ULI Austin

BUILDING A SUSTAINABLE REGION OF INCLUSIVE COMMUNITIES

Image Credit: WGI

Transportation Strategic Council | NOVEMBER 2021

ABOUT ULI

The Urban Land Institute (ULI) is a member driven organization focused on shaping the future of the built environment for transformative impact in communities worldwide. As the preeminent, interdisciplinary real estate forum, ULI facilitates the open exchange of ideas, information and experience among local, national and international industry leaders and policy makers who are dedicated to creating better places. ULI has long been recognized as one of the world's most respected and widely quoted sources of objective information on urban planning, growth, and development.

ULI Austin

Established locally in 1994, ULI Austin is a district council of the Urban Land Institute where real estate professionals from across Central Texas exchange ideas and best practices to serve community needs. ULI Austin brings together leaders from both private and public sectors who share a common interest in responsible land use strategies and a commitment to excellence in development practice. ULI Austin does not advocate; we offer fact-based information through research, education and publishing.

Transportation Strategic Council

ULI Austin's Strategic Councils convene public, private, and non-profit entities to discuss and impact local issues. Current councils are Affordability, Transportation and Creative Culture. The Transportation Strategic Council, who produced this paper, focuses on issues related to mobility across Central Texas. These efforts include coordination with regional partners and understanding the dynamic between land use and transportation. Previous efforts by the Transportation Strategic Council have included a review of proposed transportation impact fees by the City of Austin and education efforts surrounding the Austin Strategic Mobility Plan and Capital Metro's Project Connect. Contributors to this paper include:

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Table of Content

INTRODUCTION

Why Does This Matter?

Studies, including those that have centered on Central Texas, have shown that the costs of housing and transportation are inextricably tied to one another. As the density of housing rises in urban areas, transportation cost burdens tend to decrease. However, if low density is prevalent in urban areas, residents seek housing further out from the urban core. While the cost of housing may decrease, transportation costs can increase significantly in the absence of affordable mass transit options. When analyzed together, housing and transportation costs are similar in urban, suburban, and rural areas in the Austin region, though the urban option is the lowest in terms of costs[1]. Not only are these options the most cost effective, they are also the most environmentally friendly - a Sierra Club analysis showed that doubling neighborhood density decreased vehicle miles traveled per capita by 20 to 30 percent[2]. A sustainable approach, such as allowing a majority of a region's residents options to live in walkable places with lots of services nearby, is not only the best for the environment, but also provides options for cost savings for residents.

A great deal of suburban development requires clearing natural cover to install wide swaths of concrete and asphalt (used primarily for roads and parking), which is a practice that is increasingly unsustainable. Sustainable development could be created by considering not just what the land can do for the local economy, but also who it will serve on a day-to-day basis. Uncoordinated development contributed to the creation of urban heat islands, a phenomenon spurred by human activities such as building and clearing of natural cover, with those developed areas experiencing noticeably higher temperatures than nearby rural areas. Studies have shown that natural and developed areas must be planned together to reduce the urban heat island effect while also creating settings that are more hospitable to the casual visitor. An example of a complete community is transit-oriented developments (TODs), which are able to counteract the urban heat island effect by creating density with much less land use committed to roads and parking lots. With all important city functions located within a quarter to half mile of transit, density is achieved with greatly reduced parking ratios compared to typical built areas that experience the urban heat island effect.

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[1] Housing + Transportation Affordability by Urban Form Across the Austin Region

[2] John Holtzclaw, "Using Residential Patterns and Transit to Decrease Auto Dependence and Costs", *Natural Resources Defense Council*, June 1994

Existing City of Austin Policies

Recent City of Austin policies established aggressive goals for changes in transportation usage with correlating land use modifications needed to reach those goals. In 2015, the City of Austin created the Community Climate Plan to create a blueprint to achieve net-zero emissions by 2050. City staff have updated the plan in 2020 with the added goal of addressing racial equity, which is pending Council approval. The 2020 Austin Climate Equity Plan prioritized racial equity while reducing greenhouse gas emissions through five key topics, 18 goals, and 75 strategies via a diverse working group of 120 community leaders[3]. It aspires to have 5% of all trips made on Public Transit and 4% via people-powered transportation modes like bicycle, walking, and wheelchairs by 2030. Another City of Austin document, the Austin Strategic Mobility Plan (ASMP), looks to create a sustainable community by decreasing single-occupancy vehicle dependence from 74% of trips to 50% by 2040[4]. Both the Austin Climate Equity Plan and ASMP discuss land-use changes that are necessary to reach each of the plan's goals. The Austin Climate Equity Plan mandates that 80% of new non-residential and 70% new residential developments are located within the city's growth centers and corridors. The ASMP also encourages future land-use patterns to be compact with a focus on mixed-use developments. The passage of the Project Connect transit plan in 2020 makes the goals of city policy related to transportation feasible and necessitates significant changes in land use.

Opportunities with Project Connect

Voter approval of Project Connect, through passage of Proposition A in 2020, promises the addition of new light rail, regional rail, rapid bus, express bus and ride-hailing services plus several new park and ride facilities over the course of the decade. By 2030, the agency expects to operate two new light rail lines: the Blue Line, connecting the Austin-Bergstrom International Airport to the Austin Convention Center downtown and the North Lamar Transit Center, located midtown where North Lamar and US 183 connect; and the Orange Line connecting the North Lamar Transit Center and downtown to Stassney Lane in South Austin. In addition to the Green Line, connecting Colony Park and East Austin to downtown, and expanded bus service on another half dozen corridors, Austin will have opportunities throughout the city over the next several decades to build sustainable places.

[3] Austin Community Climate Plan

[4] Austin Strategic Mobility Plan

Opportunities with New Land Development Code

Zoning codes can include restrictions that artificially limit supply and raise prices that meet only the higher end of the housing demand curve. Since the 1980s, the City of Austin's land development code has allowed the city to accommodate only roughly 25 percent of the region's growth, exacerbating sprawl and driving up public and private costs. The United States Department of Housing and Urban Development defines affordable housing as "[h]ousing in which the occupant(s) is/are paying no more than 30 percent of his or her income for gross housing costs, including utilities." Market rate affordable housing (lowercase-a affordable housing) is that which occurs naturally as a result of supply and demand of the market, as well as qualities of dwelling units. Income-Restricted Affordable housing (Capital-A Affordable housing) are units reserved for households of particular incomes based on the Median Family Income of the City or region in which it exists.

While Affordable housing is often seen in larger apartment buildings, lowercase-a affordable housing units priced for lower-middle and middle incomes, can be provided through a greater mix of housing types, often referred to as missing middle housing. These types of units could be duplexes to fourplexes, townhomes and condominiums, or cottage courts, among others. Currently, the City of Austin's Land Development Code makes it difficult to build these types of units in many zoning categories and locations, limiting our supply to single-family homes or apartment complexes that provide hundreds of units. Sustainable design practices would provide housing opportunities at all income levels and mix them throughout our neighborhoods.

Existing Examples in Central Texas and Throughout Texas

While some of these concepts may seem more appropriate for dense northeastern United States cities, or even European or Asian cities, there are examples throughout the country, in Texas, and even in Central Texas, which will be discussed throughout this paper. In Austin, the University Neighborhood Overlay (UNO) has succeeded in incentivizing development to help build a dense community through specific development standards and density bonuses. As a result of allowing increased density, median housing costs in the UNO area have not risen as they have in neighboring exclusive neighborhoods. Houston and Dallas have also achieved this in certain areas to support their transit investments along light-rail lines. Even smaller communities, like Georgetown and Leander, have worked with transit providers to provide service and have changed their land development codes and zoning ordinances to allow the provision of places that would best utilize that infrastructure. As a result, some of the most sustainable places in the region may be built outside its core.

ELEMENTS OF SUSTAINABLE PLACES

Successful sustainable places incorporate a variety of new urbanism practices that help to support a car-free or car-lite lifestyle for those who choose to live it, while creating the mix of activities and living options in close proximity to residents. These practices are outlined below, and an appendix of definitions for some infrastructure elements is included at the end of this paper.

