



13 OCT 2022 **DRAFT**



# **BANDERA ROAD**

**CORRIDOR PLAN**

SA Tomorrow Corridor Planning  
Bandera Road Corridor Plan

**ADMINISTRATIVE DRAFT**

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## EXECUTIVE SUMMARY

Bandera Road is a corridor in transition. It was originally a rural highway, connecting San Antonio to points west, but with explosive suburban growth has become one of the city's most-traveled corridors. Both of those identities are evident: some areas towards Loop 1604 still have a pastoral feel, with remnant undeveloped land, while areas toward Loop 410 are some of the most congested in the entire city. This plan arrives at a time when residents and policymakers are re-examining what transportation means, moving toward a greater emphasis on public transit, bicycling, and the pedestrian connections which support both of those modes.

This is a corridor plan, so the plan contents address a number of issues related to the areas of the city which line the quarter-mile area on either side of Bandera Road from Loop 410 to Loop 1604. Work began with an analysis of existing conditions, including an in-depth market study, which has deeply influenced the recommendations in this document. Public input has been sought, and incorporated, at each step of the process. The plan's land use recommendations are shaped in large part by public support for mixed-use land uses and by strong support for protecting existing neighborhoods from the encroachment of increased density.

### TRAFFIC AND TXDOT STUDY

Area residents have long expressed concern about the congestion on Bandera Road, as was made clear in each round of public input. Unfortunately, residents, policymakers, and engineers have not been able to agree on the right way to address traffic. A number of changes have been proposed over the past 20 years, some of which have been implemented, but no major transformation has been agreed upon.

This plan does not address the Bandera Road roadway and adjoining area in depth for the simple reason that Bandera Road is also SH-16, a state highway, and a simultaneous study is being conducted by the Texas Department of Transportation (TxDOT) which focuses specifically on the traffic lanes. This plan includes recommendations for right-of-way improvements based on current TxDOT work and recommends a public discussion and further study – in conjunction with extensive public input, given the sensitivity of any such changes – for other roadway improvements which could improve traffic on Bandera Road by addressing a deficit of options for traffic ultimately moving east and west which uses Bandera Road as a portion of a trip.

Regardless of which proposals are moved forward by the TxDOT study, it has become clear that the traffic situation is bad enough to necessitate multiple modes of attack.



Figure 1.1: Aerial rendering of potential development type

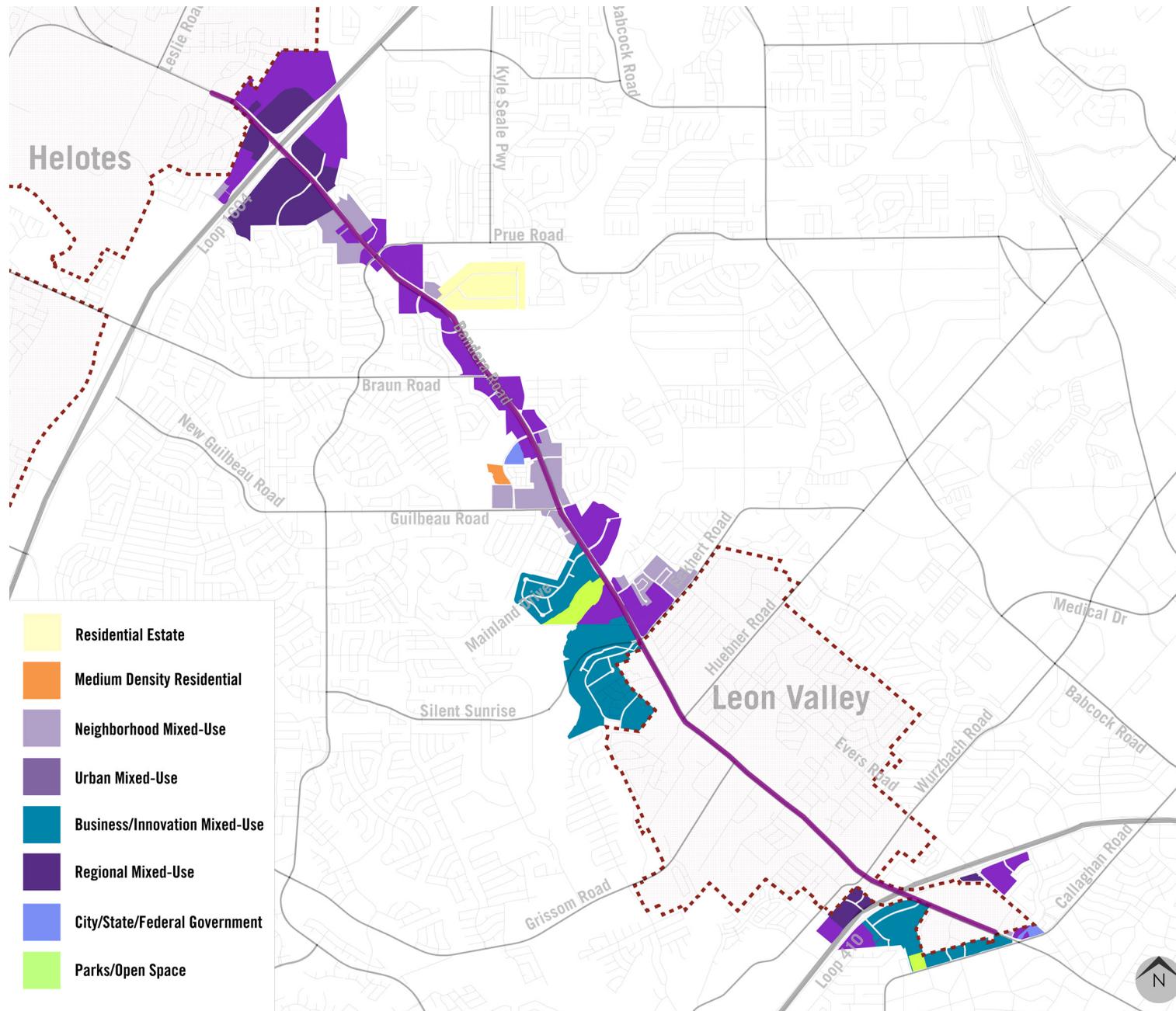


Figure 1.2: Bandera Road Corridor Plan Future Land Use Map

**Simply adding traffic lanes will not resolve the situation;** traffic will only grow to fill those lanes as well. The cross-corridor movements (from residential areas in the northwest to the Medical Center and other regional employment centers to the southeast) are not easily addressed by improvements in throughput.

Throughout the project, the design team and city staff have emphasized the need for strategies which can incorporate the growth expected in the corridor while minimizing additional traffic. Those strategies include:

- Additional city arterial network improvements
- Mixed-use land uses, which typically generate less traffic than traditional land uses and create more dynamic places
- Support for multi-use paths, sidewalk improvements, and greenways
- Transit-supportive development guidelines
- Advocating for intersection types which improve the pedestrian experience

**VISION**

Many public meetings have been held to invite public input on the current conditions of the corridor as well as on proposed solutions. That influence can be found throughout in specifics of how ideas have been developed, but just as important, public input defined the vision of the plan:

**TRANSPORTATION**

- Ease congestion
- Enhance non-auto transportation options
- Make all modes of travel safer

**LAND USE**

- Create a more attractive environment
- Create more diverse housing and retail options
- Implement mixed-use categories throughout the area
- Preserve open space and increase connections to trails and parks

## PREFERRED DEVELOPMENT PATTERNS

A land use plan only establishes the future patterns of use; it does not set requirements for how developments will be designed. That level of detail falls to design standards which are incorporated into city ordinances. As a precursor to that, this plan establishes guidelines for developments within the corridor which will help to ensure that future development is designed consistent with best practices and public input regarding aesthetic preferences.

## TRANSIT-SUPPORTIVE DEVELOPMENT

It is critical that future developments, especially those above a certain size, be designed to enhance connections to public transit. Features include orienting these developments around a semi-public space, placing buildings close to the corridor with parking behind, incorporating mixed-use development, and using landscaping along the corridor.

## SPACE-CENTRIC DEVELOPMENT

Projects along the corridor should incorporate green spaces which connect to multi-use paths along Bandera Road itself. In larger developments, this green space should be semi-public space, accessible to those who visit the development. Smaller developments should incorporate green space for residents or employees. In both cases, green space should open up to Bandera Road. Where greenways are adjacent to developments, semi-public green space should extend to the greenway.

## PEDESTRIAN-FORWARD DEVELOPMENT

Priority should be given to pedestrians, rather than cars, in new developments. Walkways should connect areas within larger sites to each other and to Bandera Road. Buildings should be clustered to make walking from building to building safer and easier, and driveways should be consolidated, and parking areas should include trees, walkways, and other pedestrian-centric features.



Figure 1.3: Perspective rendering of transit-supportive development

### SUSTAINABLE DEVELOPMENT PATTERNS

Developments should preserve open space wherever possible, including focusing development on previously developed sites rather than undeveloped areas. Facilities should incorporate low-impact development (LID) strategies; prioritize walking, biking, and public transit connections; minimize heat island effects through natural features and

material choices; and consider life cycle costs rather than simple first costs. These concepts are discussed in further detail within the Sustainability Memorandum which can be found in the appendix of this plan.

### DEVELOPMENT PATTERN IMPLEMENTATION

Having understood what this plan calls for, then, through what mechanisms will it be implemented? What are the potential costs involved in the public facets of the plan?

### OVERLAY DISTRICTS

Many of the preferred development patterns affect the form of buildings and how they relate to public space. Implementing a corridor-specific overlay district is one mechanism for establishing these design standards within city ordinances, and it is a method which has been successfully used in similar situations elsewhere in the city and throughout the country.

Further, there are several greenways within the corridor, including the Leon Creek Greenway. To date, the city has not implemented a citywide overlay district for properties bordering greenways, but given the extent, success, and character of city greenways, a specific overlay district may be warranted. Such an overlay district should emphasize development patterns which help to protect the character of greenways, and the process of establishing this district could serve as a useful forum for discussion of these concepts with the public.

### TIRZ RECOMMENDATION

Another tool which has been used successfully in similar situations elsewhere in the city is establishment of a Tax Increment Reinvestment Zone, or TIRZ. TIRZs are valuable ways to revitalize areas which are in need of focused investment to improve the appearance and function of public infrastructure, especially where there is a defined community vision for an area. No other TIRZs are within the project area – in fact, none are defined in areas in the far western portions of the city at all.

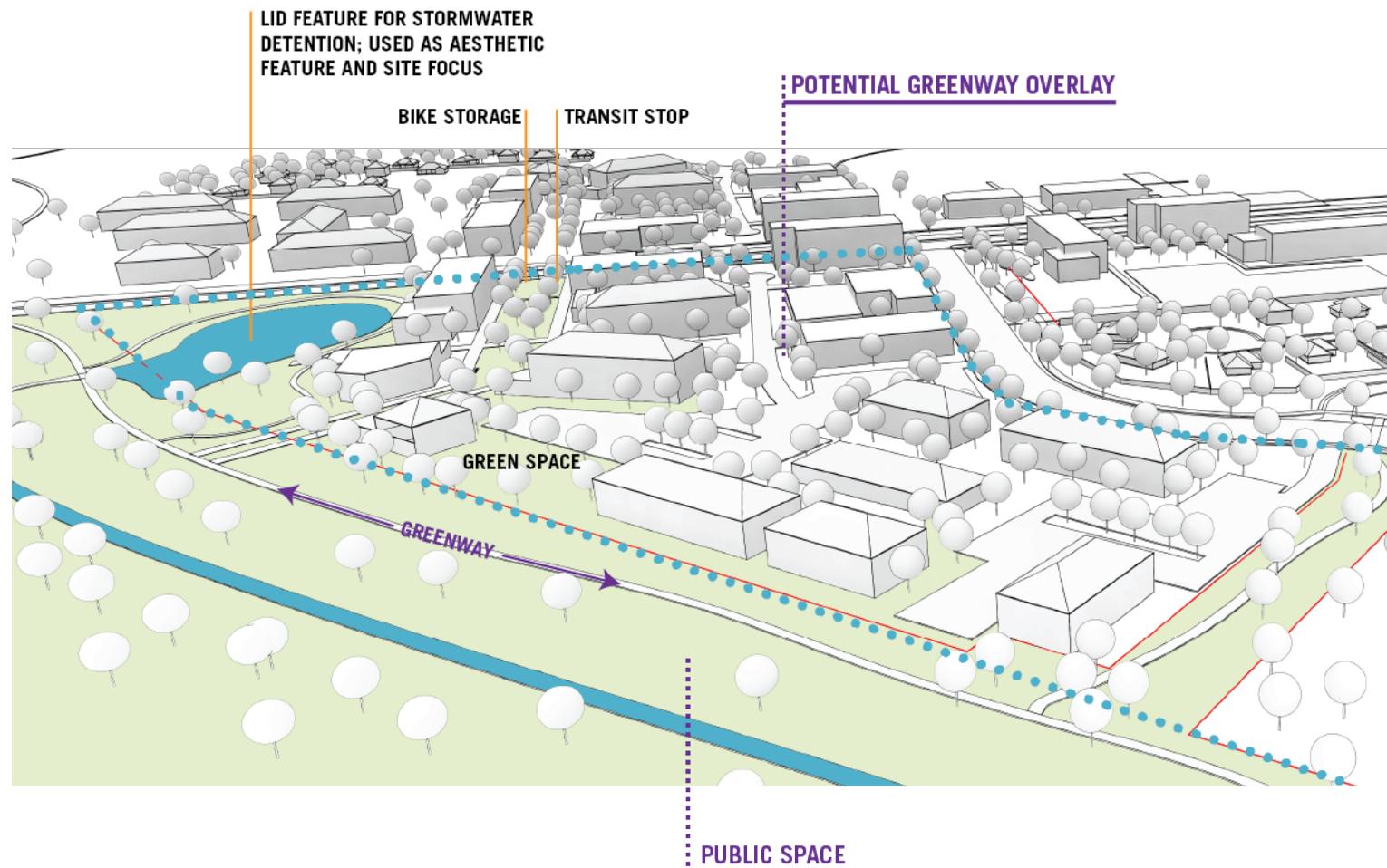


Figure 1.4: Recommended development features

### TRANSPORTATION AND NEIGHBORHOOD CONNECTIVITY

While the concurrent TxDOT study is analyzing options for improving Bandera Road and its right-of-way, cross-streets, neighborhoods, and other components of the corridor are just as important in a healthy transportation network. Improving the connectivity along Bandera Road by installing bicycle and pedestrian paths would be a significant, and positive, change in mobility options for the corridor. The focus of the analysis is to identify short- and long-term improvements that can directly benefit the corridor by enhancing connectivity, creating multimodal options, improving safety and helping to enhance the City of San Antonio’s commitment to Vision Zero, and reducing congestion. The analysis identified and prioritized potential projects based on the benefit of the new connection to the existing network, the potential for overall connectivity, and equitable access.

### ARTERIAL IMPROVEMENTS

TxDOT identified twelve opportunities to improve street connections near Bandera Road. The opportunities consist of new arterial connections and street widening capital improvement projects. These improvements would create better and more direct connections between arterials, creating the opportunity to shift short trips off Bandera Road and reduce congestion. The project team evaluated the top three options, all of which create a significant congestion reduction, plus a fourth configuration which combines elements of two of the three options. The results of this study strongly suggest that arterial improvements should be a critical part of overall network congestion relief.

### TXDOT CONCEPT REVIEW

TxDOT held a Virtual Concept Workshop to present potential improvement options along Bandera Road. Among the options presented were two roadway concepts and various intersection treatments. The team evaluated these concepts in relation to the goals of the Bandera Road Corridor Plan.

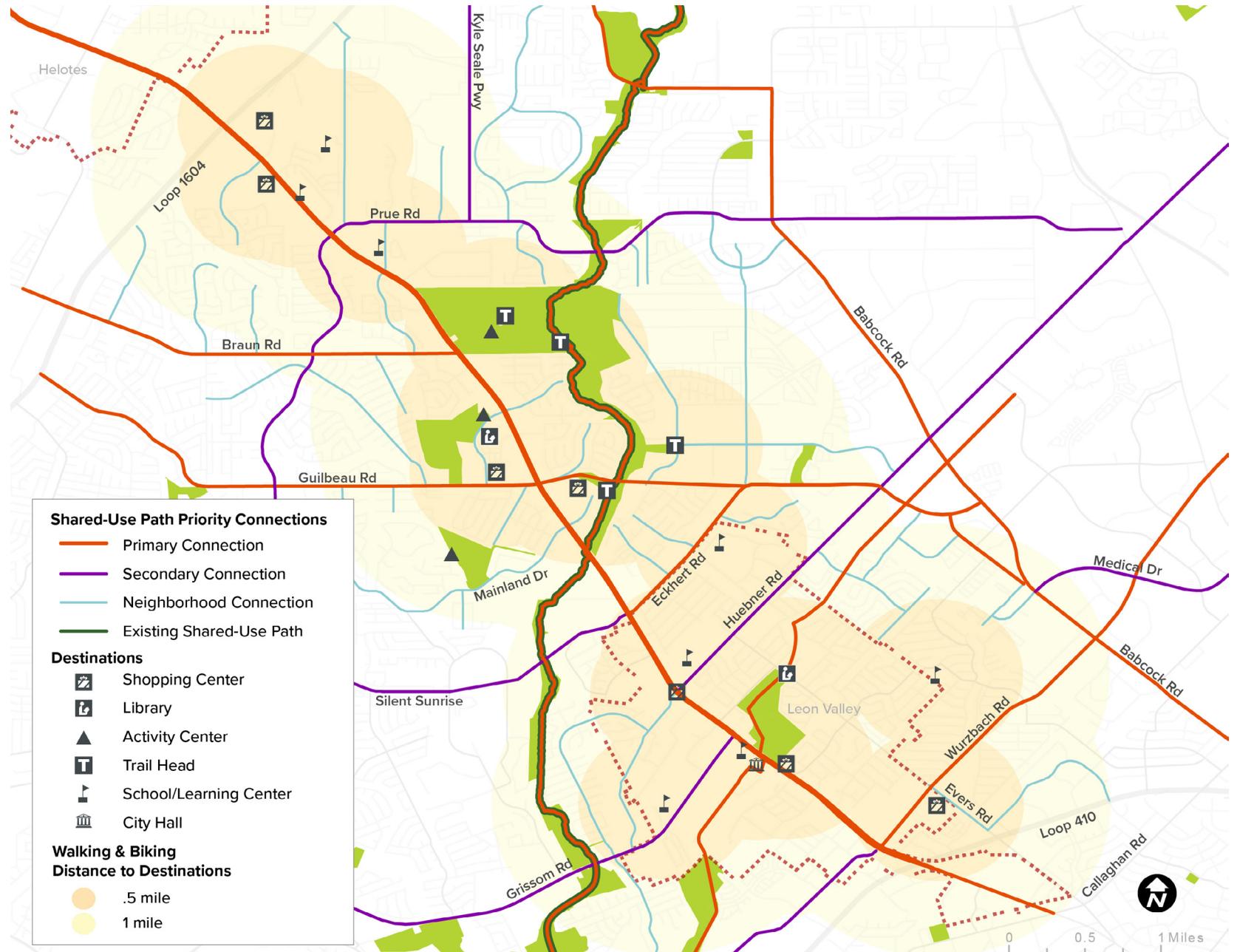


Figure 1.5: Shared use path priority connections

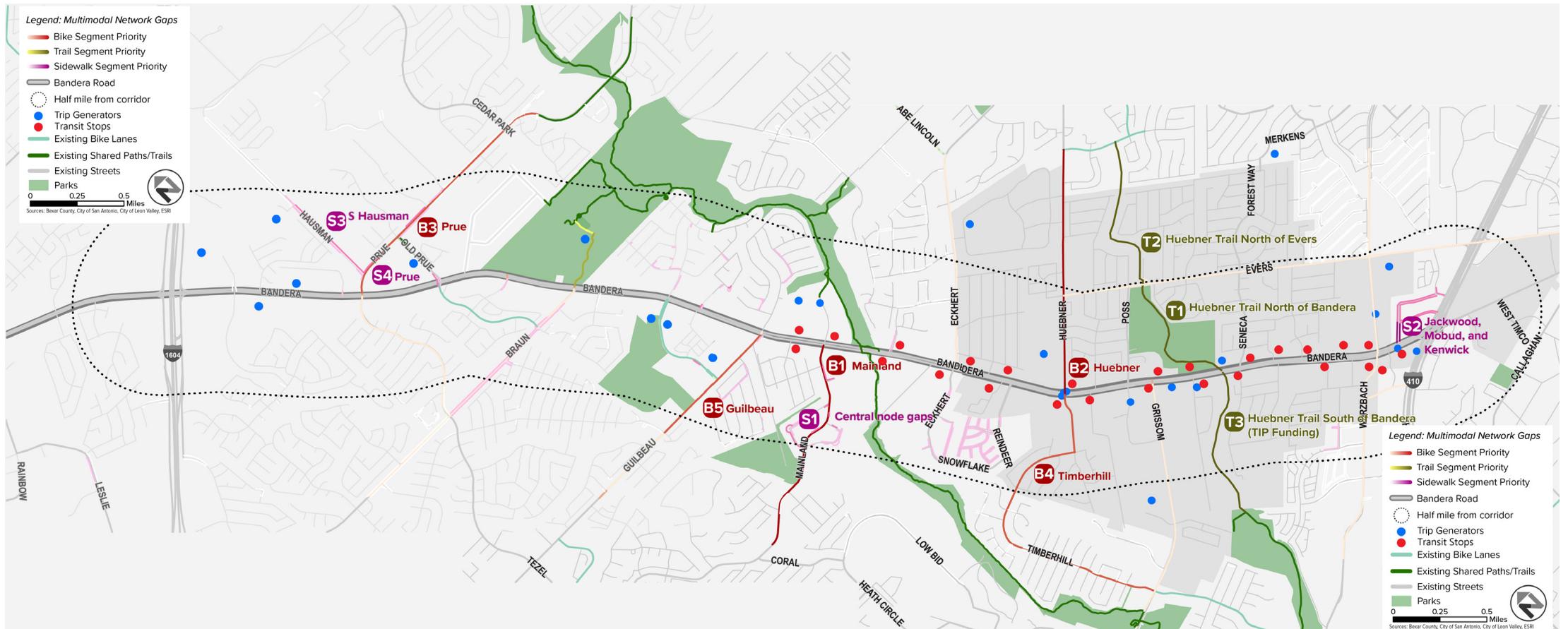


Figure 1.6: Potential projects

**Boulevard Concept:** The primary purpose behind the Boulevard Concept is to separate local traffic from through traffic by separating mainlanes and frontage roads. Drivers who are looking to access local destinations would primarily use the frontage roads, where vehicle speeds would be lower and where bicycle and transit facilities would be located. The Boulevard Concept creates conflict points between vehicles and those using the crosswalks, reducing pedestrian safety. Additionally, significant right-of-way acquisition is needed due to the potential width of the lane configuration.

**Parkway Concept:** The Parkway Concept was developed in response to community feedback. The design of this concept is more consistent with traditional divided arterial roadways. Because there are no frontage roads, the footprint of this concept is narrower than the Boulevard Concept, and with fewer conflict points. The Parkway Concept would provide better crossing safety for pedestrians than the Boulevard Concept, but the overall crossing distance would still be long. However, it would be unlikely to address congestion as effectively as the Boulevard Concept.

Both concepts have limitations that do not effectively address the holistic goals of the Bandera Road Corridor Plan. This plan envisions Bandera Road as a walkable corridor, and neither concept would fully meet the plan’s goal of enhanced non-auto transportation options or improved safety for all modes due to the limitations for crossing pedestrians. Rather, managing the demand side of the equation, through formalized Transportation Demand Management strategies (like reducing the parking supply, emphasizing mixed-use developments, and programs which incentivize transit use or carpooling) along with

strengthening the bicycle, pedestrian, and transit infrastructure, can reduce congestion without relying solely on an increase in capacity.

### COSTS AND FISCAL IMPACT

The interrelationships between land use, market forces, zoning, property tax revenue, and the financial sustainability of our cities are complex. And they are all shaped by considerations regarding quality of life for citizens, which should ultimately drive choices in these areas. This plan directly impacts all of those conditions, either directly (by changing land use or by recommending development standards) or indirectly (by built-in assumptions regarding density of future development or downstream impacts of recommendations, for example).

Less dense developments are more expensive for cities to build infrastructure for and to maintain – this is fairly obvious on its face, as lower densities require longer streets and more utilities for each person than does a more dense development. But this isn't the whole picture.

Figure 1.7 shows a quick analysis of property tax revenue by parcel and by acre. Briefly, what this shows is that larger lots in developed areas tend to return more tax revenue in an absolute sense, but that's only part of the picture. Once revenue is charted per acre of lot size, it becomes apparent that smaller lots return more revenue per unit acre than do larger lots, generally speaking.

The sweet spot between these two dynamics is dense development with smaller lots. This combination does the best job of maximizing property tax revenue while minimizing infrastructure costs. It has the benefit of offering residents more diversity as well.

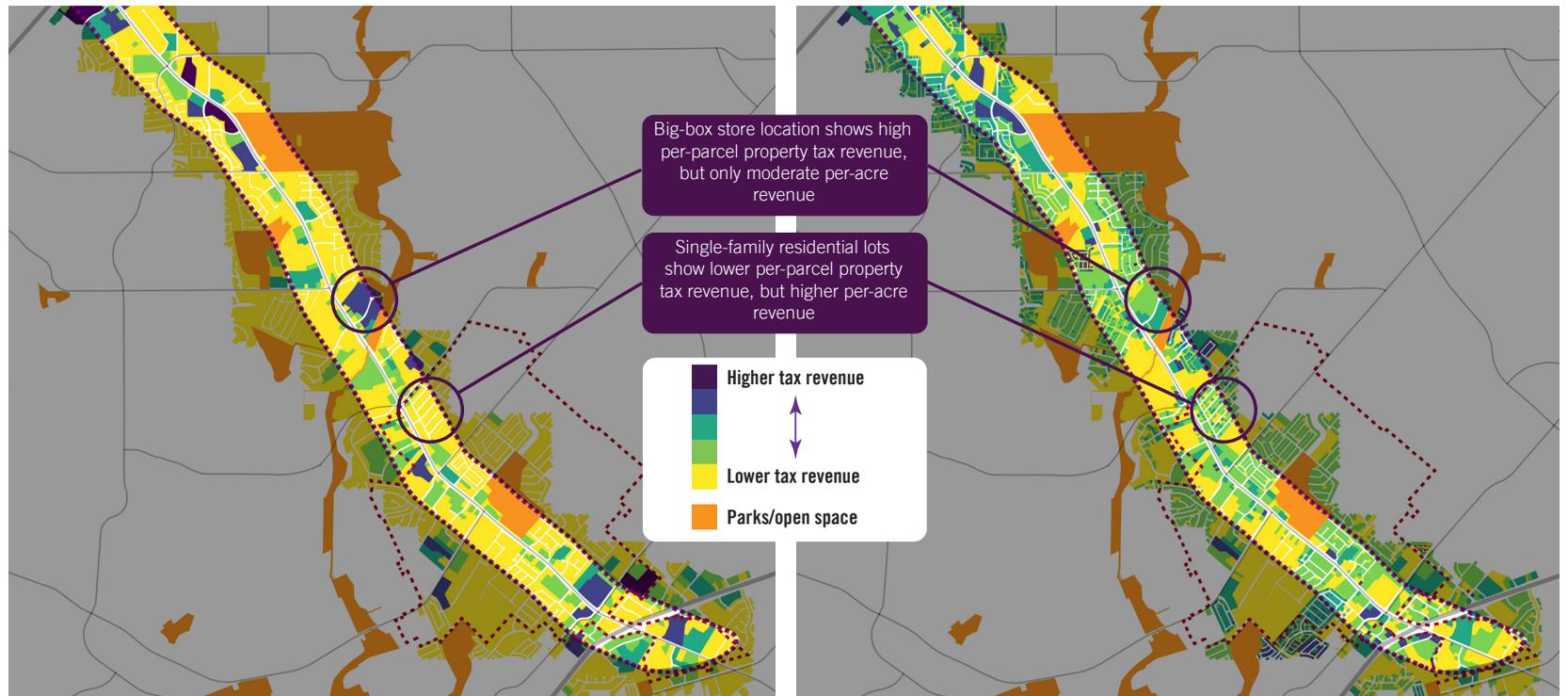


Figure 1.7: Lot size and tax revenue comparisons

### FISCAL IMPACT ANALYSIS

Fiscal impact projections model cash flow to the public sector, primarily in the form of tax revenue. It is not a projection of the overall economic impact which measures changes in income, jobs, and the wider economic picture; it is merely an assessment of how revenue inflows balance new expenditures.

The fiscal impact analysis reached several conclusions:

- The area as a whole likely operates at a deficit both now and within a 30-year study period in the no-build scenario
- The proposed future land use plan outperforms the existing land use plan
- The proposed future land use plan shifts the distribution of

land use slightly away from retail/commercial usages and towards residential

- The projected mix of employment with the new future land use designations trends towards more office space than the existing conditions, coupled with a shift away from the current heavy emphasis on retail employment. This addresses the findings in the market study which noted that retail is currently overbuilt, resulting in the vacancies and low rental rates seen on the corridor (especially the southern portions) now

### PROJECT BUDGETING

Project budgeting at the planning phase is an art, not a science, because no detailed project information can be known yet. Cost

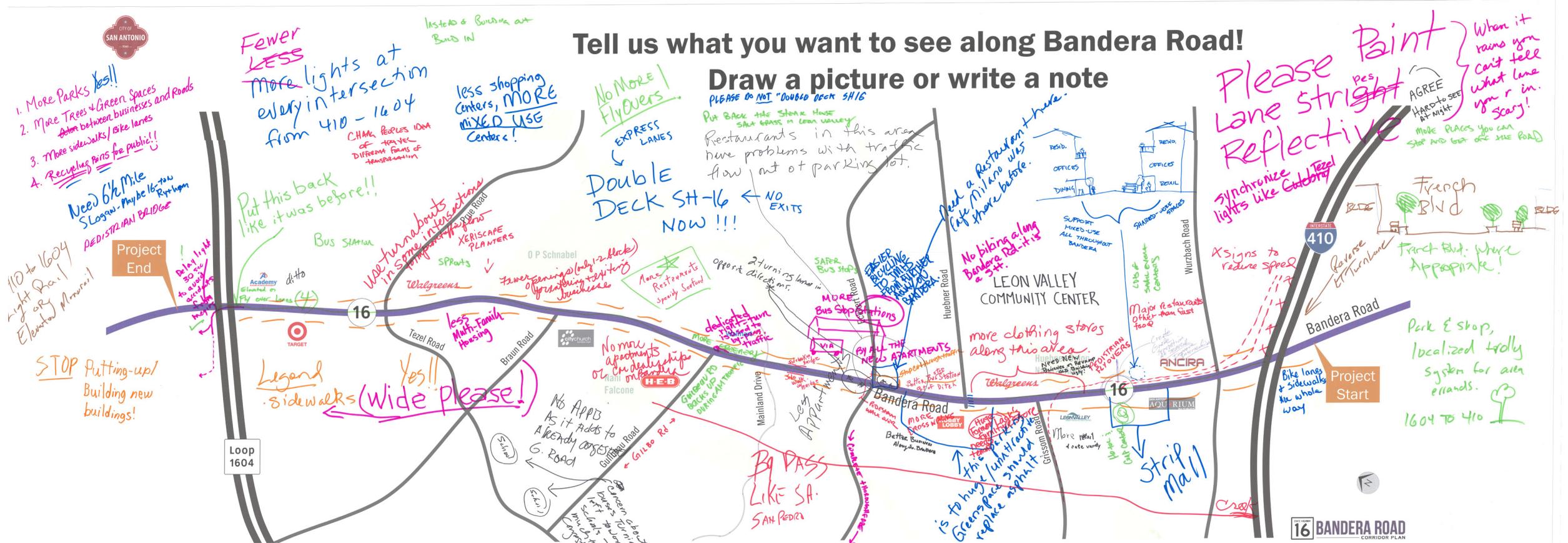


Figure 1.8: Public input from the December 10 public meeting

data can only be as precise as the information known about projects, so these budgets are necessarily vague and imprecise. That said, they give a general idea of project size and can be useful in comparing two projects about which equally little is known, such as in the arterial improvements described in the previous section.

Budgets are presented as ranges rather than as single figures, as is appropriate for the lack of precise scoping of the projects. Even these brackets can prove to be wrong as projects are

scoped out more fully and design begins. This is especially true if the scope of projects is modified as more is learned about requirements, or if the extents of projects change.

**PUBLIC INPUT**

Public input on the project has been extensive: four sets of comprehensive public meetings, plus additional targeted meetings with working groups, neighborhoods, business groups and others. That public input significantly shaped the final product, including priorities for development standards;

principles for how the land use plan was developed; priorities for incorporation of multimodal development; and a multitude of other facets of the overall plan. The strong mixed-use component of the new future land use plan was both derived from, and strongly supported by, public feedback throughout the process. Additionally, public input in the last phase led to modifications of both land use and recommendations for city roadway work. For more details on public input, please refer to the Public Input section later in this document.

# RECOMMENDATIONS SUMMARY

This section collects all recommendations from the various report sections which contain them into one spot for easy reference. The beginning of each section contains a summary of these recommendations as well. Please refer to individual sections for full detail on all recommendations.

## CORRIDOR AND LAND USE PLAN

Adopt the proposed new future land use plan incorporating suggested adoption of extensive mixed-use land use categories along Bandera Road

Integrate the four identified mixed-use centers into implementation of future land use planning and zoning

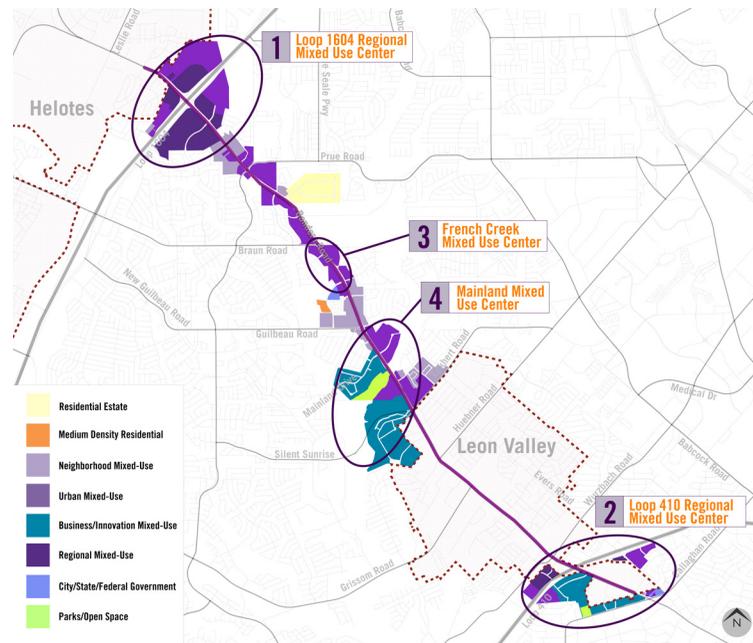


Figure 1.9a: Proposed Bandera Road Corridor Plan future land use plan, with focus areas

## PREFERRED DEVELOPMENT PATTERNS

Encourage the conversion of excess retail space into other uses and do not incentivize or require retail until the market has rebalanced

Adopt a corridor design overlay district which includes the following features for new development:

- Reduced or eliminated minimum parking requirements for mixed-use developments and transit-supportive developments
- Required inclusion of transit-supportive development features including bringing buildings up to right-of-way and placing parking behind; interior pedestrian walkways which connect to multi-use paths along Bandera; dedication of right-of-way for multi-use paths and transit stops where needed;
- Required inclusion of sustainable features including preservation of green space, material choices to minimize heat island effects, and low-impact development
- More stringent landscaping requirements
- Requirements for reduction of building height near single-family residential areas

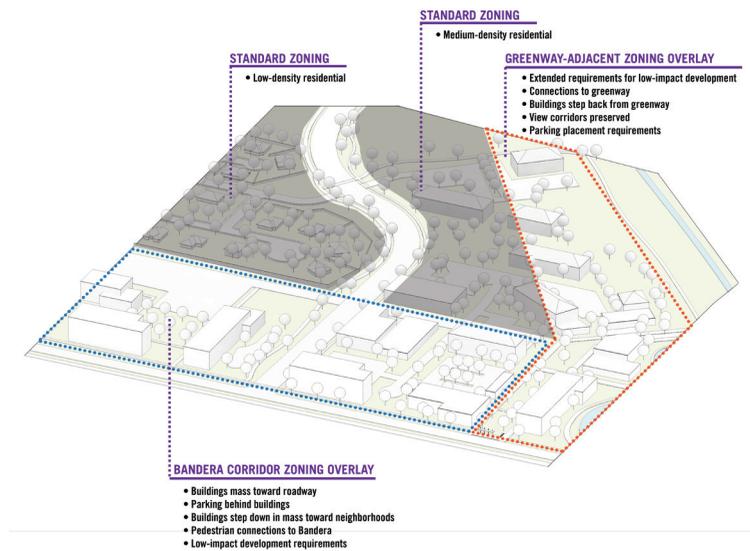


Figure 1.9b: Zoning and overlay options

Adopt incentive programs which support the following development features:

- Incorporation of semi-public space
- Inclusion of transit-supportive features
- Use of stormwater detention features for aesthetic purposes

Consider the adoption of a greenway design overlay for projects which abut greenway corridors

Implement the following tools to incentivize preferred development patterns:

- Adopt a TIRZ centered on Bandera Road to provide funding for public improvements
- City-initiated rezonings
- Keep design guidelines approvals processes streamlined
- Simplify design approvals, provide direct financial assistance, further reduce or eliminate parking requirements, and/or provide fee waivers for projects which incorporate preferred development features
- Eliminate retail requirements for mixed-use developments

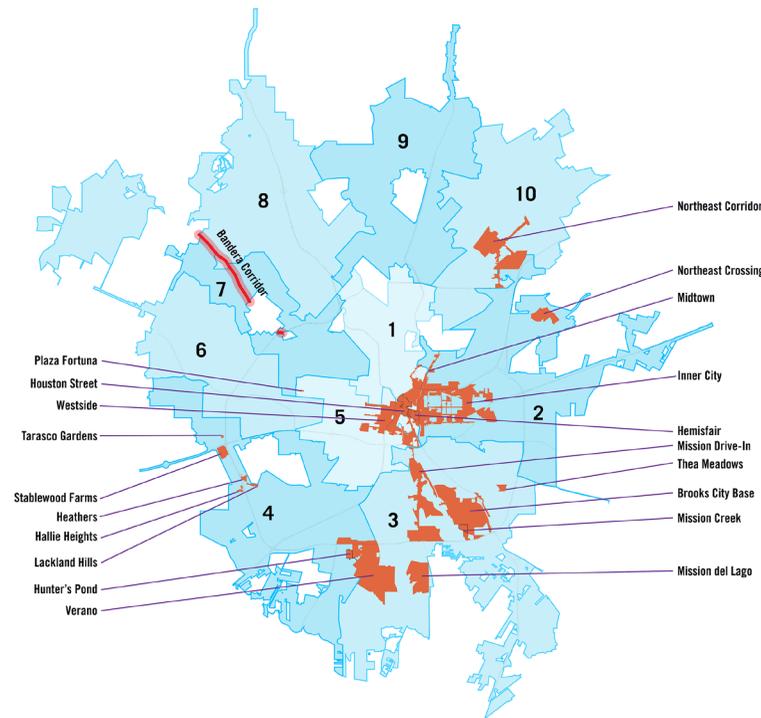


Figure 1.10a: CoSA TIRZ map

### TRANSPORTATION AND NEIGHBORHOOD CONNECTIVITY

Consider the following projects:

- Add bicycle facilities on Mainland west of Bandera Road
- Add bicycle facilities to Huebner on both sides of Bandera Road
- Build a trail segment along Huebner Creek east of Bandera Road
- Build a trail segment along Huebner Creek east of Evers Road
- Build a trail segment along Huebner Creek west of Bandera Road
- Add bicycle facilities to Prue Road between Bandera Road and Cedar Park
- Complete bicycle facilities on Timberhill to connect to proposed facilities on Huebner Road
- Add bicycle facilities on Guilbeau to connect to retail nodes at Bandera Road and Tezel Road as well as to Nani Falcone Park
- Complete missing sidewalks near Mainland
- Complete missing sidewalks on Jackwood, Mobud, and Kenwick
- Complete missing sidewalk segments on Hausman Road
- Complete missing sidewalk segments on Prue Road

Improve intersections using the following strategies:

- Connect new multi-use paths to clearly-marked crosswalks, including green-painted markings for bicycles
- Include push-button-activated pedestrian signals at all intersection corners; implement pedestrian islands at wider crossings
- Raise sidewalk crossings at selected areas within developments to prioritize pedestrians

Incorporate the following amenities along the corridor:

- Implement an extensive shade tree planting program
- Include shade structures at all transit stops, and in dense areas, include benches and waste/recycling receptacles
- Take advantage of natural features in pathway design

Initiate a public process, with extensive public input, to generate options for connecting the adjacent roadway network to Bandera Road to address east-west movement in the area

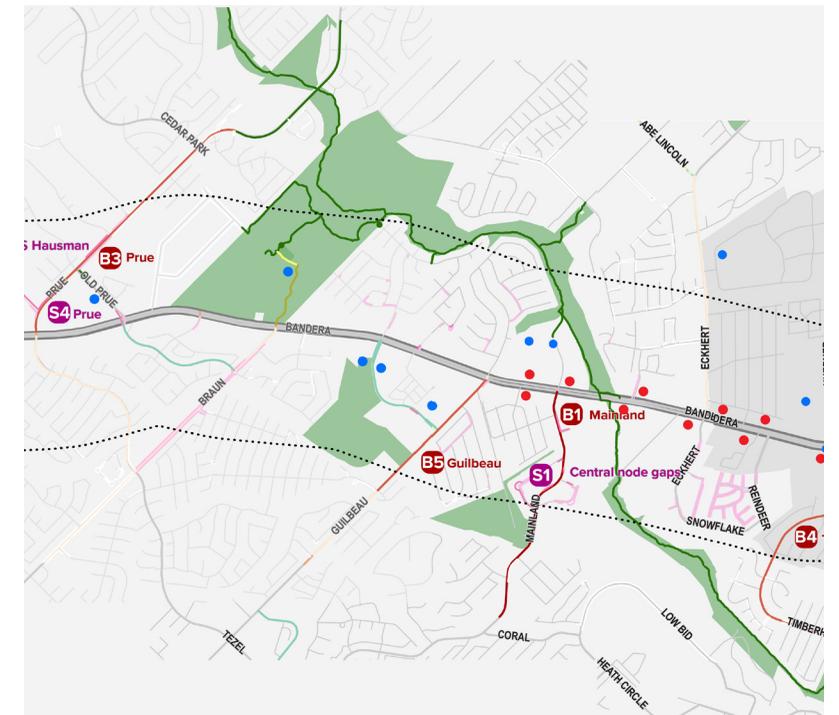


Figure 1.10b: Sample view of proposed projects



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SECTION 2

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# **CORRIDOR VISION**



## VISION ELEMENTS

The Bandera Road Corridor Plan, in conjunction with TxDOT's SH 16 (Bandera Road) Project, held many public meetings to invite public input on the current conditions of the corridor as well as on proposed solutions. This document has been shaped by that public input. That influence can be found throughout in specifics of how ideas have been developed, but just as important, public input defined the very vision of the plan.

That vision – contained in the following vision elements – was established by listening to conversations in public meetings, synthesizing those conversations in tandem with written and graphic input collected at those meetings, then refined over a further series of meetings where the public and Task Force were asked directly for their opinions on these elements. They form the core of the evaluation metrics which were used to shape the final land use proposal and other elements of this plan.

### TRANSPORTATION EASE CONGESTION

Congestion is undoubtedly the prime concern of residents. While the simultaneous TxDOT project will tackle roadway improvements on Bandera Road, this corridor plan can positively impact the traffic situation as well through encouraging appropriate patterns of land use.

### ENHANCE NON-AUTO TRANSPORTATION OPTIONS

Part of the traffic solution is to enable ways for people to move along the corridor without vehicles: walking, biking, and public transit. This plan enhances those ways of movement through improvements on the corridor itself as well as improvements to the transportation network connecting to Bandera Road.

### MAKE ALL MODES OF TRAVEL SAFER

Choices that we make with the roadway and with accommodations for bikers and walkers can significantly improve the safety of people who use the corridor. Especially for those not in vehicles, the corridor is not perceived as safe now, so focusing improvements on those areas is critical.

### LAND USE

#### CREATE A MORE ATTRACTIVE ENVIRONMENT

People do not perceive Bandera Road to be attractive right now – the visual dominance of parking lots, signage, and traffic is not an aesthetically pleasing environment. Design guidelines in this document work to address those issues in future projects.

#### CREATE MORE DIVERSE HOUSING AND RETAIL OPTIONS

Bandera Road right now has the characteristics of a monoculture: the focus on retail and single-family developments, without mixed-use developments which blend office, retail, and housing, does not offer many options to residents. This plan addresses that lack of diversity by changing land use types to accommodate and encourage mixed uses.

#### IMPLEMENT MIXED-USE LAND USE THROUGHOUT THE AREA

Along the same lines as the point above, public support for mixed-use developments was broad, consistent, and vocal. The plan responds by dramatically reshaping land use categories to focus mixed uses on Bandera Road while protecting existing single-family neighborhoods.

#### PRESERVE OPEN SPACE AND CONNECT TO TRAILS AND PARKS

Bandera Road's character is in transition from what was a rural highway to a more traditionally suburban appearance. Preserving open space along the corridor and ensuring that both the corridor itself, as well as surrounding neighborhoods, connect to the trails and parks will preserve the character of the corridor.



Figure 2.2: Rendering of prototype developments along Bandera Road

## WHAT DID WE HEAR?



Figure 2.3a: December 10 public meeting

The public input process served as the first key source of direction for this plan. Participants have been fairly universal in their lack of approval for the corridor’s appearance and character, using words such as “old,” “ugly,” “busy,” and “unattractive” to convey how they feel about it. Residents agree that improved landscaping and sidewalks are needed, and they are concerned about safety. Throughout the project, residents have expressed concerns

with what future changes might do to property values and whether properties may be condemned in the future to expand Bandera Road right-of-way. While the separate TxDOT Bandera Road project may require land purchase, this corridor plan is built around the notion of protecting existing single-family neighborhoods, consistent with public opinion.

Public input regarding what people would like to see in the future along the corridor has been consistent throughout the project. Residents have asked for mixed-use development, better and more varied choices for housing, and improved bike, pedestrian, and multimodal accommodations. Support for mixed-use development has been so consistent and outspoken that incorporating mixed-use land use types (including some of the city’s newest mixed-use land use categories, adopted as part of the SA Tomorrow planning) has been a major feature of the proposed land use plan.

A wide variety of methods have been used to elicit public opinion and to inform residents of opportunities to weigh in. Social media, postcards, newsletters, email, outdoor signs on Bandera, and traditional media outlets have all been used to notify the public of public meetings. In-person meetings with online feedback mechanisms, online meetings, and asynchronous online polling have all been used at different points during the project. A total of

four major public meetings (comprising seven individual meetings, as some meetings were duplicated to allow for additional opportunities for attendance) plus multiple online polling sessions and attendance by city staff and planning team members at neighborhood meetings have been used to provide information and solicit feedback.

For more details about public meetings and other outreach, please refer to the Public Input section later in this document.

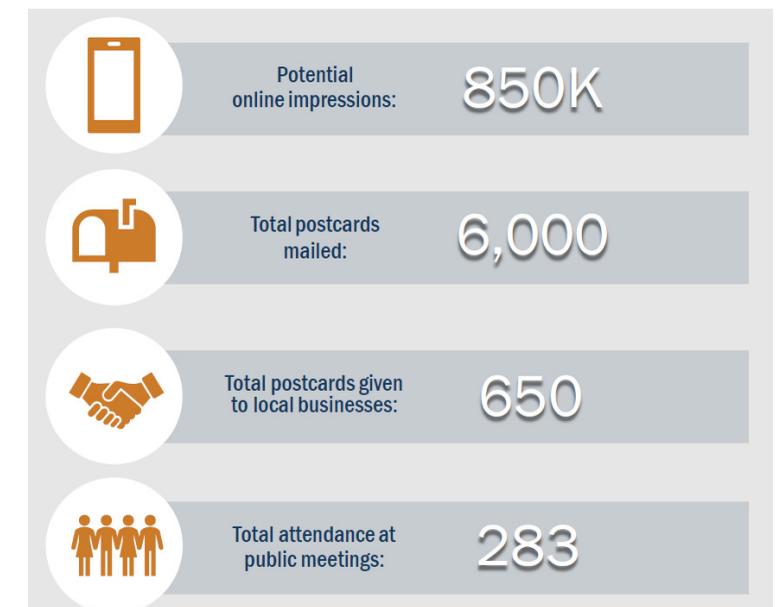


Figure 2.3b: Notification methods for the December 10 and 11 meetings

## WHAT DID WE FIND?

The second key source of direction for this plan is the Existing Conditions Report completed in the first phase of the project. The report studied several characteristics of the corridor, including base land planning, demographic and market studies (focused on the retail market and the housing market, given the overwhelming importance of those two to the corridor), a transportation analysis, and studies of public transit and bike/pedestrian infrastructure. A summary of those sections follows, but the full report should be consulted for in-depth information about each of these components.

