Anchorage Talks Transit
Choices, Outreach and Future Alternatives

For the Municipality of Anchorage

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1. Introduction

The first part of this report is an assessment of the market for transit in Anchorage. By "market" we are referring specifically to the demands for transit that result in *high ridership relative to cost*. This way of thinking about a transit market is similar to the way a private business thinks about its market for sales – how many potential customers there are, how useful they will find the product, and how well the product competes for their business.

High transit ridership serves a number of commonly-held values, like:

- Competing with the private car,
- Protecting the economy from the effects of congestion,
- Reducing household transportation costs, and
- Keeping subsidy per passenger low.

An assessment of transit ridership potential is contained in Chapter 2.

In this report, we refer to transit services that are not operated with the goal of high ridership as having a coverage goal. Coverage goals reflect concerns about equity, and they also reflect social-service objectives, such as meeting the needs of people who are especially reliant on transit, whether due to age, disability, poverty or some other condition. Arguments for coverage services generally refer not just to *how many* people need transit service but also to the *intensity* of their need.

Transit coverage serves a set commonly-held values, like:

- Giving all residents equal access to transit, no matter where they live,
- Providing transit service to certain groups of people, because of how intensely they need access or because of civil or legal entitlements, or
- Spending tax revenues close to where they were raised.

If the severity of a person's need is a more important driver of transit service allocation than the number of people who will be served, that leads to a coverage goal.

An assessment of coverage needs is contained in Chapter 3.

Maximizing ridership is not People Mover's only goal

If the People Mover system were designed *only* for maximum ridership or maximum farebox revenue, it would focus only on areas where there are many potential riders, and transit is useful for many of their trips. In other words, People Mover would be thinking like a private enterprise and targeting a market where its product is competitive.

Yet maximizing ridership is not the only goal of public transit systems. While private transit companies may focus on profits, and therefore on exclusively high-ridership routes, public transit is almost always expected to meet other goals. In nearly every city, there is an expectation that transit service should be provided in some or all places regardless of the ridership it attracts.

Unlike governments, businesses are under no obligation to open storefronts in places where they would spend a lot of money to reach few potential customers, or where their products can't compete. For example, McDonald's is under no obligation to provide a drive-thru restaurant within 1/2 mile of every resident in Alaska. If it was, then thousands of houses in rural Alaska would need to have their own McDonald's at the end of the driveway (or air strip). The company would quickly go bankrupt, as a result of operating all those restaurants across the state for tiny numbers of customers.

People understand that in a low-density, rural place they will have to drive many miles to reach a McDonald's, because McDonald's will be located only in cities with enough potential customers. We wouldn't describe this situation as McDonald's being *unfair* to people in rural areas; McDonald's is just acting like a business. It has no coverage obligation, only a goal of maximizing profit.

Transit agencies are often accused of failing to maximize ridership, as if that were their only goal. But they are not private businesses, and as public agencies they are intentionally providing coverage services that they know will not generate much ridership. The elected officials who ultimately make public transit decisions hear their constituents say things like *"We pay taxes too"* and *"If you cut this bus line, we will be stranded"* and they decide that coverage, even in low-ridership places, is an important transit outcome.

Figure 1: Is an empty bus failing? That depends entirely on whether it is meant to attract high ridership, or provide coverage.

Ridership and coverage goals are in conflict

Ridership and coverage goals come into direct conflict with one another. If a transit agency wants to do more of one, it must (within a fixed budget) do less of the other, due to fundamental geometry and geography.

In the fictional town shown in Figure 2, the little dots indicate dwellings and commercial buildings and other land uses. The lines indicate roads. Most of the activity in the town is concentrated around a few roads, as in most towns.

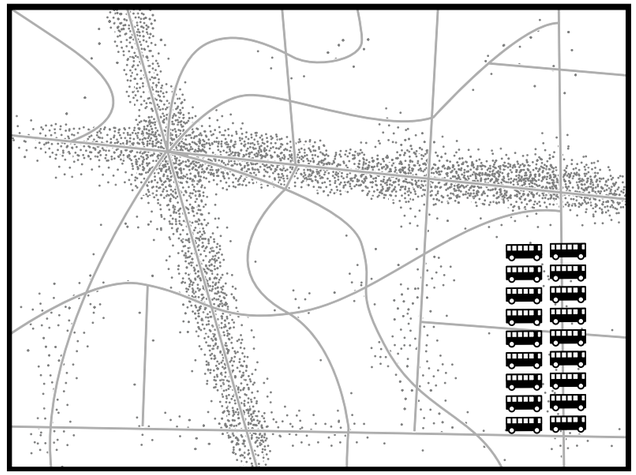
A transit agency pursuing only a ridership goal would run all of its buses on the streets where there are large numbers of people, walking to transit stops is easy, and where they can run straight routes that feel direct and fast to customers. This would result in a network like the one at bottom-left in Figure 2.

If the town were pursuing only a coverage goal, on the other hand, the transit agency would spread out services so that every street had some bus service, as in the network at bottom-right. As a result, all routes would be infrequent, even those on the main roads.

In these two scenarios, the town is using the same number of buses. These two networks cost the same amount to operate, but they deliver very different outcomes.

On a fixed budget, designing transit for ridership or coverage is a zero sum game. In the networks in Figure 2, each bus that the transit agency runs down a main road, to provide higher frequency service there, is not running on the neighborhood streets, providing coverage, and vice versa. While an agency can pursue ridership and provide coverage within the same budget, *it cannot do both with the same dollar.* The more it does of one, the less it does of the other.

These illustrations also show a relationship between coverage and complexity. Networks offering high levels of coverage – a bus running down every street – are naturally more complex. In this imaginary town, any person could keep the very simple "high ridership" network in their head, since it consists of just two routes, running in straight lines at high frequency. 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).

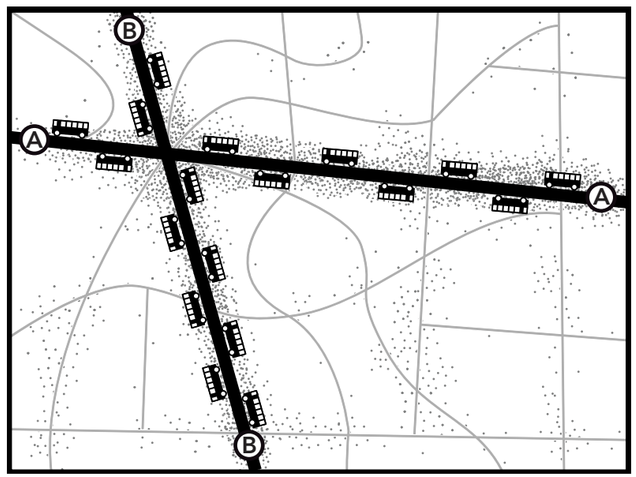


Imagine you are the transit planner for this fictional town. The dots scattered around the map are people and jobs; the streets shown are ones on which transit can be operated. The buses are the resources the town has to run transit.

Before you can plan transit routes, you must first decide what you want transit to do.

Ridership Goal

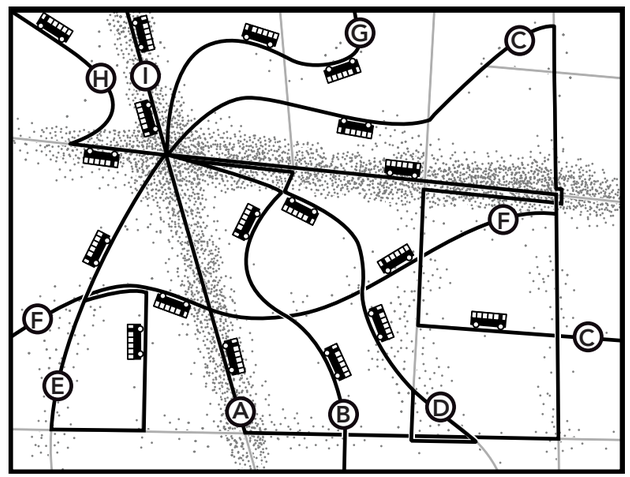
"Think like a business"



This transit network is designed to generate high ridership as efficiently as possible. The transit agency has thought like a business, investing its resources only into the best transit markets.

Coverage Goal

"Access for all"



This network is designed to provide some access to the transit system for all people. The transit agency has divided its resources among many routes throughout the town, none very frequent.

Figure 2: For basic geometric and geographic reasons, ridership and coverage goals must be traded-off against one another.

Frequency is freedom

In transit conversations there is always a great focus on *where* transit is provided, but unfortunately little concern about *when* it is provided. The "when" of transit service is described as frequency (how many minutes between each bus) and span (how many hours a day, and days a week, it runs).

Low frequencies and short spans are one of the main ways that transit fails to be useful, because it means service is simply not there when the customer needs to travel.

Even though Google Maps or an app on a phone can be consulted for directions, frequent transit service is effective at attracting ridership because it has the simplicity of a road: you can use it anytime you need to. Frequent service allows someone to maintain a map of the transit system that is much like a road map, in that no schedule is needed to know how to go places whenever you want to.

Anchorage currently only has one transit route that approaches this "no-schedule-needed" level of frequency, and that is the 45-Mountain View, which weaves its way from the University north to Mountain View, and then southwest to downtown. Route 45 comes every 20 minutes during the midday, each weekday, and less frequently at other times. (Route 45 is shown in pink in the frequency map on page 8.)

Frequent service:

- Reduces waiting time (and thus overall travel time).
- Improves reliability for the customer, because if something happens to your bus, another one is always coming soon.
- Makes transit service more legible, by reducing the need to consult a schedule.
- Increases capacity (moving more people, with less crowding) on busy routes or at busy times.

Many people assume that today, with real-time transit arrival information (like People Mover's Bus Tracker) and smartphones, nobody needs to wait for a bus anymore, and frequency therefore doesn't matter. If a bus only comes once an hour, that's fine, because your phone will tell you when it is a few minutes away and you should start walking.

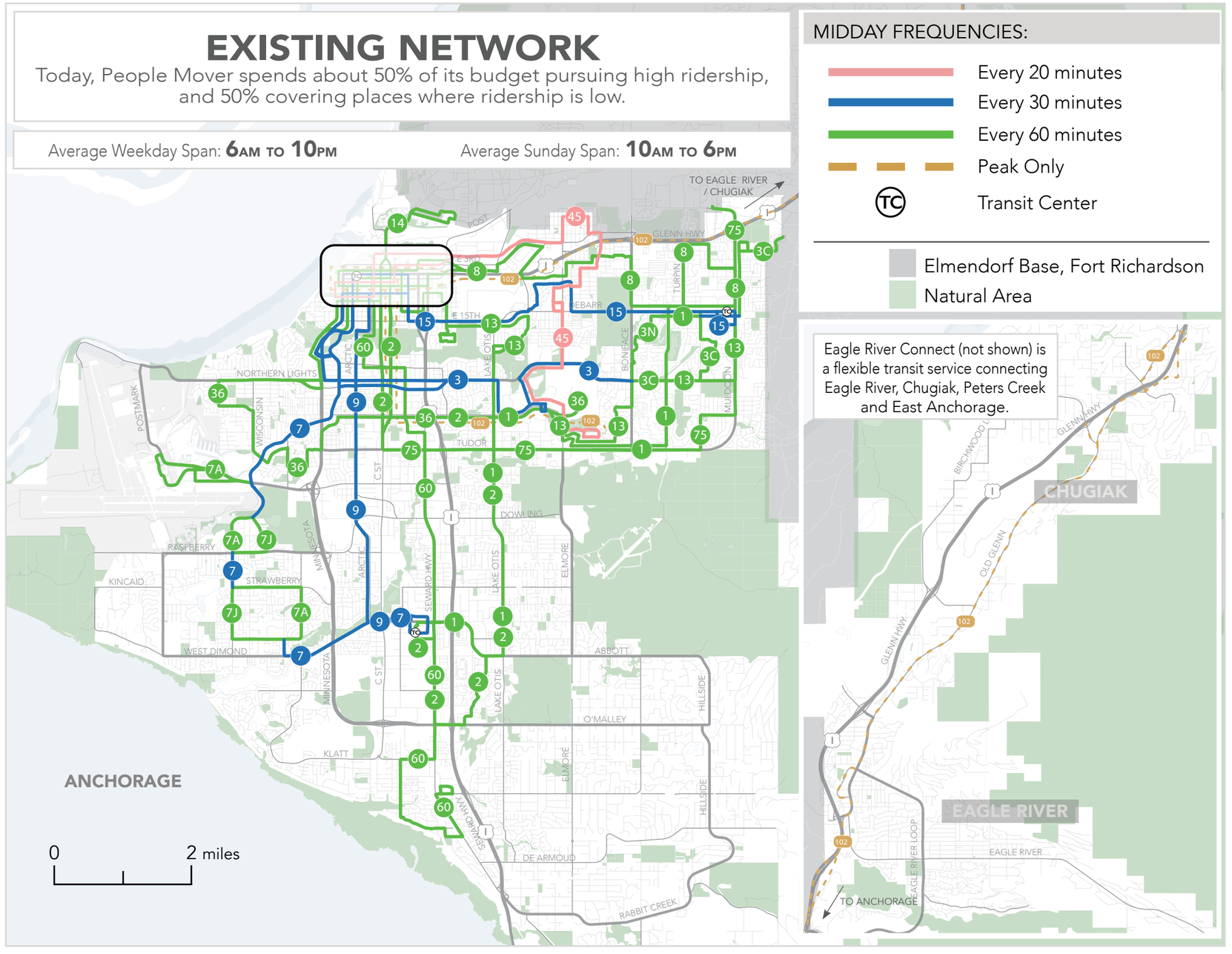


Figure 3: The existing Anchorage transit network, with routes color-coded based on their midday frequencies.

Despite all these new technologies, frequency still matters enormously, because:

- Waiting doesn't just happen at the start of your ride, *it also happens at the end.* You may not need to leave the house much before your departure, but if your bus is infrequent and the schedule doesn't happen to line up perfectly with your desired arrival time, you have to choose between being very early or too late. If you start work at 8:00 am but the bus passes your workplace at 8:10 am, you can be 50 minutes early or 10 minutes late. Or you can drive.
- Many of the places we go don't let us hang out until our bus's arrival is imminent. We can easily do this when leaving home, but it is more awkward when leaving a restaurant, an office that is closing, or someone else's house.
- Real-time arrival information doesn't make the bus more reliable, but frequency does. Your smartphone can tell you when your bus is arriving, but it cannot prevent your bus from having a problem and being severely delayed, or not showing up at all. Only frequency – which means that another bus is always coming soon – can offer this kind of reliability.

Interestingly, the 45-Mountain View is not only People Mover's most frequent route, it is also the one which generates the most ridership per weekday.

Key choices for Anchorage

How to balance ridership and coverage?

Very few transit agencies are explicit with themselves, with their riders and with the public about which routes (or parts of a route) are pursuing ridership, and which are providing coverage. Nor about how much of their budget they spend pursuing these two conflicting goals, and why.

Transit staff sometimes find that they cannot meet the agency's conflicting goals, no matter what they do. When they cut service from a low-ridership coverage route in order to increase frequency on a high-ridership route, they are criticized for cutting service to people in need. When they provide coverage service to low-density areas, where a few people need it badly but it will never attract many riders, they are criticized for running empty buses.

A key choice for Anchorage to consider in this process is therefore how these two laudable but conflicting goals should be traded-off in People Mover's transit system. We estimate that today, about 50% of People Mover's bus service is designed as it would be if maximizing ridership were its only goal. This high-ridership bus service focuses on dense places, travels on reasonably direct paths, at high enough frequencies and for enough hours of the day that many different kinds of people would – and do –find it useful.

The other 50% of People Mover's service is designed for predictably low ridership. It serves places where density is low, so there are few people or jobs near any bus stop; walking is difficult, dangerous, long or impossible; bus routes have to follow serpentine paths between major destinations, so they feel indirect and slow to customers; and service runs infrequently and for a short span each day.

These coverage services must be running for non-ridership reasons, because their low ridership is easy for any transit planner to predict:

- They may be providing access for low-income people, for people with disabilities, or for ethnic minorities.
- They may be offering lifeline access to essential services, like hospitals.
- They may be reassuring Anchorage residents that their tax dollars pay for at least some transit in their neighborhood.

These are all appropriate goals for a transit agency, but they are not related to ridership. The failure of that 50% of People Mover's service to achieve high ridership is thus entirely predictable, and may not be a failure at all.

Whether People Mover should continue to spend one-half of its budget pursing high ridership, and the other half pursuing coverage with predictably low ridership, is a question for the municipality's stakeholders and elected officials to answer.

The failure of that 50% of People Mover's service to achieve high ridership is entirely predictable, and may not be a failure at all.

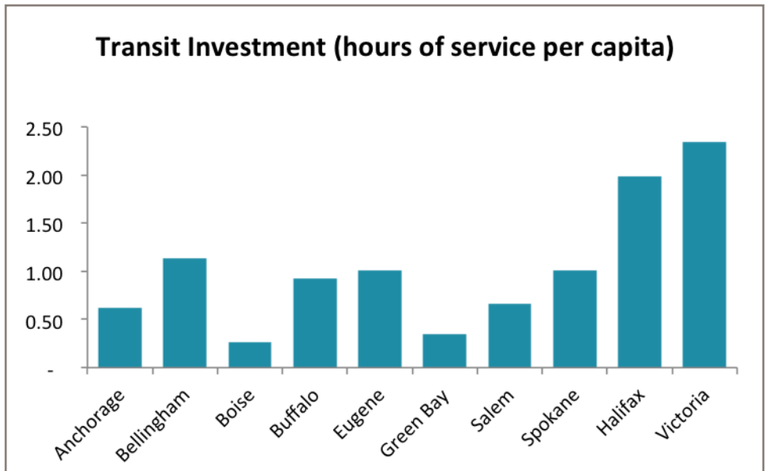
Is our current level of service enough?

Anchorage currently invests in less service per capita than many of its peers, and sees a nearly-proportionate amount of ridership per capita as a result (as shown in the charts in Figure 4). The quantity of service provided by People Mover has declined slightly but steadily since 2008, despite growth in the municipality's population. Ridership and productivity have also declined slightly over the same period.

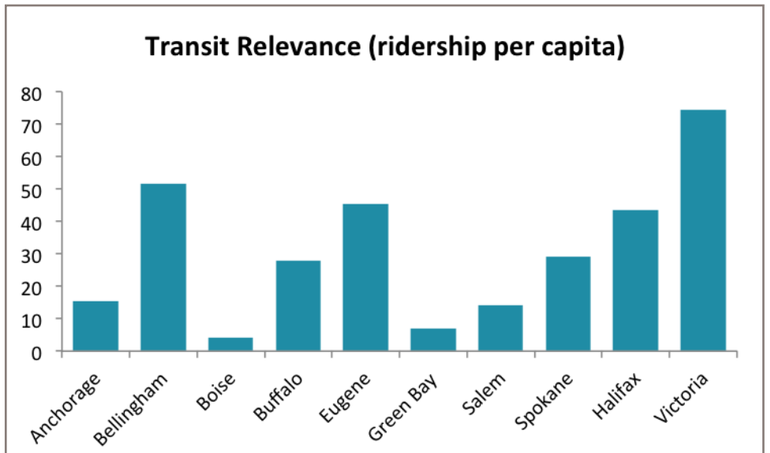
While it is certainly possible to increase transit ridership without raising more money, doing so requires cutting low-ridership coverage services. Cutting coverage services always means taking away transit access from a small number of people who need it desperately. If Anchorage wants to avoid that unfortunate (but unavoidable) trade-off, increasing the total supply of transit service is the only way.

Even if Anchorage *does* decide to wrestle with the trade-off, and to shift resources from coverage services to higher-ridership services, there may still be an appetite in the municipality for higher levels of service overall.

Many other northern cities invest heavily in transit and reap the benefits of having high ridership. There is nothing in Anchorage's history, weather, economy or even sprawling development pattern to prevent it from enjoying a high-ridership, high-quality transit system that is central and powerful in the life of the municipality. The major hurdles between the existing system and that potential future are a set of easy-to-understand but difficult-to-make political choices, and a higher level of investment.



Data source: Federal Transit Administration, National Transit Database 2014.
Note: Based on 2014 data for bus, light rail, bus rapid transit, and other non-paratransit modes.



Data source: Federal Transit Administration, National Transit Database 2014.
Note: Based on 2014 data for bus, light rail, bus rapid transit, and other non-paratransit modes.

Figure 4: Transit Investment and Relevance: "You get what you pay for."

2. Market Assessment

Development Patterns Affect Transit Ridership

Some people have the impression that transit's success at attracting riders is within the control of the transit agency alone, but this is rarely the case. Land use, development, zoning, urban design, density, highways and street patterns have very strong effects on transit's usefulness and therefore on its ridership. For this reason, transit providers like People Mover collaborate with municipal planners, counties, and other agencies to write plans and policies recognizing the relationships among these factors.

These factors in Anchorage are outside of the direct control of People Mover, and yet they impact ridership and the costs People Mover must bear to attract that ridership. A good way to visualize the different ways they impact ridership and costs is to ask: *"How far do we have to drive a bus to serve 100 people or jobs?"* The lower this distance is, the higher the ridership potential of an area and the lower the cost.

"How far do we have to drive a bus to serve 100 people or jobs?"

If a transit agency is designing for high ridership, it will naturally focus service on places where ridership potential is high and cost is low.

Figure 5 offers a simple distillation of four key ways that the built environment affects transit ridership potential:

- Density: How many people, jobs and activities are near each bus stop?
- Walkability: How many of the people near the bus stop can actually walk to the bus stop?
- Linearity: How many people and jobs can transit reach by traveling straight, direct paths?
- Proximity: Does transit have to traverse long, low-demand gaps to reach people and jobs?

These factors determine both the costs of providing transit in a particular place and how many people are likely to find the service useful. Density and walkability tell us about the overall ridership potential of the market: *"Are there are a lot of people around, and can they get to the transit stop?"*

Linearity and proximity tell us about both ridership potential and cost: *"Are we going to be able to serve the market with fast, direct lines, or will we have to run indirect or long routes, which cost more to operate (and cost riders time)?"*

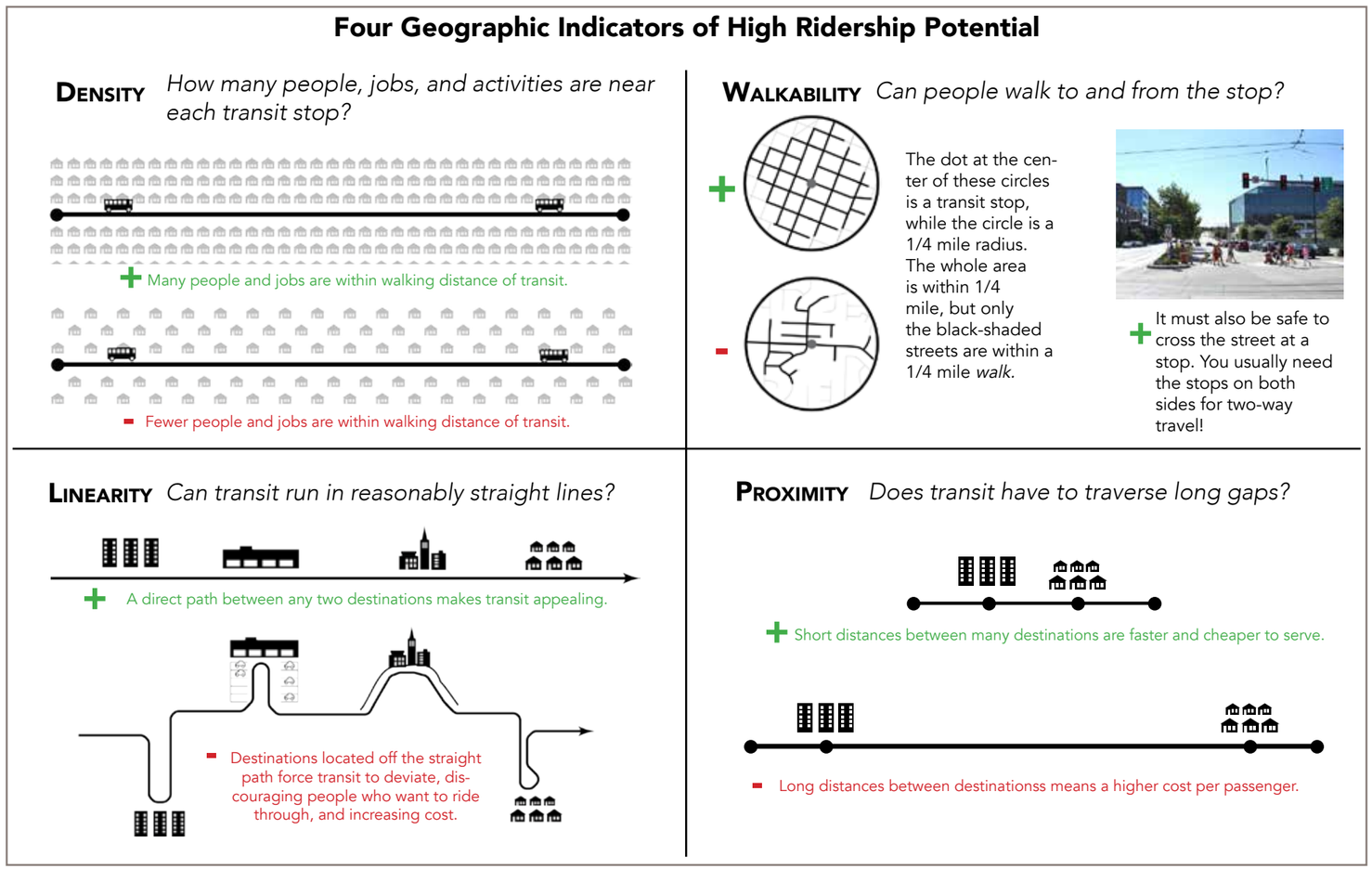


Figure 5: For any given level of transit service, whether or not it achieves high ridership depends largely on these four factors.

A transit provider can influence the level of ridership their services generate, within their fixed budget, by targeting corridors and places where the "Ridership Recipe" is in effect. However, they cannot directly control the urban form of the places they serve. Without dense, walkable places with connected streets, where demand is continuous along straight transit paths, a high level of transit service alone is unlikely to achieve high ridership. The transit agency can try to provide a level of transit service that is as useful as possible, but without support from the built environment, the ceiling for transit ridership is low.

In the following pages, we look at the Anchorage transit market with these considerations in mind.

Density

The maps on this page and the following page show the densities of residents and jobs in Anchorage.

In planning, people sometimes react strongly to the word "density" based on their emotional and cultural experiences. Yet density describes a simple geometric and geographic fact that matters enormously for transit – the number of people around any given transit stop.

Residential density

While not all trips start or end at home, nearly everybody makes at least one trip starting or ending at their place of residence on most days. Further, places with many households are also destinations for other people, who may be socializing, or working as caregivers in someone else's home.

The map at right allows us to make a few observations[1] about the patterns of residential density in Anchorage:

- Places where people live in moderate or high densities are scattered across the municipality, rather than concentrated in certain parts of the municipality. The exception is in East Anchorage, where all zones are moderately dense. Referring back to the "Ridership Recipe," Anchorage residential development does not offer *proximity*.
- Places where people live in moderate or high densities are not arranged along major streets. Looking at the map at right, it is hard to trace a straight line along any single road and pass more than one dense zone. In terms of the "Ridership Recipe," this would be described as a challenge for *linearity* – a transit route can either run in a straight line, or serve multiple dense residential areas, but it cannot do both.
- There are dense zones located along roads that are unsafe, unpleasant or even impossible to cross (for example, for example, Dimond Boulevard west of Minnesota Avenue). Per the "Ridership

1. When looking at the maps in this section, keep in mind that residential data is available from the Census Bureau for fairly large zones. Where zones are big, density is averaged over a large area and this may conceal small pockets of high density. For example, a series of apartment buildings along a road, with low-density single-family houses behind, will look like a medium-density zone on this map, because the zone boundaries lump the two together rather than separate them.

This is an important caution for transit planning, because transit demand is sensitive to walking distance, and some zones are so large that almost no one would walk across them. The arrangement of development within a large zone may be very relevant to transit demand, but these maps do not reveal that detail. For that reason, planning work in this study will also include more detailed assessments, field work and aerial images.