Density

Mixed-use, mixed-income, accessible, inclusive places are denser places than what many Americans are used to today. Higher density of human activity means that people can access more services within walking distance of their homes, have easier access to jobs, schools, and shopping, and have easier access to other people.

Closer access to people and places also directly translates to lower costs for individual affordability, lower public costs to support dense lifestyles, and lower costs related to impacts from human activities on local ecosystems and wildlife. Alternatively, low-density developments mean longer distances between people and the places they need to utilize in their daily lives, based on the simple geometry of living farther away from people, schools, jobs, shopping, places of worship, and other relevant places of interest. The greater need for travel required by living in low density places increases the various costs of our transportation system such as traffic-related deaths, increased costs due to crashes, and negative health impacts of poor air quality.

Diversity of Land Uses

Zoning and other regulations regarding height and density greatly influence the development of commercial and residential real estate and affect the jobs-housing balance. Generally, companies desire to locate in areas of higher-density residential while, conversely, many employees want to live in areas with high-density job opportunities. Mixed-use developments have become popular recently as real estate developers look to continue to diversify risk as well as create denser live-work-play communities. As households desire to live and work within close proximity of each other, available urban land will continue to deplete and will be required to accommodate more of each land use.

Municipalities continue to promote denser development throughout the greater Austin MSA. Currently, the City of Austin allows mixing uses within a building if such uses are specifically permitted or has a Mixed Use (MU) or Vertical Mixed Use (VMU) overlay. VMU developments typically include ground floor retail uses on the primary street with residential units above and behind and is most common along major transit corridors. Early examples include The Triangle along the Lamar Boulevard corridor, Corazon Apartments in East Austin, and Lamar Union on South Lamar Boulevard, which all feature ground floor commercial space facing the major roads with residential units above and behind. This kind of development not only provides desperately needed urban housing options but improves quality of life for existing residents who gain access to coffee shops, retail, restaurants, and other services within a short distance of their homes.

Complementary Uses

Ground floor retail is essential for any successful dense, active neighborhood. The continuous line of shops activates the sidewalk and gives life to a block and can go on for many blocks. It is most successful with no breaks, blank walls, or non-retail 'dead' frontages to disrupt continuity, with a variety of store sizes, small shops and narrow store fronts recommended. Larger stores are incorporated by tucking partly behind a line of smaller storefronts, or by using the second floor. Smaller spaces add variety and attract unique, mom-and-pop businesses that bring unique character. These frontages should include services as well, to provide additional opportunity for activity and multi-purpose trips to a specific area.

Access and Mobility Choices

Green infrastructure is an essential element in creating sustainable places in cities and towns, and an important element of that is pedestrian and bicycle infrastructure. These features help determine how walkable a city or a neighborhood is, from attractiveness, safety, quality of the environment, and comfort. Studies have shown that cycling and walking have numerous benefits in terms of reduced congestion, improved air quality, promoting health and reducing health costs. Other studies have shown that cycling and walking increase with both the presence of quality infrastructure and a network of places to go within the relative time/distance constraints of those modes. This infrastructure has become increasingly important with shared mobility options as well as the advent of micromobility based around small, lightweight vehicles (bicycles and scooters primarily). With speeds that often match those of cyclists and vehicles that are of similar size and maneuverability, traditional bicycle infrastructure is now used by more people for a greater set of trip purposes. Local officials can encourage the use of bicycle and

micromobility transportation by creating more legal safeguards protecting pedestrians, approving infrastructure such as pedestrian bridges and bike path networks, and embracing urban planning features such as connected grids.

Creating more dense mixed use places with ubiquitous pedestrian and low-speed vehicle networks designed for users of all abilities is an essential approach to meeting the vision of the American with Disabilities Act. Proximity and high-quality pedestrian infrastructure allow for people of all ages and abilities to have the freedom of abundant access that currently requires using cars and trucks in much of the Austin region. Too many Austinites fear the danger of our low-density, high speed streets and do not let their children roam freely, as many Americans may have experienced growing up in the 1980s and earlier. Sustainable places, designed for safe pedestrian access also facilitates children enjoying more freedom, appropriate independence, and health active lifestyles.

Transit

Easily accessible transit is an essential component of successful TODs, with a variety of modes to move people to and around the development area. Capital Metro (CapMetro) is Central Texas' regional transportation provider. The agency's current system of transit options includes bus, rapid bus, express bus, regional rail, vanpool, ride hailing, paratransit, bikeshare, and campus shuttles at the University of Texas at Austin. Currently, the agency operates MetroRail Red Line service, a nine-station, 32-mile regional rail system connecting downtown Austin and its northwestern suburb, Leander. MetroRail Red Line service began in 2010 and runs six days a week. Due to growing ridership and recent federal and state grants, CapMetro has recently expanded MetroRail capacity, allowing for more frequent service and more train cars for riders. CapMetro has also expanded the line's Downtown Station to increase the line's capacity and create quality public space in east downtown.

By 2035, in addition to the Blue Line and the Orange Line mentioned earlier, the rail system will include the Green Line, a 10-station, 25-mile regional rail line connecting downtown Austin to the northeast neighborhood of Colony Park. A future extension of the Green Line will connect to the northeast suburbs of Manor and Elgin, while future extensions of the Orange Line will connect to Tech Ridge at the north terminus and Southpark Meadows at the south terminus. Further, the Gold Line, a new bus rapid transit line expected to launch by 2026, will connect the Austin Community College Highland Mall campus area to downtown, which will eventually be converted to light rail with extensions to the South Congress Transit Center, located near TX-71 and South Congress Avenue.

CapMetro operates an extensive bus network expected to expand this decade. In addition to traditional, fixed-route MetroBus, which provides service on hundreds of neighborhood routes with frequent stops, CapMetro operates a High-Frequency Network, with 13 routes operating every 15 minutes from 6 a.m. to 8 p.m., seven days a week. CapMetro also operates two high-capacity, high-frequency rapid bus lines, MetroRapid, which connect many of Austin's favorite destinations by running along CapMetro's highest-ridership routes. These routes connect Tech Ridge with Southpark Meadows (via North Lamar Boulevard and South Congress Avenue) and The Domain with the Westgate Transit Center (via Burnet Road and South Lamar Boulevard). Station areas for these lines include enhanced shelters (including real-time arrival data), as well as local maps and wayfinding. Due to funding secured as part of Project Connect, CapMetro is launching three new MetroRapid lines and an extension of an existing line. New corridors will include:

- Pleasant Valley: connecting Mueller to Goodnight Ranch Park & Ride (via Manor Road, Airport Boulevard, and Pleasant Valley Road)
- Expo Center: connecting the Travis County Expo Center to the University of Texas and downtown (via Loyola Lane, Manor Road, and San Jacinto Boulevard/Trinity Street)
- The Gold Line: connecting the Austin Community College Highland Campus to Republic Square Park (via Airport Boulevard, Red River Boulevard, and San Jacinto Boulevard/Trinity Street)
- Burnet: extending MetroRapid 803 southwest to the Oak Hill Park & Ride (via TX-71) and south to Slaughter Lane (via Menchaca Road) from its current terminus at the Westgate Transit Center

CapMetro also operates seven MetroExpress bus routes to connect suburban commuters with limited-stop service downtown. Several of these routes operate in managed toll lanes on MoPac, allowing passengers to forgo congestion on this expressway. Many of these routes serve Park & Ride facilities, which may offer potential sites for adjacent transit-oriented development. CapMetro is leveraging funds from Project Connect to launch three new MetroExpress routes:

- Four Points: connecting 620 to downtown (via 2222 and Mopac)
- Oak Hill: connecting the Pinnacle Park & Ride to downtown (via TX-71 and Mopac)
- South MoPac: connecting the Wildflower Center to downtown (via Mopac)

Other significant bus services offered by CapMetro include:

- Pickup, a rideshare option providing on-demand transit service within specific zones, often used for first-mile/last-mile trips.

- NightOwl, service running from midnight to 3 a.m. on Monday through Saturday nights.
- UT Shuttles, frequent circulator service for the University of Texas campus and routes that connect the campus to outlying residential areas
- MetroAccess, a door-to-door, shared-ride service for those with ADA-eligible disabilities who cannot always use the accessible fixed-route buses.

