Transit Forward

Project Connect in Action: A New Era of Transit on Austin's Eastside

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Executive Summary

While the centerpiece of Austin's Project Connect, an ambitious $7.1 billion investment approved in 2020 is two high capacity light rail lines, also included is huge investments in a diversity of other transit modes. Among these are seven new CapMetro Rapid bus lines, with the Pleasant Valley and Expo Center Lines launching in Spring of 2025. Both of these new lines will serve the heart of Austin's Eastside as well as the growing communities of Colony Park, Mueller, and Dove Springs. Important features like limited stops, 10 minute frequencies, enhanced bus shelters, bus-only lanes, and technologies like transit signal priority build on the success of the existing 801 and 803 Rapid routes and ensure a fast, reliable, and convenient alternative to driving.

Moving forward, once both lines are fully operational there will be multiple opportunities to grow ridership even further. Exploring the potential for a greater degree of signal priority and bus-only lanes in heavily congested areas through a stronger collaboration between CapMetro and the City of Austin could ensure faster speeds and greater reliability. Ensuring greater cohesiveness between the new Rapid routes and Austin's growing transit network will also allow for greater ridership. The Austin Transit Partnership and CapMetro must work together to ensure the station at Pleasant Valley and Riverside, where light rail will meet CapMetro Rapid, is designed with both intuitive wayfinding and the placement of services to make transfers as seamless as possible. Strategic infill stations on Airport Boulevard at 12th Street and MLK Jr. Blvd, as well as at the intersection of Manor Road and Loyola Lane would also improve connectivity between CapMetro Rapid and the existing bus network. Lastly, ensuring a stable partnership between affordable housing and transit will allow for a greater protection of vulnerable communities and create an Austin that is accessible for all.

The Pleasant Valley and Expo Center Lines also mark the first set of lines to be fully operated with environmentally friendly battery electric buses. While this commitment is important to ensure improved air quality and reduced noise pollution, numerous setbacks have forced CapMetro to initially operate both routes with diesel buses at reduced frequencies. Despite these challenges, a launch in Spring of 2025 ensures that critical transit infrastructure becomes operational, supporting Austin's broader climate goals and making travel more accessible across the region.

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Project Connect

In 2020, Austin voters approved Proposition A, a historic $7.1 billion dollar investment in the city's transportation future. The ballot measure's approval enabled the city to begin planning the implementation of Project Connect, a wide ranging public transit plan aimed at preparing Central Texas for future growth. The plan includes the construction of new bus and rail lines across the city, allowing for greater connectivity and access across the region. By implementing a diversity of new travel options, Project Connect also enables the city of Austin to reach its goals of a 50/50 mode share by 2039, in which half of commuters choose transit, walking, cycling, or other alternatives to driving alone (City of Austin, 2019*)*. While two high capacity light rail lines are the centerpiece of the proposal and represent a majority of the plan's cost, the plan also includes several other investments in transit throughout the region already under construction aimed at making travel more accessible and efficient for all types of trips.

Unlike previous transit plans rejected by Austin voters in 2000 and 2014, Project Connect incorporates a variety of transit modes designed to meet the different needs of Austin's diverse collection of neighborhoods, rather than focusing solely on light rail in the central core. The plan includes new park and ride lots, regional express routes to outlying areas, improved and expanded commuter rail, enhanced local bus service, and new Pickup zones, where riders can request a ride to and from anywhere within a specific area (City of Austin, 2020). Additionally, the plan proposes seven new "CapMetro Rapid" routes designed to reach areas of the city where the high cost of light rail may not be justified. These new routes would operate similarly to CapMetro's already existing and very successful 801 and 803 Rapid routes, which were launched in 2014. The 801 is consistently the highest ridership route in the CapMetro network, with the 803 not far behind (CapMetro, 2024a), proving investments in this type of frequent, reliable, and well-designed bus service can significantly support higher transit usage.

The Pleasant Valley and Expo Center Lines

In Spring of 2025, the first two of seven brand new CapMetro Rapid routes promised in Project Connect are to be in operation. Dubbed the Expo Center and Pleasant Valley Lines, these routes primarily serve the Eastside of Austin, with the Expo Center Line briefly crossing west of I-35 in order to serve UT and Downtown. Austin's Eastside has long been shaped by racial segregation and disinvestment, which was solidified in the City's 1928 Master Plan. By withholding sewer lines, paved roads, and important municipal services to Austin's Freedman towns, new communities composed of recently emancipated slaves, the plan effectively forced the city's Black population to concentrate east of Interstate 35 which at the time was the tree lined East Avenue (Skop, 2009). This deliberate discrimination and disinvestment spearheaded by local leaders decades ago is still felt today. Almost 100 years later, millions of dollars of much needed transit investments are being brought to the Eastside. Building the first iteration of Rapid lines on the city's Eastside and providing those living in the area with fast and reliable rapid transit is an important step in addressing long-standing inequalities.

