

REGIONAL TRANSIT ISSUE PAPER

Agenda Item No.	Board Meeting Date	Open/Closed Session	Information/Action Item	Issue Date
4	11/12/18	Open	Information	10/24/18

Subject: SacRT Forward Alternatives Report Presentation

ISSUE

Jarrett Walker + Associates (JWA) will provide a presentation to the Board on the SacRT Forward Alternatives Report and Public Involvement campaign to date.

RECOMMENDED ACTION

Information Item.

FISCAL IMPACT

None.

DISCUSSION

Jarrett Walker + Associates will provide a follow up presentation to the Board on the Route Optimization project, known as SacRT Forward. After conducting multiple outreach and stakeholder events for public response on route system design, Jarrett Walker + Associates has prepared the Alternatives Report presentation in order to illustrate possible network designs that will be brought back to the Board at a later date.

Approved:

Presented:

Final 11/07/18

General Manager/CEO

Director, Planning

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SacRT Forward Network Plan: Alternatives Report

OCTOBER 2018

For Sacramento Regional Transit District

JARRETT WALKER + ASSOCIATES

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1 Introduction

Introduction

The purpose of this report is to illustrate for the public and decision-makers the trade-off that Sacramento Regional Transit (SacRT) faces in how it distributes its service.

This report contains two Alternatives for the future, which are intentionally very different from one another:

- The High Coverage Alternative preserves all of the existing coverage of the SacRT network. The places that are served today would be served in the High Coverage Alternative, though most of them are served with low frequencies and short spans.
- The High Frequency, High Ridership Alternative concentrates service into fewer routes, where the largest numbers of people and jobs are, so that those routes can run more frequently, later at night and on the weekends.

Neither of these Alternatives is a *proposal*. Rather, each is an illustration of one end of the spectrum between focusing service to maximize ridership, and spreading service out to maximize coverage.

High Frequency, High Ridership Alternative



High Coverage Alternative



Where should SacRT be, on this spectrum?

How to Use This Report

We suggest that you take the following steps in reading this report:

- Look at the detailed **network maps** starting on page 10. Find the places you care about, and notice which routes go by there. Note the colors of the routes, which represent their frequencies and their spans of service each day and each week. Note where else those routes go.
- There are detailed **maps of weekend service** starting on page 13. Locate the places you care about on these maps, too.
- Note that the bus route numbers in these Alternatives are very different from the existing numbering! **Do not simply look for your route by its number**, or you risk overlooking an improved route near you, with a different number.
- The **frequencies and spans of every route** in each Alternative are shown in the tables starting on page 16. This is where you can see if the route(s) you would care about run at the times of day, and on the days of the week, when you would want them too, and at what frequencies.
 - Remember, **do not simply look for your route number** – start by looking at the maps to find routes near you, and then reference these tables.
- If you care about **regional-scale outcomes**, look at the maps and charts in Chapter 3 (starting on page 19), which show how access to jobs within reasonable travel times would change in different parts of the service area.

What is the Purpose of Transit?

Transit can serve many different goals. But different people and communities value these goals differently. It is not usually possible to excel towards all of these goals at the same time.

Understanding which goals matter most in Sacramento is a key step in the SacRT Forward Transit Network Plan.

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.
- **Environmental:** increased transit use can reduce air pollution and greenhouse gas emissions. Transit can also support more compact development and help conserve land.
- **Social:** transit can help meet the needs of people who are in various situations of disadvantage, providing lifeline access to services and jobs.
- **Health:** transit can be a tool to support physical activity by walking. This is partly because most riders walk to their bus stop, but also because riders will tend to walk more in between their transit trips.
- **Personal Liberty:** By providing people the ability to reach more places than they otherwise would, a transit system can be a tool for personal liberty, empowering people to make choices and fulfill their individual goals.

Some of these goals are achieved when more people ride, for more of their trips. For example, the environmental benefits of transit only arise from many people riding the bus rather than driving. Subsidy per rider is lower when ridership is maximized. Access to jobs for large numbers of people, in support of economic prosperity, depends on high ridership. We call such goals “ridership goals” because they are achieved through high ridership.

Other goals are served by getting service close to people, whether or not they ride. A bus route through a neighborhood provides residents insurance against isolation, even if the route is infrequent, indirect or only runs on certain days. People with severe needs for transportation live everywhere, if in small numbers in some places, and a route nearby helps them meet their needs. Coverage may also fulfill political or social obligations, for example by getting service into every political district. We call these types of goals “coverage goals” because they are achieved in part by covering areas with service, regardless of ridership.

Ridership and Coverage Goals Force a Trade-off

Ridership and coverage goals are both laudable, but they lead transit agencies in opposite directions. Within a fixed budget, if a transit agency wants to do more of one, it must do less of the other.

Here is an illustration of how ridership and coverage goals conflict with one another, due to geometry and geography.

In the fictional neighborhood at right, the little dots indicate residents and jobs. The lines indicate roads. Most of the activity in the neighborhood is concentrated around a few roads.

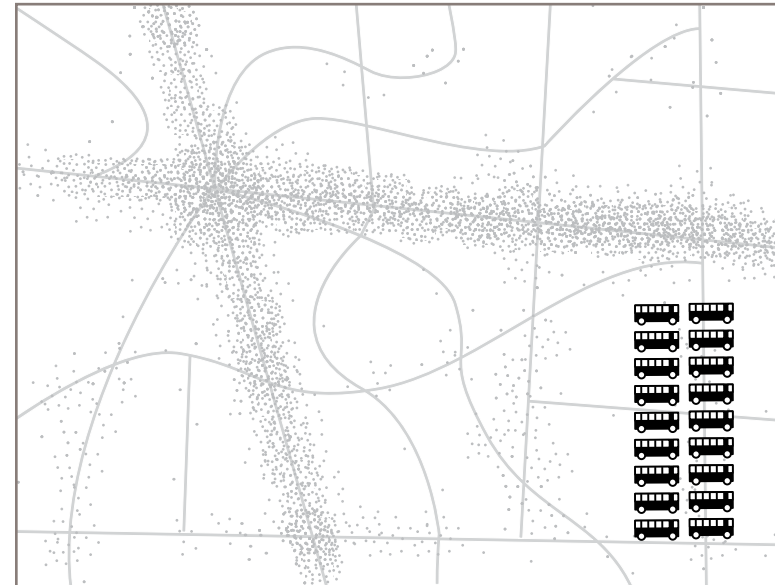
A transit agency trying to maximize ridership would focus service on the streets where there are large numbers of people and where the straight routes are direct and fast. Because service is concentrated onto fewer routes, frequency can be high: a bus is always coming soon. This would result in a network like the one at bottom-left. Frequency is a key part of a high-ridership strategy.

If the agency were trying to maximize coverage, on the other hand, they would spread out services so that every street had a bus route, as in the network at bottom-right. As a result, all routes would be infrequent, even those on the main roads.

On a fixed budget, designing transit for both high frequency and coverage is a zero-sum game. In the alternative networks at right, each bus that the transit agency runs down a main road, to provide more frequent and competitive service in that market, is not running on the smaller streets, providing coverage.

While an agency can pursue ridership and provide coverage within the same budget, the more it does of one, the less it does of the other.¹

These illustrations also show a relationship between coverage and complexity. Networks offering high coverage are naturally more complex. In this imaginary neighborhood, any person could keep the very simple “high frequency” network in their head, since it consists of just two routes, running in straight lines. They would not need to consult a schedule to catch a bus. The coverage network would be harder to memorize, requiring people to consult a map (to understand the routing) and a schedule (to catch these infrequent services).



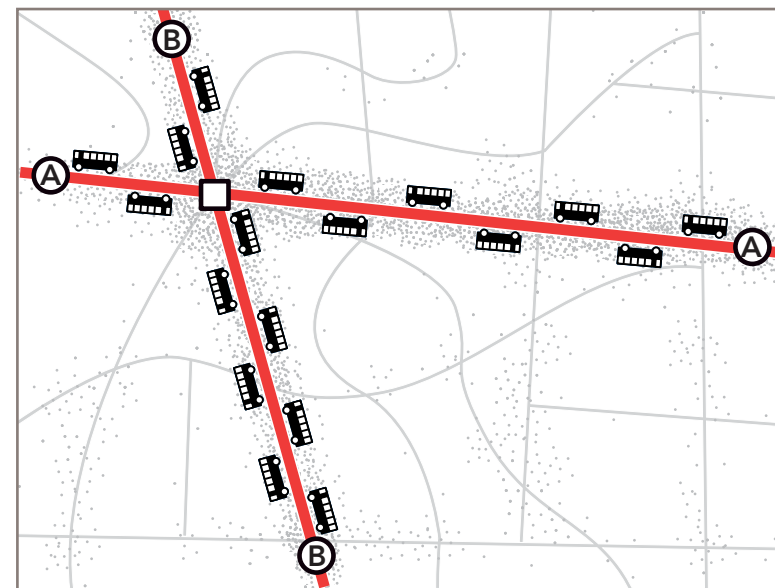
Imagine you are the transit planner for a fictional town. A neighborhood is shown at left.

The dots scattered around the map are people and jobs.

The 18 buses represent the budget you have for transit in this neighborhood.

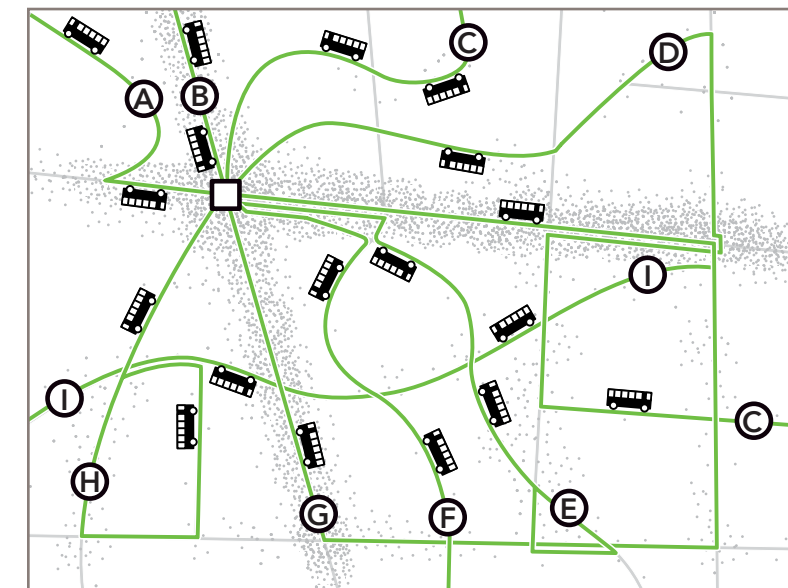
There are two different goals you could pursue, in designing the transit network here. The networks below show the extremes.

Maximum Ridership



All 18 buses are focused on the busiest areas. 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.

Maximum Coverage



Your 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.

Figure 1: Ridership and coverage goals, both valued by most people, lead transit agencies in opposite directions as they decide how to design a network and routes.

¹ The same trade-off arises between long spans of service (late into the night and on weekends) and coverage. The more an agency reserves budget to run long hours and every day of the week, the less service can be spread out to cover more areas. Agencies can cover the most places by offering service just on weekdays, for a short span – but then the bus is not available when many people need it for many of their trips.

2 The Alternatives

What are the Alternatives?

This chapter introduces two Alternatives illustrating very different ways that the SacRT network could be designed in the future. Both Alternatives assume no growth in the budget for operating transit service, so they show different ways of allocating SacRT's existing budget.

The two Alternatives differ in the degree to which they emphasize Ridership goals as opposed to Coverage goals.

The "High Ridership" Alternative is also called the "High Frequency" Alternative, because frequent service is such an essential part of a high-ridership strategy.¹

Alternatives, Not Proposals

A proposal is something that the proposer recommends. At this stage, neither SacRT nor the consulting team is proposing or recommending anything.

The purpose of the Alternatives is to illustrate the ends of the spectrum of choices that SacRT can make, about how to balance frequency and coverage within its budget. The public conversation about these Alternatives will guide the development of an actual network proposal, which will be presented for public consideration in 2019.

No New Money

Both Alternatives are designed for the year 2021, but with the assumption that SacRT has only its existing fixed route operating budget to work with.

The existing SacRT operating budget is fairly small given both the service area population and the very large geographic area that SacRT is expected to cover. In addition, land use and development patterns in much of the region are hostile to transit and to walking, which means that getting useful transit service close to people is more expensive for SacRT than it is for other transit agencies of similar size.²

There is hardly any "low-hanging fruit" in the existing SacRT network, that a blank-slate redesign (such as this process) can fix. Within the existing budget, nearly every improvement in service requires a difficult trade-off.

¹ It could also be called the "Long Span" Alternative, because long hours of service seven-days-a-week are also a key part of a high-ridership strategy.

² For a longer explanation of how geography, land use and development in the SacRT service area affect the usefulness of transit, see the [Transit Choices Report](#), especially Chapter 3 starting on page 36.

High Frequency, High Ridership Alternative



High Coverage Alternative



No Preferred Alternative

Neither the consultant nor SacRT staff has any preference among these Alternatives, nor any desire to steer the conversation to one end of the spectrum or the other.

The most important word in this report is *if*. The High Coverage Alternative shows what could happen *if* SacRT chose to retain its current balance of ridership and coverage goals, while updating the network to better match today's travel demands.

At the other extreme, the High Ridership Alternative shows what could happen *if* SacRT chose to focus service into higher-frequency, longer-span routes, in pursuit of higher ridership.

The High Ridership Alternative is the most different from the existing system. For this reason, this report puts greater focus on explaining it, including both its upsides and downsides. This can create the illusion that this Alternative is being promoted. This is not the intent.

The High Coverage Alternative will naturally be more familiar and more easily understood by readers of this report, especially if they use the existing SacRT network.

Focus on the Big Picture

These Alternatives have not been refined to the point that they could be implemented, because their purpose is to illustrate choices at a high altitude. A later stage of planning will produce a Draft Network Plan, based on public feedback and policy direction from the SacRT Board. At that point many more details will be filled in.

These Alternatives do not show any information about:

- Specialized services designed around school demands or commuters, with just a few trips each day.
- Shuttles delivered in partnership with local partners, such as large employers.
- Local routing details such as turnarounds.
- Bus stop locations.
- Precise schedules and the timing of connections.
- Peak frequencies. On a few routes, to avoid crowding, SacRT may increase frequencies slightly at peak times. These brief peaks in frequencies are not represented in this report.

All of this detail will be added later in a final plan, but doing so would be premature at this stage.

2 The Alternatives

Design Choices and Assumptions

Some design choices are common to both Alternatives, but even these are not proposals yet.

In designing the Alternatives, we wanted to highlight the ridership-coverage trade-off. To do this we tended to make a single choice about matters that were unrelated to that trade-off, and keep that choice constant across all alternatives.

Just because something is the same in both Alternatives does not mean that a different choice could not be made, and we welcome public comment about these aspects.

Longer Routes

Both Alternatives include a few routes that are longer than any route SacRT offers today. (They are not, however, longer than routes offered in other California cities). These longer routes pass through transit centers and light rail stations, rather than terminating there.

Same Speeds

Both Alternatives assume that buses travel at the same average speeds as in the existing network. This means that the available budget can pay for the same amount of service in the two Alternatives as in the existing system.³

However, SacRT buses today travel about 8% lower (on average) than the speeds implied by bus schedules. Demonstrations of travel time for the existing network therefore slightly overstate how far people can get in a given amount of time. The same demonstrations for the Alternatives make the same slight overstatement.

The need to improve bus speeds, or to rewrite schedules to acknowledge slower speeds, will be addressed later in this planning process. Cities and counties are essential partners in any effort to improve bus speeds, since they control roads and intersections.

No Change to Bus Stop Spacing

Neither Alternative implies any change to bus stop spacing.

The more closely-spaced bus stops are, the more slowly buses travel,

³ Slower speeds cost more to provide, and faster speeds cost less. This is because most of transit's operating cost arises from human labor, rather than from fuel or wear-and-tear, and humans are compensated based on their time. Assuming the same speeds therefore means that the two Alternatives and the existing network all reflect the same amount of service to riders.

especially in areas with high ridership. Rebalancing bus stops may be a valuable step for SacRT to take in the future, in order to achieve higher speeds (and therefore provide more service to passengers within the same budget). Bus stop rebalancing is not a step that we have assumed in the design of these Alternatives.

Free Transfers

In both Alternatives, there is an underlying assumption that transfers are free. SacRT has already taken a step towards eliminating the "transfer penalty" currently experienced by cash-paying riders, by deciding in August 2018 to reduce the cost of a cash-fare transfer from \$2.75 to \$0.25.

In the most effective transit networks, people are encouraged to change buses (or trains) as needed to reach their destination quickly. This allows the agency to provide a network that is efficient and liberating, with appealing simplicity and little duplication.

Transferring is therefore a behavior that SacRT should be encouraging, and thus it makes no sense to charge an extra fare for it.

A Blank Slate

Both Alternatives were designed starting from a "blank slate."

If a route in an Alternative resembles an existing route, this is not out of respect for history, nor is it an attempt to provide familiarity for existing riders. Rather, it indicates that the existing route makes sense in the context of the geography, people's travel demands and the design of a connected network, and thus the route is likely to be included in a redesigned network.

No Change to Local Contracted Services

The intention of this planning effort is to rethink SacRT's services without making significant changes to contracted services operated by SacRT for other communities.

Neither Alternative assumes any changes to the contracted services provided by SacRT for the North Natomas TMA (the *Jibe Express*, formerly known as the *Flyers*), for the City of Rancho Cordova (the *Cordovans*) or for the McClellan business park. All of the routes shown on the maps of the Alternatives would be *supplemental* to those contracted services.

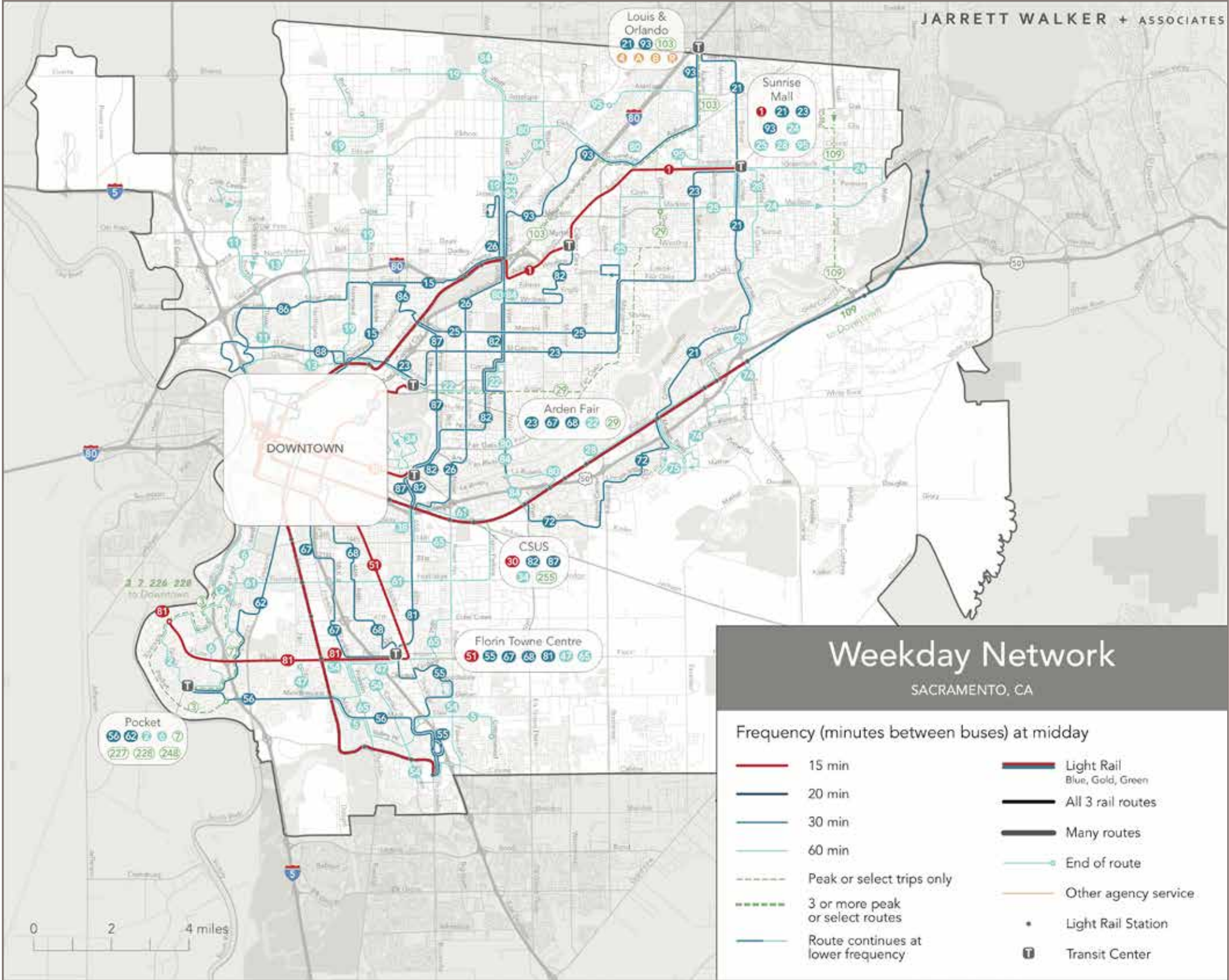
SacRT is currently piloting "microtransit" demand-response service in various parts of the region. The two Alternatives were designed with the year 2021 in mind. SacRT does not yet know whether the "microtransit" pilots will continue beyond 2020, nor where they would be offered, and for this reason "microtransit" service areas are not defined in either Alternative.

Map: Weekdays in the Existing Network

To help the reader compare the two Alternatives on the following pages to the existing network, a map of the existing network is shown at right. A map of existing routes downtown is shown on page 31.

Note that the existing network includes more variation in frequencies (and spans) than do either of the Alternatives. The Alternatives have a simpler set of “service categories,” each represented by a color.

The map at right does not show the contracted services that SacRT currently provides: the Jibe Express (former the North Natomas Flyers), the Cordovan and the McClellan shuttle. There are no plans to change these services, but they will not be part of the SacRT Forward Network Plan (since part of their cost is covered by other parties) and they are therefore not shown on the maps in this report. Similarly, the “microtransit” service areas currently being piloted by SacRT are not shown in this map or maps of the Alternatives.



Map: Weekdays in the High Coverage Alternative

The High Coverage Alternative is similar to the existing network in that most areas with a route nearby today would have a route nearby in this Alternative.

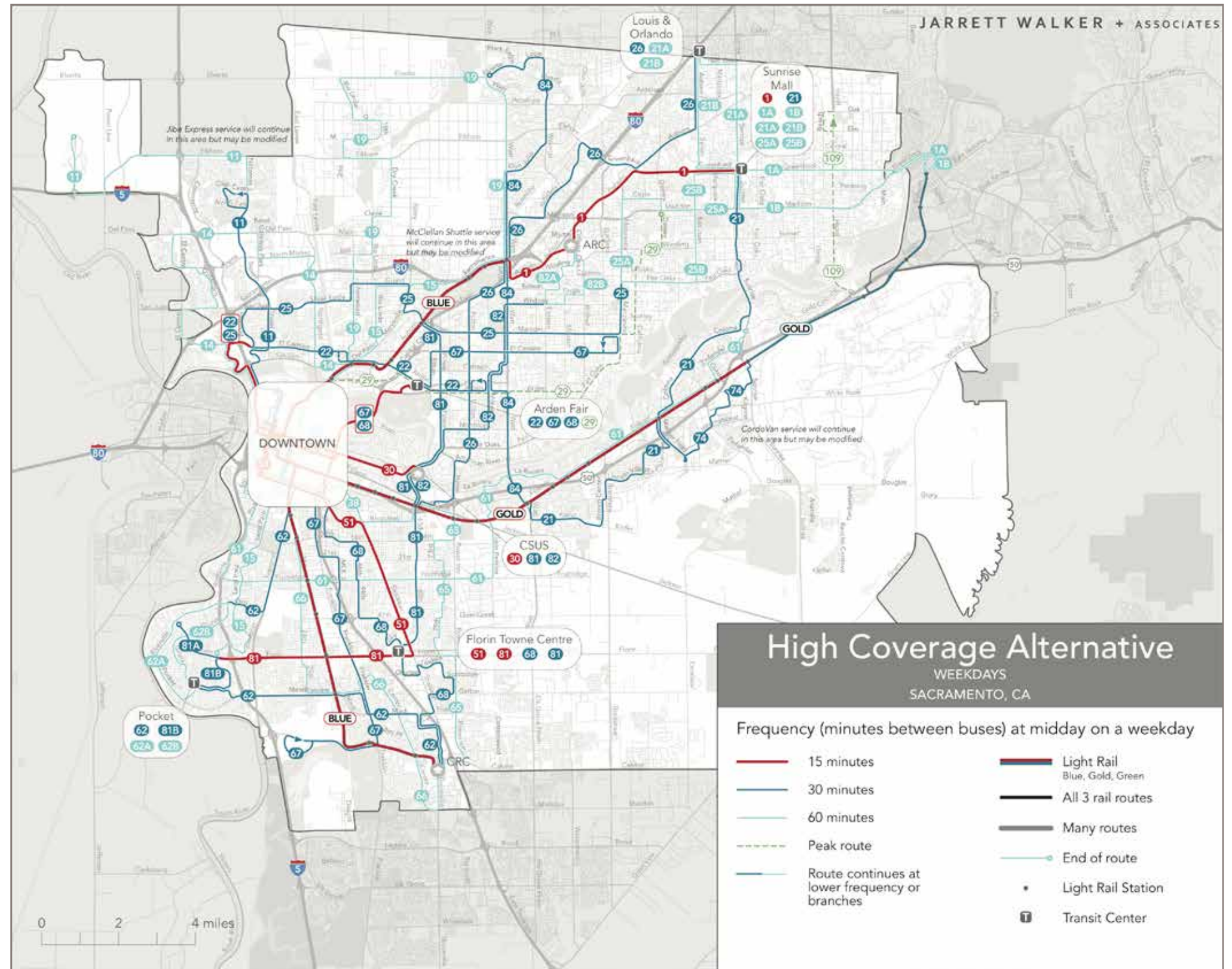
To explore this network and its relevance to your life, or the lives of people you care about, you can:

1. Find a place you care about on the map, using the labeled streets.
2. Note which routes are nearby, by number and by color.
3. Look at the legend at bottom right, to see what frequency those routes would have on weekdays.
4. Look at where else those routes go, besides the place you care about. They may go farther than your routes do today.
5. Refer to the table on page 16 to learn how the frequencies of these routes would change throughout a weekday, how many days of the week they operate, and what hours of service they offer.

Because this Alternative is designed to cover all of the neighborhoods where service exists today, it is not possible to increase frequencies on any routes. It is also not possible to increase spans of service (e.g. at night or on weekends) by more than a little bit on a few routes.