### LAND PLANNING

Retail space and residential dominate the corridor, along with some minor light industrial. A large proportion of the residential land use is single-family homes. Population density is typical of San Antonio; generally not very dense.

The corridor is the product of multiple generations of auto-centric construction which have not been synchronized by zoning intent, design overlays, or other means of planning for appearance and feel. The primary visual element of many portions of Bandera Road is parking, and placemaking is completely absent. Even though the corridor is planned around the automobile, many people experience it primarily through congestion.

But there are other features of significance, even if well hidden. The corridor is crossed by three creeks, one of which features a greenway path, and is bordered by natural areas including O.P. Schnabel Park and the Huebner Onion homestead.

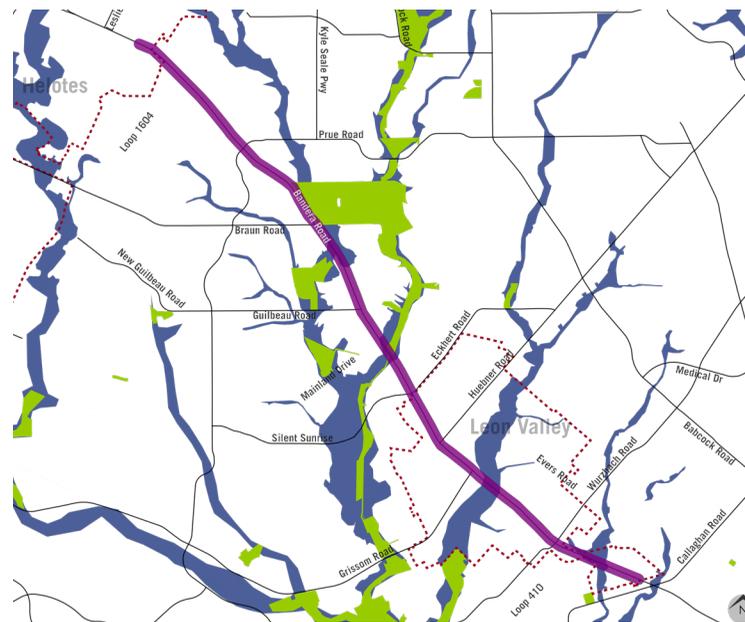


Figure 2.4a: Floodways and parks along the corridor

### DEMOGRAPHICS AND MARKET STUDIES

Differing characteristics of the northern and southern halves of the corridor – the southern half is constituted

primarily of Leon Valley – quickly become apparent. Generally speaking, the north is growing faster, has more college-age young adults and those over 55, and has more households with higher average income. The north also has significantly higher levels of college education. The south has more young families, and has a growing number of households with annual incomes less than \$35,000.

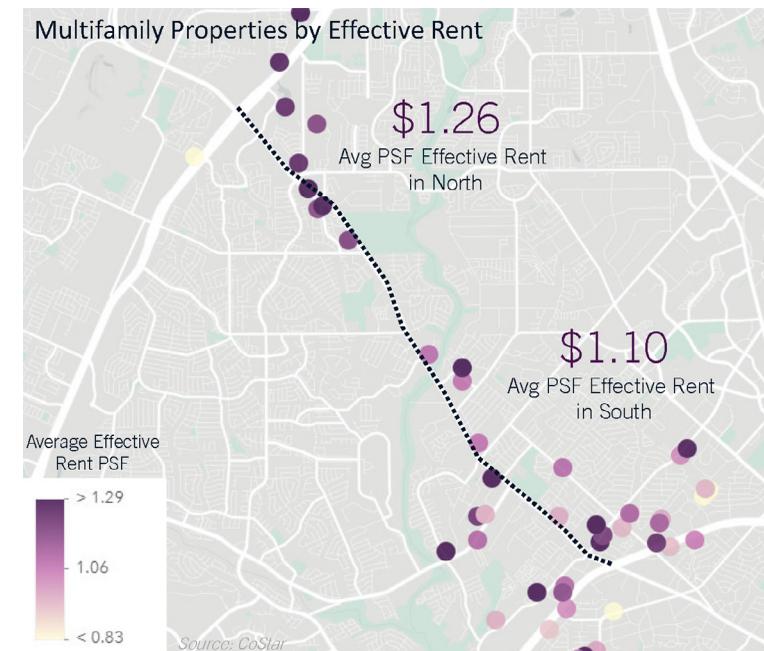


Figure 2.4b: Multifamily properties by effective rent

From 2000 to 2017, the north has seen over 4,500 single-family homes built, while the more built-out south has seen 1,130. Each area has seen growth of nearly 1,400 multifamily units in the same time frame. Apartment rental rates are higher in the north – \$1.26 per square foot, versus \$1.10 in the south. Analysis shows a total demand of roughly 200 additional multifamily housing units per year for the corridor as a whole.

Bandera Road is densely lined with retail, with another over 100,000 square feet in the pipeline. There is a wide – and widening – discrepancy between retail in the northern and southern halves of the corridor. Average retail rents are substantially lower in the south – \$11.32, versus \$19.81 in the north – and vacancy rates are approaching 10% in the south.

The retail market is near saturation. Additional retail may not be viable without other market changes.

### TRAFFIC

Traffic volume is extremely high for a roadway with Bandera Road's configuration. Volumes are highest where the flyover meets surface streets, then decrease as the corridor moves northward. Heavy turning movements from side streets indicate a lack of cross-neighborhood access, which was also indicated by a Bluetooth-based origin-destination study completed for the TxDOT project. Some key points:

- 35% of people entering and exiting the northern extents of the corridor are traveling to or from north of Braun Road, which represents a short distance compared to the full study corridor length.
- Major travel movements occur west to south, utilizing Bandera for a short stretch to move from neighborhoods to Loop 410 and I-10. This is likely due to the lack of longer distance east-west through routes in the area.

- 50% of Grissom Road traffic west of Bandera Road is accessing Loop 410 via Bandera Road.
- 25% of Mainland Drive, Guilbeau Road, and Braun Road traffic is accessing Loop 410 via Bandera Road cut-through traffic.
- 15% of daily trips from the north are traveling the full extent of the corridor.
- 9% of trips from the south are traveling the extent of the full corridor.

While Bandera Road intersects many arterials, few of them are continuous on both sides of the corridor. Most terminate at the corridor or become local streets on one side. This lack of connectivity forces drivers who are using the arterial network for trips within Northwest San Antonio to use Bandera Road to make connections.

### TRANSIT

Transit service within the study area is not extensive. Route 88 is the main service; it nominally operates every 15 minutes, but because it deviates to Evers Road through Leon Valley on every other trip, a portion of the route is served only every 30 minutes on weekdays. Service frequency is highest along the southern half of the corridor. Service along roads intersecting Bandera Road typically operates at frequencies of 20 to 35 minutes. Service is very limited north of the Mainland Transit Center.

Transit boardings are highest at the Walmart Supercenter, with other clusters at Huebner Road and Wurzbach Road. A study of transit propensity by census block group indicates that there is potentially unmet demand for transit in pockets north of Mainland. Boarding activity is currently low in this area, probably because of the infrequency of service.

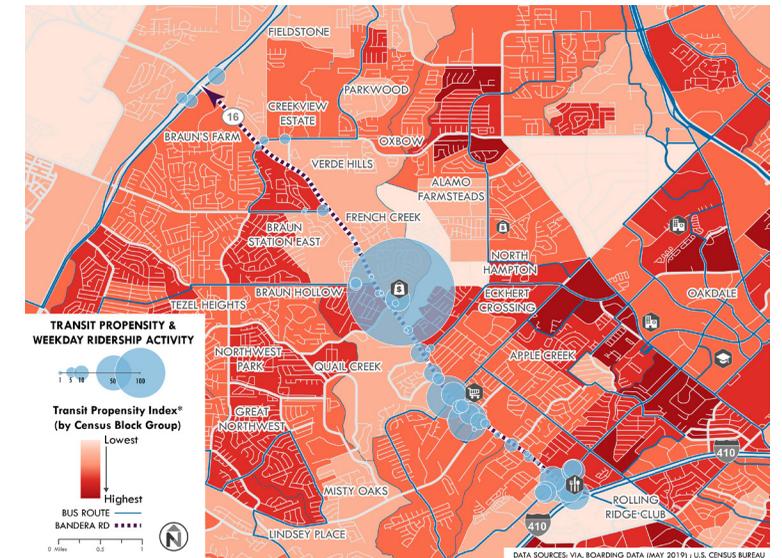


Figure 2.5: Transit propensity and ridership

### BIKING AND WALKING

Facilities for bikers and pedestrians are meager within the study area. Not only is sidewalk coverage poor along Bandera Road (though improved by recent TxDOT and CoSA projects), but crosswalks are incomplete or nonexistent at all but four intersections, three of which are at Loop 410 and Loop 1604. Virtually no bike facilities exist within the study area except for the Leon Creek Greenway Trail.

This lack of facilities is unsafe for users and challenges transit riders, who are dependent on pedestrian crossings and complete sidewalks to reach transit stops. It also represents a near-complete failure of provision of ADA-compliant facilities. This lack of safety has translated into fatalities. From 2014 to 2018, five pedestrian fatalities have occurred. These were not concentrated, but instead were spread throughout the southern 2/3 of the study area, and occurred at intersections.

## INNOVATION, SUSTAINABILITY, AND EQUITY

City staff and the consultant team worked with technical experts to address the topics of innovation, sustainability, and equity in planning. This work, which was documented in technical papers, sought to explore current and future best practices in those areas to guide work on the plan. Findings from those technical papers were integrated into each step of the plan and are included in the appendix of this plan.

### SUSTAINABILITY

Within the overall area of sustainability, this plan implements features in three main areas: low-impact development (LID) infrastructure principles, environmental sensitivity features (including ameliorating the heat island effect), and mixed-use development principles.

### INCORPORATION OF LID INFRASTRUCTURE PRINCIPLES IN NEW DEVELOPMENT

- Preservation of floodplain
- Maintenance of natural areas, including zones of significant tree canopy free of development

The extents of floodplain within the project area were identified and used to continue, and where appropriate, expand designations of Parks/Open Space categories. While requiring privately owned land to be maintained as

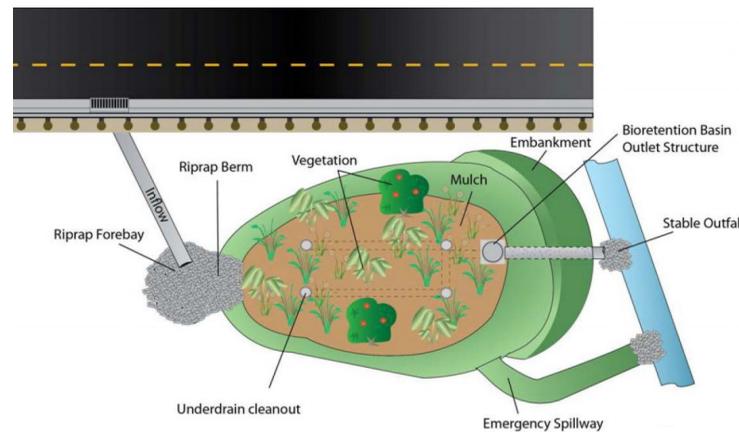


Figure 2.6a: Bioretention basin

open space is generally not possible within the strictures of state law without additional consideration, this plan leverages existing requirements for on-site rainwater detention and establishes preferred development patterns for how those features can be used as open space.

- Capture rainwater for reuse on site wherever possible
- Incentivize porous paving to minimize areas of impervious cover throughout the district

The preferred development patterns laid out in this plan incorporate several different techniques for minimizing impervious cover and other ideas, such as porous paving, to

minimize the effects of rainwater runoff.

- Utilize native plantings with low irrigation requirements
- Conserve and restore native species biodiversity

The city currently has landscaping and tree preservation ordinances which apply to new development. The preferred development patterns in this plan further discuss how standards might be applied within the corridor to improve the aesthetics of new developments, and incorporation of native plantings is a significant part of that.



Figure 2.6b: Trees and light-colored paving to reduce heat island effect

### ENVIRONMENTAL SENSITIVITY AND THE HEAT ISLAND EFFECT

- Maintain and increase the existing tree canopy
- Provide shading of public spaces
- Use light-colored hardscape and paving materials
- Subdivide parking areas with vegetation and shading, which helps to moderate temperatures during hot weather

The plan incorporates several features intended to include trees in development, especially the development standards which emphasize incorporation of nature-focused semi-public space in new developments. It also includes provisions for additional planting in public space, such as the multi-use paths which are proposed to line Bandera Road and to connect the corridor to existing neighborhoods. Discussion of selection of paving materials and their impact on heat absorption are included as a feature of that section as well.

- Land use policies should encourage redevelopment of existing, underutilized infrastructure (roads, buildings, hardscape) over new greenfield or brownfield development to preserve existing natural space

The Bandera Road corridor is in an area of growth within our city, which is itself growing rapidly. Within that dynamic, as well as the restrictions of state law, it is difficult to restrain development within land use policies. However, the plan contains measures which can be implemented to help shape development towards redevelopment rather than greenfield development. Additionally, the trail-oriented development features in the plan provide tools for developers to rethink how development can positively interact with greenways, enhancing both the greenways as well as development.

### MIXED-USE DEVELOPMENT

- Encourage districts that mix employment centers with multiple housing typologies, allowing opportunities for living and working in a single area
- Construct affordable housing near goods and services for improved access
- Incorporate multimodal transit centers with mixed-use developments
- Redevelop (at higher densities) of previously developed land near green corridors, rather than new greenfield development

These concepts are at the very heart of this plan, which implements multiple categories of mixed-use land use. Specific reference is made in this plan to multimodal transit, with one of the major focus areas identified as a multimodal transportation node. The trail-oriented development features of the plan encourage redevelopment rather than new development, and the densities of the land use categories are such that preservation of open space near greenways and other green corridors is both feasible and encouraged through model standards.



Figure 2.7: Mixed-use, multimodal transit center

## EQUITY

- Provide services located appropriately throughout the district to allow connections to multiple and diverse communities
- Consider multi-modal access from the surrounding communities to and through key areas along the corridor. These modes include improving sidewalk connections for walking, adding safe and visible bicycle routes, ensuring proximity of transit stops, and incorporating safe, complete streets
- Provide well-connected transit hubs to surrounding communities by walking, bicycling, other micro-mobility, and driving
- Provide access to greenbelts, public spaces, and nature areas through clear and open pathways at multiple points. New development (or redevelopment) adjacent to regional greenbelts should be encouraged to provide publicly accessible space along or to the greenbelt
- Incorporate universal design principles to make the corridor accessible for all, regardless of age, size, ability, or disability

These points all translate into access for all in comprehensive ways which the current design of neighborhoods, roadways, and other infrastructure within the corridor simply does not allow. Each of these points is addressed in multiple ways in the plan, whether it is identification of neighborhood-to-corridor connectivity opportunities, discussions of right-of-way improvements which prioritize pedestrians in ways which also implement universal accessibility principles, or development standards which prioritize transit-centric principles.



Figure 2.8: Access to nature, here shown via a greenway connection

**INNOVATION**

**TRANSPORTATION DEMAND MANAGEMENT**

- Promote walkable “urban villages”
- Provide a wide array of transportation alternatives to driving – public bus services, bike trails, commuter rail, etc.
- Provide information about, encourage, and incentivize alternatives to vehicular transportation

The mixed-use land use category implementation and transit-supportive features of this plan all help to achieve these three points, which are the land use-oriented components of transportation demand management (TDM). Properly implementing TDM policies requires programming and financial incentives beyond the scope of this project, but without the framework that the new development patterns establish, such policies are difficult to maintain.

**PARKING REFORM**

- Reduce minimum parking regulations
- Simplify parking requirements
- Lower parking requirements for locations with alternative transportation options

Parking is addressed in the Preferred Development Patterns section. While comprehensive parking reform is a larger effort – with important city-wide impacts – than can be addressed through this plan, the standards include discussions of potential changes and their impacts on future development within the corridor. The corridor is a prime example of parking requirement and demand mismatch (as many suburban areas are). Correcting this discrepancy will contribute significantly to improving the aesthetics and sustainability of developments.



Figure 2.9a: Transportation demand management strategies

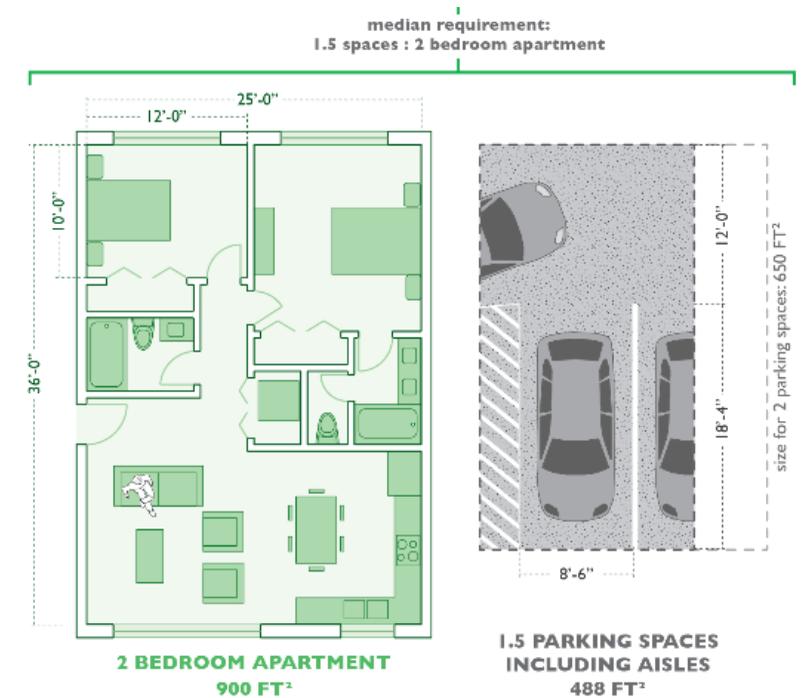


Figure 2.9b: Comparison of typical parking and living space



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**DRAFT**

SECTION 3

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# **CORRIDOR AND FUTURE LAND USE PLAN**



## CORRIDOR AND LAND USE PLAN: INTRODUCTION

A future land use plan is a set of broad policies and principles to guide the city’s decision-making regarding growth and development patterns. It is not specific regulations about what a property owner may or may not do. It is policy, not law. The intent of this section is to describe a vision for future growth and community form. Ultimately, it will be used as a decision-making tool by City staff, commissions, and City Council.

Existing land use along the corridor can be characterized through two principles: the broader area is primarily residential, but the corridor itself is dominated by retail commercial uses. This has created two adjacent monocultures: one of large swaths of single-family homes with some apartment complexes, and another of businesses facing Bandera Road.

This future land use plan calls for some changes to this pattern, intended to transition the corridor from its current heavy retail-centric mix towards a mixed-use, blended community with diverse retail, residential, and other options:

- Utilize mixed-use land use types in place of commercial-only land use to blend residential, office, and commercial space into mixed-use area
- Retain existing light industrial uses, but incorporate them with commercial and carefully located medium-density residential
- Focus increases in residential density on Bandera Road itself, leaving single-family neighborhoods unchanged

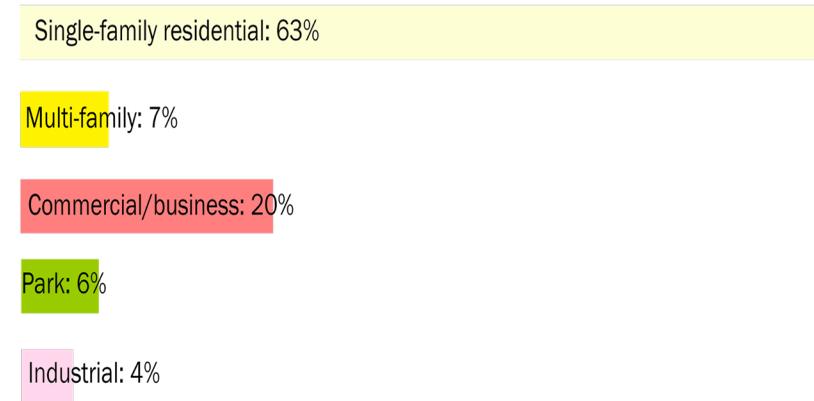


Figure 3.2b: Percentages of existing land use in the corridor and color key

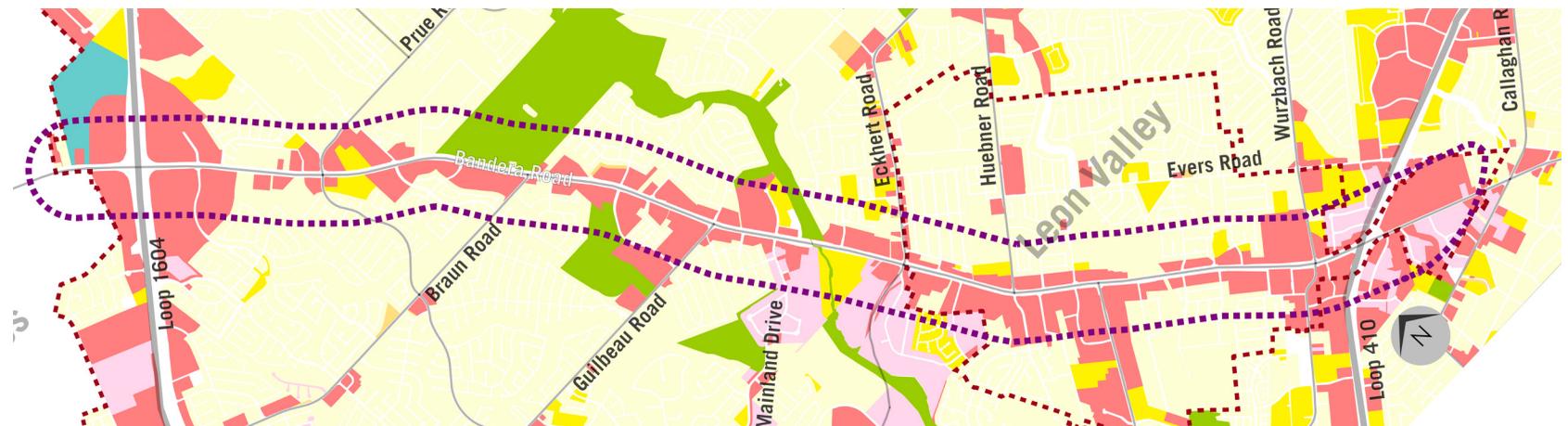


Figure 3.2a: Existing land use in the corridor

### HOW DOES THE PLANNING AND ZONING PROCESS WORK?

The future land use plan, when adopted by City Council, serves as a road map for how parcels of land within its boundaries can be zoned. Zoning, in turn, applies city regulations to those parcels of land including how it can be used, what type of buildings can be built, and a host of other requirements.

The ways in which we have built cities have changed dramatically over time, as different societies have applied their own notions of rights and responsibilities to city building. In the United States over the past 150 years, as industrialization increased and cities became more dense, city leadership determined that it was important to have rules about how people can use their property to ensure that incompatible uses are not placed adjacent to one another. Furthermore, accommodating sometimes explosive growth required thoughtful advance planning. These trends gave rise to land planning and development regulations on a civic scale.

As this thinking evolved, cities have found it necessary to be proscriptive about requirements. A three-level process for development (as shown in the accompanying graphic) has been established in many municipalities. These layers proceed from most general to most specific and allow cities to incorporate public feedback in planning and zoning, separate from permitting, expediting that process for most development projects.

Future land use plans, like this one, are typically established at the multi-neighborhood scale. They are formulated around ideas about how development around major roadways, adjacent commercial areas, large-scale urban nodes, and/or residential neighborhoods should interrelate. Future land use plans can be thought of as establishing the overall principles for how the city should develop, first at a conceptual level, then at the level of general categories of uses of land. As with this plan, future land use planning usually involves significant public input to ensure that the future land use plan is consistent with both public sentiment and professional findings.

The next level of the process is zoning. After a future land use plan has been adopted by the city, it serves as a guide for how the more specific zoning categories should be applied to properties. Future land use categories generally encompass many different zoning classifications. Depending on how cities define them, one future land use category can be translated into any of perhaps two to ten zoning classifications. Such a process can be triggered either by the city, which might seek to rezone property to a classification consistent with the future land use plan, or by a property owner, who might seek rezoning to enable a planned development project. Different cities have slightly different processes for rezoning, but they generally involve public input and city staff recommendations, using the future land use plan as a guide.

The final level is permitting. With some exceptions – such as overlay zoning districts, which might involve additional city council approvals and public input – the permitting process is usually handled administratively, using established zoning and the city’s code of ordinances as its ruleset to minimize interpretation and other variance.

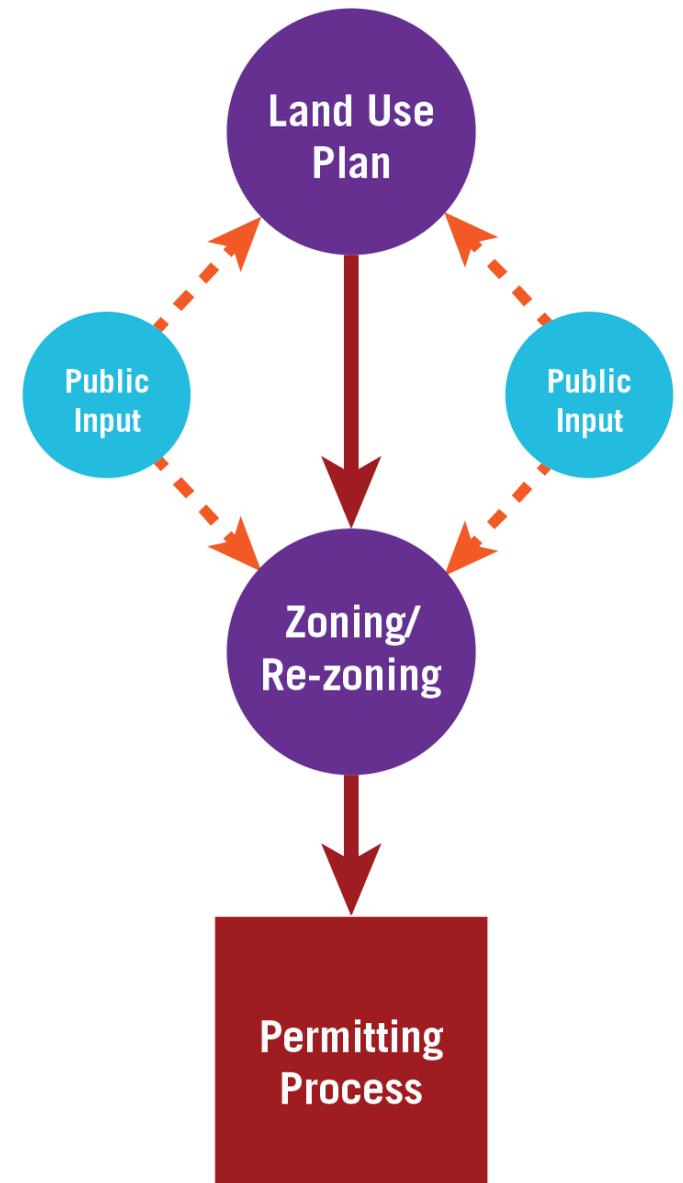


Figure 3.3: Typical land use plan, zoning, and permitting process

### LAND USE PLANNING CATEGORIES

The SA Tomorrow planning process introduced several new future land use categories and reorganized or clarified existing categories. The Bandera Road Corridor Plan employs those categories, but not all categories described in SA Tomorrow are used here. The categories illustrated and described on the next pages are those which are included in the future land use plan. A full listing and description of land use categories is included in the City of San Antonio Unified Development Code (UDC), Section 35-A101, Definitions and Rules of Interpretation, under “Comprehensive Land Use Category.” Land use categories which can be applied to any future plan amendments are those which are referenced in the UDC.

Land use is different from zoning. Land use is typically general and expresses an overall perspective which breaks built development into overarching categories; zoning can be very specific about how land is used and about how developments are designed. For each future land use category illustrated, zoning categories which generally coordinate with those categories are listed. However, in some cases, additional zoning categories can correspond with a given land use category.

The diagram on this page serves as a key to those on the next several pages. Together, they describe the future land use categories in the new future land use plan.

These categories are depicted generically – each development project interprets land use differently, according to the goals of the development. The representations here are useful in gaining an understanding of the basic components and relative densities of the various types.

#### ONE ACRE OUTLINE

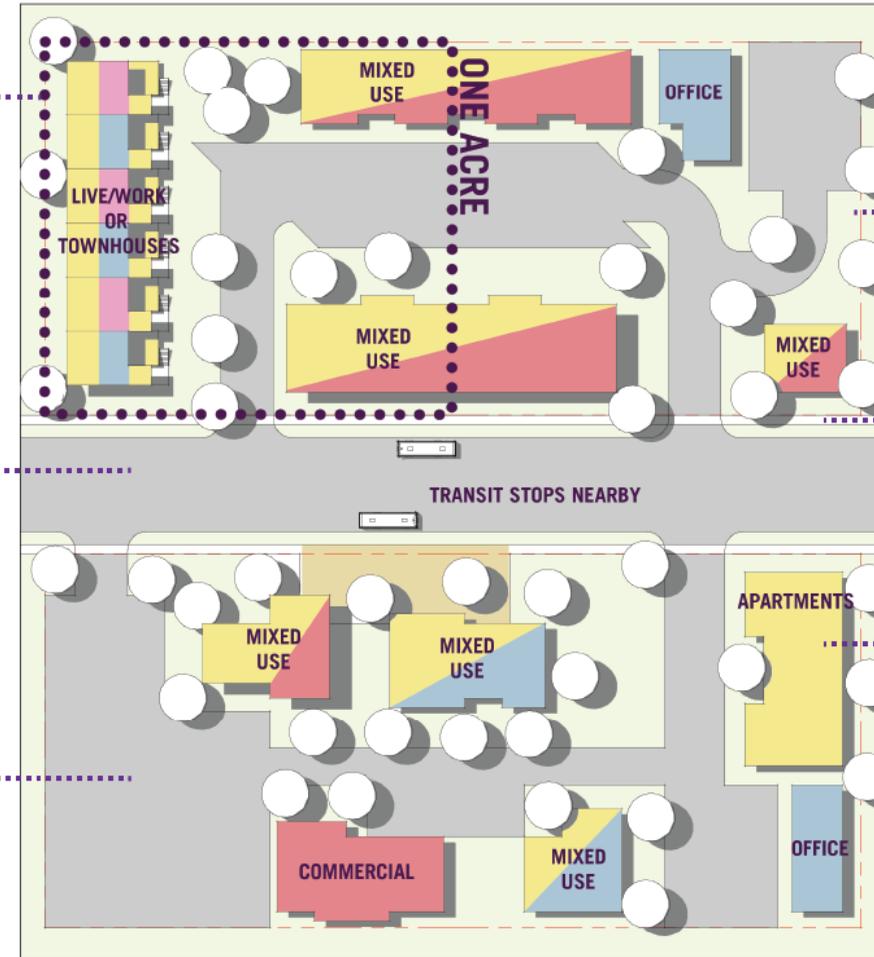
Indicates one acre of area so that land use diagrams can be compared and to provide a sense of scale

#### MAIN CORRIDOR

This major roadway could be analogous to Bandera Road or to a major cross street, but it is not specifically anything for these generic examples

#### PARKING

Size of parking lots is roughly proportional to use and type, but is generic and only representative



#### LANDSCAPE

Trees and landscape are shown generically, but represent typical patterns

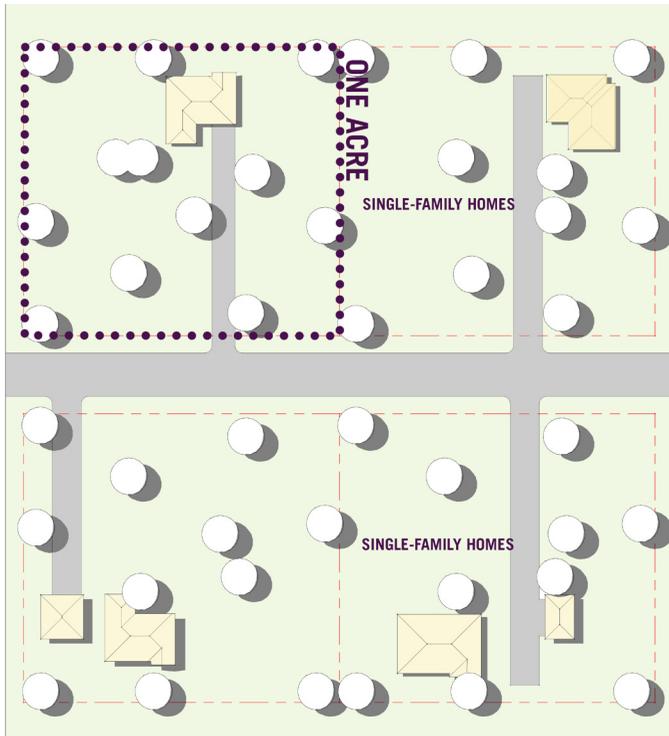
#### SHARED USE PATHS

These are shown as typical in all examples, though right-of-way and path width varies in reality

#### BUILDINGS

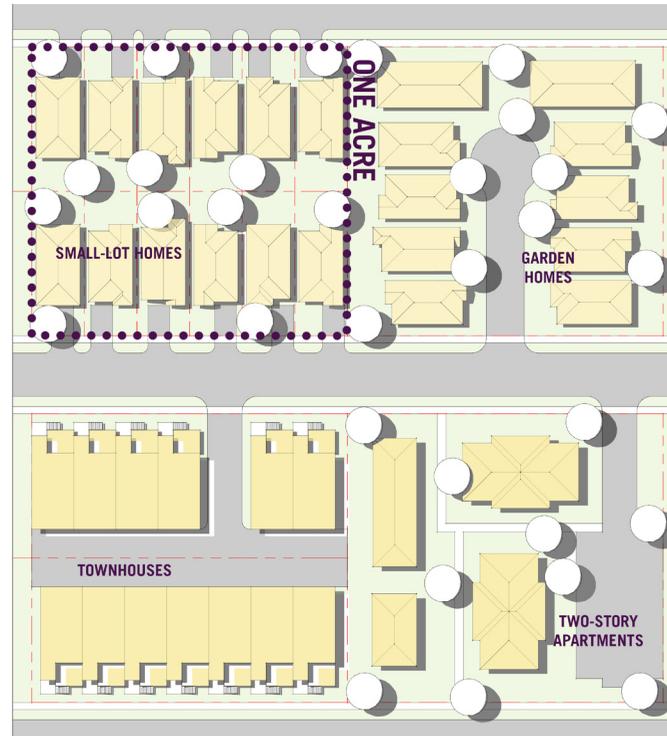
Footprints are representative of size and building type in the examples. Refer to the color key for building use

Figure 3.4: Interpretive key diagram for land use diagrams on following pages



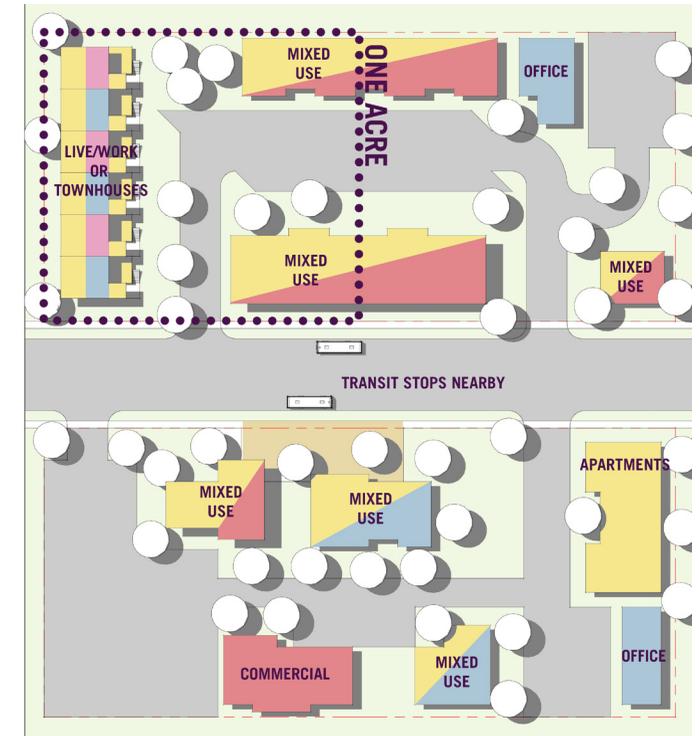
**RESIDENTIAL ESTATE**  
Zoning: FR, R-20, RE, RP

This residential category is the lowest-density residential zoning, intended for single-family homes with very large lots. The residential development of Verde Hills is a good example of this type; Residential Estate is otherwise limited on the corridor.



**MEDIUM DENSITY RESIDENTIAL**  
Zoning: R-3, R-4, RM-4, RM-5, RM-6, MF-18, MF-25, MF-33, IDZ-1, PUD, MXD, TOD

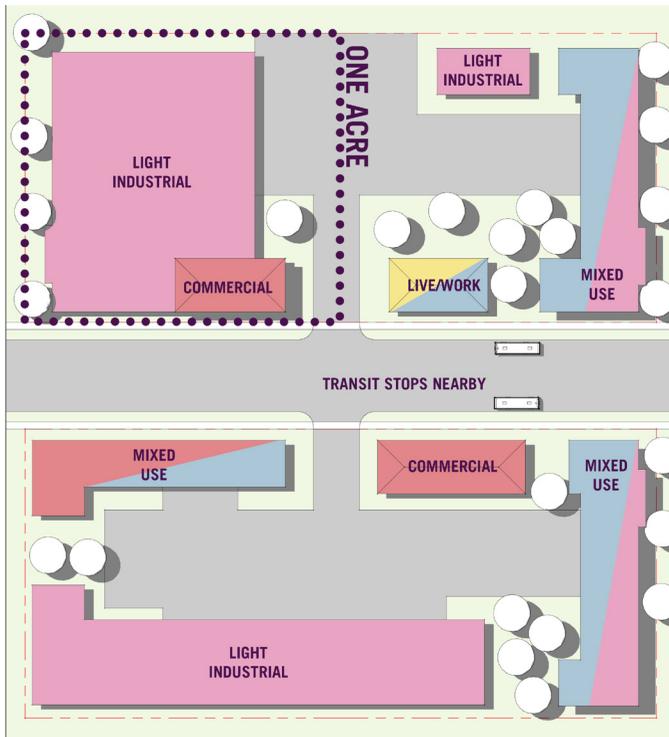
Still residential, this category increases the density of development to include duplexes, triplexes, and low-rise garden-style apartments. Detached single-family homes are included as well. The higher-density uses in this category should be located near transit services, which in most cases means that they should be located along arterials and/or collectors.



**NEIGHBORHOOD MIXED-USE**  
Zoning: RM-4, RM-5, RM-6, MF-18, O-1, NC, C-1, IDZ-1, PUD, MXD, TOD, MPCD

This classification combines the types of residential uses allowable in Medium Density Residential with lower intensity commercial and office uses. Heights are limited to three stories, with smaller footprints than the other mixed-use categories. Buildings are pulled close to the roadway, with parking behind. Residential would typically be on upper floors with office, professional services, and small scale retail and restaurants on the first floor. These should be located near transit facilities.

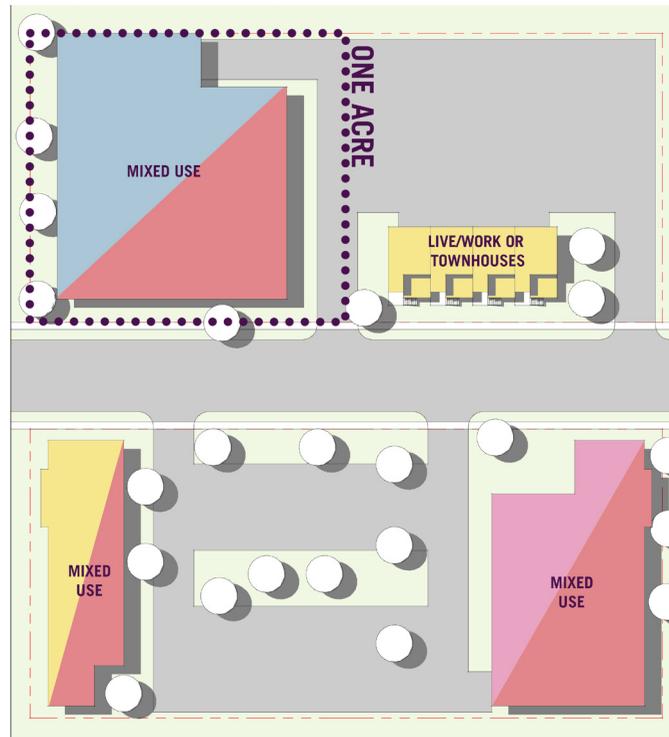




**BUSINESS/INNOVATION MIXED-USE**

Zoning: RM-4, MF-18, MF-25, O-1.5, O-2, C-2, C-3, L, I-1, MI-1, BP, IDZ-1, IDZ-2

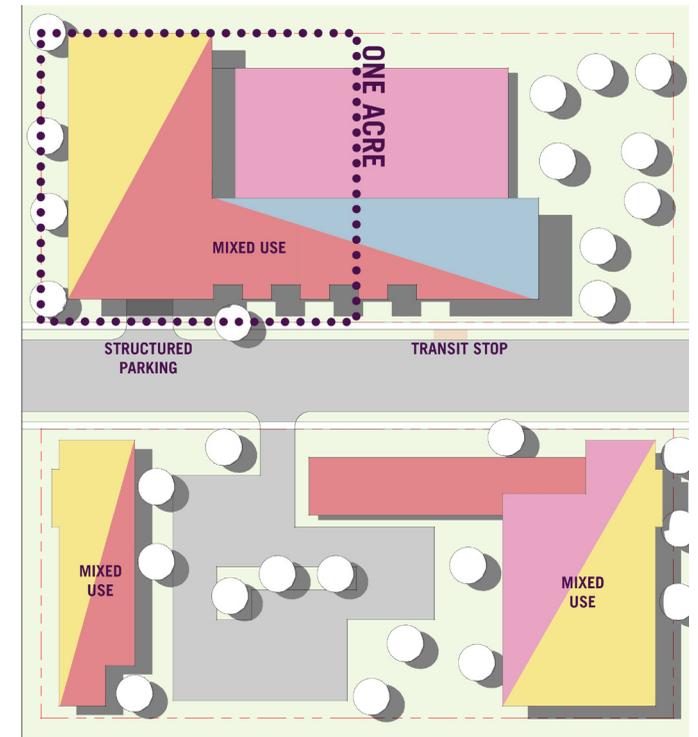
This land use type includes industrial uses as well as office, commercial, and residential uses. Footprints of these facilities are typically larger. Uses may include industrial arts workshops, high-tech fabrication, assembly, as well as a variety of commercial uses. Standards which address hours of activity, loading, noise levels, and lighting should be implemented to ensure compatibility of activities.



**URBAN MIXED-USE**

Zoning: RM-4, RM-5, RM-6, MF-18, MF-25, MF-33, MF-40, O-1, O-1.5, C-1, C-2, IDZ-1, IDZ-2, PUD, MXD, TOD

Urban Mixed-Use blends residential, commercial, and office, but buildings tend to be larger than Neighborhood Mixed-Use. This land use type is most typically used at major intersections and should generally be separated from lower-intensity land uses by medium-density uses. Structured parking is encouraged, though not required, and this category should be located near transit facilities.

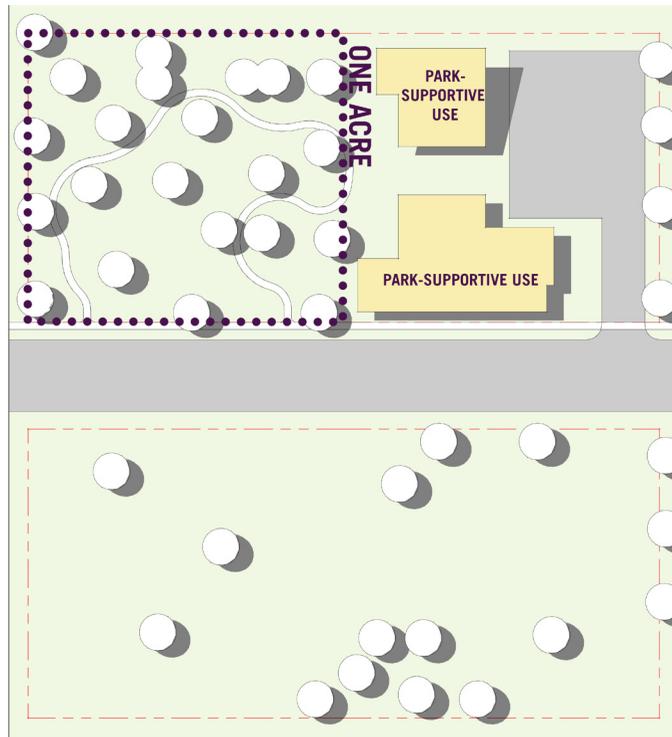


**REGIONAL MIXED-USE**

Zoning: MF-33, MF-40, MF-50, MF-65, O-1.5, O-2, C-2, C-3, D, ED, FBZD, IDZ-1, IDZ-2, IDZ-3, MXD, TOD, MPCD

Regional Mixed-Use is the most intense of the mixed-use categories. Mid-rise and high-rise buildings are appropriate within this category, as is structured parking, and development is frequently built at the block scale. This land use type is located at regional centers and should be separated from lower-intensity land uses by medium-density uses. Live/work housing is permissible. This category should be located near transit facilities, which may be incorporated into the development.





PARKS/OPEN SPACE

Including unimproved land as well as parks, these areas are public land, or are privately owned and platted as open space, drainage, or park land. Public recreation is generally encouraged in this use. Development surrounding Parks/Open Space should be supportive of it by (for example) incorporating semi-public space which augments and connects to the open space or by including trails and walkways that connect the development to the open space.

CITY/STATE/FEDERAL GOVERNMENT

This category includes an array of public and community-serving uses such as public buildings and infrastructure, located on areas owned and operated by a public agency. It is not illustrated here due to the wide variety of forms, sizes, and relationships which this category can entail. Land of this type is normally identified with some specificity to a particular concept – for example, if the need for a new fire station is identified based on population growth, a new site may be shown within a land use plan.

FOCUS: LIGHT INDUSTRIAL

What are light industrial uses? The words might bring to mind factories or other intensive uses, but those are actually heavy industrial uses, which are not appropriate along the corridor.

Rather, light industrial uses frequently seem like typical commercial uses: craft breweries, auto repair, artisan metalworking, and a variety of similar low-impact uses – many of which are already located along the corridor, and which usually blend in seamlessly with commercial uses – are possible within light industrial land use categories. They are of types and scales which work well alongside retail, restaurants, apartments, and other uses.



Figure 3.7: Example mixed-use development showing color-coded usage types



**LAND USE PLAN**

Adoption of a future land use plan is a transformative, but slow-moving, means of affecting change in our city. The main action of a future land use plan is performed indirectly. By affecting the adoption of rezoning of parcels of land, a future land use plan can gradually impact large-scale issues like development density, the mix of types of uses, and even – through those other changes – construction types, investment returns, and property tax revenue. Some immediate changes are possible where landowners are either awaiting the future land use plan to pursue development projects or see an immediate application for the new plan, but generally, changes occur gradually.

Through extensive public input, the future land use plan for the Bandera Road corridor has been derived from the following core principles:

- Preserve single-family neighborhoods and green space
- Protect single-family neighborhoods by not increasing density of future land use within existing neighborhoods or immediately adjacent to them
- Incorporate future land use categories which enable transit-supportive development
- Incorporate future land use categories which enable mixed-use development
- Focus higher-density uses at intersections of Bandera Road with other roadways and greenways (nodes)
- Span areas between nodes with low to medium density mixed uses
- Incrementally increase the potential intensity of future land use to accommodate population growth

Note that as a City of San Antonio plan, future land use conditions in the City of Leon Valley are not documented.