While these routes will greatly improve regional mobility for those in Central East Austin, other communities along the alignment further from the core and developed more recently in the 1980s and 90s will also see huge benefits. Dove Springs, East Riverside, Springdale, and Colony Park have large populations of new immigrants, people of color, and those without access to a car. These neighborhoods are incredibly transit dependent yet experience some of the longest commutes in the city (U.S. Census Bureau, 2022). Both the Expo Center and Pleasant Valley Lines will bring much needed relief by providing faster and more reliable transit options to these growing areas. The rapidly developing Mueller community, also currently without any rapid transit, is actually where the two CapMetro Rapid lines will meet. The area began rapid brownfield redevelopment following the closure of Mueller Municipal Airport in 1999, and has seen rapid growth since the last redesign of Austin's bus network in 2015. Both Rapid lines will travel along Berkman Drive, which was constructed 20 years ago with future rapid transit in mind (City of Austin, 2004). This new investment in high capacity rapid transit will fill a much needed gap and complement Mueller's already existing pedestrian and bicycle infrastructure, vibrant green spaces, and mixed use developments.

Both routes will also serve two new park and ride facilities on the outskirts of the city. Over 200 parking spaces are shared between the two locations in the hopes that commuters

will leave their cars behind when commuting into an already congested Central Austin. These facilities will provide residents living on the fringes of the city greater access to high capacity rapid transit and a more comfortable space for bus operators to layover. Although service on both Rapid routes will begin in the Spring, both the Goodnight Ranch and Expo Center Park and Rides are still under construction. Initially, both routes will terminate at temporary stops until construction is completed. Both facilities will feature overhead electric charging infrastructure, meaning the operation of an all-electric fleet on both Rapid routes is dependent on the completion of these park and ride facilities (Bernier, 2024).

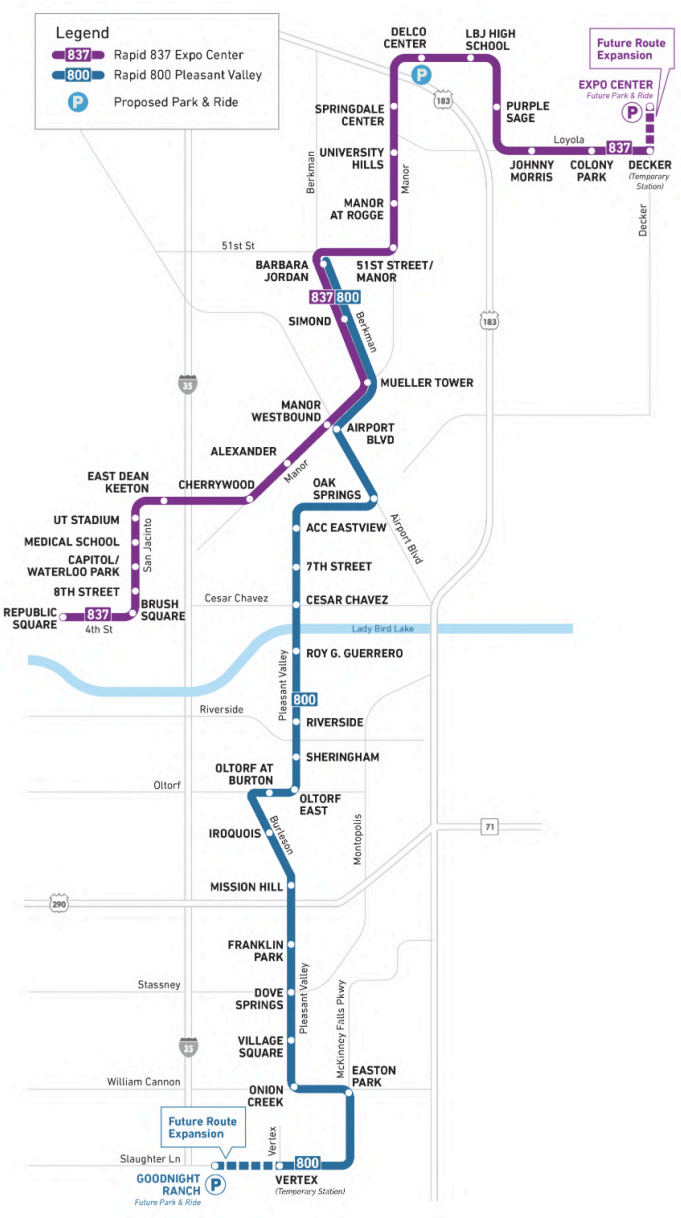

Figure 1: The Pleasant Valley and Expo Center Lines (CapMetro, 2024)

What is CapMetro Rapid

While the “CapMetro Rapid” branding is unique to Austin, numerous cities across the United States including Seattle, Houston, and Albuquerque have implemented similar schemes albeit with different names. These systems are often referred to as “Bus Rapid Transit,” or “BRT,” and are designed to be faster and more reliable than a traditional local bus operating in mixed traffic. Globally, BRT systems can vary in terms of the features they include. The Institute for Transportation and Development Policy has developed a “BRT Standard,” which evaluates and ranks different systems throughout the World with Gold being the highest rating (Institute for Transportation and Development Policy, 2024). Gold Standard BRT systems, for example, might have fully grade separated bus-only guideways, large stations, ticket barriers, and operations that more resemble subway lines. In Austin’s case, routes under the CapMetro Rapid banner are not as costly or complex as Gold Standard BRT systems, and act more like upgraded local buses. Despite this, CapMetro Rapid still incorporates several important features, such as limited stops, improved stations, dedicated lanes, and other priority features, which make them significantly more competitive and faster than a traditional bus.

