of the bridge structure are shown in Appendix G.

Pedestrian Facilities

The shared-use facility described above for bicycles will also provide service for pedestrians. As mentioned previously, the concept was presented to TPD for a 'safety-by-design' review to obtain input on the concept, and the suggestions received will be incorporated into the design. The new sidewalks will provide a connection to the existing shared-use path along the Barraza-Aviation Parkway, and therefore will eliminate the need to cross the Barraza-Aviation Parkway on and off ramps at grade.

Public Transit Facilities

The project will improve existing public transit routes facilities. With the completed project, the transit routes that were being detoured around the bridge will be able to travel more directly using the new bridge. In addition, the bus stop at 22nd Street and Tucson Boulevard will have a bus pullout to facilitate traffic movements when a bus is picking up riders.

D. Public Art

Public art is in integral element of this project. The Tucson Pima Arts Council issued a call to artists for the Kino Parkway/22nd Street intersection project, and public artist selected for that project has been tasked with the planning effort for this section of 22nd Street. The artist has worked with the Citizens Advisory Committee to develop an art theme for the project. The foundation of the theme is 'structure in native plants'.

A new call-to-artists will be issued for this project to select an artist for art design and production. As part of the planning process for public art, an art plan is being developed to provide guidance and outline opportunities for the selected artist. Such opportunities include softening the exterior edges of the project, using art as a buffer between the new roadway and the neighborhoods, integrating art into the bridge structure and landscaping, and/or including stand-alone art elements.

The art plan will be a stand-alone document. This plan will provide the artist selected for the design with direction on art theme and in particular, the opportunities to react to and interact with the public art on the adjacent Kino Parkway/22nd Street intersection project. In addition, opportunities to mitigate the roadway widening within the 22nd Street corridor between Kino Parkway and Tucson Boulevard will be identified.

5.0 MITIGATION MEASURES

Although the project has some impacts, this project provides the opportunity to improve conditions for motorists, bicyclists, and pedestrians. Reconstruction of the roadway allows the City to provide sidewalks connecting into other pedestrian facilities, provide a pullout for SunTran buses, provide a connection between the shared-use path and 22nd Street, and bring the road up to current City standards with ADA ramps and street lighting. The project also provides the extra benefit of enhancing the area through the use of well-designed landscaping and art elements.

Table 3 describes the identified project impacts and the mitigation measures incorporated into the project design.

Table 3: Project Impacts and Associated Mitigation Measures

Description	Impacts	Mitigation Measures
Environmental		
Topography	None.	None required.
Drainage	Identified culverts will be extended.	100-year flood levels will be maintained within 0.1 foot of existing levels.
Vegetation	Existing protected native plants will be removed from the medians and shoulders during project construction. Xeroriparian Low Habitat will be disturbed along Railroad Wash during project construction	Mitigation plant quantities, determined after the limit of disturbance is established will be incorporated into the urban streetscape landscape. Mitigation plant quantities, determined after the limit of disturbance is established will be planted in the vicinity of Railroad Wash as part of the project landscape.
Wildlife	Yellow-billed Cuckoo is within 3 miles of project area. The Yellow-billed Cuckoo requires dense riparian habitats; there are none within the project area	None required.
View Sheds	Increased height of bridge will impact north-south views.	Integrated art with bridge design to improve aesthetics of bridge and to promote view from atop the bridge with wider sidewalks for pedestrians.
Historical, Cultural and Archaeological	None.	In the event that archaeological artifacts are found during construction, all construction work in that area shall be halted until an archaeological assessment can be conducted.

Table 3: Project Impacts and Associated Mitigation Measures (continued)

