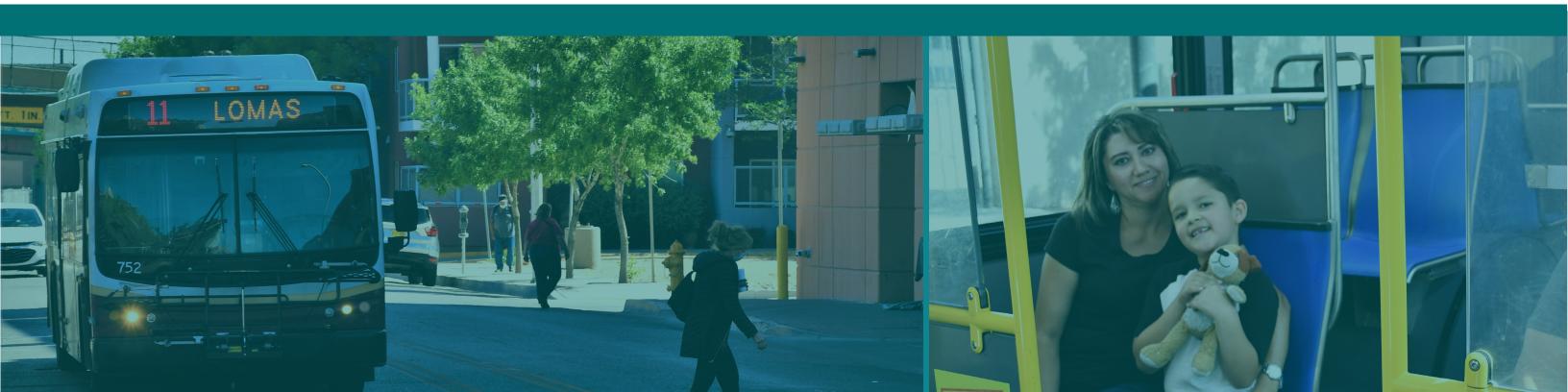
# Transit Existing Conditions Report August 2022



Prepared for the City of Albuquerque



# TABLE OF CONTENTS

What is <b>ABQ RIDE Forward</b> ?	
Summary of Observations	8
Key Questions	1
Next Steps	1
2 Introduction	1
Transit Goals	2
Transit Access: Expanding Where People Can Go	2
Map of the Albuquerque Transit Network	2
Hours and Days of Service	2
Key Transit Planning Choices	3
3 Transit Market and Need Assessment	3
Residential Density	3
Job Density	3
Activity Density	3
Walkability	3
Zero-Vehicle Households	3
Low-Income Residents	3
Senior Residents	4
Young Residents	4
Socially-Vulnerable Residents	4
Race and Ethnicity	4
Transit Access and the Built Environment	4
Examples: Density and Walkability	4
Examples: Linearity	4
Senior Residents  Young Residents  Socially-Vulnerable Residents	4 4 4

	Examples: Walkability	. 47
	Examples: Proximity	. 48
4	Network and Route Performance	.49
	The Transit Network through the Day and Week	. 50
	Where Are People Riding Today?	. 52
	Ridership and Productivity by Route	. 53
	Productivity by Time of Day and Day of Week	. 54
	Productivity and Frequency Relate	. 55
	Productivity and Linearity	. 56
	Linear Route Shapes	. 57
	Circuitous Route Shapes	. 59
	Rush-Hour and One-Way Service	. 60
	Can On-Demand Service Help?	. 62
5	Recent Changes	.64
	Zero Fares Pilot Program	. 65
	Transit Worker Shortages	. 66
	Recent Network Changes	. 67
	Reduced Frequencies	. 69
	Changes in Productivity	. 70
	2022 On-Board Rider Survey	. 71
7	Network Design Considerations	.76
	Radial and Grid Networks	. 77
	ART and Local Service Design	. 79
6	Outcomes	.82
	City-Wide Job Access by Transit	



Proximity to Transit	86
Residents Without Nearby Service	9
Next Steps in ABQ RIDE Forward	92

# 1 Summary

### What is ABQ RIDE Forward?

ABQ RIDE Forward is a review of the purpose and performance of Albuquerque's bus network to plan for improvements to the network.

This is a collaborative planning effort among the City, Rio Metro, Bernalillo County, transit stakeholders and members of the community to decide the goals and purposes of the City's investment in public transit. This will inform future decisions about where bus routes go, at what times they run, and how frequently.

ABO RIDE Forward will include:

- Consultation of residents, workers, transit riders and advocates about how the City should make choices and prioritize service in the future.
- Planning for potential future growth of the Albuquerque transit network.
- Guidance for the City and its partners about how development, street management and growth can be shaped so that providing transit is less costly and more successful.

#### **Transit's Many Goals**

Public transit can serve many goals, but different people and communities value these goals differently. Understanding which goals matter most in the region is a key step in designing future ABQ RIDE service.

Possible goals for transit include:



**Economic**: Transit can give businesses access to more workers, and workers access to more jobs, and give students more access to education and training.



**Congestion**: Transit can allow for continued economic growth beyond what congestion would limit. High transit ridership can also reduce some of the local environmental impacts of cars, such as noise, air pollution, death, injury and heat.



**Climate**: High transit use can reduce greenhouse gas emissions.



Social: Transit can meet the needs of people who are in situations of disadvantage, providing access to services and jobs. It can also promote equity and inclusion across a diverse society.



**Health**: Transit can support physical activity by walking and biking. It can also improve health by bringing health care, services and food within reach for disadvantaged people.



**Personal Liberty**: By providing people the ability to reach more places, transit can be a tool for personal liberty, empowering people to make choices and pursue their own goals.

Some of these goals are only served if many people use transit. For example, transit can only mitigate congestion and pollution if many people ride the bus rather than drive. These are "Ridership Goals," because a community only makes progress towards them if ridership is high.

Other goals are served by the simple availability of transit. A bus route through a neighborhood provides residents insurance against isolation. A route may fulfill political or social obligations, for example by getting service close to every taxpayer or into every district. A route may serve a small number of people, but deliver huge benefits in their lives. None of these routes are attracting high ridership, but high ridership isn't transit's only goal.

#### **Transit and City Life**

A broadly-useful, reliable transit network underlies the success of every urban city. Urban areas are by definition places where people get close to each other, in order to do business, socialize, educate themselves and share knowledge. Every successful urban place bumps up against physical limitations on how many people can get close to one another if they move around in small vehicles:

- Road space limitations. The width of most roads and freeways is fixed. Making them wider would require demolishing parts of the city they are supposed to be serving.
- Parking limitations. Places to store private cars and hired cars when they are not in use are costly, compared to the other ways land can be used in a city.
- Intensification of land use. As demand for land goes up in Albuquerque, the pressure to use space inside the city efficiently will go

More and more people are competing for a limited amount of road space. If they are all in cars, there will come a point when they simply do not fit in the space available. The result will be severe congestion, which cuts people off from opportunity, undermines happiness, and stifles economic growth.

The photos below illustrate how transit uses exponentially less space than cars. Even autonomous cars will take up almost the same amount of space as self-driven cars. Carpools that carry three to four persons per car are marginally helpful but do not approach the space efficiency of people walking, cycling or riding transit.

#### Transit and the Climate

The threats posed to ourselves and our children by a violently-changing climate have become clearer with every passing year, and are particularly vivid in New Mexico in 2022.

For many people, an important purpose of transit is reducing the use of cars in order to reduce our use of fossil fuels, energy, heavy metals and other resources. This is not possible in rural and exurban areas, where the vast dispersal of homes and activities just doesn't work for transit, but it may be possible in cities like Albuquerque.





Big, shared vehicles use vastly less space to move people around than do small vehicles.

#### What is a Transit System?

No single transit line or project can, by itself, transform a city. Transit in cities is often referred to as a "system" because it is a combination of many parts, working together.

The graphic at right describes what makes a transit system. In Albuquerque, the system is made of:

- Local buses
- Rapid buses, called "ART" for Albuquerque Rapid Transit, or more generally "BRT" for Bus Rapid Transit, and
- Commuter trains, called "New Mexico Rail Runner Express." This service is operated by Rio Metro Regional Transit District and will not be included in this review.

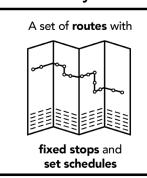
The Albuquerque transit lines don't, at present, work very well as a *network*, for reasons we'll explain in this report. However, some lines are very heavily-used on their own by large numbers of people.

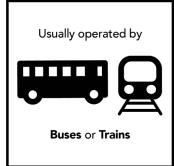
#### Why Focus on the Bus Network?

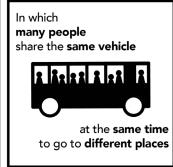
This planning effort is heavily focused on *network* design. Transit network design addresses where routes are operated, how frequently they run, during what hours and days, and - crucially - how they connect with one another.

Every successful transit system is made largely of bus service. Bus service is less expensive to operate, faster to deploy, and easier to expand than other capital-intensive transit technologies like trains, trolleys or even BRT. Bus networks are the major part of transit systems in even the biggest American cities like Chicago, San

#### A transit system is...

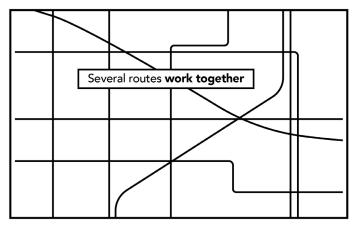


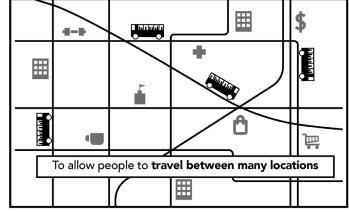






#### A transit network forms when...





Francisco or New York, to say nothing of global metropolises like Mexico City, Tokyo or Paris. And most of the transit trips within those cities are made by bus, not rail.

Successful capital-intensive transit lines like BRT, light rail or commuter rail almost always follow on the heels of successful bus lines. Bus service allows a city to grow around transit, shaping development, the economy and people's habits.

Big buses are much more space efficient than small-vehicle services like dial-a-ride or pooled Uber and Lyft rides. In suburban areas, getting two or three people to share a vehicle for their trips can be an improvement over having them drive alone. But in busy cities like Albuquerque, fleets of small shared vehicles just can't rival the space and cost efficiency of big transit vehicles.

Network design is not the only important aspect of transit planning. Other factors affect the usefulness and success of a transit system, such as reliability, safety, vehicle quality, transit fares, car parking prices, and many other factors that are within and beyond the control of the City.

This project and the public conversations that are part of it will intentionally be focused on network design: where and when bus service runs, how it connects to form a network, and how the success of that network should be measured.

#### **Fallen Ridership and Transit Worker Shortages**

Like every other U.S. city, Albuquerque has experienced two major effects from the Covid pandemic.

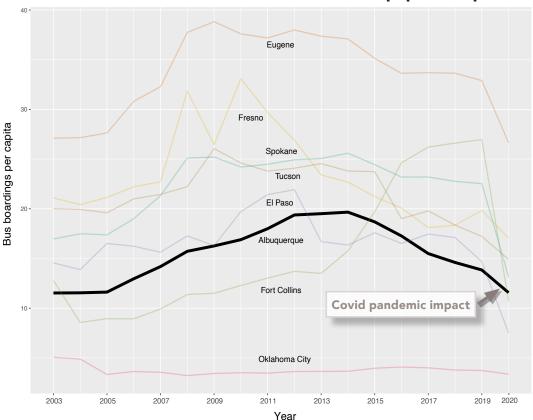
Ridership has fallen steeply since 2019, as some workers started working from home, and some people started avoiding transit to avoid sharing air with other people. Also, most U.S. cities had a gradual decline in transit ridership from about 2014 to the start of the pandemic, as did Albuquerque. These trends are visible in the two graphs at right, which show ridership per capita (at left) and transit investment per capita (at right) for Albuquerque and peer cities.1

In the past year, a severe shortage of transit workers has made it hard for the City to staff all of its routes fully. This means that only 81% of the service that the City can afford to run is currently provided on the transit network.

In addition, ABQ RIDE is now so short on substitute drivers that, anytime a regular driver calls in sick, a bus simply can't leave the garage to provide scheduled service. This bus is missing from the route all throughout the day, and people find that their scheduled bus simply doesn't **show up**. In effect, the City is running even less than 81% of its pre-pandemic service, but these additional no-show cuts are random, unplanned and unannounced, every day.

The poorer frequencies, shorter hours of service, suspended routes and no-show buses are likely to have a long-term effect on transit ridership in the city, since people have to find an alternative way to make their trips right now.

#### Transit Relevance: Annual Ridership per Capita

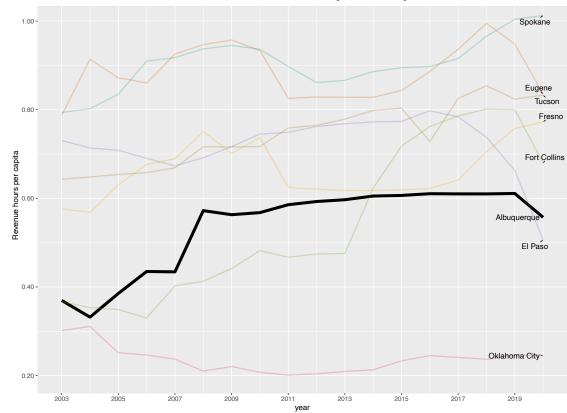


These lines show bus ridership relative to population in eight cities, including Albuquerque, from 2003 through the first year of the Covid pandemic. As in most of these cities, Albuquerque's bus ridership grew steadily until 2014 and then declined, with a precipitous fall due to the pandemic.

This worker shortage is not limited to the transit function of the City, nor is it limited to government – private businesses are also struggling to hire and retain drivers and other staff, and it's not just an issue in Albuquerque.

Most U.S. transit agencies can't staff all of their routes - 71% report reducing service below what they can afford to run due to a lack of workers<sup>2</sup>.

#### Transit Investment per Capita



These lines show transit investment in terms of revenue hours, relative to population in eight cities, including Albuquerque, from 2003 through the first year of the Covid pandemic. Albuquerque's revenue hours per capita grew until 2008, then stayed about the same until 2020, with the pandemic causing a decline in investment.

At the same time, labor shortages in other industries are increasing the pressure to make the transit network useful to a larger number of workers. Requiring a car in order to reach a job reduces the number of people who can work our most essential jobs.

All of the trade-offs that usually exist in transit planning and operating decisions are made more difficult and urgent by the labor shortage.

<sup>1</sup> While no two cities are truly alike, these peer cities were chosen for comparison because of similarities in their size, density, sprawl, climate, culture, major universities, and BRT or LRT lines.

<sup>2</sup> For recent insights into labor shortages, see "Bus Operators in Crisis" by TransitCenter and "Where Have All the Workers Gone?" by the National Bureau of Economic Research.

### **Summary of Observations**

#### No "Low-Hanging Fruit"

There is no "low-hanging fruit" in a redesign of the ABQ RIDE network. There is very little duplication or inefficiency in the existing network, which means there is little that could be reallocated into more beneficial services.

To the contrary, the bus network is very thin, providing mostly poor frequencies across a large population and a large area. Improving frequencies, hours of service or coverage in any particular place would require cutting service elsewhere.

**Development and Land Use Limit Transit's Success** 

Transit success in Albuquerque is enormously affected by development, land use and street design – which are not planned or decided by the City's transit department, ABQ RIDE. Five key factors are shown at right: density, walkability, linearity, proximity and mix of uses.

The way the city is planned and developed has a big effect on:

- The cost to get transit service close to people.
- The affordability of making that service frequent, and running it all day or all week.
- The number of people who can easily walk to transit.
- How useful the transit network is for many people's trips.

ABQ RIDE can make changes to the bus network, and those changes could show reasonably good results. But much more change will be possible with the collaboration of agencies who control development, land use and streets.

Albuquerque implemented a new zoning code in May 2018 that enhanced development opportunities along transit corridors and in activity centers in terms of increased density, lowered parking requirements, and allowing a mix of uses in formerly commercial zones.

An update to the Development Process Manual introduced different development contexts into the City's street design and requires shorter and better connected blocks in designated centers and corridors.

**DENSITY** How many people, jobs, and activities are near each potential transit stop?



Many people and jobs are within walking distance of transit.



Fewer people and jobs are within walking distance of transit.

**WALKABILITY** Is it possible to walk between the stop and the activities around it?



The dot at the center of these circles is a transit stop, while the circle is a 1/4 mile radius.



The whole area is within 1/4 mile, but only the blackshaded streets are within a 1/4 mile walk.



It must also be safe to cross the street at a stop. You usually need the stops on both sides for two-way travel!

**LINEARITY** Can transit run in reasonably straight lines?



A logical transit line is a direct path between any two destinations on it.



**PROXIMITY** Does transit have to traverse long gaps?

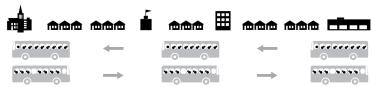


Short distances between many destinations are faster and cheaper to serve.

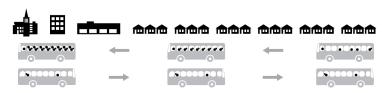


Long distances between destinations means a higher cost per passenger.

**MIX OF USES** Do people travel in both directions, all day?



A mix of land uses means buses are ridden in both directions, more times of the day and week.



Transit serving purely residential areas tends to be full in one direction, but empty in the other.

#### A Frequent Grid...without the Frequency

The Albuquerque bus network is mostly designed as a grid, with routes running for long distances either east-west or north-south.

A grid can be a very successful network design, especially in cities that have continuous density over a large area. A grid allows people to go from anywhere, to anywhere else, with one single transfer, while keeping the network very simple and understandable. This is illustrated on the next page.

But a grid transit network depends on high **frequency**. High frequency makes waits for buses short, and that is what makes transfers easy. Transfers are what allow the network to be simple and affordable, with just one route on each road.1

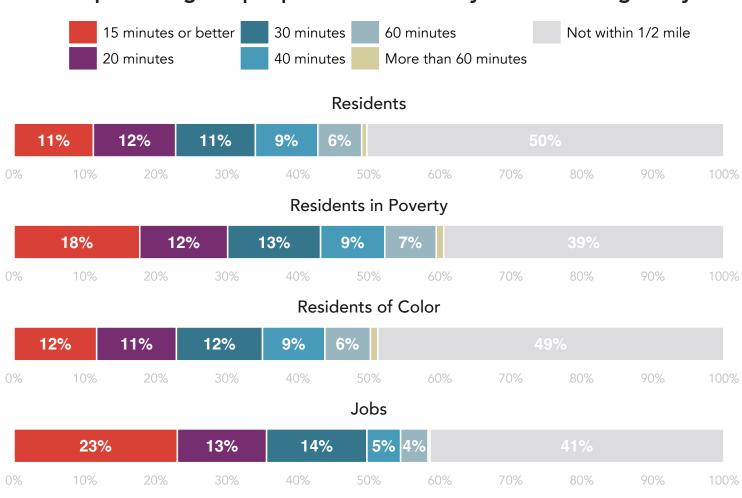
In Albuquerque, the network is shaped like a grid, but it lacks high frequency. Only a handful of routes come every 20 minutes or better, and some routes come only once per hour, or worse.

The ABQ RIDE bus network **spreads service so** thinly across the city that trips between many points on the transit network require a transfer with a very long wait. Most people will find such long waits intolerable.

The bar charts at right describe the percentage of residents who are near any kind of transit service, and who are near frequent service, all-day on a weekday. (In this case, "near" is defined as less than 1/2 mile walk from a bus stop.)

11% of residents and 23% of jobs are near routes coming every 15 minutes or better (shown in red), all-day on a weekday. Proximity to frequent

#### What percentage of people are near midday transit coming every...



service is much better for people living in poverty, and slightly better for minority residents<sup>2</sup>, compared to all residents.

The maps on the next page focus on the frequent network - routes coming every 15 minutes or better, all day. Albuquerque's minimal frequent network can be compared with two somewhat larger urban areas, Tucson and Salt Lake City.

Both Tucson and Salt Lake City share Albuquerque's sprawling, low-density

development pattern. Tucson has about 10% more people than Albuquerque, but has a vastly richer frequent network. Salt Lake City has about 40% more people, but has much more frequent service than that.3 All three have rapid transit lines that serve as a backbone of the transit system, and all three have highly-gridded road and transit networks.

#### A Small Frequent Network... but in the Right Places

Only three roads in the ABQ RIDE network have high frequency transit, all-day, as shown on the next page.

Given how little of the city is covered by frequent service, the fact that 11% of all residents, 18% of residents in poverty, and 23% of jobs are within a 1/2 mile walk of frequent service is surprisingly high!

This arises from where, exactly, the frequent service has been put:

- It serves areas that are dense with residents and jobs (including low-income residents and low-wage jobs).
- These dense areas are on linear corridors which means they can be connected efficiently with straight routes.
- These dense areas are close to each other, so buses don't have to drive far to serve all those residents and jobs.

Focusing frequent service on these roads has allowed the City to get frequent service close to a large number of people, for quite a modest operating budget.

Not only is there frequent service near people on these corridors - people are actually using it, post-pandemic, at the highest rates of any routes in the ABQ RIDE system.

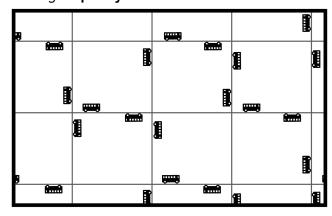
<sup>1</sup> It is impossible to time bus routes on a grid so that buses meet each other at every intersection, in both directions, every time.

<sup>2</sup> In this report, "minority" is used according to its national definition, and includes Latino or Hispanic people, who are in fact the majority within Albuquerque.

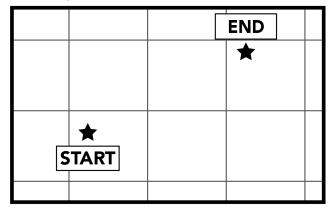
<sup>3</sup> Salt Lake City is included on the next page because its geography is so similar to that of Albuquerque and Tucson. But it is different in other ways, which is why it isn't among Albuquerque's peer cities in the graphs on page 7.

#### How Frequent Grids Work

A frequent grid consists of perpendicular lines all running frequently.

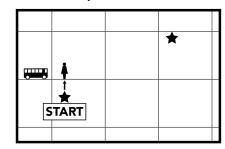


A grid serves trips from anywhere to anywhere. For example:



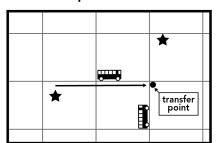
For any trip...

1. Walk and Wait\* for the first bus. \*The wait is **short** because service is frequent.



2. Ride and Wait\* for the first bus. \*The wait is **short** because

service is frequent.



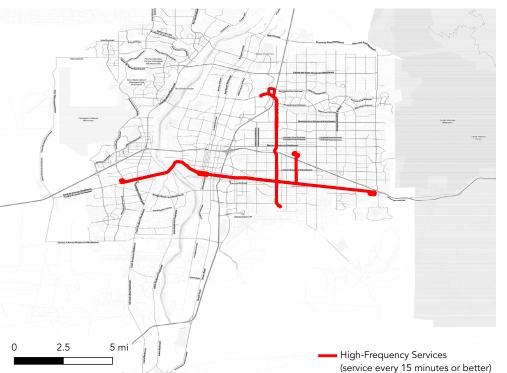
3. Ride and Walk to the destination. You've arrived!

**END** 秀★

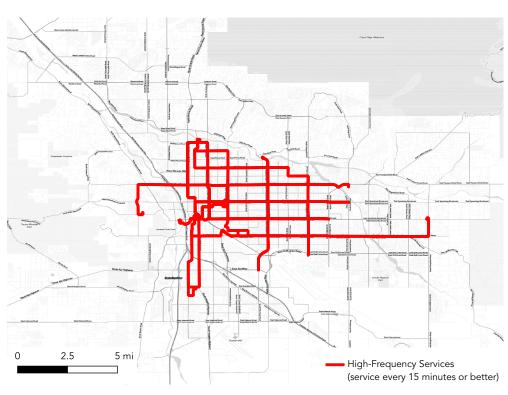
The high frequency is critical.

It makes the transfer fast, so that the whole travel time is reasonable.

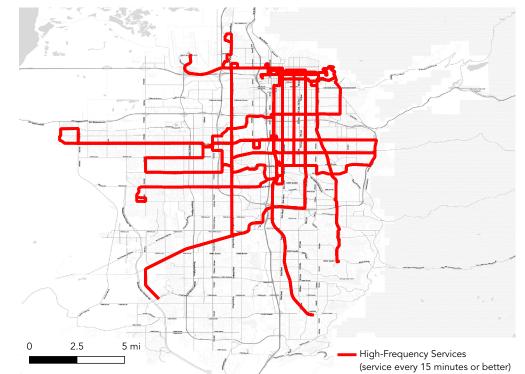
# Albuquerque



#### Tucson



### Salt Lake City



# High Ridership and High Frequency Relate

Both 2019 and 2022 data from the ABQ RIDE network show a strong relationship between the frequency of a route and the ridership on that route.

In recent years the City has prioritized maintaining frequent service on the routes that serve the most people. Additional improvements to reliability, speed, hours of service and days of service were made by adding ART (Albuquerque Rapid Transit) on Central Avenue where the most people were already riding local transit.

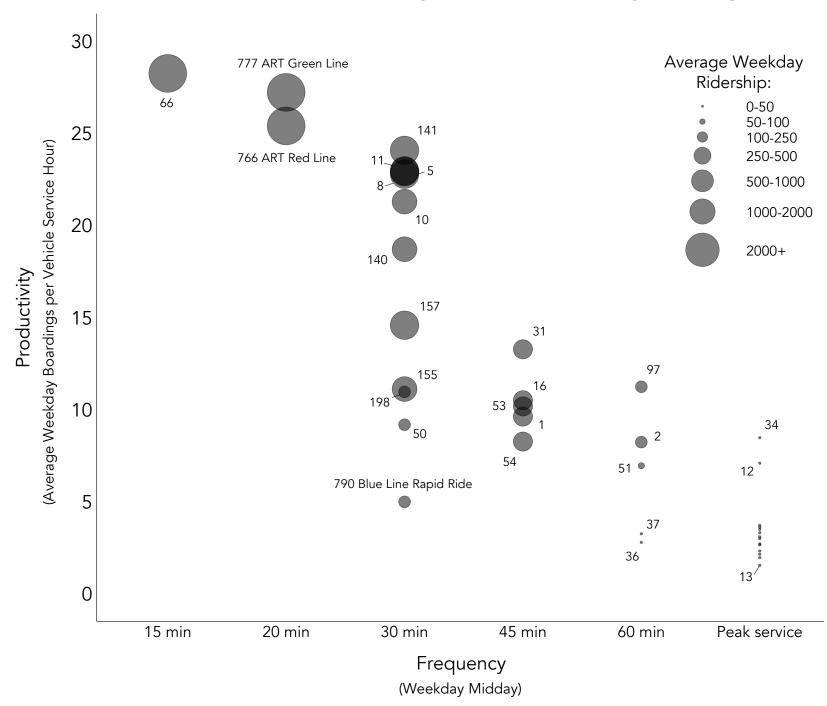
People's response to frequency improvements, on both ART and local bus routes, has been strong. The most frequent routes in the system aren't only used by the most people in total, they are also the most efficient, moving the most people relative to the amount of service provided: Route 66, the ART Green Line, the ART Red Line, and Routes 141 and 140 (which combine to offer high frequency).

The scatterplot at right shows this relationship. Each dot is a route, and it is plotted based on its frequency (on the horizontal axis) and its ridership relative to service level, or "productivity" (on the vertical axis). The most frequent routes are the most productive. The most productive routes are the most frequent.

The relationship between high frequency and high ridership is well-established all over the world, and strong in Albuquerque. If the City wants to make its network more useful to more people, and increase transit ridership, investing in frequency will be a key strategy.

However, an open question is whether increasing ridership is the top priority for Albuquerque, or whether other goals are more important.

#### ABQRide Route Frequency and Productivity, Spring 2022



This scatterplot shows each route in the ABQ RIDE network as a dot, plotted according to its frequency and the number of boardings it attracts per vehicle, per hour ("productivity"). More frequent routes are more productive.

## Ridership and Service Peak at Different Times

Through the hours of a typical weekday, Albuquerque bus service "peaks" between 6:00 and 8:00 am and again between 3:00 and 6:00 pm, when white-collar workers traditionally commute.

There is about 20% more bus service offered during rush hours than in the middle of the day. Ridership, on the other hand, is fairly low during the morning rush hour, and peaks from about 1:00 to 3:00 pm.

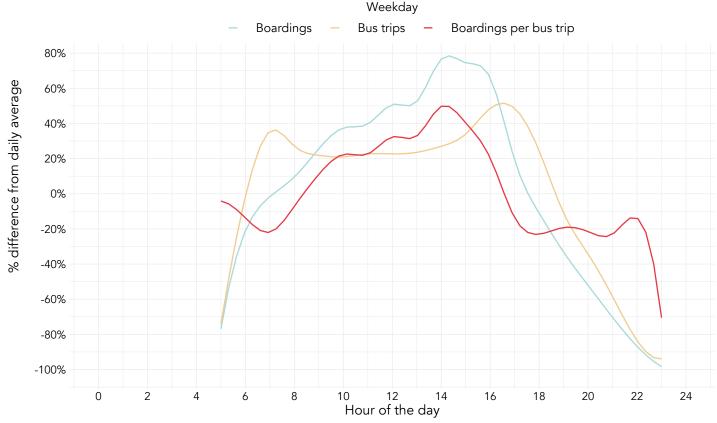
In the graph at right,

- The **Blue Line** represents boardings.
- The Yellow Line shows bus trips, which approximates the quantity of service being put out by the City in each hour. You can see the yellow line has two humps, when some rush-hour-only routes operate and when other routes have increased frequencies or added distance to peak-only destinations.
- The Red Line is a measure of productivity in each hour – the boardings divided by the number of bus trips provided in each hour.

## The bus network is most productive, and most crowded, in the midday – *not* during rush hours.

This mismatch in peaks predates the pandemic, as many U.S. cities have found their rush hour ridership falling and their midday (and weekend) ridership growing over the past 20 years. In Albuquerque, office commuters fell as some office jobs moved from Downtown to the North I-25/Jefferson corridor and other places that are more difficult to serve with transit than Downtown. But it has likely been made more severe by the pandemic, as some people who

#### ABQ Service and Ridership - 2022



Boardings on the ABQ RIDE system are fairly low during the morning rush hour, and peak in the early afternoon. In contrast, service peaks during morning and evening rush hours. This was true before the Covid pandemic and the contrast has become greater since the pandemic.

used to work in offices are now working from home on some or all days.

Rush-hour-only service is particularly costly for a transit agency to provide because of the driver work shifts it requires, the extra vehicles, and the extra miles driven to and from the route. Understanding that buses during rush hours are emptier than they are at midday raises questions about the purpose and value of rush-hour-only service.

In addition, the system is surprisingly productive late at night, keeping the *same productivity* from about 6:00 pm through 10:00 pm, even though most routes offer poor frequency and many

routes have stopped running at all during this period. This suggests that there is high demand for service at night among Albuquerque residents and workers, if the network is so diminished at that time yet many people are using it anyway.

This is not to say that ABQ RIDE should narrowly-target service at times of day when people are riding in the highest numbers *today*. Narrowly-targeted, specialized transit service is rarely a path to high ridership or high productivity, and rarely serves social and equity goals, for reasons we explain later in this report. In addition, the temporal ridership patterns of early 2022 (when this data was collected) may continue to change as the pandemic eases.

#### **Existing Job Access**

The chart at right summarizes the job access provided by the Albuquerque transit network, as of 2019.

Within transit commute times of 30, 45 or 60 minutes (including all walking and waiting time), the number of jobs people can reach is shown in the colored bars.

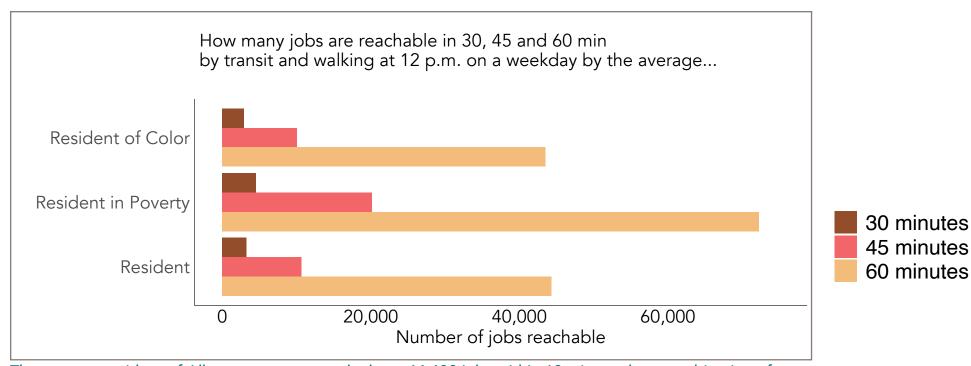
The network offers much better job access to residents in poverty than to all residents, at all three commute time thresholds. For people of color, job access is roughly equivalent to access provided for all residents.

This measure is described in greater detail, including a break-down by race, on page 85.

#### Job Access, Usefulness and Ridership

If the city wants to increase transit ridership, then a key strategy would be to increase the usefulness of the transit network. A very good way to measure transit usefulness is to measure the number of jobs (or other important destinations) to which the average resident has access.

If the city wants to increase the use of transit by lower-income residents and people of color, then improving job access for those groups specifically would be key to achieving that equity outcome.



The average resident of Albuquerque can reach about 44,400 jobs within 60 minutes by a combination of walking and using the existing transit network. The data sources and method for this analysis are detailed on page 83.

#### **Barriers to Walking**

Some goals for transit are served by large numbers of people being close to frequent, all-day and all week service. But other goals are served by the mere *availability* of transit service nearby. That availability can be important whether or not people use the service very much, and even if the service is only occasional.

The map at right measures the availability of service of any quality - whether frequent or infrequent, all-day or once-during-rush-hours-only. Residents who are more than 1/2 mile walk from a bus stop are shown in red.

This map reveals that very dense residential development has been placed far from existing transit service. This is especially true on the west side where nearly-solid red blotches represent large numbers of people who can't easily walk to a bus stop.

(Keep in mind that blue areas on this map may only be close to a bus stop with minimal service – as little as one round trip per day. And some small red areas may be just over 1/2 mile walk from frequent, all-day service.)

Unfortunately, getting transit within reach of the red areas on this map is not so simple as just running bus routes there, for a few reasons:

- Running new routes to new areas requires new funding, or it requires cutting service elsewhere in order to reallocate it.
- Some of these areas are actually close to a bus stop...by flying. The street network is so disconnected, and there are so many barriers (such as subdivision walls or freeways) that what should be a short walk is very long.
- Some of these areas can't be served with a bus route running past them, or running

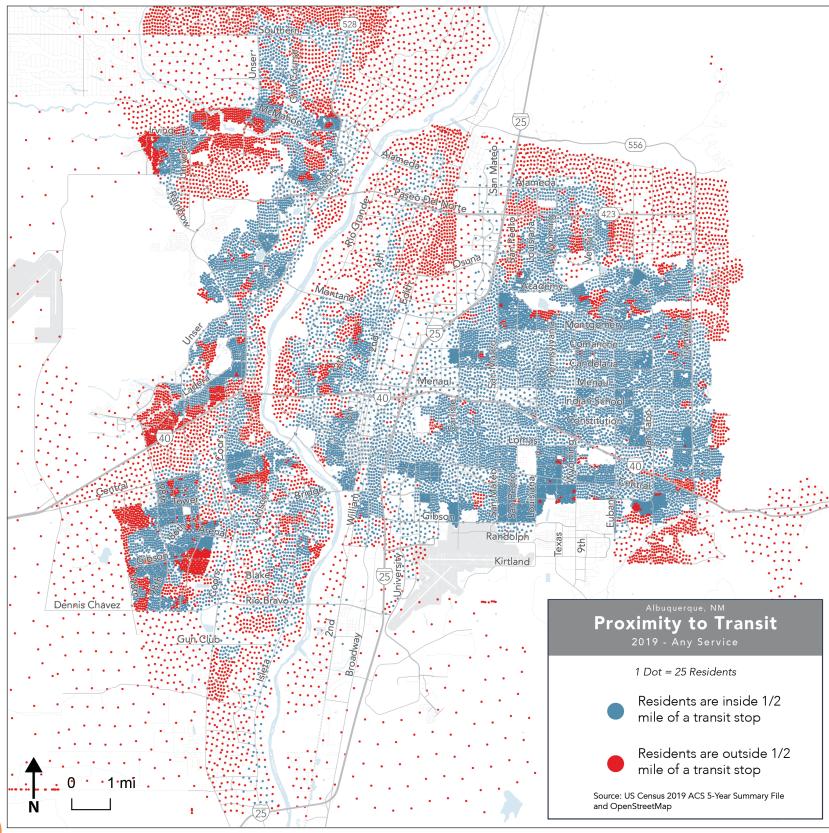
through. There is only one way in and out, so a bus route would have to make a deviation from an otherwise direct path to serve them. Such deviations are frustrating and time-consuming for the other passengers, who are riding through to other places, and often either adds cost or reduces frequency of the entire route.