All CapMetro Rapid routes feature longer distances between stops than a local bus, with similar stopping patterns to light rail. In Austin, most stops are around half a mile apart, with stops in the Downtown area spaced closer together. For example, the existing Northbound 801 Rapid has 30 stops, while the local 1 which runs mostly along the same corridor has 76 stops (CapMetro, 2024b). Fewer stops allow for quicker travel times, as the bus does not have to decelerate, pick up and drop off passengers, and reaccelerate as often. This configuration also allows for those taking local trips and those taking more regional journeys to be separated onto different routes, allowing for faster travel times for both types of trip. Because stops are more scarce, they have also been given unique names which are displayed at each location and announced onboard. Unique names often reflect local landmarks, giving seemingly simple bus stops a stronger sense of place, helping to integrate the service more smoothly within the existing community. This naming convention also helps passengers orient themselves within the network, making for a more familiar and welcoming transit experience.

Rapid routes also offer “turn up and go” frequencies most of the day, enabling riders to travel without needing to look at a schedule. Buses on Rapid routes arrive every 10 minutes on weekdays from 7am to 6pm, with slightly longer 15 minute frequencies in the

early mornings, evenings, and on weekends. During busy times and for most of the day, riders only wait on average 5 minutes for their bus. This approach highlights the growing sentiment among more and more agencies across the country that “frequency is freedom.” With frequencies like those on CapMetro Rapid, riders don't have to meticulously plan their journey before heading out or wait long periods of time, making transit more accessible and flexible for riders. Whether customers are headed to work or “trip chaining” in which they travel to multiple different destinations running errands, 10 minute frequencies make transit more accommodating and less cumbersome to use.

Enhanced Bus Stops

Rapid routes also have improved and enhanced bus stops with greater amenities which elevate the rider experience (see Fig. 3). Each stop is equipped with seating, benches, trash cans, a shelter, overhead lighting, as well as a live time departure board. CapMetro initially rolled out the 801 and 803 Rapid routes in 2014 with overhead LED displays, but since then, have updated every station with fairly new E-Ink Digital Paper technology, which can be updated remotely and has a crisper, more informative display (E Ink, 2024). These real-time departure boards allow riders to stay updated on bus departures in real time without needing to check a schedule, with spoken announcements available for visually impaired customers. Unlike stops on the 801 and the 803, which have simple maps of the two Rapid routes, each stop on the new Rapid lines will also have a specialized map showing all of the local bus services accessible from that stop. This enhanced wayfinding strategy reflects CapMetro's commitment to fully integrate the Pleasant Valley and Expo Center Lines with the existing bus network, making it easier for riders to plan trips and navigate transfers seamlessly.

Unlike existing stations on the 801 and the 803, the two new Rapid routes will feature stations with significantly larger footprints, more seating, and better shelter from the elements with protective panels in the front and back (see Fig. 2). Stations also have platforms which allow for near-level boarding, meaning buses save time by not having to kneel when picking up passengers. These improved stations not only improve the rider experience, but also give the Rapid routes greater visibility and a sense of dependability, something that a pole in the ground synonymous with many bus stops in Austin cannot offer. One of the benefits of light rail is the visibility of tracks and large stations, which instill a sense of comfort and confidence in riders that the service is fixed and reliable. By treating stops along Rapid routes with similar prominence, a sense of permanence and visibility is extended to the bus, helping to elevate the service in the eyes of the community.

New Rapid stations on the Pleasant Valley and Expo Center Lines will also feature much better integration with other modes of travel compared to existing stops on the 801 and 803. With the understanding that all bus riders must be pedestrians or cyclists at the beginning or end of their journey, pedestrian refuge islands, sidewalk extensions, and mid-block crosswalks have been implemented at various sites. CapMetro's mission to equally meet the needs of pedestrians, bikers, and transit users is reflective in the design of the new Rapid routes, but balancing these demands in one corridor can occasionally be challenging

particularly in narrow squeezes like Manor Road west of Airport Boulevard. As Austin expands its high comfort bike network, the city has also had to work creatively and collaborate across agencies to minimize conflicts between cyclists and buses. One solution implemented throughout the design of CapMetro Rapid is “floating bus stops” (National Association of City Transportation Officials, 2016). These bus stops position the parallel bike lane behind the boarding area, allowing cyclists to pass without having to wait for stopped buses or attempting to weave around them into the car lane, thus creating safer conditions for all types of travel.