Further, Capital Metro offers MetroRideShare, a vanpool service, which provides groups of 5 to 12 riders with a month-to-month lease on a van to serve their commute needs. Because MetroRideShare vehicles are shared with a group, they are often stored at Park & Rides overnight and the most effective vanpools have prioritized parking spots at employer campuses.

Parking

Progressive urbanists point to the prevalence of parking as exacerbating urban congestion by encouraging people to drive single-occupancy vehicles rather than using alternative modes. In addition, parking lots and parking garages take up valuable space that could be better used as place for people to live, work and play rather than as vehicular storage. However, the businesses, restaurants and retail establishments located in the densifying areas of our city rely on the ability of people to easily get to their doors. Parking will remain a requirement of existing land uses and future development, but there are options to condense parking's impact on land use:

- Eliminating minimum parking mandates
- Shared (or district) Parking, where developers pay into nearby shared parking facilities rather than building dedicated parking within every building
- Parking apps that would allow operators of existing parking to better optimize unused spaces
- Incentivizing new technologies, such as self-driving and self-parking cars, to better optimize available parking space in different locations and also park more vehicles closer together. Careful consideration for how these new technologies affect transit ridership needs to be considered when choosing incentives. Replacing each personally owned car with a self-driving car does not provide a significant change.
- Encouraging free-standing garages that could later be demolished and/or redeveloped rather than devoting the lower floors of buildings to parking. As new technologies and driving cultures reduce parking needs, modifying parking garages for other uses can be very limited due to low floor to floor heights and structural load capacities.

- Providing Park and Rides at the TODs for the neighborhoods to utilize the transportation options available. These same parked riders often make use of the TOD businesses/retail and overbuilding parking can be avoided by having this parking be shared parking for the businesses/retail.
- Automated Vehicle Storage and Retrieval Systems that require less square footage per vehicle (e.g., stacking parked vehicles in garages)
- Working with the development community to understand obstacles to reducing/removing parking for new developments, such as requirements imposed by lenders

Curb Management (Goods Movement and Commercial/Passenger Loading)

The possible uses for curb areas in urban settings are growing, creating more demand than ever for scarce real estate that represent the interaction of people and motor vehicles. The people and uses vying for curb space include drivers, pedestrians (including those being dropped off), mobile vendors, emergency services, parked and charging vehicles, delivery vehicles, taxis, shuttles, ride share vehicles, transportation infrastructure and parklets or other streetscape elements. This fierce competition creates congestion and brings different, often incompatible, modes of transportation in close proximity.

The strong growth in ride-sharing services and last-mile delivery powered by e-commerce use have been two of the most persistent forces on the increasingly heated competitions for curbs, with the follow-on effect of increasing traffic because of drivers regularly needing to do multiple "laps" around an area to find an acceptable drop-off or pick-up spot. This also leads to more incidents of illegal parking (even if temporarily), which also impacts traffic and pedestrian behavior nearby as well as safety for bicyclists who are often blocked out of their lanes. Cities have responded to these pressures with "active curb management" strategies that include adding parking meters, increasing monitoring and ticketing for illegal parking and creating flexible shared mobility zones that shift the preferred use (from parking to short-term delivery and drop-offs) depending on the time of day.

Shared/Micro Mobility Devices

The rise of shared mobility, micromobility, and microtransit provide additional mobility options for a range of urban trips. These new and growing smartphone-enabled modes of transit support

mode shift goals and carbon reduction strategies because they reduce driving and personal vehicle ownership. Shared mobility includes car-sharing services such as Zipcar and other single-passenger vehicles, bicycles and scooters, and on-demand ride services. It can also include alternative transit services, such as paratransit, shuttles, and private transit services, enabling users to gain short-term access to transportation modes on an as-needed basis.

Shared transit and micromobility have the potential to reduce traffic and parking needs. Bikes, e-scooters and other micromobility devices used for trips of five miles or less can make a difference in transportation issues by having far smaller form factors or road footprints, and because their use effectively eliminates the exhaust fumes and carbon dioxide that would otherwise be generated. International data shows that micromobility devices emit the same amount of carbon dioxide per passenger mile as mass transit. Their future as a reliable means of transportation in all urban centers is impacted by profitability for privately-owned companies, lack of charging and infrastructure in which to operate the vehicles, and laws that regulate their use.

Pick-up and Drop-off Zones

Pick-up and drop-off zones are marked areas in the curb zone which permit passenger loading or temporary parking, usually for an interval of less than 15 minutes, to facilitate carpooling to and from key locations. Transit stations, hotels, community buildings, schools, and businesses that include valet service are land uses which typically include pick-up and drop-off zones at the curb. Increasingly, these zones are needed for ride hailing. It is recommended that pick-up and drop-off zones be marked along the curb and include signage that is clearly visible from the sidewalk to indicate the area is only available for the loading of passengers.

Electric Charging Infrastructure

Dense neighborhoods present an opportunity to reduce carbon emissions associated with transportation through additional, publicly accessible electric vehicle (EV) charging infrastructure. Compared to the anticipated demand for charging infrastructure in 2030, less than half of the necessary infrastructure has been installed as of 2020 in Austin. Charging infrastructure introduces complexity for EV owners since some publicly available charging infrastructure is located in gated, paid parking structures, limiting access. This infrastructure would be in addition to at-home charging installed in private residences.

TODs can promote mode shift by facilitating seamless multimodal trip planning, including park-and-ride facilities. When those facilities are equipped with EV charging infrastructure they promote EV adoption at scale. Existing EV charging infrastructure has often been driven by the

private sector; however, integrating EV adoption with transit uses offers opportunities to use parking spaces that are suitable for both EV charging and transit connection on site or in proximity to transit stations.

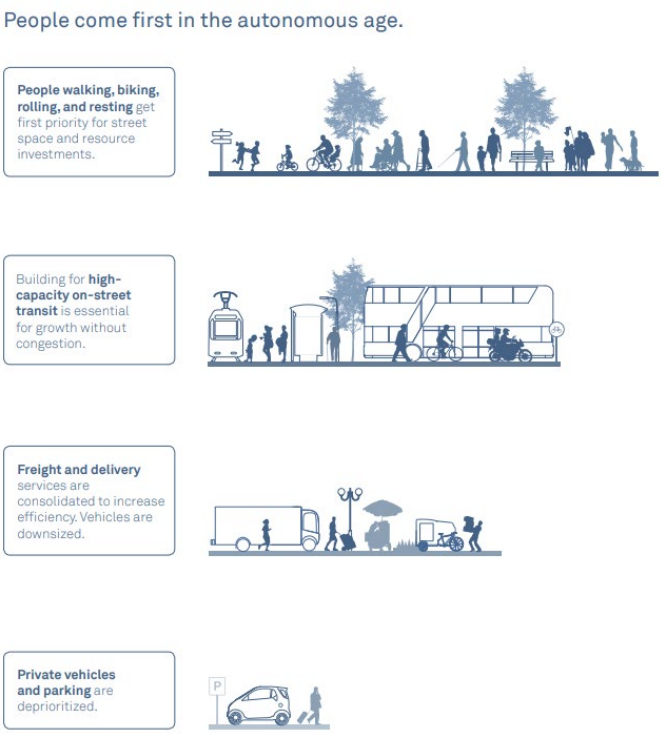
A 2016 Study by the National Center for Transit Research advocates for an active role of the public sector in the integrated EV-transit design and proposes a generic planning model for siting EV charging either on site or in proximity to transit stations. This study develops a suitability index (SI) for EV charging station siting in connection to transit stations, discusses anticipated impacts of implementing the integrated EV-Transit programs, and quantifies the environmental impacts of anticipated travel behavior changes.

Autonomous Vehicles

Autonomous vehicles (AVs) still represent a very small portion of the overall vehicle fleet, with the industry becoming increasingly consolidated following acquisitions and investments among key stakeholders. Austin was announced as Ford AV LLC's third launch market in 2019. As of 2021, a modest fleet of Ford and Argo AI vehicles is present in the urban core, mapping and driving in autonomous mode with two safety engineers present in East Austin, South Congress, Travis Heights, downtown Austin, and the area surrounding The University of Texas-Austin. The commercial service, expected to launch in 2022, will offer both moving goods and moving people services through business-to-business partnerships with both retailers and ridehail companies.