Other information about this Alternative that you may want to review:

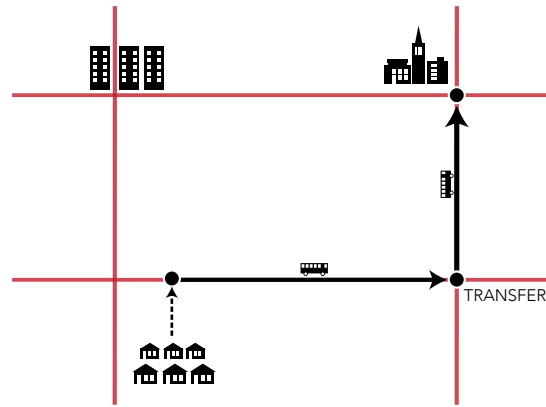
- A map showing weekend service follows on page 13.
- A map of downtown is shown on page 32.
- A text-based table detailing each route's streets, frequency and span of service is presented starting on page 35.
- The number of residents and jobs this Alternative would get close to with any service, and with frequent service, is shown on page 21.
- Charts illustrating how access to jobs would change under this Alternative are shown starting on page 28.
- Isochrones illustrating how peoples' travel time would be affected from sample locations are shown starting on page 23.



Map: Weekdays in the High Ridership Alternative

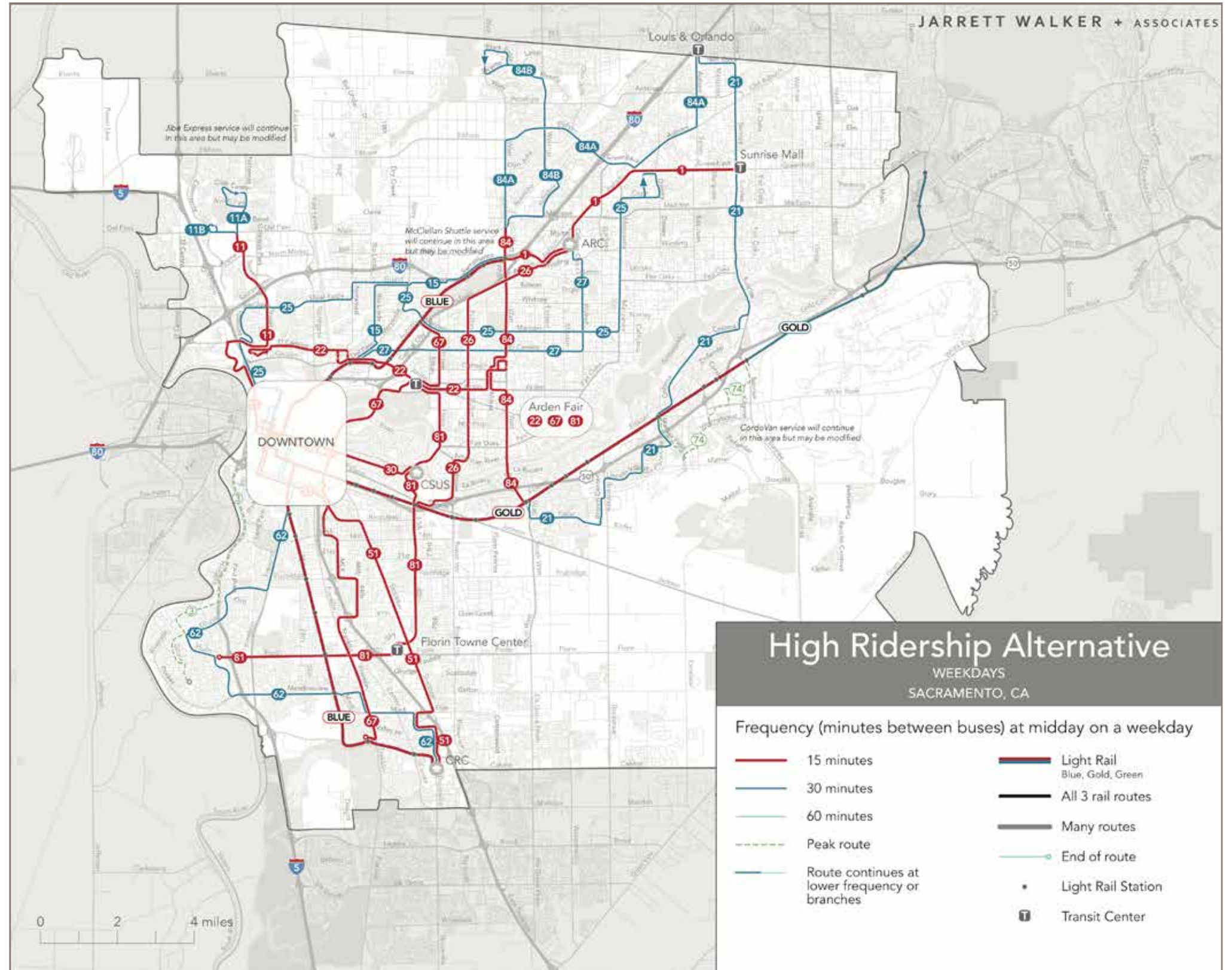
The High Frequency, High Ridership Alternative is very different from the existing network:

- Service is concentrated into fewer routes in the areas where the most people live, work and study, so that more people ride.
 - These fewer routes can be more frequent, so that a bus is more likely to be coming when someone needs it.
 - Routes also run later into the evenings, and at higher frequencies on weekends, than in the existing network or in the High Coverage Alternative. This also makes it more likely that anyone will find transit useful for the times they need to travel.
- Concentrating service into fewer routes means that less is available to spread widely, so some areas that are covered today would be a longer walk from service, or too far to walk at all, in this Alternative.
- In many cases, a place that is very close to a low-frequency route today would be walking distance from a more frequent route in this Alternative. This almost always gives people a faster travel time, despite the longer walk.
- This network includes a “frequent grid,” in which routes coming every 15 minutes cross one another. This makes transfers easy and fast, and means that people can go many more places than a single route takes them, in a reasonable travel time.



To explore this network and its relevance to your life, or the lives of people you care about:

1. Find a place you care about on the map, using the labeled streets.
2. Note which routes are nearby, by number and by color.
3. Look at the legend at bottom right, to see what frequency those routes would have on weekdays.
4. Follow the lines to see where else those routes go.
5. See page 17 for those routes' frequencies and spans.



Other information about the High Frequency, High Ridership Alternative that you may want to review:

- A map showing weekend service follows on page 14.
- A map of downtown is shown in the appendix, on page 33.
- A text-based table detailing each route's streets, frequency and span of service is presented starting on page 39.
- The number of residents and jobs this Alternative would get close to with any service, and with frequent service, is shown on page 21.
- Charts illustrating how access to jobs would change under this Alternative are shown on page 28.
- Isochrones illustrating how peoples' travel time would be affected from sample locations are shown starting on page 23.

The consulting team is certain that, were this Alternative to be implemented, it would get much higher ridership than the High Coverage Alternative. Why are we so certain?

- Repeated, wide-scale research has shown that higher frequencies and longer spans of service are a major factor in predicting ridership. This is true in many different kinds of urban areas, including places like Sacramento.
- The outcomes reported in Chapter 3 show that this network gets many more jobs within a reasonable travel time for the average resident than do the existing network or the High Coverage Alternative. People choose transit if it is workable given their destination and their time constraints, so making more destinations accessible within less time for a large number of people is a straightforward way to attract more riders.
- In places where SacRT concentrates service to offer higher frequencies and longer spans today, ridership is much higher. In similar places where frequencies are lower and spans are shorter, even if there are large numbers of people nearby and similar demographics, ridership is lower. This is not just true in Sacramento, but all over the world.

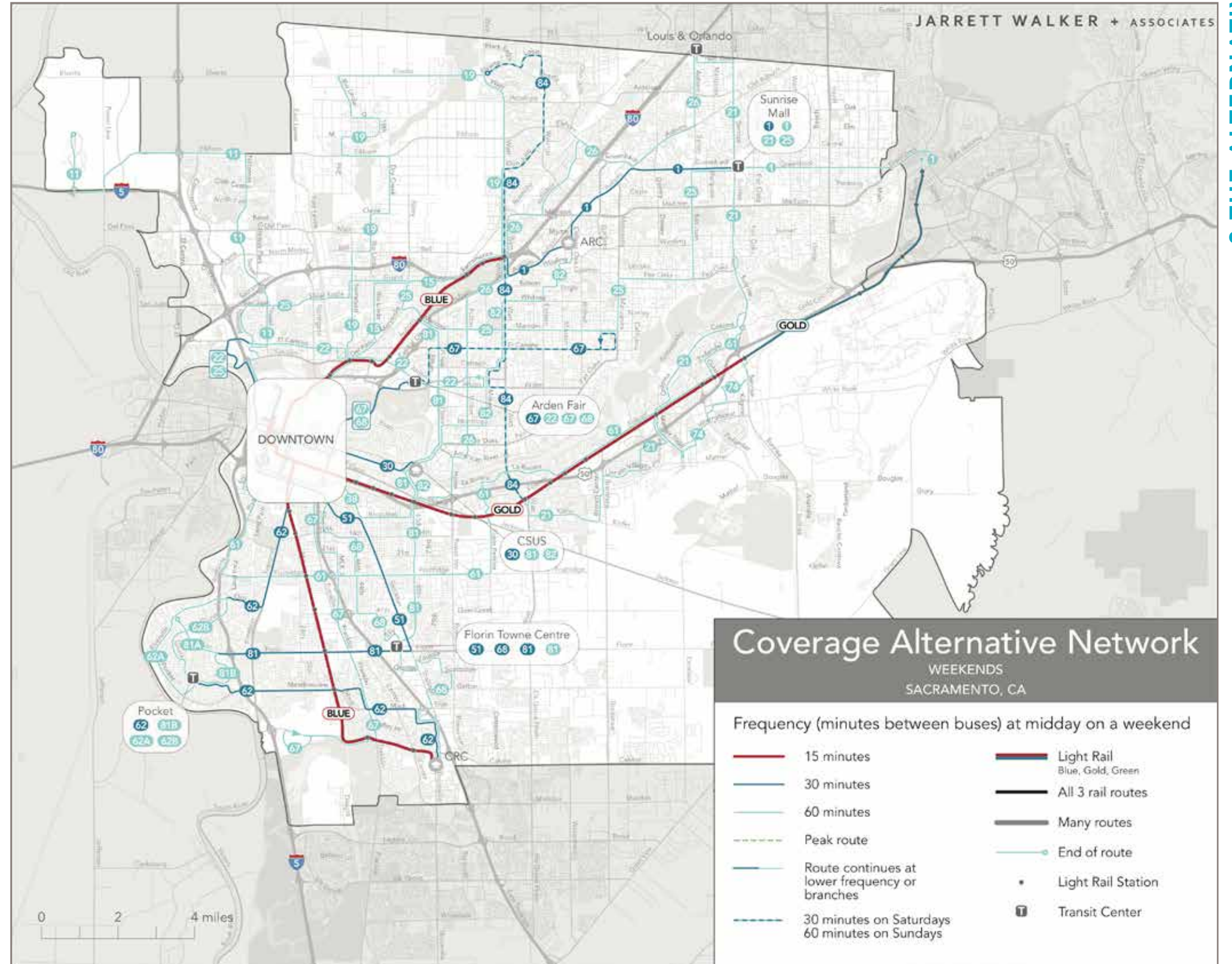
Map: Saturdays and Sundays in the High Coverage Alternative

The map at right shows the frequencies of routes in the High Coverage Alternative on weekends. All routes would follow the same patterns as during the weekday, but many would come less frequently, and for fewer hours of the day.

In this Alternative, on the weekend, the only frequent service would be on light rail. The most frequent bus routes would come every 30 minutes, but most bus routes would come every 60 minutes.

This map shows light rail lines offering 15 minute frequency on weekends (except at the eastern end of the Gold line), because SacRT is currently planning add to such service in January 2019. Today, light rail lines come every 30 minutes on weekends.

For a better understanding of weekend service on these routes, see the frequency and span table on page 16.



Map: Saturdays and Sundays in the High Ridership Alternative

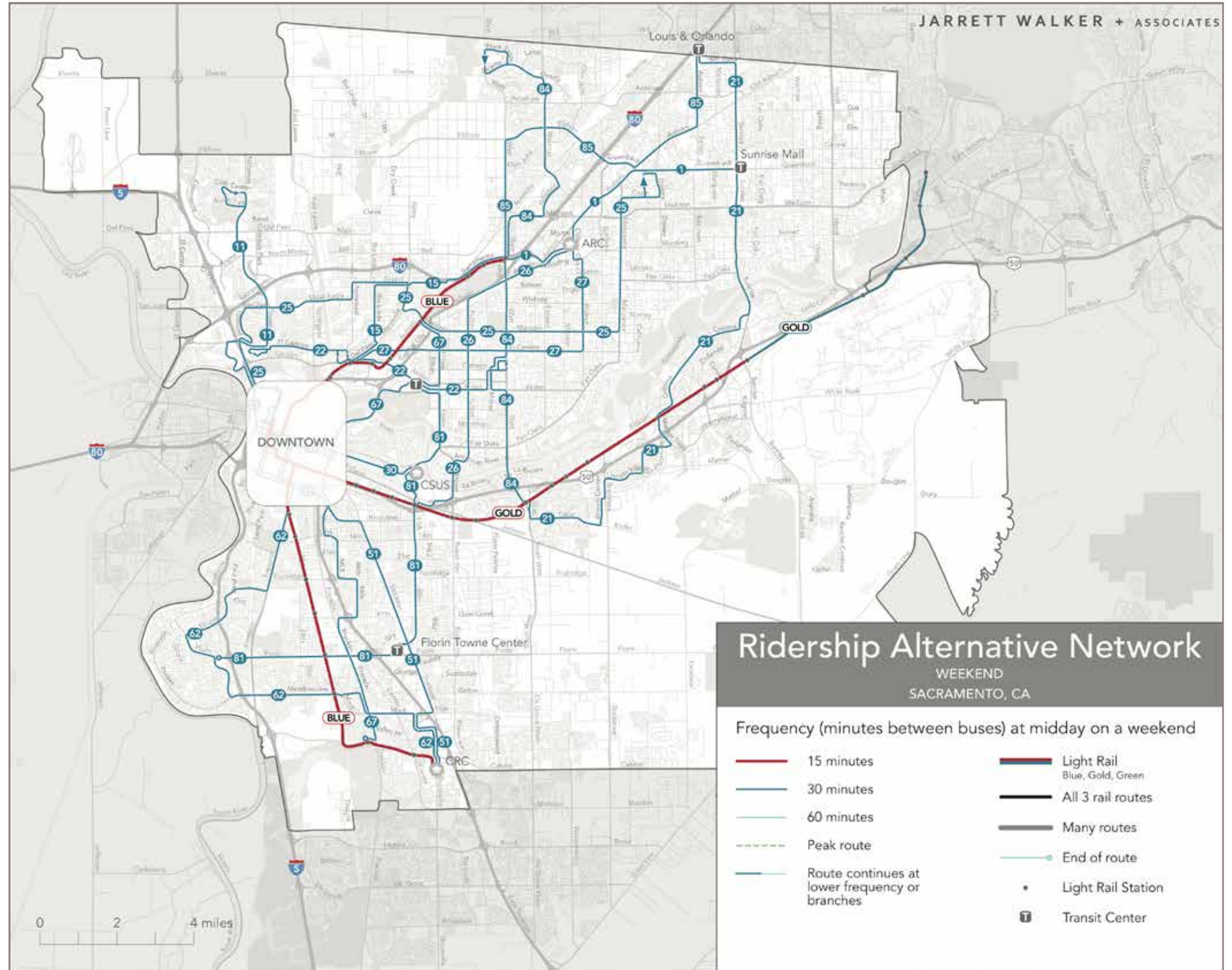
The map at right shows the frequencies of routes in the High Frequency, High Ridership Alternative on weekends. All routes would follow the same patterns as during the weekday.

With only two exceptions (peak-hour commute expresses), *every single route would continue operating on the weekends at 30-minute frequency*. The hours of service on weekends would be longer, for most routes, than they are today. This means that people who work in restaurants or retail, or who want to use transit to socialize and recreate, would be more likely to find that the bus is coming when they need it.

As on the previous page, this map shows light rail lines offering 15 minute frequency on weekends (except at the eastern end of the Gold line), because SacRT is currently planning to add such service in January 2019.

Note that Route 85 on Watt and Elkhorn would take over for the route called "84A" on weekdays.

For a better understanding of weekend service on these routes, see the frequency and span table on page 17.



Frequencies and Spans of Service in the Existing Network

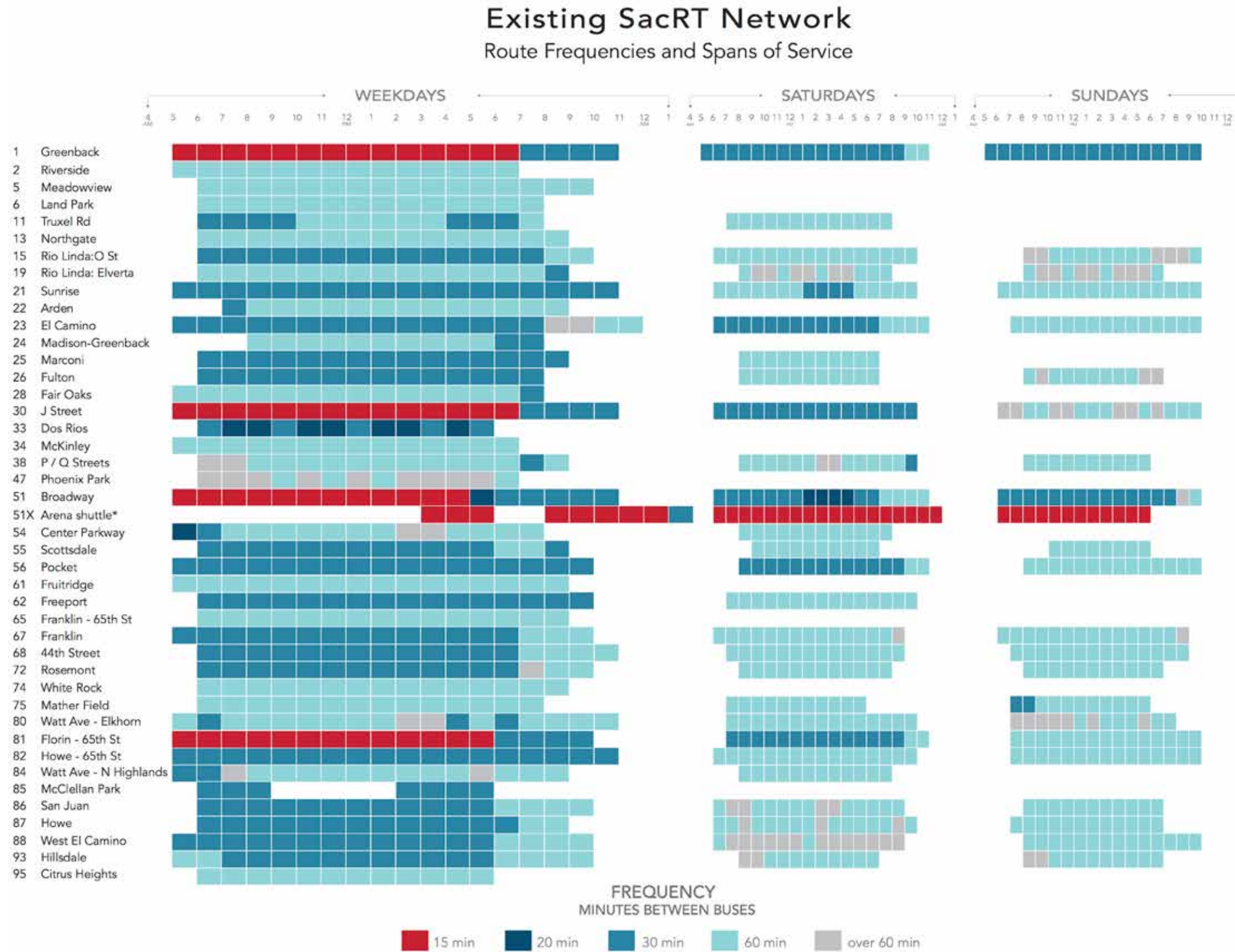


Figure 2: This table shows the frequency of every route in the existing network, for each hour of the day, on weekdays, Saturdays and Sundays. In the existing network, SacRT's total service budget is divided into a large number of routes, and as a result most routes come infrequently, and many don't run on Saturdays or Sundays.

Frequencies and Spans of Service in the High Coverage Alternative

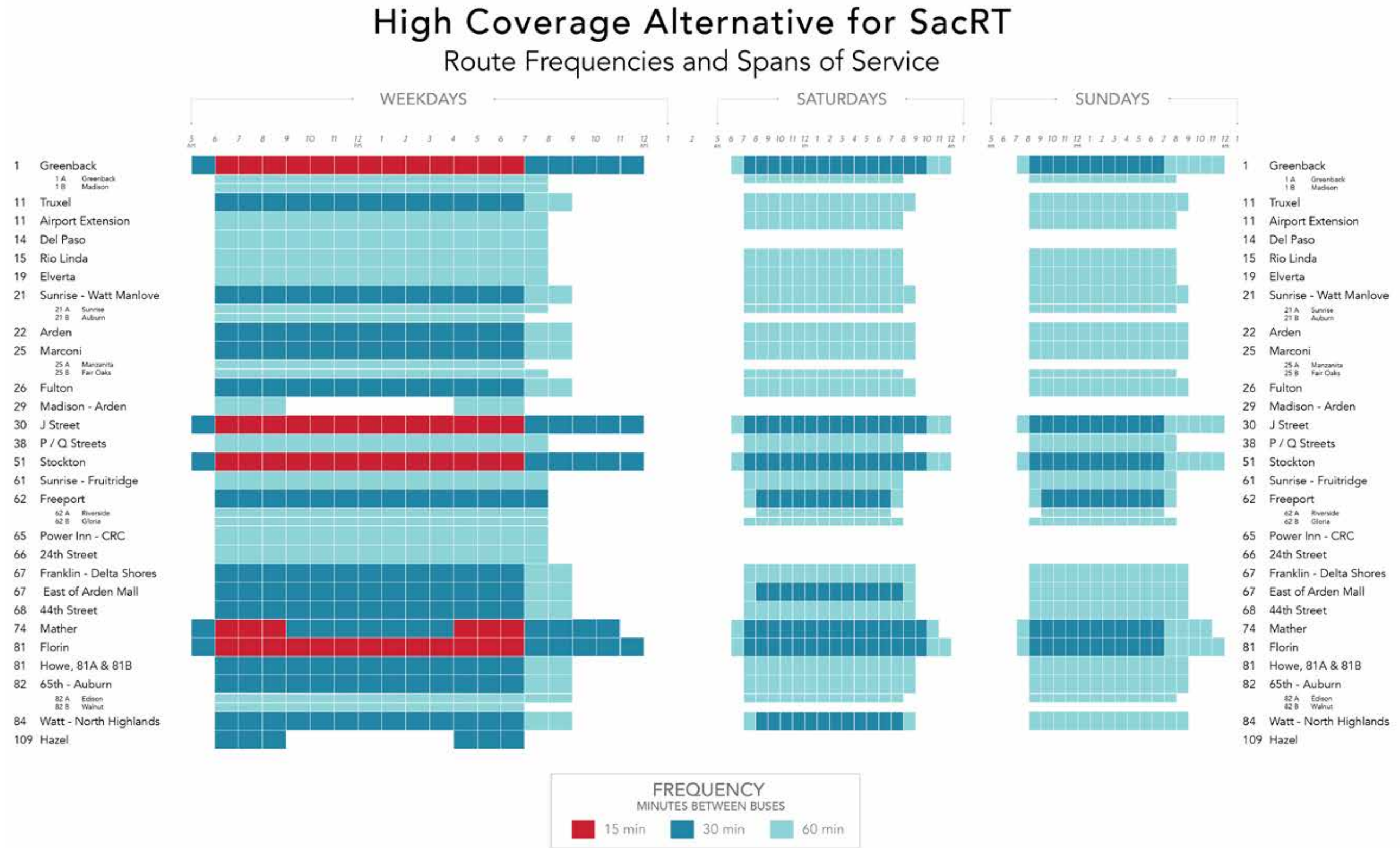


Figure 3: This table shows the frequency of every route in the High Coverage Alternative, for each hour of the day, on weekdays, Saturdays and Sundays. The High Coverage Alternative would offer slightly more service on weekends than the existing network, but frequencies would still be low on most routes, and spans of daily service would be similar to what they are today. A table detailing each route's streets, frequency and span of service is presented starting on page 35.

Frequencies and Spans of Service in the High Ridership Alternative

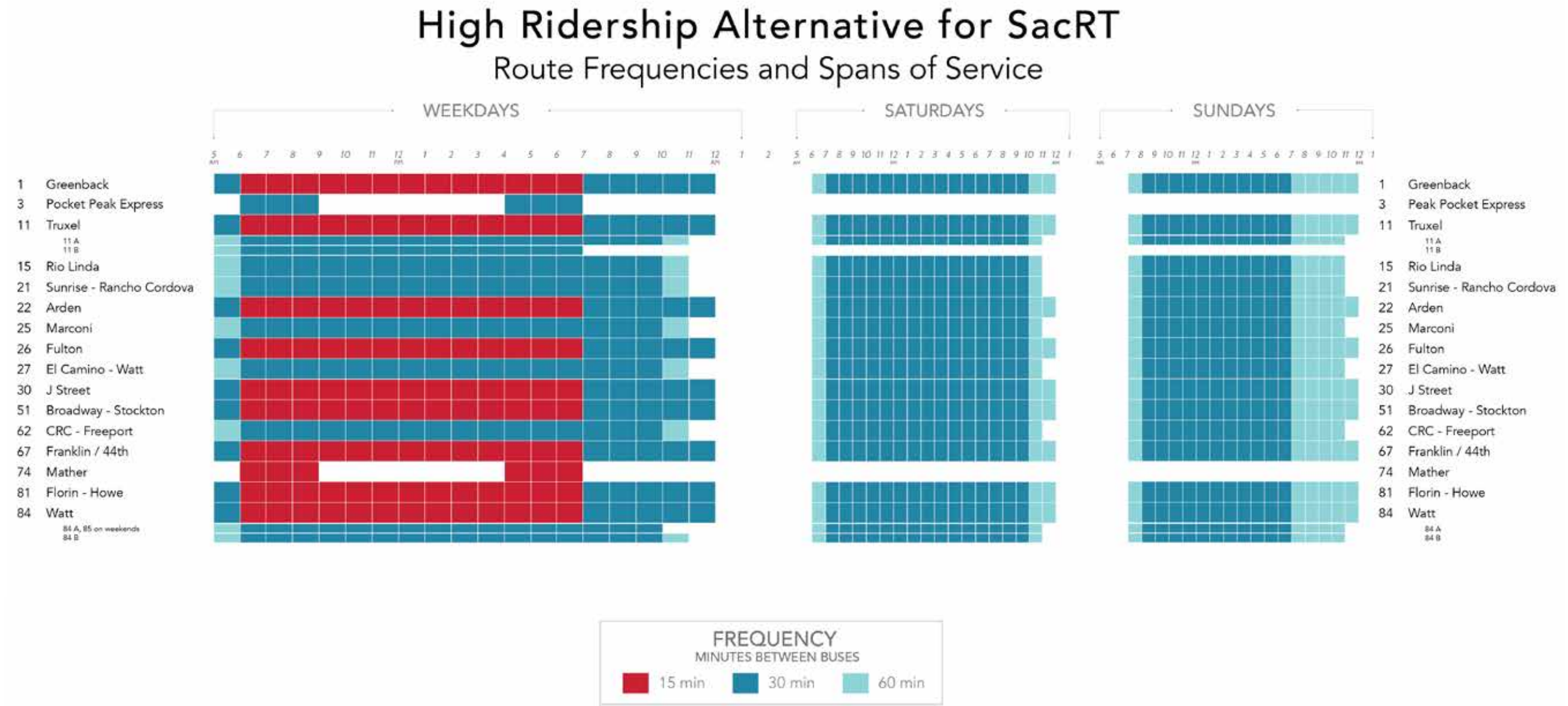


Figure 4: This table shows the frequency of every route in the High Frequency, High Ridership Alternative, for each hour of the day, on weekdays, Saturdays and Sundays. The High Ridership Alternative would offer longer spans of service on weekdays on nearly every route, from 5 am to 11 pm. It would also offer more Saturday and Sunday service in the form of higher frequencies (every 30 minutes) and longer spans. The High Ridership Alternative has fewer routes than either the existing network or the High Coverage Alternative. The same quantity of service is concentrated into these fewer routes, so that each route can be more frequent and operate longer each day and on more days of the week. A table detailing each route's streets, frequency and span of service is presented starting on page 39.