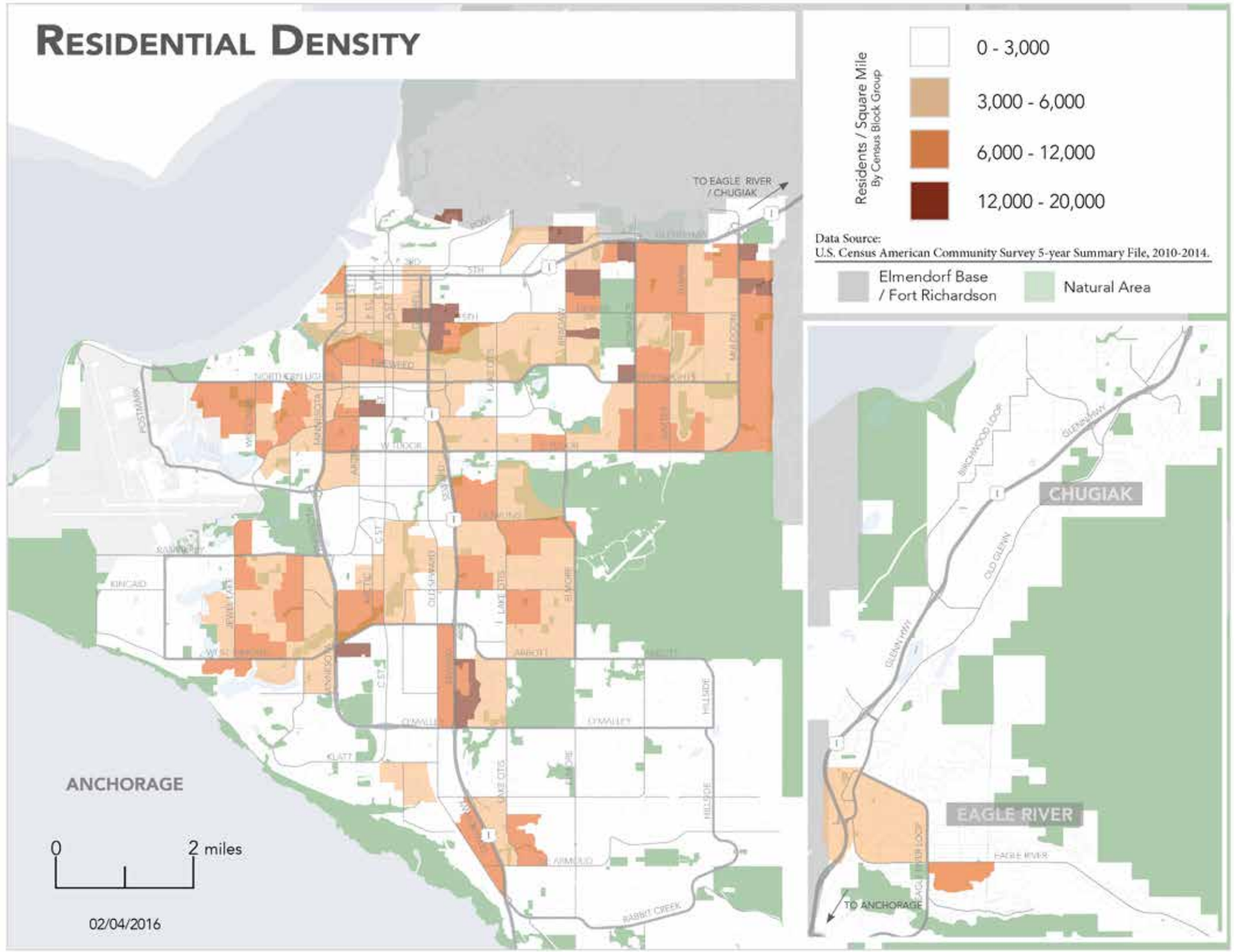


Figure 6: Census block groups in the People Mover service area are shaded based on the density of residences within them.

Recipe," *walkability* requires that people be able to reach bus stops in *both* directions, which means crossing the road at least once. A transit stop on an uncrossable road cannot attract high ridership, even if it is in front of a very dense neighborhood.

- There are very few residences downtown. Downtown is where the transit network converges, so downtown residents would have transit access to more of the municipality than residents anywhere else. Yet there are few people living at the center of the network, which also happens to be the most walkable place in the municipality.
- There is high-density housing in Government Hill, north of downtown, but it is surrounded by the military base to the north and low-density areas to the south.

As we will see in looking at the density of lower-income residents in Anchorage, some high-density zones that are visible here are also very low-income. Some of them, such as those along Bragaw and Muldoon, are compact mobile home parks.

Job density

Job density is an even better predictor of transit ridership than residential density. This is because it represents places people travel for work, but also places people go for services, shopping, culture, health care, and more.

The map at right allows us to observe a few things about the pattern of job density across Anchorage[2]:

- Jobs are concentrated in downtown and midtown.
- There are very few locations where jobs are concentrated east of Boniface, west of Minnesota and south of O'Malley, and the places where they are concentrated are long distances from one another.
- From downtown as far south as Dimond, jobs seem to be more concentrated along more walkable roads, such as Arctic, C Street and Old Seward (rather than along Seward Highway or Minnesota).

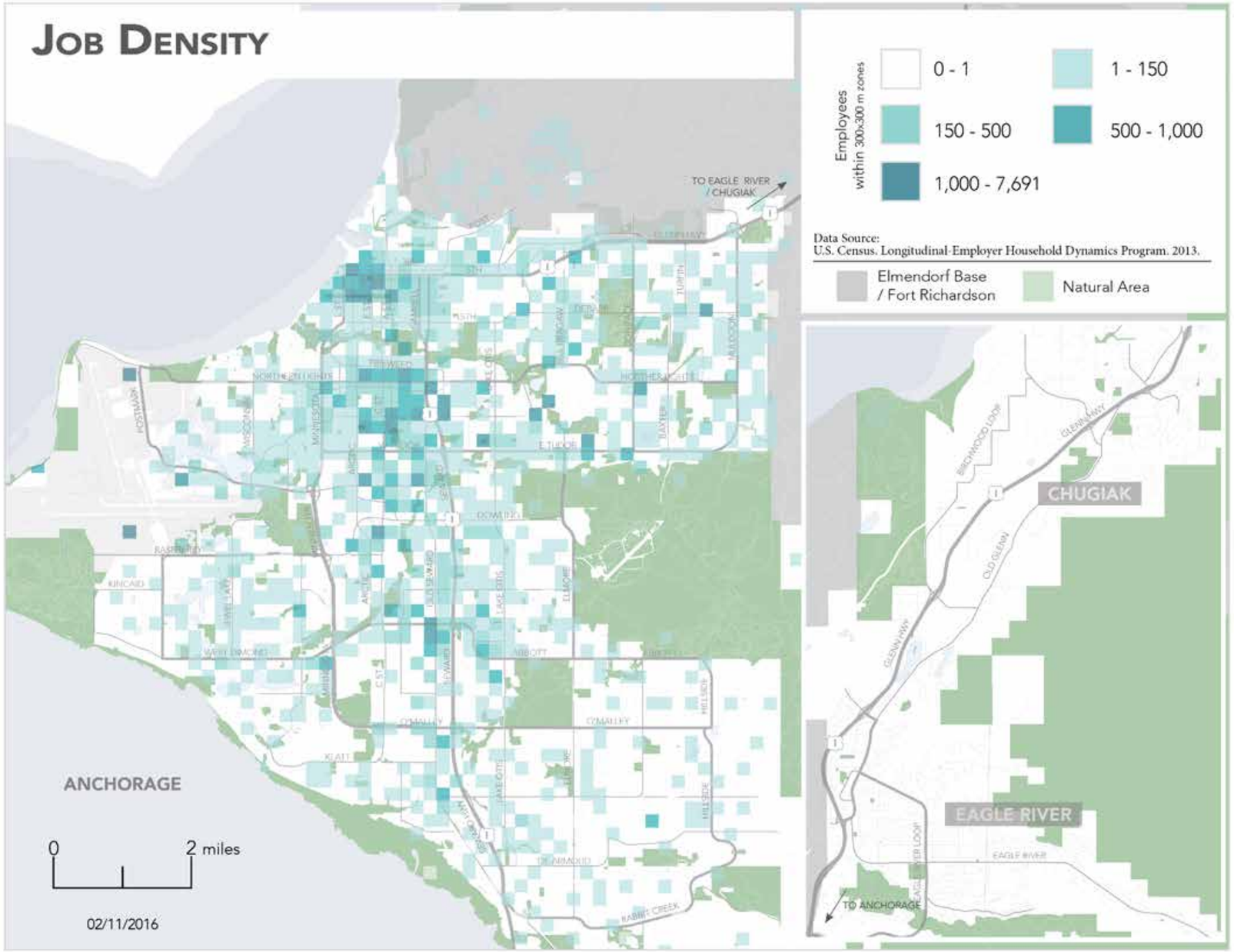


Figure 7: This map shows a grid of squares across the People Mover service area, each square shaded based on the density of jobs within it.

2. The zones in this map are different from those in the residential density map, which used Census block groups. In this map, all jobs are counted within zones defined by a 300 meter grid, to measure density (number of jobs within a constant area).

The employment data used for this map is the best available, but it does contain a flaw, which is "headquartering." An employer whose employees are out in the field may report those jobs as being located at headquarters. This is likely a problem for the school district (whose headquarters is located at Northern Lights and Boniface), oil companies (many of them headquartered in midtown) and the VA (whose hospital is conspicuously absent at the northern end of Muldoon Road).

Activity density

Residential and job densities are combined into Activity Density in the map at right. This allows us to see how the total density of activities, the mix of uses, their proximity and their linearity could affect transit ridership across Anchorage.[3] Shades of purple indicate various densities of mixed use, where block groups include both jobs and housing.

We can observe that:

- The mix of uses is continuously high in an L-shaped part of Anchorage with downtown at the north, midtown at the south, and the university district in the east.
- East Anchorage is mostly residential, though we know there are also health-related jobs and services at the north end of Muldoon.
- There is some density and a mix of uses arranged in a nice linear pattern north and south of Glenn Highway, between downtown and East Anchorage. Unfortunately for transit, Glenn Highway is more of a wall than a road. Transit running on the freeway couldn't stop, and transit running next to the freeway is walled-off from the people on the other side. In term of the "Ridership Recipe," these dense areas *look* like they are linear and proximate, but because of the freeway they are very far apart.
- There is a high mix of uses, and density, along Seward Highway as far south as O'Malley. But again, the freeway creates a wall against walking and transit access. The dense mixed uses along this corridor don't offer much ridership potential because for transit purposes they are divided, rather than connected, by the freeway.
- We know that there are many jobs at and around the airport, but they do not appear on this map because they are so far apart, in large zones. Reaching them would require traversing a long distance through low-density areas.
- There is high-density housing in Government Hill, but without any Activity Density to the north or south of it, any transit service People Mover provides there will have to be justified entirely by the ridership potential in Government Hill, or by non-ridership goals.

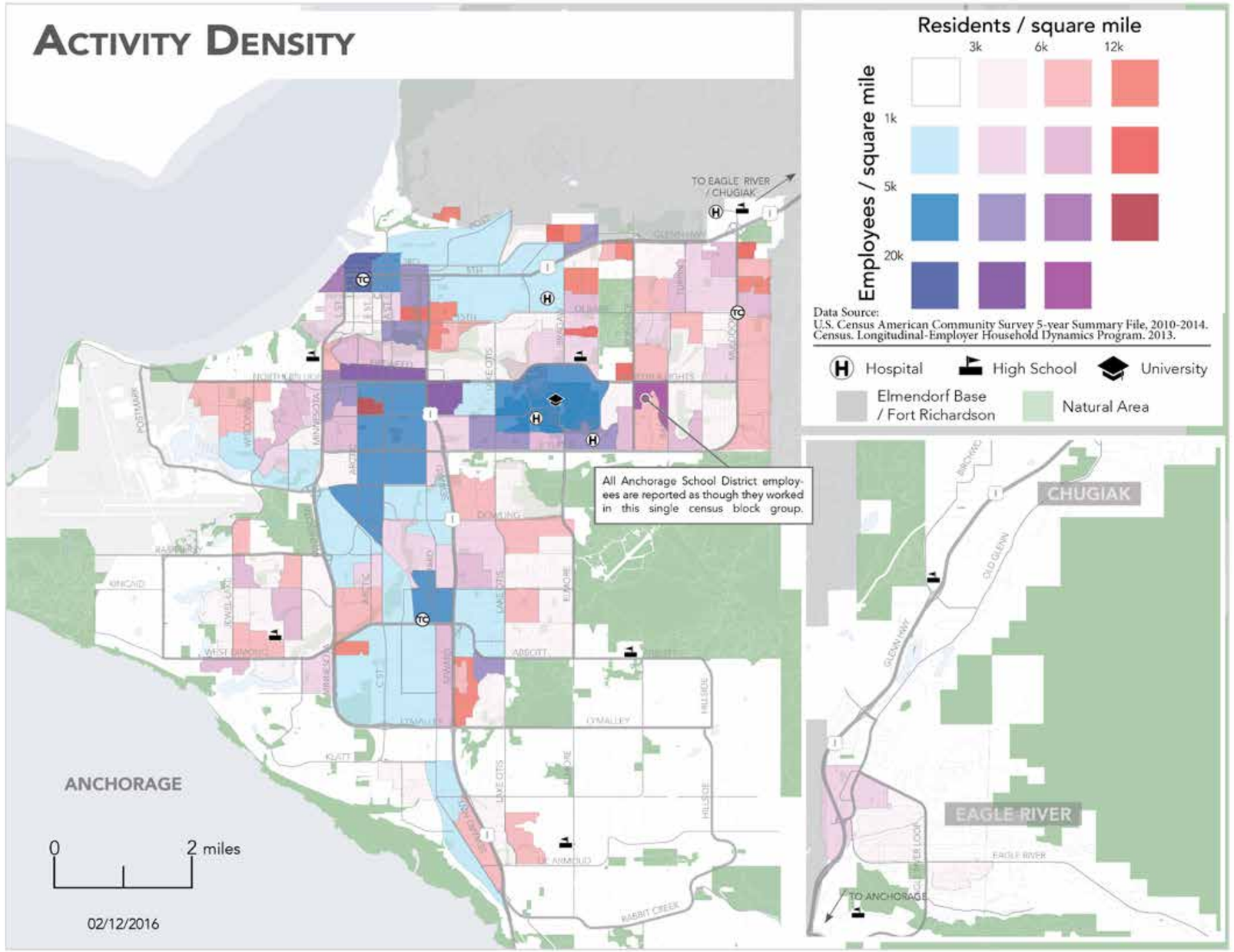


Figure 8: This map combines the density of residences with the density of jobs, to show combined activity levels and mix of uses.

3. Some caveats: Because of the large zones, jobs or residences that form dense islands within large low-density zones may not appear. A large dense zone may in fact have a small very-dense island, which might not be adjacent to the streets bounding the zone. Finally, jobs at high schools and health centers are not shown as being located at those job sites; for example, the zone containing the VA and Elmendorf health centers, and Bartlett High School, at the north end of Muldoon is not darkly-shaded, perhaps because these jobs are recorded as being located at each organization's headquarters.

Though it is not one of the four major factors named in the Ridership Recipe, the mix of uses along a corridor also affects how much ridership can that line can achieve, relative to cost.

This is because a mix of uses tends to increase demand for transit in both directions, at many times of day. Transit lines serving purely residential neighborhoods tend to be used in only one direction – away from the residential neighborhood, towards the center of jobs and services. This limits how much ridership the service can attract relative to its cost, because:

- If ridership is only high during the morning and evening rush hours, that means the transit provider must pay to run mostly-empty buses during the rest of the day (or must pay drivers to take awful split-shifts, which go from very early to very late, with a long unpaid break in the midday).
- If ridership is only high in one direction during each peak, then the provider must pay to run mostly-empty buses back in the other direction.

Thus all-day and two-way demand, along an entire route, results in higher ridership relative to cost. All-day and two-way demand tends to arise on corridors that have continuous mixtures of housing, retail, services and jobs.

Long, linear corridors with proximate, continuous density *and* a mix of jobs and housing therefore jump out from the map of Activity Density as potentially high-ridership transit lines. These include Old Seward Highway, Arctic, 15th/Debarr, Northern Lights, Tudor, A and C Street. Minnesota, Seward and Glenn Highways also look promising on the Activity Density map, but we know that they are difficult or impossible to walk along and across, so achieving high ridership there will always be a challenge.

4. Even if there were transit stops on the adjacent one-way frontage roads, people could only reach those stops for one direction of travel, so they could get there but they couldn't get back. If the frontage-road bus stopped at street crossings of the freeway, the distance between people's outbound and inbound stops would be very long, and a very unpleasant and unsafe walk across multiple freeway entrances.

Transit Commuting

About 2% of people in Anchorage use transit as their primary means of transportation to work[5], though in certain parts of the municipality, larger numbers of people do commute by transit.

For example, many people who live in the Government Hill and Mountain View areas report using transit to commute, as do people in other areas scattered across the municipality (shaded in blue, in the map at right).

The darkly-colored zones in this map indicate places where the density of people who commute by transit is high. It is possible that most of the variation we see in this map is actually attributable simply to residential density. Of the four dark-blue zones at right, three of them are also in the highest cohort on the residential density map in Figure 6 on page 13, so this is a plausible explanation. The darkly-shaded area at West Dimond and Jewell Lake is not so dense, though it is home to a large number of low-income people (as we will see in the map on page 22) .

We should keep in mind that the work commute is only one type of trip, though it is the one that is measured by the Census and other sources. This data source can't tell us anything about the other trips people are making using transit to go shopping, visit friends, reach services, and more.

On the other hand, for many people, the work trip is the most important, time-sensitive trip they make each day, and the one that must be the most reliable. In select areas in Anchorage, especially those near the most frequent line (the 45-Mountain View) transit is useful and reliable enough that in some places 5%, and in more limited cases 15%, of people are choosing to rely on it.

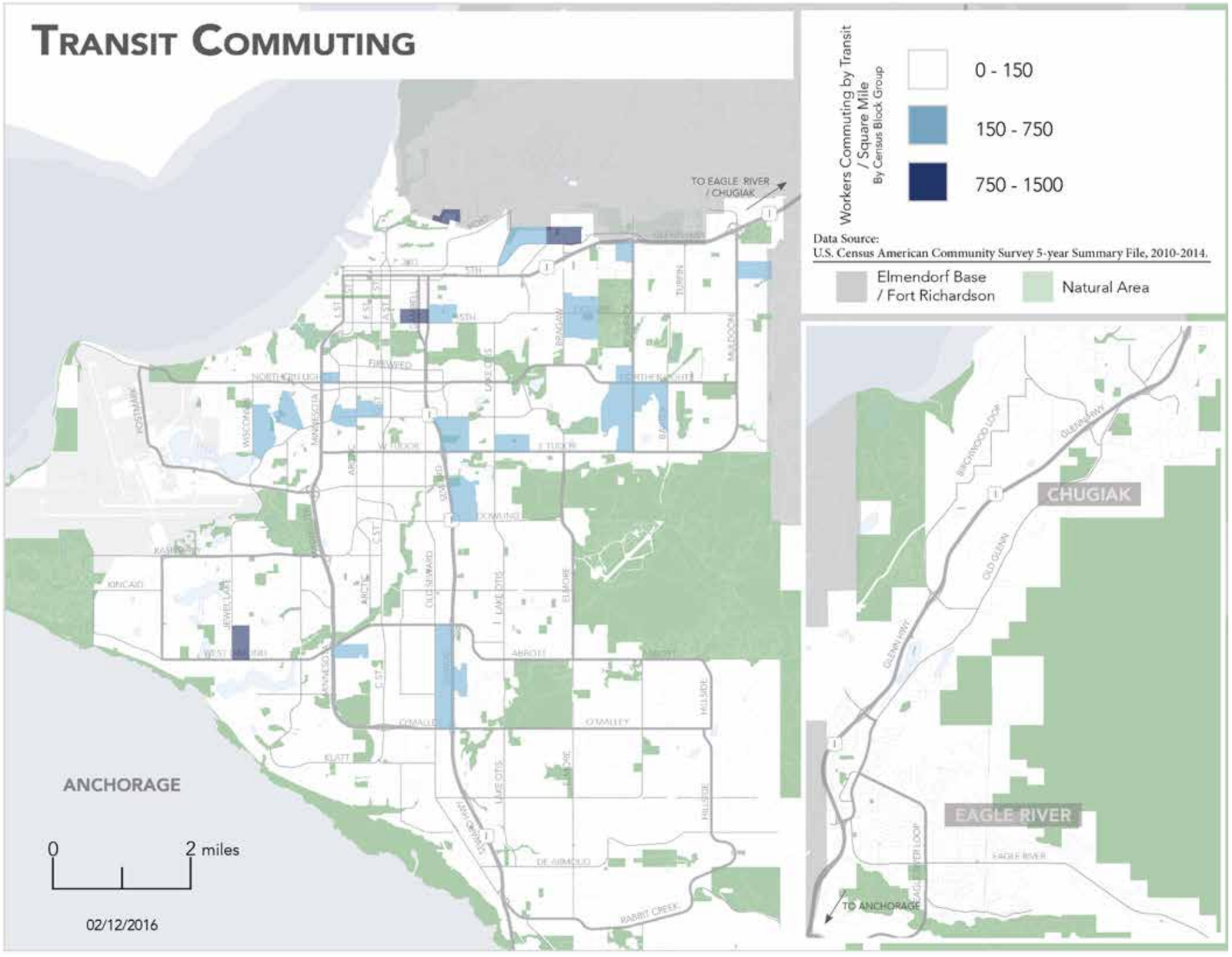


Figure 9: This map shows the density of households that reported someone in the household commuting to work by transit.

5. According to the U.S. Census American Community Survey 5-Year Summary File, 2010-2014.

Zero-Vehicle Households

The map on the previous page showed where large numbers of people are currently using transit to commute. Another demographic clue of potential transit ridership is places where large numbers of households do not have a car.

People with limited access to personal vehicles must find other ways of traveling, whether they carpool, cycle, walk, used a shared car or take transit. Which of these they choose has everything to do with availability and usefulness.

If transit is of limited use for the trips a person needs to make, they are less likely to use it, even if they don't have a car in their household. This person is not really "transit-dependent," as the industry often labels them. However, they do have a greater inclination toward transit use because they don't have a car in their driveway, always ready to go.

Figure 10, at right, shows some areas with a significant density of households without access to cars. This includes apartment complexes in north Anchorage, in the Government Hill neighborhood, and in areas between downtown and the University area. In some cases, these locations overlap with areas with elevated transit commuting rates, as near the north end of Bragaw, which is served by the 45, or near Jewel Lake and West Dimond.

In other places, zero-vehicle household density does not overlap with transit commuting, such as on either side of Chester Creek, where a large number of people may be using trails to walk or bike to work downtown or in the University district.

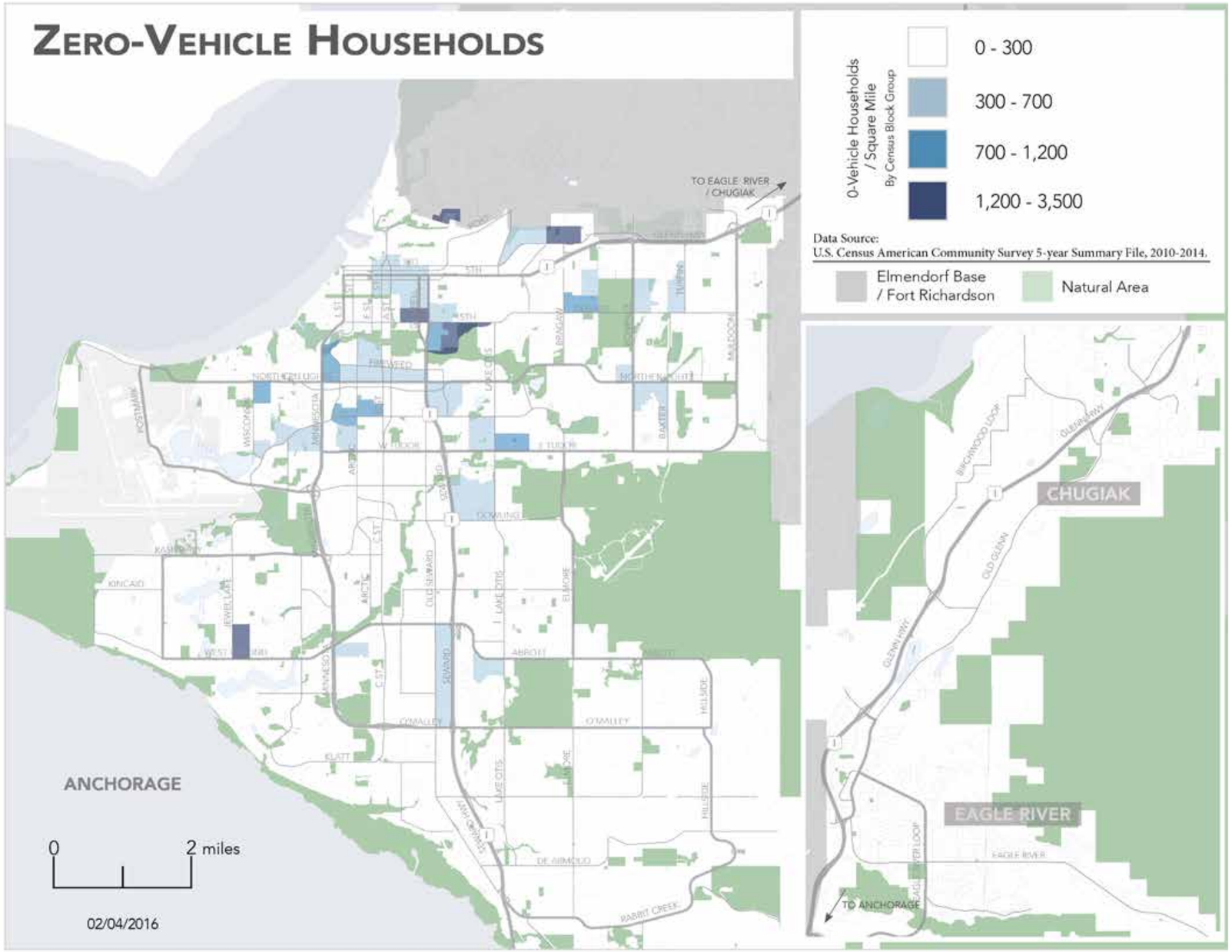


Figure 10: This map shows the density of households that reported no vehicle at the house.

Transit Propensity

The map at right combines many of the factors on the previous pages into a single measure of "Transit Propensity." This is an estimate of the likelihood that a given area will generate high transit ridership.

The factors combined into this single measure relate to land use, demographics and development. They are:

- Residential and employment density
- Levels of household income and of car ownership
- Retail, service and entertainment uses
- Community, recreation and educational uses.

These factors are given different weights within this measure, based on their expected contribution to high transit ridership. (The weights are described in the Appendix, on page 95.)

This map allows us to see, at a glance, where in the municipality numerous factors combine to suggest high ridership potential. We may also compare this pattern to People Mover's highest-ridership bus stops, which are shown as blue dots in the map. Unsurprisingly, most of the high-ridership bus stops are close to high-propensity areas.

As in the maps on the previous pages, we can observe a concentration of transit propensity in the rectangular part of the municipality that is north of Tudor Road. There are also concentrations around Jewel Lake; between Abbott and O'Malley Roads, on either side of Seward Highway; and just north of Dowling Road between Seward Highway and Lake Otis Parkway.

Note that this measure says nothing about how far People Mover might have to send a bus to *reach* each high-transit-propensity area, so this measure alone does not indicate where transit will attract high ridership *relative to cost*. This factor was described, in the Ridership Recipe, as "proximity."

For example, the census blocks in Jewel Lake might generate a large number of transit boardings, but a bus must drive a long way through low-ridership areas to get to Jewel Lake. Because of this, the ridership *relative to cost* in Jewel Lake will be lower. Any census blocks that show up in this map as having high transit propensity, but that are far away from other high-propensity blocks, present People Mover with this problem.