AVs will likely be managed fleets at market introduction, characterized by relatively small vehicle numbers and high utilization, primarily focused on the urban core. Sustainable places can support the integration of AV solutions through safe pickup and drop off zones for both people and goods, as well as supporting on-demand AV trips that integrate seamlessly with transit services. From a policy and development perspective, enabling safe loading and unloading of people and goods

requires working closely with AV companies to map dense development sites and collaborate with the city to design a public right of way that supports safe ingress and egress, as well as private developers to reinforce the safe movement of people in and around AVs through curb cuts, wayfinding, and other pedestrian infrastructure that supports Vision Zero goals. As noted in the drawing on this page, successful adoption of AVs requires an explicit pedestrian first policy with the ecosystem of AV infrastructure built around an assumption that the vehicles must operate with safety of pedestrians as a core principle.



Delivery/Sidewalk Robots

In addition to AVs, technologies like small-scale delivery robots, sidewalk robots on campuses or in neighborhoods, delivery drones are also emerging in the public domain and require consideration by both the public sector from a regulatory perspective as well as the private sector and development community as they prepare for a wider range of uses cases at their facilities. One such company, Nuro, has been operating in Houston since 2019. Nuro became the first autonomous vehicle developer to be given exemptions by the U.S. National Highway Traffic Safety Administration (NHTSA) for testing on public roads without the need to have controls for human operators. Unlike many other autonomous vehicle companies, Nuro engineered its self-driving road vehicles to transport goods instead of people. These vehicles will be another vehicle competing for pedestrian space and loading/unloading space; the development of this technology will need to be considered in site planning as it evolves.

Mobility Hubs

Mobility Hubs bring together urban amenities and multimodal mobility, with the goal of reducing emissions and enabling mode shift away from single occupancy vehicles. These hubs often include green space, e-charging stations or outlets, bike share stations, bike repair amenities,

food truck(s), and community art. Often, they present an opportunity for placemaking and community building, as well as bringing other amenities and services to underserved communities that may lack a well-stocked grocery store or access to a clinic or other health care. Mobility hubs can reduce air pollution by promoting a shift away from single-passenger personally owned vehicles to increasing the number of walking trips in the surrounding area and promoting "dwell time" that often leads to community-building

As a local example, the City of San Marcos has approved plans for a mobility hub on property that had previously been considered for use as a parking lot[5]. Instead, a performance stage, mural, benches, green space, an electric car-charging station, public art, a rain garden, a pet waste station, a water refill station, bike racks, a bike-repair station, a snack bar and minimal parking are in store for the area.

In 2019 Austin created a mobility hub as a pilot program at the southeast corner of 12th and Chicon streets in an east side neighborhood that is growing quickly and facing the pressures of increased vehicle, pedestrian, and development activity[6]. The program was launched to increase walkable access to food and activate social gathering space via alternative means of transportation. An assortment of micromobility companies, community organizations and public relations and design firms participated in the execution of the program. Improvements to the area include adding two carshare parking spots, an e-bike charging hub, additional e-scooters on site, discounts provided by ridesharing company Lyft, as well as shading trees, plants, and food trucks added to a space that had previously been dedicated to personal vehicles.

Sustainable places need a functional and accessible transit station that allows for safe, easy transfers to other modes of transportation (bus, shuttle, micro-mobility, bikes, shared vehicles, etc.), saving patrons time, improving the overall passenger experience, increasing ridership, and reducing congestion at the station. Transit stations and portals should be located to facilitate pedestrian access and capitalize on development potential. Comfortable and safe pedestrian and bicycle pathways with appropriate wayfinding signage bring the benefit of linking the station to the surrounding neighborhoods and businesses and safe crossings on streets. Pathways should be along the major and secondary corridors, local neighborhood streets, and on paseos that pass through adjacent private properties while public agencies can include park or plaza space, benches, water fountains, waste receptacles, and lighting.

[5] San Marcos 'First Mobility Hub Takes Shape as Scheduled Opening Approaches

[6] Reimagining the Urban Form: What Austin's Community Mobility Hub Means for Cities

Green Space/Public Realm

Sustainable places are more than buildings and transportation. In order for places to thrive, those who live there or visit need reasons to dwell. While much has been made of the physical buildings and transportation infrastructure, more is needed in the way of "creature comforts" and opportunities for inhabitants to interact. The public realm is a vital piece of the puzzle, offering a network of shared spaces that sustain those who live in a district and attract new visitors to the district, who in turn, support the area through their presence, patronage and spending. While developers often build to accommodate specific business or housing needs, the goal of the public realm is to activate these spaces by giving individuals a reason to be on the street or an enjoyable space to move through while connecting between places.

In addition to the character of the people who occupy a space, the combination of buildings and public spaces define a place. Successfully designed public spaces are the living rooms of the city; the places where people come together to enjoy the city and each other. Public spaces make high-quality life in the city possible, forming the stage and backdrop for the people within them. Public spaces range from grand central plazas and squares to small, local neighborhood parks.

Pocket Parks

Green spaces are a crucial ingredient in successful sustainable places, providing a benefit to both residents and the visiting public who add more energy and activity to the projects as a whole. The recent move toward pocket parks and dog parks are popular options for developers to bring green space into sustainable places without the investment and logistics needed for a large municipal park. Pocket parks (also called mini-parks and vest-pocket park) can be created on small or irregular pieces of land, in vacant building lots, or along the centers of broad avenues .

Successful "pocket parks" have four key qualities that contribute to sustainable places: they are accessible; allow people to engage in activities; are comfortable spaces with a good public image; and are sociable places where people meet and take people to when they come to visit. Though pocket parks vary according to specific purposes and locations, there are numerous common characteristics. For example, pocket park users should not have to walk more than five to 10 minutes to reach their destination. Since parking may or may not be provided, the parks should be accessible by both foot and bike and should not require the use of a car. Parks of this size should serve a nearby resident population of approximately 500-1,000 individuals and should strive to accommodate as many different users as possible, prioritizing the needs of surrounding neighborhoods.

Dog parks are a more active feature but can still be located on a small footprint. They tend to create the highest frequency of social interactions on a communal property because of the frequency of visits by dog owners and their animals that help facilitate interactions with other residents and visitors. Also, urban agricultural spaces, such as community gardens or donation gardens, should be integrated into dense urban places.

The inclusion of pocket parks and similar public features are an important ingredient in livable center concepts as the Austin metro area evolves into a highly urbanized area with far higher population densities. By providing readily accessible opportunities for public interaction and small gatherings, they help revitalize areas new and old and help facilitate community solidarity between longtime residents and newcomers.

Pedestrian Connections

Sustainable places should prioritize safe access for people who walk, bike, and use personal mobility devices, rather than focusing on auto traffic. Often the quickest and safest route is not along the streets, but between them. Through a combination of smart planning and incorporating local character, structural, natural and visual elements can be located through TOD projects to create more direct connections to major destinations. They can also address safety concerns, mitigate emissions from vehicles and make areas more pleasant and easier to navigate for residents and visitors.

Designing for the pedestrian experience and for safe interaction between pedestrians and other modes of transportation provides a vibrant activated place. Features such as paseos, green alleys, cafés and outdoor dining plazas, street furniture and public art encourage pedestrian mobility through a community activating the space while minimizing short vehicular trips. Safety features such as curb extensions, chicanes, medians and median refuge islands, pedestrian signal timers, and pedestrian hybrid beacons helps ensure safe interaction between pedestrian and vehicles. Additional safety features such as traffic circles and roundabouts, protected bicycle intersections, and bus bulbs provide further safety for the interaction of the many modes of transportation. Standard development features such as wayfinding signage and lighting need to be provided with consideration for all modes of transportation. Consideration for the differing routes and sight lines for each mode of transportation can help provide clarity for users and benefit the whole community. Further descriptions and recommendations for all the features described above is included in Appendix A.

Outdoor and Environmental Features

Both hidden and obvious, smart use of the natural environment (low-lying vegetation, trees, other shade-producing elements) in balanced neighborhoods reduce the impact of vehicles and nearby transit around people. Where parcels include on-site creeks, riparian habitat, and other environmental features, the preservation of the existing feature is recommended to be enjoyed as a publicly accessible open space. Project sites and buildings should be designed to capitalize on their topography where appropriate, with terracing used when there are considerable shifts in ground slope. Site designs should consider accessibility with stairs and ramps in heavily sloped environments.