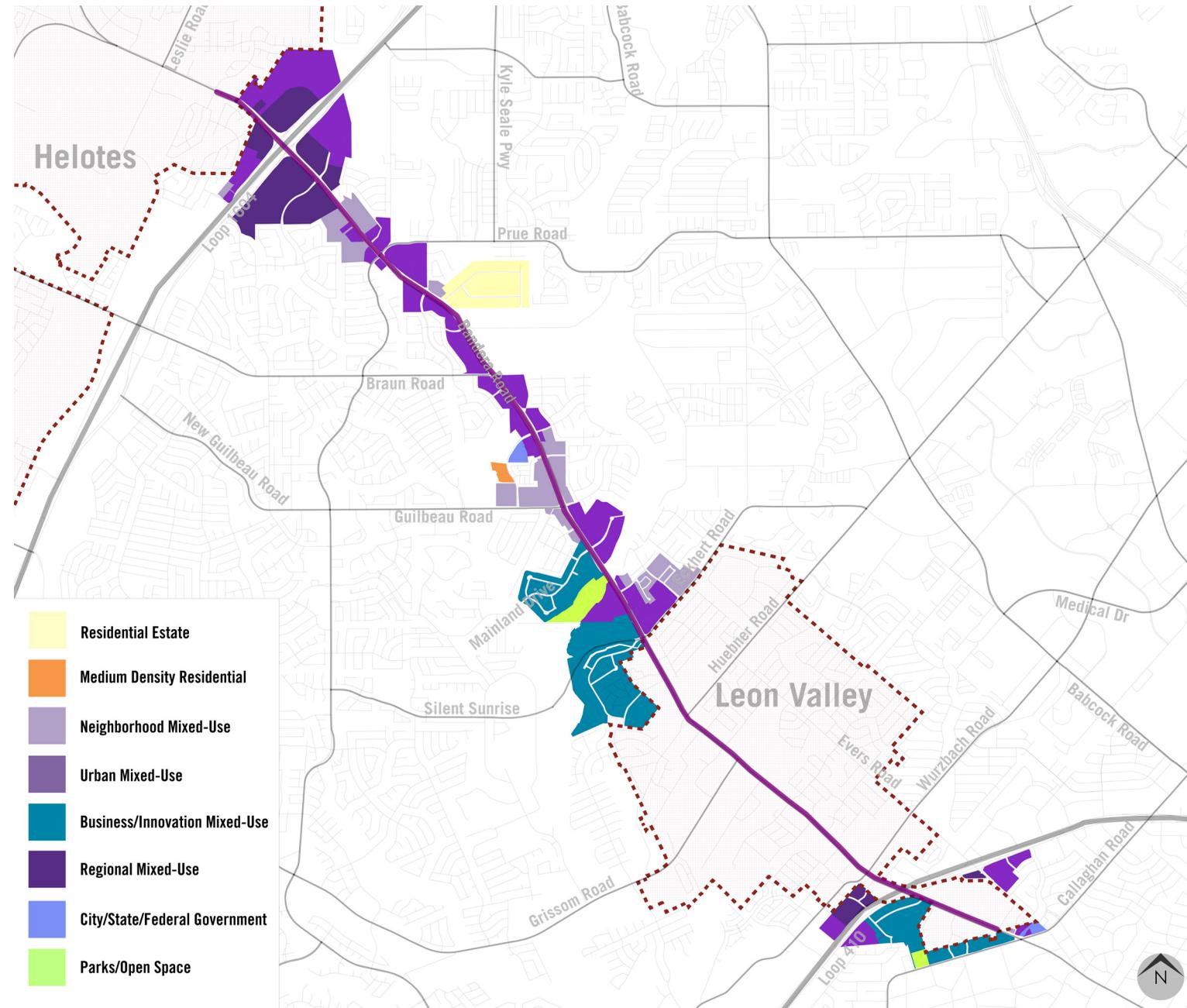


Figure 3.8: Bandera Road Corridor Plan future land use map

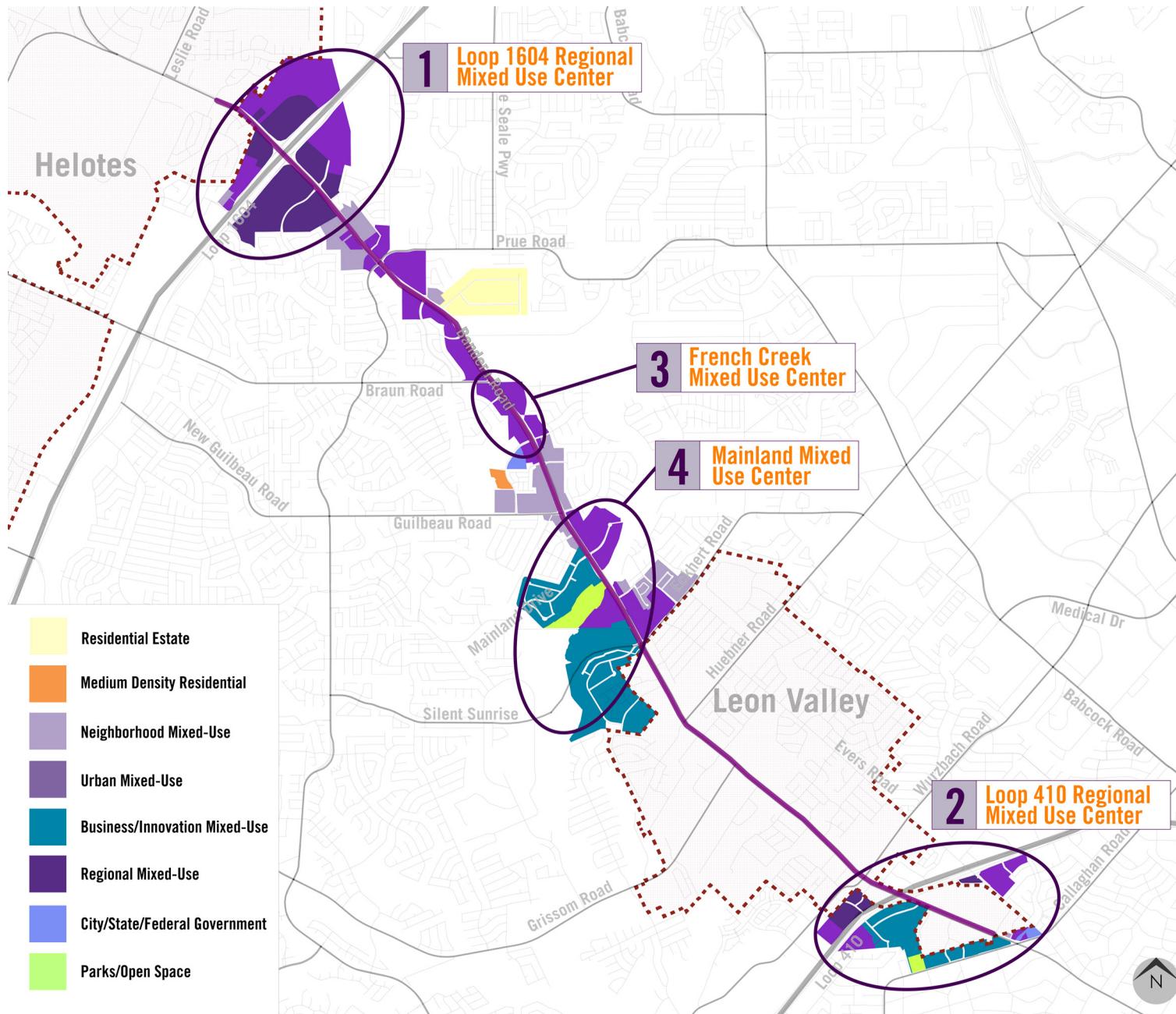


Figure 3.9: Focus areas in Bandera Road Corridor Plan future land use plan

For that information, please consult the 2018 City of Leon Valley Comprehensive Master Plan. As of this writing, the plan can be found online at [https://cms3.revize.com/revize/leonvalleynew/government/community\\_development/docs/Final%20Comprehensive%20Master%20Plan%201.23.2018.pdf](https://cms3.revize.com/revize/leonvalleynew/government/community_development/docs/Final%20Comprehensive%20Master%20Plan%201.23.2018.pdf).

The accompanying interpretive plan depicts the core principles described on the previous page. Four areas of focus have been identified, along with areas which connect those places of focus.

- 1 - BANDERA ROAD AT LOOP 1604 AND
- 2 - BANDERA ROAD AT LOOP 410

Both of these areas are designated as regional mixed-use centers, which have the potential to be some of the most dense areas in our city. They are located primarily at areas of some of the highest traffic volumes in the city, such as at the intersection of two major highways. Bandera Road at both Loop 410 and Loop 1604 easily qualifies within this category.

What is different about the future land use for these two areas, versus the current patterns of use, is a shift toward mixed-use categories. Zoning patterns are largely consistent with similar areas elsewhere in the city. Usage is focused around regional commercial-type categories, with zoning to match. The new future land use plan is centered instead on Regional Mixed-Use, with descending categories (Urban Mixed-Use and Neighborhood Mixed-Use) transitioning from the core of the areas to surrounding existing single-family neighborhoods.

The intent, consistent with the overall SA Tomorrow planning process, is to focus growth and density, including residential, office, retail, and commercial uses, at locations

which can serve as urban centers. These areas provide excellent opportunities for transit-supportive development.

### 3 - BANDERA ROAD AT FRENCH CREEK

Although the smallest and most focused of the opportunity areas along the corridor, this area is strongly positioned for transit-supportive development. Its proximity to French Creek and O.P. Schnabel Park, along with the actual and potential trail systems there, are a fantastic opportunity to create trail-oriented developments as well.

### 4 - BANDERA ROAD AT MAINLAND

This new opportunity area combines several existing features and existing land use patterns into a larger, more comprehensive node which is the best opportunity for focused development along the corridor. With a VIA transfer location at Mainland Drive, this area is perhaps the best along the corridor for incorporation of transit-supportive development principles. Additionally, the proximity of Leon Creek and a well-developed greenway system are prime prospects for trail-oriented development.

The future land use categories for this center include (in order of intensity of development, from highest to lowest) Business/Innovation Mixed-Use, Urban Mixed-Use, and Neighborhood Mixed-Use. A significant portion of the area – the southern part and some areas around Mainland Drive – is currently zoned for light industrial uses, and it is these areas where the Business/Innovation Mixed-Use category is proposed due to that category's incorporation of L and I-1 zoning. To the east, the existing land use transitions to Urban Mixed-Use and then Neighborhood Mixed-Use, which places the lower-intensity future land use categories closest to existing neighborhoods.

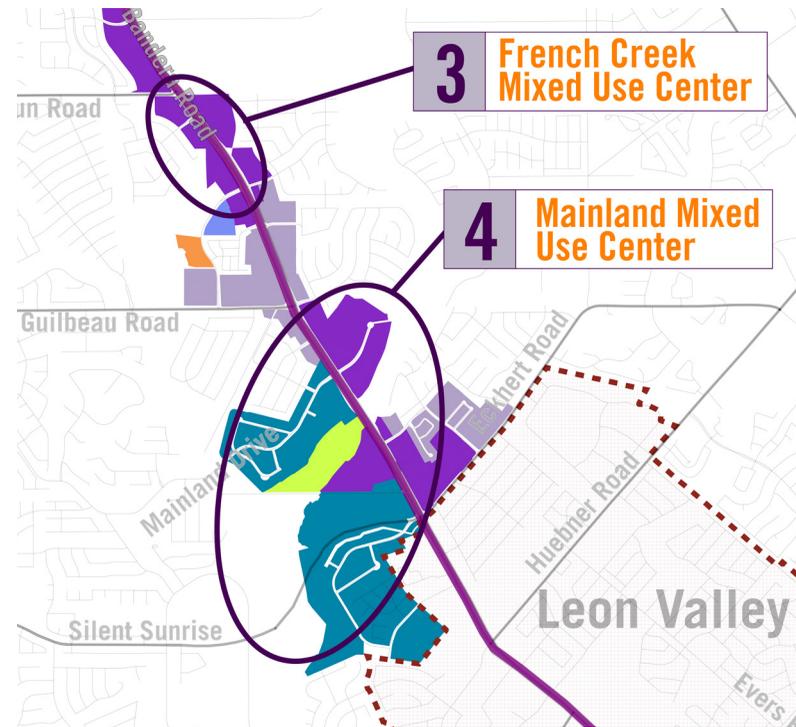


Figure 3.10: Focus areas in Bandera Road Corridor Plan future land use plan

### PLAN ANALYSIS

An important part of understanding future land use impacts is to perform two comparative analyses: first, how does future land use compare with the density implied by current zoning; and second, how does new future land use compare with previous future land use?

### EXISTING FUTURE LAND USE ANALYSIS

The majority of the parcels are changed from the existing land use planning but are within the same general level of intensity as before; these areas substitute mixed-use categories for the previous single-use categories (primarily commercial and light industrial).

There are other areas, however, which are moving to either higher or lower intensities than before. In all cases, these changes are incremental and related to the expansion of allowable zoning categories through transition to mixed-use categories, resulting in only minor changes. The following numbers correlate to the diagram on the next page.

**1** Medium Density Residential to Neighborhood Mixed-Use. The new future land use category protects existing single-family neighborhoods while incorporating minor commercial uses and allowing continued medium density residential.

**2** Community Commercial to Neighborhood Mixed-Use. This change is a minor downgrade of land use category to protect an existing single-family neighborhood from more dense development.

**3** Mixed Use, High Density Residential, and Community Commercial to Urban Mixed-Use. This redesignation replaces an outdated category (Mixed Use)

and encapsulates two other categories (High Density Residential and Community Commercial) within a single new category: Urban Mixed-Use. Generally, this change does not represent higher density, but instead allows a mixture of uses rather than single uses within the area.

**4** Light Industrial and Community Commercial to Business/Innovation Mixed-Use. As one of the new centers of development along Bandera Road, this area incorporates a mixture of different types of uses into one of the new future land use types adopted through SA Tomorrow planning.

**5** High Density Residential and Regional Commercial to Urban Mixed-Use. The new future land use category allows for the existing medium density residential and commercial mixes in this area while eliminating inappropriate high density commercial use allowed by Regional Commercial.

**6** Community Commercial to Neighborhood Mixed-Use. The new land use category protects adjacent residential areas while allowing limited commercial use.

**7** High and Medium Density Residential to Neighborhood Mixed-Use. This change protects existing residential neighborhoods while allowing a limited commercial mix along with medium density residential uses.

**8** Mixed Use, Regional Commercial, and Light Industrial to Business/Innovation Mixed-Use. This area incorporates a mixture of different types of uses into one of the new future land use types adopted through SA Tomorrow planning.

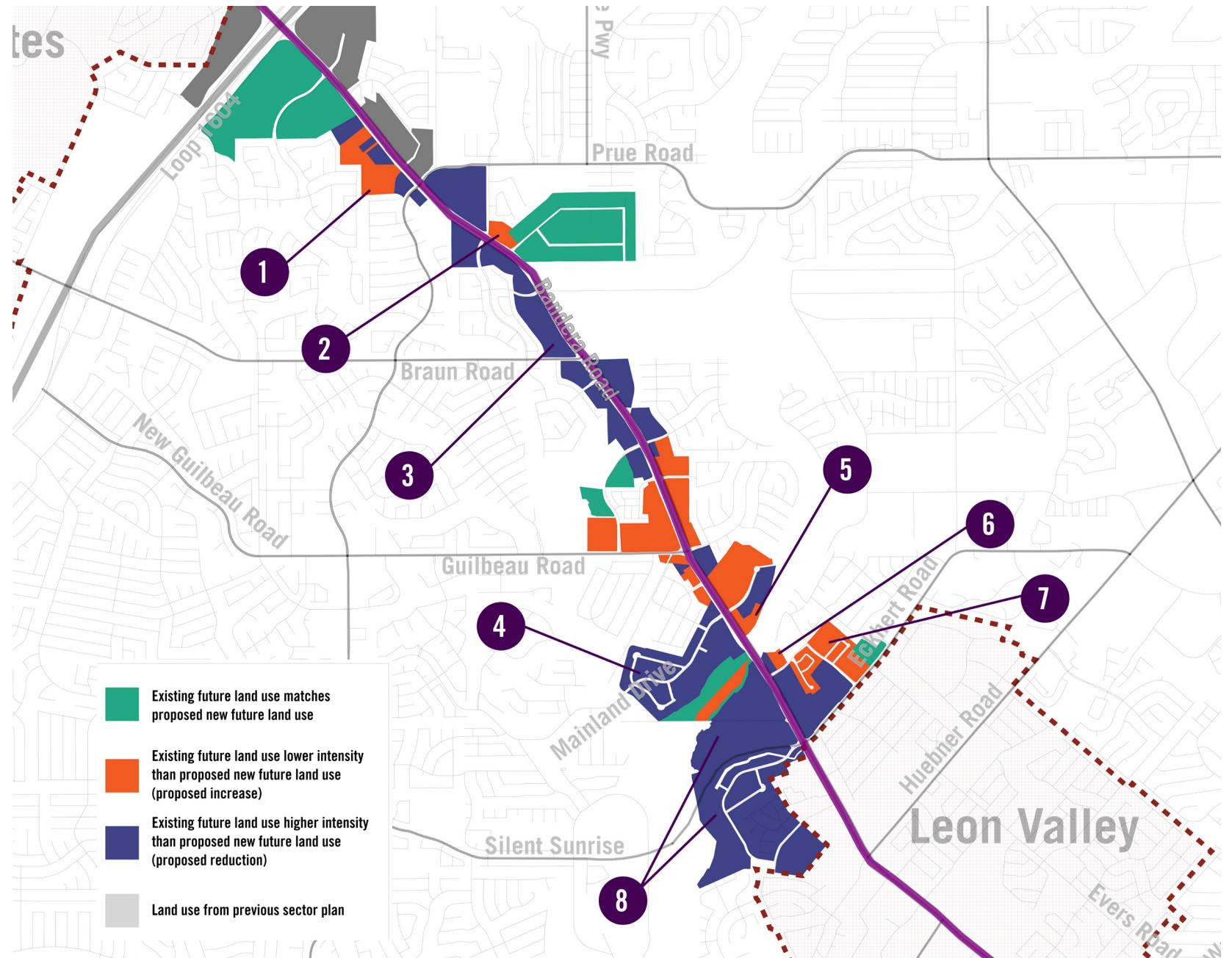


Figure 3.11: Comparison between existing land use plans and Bandera Road Corridor Plan future land use plan

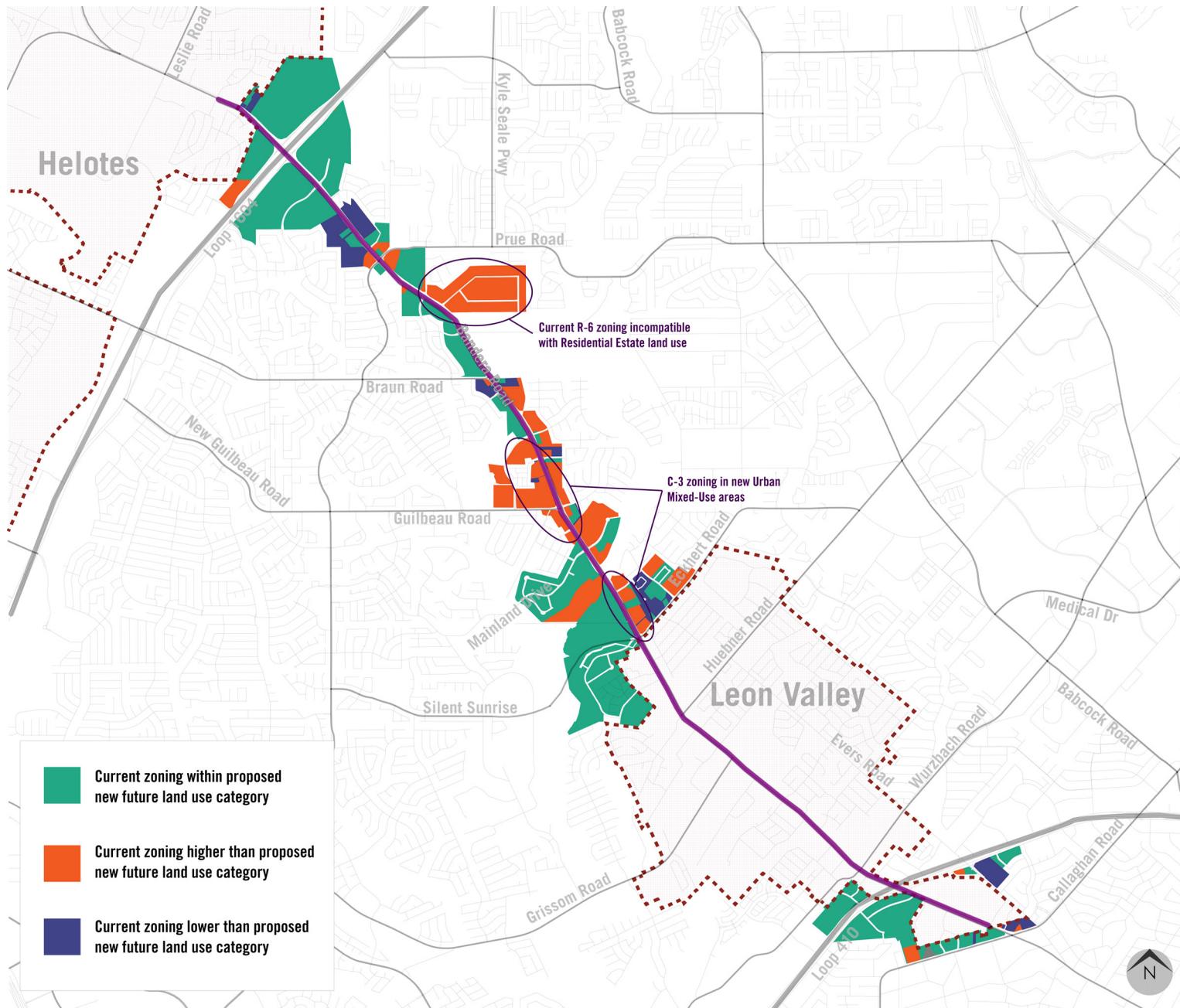


Figure 3.12: Comparison between Bandera Road Corridor Plan future land use plan and current zoning

**ZONING ANALYSIS**

Bandera Road has been transformed over the past century from a rural highway to an exurban transitional zone and now to a suburban transportation corridor. Current zoning along the corridor was primarily set in that second phase, where fast growth and large amounts of available land were translated into very intensive commercial zoning categories along the corridor and large single-family neighborhoods off the corridor.

As the corridor continues its maturation into a fully suburban – and in parts urban – corridor, some of the existing commercial zoning is appropriate, and some is not. There are areas of C-3 zoning along Bandera Road, including areas not just at its intersections with highway loops, but also within the “interior” of the corridor. For the most part, actual land uses in this interior are consistent with C-1 and C-2 zoning categories, so parcels which are zoned C-3 are effectively over-zoned. While this has not presented issues to date, as San Antonio continues to densify and land values rise, future development may take advantage of that over-zoning. For this reason, the future land use plan largely applies lower-intensity land uses to those areas, but with the added flexibility which mixed-use categories enable. Some of the main areas treated this way are indicated on the diagram on the following page.

In some cases, re-zoning should be undertaken to match current use. The Verde Hills neighborhood is the clearest example of this: the proposed future land use is Residential Estate, matching the current use, but zoning is currently R-6. Zoning categories RE or R-20 are appropriate for the proposed future land use Residential Estate.

The intensity of future land use of a limited number of parcels is increased from previous land use plans. These areas occur primarily in areas where current zoning (primarily C-2, C-3, and I-1 zoning) is higher than existing land use planning and where proper lower-intensity transitions can be made to surrounding low-density residential use.

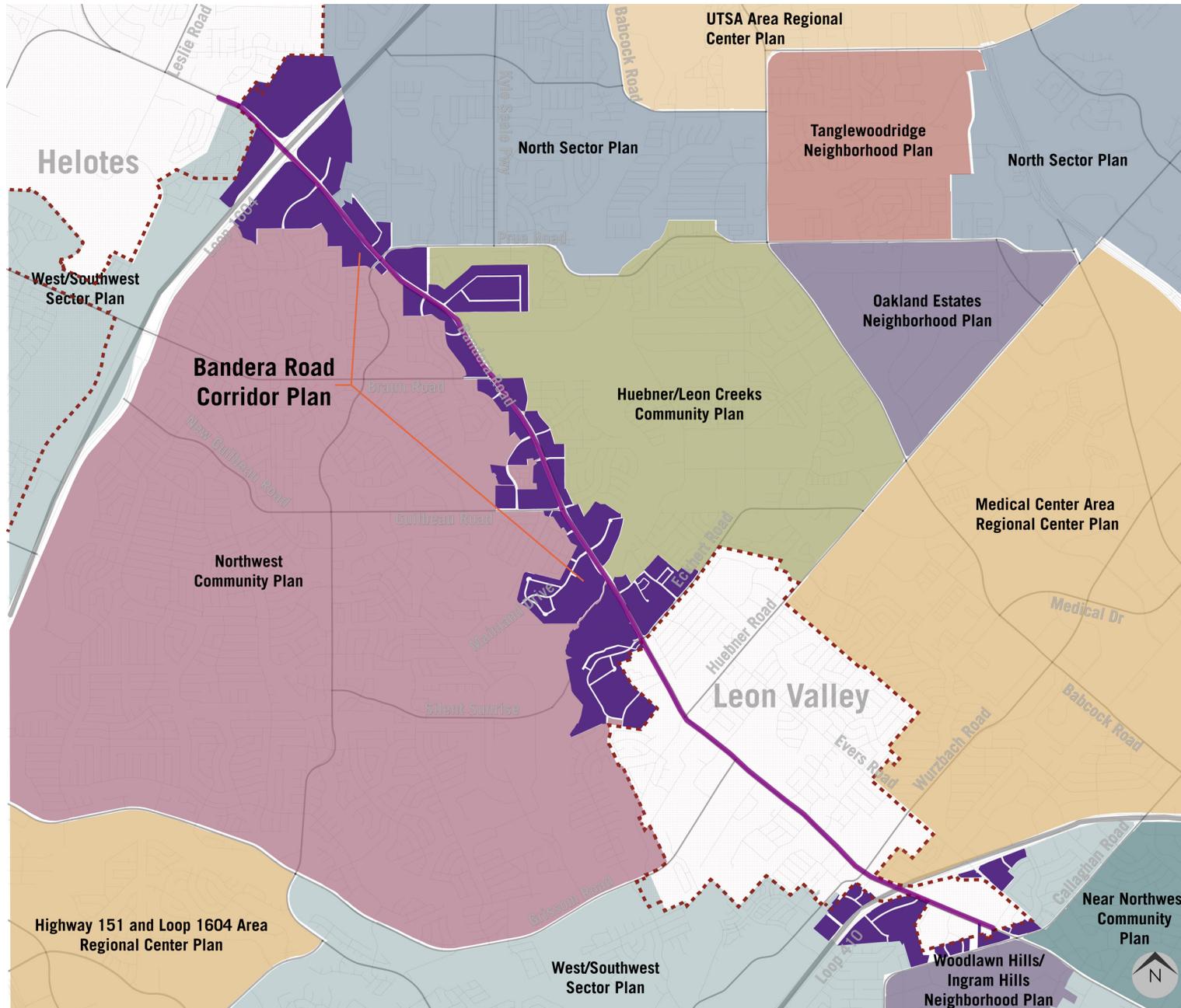


Figure 3.13: Surrounding existing land use plans

**EXISTING LAND USE PLANS**

The Bandera Road Corridor Plan focuses on the commercial and industrial properties that are located along Bandera Road or cross streets. The Verde Hills neighborhood is the sole residential subdivision included in this future land use plan; it is included at the request of the neighborhood.

Due to the placement and size of parcels, as well as how properties are grouped into subdivisions, the parcels within the future land use plan do not coincide precisely with the quarter-mile boundary of the Bandera Road Corridor Plan. Rather, plan areas are intended to capture contiguous development of the same type beginning at Bandera Road itself. This allows the future land use plan to address the entirety of existing developments rather than arbitrarily stopping at the quarter-mile boundary.

Surrounding single-family neighborhoods already carry low-density residential or similar future land use designations through existing land use planning. Those designations are not changed through this plan. Future land use planning, including the West-Northwest Community Area Plan and the Northwest Community Area Plan will address those areas.

### FREQUENTLY ASKED PLANNING/ZONING QUESTIONS

The team actively solicited questions throughout the planning process, including during the various public meetings. The following questions are extracted from some of the most frequently heard questions asked during those sessions.

#### DOES THIS LAND USE PLAN MEAN THAT I CAN'T DO WHAT I WANT WITH MY PROPERTY?

Zoning is what ultimately determines how properties can be used. Land use plans do not change zoning, so no uses allowed today are changed. In the future, though, if someone wants to change the zoning of their property, this land use plan will be used to determine which zoning districts are acceptable. However, the future land use plan generally expands the potential uses of properties, so if anything, property owners will have more opportunities in the future. This plan does not propose any changes for single-family residential property, so no effects to neighborhoods are anticipated.

#### I LIVE IN A NEIGHBORHOOD NEAR BANDERA ROAD. DOES THIS PLAN MEAN I SHOULD MOVE?

Definitely not! This plan means that there will be more choices for places to live near Bandera Road. Other parts of this plan, like the development standard recommendations and the multi-use path and other transportation recommendations, mean that the area will be a nicer place to live and work.

#### WHY DOES THIS PLAN MATTER IF IT DOESN'T FIX THE TRAFFIC PROBLEMS?

There is a separate ongoing TxDOT project to improve the Bandera Road traffic lanes and intersections which will help traffic problems. But this future land use plan will help, too. The mixed-use land use categories in the plan are a big part of that. If more people can live and work in areas that don't require them to drive, then that means fewer cars on the road. The improved multi-use paths mean that people can walk or ride bicycles for short trips and have better access to public transit, all of which also helps to take cars off the road. That improves traffic.

#### ARE YOU TAKING MY PROPERTY?

Absolutely not. No part of this future land use plan involves purchase or condemnation of private property. In fact, the expanded categories for land use for properties along Bandera Road generally mean that land could become used for more and different things, and potentially be more valuable because of that. However, a separate TxDOT project is looking at improvements to the Bandera Road roadway and intersections, and representatives of that project should be consulted for potential impacts as well.

#### HOW DOES THIS AFFECT LEON VALLEY AND HELOTES?

This future land use plan only addresses properties within the limits of the City of San Antonio, so properties within Leon Valley and Helotes are not affected. Citizens of those cities should contact their cities' planning departments for information about planning initiatives and current plans.

#### WON'T THE POSSIBILITY OF INCLUDING HOUSING IN NEW DEVELOPMENTS RESULT IN MORE TRAFFIC?

Yes and no. Our city is growing very quickly, and it is important that we make sure growth happens in appropriate ways. While growth does mean more traffic, the strategies and recommendations contained in this plan are based on best practices and can mitigate congestion. That said, different types of development create different amounts of traffic. Studies by the Institute of Traffic Engineers show that housing of all types creates the least impact on traffic. Retail and restaurant developments, because of the number of visitors that businesses have during the day, create the most traffic. But mixed-use developments, like this plan calls for, help to balance out the effect of population growth – when people live, shop, and sometimes work in the same place, traffic is reduced.



13 OCT 2022  
**DRAFT**

SECTION 4

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# PREFERRED DEVELOPMENT PATTERNS



## RECOMMENDATIONS SUMMARY

This section contains a number of recommendations related to preferred development patterns. The following points are extracted and summarized from the complete report text in order to capture all of the recommendations in a single location. A full reading of the text is strongly suggested for a complete understanding of the recommendations, including reasoning, details, and caveats.

Encourage the conversion of excess retail space into other uses and do not incentivize or require retail until the market has rebalanced

Adopt a corridor design overlay district which includes the following features for new development:

- Reduced or eliminated minimum parking requirements for mixed-use developments and transit-supportive developments
- Required inclusion of transit-supportive development features including bringing buildings up to right-of-way and placing parking behind; interior pedestrian walkways which connect to multi-use paths along Bandera; dedication of right-of-way for multi-use paths and transit stops where needed;

- Required inclusion of sustainable features including preservation of green space, material choices to minimize heat island effects, and low-impact development
- More stringent landscaping requirements
- Requirements for reduction of building height near single-family residential areas

Adopt incentive programs which support the following development features:

- Incorporation of semi-public space
- Inclusion of transit-supportive features
- Use of stormwater detention features for aesthetic purposes

Implement the following tools to incentivize preferred development patterns:

- Adopt a Tax Increment Reinvestment Zone (TIRZ) centered on Bandera Road to provide funding for public improvements
- Initiate city-led rezonings
- Keep design guidelines approvals processes streamlined
- Simplify design approvals, provide direct financial assistance, further reduce or eliminate parking requirements, and/or provide fee waivers for projects which incorporate preferred development features
- Eliminate retail requirements for mixed-use developments

Consider the adoption of a greenway design overlay for projects which abut greenway corridors

## PREFERRED DEVELOPMENT PATTERNS

### INTRODUCTION

As in many parts of the city, uses along Bandera are quite segregated – housing, retail, and light industrial uses are separate from one another and typically clustered together. This strategy requires cars to navigate from home to workplace to commercial areas, meaning that the very way the city has been developed is the primary driver of congestion as populations have grown.

This pattern of development is an artifact of automobile-centric development and associated planning trends which began in earnest in the 1950s. It is not preferred by residents – as can be seen in the public input for this project – and it is out of step with modern ideas regarding quality of life and integration of public and private space.

This section discusses future patterns of development along the corridor. It will take significant time and investment to transform the character and typologies of the corridor into those which are more sustainable, safer and more welcoming for pedestrians, and well-integrated. However, this effort is critical to improve the quality of life of those who live, work, and commute along the corridor.

### HOUSING AND RETAIL MARKET FINDINGS

The Existing Conditions Report included in-depth studies of housing and retail markets in order to understand current growth patterns along the corridor and to identify market issues and opportunities. These findings, in combination with public input, have led directly to the preferred development patterns described on the following pages.

The broader corridor continues to attract significant numbers of new residents. Those are split into two groups: south of Leon Creek, residents are typically younger and unmarried, with lower incomes and less spending power. North of Leon Creek, residents are typically more established, including families with children and higher incomes. This translates into strong demand for multifamily rental apartments – up to 200 new units per year across the entire corridor. That market will support smaller apartments with higher density and lower price points; not luxury finishes and amenities.

On the retail side, there is a large supply of retail space. Similar to the housing market, there are two sides to this: a higher-end, more expensive, and nearly fully occupied node at US 1604 and in the northern end of the corridor; and older offerings with much higher vacancy rates and weakening rents. Further study indicates that the market will not support any additional retail space.

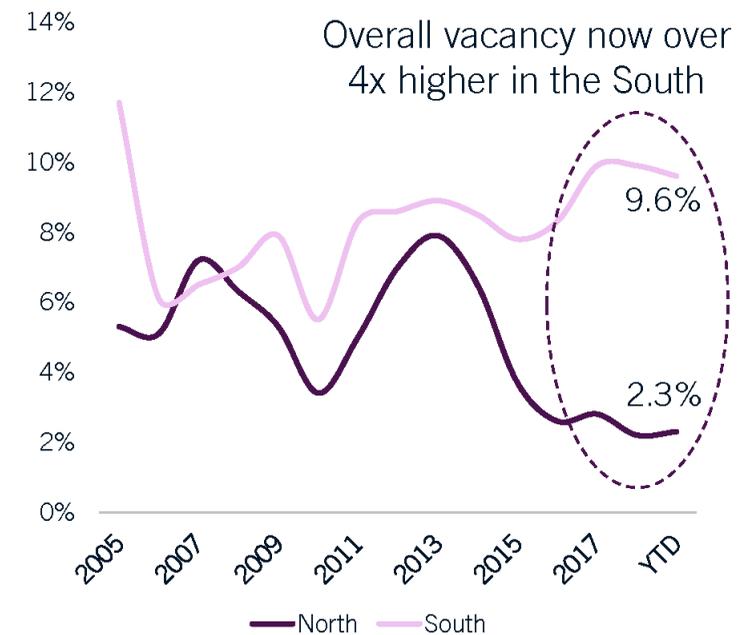


Figure 4.3: Retail vacancy analysis

To adapt the corridor to demand, existing retail space should be converted to alternate uses. Small-format, resident-serving offerings can be located in existing space. Moreover, future land use and zoning changes should support non-retail uses. Should market conditions change, or if substantial amounts of retail are replaced by other uses, this stance should be re-examined.



Figure 4.4: Mixed-use development

### MIXED-USE AND MULTI-FAMILY DEVELOPMENT

The demand for additional multi-family housing in the corridor is clear from the market analysis. From public involvement and current housing trends, it is equally clear that multi-family housing should take a more mixed-use form. It should also incorporate office space, light industrial, and a limited amount of retail space. Live/work spaces are an option as well.

Mixed-use developments can take many forms and intensities. Development along the corridor will remain relatively low intensity: generally three stories or fewer, with surface parking rather than structured parking. As discussed in this plan, developments should front on Bandera, with parking behind. Semi-public space should connect directly to pedestrian and bicycle routes along Bandera, as well as to those on intersecting streets.

### FOCUS: MIXED USES AND INDUSTRIAL

Initial reactions to proposals to combine residential and industrial developments are frequently not positive. But our city has a long history of successfully including light industrial uses near – and sometimes even intermingled with – residential uses. Selection of the type of industry is critical. The Pearl, for example, is a quite dense development which includes hundreds of apartments and a luxury hotel. Either within the development or directly adjacent, however, are a number of industrial operations: a brewery, drug manufacturing, steel fabrication, and light assembly.

For more on possibilities for combining mixed-use and light industrial uses, please refer to the Design Appendix.

### TRANSIT-SUPPORTIVE DEVELOPMENT

Transit has not been a main feature of the corridor in the past. That will change as density increases and additional routes are developed along with roadway strategies to prioritize transit, especially along routes leading to regional employment centers. Development can support this movement as new projects are shaped around the patterns of public transportation instead of the patterns of single-occupant vehicles.

Transit-supportive development maximizes space within walking distance of public transit, typically at a major transit stop. Highest density is placed near the stop, with lower densities – and parking – placed further away. The entire development is walkable and incorporates semi-public space.

Many examples of transit-supportive development are of medium to very high density. Demand and land values on the corridor do not support higher densities, so models of lower-density transit-supportive development should be used.

#### FOCUS: REDUCE MINIMUM PARKING REQUIREMENTS

Code-required minimum parking requirements, as with many other features of 20th century development, are predicated on car-centric models. This is incompatible with a development pattern which emphasizes connections to transit. Minimum parking requirements should be reduced or eliminated, and shared parking agreements and other means of limiting excessive parking areas should be employed.

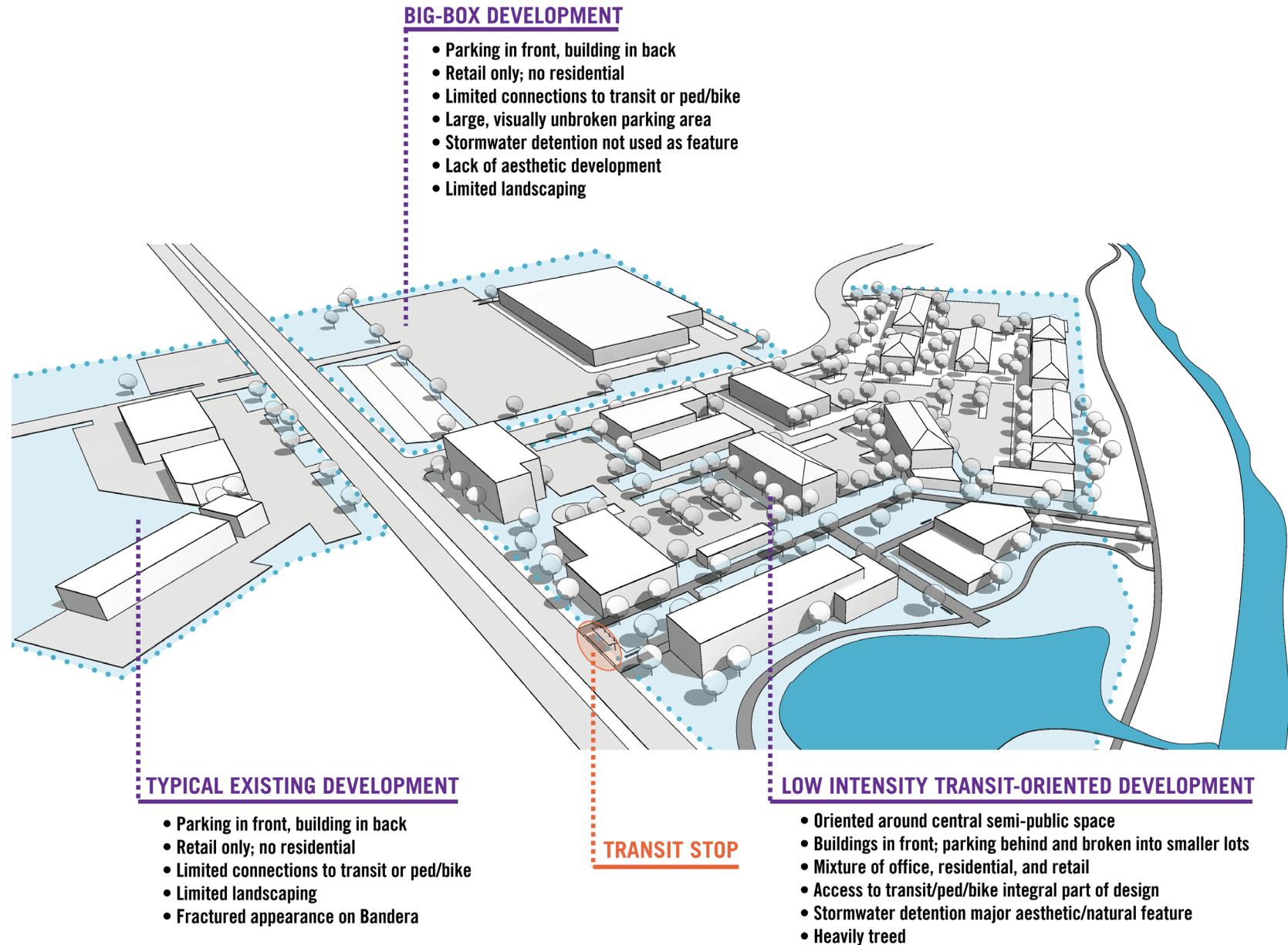
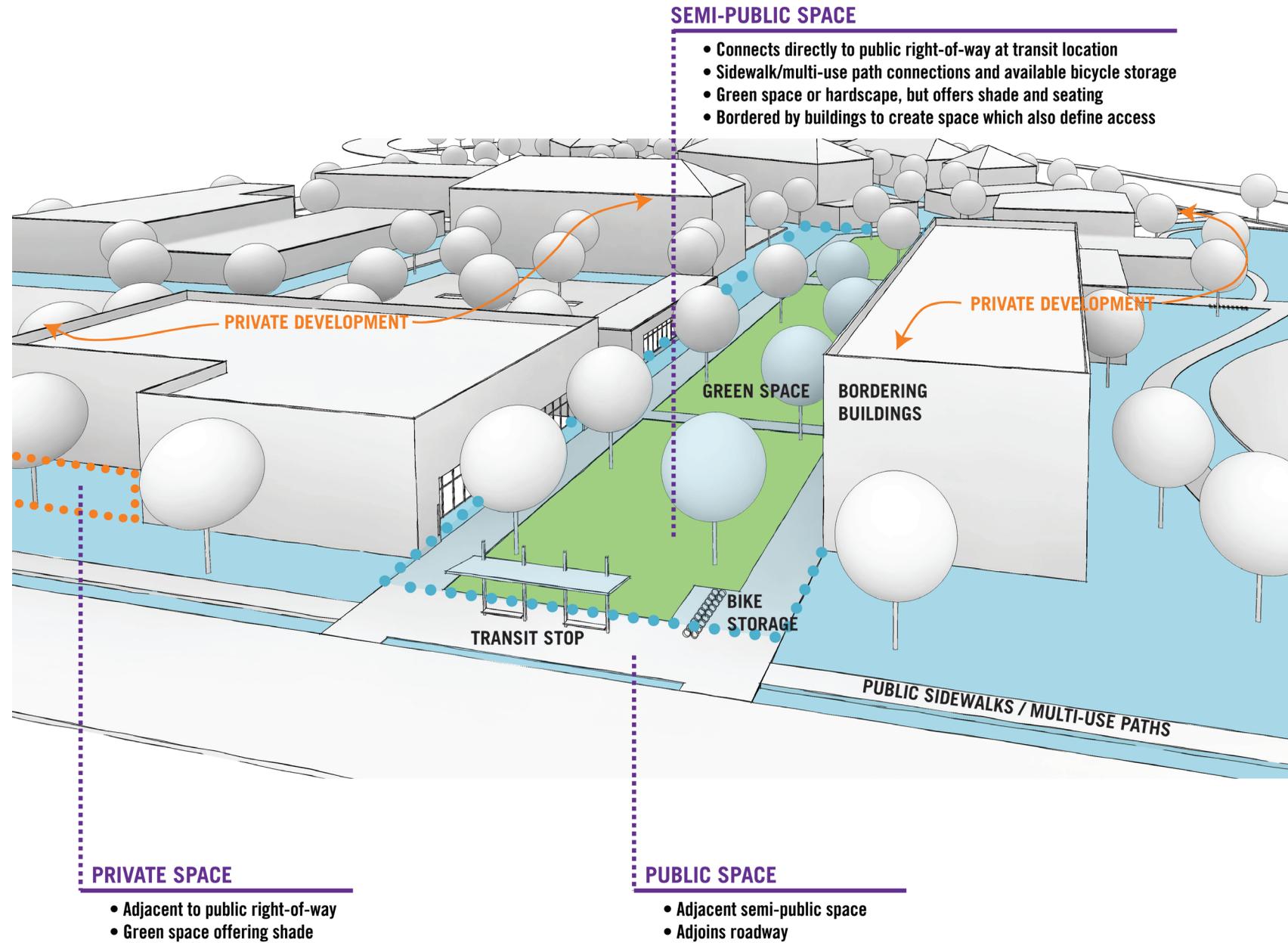


Figure 4.5: Example of low-intensity transit-supportive development, with existing and big-box models as comparisons



### SPACE-CENTRIC DEVELOPMENT

Great developments create spaces that people want to be in. Every city has examples of this, and San Antonio is no exception. San Antonio has a number of relevant examples, from the River Walk to historic spaces and places like the Pearl. These spaces can be divided into three categories: public, semi-public, and private. More information on those categories can be found in the sidebar below.

Projects of all sorts in the corridor should include open space and green space in the form of outdoor amenities such as pocket parks or walkway connections to the corridor and to nearby greenways. New major developments should incorporate semi-public green space, especially where retail or office uses are part of the development. Smaller developments or those with housing only should include private green space. In both cases, however, open space should be oriented towards the corridor, where it can serve as an interface between the development and major transportation paths.

### FOCUS: TYPES OF SPACE

**Public Space:** Space which is owned and controlled by a public entity and available with minimal restrictions for the use of all. Example: O.P. Schnabel Park

**Semi-Public Space:** Space which is owned and controlled by a private entity, but available with some restrictions for the use of all. Example: The Park at Pearl

**Private Space:** Space which is owned and controlled by a public entity and available only for residents, customers, employees, or other specific groups. Example: Oak Hills Country Club

Figure 4.6: Semi-public space characteristics

### PEDESTRIAN-FORWARD DEVELOPMENT

For many years, development in the United States has been car-centric. Location and space for parking has been given priority, and relationships between roads, parking, and building entrances have been primary. Typical strip centers are the clearest example of this: designers and developers have worked hard to make the transition from road to store entrances a priority by putting parking in front of buildings and spreading buildings out, allowing as much parking direct access to buildings as possible.

The side effect of these decisions has been to make other transportation choices difficult or impossible, which in turn increases congestion and puts those who need or want to ride public transit, bicycle, or walk at a disadvantage. Future development should reverse previous dynamics: sidewalk connections from roadways to building front doors should be prioritized, and parking should be placed behind buildings. Buildings should be clustered and oriented to make walking from building to building easy.

#### FOCUS: REVIEW SETBACKS AND LOT COVERAGE STANDARDS

How far a building or development sits from the roadway – primarily Bandera Road in this case – and how much building sits on a given piece of property impact how a corridor looks and feels. That look and feel will benefit from buildings sitting closer to the roadway instead of having large setbacks. Also, allowing buildings to take up a larger percentage of existing sites can encourage redevelopment rather than greenfield development.