Development on the west side is also less mixed and more homogenous, with large areas of purely residential land use. Commercial, retail and industrial uses are concentrated on very big arterial roads or at big intersections, rather than being interspersed along smaller roads as they are on the east side. This means that residents not only have longer walks to transit, but also to other services like grocery stores or pharmacies.

The west side has grown recently and fast since the ABQ RIDE network was last updated. This plan for network improvements could identify ways to bring more west side residents onto the bus network.

But because the transit challenges on the west side arise from land use, development and street design choices, ABQ RIDE won't be able to solve many the west side's challenges on its own.

For more about barriers to walking, see page 36.



Red dots show where residents are a long walk from transit service of any kind. This analysis is based on 2019 transit service. In 2022, with some routes not running due to the driver shortage, conditions are worse.

### **Key Questions**

Certain key questions will arise in planning for the future bus network. These aren't technical questions, with objectively correct answers.

The way someone might answer each of these questions has to do with their values, and the reasons they feel transit is important to begin with.

Reasonable people can and will disagree about the best answers for Albuquerque. Different cities answer these questions in different ways, depending on their local values.

Part of the goal for public engagement in this planning process will be to facilitate a healthy debate about these questions, so that people understand what they can expect from the ABQ RIDE network in the future and why the network can't be everything everyone wants.

# More Ridership or More Coverage?

All transit agencies balance two competing goals for their system: high ridership and extensive coverage. This trade-off is illustrated using a fictional neighborhood at right. The little dots are homes and workplaces. The lines are roads. As in many neighborhoods, most activity is concentrated around the main roads.

A transit agency pursuing only high ridership would concentrate its service on the main roads, which are linear and dense with residents and jobs. Routes would be frequent and direct, but only offered in the busiest areas, as in the network shown in red.

If the same agency were pursuing only coverage, it would spread its buses out into many routes, so that every street had some service, as in the network shown in blue. Everyone would have a route nearby, but none of the routes would be

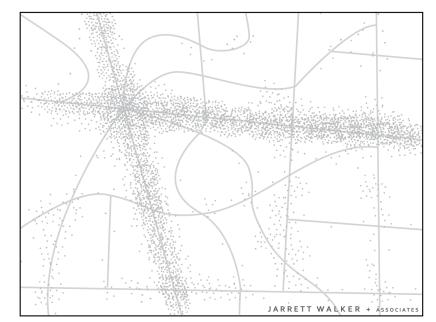
frequent or direct, not even in the busiest areas.

These two scenarios use the same number of buses and cost the same amount to operate, but they deliver very different outcomes.

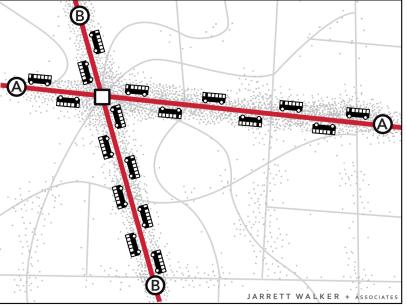
The "right" balance of ridership and coverage goals is different in every community. It can also change over time as the values, needs and ambitions of a community change. And it can change as funding levels for transit change.

The choice between pursuing ridership and coverage is not binary, it's a spectrum. Most transit agencies spend some of their service budget pursuing high ridership, and some providing wide coverage. Every agency chooses a balance between these two goals, and is somewhere on a spectrum between the extremes. ABQ RIDE can therefore devote some service to both of these goals, but...

Within any limited budget, if an agency wants to do more of one of these, it must do less of the other. For example, if the City is asked to be more "efficient" by attracting more riders, it can increase frequencies (or lengthen hours of service) in the places where the most potential riders travel. This will likely attract more riders. But doing so would require cutting service in other places or at other times – which would reduce coverage.



#### Maximum Ridership



All 18 buses are focused on the busiest area. Waits for service are short but walks to service are longer for people in less populated areas. Frequency and ridership are high, but some places have no service.

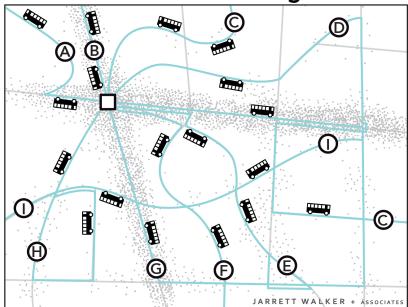
Imagine you are the transit planner working in this fictional neighborhood.

The dots scattered around the map are people and jobs.

The 18 buses are the resources the town has to run transit.

Before you can plan transit routes, you must first decide: What is the purpose of your transit system?

#### **Maximum Coverage**



The 18 buses are spread around so that there is a route on every street. Everyone lives near a stop, but every route is infrequent, so waits for service are long. Only a few people can bear to wait so long, so ridership is low.

Maximum Ridership

Maximum Coverage

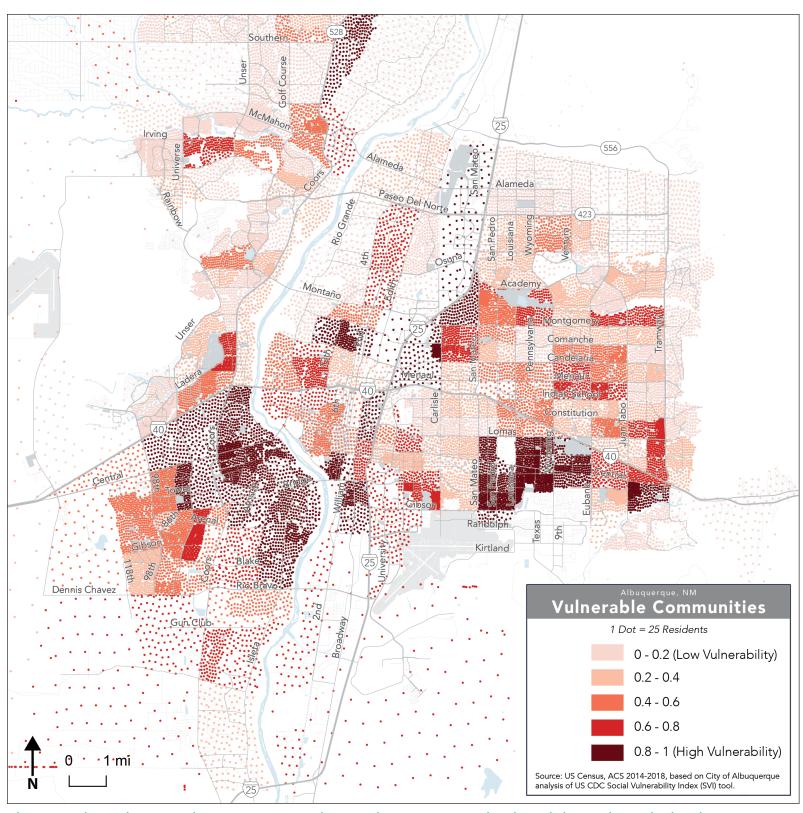
# What is the Purpose of Coverage Service?

Nearly all transit agencies run routes that few people ride, because the routes are serving some other goal. These are generally known as "coverage" goals, achieved by covering an area so that service is available.

Important community values can be served by the mere availability of transit in an area, regardless of how many people use it. Different cities develop different policies about coverage. In Albuquerque, what are the priorities for coverage?

- People need the service severely. For example, the map at right shows highly-vulnerable residents in the darkest shade of red. Some of them reside in hard-to-reach places in fairly small numbers. High ridership relative to cost is unlikely in those places, but it may be important to reach them anyway.
- Transit trips may be made only occasionally, but are essential, such as to a pharmacy or medical appointment.
- Service is available in case someone loses their car or their ability to drive.
- Nearby service reassures people that they are an important part of the city.
- Nearby service reassures taxpayers that they are receiving something in return for their contribution.
- Service in every district reassures voters and elected representatives that they are included in the transit network.

Where high ridership isn't a reasonable expectation, which of these justify providing transit service?



This map shows how residents score according to the CDC's Social Vulnerability Index, which relates to factors like poverty, language and race. This is one of many possible reasons to provide coverage service.

#### How Important are Rush-Hours Compared to All-Day? Weekdays Compared to Weekends?

As of 2019, about 9% of the ABQ RIDE bus network budget was for routes that existed only during rush-hours. Additional service, on top of that, was used to increase rush-hour frequency on certain all-day routes.

Providing extra service at rush hours is expensive, because scaling up the staff and the fleet to provide a surge of service for short time periods has extra costs. Meanwhile, rush-hour-only routes attract little ridership.

But in the Albuquerque transit network, rush-hour only routes provide unique coverage on some roads and in some neighborhoods – they are the only service there, and small numbers of people depend on them.

The ABQ RIDE network is at its biggest and most frequent during rush hours, as shown in the drawing on the left, above. The network gets smaller and less frequent at midday, on weekends, and especially during the evenings.

Many of the jobs in Albuquerque are in service, retail, hospitality and health care. The commutes to these jobs mostly don't take place at rush hours. Making transit convenient for commutes to retail, service and hospitality jobs would require greater investment in service at midday, at night and on weekends.

How should service be allocated in the future, among these different times of day and week?



Weekday Rush-Hours



Weekday Midday



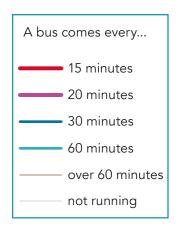
Weekday Evenings



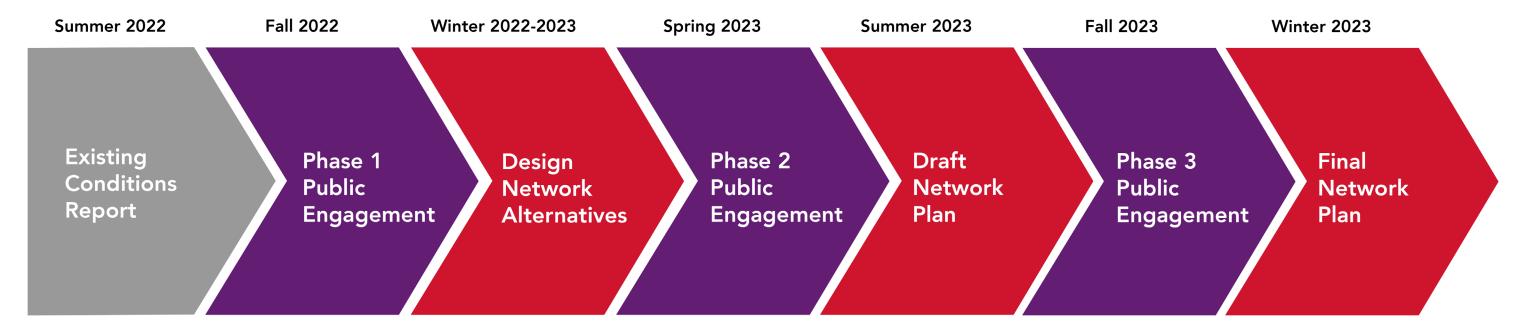
Saturday Midday



**Saturday Evenings** 



### **Next Steps**



#### **Phase 1 Public Engagement**

This report supports the first phase of public engagement in ABQ RIDE Forward, which is expected to last through the end of October 2022.

During this first phase, the planning team will consult people about key choices and priorities. There is not yet any proposed change, network or plan. Rather, the planning team is gathering public input on the fundamental choices that go into any transit network plan, so that the public can influence the plan from the beginning.

During Phase 1 Engagement, many different kinds of people will be contacted and asked to participate in different ways, including:

- Filling out an online or print survey about future choices for the transit system.
- Joining a Focus Group or Stakeholder Advisory Group.
- Attending an online open house, with a presentation and Q&A time with the planners.

• Inviting planners to present to regular events or meetings hosted by local organizations.

The outreach team will be targeting a broad range of people for engagement, with an extra effort made to reach people who ride transit in Albuquerque today or have in the past.

The team is also prioritizing reaching vulnerable communities, lower-income residents, non-English speakers, and others who have to overcome hurdles to participate in a planning process.

For more information about engagement, visit the project website, <u>abqrideforward.com</u>.

## **Designing Network Alternatives**

Once the planning team has broad public input on the purpose and priorities for the future transit network, then design of network alternatives and improvements will begin.

We will design multiple future transit network alternatives for people to consider.

#### Phase 2 Public Engagement

Public input will be gathered on the network alternatives during a second phase of engagement.

During this phase, the planners will show alternatives with concrete changes that could be made to routes, frequencies, coverage and others aspects of the transit network.

People will be contacted and asked to give feedback on the network alternatives, in similar ways as described for Phase 1.

#### **Draft Network Plan**

After public responses to the alternatives have been gathered, the team will design a draft network plan. This plan will specify routes, frequencies, hours and days of service, for a future ABQ RIDE network.

#### **Phase 3 Public Engagement**

In the last phase of public engagement, people will be asked to review the draft network plan and

respond to its specific recommendations.

#### **Final Network Plan**

The network plan will be revised based on feed-back from the public and stakeholders, and it will then be finalized.

Some elements of the final plan may be implemented right away, if they can be implemented within the limits imposed by funding and staff. Others may require more time or other different conditions in order to become possible.

## Introduction

#### **Transit Goals**

#### Related plans

Transit is an important part of other plans in and around Albuquerque, especially:

- Albuquerque and Bernalillo County's "ABC Comprehensive Plan," which plans for growth, enhancement and preservation.
- The Metropolitan Transportation Plan, which covers the region and describes all planned transportation projects for the next 20 years.
- The Albuquerque Climate Action Plan, which identifies actions to halt the city's contributions to climate change.

These plans depend on transit to support growth while still allowing for quality of life, safe streets, cuts to greenhouse gas emissions and equitable access to opportunities.

For example, Albuquerque growth will be concentrated in "Centers" and "Corridors" in part because those are the places where transit is more efficient to provide, and also where public investments in walkability and safety can support high transit ridership. Transit can make more compact development possible, livable and equitable if and where it reduces driving and the need to accommodate more cars along with growth.

These plans also reference non-ridership goals for transit, such as serving isolated, lower-density neighborhoods, so that vulnerable people who live there are able to reach resources and participate in the life of the community.

Transit can serve different types of goals for the City, and some of them are in tension with one another. High ridership gets a lot of focus, because it is key to some very urgent outcomes such as reducing carbon emissions, but other competing goals are important too.

# High ridership is not transit's only goal

Transit agencies are often accused of failing to maximize ridership, as if that were their only goal. But in many cases, transit agencies are intentionally operating coverage services in areas that are not expected to generate high ridership. Coverage services are sometimes visible to the public as mostly-empty buses.

If ABQ RIDE wanted to maximize transit ridership, it would focus service where and when it could be useful to the most potential riders. They would then be thinking like a business, focusing on places where its service is competitive for a large



Is a mostly-empty bus a sign of failure? That depends why you are running it in the first place!

number of people.

Businesses are under no obligation to operate where they would spend a lot of money to reach few customers. For example, a Walmart is under no obligation to provide a store within a mile of everyone in the region. If it were, then they would have to add many additional stores, and most of them would operate at a loss. Less populated areas will naturally have fewer Walmarts. We don't describe this as the company being *unfair* to those areas; they are just acting like a business.

Transit agencies are not private businesses. Most agencies decide they have an obligation to cover places where ridership is not high. The people who make transit decisions hear their constituents say things like "We pay taxes too" and "If you cut this bus line, I will be stranded," and they decide to provide some coverage in low-ridership places.

# Pursuing high coverage or high ridership, equitably

Equity is a guiding principle for the City of Albuquerque's other plans, and the same can be true of this transit network plan.

Ridership and coverage goals can be pursued with a focus on equity. Neither goal is in opposition to treating all people equitably, nor to providing services specifically for people in need.

Using equity as a guiding principle doesn't imply any particular balance between ridership and coverage goals. To design a transit network equitably, the question will be: Is the goal is for transit to be available equitably, or for transit to be useful and used equitably?

#### A High-Equity, High-Coverage Network

If the priority is making service *available*, then that means providing coverage where vulnerable

people live and travel. The network would be made of mostly infrequent routes, some of them weekdays- or rush-hours-only, but it would cover all of the streets and all of the neighborhoods where vulnerable people live, work and travel.

#### A High-Equity, High-Ridership Network

If the priority is creating a network that many vulnerable people *find useful and use*, and reap benefits like lower car ownership or better job access, then a different type of network would achieve that. It would provide better frequencies, all-day all-week, in places where vulnerable people live, work and travel.

A transit network that helps advance equity would, ideally, include both:

- A network that is highly useful for the types of trips that vulnerable people want to make, and
- Coverage services that ensure social inclusion for vulnerable people and connection to socially-important destinations located across most of the city, including in places where high ridership is unlikely.

There is not enough funding for transit in most U.S. cities, including Albuquerque. There is not enough bus service to provide even the core useful network that includes all dense areas with vulnerable people. When U.S. transit agencies want to move towards the high-ridership side of the spectrum, they often have to move away from providing coverage.

A network can be designed for high ridership and high equity. Or it can be designed for high coverage and high equity. Or it can be designed for a deliberate balance of both ridership and coverage goals. In this planning process, outcomes related to either ridership or coverage will be measured in terms of benefits to lower-income, minority and vulnerable people.

### Transit Access: Expanding Where People Can Go

Wherever you live, there is a certain area you can reach each day in a reasonable amount of time. You could draw a map of this area, and it would appear as a blob, with you at the center.

Beyond this area are things you won't be able to do on most days because it takes you too long to get to them. The size of this area affects your options in life: for work, school, shopping, and everything else you might want to do.

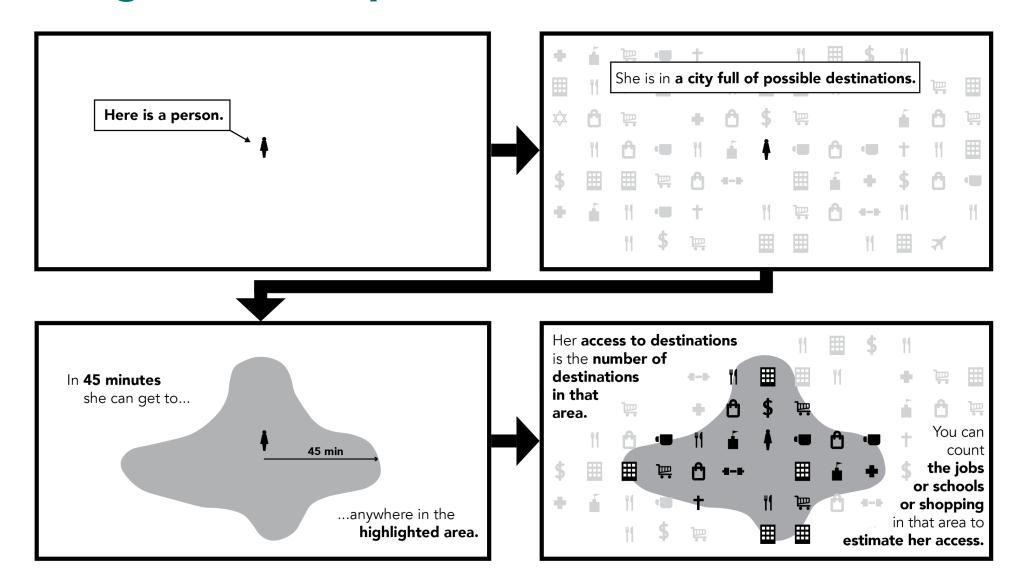
The technical planning term for this blob is an "isochrone." It's also fair to call it a drawing of someone's freedom, in the physical sense. If you can go to more places, you have more choices, so you are more free. Conversely, if you have a small isochrone and you can't get to very many places in a reasonable amount of time each day, it is as though there were a wall around your life.

Access is how transit network design can affect transit ridership. Many other things affect ridership: car prices, gas prices, transit fares, parking availability, public safety, culture, and more. If someone wants to change a transit network to increase ridership, then access is what they should measure on their new network.

#### **How Transit Affects Access**

Transit can increase the number of useful places people can access, in a reasonable amount of time, without a car. What makes someone's transit access greater or smaller? This is largely determined by:

- The **transit lines** with their frequency, speed, and span. These determine how long it takes to get from any point on the transit network to any other point.
- The **layout of the city**. This determines how many useful destinations are a short transit ride away, and close to transit stops or



stations.

Someone's particular location. This determines what transit lines are close to each person, if any.

#### **How Waiting Affects Access**

In estimating transit access from any location, and in calculating average trip times in general, we always assume some waiting time.

Waiting doesn't just happen at the start of someone's transit trip; it also happens at the end,

especially on infrequent routes. For example, if you must arrive at work by 8:00 am, but your once-and-hour bus passes by your work at 8:12 am, you are forced to arrive at 7:12 am – 48 minutes too early.

People who are able to decide their own work or school hours can schedule around an infrequent bus schedule, but most people don't get to do that. Also, a trip to a doctor's appointment or any other scheduled event can require an early arrival that feels like a waste of time.

The extra time that people spend waiting during such trips will be, on average, one-half of the

frequency of the route. When we talk about a trip that takes 30- or 60-minutes, then, we are including an average wait of one-half of the frequency of each route used.

For this reason, frequency has a huge effect on the size of these blobs and on transit access.

Including this average wait time can make transit trips sound really long, compared to how bus passengers would describe them. But it is essential to account honestly for waiting time. One of the ways public transit fails to compete with cars is by forcing people to start their trip earlier than they want to, and to waste time at their destination.

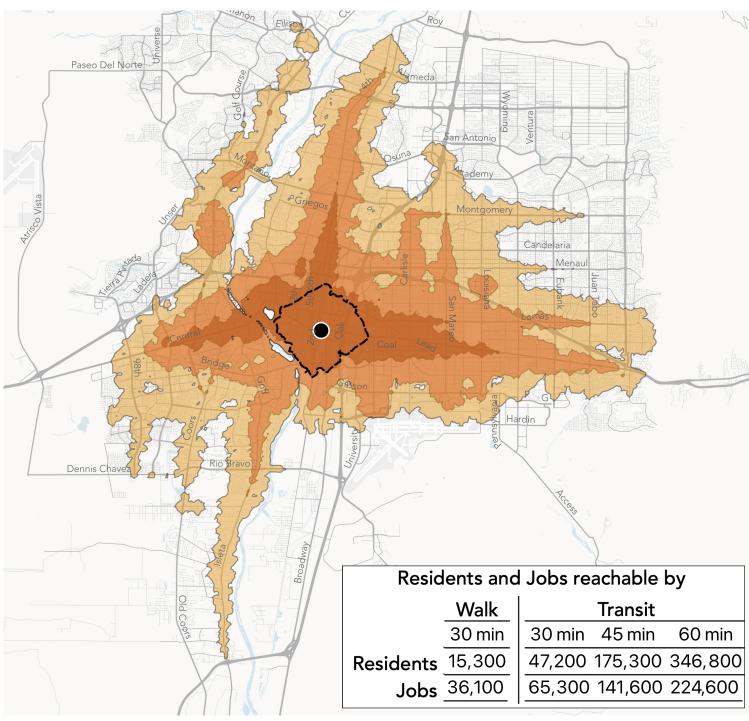
#### **Example: Downtown**

The example isochrone at right shows someone's access from the heart of downtown, near the Alvarado Transit Center. They have excellent access to some of the busiest and densest parts of the city. This arises from:

- Their location at the center of the network, where they can choose from straight transit routes heading in all directions.
- The high frequency offered on some of those routes, which means they spend little time waiting and can use more of their time traveling farther.
- The high speeds offered on some of those routes, which allow them to cover more distance in their limited time.
- The many street connections that make for short and direct walks between most places.

Of course, it isn't access to a *geographic area* that really matters – it's access to the valuable destinations and people inside that area. This is where the layout of a city has a big effect on transit access: a transit agency can make these blobs big, but it's up to city leaders, planners and developers to concentrate housing, people and useful destinations inside the blobs.

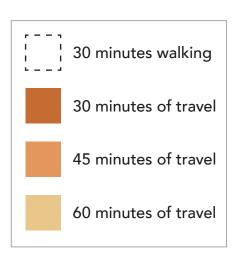
Because central Albuquerque is dense with people and destinations, access to opportunity from downtown is greater than you could guess from this map alone. **Someone starting a trip in downtown is able to reach about 224,600 jobs** and over 346,800 residents in 60 minutes or less.



In dense and walkable city centers, transit access is typically very good, as people can reach a large geographic area without much waiting, and there are many jobs and destinations within that area.

We can describe someone's transit access as how far they can go, by transit and walking, within a certain amount of travel time.

That travel time includes walking to and from the stops, waiting, riding on board, and any transfers.



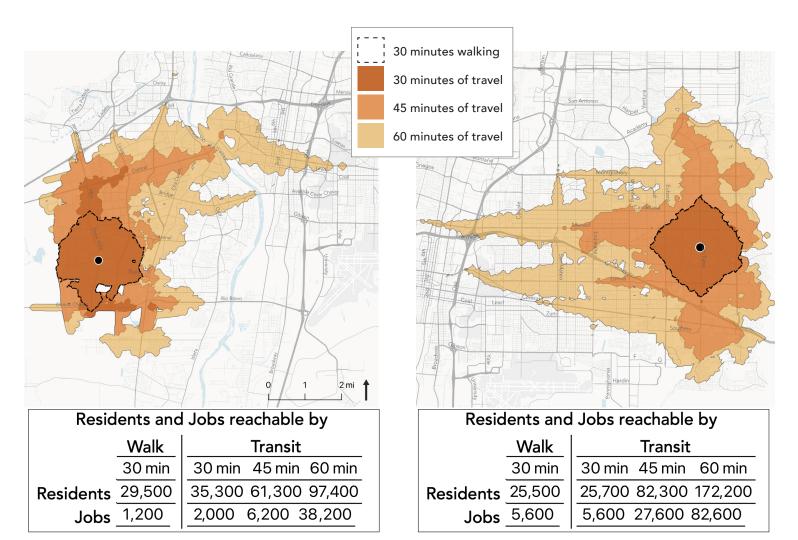
#### **Example: 98th & Gibson**

To contrast with the downtown example, the isochrone at right shows access for someone starting a trip from a home just north of 98th & Gibson. The geographic area they can reach within an hour's travel time is small, and there are few jobs within that area. Within an hour (the blob in yellow), they can just barely reach downtown.

In contrast to the downtown example, low access from this area is a result of:

- The location at the edge of the city and the edge of the transit network, where there are only a few bus routes (in contrast to downtown, where routes are naturally concentrated).
- The moderate frequency of service available in the area (every 30 minutes), which means that people spend some of their potential travel time waiting.
- The lack of streets and sidewalks between developments and bus stops, which require longer out-of-direction walks. For the home chosen as the starting point here, the circuitous walk to the bus stop takes 15 minutes. As-the-crow-flies, the bus stop is less than 1,000 feet away, a distance most people could cover in 6 minutes.
- The difficulty in crossing 98th Street and other main streets, which are extremely wide, fast and dangerous for pedestrians.

Not only does this access area look smaller on the map than the downtown example, there are also many fewer people and destinations inside it. This is normal for a suburban area at the edge of a city, in contrast with a dense and busy city center. The residents around 98th & Gibson could reach about 38,200 jobs by transit+walking within an hour.



**98th & Gibson:** On a city's edge, where densities are lower and walkability is poor, transit access is typically worse. The geographic area that can be reached is smaller, and there are fewer jobs and opportunities inside it. This is the case for the area around 98th and Gibson, plus the disconnected local streets and unwalkable major roads limit access even further.

Juan Tabo & Indian School: This neighborhood is also on the city's edge, and poor frequencies limit access a great deal. But better walkability, more transfers available between bus routes, and more jobs within the neighborhood all make for better job access than the example at left. However, because the route on Juan Tabo is so infrequent, someone can hardly go further in 30 minutes by transit than they can by just walking.

## Example: Juan Tabo & Indian School

On the opposite side of town is another neighborhood that cannot reach downtown within an hour, around the intersection of Juan Tabo & Indian School Road. An isochrone from this intersection is shown to the left.

This neighborhood has similar density and demographics as the example opposite, and it is also on the edge of the city, but it has worse transit frequency. Low access from here is a result of:

- Being at the edge of the city, since routes naturally get farther away from one another as they radiate out to cover the edges of the city.
- Poor frequencies: an all-day bus every 45
  minutes running north-south, and a bus
  that comes just twice per rush-hour running
  east-west. The route that goes straight to
  downtown, with all its jobs and services, is the
  one that only runs during rush hours.

The residents around Juan Tabo & Indian School can access 82,800 jobs by transit+walking within an hour. This is many more than those living at 98th & Gibson can reach, for two reasons:

- Juan Tabo residents are on a network of many intersecting transit lines. While the frequencies are poor, some transfers are still possible and this gives them access to other roads besides the ones they live near.
- There is retail, commercial and industrial development sprinkled across the east side of the city. Development on the west side is more residential, with fewer but large commercial nodes, which means people need to travel longer to reach the same number of jobs.

### Map of the Albuquerque Transit Network

The access examples on the previous two pages arise from the combination of the city's walking network (streets and paths) and the transit network (bus routes).

#### 2019 Citywide Network

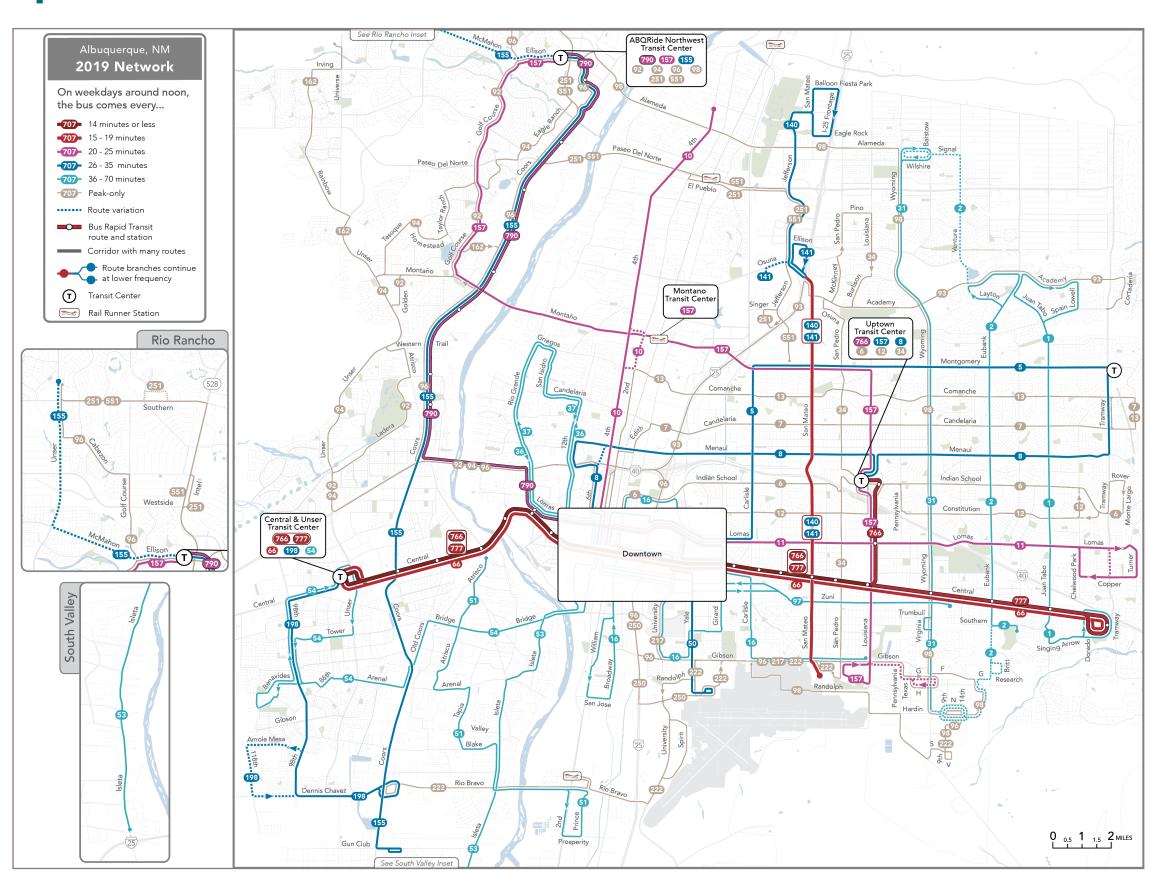
A map of the transit network is shown at right, with service levels and route patterns as they were in 2019, before pandemic-related service changes.<sup>1</sup>

In 2019, the ABQ RIDE network included 40 bus routes.<sup>2</sup> About half of them operated on weekdays-only, and the others offered at least some weekend service.

On the maps in this report, line color shows the frequency of bus routes at midday on weekdays:

- Dark red means every 7-14 minutes.
- Red means every 15-19 minutes.
- Purple means every 20-25 minutes.
- Blue means every 26-35 minutes.
- Turquoise means every 36-70 minutes.
- Tan means the route does not operate all day, making trips only during rush-hours (or "peaks") or at other special times. Some of the rush-hour only routes also offer service in one direction only, such as towards downtown in the morning and away in the evening.

2 ABQ RIDE also operates demand-response services for seniors and people with disabilities qualifying under the Americans with Disabilities Act. These services are offered over a wider area than the fixed route network. This plan is focused on the fixed-route transit network.



<sup>1</sup> This study of "existing" transit conditions is focused on the 2019 network, rather than the reduced 2022 network, because the City has sufficient funding to operate the 2019 network today – it is held back in restoring service only by a severe national shortage of bus drivers.

#### 2019 Downtown Network

The map at right shows the downtown network in the same style as on the previous page, with each route color-coded based on its weekday midday frequency. This map makes visible that – with the exception of the most frequent routes – the downtown transit network is complex and mostly infrequent.

The central hub of the transit network is the Alvarado Transit Center, where passengers can transfer among many routes and connect with the Rail Runner rush-hour trains to Santa Fe.

Two large educational institutions (University of New Mexico, or UNM, and Central New Mexico Community College, or CNM) are just outside of downtown. They are major centers of travel demand for students, staff and visitors. It is good for transit usefulness and ridership potential to have these institutions concentrated at the center of the ABQ RIDE network. They actively price and manage their parking, which is also good for transit ridership.