Designing communities for enjoyable walkability encourages pedestrian use which decreases vehicular trips and activates the community. Shade, both natural and built, is a very important consideration for pedestrians, especially in Central Texas heat. Maintaining or introducing monument/signature trees as well as street trees and landscaping can provide natural shading along pedestrian routes and in open spaces and parks. Providing covered transit stops and shelters promotes transit use through protection and safety, but also including shade-offering or rain protection locations and awnings along pedestrian routes within the community can enhance the pedestrian experience. As additional pedestrian routes are added, permeable paving is recommended to mitigate impervious cover and assist with water management. Planters and bioswales are additional landscaping features that can assist with water management by mitigating stormwater pollution and add to the streetscape in the context of pedestrians. Further descriptions and recommendations for all the features described above is included in Appendix B.

OPPORTUNITIES AND CHALLENGES FOR CENTRAL TEXAS

Project Connect

The prospects for improved mass transit options were greatly increased in November 2020 when Austin voters approved an increase in property taxes to finance the development of Project Connect. The far-reaching plan to create comprehensive mass transit throughout the area has great potential to decrease traffic and related air pollution, but will require substantial coordination, and some changes to regulations, to be successful. One of the main planning-related determinants for Project Connect's success or failure will be the extent to which residential and commercial zoning allow for the density of people that will enable suitable

ridership levels. Some proposed changes in the rewrite of Austin's land use code seek to enable increased housing capacity, a wider variety of housing types other than single-family detached construction, and greater density of affordable housing and reductions in parking minimums. The revised code has had two successful readings and approvals by City Council but is currently being contested in court prior to its third and final reading. In May of 2021, Mayor Adler suggested that incremental changes to the code may be the manner in which the code has to be updated, given the legal challenges[7].

Capital-A Affordable Housing

Affordable rental housing consists of residential units created through variety of subsidies, in which residents apply for units based on the annual household income as stated on their federal tax return. Tenants pay no more than 30% of their income for rent and utilities. Housing that is created in partnership with local and national government agencies such as the U.S. Department of Housing and Urban Development (HUD) to help households in specific lower-income demographics through subsidies is often called "capital-A affordable housing" (Affordable). The federal government sets the Median Family Income (MFI) for the Austin area in each year - $95,900 in 2019 for a four-person household – and Affordable housing programs target certain thresholds, such as households making 80 percent of MFI or less.

The density provided in sustainable communities, including TOD projects, allows for developers to create economies of scale in housing projects that allow for below-market-rate price points for both rents and purchases. Namely, the value of the land can be capitalized through market rate components, and often Affordable housing units are bonuses on top of existing entitlements, providing a net benefit to both the developer and the community. Expanding the supply of market-rate housing is not enough to help the poorest families. Housing and Urban Development (HUD) guidelines suggest these families should spend no more than 30% of their income on housing and utilities. For very low-income families, the only way to bridge the gap between incomes and housing costs is through public subsidies. In addition to Federal programs like the Housing Choice Voucher Program, examples of Affordable for-sale housing in Austin include the Mueller Affordable Homes Program (80% of MFI) and the City of Austin Down Payment Assistance Program.

Creating Affordable housing in a sustainable community also provides opportunities for people to live without the additional burden of owning a vehicle and connects them to many other

[7] Overhaul Out of Reach, Adler Pushes to Gradually Update Austin's Land Development Code: 'We Need to Do Everything We Can'

everyday needs. People living at these income levels are active through all aspects of a community; however, some are required to drive long distances due to a lack of rental and for sale housing options available to them in a competitive market. Through this cycle of density and affordability, more sustainable development can be pursued through the provision of less parking, among other items.

Lowercase-A Affordable Housing

Many of the points made in the previous section also apply generally to making housing affordable in our communities. Zoning restrictions can limit supply, raising prices to meet the higher end of the demand curve. While Affordable housing is often seen in larger apartment buildings, lowercase-a affordable housing units priced for lower-middle and middle incomes, can be provided through a greater mix of housing types, often referred to as missing middle housing. These units would not be subsidized but priced by market forces and would have rents below the current Austin average of $1,349 per month. These types of units could be duplexes to fourplexes, townhomes and condominiums, or cottage courts, among others. Currently, the City of Austin's Land Development Code makes it difficult to build these types of units in many zoning categories and locations, limiting our supply to single-family homes or apartment complexes that provide hundreds of units. Sustainable design practices would provide housing opportunities at all income levels and integrated throughout our neighborhoods, such that people with a wide assortment of jobs could find housing that allows them to work and live in a similar location. The constraints created by current planning and zoning regulations limit opportunities for many slices of the Austin populace. Making progress on this issue that affects all of society will require cooperation across federal, state, and local governments.

Today, Austin's most dense places (with more than 10,000 people per square mile) are the most affordable part of the region when housing and transportation costs are considered together[8]. But these dense, urban places are scarce, with only 109,982 people – only 5% of the region – currently allowed to live affordable, low-carbon lifestyles in these sustainable places, which include West Campus, East Riverside, or along North Lamar north of 183.

Small Lots

Currently, in Austin the minimum lot size for a single-family home is 5,750 square feet and 3,500 square feet for an "urban home". If an owner has a 10,000 square foot lot and does not fall in the

[8] Housing + Transportation Affordability by Urban Form Across the Austin Region

"urban home" requirements they cannot split that lot into two and build two homes. In 2015, the City Council approved the reduction in the minimum lot size for accessory dwelling units (ADUs) on SF-3 zoned lots to 5,750 square feet, and relaxed other construction restrictions related to driveways, parking, and building separation between units. In the years since, the city has seen an increased supply of ADUs in urban areas.

Conversely, in 1999 Houston, TX reduced regulations concerning urban neighborhood lot sizes and allowed lots as small as 1,400 square feet, down from the previous 5,000 square feet[9]. The change has allowed for increased density through vertical construction in the urban core, increasing the urban housing supply to match demand. The use of ADUs in Austin has created additional housing stock in Central Austin that meet the urban housing criteria, but limitations in other parts of the city remain under current land codes. The total added units allowed citywide has been inadequate to provide the region's growing population options to live affordable, low-carbon lifestyles in the city. Based on its density, Austin has a lot of opportunity for the creation of sustainable places; however, in many locations the elements that would be part of those places are not permitted under current regulations.

Serving all Members of the Community

The concept of providing amenities close to where people live has been around for as long as people have lived in developed areas in clusters. People have grown to enjoy the convenience of having a grocery store, restaurants, parks, and schools in the same part of town near them, and all reachable as part of the same trip. Transportation planners and developers have created Transportation Demand Management (TDM) strategies to curtail single-occupancy vehicle trips around some of these concepts, including provision of laundry, gym, and/or childcare services near both residential and commercial/office developments.

Recently, this concept has coalesced around an idea called the "15-minute city", which drives to improve quality of life by creating cities where everything residents need can be reached within a quarter of an hour by foot or bike[10]. The 15-minute city requires minimal travel among housing, offices, restaurants, parks, hospitals and cultural venues. Each neighborhood should fulfill six social functions: living, working, supplying, caring, learning and enjoying. Websites have even been created to determine if those amenities are within a certain address, also showing the

[9] How Land Use Reform Led to More Housing in Houston

[10] Defining the 15-minute City

amount of the city that is within that distance to an address based on the surrounding transportation network and connectivity.

The concept of the 15-minute city also aids those with fewer mobility options, including senior citizens, children or parents with children, and people with disabilities. With transit connectivity, services, and things to do in the neighborhood all located nearby and easily accessible, everyone from 8 to 80 could be active and access drugstores, parks, and transit stops. Those who are unable to drive or bike alone would have the ability to walk to everyday needs, decreasing the burden on the current Millennials and Gen Xers who may have children who are not yet independent and parents who are not as independent as they used to be.

Designing cities for these more vulnerable and less mobile populations will also make them more sustainable. The shift in structure of cities will also mean that individuals themselves will be more resistant to shocks, including the demographics of the people that can live in an area. Finding that balance could be difficult but would allow families and long-time residents to keep roots in the places that they have lived.