Figure 2: Existing station on the 801 and 803 Rapid (Behmer, 2024)

Figure 3: Newly built station for the new Expo Center and Pleasant Valley Lines (Behmer, 2024)

Priority Measures

Rapid routes are also often faster than local routes and spend less time in traffic thanks to several priority features. While not necessary along the entire alignment, bus-only lanes in certain congested areas are critical to improving travel times. These lanes, often painted bright red, allow buses carrying up to 100 passengers, as well as emergency response vehicles, to bypass long queues of traffic. Dedicating space for transit can remove conflicts between buses and drivers, make travel times more predictable, and increase the overall throughput of people within a specific corridor (Ben-Dor, Ben-Elia, & Benenson, 2018). The City of Austin has already constructed new bus-only lanes along Trinity and San Jacinto Street in Downtown adjacent to the State Capitol in anticipation of Rapid service (see Fig. 4). The traffic in this area during rush hour can be a large source of delay for already existing routes 7 and 10, and transit-only lanes will help to mitigate stalled buses and improve overall reliability, especially during peak times. In September 2023, CapMetro and the City of Austin developed numerous small-scale infrastructure recommendations seeking to improve multimodal travel in the city. A primary goal of the report was to reduce the amount of crowded buses stopped in traffic. Among the recommendations are new bus-only lanes along Pleasant Valley Road between East 7th Street and Oltorf Street, as well as on Dean Keeton Street between I-35 and Guadalupe Street (City of Austin, 2023b). New bus-only lanes at these locations would be used by future Rapid routes, significantly improving travel times and reducing sources of delay for transit riders.

Certain technologies will also be implemented along the alignment to reduce delay and improve reliability. Transit Signal Priority, or TSP, is a fairly new strategy which gives special treatment to buses on Rapid routes at signalized intersections. Unlike emergency response vehicles, which can trigger priority at most traffic lights, buses are not granted the same degree of priority. While buses have technology on board which can communicate with the signal, they are only permitted to shorten red lights or hold green lights for about six seconds at certain signals. Buses are also not given permission to skip entire traffic phases to pass through an intersection, meaning more often than not, the light is not affected and the bus must wait (KUT, 2015). Notably, priority is also only given if a bus is more than one minute behind schedule (Federal Transit Administration, 2018). This means while Rapid routes are less susceptible to unpredicted delay, the randomness of red lights and estimated traffic volumes at different times of day is built into the schedule. This use of TSP in Austin contrasts with “predictive priority,” more common on light rail systems, which can be more

disruptive to the order of traffic flow but force signals to skip entire phases to ensure a green light for the transit vehicle. While even a lighter use of transit signal priority as used in Austin can significantly reduce delays, more ambitious preemption technologies could drastically improve travel times and reduce the amount of buses needed to maintain 10 minute frequencies. Traffic engineers and transit planners must work together to ensure that this future is possible.

Figure 4: Newly installed bus-only lanes on San Jacinto Boulevard (Behmer, 2024)

Network Connectivity

While those living and working along a single CapMetro Rapid route will enjoy a significantly improved trip, the potential impact of CapMetro Rapid extends far beyond individual corridors, offering a chance to improve Austin's connectivity at a regional scale. Transit routes are often viewed and planned as standalone lines, rather than being a singular piece interconnected within a broader network. Given the decentralized nature of development in Austin and the lack of resources on behalf of transit agencies, providing direct, "one seat" rides between every destination is impractical. Instead, fostering seamless transfers between different modes can lead to a more efficient and faster network overall. Both Rapid routes will launch before light rail construction breaks ground, but are designed in a way to complement and enhance the future light rail lines. By integrating these modes thoroughly, Austin can achieve a more cohesive transit network that maximizes the strengths of each mode. Planning Austin's future transit network more holistically will not only ensure strong ridership on CapMetro Rapid but will lay the groundwork for the success of future light rail.

The Pleasant Valley Line for example is unique in that it will operate entirely east of I-35, without serving Downtown or UT which are some of the city's major trip generators. While this route will allow for significantly faster crosstown travel between Southeast Austin and the Eastside, it also has the potential to decrease travel time and improve access to the city center for those along its alignment once light rail is operational. Although much of the light rail's appeal has been the promise of direct trips between Downtown and the Airport, the benefits extend much further. For example, riders in neighborhoods like Dove Springs, located far from the planned rail alignment, would likely see faster travel to Downtown and the Airport through their connections to CapMetro Rapid. In the interim, before the complex and often difficult to cross intersection of Pleasant Valley Road and Riverside Drive is transformed with light rail, the safety and comfortability of those making transfers between route 20, which follows the future light rail's alignment and is one of the busiest lines in the system, should be a priority. By addressing wayfinding and safety issues at this intersection in the meantime, CapMetro can set the groundwork for a more integrated, accessible, and rider-friendly network in the future.