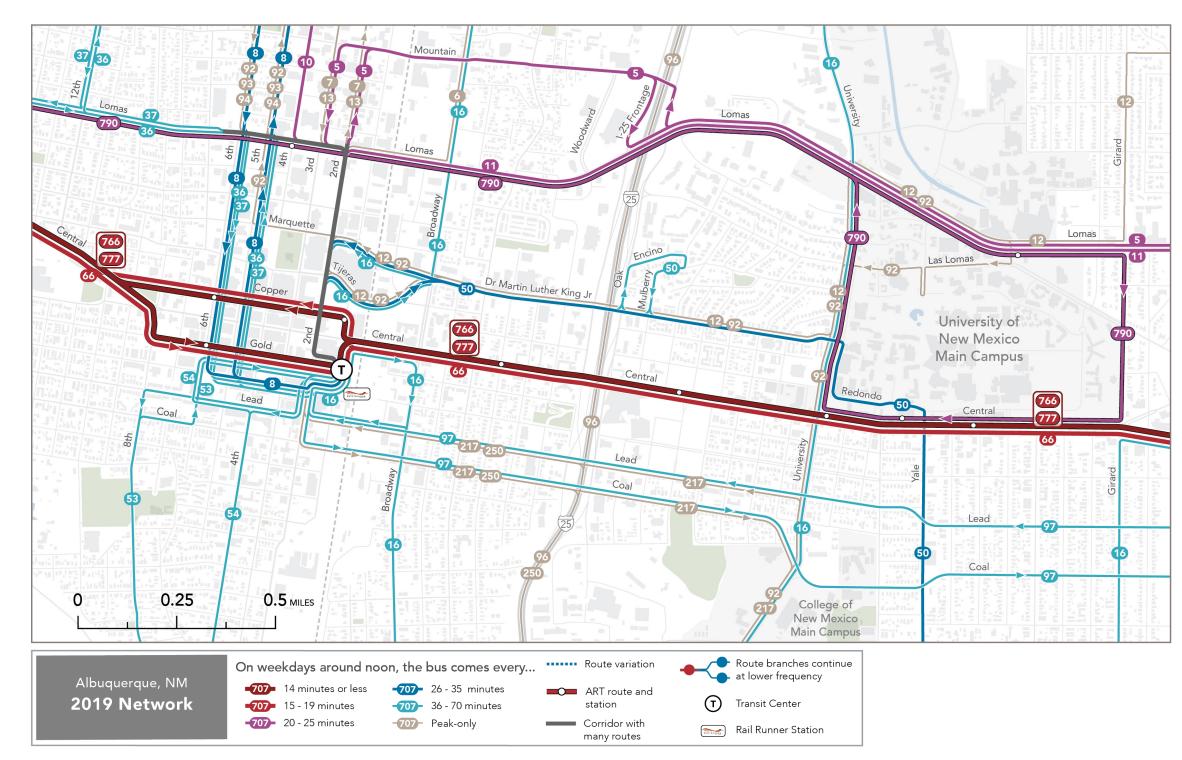
However, connecting all three places to the wider city, when they aren't all three within walking distance of one another, is challenging, especially given the overall low supply of service in the bus network.

#### **High Frequency for Short Trips**

An important feature of the central city network is the very frequent service available for east-west travel within the center, especially between UNM and downtown.

When people make shorter trips, the frequency of transit service is more influential. This is because waiting time is a bigger component of the overall travel time for short trips than for long trips.

For example, if someone wants to travel one mile, a transit line with a frequency of every 30



minutes will make them wait, on average, 15 minutes. Worst-case-scenario, they might wait 29 minutes. They could walk that distance in about 20 minutes, and drive it even faster. Most people will feel impatient with a 15 minute wait in this situation.

As of 2019, ABQ RIDE was providing 7.5 minute

frequency on Central Avenue, with the two ART lines (each coming every 15 minutes). Every 7.5 minutes is frequent enough to be useful to many people for short trips within the center city. Plus, Route 66 was also coming along the same street every 15 minutes, though it serves different stops than the ART lines.

### **Hours and Days of Service**

The table to the right summarizes each route's hours and days of service in 2019. The colors represent the frequency of service during each hour of each day.

This table shows the frequent routes clearly in red: the ART lines, and Routes 66 and 140/141. These are also the routes with the longest hours and days of service (with the addition of Route 198). And, as we'll see on a later page, these are among the routes with the highest ridership and highest productivity in the city.

This table also makes it visually obvious how few of the routes on the map on the previous page are operating during most of the week. Of 40 routes, 16 offer only rush-hour weekday service or just a pair of daily trips, some of them offering trips in one-direction only. Fewer than half of the City's routes are available seven days a week.

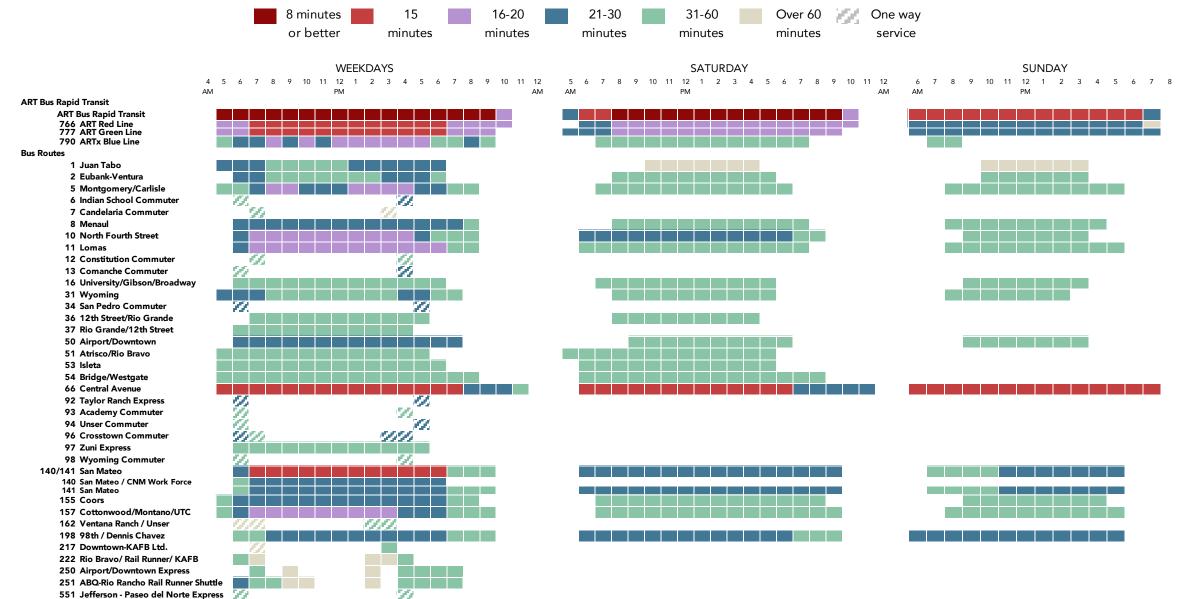
Short hours and weekday-only schedules limit the usefulness of the transit network in several ways:

- Few service workers commute during rush hours. Most service workers are changing shifts in the very early morning, at midday or in the late evening.
- People applying for retail or restaurant jobs often need to work weekends. A route that runs very infrequently or not at all on weekends is missing the peak time for this industry, when retail and restaurant businesses are "all hands on deck."
- Everyone values flexibility and spontaneity.
   The flexibility to make a trip outside of rush hours is important to many different kinds of people, including rush-hour commuters.

Offering long spans of service throughout the day and week, in places where large numbers of people can use transit, is key to attracting high ridership over time. This allows many people to choose to rely on transit, forgoing an owned or

#### **ABQ RIDE 2019 Route Frequencies**

The bus comes about every:



hired car and choosing to live or work in places where they can take advantage of transit. If the transit network is only there during certain hours or certain days, few people will make the choices and build the habits that turn them into consistent transit riders.

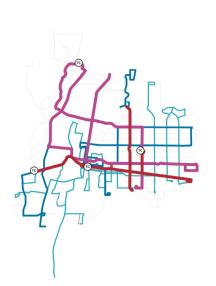
Poor frequencies, short hours of service and weekday-only schedules are often helpful towards

achieving a coverage goal. They make it possible to spread transit out over many routes, many neighborhoods and long distances, so that a little bit of service is close to many places and people. But the resulting routes can't be useful to very many people, because the schedules are so limited. **Spreading transit out means spreading it thin.** 

Routes with poor frequencies, running for only some of the day, and only on weekdays, aren't useful to most people. But they can help achieve wide coverage, by allowing for more routes to cover more areas with minimal service.







Weekday Midday



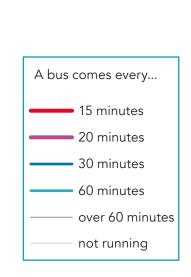
Weekday Evenings



Saturday Midday



Saturday Evenings



#### Service Dwindles at Night and on Weekends

The colorful table on the previous page and the miniature maps at right both illustrate how little service the City provides at nights and on weekends.

Most routes stop running by 9 pm on weekday and weekend evenings. Even some of the highest-ridership routes offer less than 8 hours of service on Sunday, not enough for someone to use to commute to a work shift. The frequent network disappears at night and on weekends, when only ART and Route 66 are offering high frequency service.

#### **Frequency and Transit** Usefulness

Frequency is invisible and easy to forget, and yet it has an enormous effect on where you can go in a limited amount of time.

High frequency service provides:

- Shorter waits. On average, people's waiting time to use transit will be about half the frequency. The shorter the wait, the more time people have to actually get to places they want to go.
- Faster transfers. To go beyond the places along a single transit line, you'll need to connect to another line. Better frequency makes this kind of connection faster.
- Easier recovery from disruption. When a bus route is frequent, the consequences of a disruption (like a mechanical breakdown) are less severe, because you don't have to wait long before the next bus shows up.
- Spontaneity and freedom. When transit comes every few minutes, there's no need to plan your day around a bus schedule. You can go out and come back whenever you want.

#### **How Frequent is Frequent Enough?**

Frequency is expensive, so it's important to think about just how frequent service needs to be.

Adequate frequency depends on trip length, because it doesn't make sense to wait long to go a short distance.

Many people wouldn't wait 15 minutes to go half a mile, because they could walk to their destination in less time. Also, for short trips, it's easier to get a lift from someone, and it might be fairly cheap to pay for a car ride.

But for a long trip across town, a 15 minute wait would feel more reasonable to many people. And for really long trips, such as between cities, people are more willing to schedule their day around transit coming every hour or even less frequently.

Planning for frequency improvements needn't focus only on the industry-standard for "frequent service," which is every 15 minutes or better. In

the past decade, some of the greatest gains in ridership and productivity have been observed when routes with very poor frequency – such as every 90 or 60 minutes – but high productivity (many riders relative to their cost) are given modest frequency improvements.

#### **Real-Time Information**

Many people assume that today, when so many transit systems offer real-time arrival information, nobody needs to wait for a bus anymore, and frequency therefore doesn't matter. If a bus only comes once an hour, that's fine, because your phone will tell you when it is a few minutes away and you should walk to the stop.

Real-time arrival information is wonderful, but frequency still matters because:

Frequency is hard to see, but has an enormous impact on where you can go in a reasonable amount of time.

- Waiting doesn't just happen at the start of your ride, it also happens at the end. You may not need to leave the house long before your departure, but if your bus is infrequent, you have to choose between being very early or too late. If you start work at 8:00 am but the hourly bus passes your workplace at 8:10 am, you can be 50 minutes early or 10 minutes late.
- Many of the places we go don't let us hang out until our bus's arrival is imminent. We can easily do this when leaving home, but it is more awkward when leaving a restaurant or a workplace that is closing.

Real-time arrival information doesn't make the bus more reliable, but frequency does. Your phone can tell you when your bus is arriving, but it cannot prevent your bus from having a problem and being severely delayed, or not showing up at all. Only frequency – which means that another bus is always coming soon – can offer this kind of reliability.



Real time information boards have been installed at ART stops, which help people know when their bus is coming. Real-time arrival info is also available for local buses, on smartphone apps. But real-time information isn't a substitute for high frequency.

## Frequency and Ridership Potential

The scatter plot at right shows all the routes operated by transit agencies in 24 mid-sized U.S. cities, at various points in the last ten years.

Each route is plotted based on its frequency and its productivity (boardings per service hour). Productivity speaks to what some people have in mind when they talk about transit "efficiency."

More frequent routes are to the left in this scatterplot, and more productive routes are higher up. While there are productive and unproductive routes of every frequency, in general, higher productivity is correlated with better frequency.

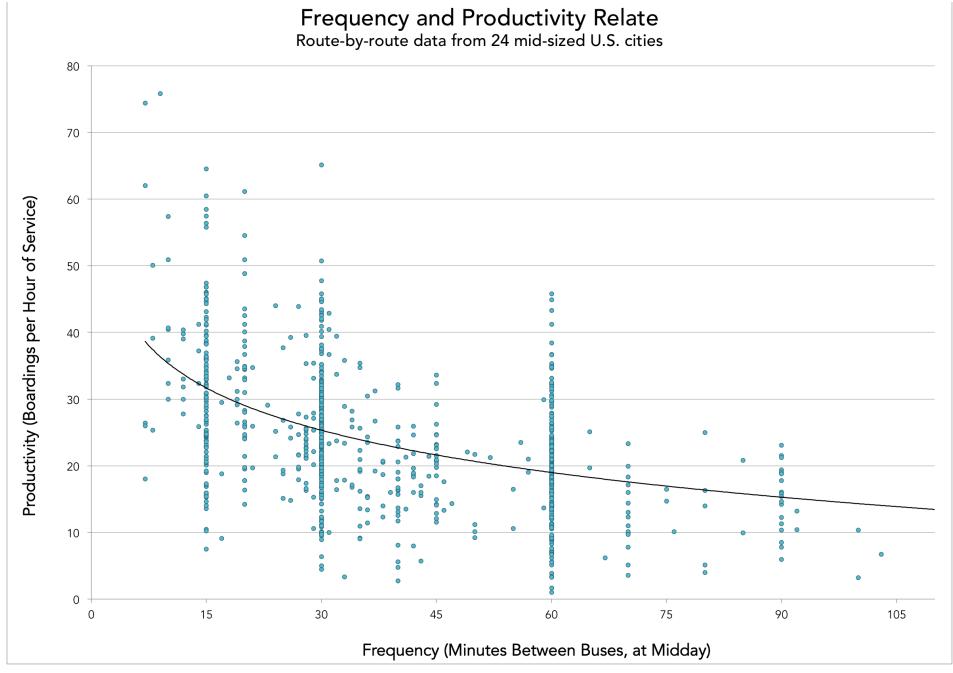
This is a two-way street: Not only does frequent service appeal to more potential riders, but also transit agencies typically deploy the extra service to make routes more frequent when ridership is already high, and the areas are dense and walkable and busy.

This is why higher frequency isn't just correlated with higher total ridership, but also with higher productivity. The service hours are increased in order to make the route more frequent, and this causes a more-than-proportional increase in ridership, making the route more productive where land uses are dense, walkable, and mixed.

### Productivity =

Boardings ÷ vehicle service hours used for a route.

Productivity describes how much a transit service is being used by people, compared to the amount of service provided.



Bus routes' frequency and productivity in 24 mid-sized U.S. cities. Each dot in this chart is a single route. Routes that offer frequent service tend to be more productive.

### **Key Transit Planning Choices**

# How should ridership and coverage goals be balanced?

Within its limited budget (and its limited team of bus drivers) the City will always be trading ridership goals off against coverage goals. What is the right balance of:

- Making the transit network useful to large numbers of people so that many people take advantage of it and ride regularly, and
- Extending transit to more areas and down more streets, to cover more people with minimal service?

The answer for today may be different from the answer for the future. If in the future additional funding is available for more service, that funding could be used to shift the balance.

Either of these goals can be pursued with an additional goal of advancing equity, and the benefits of pursuing each kind of goal can be measured especially for lower income, minority and vulnerable people. Cities often attempt some level of balance between coverage and ridership goals.

# What are the priorities for coverage services?

When the City is providing coverage services, for which high ridership is not an expectation or a goal, what are the priorities for that coverage?

There are three general reasons that coverage might be provided in an area where service isn't justified by other goals:

• To prevent the isolation of vulnerable people.

- To make sure that socially-important destinations (such as hospitals, grocery stores or community centers) are on the transit network.
- To provide geographic equity, such that all parts of the service area (or all taxpayers, or all electoral districts) have at least minimal coverage, regardless of the needs of people living there.

People may request or expect transit service in an Albuquerque neighborhood for one or all of these reasons. Which should ABQ RIDE prioritize when making decisions about where to provide service, in the absence of high ridership, in pursuit of the goal of Coverage?

# What are the priorities for ridership services?

When the City is providing ridership services, for which high coverage is not an expectation or a goal, what are the priorities for that service?

- To provide high frequency, useful services to dense places, in order to maximizing ridership.
- This will put more people near the most useful services, but the number of people across the region with access to transit may reduce.
- Competing more effectively with cars, so that the region can grow without increasing traffic congestion.
- Supporting dense and walkable development.

# How important are rush hours, compared to all-day and all-week service?

Rush-hour-only routes, and extra rush-hour frequencies, are rarely a path to high productivity despite being narrowly targeted at the busiest time of day. This is partly because they are useful only to a narrow slice of the population, and partly because there is a premium cost to operating them.

Rush hour routes in the ABQ RIDE system are ridden by very few people, relative to their cost. However, they make up only 8% of the total service on the network, so they provide minimal coverage at a minimal cost.

Since the pandemic has increased work-fromhome for white collar commuters, the productivity of rush-hour service has fallen further in most cities. Meanwhile, the off-peak commutes of "essential workers" have been better understood and more highly valued during the pandemic.

How should ABQ RIDE balance investments in rush hour transit with investments in all-day and all-week transit?

# As ART ridership grows, how should local service on Central Avenue be adjusted?

There is an all-day frequent network made up of Central Avenue and San Mateo (at least on weekdays), of which ART is the backbone.

The Central Avenue corridor, including both ART and Route 66, is extremely successful in terms of ridership, productivity, job access and equity.

When rapid transit lines are introduced, there is inevitably a conversation about whether, when, and by how much to dial down the frequency of the original local route that the rapid line was based on. In the case of Central Avenue, this is Route 66.

Route 66 uses 12% of the total service in the network, and ART uses 18%, however these are some of the most productive routes in the city. The transit network is very thin for a city of Albuquerque's size and density.

Are there improvements to ART that would make Route 66 less important to its current riders? When, where or how would it be reasonable to reallocate some Route 66 service to other routes?

These questions are discussed at greater length starting on page 79.

# **Transit Market and Need Assessment**

### **Indicators of Strong Transit Markets**

In this chapter, we present and discuss data that inform one consideration in transit planning:

### Where is there potential for high ridership relative to costs?

This tells us where there are *strong transit* markets – where high ridership is a reasonable expectation, within the City's limited transit budget.

Some of the maps and diagrams on the following pages help us visualize strong transit markets, in particular:

- Residential density
- Job density
- Activity density (combined residential and jobs)
- Walkability of an area
- Zero-Vehicle Households
- Poverty density

If you asked a transit planner to draw you a productive bus route, that planner would look mostly at densities of all residents and jobs; at the walkability of streets and neighborhoods; and at the cost of running a bus route long enough to reach them.

In fact, the transit systems that get used by the greatest number of people tend to be the ones where each route serves many different demands – different kinds of people, making trips for different reasons, at different times of day and week.

No one measure tells us that a place has high ridership potential. None of the maps on the following pages can be used, alone, to plan a highly useful transit network. Rather, we must consider The strongest transit markets are diverse: different kinds of people, making different kinds of trips, at different times of the day and week. In such places, transit can be broadly useful and widely relevant.

them in combination.

A different major consideration in transit planning is where vulnerable people live, work and travel. We learn about such people and their needs by asking a different set of questions.

#### Indicators of High Transit Need

In this chapter, we also present and discuss data that inform the other important consideration in transit planning:

# Where do people have severe needs for transit? Where is service important even if it does not attract high ridership relative to its cost?

We learn about transit needs mostly by examining who people are and what life situation they are in.

The maps and diagrams on the following pages help us visualize potential transit needs are:

- **Poverty** density
- Zero-Vehicle Households
- Walkability of an area
- Density of **Senior Residents**
- Density of **Residents Under Age 18** (Youth)
- Socially-vulnerable residents

No single measure tells us that a place has high

Where there are severe needs for transit, coverage services may be important, even if they are only used by small numbers of people.

Coverage services are often specialized for particular groups, rather than being designed for broad usefulness.

needs. Rather, we consider them in combination.

Data is not available for every type of need or vulnerability, and so additional knowledge about transit needs must come from City staff, stakeholders and members of the public.

#### **Civil Rights**

Another important set of maps in this chapter is not strictly related to *need* but rather to civil rights. These maps show **where people of color live.** 

Unequal treatment on the basis of race, ethnicity, or national origin is prohibited by the Civil Rights Act of 1964. Regulations by the Federal Transit Administration require that ABQ RIDE consider the benefits and burdens that people of color experience from transit service and in the process of planning for transit and transportation projects.

While a person's race or ethnicity does not tell us directly if they need transit, or if they have a propensity to use transit, we know that there is a correlation between race and ethnicity and income and wealth. If you are a person of color in the United States you are more likely to be low-income and less likely to own a car.

In addition, the historic impacts of segregation and discrimination have had long lasting effects on the patterns of housing, development, and investment across the region. Therefore, knowing where people of color live helps us see where there are intersections between patterns of historic segregation and concentrations of people in poverty today. Providing affordable transportation options for low-income communities and communities of color is an important strategy in addressing economic insecurity, and may be an important goal, more broadly, for addressing racial and social equity goals that the community may have.

Seeing where people of color live helps to see how much of the population lives in places that are dense, linear, and proximate, and would therefore be well served by a high ridership network design. It also helps us see neighborhoods that are predominately people of color that are not dense, linear, or proximate and would therefore be relatively expensive to serve, but might be important to serve to achieve a coverage goal.

It is also important to understand where large numbers of people of color, people in poverty, and other marginalized populations live so that public outreach during this project can maximize opportunities for participation for communities that have not traditionally participated in the transportation planning process.

This plan will offer an opportunity for vulnerable communities to share their perspective about the future of the transit network and the types of changes that would best serve their goals for their communities.

### **Residential Density**

While not all trips start or end at home, nearly everybody makes at least one trip starting or ending at home on most days. Further, places with many households are also destinations for other people, whether for visiting, caring for family or home-based trades.

A transit network designed to be useful to a large number of people will offer the most useful services in areas with high residential densities.

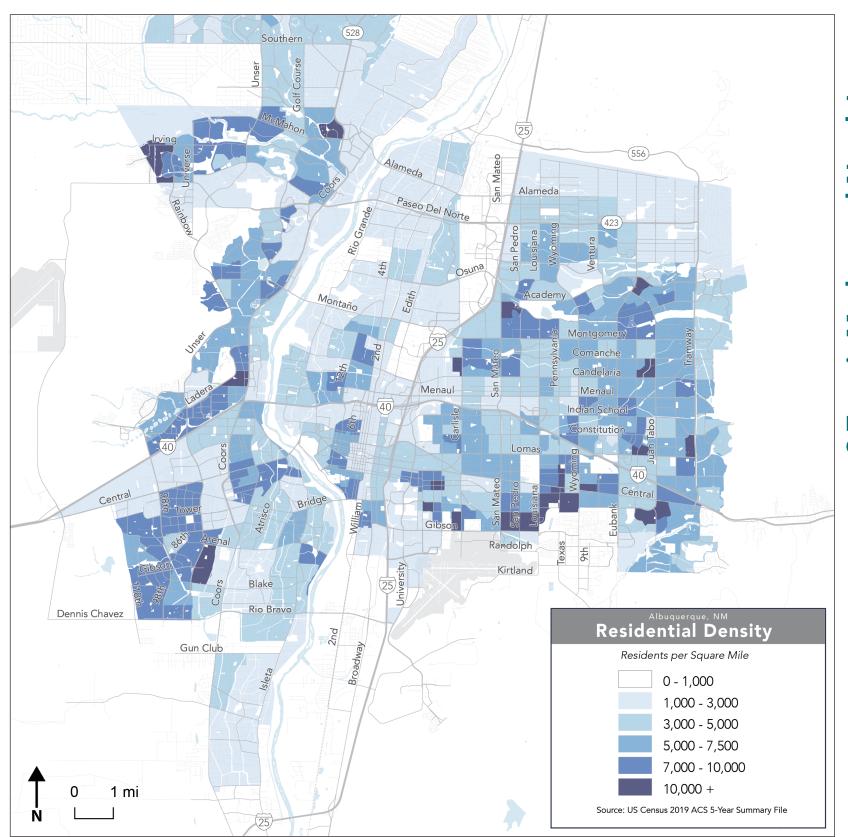
A transit network designed to get a little bit of transit close to everyone, no matter how many people live in each area, will have routes into many low-density residential areas, where few people live near any given stop.

High concentrations of residential density can be found in Albuquerque in a few areas outside of the traditional downtown. East Albuquerque has higher overall residential density with some pockets of very high density just south of Central Avenue. There are also some high density pockets near San Mateo Boulevard and Montgomery Boulevard northeast of downtown.

A second large area of high density residential is located in southwest Albuquerque with the strongest potential transit market being south of Central Avenue and along 98th Street and Unser Boulevard.

#### **Strong Transit Market:**

Residential density is key to assessing the strength of transit markets, since most trips begin or end at home. As the overall number of residents in an area increase so does the overall number of people who could begin using transit in their daily lives.



Residential Density in Albuquerque. The darker the color, the more residents in the area.

### **Job Density**

A map of job density shows us not only the places people travel for work, but also places people go for services, shopping, social needs and more.

One person's workplace may be, throughout the day, a destination for dozens or even hundreds of people. For this reason, job density is typically a better predictor of transit ridership than residential density.

Albuquerque's job density pattern looks similar to many U.S. cities, with the strongest levels of job density in the downtown core and near the university and major medical centers. Moderate densities can be found along some arterial roads, primarily in north and east Albuquerque.

Significant job densities are present in West Albuquerque, but large gaps in density around the river and on the west side mean people in those areas have to travel farther to reach dense job centers.

#### **Universities and Colleges**

Higher education campuses like the University of New Mexico and Central New Mexico Community College have many jobs and also generate all-day travel demand as students and staff arrive and leave at different times throughout the day. While they are visible on this map as red blocks, they actually attract even more trips than suggested

#### **Strong Transit Market:**

Job density can tell us not just about where people go for work, but also about important destinations people travel to. Particularly for the retail and service sectors, high job density suggests places that are likely to be major destinations for customers and clients.

by the number of jobs alone, because students are traveling there as well.

However, demand at commuter universities and colleges can have extreme peaks, as most students arrive around the same time in the morning and all want to be taken to campus just before the top of the hour. Big, concentrated peaks in demand are expensive to serve, whether they are served by public transit agencies, school districts or private organizations.

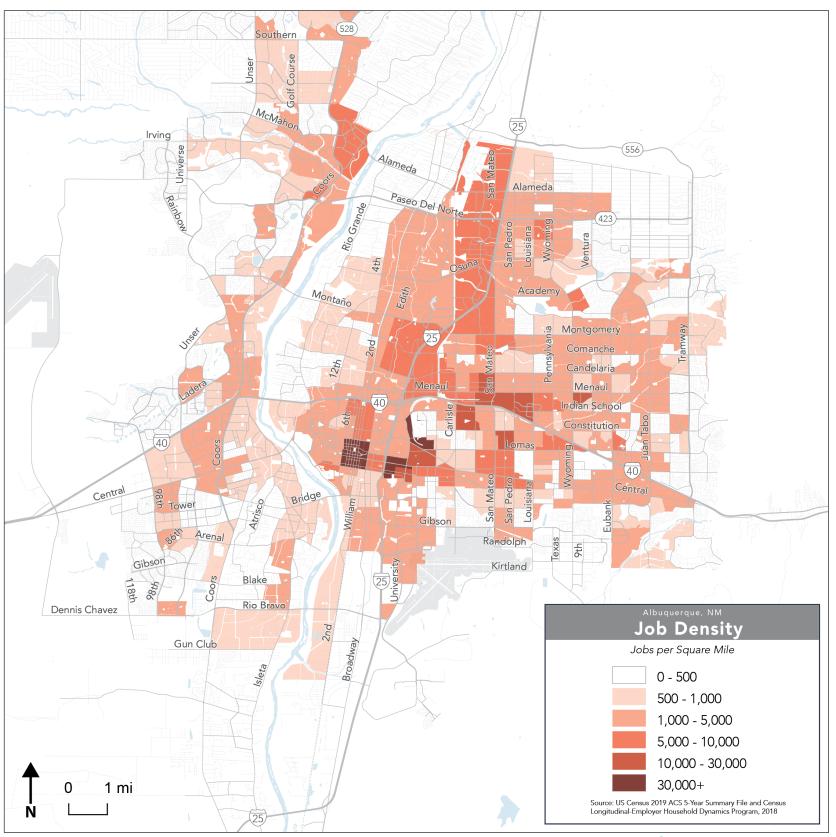
Because this peaked, one-directional demand from parking lots would be expensive and impractical for the City to serve, UNM provides a fleet of shuttles to handle it. In hopes of reducing its own parking and shuttle burdens, by getting more people to ride transit all the way to the campus area, UNM also paid for student bus passes through the end of 2021 (when the Zero Fares Pilot Program started).

#### Hospitals

Hospitals and medical centers are similar to universities in that commutes are only a fraction of the trips they attract. In Albuquerque, UNM Hospital, Presbyterian Main Raymond G. Murphy VA Medical

> Center, Lovelace Medical Center, PMG Kaseman Hospital are major destinations for workers but also for patients and visitors.

Unlike universities, hospitals do not have such pronounced one-way peaks in demand, though medical shift changes do tend to produce demand for service outside of traditional rush hours.



Job density in Albuquerque. The darker the color, the more jobs in the area. Many types of jobs also represent destinations for customers and visitors, such as jobs in retail, services, health care and education.

### **Activity Density**

Resident and job density can be combined in a single map that shows **activity density**. Activity density helps visualize the overall strength of the transit market in an area or along a corridor.

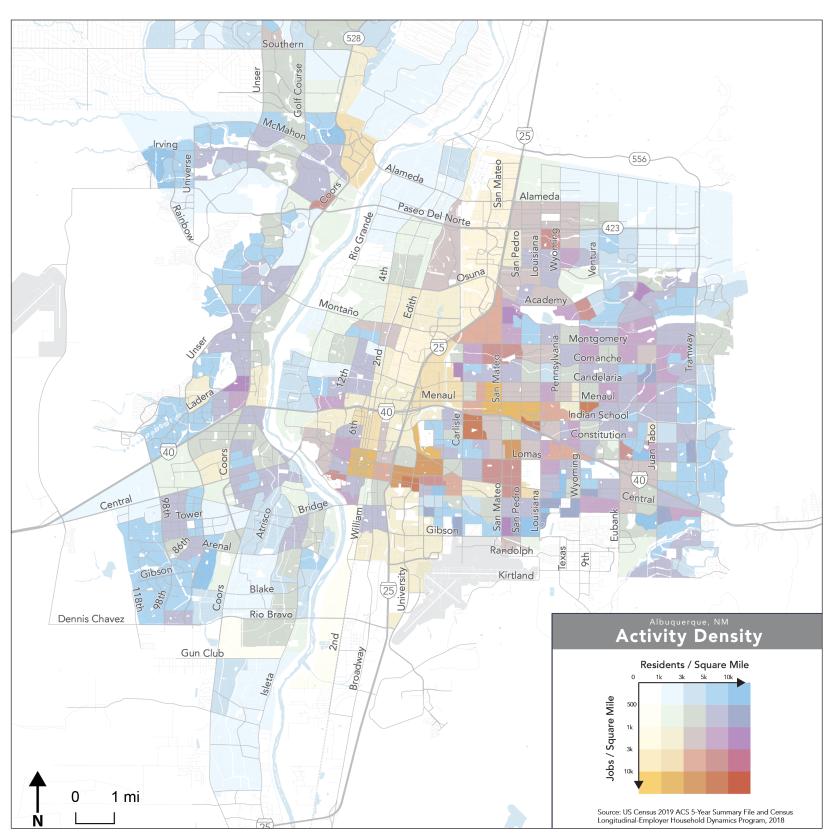
Places with more residential density are shown in increasingly brighter shades of blue; areas of high employment density, in brighter shades of yellow. The areas shown with increasing shades of reds and purples are places where there are high densities of both jobs and residents, and where there is likely to be a strong market for travel for most or all of the day.

In addition to density, the **mix of uses** along a corridor affects how many people transit can attract, relative to cost. This is because an area with a mix of housing, retail, services and jobs tends to generate more demand for transit in both directions, throughout the day.

Transit serving purely residential neighborhoods tends to be used in one direction and mostly during rush hours — as residents leave in the morning, and return in the evening. This makes for higher costs to provide the service, because:

• If ridership is only high during the morning and evening rush hours, the transit provider must run mostly-empty buses during the rest of the day. Or the transit provider might pay drivers

- extra to take split-shifts, which require working early mornings and evenings with a long mid-day break.
- If ridership is only high in one direction during rush hours, then the transit agency is driving mostly-empty buses back in the other direction. The service may be advertised as one-way, but the operating costs are always two-way.
- Transit agencies who run lots of peakonly service must buy, store and maintain extra buses for those few hours of service each day.



Activity Density in the whole region. Residential density is shown in shades of blue, job density is shown in shades of yellow, and places where residents and jobs are both present are shown in shades of red. The darker the color, the greater the number of jobs or residents in the area.

### **Strong Transit Market:**

Where residential, commercial and other uses are mixed, people are traveling in both directions so buses can be full in both directions.

Transit routes serving purely residential neighborhoods, or purely employment areas, tend to get less ridership, and cost more to provide, than routes serving a mix of land uses.

### Walkability

In almost all cases, transit trips begin and end by walking. On high-ridership transit networks, where transit is very relevant in the life of the city, nearly all trips begin and end by walking or cycling. On such networks, access by car (to a "Park and Ride") is generally a minor contributor to overall ridership.

This means that, if a city's goal is high relevance and high ridership, it is important to understand whether people can easily walk (or bike) to transit. About 50% of Albuquerque residents are more than 1/2 mile walk from some type of transit service, as shown in the graph on page 9.

The more jobs and residents there are near a stop, the stronger the transit market there. But the size of the market is also limited by the street pattern, since that determines how much of the area around a stop is truly within a short walking distance.

Areas with highly-connected streets provide short and direct walks between any two locations. Areas with poorly-connected streets, often in walled subdivisions next to freeways, force long and circuitous walks between locations.

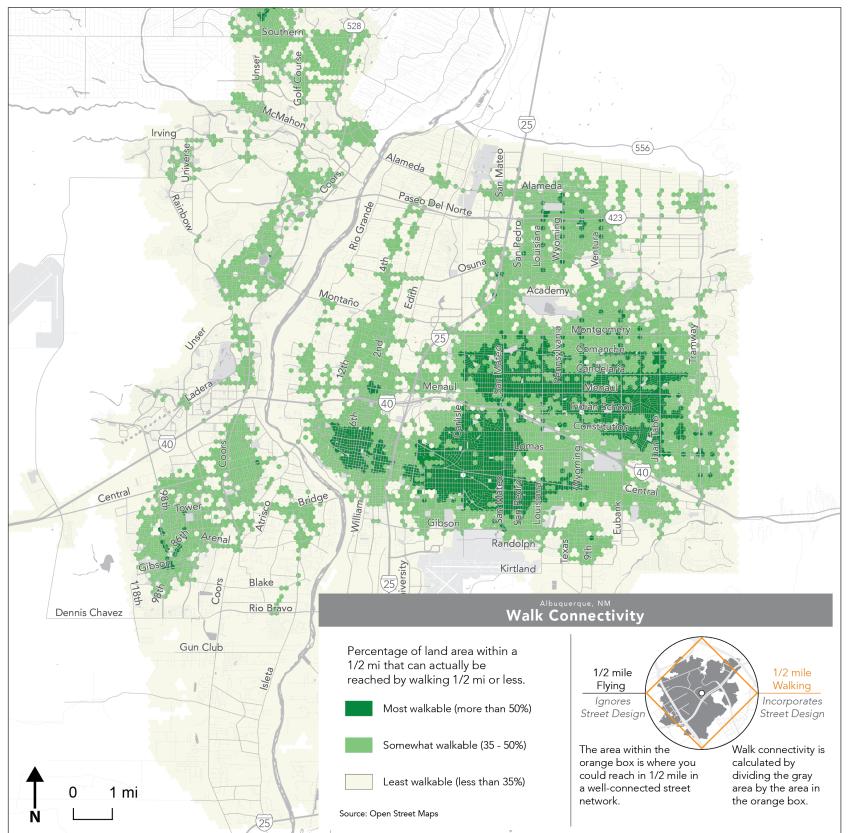
Actual walking distances to and from bus stops can far exceed "flying" distances. In a perfectly gridded street network, up to 64% of the area within a 1-mile radius can be reached by walking one mile using the street network. This number can be much lower with poorly connected street networks.

This map shows the walk connectivity between streets and pathways (including those along irrigation ditches). It does not account for the presence of sidewalks, of crosswalks, or the safety of intersections, all of which have a major effect on people's ability and willingness to walk to transit.

This means that some areas on the map that show

as having decent street connectivity still present barriers to walking due to safety concerns or limited crossing locations along major street intersections. Tramway Boulevard is an example of where intersections are spaced at a half of a mile or greater and pedestrian bridges are even more infrequent; the required additional walk to a safe signalized crossing is not represented in this map.

A lack of sidewalks and comfortable crossings of major streets mean that even fewer people and jobs are within a short walk of transit because people may have to walk further and less directly to cross the street to reach a bus stop.