Equitable Growth Considerations

Imagine Austin, the city's comprehensive plan based on citizen visions and goals, envisions growing into a more compact and connected urban area to provide mixed-use, mixed-income accessible, inclusive places for all. As the Austin region grows from about two million residents to an expected four or five million residents, we will have opportunities at all levels of decision making to choose whether to allow for dense mixed-use, mixed-income accessible, inclusive places or continue requiring and subsidizing car-dependent, low-density places.

Cities, counties, metropolitan planning organizations, and state government should employ equitable planning processes to develop equitable growth strategies to accommodate a doubling of population in ways that do not cause displacement and disproportionate harm. Planning and zoning that include a variety of housing options at a variety of income levels would offer many more residents of the region affordable options to live in healthy, walkable urban places with abundant access to jobs, education, recreation, and other people.

Opportunities along Orange/Blue Line

An interactive map has been created that not only identifies all parcels that are within one-quarter mile of existing high frequency transit and Red Line parcels, but also identifies parcels near planned priority Orange Line and Blue Line service (based on the 2019 planned routing for

Project Connect). Those parcels show TOD potential planned with proposed transit investments. The map also includes a third designation for seven other Project Connect lines.

The following image provides an example of how this map identifies potential TOD parcels as Light Blue, Red, or Pink parcels (which respectively correspond with planned short-range, mid-range, and long-range transit investments). When accessed online, this mapping tool allows the user to view parcels along transit corridors at higher resolutions and includes the entire Project Connect System Plan Map.

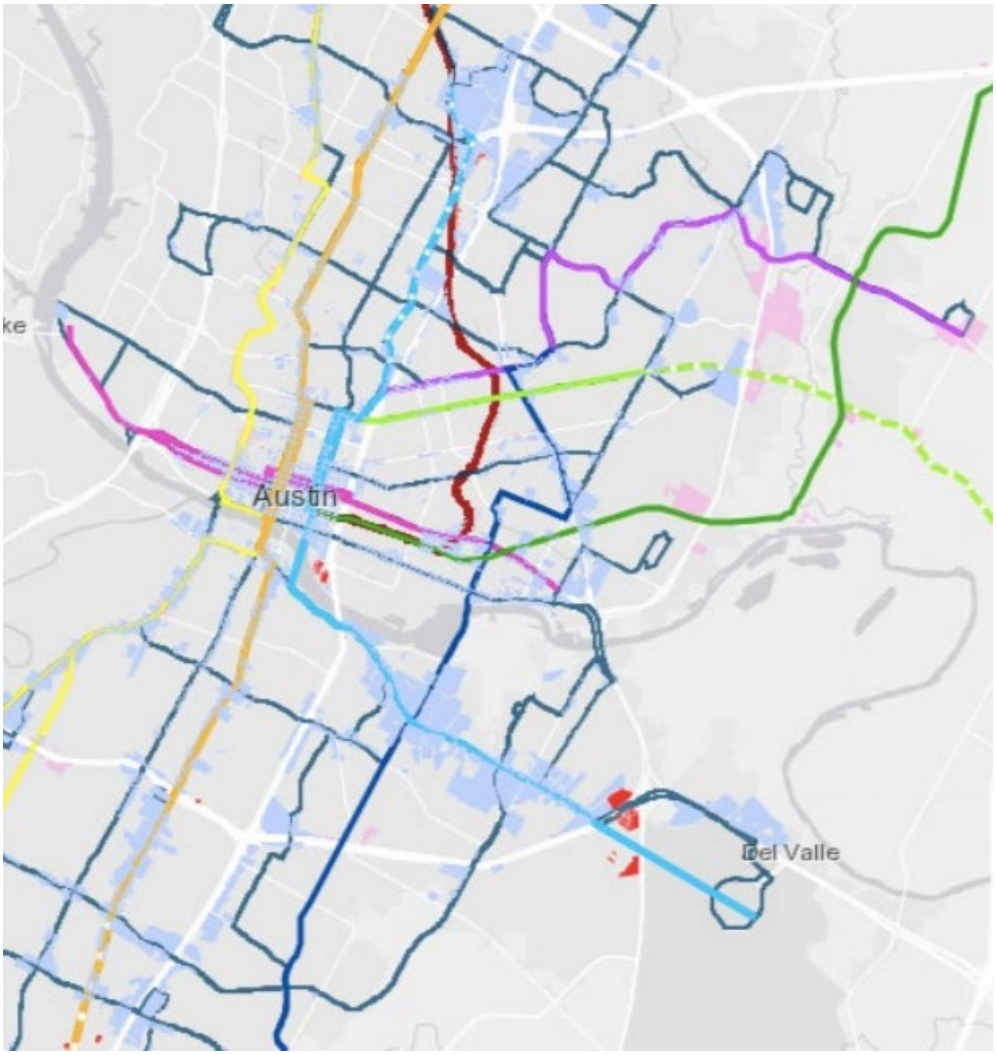


Figure 1 – Example map of parcels with TOD potential

These maps include only parcels where current zoning (such as CS, GR, DMU, CBD, and ERC) would be able to take advantage of the existing and likely potential TOD overlay and density bonuses. Additional rezoning of land as a result of the Project Connect plans or the code rewrite could further increase development potential.

Currently, there are approximately 1,350 acres (0.7 percent) within the City of Austin that could take advantage of the existing TOD designation. With just the Orange and Blue Lines, an additional 400 acres of land becomes potential for TOD. This is because the Orange and Blue Lines typically follow existing routes and would replace or complement service in those areas. However, more transit service would support additional density on these identified parcels.

With the full Project Connect vision, more than 1,100 acres of additional City of Austin land could become TOD-ready, prime candidates for significant zoning changes that would allow for TODs. These would include some of the suburban locations that rely on commuter service to and from the core of Austin. Leander is already planning a significant TOD around its Red Line station that encompasses 115 acres and would include more than 2,500 residential units and 500,000 square feet of commercial space. With additional transit service and more connections to different locations, TOD could reduce automobile dependency and support sustainable growth.

Opportunities along BRT Lines and Frequent Bus Intersections

In Austin, TODs have largely been relegated to low-frequency rail stations and/or park-and-rides. These locations overlook the actual opportunity in the Austin metro area: high-frequency bus intersections[11].

Because of the ad hoc, case-by-case progress of Austin's TOD regulatory environment, the city of Austin currently uses TOD zoning predominantly centered around rail stations and park-and-rides. However, TOD works best when near high frequency transit, whether bus or rail. Development patterns are mode-agnostic and suggest the driving factor of successful projects is being within a half-mile of corridors served by light rail, Bus Rapid Transit or bus routes with service every 10 to 15 minutes. More important than the type of transit vehicle is the provision of dedicated right-of-way to ensure on-time service and travel times that are comparable, if not faster, than traveling the same route in a private automobile.

In the Austin area, MetroRapid and MetroBus currently provide the frequencies most likely to support robust TOD. Capital Metro now offers 14 bus lines running 15-minute service, seven days a week. TOD could be an excellent fit for parts of the Austin metro area currently served by multiple, high-frequency bus lines. As the City of Austin is grappling with the land development code, with a focus on Imagine Austin centers and "transition zones," these conversations overlook potential TOD opportunities along Capital Metro's High Frequency Transit Routes. Appendix C shows a map of these routes.

[11] Transit-Oriented Development: Opportunities for Affordability and Access in Austin

Several high-frequency lines intersect in areas not currently identified for TOD zoning, or located on a designated "corridor," but would support additional residences, offices, and shopping destinations. Among the high-frequency transit intersections, the intersections named in Appendix D should be considered for zoning that could take advantage of TOD regulations. All these locations have the frequency of multiple routes to support the type of development currently identified for MetroRail and park-and-ride locations. Many of these locations are among the highest ridership locations in the Capital Metro service area, including the Oltorf and Stassney corridors and the Govalle area.