While the Pleasant Valley Line operates largely along a brand new alignment served by many different routes, the Expo Center Line mostly follows the northern segment of existing route 20 as it travels from Springdale into Downtown. This overlap raises the

question of resource allocation for potentially unnecessary duplicative service. For instance, when the 801 and 803 launched in 2014, local routes 1 and 3 were downgraded to 30 minute frequencies to encourage riders to use the faster Rapid routes, while still providing coverage for those unwilling or unable to walk to a Rapid stop. Despite this, route 1 remains one of CapMetro's most productive routes, with 24 riders per revenue hour in April of this year (CapMetro, 2024a). Unlike past service changes, CapMetro plans to launch the Rapid routes without immediate changes to overlapping routes, allowing the agency to gather ridership data and analyze travel trends before making any decisions. Continuing to operate route 20 every 15 minutes may be ideal considering it runs past Downtown towards Riverside Drive as well as operating an alternate routing on Guadalupe and Lavaca Streets serving the Western side of Downtown and UT rather than San Jacinto where the new Expo Center Line will operate. Even if sustaining route 20's high frequency status is the ultimate decision, delaying decisions on service changes until after Rapid routes are fully operational is an admirable approach to ensure the right analysis takes place that fully illustrates the complex needs of CapMetro customers.

Optimizing Transfers

While transfers within a greater network are more efficient from an operations perspective, they are often viewed unfavorably by riders. Sometimes described as a "transfer penalty," encouraging riders to get off their bus and wait for another mode like light rail in a potentially unfamiliar part of town can sometimes be a challenging imposition. Thankfully, the 10 minute frequencies planned for CapMetro Rapid reduce this burden, as riders will only have to wait an average of 5 minutes for their connecting bus. To further minimize the inconvenience associated with transferring, bus bays and rail platforms should be designed to be as close together as possible at these transfer points. Additionally, clear wayfinding measures, including signage directing riders to their next mode and live departure boards displaying bus and rail arrivals together, are widely used worldwide to make complex networks more understandable (Hu & Xu, 2022). These strategies should be considered at key locations, especially where the Pleasant Valley Line will intersect light rail on Riverside Drive. CapMetro and the Austin Transit Partnership must collaborate with one another to ensure future light rail and existing bus services are integrated properly. Prioritizing convenience and clarity in the design of these transfer points can allow for a more seamless and rider-friendly transit experience.

While connections between light rail and CapMetro Rapid are key, integrating the new Rapid lines with the already existing bus network and Pickup zones is equally important to maximize ridership. Both the 801 and 803 have seen several infill stations added post-launch which have improved connections with other routes. For example, a new station at Stassney Lane was constructed in 2023 on the 801, creating a better connection between the Rapid route and route 311, an important crosstown route operating every 15 minutes on weekdays (City of Austin, 2023a). While both Rapid routes have most of their stations strategically at the intersections of other bus routes to encourage transfers, there are notable gaps in connectivity. CapMetro made the right choice by adding the Oak Springs station to the Pleasant Valley Line to foster connections to frequent route 2, an improvement not originally included in the FTA grant (Federal Transit Administration, 2021) . However, additional infill stations could be built. For example, the Expo Center Line will not have a station at Loyola Lane, making connections to frequent route 337 more difficult. The Pleasant Valley Line will also not have stations for over a mile on Airport Boulevard. Adding stations at the intersections of 12th Street and at MLK Jr. Boulevard, two significant Eastside corridors, would better sustain transfers to two important bus routes serving Downtown (see

Fig. 5). Additionally, a potential Rapid station at MLK Jr. Boulevard would allow for a better link to the MLK Jr. Red Line station located less than a 10 minute walk away. These connections would strengthen the overall network's cohesiveness, improve ridership, and simplify the overall transit experience for riders.

The structure of an agency's fares can also have a huge impact on ridership and travel trends. While Austin has one of the lowest single ride fares in the country at just $1.25, the agency treats a trip that requires changing buses as two separate rides, a practice most peer agencies have abandoned (Walker, 2014). While those making a return trip benefit from CapMetro's $2.50 day pass, those making a single trip are charged for changing between buses. Despite the shift to a high-frequency grid-like bus network, the fare structure has not adapted to support seamless transfers. Riders already face inconvenience when transferring between services, and charging double for trips that require a change undermines the goal of creating an interconnected system where all routes function together. For example, once light rail is operational, the fastest trip between Dove Springs and Downtown might require a transfer between the Pleasant Valley Line and light rail. Despite this, lower income riders more sensitive to price may opt to take the slower, less convenient local Route 7, which would only cost $1.25, rather than paying $2.50 for the faster, more efficient option in which a transfer is involved.