Street and Path Connectivity in Albuquerque. The darker the color, the more street and pedestrian path connections are available, and the shorter and more direct walks can be between two points.

These issues around walkability are seen in cities and communities across the United States and they tend to follow similar patterns.

Neighborhoods built before 1950 tend to be more walkable, made of dense street grids with many intersections that make it easier to walk to bus stops or other neighborhood amenities.

Newer developments can have high street connectivity, even without a traditional grid of streets.

However, many newer developments are designed to minimize car traffic past the most valuable real estate. This is done in part with intentionally poor street connectivity. If streets don't go through, only residents will drive down them, forcing others to use the nearest arterial road to get anywhere. This puts more traffic on the arterials, making them harder to walk along and across. Meanwhile, due to the cul-de-sacs and lack of connections to the main roads, walking routes to the nearest bus stop are long and circuitous.

Areas around freeways, arroyos, rivers and railways tend to have few streets or paths that allow people to cross them, limiting access to transit stops just on the other side.

Both of these familiar street configurations can be found in Albuquerque and should be considered when thinking about where and how transit can serve the community.

The two neighborhoods shown as examples at right are both mostly single-use developments, with houses and little else. They are both fairly low-density, without many residents per square mile. But the area around Ladera Drive has poorly connected streets, whereas the area around Wellesley Drive has very well-connected streets. All else being equal, transit would likely attract more riders from the well-connected, walkable neighborhood than the disconnected one.

# How Street Design Impacts Walkability Circuitous streets and freeways often lead to poor walkability Highly-connected street networks lead to high walkability

## **Strong Transit Market:**

A highly-walkable street network is one element of a strong transit market because it expands the range of each transit stop or station.

## **High Transit Need:**

Neighborhoods with poor walkability may be so isolated from nearby services that the residents need transit in order to make short trips that are impossible to walk.



Ladera Drive and Painted Sky Elementary School: a single-use, residential area with cul-desacs and wide, high speed intersections, which make walking trips circuitous, long and unsafe.



Wellesley Drive and Bandelier Elementary School: a single-use, residential area, but highly-walkable with sidewalks and a denselyconnected street network that make any short trip easy and direct on foot.

# **Zero-Vehicle Households**

The map at right shows where in Albuquerque the households without vehicles are concentrated. You can see high numbers around the downtown, as would be expected in an area where parking can make car ownership more difficult. Similarly there are pockets of zero car ownership around UNM and CNM main campuses, where many students understandably find owning a car non-essential; south of Central near San Mateo and Louisiana; and in west Albuquerque near Central & Coors.

People who have less or no car access will need to use other modes when they travel. This might include walking, cycling, getting a ride from a friend or family member, or, if makes sense for their trip, transit.

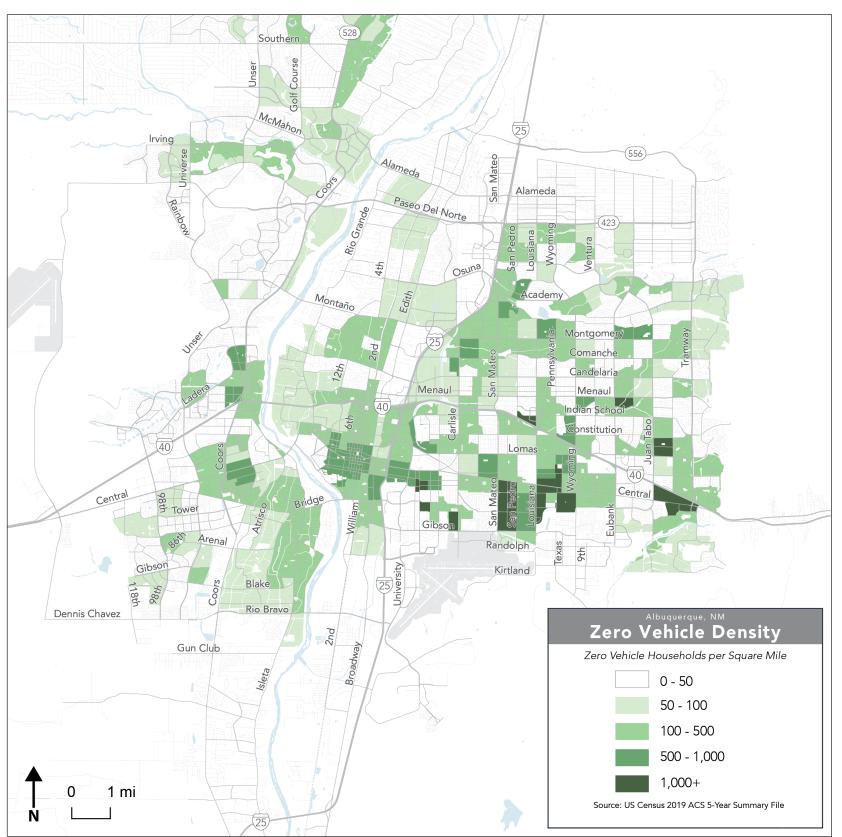
If transit does not present a realistic travel option, then people without cars will find other ways of reaching the places they need to go. People in households without vehicles are not necessarily "transit dependent" but do have a greater inclination toward transit use because they don't have a car in their driveway, always ready to go.

## **Strong Transit Market:**

Zero and low-vehicle households are often correlated with elderly or young residents, high student populations, and low incomes. These are all indicators of people's individual inclination to use transit.

## **High Transit Need:**

Transit can be especially helpful for those without access to a car, or those who cannot drive for a multitude of reasons. Transit can be a lifeline service for people facing isolation due to their lack of mobility.



Density of Zero-Vehicle Households in Albuquerque. The darker the color, the more zero-vehicle households in the area.

## **Low-Income Residents**

Transit is often tasked with providing affordable transportation for people with strong needs for transit, including lower-income people. Federal laws also protect people with low incomes from disparate transportation impacts, which is another reason agencies may provide transit service in places where poverty is high, even if the population served is small and the service does not get a lot of use.

Transit can be an attractive option for lowerincome people due to its low price and low barrier to entry. In neighborhoods with mediumto high density of lower-income residents, especially if they have walkable street networks, there is often high ridership potential.

However, an area with low-income residents doesn't *necessarily* generate high transit ridership just because of the residents' incomes. If transit isn't actually useful for the trips people need to make, in a reasonable amount of time, even lower-income residents will not use it. Most people can find other travel options, even if those other options cause them financial distress (such

as taking out a high-interest loan for a used car).

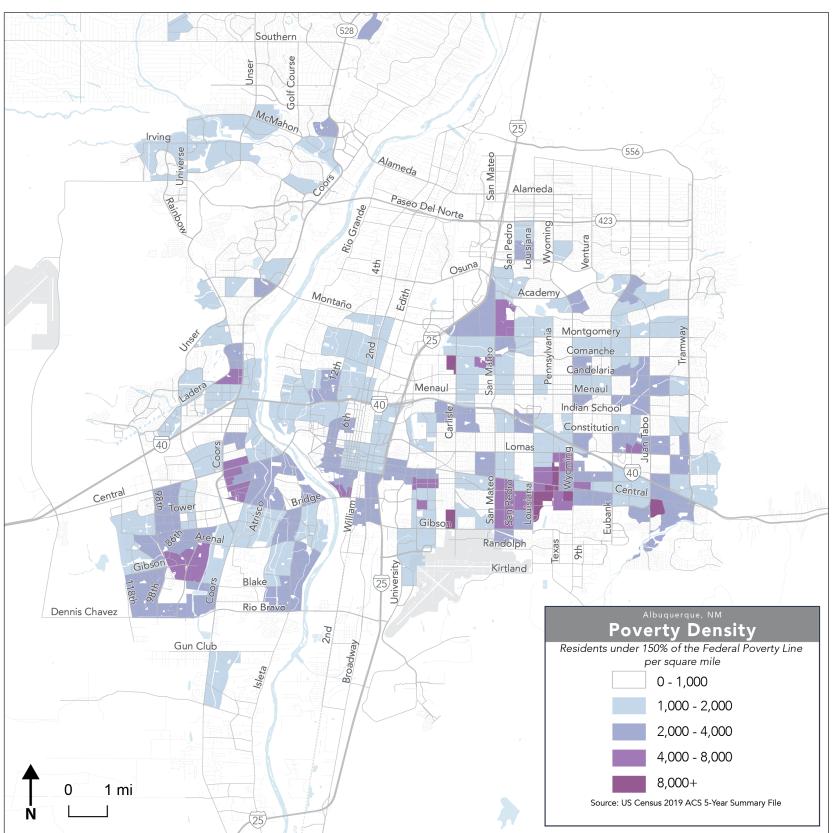
Understanding residents' incomes can therefore inform the design of both highridership transit services and coverage services.

## **Strong Transit Market:**

Low-income areas are often strong markets for transit, especially where people live at moderate or high densities and in a mix of housing and commercial developments.

## **High Transit Need:**

People living on low incomes often suffer from isolation, lack of economic opportunity, or lack of access to services. Improving transit access for lower-income people can be a major purpose of coverage services.



Density of Residents in Poverty in Albuquerque. Poverty is defined as 150% of the Federal poverty level. The darker the color, the more residents living in poverty in the area.

## **Senior Residents**

The map at right shows where seniors (those over the age of 65) live at high densities. Some places with high densities of seniors only show up with moderate density of all residents, in the map on page 33. These areas which have a high proportion of seniors tend to have retirement homes or senior-only housing developments within them.

Some seniors cannot drive and may be more likely to use transit. And as a group, senior-headed households are less likely to own cars than the general population. Understanding where seniors live in large numbers is an important part of designing coverage services.

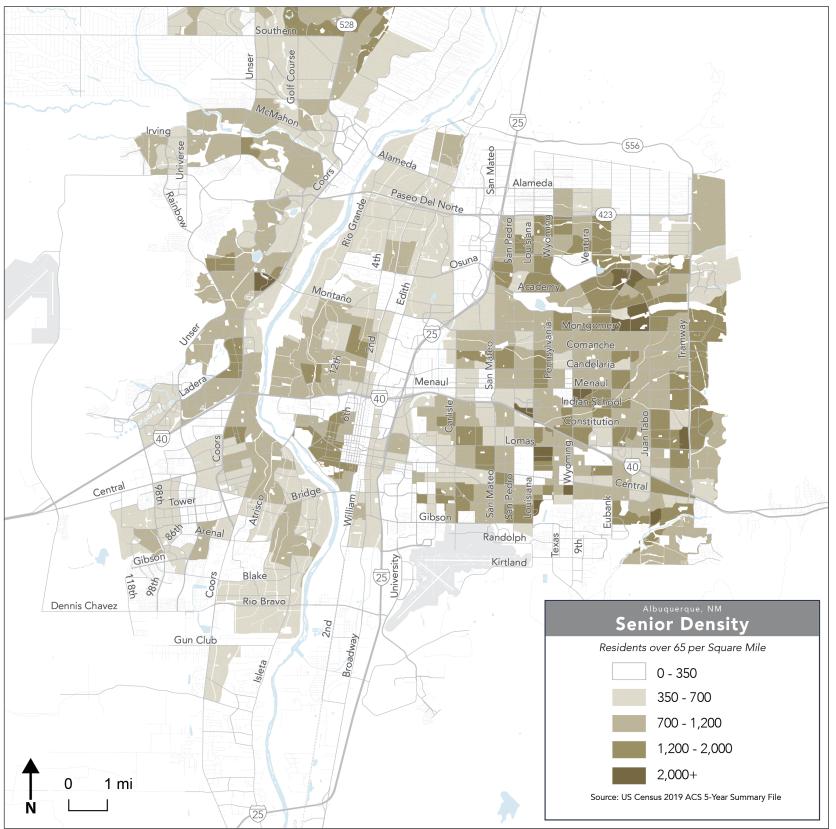
High ridership transit services are also very useful to and used by seniors, but they aren't designed on the basis of any single demographic group's needs or preferences. Rather they are designed to be useful for many different types of people and trips – including seniors.

Seniors tend to have different preferences for transit than younger people. Seniors are more likely to be sensitive to walking distance. On average, seniors also tend to be less concerned by long waits, slow speeds or indirect routes, because many are no longer working and have relatively flexible schedules. Most people who are employed, in school or caring for kids in school will find service with long waits and slow or indirect routes to be intolerable.

Due to these factors, transit service that is

specialized around the needs of seniors rarely attracts high overall ridership relative to cost. On transit services that are broadly-useful for many different people and many different trips, seniors are often an important part of the ridership on the service, as long as the vehicles, stations and sidewalks offer comfort and accessibility.

The map at right shows that the density of seniors is slightly higher in East Albuquerque, with pockets of high senior density north of Montgomery Boulevard and near Central Avenue. There are also some areas of high senior density located west of the Rio Grande, along Coors Road.



Density of Senior Residents at or over age 65 in Albuquerque. The darker the color, the more seniors live in the area.

## **High Transit Need:**

Seniors sometimes have a severe need for transit if they cannot or prefer not to drive. They are also more sensitive to walking distances and less sensitive to waiting times, which can be an important consideration in designing coverage services.

# **Young Residents**

Young people are like seniors in that they may not be able to drive. Young people and seniors are also often living on a tighter budget than working people, and can therefore be more sensitive to transit fares. Parents of multiple children who rely on transit can be quite sensitive to paying a fare for each child.

Whatever effect a change in transit price has on ridership among working age people, it generally has a stronger effect on ridership among young and old people. This is why most transit agencies (along with movie theaters and other businesses) offer discounts for seniors and children.

It will not be surprising if ABQ RIDE's Zero Fares Pilot Program has increased ridership among seniors, youth and students to a greater degree than among working and middle-aged people.

However alike they are in their price sensitivity, young people and seniors are very different in their ability and willingness to walk to transit service. Most young people can and will walk farther to reach service than seniors.

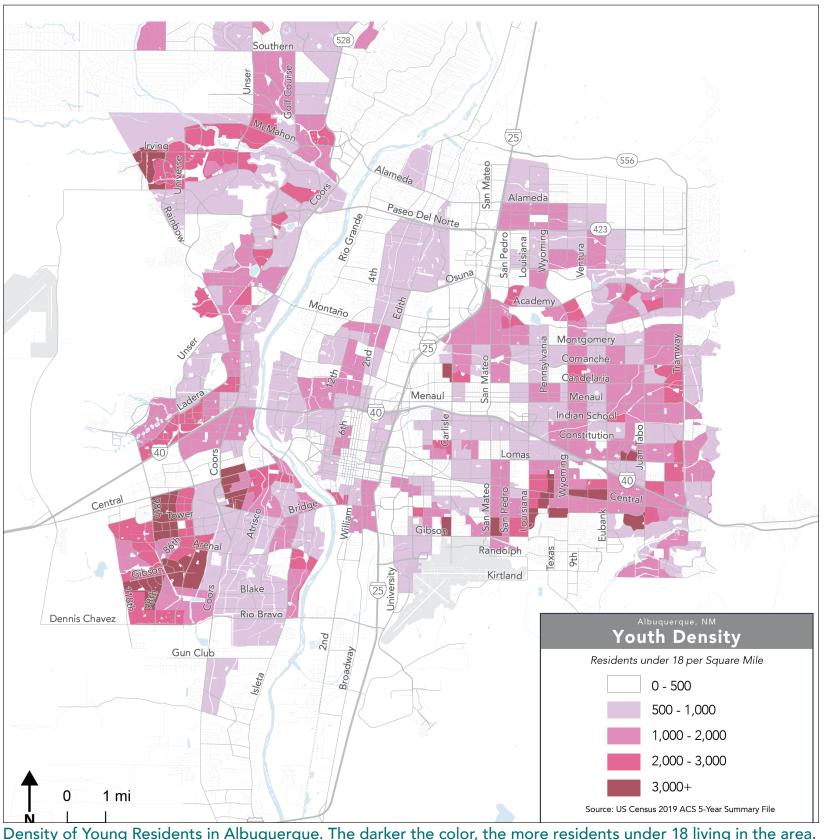
The map at right shows where people under the age of 18 live at high densities. The density of youth generally tracks with the density of residents overall.

There are some areas with moderate or high residential density which have comparatively low density of youths, and these areas are often retirement communities or have nursing homes.

You can also see much lower levels of young residents around the University. This is probably because many of the residents of this area are university students and do not have children or teenagers living with them. It is worth remembering that university students also often have limited incomes and vehicle ownership.

While middle- and high-school students sometimes ride transit in large numbers, their use of transit is often limited to school bell times, and imposes certain disruptions and costs on transit services (such as the need to send out extra buses to handle a bia surae of students).

However, integrating transit into the lives of young people is thought to be an important part of a long-term high ridership strategy, even if their ridership patterns during their school years aren't a boon for productivity.



## **High Transit Need:**

Just as transit coverage can meet the needs of seniors who cannot or choose not to drive, transit coverage can also meet the needs of children and teenagers who are too young to drive.

# **Socially-Vulnerable Residents**

The City's Office of Equity and Inclusion and the New Mexico Community Data Collaborative have assembled an index that represents social vulnerability and high transportation need. It includes these key population characteristics:

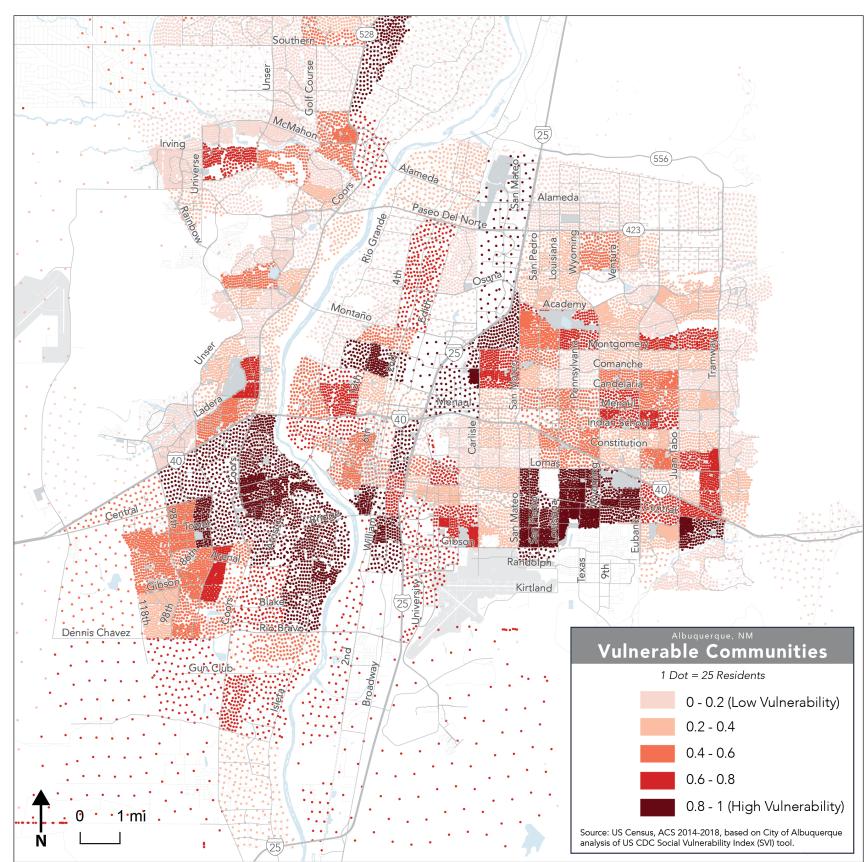
- Per capita income
- Population 65+
- Population 17 and under
- People with a disability
- Non-white population
- Limited English proficiency
- Multi-family (10+ units)
- Households with no vehicle

Populations that have higher rates of these indicators tend to have fewer transportation and mobility options and a more severe need for transportation. They are also more vulnerable to injury, death or ill health from exposure to traffic.

The map at right shows where socially-vulnerable residents live according to this index. Each dot in the map represents 25 residents, with the different colors representing the vulnerability score that has been calculated using the 8 indicators listed above. The areas with many dark red dots indicate high populations of vulnerable residents.

## **High Transit Need:**

The factors identified on previous pages as indicating transit need are combined, with others, in the City's Social Vulnerability Index. Areas with large numbers of socially-vulnerable residents may be a high priority for the provision of coverage services.



Socially vulnerable residents of Albuquerque. Darker hues indicate more severe rates of vulnerability according to the City's index. Where many dots are concentrated close together, many people live there at high densities.

# Race and Ethnicity

The map at right shows where people of different racial and ethnic identities live. Each dot in the map represents 25 residents, with the different colors representing Race or Ethnicity categories from the US Census.

Understanding where people of color live is crucial to fulfilling the obligations of Title VI and other federal requirements. These federal rules require that ABQ RIDE consider the benefits and burdens of transit service for historically-marginalized populations.

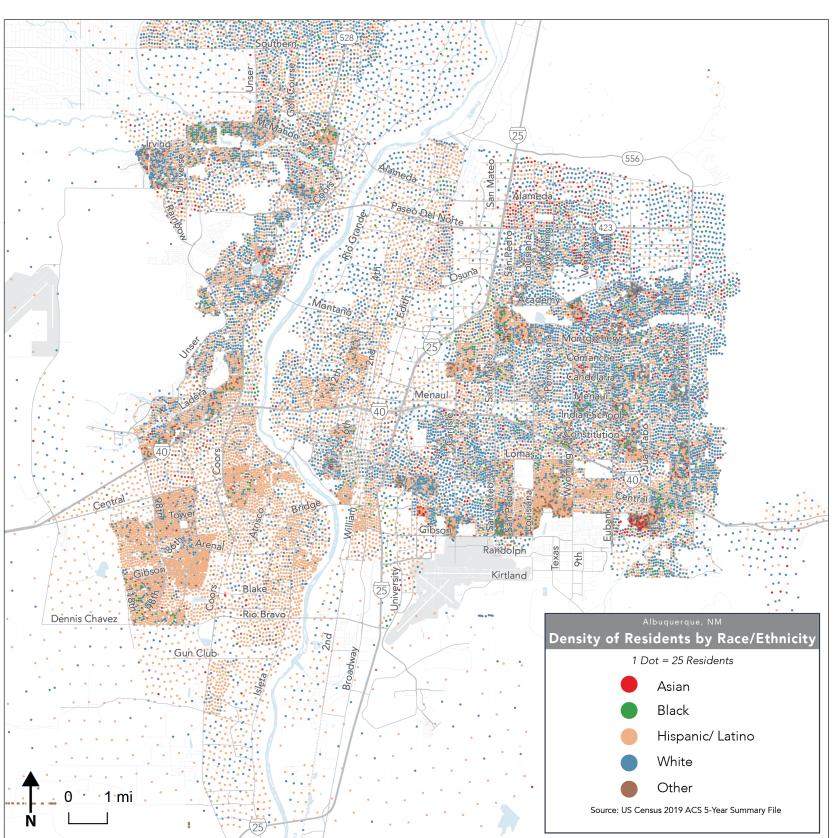
Designing transit service to reach people of color does not mean focusing solely on their residential neighborhoods. We also have to understand where people would like to go for work, shopping, services and social connection. There is less public data available to provide those insights, and so more insights have to come from local Albuquerque planners, stakeholders who know the community well, and the public.

This region, like most in the US, has a history of discriminatory practices in housing, hiring, criminal justice and other areas, which have led to geographic segregation by race. This means that when the City makes decisions about where to provide service, down which streets and in which neighborhoods, those choices have a racial dimension. The transit agency cannot assume that any bus route going down any road serves people of all different races, just because the region as a whole is diverse.

Intentional planning to address current and historic inequities can be an important goal beyond meeting federal requirements. Considering the racial geography of Albuquerque alongside the location and needs of others with severe needs for transit will be key to a transparent planning process, and to the design of a more equitable transportation system.

# **Civil Rights and Racial Equity:**

Understanding where people of color live is crucial to fulfilling the obligations of Title VI and other federal requirements. These federal rules require that ABQ RIDE consider the benefits and burdens of transit service for historically-marginalized populations.



Race and ethnicity of Albuquerque residents. Where many dots are very close together, the overall density of residents is higher. Where dots of a single color predominate, people of a particular race or ethnicity make up most of that area's residents.

## **Transit Access and the Built Environment**

Many factors outside the control of a transit provider – such as land use, development, urban design, and street design - affect transit's usefulness and overall access.

High-access and high-ridership transit networks focus service into frequent, all-day and all week routes. But these services are focused in particular places, where there is:

- **Density.** Where there are many residents, jobs and activities in an area, there are many things people can access and many potential riders near each bus stop.
- Walkability. If people can reach bus stops with a short and safe walk, that makes their transit trip quicker and more appealing.
- Linearity. Direct paths between many destinations are faster and cheaper for a transit provider to serve, which means more frequent service can be afforded.
- **Proximity.** The longer the distance between two places, the more expensive it is to connect them. When there are large, undeveloped gaps between destinations, agencies have to spend a lot driving buses past places with no riders. The more an agency spends covering distance, the less it can spend on better frequencies or longer hours of service.
- Mix of Uses. Mixed-use corridors tend to be very productive, because people ride in both directions at many times of the day. This means transit agencies can serve more people and trips for any given level of investment.

These five elements determine where transit can be useful for a large number of people, within any limited transit budget.

access, high-ridership network.

Focusing frequent, all-day service in places with Density, Walkability, Linearity, Proximity and a Mix of Uses is key to designing a high-

**DENSITY** How many people, jobs, and activities are near each potential transit stop?

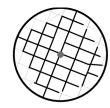
Many people and jobs are within walking distance of transit.



Fewer people and jobs are within walking distance of transit.

## WALKABILITY

Is it possible to walk between the stop and the activities around it?



The dot at the center of these circles is a transit stop, while the circle is a 1/4 mile radius.



The whole area is within 1/4 mile. but only the blackshaded streets are within a 1/4 mile walk.



It must also be safe to cross the street at a stop. You usually need the stops on both sides for two-way travel!

**LINEARITY** Can transit run in reasonably straight lines?

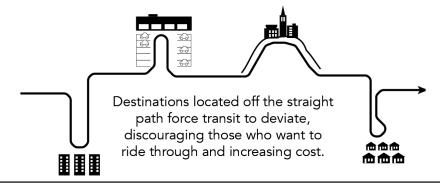








A logical transit line is a direct path between any two destinations on it.



**PROXIMITY** Does transit have to traverse long gaps?

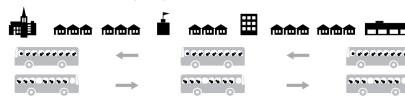


Short distances between many destinations are faster and cheaper to serve.



Long distances between destinations means a higher cost per passenger.

Mix of Uses Do people travel in both directions, all day?



A mix of land uses means buses are ridden in both directions, more times of the day and week.



Transit serving purely residential areas tends to be full in one direction, but empty in the other.

# **Examples: Density and Walkability**

Density and walkability are both key to highaccess, high-ridership transit networks. But they don't always go hand-in-hand.

These examples show different conditions of density and walkability from around Albuquerque:

- High density & high walkability: The International District in the Near Heights area. This area is among the densest parts in the region, particularly in terms of residential density. It has a highly-connected street network and closely-spaced crossings.
- High density & low walkability: 98th St. & Dennis Chavez Blvd. This area in South West Albuquerque with several recent developments has a density of over 5,000 residents per square mile. But cul-de-sacs, walls and fences separating adjacent communities also make it impossible in some cases to walk to the next nearest street. This disconnected street network puts residents far away from transit on the main roads, and limits walking or transit access to nearby jobs.
- Low density & high walkability:
  Stronghurst. This area just north of
  Downtown has single-family houses, some
  empty parcels and some large commercial or
  industrial properties. The street grid is fairly
  well-connected and walkable, but not a lot of
  people live or work in the area.
- Low density & low walkability: North Valley. This area of northern Albuquerque includes detached houses on long dead-end streets. The walks from many homes to a main street or bus stop are long, and there aren't many people there to make the walk.

Because these four neighborhoods are built so differently, the same amount of transit service in each area would result in very different access and ridership outcomes. International District
High Density; High Walkability



Stronghurst Low Density; High Walkability



98th St. & Dennis Chavez Blvd. High Density; Low Walkability



North Valley
Low Density; Low Walkability



Imagery ©2021 GoogleEarth

# **Examples: Linearity**

Linearity can be affected by geographic constraints (like rivers or steep grades) as well as by man-made obstacles like freeways, railroads or walls between developments.

The examples at right contrast a highly linear transit service with a deviating, circuitous service:

- Very Linear: Central Avenue. Central Avenue offers a straight path through the center of the city. Development concentrated along Central Avenue allows the bus to get close to many people and jobs while sticking to a straight route that through-riders will like as well.
- Not Linear: Southwest Albuquerque. Recent housing developments are located more than 1/2 mile away from the nearby main roads, with poor walkability out to the main roads. As a result, bus routes have to deviate off of 98th Street if they are to get service close to these residents. The deviation may be good for the new neighborhoods, but it lengthens the travel times of any through-riders.

Both street design and development decisions affect transit's directness and linearity:

- If development is concentrated into linear corridors, then transit can serve many people while still being direct.
- If development is placed far from main corridors, or down cul de sacs, then transit can either get close to many residents, or be linear and direct...but not both.

Finally, linearity affects transit operating costs, which in turn affects level of service. The more a transit provider spends on driving longer, deviating routes, the less is available to spend on better frequencies or longer hours of service.

#### Central Avenue Corridor: Linear



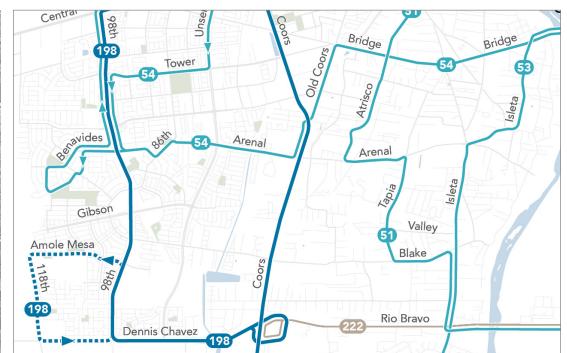


Imagery ©2021 Google, Imagery ©2021, Maxar Technologies, USDA Farm Service Agency

#### Southwest Albuquerque: Not Linear, Deviating



Imagery ©2021 Google, Imagery ©2021, Maxar Technologies, USDA Farm Service Agency



# **Examples: Walkability**

There are clusters of density throughout Albuquerque, but how efficiently these areas can be served by transit depends on how "proximate" they are to nearby areas of high activity, and also the diversity of land-uses, as we outlined on the previous pages.

Looking at Cottonwood Mall in northwest Albuquerque, we can see there are some high concentrations of jobs and shopping centers, but the distances and large parking lots make walking between destinations difficult. Heat is a major problem in areas that are dominated by parking lots. Even for the people living in the nearby apartments, high-speed roadways with long distances between crosswalks discourage walking.

In contrast, Uptown Center in northeast Albuquerque has added shops and jobs within the existing city street network. While there are still large parking lots, and the streets are fairly wide and fast, small-scale businesses provide destinations between the larger shopping complexes.

People living in the nearby neighborhoods have sidewalks and more crossing opportunities for their walks to transit and to local businesses. Even if someone drove to the area, they would be more likely to walk between destinations once they've arrived. The walks between transit and nearby homes, or transit and nearby commercial destinations, are shorter and more pleasant than at Cottonwood Mall.

#### Cottonwood Mall

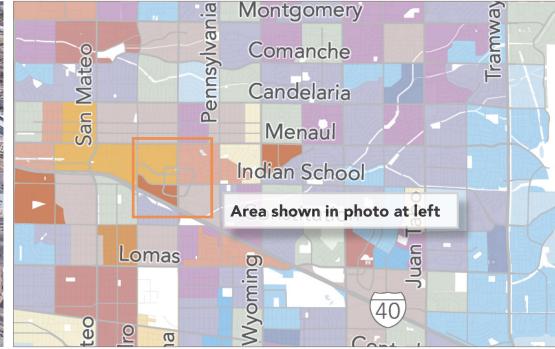


Imagery ©2021 Google, Imagery ©2021, Maxar Technologies, USDA Farm Service Agency

Cottonwood Mall has high density of jobs and shopping, but terrible walkability. On the map at right, yellow indicates a high density of jobs.

#### Uptown





 $Imagery @2021 \ Google, Imagery @2021 \ , \ Maxar \ Technologies, \ USDA \ Farm \ Service \ Agency$ 

Uptown is dense with jobs and shopping, but is more walkable. On the map at the right, yellow shows job density and red shows a dense mix of uses.

# **Examples: Proximity**

The Walmart Supercenter located in the northwest corner of the service area, at the intersection of Unser & Southern, illustrates how proximity impacts the cost to a transit agency of serving each additional rider.

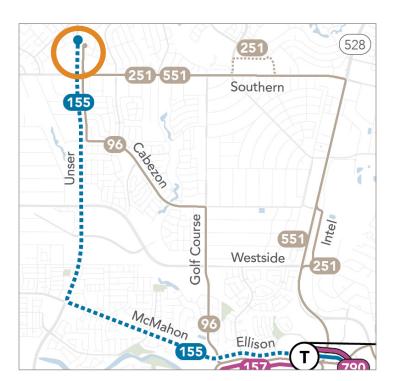
The map to the far right shows boardings at each bus stop, as red dots. The Walmart has a modest-sized dot, but there are very few boardings in the area between the Walmart and (on MacMahon/Ellison) the Cottonwood Mall. Covering long distances with transit is costly. The cost of covering that distance has to be justified by the modest number of passengers at the Walmart, because so few other people are riding over the long distance in between.

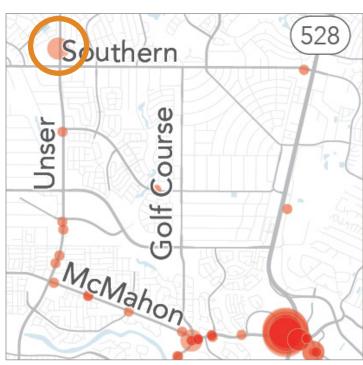
In contrast, a Walmart Supercenter located at Menaul & Wyoming in central Albuquerque shows how proximity makes providing service easy and efficient for ABQ RIDE. The Menaul and Wyoming corridors would still have routes on them if the Walmart didn't exist, because they are continuously dense, so any new development on those roads is incorporated into the transit network at little or no additional cost.

This illustrates how accommodating new development on the edges of the Albuquerque area is expensive, and will tend to stretch-thin the transit network. New development on the existing network, inside the city, doesn't add to transit costs. Proximate, continuous development is key to a highly useful, high-ridership network.

In transit, distance is time, and time is money. Driving long distances to serve new developments increases costs. When development is focused on the existing network, more people can be served cost-effectively.



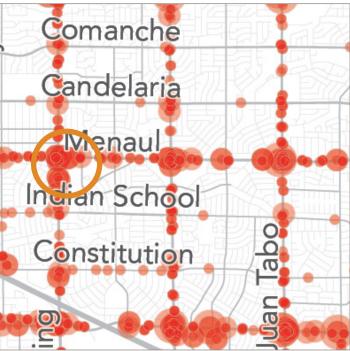




Walmart Supercenter at Unser & Southern: Because this is so far from other busy places, a long distance has to be covered to reach it. It is used by a modest number of riders (as shown by the red dot in the map at right) considering the high cost of covering the long distance.







Walmart Supercenter at Menaul & Wyoming: This store is on the way to other places, with continuous development all around. It is also used by a modest number of people (a red dot surrounded by many other red dots in the map at right). But because the route also serves dozens of other destinations very nearby, there are no extra miles driven and therefore little extra cost involved in serving those people.

# **Network and Route Performance**

# The Transit Network through the Day and Week

## Weekdays

The maps at right show how the availability of service, and service with good frequency, changed through a weekday in 2019.

#### **Rush-hours**

The highest frequencies and the most routes are offered during rush hours (6 am - 9 am and 3 pm - 6 pm).

Routes 1, 2 and 31 have higher frequency during this period, while some routes (such as Routes 34, 94 and 222) only operate during rush-hours.