Key Choices

The two contrasting Alternatives presented in this report illustrate many of the key choices considered in the SacRT Forward process. The public and stakeholders are being consulted about these key choices, and these Alternatives are one step in that consultation.

Ridership vs. Coverage Goals

There is a policy-level choice for regional leaders, in particular the Board of SacRT, about the importance of high ridership. Within a fixed budget, increasing ridership requires reducing coverage. Both goals are valued, so how should SacRT trade them off against one another?

This trade-off can also be expressed as “Frequency vs. Coverage” or even “Span vs. Coverage” since those trade-offs are forced by the basic math of transit. Concentrating service into more frequent routes, or routes with longer spans of service each day and week, means that less service is available to spread around and cover more areas. Frequency and span are both key parts of a high-ridership strategy.

Walking vs. Waiting

The individual’s experience of the trade-off between frequency and coverage is sometimes “Walking vs. Waiting.” If service is concentrated into fewer, more frequent routes, many people have to walk a little farther to a stop. Yet once they arrive, their wait will be short. On average, this makes most people’s trips faster.

Whether someone prefers walking or waiting depends on their personal situation and on the street environment around them.

The High Ridership Alternative would provide shorter waits, but longer walks, in many parts of the city. **The High Coverage Alternative would provide shorter walks, but longer waits**, similar to what people experience in the existing network.

Transfers vs. Complexity

The biggest source of complexity in most transit networks is the sheer number of routes. One way to think about this is to ask, “In how many different patterns is my transit agency dividing a fixed amount of service?”

An agency has a choice about whether to run single bus routes from everywhere, to everywhere, or whether to provide that access by connecting routes with one another and asking people to transfer.

If a community can accept connections as part of a transit network— and

if the transit agency can make the investments necessary to make them pleasant—it frees up an enormous amount of service, because the agency no longer needs to run a one-seat-ride route from everywhere, to everywhere. It also allows for a much simpler network and higher frequencies, making it both more useful and easier for people to understand.

A major barrier to asking people to transfer, at least for infrequent riders and others who pay their fare in cash, has been the high price for a cash transfer. In August 2018, the SacRT Board decided to reduce that cash transfer price to a very low amount.

The existing SacRT network already requires many connections, but the low frequencies of connecting routes make these transfers time-consuming.

The High Ridership Alternative would create better connections by offering shorter waits – wherever two frequent (red) routes cross, the transfer would be quick and reliable. The network would be simple, and yet people would be free to access places on many routes, not only on the route that goes by their home.

The High Coverage Alternative would not offer these frequent connections. However, if SacRT were to implement the High Coverage Alternative, there would be an opportunity to improve a few specific connections between low-frequency bus routes. Connections between low-frequency routes are possible, but they are delicate, and tend to fall apart as congestion harms bus reliability. In contrast, connections between frequent routes require less special coordination, and are more durable in the face of congestion.

Broad vs. Specialized

SacRT has at times offered specialized services that are designed around the needs of a small group of people. These have been parking lot shuttles, school-oriented routes, demand-response services (“dial-a-ride” or “microtransit”) and routes for rush-hour commutes.

Most highly specialized services have low ridership relative to their costs,¹ both in SacRT’s system and in transit agencies worldwide. They rarely combine with other services to form a network that anyone can use to get around the region.

¹ Specialized services sometimes have high ridership but they also tend to have high costs that riders do not see. For example, peak-only commuter expresses or school-oriented routes may be full in one direction, but the bus and driver spend a great deal of time driving empty in the other direction, and driving to and from the operating base. This “deadhead” time costs the agency just like time spent serving riders.

High-ridership transit systems are made up of transit routes that a wide variety of people find useful, for many different kinds of trips. Each route makes connections with other routes in the network, and those connections broaden its usefulness even further.

Neither of the Alternatives shown in this report shows specialized services like school-focused routes, parking lot shuttles or “microtransit.” The funds used to provide these services today were not used in the service budget for these Alternatives, so SacRT will be free to make a separate decision about whether or not to continue these specialized services.

Generally speaking, however, **the High Ridership Alternative provides broadly-useful routes**, routes that a wide variety of people would find useful for many different kinds of trips, all week long. This is a high-ridership strategy: routes are so broadly relevant to such a large number of people that they tend to be full all day, in all directions, all week long.

The High Coverage Alternative includes more routes that are moderately specialized for people who commute only during weekday rush hours, for commutes to downtown, for people going to specific social service destinations, and for small numbers of people with severe needs for transit.

3 Comparing Outcomes

Comparing Outcomes

This chapter reports on three different ways of measuring the potential outcomes of the Alternatives.

These measurements are not forecasts. They do not make assumptions about how culture, technology, prices or other factors will change in the next few years. These are simple arithmetic measures that combine existing distance, time and population information to show the potential of each Alternative and how they each differ from the existing network.

Proximity

The first measure reported, on the next page, is very simple: *How many residents and jobs are near transit?*

Proximity does not tell us how useful people will find transit service, only that it is nearby to them. We also report on proximity to frequent transit service, to provide a little more information about how many people are near service that they are more likely to use.

Isochrones

To understand the benefits of a network change, consider this simple question: *Where could I get to, in a given amount of time, from where I am?*

This question refers to the physical dimension of liberty and opportunity. To the extent that you want to do things outside of your neighborhood, your life will be more free, and you will have more opportunities, if you can get to more places in a given amount of time.

Isochrones provide a visual explanation of how a transit network changes peoples' freedom to travel, on foot and by transit, to or from a place of interest. A few examples are included in this report.

Access

Isochrones display the change in access that a person would experience to or from a particular place. By summing up the isochrones for every single part of the SacRT service area, we can describe how access to jobs would change for all residents of the service area.

This is a good proxy for a ridership forecast, because it describes the part of ridership forecasting that is basic math and highly predictable: *Could more people access more jobs (and other opportunities) by transit, in less time?* If the answer is "Yes," that implies higher ridership potential.

Summary of Outcomes

In plain language, the Alternatives would likely have these effects on transit outcomes:

- **Ridership potential** would increase slightly in the High Coverage Alternative, and would increase a great deal in the High Frequency, High Ridership Alternative.
 - *In the High Ridership Alternative, more people can reach more opportunities in a given amount of time.* This is even more the case for low-income people.
 - Other factors would affect whether or not people choose to ride, such as fares, parking pricing, gas prices, employment levels, etc. Holding all of these other factors constant, however, when more people can make more of their trips faster, by transit, more people will choose to ride.
- **Larger parts of the region are unserved in the High Ridership Alternative than in the High Coverage Alternative**, and this is very obvious when you compare the network maps.
 - However, because the uncovered areas are mostly low-density areas, the number of residents and jobs who lose coverage is lower than you might expect from the visual impression given by the maps.
- **The High Coverage Alternative would increase slightly the number of residents near any all-day service, and near frequent service.**
- **The number of people living on the frequent network would nearly double in the High Ridership Alternative.** Frequency correlates strongly with high ridership, especially when frequent services are combined into a connected network.
- **The High Coverage Alternative is somewhat simpler than the existing network. The High Ridership Alternative is radically simpler.** Simplicity is important to attract spontaneous and new riders. The number of lines goes from 42 in the existing network, to 33 in the High Coverage Alternative, to 18 in the High Ridership Alternative. Spans of service throughout the days of the week also get simpler. Fewer lines mean a network is easier to remember, and more frequent lines with more consistent spans make trip-planning easier.
- **The number of places where cities could justify encouraging transit-oriented development, including affordable housing, is higher in the High Ridership Alternative.** Dense developments and the

neighborhoods around them benefit from frequent transit service, and some cities have policies allowing more density, less parking, and greater affordability around frequent bus lines.

Proximity to Transit Service

The number of people within a certain distance of transit is the simplest measure of transit outcomes. In this report we call this measure *proximity* or *coverage*.

The two bar charts at right show how many residents (at top) and jobs (at bottom) would be within 1/4 mile¹ of any all-day service, or frequent service.²

- The High Coverage Alternative would maintain all existing coverage and even increase it very slightly (with 57% of residents close to any service, compared to 55% in the existing network). It would barely increase the number of residents near frequent service (from 11% to 12%).
- The High Ridership Alternative would nearly double the number of people near frequent service (from 11% to 21%), but this would be paid for through reductions in coverage. As a result, 38% of residents would be near any all-day service, rather than the 55% today.

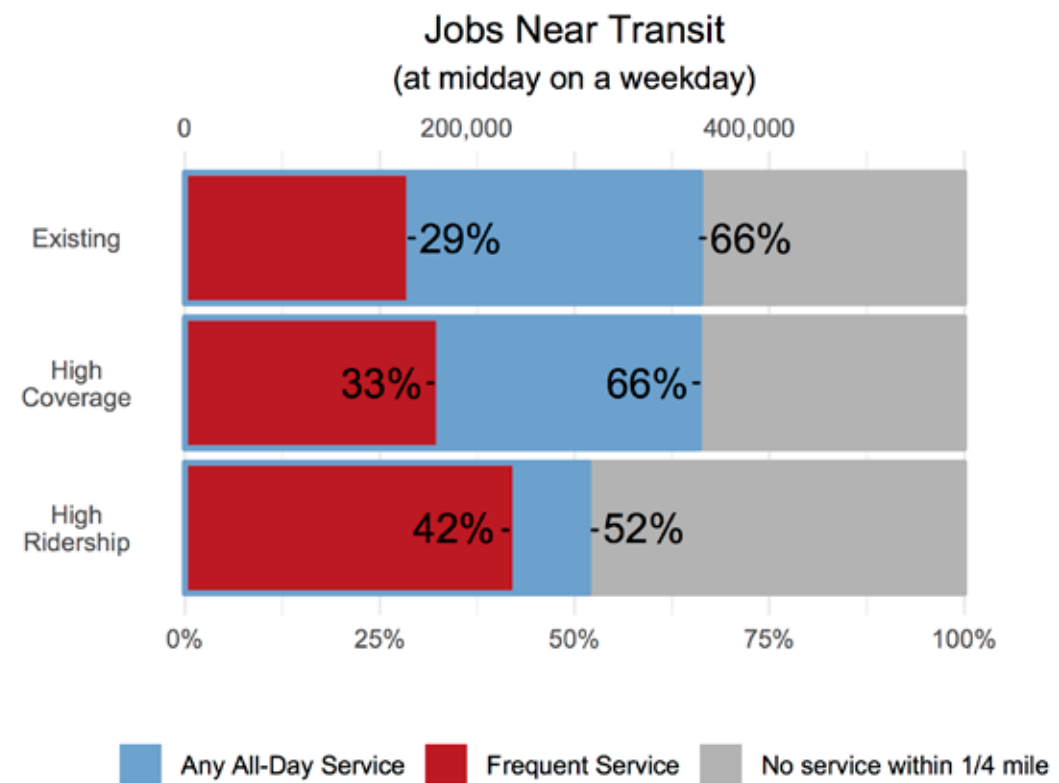
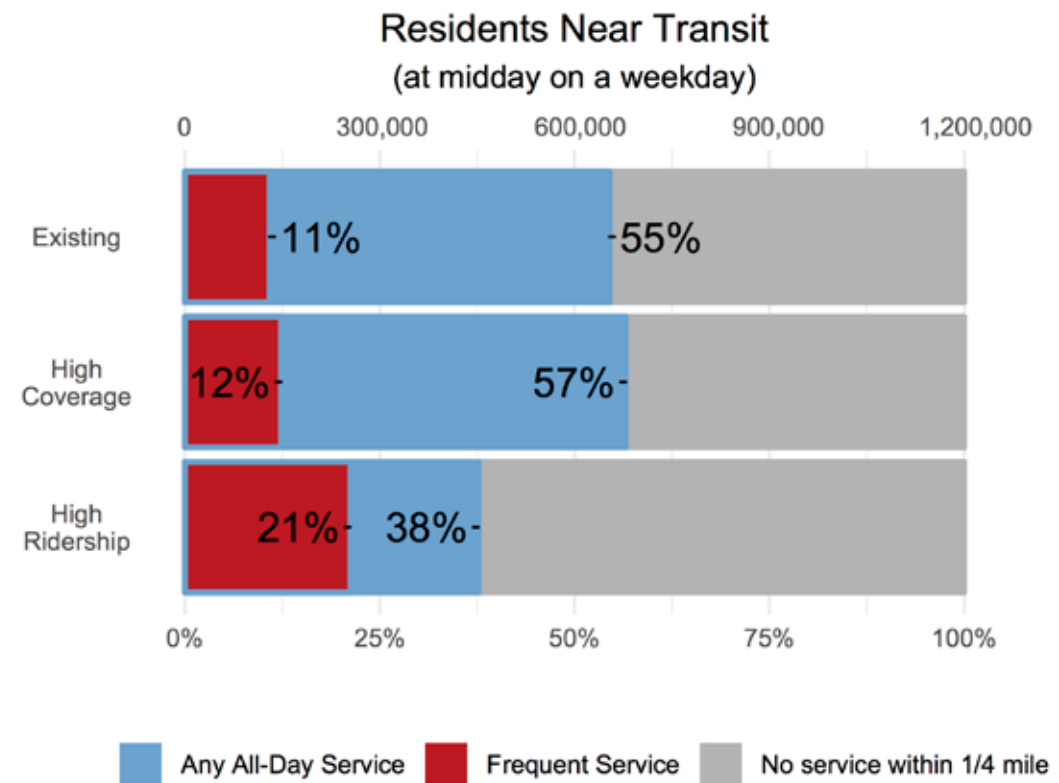
Proximity to service of any type is a good measure of an agency's success towards a Coverage Goal (though more specific investigations are essential to determine whether vulnerable people and important destinations are covered). Proximity does not tell us how useful the service is to people, only that it is nearby. In pursuit of a Coverage Goal an agency will spread service thinly, to cover as many people as possible. Spreading transit thinly means routes have low frequencies, short spans, and circuitous routing. A route that is not very useful, but is proximate to many people, is helping an agency meet a Coverage Goal.

Proximity to *frequent* service is also reported here, and it speaks more to success at a Ridership Goal. Frequent service is more expensive relative to the area it covers, but it is more useful and therefore tends to attract higher ridership.

The gain in proximity to frequent service, and the loss in proximity to non-frequent services, in the High Ridership Alternative is another illustration of the geometric trade-off between Ridership and Coverage Goals. Within a fixed budget, SacRT cannot *both* increase frequencies and spans in places where large numbers of people live, *and* spread service out to coverage a large area.

¹ Different people are willing and able to walk a different distance to transit. Different street environments make such a walk easier or harder. People will walk longer distances to services that offer shorter waits or faster speeds. Notwithstanding this variety in tolerable walking distances, we have assumed that someone is "proximate" to transit service if they are within 1/4 mile of a bus stop, as-the-crow-flies. Walking 1/4 mile over flat ground takes the average person about 5 minutes.

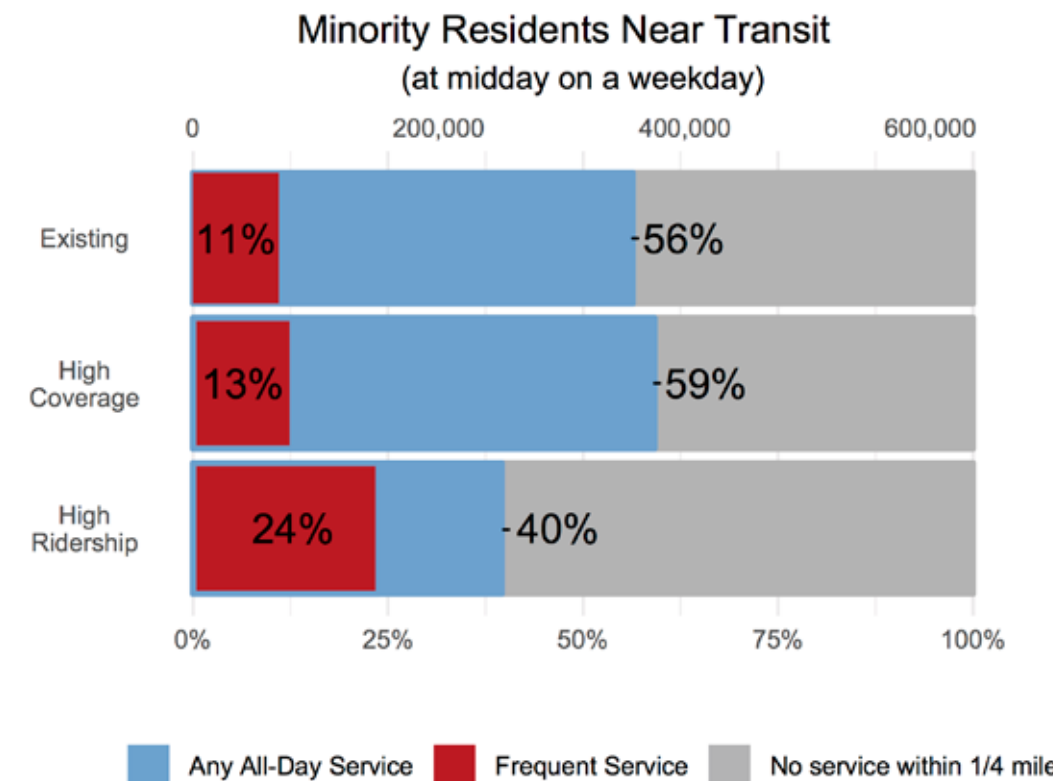
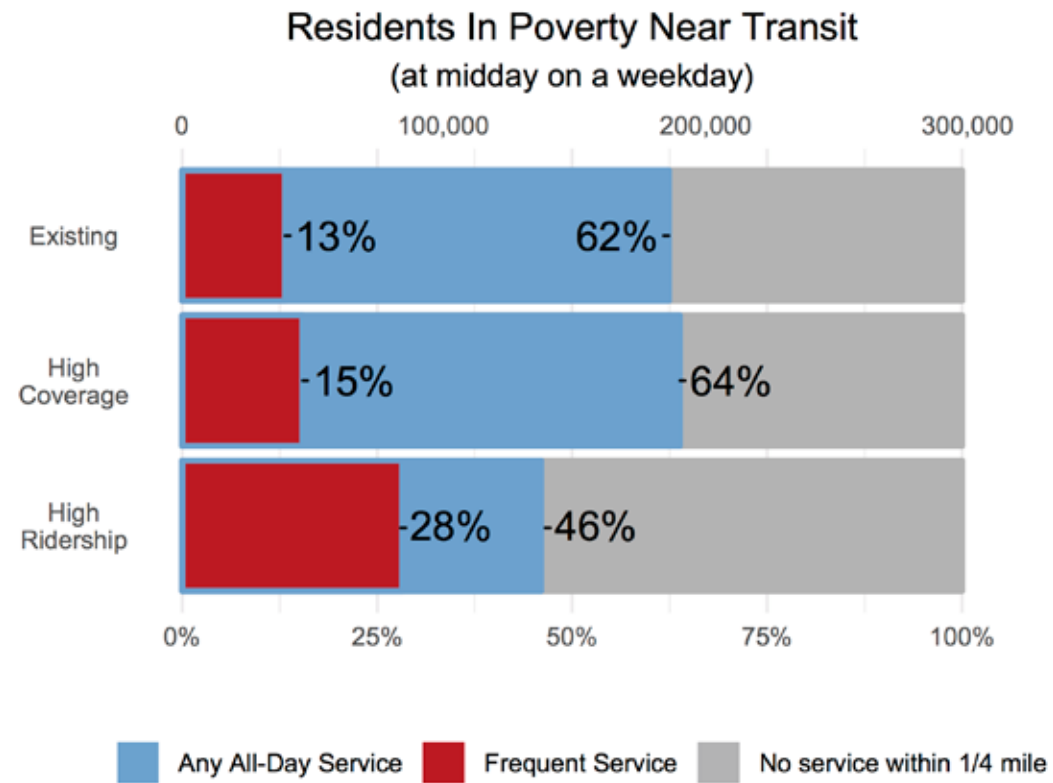
² More information about the methods and data behind this analysis is shared on page 42.



Transit is often tasked with providing affordable transportation for low-income residents, which is why agencies provide service to some people and areas, regardless of ridership potential. Federal laws also protect those with low incomes from disparate transportation impacts, which is why agencies sometimes provide transit service in places where poverty is high, even if this does not maximize ridership.

In the existing network, SacRT provides all-day service within 1/4 mile of slightly more residents in poverty (62%) than the general population (55%, as shown in the graph at top on the previous page).

- The High Coverage Alternative would increase very slightly the number of low-income residents near frequent and any service (shown at top). The same is true for minority residents (shown at bottom).³
- The High Ridership Alternative would more than double the number of low-income residents near frequent service, from 13% to 28% (shown at top). However, the number of low-income residents with access to lower frequency services would decrease.
- The High Ridership Alternative would also drastically increase the number of minority residents near frequent service from 11% to 24%, but again by reducing the number of non-white residents with access only to lower-frequency services.



³ This very slight improvement in coverage is as much as can be expected in a complete network redesign, with no additional operating budget. It arises from small adjustments to where service runs, to better-reflect recent development in the region.

Isochrones: Maps of Liberty and Opportunity

Putting transit, even high-frequency transit, near people is not enough to attract large numbers of people to actually ride. Transit needs to go *where* they want to go, and also *when* they want to go.

A proximity analysis only tells us how many people are near transit, not where and when transit meets their needs. We need a way to describe the kind of access that becomes possible on a complete and connected transit network.

We can do that by asking a question like, “Where can I get in 45 minutes on this network?” To answer that question, we analyze every trip that can be made by walking and transit. The geographic border around the trips you can take in a set amount of time is called an “isochrone.”

We refer to these as *maps of liberty and opportunity* because they show how free someone is to access the opportunities around them, using transit.

Large isochrones, centered on places where large numbers of people live, mean not only that ridership will be high, but also that a great number of people will be free to pursue the opportunities offered across the urban area.

Everyone’s Time is Valuable

All kinds of people find that their time is valuable, especially low-income and working people. Because their time is valuable, they will find another option if riding transit takes too long.¹ For low-income people, the other option might be to buy a car (and forgo other opportunities, to cover the cost); to use a taxi, Uber or Lyft; to get a ride from someone; or, worst of all, to simply not make the trip.

Ridership is not the only payoff of large isochrones. Liberty and opportunity have their own value to the community, aside from how they affect transit ridership. For lower income people, transportation is the biggest barrier to employment, and can also limit access to education. When low-income people are able to get to more places in less time, it means they have more choices in their lives, and in that sense, more freedom.

¹ Travel time is not the only reason to choose transit, but it is a major factor in nearly every potential rider’s decision. Subjective features such as comfort, amenity, and perceptions of safety also influence the choice. Those other factors matter less until the service is basically *useful* – it takes people where they want to go in an amount of time they find reasonable.

How to Read Isochrones

In the sample isochrones in this chapter, you will see a dot at the starting location. Around this starting point are blobs of color, which show where a person could be, in the noted amount of time, by some combination of walking and riding transit.²

The three colors on the map mean:

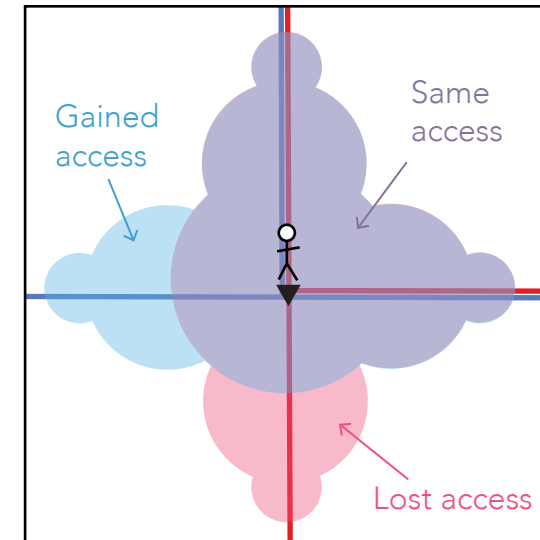
- Blue: Areas that would become accessible in the Alternative but are not accessible in the existing network.
- Red: Areas that are accessible in the existing network but would no longer be accessible in the Alternative.
- Purple: Areas that are accessible in the existing network and would remain accessible in the Alternative.

The sample isochrones in this chapter show how far someone could get within 60 minutes of travel. These locations were chosen to illustrate the differences between the two networks because they are major destinations, or home to large numbers of people. When looking at these isochrones, keep in mind that:

- Waiting time counts!³
- A long walk to a high-frequency route can get people farther, faster, than a short walk to an infrequent route.
- Much of the access shown in these isochrones isn’t reached via a single route, but rather two routes. Especially with the high-frequency grid in the High Ridership Alternative, some places are reachable quickly even when the trip involves a transfer.
- You can use this tool to think about access in the reverse. For a worksite or store at the center of the isochrone, it shows who could readily get there: the employees it could attract or the customers who could shop there.

² The isochrones assume that people must walk along the street network, and can only cross major streets and highways at a signal. The isochrones account for situations in which there are few through-streets and walking is harder. However, they do not account for opportunities to walk across parking lots, lawns and parks. The isochrones assume that people won’t be willing to spend more than about 45 minutes walking, even if walking for a full hour was the fastest option.