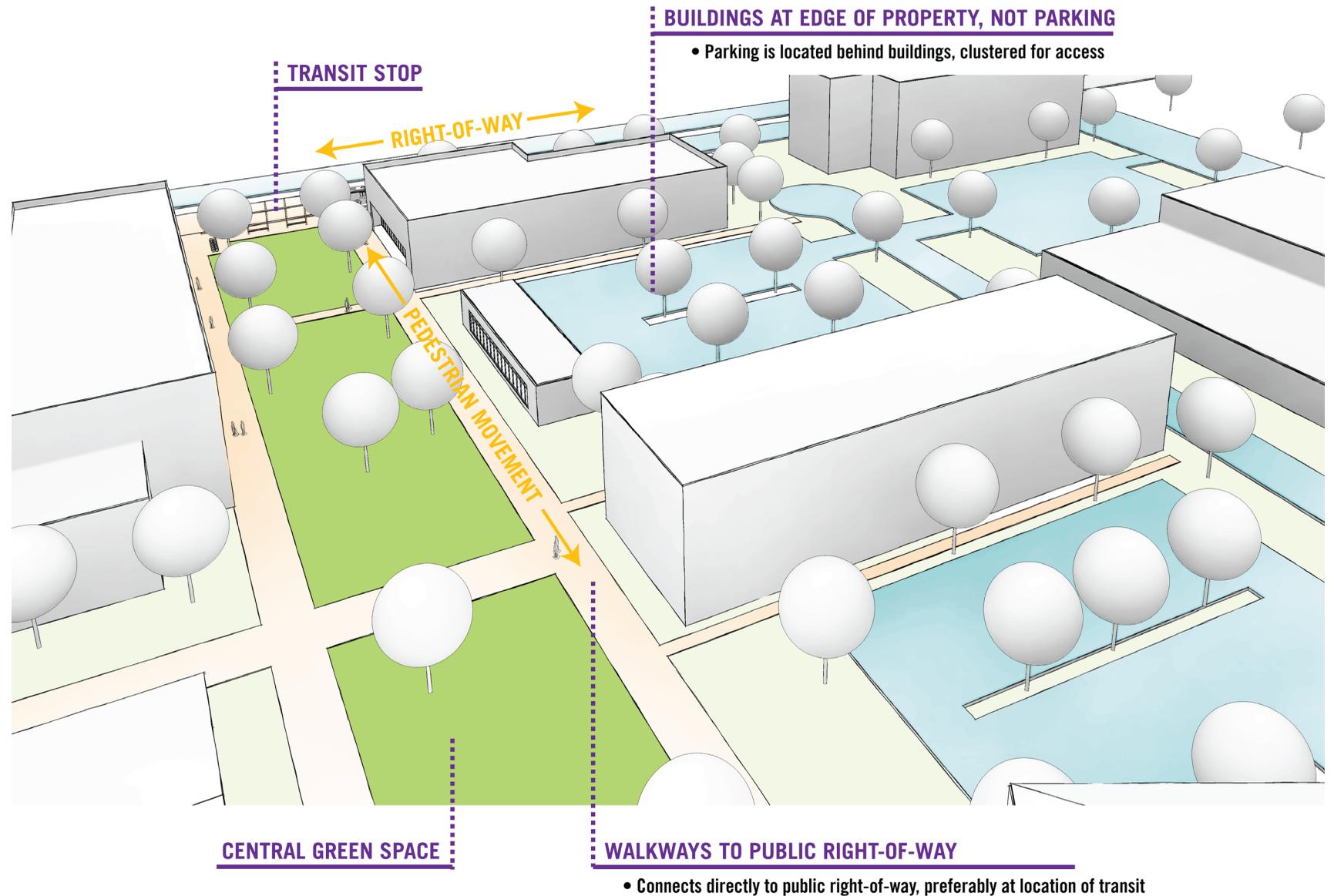
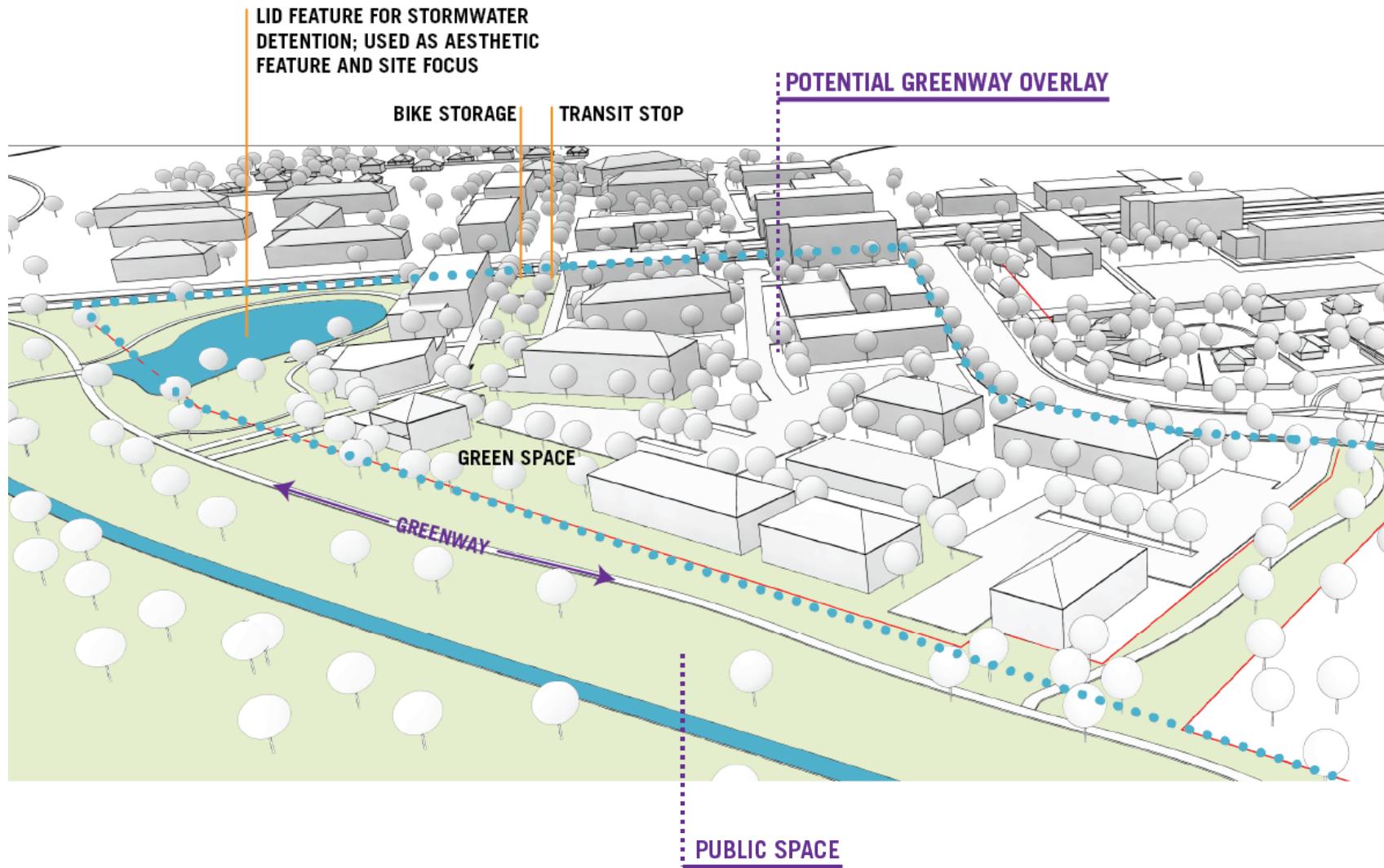


Figure 4.7: Pedestrian connections from development to right-of-way



## SUSTAINABLE DEVELOPMENT PATTERNS

Sustainable development is a large topic, covering topics as diverse as ecosystem preservation and economic continuity. For the purposes of this plan, sustainable developments are envisioned to:

- Preserve open space wherever possible. Any new greenfield development, if necessary, should support a recommended development pattern.
- Incorporate low-impact development concepts
- Be designed to facilitate energy savings strategies
- Prioritize energy-efficient means of transportation, such as walking, biking, and transit
- Minimize heat island effects through natural features and material choices
- Consider building life cycle costs rather than just initial cost

It is in the interest of the city as a whole for developers to approach new projects from the perspective of these development patterns. Such developments significantly improve the quality of life of those who live and work in and around them.

### FOCUS: LOW-IMPACT DEVELOPMENT

Low-impact development (LID) employs principles of conservation to manage stormwater runoff. On-site natural features, rather than traditional detention basins, can manage runoff while enhancing the environment and providing amenities to those who use the site. The San Antonio River Authority (SARA) has resources available to help developers and designers implement these systems.

Figure 4.8: Sustainable development patterns

## TOOLS TO INCENTIVIZE IMPLEMENTATION

The city has many tools to incentivize development, including strategies which can encourage preferred types of development over those which do not achieve the goals laid out in this plan. It is important to keep in mind, however, that those incentives should be no less sustainable and inclusive than the development which they spur. Incentives should embrace public transparency and be subject to evaluation. They should positively affect the entire spectrum of citizens through such strategies as creating affordable housing, providing semi-public space, and improving quality of life. Finally, they should prioritize local resources, in effect using city revenues to reinvest in the places and people that make up our city.

Financially-based tools such as tax abatements are not necessary to incentivize preferred development patterns. In fact, shaping the regulatory environment – in particular, making preferred design components easier to achieve and requiring other design components not normally part of developments – can be an extremely effective tool. The list below covers both current regulatory and financial tools.

## ZONING AND PROCESS ALIGNMENT

- Rezoning to allow preferred uses by right

To the extent that current zoning and the market trends of the corridor are out of step, simply re-zoning land in ways which enable preferred development can incentivize that development. This rezoning should be done with the land use plan in mind. The Planning Department should lead city-initiated rezonings of targeted parcels to encourage development which is consistent with the principles of this plan.

- Keep future design guidelines approvals processes streamlined

A zoning overlay along the corridor is one potential outcome of this process, with the intent of shaping future development in ways consistent with this plan. Making the design review process simple and unambiguous is critical in order for the design guidelines not to be perceived as an obstacle to development.

- Simplify and streamline approvals process

Layers of design review and approvals can complicate the development process and dissuade investment. Where some level of design guidance is desirable, making the process simple and unambiguous is critical.

- Create a zoning overlay district

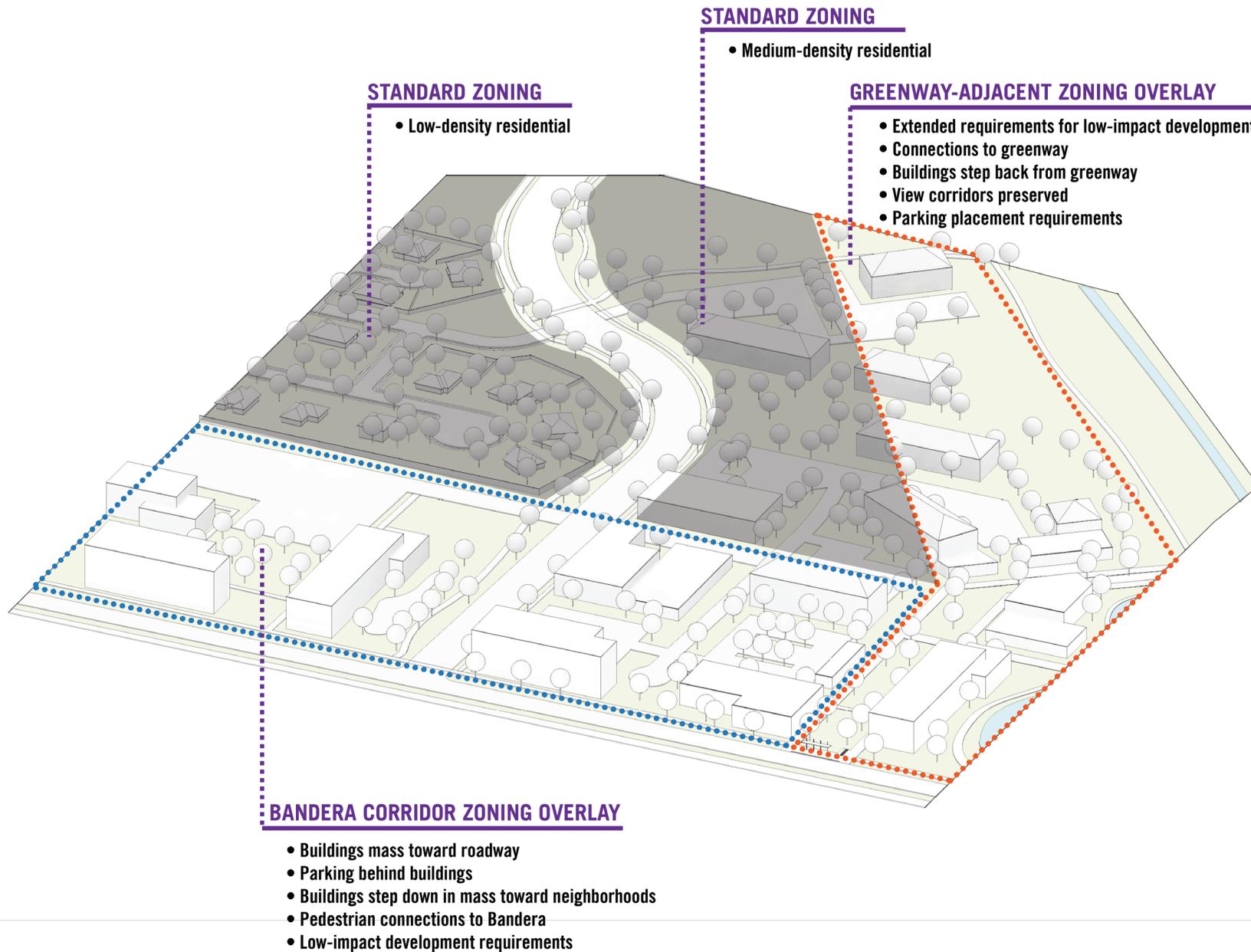
Many of the features called for in the section “Preferred Development Patterns” relate to the form of buildings and how they relate to public space. An overlay district along the corridor can establish design guidelines for how future development should comply with community intent.

There is also some possibility for a separate overlay district along drainageways, which in the study area includes Leon and Huebner creeks. As greenway-adjacent properties are developed, a set of compatible design principles should be considered to promote greenway-enhancing development.

The State of Texas recently adopted HB2439, which restricts communities’ abilities to require particular materials or building methods in new construction and renovation. Any future overlays and design standards must fully comply with that bill.

- Explore incentives for mixed-use development

Development incentives can trade an array of benefits to developers (for example, an increased number of floors or other easing of zoning regulation, or project funding) in consideration for a public benefit. The public benefit can also take a number of forms, including the mix of uses within a development, dedication of public space, improvement of public streetscapes, or other features which this plan calls for. Establishing a specific overlay area for incentive zoning along the corridor could enhance the ability of the city to encourage preferred development patterns.



### FOCUS: OVERLAY DISTRICTS AND DESIGN GUIDELINES

Principles about the following items should be included:

- How many stories buildings should be, including potential variation in height towards major roadways and nearer to residential neighborhoods
- How buildings should be placed in relation to roads and green areas
- Where parking should be located on sites
- Low-impact development requirements
- Connections from developments to transit and to multi-use paths and sidewalks
- Paving materials (either types or qualities)
- Landscaping requirements over and above those already contained within city code, as well as how landscaping should be located in relation to the corridor

Figure 4.10: Zoning overlay potential examples

**EASE OR SIMPLIFY REQUIREMENTS**

- Eliminate retail requirements for mixed-use developments

Market analysis reveals that the corridor is over-retailed. Eliminating any requirement for retail in new mixed-use developments will make that development more appealing to investors, lenders, and developers. However, where new developments replace existing retail, the market will likely support replacement of that existing retail, enabling mixed-use development with new shops and restaurants.

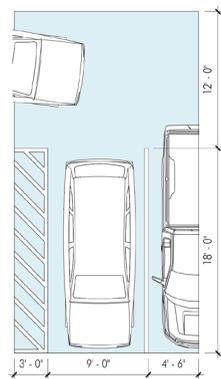
- Reduce or eliminate minimum parking requirements

Parking is both an eyesore and an expense. Allowing for developments to reduce or eliminate parking required can make developments more efficient and reduce their impact. Current codes require 1.5 parking spaces per apartment unit, plus size retail parking requirements for highest-use times of year, leading to excessive unused parking at other times of year. Market-based policies typically see this reduced to 1.0 to 1.5 spaces per unit,<sup>1</sup> and developments along transit corridors have successfully eliminated parking requirements.

1 King County Metro “Right Size Parking Model Code, p.4.



Two-bedroom apartment  
1000 SF



1.5 parking spaces  
500 SF

Figure 4.11a: Comparison of required parking and apartment size

- Encourage accessory dwelling units (ADUs)

Accessory Dwelling Units – sometimes called granny flats or casitas – are self-contained residential units on the same property as a single-family home. These units match the demand profile for housing along the corridor well, and they also increase available housing without an increase in the perceived intensity of development in the area. These are allowed in the City of San Antonio and should remain allowed in any overlay district, including inter-municipal overlay districts.

ADUs are currently allowed in San Antonio and are encouraged as part of the recently adopted Strategic Housing Implementation Plan (SHIP). The process is currently being streamlined.

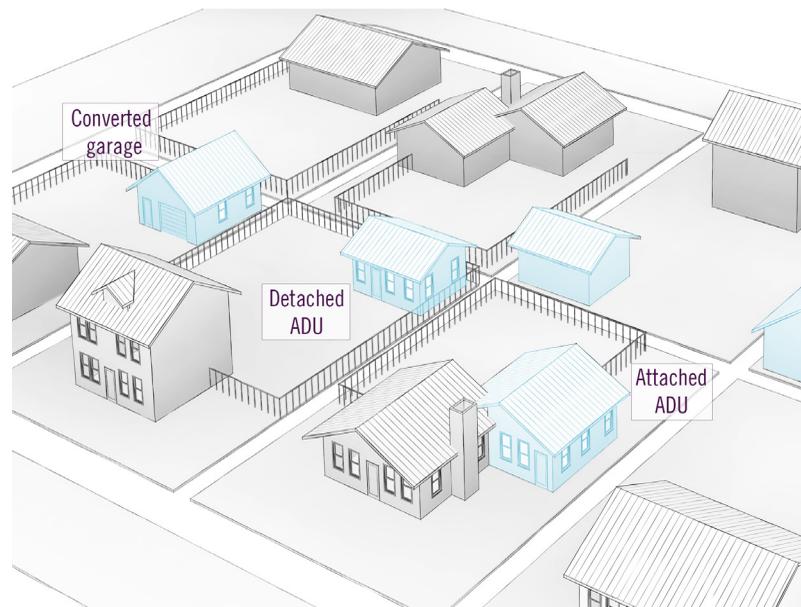


Figure 4.11b: Accessory dwelling unit examples

**DIRECT FINANCIAL INCENTIVES**

- Waive all or part of development fees for certain types of development

The City has various tools to financially incentivize construction. One of the easiest ways to do so is to partially or completely waive City permit and inspection fees and SAWS impact fees for construction. As of this writing, the City’s Fee Waiver Program prioritizes projects involving affordable housing, owner-occupied rehabilitation, historic rehabilitation, and business development. Additional categories could incentivize construction of preferred development types within the corridor.

- Implement incentive programs for incorporation of public/private space

One of the key facets of the preferred development types is incorporation of shared public space. While construction of these spaces can be incentivized via fee waivers, additional means of encouragement should be explored given the contribution of shared public space to the common good. Tax abatements are one tool. Tax increment reinvestment zones (TIRZ) or other positive funding mechanisms can also contribute to this goal.

A TIRZ for the Bandera Road Corridor would be a strong tool to accomplish many of the goals of the plan. Similar TIRZs elsewhere in the city – the Northeast Corridor in particular – provide a sound model for a Bandera Road Corridor TIRZ. It is recommended that the Planning Department have a seat on the board of the TIRZ to guide the implementation of this plan through the actions of the TIRZ.

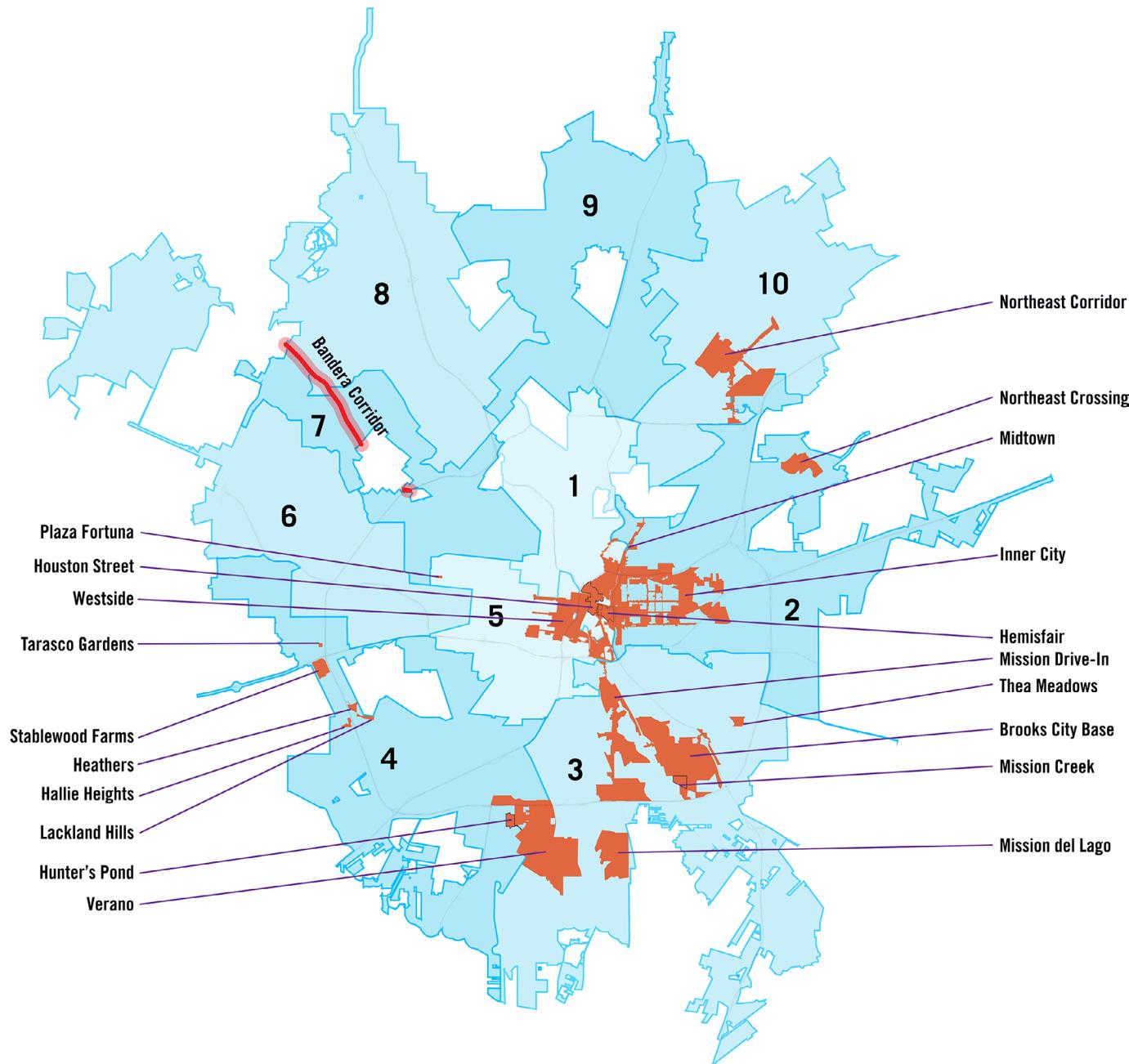


Figure 4.12: Current TIRZ districts within the city

**FOCUS: TAX INCREMENT REINVESTMENT ZONES**

A TIRZ can be a valuable mechanism to revitalize areas in need of focused investment to improve the appearance and function of public infrastructure. TIRZs can be particularly useful funding tools where a planning effort, like this one, has identified a community vision for an area and laid out a plan for how public infrastructure should be developed.

TIRZ designation requires the action of City Council. While other taxing entities can participate in a TIRZ, it is not unusual to have the city be the sole participant. When a TIRZ has been established, an increase in incremental real property taxes resulting from new construction, public improvements, and redevelopment efforts may be collected and deposited in the TIRZ fund.

There are currently no TIRZs near Bandera Road or in the far western area of the city.

13 OCT 2022  
**DRAFT**

SECTION 5

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# **TRANSPORTATION AND NEIGHBORHOOD CONNECTIVITY**



## RECOMMENDATIONS SUMMARY

This section contains a number of recommendations related to transportation and network connectivity. The following points are extracted and summarized from the complete report text in order to capture all of the recommendations in a single location. A full reading of the text is strongly suggested for a complete understanding of the recommendations, including reasoning, details, and caveats.

Construct the following projects:

- Add bicycle facilities on Mainland west of Bandera Road
- Add bicycle facilities to Huebner on both sides of Bandera Road
- Build a trail segment along Huebner Creek east of Bandera Road
- Build a trail segment along Huebner Creek east of Evers Road
- Build a trail segment along Huebner Creek west of Bandera Road
- Add bicycle facilities to Prue Road between Bandera Road and Cedar Park

- Complete bicycle facilities on Timberhill to connect to proposed facilities on Huebner Road
- Add bicycle facilities on Guilbeau to connect to retail nodes at Bandera Road and Tezel Road as well as to Nani Falcone Park
- Complete missing sidewalks near Mainland
- Complete missing sidewalks on Jackwood, Mobud, and Kenwick
- Complete missing sidewalk segments on South Hausman Road
- Complete missing sidewalk segments on Prue Road

Improve intersections using the following strategies:

- Connect new multi-use paths to clearly-marked crosswalks, including green-painted markings for bicycles
- Include push-button-activated pedestrian signals at all intersection corners; implement pedestrian islands at wider crossings
- Raise sidewalk crossings at selected areas within developments to prioritize pedestrians

Incorporate the following amenities along the corridor:

- Implement an extensive shade tree planting program
- Include shade structures at all transit stops, and in dense areas, include benches and waste/recycling receptacles
- Take advantage of natural features in pathway design

Develop a comprehensive list and create a study of roadway network options to facilitate east-west connections across the corridor

## TRANSPORTATION AND NETWORK CONNECTIVITY

### INTRODUCTION

To support safe, healthy, and efficient travel to and throughout the Bandera Road Corridor, new pedestrian, trail, and bicycle connections are needed. This plan documents potential multimodal connection opportunities and overall arterial improvements to the transportation network surrounding the Bandera Road corridor. The focus of the following analysis is to identify short- and long-term improvements that can directly benefit the corridor in terms of enhancing connectivity, creating multimodal options, improving safety, and reducing congestion. The analysis does not just look at where these potential improvements are located, but also to what extent they can improve the corridor. This plan takes the perspective that pedestrian and bicyclist safety is of paramount importance, in support of the city's Vision Zero commitment. Analysis of the potential TxDOT improvements, in the last part of this section, focuses on prioritizing the safety of those users. At times, that focus stands at odds to improving a difficult, and worsening, traffic situation.

A total of twelve multimodal improvements within ½-mile of Bandera Road were identified that better connect the corridor to key destinations while also supporting disadvantaged populations in the area. These improvements were assigned a prioritization score based on a number of metrics centered on demographics and proximity.

While developing the network surrounding Bandera Road is crucial to achieving the goals of this plan, the impact of direct improvements to the corridor itself should not be understated. As a primary thoroughfare in the region, positive multimodal impacts in the region begin with Bandera Road.

### NETWORK CONNECTIVITY

As the primary arterial in the area, Bandera Road carries more traffic than adjacent or intersecting routes. However, cross-streets, neighborhoods, and other components of the corridor are just as important to consider in order to create a healthy transportation network. Connecting neighborhoods and surrounding developments is crucial to ensure that all parts of the system are functioning well.

Neighborhood-to-corridor connectivity helps provide residents a choice about where to live and work. Quality of life is positively affected by choice: people are happier and more productive when they are free to make decisions about transportation, where they live, and where they work. That freedom of decision can only come when public infrastructure is developed to encourage it. The Bandera Road Corridor is currently primarily auto-centric and retail-focused, but it can become a place where all modes of transportation and a healthy mixture of uses are encouraged.

While neighborhood layouts ideally include multiple entry and exit points to allow direct paths to destinations, the layouts of neighborhoods in the area are largely set. Where

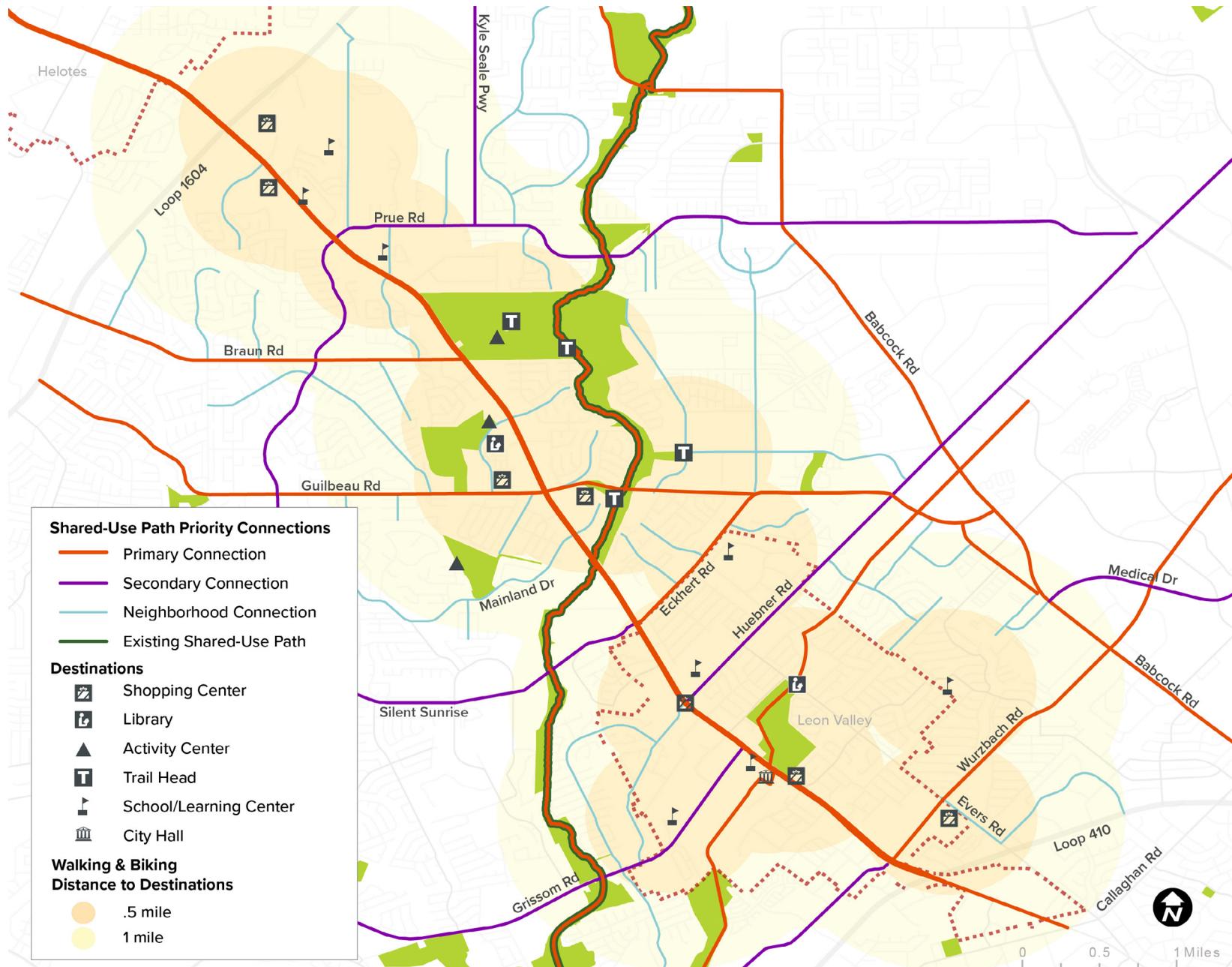
possible, routes should be simple and direct, including new access points for multiuse paths.

Along collector streets which connect neighborhoods to Bandera Road, multi-use paths – grade-separated from the road, and preferably separated horizontally by five or more feet – should create dedicated connections for people who walk or bike. These paths should also be shaded with appropriate street trees. Where paths cross drive lanes, crosswalk markings and changing pavement types should indicate the priority of people who walk or bike over those who drive.

### PRIORITY CONNECTIONS

Improving the connectivity along Bandera Road by installing bicycle and pedestrian paths would be a significant, and positive, change in mobility options for the corridor. However, in order to truly transform transportation opportunities, transportation facilities connecting to Bandera must offer similar amenities.

The network of pathways shown in Figure 5.4 has been determined based on population density to connect the most people in the most efficient manner. The City of San Antonio has a separate initiative to update a citywide bicycle master plan which will ultimately determine where and how connections are placed. This figure is merely a guide to possibilities, using demographic information as a determinant.



Three levels of connections are shown:

- Primary: First-priority connections along and to Bandera Road along arterials and collector roads
- Secondary: Second-priority connections to Bandera Road along arterials and collector roads
- Neighborhood: Connections from primary and secondary connections directly into neighborhoods and other developments

The main differentiator between primary and secondary connections, in this instance, is population density. The character of primary and secondary connections should be the same, but primary connections are those which more directly connect areas of higher population density to Bandera Road.

The potential infrastructure improvements shown in Figure 5.4 represent a network as a whole that sees Bandera Road as the main artery. Within that system of connections, there are a number of more direct connections to Bandera Road that should be prioritized due to proximity to the corridor and relative ease of construction. These opportunities were identified through a study of gaps in the sidewalk, trails, and bike lanes network, and prioritized through a number of different criteria. With limited right-of-way and potential utility constraints in some cases, further investigation is needed to accommodate the full range of additional connections.

This multimodal project analysis considered active transportation projects that would improve the overall network as well as access to destinations along and near the Bandera Road Corridor. On a national average, 35% of driving trips are less than two miles in distance. By building a safe and comfortable transportation network for all modes, many short driving trips can be replaced by walking and biking.

Figure 5.4: Priority neighborhood and greenway connections

### MULTIMODAL PROJECT ANALYSIS METHODOLOGY

The multimodal analysis consisted of three steps:

1. Identify active transportation network gaps for sidewalks, trails, and on-street bicycle network within a half mile of Bandera Road using existing spatial data
2. Map trip generators that generate demand for multimodal access
3. Prioritize projects based on the benefit of the new connection to the existing network, potential to connect destinations along the corridor, and provide equitable access.

The first step in identifying potential priority projects to improve the Bandera Road Corridor involved locating gaps in the active transportation network that were within a half mile of Bandera Road. Bicycle, trail, and sidewalk gaps were identified in the City of San Antonio’s GIS transportation datasets. This methodology did not consider potential right-of-way or utility constraints. Many of the projects identified will require further coordination with other agencies, public input, and budgeting.

Trip generators and other sources of multimodal transportation demand were identified to add to the prioritization framework. Trip generators include future nodes, specific land uses (fresh food, recreation, civic buildings, and education), transit stops with 20 or more daily boardings, parks within a half mile of Bandera Road, trailheads, and existing bike lanes. The prioritization framework also looked at disadvantaged areas, including census block groups that saw above average poverty rates, as well as block groups that had a majority nonwhite population. These elements made up the analysis criteria for which projects that addressed gaps in the multimodal transportation network were prioritized.

Analysis Criteria	Description	Spatial Methodology	Mode
<b>Future Growth Node</b>	One of three half mile radius nodes identified for potential future growth.	Within 100'	All
<b>Destinations</b>	Existing destinations providing fresh food, recreation, civic buildings, healthcare, and education.	Within 250'	All
<b>Transit Stop</b>	VIA Transit stop with 20 boardings or more per day.	Within 250'	All
<b>Parks</b>	Parks within a half mile of Bandera Road.	Within 100'	Trail, Bike
<b>Trail Access</b>	Trailheads or access trails that connect to Leon Valley Creek Trail or Huebner Trail.	Within 250'	Sidewalk, Bike
<b>Bike Network Access</b>	Connects to an existing bike lane.	Within 100'	Bike
<b>Above average poverty</b>	Census block group that has more households than average federal poverty rate for Bexar County, 14.3% (2019, ACS)	Crosses the census tract	All
<b>Majority nonwhite</b>	Census block group that's more than 50% not white (2019, ACS)	Crosses the census tract	All

Figure 5.5: Multimodal project analysis methodology

Figure 5.5 provides the specific methodology that was used to determine if a project met the criteria. The extents of the proximity analysis were based on the size of the analysis criteria. For example, parks can be relatively large, so the search buffer only looked within 100 feet, including within the park. Transit stops and destinations are smaller than parks, therefore the limits of the proximity analysis were expanded to 250 feet. All criteria were weighted the same.

ID	Project Type	Name	Project Description	Future Node	Destinations	Transit Stop	Parks	Trail Access	Bike Network Access	High poverty	Majority nonwhite	Total
B1	Bicycle	Mainland	Add bicycle facilities to Mainland west of Bandera. This facility would connect parks as well as the high-use transit stop on Mainland (via the lower stress Mainland east of Bandera), Wal-Mart and access to the Leon Creek trailhead. This bicycle facility would also provide multimodal access to potential growth in the area.	1	0	0	1	1	1	1	1	6
B2	Bicycle	Huebner	Add bicycle facilities to Huebner on both sides of Bandera to provide improved access to potential growth in the area, connect existing bike lanes, and improve access to retail destinations on Bandera. <b>COORDINATION WITH LEON VALLEY NEEDED.</b>	1	1	1	0	0	1	1	1	6
T1	Trail	Huebner Creek east of Bandera	Build a segment of trail along Huebner Creek east of Bandera. This new trail would provide a direct connection to Huebner Onion Park and other potential trail connections.	1	1	0	1	N/A	N/A	1	1	5
T2	Trail	Huebner Creek east of Evers	Build a segment of trail along Huebner Creek east of Evers, connecting to Trail 1. This new trail would connect to existing bicycle facilities, community center, and neighborhoods.	1	1	0	1	N/A	N/A	1	1	5
T3	Trail	Huebner Creek west of Bandera	Build a segment of trail along Huebner Creek west of Bandera, connecting to existing trail. This trail would connect Leon Valley to the broader Huebner and Leon Creek trail network.	1	1	0	1	N/A	N/A	1	1	5
B3	Bicycle	Prue	Add bicycle facilities to Prue between Bandera and the shared path on Prue east of Cedar Park. These facilities would provide access to Bandera and connect into the Leon Creek trail, providing access to nature and parks via bicycle.	1	0	0	1	0	1	1	1	5
B4	Bicycle	Timberhill	Add bicycle facilities where they are missing on Timberhill to complete the gap if connected to proposed facilities on Huebner. <b>COORDINATION WITH LEON VALLEY NEEDED.</b>	0	0	0	1	1	1	1	1	5
B5	Bicycle	Guilbeau	Add bicycle facilities to Guilbeau to connect retail nodes at Tezel and Bandera as well as Nani Falcone Community Park.	1	0	0	1	0	1	1	0	4

Figure 5.6a: Summary of priority bicycle and trail projects

ID	Project Type	Name	Project Description	Future Node	Destinations	Transit Stop	Parks	Trail Access	Bike Network Access	High poverty	Majority nonwhite	Total
S1	Sidewalk	Central Node sidewalk gaps	Complete missing sidewalks located in the Central Node as part of any land use changes or new development.	1	1	0	0	0	N/A	1	0	3
S2	Sidewalk	Jackwood, Mobud, and Kenwick	Complete missing sidewalks on these three streets connecting to Bandera to provide access between the retail/light industrial as well as to transit on Bandera.	0	0	1	0	0	N/A	1	1	3
S3	Sidewalk	S Hausman	Complete missing sidewalk segments on Hausman Road. As a main road that connects many neighborhoods to Prue it would remove accessibility gaps for people walking.	1	0	0	0	0	N/A	1	0	2
S4	Sidewalk	Prue	Complete missing sidewalk segments on Prue Road. As a main road that connects many neighborhoods to Bandera it would remove accessibility gaps for people walking.	1	0	0	0	0	N/A	1	0	2

Figure 5.6b: Summary of priority sidewalk projects

### MULTIMODAL ANALYSIS RESULTS

The results of the multimodal project prioritization analysis are summarized in Figures 5.6a and 5.6b. Figure 5.6a shows priority bicycle and trail projects and includes five bicycle projects and three trail projects, listed in order of priority. Figure 5.6b shows four sidewalk projects, also listed in order of priority. Figure 5.7 shows the location of the priority projects in relation to Bandera Road with each project identified with its ID.

### TYPES OF FACILITIES

The City's 2011 Bicycle Master Plan identifies multiple types of bicycle facilities for network connectivity. That document suggests that the City's development requirements and the AASHTO urban design manual be used to guide specific design. This project, along with the public input received throughout the project process, concurs with the bike master plan's identification of shared use paths along heavily trafficked roadways (including Bandera Road itself as well as major roadways intersecting Bandera Road) and on-street bicycle lanes with adjoining sidewalks on lesser-traveled roadways. While many of the projects in this plan may support elements of the bike master plan, the intention of the project identifications here are to inform updates to future active transportation planning efforts.

While public input throughout the project process has coincided with elements in the bike master plan, it is worth mentioning that the bike master plan has not been widely implemented despite its approval in 2011. The master plan is slated to be updated in 2022-2024, which could further inform prioritization for specific bicycle improvements recommended in the Bandera Road Corridor Plan. The elements in this plan that coincide with those found in the bike master plan are recommended primarily based on public input and identified local need, rather than being pulled from the bike master plan itself. Many of the projects identified will require further coordination with other agencies, public input, and budgeting.

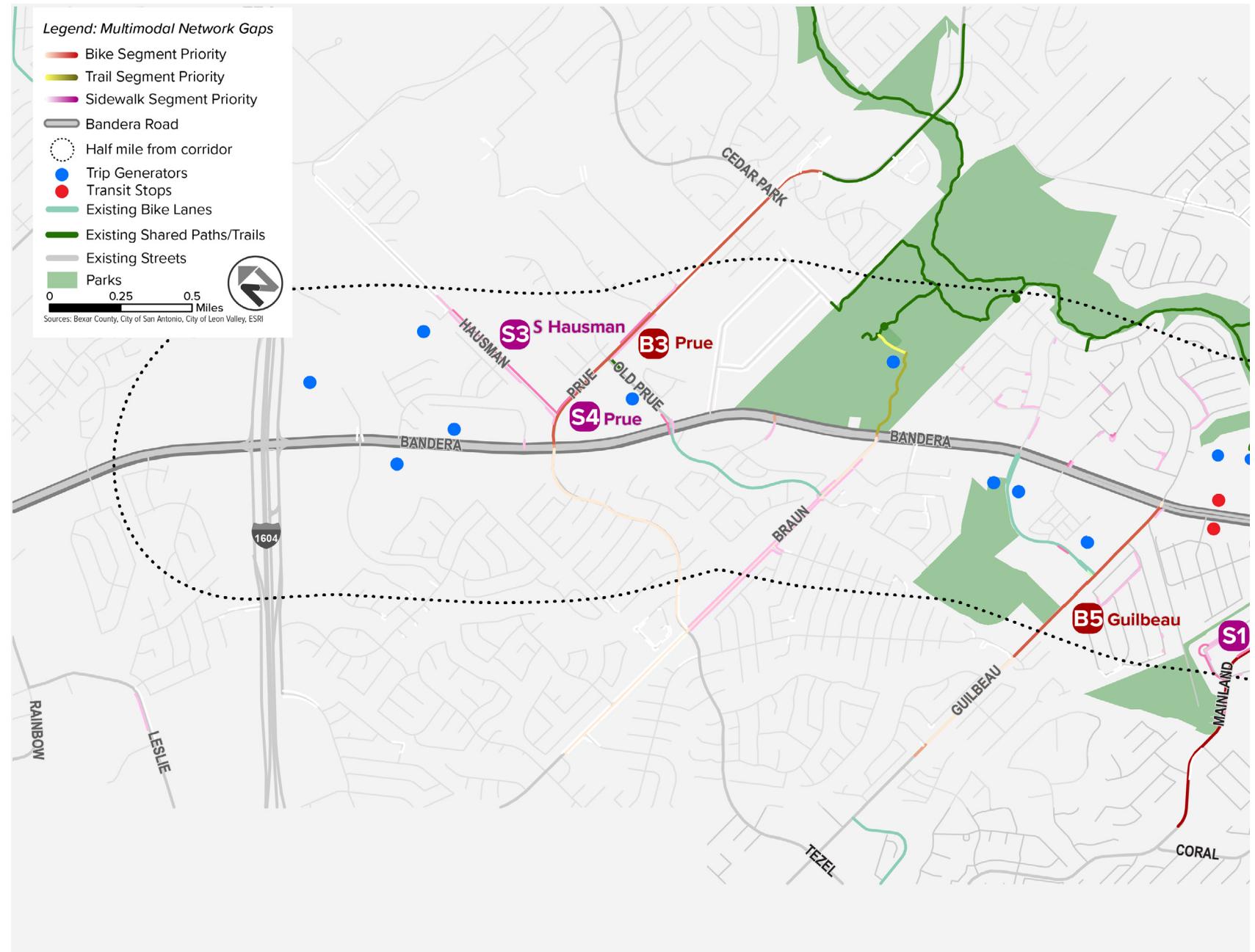


Figure 5.7: Priority projects



ID	Project Type	Name	Project Description
B1	Bicycle	Mainland	Add bicycle facilities to Mainland west of Bandera. This facility would connect parks as well as the high-use transit stop on Mainland (via the lower stress Mainland east of Bandera), Wal-Mart and access to the Leon Creek trailhead. This bicycle facility would also provide multimodal access to potential growth in the area.
B2	Bicycle	Huebner	Add bicycle facilities to Huebner on both sides of Bandera to provide improved access to potential growth in the area, connect existing bike lanes, and improve access to retail destinations on Bandera. <b>COORDINATION WITH LEON VALLEY NEEDED.</b>
T1	Trail	Huebner Creek east of Bandera	Build a segment of trail along Huebner Creek east of Bandera. This new trail would provide a direct connection to Huebner Onion Park and other potential trail connections.
T2	Trail	Huebner Creek east of Evers	Build a segment of trail along Huebner Creek east of Evers, connecting to Trail 1. This new trail would connect to existing bicycle facilities, community center, and neighborhoods.
T3	Trail	Huebner Creek west of Bandera	Build a segment of trail along Huebner Creek west of Bandera, connecting to existing trail. This trail would connect Leon Valley to the broader Huebner and Leon Creek trail network.
B3	Bicycle	Prue	Add bicycle facilities to Prue between Bandera and the shared path on Prue east of Cedar Park. These facilities would provide access to Bandera and connect into the Leon Creek trail, providing access to nature and parks via bicycle.
B4	Bicycle	Timberhill	Add bicycle facilities where they are missing on Timberhill to complete the gap if connected to proposed facilities on Huebner. <b>COORDINATION WITH LEON VALLEY NEEDED.</b>
B5	Bicycle	Guilbeau	Add bicycle facilities to Guilbeau to connect retail nodes at Tezel and Bandera as well as Nani Falcone Community Park.

ID	Project Type	Name	Project Description
S1	Sidewalk	Central Node sidewalk gaps	Complete missing sidewalks located in the Central Node as part of any land use changes or new development.
S2	Sidewalk	Jackwood, Mobud, and Kenwick	Complete missing sidewalks on these three streets connecting to Bandera to provide access between the retail/light industrial as well as to transit on Bandera.
S3	Sidewalk	S Hausman	Complete missing sidewalk segments on Hausman Road. As a main road that connects many neighborhoods to Prue it would remove accessibility gaps for people walking.
S4	Sidewalk	Prue	Complete missing sidewalk segments on Prue Road. As a main road that connects many neighborhoods to Bandera it would remove accessibility gaps for people walking.