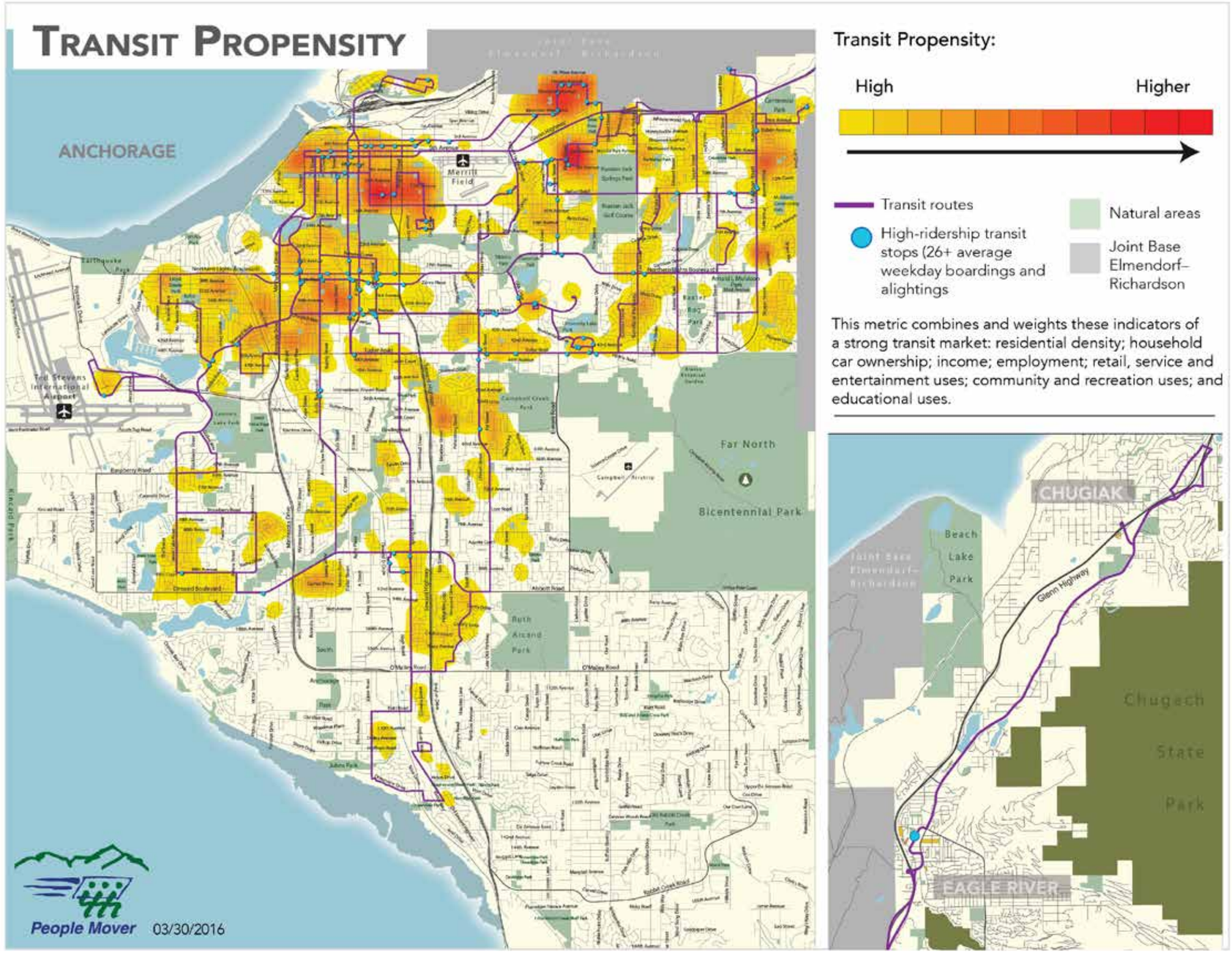


Figure 11: This map shows the results of a Transit Propensity analysis, which scores locations based on factors that contribute to high transit ridership.

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3. Need Assessment

Need Assessment

Poverty Density

Transit is often tasked with providing affordable transportation for low-income people, and this is a type of coverage goal. Federal laws also protect low-income people from disparate transportation impacts, which can lead agencies to provide transit service in places where poverty is high even if it does not maximize ridership.

However, an examination of the distribution of poverty in Anchorage arguably belongs in the preceding chapter, because people who are living in poverty can represent *either* a strong market for transit or a need for coverage, depending on the built environment around them. Understanding where large numbers of low-income people live (and where else they travel) is thus important in terms of both ridership goals and coverage goals.

A common misconception is that transit, especially all-day transit, is only useful to low income people who cannot afford a car. This is a simplistic view on a complex matter. People at all points on the income spectrum make choices about how to travel, based on their personal evaluation of a set of factors including cost, travel time, safety and comfort.

What is certainly true is that people with fewer resources have an incentive to spend less on transportation. The more carefully a person must manage their money, the more attractive transit's value proposition may be.

However, this doesn't mean that lower-income people will automatically choose transit because it's the cheapest option. The service available to them must be useful and reliable for the kinds of trips they need to make. Nor does it mean that a person further up the income spectrum will not use the same transit services as low-income people, if they find those services sufficiently useful.

The map at right shows the density of people living in poverty in each census block group in Anchorage.[6]

Knowing that the neighborhood at West Dimond and Jewell Lake is not only dense but also dense with low-income residents helps us understand why rates of transit commuting might be high there, even though transit routes serving that neighborhood are circuitous and infrequent (as can be seen in the transit network map on page 28).

It is also important to note the degree to which poverty is not concentrated in any one part of the municipality. Apart from the more

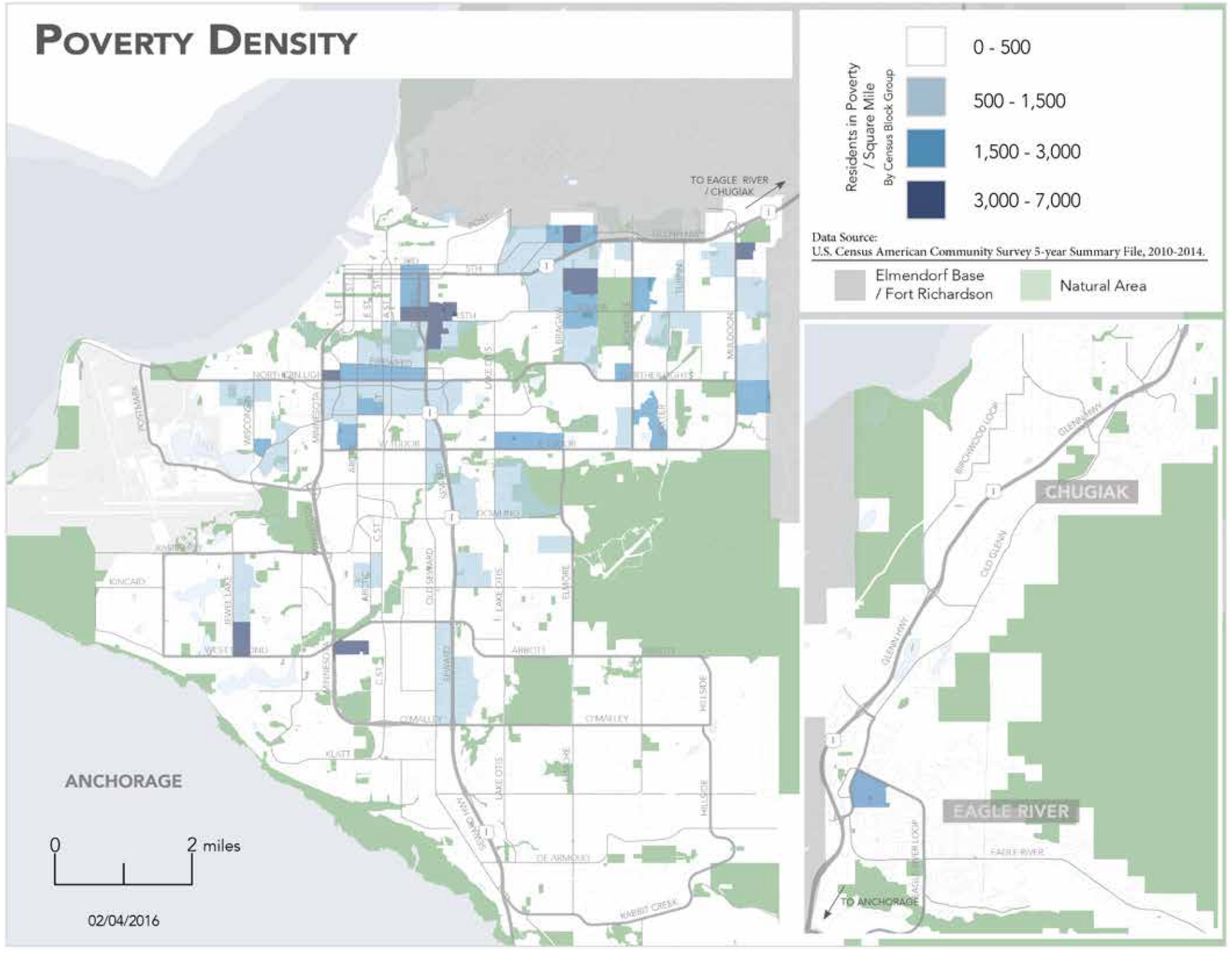

Figure 12: This map shows the density of people living in poverty (based on the Census definition, which considers local costs of living).

6. There may be places in the city where the percentage of residents who are low-income is quite high, but those places do not appear on this map because densities are so low that they actually represent a very small number of people.

affluent communities in southern Anchorage, all parts of the municipality (including one part of Eagle River) are home to people who have an incentive to use transit for reasons of income.

Median Household Income

In Anchorage, areas closer to downtown tend to have a lower median household income, while the parts of the municipality to the south are generally wealthier.

The areas with the lowest median household incomes are the block group at the far northeast corner of the municipality along Seward Highway, the few blocks to the northwest of the intersection of 15th and Gambell, and the blocks just northeast of the intersection of Northern Lights and Hickel Parkway.

The wealthiest block groups are located in the far southeast area of the municipality, near Lake Otis and Northern Lights, and north of Northern Lights near Baxter. The block group encompassing the airport also falls into the top income cohort, but this is a bit deceiving as the only residential area within it comprises one small subdivision at the block group's far southeastern corner.

There appears to be a correlation between how low the average income is in a block group and its proximity to the center of the municipality, which can be on this map and the previous map. Also, there may be a more modest correlation between the density of low-income residences and the density of all residences within each census block group, which can be evaluated by comparing the maps in Figure 12 and Figure 6.

These correlations would be good news for people who value both high transit ridership *and* the provision of affordable transit to people in need. When the concentration of low-income people is very similar to the concentration of all people, then transit providers are not forced to make a choice between running low-ridership coverage services to reach low income people, and running higher-ridership services that serve denser areas, but fewer low-income people. Transit in just about any dense, close-in part of Anchorage has potential to serve low-income people in large numbers.

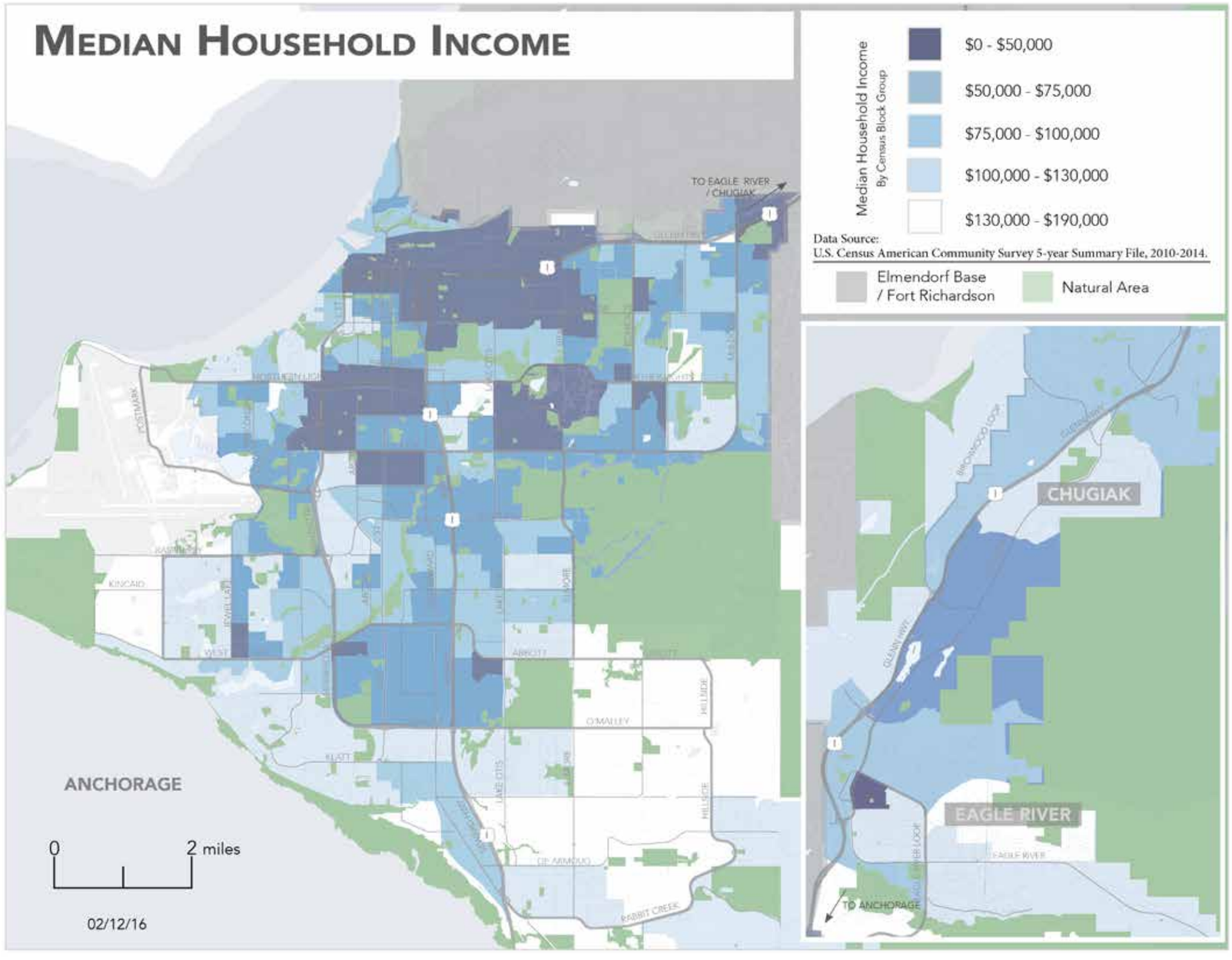

Figure 13: Census block groups are shaded based on their median household income; the darkest areas have the lowest median incomes.

Ethnicity

The map at right uses a technique called "dot-density" to represent each person in a census block as a single dot, color-coded by their race or ethnicity. Where many dots are very close together, the overall density of people is higher. Where dots of a single color predominate, people of a particular race or ethnicity make up most of that area's residents.

The most diverse area of Anchorage is clearly visible, in the Mountain View neighborhood northeast of downtown. The intensity and many colors of dots reflect the large number of people living there, and the high proportion who are not white. Other pockets of diversity exists near municipality's core, east of downtown in the Fairview neighborhood and in the Midtown/Taku-Campbell neighborhoods to the south.

Federal civil rights law protects people from discrimination in the provision of transit service on the basis of their race or ethnicity. It is important to understand where large numbers of non-white people live, so that service changes can be evaluated in light of impacts to those people.

While information about people's income tells us something about their potential interest in riding transit, information about ethnicity or race do not (except to the extent that race or ethnicity correlate with income, and in certain cases they do). However, avoiding placing disproportionate burdens on non-white people through transportation decisions is essential to the transit planning process. This type of consideration can turn into policies that reflect a coverage goal. Such policies might state, for example, that service to high-density and high-minority neighborhoods should be prioritized under certain conditions even when such service would not maximize ridership.

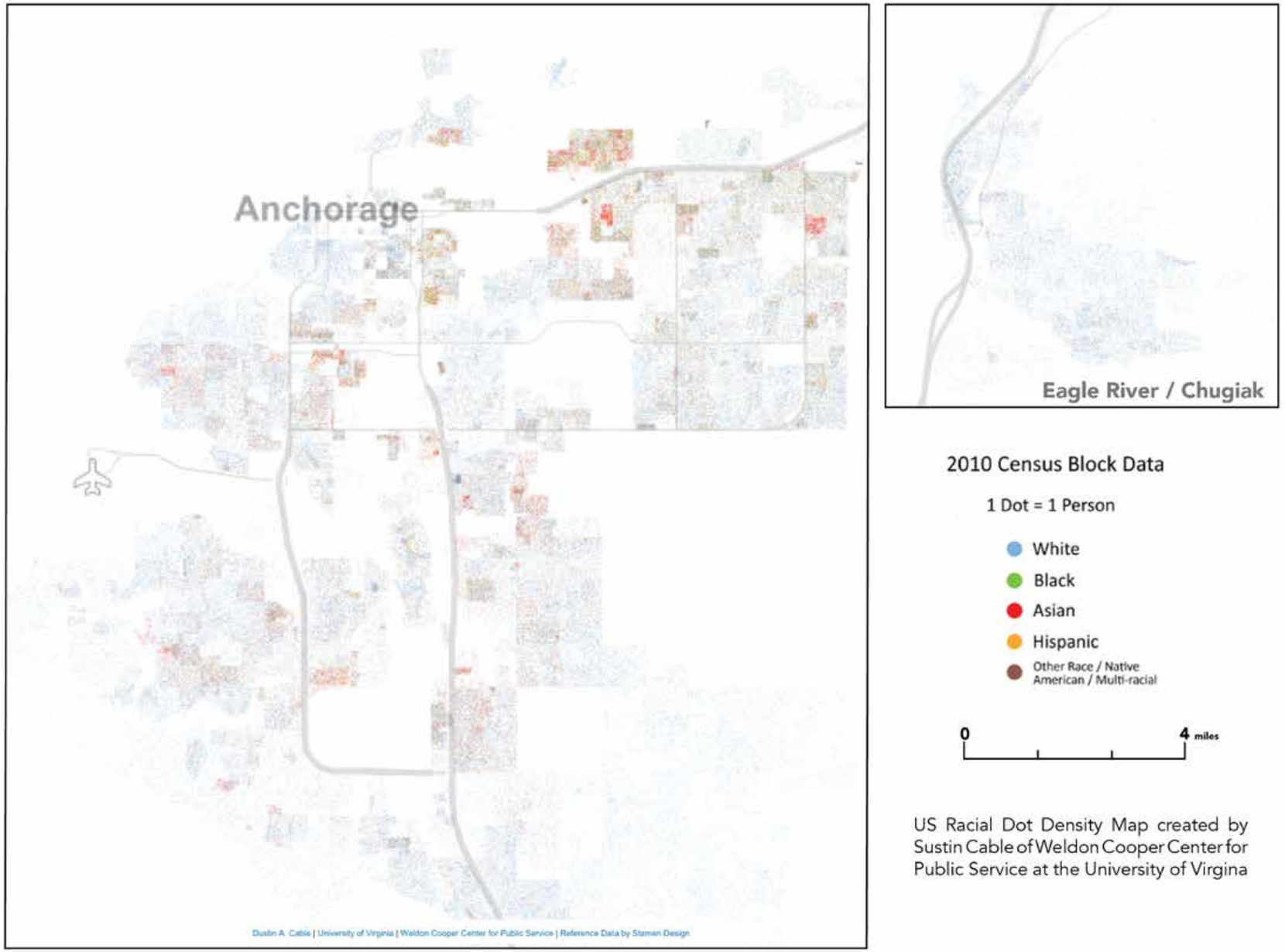

Figure 14: This map (from demographics.coopercenter.org/DotMap) shows each person with a single dot, colored based on their race or ethnicity.

Young & Old Density

One of the major drivers of transit coverage is the need for mobility among people who cannot drive. This need is particularly acute among the young, the old, and the disabled. As data on where people with disabilities live is difficult to obtain, we have focused (in the map at right) on young and old residents of Anchorage.

This map shows that the distribution of young and old residents (younger than 17 or older than 65) is fairly balanced across the municipality.

Again, as was the case in some of the other demographic maps, the density of young and old people often tracks with general residential density. A few exceptions to this are a slightly larger overall concentration east of the Seward Highway, and higher density around the University where several senior living centers are located and where University and community college students likely concentrate.

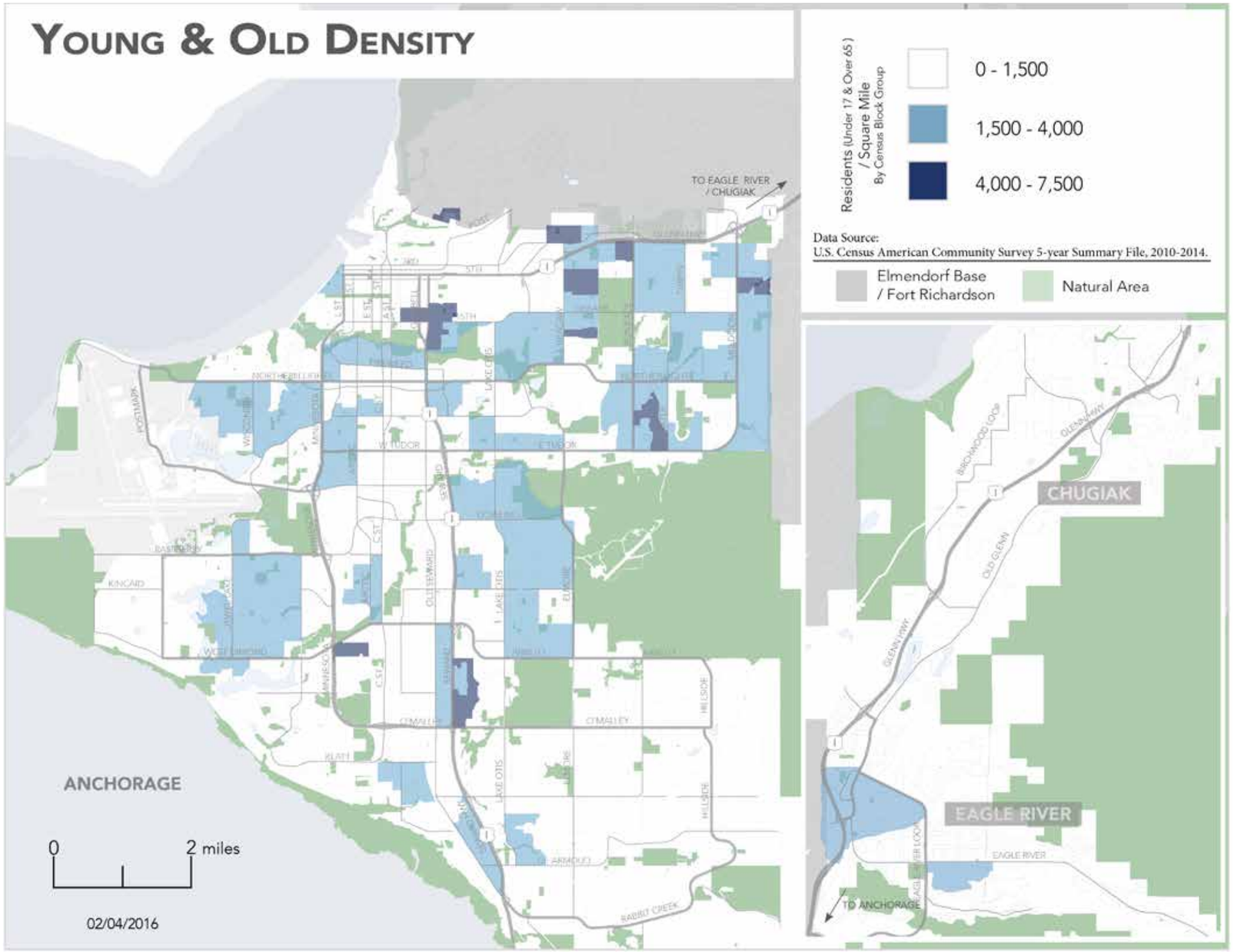

Figure 15: This map shades census blocks based on the density of residents who are younger than 17 or older than 65.

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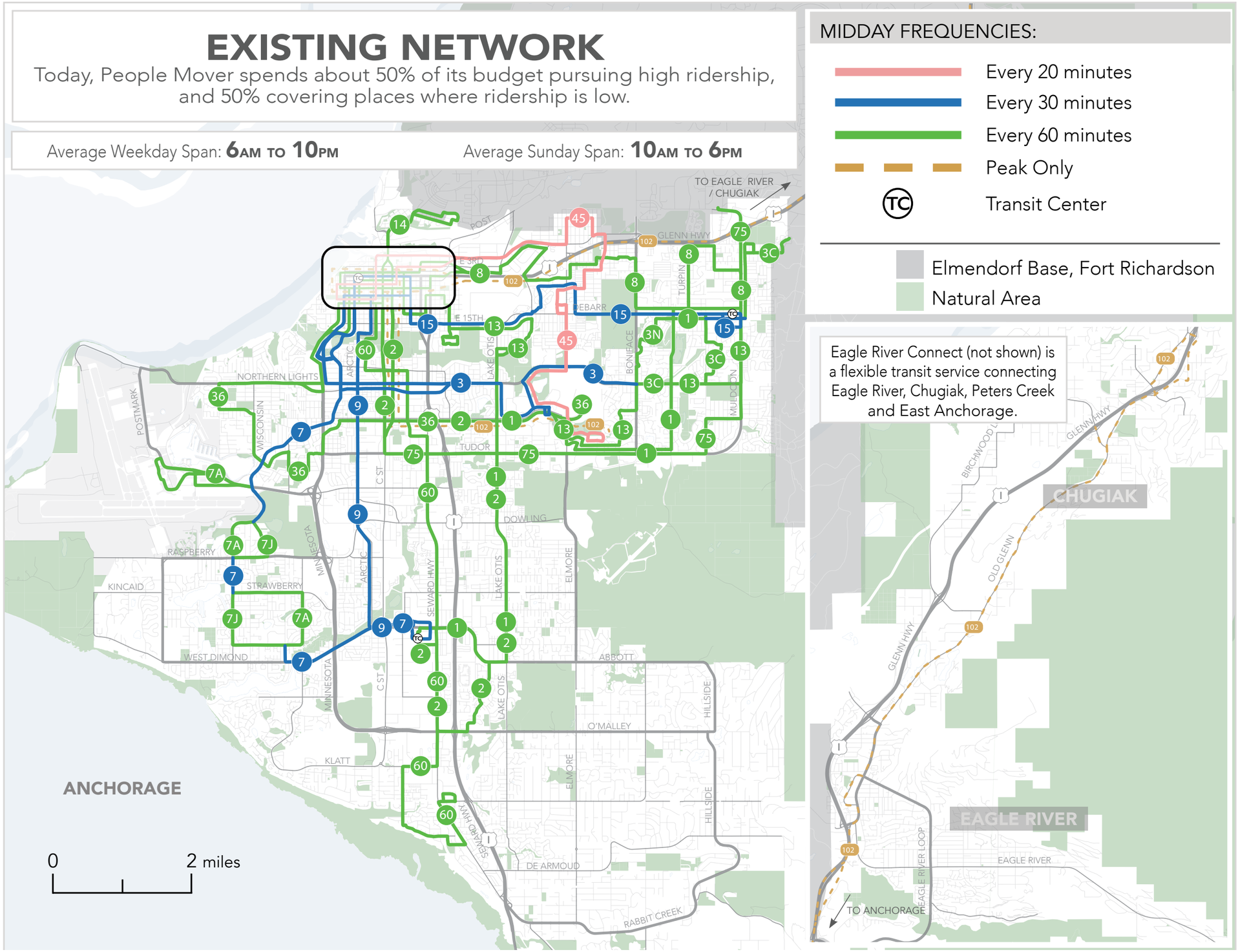
4. Transit Service Analysis

Figure 16: The Anchorage fixed-route transit network, color-coded by midday frequency.



Transit Service Analysis

People Mover operates a network of 14 routes, serving most parts of the built-up area of Anchorage. Additionally, a single express route, operating only during rush hour, provides service to Eagle River and Chugiak. In 2015, on an average weekday, between 11,000 and 12,000 boardings occurred across the system.

Recent Trends

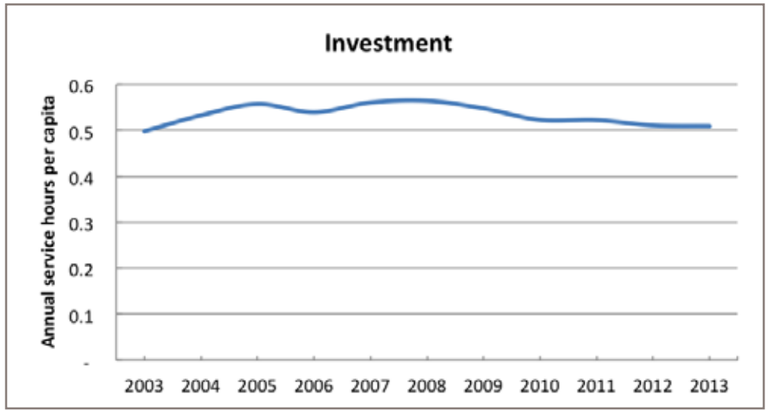
We have surveyed a few basic characteristics of the system over the past decade (2003-2013), which are summarized in the charts at right and (with regards to cost growth) on page 30.

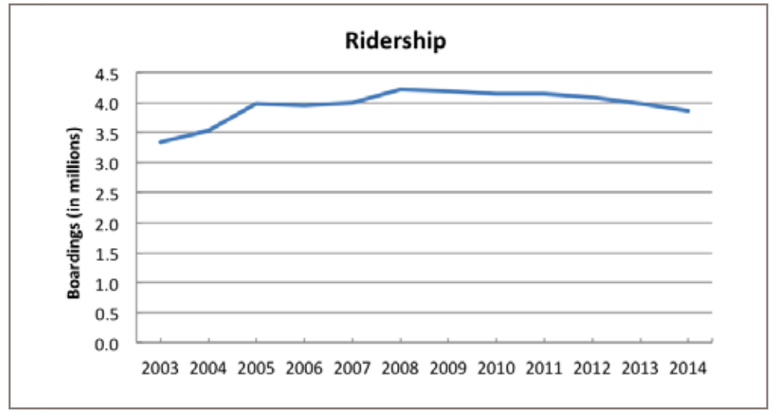
Over this period, the relative level of investment (service hours per capita) has stayed roughly steady, with a slight decline since 2008 as the total quantity of service remained stable but the Anchorage population grew.