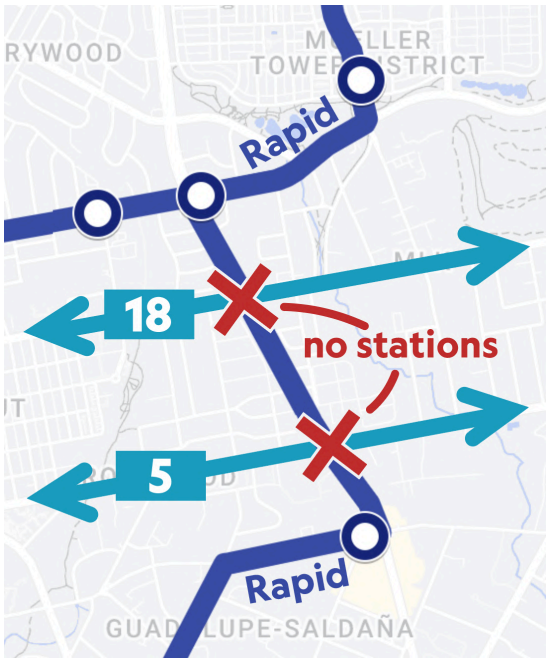

Figure 5: Missed connections along Airport Boulevard (Behmer, 2024)

Ridership Projections

High frequencies, enhanced stations, bus-only lanes, transit signal priority, and numerous other features make CapMetro Rapid a faster, more reliable, and convenient service than a traditional bus. These upgrades have the potential to significantly boost ridership across the CapMetro network. The investments made into the Pleasant Valley and Expo Center Lines will significantly improve trips for those who rely on public transit as their only option, but also have the possibility to attract "choice" riders, who might own a car but are looking for a more environmentally conscious and convenient way to travel.

Evidence from other cities which have implemented similar schemes supports this potential. Traditional routes which were replaced with "RapidRide," Seattle's comparable service, experienced a 35% increase in ridership from 2010 to 2013 compared to regular routes that maintained conventional bus service (Stewart, Moudon, & Saelens, 2017). Additionally, once light rail opens in Austin, and if CapMetro Rapid is integrated successfully, ridership will likely increase even more, particularly on the more circumferential Pleasant Valley Line. A comparable case is the opening of Seattle's Lynnwood Link Extension, which extended light rail service into Snohomish County in 2024. Following its opening, three BRT lines similar to CapMetro Rapid experienced dramatic ridership increases, with the Orange Line, which directly connects to light rail, seeing a 36% increase in ridership (Packer, 2024). While ridership on Austin's new Rapid routes might be slow to grow at first due to the initial launch of 20 minute frequencies, similar increases in ridership, as seen in other cities, can be expected once full service is rolled out in 2026.

New Housing

A potential benefit that might arise from the speed, convenience, and reliability of the Pleasant Valley and Expo Center Lines is new transit oriented development along both alignments. Austin City Council is leading the nation in implementing pro-housing reforms to the existing city code, facilitating new construction of much needed housing, both affordable and market rate across the city. Notably, Austin has become the largest U.S. city to eliminate parking minimums citywide, a move that could allow for increased density and better integration of the city's businesses with pedestrians, cyclists, and transit users (Fechter, 2023). While the full impact of these changes is yet to be seen, new Rapid routes which offer greater convenience than traditional bus routes and the possibility to travel without a car could incentivize developers to build a more connected and accessible urban environment with significantly less parking.

The City of Austin's recognition of the necessity to plan housing and transportation together marks a critical shift in preparing for sustainable growth. Following the passage of Project Connect, local leaders have been diligently developing the Equitable Transit Oriented Development Policy Plan, or "ETOD," which seeks to create mixed-use, high density neighborhoods along public transit corridors like CapMetro Rapid, in order to efficiently house the thousands of new residents expected to come to the region over the next few decades. Understanding the complex history of top down policy approaches in the city's past, the plan also seeks to ensure historically marginalized and lower income residents do not miss out on future growth. Areas in which unregulated development could lead to displacement are particularly dense in East Austin, where much of the Pleasant Valley and Expo Center Lines operate (see Fig. 6). In these areas, certain policies and tools are outlined which can ensure more sensitive development that protects low income residents and communities of color (City of Austin, 2023).

The criticism of past transit oriented development, or "TOD" projects in the past highlights this challenge of balancing growth with affordability as well as the needs of existing residents. In the case of the Plaza Saltillo TOD, the developer received only enough tax credits to construct 15% of the 800 units to be affordable, leaving a majority of the development out of reach for lower income residents who had long lived in the area (Asch, 2022). While constructing hundreds of new market rate housing units is necessary to bring down average rents, benefits for lower income residents often take a few years to materialize (Mast, 2019). This delay is particularly concerning when the demand for housing in Austin is

high. The “E” in ETOD, which stands for “equitable,” was incorporated in response to previous feedback and will be essential to ensure everyone will be included as Austin moves forward with more transit oriented growth.