³ Even if you don’t wait at the bus stop, a lower-frequency route often makes you wait at your destination because it forces you to arrive very early (rather than be late). Very few people have the liberty of arriving whenever they please for all of their trips, and no one can make it so that they are released from events like doctor’s appointments or movies at exactly the right time to catch the bus home. Riding transit means waiting *somewhere*. The more frequent the transit, the shorter the wait. On average, you will wait one-half of the frequency of the route, and that is the waiting time assumed in these isochrones.



Not Just the Area – Also What is Inside the Area

The real measure of usefulness is not just how much geographic area we can reach, but *how many useful destinations are in that area*.

This is why each map on the next four pages reports the change in the numbers of jobs and residents within each isochrone, relative to the existing network. This is also why the access analysis shown on page 28 takes into account not just the areas that are reachable within a certain amount of time, but also the number of people living or working in those areas.

It has long been known that ridership arises from service being useful, for more people, to get to more busy places. That’s why predictive models of ridership do this very same this analysis, behind-the-scenes.⁴

⁴ Predictive models use a number of additional assumptions about culture, sociology and economics, which always turn out to be wrong in some way and increase the uncertainty in the predictions.

Sample Locations

The isochrones on the next few pages compare the Coverage and Ridership Alternatives to the existing network for four locations around Sacramento. These locations were chosen to evaluate closely because they are home to large numbers of people, or destinations for large numbers of people.

71st Street and 21st Avenue

From 71st and 21st, both Alternatives show an increase in access to residents and jobs over the existing network.

In the High Coverage Alternative, the major changes shown at right are:

- A small area of additional access (shown in blue) is visible south of Florin, on Power Inn. This is due to the extension of Route 65 farther south, in this Alternative, than it goes in the Existing Network.

In the High Ridership Alternative, the major changes are:

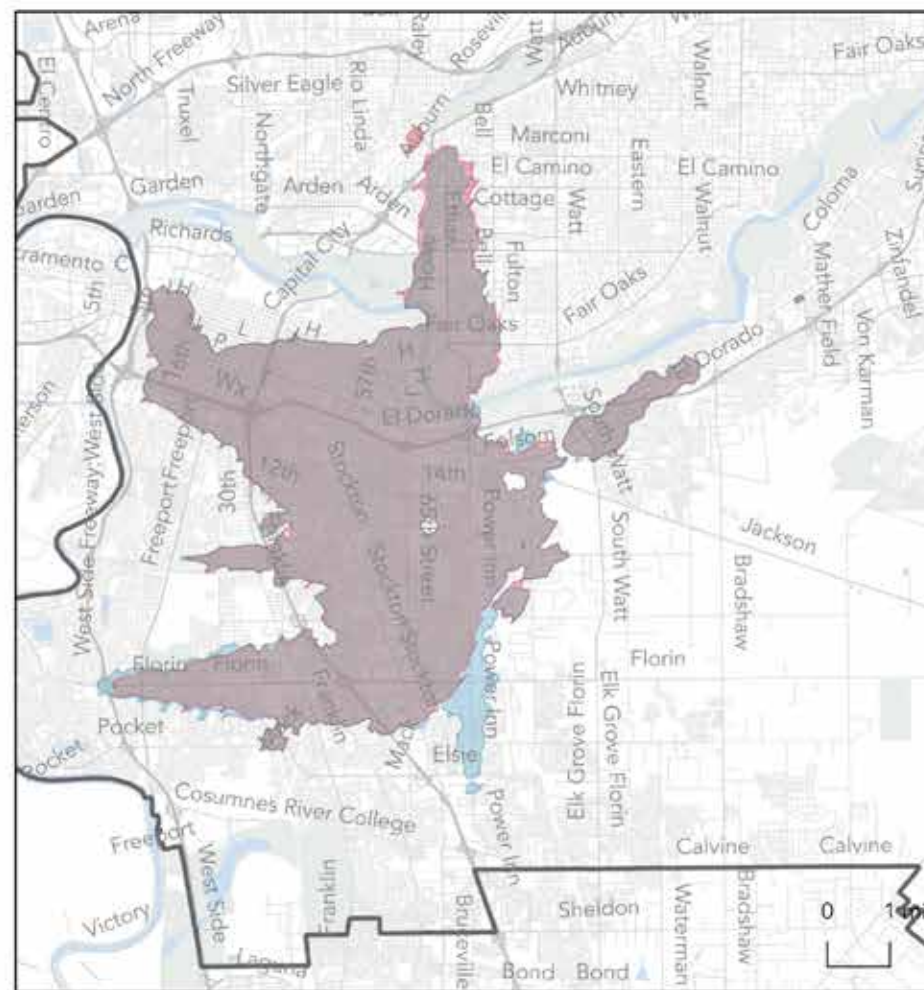
- Route 81 on 65th comes every 15 minutes, as do most of the routes that connect with the 81. Someone starting from 71st and 21st would save so much time waiting that they could go farther on the network, which is why areas of blue appear in all directions.
 - This is true of the High Ridership Alternative even though the route that passes closest to 71st & 21st - Route 65 - would no longer exist. Because Route 65 offers service only once per hour, a lot of people's travel time budget is used up waiting for it (at one end of their trip or the other), and they cannot get very far within an hour. Asking people to walk a little farther to a more frequent Route 81, instead of waiting for the hourly Route 65, would greatly increase their access.
- Access to CRC and other places far south of Florin would be improved in the High Ridership Alternative, because the frequent Route 51 would be extended along Stockton to CRC, rather than ending at Florin Towne Center as it does today.



How far can I travel in **60 minutes** from **71st St & 21st Ave** at midday on a weekday?

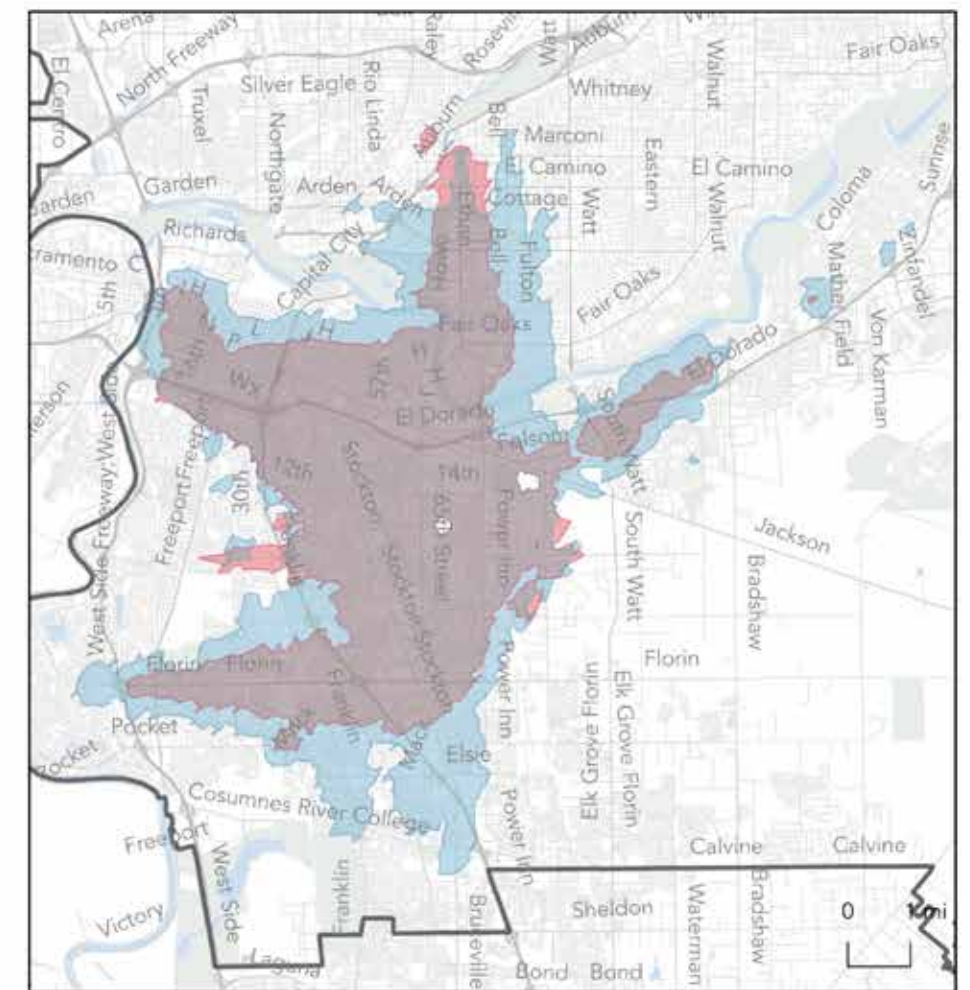
High Coverage Alternative

4% more residents and 1% more jobs accessible than existing network



High Ridership Alternative

53% more residents and 45% more jobs accessible than existing network



Downtown (Capitol)

The Alternatives do not have a major impact on how many residents can reach downtown within an hour. (The location chosen to represent the center of downtown is the Capitol Building.)

The SacRT network is already fairly radial in shape, with many routes going into downtown. Downtown is the greatest concentration of jobs and services in the region, which is part of the reason that the Existing network and both Alternatives focus much service there. However, jobs that are downtown are more likely to be high-wage jobs than jobs located elsewhere.

In the High Coverage Alternative, the major changes are:

- Areas along Truxel Blvd. would gain access (shown in blue), because the frequency of Route 11 would be increased from every 60-minutes to every 30-minutes.
- Some areas along Silver Eagle would lose access. Instead of having two routes nearby that go into downtown, in the Existing network, these areas would have one route that goes into downtown (but they would have other routes going other places).
- A small part of Arden-Arcade would gain access to downtown.
- Small parts of the Pocket and Land Park would lose access. This arises because more areas in the Pocket would have all-day coverage (instead of rush-hour-only service), but providing this wider coverage in the Pocket requires reducing some routes' frequencies.

In the High Ridership Alternative, the major changes are:

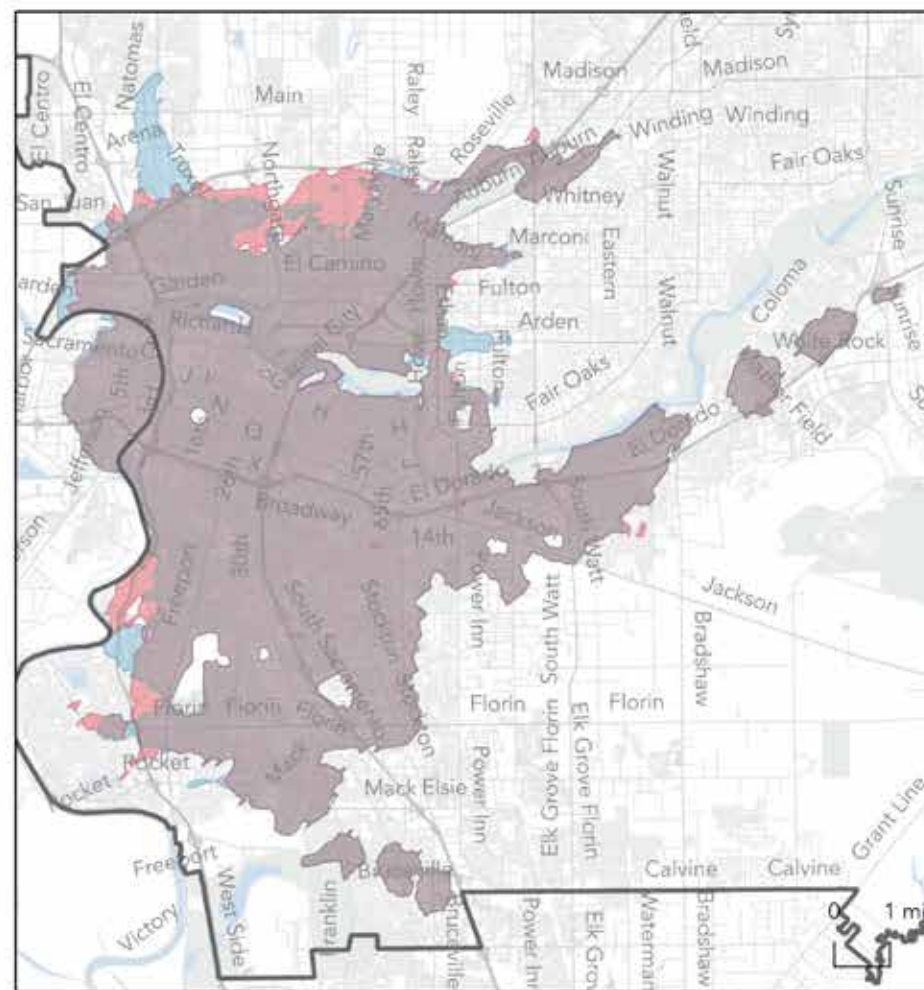
- A larger area around Truxel Road would gain access thanks to Route 11's 15-minute frequency.
- Large parts of Arden-Arcade and Watt Ave. would gain access to downtown, thanks to direct routes into downtown and a frequent grid.
- Part of the Pocket would gain access, while small parts of Land Park would lose access.
- A small area along Silver Eagle would lose access.
- Areas along 65th Street in South Sacramento would gain access to downtown.



How far can I travel in **60 minutes** from **Capitol Building** at midday on a weekday?

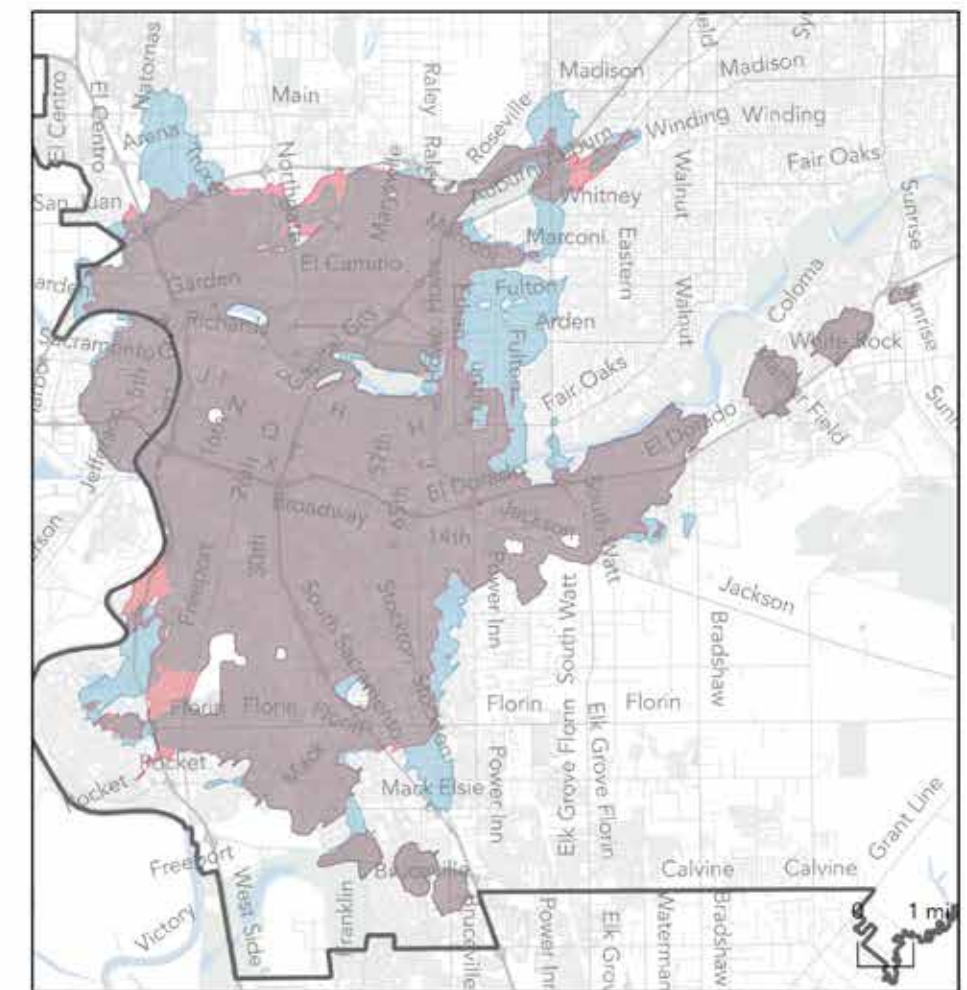
High Coverage Alternative

1% fewer residents and 2% more jobs accessible than existing network



High Ridership Alternative

13% more residents and 10% more jobs accessible than existing network



Walerga Road and Elkhorn Boulevard

From the intersection of Walerga and Elkhorn, either Alternative would increase the number of residents and jobs accessible within an hour of travel, though the High Ridership Alternative would have a larger positive effect.

Both Alternatives would make service on Walerga more frequent, compared to the existing network – every 30-minutes instead of every 60-minutes. This would reduce time spent waiting and allow people to travel farther, especially to the south where many jobs are located, and to make some new connections with other routes.

In the High Coverage Alternative, the major changes are:

- The higher frequency of Route 84 (on Walerga) allows people to travel farther to the north and to the east.
- A very small loss of access to areas along Greenback occurs because of a longer walk to get to Route 1.

In the High Ridership Alternative, the major changes are:

- The higher frequency of Route 84B (on Walerga), would allow for more access to the north.
- The higher frequency of Route 84A (on Elkhorn), would allow for much more access to the east and to the south.

Today, service drops off considerably in this neighborhood on the weekends: weekend frequency is every-60-minutes at best, and while service on Elkhorn comes all weekend, service on Walerga comes on Saturdays only. In both Alternatives, this neighborhood would have a great deal more weekend service:

- In the High Coverage Alternative, Route 84 on Walerga would come every 30 minutes on Saturdays and every 60 minutes on Sundays. (Routes 19 and 26, nearby, would also operate all weekend.)
- In the High Ridership Alternative, both Route 84 on Walerga and Route 80 on Elkhorn would come every 30 minutes, on both Saturdays and Sundays.

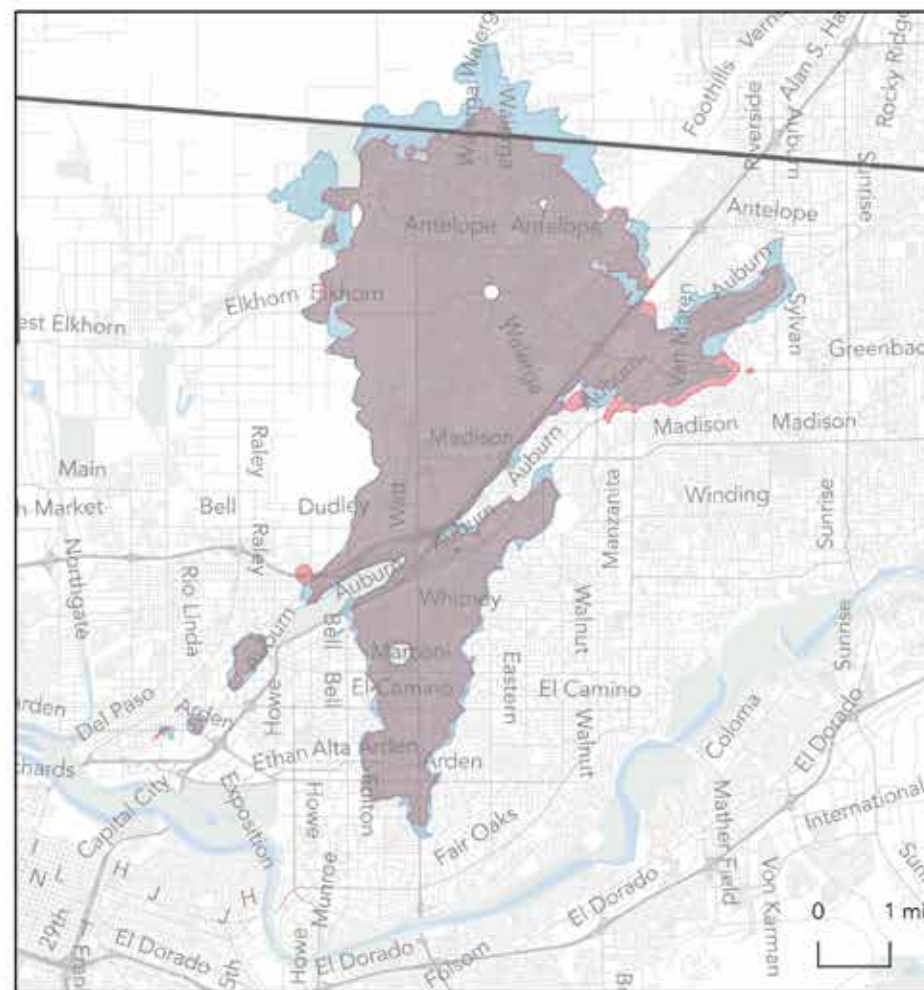
Thus a similar pair of isochrones made for weekends would show an even greater expansion of access to jobs, especially on Sundays, and especially in the High Ridership Alternative.



How far can I travel in **60 minutes** from **Walerga & Elk Horn** at midday on a weekday?

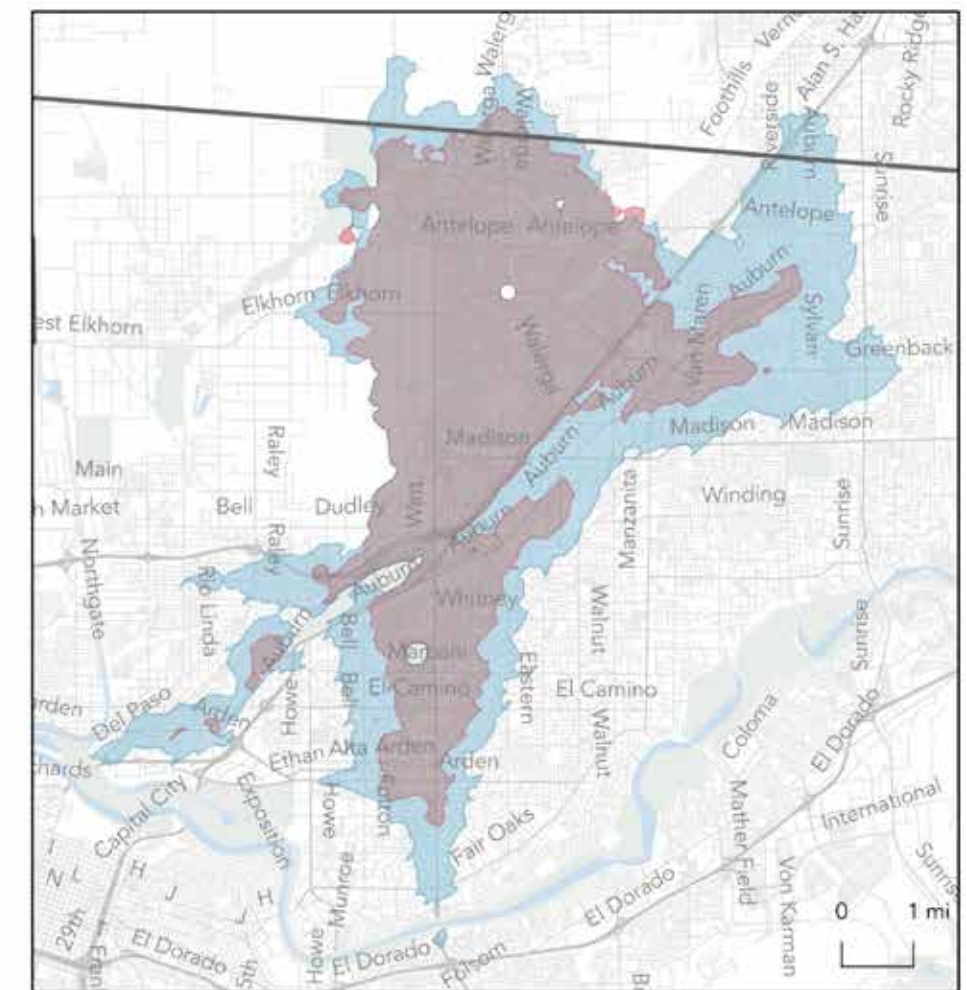
High Coverage Alternative

9% more residents and 7% more jobs accessible than existing network



High Ridership Alternative

65% more residents and 90% more jobs accessible than existing network



Cosumnes River College (CRC)

Access to CRC would increase greatly in the High Ridership Alternative, and very slightly in the High Coverage Alternative.

In the Existing network, CRC is served by light rail, but the bus network that connects at CRC is mostly low-frequency and circuitous routes. This would not change in the High Coverage Alternative, but in the High Ridership Alternative CRC would become an intersection in the frequent grid, where two frequent lines (Route 51 and light rail) connect.

In the High Ridership Alternative, the major changes are:

- Access from some parts of the Pocket would decrease (shown in pink).
- Access from a large part of South Sacramento, around 65th Street, Stockton Blvd. and Franklin, would increase (shown in blue). This is due to the frequent grid covering this area.

In the High Coverage Alternative, the major changes are:

- Access from one part of the Pocket, and small parts of Midtown and East Sacramento would decrease (shown in pink).
- Access would increase in small areas of South Sacramento (shown in blue).

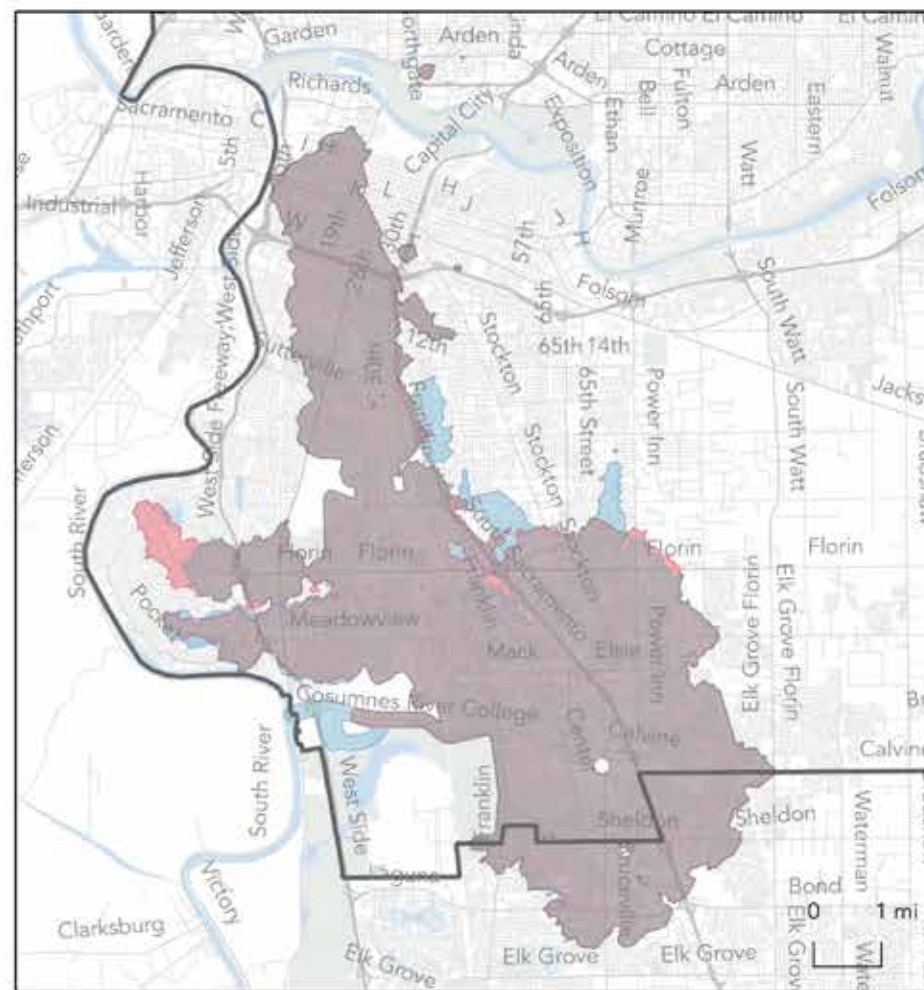


How far can I travel in **60 minutes** from **Cosumnes River College** at midday on a weekday?