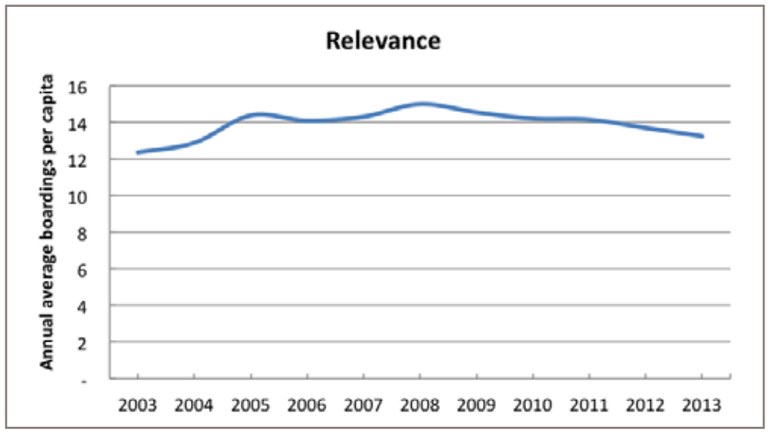
Both relevance (the number of boardings per capita) and total ridership peaked in 2008, and they have both declined ever since. Still, these factors have only changed slightly over the decade.

Productivity (boardings per service hour) has also remained fairly steady, with a small decline since its peak in 2010.

All of these measures, taken in combination, suggest that People Mover's service and ridership results have remained fairly stable in the past decade. While the declines in investment, relevance and productivity are gradual, they do suggest a troubling direction towards a less-relevant, less productive transit network.







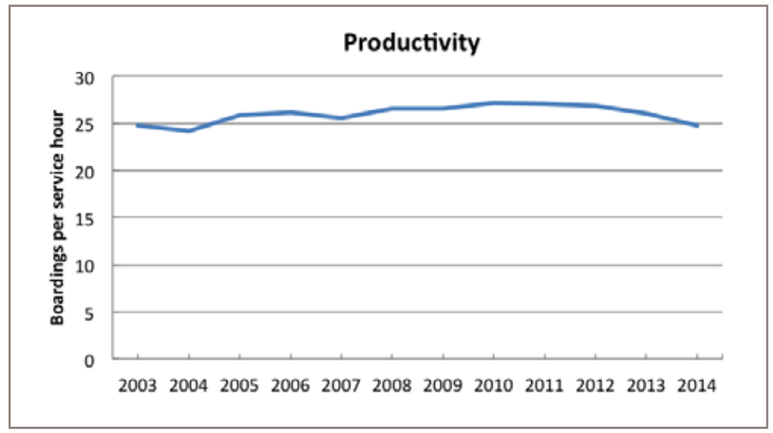


Figure 17: At top, the level of investment in service relative to Anchorage's population is roughly equal to what it was in 2003, but has declined since 2008 as the municipality has grown without a proportionate growth in transit service. At bottom, this trend is mimicked by that of relevance, the average boardings per capita in the city, which is only slightly higher than it was in 2003, and also peaked in 2008.

Figure 18: At top, total ridership peaked in 2008 as well, though it is currently still much higher than it was a decade ago. At bottom, productivity (ridership relative to service provided) has stayed relatively flat, with a slight decline since 2010.

Peer Comparison

To get a sense of how some other cities' transit services compare to Anchorage, we have compiled a short set of indicators from the National Transit Database looking at other similarly-sized cities in comparable situations.

The success of People Mover's individual routes can be evaluated in comparison to one another, since they represent a wide range of service design choices and performance results. For performance of the entire system, and as an aide in thinking about Anchorage's particular transit choices, it helps to compare People Mover to peers. Obviously no place precisely replicates Anchorage's economic, demographic and geographic conditions, so a group of peers provides a range rather than a prescriptive target. (With the exception of Salem, Oregon, each of these peer cities is home to a major public university.)

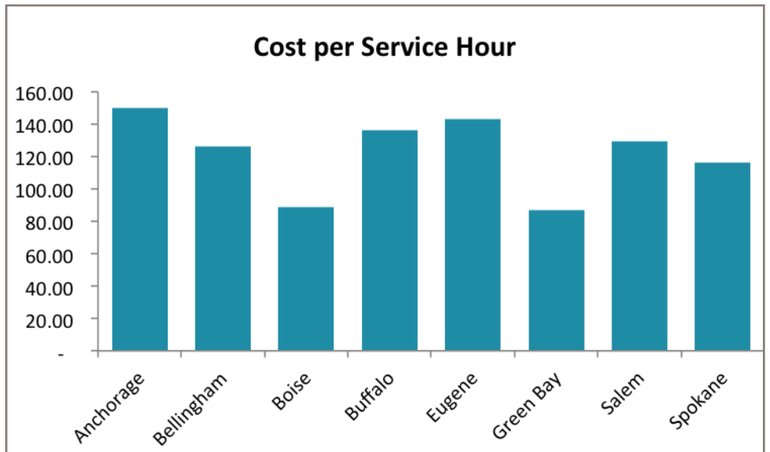
Investment and relevance

The pair of charts at right show how much a region is investing in transit service (at top) and how relevant transit is to the life of the community (at bottom). The shapes of these two charts are so similar that they suggest "You get what you pay for" – all other things being equal, the level of service provided relative to the size of the population has a big impact on transit ridership in a region. (Halifax and Eugene seem to be getting more than they pay for.)

Anchorage's overall level of investment is at the low end of the range established by these peers, though it provides more service than either Boise or Green Bay. The peer closest to Anchorage on the first two measures is Salem, the capital of Oregon. Both Anchorage and Salem provide about 0.6 service hours per person, per year, and both transit systems generate about 15 boardings per person, per year.

The other peers each have somewhat higher scores on both measures. In Buffalo, Eugene, Spokane and Bellingham, a higher level of investment in transit has been rewarded with a higher level of transit use among the public. This particularly true in Eugene and Bellingham, where frequent and rapid bus lines connect to university campuses that are well-integrated into the urban, walkable part of the cities.

The University of Alaska-Anchorage is in a less walkable and urban part of Anchorage than is Western Washington University in Bellingham, but the two Universities have a similar student population and similar scale of associated services and development.



Data source: Federal Transit Administration, National Transit Database 2014.
Note: Based on revenue hours and operating expenses for non-paratransit modes.

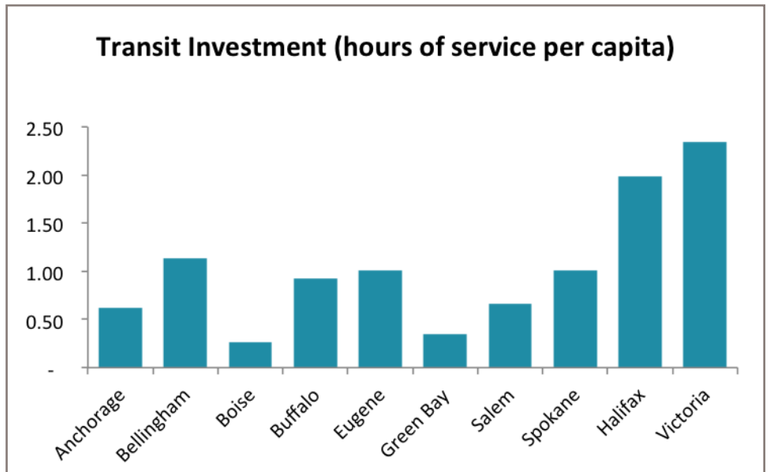
Figure 19: Costs per service hour among peers. Because of the fluctuating exchange rates, annual comparisons between U.S. and Canadian transit systems can be confusing, so we have limited this chart to U.S. peers.

The Canadian cities, Victoria and Halifax, both boast a much higher level of transit investment than the U.S. peers. Canadian cities generally have a higher level of transit investment per capita than similarly-sized U.S. cities, which in Victoria's case is rewarded by a very high level of ridership.

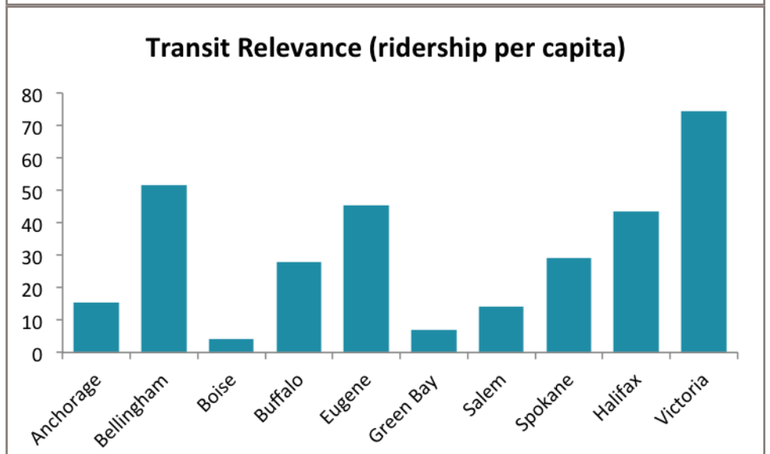
Cost per service hour

Note that the Investment chart controls for the high costs of all services in Alaska, because it reports not dollars spent but quantity of service provided. We can see from the chart in Figure 19 that Anchorage's costs for a fixed quantity of service are at least slightly higher than all of these peers' costs.

Transit systems in Anchorage, Salem, Spokane and Bellingham all reported 2013 hourly costs of between $125 and $150.



Data source: Federal Transit Administration, National Transit Database 2014.
Note: Based on 2014 data for bus, light rail, bus rapid transit, and other non-paratransit modes.



Data source: Federal Transit Administration, National Transit Database 2014.
Note: Based on 2014 data for bus, light rail, bus rapid transit, and other non-paratransit modes.

Figure 20: Transit Investment and Relevance: "You get what you pay for."

Anchorage Transit Network Characteristics

Radial networks

If a city has only one area where jobs and other activities are concentrated, then all routes can simply go from outlying neighborhoods into that center. This is a "radial" network. In small cities, there is often only one activity center, and a radial network can easily provide one-seat-rides for most people to their activities. Few trips require a connection at all, but for those that do, all connections happen downtown.

Most larger cities, however, do not have only one center of activity. Some very large metropolitan areas – such as Los Angeles – are so dense across such a large area that they truly have everywhere-to-everywhere travel demand. Anchorage is not such an extreme case, but has at least three obvious areas of concentration: downtown, midtown and the University district.

The existing Anchorage transit network is most radial, i.e. nearly every route goes to downtown. (It is not completely radial because some routes connect with one another at Dimond or Muldoon Transit Centers, and Route 1 connects the two Transit Centers, without going through downtown at all.) People Mover offers some timed connections between routes downtown (in which many routes are scheduled to reach the downtown Transit Center at the same time). Frequencies are too low for people to simply transfer from one route to another outside of downtown.

Anchorage faces a choice between a mostly radial network, that will naturally struggle to serve places outside of downtown, or a more gridded network.

Yet a radial network struggles, for basic geometric reasons, to serve more than one activity center well. A designer of a purely radial network must "pick a winner," deciding which point in the city is most important and making it the center of the network. In Anchorage we can see clearly (in the map of Activity Density on page 15) that there are multiple "centers," and many other important destinations outside of them.

Anchorage thus faces a choice between continuing to run a mostly radial network, that will naturally struggle to serve places outside of downtown very well, or shifting towards a more gridded network. A more gridded

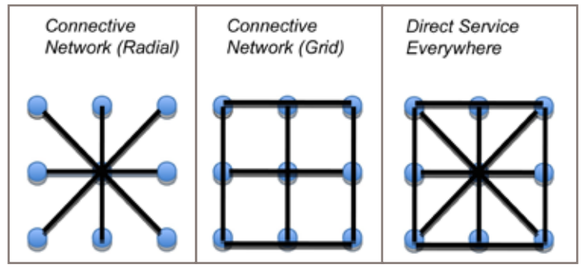


Figure 21: In small cities where all activity is concentrated in the center, a radial network (on the left) suffices. Larger cities with multiple centers, like Anchorage, tend to develop grid networks (middle) to serve travel to and from many places. The alternative to the grid is to provide direct service from everywhere, to everywhere (as on the right), but this means that every route is much less frequent.

network could offer more useful service to downtown, midtown and the University, all at once, and thereby is likely to achieve higher ridership.

People tend to have emotional attachments to their direct bus to downtown (whether or not they ride it), and emotional aversions to transferring (partly arising from the current condition of the downtown transit center). Perhaps for these reasons, People Mover has continued operating a low-frequency, one-seat-ride, radial network, beyond the point when growth and development created demand for a more broadly-connective network.

Complexity or connections?

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?"* Anchorage's transit resources are divided into a large number of routes, and this makes the network more complex (and also means that most routes run infrequently).

Dividing transit service among more streets inevitably leads to lower frequencies on each street, and therefore longer waits. If parallel routes can be consolidated onto a few main streets, frequency is better and waits are shorter. However, more walking is required. This is why walking distance and waiting time are inexorably linked in any transit network, and illustrates a common trade-off in transit planning: *Walking, or waiting?*

The map in Figure 22 shows a tangle of low-frequency routes (in green) in east Anchorage. This likely reflects People Mover's desire to cover all

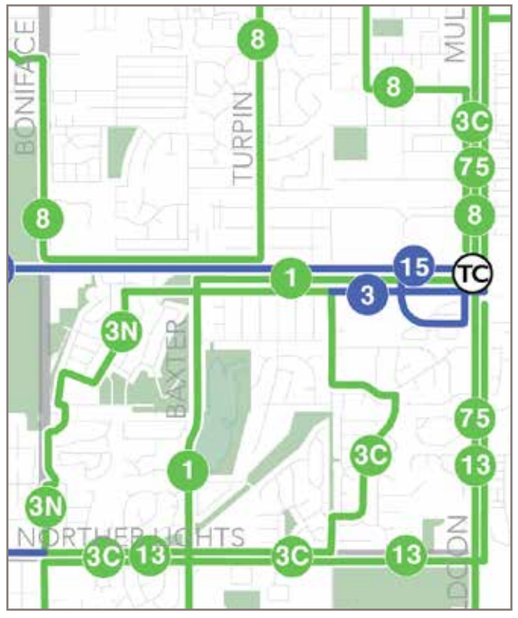


Figure 22: Anchorage's transit network is complex relative to its total level of service. For example, service in East Anchorage is divided into eight different routes, some with very indirect paths, few coming more often than every 60 minutes.

of the east Anchorage neighborhoods with at least *some* service, even if it must be infrequent and indirect. However, there is another source of complexity in the Anchorage transit network, and that is a focus on providing one-seat-rides from each neighborhood to downtown.

Making a connection between two bus routes needn't be an unpleasant or unreliable experience, though the quality of the downtown transit center has obviously given it a bad reputation in Anchorage. Connections can happen in a transit center, or they can happen at the intersection of two streets, where routes cross. In either case, they can be comfortable, safe and sheltered from the weather.

If a city can accept connections as part of a transit network – and make the capital investments necessary to make them pleasant – it frees up an enormous amount of service that no longer must be spent providing one-seat-rides from everywhere, to everywhere. It also allows for a

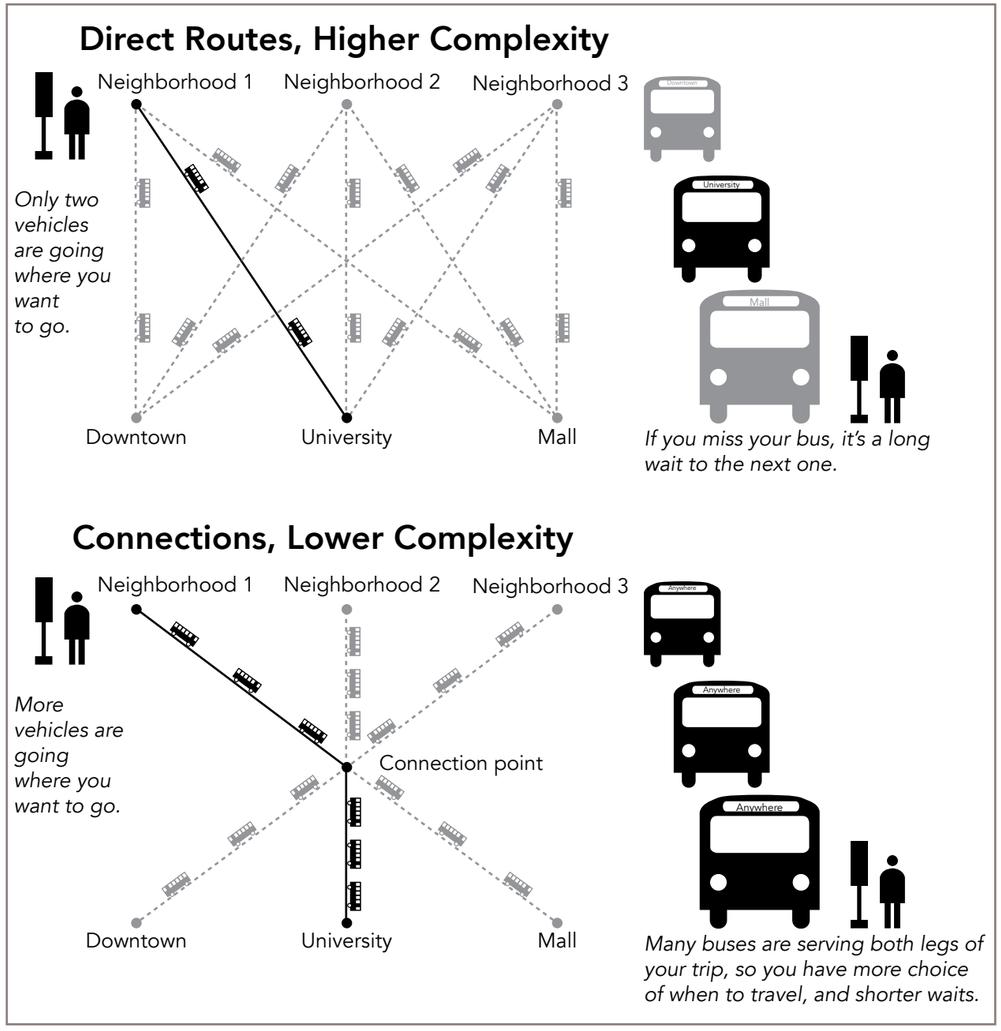


Figure 23: The network at top is made up of one-seat-rides from everywhere, to everywhere (as at top). The network at bottom arranges the same amount of service into more frequent routes with connections. The network at bottom has higher frequencies, better reliability, and in fact offers slightly faster travel times.

much simpler network and higher frequencies, making it both more useful and easier for people to understand.

How is this possible? Surely we would all prefer a one-seat-ride to our destinations, rather than a transfer and a second wait for a second bus. Making that wish come true for all of us spreads transit service very thin, and thereby makes it much less useful.

The illustration in Figure 23 shows how it is possible that requiring connections can improve frequency, reliability and even travel time.

At the top of Figure 23, a network is made of direct routes, one from each of three neighborhoods to each of three major destinations. There are a total of nine routes, but each is only run by two buses, so the frequencies are low. A person traveling from Neighborhood 1 to the University gets a direct ride, but they must wait a long time for their bus...and if they miss it, it's a long wait until the next one.

At the bottom of Figure 23, a network is made up of fewer routes, operating at much higher frequencies, but people must make a connection to get to one of the major destinations. Now, a person traveling from Neighborhood 1 to the University can step outside their door whenever they are ready, because a bus is always coming soon. And while they must get off and make a connection midway, again, the bus to the University is coming soon.

It is essential to observe about these two networks that:

- They cost the same to operate. Both networks are made up of 18 buses and drivers, but somehow the network at bottom is offering more frequent, reliable, faster service.
- The trips made on the network at bottom *are actually faster* than the one-seat-rides at top, because so much of the time in the network at top is spent waiting. As described on page 7, real-time information doesn't eliminate waiting time; a person waiting for the infrequent bus from Neighborhood 1 to the University will either wait when they depart or after they arrive. Waits for the bus in the network at bottom are so much shorter that the whole trip takes less time.
- While the connected network shown at bottom is radial, the same math applies in a gridded network.
- In the connected network, the connection point is in an arbitrary place. In reality, transit centers are often at universities, malls, or in downtowns. This means that the higher frequencies offered on the less-numerous routes are even more useful to more people, whether or not they transfer as part of their trip.

The Introduction to this report includes illustrations of imaginary "Ridership" and "Coverage" networks (on page 7). We can observe the relationship between connections, complexity and travel time in these networks as well.

In the "Ridership" network, traveling between places on the two frequent lines would require a connection (with a short wait). In the "Coverage" network, those places are more likely to be linked by a one-seat-ride route, so that traveling between them requires no connection. However, that one-seat-ride route is much less frequent.

Today, Anchorage's network resembles the "Direct Routes, Higher Complexity" and "Coverage" networks shown in these two figures.

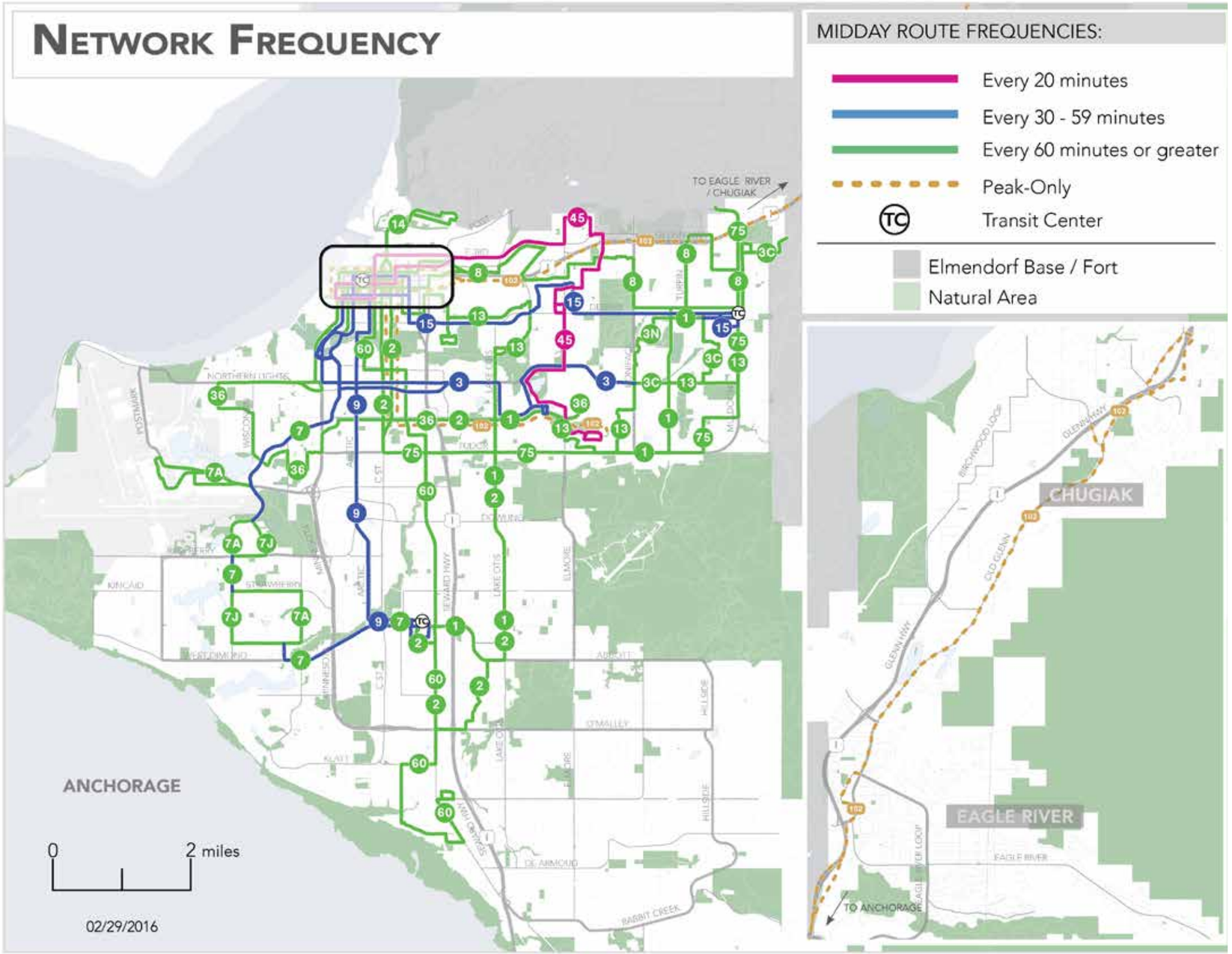
Frequency

In transit conversations there is always a great focus on *where* transit is provided, but unfortunately little concern about *when* it is provided. The "when" of transit service is described as frequency (how many minutes between each bus) and span (how many hours a day, and days a week, it runs).

Low frequencies and short spans are one of the main ways that transit fails to be useful, because it means service is simply not there when the customer needs to travel. Low frequencies also mean that connections from one route to another require a long wait.

Even though Google Maps or an app on a phone can be consulted for directions, most people still retain a mental image of their city that helps them understand their travel options in any situation. Frequent transit service is so effective at attracting ridership because it has the simplicity of a road: you can use it anytime you need to. Frequent service allows someone to maintain a map of the transit system that is much like a road map, in that no schedule is needed to know how to go places whenever you want to.

Anchorage currently only has one transit route that approaches this "no-schedule-needed" level of frequency, and that is the 45-Mountain View, which weaves its way from the University north to Mountain View, and then southwest to downtown. Route 45 comes every 20 minutes during the midday, each weekday, and



Route	Weekday Frequencies			
	AM Peak	Midday	PM Peak	Evenings
1 CROSSTOWN	60	60	60	60
2 LAKE OTIS	60	60	30	60
3 NORTHERN LIGHTS	30	30	30	60
7 SPENARD/AIRPORT	30	30	30	60
8 NORTHWAY	60	60	60	60
9 ARCTIC	30	30	30	60
13 UNIVERSITY/HOSPITALS	60	60	60	60
14 GOVERNMENT HILL	60	60	60	60
15 15TH AVE/DEBARR	30	30	30	60
36 36TH AVE/WEST ANCHORAGE	60	60	60	60
45 MOUNTAIN VIEW	30	20	30	30
60 OLD SEWARD	60	60	60	60
75 TUDOR	30	60	30	60
102 EAGLE RIVER/CHUGIAK	30		30	

Figure 24: A map of midday frequencies, and a table of frequencies throughout the weekday, for the existing People Mover transit network.

less frequently at other times. (Route 45 is shown in pink in the frequency map at right).

Frequent service:

- Reduces waiting time (and thus overall travel time).
- Improves reliability for the customer, because if something happens to your bus, another one is always coming soon.
- Makes transit service more legible, by reducing the need to consult a schedule.
- Increases capacity (moving more people, with less crowding) on busy routes or at busy times.

In order to think about whether any frequency is "frequent enough," imagine waiting one-half of the frequency, on average (since statistically, you will) and ask yourself whether you could tolerate waiting that long, regularly, in exchange for the benefits of riding transit.

Many people assume that today, with real-time transit arrival information (like People Mover's Bus Tracker) and smartphones, nobody needs to wait for a bus anymore, and frequency therefore doesn't matter. If a bus only comes once an hour, that's fine, because your phone will tell you when it is a few minutes away and you should start walking.

Despite all these new technologies, frequency still matters enormously, because:

- Waiting doesn't just happen at the start of your ride, *it also happens at the end.* You may not need to leave the house much before your departure, but if your bus is infrequent and the schedule doesn't happen to line up perfectly with your desired arrival time, you have to choose between being very early or too late. If you start work at 8:00 am but the bus passes your workplace at 8:10 am, you can be 50 minutes early or 10 minutes late. Or you can drive.
- Many of the places we go don't let us hang out until our bus's arrival is imminent. We can easily do this when leaving home, but it is more awkward when leaving a restaurant, an office that is closing, or someone else's house.
- Real-time arrival information doesn't make the bus more reliable, but frequency does. Your smartphone can tell you when your bus is arriving, but it cannot prevent your bus from having a problem and being severely delayed, or not showing up at all. Only frequency – which means that another bus is always coming soon – can offer this kind of reliability.