Description	Impacts	Mitigation Measures
Environmental (continued)		
Air Quality	Short-term impacts due to dust and odors during construction. Disturbance caused by construction will cover more than one acre. Demolition of structures could potentially involve asbestos and lead removal.	Best management practices will be followed during construction to minimize dust and odors. Requirements of Air Quality Activity Permit will be followed by contractor. Demolition contractor will need to apply for NESHAPS permit and comply with association requirements.
Water Quality	Short term impact during construction. Culvert extension at Railroad Wash	Contractor will adhere to a Stormwater Pollution Prevention Plan during construction to control erosion and keep sediment laden runoff from leaving the project area. Nationwide 404 permit required. If area of impact is over 0.1 acre but less than 1 acre, a pre-construction notification will be required.
Hazardous Waste	Demolition of structures could potentially involve asbestos and lead removal.	Demolition contractor will need to apply for NESHAPS permit and comply with association requirements. In the event unknown contaminated sites are discovered, they will be managed so that construction activities comply with state and federal environmental regulations.
Neighborhood		
Adjoining Land Uses	Properties on north and south side of 22nd Street will be in direct conflict with proposed improvements. Properties will be acquired, and structures will be demolished. Demolition of structures could potentially involve asbestos and lead removal	Streetscape enhancement will be provided in remnant areas on the acquired properties. Streetscape items will include landscaped areas and buffer walls. Displaced residents and property owners will receive compensation and assistance per the Uniform Relocation Assistance and Real Property Acquisition Policies Act. Demolition contractor will need to apply for NESHAPS permit and comply with associated requirements.
Recreation	None	None required
Access	Access to Parkway Terrace via Wilson Avenue will be removed.	Access for Parkway Terrace will be provided one block east at Norton Avenue.
Traffic	Short term impact during construction.	Contractor will maintain two lanes of traffic in each direction at all times.
Character	Houses on south side of 21st Street and north side of 23rd Street will lose buffer when structures on 22nd Street are demolished.	Landscape area with buffer walls will be built to provide a division between the urban arterial and the residential area behind the wall.
Utilities	Roadway reconstruction will impact small diameter mains.	Modification plans for affected utilities will be prepared.

Table 3: Project Impacts and Associated Mitigation Measures (continued)

Description	Impacts	Mitigation Measures
Neighborhood continued)		
Noise	Noise levels for the houses on south side of 21st Street and north side of 23rd Street will increase after existing structures are removed.	Roadway will be paved with asphaltic rubber to lessen the noise levels from tires, and buffer walls within the landscape area will be constructed.
Alternate Modes		
Bikeway Facilities	Short-term impacts during construction.	Contractor will provide appropriate signage to direct users safely through or around the construction zone.
Pedestrian Facilities	Short-term impacts during construction.	Contractor will provide appropriate signage to direct users safely through or around the construction zone.
Public Transit Facilities	Short-term impacts during construction.	Contractor will work with SunTran to provide users safe access to bus stops.

6.0 Conclusions and Recommendations

A. Proposed Action

The recommendation of this report is to carry forward the selected alternative and continue design of the improvements to 22nd Street. Because the improvements have direct impacts on the UPRR maintenance yard and the ramp connections to Barraza-Aviation Parkway, coordination efforts with UPRR and ADOT will be required. It is also recommended that the Citizens Advisory Committee for the project be maintained, if possible, for input at the 30% design and 75% design stages, and for updates and input on other design elements such as access and circulation, transit facilities, bike and pedestrian circulation, landscape and hardscape treatments, and art.

B. Cost

A preliminary estimate of the construction costs has been prepared and is shown in Table 4.

Table 4: Preliminary Construction Cost Estimate

Item	Quantity	Unit	Cost/Unit	Cost
Removals	1	LS	$100,000	$100,000
Curb	15,900	LF	$20	$318,000
Sidewalk	27,300	SF	$6	$163,800
AC (6")	9,400	TON	$95	$893,000
AB (9")	7,200	CY	$40	$288,000
PCCP Ramp Paving	2,300	SY	$60	$138,000
UPRR Bridge (incl removal)	1	EACH	$30,006,100	$30,006,100
Retaining Walls	26,800	SF	$55	$1,474,000
Lighting	0.75	MILE	$350,000	$262,500
Drainage	0.75	MILE	$500,000	$375,000
Utility Relocation	0.5	MILE	$600,000	$240,000
Landscape & Streetscape	0.5	MILE	$700,000	$280,000
Maintain and Protect of Traffic	8%	TOTAL		$4,250,880
Mobilization	7%	TOTAL		$3,719,520
Contingencies	20%	TOTAL		$10,627,200
			Construction Total:	**$53,136,000**
			Public Art/Aesthetics 1%	$531,000
			Construction Admin 15%	$7,970,400
			Engineering 8%	$4,250,880
			Right-Of-Way*	$3,502,966
			Total	**$69,391,246**

* Does not include demolition