## INTERSECTIONS

Treatment of how people who walk and bike interface with vehicular traffic is a key feature of connectivity design. As can be seen in data for Bandera Road, intersections are the most challenging areas for safety. Proper treatment for intersections will vary substantially with the characteristics of the intersection, particularly as new intersection types are implemented to improve traffic flow on Bandera Road. Figure 5.9 shows varying intersection design elements depending on the type of treatment needed. To allow for the incorporation of intersection treatments allowable under the Manual on Uniform Traffic Control Devices (MUTCD), it is recommended that TxDOT request Interim Approval, if not already done so, for the optional use of: green colored pavement in marked bicycle lanes and in extensions of bicycle lanes through intersections and traffic conflict areas (IA-14), Bicycle Signal Faces (IA-16), Bicycle Boxes (IA-18), and Two-Stage Bicycle Turn Boxes (IA-20). Depending on those considerations and specific intersection design, the following are features which should be implemented:

- Paths should connect to clearly marked crosswalks (including green-painted markings for bicycles) at all intersections (green paint can be authorized under MUTCD)
- Intersection corners should have push-button-activated pedestrian signals that can easily be reached on bike or wheelchair, and pedestrian islands should be implemented at wider crossings to offer mid-street refuge to pedestrians and bicyclists.
- In rare occasions at some comparatively lightly trafficked locations (entrances to and within developments, primarily), sidewalk crossings should be raised to create speed tables to prioritize pedestrians and slow traffic

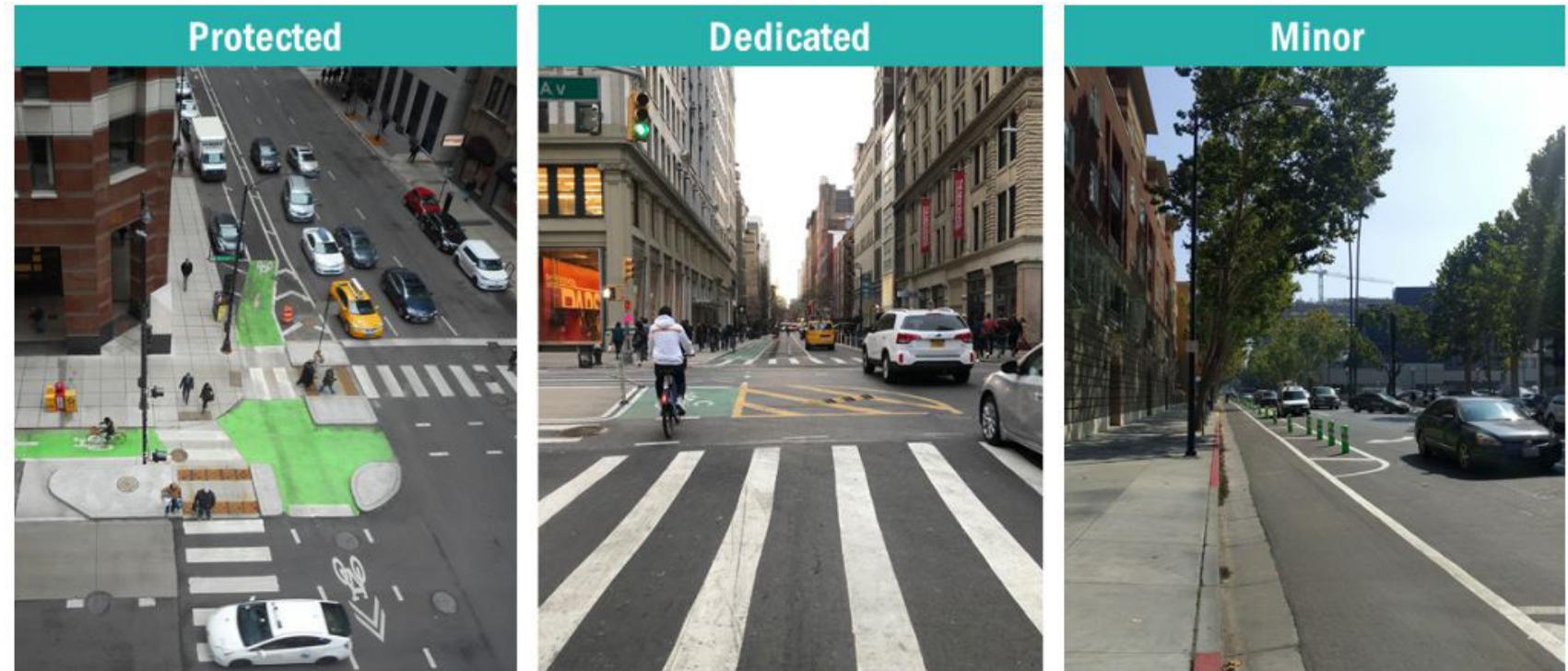


Figure 5.9: Various types of intersection design elements. Source: NACTO



Figure 5.10: Site amenities. Source: Purdue University

### AMENITIES

The most attractive and appealing places in cities to walk or to ride offer improvements beyond minimal walkways. Different types of improvements can help reduce traffic by making alternatives to driving more tempting. The cost of such improvements should be weighed against those positives; dedicating a small portion of project budgets to non-vehicular improvements can substantially improve quality of life for those who use the improvements.

- Shade trees should be provided wherever possible to improve the bike/pedestrian environment as well as for aesthetics
- Shade structures should be included at all transit stops
- Pathway design should take advantage of natural features and extra right-of-way where possible while still allowing relatively direct movement between destinations
- Priority should be given to connections to parks, greenways, and other natural features
- In densely populated areas, additional site amenities such as waste/recycling receptacles and benches should be considered
- When redevelopment occurs, new building frontages should be adequately set back to accommodate pedestrian amenities that were not previously possible due to right-of-way limitations

## ROADWAY NETWORK

The contemporaneous TxDOT study used origin-destination information to, for the first time, create a comprehensive overall picture of desired movements of those who use Bandera Road. That information revealed a significant east-west component to overall trips, meaning that many people who use Bandera Road use it primarily as a segment of an overall trip which ultimately connects to origins and destinations east or west of the study area, not points further north or south along Bandera Road.

Addressing these movement patterns directly has the potential to improve traffic congestion on Bandera Road itself. There are a number of possibilities for east-west connectivity; in conjunction with extensive public input and participation, options for further study should be developed and analyzed.

There are also other connectivity options which may not offer significant improvements to traffic congestion on Bandera Road but which would be valuable in providing greater network connectivity – including bicycle, pedestrian, and transit connections. Any such options should be studied as well.

## TXDOT CONCEPT REVIEW

TxDOT is studying potential improvements along the same limits of Bandera Road being looked at in the Bandera Road Corridor Plan. In September 2020, TxDOT held a Virtual Concept Workshop to present potential improvement options along Bandera Road to members of the study's Technical Work Group and Planning Team, which were composed of city and county engineers, planners, and representatives from local mobility and stakeholder groups.

Among the options presented were two roadway concepts and various intersection treatments. This section will evaluate these concepts in relation to the goals of the Bandera Road Corridor Plan, while acknowledging that there is no singular option that will cater to all groups who would use Bandera Road. Intersection and roadway concepts are compared against a conventional, no-build scenario. A summary of the concept review is provided in the table in Figure 5.12.

Additional detail to provide points of clarification behind some of the transit, bicycle, and pedestrian elements of the concept review is included below.

### TRANSIT FACILITIES

- Displaced left turns (DLT) received a poor rating because the intersection concept presents placement constraints for bus stops.
- Restricted crossing U-turns (RCUT) received a “bad” rating because the intersection concept would introduce delay to minor street transit routes, and the inability of the concept to provide comprehensive crosswalk coverage would make pedestrian access to transit stops less direct.
- Single point urban interchanges (SPUI) received a “bad” rating because, like RCUTs, the pedestrian experience crossing Bandera Road would be less direct than a traditional intersection, and would likely make transit stop access difficult, particularly for minor street access to major street transit stops.

### BICYCLE AND PEDESTRIAN FACILITIES

- Bike and pedestrian facilities include all infrastructure, including but not limited to: bike lanes, off-street paths, sidewalks, crosswalks, and pedestrian crossings. Bike/pedestrian crossings are only the facilities that cross a street perpendicular to the flow of vehicular traffic.

- For the Continuous Green T intersection concept, the lack of a crossing opportunity for pedestrians against a major street negatively impacted its rating.
- While bike and pedestrian crossings may have fewer conflicts in a Continuous Green T than a traditional intersection, crossing times are longer and crossing is less direct, which can lead to confusion and inaccessibility.

Concept		Ease Congestion	Transit Facilities	Bicycle Facilities	Pedestrian Facilities	Bike/Ped Crossings	Urban Design	ROW Impacts
Roadway	No-Build	⊖	⊖	✖ ✖	✖ ✖	⊗	⊖	✓
	Boulevard	✓	⊖	✓	✓	✖ ✖	✓	✖ ✖
	Parkway	✓	⊖	✓	✓	⊗	⊗	⊗
Surface Intersection	Conventional Signal	⊖	⊖	⊖	⊖	⊖	⊖	⊖
	Continuous Green T	✓	⊖	⊗	⊗	⊗	⊗	⊖
	Displaced Left Turn	✓	⊗	⊗	⊗	✖ ✖	⊗	✖ ✖
	Restricted Crossing U-Turn (RCUT)	✓ ✓	⊗	⊗	⊗	✖ ✖	✖ ✖	✖ ✖
Grade Separated	Diamond Interchange	✓ ✓	⊖	⊗	⊗	⊗	⊗	✖ ✖
	Single Point Urban Interchange (SPUI)	✓ ✓	⊗	✖ ✖	✖ ✖	✖ ✖	✖ ✖	⊗

**Legend**

- Better ✓ ✓
- Good ✓
- Neutral ⊖
- Bad ⊗
- Worst ✖ ✖

**BOULEVARD CONCEPT**

The initial roadway concept presented in TxDOT’s Virtual Concept Workshop is the Boulevard Concept. This concept expands the number of travel lanes along the corridor from six to ten and creates separation between the mainlanes of the roadway and frontage roads in both direction. This concept would connect mainlanes to frontage roads via on- and off-ramps. At intersections, drivers would be able to access cross streets from the mainlanes as well as the frontage road via left turns, but right-turn movements onto the cross street from the boulevard would only be possible for drivers in the frontage roads. Additionally, movement between frontage road and mainlanes would be prohibited at intersections, and left turn movements from frontage roads would not be allowed. Drivers would also be able to access the mainlanes as well as the frontage roads from the cross street: however, right turns from cross streets would only be allowed to the frontage roads. The diagram in Figure 5.13 shows the Boulevard Concept, complete with proposed traffic flows.

The primary purpose behind the Boulevard Concept is to separate local traffic from through traffic by separating mainlanes and frontage roads. Drivers who are looking to access local destinations would primarily access cross streets and destinations along Bandera Road from the frontage roads, where vehicle speeds would be lower and where transit facilities would be located. Bicycle and pedestrian facilities would be located in a shared-use path adjacent to and separated from the frontage road. Much like a highway, drivers accessing more regional destinations would remain on the mainlanes until reaching the desired cross street, where they would turn onto the cross street via a left-turn movement or exit onto the frontage road prior to the intersection with the cross street where they can make a right-turn movement.

Figure 5.12: Concept review summary

As noted in the Virtual Concept Workshop, the Boulevard Concept creates a higher number of conflict points than the current Bandera Road layout, in particular between vehicles and those using the crosswalks. A wider roadway with more travel lanes would require more time to cross, and so special attention would need to be paid to ensure that pedestrian cycle lengths are appropriately long to accommodate vulnerable users and that pedestrian refuge islands are provided in every roadway median.

Figure 5.14 shows the right-of-way requirements of two buildout options for the Boulevard Concept. TxDOT noted in the Virtual Concept Workshop that there is not currently sufficient right-of-way to accommodate this corridor treatment without some amount of right-of-way acquisition. As it stands now, the right-of-way width for the Bandera Road corridor is typically 180 feet – but this concept could be as wide as 245 feet at intersections, depending on the configuration. A trade-off would need to be made to reduce this concept's buildout width, and the plan notes that medians could be shrunk to the minimum recommended width of six feet, which would reduce the width to between 175 and 230 feet. The drawback to this proposal is that the shortened medians would not provide adequate refuge for pedestrians crossing Bandera Road at an intersection.

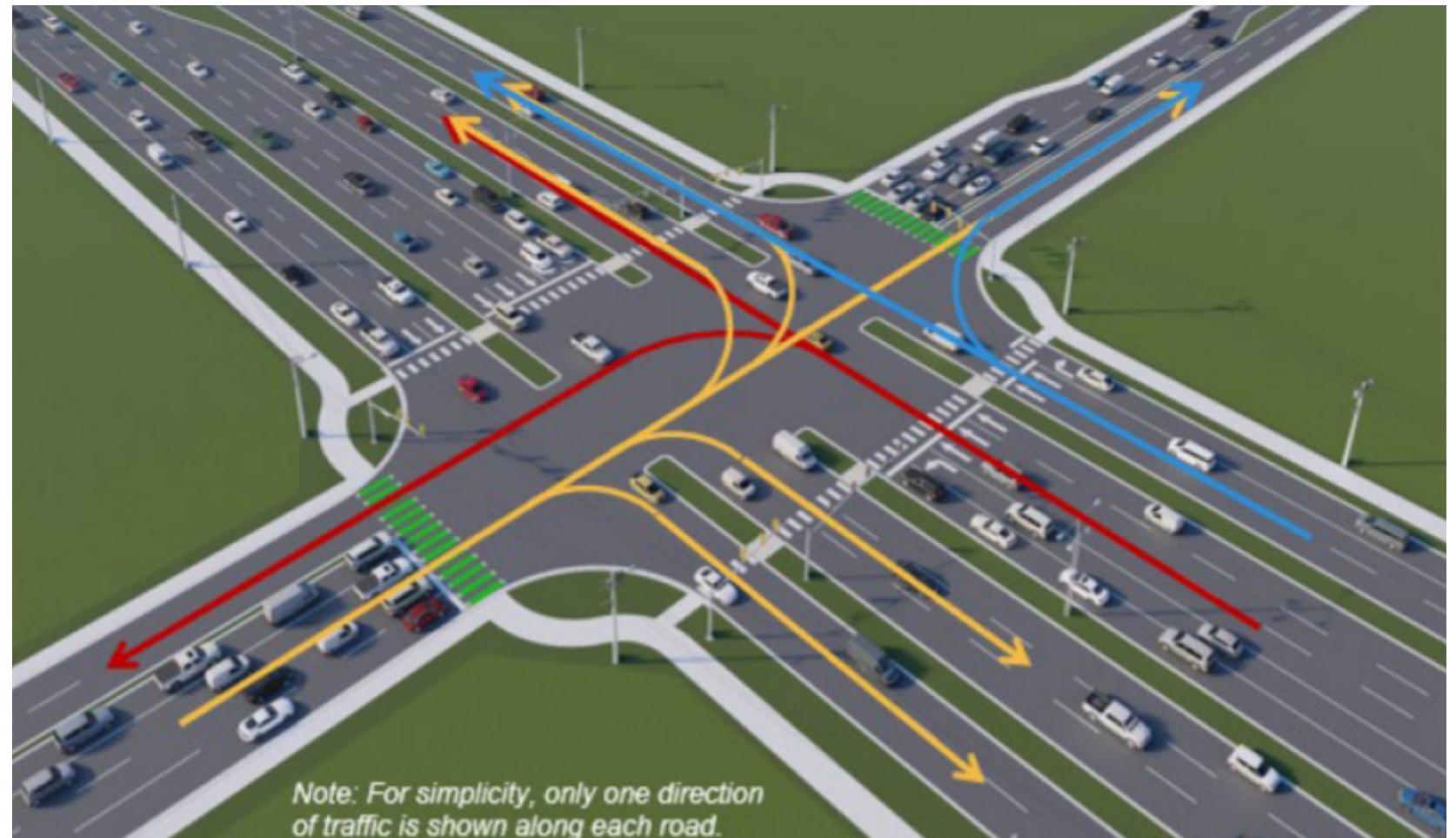


Figure 5.13: Boulevard concept diagram

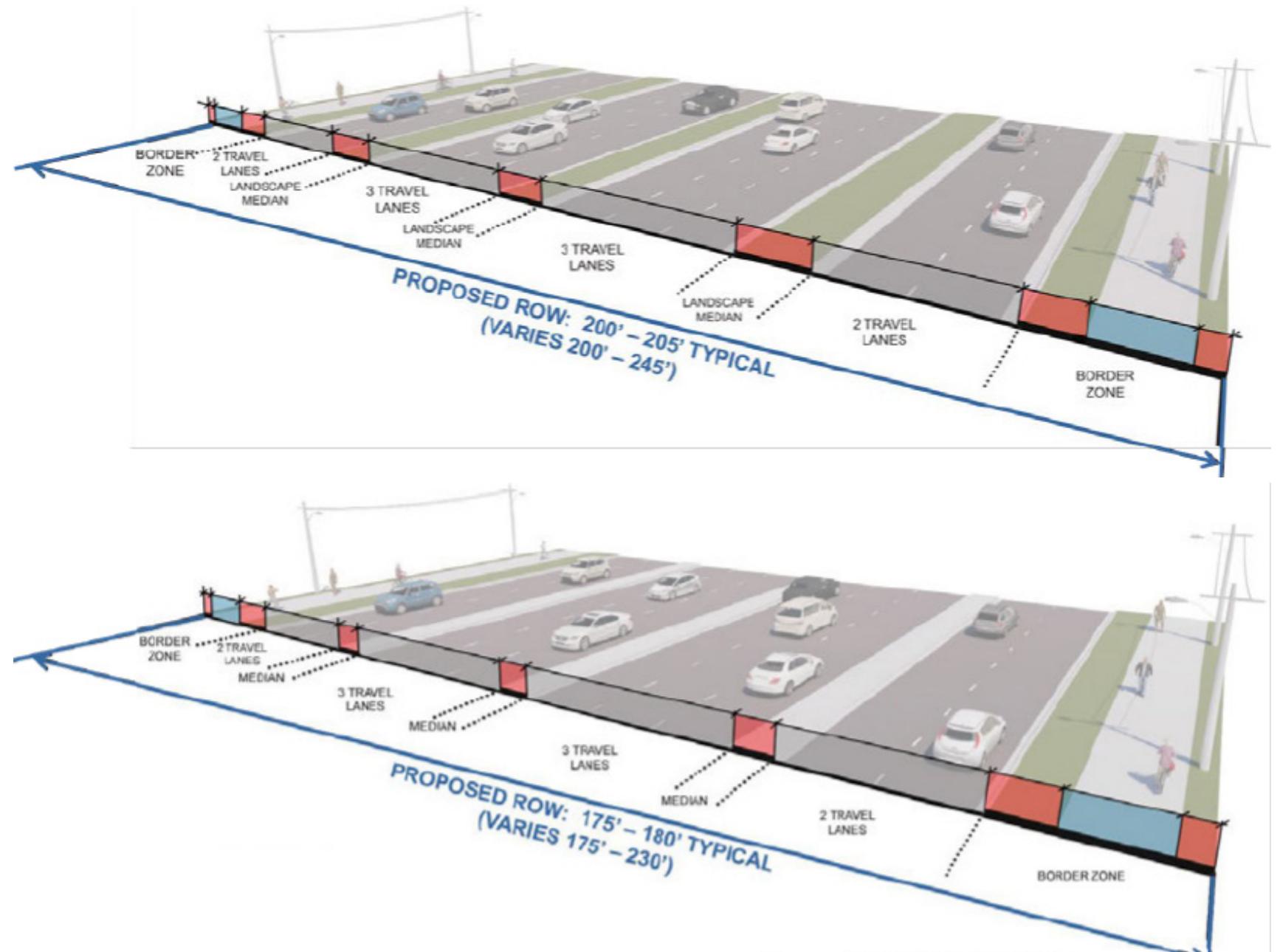


Figure 5.14: Boulevard Concept right-of-way needs

**PARKWAY CONCEPT**

The Parkway Concept was developed in response to community feedback. The design of this concept is more consistent with traditional divided arterial roadways, in that it includes eight travel lanes with a landscaped median down the center of the roadway. Because there are no frontage roads, the footprint of this concept can be narrower than the Boulevard Concept, and with fewer conflict points. Dedicated right- and left-turn lanes are a component of this concept, so there is the potential that a wider right-of-way would be needed at intersections. The TxDOT workshop noted that the typical width of the Parkway Concept would be between 170 and 180 feet wide, which would fit within the majority of the existing right-of-way on Bandera Road. However, additional space would be needed to accommodate potential dedicated turn lanes at at-grade intersections. A diagram of the Parkway Concept is shown in Figure 5.15.

The Parkway Concept would provide better crossing safety for pedestrians than the Boulevard Concept due to the shorter crossing distance and wider pedestrian refuges, but the overall crossing distance would still be long and special attention would need to be paid to signal timing efforts. For both concepts, access to any pedestrian-oriented land uses could be hindered by a perceived inability to cross Bandera Road safely. The Parkway Concept also does away with the separation of regional and local trips found in the Boulevard Concept. While the Parkway Concept may be incrementally better for pedestrians crossing Bandera Road, it would be unlikely to address congestion as effectively as the Boulevard Concept.

**CONCEPT LIMITATIONS**

Both concepts have limitations that do not effectively address all goals of the Bandera Road Corridor Plan. Easing congestion is an important goal, which both concepts would address, while other goals of this plan are not well-supported by either of the two roadway concepts. In particular, minor street crossings for bicyclists and pedestrians become more difficult compared to

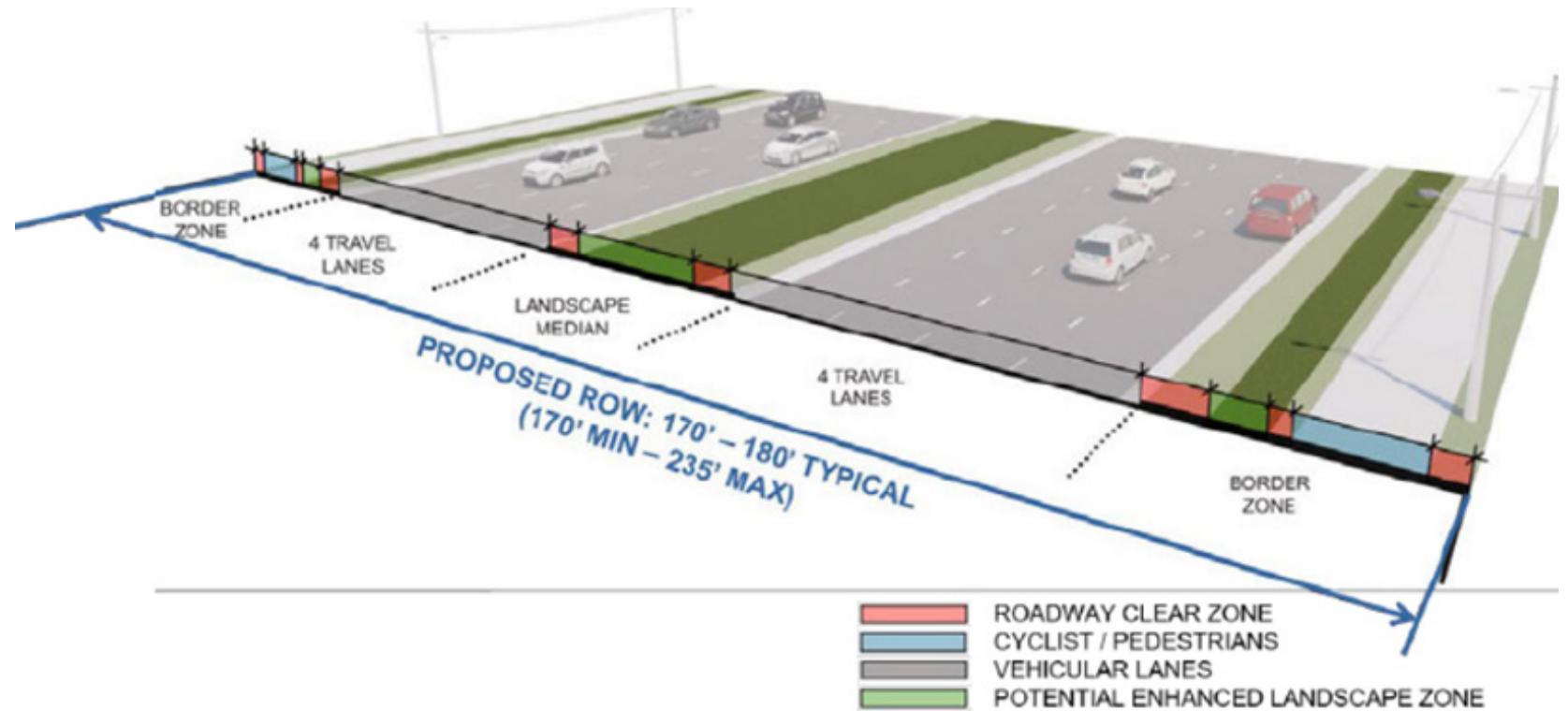


Figure 5.15: Parkway Concept

a no-build or conventional configuration scenario. While the shared-use paths that are included along Bandera Road in these concepts would help establish Bandera Road as a walkable corridor, neither concept would fully meet the plan’s goal of enhanced non-auto transportation options or improved safety for all modes due to the challenges introduced for crossing pedestrians and bicyclists at intersections. However, the shared-used path along Bandera Road would be a significant safety improvement over the existing conditions, where pedestrian facilities are inconsistent and often lack sufficient width.

The buildout of these two concepts adds either two lanes (Parkway Concept) or four lanes (Boulevard Concept) to the

existing roadway layout. According to data from the Traffic Count Database System, traffic volumes collected in 2019 at five locations along the corridor show an average daily traffic (ADT) of between 29,000 and 55,000. This level of usage is typical for a six-lane divided arterial, fitting the current configuration of Bandera Road. It can be reasonably assumed that regional growth and new local land uses will generate additional trips on Bandera Road. According to the principle of induced demand, to widen Bandera Road with additional lanes will encourage usage of the new capacity to the point where it maxes out. The problem of congestion cannot be addressed by supply alone – there must be some consideration for demand as well.

Simply widening Bandera Road to add capacity is unlikely to

effectively manage congestion alone. As mentioned in a previous section, building out the surrounding arterial network to create connections to Bandera Road can move trips off Bandera Road and onto adjacent roadways. Each of the four modeled scenarios discussed previously create the opportunity to move traffic off a segment of Bandera Road. It can be anticipated that a full buildout of each option could at the least provide travelers with several options for completing trips to avoid Bandera Road entirely.

In the same sense that creating vehicle capacity would induce demand for that new capacity, the same is true about facilities for other modes. The more bicycle, pedestrian, and transit infrastructure that is incorporated into the network, the more it will be used, potentially creating a reduction in trips that would otherwise be taken by car.

Transportation Demand Management (TDM) options can also be explored to reduce vehicle demand along the Bandera Road corridor. TDM involves incentivizing other forms of transportation through a reduction in parking supply, the provision of programs, and the construction of infrastructure. A TDM-focused approach to new development along Bandera Road would involve undertaking parking studies to take advantage of adjacent land uses to provide shared parking opportunities. In general, mixed-use developments help reduce vehicle trips due to shortening trips between adjacent and complementary uses to the point where they can be replaced by walking or biking. Additionally, property owners and tenants can provide programs to employees and residents that can reduce demand for parking, including paid parking, unbundling parking from leases, offering universal transit passes, improving nearby transit infrastructure, and many more. Through a combined effort between providing network connections and helping reduce demand, congestion can be reduced on Bandera Road without solely relying on an increase in capacity. Any work towards developing the larger street network or implementing

TDM strategies would need to be further studied and led by local municipalities, as those efforts would not directly fall under TxDOT's oversight.

### INTERSECTION CONCEPTS

In addition to roadway concepts, TxDOT also presented potential at-grade and interchange intersection configurations along Bandera Road. These options were evaluated with the CAP-X tool, which considers inputs related to vehicle turning movement counts, truck traffic, and critical lane volumes using forecasted traffic for the design year of 2047. The tool's output ranks a variety of intersection configurations based on volume to capacity ratio (v/c) at the intersection level.

These concepts were reviewed in the Virtual Concept Workshop, but primarily in terms of the movements of and impacts to drivers. This review continues that evaluation, taking into account both qualitative and quantitative methods to examine the user experience and operations of walking, transit, biking, and auto modes.

The concepts reflect both at-grade and interchange configurations, but the analysis notes that the at-grade innovative intersection concepts would only be applicable to the Parkway Concept of Bandera Road. Any interchange concept would include an at-grade connection with the frontage roads in the Boulevard Concept. While the exact design of each intersection along Bandera Road is not known, and specific details of each type of intersection configuration can have a profound effect on user experience, the following section provides general feedback and guidance if any of the evaluated configurations are advanced further into concept level design.

### CONVENTIONAL SIGNAL

Conventional signals along Bandera Road, much like those that exist currently on the corridor, would require additional signal sophistication and coordinating timing for the Boulevard Concept. At the very least, new signal heads would be needed

to accommodate new turning movements and dedicated turn lanes. In general, signalization of intersections for the Boulevard Concept will be more complicated and will require more precision than for the Parkway Concept.

Generally, this concept is the least complicated of those presented by TxDOT. Conventional signals typically have the smallest footprint of the intersection concepts presented, and as a result, it allows the shortest crossing distance for pedestrians. The conventionally signalized intersection is familiar to drivers, and it should not cause confusion or a learning curve to use. Additionally, due to the reduced right-of-way needed, there is the opportunity to use the leftover right-of-way for transit stop enhancements, a transit signal priority layout, or protected bicycle treatments. There is also the opportunity for compact infill development at the corners of this intersection due to the familiar and compact layout. Based on TxDOT's initial analysis, conventional intersection improvements with added capacity would utilize most of the existing right-of-way, or in some cases, would require additional right-of-way to construct due to additional turning lanes.

In the standard configuration of the conventional signal concept, there is the potential for conflicts between vehicles making right-turns and bicycles or pedestrians continuing through the intersection. Due the compact layout, there is also the potential for capacity constraints. The conventional signal also does not favor the minor street (since operations on the minor street will continue to experience delay with the intersection treatment offered), so there is the potential for delay for vehicles at those approaches.

**CONTINUOUS GREEN T**

This intersection configuration, shown in Figure 5.17, can only be used at intersections with three approaches. The intersection is laid out in such a way that through vehicles traveling on the far side of the cross-street intersection have no stop control aside from those making a left-turn movement. Vehicles traveling in the other direction on Bandera Road would need to stop at the signal much like at a conventional signal.

For bicycle and pedestrians, this concept provides a number of benefits. Because this concept allows for single leg movements, it makes crossing easier for pedestrians and provides refuges for multi-stage crossings. Right-turn operations at the minor street are identical to those at a conventional intersection. The existence of the continuous side of the intersections means that those on bicycles can proceed in that direction without conflicts. Additionally, bicyclists on the side street can make a protected left turn every time. For transit, the free flow nature of the continuous direction reduces the chance for delay, and the protected left turns allow for an acceleration lane for buses to safely merge with continuous traffic. Finally, the free flow nature of the continuous direction benefits auto drivers by reducing opportunities for delay.

The primary deficiency of this configuration for pedestrians is that the continuous segment would need a signal in order to create the opportunity for pedestrians to cross onto the side street. Adding a signal would reduce many of the benefits of the configuration for through-traffic. For bicyclists, making a left-turn movement onto the minor street would require additional signal phasing and physical accommodations.

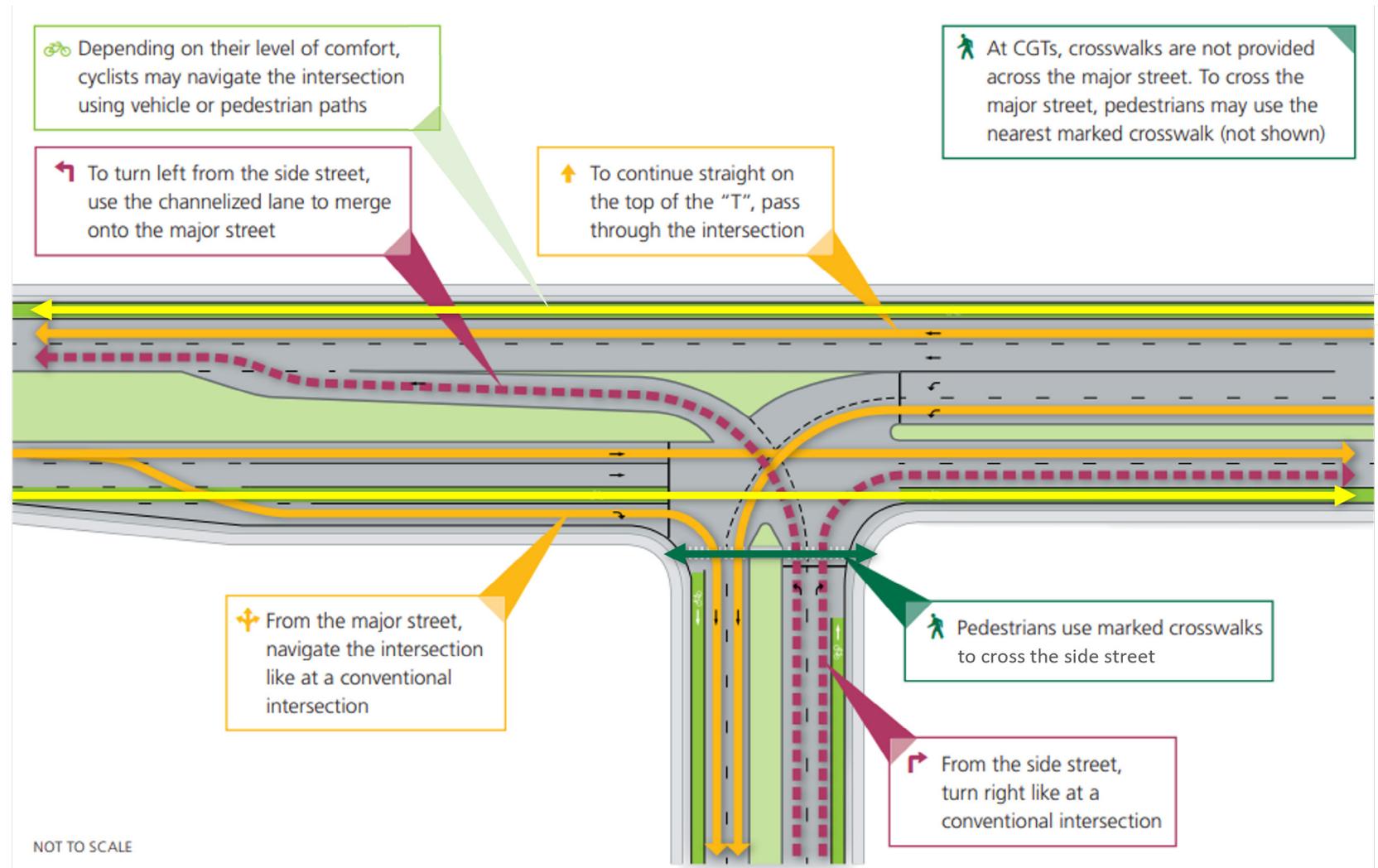
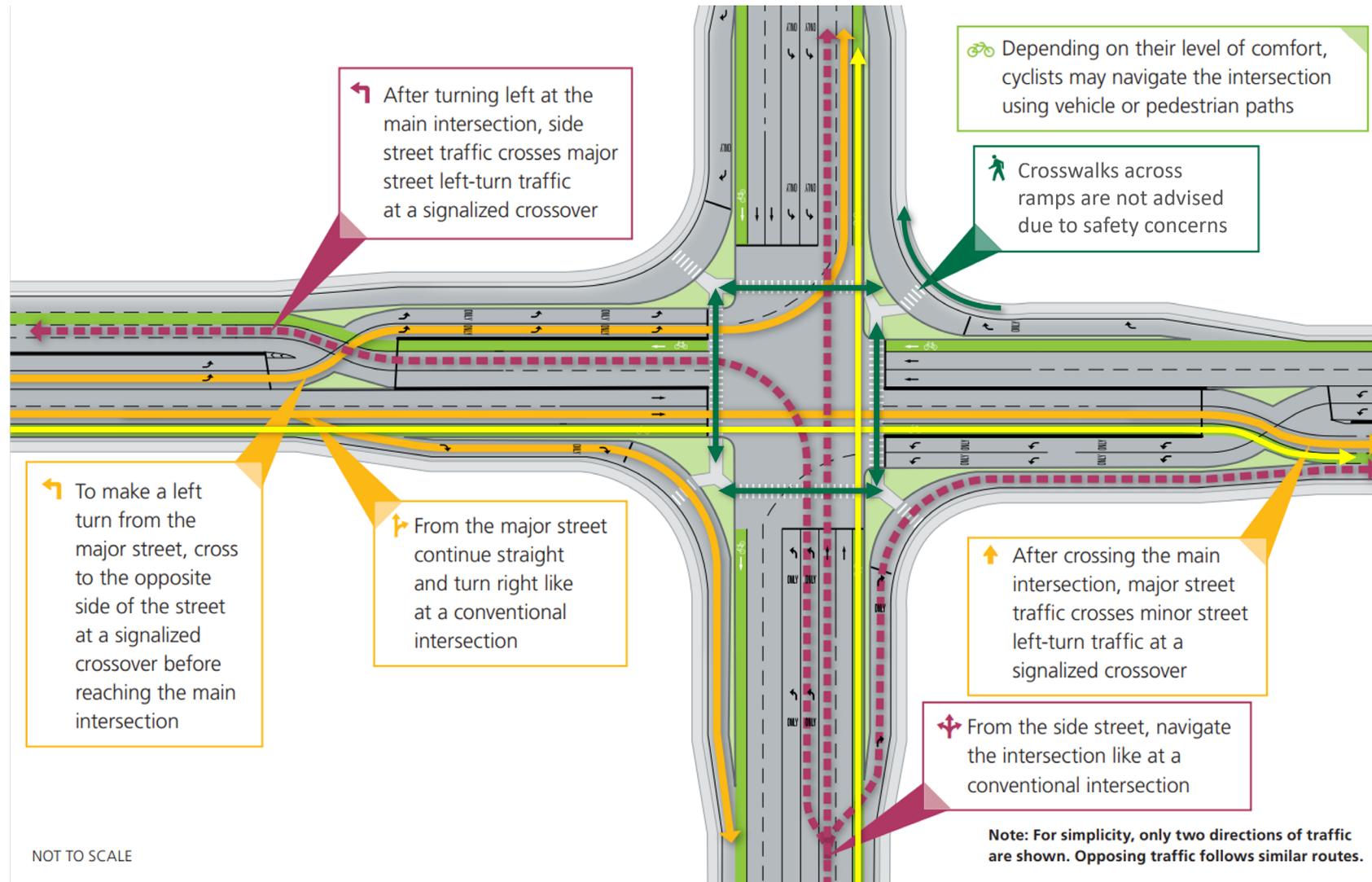


Figure 5.17: Continuous green T intersection. Source: Virginia Department of Transportation; Some additional bike and pedestrian information overlaid by Nelson\Wygaard



### PARTIAL/FULL DISPLACED LEFT TURN

The at-grade displaced left turn concept means that vehicles making left turns are required to cross through opposing traffic at a signalized crossover before reaching the main intersection, as displayed in Figure 5.19. The primary benefit of this configuration is increased efficiency and capacity. A sophisticated signal timing system allows for a seamless throughput of vehicles passing through the intersection. This configuration in particular is well-suited for intersections with a large number of left-turning vehicles. The grade separated intersection concept sees the main road separated over the cross street. This configuration exists locally at the intersection of Bandera Road and Loop 1604.

A primary benefit of this configuration is that the intersection can be designed to a pedestrian- and bike-friendly scale and blend well with future infill development if the number of slip lanes (or separated right-turn lanes) is limited. In general, the configuration creates opportunities for additional crossings for pedestrians and two-stage protected turn boxes for bicyclists. For transit, key left turn movements can be prioritized with appropriate signal optimization or transit signal priority. Similarly, for drivers, there is an opportunity to better accommodate left-turn movements from all approaches, which is a common occurrence along Bandera Road.

This intersection configuration can see additional conflicts if slip lanes are incorporated. Crossing slip lanes as a pedestrian can be a dangerous endeavor, particularly if the lane is between two high speed roadways. This conflict would exist for bicyclists as well. For transit, the right-turn configurations can create a challenge for transit stop placement – it is unlikely that a transit stop could be constructed at both the near and far side locations at the intersection. Generally, the largest limitation for all users is the addition of multiple signals. Since the intersection has

Figure 5.18: Partial/full displaced left turn. Source: Virginia Department of Transportation; Some additional bike and pedestrian information overlaid by Nelson\Nygaard

multiple signals instead of just one, there are more conflict points and more opportunities for delay – more specifically, while delay and number of conflict points may be reduced for vehicles in a displaced left turn, they are increased for pedestrians and cyclists.

**SIGNALIZED RESTRICTED CROSSING U-TURN**

The Signalized RCUT configuration prohibits through movements at the cross street, requiring those vehicles to make a right-turn followed by a U-turn and another right-turn to cross the major road. This intersection configuration is displayed in Figure 5.19b. Signals in this concept would be located at the cross-street intersection and at cross-over turnarounds.

In order to adequately protect crossing pedestrians, this intersection would need to prohibit right-turns on red. With that prohibition in place, this configuration could provide completely separated crossing opportunities for bicycles and pedestrians. For transit and auto users, this configuration in general provides more efficient throughput of vehicles on Bandera Road, as there are fewer conflicts with cross-street vehicles.

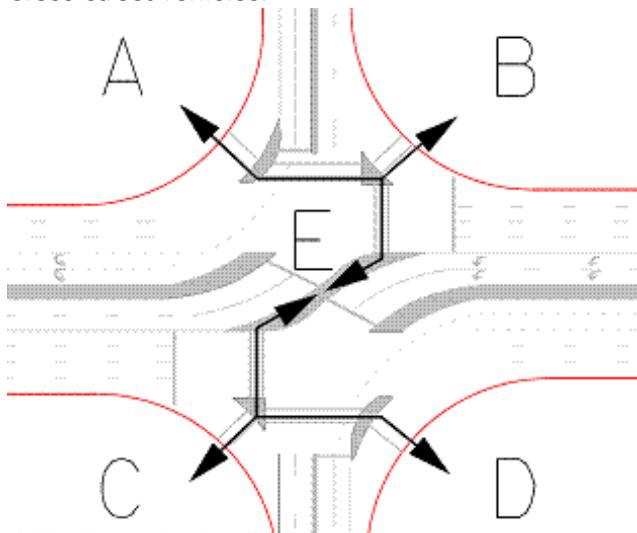
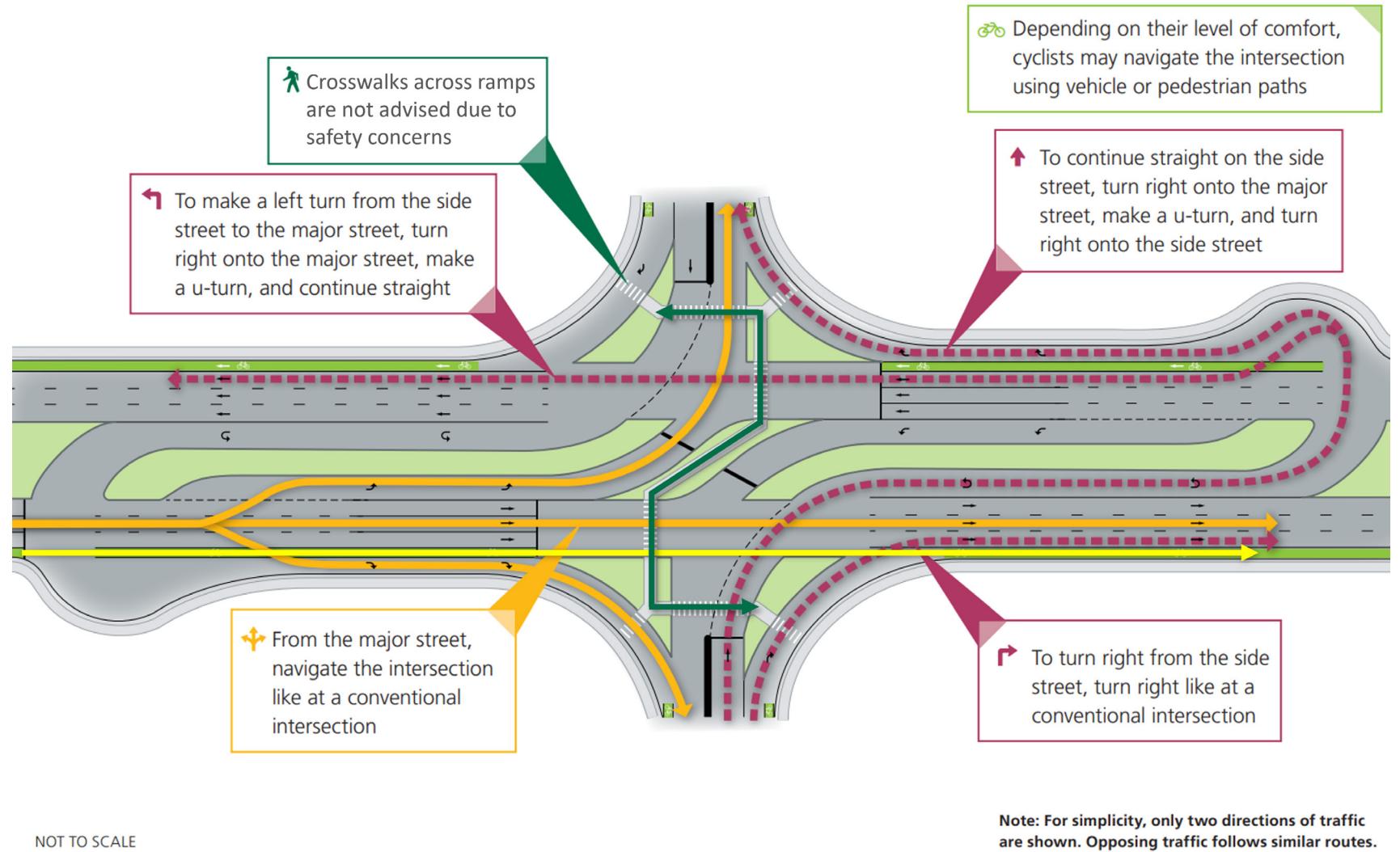


Figure 5.19a: Crosswalks at an RCUT



NOT TO SCALE

Figure 5.19b: Signalized restricted crossing U-turn intersection. Source: Virginia Department of Transportation; Some additional bike and pedestrian information overlaid by Nelson\Nygaard

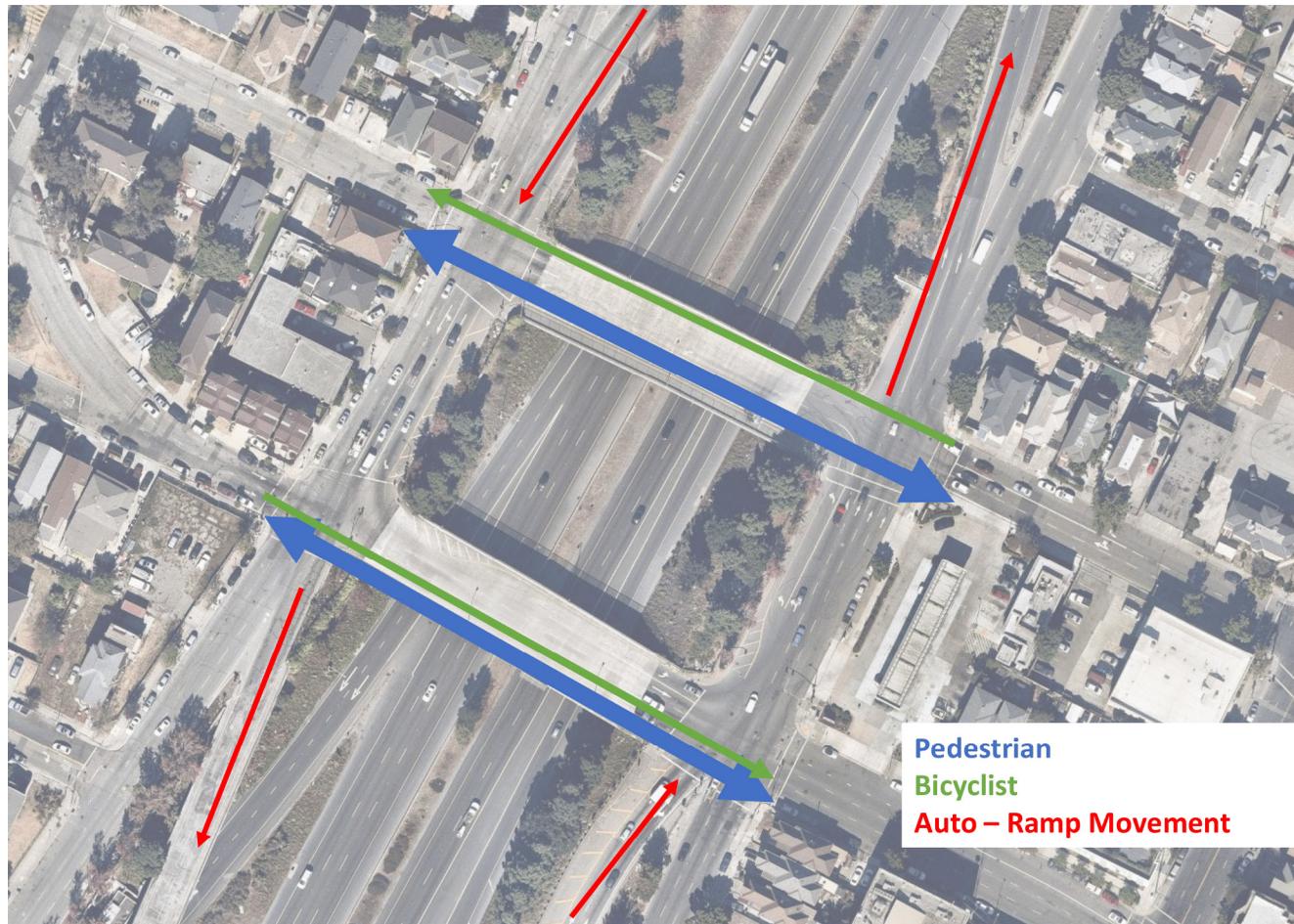


Figure 5.20: Conventional diamond interchange

The largest downside to this configuration is the added crossing length for pedestrians and bicyclists. At minimum, users would need to use three crosswalks to cross and a maximum of six, which is shown in Figure 5.19a. Similarly, bicyclists would need to use six crosswalks to make a left turn. Overall, this intersection favors the major street, creating potential delay for vehicles and transit at the cross-street. In reference to minor street bike and pedestrian crossings, it is only advised that this

configuration be used at intersections with very low cross-street volumes due to the extended walking time and distance that this concept has over a traditional intersection configuration. Additionally, it is advised that this configuration not be used at intersections where future community development would create major street pedestrian crossing demand, or where existing or future bike routes cross the major street.