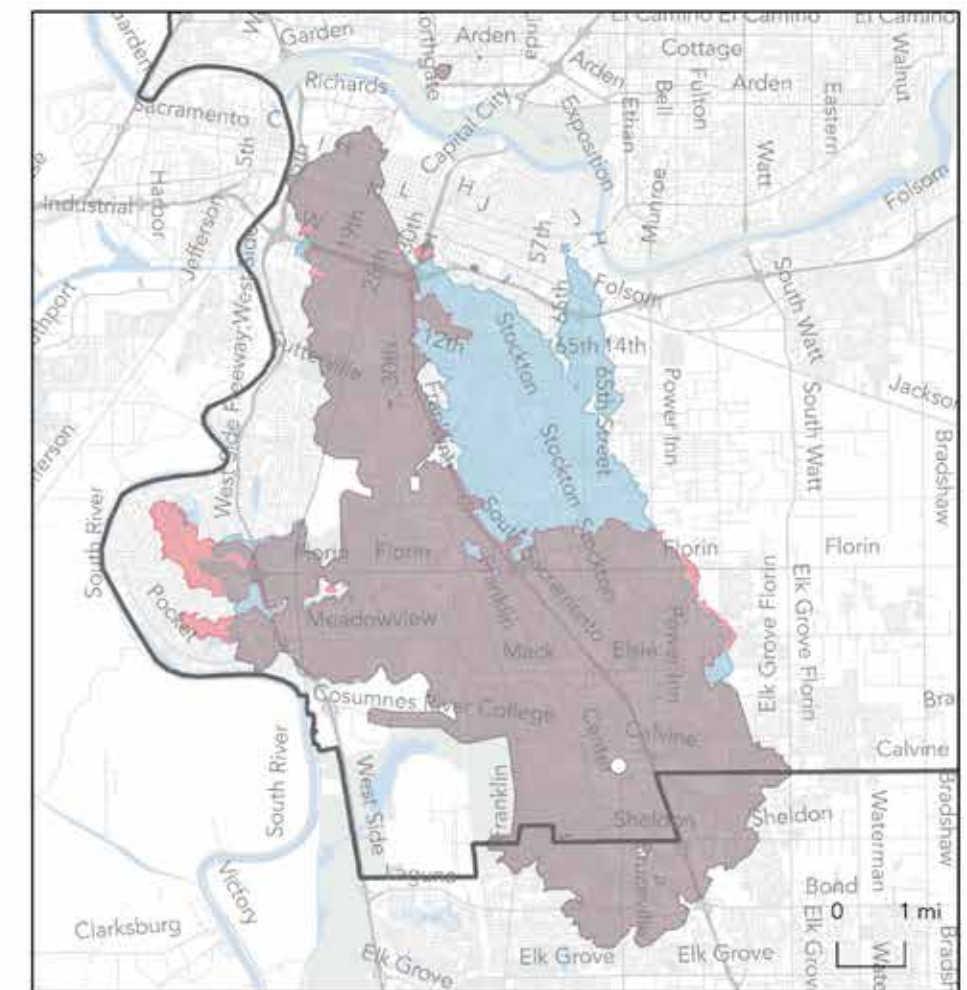
High Coverage Alternative

3% more residents and 1% more jobs accessible than existing network



High Ridership Alternative

25% more residents and 17% more jobs accessible than existing network



In the table on the previous page, we report the change in access to jobs, split by the type of jobs (low-, middle- or high-wage).

High Coverage Alternative: Similar Access to Jobs

In the bar chart at right, we report the proportion of residents who would experience a change in the number of jobs they could access within 45 minutes of travel. The results are split-out for people living on low incomes.¹

- The median degree of change experienced by low income residents in the High Coverage Alternative (the top pair of bars) would be 0%.²
- Slightly more residents would experience an increase in job access (shown in shades of green) than a decrease (shown in shades of pink).

High Ridership Alternative: Greater Access to Jobs, Especially for Low-Income People

The pair of bars at bottom show the change that would be experienced by all residents and low-income residents in the High Ridership Alternative.

- The median change would be a 10% increase in access to jobs, or an 16% increase for low-income residents.²
- Many more residents would experience a positive change in access (shown in greens) than a negative change (shown in pinks).
 - This is especially true for low-income residents.

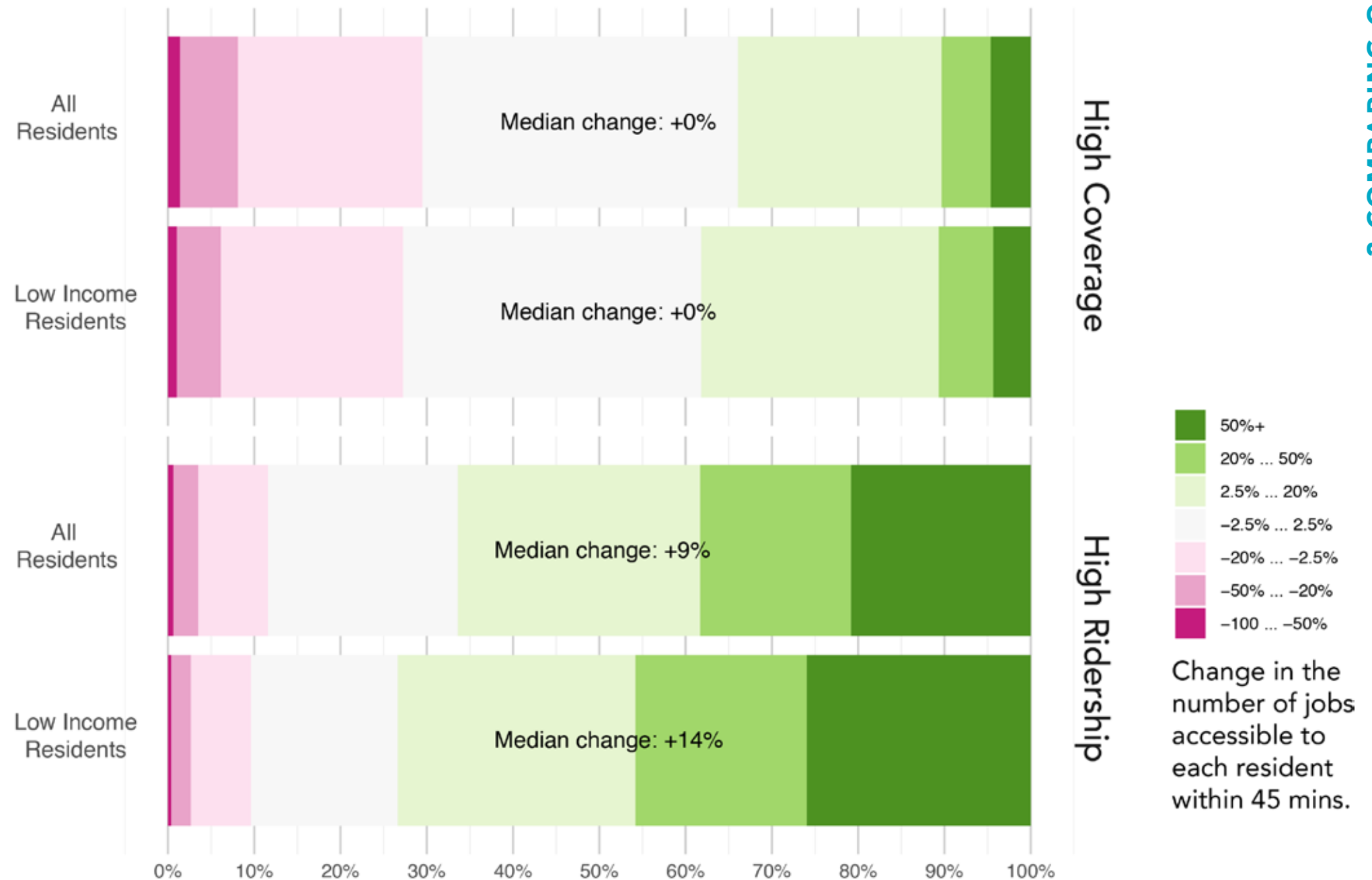
This measure shines a very different light on the Alternatives than does the measure of proximity. This measure takes into account *time*, and takes into account the *number of people* who could make faster commutes. It reflects the idea that everyone’s time is valuable, including – and especially – the time of low-income people and workers.

Jobs are not the only source of opportunity. People also benefit from access to services, to shopping, to education, and to friends. We measure access to jobs because data on jobs is much more complete than data on other types of destinations.

¹ The methods for this access analysis are described on page 43.

² To understand the “median,” picture all residents standing in a line in order from the people who gain the most access at one end to the people who lose the most at the other. The “median” experience is that of the person standing in the very middle of the line.

How would access to jobs change for all residents, and low-income residents?



Many of the places people go for other purposes also places with jobs: hospitals, malls, movie theaters. Thus access to jobs is a helpful proxy for access to the other sources of opportunity in peoples’ lives.

Get Involved

This report is the second step in the SacRT Forward Network Plan. It kicks off a second round of public involvement in the choices faced by SacRT.

In the spring of 2018, starting with the publication of a Choices Report (which can be downloaded from the [project webpage](#)), the public was consulted on some general trade-offs that SacRT must make in the future design of its service.

In the fall of 2018, these Alternatives will give people a more vivid illustration of the range of possibilities for the future, with regards to a major trade-off: how to balance ridership and coverage goals within the existing budget.

In the winter or spring of 2019, this process will produce a Network Plan, incorporating input from 2018 and guidance from the SacRT board. If SacRT decides to move ahead with any of the recommendations of that Network Plan, then there will be additional community engagement, first when those recommendations are incorporated into SacRT's updated Short Range Transit Plan, and again before any actual service changes are made.

We hope you will encourage other people you know to learn about this effort and get involved by:

- Visiting www.sacrt.com/apps/sacrtforward/
- Joining the email list by contacting us at sacrtforward@sacrt.com or (916) 321-2877.
- Providing input via an online survey, which will be available soon at the project website.
- Meeting the project team at a public event—places and times are listed on the project website and will be announced to the project email list as well.



Appendix A: Downtown Maps

Appendix A: Downtown Maps

Existing Network Downtown

The map at right shows weekday service downtown in the existing network, and is an inset of the larger regional map shown on page 11.

Note that the existing network includes more variation in frequencies (and spans) than do either of the Alternatives. The Alternatives have a simpler set of "service categories," each represented by a color.

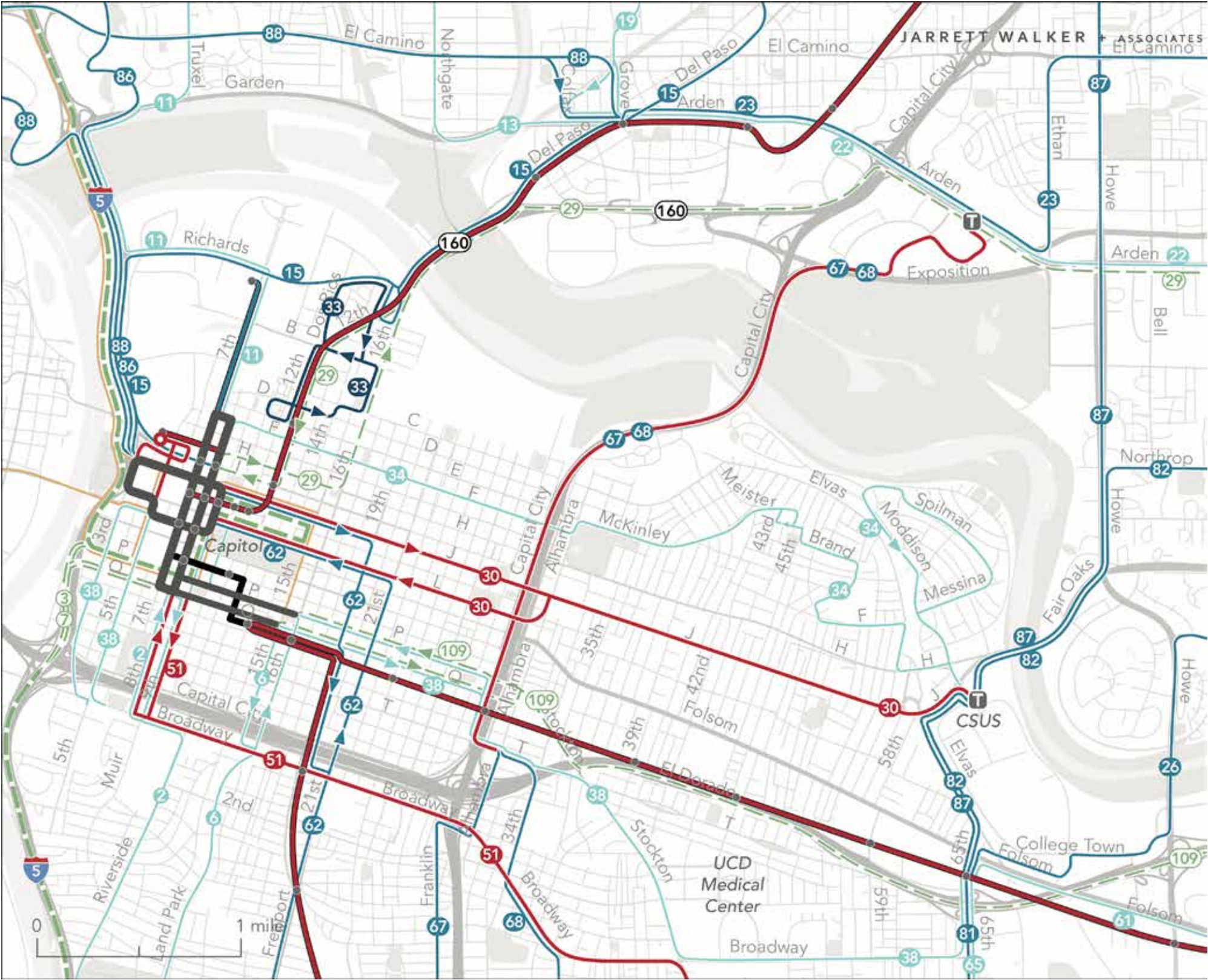
Both of the Alternatives present simpler downtown networks (shown on the following two pages) than exists today. The High Ridership, High Frequency Alternative presents a particularly simple downtown network, one that most people could learn and keep in their heads.

Frequencies and spans of existing routes are shown in the table on page 15.

Weekday Network SACRAMENTO, CA

Frequency (minutes between buses) at midday

- 15 min
- 20 min
- 30 min
- 60 min
- - - Peak or select trips only
- - - 3 or more peak or select routes
- Route continues at lower frequency
- Light Rail
- Blue, Gold, Green
- All 3 rail routes
- Many routes
- End of route
- Other agency service
- Light Rail Station
- T Transit Center



Appendix A: Downtown Maps

High Coverage Alternative Downtown

The map at right shows weekday service downtown in the High Coverage Alternative. (It is an inset of the larger map shown on page 10.)










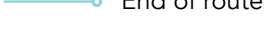


To explore this network and its relevance to your life, or the lives of people you care about:

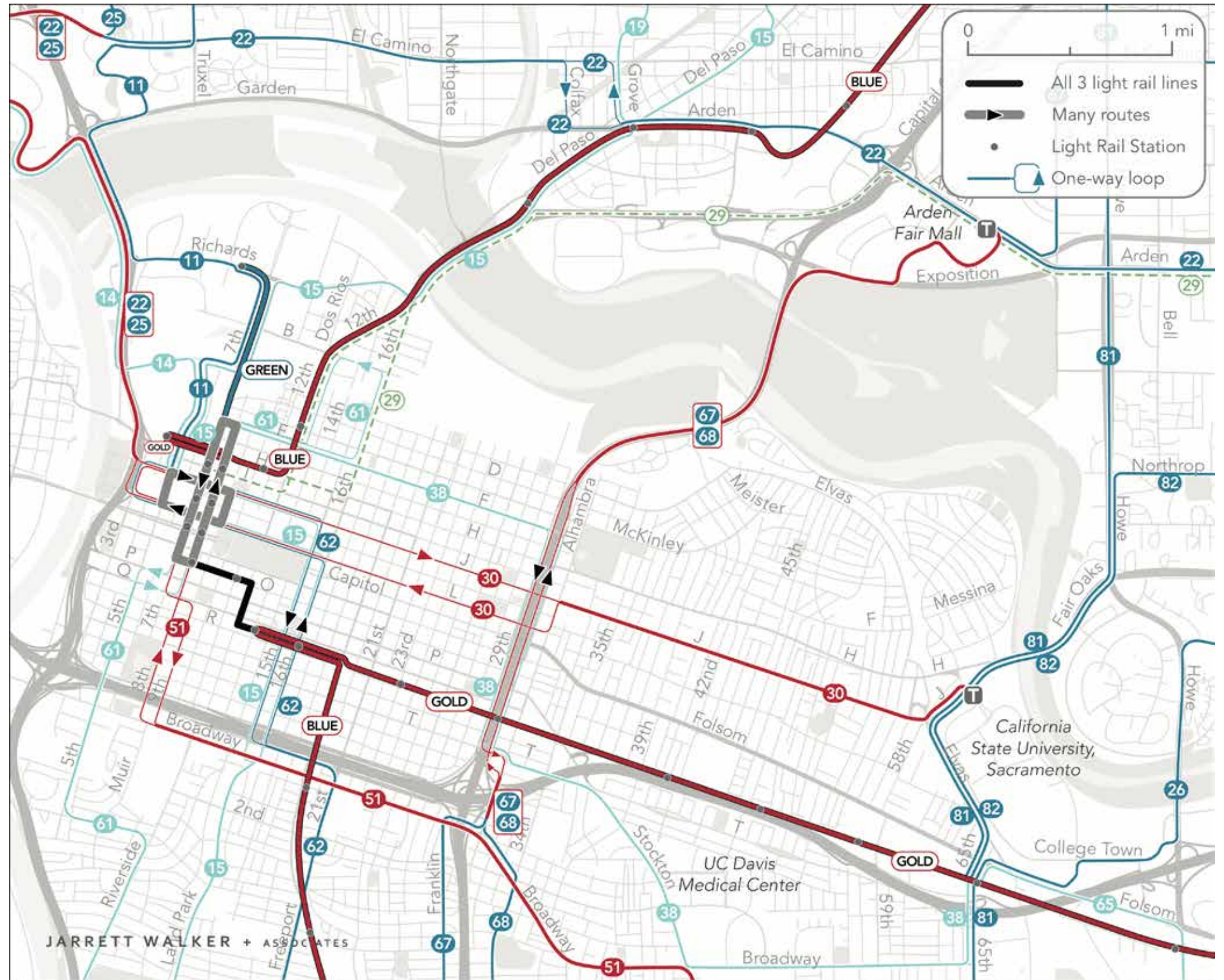
1. Find a place you care about on the map, using the labeled streets.
2. Note which routes are nearby, by number and by color.
3. Look at the legend below to see what frequency those routes would have on weekdays.
4. Look at where else those routes go, outside of downtown. (You may need to refer to the map on page 10.)
5. Refer to the table on page 16 to learn how the frequencies of these routes would change throughout a weekday, how many days of the week they operate, and what hours of service they offer.

Because this Alternative is designed to cover all of the neighborhoods where service exists today, it is not possible to increase frequencies on any routes. It is also not possible to increase spans of service (e.g. at night or on weekends) by more than a little bit on a few routes.

High Coverage Alternative WEEKDAYS SACRAMENTO, CA

Frequency (minutes between buses) at midday on a weekday

- | | | | |
|---|--|---|--------------------|
|  | 15 minutes |  | Light Rail |
|  | 30 minutes |  | Blue, Gold, Green |
|  | 60 minutes |  | All 3 rail routes |
|  | Peak route |  | Many routes |
|  | Route continues at lower frequency or branches |  | End of route |
| | |  | Light Rail Station |
| | |  | Transit Center |



Appendix A: Downtown Maps

High Ridership Alternative Downtown

The map at right shows weekday service downtown in the High Ridership, High Frequency Alternative. (It is an inset of the larger map shown on page 11.)

Because service is concentrated into fewer routes, there is a simple and memorable “frequent grid,” in which bus routes and rail lines coming every 15 minutes cross one another. This makes transfers easy and fast.

The shorter a transit trip is, the more waiting time affects overall travel time, and the less willing people are to tolerate long waits. The high frequencies of nearly all routes entering downtown, and the connections they make with one another, would make transit a viable option for many people for trips within this map area.












To explore this network and its relevance to your life, or the lives of people you care about:

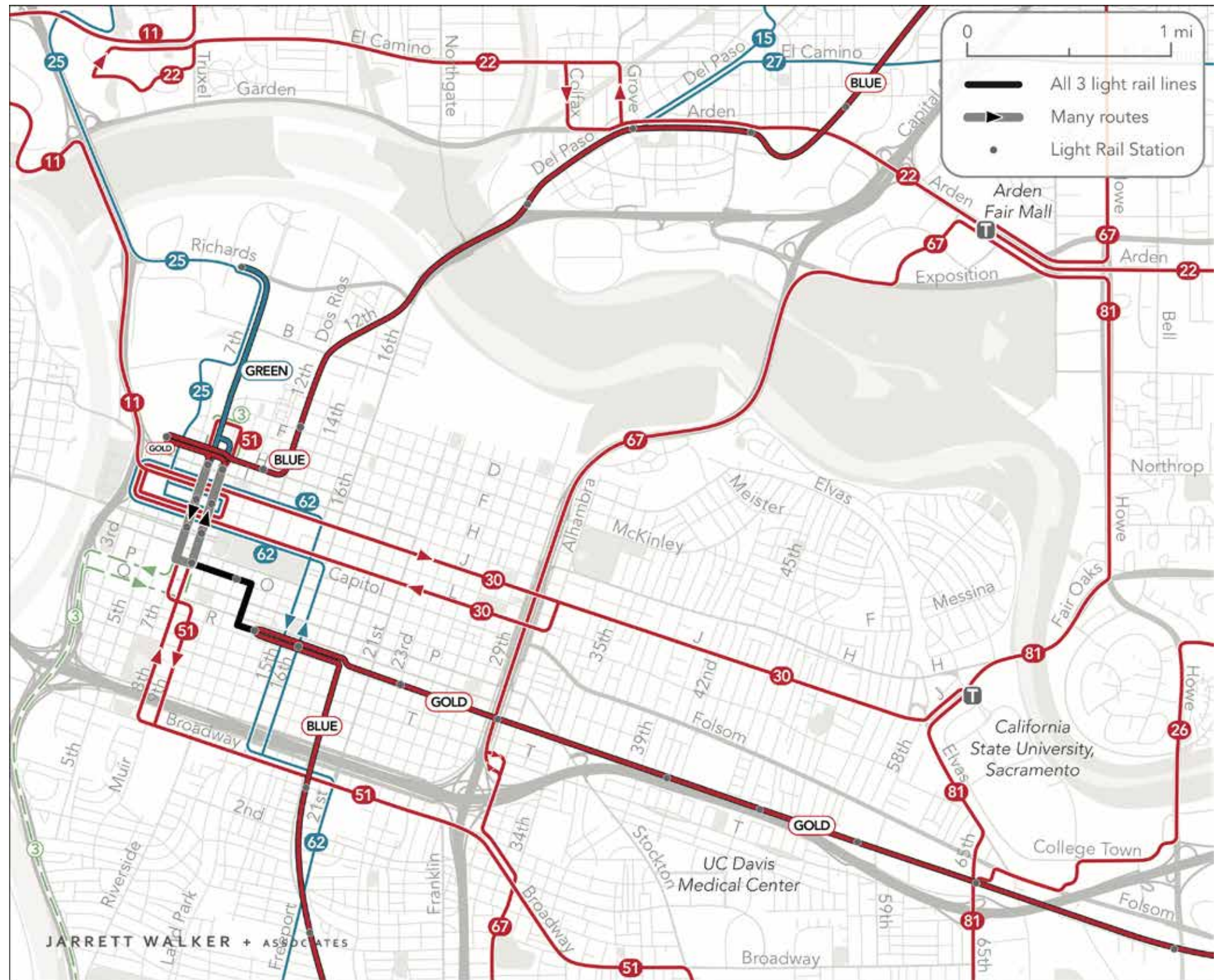
1. Find a place you care about on the map, using the labeled streets.
2. Note which routes are nearby, by number and by color.
3. Look at the legend below to see what frequency those routes would have on weekdays.
4. Follow the lines to see where else those routes go. (You may need to consult the larger map on page 11.)
5. See page 17 for those routes’ frequencies and spans.

High Frequency Alternative

WEEKDAYS
SACRAMENTO, CA

Frequency (minutes between buses) at midday on a weekday

- | | | | |
|---|--|---|--------------------|
|  | 15 minutes |  | Light Rail |
|  | 30 minutes |  | All 3 rail routes |
|  | 60 minutes |  | Many routes |
|  | Peak route |  | End of route |
|  | Route continues at lower frequency or branches |  | Light Rail Station |
| | |  | Transit Center |



Appendix B: Detailed Route-by-Route Descriptions

Appendix B: Detailed Route-by-Route Descriptions

High Coverage Alternative

This table details routing, frequencies and hours of service.