The city should also be careful in its consideration of BRT and the development potential associated with different transit modes. While more advanced systems like light rail tend to spur private development along their corridors, an analysis of aBRT in Minneapolis, a service similar to CapMetro Rapid, found that the impact of BRT systems with fewer priority features can be more variable (Guthrie & Fan, 2016). As such, Austin must be cautious in permitting new development around Rapid stations, ensuring these projects truly meet the needs of transit users and provide affordable options. By aligning important transit investments like the Pleasant Valley and Expo Center Lines with the needs of both future and existing residents, Austin can avoid past mistakes and ensure that transit and housing growth benefits all communities.

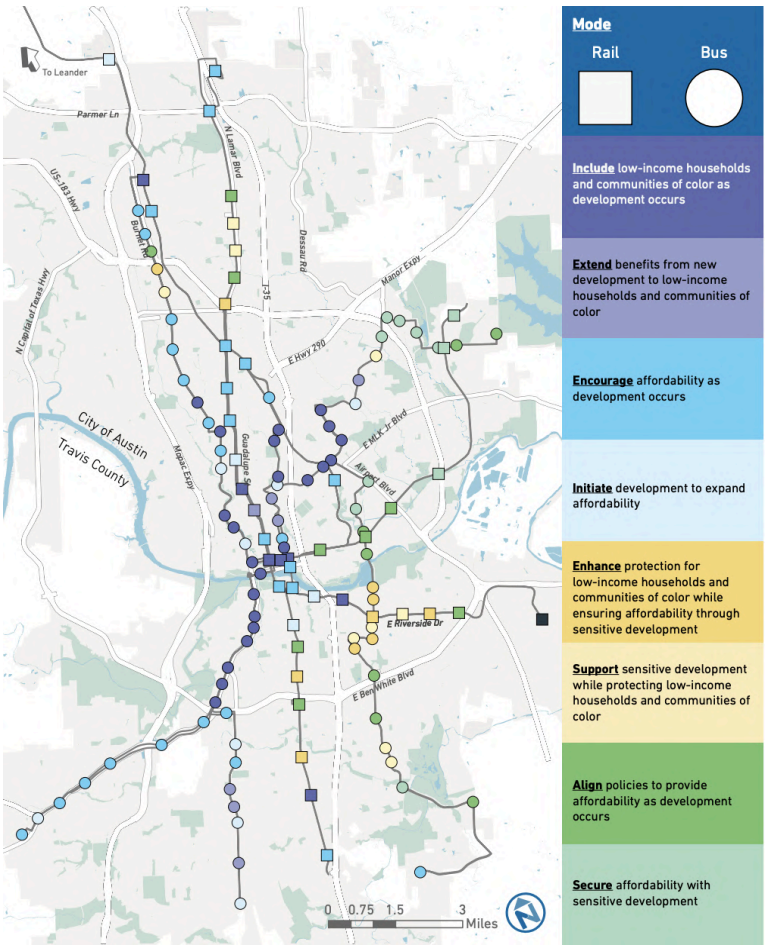

Figure 6: Station Typologies outlined in the ETOD Policy Plan (City of Austin, 2023)

An All Electric Fleet

Creating a fast, reliable, and convenient transit network that can compete with driving is a cornerstone of Project Connect, alongside the ambitious goal of transitioning CapMetro's entire bus fleet to be fully zero-emissions. While the choice to travel via diesel bus rather than driving already significantly lowers one's carbon footprint by an estimated 33 percent (Hodges, 2010), more can be done to create a sustainable and environmentally friendly choice for commuters. Transportation is the largest source of carbon emissions in the United States, with urban areas particularly susceptible to adverse health risks associated with poor air quality. Battery electric buses produce zero tailpipe emissions, which dramatically reduces greenhouse gas emissions and can improve local air quality. Additionally, electric buses produce significantly less noise than their diesel counterparts, which would help to alleviate noise pollution along busy corridors and in residential areas (Martinez & Samaras, 2024). Transitioning to an all electric fleet would not only advance Austin's broader climate goals, but improve the livability and health of the city for all residents.

In 2021, the agency approved the largest electric vehicle procurement in the nation, with over 200 electric buses to be delivered in time for the opening of the Pleasant Valley and Expo Lines. However, there have been significant setbacks. Electric buses, though a promising and environmentally friendly technology, were found to be far less reliable than diesel buses. The newness of this technology has created challenges in acquiring parts and conducting repairs, meaning many of the agency's newly purchased electric buses idle in the yard instead of picking up passengers. Additionally, due to shorter than expected battery life, electric buses must be taken out of service midday in order to charge. The Texas Transportation Institute found that because of this, electric buses were only able to cover 36 percent of the agency's bus schedules, as they typically operate for about 8 to 10 hours a day before requiring recharging (Bernier, 2024). While CapMetro is ahead of the curve in acquiring green technologies, and making ambitious strides compared to peer agencies, these challenges highlight the growing pains of adopting electric buses while emphasizing a broader need for continued improvements in technology and infrastructure to support their integration.