#### CONVENTIONAL DIAMOND INTERCHANGE

This configuration, reserved for intersections where

crossings are grade separated, can facilitate walking and biking conditions that mimic traditional blocks. In the conventional diamond interchange, cross-street crossings are free from interaction with the mainlanes of the major street, with the intersection occurring where the frontage road meets the cross-street. There is the opportunity to construct this intersection compactly, with a reduced right-of-way needed compared to some of the other configuration options presented here.

As shown in Figure 5.20, this configuration creates opportunities for cross-street movements most similar to a conventional intersection. As a result, minor street facilities would be unaffected, allowing for pedestrians and bicyclists to easily cross with few conflicts. For transit, there is the opportunity for off-ramp transit queue jumps, should there be heavy congestion on Bandera Road. For both auto and transit users, free-flow travel on the major street reduces opportunities for delay, and the configuration is familiar to users of all modes.

Benefits for pedestrians are best achieved when this intersection is designed compactly – if the on/off ramps are flared with a large curve radii, unsafe pedestrian crossings could be introduced. For bicyclists, there is the potential for a large conflict zone at the ramps if Bandera Road was designed with on-street bicycle facilities. In particular, the free movement nature of the ramps could create potential visibility and safety concerns. For auto users, those making left turns must traverse two signals, and operationally this intersection configuration requires a more coordinated signal timing effort.

#### SINGLE-POINT URBAN INTERCHANGE

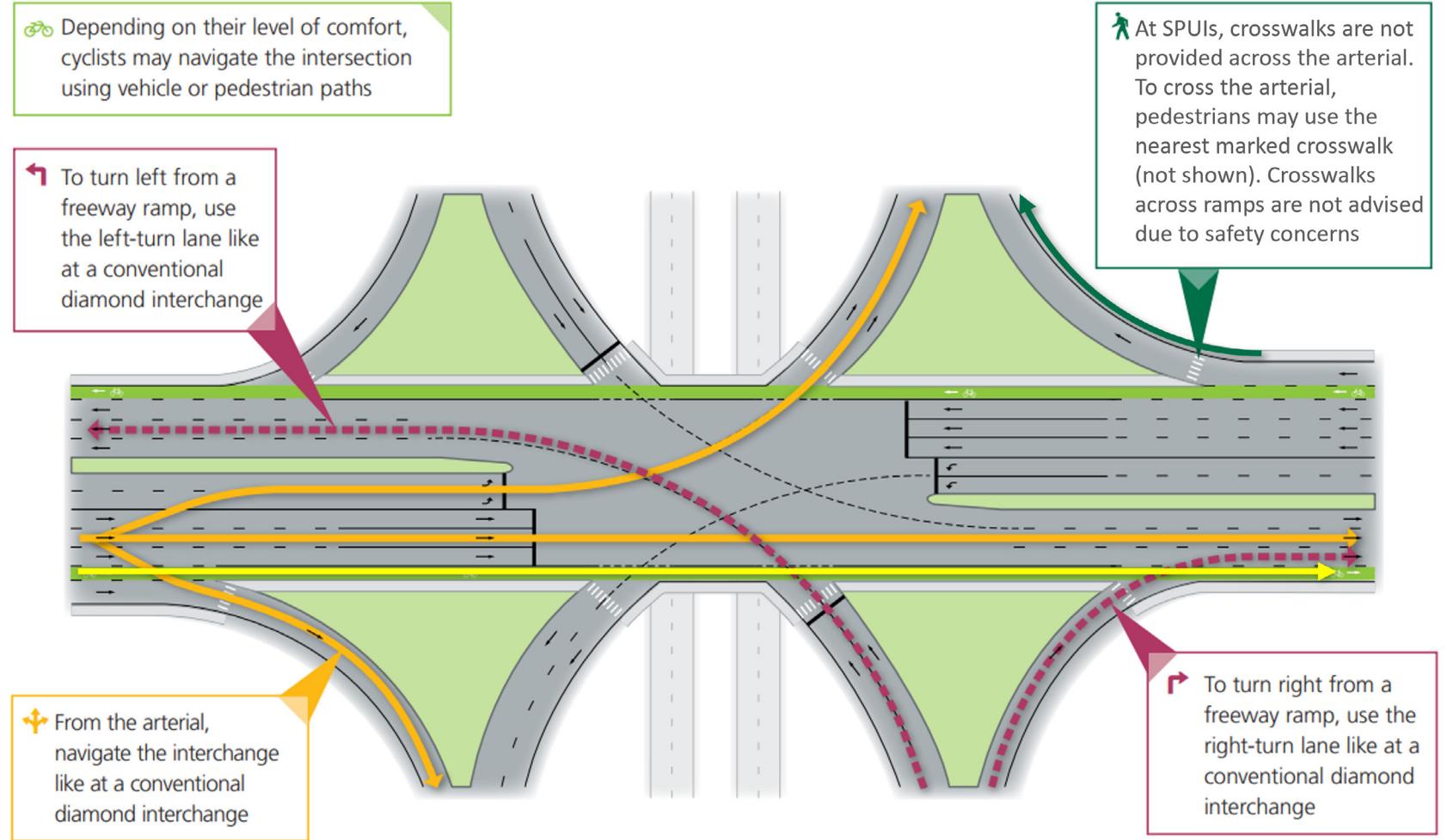
The single-point urban interchange, or SPUI, is a grade-separated intersection configuration that separates the through movement on the major road from all turning movements, as shown in Figure 5.21. Movements between major and minor street are coordinated, and traditionally SPUIs do not allow for the major street's ramps to have through movements at the cross-street intersection. This configuration should only be considered in locations where future land use conditions would not expect an increase in nonmotorized travel.

The largest benefit to pedestrians for this configuration is that those crossing the major street can travel without as many conflicts as a traditional intersection – with just one conflict point at each ramp. For transit, buses on the major route can proceed with fewer opportunities for delay, and there is the opportunity to

provide left turn queue jumps at the signal in any direction. For auto users, there is only one signal for all movements, which creates the opportunity for less delay.

In general, this configuration is not ideal for non-car modes of travel, as there is the potential for on/off-ramp conflicts with pedestrians and longer walking distances due to the interchange size. For transit, minor street pedestrian access to major street transit stops can be challenging. Generally, the right-of-way needs for this treatment favor auto modes and create risks for pedestrians and bicyclists.

Additional feedback on the intersection concepts is included in the table in Figure 5.22. Comparative feedback is based against traditional signalized intersection concepts in a general sense. Specific applicability to Bandera Road is only where noted.



NOT TO SCALE

Note: For simplicity, only two directions of traffic are shown. Opposing traffic follows similar routes.

Figure 5.21: Single-point urban interchange. Source: Virginia Department of Transportation; Some additional bike and pedestrian information overlaid by Nelson\Nygaard

Intersection Concept/Configuration	Pedestrian	Transit	Bicycling	Auto	Other Considerations
<b>Conventional Signal</b>	<ul style="list-style-type: none"> <li>+ Most Compact of Concepts, shortest crossing distance</li> <li>- Right turn conflict potential</li> </ul>	<ul style="list-style-type: none"> <li>+ Potential for transit signal priority</li> <li>+ Leftover right-of-way for transit stop enhancements (however, depending on the number of lanes needed, additional right-of-way may be needed)</li> <li>- Additional delays on routes on minor streets</li> </ul>	<ul style="list-style-type: none"> <li>+ Potential modifications for protected intersections</li> <li>- Right turn conflicts in standard configuration</li> </ul>	<ul style="list-style-type: none"> <li>+ Clear and familiar routing</li> <li>- Capacity constraints</li> </ul>	<ul style="list-style-type: none"> <li>▪ Requires least amount of right-of-way</li> <li>▪ Promotes more compact infill development at corners</li> </ul>
<b>Continuous Green T</b>	<ul style="list-style-type: none"> <li>+ Allows for single leg movements, or provides refuges for multi-stage crossings</li> <li>+ No free right turns that conflict with pedestrian crossings</li> <li>- Need to signalize continuous segment to allow for crosswalk</li> </ul> <p><b>Note:</b> This concept is only applicable for a 3-leg intersection (it is not a universal option)</p>	<ul style="list-style-type: none"> <li>+ Free flow in the continuous direction</li> <li>+ Provides left turn acceleration lane to safety merge with continuous traffic</li> </ul>	<ul style="list-style-type: none"> <li>+ No conflicts in continuous direction</li> <li>+ Left turns out of minor street have opportunity for protected movement</li> <li>- Left turns into minor street will require physical and signal phasing accommodation</li> </ul>	<ul style="list-style-type: none"> <li>+ Less delay in continuous direction</li> </ul>	<ul style="list-style-type: none"> <li>▪ On Bandera Road, can be beneficial at locations where heavy 'jog' traffic occurs between adjacent major T intersections</li> </ul>
<b>Partial/Full Displaced Left Turn (DLT)</b>	<ul style="list-style-type: none"> <li>+ Displaced turn intersections could provide additional crossing opportunities</li> <li>- Slip lanes provide a conflict point (identical to a channelized right-turn at an intersection)</li> </ul>	<ul style="list-style-type: none"> <li>+ With signal optimization/transit signal priority, key left turn transit movements can be prioritized</li> <li>- Challenging to provide stops at both near and far side locations due to right turn configurations</li> </ul>	<ul style="list-style-type: none"> <li>+ Opportunity for protected intersections and two-stage turn boxes</li> <li>- Large conflict zone where RT pockets start</li> </ul>	<ul style="list-style-type: none"> <li>+ Opportunity to accommodate phase overlap of heavy lefts from both major and minor approaches, as exists on Bandera</li> <li>- Expands one intersection into three signals</li> </ul>	<ul style="list-style-type: none"> <li>▪ By limiting number of right turn slip lanes, intersection can be built to a pedestrian- and bike-friendly scale in order to blend with future infill development</li> </ul>
<b>Signalized RCUT</b>	<ul style="list-style-type: none"> <li>+ If no RTOR, provides protected crossing opportunities</li> <li>- Three legs to cross minimum, six maximum</li> <li>- Longer crossing distances than conventional intersections for pedestrians/cyclists using the crosswalks</li> </ul>	<ul style="list-style-type: none"> <li>+ Bandera through routes will operate more efficiently</li> <li>- Cross street through routes will see additional delay</li> </ul>	<ul style="list-style-type: none"> <li>+ If off-street path on Bandera, opportunity for completely separated bike crossings</li> <li>- Left turning bicyclists using paths will need to cross 6 Crosswalks</li> </ul>	<ul style="list-style-type: none"> <li>+ Bandera Rd priority</li> <li>+ RCUTs utilize two-phase signals, which reduces red time (delay) and increases capacity</li> </ul>	<ul style="list-style-type: none"> <li>▪ Due to ROW requirements, would not be advised at locations where future land use changes may warrant a more pedestrian-scale public realm.</li> <li>▪ RCUTs typically have much smaller overall ROW footprints than DLTs</li> </ul>
<b>Interchange Concepts/Configurations</b>					
<b>Conventional Diamond Interchange</b>	<ul style="list-style-type: none"> <li>+ Opportunity for compact interchange</li> <li>+ Pedestrian crossings most similar to a conventional intersection</li> <li>- If diamond on/off ramps are flared with a large curve radii, can introduce unsafe pedestrian crossings</li> </ul>	<ul style="list-style-type: none"> <li>+ Opportunity for off-ramp transit queue jumps</li> <li>+ Free flow along major route</li> </ul>	<ul style="list-style-type: none"> <li>+ Minor street facilities would be unaffected</li> <li>- Potential for large conflict zone at ramp weaving segments</li> <li>- Free movement ramps with potential visibility and safety concerns</li> </ul>	<ul style="list-style-type: none"> <li>+ Clear and familiar routing</li> <li>- Left turns must traverse two signals</li> </ul>	<ul style="list-style-type: none"> <li>▪ When designed in a compact manner and utilizing major route undercrossings, diamond interchanges can facilitate walking and biking conditions that mimic traditional blocks</li> </ul>
<b>Single-Point Urban Interchange</b>	<ul style="list-style-type: none"> <li>+ Major route can provide a dedicated path through intersection with only two conflict points on each side (at ramps)</li> <li>- Potential for on/off-ramp conflicts for people walking along major route</li> <li>- Due to interchange size, long walking distances are introduced to cross intersection</li> </ul>	<ul style="list-style-type: none"> <li>+ Free flow for buses on major route, or making right turns off major route</li> <li>+ Opportunity to provide left turn queue jumps at the signal in any direction</li> <li>- Minor street pedestrian access to major street transit stops can be challenging</li> </ul>	<ul style="list-style-type: none"> <li>- Turns off the major route are challenging to facilitate without dedicated</li> <li>- Due to size of the interchange, long conflict points at weaving maneuvers are usually present</li> </ul>	<ul style="list-style-type: none"> <li>+ Only one signal for all movements</li> <li>+ Uninterrupted flow for major route</li> </ul>	<ul style="list-style-type: none"> <li>▪ Should only be considered in locations where future land use conditions would not expect an increase in nonmotorized travel.</li> </ul>

Figure 5.22: Intersection concept feedback



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**DRAFT**

SECTION 6

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# **COSTS AND FISCAL IMPACT**



## COSTS AND FISCAL IMPACT

### INTRODUCTION

The interrelationships between land use, market forces, zoning, property tax revenue, and the financial sustainability of cities are complex. And they are all shaped by considerations regarding quality of life for citizens, which should ultimately drive choices in these areas. The Bandera Road Corridor Plan directly impacts all of those conditions, either directly (by changing land use or by recommending development standards) or indirectly (by built-in assumptions regarding density of future development or downstream impacts of recommendations).

This section contains several different features, all of which explore different facets of the financial picture. First is a discussion of some big-picture concepts related to development density and related city-scale financial issues. The intent of this section is to illuminate some considerations for land use which are not frequently addressed in urban planning efforts, but which are critical to the financial health of our city.

Second is a fairly complex fiscal impact analysis which compares three scenarios: the no-build scenario, as if no future development will take place; a potential scenario of building out space based on the current land use plan, unchanged; and a potential scenario modeled after the land uses outlined in the land use plan.

Last, conceptual budgetary estimates are included for various items shown in the plan. This takes the form of budget-level estimates for major projects. The nature of these estimates is quite general and conceptual, as no project design has occurred, and assumptions regarding existing conditions are necessary. The variance between these budgetary estimates and potential actual project costs is significant due to this conceptual nature.

Costing and financial data for urban planning must be general in nature. It is most correct to look at these types of projections through a cloudy window: many of the factors are so far in the future and so complicated that it is impossible to draw any specific conclusions. However, taken together, these analyses help draw a picture of where the plan will lead us.

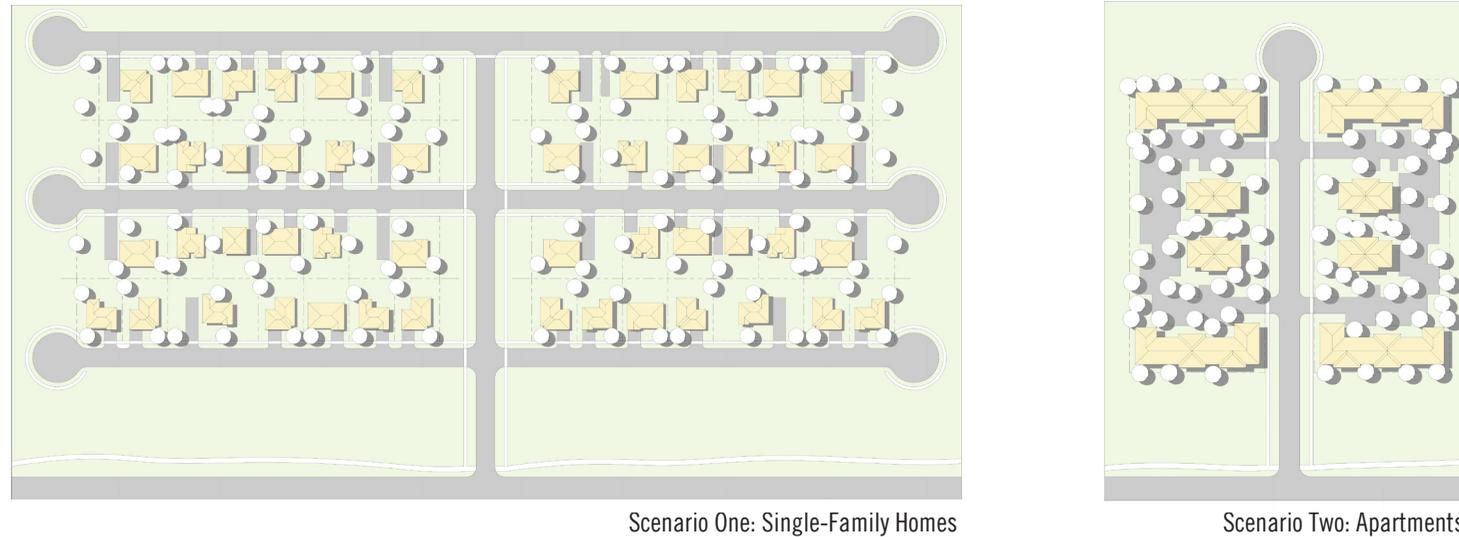
### DENSITY AND URBAN FINANCIAL HEALTH

Cities are subject to the same overall financial dictates as any business, or indeed any household. Their sources of revenue are different – primarily taxes, rather than income from sales or a job – and their expenditures differ as well – roads, infrastructure, and services, rather than rent or groceries – but their overall finances must be balanced, just as we must manage our own personal budgets.

Because the primary revenue source for cities is tax revenue, how taxation relates to land use bears examination. Property taxes are of particular interest to us in this discussion, as the structural characteristics of land use and zoning directly impact that budget balance.

How so? Cities provide infrastructure for development. Different types and densities of development require more or less infrastructure. But “more” and “less” in this case are not simple measures because of the impact of density.

Let’s examine two cases, using residential development as a model. Imagine that 50 households are moving to the city, and they need new homes. Two scenarios are shown in Figure 6.3. In Scenario One, those homes are provided in single-family houses with R-6 zoning, so 4,000 square foot lots per house, each of which is 1,600 square feet. The infrastructure for this development is shown in the diagram,



along with costs. In Scenario Two, those homes are provided in an apartment building. It's a large complex – we're projecting the same 1,600 square feet per apartment as in each house. Infrastructure and its costs are included in its diagram, too.

Notice the differences in infrastructure costs for the two developments. They are substantially greater in Scenario One – five to one or five times the cost – due to the larger land area, which in turn requires substantially more infrastructure to service.

But what about the tax revenue side? There are differences there as well. The proportional tax revenue per acre is noted in the two diagrams. When that is multiplied out by the number of acres, it yields a relative revenue for each scenario. As the chart shows, the single-family home tax revenue is higher per acre than the medium-density residential tax revenue by a ratio of about 1.6 to 1. Given the higher costs for maintaining that infrastructure on the single-family residential side, it is apparent that even with higher tax revenues, the difference will not be made up.

Low Density Residential				Medium Density Residential		
Proportion	Value	Item	Unit	Unit Cost (1)	Value	Proportion
	27.5	Area	Acres		9.5	
549,100	219,650	Roadways	SF	2.50	42,050	105,000
88,800	4,440	Sewer (public)	LF	20.00	600	12,000
51,400	51,350	Sidewalks	SF	1.00	11,100	11,000
	120,000	Building Footprint	SF		59,200	
	120,000	Total Building Area	SF		120,000	
	47,050	Off-Street Paving	SF		46,850	
<b>5</b>	<b>Total Public Cost (proportional)</b>					<b>1</b>

(1) Unit costs are proportional, not actual costs. Proportions are extracted from CoSA Unit Price List

50	Number of parcels		1
17	Common/public space	Acres	5.5
0.21	Size of parcel	Acres	4
10.5	Total developed area	Acres	4
1	Average tax revenue (2)	Units/acre	1.6
10.5	Total tax revenue (3)		6.4

(2) Derived from an average of similar developments within the study area and shown proportionally

(3) Shown proportionally

Figure 6.3: Development density and infrastructure impacts

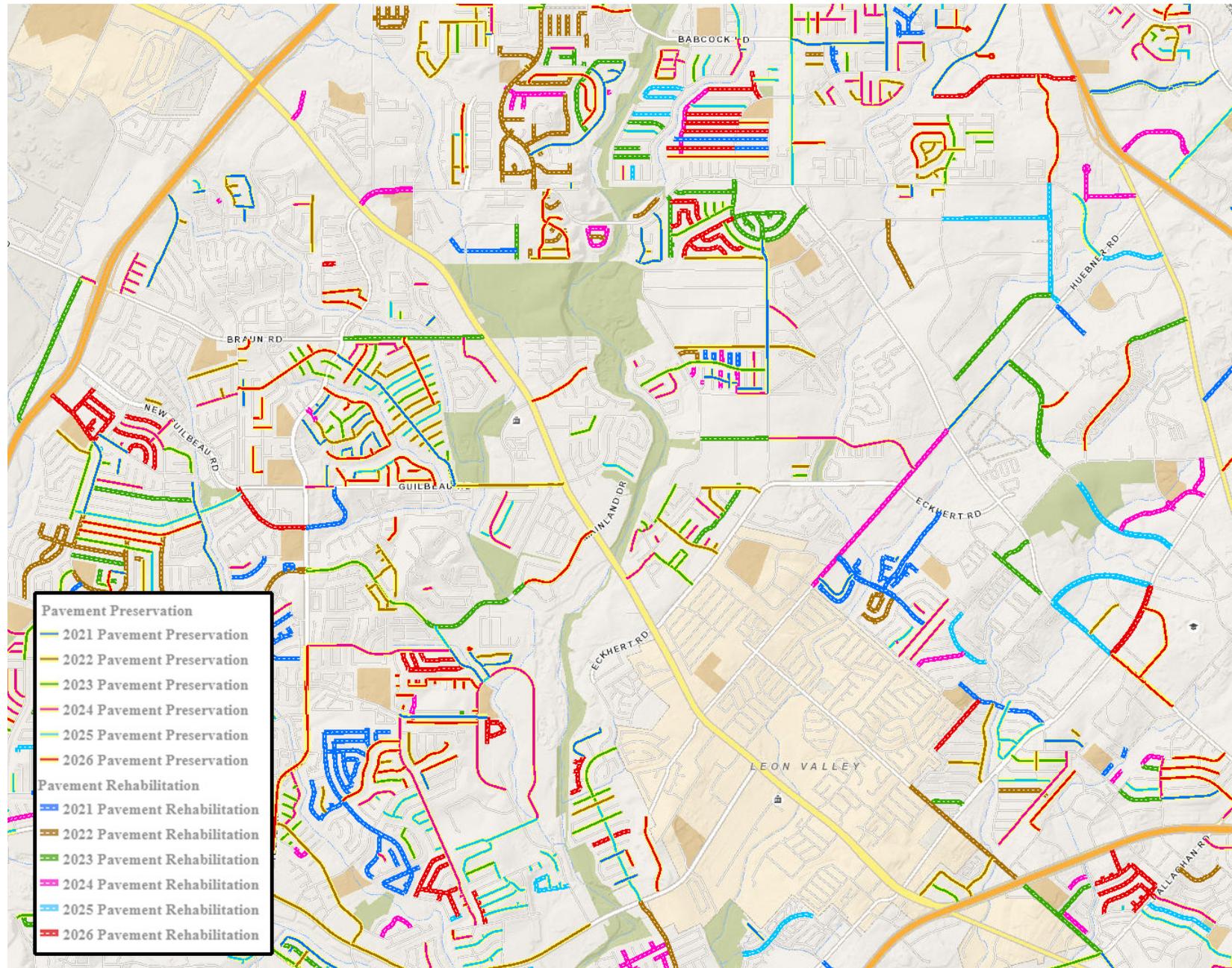


Figure 6.4: City of San Antonio Infrastructure Management Program pavement projects, 2020-2025

Reviewing the city’s current Infrastructure Management Program (IMP) can give some idea of the impact of these choices, though directly translating previous planning choices into current maintenance costs is beyond the scope of this project. Figure 6.4 shows the city’s current and planned pavement preservation and rehabilitation projects, scheduled for 2020 through 2025. Pavement preservation includes crack and fog seals, slurry and microsurfacing – work intended to extend the life of asphalt pavement through relatively minor means. Pavement rehabilitation is much more comprehensive, and includes mill and overlay, full-depth reclamation, or reconstruction. All of these latter methods essentially rebuild existing roadways which have reached varying levels of deterioration.

Asphalt paving requires relatively frequent maintenance, so the long-term cost impacts of extra paving extend far beyond mere initial paving costs. Reducing ongoing maintenance needs through managing growth patterns can significantly, and positively, impact city budgets.

Figures 6.5a, 6.5b, and 6.5c show a comparison between two ways of looking at property tax revenue: by parcel and per acre, respectively. In the listing of tax revenue per parcel, there is a bias towards larger lots returning more property tax revenue. This is also shown via the orange line on graph 6.5c – as one would expect, larger lots tend to lead to per-lot higher revenues. This analysis is specific to the properties within the study area, so the large parcels in this case include a number of big-box stores at the Loop 1604 and Loop 410 intersections, as well as several others along Bandera.

But this is only part of the picture. Graphing revenue per acre of lot size tells a very different story, and it is this conclusion which is most compelling for building a sustainable city. The purple bars on the graph show average property tax revenue per acre, again with lots grouped into roughly equal brackets. This graph shows that smaller lots return more revenue per acre than larger

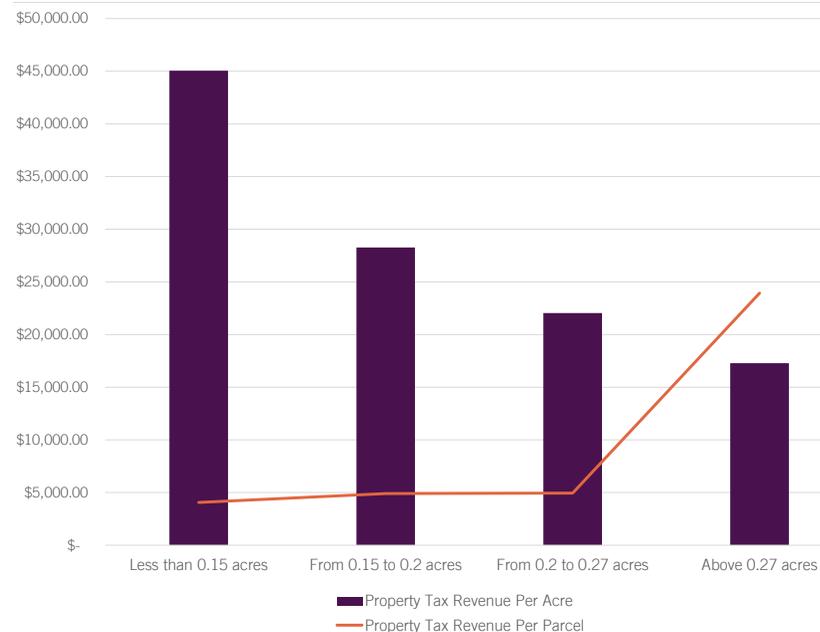


Figure 6.5c: Graphing property tax revenue per acre and per parcel

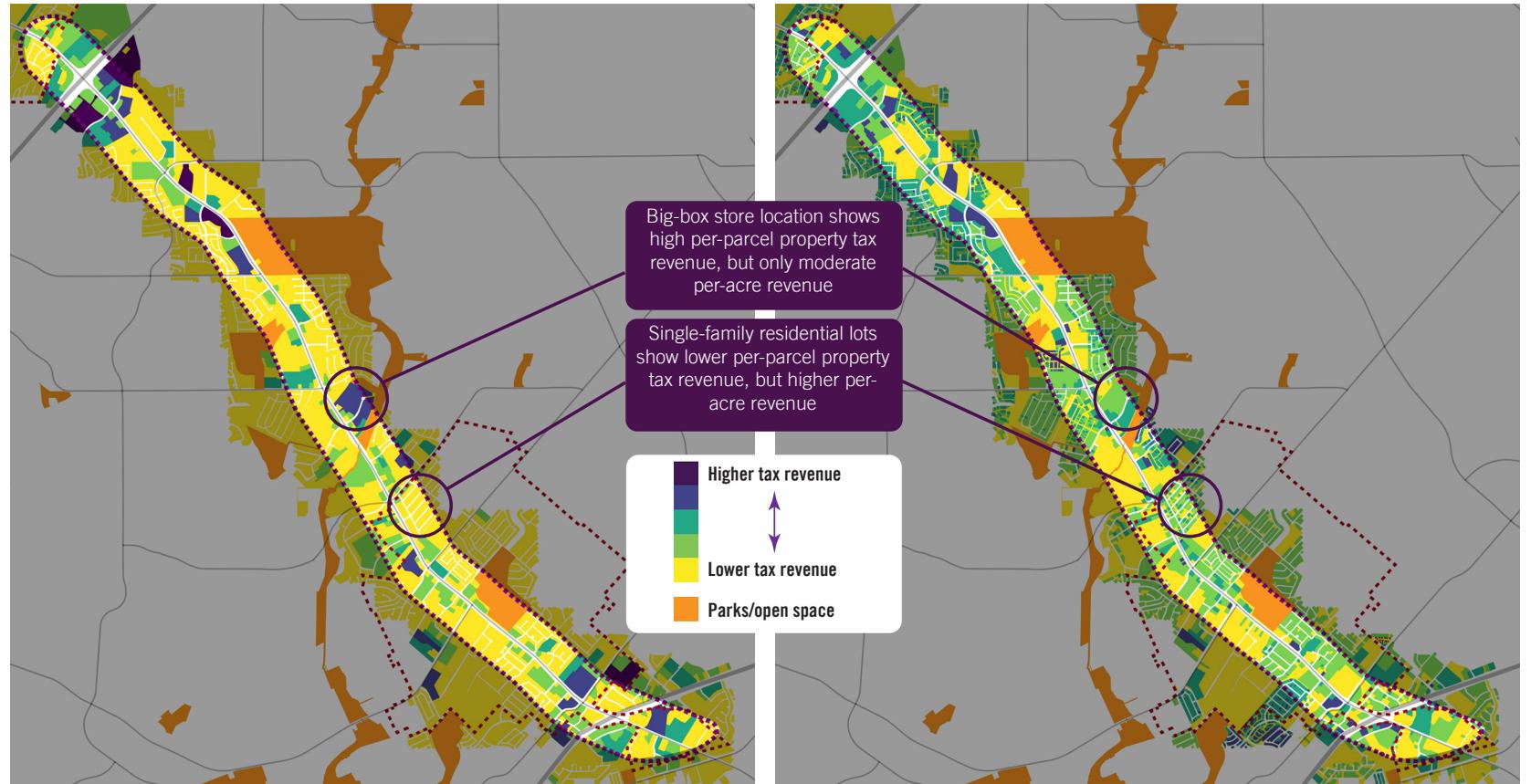


Figure 6.5a: Tax revenue per parcel

Figure 6.5b: Tax revenue per acre

lots. In other words, a one-acre area will return, on average, 1.6 times the revenue when split into six lots rather than one.

Pulling the revenue and cost sides of the equation together, then, draws a more nuanced picture. Smaller lots require more costly city infrastructure (and have higher costs for service for maintenance), but they also produce more property tax revenue per acre.

## FOCUS: PANDEMIC

This assessment has not been adjusted specifically to account for the Covid-19 pandemic for several reasons:

- The true effects of the pandemic on development are not yet known. While some sectors of the economy have been severely adversely affected, others remain strong, and all sectors are changing quickly as the situation progresses. Modifying assumptions to fit this situation is not wise given these factors.
- The timeline for this assessment is 30 years. Indications are that while the impacts of the pandemic may reverberate for decades, the specific and immediate economic effects will be resolved well within that time frame.
- The basic dynamics of San Antonio's economic situation remain strong. Population growth is the main factor driving development, and all indications are that population growth will be unaffected within this planning horizon.

The conclusion from these findings – which is strictly a financial conclusion – is that more dense developments are financially more sustainable, because of the higher tax revenue per acre and the lower infrastructure costs per acre. In fact, depending on a number of different factors, many less dense developments operate at a deficit. That is, once maintenance and replacement costs are added in, developments less than a certain density never generate sufficient tax revenue to pay for themselves, at least at the level of city service which many people expect. Because city budgets must balance, those deficits are paid for by revenues which come from other places.

This does not mean that there's no place for lower-density development – far from it. Although city budgets must balance, we don't operate our cities like businesses, which are tasked with extracting profit from operations and returning it to shareholders or owners. Instead, quality of life, diversity of experiences, variety in housing types, and a myriad of other factors are important considerations. What this means is that it is important to have density in cities and to incorporate land uses which create greater tax revenues. While this is sometimes opposed by neighborhoods, whose residents can view greater density as just more traffic and complication, that diversity of development type is critical to the financial sustainability of our city.

## FISCAL IMPACT ANALYSIS

Development impacts our city in obvious ways, such as visually or in the variety of housing or retail. But it also has tremendous impacts on the way our city operates. New development brings in new opportunities for city revenue, and it also brings with it more expenditures. To assess this, fiscal impact projections model cash flow to the public sector, primarily in the form of tax revenue. It is not a projection of the overall economic impact which measures changes in income, jobs, and the wider economic picture; it is merely an assessment of how revenue inflows balance new expenditures.

Many different factors affect this analysis. Those relevant to the concepts studied here include:

- Increased property tax revenue due to higher density of development, equating to higher tax values with unchanged tax rates
- Increased sales tax revenue due to higher utilization of existing facilities because of population increase
- Unchanged revenue due to retaining open space rather than increasing development (strongly supported by public input)
- Increased expenditures for public utilities, public safety, and other municipally-funded services and capital improvements due to additional infrastructure

The fiscal analysis zone (FAZ) for this analysis is the boundary of the corridor plan, and the time frame of this analysis is the 30 years beginning in 2020. For the purposes of this analysis, the demand unit for residential facilities – which is the minimum unit of growth being analyzed – is a single housing unit. For non-residential development, the demand unit is square feet. The modeling here does not include the capital projects shown in the previous section because this model shows impacts to the city's operating budget. While some of those projects may be done using normal budget dollars, the basic expectation is

that the funding will be primarily from other sources such as bond campaigns and funding agreements with other agencies.

The fiscal impact modeling in this study is based on a derivative of the United States Federal Reserve’s Fiscal Impact Tool, or FIT. This tool was originally published by the Federal Reserve to assist communities in assessing impacts of development projects. An updated version of this tool, which is no longer maintained by the Federal Reserve, is maintained as a Creative Commons-licensed version called ReFIT under the auspices of Envision Tomorrow. For this study, version 3.4.0 of ReFIT was used. Assumptions have been modified as noted below.

ReFIT is a scenario-based modeling tool. That is, it compares financial effects of two or more scenarios. For the purposes of this study, two scenarios have been used: a no-build scenario, where land use patterns remain unchanged, and a scenario built using the proposed new future land use plan. Those scenarios are compared to the existing conditions.

This analysis is a forward-looking projection. Any analysis is dependent upon its assumptions, but an analysis which attempts to project into the future is even more so. Given the strength of the modeling tools used, the degree of confidence in the comparison of the impacts of the proposed land use plan relative to the previous land use plan scenario is reasonably high, but these figures should not be used in an absolute sense. That is, these figures should not be used to assess specific impacts to future city budgets. They are intended to portray, in a general sense, the financial effects of changing land use patterns relative to a baseline of the existing conditions, and nothing more.

**CONCLUSIONS**

Upon analysis, several conclusions become clear:

- The study area is not currently built out, meaning that built square footage on the ground now is significantly less than is anticipated using floor area ratios for similar construction in developed areas. This is attributable primarily to under-development rather than large amounts of undeveloped land, and it is expected for

an area like this which is undergoing a transition from a rural to a suburban setting. Figure 6.7 shows this phenomenon and how it translates into the future for both the existing and the proposed new future land use plans.

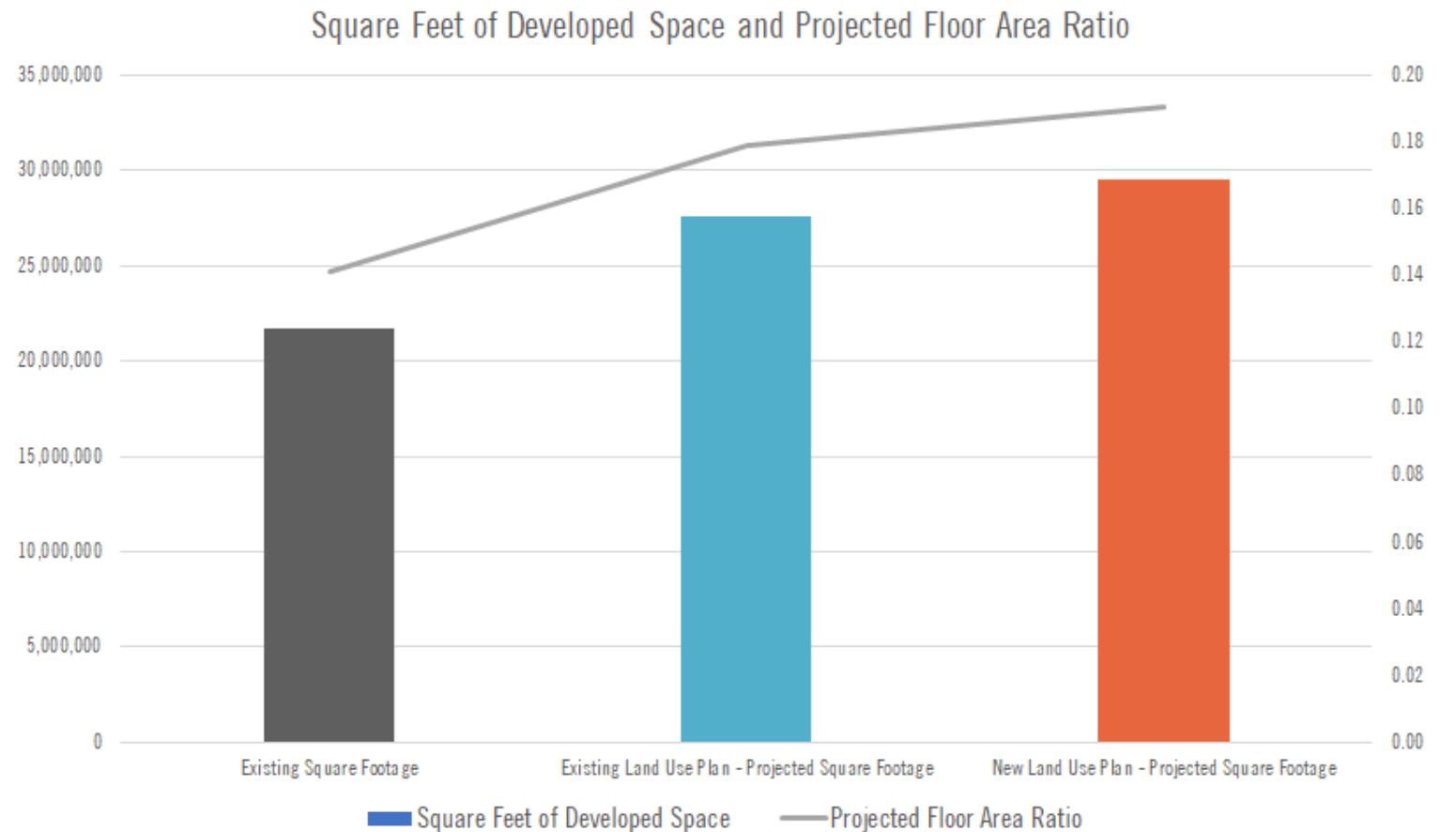


Figure 6.7: Square feet of developed space and projected floor area ratio (note dual y-axis scales)

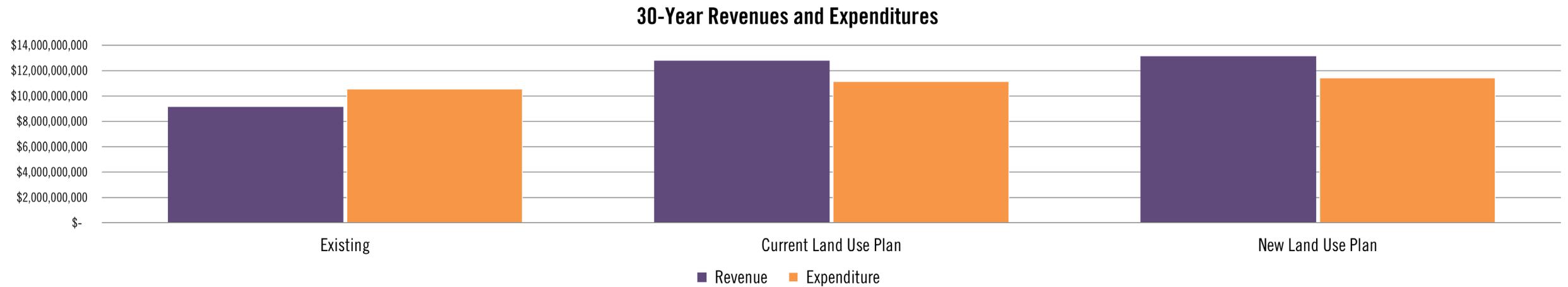


Figure 6.8a: 30-year revenues and expenditures for three scenarios

- The area likely currently operates at a deficit, consistent with analysis earlier in this chapter, both now and within a 30-year study period in the no-build scenario, as shown in Figure 6.8a.
- Build-out of either the current land use plan or the proposed future land use plan results in revenues exceeding expenditures over a 30-year period.
- The proposed future land use plan outperforms the existing land use plan. Expenditures are higher in the proposed plan, but the increase in revenues is significantly higher, yielding a net increase.
- The proposed future land use plan shifts the distribution of land use slightly away from retail/commercial usages and towards residential. This is consistent with what the market analysis performed in the first phase projects as a sustainable balance and is a validation of the new land use category designations.

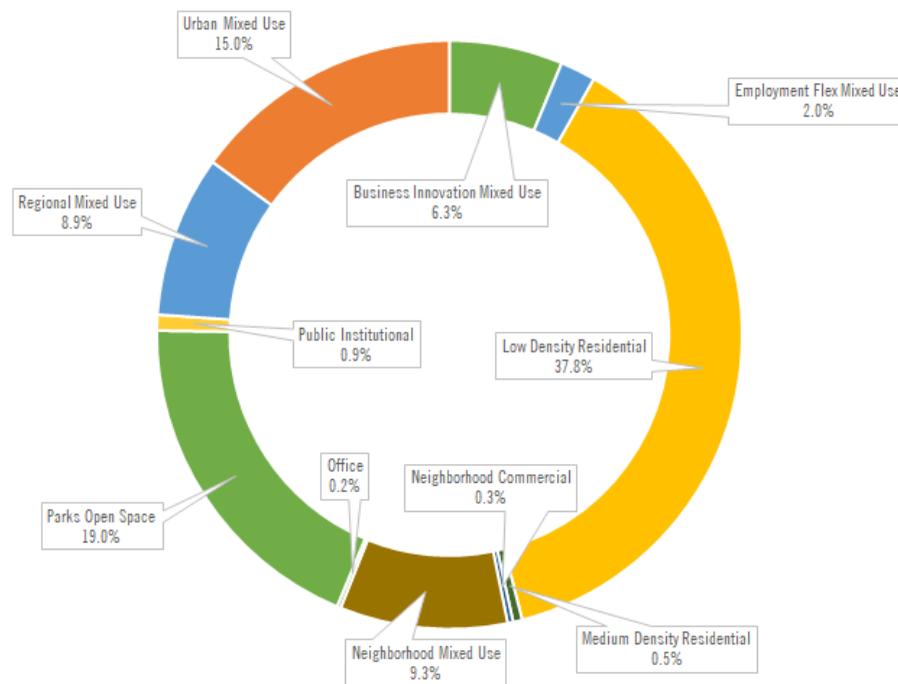


Figure 6.8b: Proposed future distribution of land use

- The projected mix of employment with the new future land use designations trends towards more office space than the existing conditions, coupled with a shift away from the current heavy emphasis on retail employment. This addresses the findings in the market study which noted that retail is currently overbuilt, resulting in the vacancies and low rental rates seen on the corridor (especially the southern portions) now.

**CAVEATS**

This analysis is performed at a very high level – the necessity of making significant and impactful assumptions at multiple steps in the process mean that the accuracy of this work is useful only for comparison between scenarios, not for budgeting or other planning purposes.

Both of the build-out scenarios (for the existing land use plan and for the proposed future land use plan) assume market conditions and demand which allow for maximization of construction within current zoning categories. This is a necessary assumption, but in practice, rezoning and large-scale market factors will inevitably drive a different mix of land uses than either the current or projected land use plan call for.