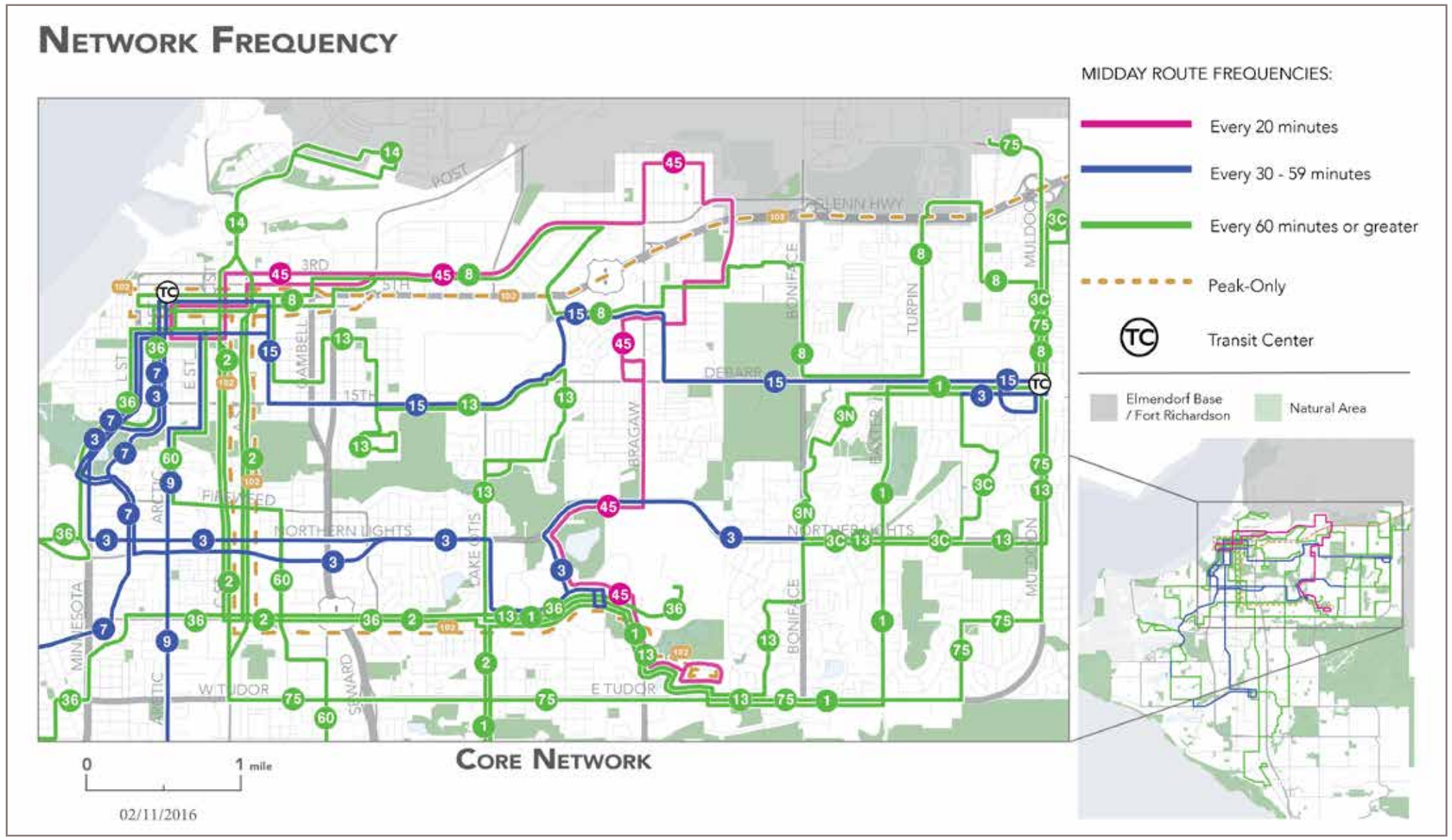


Figure 25: Closer detail of the existing Anchorage transit network, in the core of the city. Routes are color-coded by midday weekday frequency.

Interestingly, the 45-Mountain View is not only People Mover's most frequent route, is also the one which generates the most ridership per weekday.

Daily and Weekly Span of Service

In the focus on *where* transit goes, public conversations very often neglect the topic of *when* transit goes. Frequency is one aspect of this "when" question, but an even more critical aspect is span. The span of a service is how many hours each day it operates, and how many days each week. If someone is considering using a low-frequency service, they may be disappointed to find that it requires a long wait. In considering a short-span service, someone may find that it simply isn't there at the time of day, or on the day of the week, when they need it.

The transportation profession has long been focused on the weekday peaks, because those are the times when our road capacity is most-used and congested. Yet people need to travel at all times of day and week, and if a transportation option is only available during the weekday peaks, it is unlikely to gain anyone's trust.

Service workers tend to work from very early in the morning to midday, or from midday to late at night, and the service industry peaks on weekends. People who hold two jobs may need to commute to both of them on a single day, leaving home early and returning late. And of course anyone taking an evening class, pursuing a hobby, going to bible study, or staying late at work to finish a report needs a bus ride home outside of the traditional 8-to-5 workday.

As of the 2010 Census, 29% of U.S. workers did not work a traditional weekday, daytime schedule. Add to this population the large proportion of people who are employed part-time, are studying, are retired, or are not working, and we can imagine the proportion of Anchorage residents whose essential travel needs go far beyond the morning and evening weekday peaks.

Buses running late at night, and very early in the morning, will always be much emptier than those running during the day. Yet the presence of those late buses is, in many transit systems, supporting higher productivity during the day.

This sometimes becomes clear when an agency cuts the last bus trip of the day, because few people ride it. Measured alone, the last trip of the day is the least productive. Very soon, however, the bus trip that is *now* the last of the day (and was the second-to-last, before they cut the last trip) becomes equally unproductive. No responsible person will plan their daily schedule, or their life, around the last bus of the day. The last bus is a sort of insurance policy, there if people need it, and it always looks unproductive when it is evaluated on its own.

Route	Weekday frequencies				Weekday span (hours)
	AM Peak	Midday	PM Peak	Evening	
1 CROSSTOWN	60	60	60	60	16.12
2 LAKE OTIS	60	60	30	60	16.73
3 NORTHERN LIGHTS	30	30	30	60	17.57
7 SPENARD/AIRPORT	30	30	30	60	17.50
8 NORTHWAY	60	60	60	60	15.90
9 ARCTIC	30	30	30	60	15.72
13 UNIVERSITY/HOSPITALS	60	60	60	60	17.25
14 GOVERNMENT HILL	60	60	60	60	15.32
15 15TH AVE/DEBARR	30	30	30	60	16.35
36 36TH AVE/WEST ANCHORAGE	60	60	60	60	16.80
45 MOUNTAIN VIEW	30	20	30	30	17.53
60 OLD SEWARD	60	60	60	60	15.78
75 TUDOR	30	60	30	60	16.37
102 EAGLE RIVER/CHUGIAK	30		30		6.93

Figure 26: This table shows the total span of service on each People Mover route, each weekday, sorted by the productivity of the routes. Each route's weekday span equals the number of hours from when the bus makes its first stop to when it makes its last stop. The longest spans are highlighted in orange.

Late night trips also tend to support afternoon ridership, because people who work or study in the second half of the day head out in the afternoon and come back home at night. If the bus isn't there for them to return home at night, then they have a powerful incentive to get a car or find some other way to make their round-trip commute. For this reason, it is common for transit agencies to find that, when nighttime service is cut, afternoon ridership drops.

It is rarely a good idea to measure the productivity of a route or a network by time of day, with an eye towards cutting trips and thereby increasing productivity. The ridership on a route is almost always arising from the *day-long and week-long* level of service.

In addition, a well-designed transit network operates as a *network*, rather than as isolated individual routes. Ridership on different routes may relate, as people use combinations of routes to make their trips. It can therefore be valuable if spans and schedules are set so that the group of routes that runs early and late works together as a network.

Agencies that run long spans of service often link those spans to a strong "service brand." A service brand tells the public something about a service's usefulness, especially frequency and span. For example, in many cities there are "Frequent" or "Core" service brands. Routes branded this way are known to come frequently and have longer spans than other service brands. These branded routes also operate as a network, and running all of the branded routes equally late maintains the connections between them.

The table in Figure 26 shows the weekday total spans of service for People Mover routes, along with each route's weekday frequencies. Aside from the peak-only route 102, most People Mover routes operate for between 15 and 17.5 hours per day. The only frequent route in the network (45-Mountain View) has one of the longest spans of service, but so does the low-frequency 13-University/Hospitals. Span and frequency do not appear to be related in People Mover's current service design.

Keeping the caveats on the previous page in mind, looking at ridership by time of day can allow us some insights into where (or rather, when) to find additional ridership potential.

In People Mover's current schedules, the supply of transit vehicle trips peaks twice each day, during the morning rush hour and the evening rush hour (as shown by the blue line in Figure 27). Yet the number of boardings is actually proportionately quite low in the morning, and grows steadily through the midday to a late-afternoon peak (as shown by the orange line in Figure 27).

As a result, the productivity of the transit system is far higher midday than it is on the peaks, as illustrated by Figure 28. The way transit riders would observe this is that midday buses are much more full than morning or evening peak buses.

This suggests that there is great potential to grow ridership by increasing the frequency of service during the midday and afternoon. At a certain point, ridership potential in the midday would be limited by the supply of morning and late-evening service, as an afternoon commute goes along with either an early-morning or late-evening commute.

These are ridership-related reasons to increase midday, morning or night service, on weekdays or weekends. Yet there are social reasons to do so as well, regardless of their impact on ridership and productivity:

- Low-income people, who have a more severe need for transit than other people, are more likely to work service jobs that require them to commute early or late, and on the weekends.
- Weekend service allows people to use transit to shop, run errands or make appointments on the weekends, which can be essential for people with severe needs.
- Young people are more likely to stay out late, and late-night bus services are one strategy to reduce intoxicated driving and teenage driving.
- Late-night bus service can also improve the sense of safety in a city, since late-night bus riders and drivers act as "eyes on the street."

These are all reasons why a community might value a longer span of service, even if it did not increase daily or weekly productivity.

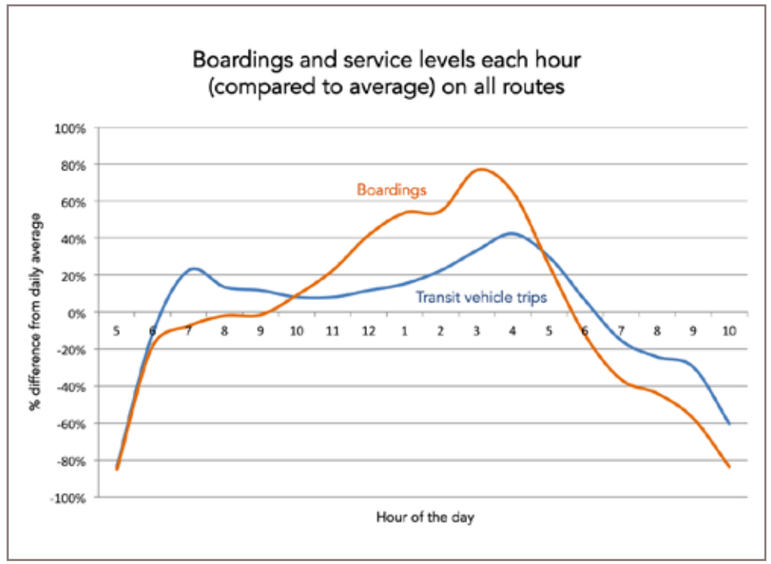


Figure 27: This graph compares the relative level of boardings on People Mover in each hour of the weekday day, with the relative level of transit service in each hour of the weekday. Both are compared to the hourly average for the whole day. The resulting lines show when and by how much each factor "peaks." Boardings are highest in midday and late afternoon, while transit vehicle trips peak in the morning and early evening. This suggests that service is under supplied in the midday, relative to current demand.

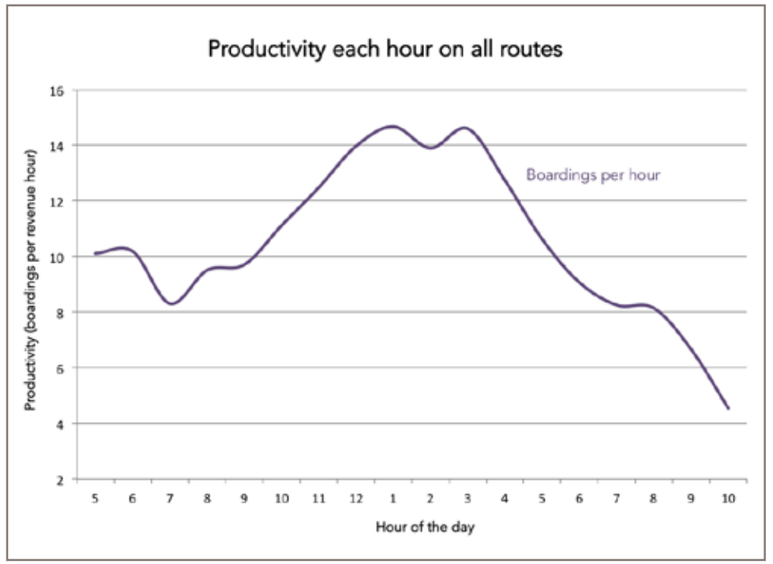


Figure 28: This graph shows the productivity (boardings per service hour) of all People Mover routes for each hour of the weekday. Productivity is very high in the midday and early afternoon. This type of peak is often a result of large numbers of people using transit to commute to and from service jobs; to come home from school; and to travel for errands or appointments.

Ridership

One measure of transit performance is the amount of ridership it generates. This can be visualized by mapping boardings at transit stops. Figure 29 shows the average number of daily boardings at each stop in the existing Anchorage network, on weekdays. Where multiple routes serve the same stop, their boardings are summed for that stop.

From this map, we can observe that:

- The highest-ridership single stops are found downtown and at the transit centers, as well as at major destinations like the University of Alaska, nearby medical institutions, and shopping centers.
- The shape of the 45-Mountain View is clearly visible, as a continuous pattern of larger, overlapping dots, weaving from the University to Mountain View to downtown.
- Northern Lights, Bragaw, and Tudor all have segments of continuous moderate- or high-ridership stops.
- There are few large boardings dots on or east of Boniface (except at the transit center on Muldoon[7]). As the market assessment showed, east Anchorage is mostly single-use residential, with moderate density (except for the hospitals at the north end of Muldoon). Further, as shown in the map on page 33, most of the service covering east Anchorage is infrequent, so potential transit riders may simply be responding to low levels of service by choosing a different mode.
- Similarly, there are few large dots south of Tudor. The exceptions are at the airport, likely due to the number of jobs there, and at Dimond Transit Center[7].
- 70% of average weekday ridership is contained within the rectangle bounded by Minnesota to the west, Boniface to the east, 3rd/Commercial to the north, and Tudor to the south.

Looking at this map, however, we must keep in mind that *not every stop is offering the same level of service*. Some of these stops are served once per hour. Some are served every 20 minutes.

A small dot on a very low-frequency route may simply be a reflection of the low quality of service. A small dot on a frequent route, on the other hand, suggests other problems. Conversely, a large dot on

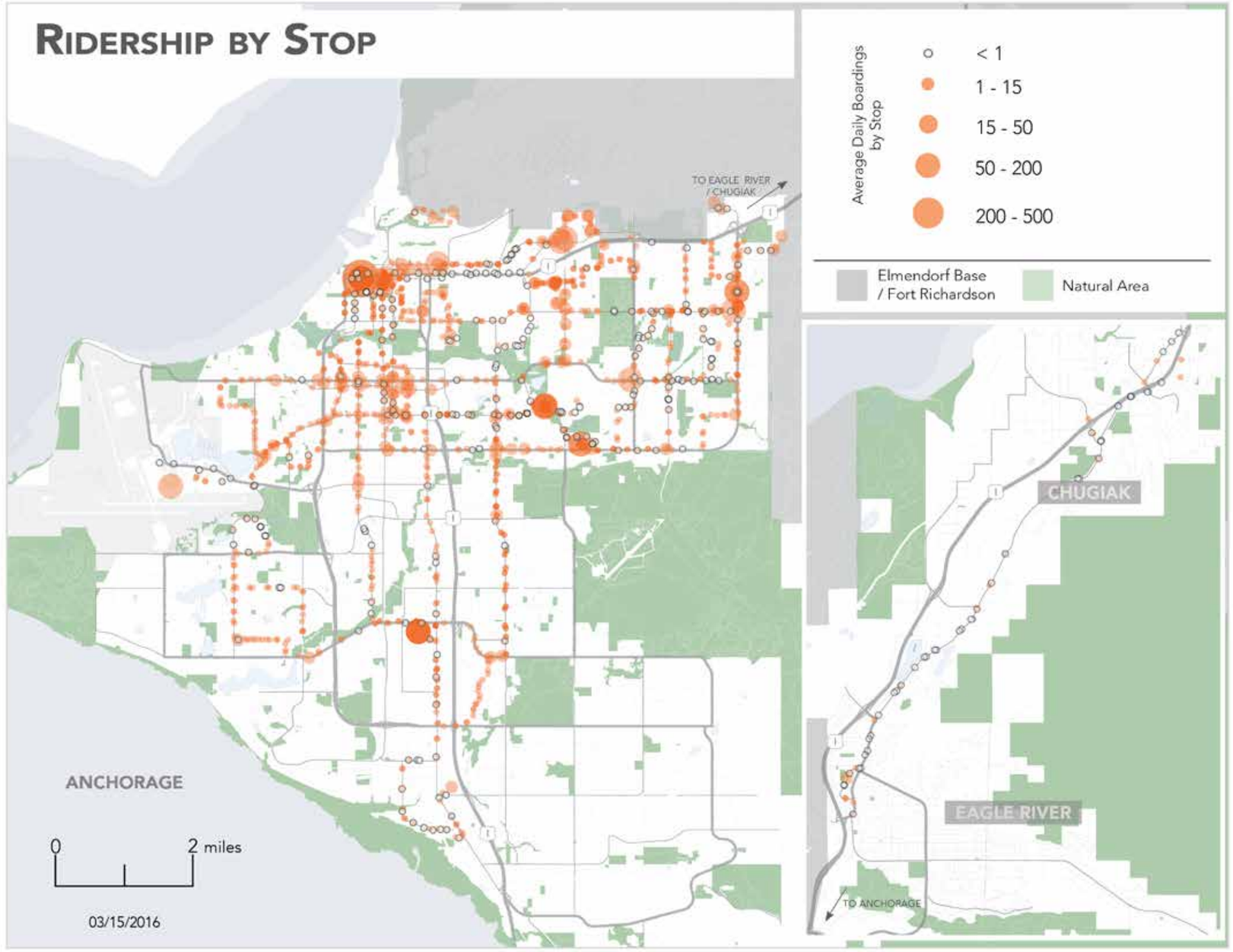


Figure 29: Average weekday boardings are shown here for every stop in the existing transit network. Note that some large dots are at Transit Centers, where transfers between routes are counted as boardings, potentially overstating the level of transit demand near the Transit Centers.

7. Some of the boardings counted Transit Centers are transfers, and do not represent unique trips, so those large dots should not be interpreted as entirely representing nearby transit demand.

an infrequent route means that ridership is high *despite a low level of service,* which suggests that underlying transit demand may be high.

For example:

- The boardings dots produced by the 9-Arctic and the 60-Old Seward, between Tudor and Dimond, are similar, with just slightly larger dots on Route 9. (Refer back to Figure 29 on the previous page.) Yet the 9-Arctic is nearly twice as frequent the 60-Old Seward. If these two street segments had similar ridership potential, all other things being equal, we would expect boardings on Arctic to be higher than boardings on Old Seward. (There are other reasons that boardings on the two segments might differ, such as the different places that the two routes go outside of these segments.) The similarity in the boardings patterns raises questions about the ridership potential of these streets and the design of the two routes serving them.

- The 75-Tudor has more boardings on Tudor than does the 15-Debarr on 15th Ave. This is even more visible in the Atlas of individual route maps, on page 86 (15-Debarr) and page 90 (75-Tudor). Yet the 75 offers less frequency in the midday (both routes offer 30-minute frequency on the peaks).

- Boardings dots on the 14-Government Hill are fairly large, despite the fact that the route only comes every hour. (In comparison, boardings on the 1, 3N and 3C routes in the Nunaka Valley area, which also come once an hour, are much lower.) People in Government Hill are responding to low frequency service by riding it in larger numbers than are people in other neighborhoods. These relatively large boardings dots may be attributable to:

  - Density and demographics. As shown by the maps in Chapters 2 and 3, Government Hill is a dense residential area, with many people walking distance from each bus stop. It is also densely populated with people who are either young or old; with zero-car households; and with low-income people.

  - Government Hill's close proximity to downtown and the Downtown Transit Center. The frequency of the 14-Government Hill is low, but it offers a short and direct ride to downtown services and jobs.

  - The Base. Because there are no routes into Joint Base Elmendorf-Richardson, anyone wanting to access the Base by transit (or access the municipality from the Base) would board and disembark just outside the Base itself. Some of the boardings at the end of the 14-Government Hill might represent base residents, workers or visitors.

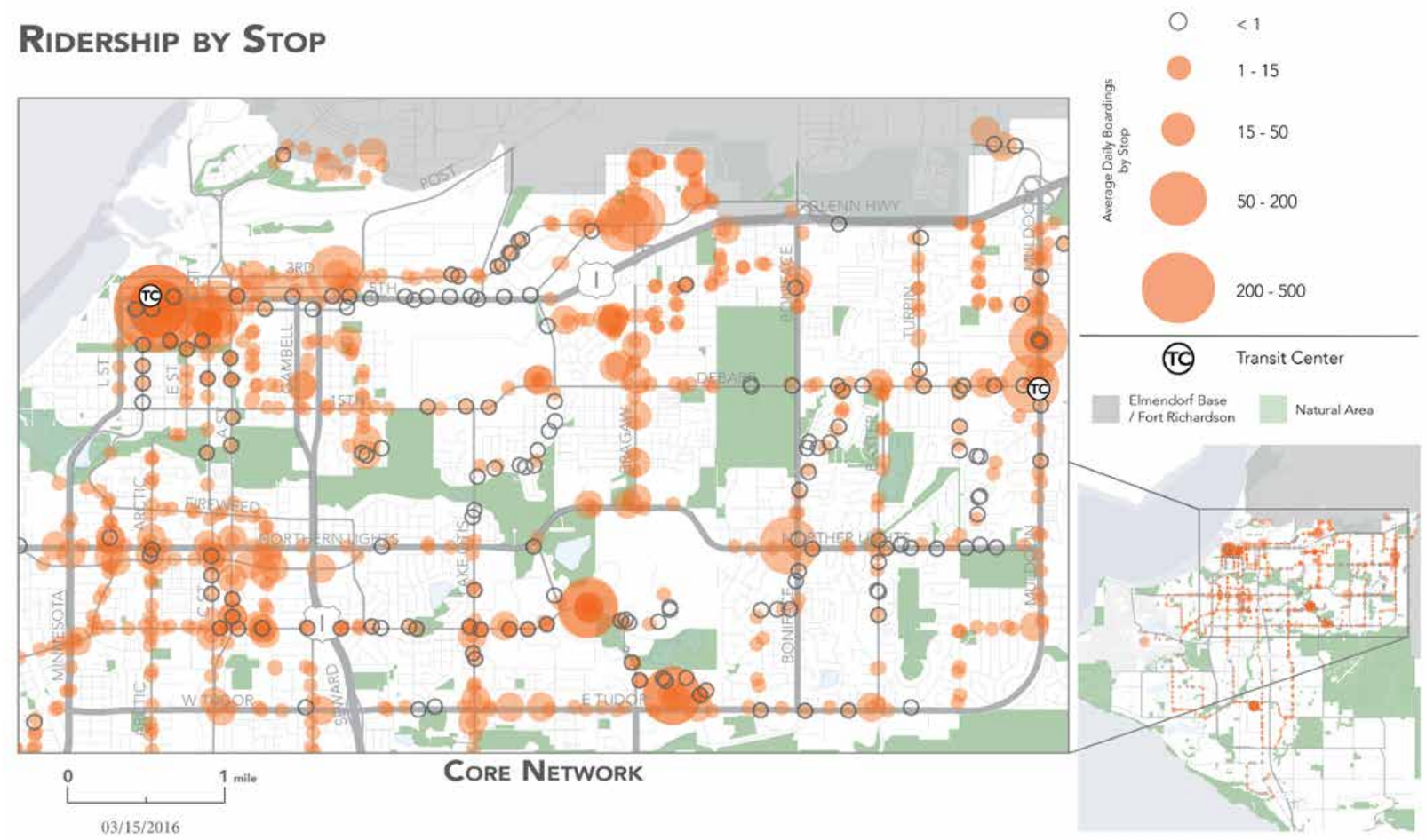


Figure 30: Average weekday boardings are shown here for every stop in the core transit network. Note that the large dots at the Downtown and Muldoon Transit Centers represent transfers between routes, potentially overstating the level of transit demand near the Transit Centers.

Productivity

Some transit agencies and cities have adopted a goal of "maximizing ridership." Implicit in this statement, however, is a constraint: there is a limit to how much funding is available to increase ridership. The transit agency cannot spend infinite amounts of money pursuing each additional rider in pursuit of "maximum" ridership. The more specific way to state this goal, then, is "maximize ridership within a fixed budget." Even if the budget grows, it is and will always be limited.

People who value the environmental, business or development benefits of transit highly will talk about ridership as the key to meeting their goals. However, because their transit agency is operating under a fixed budget, the measure they should be tracking is not sheer ridership but ridership per unit of cost. They would not be satisfied simply by a large dot on the boardings map on page 37, until they knew what it cost the transit agency to achieve that large dot.

If a transit agency is getting a large number of riders, but it costs them a lot of service to attract each rider, this suggests that even *more* ridership could be attained if some of that service were reallocated to places where it attracts more riders for the same cost. Thus only by measuring ridership relative to cost – productivity – can we evaluate how well a route is maximizing its potential ridership.

In this report, productivity is measured as boardings per service hour.[8]

Productivity = Ridership / Cost = Boardings / Service hour

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

System-wide productivity

The average productivity of the entire Anchorage fixed-route network (which excludes paratransit) was 23.0 boardings per service hour in 2015. This represents a moderate level of ridership, relative to cost, for a city of Anchorage's size. However, productivity has gradually declined in recent years (as is shown by the graph in Figure 18 on page 29).

The productivities of Anchorage and some peer transit systems, in 2014, are shown in Figure 31.[9] Additional peer comparisons are shown starting on page 30.

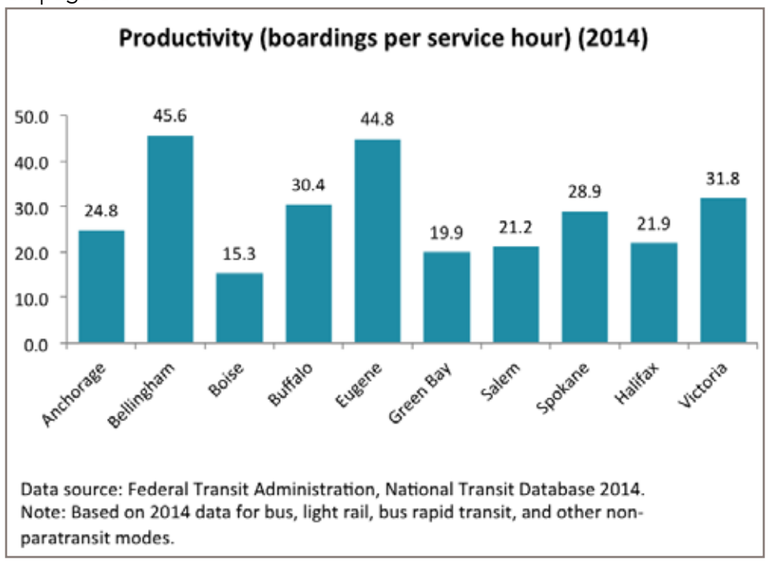


Figure 31: Alongside its peer cities in the U.S. and Canada, Anchorage achieves a moderate level of ridership relative to service levels.

8. The technical term is "revenue hour of service," which represents one hour of a bus and driver in operation, open to the public, accepting revenue. Revenue hours do not include the time drivers spend getting to the start of a route, which is known as deadhead. In this report we will use the more intuitive term "service hour" instead of "revenue hour."

Normally, revenue hours of service would include layover time, which is time added to the schedule in case of delays and to provide driver breaks. However, People Mover does not track layover time and assign it to individual routes in a way that would permit us to include it in a route-by-route analysis of productivity. Thus the individual route productivities quoted in this section do not include layover time, and if summed, will not generate a systemwide productivity measure. The total system-wide productivities quoted in this section DO, however, include layover, and can be compared to productivities of other systems.

9. (Productivity figures given for Anchorage in this report may not line up perfectly because of slight differences in local and national data definitions.)

Route-by-route productivity

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

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

Changing any of these factors for a transit route will affect the denominator of the productivity ratio. For example, doubling the frequency of service on a route will double the number of service hours being supplied. This means the denominator of the productivity ratio has been doubled. We might therefore expect that productivity of the route would be cut in half, unless the numerator of the productivity ratio – boardings – were to also increase.

In the table in Figure 32, People Mover's routes are sorted according to their weekday productivity, i.e. ridership relative to cost.