Route	Routing	Weekdays	Saturdays	Sundays and Holidays
Route 1	As in existing network, and continues as 1A and 1B where existing route 24 runs, and continues out to the Folsom light rail station. 1A runs along Greenback, and 1B runs along Sunrise, to Madison, to Greenback.	30-minute frequency from 5 am to 6 am, then 15-minute frequency until about 7 pm. 30-minute frequency from 7 to 12 am. Routes 1A and 1B run at 60-minute frequency from 6 am to about 8 pm.	60-minute frequency from about 6 am to 7 am, then 30-minute frequency until 10 pm. Then 60-minute frequency until midnight. Only 1A along Greenback runs on Saturdays, from 7 am to 8 pm.	60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm; then 60-minute frequency until midnight. Only 1A runs on Sundays, with 60-minute frequency from 8 am until 8 pm.
Route 11	As in existing network, with a long line that continues north along Natomas, west on Elkhorn and ends at the airport.	30-minute frequency from 6 am to 7 pm, then 60-minute frequency until about 9 pm. The long line to the airport runs from 6 am until 8 pm at 60-minute frequency.	60-minute frequency from about 7 am to about 9 pm. The long line ends one hour earlier at 8 pm.	60-minute frequency from about 8 am to about 9 pm. The long line ends one hour earlier at 8 pm.
Route 14	Uses part of existing route 13 from the Arden / Del Paso station via Arden Way, Northgate, North Market, Gateway Park, Del Paso, Natomas Central, Duckhorn, San Juan, El Centro, and I-5 to Downtown.	60-minute frequency from 6 am until about 8 pm.	No service.	No service.
Route 15	As in existing network. Between Downtown and I-80 / Watt station via Del Paso, Rio Linda, and Grand.	60-minute frequency from about 6 am to 8 pm.	60-minute frequency from about 7 am to about 8 pm.	60-minute frequency from about 8 am to about 8 pm.
Route 19	As in existing. Between Arden / Del Paso station and Watt / I-80 station via Norwood, Bell, Rio Linda, Claire, Dry Creek, Elkhorn, 2nd, M, 10th, Q, Rio Linda, Elverta, and Watt.	60-minute frequency from about 6 am to 8 pm.	60-minute frequency from about 7 am to about 8 pm.	60-minute frequency from about 8 am to 8 pm.
Route 21	Combines existing routes 21 and 72, and adds two branches between Sunrise Mall and Louis and Orlando transit center. Between Watt / Manlove station and Louis and Orlando TC via Watt, Kiefer, Branch Center, Bradshaw, Lincoln Village, Mather Field, Coloma, Sunrise; 21 A continues along Sunrise and Twin Oaks; 21 B turns onto Greenback and Sylvan.	30-minute frequency from 6 am to 7 pm, then 60-minute frequency until 9 pm. Both branches have 60-minute frequency. 21 A runs from 6 am until about 8 pm. 21 B ends one hour earlier at 7 pm.	60-minute frequency from about 7 am to about 9 pm. 21 A has 60-minute frequency from 7 am to 8 pm. 21 B does not run on Saturdays.	60-minute frequency from about 8 am to about 9 pm. 21 A has 60-minute frequency from 8 am to 8 pm. 21 B does not run on Sundays.
Route 22	A combination between existing routes 22 and 88. Between Downtown and the intersection of Arden and Morse via I-5, El Camino, and Arden.	30-minute frequency from 6 am to 7 pm, then 60-minute frequency until about 9 pm.	60-minute frequency from about 7 am to about 9 pm.	60-minute frequency from about 8 am to about 9 pm.
Route 25	A combination between existing routes 25 and 86, with two branches. Between Downtown and Sunrise Mall via I-5, Azavedo, San Juan, Silver Eagle, Norwood, Grand, Marysville, Marconi, and Manzanita. 25 A continues along Manzanita, Coyle, Dewey, Madison and Sunrise. 25 B turns onto Fair Oaks, San Juan, and Greenback.	30-minute frequency from 6 am to about 7 pm, then 60-minute frequency until 9 pm. Both branches have 60-minute frequency. 25 A runs from 6 am until 7 pm; 25 B runs one hours later until 8 pm.	60-minute frequency from about 7 am to 9 pm. 25 A does not run on Saturdays. 25 B has 60-minute frequency from 7 am to about 8 pm.	60-minute frequency from about 8 am to 9 pm. 25 A does not run on Sundays. 25 B has 60-minute frequency from 8 am to about 8 pm.

Appendix B: Detailed Route-by-Route Descriptions

This table details the High Coverage Alternative’s routing, frequencies and hours of service.

Route	Routing	Weekdays	Saturdays	Sundays and Holidays
Route 26	A combination between existing routes 26 and 93. Between University / 65th Street Station and Louis and Orlando Transit Center via Howe, Fulton, Auburn, Watt, Madison, Hillsdale, Greenback, and Auburn.	30-minute frequency from 6 am until about 7 pm, then 60-minute frequency until about 9 pm.	60-minute frequency from about 7 am to about 9 pm.	60-minute frequency from about 8 am to 9 pm.
Route 29	Same as in existing, between downtown and the intersection of Dewey and Madison, via Lincoln Highway, Arden, Fair Oaks, Manzanita, Marconi, California, Winding, and Dewey.	60-minute frequency during peak times, from 6 am to 9 am, and from 4 pm to 7 pm.	No service.	No service.
Route 30	Same as in existing, between Downtown and SacState, via 3rd, J and L streets.	30-minute frequency from 6 am until 7 am, then 15-minute frequency until about 7 pm. 30-minute frequency from 7 pm until about midnight.	60-minute frequency from 6 am to 7 am, then 30-minute frequency until 10 pm. 60-minute frequency from 10 pm to 12 am.	60-minute frequency from 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until about 12 am.
Route 38	Between Downtown and University / 65th Street station, via F, 29th and 30th, T, Stockton, Broadway, and 65th.	60-minute frequency from about 6 am to 8 pm.	60-minute frequency from about 7 am to about 8 pm.	60-minute frequency from about 8 am to about 8 pm.
Route 51	Same as existing, between Downtown and Florin Towne Center, via 8th and 9th, Broadway, Stockton, and Florin.	30-minute frequency from 6 am until 7 am, then 15-minute frequency until about 7 pm. 30-minute frequency from 7 pm until about midnight.	60-minute frequency from 6 am to 7 am, then 30-minute frequency until 10 pm. 60-minute frequency from 10 pm to 12 am.	60-minute frequency from 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until about 12 am.
Route 61	Between Downtown and the intersection of Zinfandel and Sunrise, via Riverside, Fruitridge, Florin Perkins, La Riviera, Folsom, Cordova, and Zinfandel.	60-minute frequency from about 6 am to 8 pm.	60-minute frequency from about 7 am to about 8 pm.	60-minute frequency from about 8 am to about 8 pm.
Route 62	A combination between existing routes 62, 2, and 56. Between Downtown and Consumnes River College via Freeport, 43rd, branches between Riverside and Gloria, rejoins at Pocket Transit Center and travels along Meadowview, Franklin, Mack, Valley Hi, Wyndham, and Bruceville.	30-minute frequency from 6 am until about 8 pm. 62 A and 62 B have 60-minute frequency from 6 am until 8 pm.	60-minute frequency from 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm to 8 pm. 62 A has 60-minute frequency from 8 am until 7 pm. 62 B has 60-minute frequency from 7 am until 8 pm.	60-minute frequency from 8 am to 9 am, then 30-minute frequency until 7 pm; then 60-minute frequency until 8 pm. 62 A has 60-minute frequency from 9 am until 7 pm. 62 B has 60-minute frequency from 8 am until 8 pm.
Route 65	Between University / 65th Street station and Consumnes River College, via Folsom, Power Inn, 14th, 73rd, 21st, Bradford, Wilkinson, Logan, 75th, Briggs, Florin, Power Inn, Calvine, and Bruceville.	60-minute frequency from 6 am until about 8 pm.	No service.	No service.
Route 66	Between 24th Street and City College station and Consumnes River College, via 24th, Meadowview, Franklin, Forest, Center, and Bruceville.	60-minute frequency from 6 am until about 8 pm.	No service.	No service.

Appendix B: Detailed Route-by-Route Descriptions

This table details the High Coverage Alternative’s routing, frequencies and hours of service.

Route	Routing	Weekdays	Saturdays	Sundays and Holidays
Route 67	Between Delta Shores and Arden Fair Mall, via Cosumnes River College Boulevard, Franklin, MLK Jr, 21st, Franklin, Alhambra, 29th and 30th, Capital City, Exposition, Heritage, and Arden.	30-minute frequency from 6 am until about 7 pm, then 60-minute frequency until about 9 pm.	60-minute frequency from about 7 am to about 9 pm.	60-minute frequency from about 8 am to 9 pm.
Route 67–east of Arden Fair Mall	Continues from Arden Fair Mall to the intersection of Manzanita and Marconi, via Arden, Ethan, El Camino, and Manzanita.	30-minute frequency from 6 am until about 7 pm, then 60-minute frequency until about 9 pm.	60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 8 pm. 60-minute frequency from 8 pm to 9 pm.	60-minute frequency from about 8 am to 9 pm.
Route 68	Between Cosumnes River College and Arden Fair Mall, via Bruceville, Wyndham, Valley Hi, Mack, Stockton, Gerber, Power Inn, Scottsdale, Palmer House, Lindale, Stockton, Orange, Florin Mall, Sky, Steiner, 47th, 44th, 14th, 12th, 33rd, 34th, Broadway, Alhambra, 29th and 30th, Capital City, Exposition, Heritage, and Arden.	30-minute frequency from 6 am until about 7 pm, then 60-minute frequency until about 9 pm.	60-minute frequency from about 7 am to about 9 pm.	60-minute frequency from about 8 am to 9 pm.
Route 74	Similar to existing, between Mather Field / Mills station and Sunrise station, via Mather Field, Peter A. McCuen, Femoyer, International, Zinfandel, Data, White Rock, Prospect Park, Sun Center, and Sunrise.	30-minute frequency from 5 am until 6 am, then 15-minute frequency until about 9 am. 30-minute frequency from 9 am until 4 pm, then 15-minutes until 7 pm. 60-minute frequency from 7 pm until 11 pm.	60-minute frequency from 6 am to 7 am, then 30-minute frequency until 10 pm. 60-minute frequency from 10 pm to 11 pm.	60-minute frequency from 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until about 11 pm.
Route 81- Florin	The frequent trunk of route 81 runs between Florin Towne Center and the intersection of Florin and Greenhaven, via Florin.	30-minute frequency from 5 am to 6 am, then 15-minute frequency until 7 pm. 30-minute frequency from 7 pm until midnight.	60-minute frequency from 6 am to 7 am, then 30-minute frequency until 10 pm. 60-minute frequency from 10 pm to 12 am.	60-minute frequency from 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until about 12 am.
Route 81 - Howe, 81A and 81B	The less frequent route 81 runs between Florin Towne Center to SacState, via 65th and Elvas. The two branches of route 81 extend from the intersection of Florin and Greenhaven. 81 A continues on Florin until it reaches Riverside. 81 B turns onto Greenhaven then Rush River to the Pocket Transit Center.	30-minute frequency from 6 am until about 7 pm, then 60-minute frequency until about 9 pm.	60-minute frequency from about 7 am to about 9 pm.	60-minute frequency from about 8 am to 9 pm.
Route 82	Similar to existing, 82 runs between University / 65th Street station and American River College via Elvas, Howe, Northrop, Morse, Cottage, Butano, Watt, and Whitney. The route splits into two branches at Whitney and Eastern. 82 A runs via Eastern Edison, Pasadena, Winding, and College Oak. 82 B continues on Whitney, then runs via Mission, Engle, Walnut, and College Oak.	30-minute frequency from 6 am until about 7 pm, then 60-minute frequency until about 9 pm. Both branches have 60-minute frequency. 82 A runs from 6 am until 9 pm. 82 B runs from 6 am until 7 pm.	60-minute frequency from about 7 am to about 9 pm. 82 A has 60-minute frequency from about 7 am to about 8 pm. 82 B does not run on Saturday.	60-minute frequency from about 8 am to about 9 pm. 82 A has 60-minute frequency from about 8 am to about 8 pm. 82 B does not run on Sunday.

Appendix B: Detailed Route-by-Route Descriptions

This table details the High Coverage Alternative’s routing, frequencies and hours of service.

Route	Routing	Weekdays	Saturdays	Sundays and Holidays
Route 84	Between Watt / Manlove station and the intersection of Watt and Elverta, via Watt, Arden, Morse, Cottage, Butano, Watt, Don Julio, Walerga, N Loop, and Elverta.	30-minute frequency from 6 am until about 7 pm, then 60-minute frequency until about 9 pm.	60-minute frequency from 7 am to 8 am, then 30-minute frequency until 8 pm. 60-minute frequency from 8 pm to 9 pm.	60-minute frequency from about 8 am to 9 pm.
Route 109	Between Hazel station and the intersection of Hazel and Oak, via Hazel Avenue.	30-minute frequency during peak hours, from 6 am until 9 am, and from 4 pm until 7 pm.	No service.	No service.

Appendix B: Detailed Route-by-Route Descriptions

High Frequency, High Ridership Alternative

This table details routing, frequencies and hours of service.

Route	Routing	Weekdays	Saturdays	Sundays and Holidays
Route 1	Similar to existing, between Watt / I-80 station and Sunrise Mall, via freeway ramp, Auburn, Orange Grove, College Oak, Auburn, and Greenback.	30-minute frequency from 5 am to 6 am, then 15-minute frequency until about 7 pm. 30-minute frequency from 7 pm until midnight.	60-minute frequency from about 6 am to 7 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 12 am.	60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until 12 am.
Route 3	Between Downtown and the Pocket Transit Center, via Rush River, Gloria, Florin, Riverside, I-5, P/Q streets, and 7th/8th streets up to F street.	30-minute frequency at peak hours, from 6 am until 9 am, and 4 pm until 7 pm.	No service.	No service.
Route 11	The frequent trunk of route 11 runs between downtown and the intersection of Truxel and Del Paso, via J/L streets, I-5, El Camino, and Truxel.	30-minute frequency from 5 am to 6 am, then 15-minute frequency until about 7 pm. 30-minute frequency from 7 pm until midnight.	60-minute frequency from about 6 am to 7 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 12 am.	60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until 12 am.
Route 11A and 11B	Both branches connect with the trunk at the intersection of Truxel and Del Paso. 11 A continues along Truxel, North Park, Northborough, and Club Center. 11 B runs via Del Paso and Commerce around Natomas Town Center.	Both branches have 60-minute frequency from 5 am until 6 am, then 30-minute frequency until 7 pm. 11 B stops running at 7 pm, but 11 A continues at 30-minute frequency from 7 pm until 10 pm, and at 60-minute frequency from 10 pm until 11 pm.	11 A has 60-minute frequency from about 6 am to about 7 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 11 pm. 11 B does not run on Saturdays.	11 A has 60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until 11 pm. 11 B does not run on Sundays.
Route 15	Between Arden / Del Paso station and Watt / I-80 station via Del Paso, Rio Linda, Grand, and I-80.	60-minute frequency from 5 am to 6 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 11 pm.	60-minute frequency from about 6 am to about 7 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 11 pm.	60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until about 11 pm.
Route 21	Combination between existing routes 21 and 72. Between Watt / Manlove station and Louis and Orlando TC via Watt, Kiefer, Branch Center, Bradshaw, Lincoln Village, Mather Field, Coloma, Sunrise, and Twin Oaks.	60-minute frequency from 5 am to 6 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 11 pm.	60-minute frequency from about 6 am to about 7 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 11 pm.	60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until about 11 pm.
Route 22	Between the intersection of Truxel and El Camino and the intersection of Cottage and Watt, via El Camino, Arden, Morse, and Cottage.	30-minute frequency from 5 am to 6 am, then 15-minute frequency until about 7 pm. 30-minute frequency from 7 pm until midnight.	60-minute frequency from about 6 am to 7 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 12 am.	60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until 12 am.
Route 25	Between Downtown and the intersection of Dewey and Greenback, via 7th, Richards, I-5, Azavedo, San Juan, Silver Eagle, Norwood, Grand, Marysville, Marconi, Manzanita, Coyle, and Dewey.	60-minute frequency from 5 am to 6 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 11 pm.	60-minute frequency from about 6 am to about 7 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 11 pm.	60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until about 11 pm.
Route 26	Between University / 65th station and American River College, via Howe, American River, Fulton, Auburn, and Orange Grove.	30-minute frequency from 5 am to 6 am, then 15-minute frequency until about 7 pm. 30-minute frequency from 7 pm until midnight.	60-minute frequency from about 6 am to 7 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 12 am.	60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until 12 am.

Appendix B: Detailed Route-by-Route Descriptions

This table details the High Frequency, High Ridership Alternative's routing, frequencies and hours of service.

Route	Routing	Weekdays	Saturdays	Sundays and Holidays
Route 27	Between Arden / Del Paso station and American River College, via Del Paso, El Camino, Walnut, Winding, and College Oak.	60-minute frequency from 5 am to 6 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 11 pm.	60-minute frequency from about 6 am to about 7 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 11 pm.	60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until about 11 pm.
Route 30	As in existing, between Downtown and SacState, via 3rd, J and L streets.	30-minute frequency from 5 am to 6 am, then 15-minute frequency until about 7 pm. 30-minute frequency from 7 pm until midnight.	60-minute frequency from about 6 am to 7 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 12 am.	60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until 12 am.
Route 51	Between Downtown and Cosumnes River College, via 7th, 8th, 9th, Broadway, Stockton, Mack, Valley Hi, Wyndham, and Bruceville.	30-minute frequency from 5 am to 6 am, then 15-minute frequency until about 7 pm. 30-minute frequency from 7 pm until midnight.	60-minute frequency from about 6 am to 7 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 12 am.	60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until 12 am.
Route 62	Between Downtown and Cosumnes River College, via J and L, 15th and 16th, Freeport, 35th, Gloria, Florin, Greenhaven, Pocket, Meadowview, Franklin, Mack, Valley Hi, Wyndham, and Bruceville.	60-minute frequency from 5 am to 6 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 11 pm.	60-minute frequency from about 6 am to about 7 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 11 pm.	60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until about 11 pm.
Route 67	Between Franklin Station and Arden Fair Mall, via Franklin, 47th, 44th, Fruitridge, MLK Jr, 14th, 12th, 33rd, 34th, 29th and 30th, Capital City, Exposition, Heritage, and Arden.	30-minute frequency from 5 am to 6 am, then 15-minute frequency until about 7 pm. 30-minute frequency from 7 pm until midnight.	60-minute frequency from about 6 am to 7 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 12 am.	60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until 12 am.
Route 74	Similar to existing, between Mather Field / Mills station and Sunrise station, via Mather Field, Peter A. McCuen, Femoyer, International, Zinfandel, Data, White Rock, Prospect Park, Sun Center, and Sunrise.	15-minute frequency at peak hours, from 6 am until 9 am, and 4 pm until 7 pm.	No service.	No service.
Route 81	Between the intersection of Florin and Greenhaven and Arden Fair Mall, via Florin, 65th, Elvas, Howe, Arden.	30-minute frequency from 5 am to 6 am, then 15-minute frequency until about 7 pm. 30-minute frequency from 7 pm until midnight.	60-minute frequency from about 6 am to 7 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 12 am.	60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until 12 am.
Route 84 - trunk	Between Watt / Manlove station and the intersection of Watt and Roseville, via Watt, Arden, Cottage, Butano, and Watt, where it branches into 84 A and 84 B.	30-minute frequency from 5 am to 6 am, then 15-minute frequency until about 7 pm. 30-minute frequency from 7 pm until midnight.	60-minute frequency from about 6 am to 7 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 12 am.	60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until 12 am.
Route 84 A and 84 B	Both branches follow the routing listed for Route 84 - trunk. 84 A continues on Watt, Elkhorn, Greenback, and Auburn to Louis and Orlando TC. 84 B turns from Watt onto Roseville, Hillsdale, Walerga, and Elverta to its intersection with Watt.	Both branches have 60-minute frequency from 5 am until 6 am, then 30-minute frequency until 10 pm. 84 A stops running at 10 pm, but 84 B continues at 60-minute frequency from 10 pm until 11 pm.	Both branches have 60-minute frequency from about 6 am to about 7 am, then 30-minute frequency until about 10 pm. 60-minute frequency from 10 pm until 11 pm.	Both branches have 60-minute frequency from about 7 am to 8 am, then 30-minute frequency until 7 pm. 60-minute frequency from 7 pm until 11 pm.

Appendix C: Methods

Appendix C: Methods

How is the proximity analysis performed?

The proximity analysis estimates the number of residents (or jobs) within a given distance of any transit stop. More specific analysis gives the results for low-income residents and minority residents.

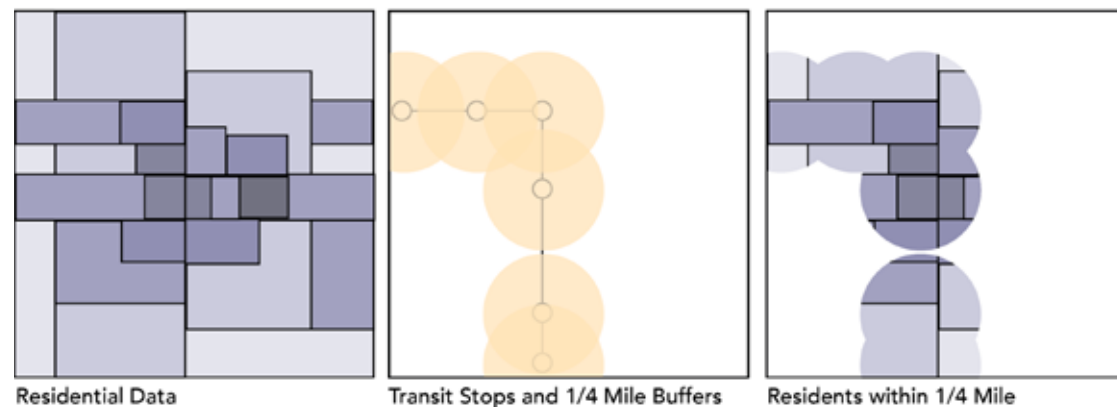
The demographic data necessary for this analysis, and for the access analysis, comes from the U.S. Census. The most recent source was used, the 2012-2016 American Community Survey (ACS) 5-Year Summary.

The data source for job locations and wage levels is the U.S. Census Longitudinal Employer-Household Dynamics (LEHD) Program, 2015.

The diagram below illustrates how the proximity analysis is performed:

- Demographic data is mapped, in the smallest geographic units available (for residential data, these were Block Groups).
- For this analysis, we must assume that residents are evenly-distributed within each unit, though we know this is not always the case, especially not for high-density housing in a suburban setting.
- Bus stop locations were created for all new routes in the Alternatives, and a 1/4 mile buffer was drawn around them.¹
- The number of residents within the buffer was summed for that route.
- The same procedure was followed for minority residents, low income residents and jobs; and using only frequent bus and light rail services, as distinct from any all-day service.

The sums that result from these steps were then compared to the total population and jobs in SacRT's 367-square mile service area, to give results in terms of percentages.



¹ As noted earlier in this report, 1/4 mile is an overestimate of an acceptable walk for some people and some situations, and an underestimate for other people and other situations. 1/4 mile is a standard assumption in transit planning, though 1/2 mile is often used as an assumed tolerable walking distance for frequent, rapid and express services.

Appendix C: Methods

How are isochrones made?

To create the isochrones, we used a trip planning tool called Open Trip Planner (OTP). Each of the networks was created in or imported into OTP, along with all route frequencies, spans, and vehicle speeds. The frequencies, spans, and speeds are used to generate a schedule for stops along each route. These schedules were imported into OTP, which allows the software to plan trips and determine travel times along the transit and street networks in each Alternative.

Each transit trip involves some combination of walking, waiting and riding. For waiting time, we assumed riders wait on average half the time until the next bus. For a route that operates every 30 minutes that would mean an average wait of 15 minutes. This applies to the wait for the first ride and any transfer throughout the trip.

This waiting time exists in real life, even when real-time information allows people to have shorter waits at the bus stop. If someone has to be at work, or a doctor's appointment, or some other commitment at 9 am, they have to catch a bus early enough to get them there on or before 9 am. If the bus comes every 15 minutes, they will have to arrive, at worst, 14 minutes early. If the bus comes every 60 minutes, they will have to arrive, at worst, 59 minutes early.

On average, their waiting time – whether at the bus stop or at their destination – will be 1/2 of the frequency of the bus route. This can be thought of as the mismatch between the route's frequency and their life. The lower the frequency, the bigger the average mismatch.

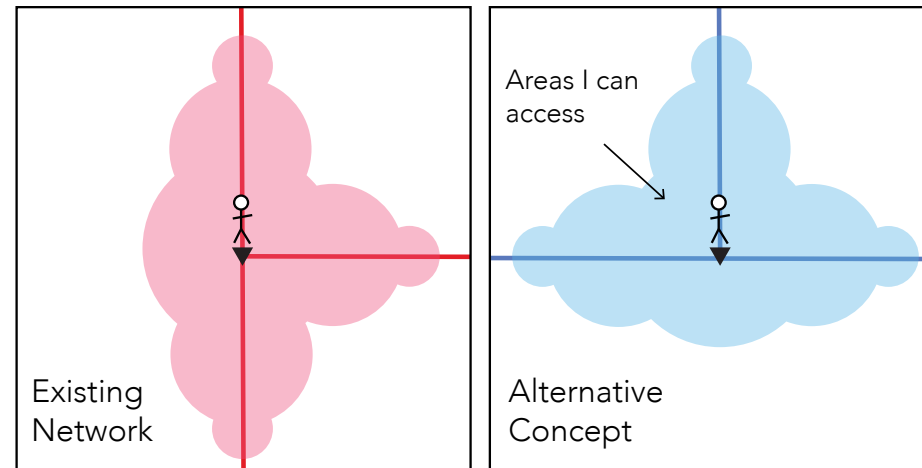
The assumed walking speed in the isochrones is 3 miles per hour. There is an assumed maximum walking time as part of any transit trip, of about 45 minutes. Some people cannot or will not walk that far, and other people will walk all the way to their destination if walking is the fastest option.

Each isochrone map shows two overlapping isochrones. Isochrones for the Alternatives are shown in blue, while the existing network isochrones are shown in red, as illustrated in the diagram at right.

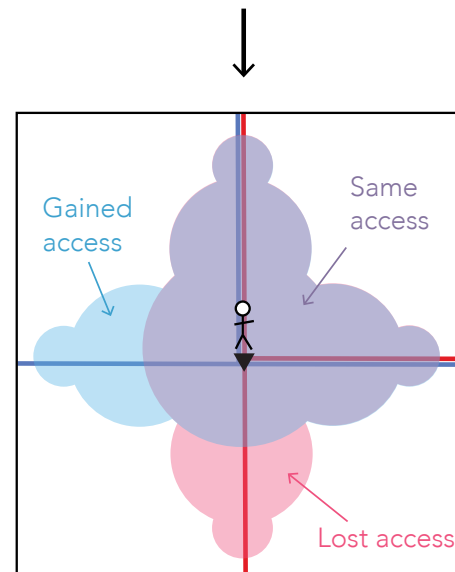
Purple areas show where two isochrones overlap, meaning access would be preserved under the Alternative. Red areas show where access would be lost under the Alternative. Blue areas show where the Alternative would provide new access.

Each isochrone page includes an estimate of the percentage increase or decrease in residents and jobs that could be reached from the center point.

By walking and transit, where can I get to in 30 minutes?



How is my access different between these two networks?



Overlapping isochrones can show the areas that are lost or gained between two transit networks.

Residential population and job data for this analysis come from the same U.S. Census data sources as were used in the proximity analysis (and the demographic maps included in the [Transit Choices Report](#)).

How is the access analysis performed?

The access analysis reported on page 28 builds on the isochrone methods.

To measure access for all residents, we created a grid of sections, spaced 1/4 mile apart across the SacRT service area. (As in the proximity analysis, this required an assumption that residents are evenly-distributed within each Block Group.)