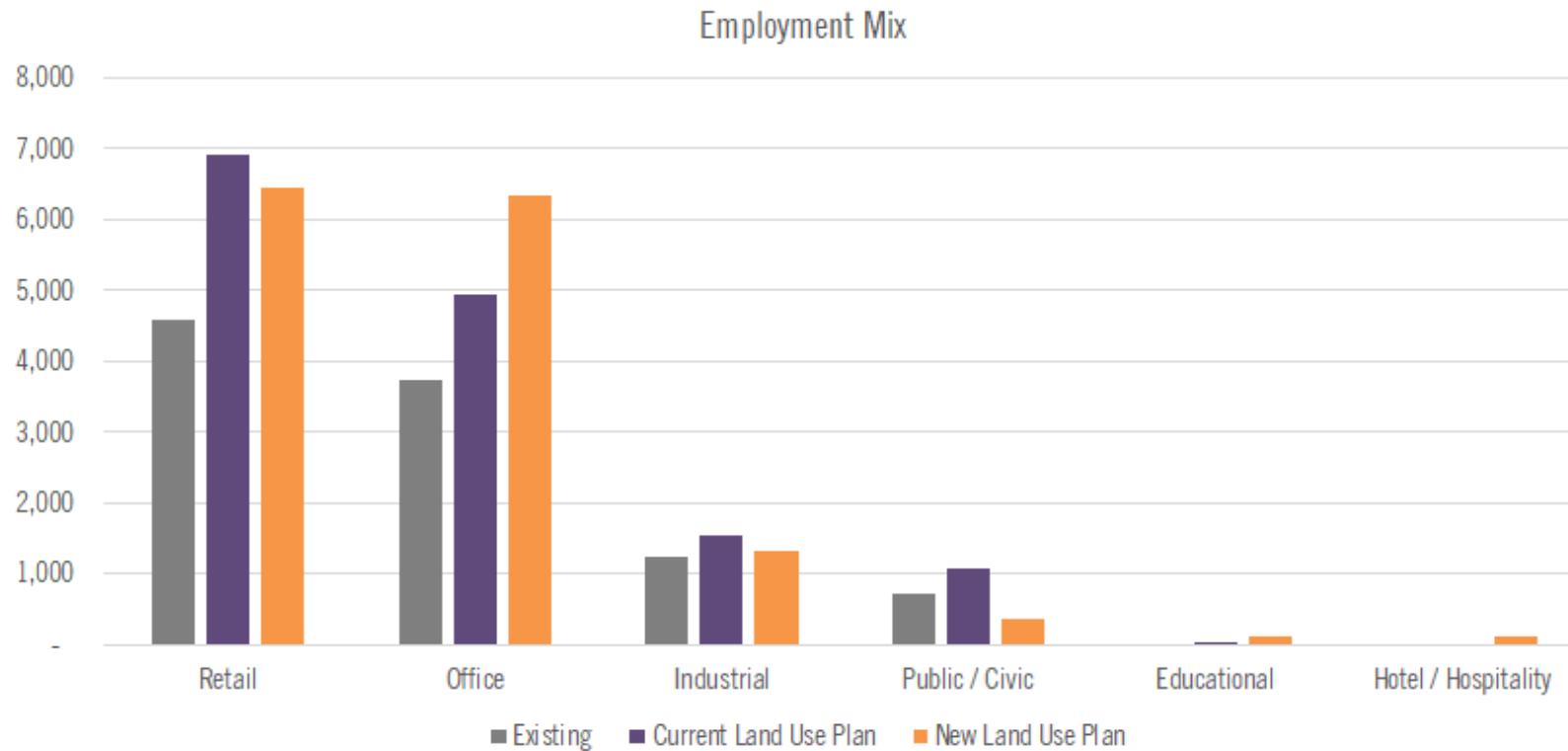


Figure 6.9b: Projected employment mix for existing, current land use plan, and new land use plan

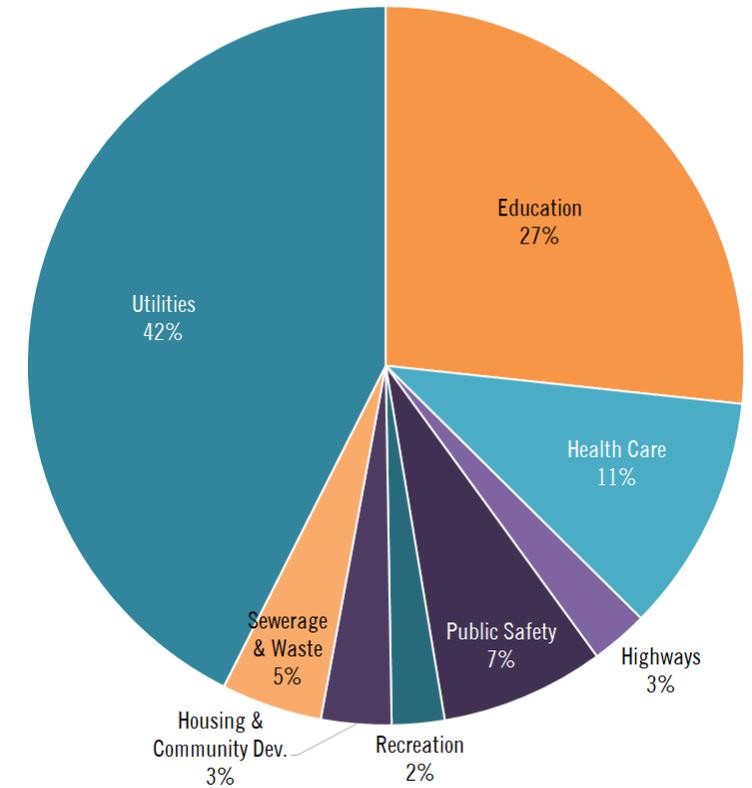


Figure 6.9a: Projected percentages of operations and maintenance items for proposed future land use plan

## ASSUMPTIONS

ReFIT uses 2010 census data – the latest comprehensive data currently available – as a basis for financial assumptions. It allows for overrides where more up-to-date information is available, and that has been done primarily by extracting pertinent information from current city and county budgets. Additionally, establishing scenarios requires estimation of wages, jobs, energy usage, sales tax, and other factors. The overrides and assumptions used in this study are as follows:

- Calculations of net jobs increases and population growth have been made based on the square footages of new developments. The figures for those calculations come from the United States Census Bureau (persons per household), the Institute of Transportation Engineers (employment per square foot), and other sources.
  - Prices per square foot for developments of various types were derived from internal sources, including ongoing projects and industry benchmarks.
  - Tax information, including property and sales tax revenues, taxing rates, and related information, was taken directly from City of San Antonio and Bexar County budget information.
  - Existing built square footage was determined via Bexar County tax records, and visual observations and GIS systems were used to estimate existing lot coverage ratios and to estimate other information which was used to project future square footage and lot coverage.
  - Floor area ratios used are generally suburban in character, using the land values and development characteristics of the market study as a guide. That is, no development is projected to be dense at an urban scale within the 30-year time frame.
- Assumptions of capital costs (new construction and related costs) borne by the city were as follows. It should be noted that with the caveats above that these figures are not intended for budgeting, changing these figures will not result in significant changes to the conclusions.
    - Education: 100%. For this study, school district revenue and expenditures were treated as city revenue and expenditures. Because this is a relative, rather than an absolute, modeling exercise, this assumption can be made.
    - Healthcare: 5%. These costs are generally borne by the county and private sector in San Antonio.
    - Roads: 80%. State and county involvement in roadway construction (including project components not specifically roadway, but usually included in roadway project budgeting) makes up the other 20%.
    - Public safety: 90%. Minor involvement from state and county is anticipated.
    - Recreation: 100%. Parks and recreation projects in this area are virtually exclusively city expenses.
    - Housing and Community Development: 100%
    - Sewerage and Utilities: 100%. As with education, utility revenue and expenditures were treated as a component of city budgets.
- Assumptions of financial and other factors were as follows:
    - Inflation of government revenue and spending was assumed to be 3.0%, in line with industry-standard practices for projected inflation
    - The discount rate was assumed to be 2.0%. This is in line with typical long-term assessments of projected discount rate
    - A period of 30 years was used

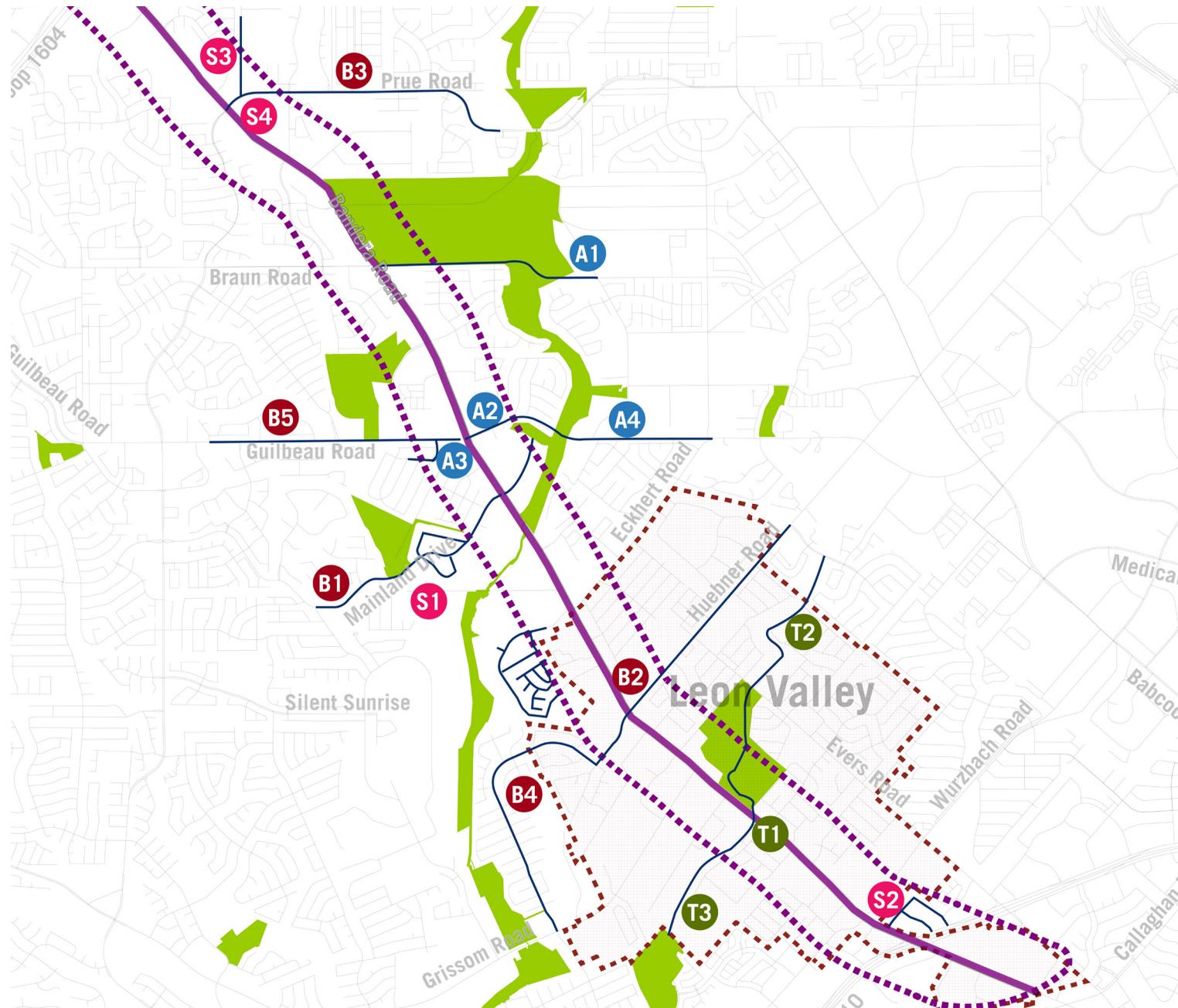


Figure 6.11: Map of potential projects. Refer to cost estimate, next page, for more information

## PROJECT BUDGETING

Project budgeting at the planning phase is an art, not a science. No comparison should be made between this budgeting exercise and cost estimating. Cost estimates are built from complete designs, with detailed information about all facets of projects. None of that information can be known at this stage. Cost data can only be as precise as the information known about projects, so these budgets are necessarily vague and imprecise. That said, they give a general idea of project size and can be useful in comparing two projects about which equally little is known, such as in the arterial improvements described in the previous section.

Cost information used to build these budgets was obtained from a variety of sources. These include:

- City of San Antonio 2017 bond projects. Budgeting data as well as actual costs for projects which have been completed were used
- City of San Antonio unit costs for sidewalks
- TxDOT fiscal year 2019 average unit costs for bridges and roadways
- Final project costs for Alazan and Salado Creek greenways
- Florida Department of Transportation 2020 average unit costs for sidewalks, multi-use paths, and composite roadway sections, corrected to San Antonio location costs using RS Means location data

Project IDs are keyed to the map in Figure 6.11. Extended information, including why these projects were selected for budgeting and the role they play in the overall transportation network, can be found about these projects in the Transportation and Network Connectivity section earlier in this document.

In all cases, data from previous years was inflated to 2021 using an annual inflation rate of 5%, consistent with industry averages for the past five years. Since projects like these are usually considered, budgeted, and built over a number of years, inflation factors should be applied in the future as well to projected mid-point of construction, with inflation factors determined according to current trends.

Budgets are presented as ranges rather than as single figures, as is appropriate for the lack of precise scoping of the projects. Even these brackets can prove to be wrong as projects are scoped out more fully and design begins. This is especially true if the scope of projects is modified as more is learned about requirements, or if the extents of projects change.

ID	Type	Scope	Length, ft	Length, mi	Cost Low	Cost High
B1	Bicycle	Mainland west of Bandera	5680	1.08	\$ 600,000	\$ 900,000
B2	Bicycle	Huebner on both sides of Bandera	7237	1.37	\$ 700,000	\$ 1,100,000
B3	Bicycle	Prue between Bandera and east of Cedar Park	8516	1.61	\$ 900,000	\$ 1,300,000
B4	Bicycle	Timberhill	8432	1.60	\$ 800,000	\$ 1,200,000
B5	Bicycle	Guilbeau	5667	1.07	\$ 600,000	\$ 900,000
T1	Trail	Huebner Creek east of Bandera	3816	0.72	\$ 2,300,000	\$ 3,200,000
T2	Trail	Huebner Creek east of Evers	4595	0.87	\$ 2,800,000	\$ 3,900,000
T3	Trail	Huebner Creek west of Bandera	4210	0.80	\$ 2,500,000	\$ 3,500,000
S1	Sidewalk	Central node sidewalk gaps	9277	1.76	\$ 360,000	\$ 400,000
S2	Sidewalk	Jackwood, Mobud, and Kenwick	6229	1.18	\$ 240,000	\$ 270,000
S3	Sidewalk	Hausman	11873	2.25	\$ 450,000	\$ 510,000
S4	Sidewalk	Prue	5089	0.96	\$ 200,000	\$ 220,000

Figure 6.12: Chart of potential projects







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SECTION 7

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# **PUBLIC INPUT SUMMARY**

## PUBLIC INPUT SUMMARY

Public input on the project has been extensive: four sets of comprehensive public meetings, plus additional targeted meetings with working groups, neighborhoods, business groups and others. That public input significantly shaped the final product, including priorities for development standards; principles for how the land use plan was developed; priorities for incorporation of multimodal development; and a multitude of other facets of the overall plan. The strong mixed-use component of the new future land use plan was both derived from, and strongly supported by, public feedback throughout the process.

CoSA and TxDOT jointly held two sets of public meetings: one on April 29, 2019, and the second consisting of meetings on December 10 and 11, 2019. Both sets of meetings were designed to solicit feedback from the public. Generally, the April 29 meeting was intended to generate broad input regarding major issues, while the December meetings were intended to provide information to the public regarding results of TxDOT’s initial studies and to solicit more specific feedback regarding both that information as well as a more discrete set of issues including usage patterns and desired features.

Following that, CoSA held a series of four online public meetings on March 29, 30, 31, and April 3. Identical content was available online through the city website, along with an online survey which matched the feedback

questions asked during the live public meetings. These meetings – which were identical in presentation format – focused primarily on future land use plan concepts in order to solicit public input on potential planning concepts. Mentimeter, an online real time survey tool, was used to receive public feedback on a series of survey questions which were interlaced with presentation material.

The final public meeting took place at CityChurch on August 24, 2022, in a town hall format. Much of the public comment focused on a portion of the draft plan within the Transportation and Neighborhood Connectivity section which called for further study of four connections identified by the separate TxDOT study. That section was removed following public comment. Similarly, changes were made to the land use plan at the Verde Hills neighborhood after comments from the neighborhood.

A variety of methods was used to publicize the public meetings. Postcards, social media accounts (including those of the CoSA Planning Department, CoSA Council Offices, City of Leon Valley, Alamo Area Metropolitan Planning Organization, and SA Tomorrow accounts) were used. Local newspaper advertisements, changeable message signs placed along Bandera Road, local news coverage, and local community calendars were also used to communicate event information to residents.

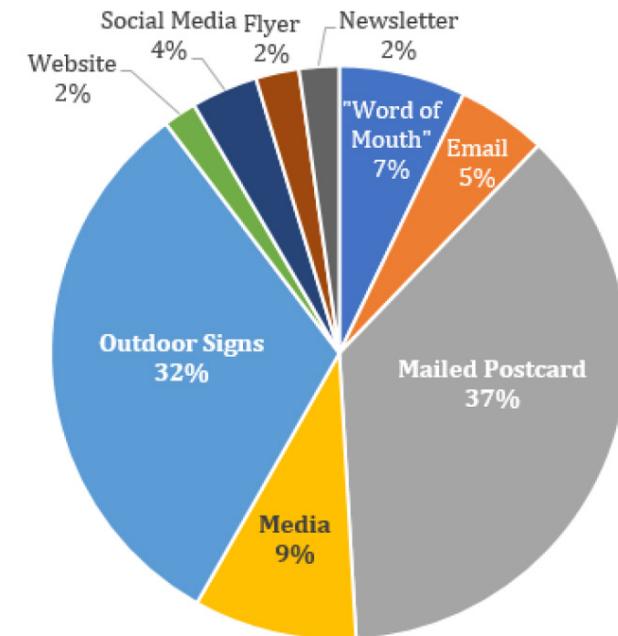


Figure 7.2: Community outreach methods

All public meetings have included synchronous facilitation for Spanish translation if needed, and some have included asynchronous (but with identical content as the real time meetings) American Sign Language translation as well.





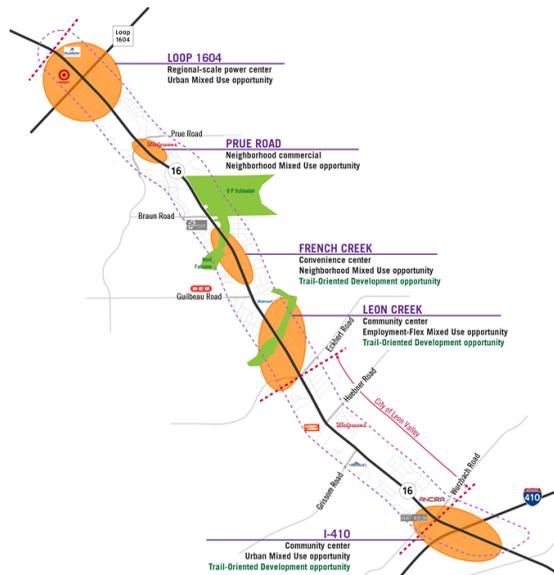


Figure 7.5a: Illustration of node concept used in presentation

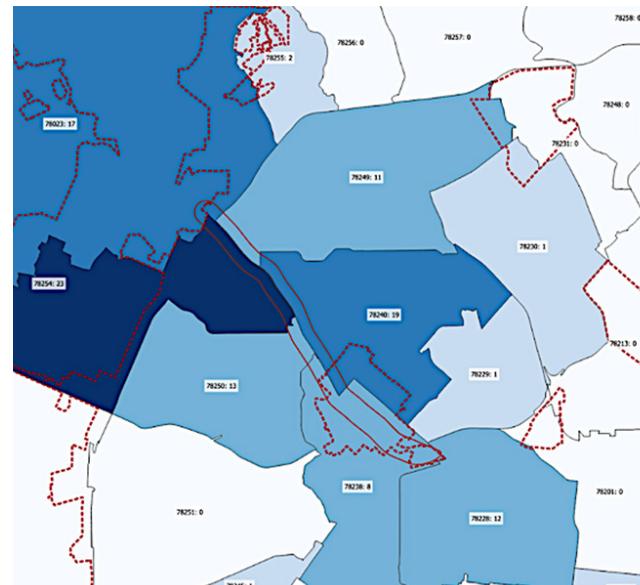


Figure 7.5b: Locations of respondents to SurveyMonkey poll

### PUBLIC MEETING 3

MARCH 29 - 31 AND APRIL 3, 2021

Due to the ongoing pandemic, these meetings were all conducted online in a format which allowed for interactivity. Content and feedback were structured to support one another: the presentation components and survey questions were intermixed, with survey questions immediately following the material they asked about.

The meetings focused on gathering public opinion and comment on various land use elements and potential urban design concepts. All four live virtual meetings featured identical presentations and polling questions via the Mentimeter live-polling platform. In addition to the live meetings, a pre-recorded presentation (posted on YouTube in English and Spanish), along with a web-based poll via SurveyMonkey (identical to the virtual meetings) and comment feature were available on the City’s Planning Department website.

Over 100 members of the public participated in the online meetings, with an additional number of respondents – varying by question, but up to 120 – to the SurveyMonkey poll.

Participants strongly supported multiuse paths along Bandera Road. They also supported developments which incorporate facilitation of multimodal transportation and internal semi-public spaces. Mixed-use developments again received overwhelming support. Two different potential land use concepts were presented, and attendees supported a blend of the two options.

## Which concept do you prefer?

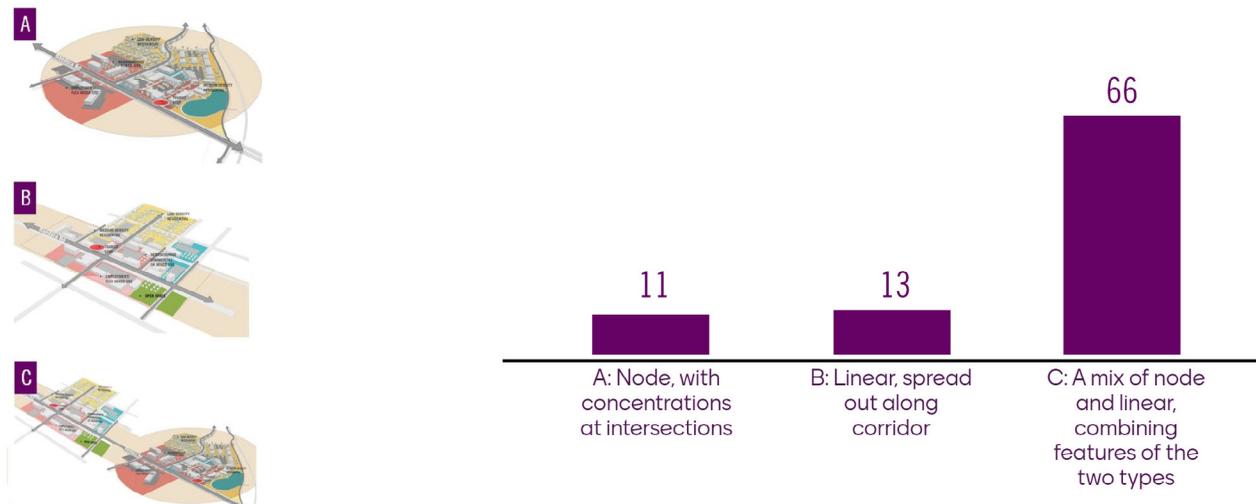


Figure 7.5c: Example question from Mentimeter, with composite results from all sessions shown

## PUBLIC MEETING 4

AUGUST 24, 2022

The final public meeting was held at CityChurch from 5:00 PM to 8:00 PM, in an open house format which allowed participants to come and go freely. Four stations with boards featuring illustrations from the plan were set up, each with one or two members of the Planning Department and/or the design team available to answer questions. Additionally, a station was set up to receive comments from attendees either in written form or via electronic devices. Attendance was over 200, with attendees from many neighborhoods in the study area as well as residents of Leon Valley and others with interest in the project. Written comments numbered nearly 80, with another nearly 150 comments received electronically. The draft plan was posted in July of 2022, with a response end date of August 31, 2022.

Much of the public comment focused on a portion of the draft plan within the Transportation and Neighborhood Connectivity section which called for further study of four connections identified by the separate TxDOT study. Those connections were modeled by TxDOT and were addressed in a qualitative fashion within the draft. Comments were strongly negative; residents opposed using park land for connections as well as feared impacts from any roadway connection to neighborhoods, including concerns ranging a spectrum from realistic to unlikely. Following an initial round of comments, that material was removed from the draft.

Residents from the Verde Hills neighborhood provided comments opposing the designation of properties in their neighborhood as Low Density Residential and opposing a recommendation to construct sidewalks within the neighborhood to connect homes to the corridor. The draft plan made the future land use recommendation to bring the future land use plan in line with current residential zoning. However, following comments and discussion with neighborhood representatives, wherein concerns were raised about the low density residential

land use categorization, the future land use plan was revised to propose the Residential Estate land use category and further recommends that the city investigate rezoning properties within the neighborhood to implement the future land use map.

The plan aims to preserve residential development in the existing character of the neighborhood and supports a diverse mix of housing options along the corridor. The preservation of existing estate sized lots are not excluded from this sentiment. However, careful consideration should be given to ensure the ability for residents with larger lots to consider multigenerational housing scenarios in the future. Residents and their family members should have the option to age in place, or grow their families, within their neighborhood. Additionally, staff considered and felt it prudent to remove the sidewalk recommendation for this neighborhood from the plan.

Other comments were more divided. A variety of issues inspired comments which both opposed and supported aspects of the plan, to an extent that no clarity could be gained to revise the draft. Issues which featured both support and opposition included:

- Inclusion of mixed-use land uses along the corridor
- Construction of sidewalks and bicycle facilities to connect to the corridor
- Recommended development standards including reduced parking, additional landscaping, and other features

Some comments included opinions about topics which either are not directly relevant to the plan or which delve into issues of property rights and cannot be realistically addressed within the plan, including:

- Provision for additional transit
- Opposition to multifamily housing
- Requests to include planning for the cities of Leon Valley and Helotes.

## Development Guidelines



Figure 7.6: Example board from public meeting

Finally, many comments featured support for or opposition to portions of the TxDOT plan for Bandera Road, or recommendations for changes to the roadway itself. As this plan does not directly address those issues, those comments were forwarded to TxDOT for their information.



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Appendix 1

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# **INNOVATION TECHNICAL APPENDIX**

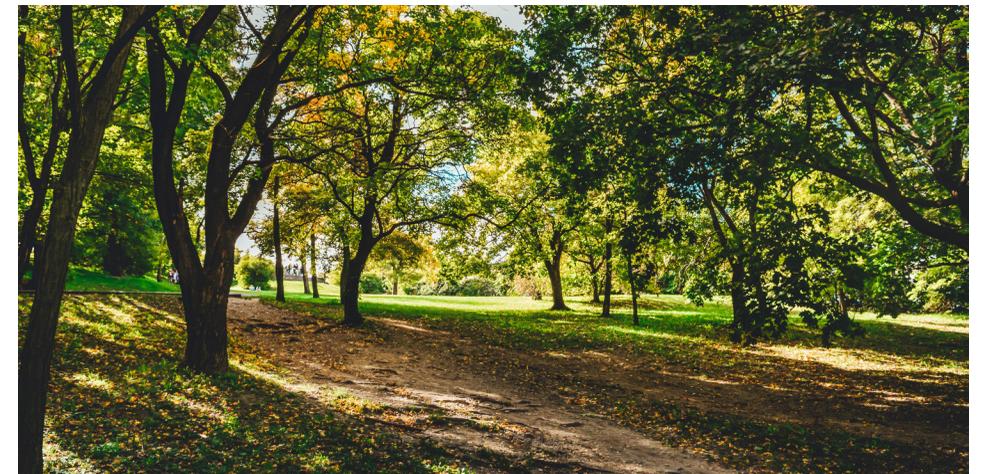


## Innovation

In April 2019, the City of San Antonio conducted its first community meeting for the Bandera Road Corridor Plan at City Church Bandera Road. When asked which area of sustainability/innovation residents would most like to see considered in the corridor plan, the majority of surveyed residents indicated a desire for air and water quality, connection to trails and parks, and technological solutions.

The City of San Antonio is committed to utilizing innovative solutions to enhance transportation options, as expressed in the SA Tomorrow Comprehensive Plan. Technological advancements have the potential to bring positive changes to San Antonio's commuters, but it is important to remember that public policies and ordinances also have the potential to foster innovative change.

The following section provides an overview of innovative strategies relevant to the Bandera Road Corridor. Some of the strategies are further evolutions of practices that the City of San Antonio or TxDOT have already implemented, while some are substantially different in form or concept than current policies in the city.





### Intelligent Transportation Systems (ITS) Technology

An intelligent transportation system (or ITS) “is an operational system of various technologies that, when combined and managed, improve the operating capabilities of the overall transportation system.”<sup>1</sup> ITS benefits San Antonians every day, from applications that inform them when to catch the next bus to GPS technology in their private automobiles.

ITS can bring a wide array of benefits, such as reduced fuel use. Connected vehicle technology can be used to provide speed advice to drivers to pass the next traffic signal on green or to brake efficiently. Driver speed notification systems can be used to improve safety for both drivers and pedestrians.<sup>2</sup>

ITS can be implemented to collect passenger counts, driver speeds, and other real-time data affecting road conditions. Corridors that have implemented ITS technology have seen improved transportation benefits. For example, the United States Department of Transportation selected San Diego’s I-15 corridor as a pioneering site to analyze Integrated Corridor Management strategies. As a result of the various strategies implemented in the corridor (which ranged from traffic management to transit management), congestion has been reduced and the productivity of the transit system has been improved.<sup>3</sup> ITS technology has the potential to be scaled down to fit Bandera Road’s arterial context and improve current conditions.

1 United States Department of Transportation, Bureau of Transportation Statistics, “History of Intelligent Transportation Systems,” 2016

2 United States Department of Transportation, ITS Fast Facts

3 [https://www.its.dot.gov/research\\_archives/icms/index.htm](https://www.its.dot.gov/research_archives/icms/index.htm)

Figure A1.3: Integrated Corridor Management concepts, from San Diego Forward planning

### Microtransit/Mobility On Demand

Microtransit is a service that provides on-demand, curb-to-curb transit service on small vehicles in areas where traditional fixed-route transit service may not be cost effective. Many public transit agencies have conducted pilot programs to study project impacts and local applicability. At the same time, private operators have also entered the microtransit market.

For example, the city of Arlington, Texas started providing microtransit services in partnership with a private company, Via (not to be confused with San Antonio's public transit agency). The city of Arlington does not have a public bus system – its Via Rideshare microtransit service provides an alternative for residents to access employment and educational opportunities, shopping trips, and other services in a limited area of the city. As of April, 2019, Via Rideshare provided more than 150,000 rides for a cost of \$3 per trip.<sup>1</sup>

San Antonio's transit agency VIA has also begun pilot projects to explore the efficacy of microtransit within the San Antonio area. The first "VIA Link" on-demand service was initiated in Northeast San Antonio in 2018. Unlike some microtransit pilots that offer curb-to-curb service, VIA Link, operated by third-party contractors, requires passengers to meet at a designated stop (sometimes an existing VIA local bus stop). The service provides passengers lower waiting times and more reliable service in a part of the service area where transit typically runs only once every

hour. VIA is exploring establishing additional VIA Link areas throughout the service area, including in the Bandera Road Corridor study area.<sup>2</sup>

Microtransit has the potential to be implemented in areas of low transit coverage, but it is important to remember that its effectiveness depends on many factors. Many microtransit pilot projects implemented across the nation have been well-received, but others have not achieved target ridership numbers or have encountered higher than expected costs.<sup>3</sup> Any microtransit initiative implemented in the Bandera Road Corridor must consider local conditions, demand, and potential costs in order to be successful.

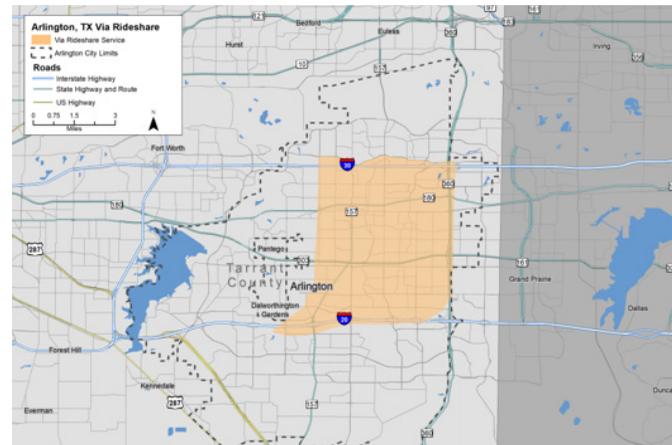


Figure A1.4a: City of Arlington Via Ridershare Program Area

1 City of Arlington, Data in Action, 2019 [https://www.arlingtontx.gov/news/my\\_arlington\\_t\\_x/news\\_stories/datainaction\\_via](https://www.arlingtontx.gov/news/my_arlington_t_x/news_stories/datainaction_via)

2 <https://www.viainfo.net/link/>

3 Metropolitan Washington Council of Governments, "Demand Response Transit/Microtransit: Implementation Guide," 2019

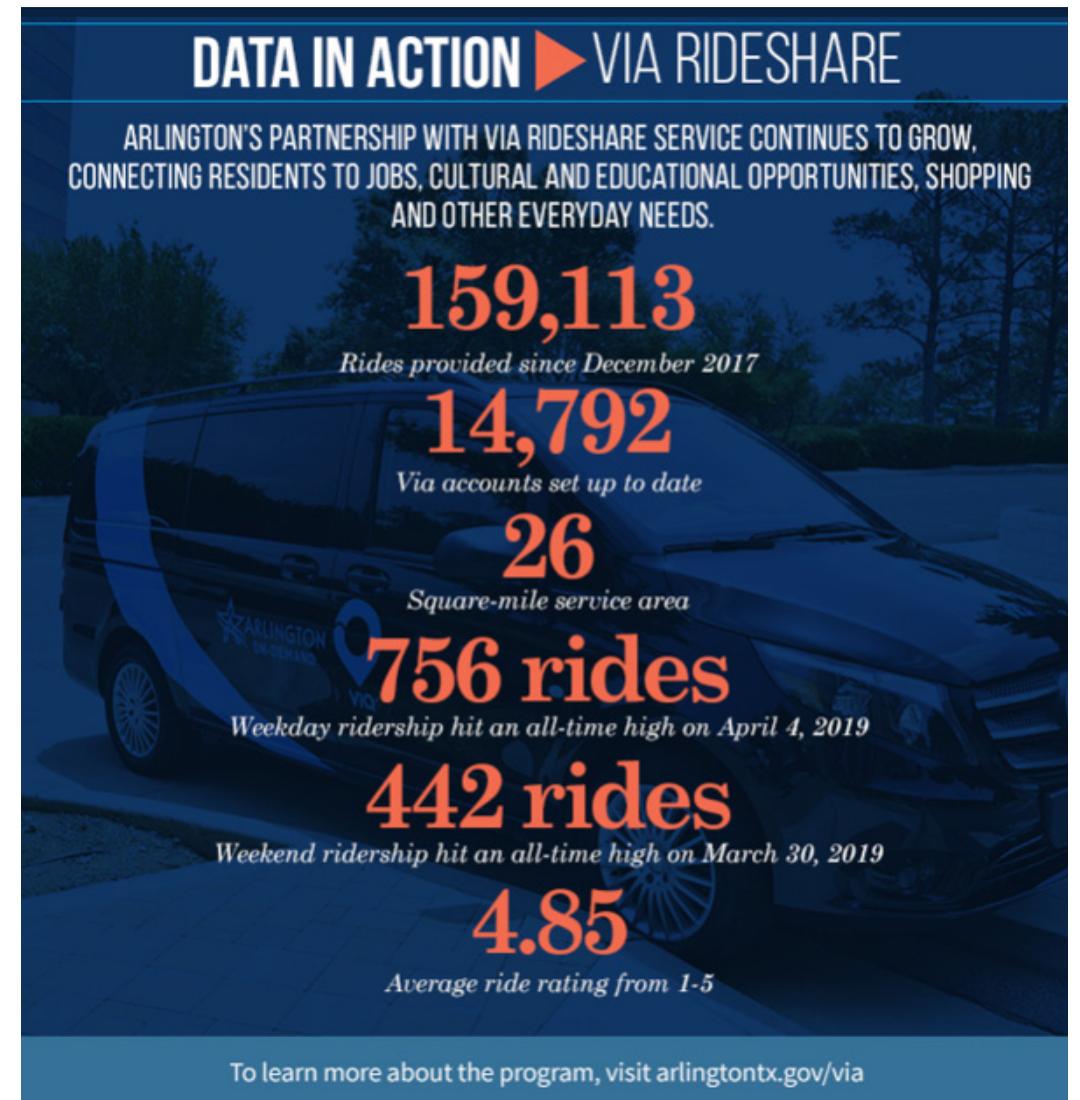


Figure A1.4b: City of Arlington Via Ridershare Program Results, Posted April, 2019

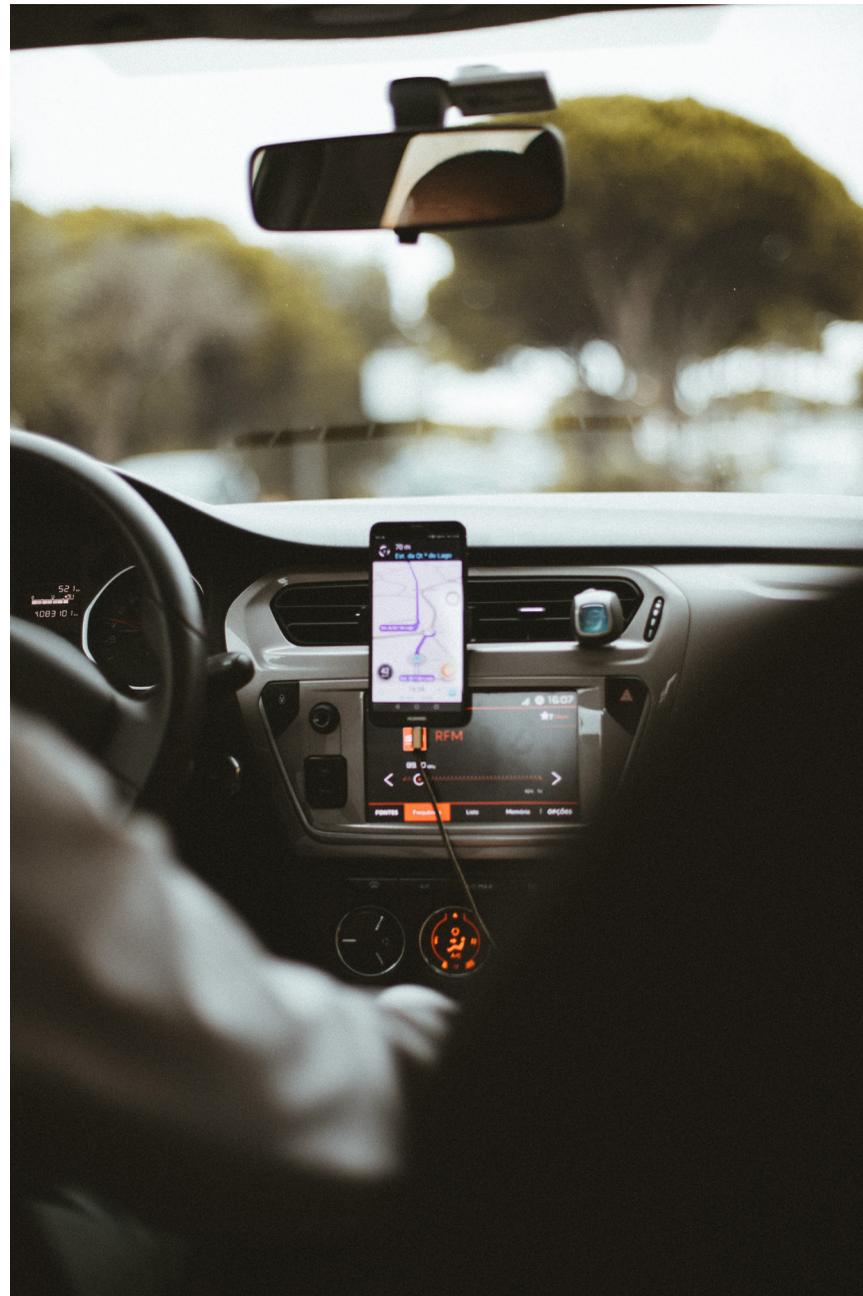


Figure A1.5: Ridehailing driver

### Ridehailing

Ridehailing represents a challenge and an opportunity to public transit and commuter transportation in San Antonio. Since Uber entered the market in 2009, the availability of on-demand transit services has increased exponentially. Recent research seems to indicate that ridehailing is decreasing transit ridership and increasing car travel in many cities. However, the effects of ridehailing on transit ridership are different in every region, and ridehailing might even benefit and complement public transit in some situations. For example, a survey conducted by the University of California at Berkeley found that 4 percent of Uber and Lyft customers ended their rides at transit stations.<sup>1</sup>

Many transit agencies across the country have created partnerships with ridehailing providers in order to enhance their services and increase accessibility. For example, Dallas Area Rapid Transit partnered with Uber to provide free or discounted trips to and from transit stations.<sup>2</sup> In the greater Boston area, the Massachusetts Bay Transportation Authority's paratransit service partnered with various ridehailing companies for a pilot program providing on-demand services for its users.<sup>3</sup> Ridehailing companies are disrupting traditional transit and commuter patterns, but innovative partnerships between public transit providers and on-demand travel providers might also present an opportunity to increase access and mobility for the people in the Bandera Road Corridor.

<sup>1</sup> Scientific American, "Can Ridehailing Improve Public Transportation Instead of Undercutting It?", 2018

<sup>2</sup> <https://www.uber.com/blog/dallas/dart-pool/>

<sup>3</sup> <https://www.mbta.com/accessibility/the-ride/on-demand-pilot>

### Transportation Demand Management (TDM)

Transportation Demand Management is a set of strategies aimed at maximizing traveler choices. Traditionally, TDM has been associated with ridesharing, but it is more than that. TDM programs include policies as varied as HOV lanes, dedicated bus and bike lanes, transit ridership education, and improvements to transit access.<sup>1</sup>

A successful case study of TDM is Arlington County, Virginia. Although the area has experienced significant growth, TDM strategies have been implemented and helped reduced automobile trips. The program’s success is based on three factors:

- Promoting walkable “urban villages”
- Providing a wide array of transportation alternatives to driving: public bus services, bike trails, commuter rail, etc.
- Providing information about, encouraging, and incentivizing alternatives to vehicular transportation<sup>2</sup>

Transportation demand management programs have the potential to foster transit ridership in the Bandera Road Corridor. Many TDM strategies are directly within the city’s purview, particularly strategies that modify development review standards such as required mitigation measures for new developments results from traffic studies (such as Transportation Impact Analyses or TIAs).



Figure A1.6a: TDM Supply/Demand Balancing (diagram by Nelson\Nygaard)

<sup>1</sup> Mobilitylab, “What is Transportation Demand Management Actually,” 2018  
<sup>2</sup> Victoria Transportation Planning Institute, Examples of TDM Programs that Work, 2019

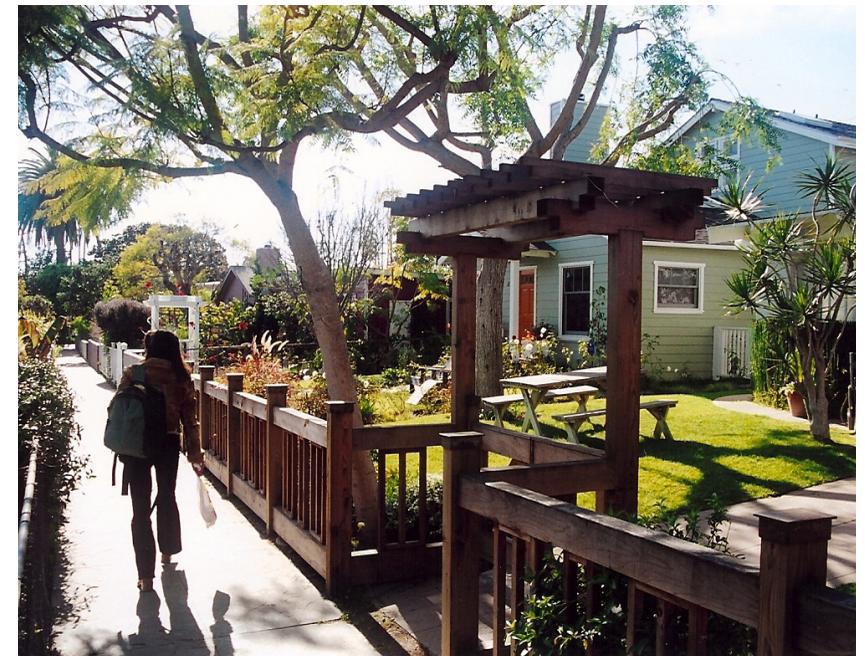
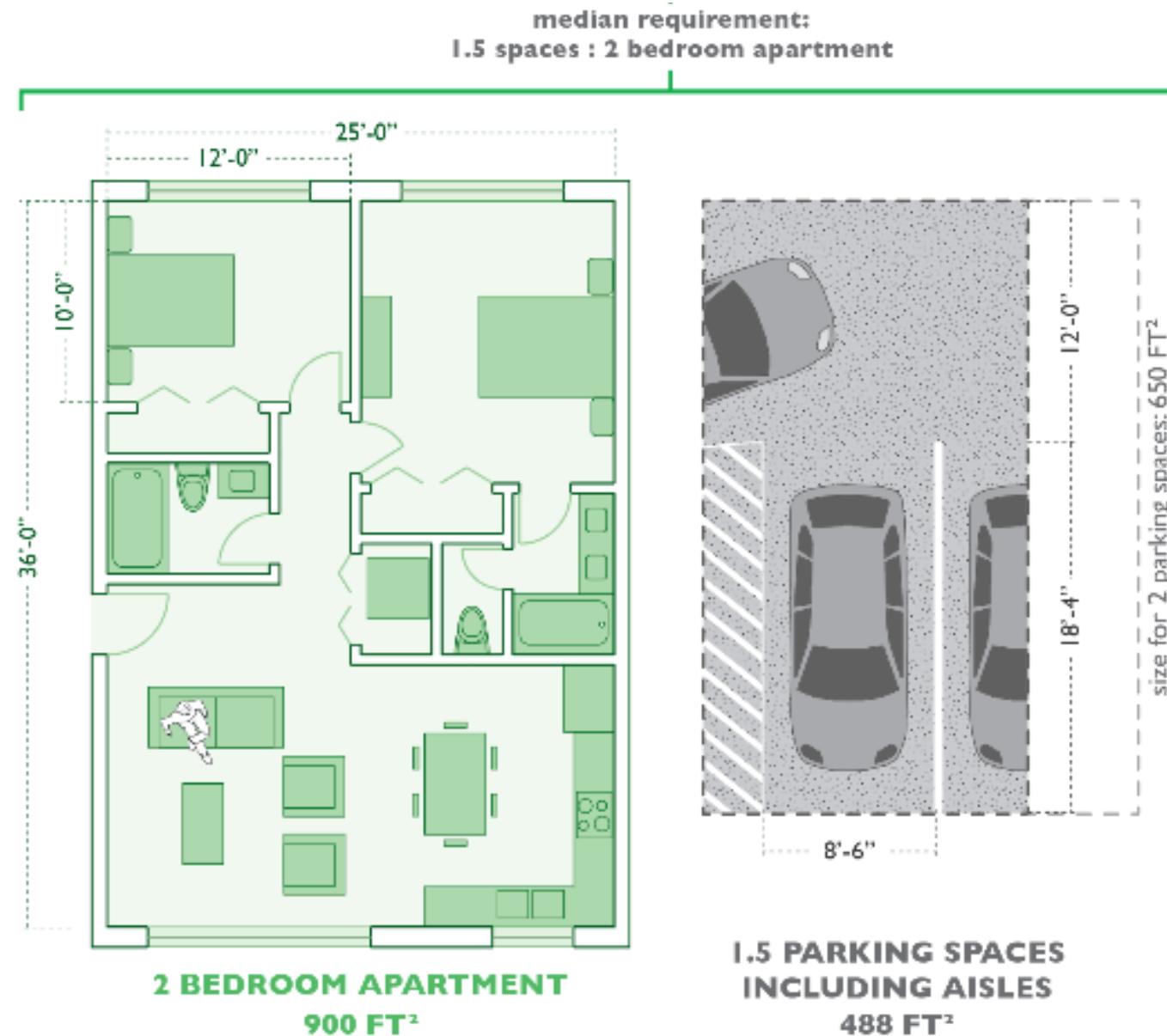


Figure A1.6b: Pedestrian lane in Venice, CA (photo by Michael E. Arth)



Figure A1.6c: Example of a walkable neighborhood



### Parking Reform

As the SA Tomorrow Sustainability Plan explains, San Antonio is committed to “innovative parking strategies to encourage walkability and alternative modes of transportation”. Although parking is necessary in many instances, an excess of free and readily available parking tends to incentivize people to take single-use vehicle trips and decreases interest in alternative forms of transportation. Excess parking can also have negative effects on the environment, as well as decreasing the amount of land available for more economically productive uses.<sup>3</sup>

Implementation of parking reforms within the Bandera Road Corridor could incentivize alternative forms of redevelopment that would be unattainable with current parking requirements. Parking reform strategies that could be implemented in the study area are very diverse, but can include the following:

- Reducing minimum parking regulations
- Simplifying parking requirements
- Lowering parking requirements for locations with alternative transportation options

3 City of Minnetonka, Parking Reform Proposal, 2013

Figure A1.7: Space occupied by two bedroom apartment and required parking (diagram by Sightline Institute)

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Appendix 2

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# **SUSTAINABILITY AND EQUITY TECHNICAL APPENDIX**



## Sustainability and Equity

As exemplified by San Antonio’s Climate Action and Adaptation Plan, the City of San Antonio has a very strong commitment to economic, environmental, and social sustainability.

Beyond carbon, a truly sustainable future for Bandera Road includes working with the residents, businesses, and commuters that inhabit and utilize the corridor to create a holistic strategy that addresses not only consumption of natural resources, but also economic sustainability and the health and wellness of citizens.

The following sections provide additional information on how distinct sustainability concepts can be implemented through the Bandera Road Corridor Plan. Specific areas of focus include general environment (including issues of water, vegetation, and shade), greenhouse gas emissions, and green infrastructure.