In this table, we can see the major impact that length, span and frequency have on the service hours required to operate the 45-Mountain View and the 14-Government Hill. The 45 is frequent; we can see from the map on page 34 that it is long; it also has one of the longest daily and weekly spans of service. As a result, the agency must pay for 53 hours worth of service on it each day.

The 14, on the other hand, is infrequent and is very short, running just from downtown to Government Hill and back. It has a shorter span of service each day than the 45. It requires much less service to operate than the 45 – just 6 service hours per day.

The denominator of the productivity ratio for the 45-Mountain View is almost nine times as large as the denominator for the 14-Government Hill. And yet, the 45 is more productive, which indicates that the numerator is even larger. In other words, each additional bus running on the 45-Mountain View attracts a *greater-than-proportionate increase in riders.* If it didn't, then increasing the frequency of the 45 – and thereby its cost – would decrease its productivity.

If People Mover were seeking to increase ridership on its network, one way to do so would likely be to shift resources from a route that is attracting fewer boardings per service hour (such as the 13-University or 36-36th Ave) and invest those resources in some of the most productive routes in the system today (like the 75-Tudor and the 45-Mountain View). This would likely cause ridership to go up on the supplemented routes by more than it went down on the cut routes, thereby increasing total ridership.

The routes in this table have been sorted according to levels of ridership relative to cost, i.e. productivity. The weekday and weekend spans that are longest are highlighted in orange.

While the highest-ridership, most productive route (the 45) does have one of the longest spans on weekdays and weekends, other routes with middling and low productivity and frequencies also have along spans. Earlier, we observed that People Mover's decisions about what weekday span of service to offer on each route do not appear to relate to frequency. Here we can see that they do not consistently relate to productivity either, since both high- and low-productivity routes are among those with the longest spans of service.

Weekend productivity

Saturday and Sunday productivity, for the entire People Mover system, is 93% of weekday productivity (as shown at the bottom of the right-most column in this table).

It is unusual for weekend productivity to be nearly as high as weekday productivity. On seven routes, weekend productivity is actually higher than weekday productivity. In general, this suggests that shifting more service to weekends, in the form of higher frequencies or longer spans, would likely increase ridership. Given the shape of the weekday demand curve by hour (shown in the charts on page 36), it may be that weekday peaks are over-supplied with service, and weekends are under-supplied, compared to what would maximize ridership within the existing budget.

Finally, weekend spans – especially Sunday spans – are fairly short for an urban transit system. So short that a person who works a typical 8.5 hour shift on Sundays couldn't commute both ways on many routes.

	Weekdays								Weekends				Ratio of Sat/Sun to weekday productivity
Route	Frequencies				Span (hours)	Boardings	Service hours	Productivity	Frequency	Span (hours)		Productivity	
	AM Peak	Midday	PM Peak	Evenings						Saturday	Sunday		
45 MOUNTAIN VIEW	30	20	30	30	17.5	2,128	53	40.5	60	12.9	8.9	42.4	105%
75 TUDOR	30	60	30	60	16.4	1,192	34	34.6	60	13.3	8.3	32.4	94%
14 GOVERNMENT HILL	60	60	60	60	15.3	189	6	33.1	60	11.3	8.4	21.6	65%
15 15TH AVE/DEBARR	30	30	30	60	16.4	832	26	31.5	60	12.0	7.9	32.2	102%
9 ARCTIC	30	30	30	60	15.7	776	25	30.6	60	11.9	8.0	32.4	106%
3 NORTHERN LIGHTS	30	30	30	60	17.6	1,464	51	28.9	60	12.8	8.8	29.2	101%
2 LAKE OTIS	60	60	30	60	16.7	888	31	28.5	60	11.4	8.8	30.0	105%
1 CROSSTOWN	60	60	60	60	16.1	623	22	28.0	60	11.8	9.6	20.9	75%
8 NORTHWAY	60	60	60	60	15.9	650	23	28.0	60	11.1	7.8	26.7	95%
7 SPENARD/AIRPORT	30	30	30	60	17.5	1,305	47	27.8	60	13.8	9.7	28.3	102%
60 OLD SEWARD	60	60	60	60	15.8	668	30	22.3	60	12.8	8.5	17.5	79%
13 UNIVERSITY/HOSPITALS	60	60	60	60	17.3	666	34	19.5	60	12.1	8.9	15.8	81%
36 36TH AVE/WEST ANCHORAGE	60	60	60	60	16.8	466	27	17.5	60	9.9	6.9	18.4	105%
102 EAGLE RIVER/CHUGIAK	30		30		6.9	199	12	16.3				-	
ALL ROUTES						12,045	524	23.0				21.5	94%

Figure 32: In the table at left, routes are sorted based on their weekday productivity, from most to least productive. As is common in other transit systems, we see the more frequent routes towards the top of the list, and the less frequent routes – and the peak-only route – towards the bottom. Note, however, that many routes are actually more productive – attracting more ridership relative to cost – on the weekends, as shown in the right-most column.

Productivity and frequency relate

What do routes with high productivity have in common? In examining transit systems in cities around the U.S., we have found a general correlation between transit route frequency and productivity. The chart at the top of Figure 33 shows the individual routes from 17 U.S. transit networks, each plotted according to their midday frequency and their total average productivity.[10] The dots representing People Mover routes are shown in red.

There is a clear curve detectable, up and to the left, as frequencies get better and productivity grows. On average, high frequency routes are getting more riders on each bus than low-frequency routes. However, this chart alone does not tell us whether higher frequency *causes* higher productivity, or whether transit agencies are responding to productive routes by increasing their frequency. In reality, both are occurring.

More frequent services tend to have higher productivity (ridership per service hour), even though providing high frequency requires spending *more* service hours. This happens because frequent service is the most useful and convenient service for riders; thus, transit agencies typically target this most expensive service towards their strongest markets. When frequent service is available to people in a suitably dense, walkable environment, high ridership is a common result.

At the bottom of Figure 33, a chart shows People Mover routes, plotted by their weekday midday frequencies and their productivities. We can make a few observations about the patterns of productivity in the existing People Mover network:

- As was evident already in the table on the previous page, the 45-Mountain View is the system's most productive route, with over 40.5 boardings per service hour. Though its higher frequency results in a higher cost than any other route, it attracts much higher ridership as a result.
- There is a very wide spread of productivity among the hourly routes, from 34.6 for the 75-Tudor to just 17.5 for the 36-36th Ave. However, 17.5 boardings per hour is still far above what a dial-a-ride service could possibly achieve, suggesting that the investment in the 36 is a higher-ridership strategy than flexible service would be.
- The 102-Eagle River/Chugiak is the least productive route in the system, even though it operates during peaks only, when demand for commutes into Anchorage ought to be highest. In fact, this particular measure of productivity *overstates* the performance of the 102, because it does not include the time that a driver must be paid to drive an empty bus out to Chugiak to start each of nine trips. This cost is not included in service hours.

10. Note that this chart does not include peak-only and extremely infrequent routes.

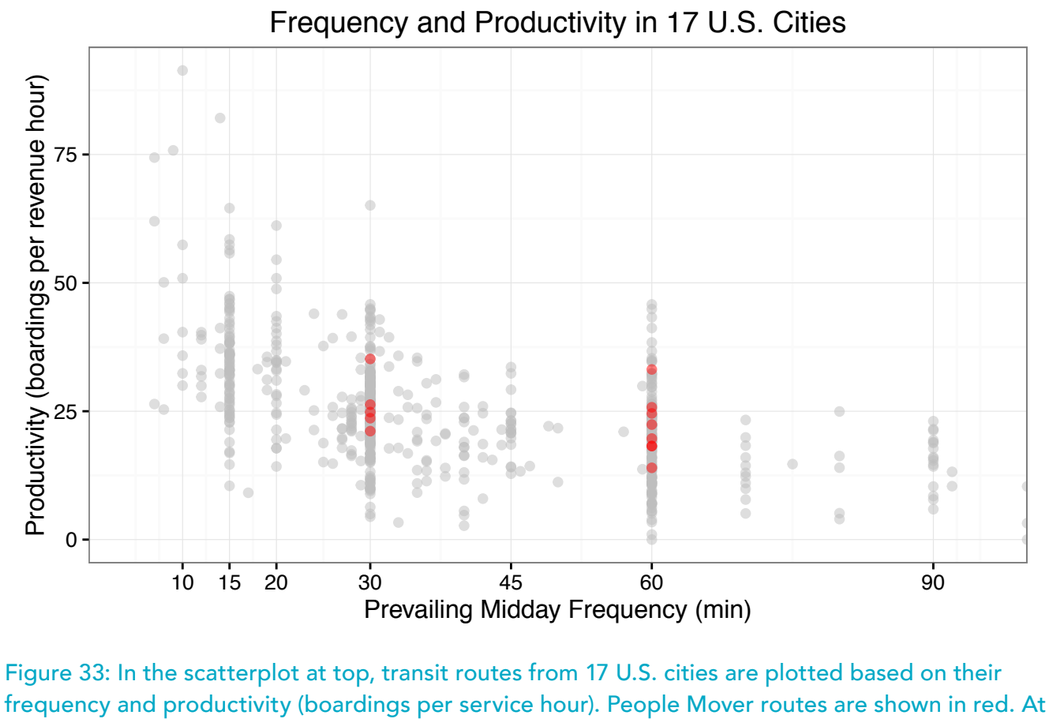
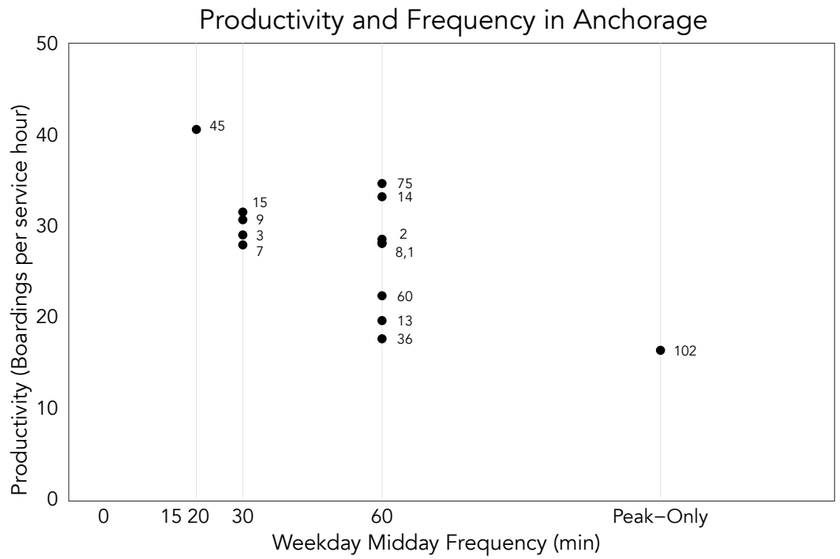


Figure 33: In the scatterplot at top, transit routes from 17 U.S. cities are plotted based on their frequency and productivity (boardings per service hour). People Mover routes are shown in red. At bottom, People Mover routes are plotted alone.



Network Design

The previous sections presented high-level indicators of the performance of the People Mover network. In this section we make a number of more detailed observations about the design of the transit network itself.

Poor linearity

In Chapter 2, we discussed four attributes of the built environment that affect ridership potential: density, walkability, linearity and connectivity.

Linearity describes whether transit can follow straight paths that most riders will experience as direct. Whether or not transit is able to operate on such simple paths depends on the layout of the street network, and on the goals of transit. If transit is asked to pursue a coverage goal, or touch certain key destinations, then more circuitous or deviating routes are necessary. The diagram in Figure 35 illustrates these potential shapes.

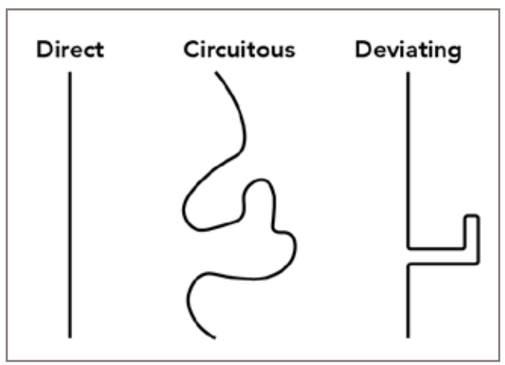
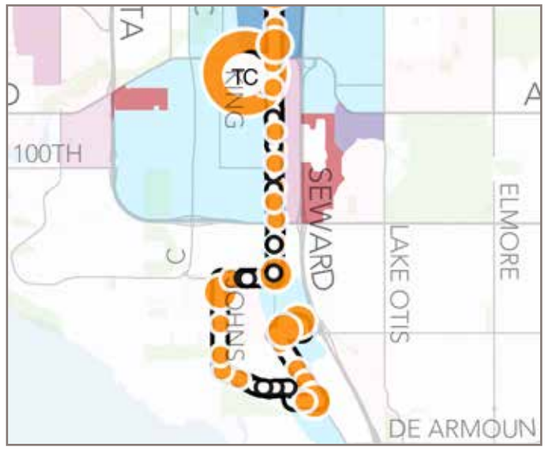


Figure 35: Transit routes can be designed to be direct, circuitous or deviating. This generally depends on the built environment, land use patterns and the purposes of the routes themselves.

Many of People Mover's routes are circuitous, with the route travelling out of its overall direction for long distances. One example is the 60-Old Seward, shown in Figure 34. The south end of the route does a circuit along Klatt and Johns Roads, before returning northwards to terminate at Huffman Road. This covers more of the area, but adds 3 miles and about 10 minutes to the trip for anyone traveling to or from the end of line.

A more severe departure from a route's overall path is often called a deviation. Route 13-University/Hospitals offers an example of a large deviation, to the Anchorage Senior Activity Center on 19th Ave., as shown in Figure 36. Even simply reaching the Dimond Transit Center on Route 60 (shown in Figure 34) requires a short deviation from the otherwise straight section of Route 60 on Old Seward Highway.

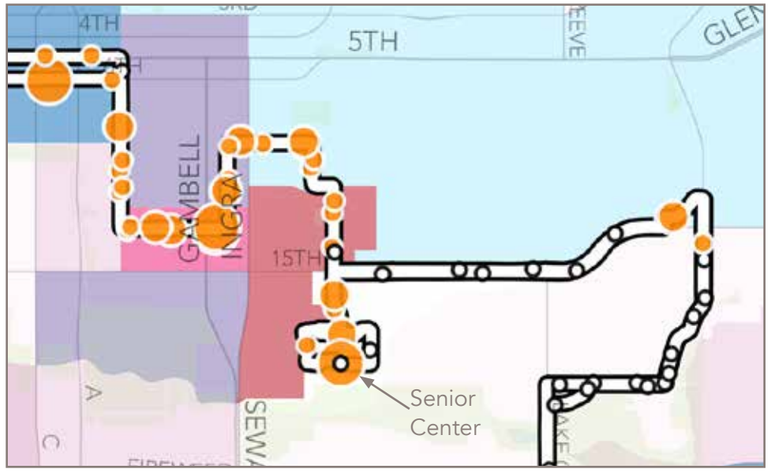
Figure 34: Route 60-Old Seward becomes very circuitous at its south end, adding about 10 minutes to the travel time for anyone riding to or from its end at the Huffman Business Park, but serving a neighborhood that would otherwise be a long walk from transit.



Deviations and circuitous routing are not inherently a problem in route design, but they express a particular value set in the design of the service. The circuitousness at the end of the 60-Old Seward expresses that a higher value is placed on covering more neighborhoods, and reducing people's need to walk to access transit, over providing direct and fast service between major destinations.

Similarly, the deviation of Route 13 to the Senior Center expresses that serving that destination is more integral to the purpose of the route than is attracting ridership between other points on the route. Accordingly, these routes will attract fewer through-riders, and more of the subset of people who benefit from the deviation, than they would if the route were more direct.

Figure 36: Route 13-University/Hospitals is very circuitous, and includes a large deviation to the south of 15th Ave. to reach the Anchorage Senior Activity Center.



More generally, a review of all of People Mover's fixed routes reveals that very few of them don't involve major deviations or circuitousness. Most routes do not offer direct travel between most points on the route. On some routes, such as the 8, 13 and 36, it is hard to find segments of the route longer than three miles over which the route would feel reasonably direct to riders. Even the most frequent and, arguably, ridership-oriented route (45-Mountain View) is still offering very circuitous travel among most of the pairs of points on the route. These four routes are shown in Figure 37.

Again, circuitous routes are not inherently wrong. They simply indicate that high ridership is not the routes' purpose, since high ridership transit successfully competes against other modes (such as driving and biking) only when it offers reasonably direct travel.

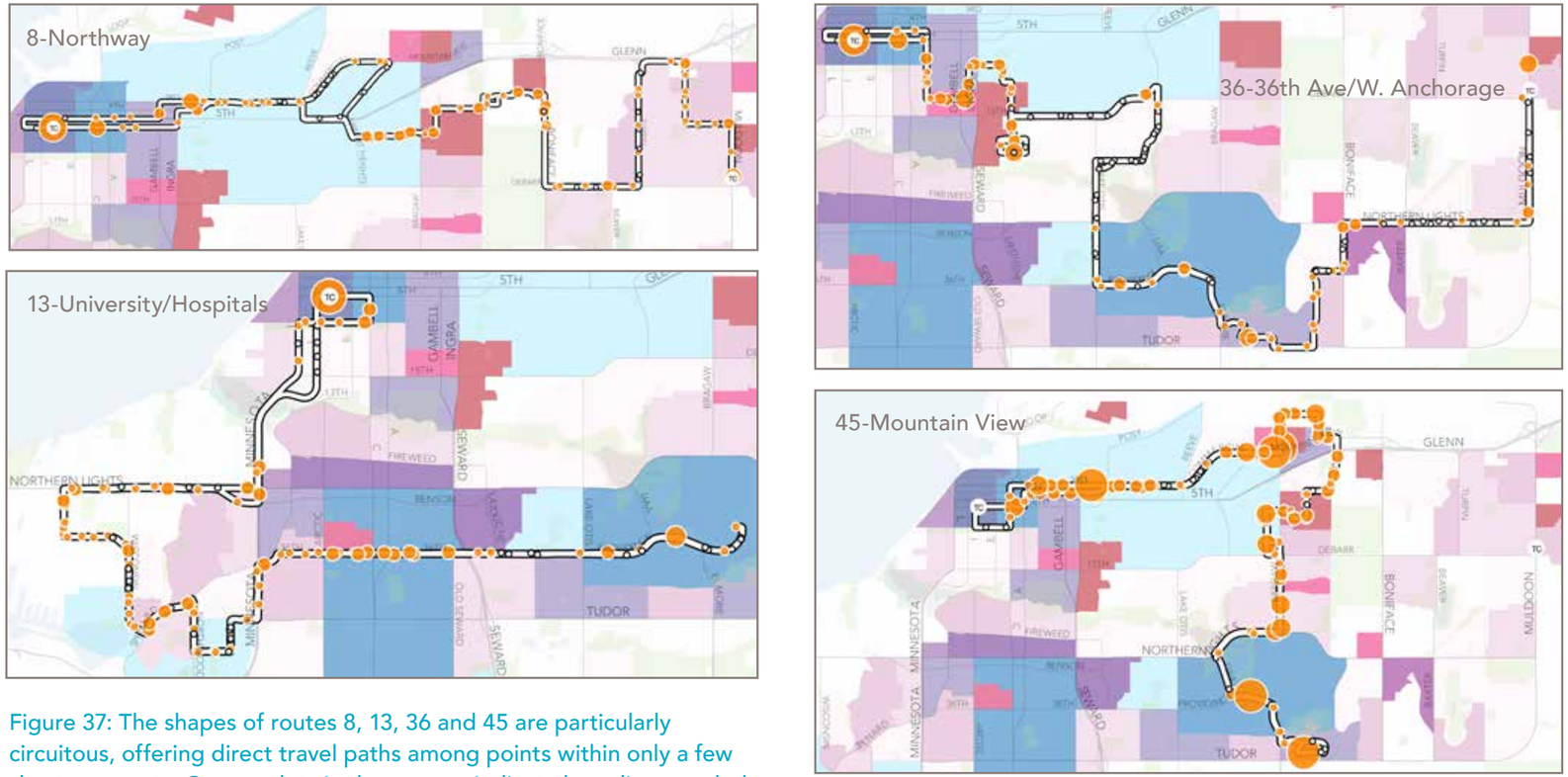


Figure 37: The shapes of routes 8, 13, 36 and 45 are particularly circuitous, offering direct travel paths among points within only a few short segments. Orange dots in these maps indicate boardings, scaled according to the number of boardings at each stop.

Radial complexity

A second notable design feature of the Anchorage transit network is its highly radial nature – all routes except for the 1-Crosstown converge in downtown Anchorage.

A radial network design ensures that anyone looking to travel downtown can make their trip without the need to transfer between routes. Because Anchorage is a highly centralized city, with a lot of employment and commercial activity in its core, it is important for people to be able to reach the center of the city easily.

However, this focus on radial service is also a choice, and is not inherent to all transit networks. It is a choice that has consequences for the usefulness of the network, and that therefore impacts ridership. While trips to and from downtown to most places in the city are easy enough, continuing on to other destinations is more difficult.

Imagine a person who wanted to use transit to travel from somewhere along Old Seward near Dowling to the intersection of Tudor and Elmore (where there is a very large boardings dot on the map on page 38, and where the Alaska Native Health Center is located). The three fastest options are likely to be:

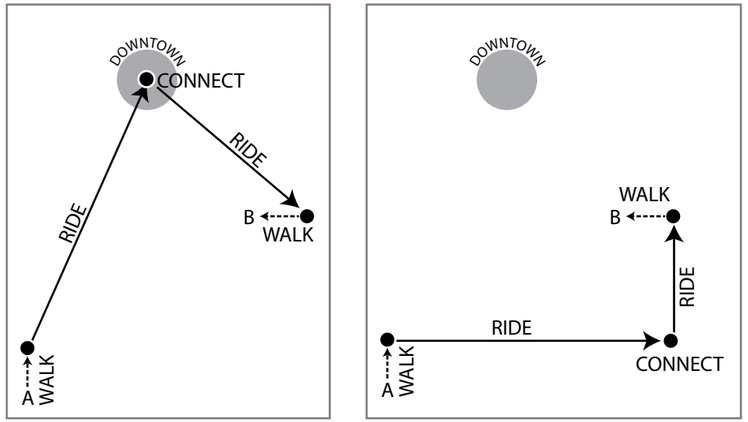


Figure 38: Purely-radial networks force all travel through downtown, sometimes resulting in out-of-direction travel (shown at left), but allowing an agency to invest in nice connection facilities at just a single downtown transit center. Grid networks allow more direct paths of travel among many places in the city (shown at right), but require connections at intersections all over the city.

- Walk 1 mile to catch the 1-Crosstown and ride it north, making sure not to miss the bus since it only comes once an hour, or...
- Catch the 60-Old Seward northbound, which also only comes once an hour, and then either...
  - Ride to Tudor and transfer to the 75-Tudor. This will feel reasonably direct. However, the 75-Tudor comes every 60 minutes in the midday, so on average they will wait for 30 minutes to make the connection (and sometimes, when they are very unlucky, they will wait 59 minutes). Or...
  - Ride out of their way, further towards downtown than they actually want to go, in order to catch the 3-Northern Lights, which comes every 30 minutes. Because of its higher frequency, they will have to wait less – on average, 15 minutes – to make the transfer.

All three options involve either a long walk, a long and unreliable connection, or riding a bus out of direction. Long walks and long waits are particularly unappealing in the winter. While the Downtown Transit Center has an indoor waiting area, and most routes connect there, traveling all the way downtown just for an indoor waiting area adds a great deal of out-of-direction travel to the trip (as illustrated on the left side of Figure 38).

In a network with more frequent routes running in a grid pattern, a person making this trip would probably have the option of transferring to a 30-minute route to the Alaska Native Health Center without having to travel extra distance towards downtown to do so. A frequent grid requires transfers, but in exchange it offers access to many destinations, faster, with less out-of-direction travel.

> Dense developments have popped up all over the city, and a great deal of travel does not involve downtown at all. Yet the network is still primarily radial, with downtown as its main connection point.

The circuitousness described in the previous section is likely related to both the radial nature of the network and to a reluctance to ask people to transfer. As dense residential and commercial developments have popped up all over the city, a great deal of travel demand does not involve downtown at all. Yet the network is still primarily radial.

It may be that People Mover has attempted to serve growing everywhere-to-everywhere travel demand by sending individual routes into many different places, so that each route offers a one-seat-ride between many destinations, including downtown. This necessarily makes most routes very circuitous.

Some transit agencies attempt to improve the utility of their networks for everywhere-to-everywhere travel by establishing a grid of crosstown services that allow connections outside of downtown. (This is especially true in sprawling cities and suburbs in the LA, Chicago and Vancouver, BC, metro areas. Smaller cities like Fresno, CA; Spokane, WA; and Detroit, MI, also use grid networks).

People Mover has one dedicated crosstown, the 1-Crosstown, and many of its other routes have short crosstown segments (such as the 36, shown in Figure 37). However, because most of these routes run at low frequencies, the waiting times for connections are long, and the waiting environments at some of Anchorage's largest intersections can be unpleasant (due to high vehicle speeds, noise and pollution).

Duplication

Radial networks and high-coverage networks both tend to have a lot of duplication among individual routes. This occurs in radial networks because the number of possible transit paths into downtown is limited, so routes pile up on top of one another as they approach downtown. This can be positive – if those paths are along walkable, dense corridors, and if the duplicative routes can be scheduled so that the buses offer regular frequency on that shared corridor, the result can be a useful, high-ridership segment.

Duplication sometimes arises in high-coverage networks because a limited number of roads offer transit paths to neighborhoods that are each given their own unique coverage route.

For example, the 15-Debarr overlaps with other routes for the entirety of its route, except in the segment between Airport Heights Drive and Boniface. In the eastern segment along Debarr, the 1, 3 and 8 all overlap with the 15. In the western segment along 15th, a person could use the 13 more or less interchangeably. In fact, all of these routes (the 1, 3, 8 and 13), are likely in direct competition with the 15 for customers. The 1, 8 and 13 are half as frequent, and much more circuitous, but might get someone closer to their final destination. The 15 offers shorter waits (which make transfers from the 45 less onerous) and faster travel, but requires more walking.

We can also observe a great deal of duplication in services with their endpoints in downtown and the University. Five all-day routes, plus the peak-only 102, connect these two destinations. Ridership between a major university and a downtown core is typically very high in most cities, and this is the case in Anchorage as well – especially on Route 45, the most frequent People Mover route. However, travel between downtown and the University needn't be provided only by single routes, which as we've seen increased circuitousness and complexity. It could also be provided by connections outside of downtown if the frequency of crosstown routes were increased.

Figure 40: Route 15-Debarr is duplicated by other routes along nearly its entire path.

Figure 41: Typical winter conditions at a People Mover bus stop. In Anchorage, a "walkable" street needn't just have sidewalks and safe crossings; it must have sidewalks that are reasonably clear of snow and ice. Only in downtown are sidewalks maintained to such a standard.

Disconnected streets

All of the network characteristics described above – complexity, poor linearity and duplication – probably relate, in Anchorage, to choices made about the street network.

In thinking about walkability, we are almost always focused on the existence and quality of sidewalks and safe crossings, and these are certainly necessary minimal features of a walkable place. In Anchorage, maintaining sidewalks in winter is a known problem, especially sidewalks that are directly adjacent to large roadways and become covered in snow and ice.

However, even when there are sidewalks and safe crossings, the design of the street network itself can severely limit walking, and in doing so can limit the ridership potential of a transit stop or route.

To understand how, compare the two street networks in Figure 39, at right:

- The grid of streets in downtown Anchorage has very high connectivity. This means that of the places around a transit stop, most of them will be within walking distance, because the street network offers such direct paths. This means that a single stop in a connected street network can serve a fairly large area.
- The looping streets and cul-de-sacs just south of Abbott Road have low connectivity. (Yet the road bisecting the neighborhood, Independence Drive, can be pleasant to walk along.) This means that of the homes around the transit stop in that neighborhood, only a few are within a short walk. The street network requires people to walk far out of their way. A single stop in a disconnected street network, like this one, is not accessible to as many people as in a more connected street network.