Some of the rush-hour-only routes actually provide only one direction of service – a person can ride them in one direction during the morning, but not the other direction, and vice versa in the evening. Thus there is even less service than might be implied by the thinnest

## Midday

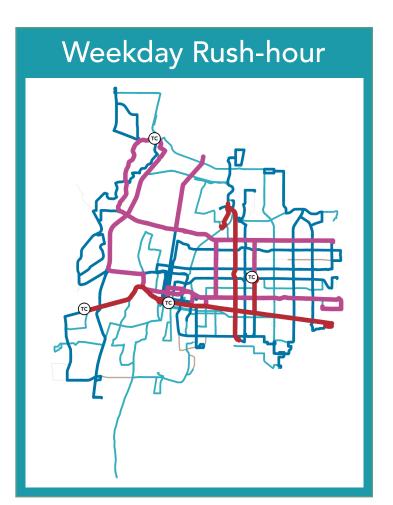
lines on this map.

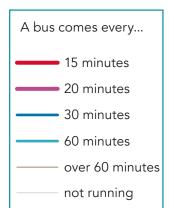
Most of the routes that offer 25-minute frequency or better at rush hours are kept at that frequency during the midday. Even so, there is only one place in the network where routes coming every 15 minutes or better (red lines) cross: Central and San Mateo. Such an intersection of high frequency routes makes transfers in any direction easy and quick.

Where pink and red lines cross, transfers would involve as much as a 25 minute wait – not terrible, but not an amount of time most people are willing to spend waiting at a bus stop on the side of a busy road.

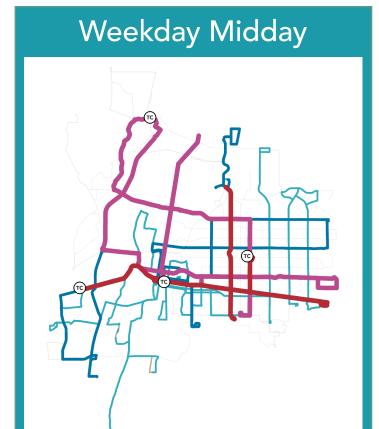
#### Night

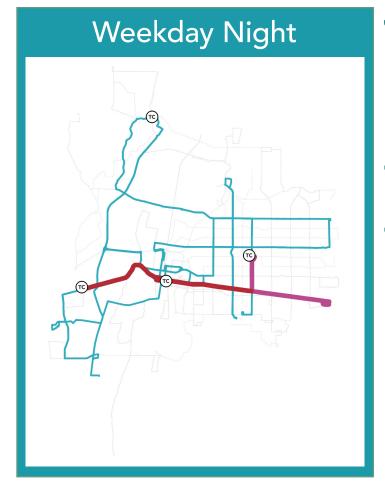
By 9 pm in the evening the network is greatly reduced. The most frequent daytime routes are turned down to hourly service, except for ART. You can visualize how someone living within





walking distance of Central Avenue could take a service or retail job, or a shift job, if it is also located along Central Avenue, because that's the one corridor where frequency stays high for their commute home.





## **Rush-Hour Service**

What role will rush-hour transit service play in the Albuquerque transit network moving forward? One of the changes caused by the Covid pandemic has been a hastening of the decline of rush-hour transit ridership, as many white-collar workers keep a work-from-home schedule. Even before the pandemic, rush-hour services saw declining ridership and high costs.

Rush-hour-only service makes up a small percentage of ABQ RIDE's annual operating budget. But two questions will arise in planning and scheduling future services: Is rush-hour ridership is more important than ridership at other times? Are rush-hour-only routes an acceptable minimal service level for covering an area?

## **Saturdays and Sundays**

The maps at right compare the transit network between weekdays, Saturdays and Sundays, in 2019. This is the network that the City has the funding to provide today, but that cannot be entirely provided due to the driver shortage.

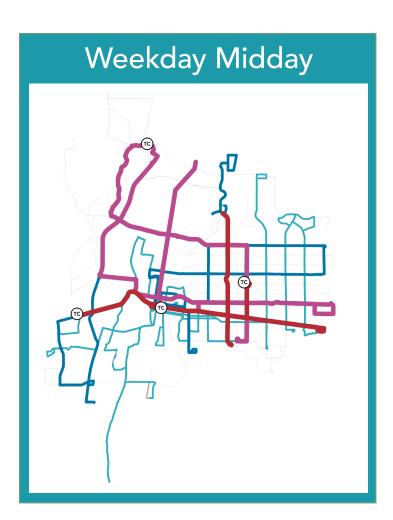
In 2019, nearly half (19 out of 40) of the ABQ RIDE bus routes operated *only on weekdays*. Most of the routes that continued operating on Saturdays and Sundays offered poorer frequencies and shorter hours of service than on weekdays.

We can compare ridership by day to the hours that ABQ RIDE buses are on the road, providing service. This ridership relative to service is known as "productivity." In early 2022, productivity held up surprisingly well on weekends despite the dwindling network:

Days	Bus service as a % of weekday	Average 2022 productivity (Boardings relative to service level)
Weekday	-	18
Saturday	70%	13
Sunday	56%	14

On Sundays, the network is reduced almost in half, and the places a person can go are similarly reduced by almost half. Yet the number of riders using it per hour of service provided is reduced only by one-fifth. And on Sundays, the network is actually *more* productive than on Saturdays, despite offering *less* service.

This suggests that there is more demand for service on weekends than is met by the existing network, if many people are still willing to ride at times when so little service is offered.

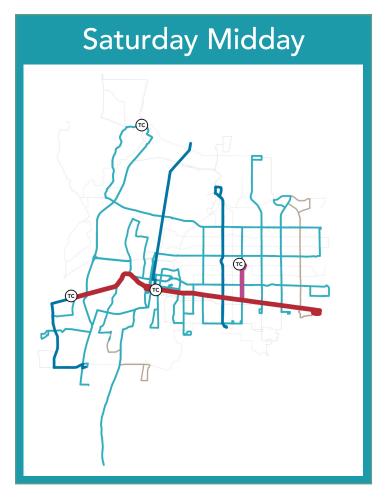


#### **Weekend Commutes**

ART and Route 66 are the only lines still offering service every 15 minutes on Sundays. On weekends, there is no frequent network – no place where a transfer can be made between two routes coming every 15 minutes or better, such that someone could commute to and from work without having to bear a long wait.

For decades transit has been designed and scheduled for an 8-to-5 weekday worker. Many transit providers run much less service on weekends than on weekdays.

As retail and service jobs become a bigger part of the US economy, this focus is shifting in many cities. As labor shortages affect retail and service industries, employers are looking to



remove barriers to employment on the weekends when those industries are all-hands-on-deck. Anemic weekend transit networks are one barrier between potential workers and the retail and service jobs that need them.

## **Shopping and Services**

In addition to the commutes of service and retail workers, trips for shopping, socializing and to reach services are made on weekends by many different people. If people need to own a car to do their shopping on Saturday and Sunday, they are more likely to use that car for weekday trips as well, even if the transit service on weekdays would be adequate for them.

Modern high-ridership transit systems are no longer five-day-a-week systems that send riders





looking for other solutions on weekends. Prior to the pandemic, the US cities that were growing transit ridership and relevance were the ones that invested in all-day, all-week networks.

# Where Are People Riding Today?

Detailed data was collected on-board ABQ RIDE buses in the first five months of 2022. This allows us to visualize and analyze where people are riding transit now.

The map at right shows this data. Each dot shows the average number of weekday boardings at each ABQ RIDE bus stop.

High ridership areas and corridors can appear in two different ways on this map: either as a few large dots, or as multiple medium-sized dots that are very close to each other. Looking for those patterns we can observe that the highest boardings occur:

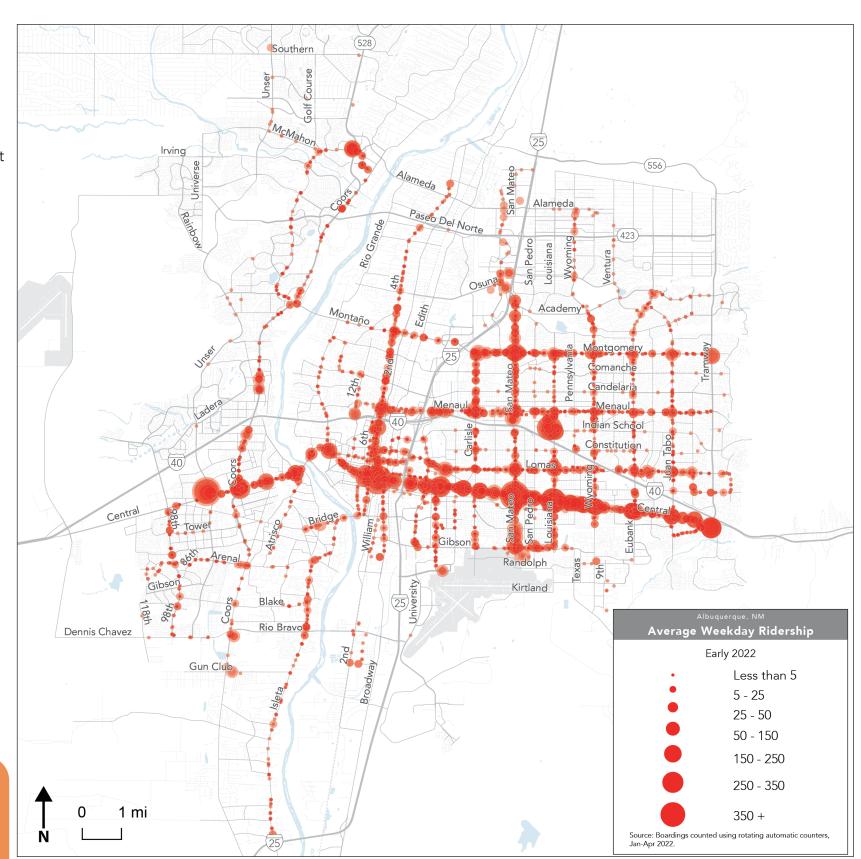
- Along Central Avenue where there are many activities, a mix of uses, and the ART and Route 66 combine to provide high frequency all-day.
- Large dots can be found at the major Transit Centers (TCs). Alvarado TC in downtown, Central & Unser TC in west Albuquerque, and Uptown TC at the end of the 766 ART Red Line all have large numbers of boardings. This data alone cannot tell us if these boardings arise from high demand near the Centers, or from transfers between buses at the Centers.
- A pattern of high boardings can be seen along San Mateo, 4th Street, Montgomery, Menaul and Lomas.

There are some medium-ridership areas that are more scattered or isolated. Most of them are attributable to specific generators like big apartment buildings, social service providers, or large retail areas.

Looking at this map, we must keep in mind that not every stop is offering the same level of service to these riders. This boarding data tells us something different, depending on the service level it is responding to:

- A small dot on a low-frequency route may simply reflect the low level of service offered.
- A small dot on a more frequent route would suggest low demand for transit near that stop.
- A large dot on an infrequent route means that ridership is high despite a low level of service, which suggests that nearby transit demand may be high.

Central Avenue is the only place in the city with high frequency service all-week long. It's also where the most people use transit, by far.



Average weekday boardings per stop (for all routes) counted in the first five months of 2022.

# Ridership and Productivity by Route

The table to the right shows each route's average weekday boardings, service hours, and productivity in 2022.

#### Ridership

Some transit agencies and cities have adopted a goal of "maximizing ridership." Implicit in this statement, however, is a constraint: there is a limit to how much funding is available to increase ridership. The transit agency cannot spend infinite amounts of money pursuing each additional rider in pursuit of "maximum" ridership.

The more specific way to state this goal, then, is "maximize ridership within a fixed budget."

Even if the budget grows, it is and will always be limited.

People who value the environmental, business, or development benefits of transit will talk about ridership as the key to meeting their goals. Since their transit agency is operating under a fixed budget, the measure they should be tracking is not sheer ridership but **ridership relative to cost**. They would not be satisfied simply by a large dot on the boardings map on the previous page, or a high ridership number for a route in the chart to the right, until they knew what it cost the transit agency to achieve that large dot.

#### Service Hours

The cost of a transit route relates primarily to the time spent by operators running the route, since most of the cost of transit is in the wages paid to everyone running the system day-to-day. In the transit business, the measurement of time spent operating service is called "service hours" or sometimes "revenue hours of service". One bus operating on a route, picking up and dropping of people has spent one "service hour".

The service hours provided on any particular route, and to any particular stop, will depend on a few factors:

- The **length** of the route.
- The operating speed of the bus (since a slower operating speed means that covering the same distance takes more time).
- The **frequency** of service along the route or to the stop (since higher frequency is supplied by more buses and operators out driving the route).
- The **span** of service along the route each day and each week.

#### **Productivity**

Ridership relative to cost is called "productivity." Productivity is measured as boardings per service hour.

# Productivity = Ridership / Cost = Boardings / Service hours

Productivity is strictly a measure of achievement towards a *ridership goal*. Services that are designed for *coverage goals* will likely have low productivity. This does not mean that these services are failing or that the transit agency should cut them. It just means that their funding is not being spent to maximize ridership.

The three most productive routes in Albuquerque in 2022 are Route 66 and the two core ART Lines (Red & Green). These are the only routes in the system that offer all-day, all-week frequent service (in part because ABQ RIDE has invested in high levels of service where many people ride). They provide this frequent service along a linear, dense, mix-used corridor with many lower-income residents, workers and students along it.

This data reveals that, even after the pandemic, the routes City staff have chosen to prioritize for frequent, all-week service are the routes that are serving the most people in total, and the most people relative to the service investment.

	Route Name	Ridership (Average Weekday Boardings, 2022)	Service Quantity (Revenue Hours per Weekday, 2022)	<b>2022 Productivity</b> (Boardings per Hour)	2022 Frequency (Midday Weekday)
66	Central Avenue	4,135	146	28.3	15 min
777	ART Green Line	2,603	96	27.2	20 min
766	ART Red Line	2,556	101	25.4	20 min
141	San Mateo	1,099	46	24.1	30 min
11	Lomas	1,057	46	23.0	30 min
5	Montgomery/Carlisle	1,402	61	22.9	30 min
8	Menaul	1,575	69	22.8	30 min
10	North Fourth Street	862	40	21.3	30 min
140	San Mateo/CNM Work Force	937	50	18.7	30 min
157	Cottonwood/Montano/UTC	1,118	77	14.6	30 min
31	Wyoming	421	32	13.3	45 min
97	Zuni Express	144	13	11.2	60 min
155	Coors	694	62	11.1	30 min
198	98th / Dennis Chavez	202	18	11.0	30 min
16	University/Gibson/Broadway	386	37	10.5	45 min
53	Isleta	289	28	10.2	45 min
1	Juan Tabo	306	32	9.6	45 min
50	Airport/Downtown	222	24	9.2	30 min
34	San Pedro Commuter	10	1	8.5	Peak service
54	Bridge/Westgate	272	33	8.3	45 min
2	Eubank-Ventura	191	23	8.2	60 min
12	Constitution Commuter	11	2	7.1	Peak service
51	Atrisco/Rio Bravo	93	13	7.0	60 min
790	Blue Line Rapid Ride	199	40	5.0	30 min
6	Indian School Commuter	5	1	3.7	Peak service
222	Rio Bravo/ Rail Runner/KAFB	16	5	3.6	Peak service
92	Taylor Ranch Express	8	2	3.5	Peak service
96	Crosstown Commuter	18	6	3.3	Peak service
37	Rio Grande/12th Street	38	12	3.3	60 min
217	Downtown-KAFB Ltd.	8	3	3.1	Peak service
93	Academy Commuter	4	1	3.0	Peak service
36	12th Street/Rio Grande	34	12	2.8	60 min
98	Wyoming Commuter	8	3	2.7	Peak service
7	Candelaria Commuter	4	2	2.7	Peak service
251	ABQ-Rio Rancho Rail Runner	 11	5	2.3	Peak service
94		4	2	2.2	Peak service
250		7	4	2.0	Peak service
13		2	<u>.</u> 1	1.6	Peak service

# Productivity by Time of Day and Day of Week

The chart to the right, which is repeated from the Summary, shows a measure of productivity over each hour of the average weekday in early 2022.

- The **Blue Line** represents boardings or ridership throughout an average weekday.
- The Yellow Line shows bus trips, which approximates the quantity of service being put out by ABQ RIDE in each hour.
- The **Red Line** is a measure of productivity in each hour the boardings divided by the number of bus trips provided in each hour.

#### Weekday Ridership

The **Blue Line**, shows ridership increases through the morning and peaks between 2 pm and 3 pm Total ridership during this early-afternoon peak is more than 50% higher than ridership during the morning rush hour.

The shape of this daily demand is similar to that in other cities with large universities, where class start times are staggered throughout the morning. The afternoon peak may be increased by surges of middle- and high-school students, who are more likely to be driven to school in the morning than to be picked up in the afternoon. Finally, people running errands, and service workers commuting, also have reason to be out riding transit in the early afternoon.

It's important to remember that this chart shows ridership in each hour alone, without the context of how much service ABQ RIDE has provided to attract that ridership. We can also look at the productivity over each hour of the day.

## Weekday Service Levels

The Yellow Line shows the number of trips made by ABQ RIDE vehicles on all routes throughout the day. You can see the yellow line has two humps around the morning and afternoon rushhour periods. This increase in service happens from all-day bus routes adding additional buses and increasing frequency for the rush-hour period or from rush-hour only routes which do not run throughout the day. This rush-hour focused service pattern has become standard practice throughout most US transit agencies, as they look to support traditional 9-5 office workers.

#### Weekday Productivity

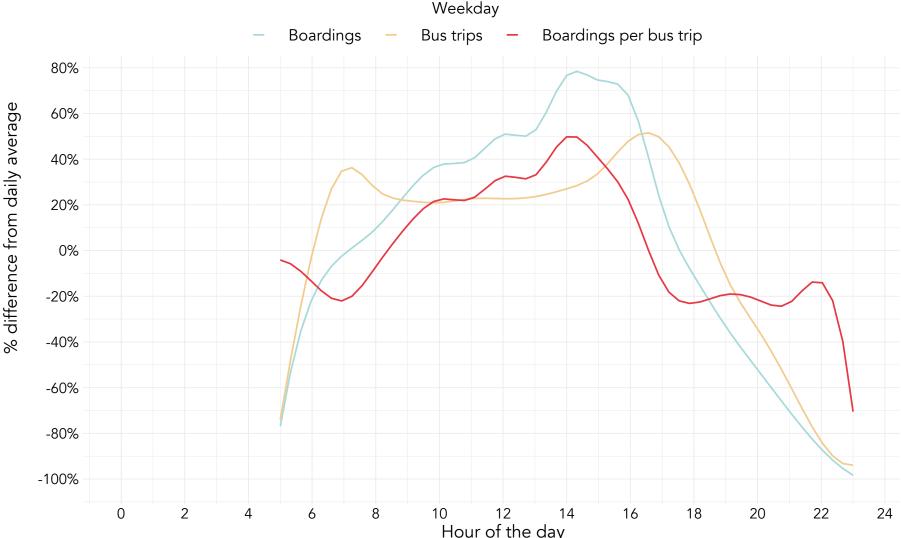
The **Red Line** shows how system productivity changes throughout the day. Similar to looking at the overall productivity of each route, discussed on the previous page, looking at system productivity throughout the day can help reveal when total bus service and ridership are mismatched.

From this chart we can see that during the AM rush-hours, when extra service is put out (the hump in the yellow line) but total ridership is still fairly low (the blue line), productivity is quite low. It's slightly lower between 5 pm and 6 pm, for the same reason.

Peak productivity occurs after 2 pm, which ridership is peaking but no extra service is yet out on the street. This is probably when buses are most full, and in the case of the highest-productivity routes they may even be crowded.

Finally, there is a bump in productivity between 9 pm and 10 pm at night, as the supply of bus service falls away but boardings fall more slowly.

## ABQ Service and Ridership - 2022



This chart compares ridership (Boardings), service levels (Bus trips), and productivity (Boardings per bus trip) throughout an average weekday.

# **Productivity and Frequency Relate**

The scatter plot at right shows the individual routes from ABQ RIDE, each plotted according to their midday frequency (on the horizontal axis) and their productivity (on the vertical axis).

The data points form a curve, up and to the left. More frequent services tend to have higher productivity (ridership per service hour), even though providing high frequency requires spending more service hours. (This is true not only in the ABQ RIDE region but also all over the world.)

This happens because frequent service is the most useful and convenient service for riders; thus, transit agencies typically target this most expensive service towards their strongest markets. When frequent service is available to people in a suitably dense, walkable environment, high ridership is a common result.

As always, the "outliers" are the most interesting parts of this graph:

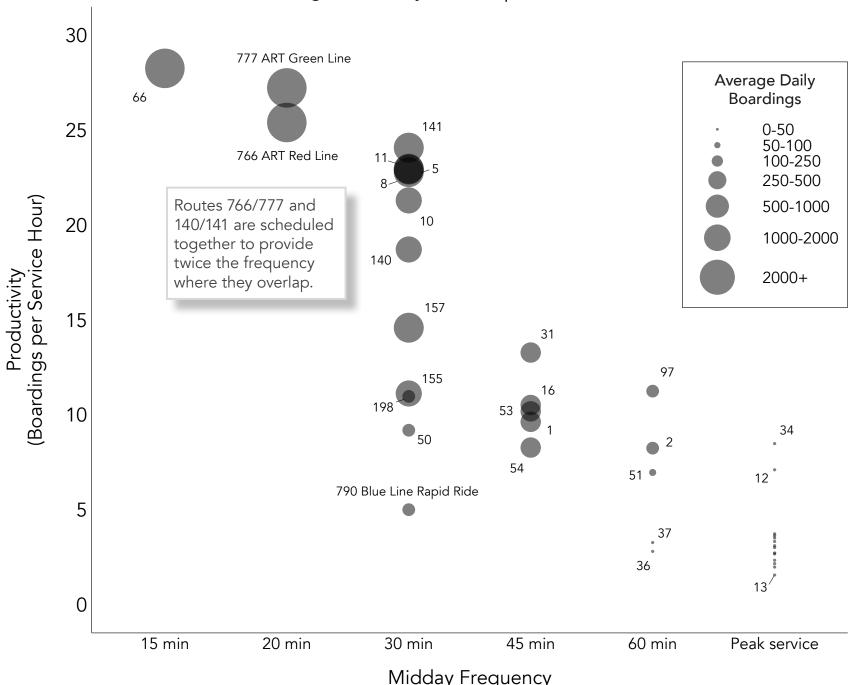
- Route 66, 777 ART Green Line, and 766
   ART Red Line are by far the highest productivity routes in the system, and all three serve Central Avenue. Route 66 makes closely-spaced stops while the ART lines stop every 1/2 to 1 mile.
- Route 790 ART Blue Line Rapid Ride is the least productive route in the 30-minute category. This is not surprising given that it serves downtown and UNM with 30-minute frequency on weekdays, only hourly service on Saturdays and no service on Sundays; yet weekday commutes to office jobs are reduced due to the pandemic, and some UNM classes were meeting virtually in spring 2022. Route 790 takes people very long distances, so the productivity measure (boardings per hour) is not the perfect measure of the good it is doing in terms of avoided car mileage.

When frequent service is available to people in a dense, walkable environment, high ridership often results.

- Route 31 and Route 97 both have the highest productivity in their frequency categories. Both are very linear routes crossing multiple higher frequency routes.
- Peak routes, in general, are low productivity services. You can see that only Routes 34 and 12 are producing over 5 boardings per service hour.

## **ABQ Route Frequency and Productivity (Spring 2022)**

Average Weekday Ridership and Service Level



(minutes)

**Productivity by Route in Spring 2022** 

# **Productivity and Linearity**

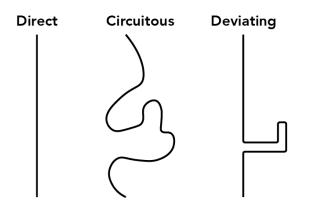
Highly productive routes often operate very linear alignments, meaning they offer people direct travel. While a linear route will not guarantee high productivity it has benefits for riders and it allows the agency to run more efficient service.

Direct and linear routes can help potential riders quickly understand and see how the route operates.

Think of Route 11, which runs primarily along Lomas Boulevard, and can easily be described as the "Lomas Route." Having a linear route operating on a single (or sometimes two) strong corridors allows riders to quickly visualize how they can complete their trip. If they are traveling to or from a destination on Lomas Boulevard, they know that Route 11 will be required for their trip. If they need to make a transfer they can simply get off another bus where it intersects with Lomas Boulevard to make the connection to Route 11.

For the transit agency, being able to run direct routes along linear corridors is key to efficiency and high frequency.

In transit, covering distance takes time, and time is the major driver of operating costs. Direct, linear routes are shorter than circuitous, deviating routes.



Shorter routes can be operated at better frequencies, or for longer hours of the day, at the same cost as longer routes.

When development is organized along a linear path, the transit provider can run better frequency than would be affordable if it were a circuitous and deviating route.

If routes need to zigzag into neighborhoods to reach off-street destinations or to navigate a disconnected street network, this makes the route longer. The longer distance makes it either more expensive to provide, or less frequent – which is worse for riders.

## **Linear Route Shapes**

The highest productivity routes are highlighted in red in the scatterplot at right. These routes are all shown on the next page, by themselves.

Linearity is a common feature of all of these routes. These routes also all offer seven-day-a-week service, though service hours are fairly short on Sundays for some of them.

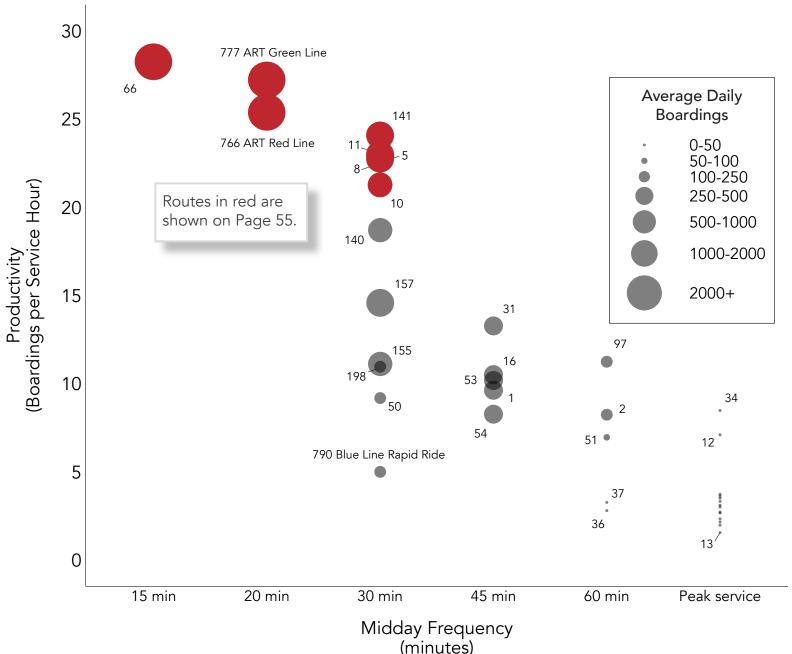
Even Routes 5 and 8, which appear to be non-linear as they form an L-shape, are actually providing the most direct path that is physically possible by car, transit, walking or biking. They connect the east side to downtown via the grid of arterial streets. Only birds can make the trip in a more direct way.

## **Central Avenue**

ART Green and Red Lines (777 & 766) and Route 66 all run frequent service along Central Avenue. This linear pattern combined with the very frequent service, high densities, mixed use and walkable environment, major destinations (like UNM and CNM), and seven-day per week service all work to make Central Avenue the strongest transit corridor in the whole city.

## **ABQ Route Frequency and Productivity (Spring 2022)**

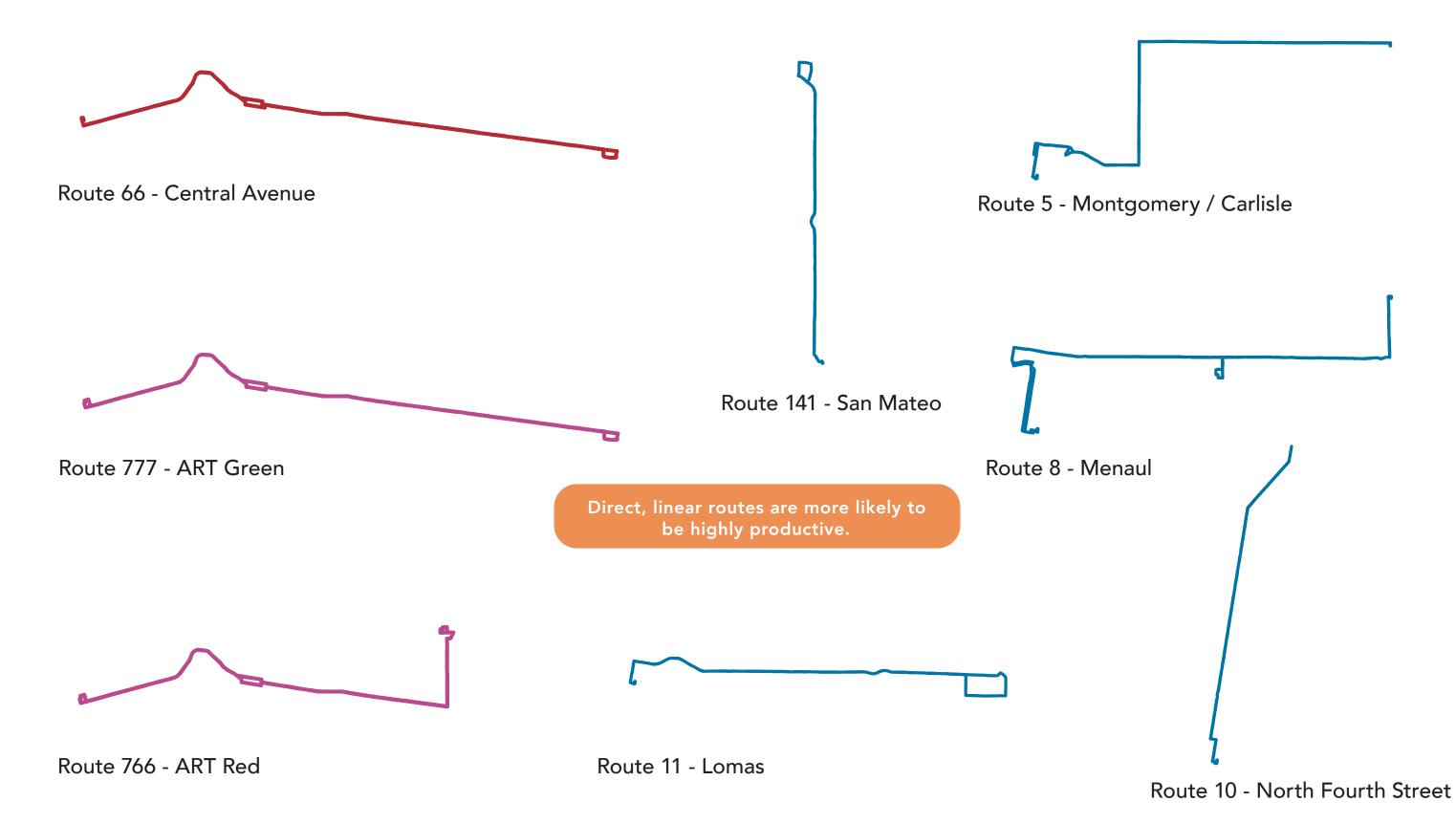
Average Weekday Ridership and Service Level



Direct paths between many destinations are faster and efficient to operate, which means more frequent service can be afforded.

Linear routes are also easy to understand and appealing to potential riders.

# **Linear Route Shapes**



## **Circuitous or Deviating** Routes

Routes that are circuitous or deviating tend to be less productive.

Sometimes this is because they are designed with Coverage goals in mind, so the transit agency is not even trying to attract high ridership relative to their cost. Instead, the transit agency may be trying to provide short walks to service, and to that end is deviating off main arterials or into hard to reach places in order to bring service closer to specific people or places. Or a route may be sent to zigzag around a neighborhood to overcome a disconnected street network or take people across an road that is too dangerous to cross on foot.

Circuitous and deviating routes are often very long, much longer than they seem on a map. This increases their operating cost, and makes it hard for transit agencies to provide high frequencies or long hours of service on them. In addition, many transit riders will walk a little further to reach more direct or more frequent routes, so agencies sometimes invest more service into nearby linear routes.

A few examples of circuitous, low-productivity routes are described here:

#### Route 51

Route 51 runs between Central Avenue and Mountain View via Atrisco Drive and Rio Bravo Boulevard. With poor frequency and a squiggly path, and a lack of major destinations on it, high ridership is not a reasonable expectation on this route. Also, many of Route 51's potential riders could walk farther to reach either Route 155, which is coming every 30 minutes and connects directly to Central Avenue, or Routes 53 or 54, both which connect directly to Downtown Albuquerque.

However, Route 51 is covering neighborhoods that are far from any other route, and helping people connect from those neighborhoods to the rest of the city without a very long walk.

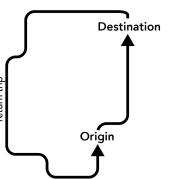
#### Route 54

Route 54 connects downtown with the Central & Unser TC on the west side, but it takes a very circuitous path between them. For anyone traveling between those end points, higher frequency and more direct options are available, so no one would ride Route 54 end to end.

Route 54's purpose is covering a few areas that are far from any other route on a main road.

One neighborhood on Route 54 is covered only with one-direction of service. For people there to make their round trip, they have to ride around the whole loop.

A one-way loop is the epitome of circuitous service, because for every round trip someone makes, they have to go in a complete circle.



Service Hour)

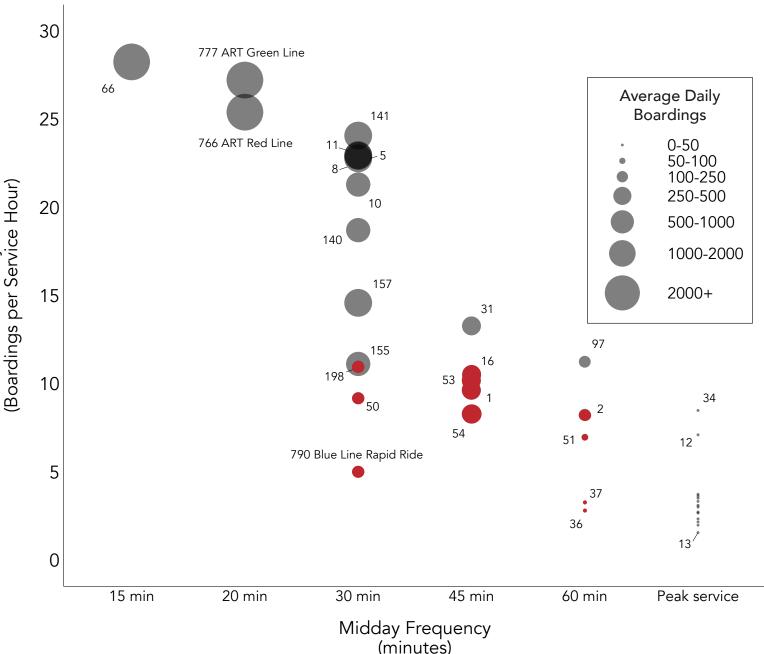
## Circuitous **Route Shapes**

In the scatterplot at right, the lowest-productivity all-day routes are highlighted in red. Their shapes are shown on the following page – most of them deviate, zigzag or loop.

Linearity isn't enough to cause high productivity (as demonstrated by Route 53). When linearity combines with density, walkability, mix of uses and proximity; and when high frequency is provided; then high productivity is likely.

## **ABQ Route Frequency and Productivity (Spring 2022)**

Average Weekday Ridership and Service Level



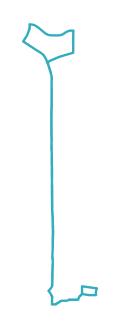
Indirect, deviating paths are longer and slower drive with a transit vehicle. This means service is more costly to provide or has to be less frequent.

Non-linear routes are also harder to understand and less appealing for potential riders.

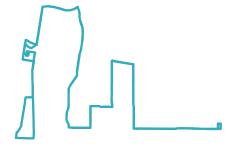
# **Circuitous Route Shapes**



Route 198 - 98th / Dennis Chavez



Route 1 - Juan Tabo



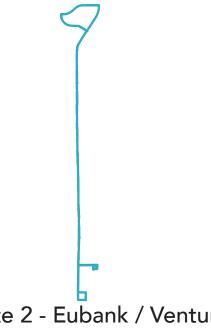
Route 16 - University / Gibson / Broadway



Route 50 - Airport / Downtown



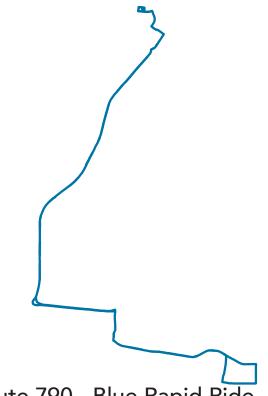
Route 54 - Bridge / Westgate



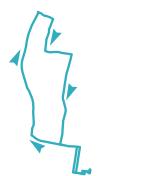
Route 2 - Eubank / Ventura



Route 51 - Atrisco / Rio Bravo



Route 790 - Blue Rapid Ride



Route 37 - Rio Grande / 12th St.