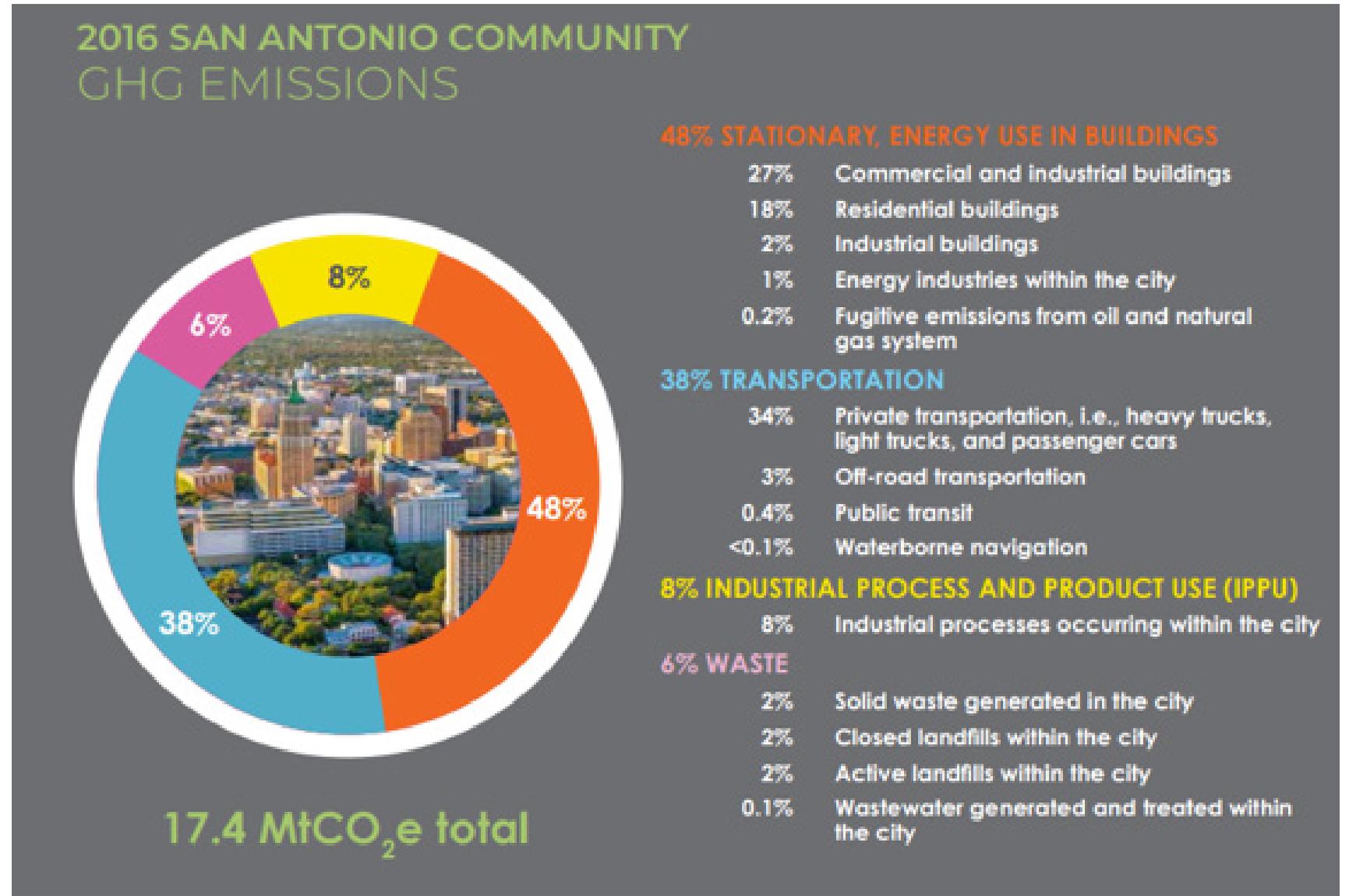


Figure A2.2: Source: SA Climate Action and Adaptation Plan (CAAP), 2019

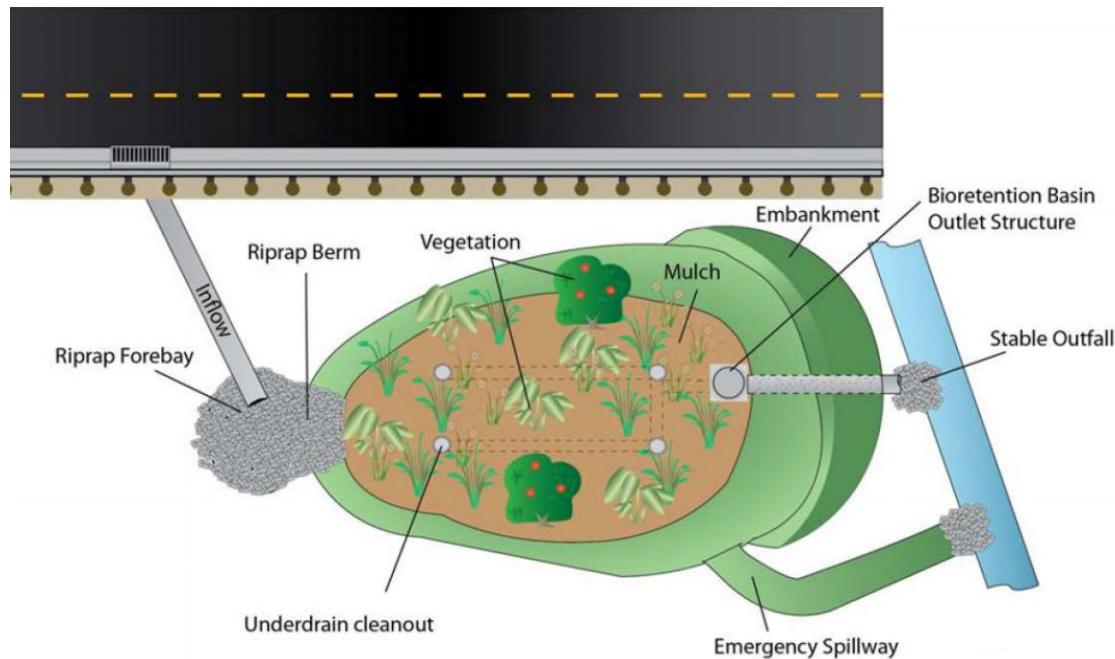


Figure A2.3a: Bioretention feature, Georgia Department of Transportation



Figure A2.3b: Bioretention feature and swale in Georgia

### Low-Impact Development and Green Infrastructure

Much of Bandera Road is currently bordered with concrete-lined drainage ditches. While unsightly, they represent both a major issue to be managed and an opportunity to integrate natural beauty, stormwater management, and water quality.

Green infrastructure has the potential to create more resilient communities, reduce energy consumption, and foster a cleaner environment. Green Stormwater Infrastructure (GSI), in particular, has the potential to be implemented in the Bandera Road Corridor. GSI aims to simultaneously manage water and create healthier urban environments,<sup>3</sup> and it has been adapted in many communities throughout the country.

Beyond these strategies, managing stormwater should be a significant focus. Low-impact development (LID) techniques can be used to reduce the negative impacts of development, and when adopted early in the planning and design process, can be of limited additional expense.

<sup>3</sup> North Central Texas Council of Governments (NCTCOG), Green Infrastructure Guide, 2017

LID strategies include:

- Preservation of floodplain
- Maintaining natural areas, including zones of significant tree canopy free of development
- Capture rainwater for reuse on site wherever possible
- Incentivize porous paving to minimize areas of impervious cover throughout the district
- Utilize native plantings with low irrigation requirements
- Conserve and restore native species biodiversity

Planting additional trees along the Bandera Road Corridor could also have positive environmental effects. Enlarging the tree canopy cover has the potential to provide more effective rainfall interception, help alleviate the negative effects of heat islands, improve air quality, and increase overall livability in the area. In addition to aesthetic enhancements, trees also provide economic benefits. It is estimated that annual benefits of street trees range from \$30 to \$90 per tree, and they may also help increase property values up to 15%.

The San Antonio River Authority has been very active and successful in promoting LID techniques in San Antonio, and the City of San Antonio has a voluntary LID incentive program for qualifying projects.

### Environmental Sensitivity and the Heat Island Effect

Along the Bandera Road Corridor today, larger commercial developments and uninterrupted surface parking lots proliferate. These contribute to elevated temperatures in these areas, known as the heat island effect, which has health-related impacts and can have long-term effects on real estate developments and economic vitality.

Mitigating these effects can benefit more than just the micro-climate of a district. As stated in the Urban Land Institute's 2019 report "Scorched: Extreme Heat and Real Estate," "heat-related land use policies often support other city goals related to greenhouse gas (GHG) emissions reduction, stormwater management, public health improvement, decreased social inequity, and effective emergency response". A significant portion of urban anthropogenic heat – 47% to 62% – comes from vehicular sources.<sup>4</sup> Strategies to mitigate this include:

- Maintain and increase the existing tree canopy
- Deploy active or passive green roofs on buildings
- Provide shading of public spaces
- Encourage use of San Antonio Water System rebate programs for water conservation (commercial and residential)
- Use light-colored hardscape and paving materials
- Subdivide parking areas with vegetation and shading, which helps to moderate temperatures during hot weather
- Installing sensors to monitor heat, wind, and humidity in order to inform people of health-threatening conditions
- Land use policies should encourage redevelopment of existing, underutilized infrastructure (roads, buildings, hardscape) over new greenfield or brownfield development in order to preserve existing natural space

Environmental sensitivity should also be considered with respect to ecology and habitat. New developments should avoid creating "islands" where wildlife are unable to migrate from one zone to another without traversing urbanized areas. The existence of features such as the Leon Creek Greenway help facilitate this movement, and similar features should be created or enhanced throughout the corridor.

<sup>4</sup> Sailor, David J., and Lu Lu. "A Top-down Methodology for Developing Diurnal and Seasonal Anthropogenic Heating Profiles for Urban Areas." *Atmospheric Environment* 38, no. 17 (2004): 2737–48.

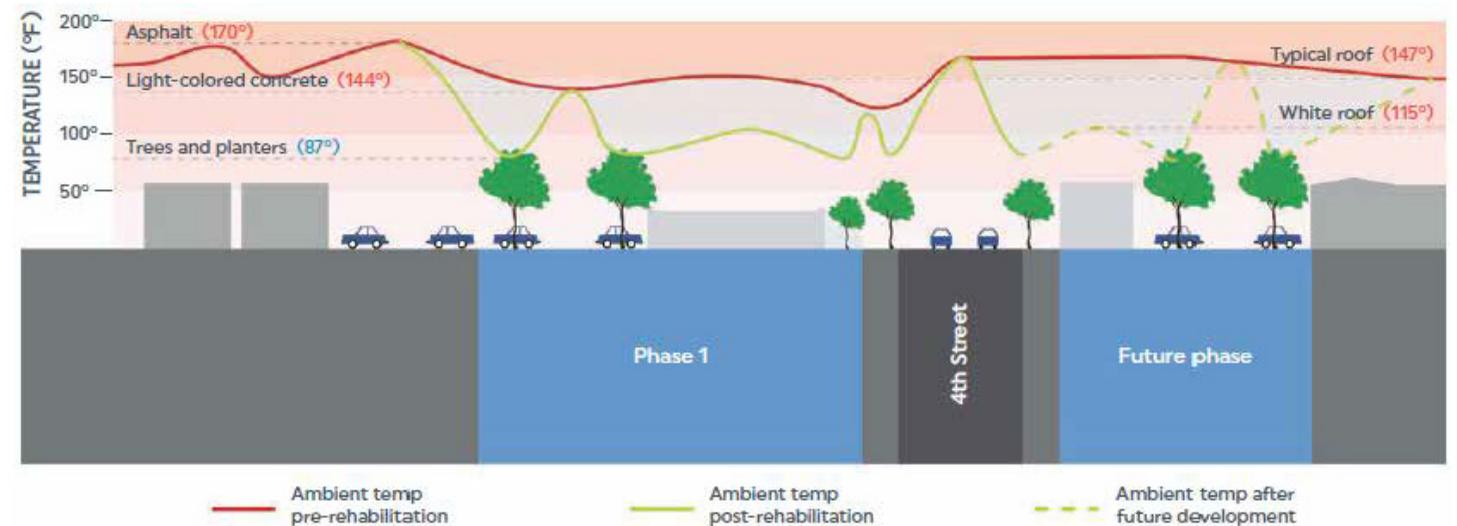


Figure A2.4a: Temperature modeling for a redesigned development in Southern California estimates cooler microclimates created by selecting white roofs and light-colored concrete as well as planting additional trees. (Studio One Eleven)



Figure A2.4b : Shade from the tree canopy and evaporation from vegetation create a thermally comfortable environment



Figure A2.5: Mixed-use development (By Payton Chung, CC BY 2.0, <https://commons.wikimedia.org/w/index.php?curid=29449411>)

### Mixed-Use Developments

As land uses are evaluated along the Bandera Road corridor, priority should be given to mixed-use and mixed-density development. These afford opportunities for more equitable communities and can support economic and environmental goals through compact zones. Mixed-use nodes can encourage walkability and increase the ability to utilize transit, thus decreasing vehicle miles traveled (VMT). Similarly, they provide opportunities for identifiable and unique community spaces that do not currently exist along the corridor.

Land use policies should encourage the following development types:

- Districts that mix employment centers with multiple housing typologies, allowing opportunities for living and working in a single area
- Affordable housing near goods and services for improved access
- Incorporation of multi-modal transit centers with mixed-use developments
- Redevelopment (at higher densities) of previously-developed land near green corridors, rather than new greenfield development

### Access

Providing equitable access throughout the corridor is a key driver for long-term success and sustainability. Access includes linkages to goods and services, as well as public spaces, greenbelts, and nature areas. It should be considered as a multi-faceted strategy:

- Provide services located appropriately throughout the district to allow connections to multiple and diverse communities
- Multi-modal access should be considered from the surrounding communities to and through key areas along the corridor. These modes include improving sidewalk connections for walking, adding safe and visible bicycle routes, ensuring proximity of transit stops, and incorporating safe, complete streets
- Transit hubs should be well connected to surrounding communities by walking, bicycling, other micro-mobility, and driving
- Provide access to greenbelts, public spaces, and nature areas through clear and open pathways at multiple points. New development (or redevelopment) adjacent to regional greenbelts should be encouraged to provide publicly accessible space along or to the greenbelt
- Incorporate universal design principles in order to make the corridor accessible for all, regardless of age, size, ability, or disability



Figure A2.6: Multimodal access, including greenways

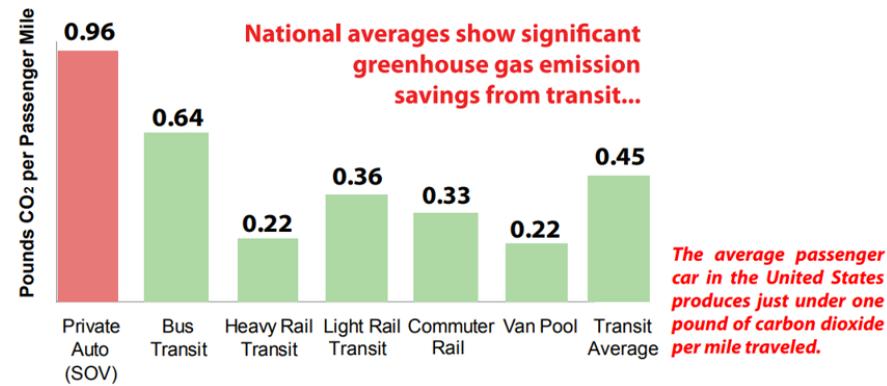


Figure A2.7a: Estimated CO2 Emissions per Passenger Mile for Transit and Private Autos

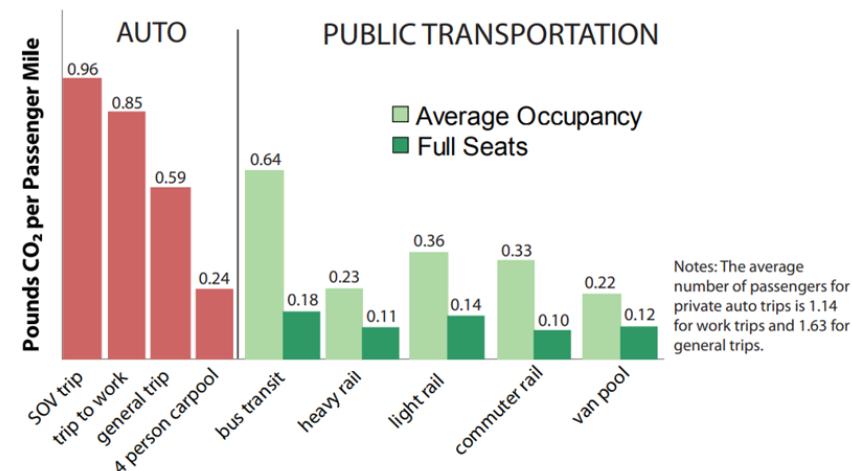


Figure A2.7b: Estimated CO2 Emissions per Passenger Mile for Average and Full Occupancy

Source: TCRP 128: Effects of TOD on Housing, Parking and Travel, 2008.

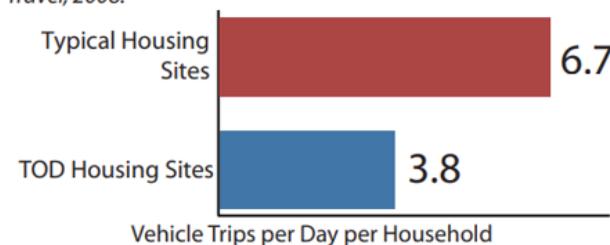


Figure A2.7c: Vehicle Trips per Day of Transit Oriented Development (TOD) Housing Sites versus Typical Housing Sites

### Transportation's Role In Greenhouse Gas Emissions

Transportation accounts for 38% of greenhouse gas emissions in San Antonio.<sup>1</sup> According to the SA Tomorrow Comprehensive Plan (2016), over the five-year period from 2009-2013, 95% of San Antonio residents traveled to work by car: only 3.5% of workers rode public transit, 2% walked to work and less than 0.25% cycled to work.

Improving public transportation options and fostering alternative modes of transportation will allow the city of San Antonio to decrease GHG emissions. On average, transit produces 0.45 pounds of CO<sub>2</sub> per passenger mile vs. 0.96 produced by private automobiles.<sup>2</sup> It is important to keep in mind that transit ridership numbers also affect CO<sub>2</sub> emissions per passenger mile: the more San Antonians utilize public transit, the lesser the effect on the environment.

Additionally, it is important to consider that transit use is impacted by compatible land uses. The city of San Antonio has already evaluated the southernmost part of the Bandera Corridor Study area in its SA Corridors Strategic Framework Plan, which includes a transit-supportive land use framework. Further implementation of transit-friendly zoning regulations in the Bandera Road Corridor have the potential to make transit more accessible, which will ultimately help further decrease GHG emissions in San Antonio.

<sup>1</sup> SA Climate Ready Report (2019)

<sup>2</sup> Federal Transit Administration, Public Transportation's Role in Responding to Climate Change, 2010

## Electrification

The city of San Antonio's Sustainability Plan aims to “expand infrastructure and promote policies that encourage the use of electric vehicles” (pg. 26). Electrification is also supported in CoSA's Climate Action & Adaptation Plan which seeks to reduce greenhouse gas emissions from transportation by advancing “cleaner and more efficient vehicle technologies” (CAAP, p. 34), and through the American Cities Climate Challenge initiative to facilitate EV charging. The city's “Electric Vehicle Fleet Conversion and City-Wide Electric Vehicle Infrastructure Study” projects 45,000 EVs in San Antonio by 2030.

Currently, there are no charging stations along Bandera Road (the nearest charging station being located at the Santikos Silverado 16 Movie Theater parking lot, near the intersection of Bandera Rd. and West Loop 1604). There are many opportunities to incentivize the implementation of EV charging stations along the study area in both commercial and multifamily developments. However, it is important to remember that the widespread adoption of electric vehicles depends on many factors that are outside of the city of San Antonio's control. Currently, electric vehicles represent only 1.2% of overall car sales nationally.<sup>1</sup> While it is important to foster the development of an environment supportive of electric vehicle users, these efforts should be seen as a part of a more holistic sustainability plan.

<sup>1</sup> Morning Consult, “For Widespread Adoption of Electric Vehicles, Many Roadblocks Ahead”, 2019



Figure A2.8a: Electric vehicle charging station (Jacquesverlaeken [CC BY-SA (<https://creativecommons.org/licenses/by-sa/4.0/>)])

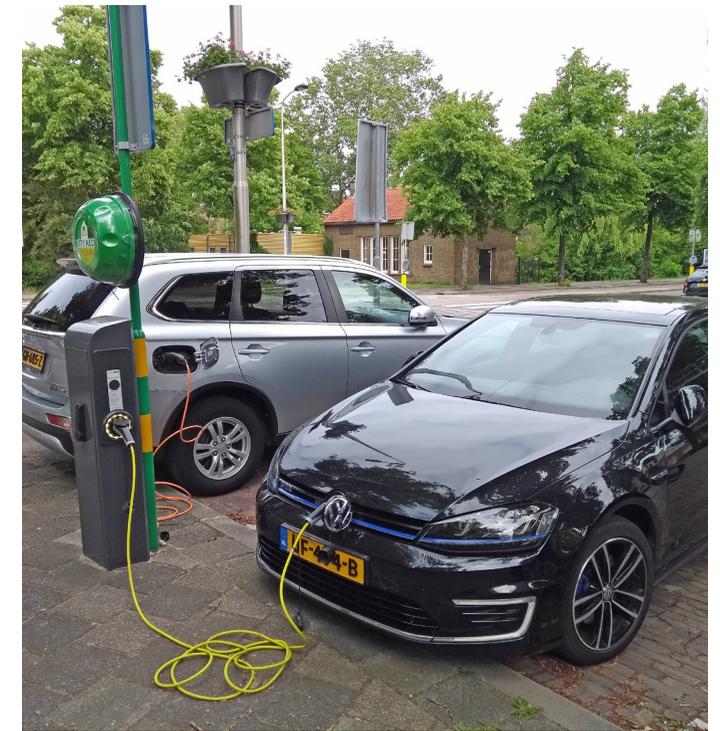


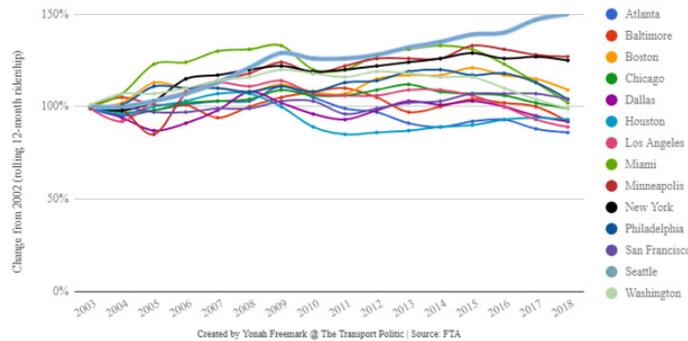
Figure A2.8b: Electric vehicle charging station (Francis Flinch - Own work, CC BY-SA 4.0, <https://commons.wikimedia.org/w/index.php?curid=79231008>)

THE 10-MINUTE NETWORK

8 out of every 12 Seattle households are located within a 10-minute walk of 10-minute or better all-day transit service.



Change in transit ridership in major US regions 2002-2018



Transit and Single Occupancy Vehicle (SOV) Mode Share to Downtown Seattle 2010 - 2017 & 2035 Goal

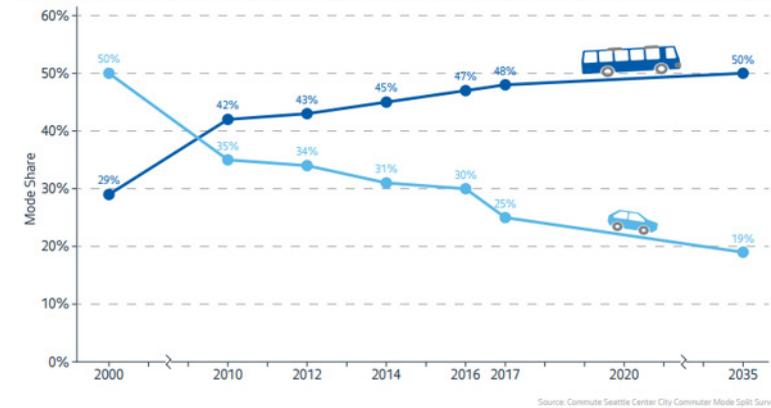


Figure A2.9a: Seattle transit and national transit ridership



Figure A2.9b: Bikeshare in San Antonio

Mode Shift

Implementing a transportation system that allows for multiple alternatives for travel is pivotal for the sustainability and well-being of communities. The Bandera Road corridor benefits from its unique position which intersects the Leon Creek Greenway. The Leon Creek Greenway provides access to 20 miles of multi-use trails spanning from northeast of Loop 1604 and IH-10, to W. Military Drive, southwest of Loop 410, with nearby trailheads at O.P. Schnabel Park, Leon Vista and Mainland. Active transportation efforts have been shown to provide economic benefits to many of the municipalities that implement them. For example, in the city of Fort Worth, the Magnolia Street district saw a 179% increase in restaurant revenues after streets were restriped with bike lanes. Similarly, homes located near trails sell for 6% more than comparable homes located far from trails.<sup>1</sup>

Encouraging a mode shift away from a driving-focused environment has the potential to foster positive health effects for the general population. Bicycling and walking are associated with improved heart health and lower levels of obesity, Type 2 diabetes, and cancer. Similarly, every \$1 invested in trails can yield anywhere from \$1.65 to \$13.40 in direct medical benefits.<sup>2</sup>

Increasing the availability of public transportation can also foster a widespread shift away from single-occupancy vehicles. The city of Seattle has recently boosted its investment in public bus and rail services. Most households in Seattle are now located within a 10-minute walk of frequent transit: as a result, the city has experienced the largest increase in transit ridership in the US, and a decrease in downtown-bound Single Occupancy Vehicle (SOV) trips.

1 North Central Texas Council of Governments (NCTCOG), Green Infrastructure Guide, 2017  
 2 American Public Works Association, "Road redevelopment paves way for growth, sustainability", 2015

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Appendix 3

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# MIXED USE DESIGN STUDY



## INTRODUCTION

The Bandera Road Corridor Plan represents a significant change in proposed future land use along Bandera Road. Land use categories, and zoning classifications, are almost exclusively single-use: commercial, residential, or light industrial. Single-use categories are very typical of San Antonio zoning throughout the establishment of citywide zoning plans through the early 21st century; only in the past ten or so years have different zoning categories come into widespread use, and even then, that has occurred mostly in the urban core. This plan proposes expanding mixed-use land use categories to the Bandera Road corridor as an expansion of that change in support of future mixed-use zoning.

The plan itself contains design guidelines and other information about how mixed-use developments should be implemented, but this design appendix takes things a step further by showing an actual model development, discussing the features of that development, and even delving into how potential city incentive plans, code changes, and related policies could be used in this hypothetical case to encourage certain types of development.

The mix of uses in the development is built from information contained in the plan: it incorporates a small amount of retail/restaurant space, but more significantly, a variety of residential types as well as office and light industrial. It is

meant to illustrate how these uses can be blended in one development as well as with surrounding uses.

While the model development here is sited at a specific location, it is purely hypothetical. It is not intended as a suggestion to specific property owners, nor does it represent

a City of San Antonio position as to what types of uses would be commercially successful or viable. It is merely an illustration of what could be, meant to further explain how the changes proposed in the plan could become real.



Figure A3.2: Pedestrian view of speculative development

## HOW DID WE GET HERE?

Mixed-use land use may seem like a new concept, but in truth, mixed use is the oldest of urbanized land uses. Long before zoning was used to determine where various uses could be placed within our cities, urban development combined living, working, manufacturing, and other land uses as a basic practice. Visiting the ruins of Roman towns and cities, in just one example, is instructive – blocks of structures placed restaurants and retail space at the corners and edges with residential space in the middle of blocks (often with fully enclosed courtyards open to the sky), and more residential on upper levels. Small industrial uses were sprinkled throughout the ground floors of developments.

Early American models of development were not dissimilar, although our greater availability of land tended to spread uses out a bit (industry might be in an adjacent building, for example, rather than buried within a single block development). But the lack of self-propelled vehicles and a resultant reliance on walking meant that cities naturally developed in a dense manner and with places to work and places to live mingled together.

The Industrial Age began to change those patterns. There was a wider array of transportation options, including streetcars and then bus lines, allowing commutes from home to work and back to become a matter of miles rather than blocks. Further, the increasingly noxious character

of industrialized processes – and a lack of means or desire to control pollution of all sorts – contributed to movement of industry away from residential areas. That separation allowed the definition of neighborhoods as primarily residential areas, with little (or later on, no) commercial development.

After World War II, the availability and affordability of cars completed the transformation of development patterns. The travel distances that people perceived as reasonable grew to new lengths. Travel between cities for the commute from home to work was now common, as suburbs exploded. Zoning and land use patterns were deeply affected; where primarily pedestrian modes of travel forced the intermingling of work and living space, the car now allowed for vast separations.

The net effect of this was to unintentionally create patterns of living which were entirely dependent on the car. And as urban populations continued to grow, so did traffic. Bandera is an excellent example of this phenomenon – it is a formerly rural highway now lined directly with retail and surrounded by single-family residences, virtually none of which are in easy walking distance of that retail.

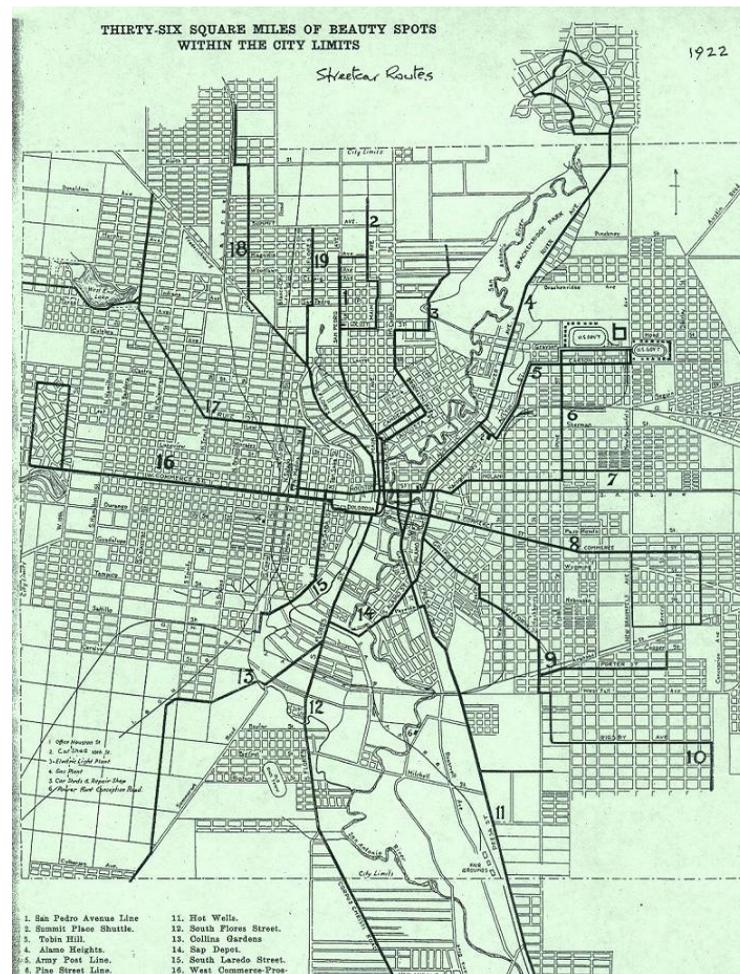


Figure A3.3: 1922 map showing streetcar lines in San Antonio

## HOW ARE CITIES CHANGING?

Cities have increasingly returned to mixed-use development as people have realized the importance of walkability and have tired of fighting traffic. Issues of pollution control have been resolved, at least for light industry. This combination of factors means that a modern version of mixed-use land uses now offer the best of development: support for vehicular transportation (including mass transit as well as cars); walkability; a mix of uses including residential, commercial, office, service, and light industrial; and even integration of nature into development in new ways. This appendix depicts ways in which that development can and should be done along the Bandera Corridor, using a variety of illustrations and diagrams to show model examples. The guidelines laid out in the Bandera Road Corridor Plan are integrated into these examples, as are forward-looking concepts for transit, greenway development, density, and development design.

Public input received during the Bandera Corridor Plan resoundingly supported mixed-use development as well as the other pedestrian-friendly features of the plan such as greenway connections, multi-use paths along Bandera Road, integration of improved landscaping and enlarged tree canopies, and preservation of existing green space. The model developments depicted here incorporate all of those ideas.



Figure A3.4: The Lawn at the Pearl, one of San Antonio's best-known examples of mixed use developments

## MODEL DEVELOPMENT



Figure A3.5: Aerial view of development, with frontage tenants in foreground

### DEVELOPMENT MIX

The most prominent tenants are those on Bandera Road, of course. They are a mix of retail, restaurant, and office space. Architecturally, the buildings are connected with open breezeways which create weather-protected areas for outside seating and for people walking between the buildings. The buildings are pulled forward, toward Bandera Road, with trees and landscaping lining the frontage. Parking is placed behind the buildings, oriented around walkways which collect pedestrians from the parking areas and concentrate walk paths on the retail/restaurant sites. This also creates a core of pedestrian circulation which connects to the multi-use path along Bandera and to transit stop locations.

Frontage tenants include:

- A fast-casual restaurant seating 80
- A contemporary casual restaurant seating 60
- Two 5,000 square foot retail locations; options include clothing, electronics, and similar goods

The anchor tenant is a small biomedical equipment firm. This light industrial use includes low-impact manufacturing, packaging, and associated office uses in a building of approximately 20,000 square feet. The site for this facility was carefully selected – it is on the back side of the development, adjacent to a cross street (Ebert Road),

Larger light industrial development off Bandera, accessed from cross street

Low-rise office development

Greenway / floodway improved, with some water impounded year-round

Light industrial / office park development

Live/work townhouses with entrances off cross street

Shared-use path along cross street connects to Bandera

Transit stop at corner

Buildings pulled to front Bandera



Figure A3.6: Interpretive graphic of site development



Figure A3.7: Perspective view showing shared use path with single-family housing in foreground and multifamily in background

offering good access for deliveries and outgoing traffic.

The back portion of the property, closest to the greenway and near a large, landscaped retention pond, is used for residential. A mix of townhomes – either rental or replatted for individual sale – are shown, but a mixture of single-family and small apartment complexes would work as well. The total square footage of the residential piece could range from 30,000 to 35,000 square feet.

Consistent with current patterns along and adjacent to the corridor, larger/lower-density land uses adjoin the development. In this case, a larger biomedical development (perhaps 85,000 square feet) is located further west. That development used targeted use tax abatements to build a campus which combines industrial, office, and residential.

## DEVELOPMENT DETAILS

A landscaped retention pond connects the greenway to the development, increasing the amount of green space, while also meeting on-site drainage control requirements

Pervious paving at paths and parking areas link site drainage to the retention pond while minimizing additional impervious cover

All edges of the property are landscaped and include trees which serve to improve the aesthetics of the corridor and screen portions of the property

The master developer structured lease agreements for the light industrial property to set quiet hours, meaning that deliveries and heavy truck traffic are restricted to daylight hours

The density of this development is higher than what currently exists on the sites, but it does not approach the maximum intensities allowable by current zoning.



Figure A3.8: Development site plan

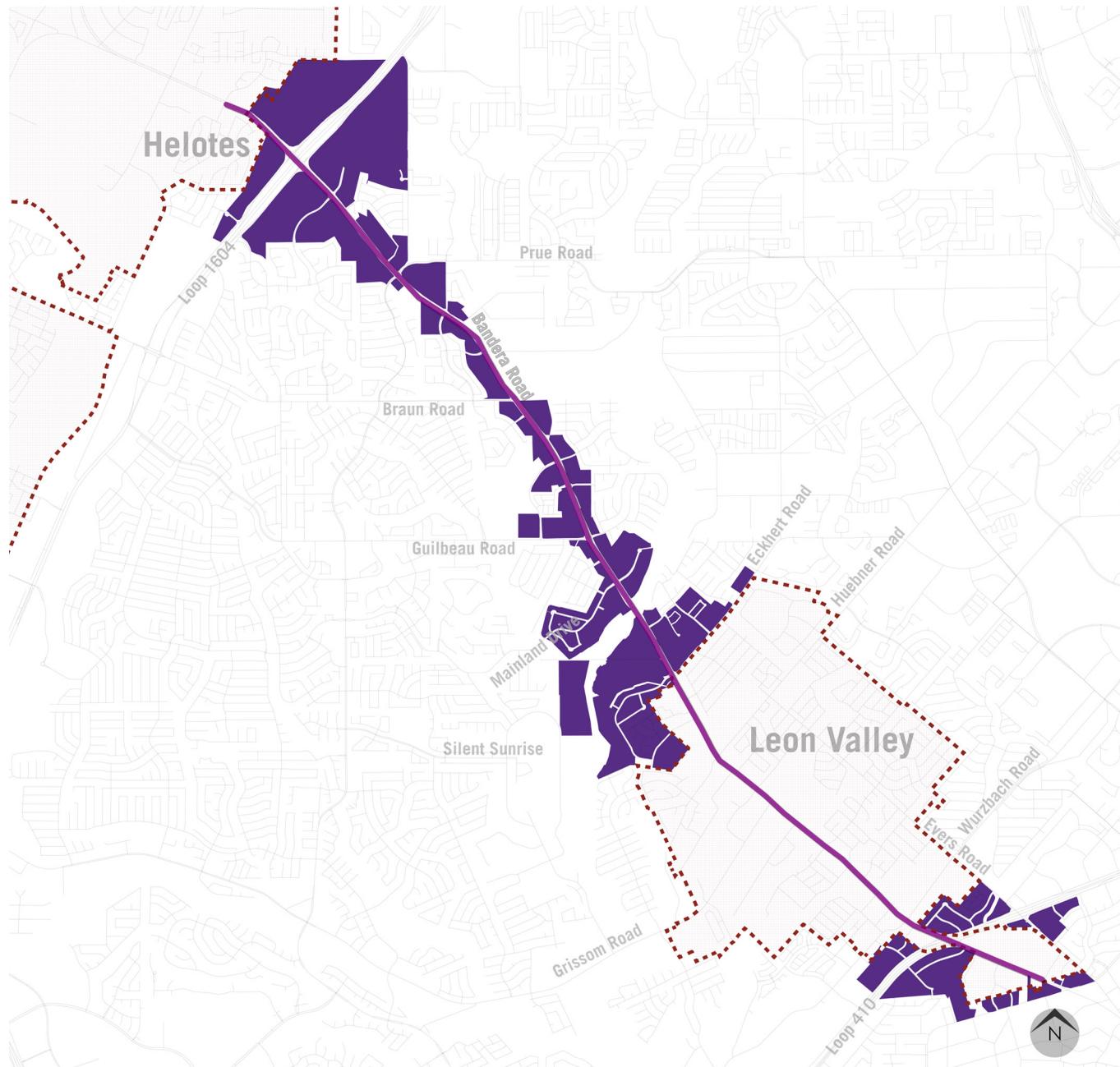


Figure A3.9: Properties with potential for inclusion in a future TIRZ

## FINANCIAL INCENTIVES AND DEVELOPMENT REQUIREMENTS

The property was developed in accordance with specific requirements defined within the Bandera Corridor Overlay. The overlay also tied to financial incentives, including tax abatements and easing certain basic Unified Development Code requirements. Public frontage received improvements thanks to a TIRZ enacted which roughly aligned with the limits of the corridor.

Specifically, in this theoretical scenario, the following benefits and incentives were utilized:

- A tax abatement which incentivizes mixed-use developments which provide housing units at various target percentages below the area median income (AMI)
- Fee waivers for projects which incorporate low-impact development (LID) features
- Substantially reduced parking requirements for projects which incorporate mixed uses
- A tax credit for properties which house certain types of research, development, and production facilities
- Targeted public right-of-way and utility infrastructure investments to improve aesthetics and infrastructure capacity along the property perimeter, including undergrounding utilities, through TIRZ funding
- A forgivable loan from the city for retail build-out supporting certain types of small and minority-owned businesses
- Tax credits for implementation of public/private green space; specifically, offsets for percentages of public/private area within a development, incorporation of native planting, and percentage of property with new tree canopy

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Appendix 4

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# **GREENWAY CONNECTIONS DESIGN STUDY**



## INTRODUCTION: SAN ANTONIO'S GREEN INFRASTRUCTURE

A major component of the Bandera Road Corridor plan is a focus on trail-oriented development. The plan contains quite a lot of information addressing how developments should be shaped to best connect with greenway trails and similar multi-use paths. But another important part of the plan is the “Transportation and Neighborhood Connectivity” section, which recommends expanding and completing greenway, sidewalk, and bicycle path connections throughout the plan area. This design appendix furthers that discussion by providing important points and illustrations for how connections should be made in a variety of circumstances.

San Antonio's climate, topography, and geology mean that our predominant waterways are creeks. Those creeks are usually small and tame, but during rain events, they flood quickly and to dramatic heights. Buffers of undevelopable land line our drainageways as protection against that flooding. So as the city grew, we built by omission: those buffers became tendrils of green connecting from creek to creek within a bustling city.

One of San Antonio's best-known features, the River Walk, takes advantage of one of those tendrils to create a series of world-famous recreational pathways. But the

city has another 82 miles – and growing – of pathways routed through the greenways which have both become an incredible recreational amenity as well as forming a secondary transportation network.

One of the features of this plan is to emphasize connections to existing greenways. This design appendix examines in greater detail how those connections should be made in various scenarios.



Figure A4.2: Map of greenways near the Bandera Road Corridor area

## TYPES OF CONNECTIONS

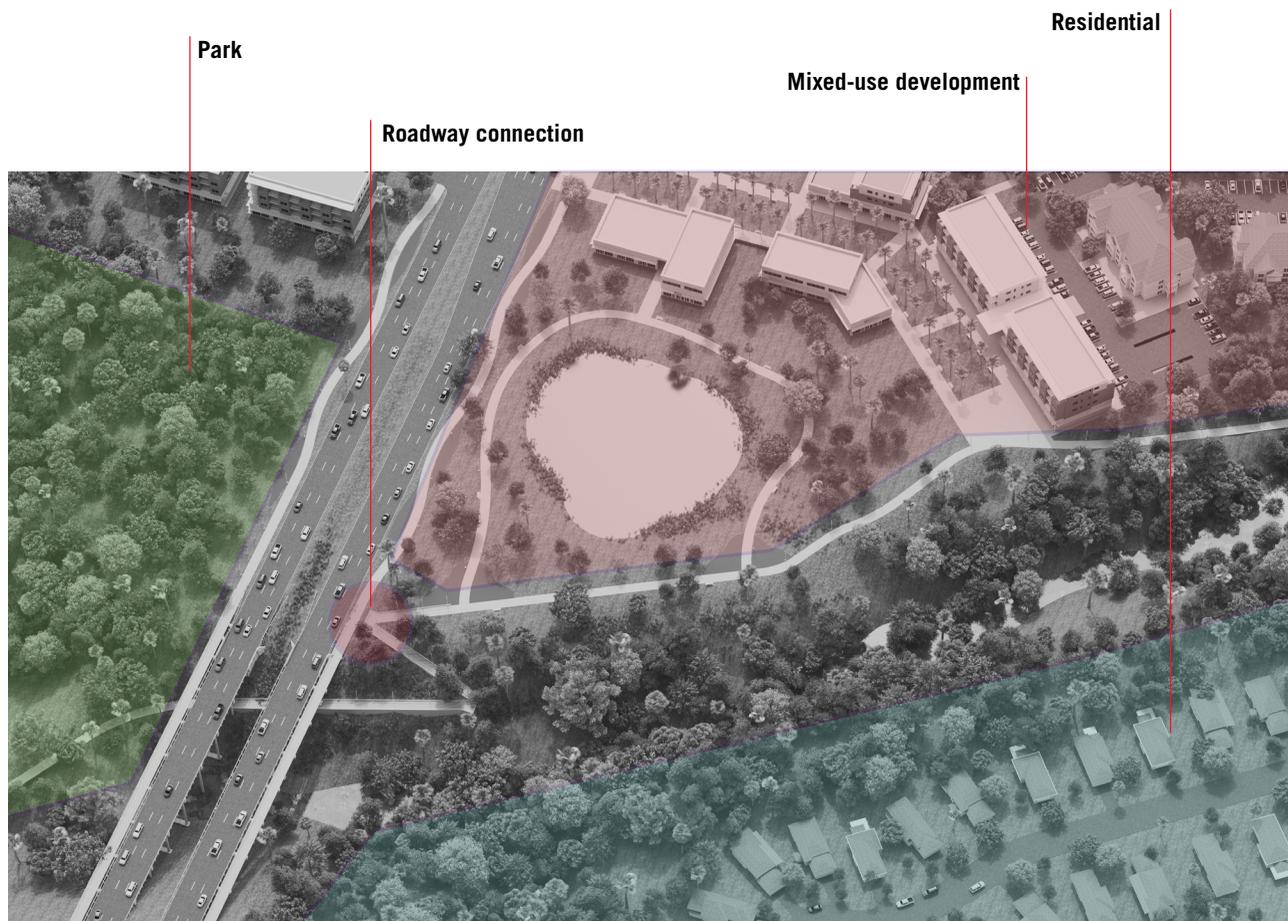


Figure A4.3a: Different types of greenway connections

The greenways have different characteristics in different locations, and so should the connections between the greenways and other sidewalks, streets, and multi-use paths. This document breaks them down into several major types, each with their own considerations. They are:

**Neighborhood:** The private nature of neighborhood connections should drive the character of these designs, specifically the way they are intended to connect neighborhoods to trails and are not part of a wider transportation network.

**Roadway:** Connections to roadways are primarily for transporting people from place to place. Roadway connections will often be used to transport people from the greenways to commercial locations and to transit interconnections.

**Park:** These connections are for recreation, so they will see a wider range of ages and ability levels. The character of these connections should mirror what people expect from our parks.

**Mixed-use (or other) Development:** To a certain extent, design of these connections will vary according to the development itself, but in all cases, these connections should be thought of as public rather than private, and should feel like extensions of the greenways themselves.

This design appendix does not address regulatory or other code-related requirements for greenways and their components – it is intended to provide guidance for the character, development, site selection, and other planning characteristics. Relevant codes and standards for the design of connections should be addressed within individual projects.

## NEIGHBORHOOD GREENWAY CONNECTIONS

Neighborhood greenway connections are for neighborhoods. They are not meant to be trailheads for a broad segment of the city. They will be accessed almost exclusively by people who walk, run, or ride to them from the neighborhood itself. They will be used primarily for recreational purposes, with growing transportation usage as the area grows and multimodal transportation becomes more viable.

- Select route/connection point carefully: separate connections from houses and place at neighborhood entrances when possible
- Landscape, plant trees, and otherwise make the connections feel like an extension of the greenway itself
- Include amenities like benches, waste receptacles, and lighting
- Use trail-marking signage, and where funding allows, provide maps of connecting paths
- Separate from traffic, even low-speed traffic
- Follow National Association of City Transportation Officials (NACTO) design guides for width, materials, curvature, and other location-specific design needs



Figure A4.4: Example greenway-to-neighborhood connection

## GREENWAY-TO-ROAD CONNECTIONS



Figure A4.5: Example greenway-to-road connection

Greenway-to-roadway connections should be designed with transportation needs in mind. While primary use now may be recreational, the use of greenways for transportation will become more important as projects which facilitate multimodal transportation are completed.

- Place near intersections to facilitate movement and connect to transit stops to enhance multi-modal character of connections
- Design intersections with separate, well-marked crossings for bicycles and pedestrians, including green-marked bicycle crossings
- Some sinuosity is good, but avoid excessively indirect connections and significant elevation variation
- Landscape, plant trees, and otherwise make the connections feel like an extension of the greenway itself
- Include amenities like benches, waste receptacles, and lighting
- Use trail-marking signage, and where funding allows, provide maps of connecting paths
- Follow National Association of City Transportation Officials (NACTO) design guides for width, materials, curvature, and other location-specific design needs

## GREENWAY-TO-PARK CONNECTIONS

Greenway-to-park connections are for recreation almost exclusively. Lower design speeds, even higher levels of planting (especially tree cover), and more sinuosity and elevation variation are appropriate.

- Connect to existing park pathways where they are appropriate for bicycle traffic; separate out bicycle traffic to park roadways where existing park pathways are pedestrian-only
- Design intersections with separate, well-marked crossings for bicycles and pedestrians, including green-marked bicycle crossings
- Landscape, plant trees, and otherwise make the connections feel like an extension of the park
- Use trail-marking signage and provide maps of connecting greenway and park paths
- Include amenities like benches, waste receptacles, and lighting
- Follow National Association of City Transportation Officials (NACTO) design guides for width, materials, curvature, and other location-specific design needs



Figure A4.6: Medina River greenway system

## GREENWAY-TO-DEVELOPMENT CONNECTIONS / TRAIL-ORIENTED DEVELOPMENT



Figure A4.7: Example greenway-to-development connection

Developments themselves can connect to trails. The plan lays out a number of locations where this can, and should, occur. Trail-oriented development makes deliberate connections to greenways and shapes pieces of the development specifically to both take advantage of and enhance greenway character. Successful trail-oriented development does not do so in superficial ways, though – trail-oriented development should be designed around the ideas of green space inclusion and pedestrian-centric features from the outset.

- Include green space within the project itself to extend public green space
- Connect from within the development to trail systems
- Step down building massing towards greenways
- Use drainage control features like detention ponds as well-landscaped site features
- Center the development on internal walkways (not parking areas or roadways) which connect to greenways
- Follow National Association of City Transportation Officials (NACTO) design guides for width, materials, curvature, and other location-specific design needs