We then created isochrones for each of these 1/4 mile grid sections, for the given amount of travel time, and summed all of the jobs within each isochrone area.

While some grid sections contain thousands of residents, others contain only a few. The jobs accessible from each grid section were multiplied by the number of residents estimated to live in that grid section. The products of this multiplication was summed for all grid sections in the service area, and then divided by the total number of residents in the service area.

A more refined look at the resulting geographic data (using R analysis software) allows us to describe the numbers of residents that would experience different ranges of changes in access. This is reported in the bar charts on page 28.

Glossary

Glossary

Access	The number of jobs or residents reachable from a starting location by transit and walking. Access is often calculated for many starting points in a network, based on some assumed travel-time “budget,” and summarized on a map.	Grid Network	A network of routes that intersect all over the city. Grid networks are best suited for places with many activity centers, as opposed to radial networks, where most people are traveling to a central location. Grid networks require high-frequency to make transfers short, reliable and convenient.
Arterial road	A high-capacity through road.	Headway	Headway is the time between successive trips at a stop, a more technical transit term for frequency. A service that comes every 15 minutes can be said to have a “15 minute headway.”
Circulator	Circulator is often used to describe a service that provides transit coverage to a low-density area, because the travel paths that result are so often circular in shape. In some places a circulator is also operated downtown. Large circular transit routes that offer high speed or high frequency and serve high demand areas, however, are generally referred to as loops.	Investment	Service or revenue hours per capita, a measure of the relative level of transit service.
Commuter express service	An FTA designation that distinguishes between fixed routes that must be supplemented by paratransit, and fixed routes that may not. From the FTA’s website: “Commuter bus service means fixed route bus service, characterized by service predominantly in one direction during peak periods, limited stops, use of multi-ride tickets, and routes of extended length, usually between the central business district and outlying suburbs. Commuter bus service may also include other service, characterized by a limited route structure, limited stops, and a coordinated relationship to another mode of transportation.” http://www.fta.dot.gov/12876_3906.html	Isochrone	An illustration to help visualize where someone can go from a location, in a certain amount of time, using transit or by walking.
Connection	A connection or transfer takes place when a person uses two transit vehicles to make a trip.	Land use	Land use describes the way a parcel of land is being used, for example as commercial, industrial or multi-family residential. Land use descriptions can be general or very specific. Land use is distinct from zoning, as land may be rezoned under existing uses and buildings long before changes to its use take place.
Coverage	Coverage can refer to the amount of geographic space, the proportion of people or the proportion of jobs that are within a certain distance of transit service. An assumption about how far people will walk to a given transit service—often ranging from 1/4 to 1/2 mile—must be made in order to estimate coverage.	Layover	Time for driver breaks between trips. Usually included in revenue hours. Unlike recovery time, layover time sometimes cannot be skipped even when a bus is behind schedule.
Deadhead hours	The time a vehicle spends between the garage and the start or end of revenue service, or between the end of a trip on one route and the beginning of a trip on another route.	Longline	Some routes have a more frequent inner segment and a less frequent outer segment. At the end of the inner segment, some buses turn around and come back, while others continue on to a more distant turnaround point. The outer, less-frequent segment is often called the “longline,” though technically the longline is the longest path that buses on that route travel, and its length is the inner segment plus the outer segment. The inner segment is called the “shortline.”
Dial-a-ride	Demand response service, usually requires booking a day in advance, over the phone.	Microtransit	Demand response service, like dial-a-ride, but usually distinguished by same day or instant booking, often with an app.
Express	Express can have a range of meanings when applied to transit. It most often describes a route with a long non-stop segment. It can also be used to describe a route with wide stop spacing and overall faster speeds, though that is more commonly called a rapid.	Mobility	Mobility is generally used to express the ease with which people can move from place to place. It is distinct from access, which describes the extent to which people can meet their needs nearby. In some places, people have high access (they are able to meet all of their needs without travelling very far or at all) and low mobility (because traveling long distances is difficult or slow). In other places, mobility is high and access is low.
Farebox recovery	Farebox recovery is a measure of how much of a transit system, network or route’s operating cost is recovered through fares. It is often expressed as a ratio, e.g. “The farebox recovery ratio for SacRT’s fixed routes in 2013 was 20%.”	Mode share	Mode share is a technical term for the percentage of a population that uses a particular mode (e.g. transit, walking, driving) for traveling. Mode share information in the U.S. is generally reported for commute trips.
Feeder	A local route that connects or feeds into a radial route. Low-frequency feeders sometimes pulse so that transferring is more convenient	National Transit Database	The National Transit Database is a federal clearinghouse of general information about transit in the U.S. and information specific to each transit agency. Agencies of a certain size are required to submit financial and performance data to the NTD each year. https://www.transit.dot.gov/ntd/
Fixed route transit	Fixed route transit describes any transit service that is operated on the same predictable route. In contrast, paratransit and demand-responsive service may always or often follow different routes for each vehicle trip, as they serve different customers and their trips.	One-seat-ride	A trip that requires boarding only one transit vehicle (no transfers).
Frequency	Frequency is often expressed in minutes, i.e. a service that comes every 15 minutes has “15 minute frequency.” A more technical term for frequency is headway.		

Glossary

Paratransit	Paratransit is a transit service that provides on-demand curb-to-curb travel for people with disabilities, per the American’s with Disabilities Act. It is required by this U.S. law to be provided to people who have a disability that prevents them from using fixed route transit service, within 3/4 mile of fixed route transit, during all times when fixed route transit is operating.	Span	The span of a transit service is the number of hours it operates during the day, e.g. a service that runs from 6:00 am to 11:30 pm would have a 17.5 hour span. Span can also describe the number of days per week and per year that a service is operated.
Peak	In some places, two peaks of travel (and transit) demand take place each day: in the morning and afternoon, as people travel to and from work and school. However, in many places travel demand peaks only once, in the midday or afternoon, as service shifts change and students leave school.	Street connectivity	The degree to which streets connect to one another, and multiple paths exist between any two points, is describe as that place’s connectivity. Areas with many cul de sacs or loops and few through routes have low connectivity; areas with grid-like street patterns have high connectivity. Low connectivity discourages trips by slower modes (such as walking or bicycling), and presents challenges for transit routing.
Peak-only	A transit service that is peak-only operates only during the morning and afternoon travel peaks.	Transfer	When a person uses more than one transit vehicle to make a trip, they transfer in between vehicles. This is also often called a connection.
Productivity	The word productivity is often used in transit to describe the number of people served per unit of cost. Productivity can be expressed for an entire transit system, a subset of the system, individual lines or even for segments of lines.	Transit dependency	If a person has a severe need for transit, due to a disability or to lack of access to an automobile, they are often referred to as transit dependent. However, transit dependency is in fact a spectrum, not a category. People with disabilities and people without their own cars may have access to rides or taxis, but the extent to which they use those rides may depend on the availability and quality of transit service.
Pulse	A pulse takes place when two or more transit services arrive together at the same place at the same time, so that their passengers may transfer among them with minimal waiting.	Transit orientation	As with transit dependency, transit orientation is a spectrum, not a category. People who are living or working around higher activity densities, in places where walking to transit is safe and appealing, or who do not have easy access to an automobile may have some degree of transit orientation. Transit orientation can exist among poor and affluent populations alike.
Radial	A route or network design where most routes go to and from a central point (typically a downtown). As opposed to a grid network.	Tripper	A tripper is a special type of transit service that makes only a few or a single trip each day. Transit agencies often send one or more trippers to relieve crowding on certain routes, or to provide direct service where none exists at other hours. Trippers often run at the start and end of school days or work shifts.
Rapid	Rapid can have a range of meanings when applied to transit. It most often describes a route with wider stop spacing and overall faster speed.	Vehicle hours	The time during which a transit vehicle is away from the garage, whether providing revenue service (represented by “revenue hours”), driving between the garage and the start or end of service (represented by “deadhead hours”) or in layover and recovery time.
Recovery time	Extra time between trips to make up for a delay. Unlike layover, which is a driver’s break time, recovery time can be cut short so that the next trip can depart on-time.		
Relevance	Boardings per capita, a measure of how relevant transit is to the population it serves.		
Revenue hours	The time a transit vehicle and its operator spend out in public, available to passengers and (potentially) collecting revenue. Usually includes layover and recovery time, but excludes deadhead.		
Ride check	The National Transit Database requires that transit agencies regularly sample on all of their services to collect ridership and on-time performance information. This is often performed using surveyors on transit vehicles, though increasingly it is performed by automated counters and GPS devices on transit vehicles. It is sometimes called a ride check.		
Ridership	Ridership refers informally to the number of boardings or trips taken on a transit system or a particular transit service.		
Shortline	Some routes have a more frequent inner segment and a less frequent outer segment. At the end of the inner segment some buses turn around and come back, while others continue on to a more distant turnaround point. The outer, less-frequent segment is often called the “longline,” though technically the longline is the longest path that buses on that route travel, and its length is the inner segment plus the outer segment. The inner segment is called the “shortline.”		

*Sac***RT** *Forward*

The new generation network 

Sacramento Regional Transit Board Update

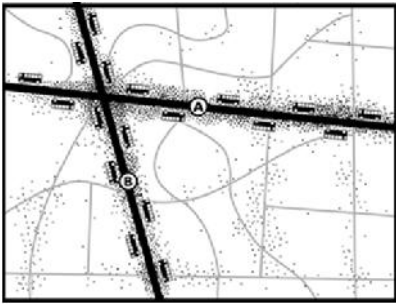
November 12, 2018



How to balance competing goals
within the existing budget?

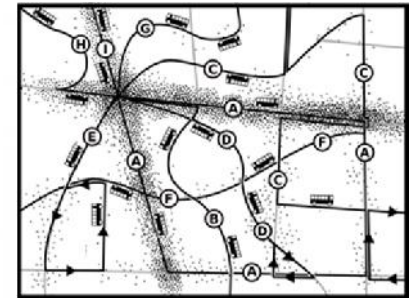
High
Ridership

Focus!
Run like a
business!



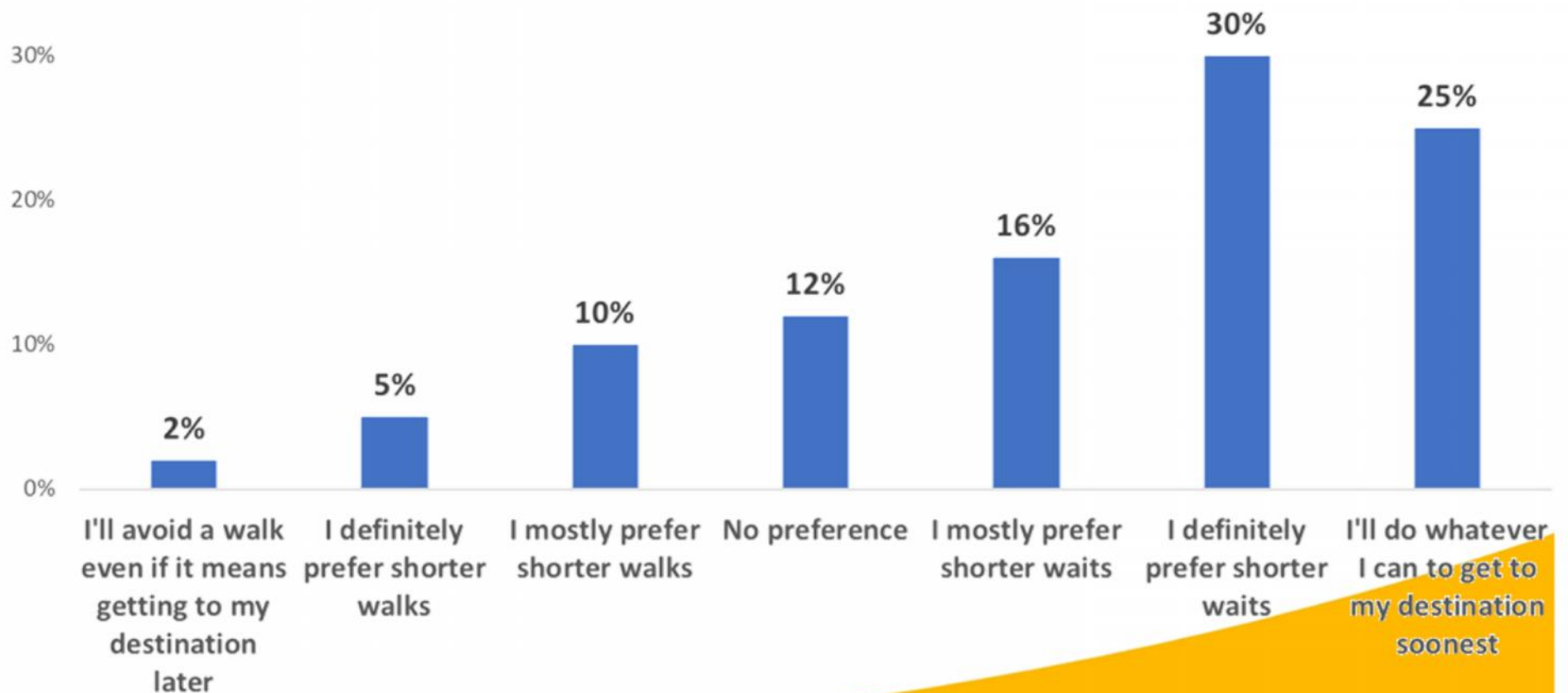
High
Coverage

Access
for all!



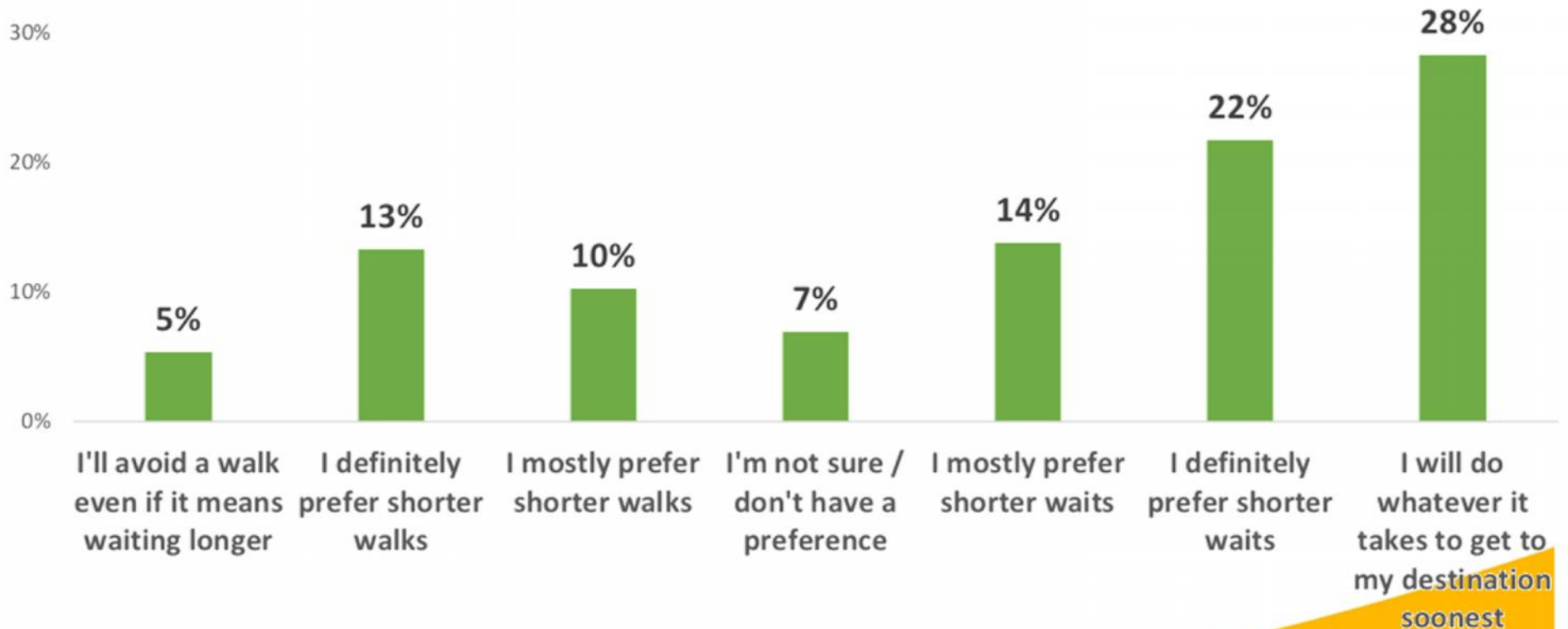
“Would you rather walk farther, but have a short wait for your bus OR walk a short distance, but wait longer for your bus?”

631 responses



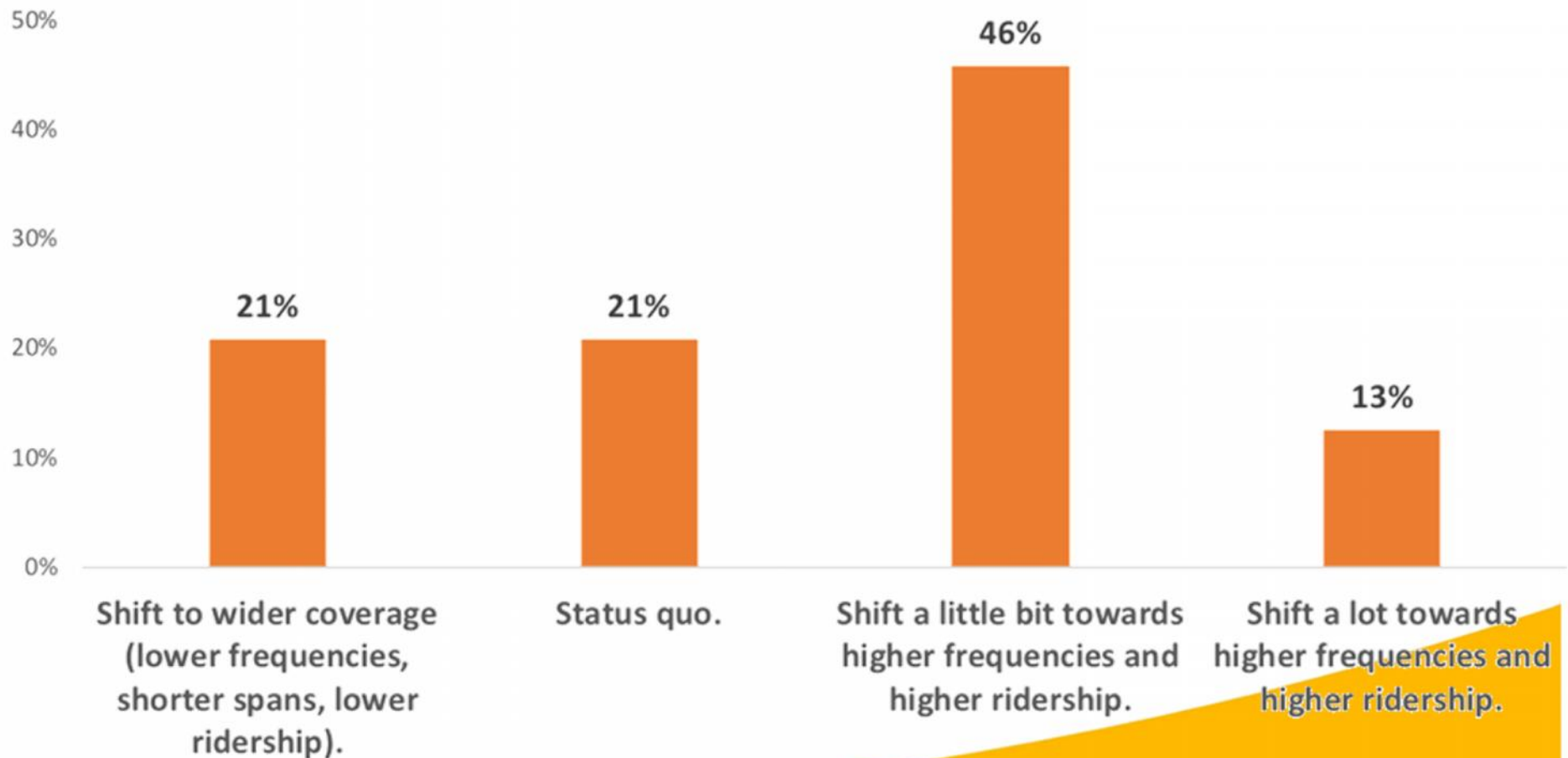
“Would you rather walk farther, but have a short wait for your bus OR walk a short distance, but wait longer for your bus?”

420 responses



“How would you want SacRT to balance ridership and coverage goals within the existing budget?”

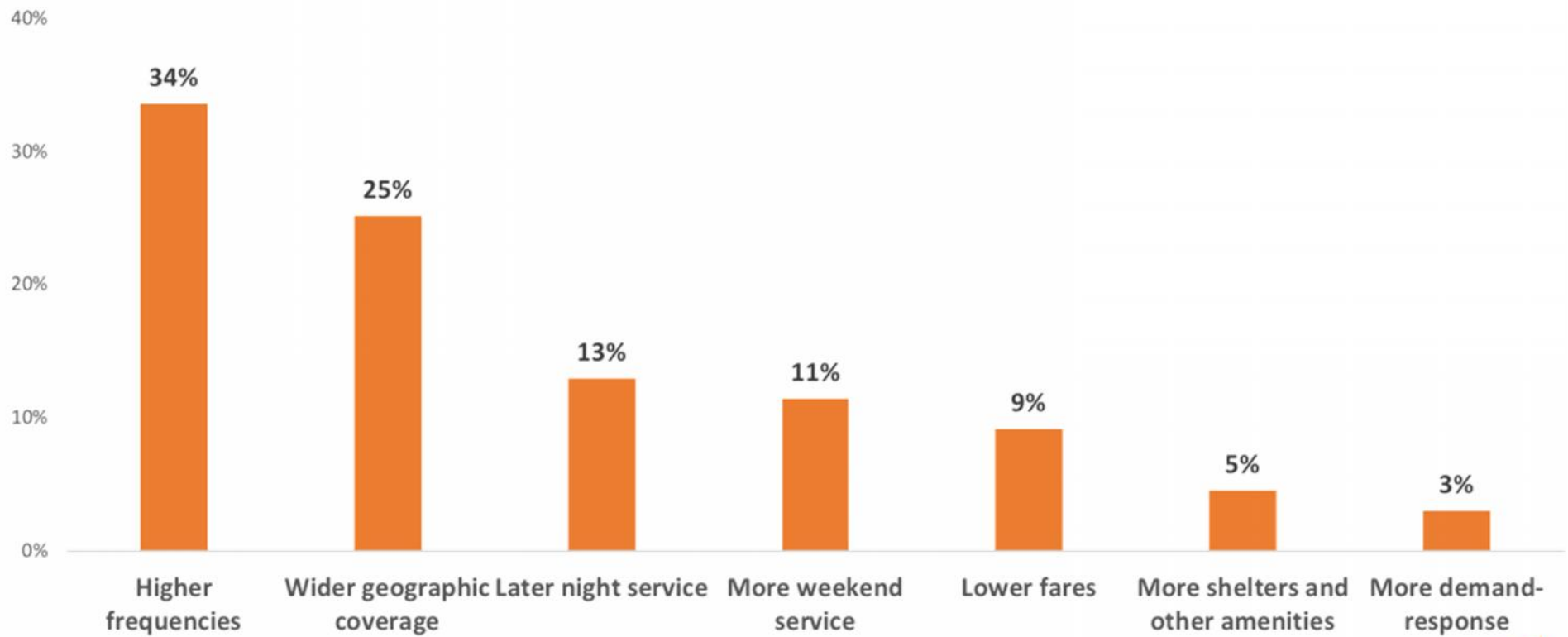
24 responses



Key Choice:

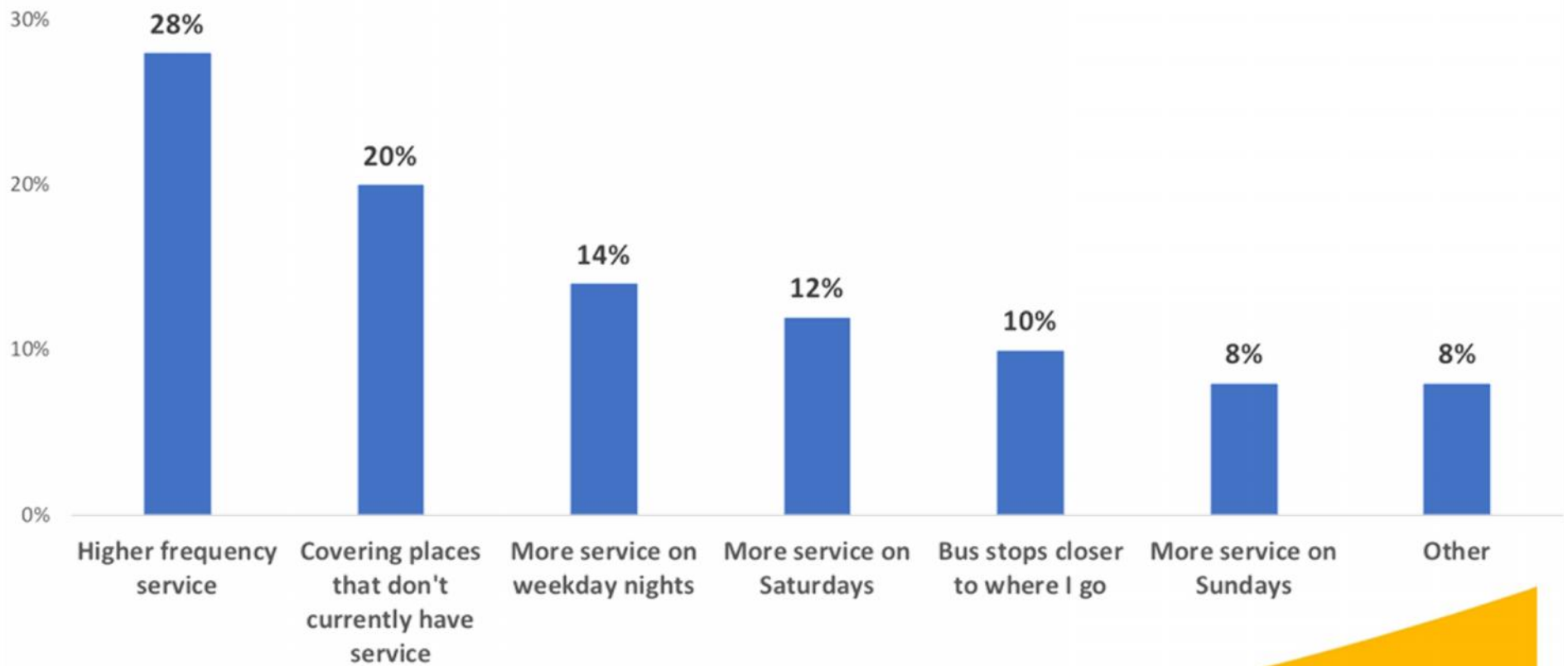
What should be done with any
new funding?