Route 36 - 12th St. / Rio Grande

# **Rush-Hour and One-Way Service**

Most transit agencies run one-way services at rush-hour periods or at school 'bell times'. These routes are almost always running to provide service for a very specific reason or for a targeted group of riders.

Again similar to non-linear routes, there can be Coverage purposes for this service. It uses less of the operating budget than all-day services (though is more costly on a per-hour and per-rider basis). If covering the widest possible area or the most streets is the priority, then service will need to be spread thin, and rush-hour-only routes are as thin as it gets.

The productivity scatterplot repeated at right has the rush-hour-only routes in the red box. They use less than 8% of the total operating budget. In 2022 their productivity ranged from 8 boardings per vehicle service hour at the highest (Route 34) to two at the lowest (Route 13). Before the pandemic, the top of the range was just as low.

# The Fallacy of Specialized Service

Non-transit planners can be forgiven for guessing that, if transit service is narrowly targeted at the busiest time for commuting and the busiest time on the roads, that will make it most efficient at attracting riders for the lowest possible cost. Unfortunately this is rarely the case.

More often, narrowly-targeted services designed around the needs of a subset of people attract few riders relative to their costs:

- Narrowly-targeted services fail to be useful to individuals for a wide range of trips, such as shopping and socializing in addition to commuting.
- They also fail to be useful to a **wide range of people**, such as people who work in retail or

service, people who want to do something away from their work at midday, or people who want to ride transit to socialize at midday, evenings and weekends.

If the City wants transit to serve large numbers of people efficiently, the way to do that is not to target at any one group of people narrowly. Instead, it is to offer a transit network that is useful to a broad range of people, for a broad range of trips. This means that any single route is unlikely to be perfect for any individual person or group. But the system overall will be *good enough* or *workable* for a large number of people.

Rush-hour-only routes are but one example of specialized, narrowly-targeted services. They are the most common example in all cities and in the Albuquerque system.

The annual cost of operating rush-hour routes in Albuquerque is quite low (because they represent only 4% of total service), However, they come with a subtle cost related to driver scheduling and they drive up the capital and maintenance costs of the bus fleet.

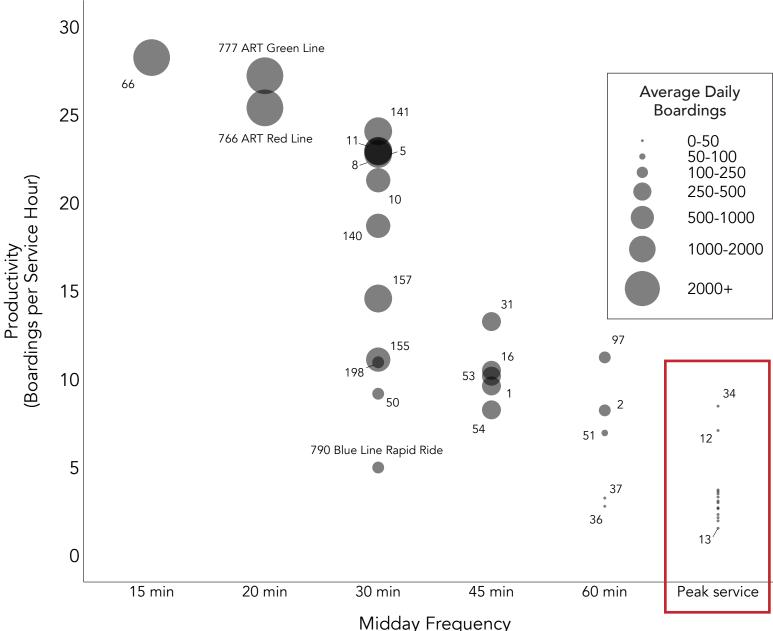
## **Labor Impacts**

Peak hour services have a slightly higher labor cost than service at other hours. This can be hard to estimate, because it accrues in subtle ways, either to the transit agency or to the operators.

Whether a route runs only at rush hours; offers extra frequency at rush hours; or goes a longer distance at rush hours, this means that more bus operators need to be at work during rush hours than at midday. This can either be accomplished through split shifts, in which people work two short shifts with a long unpaid break during the day, or by paying operators extra to work only one short shift.

## **ABQ Route Frequency and Productivity (Spring 2022)**

Average Weekday Ridership and Service Level



(minutes)

Split shifts can be hard for operators. They have a long "break" during the day, but they may be far from home with little to do. Transit agencies go to great lengths to assemble full shifts for most operators, rather than "splits" or "shorts." The more service peaks at rush hours, the harder these shifts are to avoid.

Especially at a time when bus driver recruitment and retention is a challenge, the consequences

for transit workers of offering extra service at rush hours should be considered.

## **Vehicle Costs**

The City also must maintain a larger fleet of buses for rush hours, buses that sit idle during the rest of the day and week.

About 22% of the bus fleet is attributable to rush-hour-only routes. In 2019, this represented 29 buses.<sup>1</sup>

For the 29 extra buses used only during rush hours, the City has to purchase the bus, find land to store it, stock parts for it and pay people to maintain it. The cost of each "peak bus" is borne for the sake of the people who use it during those few hours of the week, whereas the cost of an "all-week" bus is borne for the much larger number of people riding during all the non-rush-hour times of the week.

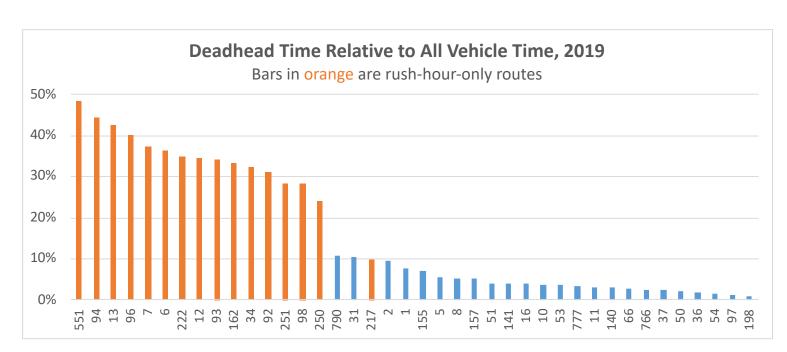
Given the "premium" cost of rush-hour peaking, it may be justifiable to ask people traveling at rush hours to bear more crowding than people traveling at other times. Yet the graph on page 54 suggests that buses are actually *less* crowded at rush hours than at other times of day.

## Deadhead

A third type of extra cost that arises for most rush-hour-only services is "deadheading."

Deadhead is the time that a bus and driver spend traveling between the route and the bus garage.

The distance between a route the ABQ RIDE's two garages is a major factor in deadhead, and a certain amount of deadhead is unavoidable since very few routes will naturally start or end near an ABQ RIDE garage. However, rush-houronly routes tend to spend much more time



ABQ RIDE's rush-hour-only routes (shown in orange) spend much more time deadheading than do all-day routes. Hours spent deadheading have the same cost to the City as hours spent in service and available to customers.

deadheading than other routes because:

- Rush-hour-only buses come into and out of service twice per day, rather than once, which means twice as many deadhead trips between the route and the garage.
- Some rush-hour routes also offer service in one direction only (such as, towards downtown in the morning, or towards a RailRunner station in the morning, and back out in the evening). Such one-way routes spend less time in-service available to passengers, but more time deadheading to and from the ends of the route.

All of the routes that spend more than 11% of vehicle hours deadheading are rush-hour-only routes, highlighted orange in the graph above.

All of these high-deadhead routes are also low-productivity routes, none of them attracting more than 8 boardings per vehicle service hour in 2019.

# Minimal Coverage at a Minimal Cost

ABQ RIDE's peak-only services are providing coverage on many streets where there is no other service. This is the most minimal form of coverage, in some cases just one single morning trip inbound and one single evening trip outbound. In the 2019 network these routes used only 8% of the total bus operating budget.

There is an interesting and difficult debate to be had about whether such a low level of service is worth anything at all, or whether coverage service should only "count" if it is available continuously throughout the weekday, or on one weekend day as well, or some other hours-and-days-of-service standard.

Regardless, these rush-hour-only routes do not represent a big repository of service. They make up less than 8% of the system's service,

which would not go very far towards improving the rest of the network.

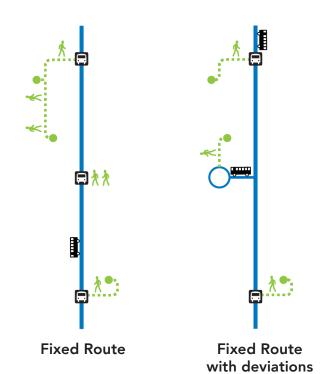
<sup>1</sup> This does not include the extra buses in the fleet that are used to offer higher frequencies at rush hours on all-day routes, or to cover segments of routes that are only offered at rush hours.

# Can On-Demand Service Help?

Recently many transit agencies have experimented with service concepts consisting of small vehicles that pick people up when and where they request them, rather than running fixed routes. This is often referred to as "dial-a-ride", "ondemand", "demand-response" or "microtransit" service.

The graphics below show how on-demand transit differs from fixed route transit. For fixed routes, people walk to bus stops and buses arrive based on a predetermined schedule. On-demand service can pick up riders where and when they request it.

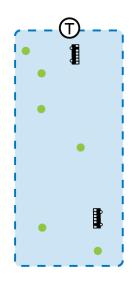
On-demand service can be very convenient for riders because it doesn't ask them to walk to a bus stop. It may let them travel at the times they prefer, perhaps even with the short notice typical of calling a taxi or an Uber. But these features don't come free.

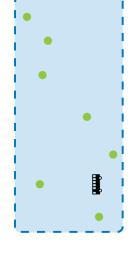


## The Limits of Fixed Routes

There are obvious inconveniences in relying on fixed transit routes:

- Long Walks. Depending on where you are located, it may not be easy to get to the nearest transit stop. In Albuquerque, widely-spaced arterials and walled-subdivisions make the walks from some homes to a main street very long, and make crossings less safe.
- Long Waits. Even on frequent routes, you may have to wait up to 15 minutes to get a bus. On some routes, you could wait an hour or longer. And you'll wait twice if your trip requires a transfer.
- Buses run even if empty. When demand is extremely low, scheduled bus trips still have to run at the promised times, which means at some times and in some directions buses are empty.





On-demand service to a specific location

On-demand service to anywhere

Transit can be offered in a fully fixed form (as at left) or a fully on-demand form (as at right). It is also possible to make fixed routes a bit more flexible, and on-demand services a bit more rigid.

# The Limits of On-Demand Transit

On-demand trips can be much more expensive to provide than fixed route trips. This is why transit agencies are careful and thoughtful about where they offer demand-response service and how they control its costs.

The cost of a fixed route is steady over time. It does not go up immediately when more people ride it. When more people ride, it becomes *less* expensive to provide each ride.

In contrast, the costs of demand-response service rise as more people request trips. As demand increases, more drivers and vehicles have to be added to serve them.

On-demand services often achieve much less than 5 boardings per vehicle per hour. If you think about what the on-demand vehicle has to do – drive around to each person's requested pick-up, then their requested drop- off, at the time they choose, not necessarily at the most efficient times – then it's clear why it can only be done a few times in an hour, especially in lower-density areas with poor street connectivity.

The cost of providing on-demand service is the transit agency's concern (unless they pass most of that cost on to the passenger through fares, which few agencies do). But there are also minor inconveniences for passengers to keep in mind:

• Traveling out of direction. Using ondemand transit means riding through

The cost of on-demand service rises as more people request it, which makes it affordable only where demand is low.

deviations to drop off and pick-up other people, on a path that's not the fastest way to your destination.

• Scalability and reliability. On-demand services can make a small number of pick-ups each hour, per driver. If demand increases unexpectedly, they can easily be overwhelmed, leading to long wait times.

## **Typical Productivity**

On-demand services in the U.S. rarely average more than 5 boardings per vehicle per hour, and in low-density areas productivities of just two or three boardings per hour are more likely. In 2019, before the pandemic, only 7 of ABQ RIDE's routes averaged less than 5 boardings per hour. In 2022, 15 of ABQ RIDE's 40 routes are averaging less than 5 boardings per hour.

The scatterplot at right is from a real transit agency, with successful fixed and on-demand transit services, before the Covid pandemic.

Each dot is a single fixed route, or a single ondemand zone. The dot's height on the graph shows its average number of boardings per hour per vehicle. On-demand service (all the way to the right) handles fewer rides per hour than even the lowest-ridership fixed routes in this city's network.

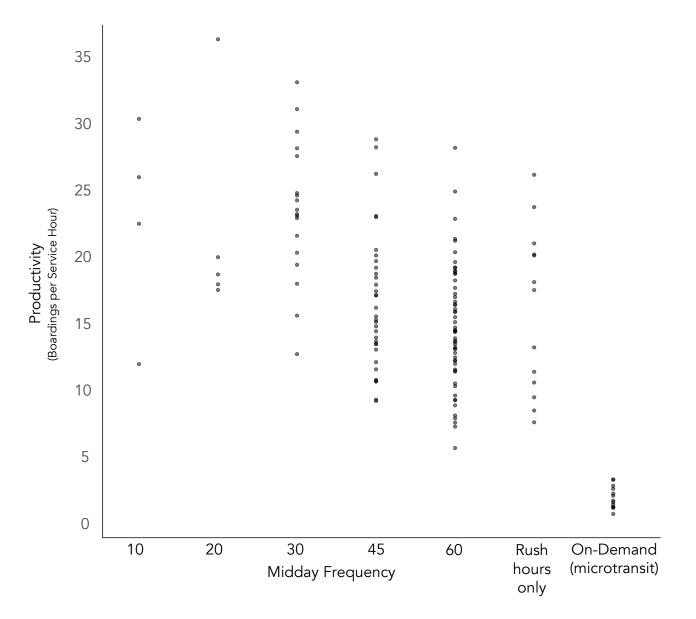
This difference in potential ridership per vehicle per hour, when comparing fixed routes to demand-response, is quite typical. The difference arises from the basic math of how the two types of services work.

## Making On-Demand Service More Productive

On-demand service productivity can be pushed higher than what is shown in this scatterplot. It can be made a little less convenient for riders, and a little more efficient for the agency to provide. For example:

- People can be asked to walk out to a stop on a main road for their pick-up.
- They can be asked to travel at a different time, when a vehicle is already planned to be in their area.

## Typical Productivities of Fixed and On-Demand Transit



 The service can be set up as having only one destination, such as a transit center, shopping center or train station.

In this way, "flexible" service can be made a little more rigid, in order to make it more productive and to reduce costs per rider.

Just because an on-demand service can't handle

as many rides as a fixed route doesn't mean the cost per ride of on-demand is higher, or that the subsidy per ride is higher. That depends on how much it costs the agency to deploy the on-demand service, and how high the fare is. Agencies can sometimes hire contractors to provide on-demand service at a very low operating cost. And the higher costs of providing each ride can be partially recovered from riders

themselves, through higher fares.

# On-Demand as a Coverage Service

Because on-demand transit is almost always more expensive per ride than a fixed route, and because it rarely handles more rides per vehicle than a fixed route, it is useful as a coverage tool but not a high-ridership tool.

On-demand transit can be cost-effective in lowdemand areas, or at low demand times like late at night. It can complement a high-ridership network, but is not by itself a strategy for high ridership.

In areas where fixed route transit gets less than 5 boardings per hour, where trips are short, and where demand peaks predictably, on-demand service can be a better solution. The same is true for very low-ridership times like late at night or very early morning.

In these settings, on-demand service provides a much better experience for riders, without necessarily imposing high costs or risks on the agency and the public that funds the transit service.

On-demand service can help with the trade-off between ridership and coverage goals... but only if it lowers the cost of providing coverage.

# **Recent Changes**

# **Zero Fares Pilot Program**

In 2021, the City of Albuquerque decided to invest \$3 million to pilot a Zero Fares program for all of 2022. The pilot was recently lengthened to June 2023 with additional funding of \$1.5 million.

Through the Zero Fares program, passengers no longer have to pay for ABQ RIDE, ART or Sun Van (paratransit) services.

The program is a "pilot" because data and feedback are being collected on ridership, trip lengths, trip purpose, rider demographics and safety, to evaluate whether free fares would be a good investment for the long term.

## **Zero Fares in Other Cities**

Albuquerque is one of a handful of U.S. cities that have implemented zero fare pilot programs in the past few years - along with Olympia, Washington, and Kansas City, Missouri. There are transit providers in the U.S. who implemented similar pilot programs many years ago and decided to maintain them. Two of the largest are Missoula, Montana (which eliminated fares in 2015) and Corvallis, Oregon (which eliminated fares in 2011). Both agencies have found that eliminating a fare was the most efficient way (in terms of investment-per-rider) to increase ridership and thereby accomplish certain community goals. It was also a way to attract a more diverse group of people to the transit system, and include people who only take occasional trips on transit.

Finding out the price of a ride on transit, gathering the correct change, or figuring out how to buy an electronic pass, are all deterrents to people using transit for the first time or only sporadically. For this reason, eliminating fares can lead to greater inclusion of different kinds of people in the transit system: lower-income people who would be deterred by a fare, certainly, but also young people, seniors, tourists, locals going on the occasional day-trip to a



sports game or a festival, and people who unexpectedly need or want to hop on a bus but who don't usually ride.

Eliminating fares reduces income to the transit agency which, absent another source of funding, would mean a reduction of service. It also reduces some administrative work that the transit agency normally does to collect and handle fare revenues, though not by nearly enough to offset the lost revenue.

Setting fares at zero also brings a new set of challenges, especially in the many U.S. cities that are struggling with high housing costs, homelessness, mental illness and drug addiction. Transit vehicles and stations are a public space. Public spaces which anyone can enter for free benefit from a certain amount of oversight, supervision and

support – think, for example, of public restrooms, public schools or public libraries. Transitioning from buses to which entry is controlled by the farebox to buses that are free-entry public spaces does require more staffing to supervise and manage that space.

## **Free Paratransit**

Another challenge experienced by other fare-free agencies relates to ADA paratransit. Paratransit is a door-to-door service that transit agencies must provide whenever and wherever the fixed-route bus system is running, for those people whose disabilities prevent them from using fixed routes.

Paratransit is an on-demand service (described starting on page 62), and the costs of providing the service scale up quickly as the number of riders scales up. Unlike on fixed-route buses, which can handle a lot of growth in riders before another bus and driver need to be added, each paratransit van and driver can only handle a few rides per hour. If demand goes up, vans and drivers need to be added rapidly.

Each paratransit ride costs the City about \$47 to provide, whereas each fixed route ride costs about \$5 to provide. The paratransit fare cannot be more than twice the fixed-route bus fare – so when the fixed-route fare is \$0, the paratransit fare is \$0 as well.

Other fare-free agencies have found that they needed to be more deliberate and careful about who is eligible for paratransit once it became free. Without the higher fare to signal to riders that paratransit costs much more to provide than a fixed route, some people who have a choice of either will understandably shift trips to paratransit. Free paratransit may also attract new riders.

Within a limited operating budget and, more crucially at the moment, a too-small pool of transit

drivers, fast growth in paratransit demand could be a problem. This has not occurred this point, as paratransit ridership in early 2022 was similar to ridership just before the start of the pandemic. However, it is something that long-time fare-free agencies have had to monitor and manage and ABQ RIDE will need to do the same.

# **Transit Worker Shortages**

According to a recent survey, 71% of U.S. transit agencies have had to cut service or postpone additions of service because they don't have enough workers.

This is true of the City of Albuquerque as well, where **ABQ RIDE** has been able to restore only **81%** of the bus network that it can actually afford to run, and more service is cut randomly and unannounced each day.

In addition, because the team of operators is diminished, ABQ RIDE is more vulnerable when an operator calls out sick, and less likely to have a substitute who can drive that route that day.

## **Missed Trips**

In Albuquerque and other cities, the worker shortage is causing missed trips, where a bus just doesn't show up at the times it was supposed to, because it couldn't leave the depot for lack of a driver.

Missed trips are a major breach of the trust between a transit provider and its riders. If someone is waiting for an hourly bus, and it simply doesn't show up, they may lose their job. They will certainly be docked pay, if they are an hourly worker. They may need to spend money they don't have to hire a car, to avoid being fired. Or they might have to stand on the side of the road for another whole hour to get where they are going.

Regardless of what exactly happens to someone when their bus never shows up, after one or a few missed trips, most people won't choose to depend on the transit network if they can find any workable alternative.



# Potential Long-Term Effects on Ridership and Relevance

Through these service cuts and missed trips, the worker shortage is hampering transit agencies' abilities to serve the travel demand that has come back recently. Nationally, and in Albuquerque, it is starting to look as though the ridership losses of the pandemic could be long-lasting not because of Covid itself but because of service reductions caused by worker shortages.

Everyone who cares about transit should be worried about the long-term effects of this 19% reduction in ABQ RIDE service. Less service makes the network less useful, which causes people to find other ways to get around. Some people will buy cars, and they may even move homes or jobs to a place that requires a car and isn't on the transit network. In doing so, they've made long-lasting commitments and investments that they won't kick to the curb the moment the ABO RIDE network is restored.

# Broader Demographic and Economic Challenges

The worker shortage is not limited to transit. Other industries are also having trouble retaining and hiring workers, and are reducing service or closing their doors as a result: hospitals, trucking companies, restaurants, gyms, and more.

For the socially-essential industries facing this shortage – think of nurses and teachers as well as bus drivers – there is an urgent need to make these positions more attractive to applicants and more rewarding for the people already filling them. Meanwhile, transit workers' jobs have become more difficult and stressful, while their working conditions and pay have not kept up either with the job's difficulty or with the cost of living in cities.

The worker shortage for transit agencies is not entirely due to Covid and the social shifts introduced by the pandemic. **Bus driver shortages** began before the pandemic at many agencies. They were caused by a high proportion of transit employees being older, and therefore entering retirement around the same time, faster than agencies could hire and train young replacements. The changes that occurred during the pandemic, and more competition from hired-car and delivery services (like Lyft or Amazon), added to this demographic challenge.

# ABQ RIDE Driver Recruitment

In Albuquerque, recruiting new bus drivers has been extremely hard since the pandemic. The transit department encourages applicants who do not yet have a CDL (Commercial Drivers License), and even provides paid training for a CDL. This has not had a meaningful impact on the number of applicants in 2022.

Retention is also a challenge. Some ABQ RIDE drivers find that, once they have their CDL and training from the transit department, they can get better-paid jobs with more opportunities for advancement at private companies or even other City departments.

In 2021, the transit department made improvements to its contract with drivers, so that newer drivers have access to better wage-advancement within ABQ RIDE than previously. This should, over many years, help ABQ RIDE to build up an experienced cadre of drivers. But ABQ RIDE is still struggling to compete for new hires with the other driving jobs at the City and elsewhere in Albuquerque.

More information about the current national transit worker shortage, and recommendations for addressing it, are documented in "Bus Operators in Crisis" by TransitCenter. A general report on labor shortages across industries called "Where Have All the Workers Gone?" was recently published by the National Bureau of Economic Research.

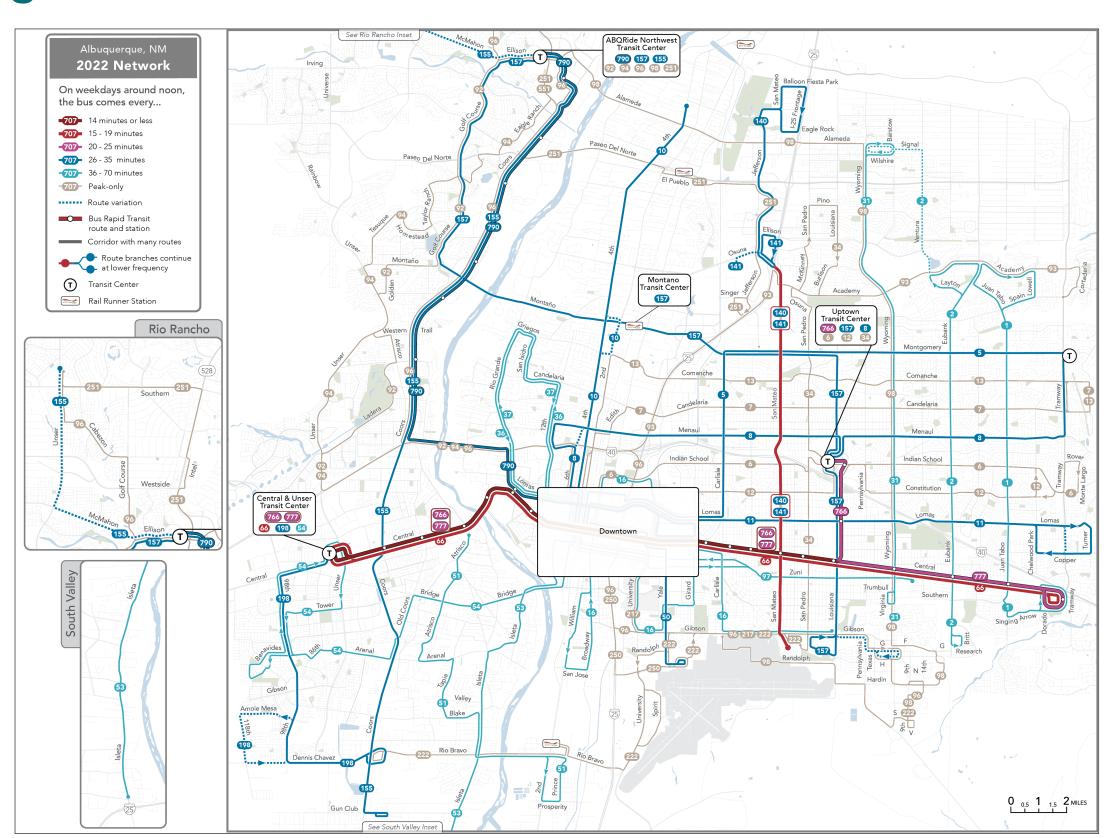
# **Recent Network Changes**

In response to the Covid pandemic, the City was forced to alter its network to minimize risk to the community.

In the past year, persistent worker shortages have prevented the City from restoring all prepandemic routes and frequencies. The network in operation in 2022 contains just 81% of the service that the City can afford to run, and that was running in 2019.

The map on this page shows the partially-restored network as of Spring 2022.

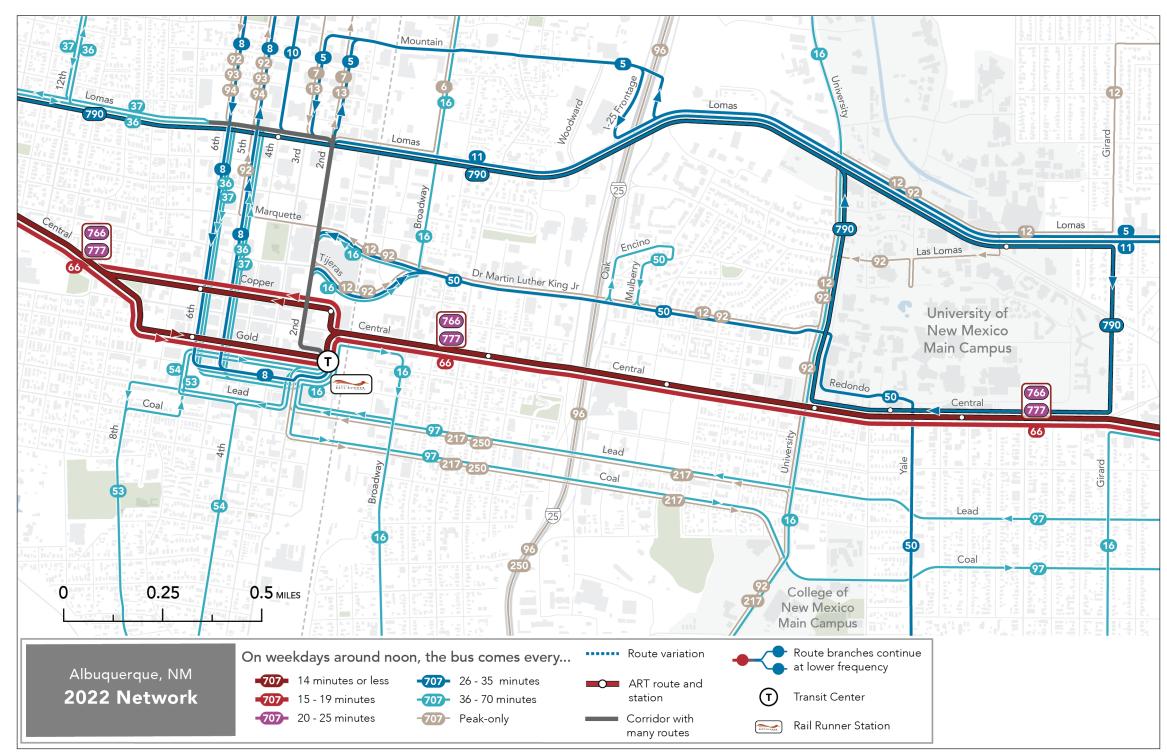
- The largest changes to the network were in the reduction on frequent corridors. Both core ART Lines (766 & 777) were reduced to 20 minute service and the only corridors operating better than 30 minute service were Route 66, the combined ART segments, and the combined 140/141 corridor on San Mateo.
- In addition, many of the rush-hour-only or rush-hour-oriented routes were reduced or suspended when service had to be cut. This can be seen in the reduction of the 790 ART Rapid Ride from 20 minute to 30 minute midday frequency, and the suspension of Routes 162 and 551.



The Albuquerque bus network, as of Spring 2022.

The map on this page shows Downtown routing on the partially restored network as of Spring 2022.

- Cuts to frequency can be seen in the downtown core, with only the combined ART (766, 777) segment and Route 66 running at midday frequencies better than every 30 minutes.
- Frequency reductions can also be seen along Lomas, north of the University of New Mexico, where 20-minute routes were reduced to operate every 30 minutes.



ABQ RIDE network of bus routes, as of 2022.

# **Reduced Frequencies**

As mentioned before, most of the service cuts between the pre-pandemic 2019 network and the current mid-recovery 2022 network were seen in changes to route frequencies. The City tried to avoid eliminating entire routes.

The table at right compares the weekday midday frequencies offered on each route before and after the pandemic adjustments and the current driver shortage.

While some of the routes have returned to their 2019 frequencies, many of the most frequent routes are running at worse frequencies than 2019.

The City has the funding to restore 2022 service

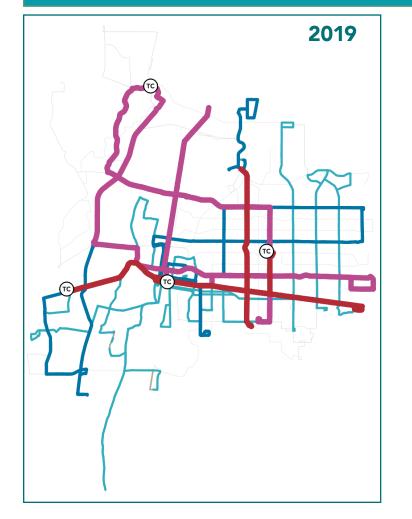
levels, but cannot reliably deliver more frequent service without hiring and retaining more drivers.

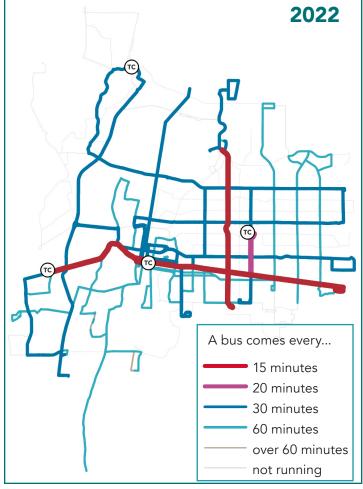
The maps below show where in the network the frequency reductions have occurred.

Central Avenue west of Louisiana has ART service every 10 minutes rather than every 7.5 minutes. San Mateo frequency has been maintained at every 15 minutes.

Many of the corridors which had 20 minute frequencies in 2019 (pink lines) now run every 30 minutes (blue lines), such as Lomas Boulevard, Montgomery Boulevard and Coors Boulevard.

## Many higher frequency routes now have reduced service.





Pouto Name		Weekday Midday Frequency			
	Route Name	2019	2022		
766+777	ART Red & Green Lines	7.5 min	10 min		
66	Central Avenue	15 min	15 min		
140+141	Combined San Mateo Routes	15 min	15 min		
766	ART Red Line only	15 min	20 min		
777	ART Green Line only	15 min	20 min		
790	Blue Line Rapid Ride	15 min	30 min		
5	Montgomery/Carlisle	20 min	30 min		
10	North Fourth Street	20 min	30 min		
11	Lomas	20 min	30 min		
157	Cottonwood/Montano/UTC	20 min	30 min		
8	Menaul	25 min	30 min		
50	Airport/Downtown	30 min	30 min		
140	San Mateo / CNM Work Force	30 min	30 min		
141	San Mateo	30 min	30 min		
155	Coors	30 min	30 min		
198	98th / Dennis Chavez	30 min	30 min		
1	Juan Tabo	45 min	45 min		
16	University/Gibson/Broadway	45 min	45 min		
31	Wyoming	45 min	45 min		
53	Isleta	45 min	45 min		
54	Bridge/Westgate	45 min	45 min		
2	Eubank-Ventura	60 min	60 min		
36	12th Street/Rio Grande	60 min	60 min		
37	Rio Grande/12th Street	60 min	60 min		
51	Atrisco/Rio Bravo	60 min	60 min		
97	Zuni Express	60 min	60 min		
6	Indian School Commuter	Peak service	Peak service		
7	Candelaria Commuter	Peak service	Peak service		
12	Constitution Commuter	Peak service	Peak service		
13	Comanche Commuter	Peak service	Peak service		
34	San Pedro Commuter	Peak service	Peak service		
92	Taylor Ranch Express	Peak service	Peak service		
93	Academy Commuter	Peak service	Peak service		
94	Unser Commuter	Peak service	Peak service		
96	Crosstown Commuter	Peak service	Peak service		
98	Wyoming Commuter	Peak service	Peak service		
217	Downtown-KAFB Ltd.	Peak service	Peak service		
222	Rio Bravo/ Rail Runner/ KAFB	Peak service	Peak service		
250	Airport/Downtown Express	Peak service	Peak service		
251	ABQ-Rio Rancho Rail Runner Shuttle	Peak service	Peak service		
162	Ventana Ranch / Unser	Peak service	Not operating		
551	Jefferson - Paseo del Norte Ex	Peak service	Not operating		
Many route	Many routes' frequencies worsened due to the pandemic, initially due to the fall-off				

Many routes' frequencies worsened due to the pandemic, initially due to the fall-off in demand but more recently due to the shortage of drivers.

# **Changes in Productivity**

Overall network productivity is lower in 2022 than it was in 2019. Between the pandemic restrictions, reductions in service levels due to driver shortages and the growth in telecommuting, transit ridership across the U.S. has not recovered to its pre-pandemic levels.

In Albuquerque, some increase in ridership should be expected as a result of ART and the Zero Fares pilot program. However, the growth in ridership in Albuquerque due to free fares and ART have not been enough to offset the losses attributable to the pandemic and driver shortages.

Nearly all individual routes are less productive in 2022 than they were in 2019.

More frequent routes declined less in productivity than less frequent routes (as shown in the table at right). The routes at the top of this table are also the routes that offer all-day all-week service, rather than service on weekdays only or during rush hours only. Some routes are currently running full service while others are running a variety of reduced levels, as shown on page 69.