Unfortunately, CapMetro does not have enough electric buses to operate both the Pleasant Valley and Expo Center Lines with a fully electric fleet on opening day despite previous promises. Before battery electric buses are delivered and used on the Rapid routes, the agency must test them out individually on a variety of different routes to ensure

dependability before committing to a fully electric fleet on two high frequency Rapid routes. Each bus also has an expected battery life of around 8 to 10 hours, meaning recharging is required midday. Construction of the two parks and rides which have essential charging equipment (see Fig. 7) are currently behind schedule, meaning diesel buses will terminate at temporary stops for the time being. Instead of delaying service any further, CapMetro has thus chosen to operate the Pleasant Valley and Expo Center Lines, two essential pieces of transit infrastructure, with diesel buses at 20 minute frequencies during most of the day and 30 minute frequencies in the evenings. The agency simply does not have enough buses to operate at 10 minute frequencies even with diesel buses. A goal of full electric service with full 10 minute frequencies as initially promised is set for 2026 (CapMetro Rapid FAQ 2024). While these delays and setbacks are incredibly unfortunate, less service now is better than no service at all, and this approach ensures critical pieces of transit infrastructure become operational, laying the groundwork for improved transit connectivity across the region.

Figure 7: Existing overhead charging station in Providence, Rhode Island to charge the state's first fleet of battery electric buses (Reed, 2024)

Recommendations and Conclusion

Moving forward, once the Pleasant Valley and Expo Center Lines are fully launched with 10 minute frequencies and with an all electric bus fleet, there will be significant opportunities to sustain and grow ridership even further. While bus-only lanes on San Jacinto and Trinity Streets are important in increasing reliability Downtown, constructing more transit priority lanes where congestion is particularly bad could be very helpful, leading to more competitive travel times and a more dependable transit network. Following recommendations outlined in the Transit Infrastructure Enhancement Report (City of Austin, 2023b) and constructing new bus lanes on Pleasant Valley Drive, Dean Keeton Street, as well as other locations, would improve the reliability and competitiveness of the rapid routes even more.

Strengthening the degree of transit signal priority offered to Rapid buses and fostering a shared mission between CapMetro and the City of Austin to prioritize transit riders on busy corridors could also significantly improve speeds and reliability of service. Exploring the potential for more advanced preemption technology at every signal, rather than only extending a green light or shortening a red light for buses behind schedule presents an opportunity for even greater efficiency. Other technologies, like queue jumps, have already been incorporated at three other sites in Austin and could also be effective. This strategy improves reliability by incorporating a short bus lane at the near side of a signalized intersection in which a bus-only signal gives transit vehicles a green light to enter the intersection before general traffic (National Association of City Transportation Officials, 2016). Incorporating more aggressive signal technology and priority treatments at particular locations could enable MetroRapid buses to maintain quicker and more consistent travel times, positioning public transit as a more attractive option for choice riders who might otherwise solely rely on personal vehicles. More competitive transit travel times and a sustained mode shift away from driving is only possible if CapMetro and the City of Austin must agree on the necessity to improve the experience of transit riders in Austin and work jointly to achieve these goals.

As elements of Project Connect become operational over the next decade and Transit Plan 2035 develops, ensuring cohesiveness between the two Rapid routes and the rest of the CapMetro network is also essential to fostering high ridership. Both routes will function as central spines within the greater network and their effectiveness depends on smooth, efficient transfers to other services. An incredibly important element of this integration will be the

future transfer station where the Pleasant Valley Line will meet light rail along Riverside Drive. A collaborative relationship between CapMetro and the Austin Transit Partnership will ensure the station is designed with transfers in mind, through intuitive wayfinding, clear signage, and co-locating the bus and rail services. Strategic infill stations along the Pleasant Valley Line on Airport Boulevard, particularly at 12th Street and MLK Jr Blvd, represent another opportunity to strengthen the network particularly on the Eastside. Additionally, CapMetro's decision to delay changes to underlying routes when the new MetroRapid lines launch in the Spring is a prudent strategy and will allow a thorough assessment of rider behavior, particularly on route 20, before making adjustments. Lastly, assessing the agency's fare structure, which charges for transfers between services for single trips, could be pivotal in the success of Austin's high-frequency transit grid moving forward.

Ultimately, a well integrated and successful transit network relies on a strong collaboration between CapMetro, the City of Austin, and the Austin Transit Partnership. Both the Pleasant Valley and Expo Center Lines mark a transformative first step in Austin's growing transit network, offering much needed mobility investments as well as the potential for dense, affordable new housing. These critical rapid transit lines connecting Austin's Eastside with the broader region are a small piece of the $7.1 billion dollar investments included in Project Connect, and mark the beginning of a city wide effort to redefine public transportation in the area. Building on the success of the Rapid 801 and 803, CapMetro has raised the bar with an improved rider experience and the eventual rollout of a fully electric bus fleet, offering a greener, more comfortable way to move through a rapidly growing city. These routes lay the foundation for a transit network that can adapt to Austin's growing needs and improve travel for communities across the city.

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