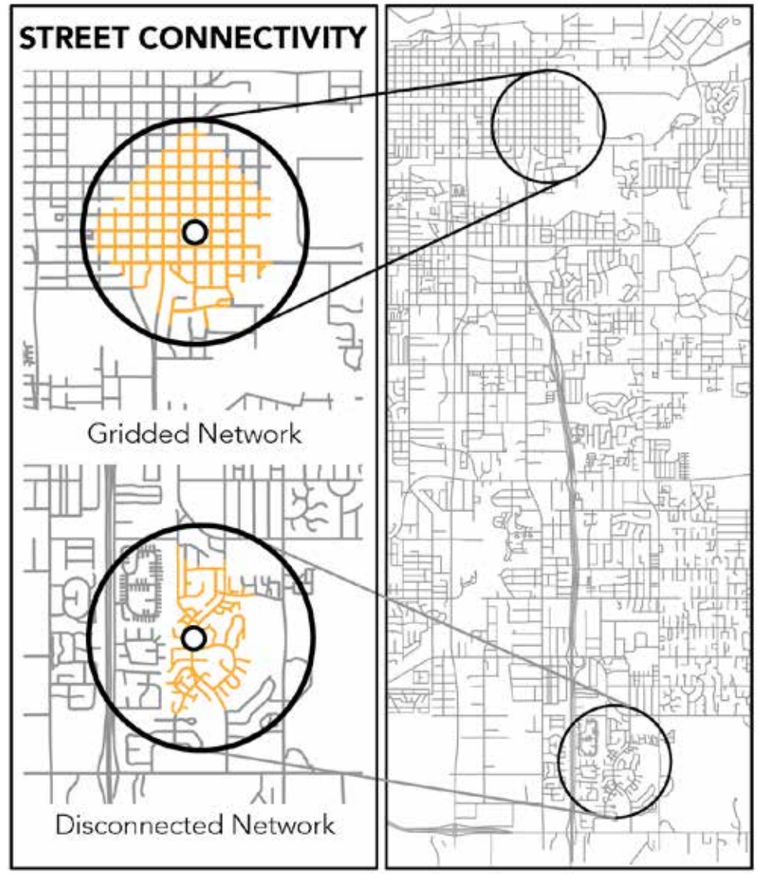


Figure 39: In a connected street network, as in downtown Anchorage (inset at top), nearly all of the places within 1/2 mile of a transit stop are within a 1/2 mile *walking* distance. In a disconnected network, as at bottom, a transit stop might be within 1/2 mile of many activities by *flying* distance, but the lack of street connections means that few people nearby the stop can actually access it by walking less than 1/2 mile.

- A secondary effect of disconnected street networks is that they require those roads that *do* go through to be even larger, in order to handle all the traffic that is forced to use them. This means that neighborhoods are surrounded by wider roads and bigger intersections, which makes walking or accessing transit on those main roads less safe and less pleasant.

It is worth noting that the Municipality of Anchorage has done a good job using off-street trails to connect dead end streets and suburban-style developments, so that street connectivity is higher for walking and biking than it is for driving. However, there are still many places in the city where, even with the trails, walking connectivity is poor. In addition, there are many roads that are completely accessible to cars but are so hostile to walking that they serve as barriers rather than connections.

If a transit stop is only within walking distance of a small set of places, then a transit agency needs to run more circuitous and looping routes in order to get close to everyone. For example, the Nunaka Valley area, between Boniface and Baxter, has no east-west street connections (the disconnected streets are visible, in grey, in Figure 42). Someone living in the middle of that zone can walk to either Boniface, or Baxter...but not both.

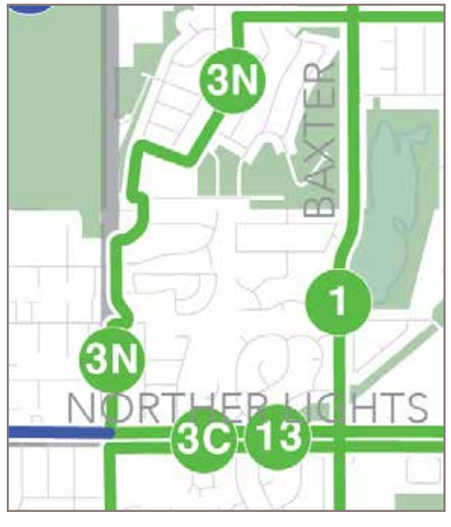


Figure 42: The Nunaka Valley area, just north of Northern Lights, has no east-west street or trail connections. This means people are either walking distance from the 3N, or from the 1, but not both. The need to cover every through-street forces transit agencies to divide service into more routes and thereby into lower, less-useful frequencies.

This means that People Mover must choose between three bad choices:

- Dividing service into two infrequent routes to service both north-south streets.
- Offering more frequent and useful service on only one street, out of walking distance of half of the population of that zone.
- Running an extremely circuitous single route that weaves across east Anchorage, travelling on both Boniface and Baxter.

Poor street connectivity forces the transit agency into this choice. Thus low street connectivity can contribute to low linearity, low frequency, higher complexity and ultimately lower ridership on a transit network.

Difficult intersections

Disconnected streets offer the biggest challenge to walkability, because certain places are just too far away to walk. The other major way that Anchorage street design and management decisions affect walkability, and therefore transit access, is in the design of major intersections.

As described above, gridded transit networks can offer people faster and more direct travel between many different places by allowing for transfers outside of downtown or a small number of Transit Centers. This only works if the frequencies of grid routes are high enough that any transfer between a pair of routes, at the intersection where they cross, requires only a short wait. People Mover does not yet offer frequencies that are high enough to accomplish this.

The other barrier to making transfers anywhere on a frequent network easy is the transferring environment. The intersection in Figure 43 where someone connects between two crosstown routes is crucial: if the connection is safe, fast and comfortable, then the short wait is no problem.

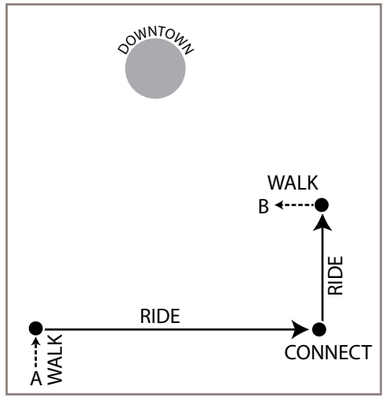


Figure 43: A grid network can offer great cross-town mobility, but depends on both high frequencies and safe, appealing intersections where routes cross one another and people make connections.

Unfortunately, many of Anchorage's large intersections are fast, uncomfortable, and feel unsafe for walking from one bus stop to another, which would depress demand for transfers at these intersections even if People Mover were to offer frequent, intersecting routes. One such intersection, Tudor and Lake Otis, is shown in Figure 44. These intersections were designed to maximize the throughput of cars, and as a result they offer pedestrians:

- Long waits to walk across the street (as long as 2 1/2 minutes).
- Long walks between bus stops, since bus stops close to the intersection would interfere with the free movement of right-turning cars.
- Un-signalized crossings of free-flow right turn lanes (in the case of Lake Otis, below, *double* free-flow right turn lanes).

Like many other parts of the Ridership Recipe, walkability depends a great deal on street design and operations decisions. In many cities, one agency designs and operates streets, and an entirely separate agency provides transit. Fortunately, in Anchorage, most of the streets and intersections are managed by the Municipality (some are managed by the State DOT), and all of the transit service is provided by the Municipality. This means there is great potential for coordinating transit decisions (like, whether to encourage transfers between frequent routes wherever they cross) with street design decisions (whether to operate those intersections for maximum car throughput or for other goals).

This coordination happens even in places where different agencies control walkability and transit service. At many intersections in Portland, Oregon, where much of the city is covered by a frequent transit grid, bus shelters are placed very close to the corners. In the example at right in Figure 44, three agencies are involved: the east-west street is managed by the City, the north-south street is managed by the state DOT, and the transit service is managed by a regional provider. This Portland intersection is particularly important, because it is close to a community college campus.

Placing bus stops near corners gets in the way of right-turning cars (and certainly makes uncontrolled double-right-turn lanes, like those on Lake Otis, impossible). In trade, it makes the walking and transferring experience as excellent as it can be on these otherwise wide, car-oriented roads.

Figure 44: At left, bus stops are not allowed near the intersection of Lake Otis and Tudor, so transferring between routes there can involve a 1,000 foot walk (about 1/8 mile). In addition, people walking between bus stops face long waits to cross the street, and frightening crossings of right-turn slip lanes that are uncontrolled by traffic lights. At right, a pair of large roads in East Portland intersect. Both are served by frequent buses, and the bus stops have been placed as close to the corners as possible, allowing people to transfer with short walks or, for some directions, no walk at all.

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5. Key Choices

Ridership or Coverage?

The most fundamental choice before the Municipality of Anchorage concerns ridership: *How important is maximizing ridership within the Municipality's fixed budget for transit?*

A goal of maximizing ridership serves several common intentions for transit, including:

- Low subsidy, because more of the revenue comes from fares.
- Vehicle trip reduction and emissions benefits.
- Support for denser urban development, where people can drive less and own fewer cars. (These places are called "transit-supportive corridors," but of course the relationship between the transit and the development is mutually-supportive.)

On the other hand, all sorts of other non-ridership transit goals also exist, and are also valid and important uses of transit resources. These include:

- Ensuring that everyone throughout the service area has access to some transit service.
- Providing lifeline access to critical services.
- Providing access for people with severe needs.

No transit agency focuses solely on either of these goals. Most transit agencies have routes that generate a lot of ridership very efficiently, and other which don't draw as much ridership but which have an important social purpose.

Many transit agencies act as though these goals were not in conflict, promising that they will "increase ridership while ensuring that all residents have access," or "reduce congestion" and "provide access for all." This generally leads to a feeling among the public, elected officials and even transit staff themselves that no matter what they do, they are failing to achieve their goals.

In a sense, they are failing no matter what they do, because their adopted goals are in conflict. If a high-ridership bus line is crowded, they are scolded for not offering enough frequency there; yet if they remove buses from a low-ridership line to reallocate them to the high-ridership line, they are scolded for cutting access that some people rely on. Only by acknowledging the conflict between these goals, and explicitly deciding how much effort to use pursuing each, can a transit agency truly succeed at both.

It is often said about public and private organizations alike that if you want to know what really matters, look at their budgets. High-level policies are valuable, but when they are vague or in conflict, the real evidence of what a community values is in the budget.

Thus we suggest that Anchorage think about this choice not as black-and-white, but as a sliding scale that the community can help to set:

What percentage of the available budget for transit should be dedicated to generating as much ridership as possible, and what percentage should be spent providing transit where ridership is predictably low, but needs are high?

This is not a technical question, but one that relates to the values and needs of a community. We estimate that about 50% of the existing Anchorage fixed-route transit network is designed as it would be if maximizing ridership were its only goal. The other 50% has predictably low-ridership, suggesting that it is being provided for other, non-ridership purposes. This may be the right balance for Anchorage in the future, or the community may wish for a shift in emphasis.

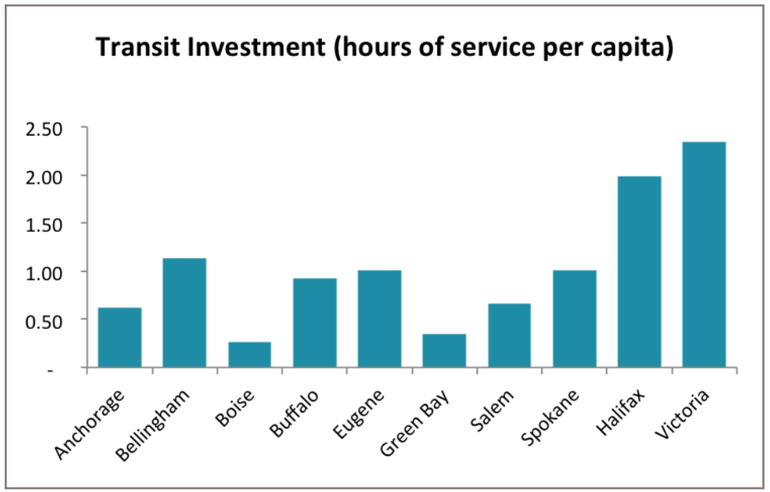
The direction of that shift – either towards higher or lower ridership – and how fast People Mover should make such a shift is a focus of Anchorage Talks Transit.

Resource Level: How Much Transit is Right for Anchorage?

The last question to consider in any visioning process around transit is the simplest: *Do we have enough transit service to support our goals?*

The choice of what goals transit should serve is very separable from the choice of how much transit service to provide. The Municipality could shift towards higher ridership, or higher coverage, within the existing transit budget. Transit outcomes would change as a result, even without a change in resources. This is a separate question from whether the sheer *quantity* of service in the Municipality is appropriate.

The way that these two separate questions can become related, however, is if people's level of confidence in the Municipality to deliver successful transit improves. If People Mover's goals are not currently aligned with the goals of the community it serves, or if people do not understand what goals People Mover is serving, then of course there will be a reluctance to increase investment in the transit system. Wrestling



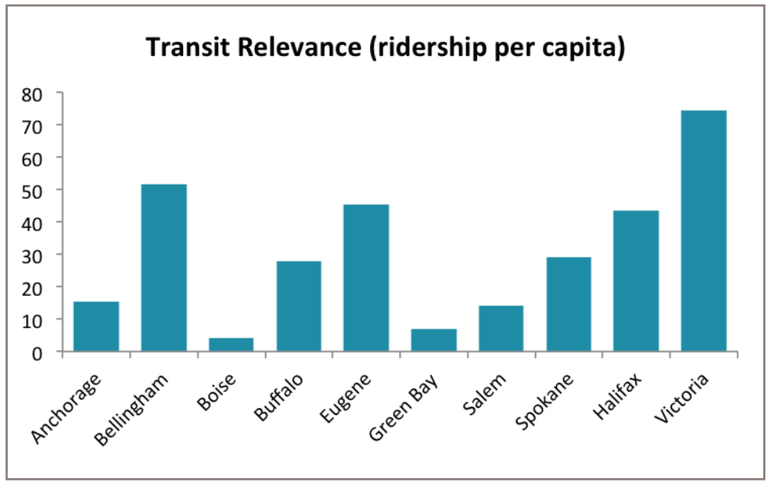


Figure 45: In these charts (repeated from page 30) similar patterns are visible in the level of investment in each peer city and the degree of relevance that transit has in people's lives. Anchorage provides little service relative to its population, and sees little ridership in return.

with the first choice – how to balance ridership and coverage – and altering the transit network to meet new, clearer goals, may improve people's sense that the transit network is delivering on their goals and is therefore worth further investment.

As mentioned earlier in this report, the Municipality of Anchorage provides less transit, relative to its population, than many of its peers. Transit is less relevant to the life of the municipality and its residents than it is in many of those peer regions.

On average across all cities, there is a simple relationship between the amount of service provided and the amount of transit ridership. This is clearest when U.S. cities are compared to Canadian cities, all of which spend more, per capita, on transit. Even a massively sprawling, car-oriented city like Calgary has very high transit ridership compared to its U.S. peers, because it puts out so much more service.

Anchorage could absolutely increase transit ridership without investing in more service. This would require cutting and reallocating low-ridership services, however, and while they may be low-ridership there are still small numbers of people who need them badly. The only way to substantially increase ridership *without cutting coverage services* is to provide more transit service. This almost always requires raising more funding.

The only way to substantially increase ridership *without cutting coverage services* is to raise and spend more money on transit.

Another way to express this same idea is that wrestling with ridership vs. coverage is much harder in an austerity situation, when competing goals are fighting for a small fixed budget. When there is new revenue available for transit, ridership can be increased without cutting coverage. The growing resource pot protects the community from having to make painful trade-offs between competing, but closely-held, values.

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6. Public Outreach and Engagement

Outreach Events and Efforts

Between April and September 2016, People Mover carried out a wide variety of public outreach events and activities. These events and efforts are described below. The insights into public priorities gained through these events are also described in this section.

- A **project website** was regularly-updated, collected public comments, and informed visitors of Anchorage Talks Transit events;
- 17 **Community Council presentations** that spread the word and established initial dialogues;
- A **marketing** effort encouraged participation in Anchorage Talks Transit events and discussions;
- A major **kickoff event** on May 5th at the Anchorage Museum was attended by 98 people, representing transit stakeholders from all walks of life;
- A **stakeholder workshop** held on May 6th included a diverse set of representatives from 38 government, non-profit, community, and business groups;
- A **web survey** in English, Spanish, Tagalog, Korean and Hmong was open from May 5 to June 15, and received more than 750 responses.
- **Transit Table** sessions were held at a variety of meetings and public spaces, including the Downtown Transit Center;
- **Community meetings** were held at the Chugiak-Eagle River Senior Center, the Muldoon Public Library, the Mountain View Public Library, and Dimond High School, collectively attended by 21 people;
- The **Anchorage Assembly** was briefed on key choices and public input at work sessions in August and September.

PROJECT WEBSITE

In addition to providing information on upcoming events, the Anchorage Talks Transit website allowed interested residents to sign up for project email updates, submit comments, and get in touch with the People Mover project team.

COMMUNITY COUNCIL PRESENTATIONS

People Mover visited 17 Community Councils in April 2016, giving a presentation at each meeting that introduced some key transit choices, and advertising the May 5th kickoff event and web survey. Presentations to Councils explained the trade-offs described earlier in this report, to pique the interest of the Community Councils and their networks. While People Mover was only able to visit 17 Community Councils, staff gave presentations at two meetings of the Federation of Community Councils (FCC), and partnered with the FCC to get the word out. For in-person Community Council visits, People Mover prioritized Councils that currently have bus service within their borders (see Figure 64 on page 100 for a list).

KICKOFF EVENT

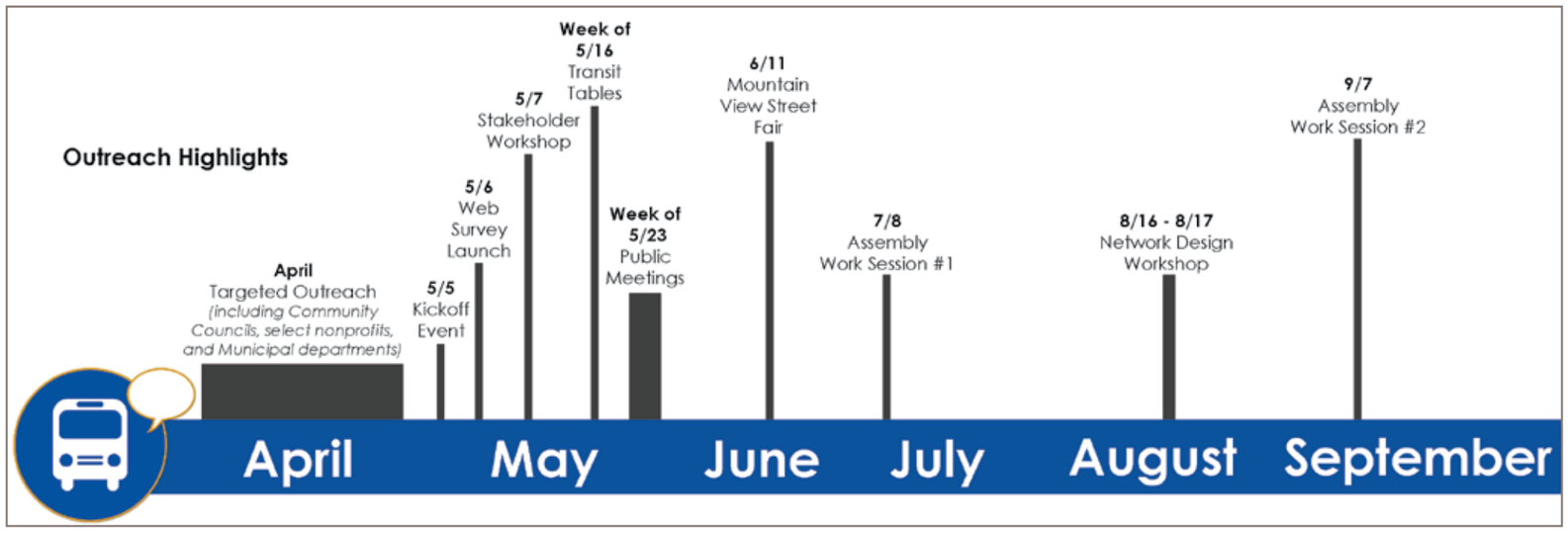
The kickoff event on May 5th included a guest lecture and Q&A session, and a set of boards inviting public input on Anchorage's key transit choices. The event attracted almost 100 people with diverse backgrounds and interests, and provided a lively forum for attendees to express their priorities and converse with staff. Interpreters were on-hand to provide translation services to speakers of Hmong, Spanish, Tagalog, Korean, and American Sign Language.

STAKEHOLDER WORKSHOP

A variety of non-profit, community, and business groups attended a four-hour interactive workshop, in order to work through some of the toughest trade-offs in Anchorage transit planning. The attendees were community leaders representing a broad swath of interests and constituencies. A total of 80 organizations received invitations, of which 38 sent representatives. In the workshop, these people learned about key transit choices, and took live polls on their preferences. These activities helped People Mover understand the transit priorities of the groups they represented, which included populations that are traditionally less likely or less able to attend public meetings or engage online.

WEB SURVEY

A web survey was open from May 6th, 2016 through June 15th, 2016 and received over 750 responses. It was an interactive, visually engaging survey (using a platform called "MetroQuest") that asked people to make choices and balance competing goals according to their own values. The survey was available in English, Hmong, Korean, Spanish, and Tagalog.



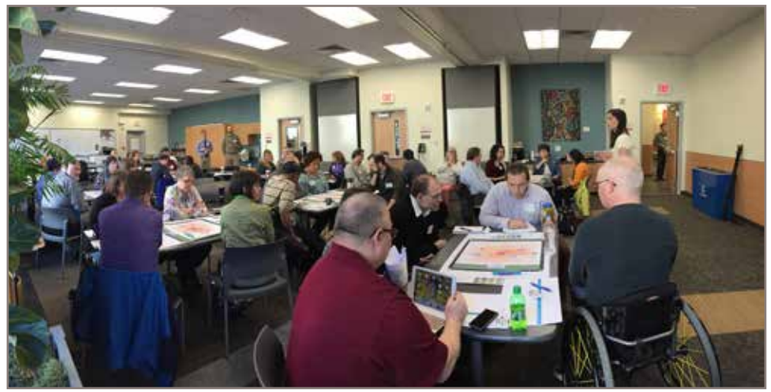


Figure 46: At the Stakeholder Workshop, 38 community representatives wrestled with Anchorage's tough transit choices.

TRANSIT TABLES

People Mover staff set up informational "transit tables" at the Downtown Transit Center, the Dimond Transit Center, Anchorage's Vision Zero Kickoff, the Mountain View Street Fair, and the Anchorage Transportation Fair. At all but two of these events, staff provided iPads that visitors could use take the web survey. At all events, staff discussed the project and its potential implications with all interested passersby.

COMMUNITY MEETINGS

During the week of May 23rd, People Mover held four evening community meetings to provide an open forum for interested people (a flyer promoting these meetings is shown in Figure 48). Staff presented information on Anchorage's key transit choices, answered questions, took written comments, encouraged attendees to mark their transit priorities on a series of posters, and provided iPads for taking the web survey. Twenty-one people attended these meetings in total, which were held at the Chugiak-Eagle River Senior Center, the Muldoon Public Library, the Mountain View Public Library, and Dimond High School.

Figure 47: Nearly 100 members of the public attended the May 5th kickoff event, for a lecture, Q&A, and a chance to give their input.

MARKETING

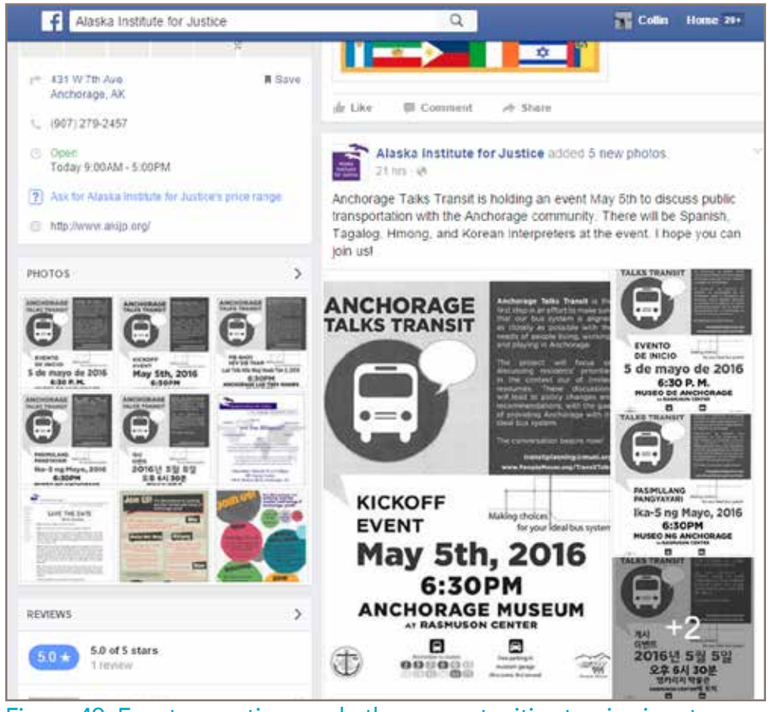
For all of these events and input opportunities, People Mover spread the word through social media, news media, radio and public notices made residents and businesses aware of the project. In addition, these marketing efforts highlighted various ways to get involved. Media engagement included print and online news advertisements in the Alaska Dispatch News, online advertisements with KTVA/CBS 11 and KTUU/NBC 2, event postings on Nextdoor, sponsored Facebook posts, Twitter updates, and informational flyers in several languages at local businesses, on buses, at the Downtown Transit Center, and at the Dimond Transit Center.

More than 5,200 people were engaged through social media, and print and web ads reached more than 200,000. (These numbers do not represent unique engagements or impressions, rather a total number that were reached or engaged across multiple ads. This means that a single resident could be counted multiple times if they were exposed to a variety of Anchorage Talks Transit ads.)

Figure 48: Notices in newspapers, Facebook, Twitter, news websites, and elsewhere garnered nearly 100 people at the public kickoff event.

ASSEMBLY PRESENTATIONS

Jarrett Walker + Associates presented to the Anchorage Assembly on July 8th and September 7th. The July presentation described the Anchorage Talks Transit project, explained the same transit choices that were presented to the public and stakeholders, and provided time for Q&A. The September presentation went into more detail, reported on public input received thus far, and sought initial feedback on the future network Concepts that are presented in the next chapter.



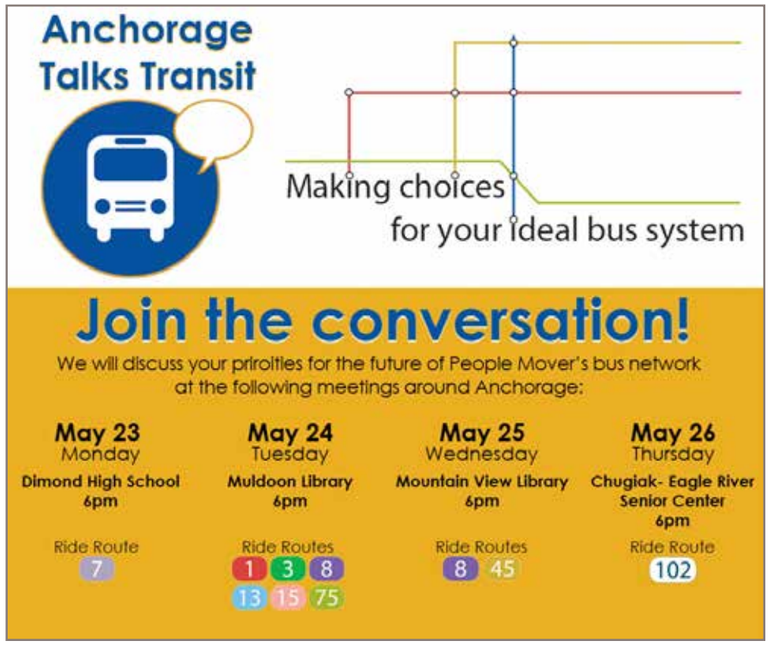


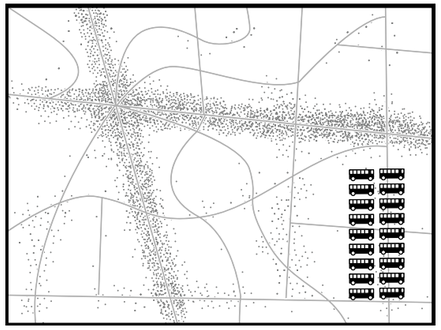
Figure 49: Events, meetings and other opportunities to give input were promoted by People Mover using flyers, notices on buses and social media ads, many of them in five languages.

Key Trade-Offs

At each event (and in the survey) we asked people to give input on certain key trade-offs that arise in transit planning for Anchorage:

- **Ridership vs. Coverage.** Should resources be targeted to provide the best possible transit service in high-demand areas, or should they be spread out so that all areas receive a little transit service?
  - Walking vs. Waiting. For the individual, the ridership-coverage trade-off is experienced as a trade off between waiting longer and walking farther. We asked the question in this form, too.
  - At the kick off event, public meetings, and in the web survey, this trade-off was illustrated using the fictional town example shown in Figure 50.
- **Connections vs. Complexity.** Should transit provide direct but infrequent service between any two points in a complex network? Or should routes be more frequent, and form a simple connected network that requires some transfers?
  - Faster travel vs. fewer transfers. For the individual, this trade-off is experienced as a trade off between faster travel (because waits are so much shorter) and fewer transfers (but longer waits). We asked these questions using the imaginary networks shown in Figure 51.