Opportunities in non-Austin communities

There are opportunities for other municipalities in the Central Texas region, even those that may currently exhibit a more suburban development pattern. Small cities, with walkable downtowns and adjacent neighborhoods are at a particular advantage to encouraging sustainable urban form. One path forward for several communities has been to begin transit service through the adoption of a transit development plan. Often, these plans set out fixed-route options for the near term and determine how the municipality will contract with local transit providers when traditional funding methods may not be feasible. Three communities in the Central Texas region have already approved transit development plans and their implementation can help build the case for more walkable, urban neighborhoods.

In 2016, the City of Georgetown, TX and CapMetro adopted a Transit Development Plan Study, which sought to help establish a fixed-route bus service in the city[12]. GoGeo, which also includes a paratransit service, is a four-route bus system that centers around the downtown-adjacent Georgetown Public Library. The Capital Area Rural Transit System (CARTS) operates the service for the city and provides connection via the CARTS Interurban Coach route to Plaza Saltillo in Austin. In 2017, the City of Georgetown and the Capital Area MPO (CAMPO) completed a study on the Williams Drive corridor, which connects Northwest Georgetown to Downtown. The study included a center area plan that seeks to enhance the overall urban form and promote the development of mixed-use, walkable, and transit support densities extending into Downtown[13]. In conjunction with the new transit service, Georgetown has significant opportunity to further the goal of building sustainable, urban neighborhoods.

[12] Georgetown Transit Development Plan

[13] Georgetown Williams Drive Study

The City of Leander also offers opportunity to see more sustainable urban development in Central Texas. There have been many past plans and studies to encourage mixed-use, urban development adjacent to the CapMetro Red Line commuter rail station in Leander, TX. A TOD SmartCode, a type of form-based code, was adopted in 2005 to set design standards for any new development within the Transit Oriented Development District. The Northline development has the potential to develop a large portion of the district into a walkable, urban community with direct access to the rail station. Further studies and investments in the pedestrian and bicycle networks can help to ensure the success of this project and others within the TOD district.

Round Rock, TX and Pflugerville, TX, both located to the north of Austin, show how to plan for transit despite being outside of the service area of a transit provider. In 2015, Round Rock approved a Transit Master Plan which led to the introduction of four fixed routes provided by CapMetro and the Round Rock Transit Center, which also provides access to CARTS buses[14]. Importantly, the Round Rock Transit Center is located within the downtown area and is already quite walkable. These assets provide an opportunity for a denser urban form in the adjacent residential and commercial areas. Pflugerville's Transit Master Plan was adopted in November 2019 and, combined with the 2018 Transit Development Plan, will lead to the introduction of a pilot pickup service within the city operated by CapMetro as of March 2021[15]. The success of this service can help Pflugerville point to the need for filling in gaps in the pedestrian network and make the case for fixed transit service that connects the city commercial and employment centers in north Austin and Round Rock.

CASE STUDIES

West Campus University Neighborhood Overlay

One of the best examples of how to build sustainable, urban places in Austin is the West Campus neighborhood. The University Neighborhood Overlay (UNO) is a set of districts in and around the West Campus area that has succeeded in incentivizing development to help build an "Uptown district[16]." Using district-specific development standards and density bonuses, UNO has been able to not only ensure that new development is transit-supportive but has led to an increase in affordable housing units. Most importantly, standards establish a 12-foot minimum for

[14] Transit Master Plan, Round Rock

[15] Transportation Master Plan, Pflugerville

[16] Overview of the University Neighborhood Overlay (UNO)

sidewalks, call for no Floor-to-Area ratios, and set no compatibility requirements. Additionally, parking is heavily reduced and housing affordability is further ensured through a Housing Trust Fund that is accessible to the housing cooperatives that function within the district. The use of these sorts of standards and incentives, if applied to a broader area of the city, have the potential to spur the same sort sustainable, urban developments.

Dallas Region

Among the other large cities in Texas, Houston and Dallas can also offer insight into how to best encourage sustainable urban development. Both have attempted to use the policy tools at their disposal, of which Central Texas communities can learn what might work within their jurisdictions.

In Dallas, livable centers and TOD districts are used to encourage high-density, mixed-use development around Dallas Area Rapid Transit (DART) stations. In 2008, a TOD Tax Increment Financing (TIF) District was established and would eventually encompass eight separate light-rail station areas. As with traditional TIF districts, the increment is used to fund infrastructure improvements and affordable housing units across the district. Although the economic recession of 2008 and 2009 impacted the initial success of the district, as of 2019, $219 million has been invested in the district and associated projects have resulted in over 1,500 new households adjacent to the DART stations[17].

Houston Region

For Houston the creation of management districts, in conjunction with good sub-area planning, has led to the development of better urban form. The East End District was established in 1999 by the Texas State Legislature and its investments into infrastructure, business attraction, and marketing are funded through an assessment of commercial properties. The district has succeeded in spurring redevelopment and helping local businesses thrive. However, the major investment in turning the East End into a more sustainable urban neighborhood was the development of the East End light-rail or Green Line. The addition of this light-rail line, and in conjunction with Houston's 2009 transit corridor ordinance that set both required and optional design standards for new development, have allowed for the enhancement of the public realm

[17] TOD TIF District FY 2018-2019 Annual Report

with the addition of sidewalks and street furniture and set the district on the path of furthering true transit-oriented development.

The Energy Corridor District is primarily a business district located adjacent to IH-10 and west of Beltway 8. A management district was created in 2001 by the state legislature to further success of this important employment node[18]. In the years since, there have been numerous plans and development efforts to turn the district into a more compact, urban place, but one of the most forward-thinking is the Energy Corridor Livable Centers Study produced by the district in partnership with the Houston-Galveston Area Council (H-GAC). Not only does the plan envision the district as a mixed-use, pedestrian-friendly community, but sets out to establish itself as a major hub for transit in west Houston. This is done by transforming the existing Addicks Park & Ride into a destination offering retail, office, and hotel space, along with 1,200 residential units. Although the full vision of the plan has yet to be realized, it is just a matter of time given the overall investment in the area and in west Houston.

CONCLUSION

While livable centers or sustainable places may seem like an innovative concept, it simply aims to concentrate jobs, housing, and services within a transportation network that allows many types of lifestyles, rather than dictating a car-centric way of living. It harkens back to planning and development patterns before widespread use of the private automobile and the proliferation of highways, freeways, and the Interstate Highway System. Sustainable places put a person at the center of its plan and scales the built environment to human movements (both in terms of size and speed), rather than that of the automobile.

Around the world, an approach built around sustainable places has helped many cities reduce their carbon footprint while becoming more productive and more livable. Principles that create sustainable places cannot be applied uniformly across an entire city; they must be used in concert with the surrounding characteristics of a place. This paper finds that there are three elements of a complete community that are important:

- Transit connectivity (and more mobility options and access for all), which allows the greatest number of people to work and live in a place and have access to the greater metropolitan region
- Quality of the urban environment, which can determine the desirability of people to work in, live in, or visit a place

[18] Energy Corridor | Livable Centers Plan

- Market potential, which allows development activity to support resident and job density to support one another at a different scale than traditional American development patterns allow for

If we accept that economic growth, urban transport, and land use can be managed more efficiently if planned together, creating complete neighborhoods is a strategy that can be used to be more productive with our limited urban space. It has been successfully applied at an urban scale in cities around the world, and with Project Connect coming to Austin, there will be opportunities to have true transit connectivity. This will require a regional approach; cities with land use review and approval authority, transportation providers, and private developers must work more closely to remove barriers to creating these communities. If we commit to improving the quality of the urban environment as mentioned throughout this paper, we will also come closer to realizing the market potential of the city and region, allowing more people to live and thrive in Central Texas.

APPENDIX A - Pedestrian Connections, Defined

Paseos

A paseo is a landscaped public place with a wide sidewalk to encourage walking, strolling, biking, and passive use. Paseos can be part of a larger trail system connecting neighborhoods, parks, schools, and public sidewalks, with pathways between individual properties or through neighborhood gates.

Green Alleys

Green alleys are typically narrow passages designed for less frequent pedestrian and bicycle traffic, made by repurposing underutilized auto-focused service alleys. They improve pedestrian circulation and feature pedestrian-friendly lighting, paving and plantings.