	Route Name	2022 Frequency (Midday Weekday)	2019 Productivity (All days)	2022 Productivity (All days)	Productivity Change
66	Central Avenue	15 min	36	27	-25%
141	San Mateo	30 min	31	24	-22%
8	Menaul	30 min	29	23	-20%
5	Montgomery/Carlisle	30 min	29	22	-23%
11	Lomas	30 min	28	22	-22%
10	North Fourth Street	30 min	26	21	-18%
777	ART Green Line	20 min	25	21	-19%
766	ART Red Line	20 min	23	19	-17%
140	San Mateo / CNM Work Force	30 min	33	19	-44%
157	Cottonwood/Montano/UTC	30 min	18	15	-19%
31	Wyoming	45 min	17	14	-18%
155	Coors	30 min	12	11	-2%
97	Zuni Express	60 min	22	11	-49%
198	98th / Dennis Chavez	30 min	16	11	-32%
16	University/Gibson/Broadway	45 min	15	10	-31%
53	Isleta	45 min	16	10	-35%
1	Juan Tabo	45 min	20	10	-51%
50	Airport/Downtown	30 min	18	9	-48%
2	Eubank-Ventura	60 min	14	9	-37%
34	San Pedro Commuter	Peak service	7	8	19%
54	Bridge/Westgate	45 min	13	8	-37%
51	Atrisco/Rio Bravo	60 min	10	7	-32%
12	Constitution Commuter	Peak service	12	7	-39%
790	Blue Line Rapid Ride	30 min	11	4	-60%
6	Indian School Commuter	Peak service	11	4	-66%
222	Rio Bravo/ Rail Runner/ KAFB	Peak service	5	4	-28%
92	Taylor Ranch Express	Peak service	8	4	-54%
96	Crosstown Commuter	Peak service	9	3	-62%
37	Rio Grande/12th Street	60 min	7	3	-52%
36	12th Street/Rio Grande	60 min	9	3	-65%
217	Downtown-KAFB Ltd.	Peak service	8	3	-59%
93	Academy Commuter	Peak service	9	3	-67%
98	Wyoming Commuter	Peak service	7	3	-62%
7	Candelaria Commuter	Peak service	12	3	-78%
251	ABQ-Rio Rancho Rail Runner	Peak service	4	2	-43%
94	Unser Commuter	Peak service	5	2	-56%
250	Airport/Downtown Express	Peak service	10	2	-80%
13	Comanche Commuter	Peak service	9	2	-83%

In this table, routes are sorted by their 2022 productivity (over all days of the week). Nearly all routes became less productive since before the pandemic. The losses have been most severe, proportionally, for peak-only and less frequent routes.

## **Productivity:**

**Boardings ÷ Vehicle Revenue Hours** 

# **2022 On-Board Rider Survey**

## **Survey Summary**

An on-board transit survey was conducted from January 29th to February 26th, 2022. Riders on buses were randomly selected and asked to complete a survey.

The survey was conducted on both weekdays and weekends. Surveys were completed in English and Spanish.

There were a total of 1403 weekday responses and 827 weekend responses.

All of the following survey results were weighted based on average daily ridership from January 2022 through May 2022. This means that a subset of riders were surveyed, and then their responses were given additional weight (multiplied by a number) reflecting how many other people ride that same bus route, at that time of day, in that direction.

## **Travel Behavior**

## Where are riders coming from?

On weekdays, 37% of riders' origin place was home while 16% of trips were made by people that rode the bus with no particular destination and without any particular purpose.

Most weekday riders (94%) walked from their origin location to their very first transit stop. One percent of passengers used a personal vehicle to get to their first transit stop.

#### Where are riders going?

39% of weekday respondents answered that their destination place was home. The second highest destination place type was work (17%), and the third highest was shopping (11%) on the weekdays.

## How do riders complete their trip?

A significant majority (94%) of weekday respondents said they would walk to from their last transit stop to their destination.

#### How many riders take transfers?

When asked about how many transfers people were taking to get to their destination, 64% of weekday respondents said they only took one bus. About 36% said they took at least one transfer. In 2017, 48% of riders took at least one transfer, showing a 12% decrease in transfers.

#### How many years have riders been riding ABQ RIDE?

On weekdays, 20% of riders have been riding ABQ RIDE for less than a year, while 46% have been riding for six or more years.

#### How often do riders typically ride ABQ RIDE?

About 26% of weekday riders use ABQ RIDE days a week, and 47% said they use ABQ ride six to seven days per week.

#### How would riders make their trips if ABQ RIDE was not available?

If ABQ RIDE was unavailable, 44% of weekday riders would walk to make their trip, and 15% would get a ride from someone else.

## **Demographics**

## Household Demographics

About 46% of weekday riders live in individual households, and 35% percent of passengers live in two to three person households. 35% of passengers live in households which no one is employed, and 31% live in a household where one person in their household is employed (full or part-time).

63% of riders do not have a vehicle in their household, and 24% have one in their household. For riders who do have a household vehicle, over 80% would not have been able to use a vehicle to complete their trip.

In terms of income, 38% of weekday riders had an annual household income of less than \$10,000. 76% of weekday riders had a household income of less than \$25,000.

#### **Driver's License Status**

61% of weekday riders do not have a valid driver's license.

#### **Employment**

33% of weekday riders were employed either full time and 17% were employed part time. 16% percent of passengers are unemployed but seeking work.

#### **Students**

14% of weekday riders were students. 5% were full-time college students and 3% were part-time college students.

## Age

17% of weekday riders were 24 or under. 44% of weekday riders are between the ages of 25 and 44, and 23% were 55 and over.

## Race/Ethnicity

37% of weekday passengers identified as White, and 36% identified as Hispanic/Latino. 15% identified as American Indian / Alaska Native, and 9% identified as Black/African American.

## Language

About 25% of weekday riders speak another language other than English at home, and 76% of those riders speak Spanish. Out of the riders that speak another language, 11% speak Navajo. 80% of riders who said they speak another language

stated that they speak English very well.

#### Gender

About 65% of weekday riders identified as male, 32% identified as female, and 2% identified as non-binary/third gender.

## **Rider Preferences**

#### **Route Preferences**

45% of weekday riders prefer routes that are more frequent even if they must travel further to access them, compared to 26% who prefer routes that are closer but come less frequently. 30% did not know, didn't understand, or didn't have an opinion.

#### **Improvement Priorities**

Riders were asked what improvements they wish could be made to ABQ RIDE's bus service. Riders ranked each priority individually, from most valuable to least valuable. The most valuable improvement was keeping the bus fare free for both weekday and weekend respondents. The second highest valued improvement for weekday riders was improving bus frequencies. For weekend riders, the second highest valued improvement was having more weekend service.

## **Summary Tables**

Beginning on the next page, tables summarize the results described on this page.1

<sup>1</sup> Results in the text on this page and in the following tables are given separately for weekdays and weekends, because the sampling rate differed on weekdays compared to weekends, and the weighting applied to individual riders' responses was different on weekdays compared to weekends. This is why the weighted results cannot simply be combined.

"What type of place are you COMING	Weekday	Weekend
FROM NOW? (the starting place for your	Responses (%)	Responses (%)
one-way trip)"	(weighted)	(weighted)
Your HOME	37%	43%
No particular destination	16%	7%
Your usual WORKPLACE	13%	7%
Shopping	10%	17%
Visit Friend / Relative	6%	8%
Church / Personal Business	3%	3%
College / University (students only)	3%	1%
Recreation / Sightseeing	3%	7%
Medical / Doctor / Clinic (non-work)	3%	1%
Other business related (e.g. meeting, delivery)	2%	2%
School (K-12) (students only)	1%	0.1%
Restaurant	1%	3%
Your Hotel / motel / lodging	0.3%	2%
Other	0.3%	0.1%

"How did you GET FROM your origin?"	Weekday Responses (%) (weighted)	Weekend Responses (%) (weighted)
Walk	94%	93%
Bike	3%	3%
Was dropped off by someone	2%	3%
Drove alone and parked	1%	0.2%
Wheelchair	1%	1%
Skateboard	0.4%	0.4%
Drove or rode with others and parked	0.1%	0%
Uber, Lyft, etc.	0%	0.1%

"What type of place are you GOING TO	Weekday	Weekend
NOW? (the ending place for your one-	Responses (%)	Responses (%)
way trip)"	(weighted)	(weighted)
Your HOME	39%	29%
Your usual WORKPLACE	17%	12%
Shopping	11%	21%
Church / Personal Business	9%	8%
Visit Friend / Relative	7%	13%
Recreation / Sightseeing	5%	9%
College / University (students only)	3%	0%
Other business related (e.g. meeting, delivery)	2%	2%
Medical / Doctor / Clinic (non-work)	2%	2%
Restaurant	2%	4%
School (K-12) (students only)	1%	0%
Your Hotel / motel / lodging	0.2%	1%
Airport	0%	0.4%
Other	0%	0%

	Weekday	Weekend	
"How will you GET TO your destination?"	Responses (%)	Responses (%)	
	(weighted)	(weighted)	
Walk	94%	94%	
Bike	3%	3%	
Be picked up by someone	2%	0.4%	
Get in a parked vehicle & drive alone	1%	0.1%	
Wheelchair	1%	2%	
Uber, Lyft, etc.	0.1%	0.2%	
Skateboard	0%	1%	

"How many years have you been riding ABQ RIDE?"	Weekday Responses (%) (weighted)	Weekend Responses (%) (weighted)
Less than 1 year	20%	21%
1-2 years	13%	12%
3-5 years	20%	21%
6-10 years	13%	13%
More than 10 years	33%	32%
First time riding	1%	2%

"How often do you typically ride ABQ	Weekday	Weekend
RIDE?"	Responses (%)	Responses (%)
RIDL:	(weighted)	(weighted)
First time riding	1%	2%
Less than 1 Day per week	2%	2%
1 Day per week	2%	3%
2 Days per week	4%	7%
3 Days per week	10%	9%
4 Days per week	8%	8%
5 Days per week	26%	18%
6-7 Days per week	47%	51%

"If transit service were not available, how would you have made this trip?"	Weekday Responses (%) (weighted)	Weekend Responses (%) (weighted)
Walk	44%	44%
Ride with someone else	15%	13%
Uber, Lyft, etc.	13%	14%
Would not make this trip	13%	16%
Bicycle	8%	7%
Drive myself	6%	5%
Bicycle/Skateboard/Scooter	0.3%	0.4%
Taxi	0.1%	1%
Other	0%	0.2%

"Including YOU, how many people live in your household?"	Weekday Responses (%) (weighted)	Weekend Responses (%) (weighted)
One (1)	46%	49%
Two (2)	20%	21%
Three (3)	15%	14%
Four (4)	10%	7%
Five (5)	5%	5%
Six (6)	1%	2%
Seven (7)	1%	1%
Eight (8)	1%	0.5%
Nine (9)	0.3%	0.2%
Ten or More (10+)	0.3%	1%

"Including YOU, how many people (over age 15) in your household are employed	Weekday Responses (%)	Weekend Responses (%)
full or part-time?"	(weighted)	(weighted)
None (0)	35%	35%
One (1)	31%	35%
Two (2)	22%	20%
Three (3)	9%	7%
Four (4)	3%	2%
Five (5)	0.2%	1%
Six (6)	0.3%	0.3%
Eight (8)	0.1%	0.1%
Ten or More (10+)	0.0%	0.0%

"How many vehicles (cars, trucks, or motorcycles) are available to your household?"	Weekday Responses (%) (weighted)	Weekend Responses (%) (weighted)
None (0)	63%	69%
One (1)	24%	22%
Two (2)	9%	6%
Three (3)	3%	2%
Four (4)	1%	1%
Five (5)	0.1%	0.2%
Six (6)	0.1%	0.2%

"Could you have used one of these	Weekday	Weekend
vehicles to complete this trip?"	Responses (%)	Responses (%)
verticles to complete this trip:	(weighted)	(weighted)
No	80%	83%
Yes	20%	17%

	Weekday	Weekend
"Do you have a valid driver's license?"	Responses (%)	Responses (%)
	(weighted)	(weighted)
No	61%	57%
Yes	39%	43%

"What is your employment status?"	Weekday Responses (%) (weighted)	Weekend Responses (%) (weighted)
Employed full-time (at least 35 hours per week)	33%	31%
Employed part-time (less than 35 hours per wee	17%	17%
Not currently employed, but seeking work	16%	14%
Not currently employed, and not seeking work	22%	26%
Retired	10%	11%
Homemaker	1%	1%

"What is your student status?"	Weekday Responses (%) (weighted)	Weekend Responses (%) (weighted)
Not a student	86%	91%
Yes - Full-time College / University	5%	3%
Yes - Part-time College / University	3%	3%
Yes - Vocational / Technical / Trade School	0.5%	1%
Yes - K-8th grade	1%	0.4%
Yes - 9-12th grade	3%	2%
Yes - Other	0.3%	0.0%

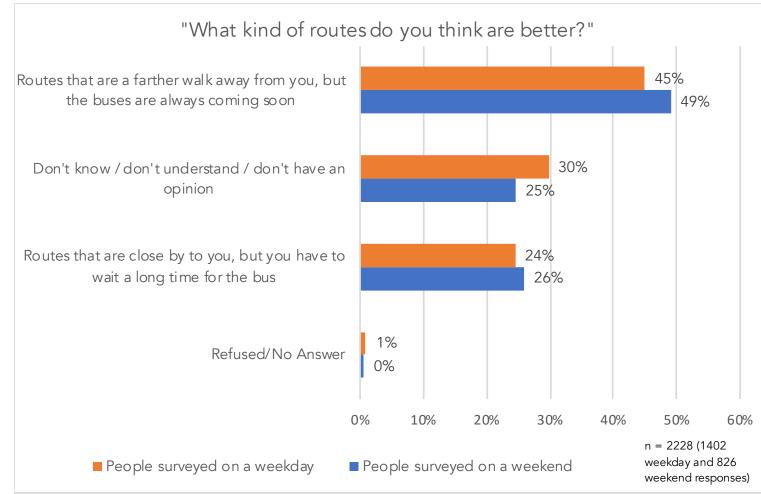
"M/hat is your Base / Ethnisity?"	Weekday	Weekend
"What is your Race / Ethnicity?"	Responses (%) (weighted)	Responses (%) (weighted)
White	37%	33%
Hispanic / Latino	36%	33%
American Indian / Alaska Native	15%	17%
Black / African American	9%	11%
Asian	3%	3%
Native Hawaiian / Pacific Islander	0.4%	2%

"Do you speak a language other than English at home?"	Weekday Responses (%) (weighted)	Weekend Responses (%) (weighted)
No	75%	75%
Yes	25%	25%

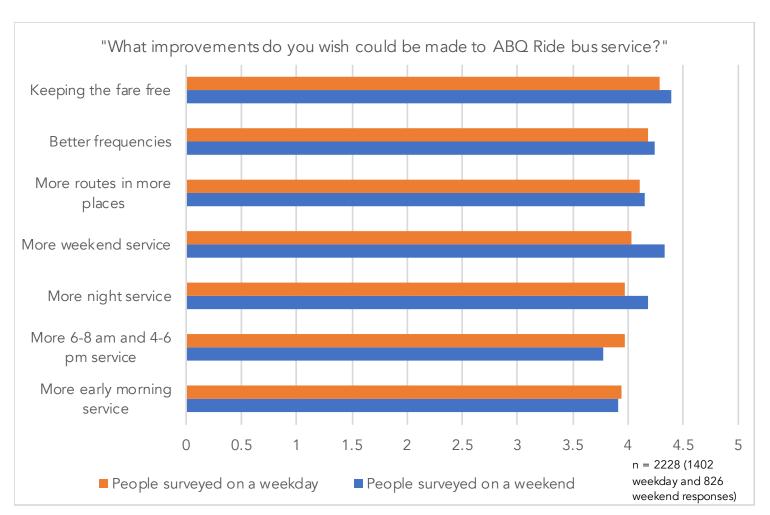
	Weekday	Weekend
"How well do you speak English?"	Responses (%)	Responses (%)
	(weighted)	(weighted)
Very well	80%	80%
Well	4%	6%
Less than well	12%	4%
Not at all	4%	10%

"Do you identify as?"	Weekday Responses (%) (weighted)	Weekend Responses (%) (weighted)
Male	65%	66%
Female	32%	31%
Non-binary / third gender	2%	1%
Transgender	1%	1%
Prefer not to say	0.4%	1%
Other / Prefer to self-describe	0.0%	0.2%

"Which of the following BEST describes	Weekday	Weekend
your TOTAL ANNUAL HOUSEHOLD	Responses (%)	Responses (%)
INCOME in 2021 before taxes?"	(weighted)	(weighted)
Less than \$10,000	38%	36%
\$10,000 - \$14,999	19%	22%
\$15,000 - \$24,999	18%	21%
\$25,000 - \$34,999	13%	12%
\$35,000 - \$49,999	6%	5%
\$50,000 - \$74,999	3%	3%
\$75,000 - \$99,999	1%	0.5%
\$100,000 or more	1%	1%



This chart shows riders' responses to this planning-related question about route design and frequency. More people preferred to walk farther to reach a bus that is coming soon. (The responses are from both weekday and weekend survey respondents. Their responses are unweighted, unlike the demographic and trip information shown on the previous pages.)



Like the chart at left, this chart shows unweighted responses to a planning question about service investment priorities. Keeping the fare free was the most valued type of investment, though among people surveyed on a weekend (blue bars) more weekend service was nearly as valuable.

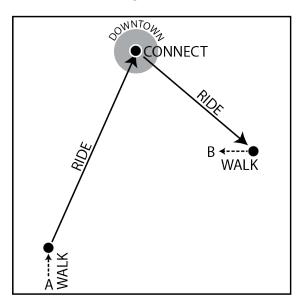
# **Network Design Considerations**

# Radial and Grid Networks

Some network design considerations have already been introduced earlier in this report. For example, the question of whether routes can be linear and direct rather than deviating and circuitous, and how these different route design choices relate to transit goals.

At a larger scale, improving a transit network like Albuquerque's benefits from bigger-picture thinking and attentiveness to connections. A transit network, like other types of networks, should be greater than the sum of its parts. One line can take people only so many places – but if that line makes connections with many other lines, vastly more places become reachable.

There are a few basic shapes for transit networks, and the two that are most relevant in Albuquerque are the "radial" and "grid" networks, illustrated at right.

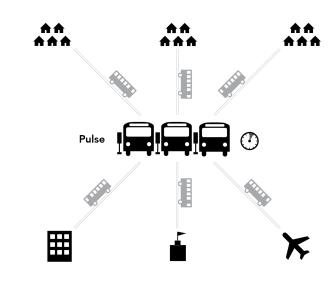


### **Radial Networks**

In a purely-radial network, every line connects with every other line at the center; only one transfer is needed to reach every point in the system. But as the system grows large, cross-town or orbital trips require such long trips through the

center that they become impractical by transit.

This is why purely-radial transit networks are mostly found in small towns. In big multi-centric regions, the radial network tends to be modified and added-to over many years for trips that cross the region without going near downtown.



#### **Pulsing Infrequent Routes**

Another powerful feature of radial networks is that the lines can be timed to "pulse" at the center of the network. In a pulse, transit vehicles meet and dwell together for a few minutes. People can transfer among them with a reliably short wait.<sup>1</sup>

Pulses are a way that infrequent services can connect with one another, quickly and reliably. If two routes coming every 60-minutes cross, the untimed connection between them will require, on average, a 30-minute wait (one half of the frequency), and sometimes as bad as 59 minutes!

But if two routes are designed to pulse, the connection can take just 5-10 minutes, every time.

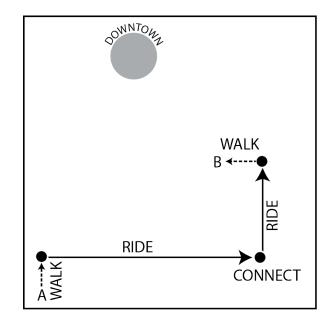
In Albuquerque, if the infrequent network were to pulse, there would surely be a pulse downtown. There might also be a pulse among just two or three routes at other major destinations. Transit centers are often where pulses take place, but natural centers of activity like shopping malls can also be excellent places to pulse.

There is a cost to pulsing. First, the routes must be designed so that they can make a round trip in exactly the right amount of time to get back to the pulse with all of the other routes. This means that routes cannot be lengthened just a tiny bit in response to requests, which the City has a tradition of doing.

This inflexibility also means that any reduction in the speed of the bus can be threatening to the pulse, since that bus may not be able to do its round trip in the required amount of time anymore. Protecting buses from congestion (typically the job of city, county and state transportation engineers) is important for pulse routes just as it is for high frequency and high capacity routes.

The consequences of a bus arriving late to a pulse are more severe than that of an untimed connection. An untimed connection between two hourly routes involves, on average, a 30 minute wait. For an hourly route that arrives one minute too late at the pulse, and all the other buses have already departed, connecting passengers will have to wait an extra 59 minutes for the next bus.

Pulses are not just a network design. They are also an operating system, and an operating imperative. Transit agencies need to have the technology, the expertise, the staff and the political commitment to maintain them. Their design and their reliability must not erode over time.



#### **Grid Networks**

Grid networks also offer people a way to travel from anywhere to anywhere with a single transfer. But unlike in a radial network, the transfers in a grid network happen at the intersections wherever two routes cross.

In large cities with many centers (such as LA, Tucson or Houston) a large frequent grid requires much less out-of-direction travel than a radial network would. A frequent grid offers the simplicity and reliability of a street network. It's easy to keep the map in your head.

The necessary precursors to a successful grid are high frequency routes, all day and all week. Radial networks can offer timed connections at their central point, so most transfers from one route to another can be made quick and easy. Grid transfers happen at so many different places that they cannot possibly be timed. People's waiting time to make a grid transfer is random. The only way to offer a short, random waiting time is to offer high-frequency on both connecting routes.

If two routes intersect, and each offers service

<sup>1</sup> Frequent air travelers might have noticed a pulse at an airport. Dozens of arriving flights make the terminal busy for about an hour, and then all flights depart and it becomes quiet again.

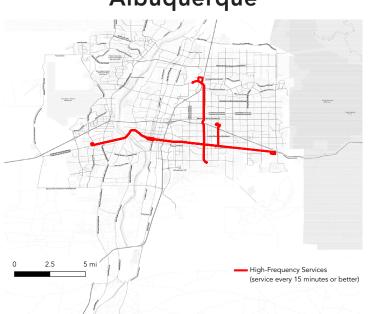
every 40 minutes, the average wait to connect from one to the other will be 20 minutes. The worst possible wait will be 39 minutes! Very few people are willing to build their lives around such waiting times.

When two frequent routes cross, if each comes every 15 minutes, the average wait to transfer between them will be 7.5 minutes. The worst wait will be 14 minutes. Many more people are willing to build their lives around such short waiting times. High all-day and all-week frequencies make grid networks possible.

# Should Albuquerque continue operating a grid network?

Albuquerque has a very regular grid of arterial roads east of the river, which suggests that the transit network should be designed as a grid, with one route on each road, and with routes proceeding straight across the city rather than stair-stepping across the grid into and out of downtown. There are enough bridges across the river to continue some of that grid function to the west side.

Albuquerque

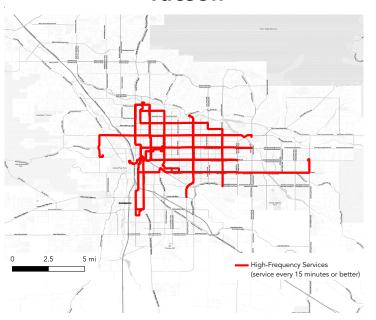


Radial networks work best when the center – generally a downtown – is far and away the largest concentration of jobs, housing and activity in a city. Yet the pandemic may have reduced activity in U.S. city centers for many years to come. The less dominant a city's downtown, the less compelling a radial network is, because a high proportion of trips aren't bound for downtown but have to pass through there anyway.

The City has made a start on a citywide frequent network, by identifying two long, dense, mixed use corridors and concentrating service there (on Central and San Mateo). Beyond those two roads, the development pattern east of the river is quite conducive to a frequent grid. Moderate and high densities of both residents and jobs are continuous along nearly all streets, a development pattern reminiscent of grid-transit cities like LA and Chicago.

Finally, Albuquerque and its regional partners have plans for growth that emphasize Centers and Corridors. Some of the corridors are *not* emanating radially out from the center of the city. The places that are planned for development would

Tucson



be better-served by a grid network with some radial routes than by a purely radial network.

# Should Albuquerque revert to a radial network?

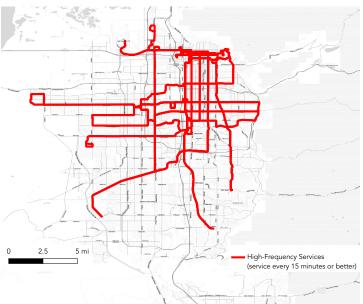
For all those arguments in favor of a grid transit network, Albuquerque doesn't have enough service to provide even modest frequency on all of the major roads in the city, to say nothing of the high frequency necessary for a grid to work.

To reinforce how little frequent service is available in Albuquerque, the maps from the Summary chapter showing two peer cities' frequent networks are repeated below.

The small amount of service ABQ RIDE has to work with, and the large area it must cover, result in poor frequencies on most routes. These poor frequencies suggest that a radial structure would be more successful at providing people with reasonable travel times, and reliable transfers.

Yet redesigning the existing ABQ RIDE network to make it radial would disrupt many trips that people make on existing transit routes. The

Salt Lake City



benefits of restructuring the network would be modestly positive, but most cities don't choose to introduce so much disruption into transit riders' lives unless there is a large positive benefit overall.

Many cities have a mix of grid and radial routes, as both can be thoughtfully designed into one coherent network. A future Albuquerque network could have some grid routes that cross the city making frequent connections, and some radial routes that offer infrequent service but take people straight to the city center.

It is important to acknowledge, at this stage of ABQ RIDE Forward, that the existing network simply can't be useful to many people given the mismatch between its design and the level of frequency provided.

# **ART and Local Service Design**

When cities build high-frequency and rapid transit lines, such as Bus Rapid Transit (BRT) or light rail, they have to make a choice about whether to change the local bus route that has been there all along. Nearly all successful BRT and light rail lines are either adding to or replacing successful bus lines, so this is a very common dilemma. As ridership grows on BRT and light rail lines, many cities start to reevaluate the local routes running alongside.

On a map, it may look odd that ABQ RIDE is continuing to run Route 66 right alongside the ART Green Line (777).

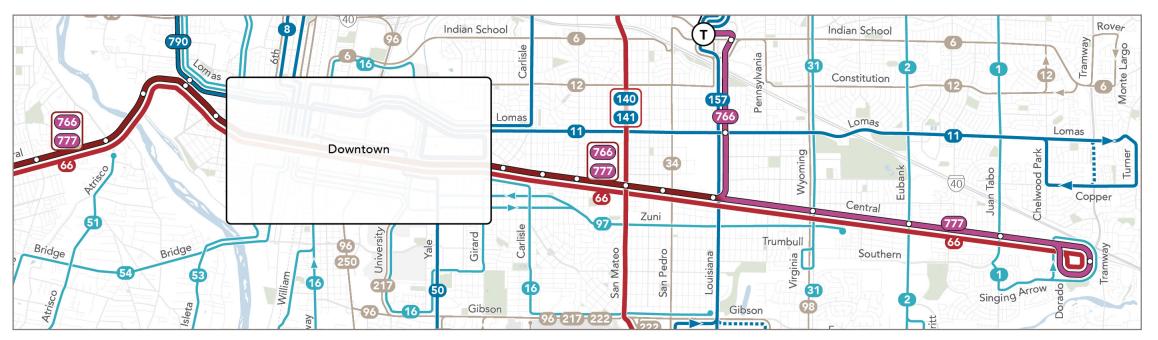
The reason a local route would be maintained even once the Green Line started operation is because of **station spacing**. Between its western terminus and Louisiana. ART stations are about 1/2 to 2/3 mile from each other. (On the 2022 network map at right, ART stations are shown as white dots on the red line.)

East of Louisiana, ART stops are one mile apart. At such wide spacing, people who are near Central Avenue could be a very far walk from a station – first they have to walk north or south to Central Avenue, and then as much as 1/2 mile along it.

The wide station spacing of ART east of Louisiana therefore makes it important that a local route continue to operate, serving local stops in between the ART stops, at least east of Louisiana, if not also along the entire line.

### **Separate Stops**

Along about 3/4 of its length, ART has stations in the median. The ART vehicles open their left-side doors when they pull up to those stations. In this part of the route the local route can't possibly stop at the ART stations, or vice versa, because the local route uses a bus with doors on the





ART stops are in the median (in red) and Route 66 stops are on the right-hand sidewalks (in orange).

right-hand side so it must stop on the right-hand sidewalk.

The satellite image above shows a section of Central Avenue west of the river. The ART station is in the median (marked in red) and the Route 66 stops are on the sidewalk (marked in orange).

If ART buses were pulled over to the right-hand sidewalk, to the Route 66 stops, they would

experience lots of delay from being in lanes with general traffic, delay that they are protected from by staying in their median lane.

So there's no question of ART and local buses sharing stations over the 3/4 of the Central Avenue ART line where ART is in its median, protected lanes. The benefit of this arrangement is that ART is fast and reliable.

The downside is that people can't stand in one place to wait for either Route 66 or ART, whichever comes next. They have to pick one, and then get on the correct side of the roadway for that vehicle. In the center of the city, they are on separate parts of the road, with ART in the median and Route 66 on the right-hand edge. This means that someone who would be happy to take either bus has to pick just one to wait for.

Real-time information about arrivals should help, but it isn't always perfectly accurate. If someone makes the wrong choice, they stand at a stop or station waiting while a bus going where they're going drives by without them.

East of Louisiana, ART buses can stop on the right-hand edge of the road, close to Route 66 stops. In this area, someone could wait for either bus, and take whichever came first, though they would have to quickly walk down the sidewalk to the other stop if the arrival of the other bus surprised them.

# Continuing Service Beyond the End of the Infrastructure

The City made a deliberate choice of BRT technologies when it selected buses that can operate beyond the end of the median-running infrastructure. This is why the ART Green Line can continue far to the east and west of the city, without the City having to bear the capital costs and construction impacts of building median stations across the entire length of Central Avenue.

BRT that can run off the end of its infrastructure and continue providing useful service is known as "open BRT." It's a lower-cost, simpler choice for BRT technology that generally leads to better access and equity outcomes on a transit network.

In Albuquerque, the choice of open BRT means that ART can run right off the end of its infrastructure, at Louisiana, and keep going through the International District all the way to Tramway or Uptown. People living on that outer eastern part of Central or Uptown— or riding connecting bus routes to Central—can ride ART into the center of the city without an extra transfer. In contrast, a closed BRT line (or a light rail line) would have to end where its infrastructure ended, at Louisiana. This would introduce an additional transfer for anyone wanting to travel beyond that point.

The benefits of open BRT in Albuquerque can be seen in:

- The high ridership on the eastern and western ends of the ART line.
- The high productivity of the ART Green Line (777).
- The good job access available via transit for people living anywhere near the frequent network (Central Avenue, Louisiana or San



Mateo).

All of these outcomes are improved by the fact that the high frequency, high capacity, reliability, and long hours of service associated with the ART project can be sent to dense and diverse neighborhoods far beyond the boundaries of the capital construction project.

### **Potential Duplication**

In transit network design, "duplication" describes a situation in which multiple routes are doing the same thing, without providing much benefit to passengers.

Route 66 is a very important local supplement to the ART service with its wide-station spacing. As ART is currently designed and operated, there is no question that a local route is needed to cover the stops in between major intersections that are one mile apart. In this sense Route 66 is not "duplication" of ART, at least not in the eastern segment where ART stations are far apart.

As of 2019, 12% of the bus service provided on the whole network was used for Route 66.

In the future, the big question for Central Avenue will not be whether having Route 66 provide 15-minute frequency to very closely-spaced stops is a *good idea*, or is *beneficial* to Route 66's many riders.

Instead, the question will be a harder one, which is: Given the unmet needs and desires for service all over the city – including on and near Central Avenue – is running frequent local service underneath the ART lines the best use of that entire 12% of the budget?

The maps on the following page show the pattern of boardings on the routes serving Central Avenue, and the difference between where ART lines are most used and where Route 66 is most used.

In the maps below, boardings per stop (counted in early 2022) are shown for the two ART lines (at left and center) and Route 66 (at right). The wide ART stop spacing is visible as the gaps between big boardings dots. Also visible in these maps is the fact that there are relatively few boardings on Route 66 on the west side through to UNM, except at the Alvarado TC, but consistently high boardings east of San Mateo.

The high eastern ridership on Route 66 is probably due to four factors:

• San Mateo & Central is the highest-frequency connection available in the whole network, between the Routes 140+141 running north-south and ART+Route 66 running east-west. For people who can make a trip using a combination of those routes, they

would be transferring at San Mateo & Central, which shows up as a big dot on these maps.

- ART frequency gets worse east of Louisiana (where the two ART lines branch apart), going from every 10 to every 20 minutes (in 2022).
- ART station spacing gets wide east of San Mateo (though an additional ART station was added, between San Mateo and Louisiana, while this data was being collected).
- Central Avenue is dense with mixed-uses along almost its entire length. Also, east of San Mateo, socially vulnerable people are living at particularly high densities, as shown in the map on page 42.

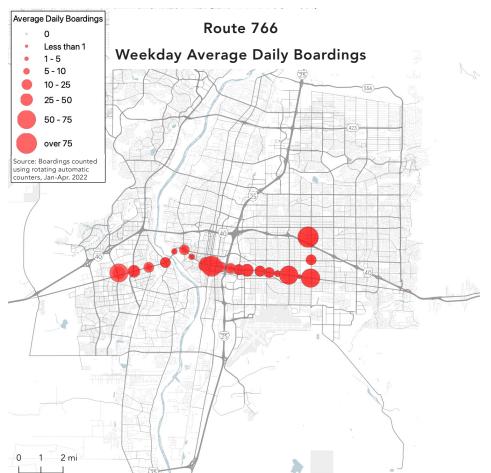
With long walks to stations from many places, and less-fabulous (but still high) frequency, the ART Green Line (777) east of Louisiana is understandably less appealing to people than Route 66.

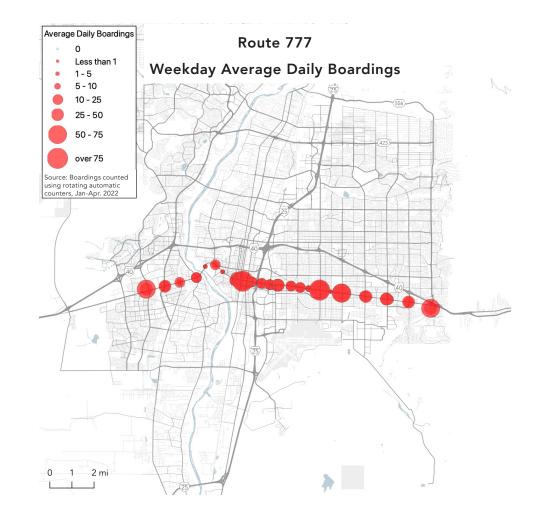
If additional ART stops could be added, so that ART stops were consistently-spaced every half-mile, rather than every mile, that would make ART more useful to people east of Louisiana. It would also likely raise questions about whether so much local service is needed in addition to ART.

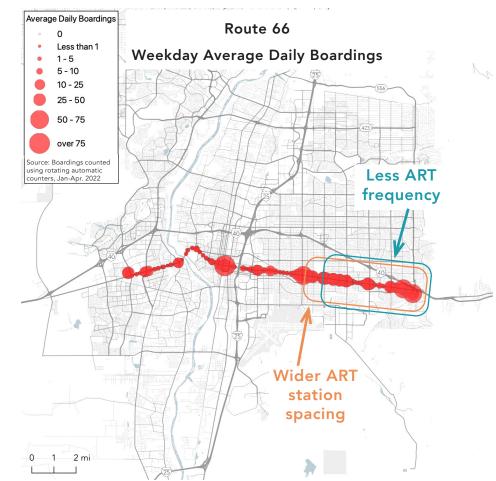
At that point, people's maximum walks along Central Avenue to an ART stop would be 1/4 mile, a distance most people can cover in about 6 minutes. (The walking conditions, safety and temperature on certain parts of Central Avenue might make it seem longer.)

Route 66 today makes very closely-spaced stops, sometimes with bus stops on multiple consecutive blocks. Asking people to walk five blocks (to an ART stop) instead of one block (to a Route 66 stop), and possibly the same again at their destination, would negatively impact some people.

Some transit agencies work over time to add stops to their rapid lines, which ABQ RIDE may also do. This tends to attract more people to the rapid lines, and the agency pulls back the frequency of the local bus route. Agencies sometimes repurpose that service so that it stays in the neighborhood, by putting it into the rapid line on the same corridor (in this case, ART); or onto parallel, infrequent lines (such as on Lomas or Gibson); or into intersecting routes, to help people reach the corridor without long walks.