“What are your top 3 priorities for any new funding?”
24 responses

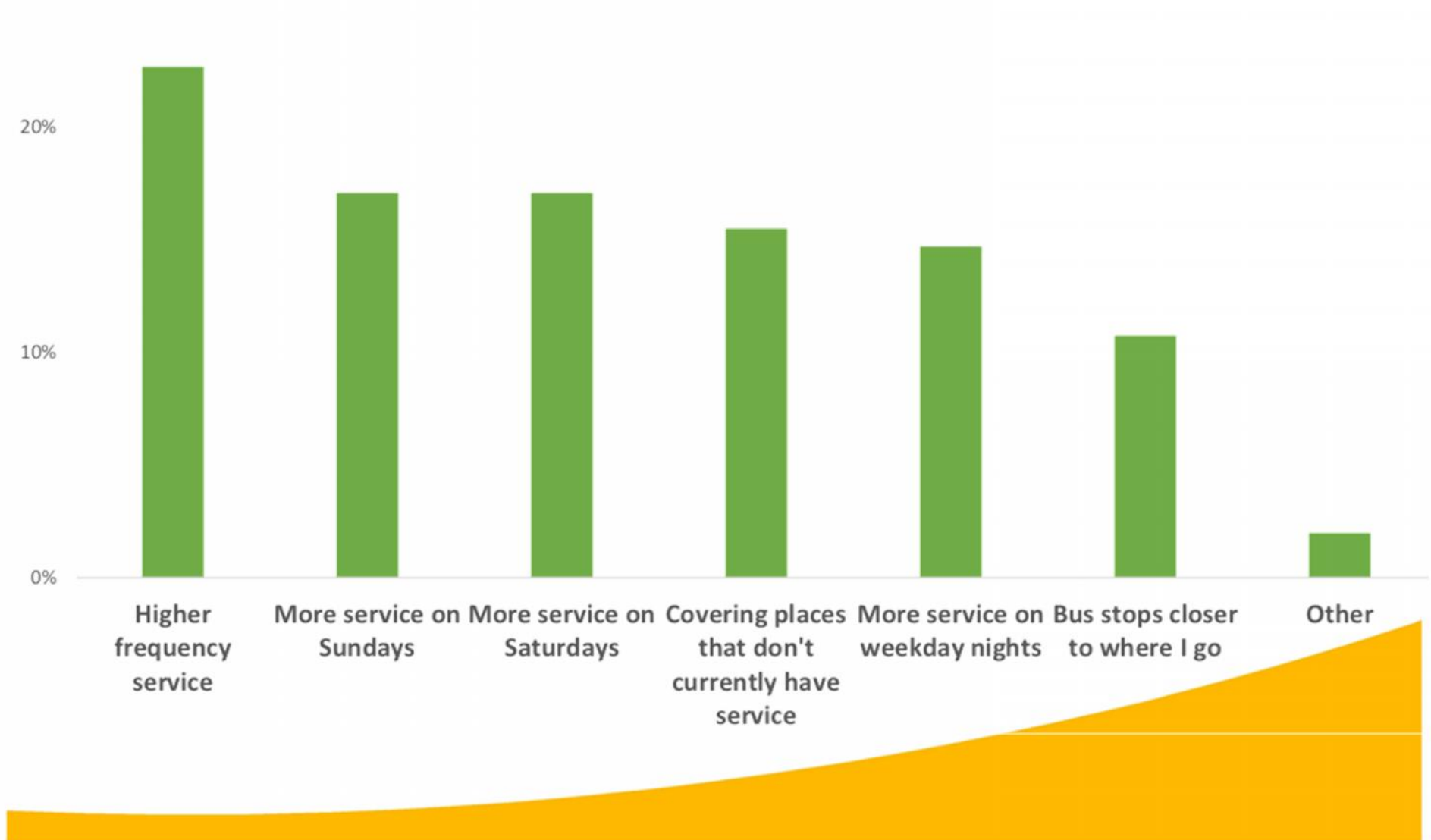


“If you discovered some new funding for SacRT service,
what would you spend it on first?”

609 responses



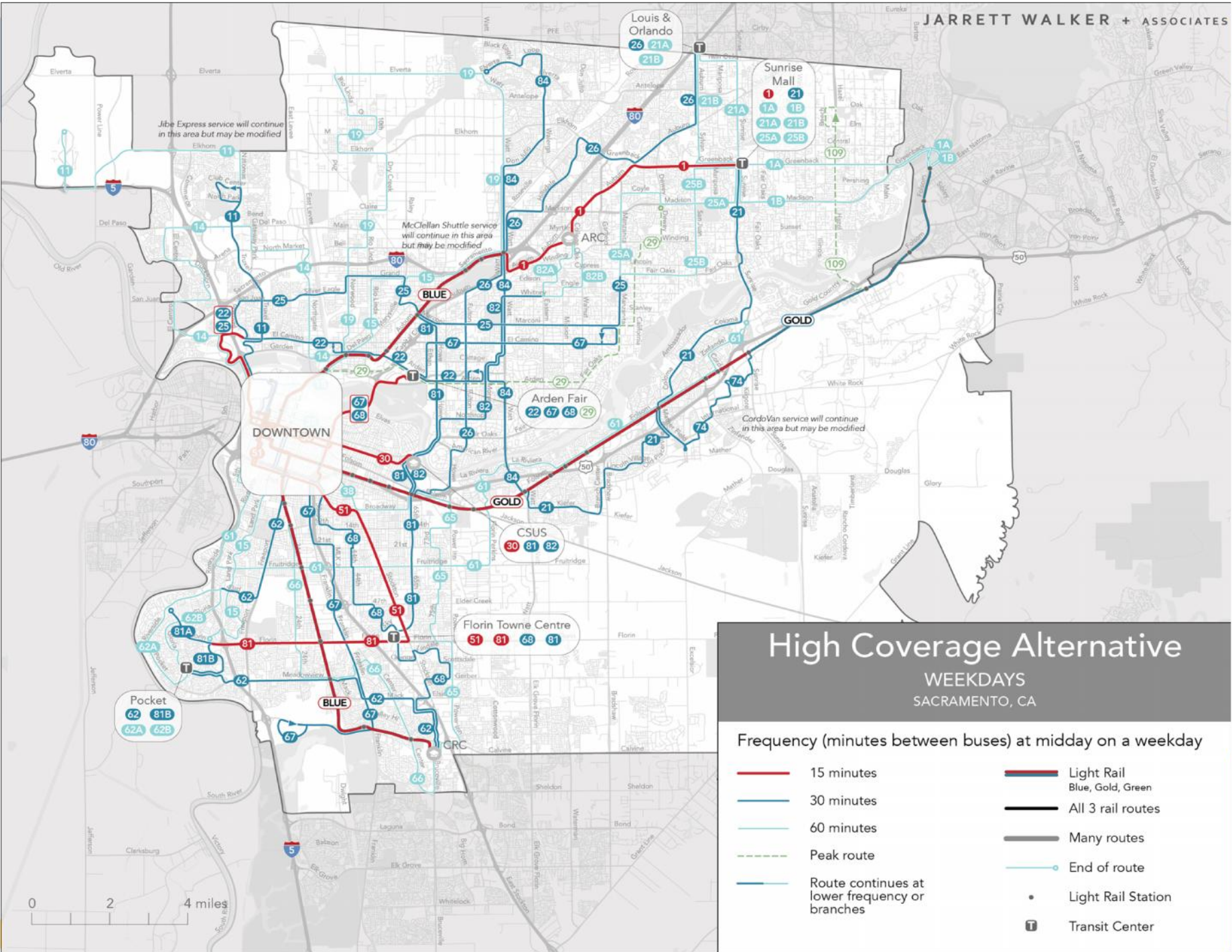
"If new funding for SacRT became available, how would you like it spent?"



“Tour” of the Alternatives

Key assumptions:

- No new money.
- Same speeds, same bus stops.
- Specialized services needn't change.
- Free (or extremely cheap) transfers.
- Blank slate.



Jibe Express service will continue in this area but may be modified

McClellan Shuttle service will continue in this area but may be modified

CoroVan service will continue in this area but may be modified

DOWNTOWN

CSUS

Pocket

Florin Towne Centre

Louis & Orlando

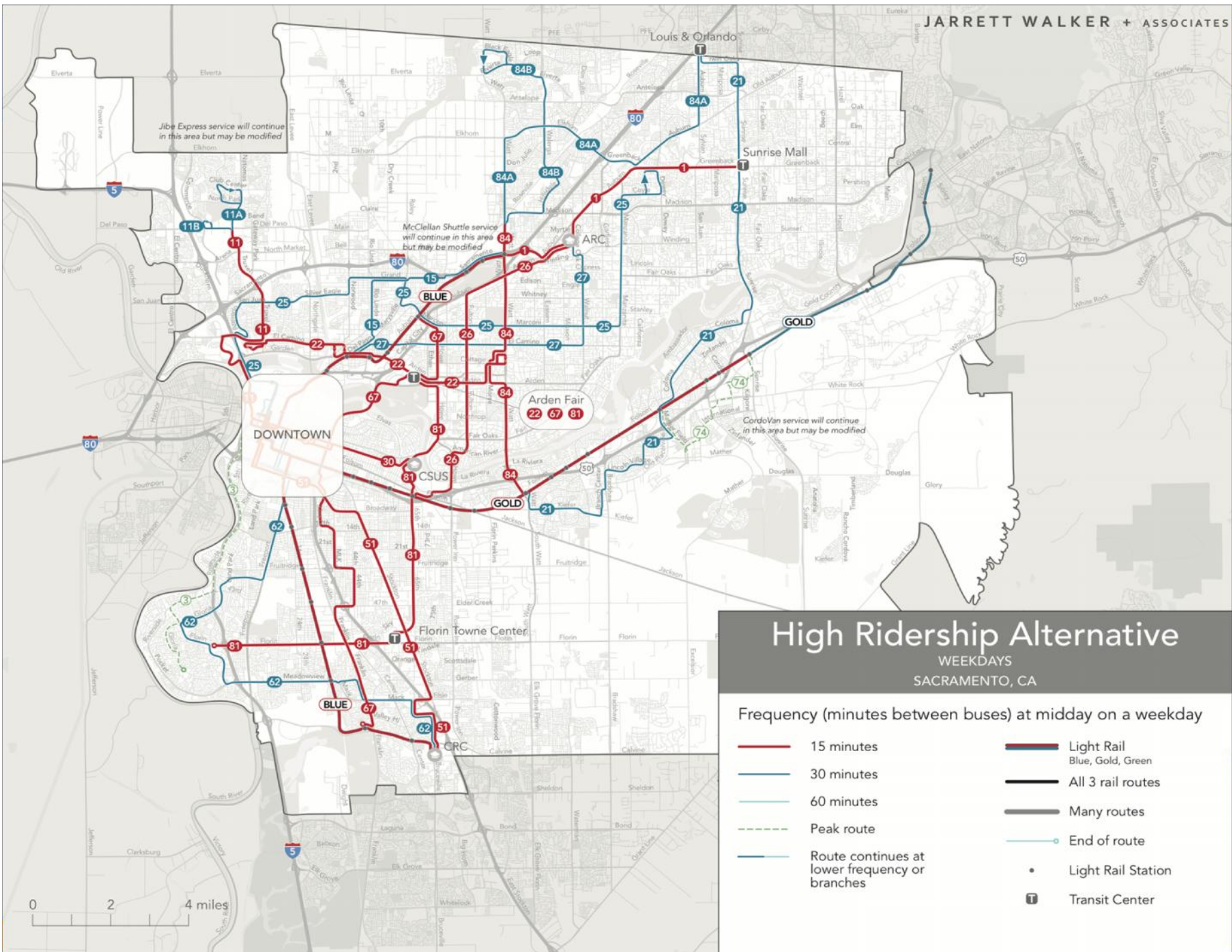
Sunrise Mall

Arden Fair

ARC

GRC

0 2 4 miles



High Ridership Alternative

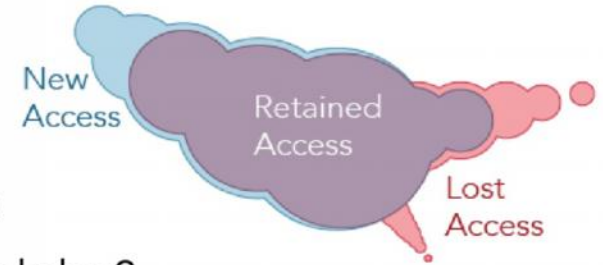
WEEKDAYS
SACRAMENTO, CA

Frequency (minutes between buses) at midday on a weekday

- | | | | |
|--|--|--|--------------------|
| | 15 minutes | | Light Rail |
| | 30 minutes | | Blue, Gold, Green |
| | 60 minutes | | All 3 rail routes |
| | Peak route | | Many routes |
| | Route continues at lower frequency or branches | | End of route |
| | | | Light Rail Station |
| | | | Transit Center |



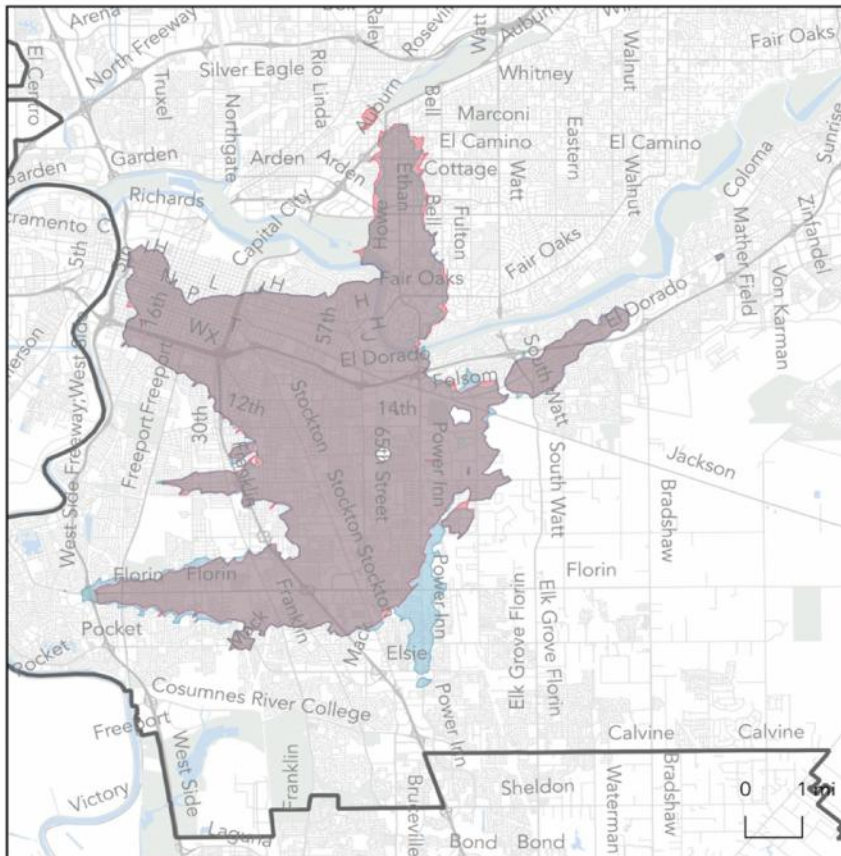
SacRT Service Area



How far can I travel in **60 minutes** from **71st St & 21st Ave** at midday on a weekday?

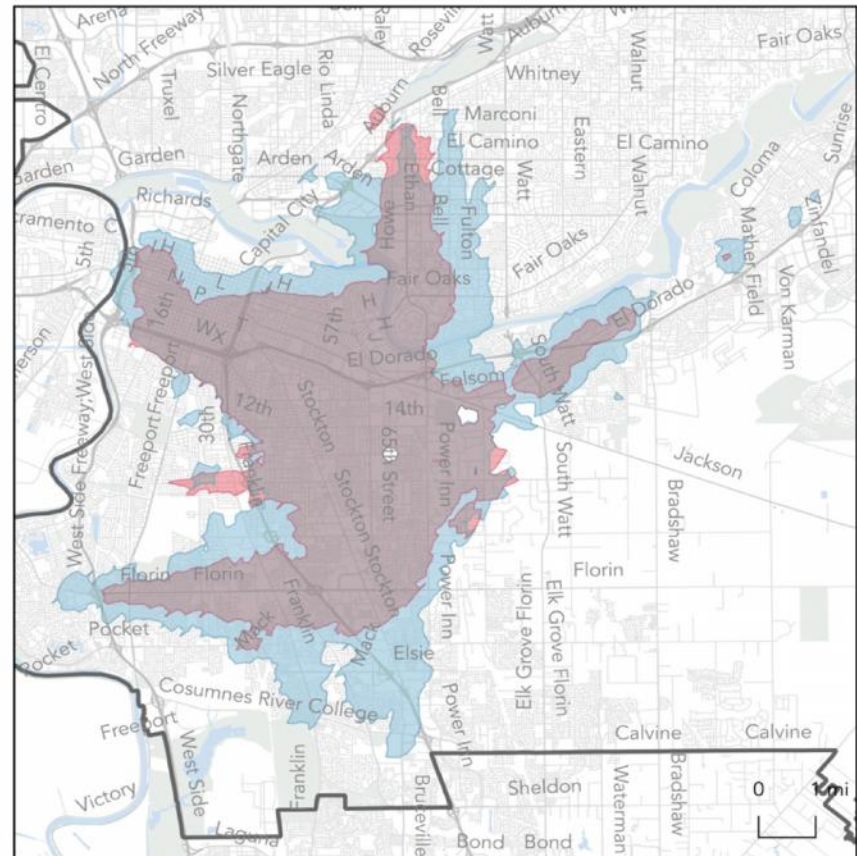
High Coverage Alternative

4% more residents and 1% more jobs accessible than existing network



High Ridership Alternative

53% more residents and 45% more jobs accessible than existing network



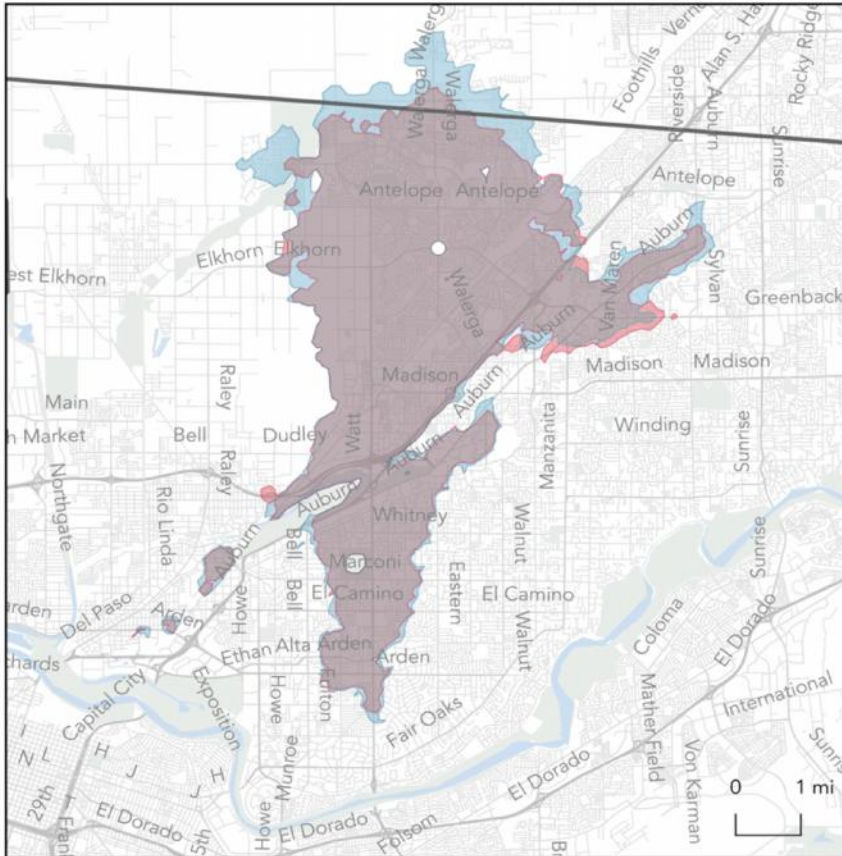
SacRT Service Area



How far can I travel in **60 minutes** from **Walerga & Elk Horn** at midday on a weekday?

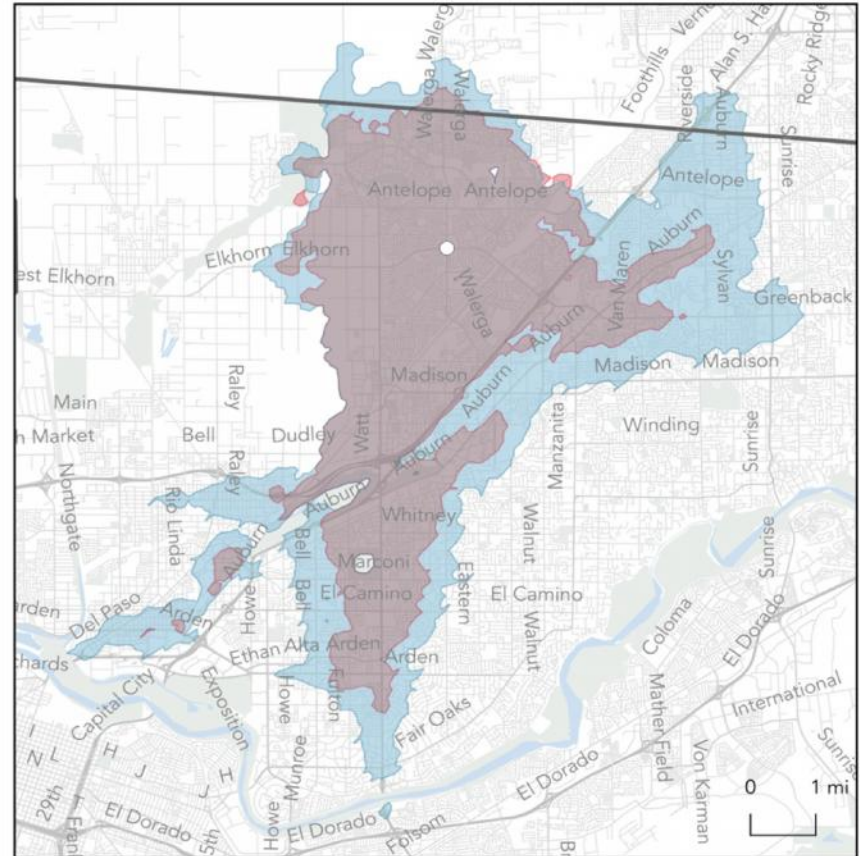
High Coverage Alternative

9% more residents and 7% more jobs accessible than existing network



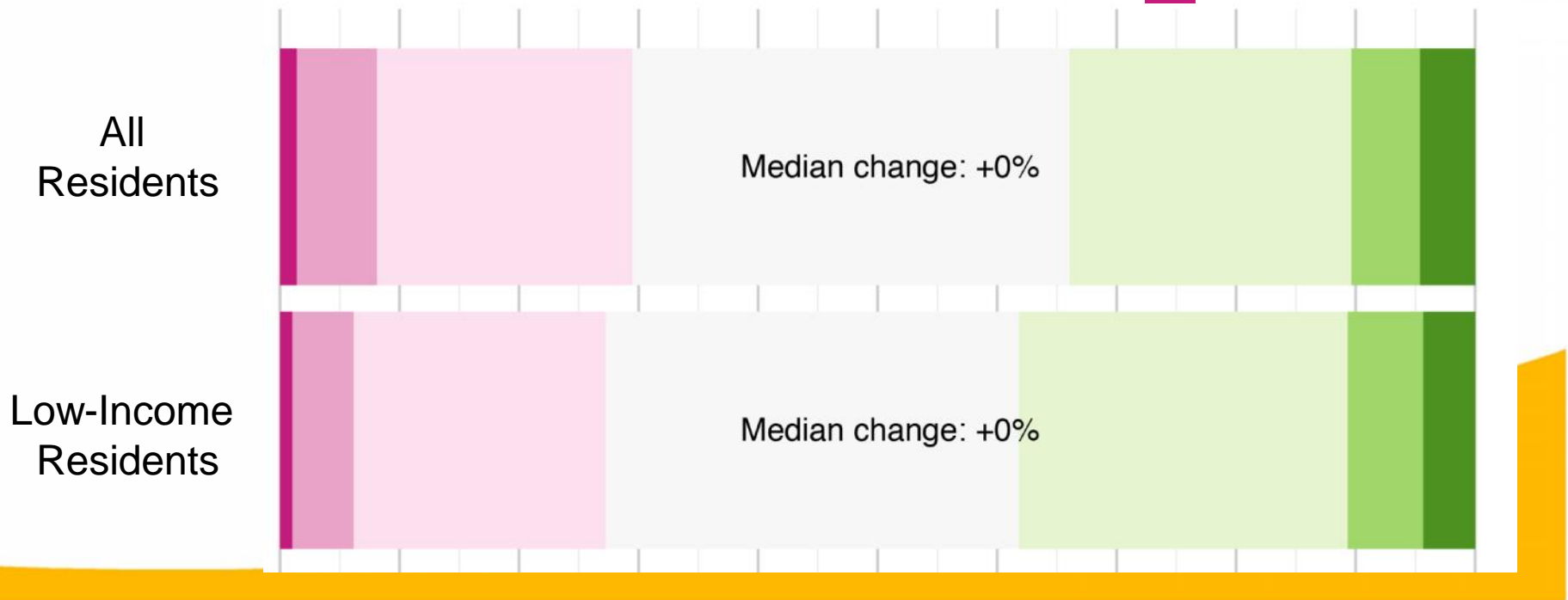
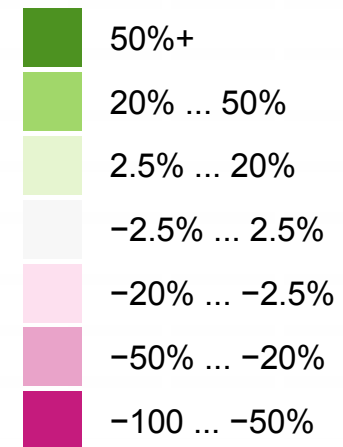
High Ridership Alternative

65% more residents and 90% more jobs accessible than existing network



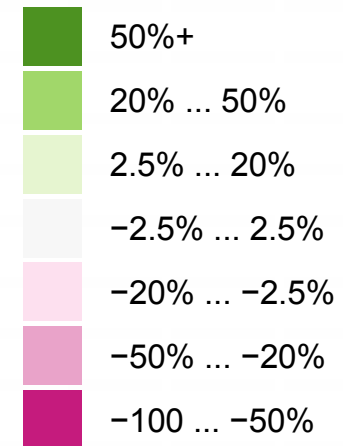
High Coverage Alternative Access to Jobs

Change of Access



High Ridership Alternative Access to Jobs

Change of Access



- Over 40 in-person outreach events in October
- Online Virtual Workshop, through Nov. 16
- Input from Operators
- Public Open House on Nov. 13
- ...results all summarized for you at your December meeting.