Café Districts and Outdoor Dining Plazas

Outdoor dining on private property and in the frontage zone along a commercial corridor should be encouraged where adequate space exists. Café districts provide outdoor dining space for multiple café, either along the sidewalk, and/or in a plaza. Both attractions add vitality to the street, make a district more inviting, encourage walking, and promote local economic development and tourism, with successful café districts around the world offering up to eight blocks of continuous café options and hundreds of seats.

Street Furniture

Street furniture on sidewalks buffer pedestrians and vehicular traffic, contributing to an active, walkable environment while providing pedestrians a place to rest. Benches, trash receptacles, and bicycle racks are common types of street furniture, which should be placed outside of the walking zone to avoid creating a hazard to pedestrians. Benches should be placed perpendicular to the sidewalk to create a seating nook, and bike racks are best located near transit stops, major destinations and bike paths.

Public Art

Cities and developers can commission local artists to decorate civic infrastructure (utility boxes, blank walls adjacent to or visible from major arterials, and on pavement as part of temporary

installations) and use art in consideration of cultural preservation and resiliency within a district. Public events, commissioning of new public art, and embedding urban design that encourages cultural exchanges within the district are recommended practices, while farmers markets, art walks, festivals, block parties, holiday parties, tournaments, etc. add to the cultural resilience of a district by encouraging more use of public space.

Curb Extension

A curb extension is a portion of the sidewalk that is extended into the curb zone, typically located at intersections and other crossing points. They improve pedestrian safety by reducing the necessary crossing distance and allow pedestrians and drivers to see each other when parked vehicles would otherwise block visibility. It is recommended that curb extension be installed with curb ramps that comply with ADA standards and that they do not obstruct sight lines for motorists. A curb extension could also include low-height landscaping, bioswale planting, bike parking, or seating, and could be designed to divert storm water.

Chicanes

Chicanes narrow the roadway and altering travel lanes from a straight orientation to a curved or "S"-shaped orientation on alternating sides of the street, helping to calm traffic and reduce vehicle speeds. Chicanes also provide additional landscaping, seating and signage to create a more pleasant walking environment and to create a buffer between the sidewalk and the street.

Medians and Median Refuge Islands

Medians divide a roadway and may be painted, paved, elevated, or landscaped, with a raised landscaped center median to allow for street landscaping, signage, and pedestrian refuge islands. A raised median may help to slow travel speeds, reducing vehicle-pedestrian collisions. A landscaped median may also replace a portion of an existing dedicated left-turn lane and can aid stormwater detention. Median refuge islands protect pedestrians or bicyclists crossing the street at intersections or mid-block crosswalks on roads with a raised median. They are recommended for highways or other wide streets that lack traffic signals and signage, and should accommodate pedestrians with disabilities to provide all pedestrians with a clear path of travel.

Pedestrian Signal Timers

Leading pedestrian intervals allow pedestrians to begin crossing the roadway before the vehicle signal turns green. Also referred to as “scramble intersections” or “scramble crosswalks,” all vehicular traffic is stopped to allow pedestrians to cross in all directions including diagonally. They are advantageous at major intersections with high pedestrian traffic, as they allow pedestrians to cross to their desired corner and reduce pedestrian-vehicle conflicts.

Pedestrian Hybrid Beacon

Pedestrian-activated warning beacons are flashing yellow lights that provide additional warning to drivers that a pedestrian is crossing the roadway. This signal is more visible to drivers than traditional crosswalks, which makes them ideal for mid-block crossings. Push buttons should use sound for the visually impaired and crossings should be clearly marked. Beacons can help to retrofit existing roadways that were not designed to support robust pedestrian use.

Wayfinding Signage

Wayfinding signage helps visitors navigate to major destinations, public facilities, and transit connections, and can help create an identity for a place. The wayfinding signage comes in three types: 1) identification signs that mark key destinations and activity centers, 2) informational signage that provide contextual information on a point of interest, and 3) directional signage showing the optimal route between destinations. An emphasis on directional signage can point pedestrians to a transit station while informational signage is used for major destinations. Signage should conform to a consistent color palette, fonts, materials and graphics to create an identity for the area for visitors to the district.

Lighting

Streetlights accompanied by shorter, pedestrian-scale lighting positioned at frequent intervals create a comfortable, and safe environment for pedestrians. The lighting, which can incorporate energy efficient formats, adds to the identity of a sustainable place’s commercial corridor.

Traffic Circle / Roundabout

Traffic circles are intersections with a circular island in the center that control the flow of traffic. Traffic circle intersections can be stop-controlled or yield-controlled, with the flow of vehicular traffic into slowed to reduce collision potential and create a more safe and comfortable environment for bicyclists and pedestrians. Traffic circles improve air quality and roadway

circulation by eliminating the stop-and-start movements associated with four-way stops. Using permeable materials and low water landscaping in their construction can support storm water management and create an attractive image.

Protected Bicycle Intersection

A protected bicycle intersection uses a curb extension to add a barrier between a bicycle lane and vehicular travel lanes at an intersection to make cyclists more visible to motor vehicles. This reduces bicycle-vehicle conflicts by preventing motorists from coming into conflict with cyclists when making a right turn, providing turning cyclists with an area to queue.

Bus Bulb

A bus bulb is a curb extension that allows buses to stop in a vehicular lane, increasing transit efficiency as the bus does not need to wait to pull into moving traffic. Bus bulbs create more space adjacent to the sidewalk for pedestrian and transit amenities. Bulbs on multi-lane arterials with curbside parking allow for an extension of the sidewalk at intersections, and for vehicles to pass stopped buses in adjoining lanes. It is recommended to use far side bus bulbs instead of near side bus bulbs to avoid right turn interference.

APPENDIX B - Outdoor and Environmental Features, Defined

Monument/Signature Trees

Signature trees act as a visual focal point and communal centerpiece in public spaces (parks, plazas and transit stations) and offer aesthetic appeal. They can also help to mitigate urban heat island effects caused by surrounding roadways and are best used when planted throughout the area and can be relatively low maintenance while providing color and shade.

Street Trees and Vegetation/Landscaping

Street trees and vegetation enhance the walkability and attractiveness of sustainable places, providing visual interest and shade while mitigating urban heat island effects.

Street trees and landscaping in the amenity zone should be selected to achieve a strong visual presence that fits in the neighborhood, while smaller trees may be selected for local small-scaled streets. Typical street trees should be spaced 25-to-30 feet apart while avoiding interference with street lighting, utilities and visibility of approaches to intersections and driveways. Vegetation can be used to created physical and visual barriers between high-volume roadways and the built environment adjacent to housing development and along commercial corridors.

Transit Stops and Shelters

Transit stops and shelters create a safe, positive passenger experience with adequate lighting, equipment such as emergency telephones, and visibility from the surrounding area and streets. Shelters should be established away from pedestrian zones and provide adequate space for pedestrian passage, and bus wheelchair lift loading and unloading. Transit shelters can protect commuters from sun and inclement weather, with those near major transit stations displaying real-time arrival information for the routes serving that station.

Shade Structures / Rain protection

Green spaces and other outdoor features located within TODs need to incorporate welcoming structures that provide cover from rain, sun and other natural elements. When properly planned in accordance with other components of the project they can add character and energy to the area, rather than merely existing as a freestanding utility piece.

Awnings

Awnings help provide sun protection during Texas summers and give buildings a distinctive identity to increase visual interest along a pedestrian corridor. Shade structures over doors help in identify building entrances and using open-ended awnings instead of closed-off awnings helps to reduce visual interference. Steel, canvas, and glass in their awnings prove more durable than cloth structures, though those materials may be precluded from use in some building types or settings.

Permeable Paving

Permeable pavement allows stormwater runoff to seep into the soil below, filtering the water into the existing aquifer. An alternative to concrete and asphalt paving, it offers utility, strength, and sustainable properties. These materials include permeable concrete, asphalt, clay brick interlocking unit pavers, open grid pavers, gravel pavers or decomposed granite.

Planter/Bioswale

Planters and bioswales help to mitigate storm water pollution from parkways between the street and sidewalk, collecting and filtering storm water runoff with native vegetation reducing the flow of water to filter out sediment, trash, and heavy metals. Drainage pipes may be installed beneath the soil to carry the filtered water to the storm drain system, with parkway planters typically installed next to curbside parking or next to the curb itself.

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