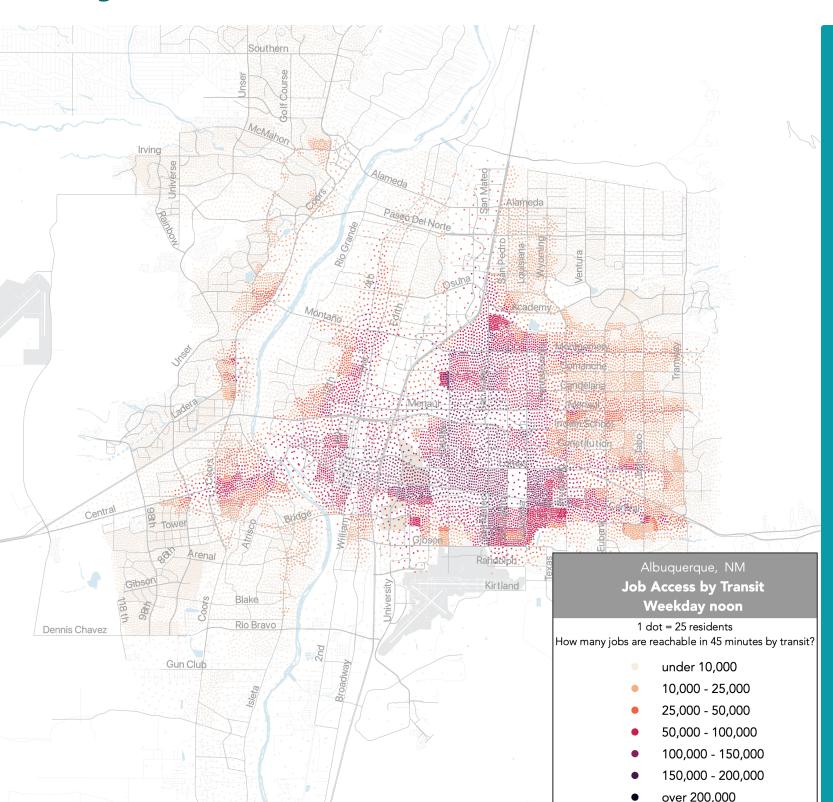
# **Outcomes**

# **City-Wide Job Access by Transit**

The map at right shows how many jobs a person could reach within 45 minutes by transit + walking, on the 2019 transit network. Dark red represents residents who could access many jobs, while light peach and white areas represents access to fewer jobs.

Most of the dark red is located near downtown, along Central Avenue, and in east Albuquerque because there are so many jobs within the city center (downtown, Old Town, the university area, and the health services along San Mateo).

The ART BRT corridor shows up strongly, as do the east side corridors running 20 minute bus service. Corridors with higher frequency show up with higher access because your waiting time is much shorter, and you can therefore spend more of your travel budget moving, rather than waiting.



Transit agencies can decide where and when transit runs, but they have little control over where jobs, housing and other opportunities are located.

## **Access Analysis**

To do this access analysis, we used a software tool called "OpenTripPlanner" (OTP). OTP works similar to how you might request directions from Google Maps – you give it a start and end point, and it tells you how to travel between them using transit, and how long it will take.

OTP can also be used to generate an isochrone, showing all of the possible trips from a point that can be made within a certain amount of time or less. (Example isochrones are shown starting on page 22.) We merge those isochrone shapes with data on where people live and work to estimate the number of residents and jobs reachable from the center point of that isochrone.

For the map at left, showing job access by residents across the entire city, we essentially created isochrones from every single point (or nearly – the points are arranged in a 400 meter grid across the city). Each of those isochrones were then merged with employment data to produce the job access maps and charts shown in this chapter.

The analysis relies on the best data currently public and available: the 2019 American Community Survey (from the Census Bureau) for residents, and the 2018 Longitudinal Employer Household Dynamics survey for jobs.

Source: US Census 2019 ACS 5-Year Summary File, 2018 Census Longitudinal-Employer Household Dynamics Progran

Open Street Map, and ABQ RIDE GTFS 2019

The series of maps below show the job access available to Albuquerque residents, in 2019, depending on how long they are able to spend traveling.

#### 30 minutes of travel time

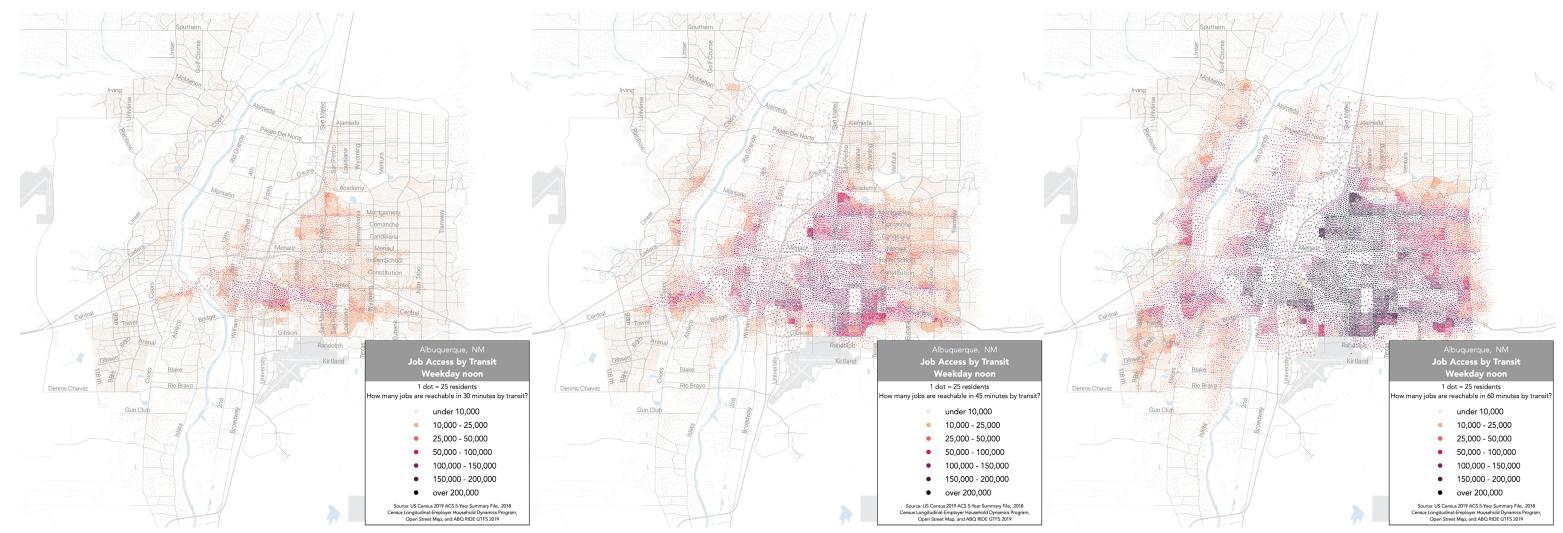
The 30 minute travel time map shows that people living along the frequent Central Avenue corridor (Routes 66, 766, 777) and the San Mateo corridor (Routes 140, 141) can reach numerous jobs in half an hour or less.

#### 45 minutes of travel time

With 45 minutes to spend traveling to jobs, residents along roads that have routes coming every 20 minutes, who aren't too far from big job centers, have a lot of access. Coors west of the river appears (because of access to jobs in the city center and at Cottonwood Mall). Many residents on the east side, who have access to frequent service or to a route going downtown every 30 minutes, have good job access within 45 minutes of travel.

#### 60 minutes of travel time

If people are able to spend an hour getting to work, then nearly the entire city can access more than 25,000 jobs. Even people living on routes that come just every 60 minutes can spend enough time waiting to still reach many jobs once they're on the bus. Many jobs also become reachable with transfers, which are possible within an hour's travel time for those people who live on routes coming every 30 minutes.



30 mins: Additional Job Access by Transit in 30 mins. of Travel

45 mins: Additional Job Access by Transit in 45 mins. of Travel

60 mins: Additional Job Access by Transit in 60 mins. of Travel

# Job Access and Demographics

The charts at right shows the number of jobs accessible by the average person, and by different sub-groups in the region.

#### All Residents of Albuquerque

By a combination of walking and using the existing transit network, the average resident of Albuquerque can reach about 44,400 jobs within 60 minutes.

#### **Residents Living in Poverty**

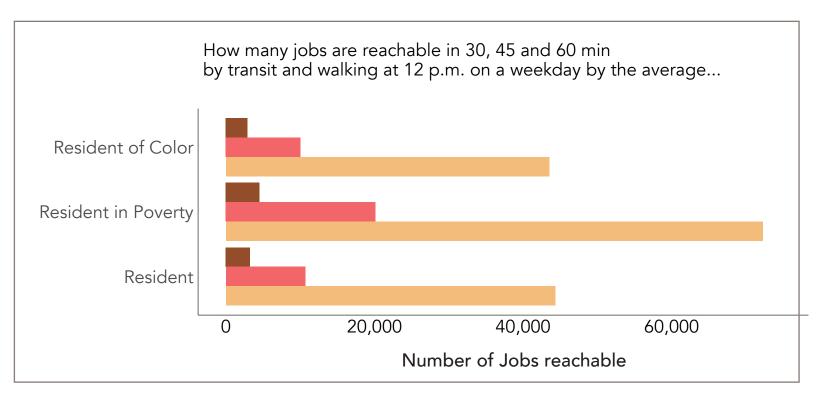
The average resident living below 150% of the federal poverty line can reach about 72,300 jobs, nearly 28,000 more jobs than the average resident. This is due to most residents in poverty living near the city center, along Central Avenue, and along transit corridors with higher frequency service. This favorable pattern is not universal among American cities, particularly those where development pressure, housing policies, and housing costs have pushed more people of color and those in poverty towards peripheral areas.

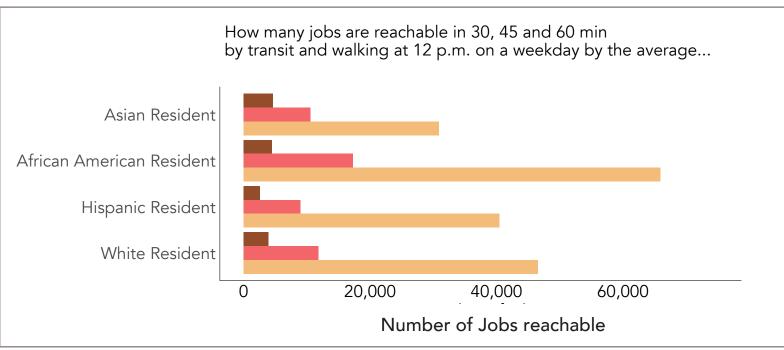
#### **Residents of Color**

The average resident of color has similar access to jobs as the average resident, at 43,500 jobs reachable within 60 minutes. When looking closer at census demographics we can see that Black or African American and White residents can reach the most jobs in 60 minutes, 65,900 jobs and 46,500 jobs respectively.

#### Job Access, Usefulness and Ridership

If the city wants to increase transit ridership, then a key strategy would be to increase the usefulness of the transit network. A very good way to measure transit usefulness is to measure the number of jobs (or other important destinations) to which the average resident has access.





If the city wants to increase the use of transit by lower-income, minority and vulnerable residents, then improving job access for those groups specifically would be a key strategy for achieving that equity outcome. 30 minutes 45 minutes 60 minutes

30 minutes 45 minutes 60 minutes

# **Proximity to Transit**

By counting the number of people and jobs near service, we can estimate how well a transit network serves both coverage and ridership goals.

- Proximity to any service speaks to a coverage goal.
- Proximity to service that runs all day, or all week, can also speak to a coverage goal, if temporal coverage is important along with geographic coverage.
- Proximity to *frequent* service speaks to a high access or high ridership goal.
- Proximity to all-day, or all-week, frequent service can also speak to a ridership goal.

## Midday on Weekdays

The chart at right reports proximity to services of different frequencies at midday on weekdays, on the 2019 network.

#### **All Residents**

23% of all residents lived within a 1/2 mile walk of 20-minute or better frequency service, at midday during weekdays.

In contrast, 50% of all residents lived more than 1/2 mile walk from any transit service at all.

#### All Jobs

36% of all jobs were located within 1/2 mile of 20-minute or better frequency service. This is largely due to the concentration of jobs in downtown and around UNM.

41% of all jobs were located more than 1/2 mile walk from any bus service.

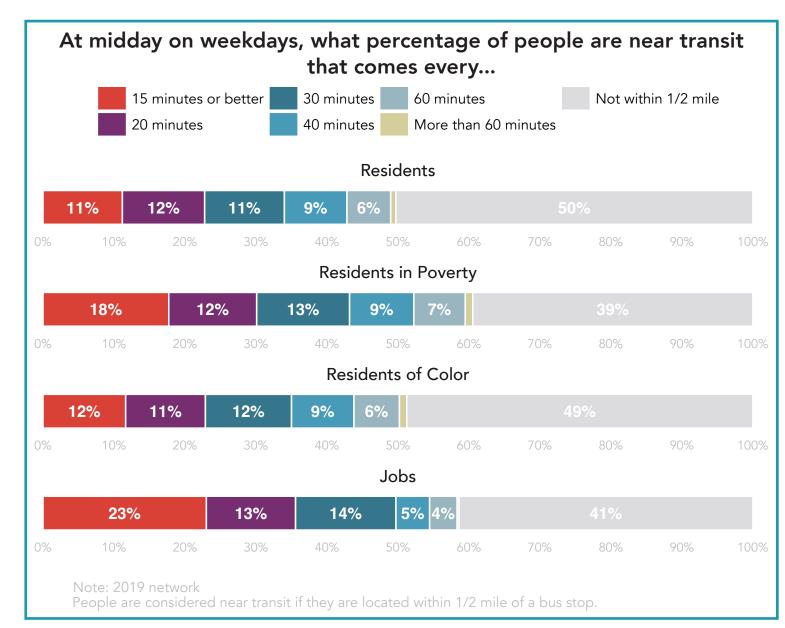
#### Residents living in Poverty

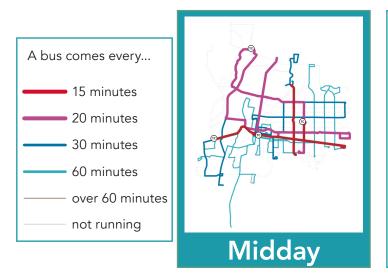
When taking a closer look at residents living at or below 150% of the federal poverty line:

- 30% lived within 1/2 mile of 20-minute or better service, which is a higher percentage than then when looking at all residents.
- Only 39% of residents living in poverty were more than 1/2 mile walk from any bus service, a smaller percentage than for all residents.

#### **Minority Residents**

- 23% were living within 1/2 mile of 20 minute or better service, matching the percentage of all residents.
- 49% of minority residents were living outside of a 1/2 mile walk of any service, a very slight improvement when compared to all residents.









### **Rush-hours on Weekdays**

The chart at right reports proximity to services of different frequencies during the evening rush hour, on weekdays, on the 2019 network.

#### **All Residents**

24% of all residents lived within a 1/2 mile walk of 20 minute or better frequency service at rush hour during weekdays.

In contrast, 46% of all residents lived outside of 1/2 mile of any bus service.

#### All Jobs

38% of all jobs are located within 1/2 mile of 20 minute or better service. This is likely largely due to the higher concentration of jobs in downtown.

35% of all jobs are located outside of 1/2 mile of any bus service.

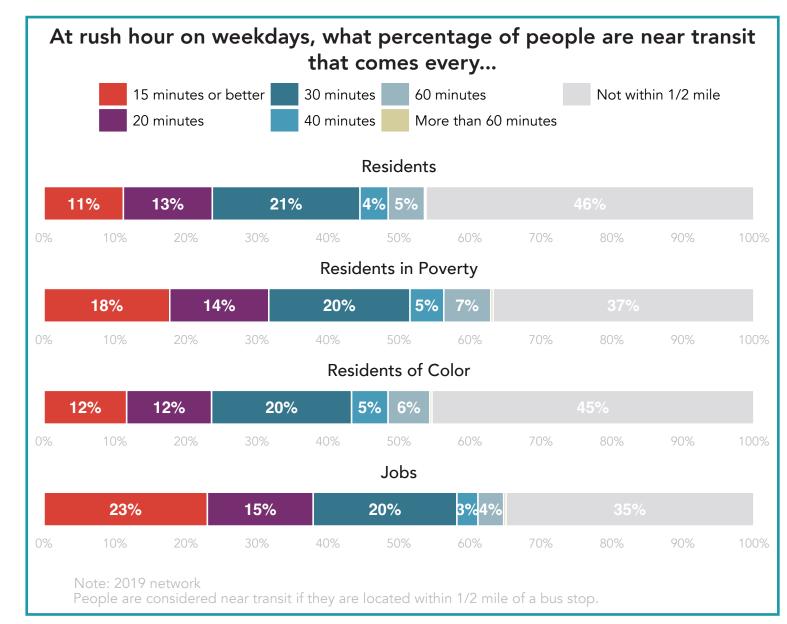
#### **Residents living in Poverty**

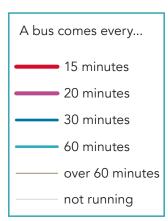
When taking a closer look at residents living at or below 150% of the federal poverty line:

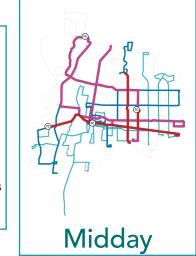
- 32% lived within 1/2 mile of 20 minute or better transit service; this is higher than when looking at all residents.
- 37% of residents living in poverty lived outside of 1/2 mile of any bus service, a smaller percentage than all residents.

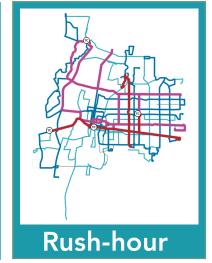
#### **Minority Residents**

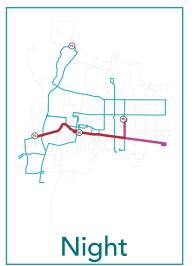
- 24% living within 1/2 mile of 20 minute or better service, matching the percentage of all residents.
- 45% of minority residents lived outside of 1/2 mile of any service, a slight improvement when compared to all residents.











### Nights on Weekdays

The chart at right reports proximity to services of different frequencies at night (8 - 10 pm) on weekdays, on the 2019 network.

#### **All Residents**

9% of all residents lived within a 1/2 mile walk of 20 minute or better frequency service at night during weekdays.

In contrast, 76% of all residents lived outside of 1/2 mile of any bus service.

#### All Jobs

21% of all jobs are located within 1/2 mile of 20 minute or better service. This is likely largely due to the higher concentration of jobs in downtown.

67% of all jobs are located outside of 1/2 mile of any bus service.

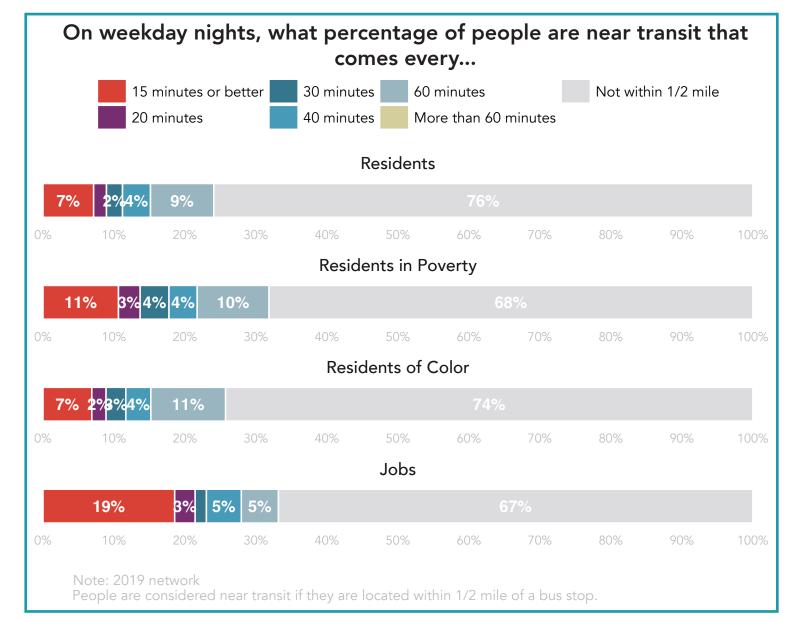
#### **Residents living in Poverty**

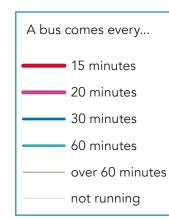
When taking a closer look at residents living at or below 150% of the federal poverty line:

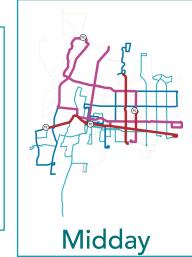
- 14% lived within 1/2 mile of 20 minute or better transit service; this is higher than when looking at all residents.
- 68% of residents living in poverty lived outside of 1/2 mile of any bus service, a smaller percentage than all residents.

#### **Minority Residents**

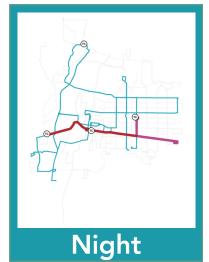
- 9% lived within 1/2 mile of 20 minute or better service, matching the percentage of all residents.
- 74% of minority residents lived outside of 1/2 mile of any service, an improvement when compared to all residents.











# Midday on Saturdays

The chart at right reports proximity to services of different frequencies at midday on Saturdays, on the 2019 network.

#### **All Residents**

11% of all residents lived within a 1/2 mile walk of 15 minute or better frequency service at midday during weekdays.

In contrast, 51% of all residents lived outside of 1/2 mile of any bus service.

#### All Jobs

23% of all jobs are located within 1/2 mile of 20 minute or better service. This is likely largely due to the higher concentration of jobs in downtown.

46% of all jobs are located outside of 1/2 mile of any bus service.

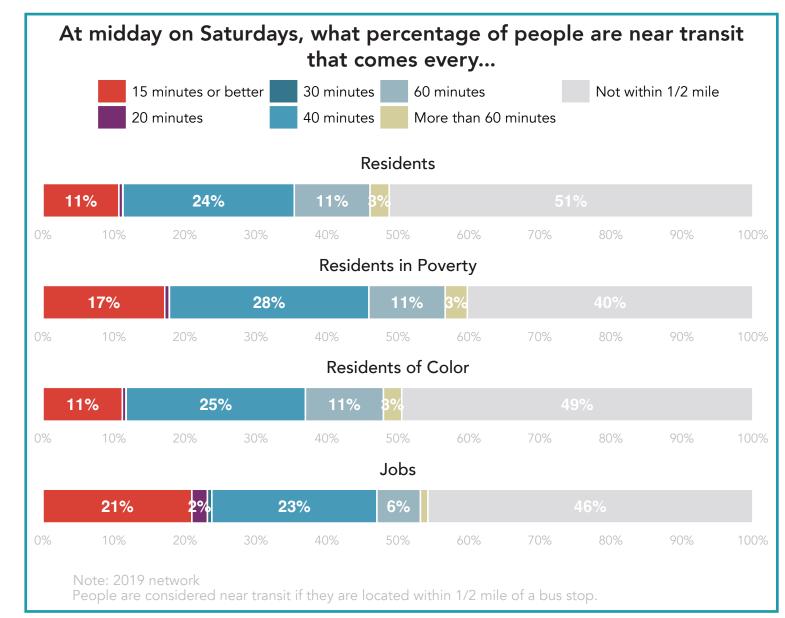
#### **Residents living in Poverty**

When taking a closer look at residents living at or below 150% of the federal poverty line.

- 17% lived within 1/2 mile of 15 minute or better transit service, this is higher than then when looking at all residents.
- 40% of residents living in poverty lived outside of 1/2 mile of any bus service, a smaller percentage that all residents.

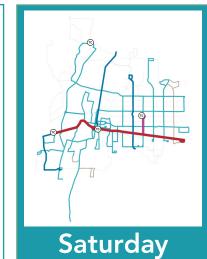
#### **Minority Residents**

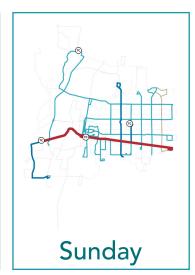
- 11% lived within 1/2 mile of 15 minute or better service, matching the percentage of all residents.
- 49% of minority residents lived outside of 1/2 mile of any service, an improvement when compared to all residents.











# Midday on Sundays

The chart at right reports proximity to services of different frequencies at midday on Sundays, on the 2019 network.

#### **All Residents**

11% of all residents lived within a 1/2 mile walk of 15 minute or better frequency service at midday during weekdays.

In contrast, 60% of all residents lived outside of 1/2 mile of any bus service.

#### All Jobs

24% of all jobs are located within 1/2 mile of 20 minute or better service. This is likely largely due to the higher concentration of jobs in downtown.

50% of all jobs are located outside of 1/2 mile of any bus service.

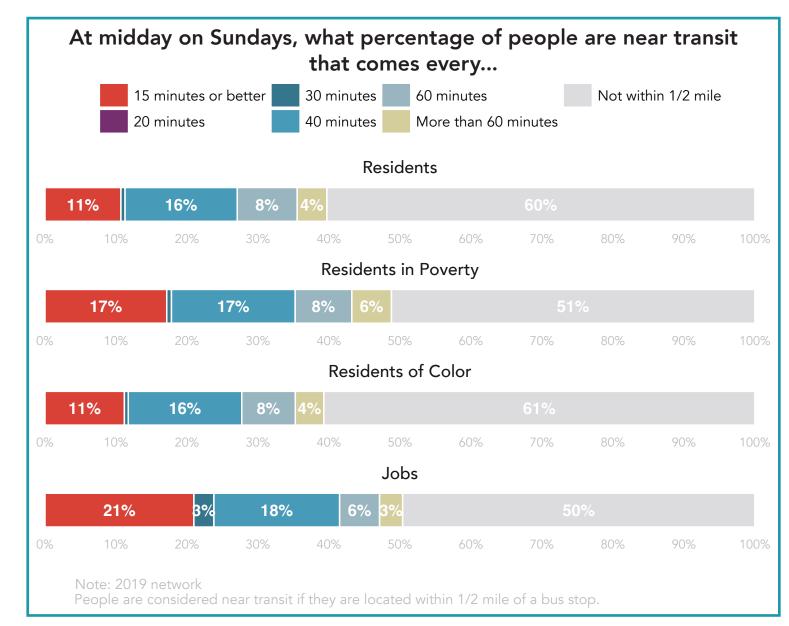
#### **Residents living in Poverty**

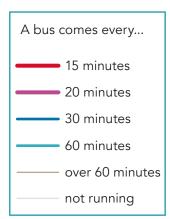
When taking a closer look at residents living at or below 150% of the federal poverty line:

- 17% lived within 1/2 mile of 15 minute or better transit service, this is higher than then when looking at all residents.
- 51% of residents living in poverty lived outside of 1/2 mile of any bus service, a smaller percentage that all residents.

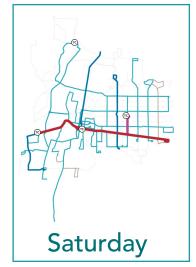
#### **Minority Residents**

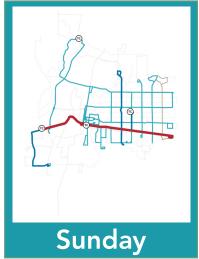
- 11% lived within 1/2 mile of 15 minute or better service, matching the percentage of all residents.
- 61% of minority residents lived outside of 1/2 mile of any service, slightly worse then all residents.











# **Residents Without Nearby Service**

The previous pages reported who was more than 1/2 mile walk from transit in 2019. This map shows us where those people lived, and especially where there were large numbers of residents living at high densities far from transit service.

Every dot on this map represents 25 residents, and the dots are color-coded based on whether the residents are within (blue dots) or beyond (red dots) a 1/2 mile walk of transit of any frequency.<sup>1</sup>

This map shows that most of the dense residential areas in the city do have access to some level of transit service. These areas show up in dark blue in east Albuquerque, west Albuquerque along Coors Boulevard, parts of southwest Albuquerque along 98th Street.

It also becomes clear that there are dense residential areas more than 1/2 mile from transit. Large clumps of red dots can be seen to the north around Rainbow and Irving Boulevards; north of the Coronado Freeway; in southwest Albuquerque on either side of 98th Street; and in smaller pockets throughout central Albuquerque where the arterial street network require long walks exceeding the 1/2 mile distance.

#### **Street Connectivity**

The street network has a big impact on whether someone is near transit service. If you compare the red areas on this map to the low street connectivity areas on the Walkability map earlier in the report, you can see some strong similarities.

The area just north of I-40 in west Albuquerque cannot access transit to the south because the freeway blocks all street or path connections. People there are forced to walk east to reach a stop on Unser Boulevard. A bus route could

wiggle its way deep into this neighborhood and then out again, but this would be a costly deviation to add to any route and that entire cost would have to be justified by this neighborhood alone.

Similarly, the red areas on either side of 98th Street in southwest Albuquerque are mostly in subdivisions with cul-de-sacs and walls. Streets that dead-end and barriers around neighborhoods both force residents to walk a long way out-of-direction to the nearest stop.

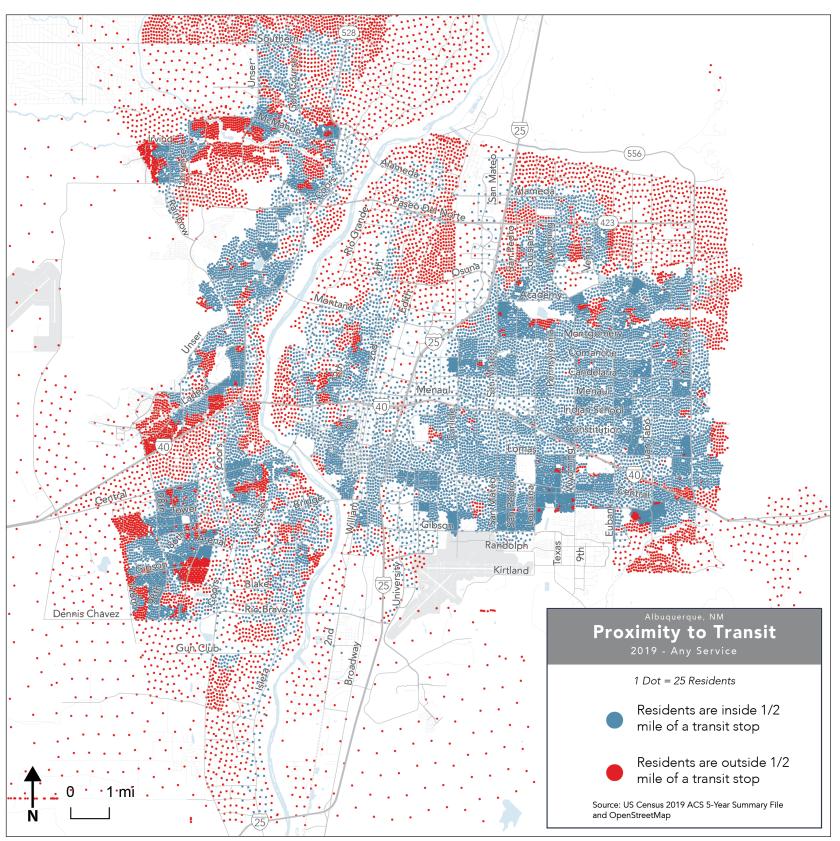
In some of the red areas of this map access to transit could be improved through new pedestrian connections or the dismantling of barriers, as opposed to having a bus run a very winding path into and out of each isolated pocket of development.

#### The Wide Arterial Grid

A different sort of problem is present east of the river. The city's north-south arterial roads are spaced one whole mile apart. Many residents are a very long walk from their nearest north-south bus line, especially if their local neighborhood streets are circuitous or disconnected.

On a normal grid transit network, people would enjoy being able to walk to an east-west route for east-west trips, or to a north-south route for their north-south trips.

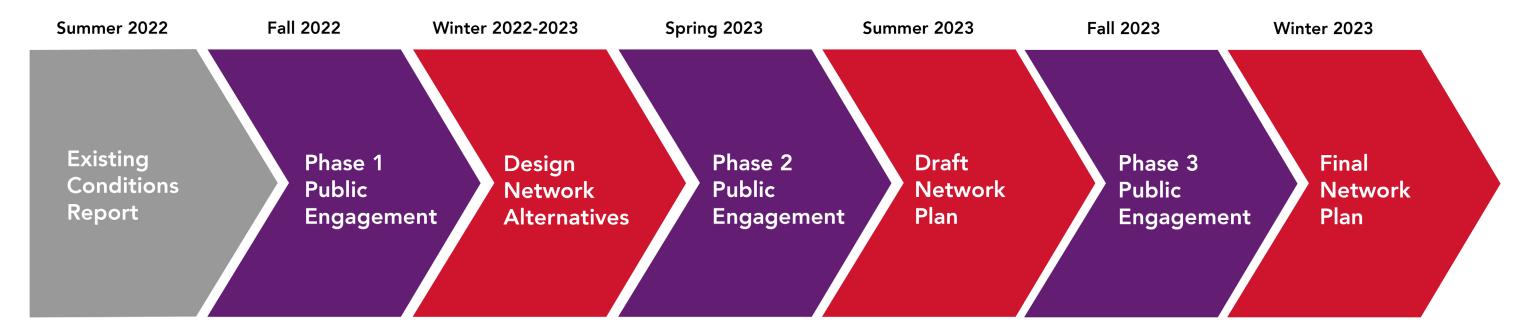
But in this part of the city, many people are a short walk *only* from an east-west route, and most of those east-west routes come only during rush hours, perhaps just twice a day and in one direction only. These residents are "covered," and shown in blue in the map at right, but they are a long walk from the *all-day* network.



This map shows where people are a long walk from transit service of any kind. This analysis is based on 2019 transit service. In 2022, with some routes not running due to the driver shortage, conditions are worse.

<sup>1</sup> For this analysis we have used 1/2 mile walks, but for some people that is too far, and for other people they may be willing to walk farther. Weather, time of day, reliability and frequency of service can also affect people's willingness to walk a certain distance.

# **Next Steps in ABQ RIDE Forward**



### **Phase 1 Public Engagement**

This report supports the first phase of public engagement in ABQ RIDE Forward, which is expected to last through the end of October 2022.

During this first phase, the planning team will consult people about key choices and priorities. There is not yet any proposed change, network or plan. Rather, the planning team is gathering public input on the fundamental choices that go into any transit network plan, so that the public can influence the plan from the beginning.

During Phase 1 Engagement, many different kinds of people will be contacted and asked to participate in different ways, including:

- Filling out an online or print survey about future choices for the transit system.
- Joining a Focus Group or Stakeholder Advisory Group.
- Attending an online open house, with a presentation and Q&A time with the planners.

• Inviting planners to present to regular events or meetings hosted by local organizations.

The outreach team will be targeting a broad range of people for engagement, with an extra effort made to reach people who ride transit in Albuquerque today or have in the past.

The team is also prioritizing reaching vulnerable communities, lower-income residents, non-English speakers, and others who have to overcome hurdles to participate in a planning process.

For more information about engagement, visit the project website, abgrideforward.com.

### **Designing Network Alternatives**

Once the planning team has broad public input on the purpose and priorities for the future transit network, then design of network alternatives and improvements will begin.

We will design multiple future transit network alternatives for people to consider.

# **Phase 2 Public Engagement**

Public input will be gathered on the network alternatives during a second phase of engagement.

During this phase, the planners will show alternatives with concrete changes that could be made to routes, frequencies, coverage and others aspects of the transit network.

People will be contacted and asked to give feedback on the network alternatives, in similar ways as described for Phase 1.

### **Draft Network Plan**

After public responses to the alternatives have been gathered, the team will design a draft network plan. This plan will specify routes, frequencies, hours and days of service, for a future ABO RIDF network.

### **Phase 3 Public Engagement**

In the last phase of public engagement, people will be asked to review the draft network plan and respond to its specific recommendations.

#### **Final Network Plan**

The network plan will be revised based on feedback from the public and stakeholders, and it will then be finalized.

Some elements of the final plan may be implemented right away, if they can be implemented within the limits imposed by funding and staff. Others may require more time or other different conditions in order to become possible.