Figure 50: This demonstration of the conflict between maximizing ridership and maximizing coverage was used in public meetings and the web survey to elicit public input on how People Mover should balance ridership and coverage goals.

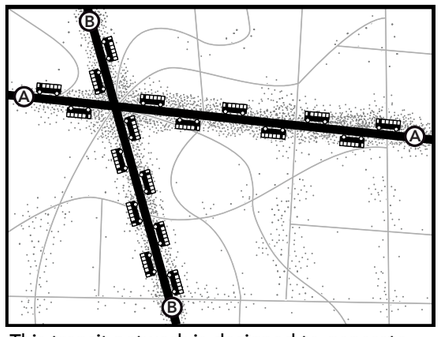


Imagine you are the transit planner for this fictional town. The dots scattered around the map are people and jobs; the streets shown are ones on which transit can be operated. The buses are the resources the town has to run transit.

Before you can plan transit routes, you must first decide what you want transit to do.

Ridership Goal

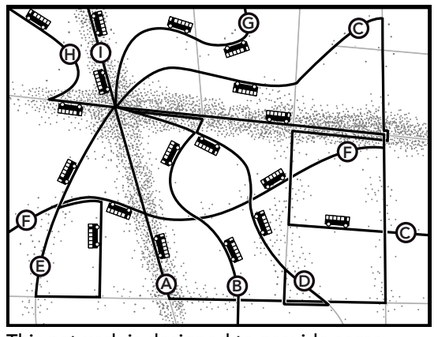
"Think like a business"



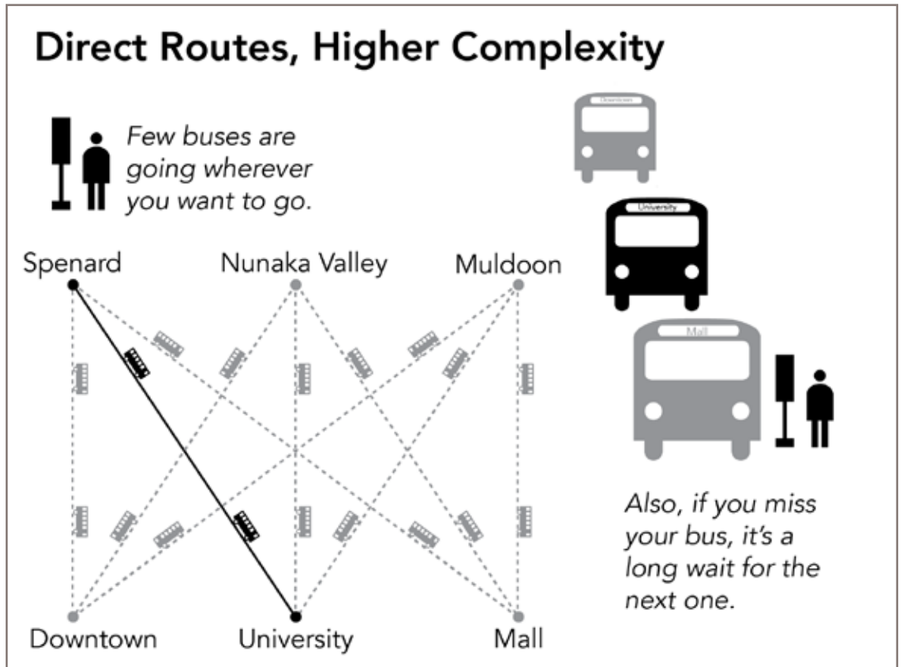
This transit network is designed to generate high ridership as efficiently as possible. The transit agency has thought like a business, investing its resources only into the best transit markets.

Coverage Goal

"Access for all"



This network is designed to provide some access to the transit system for all people. The transit agency has divided its resources among many routes throughout the town, none very frequent.



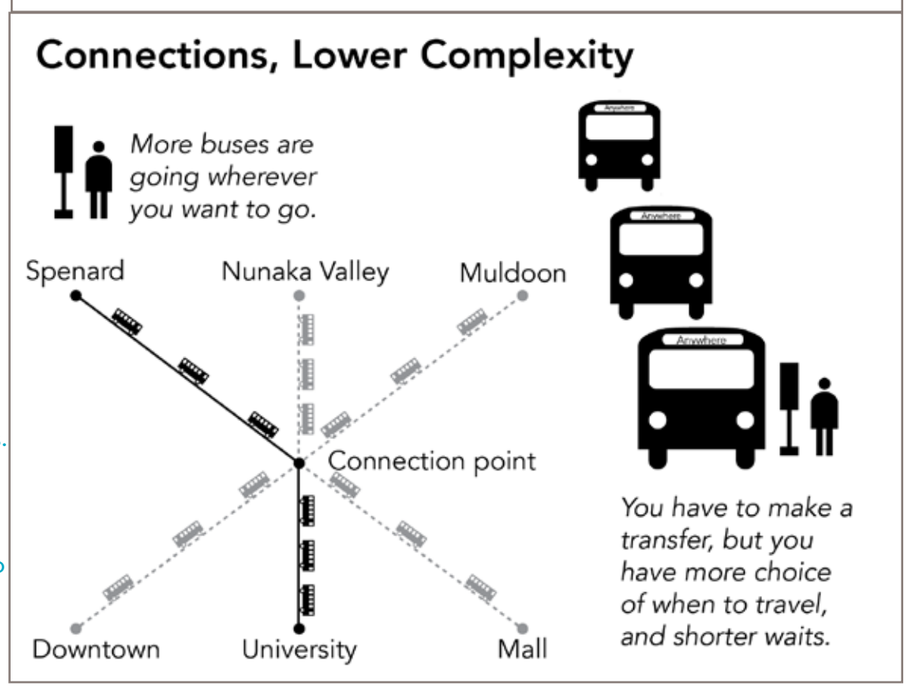


Figure 51: The trade-off between complexity and connections was presented using two imaginary scenarios. Web survey respondents and meeting attendees were asked to rate the scenarios according to their own values. Most respondents preferred the scenario at bottom. (The entire web survey was translated into Tagalog, Spanish, Hmong and Korean.)

- **Spending Priorities.** Given that every hour of transit service comes at a cost, when and where is it most important? At rush-hour? In the middle of the day? How about during evenings, or on weekends? How important is frequent service on major corridors, compared to coverage of low-ridership areas? The relative value of these investments was queried using a "coins" exercise, shown below.

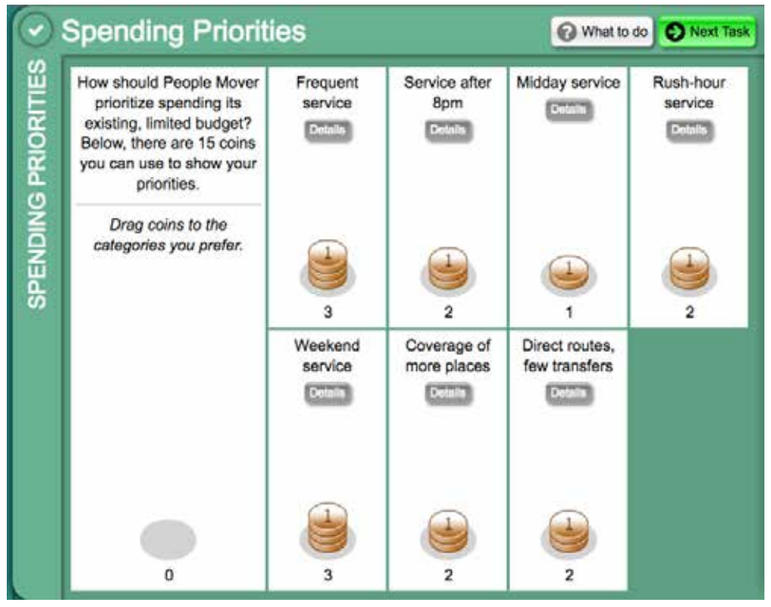


Figure 52: Web survey respondents were asked to rank certain features of transit service by spending a stack of 15 "coins" on them. A similar exercise was offered to people at the kick-off event.

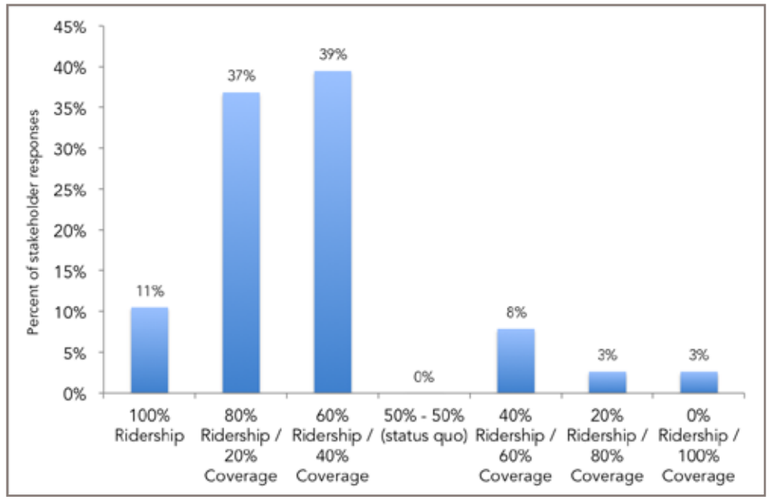


Figure 53: The 38 attendees of the stakeholder workshop were asked how they thought People Mover should balance ridership and coverage goals. Their responses are shown at top. Figure 61 shows their response to a related trade-off: walking more to frequent service vs. waiting more for infrequent service.

Key Insights

Based on input received, it appears that the community has broadly expressed support for the following positions:

Shift service investment away from coverage, towards higher ridership

On average, participants in this process valued high ridership more than geographic coverage, but most still support spending *some* resources on coverage.

- At the stakeholder workshop, nearly 40% of stakeholders favored a 60/40 ridership-coverage split, and over 35% preferred an 80/20 split (as shown in Figure 53).
- Almost 65% of kickoff event attendees favored ridership over coverage when presented with a direct trade-off (as shown in Figure 55).
  - However, service frequency and coverage were mentioned in nearly equal amounts in free-form comments submitted at the kick-off event (38 vs. 42).
- Over half of community meeting attendees favored pursuing ridership over providing coverage.
- In the web survey:
  - Ratings for the "ridership" scenario averaged 3.3 out of 5 stars (600+ responses) (as shown in Figure 54).
  - Ratings for the "coverage" scenario averaged 2.4 out of 5 stars (450+ responses).
  - More respondents selected ridership indicators (e.g. "service in busy places", "shorter travel times") as priorities than selected coverage indicators (e.g. "some service for everyone", "shorter walks") (as shown in Figure 62).

Emphasize frequency and connections rather than one-seat-rides and complexity.

When presented with the choice of having more routes that go directly between key locations, but infrequently; or a network of fewer routes that requires more transfers, but with more frequent routes, most people preferred the latter. This choice was illustrated in the survey and other public events using the diagram in Figure 51.

- Over 90% of kickoff respondents favored connections (as shown in Figure 57).
- Over 50% of community meeting respondents favored connections.
- In the web survey:
  - Ratings for the "connected" scenario averaged 3.7 out of 5 stars (400+ responses), as shown in Figure 56.
  - Ratings for the "complex" scenario averaged 2.1 out of 5 stars (400+ responses), as shown in Figure 56.

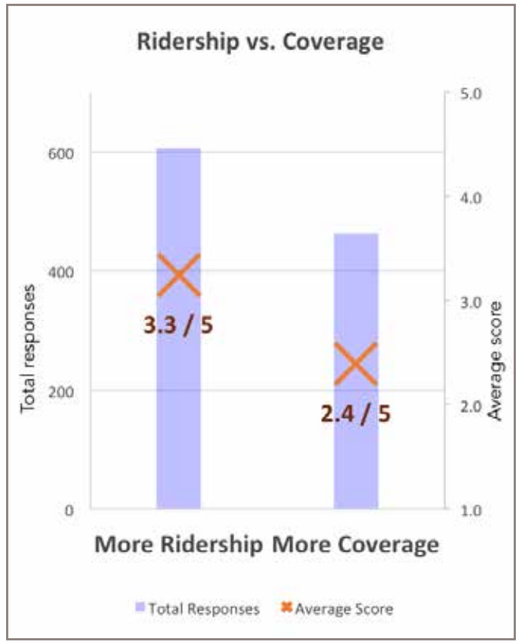


Figure 54: The 755 web survey respondents preferred, on average, the high ridership network over the high coverage network, shown in Figure 50.

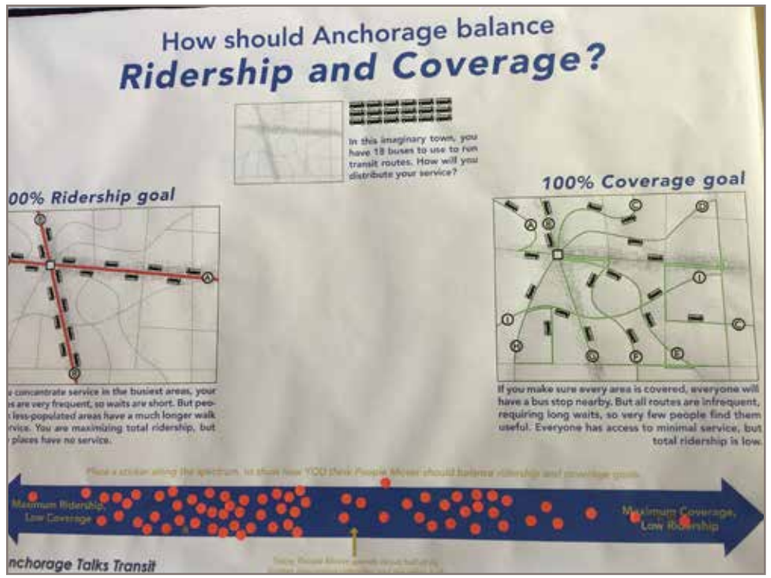


Figure 55: At the public kickoff event, nearly 100 people were invited to place stickers representing their preferred balance between ridership (at left) and coverage (at right) goals.

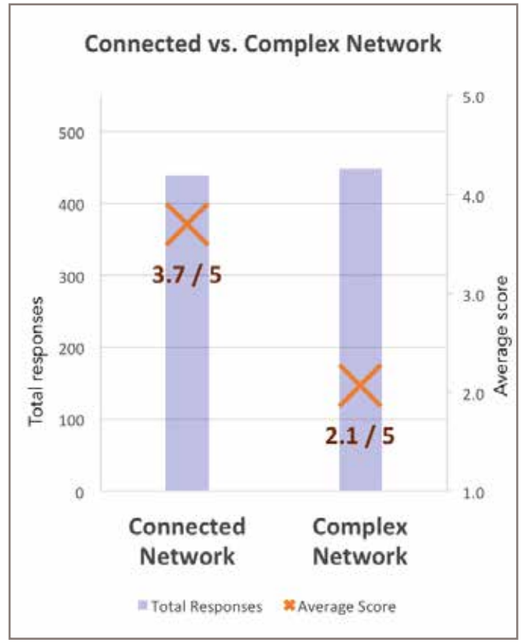


Figure 56: Web survey respondents preferred, on average, the frequent, connected network (that requires more transfers) over the complex network of one-seat-ride, but infrequent, routes.

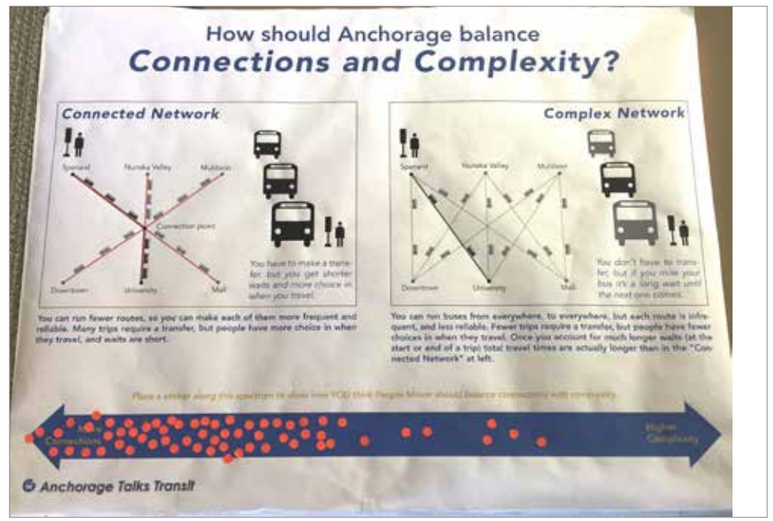


Figure 57: At the public kickoff event, people were invited to express their preference for a connected network that requires more transfers, at left, or a complex and infrequent network that requires fewer transfers, at right.

Funding frequent service is a high priority, as are expanding the hours of evening and weekend service.

- Given three "gold stars" to spend on priorities, kickoff attendees spent the most stars on frequent service (approximately 60), weekend service and evening service (approximately 40 each) (as shown in Figure 58).
- A significant number of kickoff attendees (26) provided free-form comments expressing a desire for longer service duration. Fifteen of these specifically mentioned either evening, late-night or 24-hour service.
- Given 15 "coins" to spend on transit service, web survey respondents spent an average of 3 coins on frequent service, but only 2 coins on weekend, rush-hour and evening service, and less than 2 coins on expanding coverage, more direct routes, and midday service (as shown in Figure 59).
- Over 85% of stakeholder workshop attendees voted for shifting transit service away from rush hours and toward more evening and weekend service (as shown in Figure 60).

Design service so that shorter waits are prioritized over shorter walks.

- When asked about their personal preferences, over 45% of stakeholder workshop respondents said they were "willing to walk more in order to wait less." An equal number said they would "do whatever gives me the shortest travel times" (which, at a network level, means more frequent routes that require longer walks, rather than infrequent routes that get close to more places). This response is shown in Figure 61.
- "Shorter waits" and "shorter travel times" received the highest rankings of all potential priorities in the web survey. Nearly twice as many respondents selected "shorter waits" (400+) as selected "shorter walks" (200+) among their priorities (as shown in Figure 62).

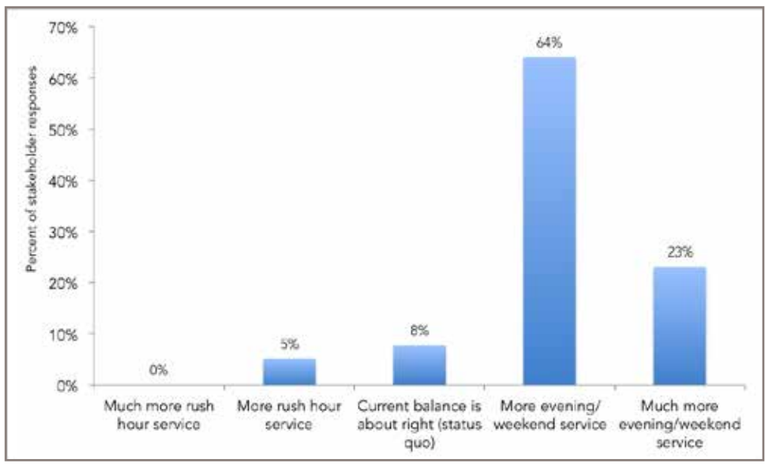


Figure 60: At the stakeholder workshop, the group was polled on their preferences for rush hour service vs. service at other times. On average, they strongly support more evening and weekend service (at right).

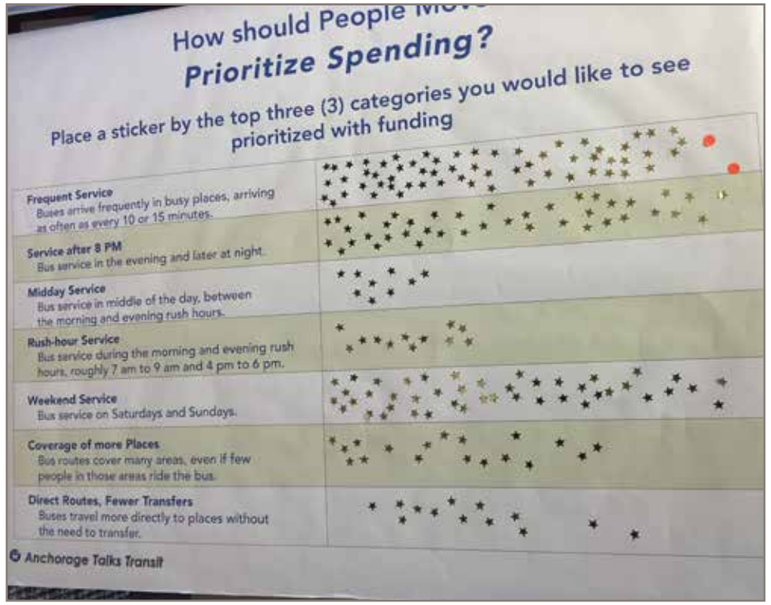


Figure 58: Each of the 98 people who attended the kickoff event was given three gold stars to place on this board, according to the service features that were most important to them. "Frequent service," "Service after 8 p.m." and "Weekend service" received far more stars than the other features.

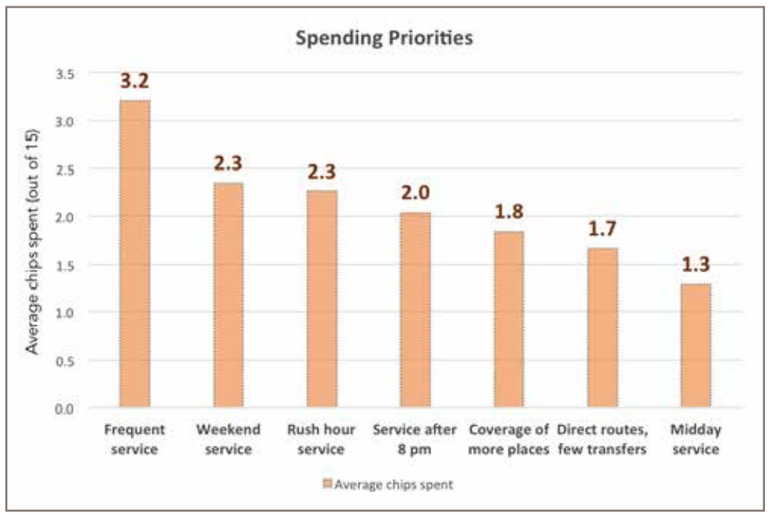


Figure 59: Web survey respondents were given 15 "coins" to spend on certain features of transit service. This chart shows the average number of "coins" spent by each respondent on each potential area of investment. Frequent service, at left, received far more support than any other type of investment.

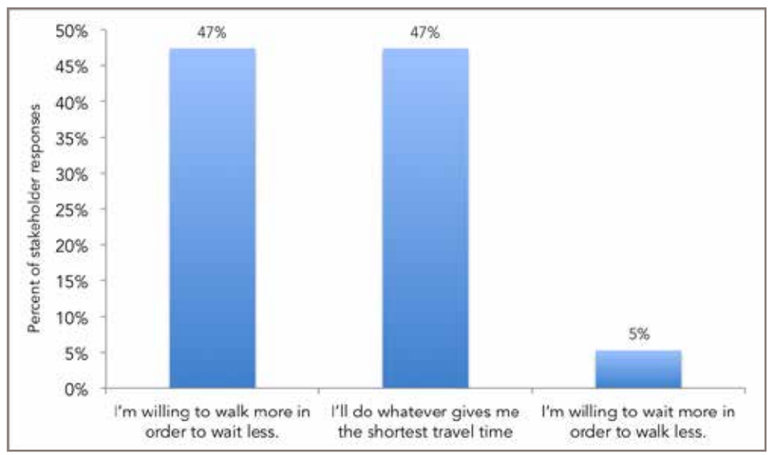


Figure 61: Asked about their own individual preferences, stakeholder workshops attendees expressed a strong preference for walking farther in order to wait less (or for doing whatever is fastest, which is often walking farther to more frequent service).

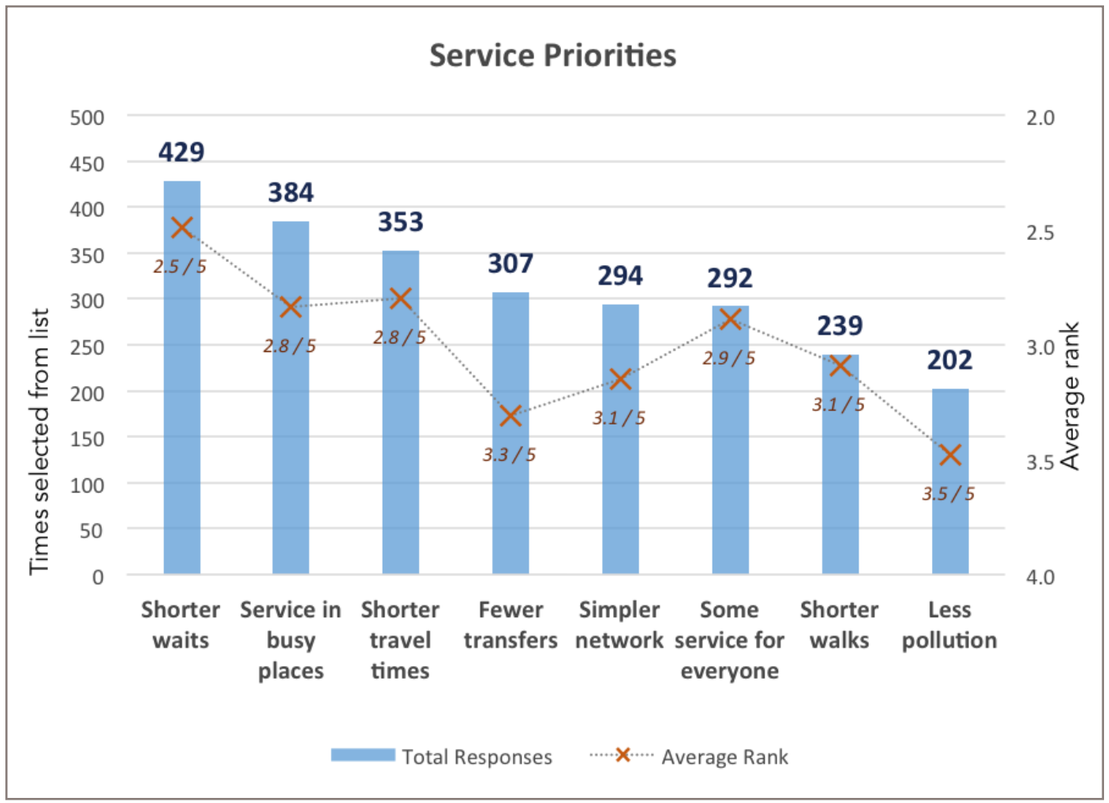


Figure 62: Web survey respondents were asked to select transit service priorities from a list, and then rank them according to their own values. This ranking can be used to inform many of the trade-offs and choices described in this report, especially the trade-off between shorter waits (ranked highest, at left) and shorter walks.

Next Steps in Public Engagement

A great deal of public conversation, thought and input took place in the spring and summer of 2016 regarding these trade-offs for transit in Anchorage.

In the next phase of the conversation, the municipality will showcase three alternative concepts. These concepts will illustrate how the People Mover network would change *if* the municipality shifted some budget away from providing geographic coverage and towards higher frequency service and higher ridership.

These three alternative concepts are described in the following chapter.

The quantity of transit service in Anchorage is too low.

Most of the questions asked of stakeholders, meeting attendees and the public focused on how People Mover should make trade-offs within the existing budget. However, when asked (and when not asked) many people expressed their desire for a greater quantity of transit service in the Municipality.

- Nearly 80% of stakeholder meeting respondents said that they desire more total service (as shown in Figure 63).
- While a sizeable minority wishes to maintain some coverage services, the consistent prioritization of both more frequent service and expanded service into evenings and weekends points to interest in a higher overall quantity of transit service. Within a fixed budget, these service features must be traded off against one another, or against geographic coverage. All of these desires cannot be satisfied at the same time within the existing budget.

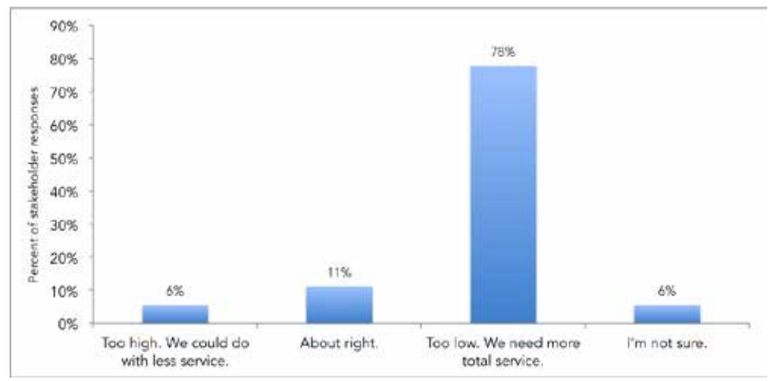


Figure 63: After lengthy discussion of how Anchorage's existing transit budget could be spent towards different goals, stakeholder workshop attendees were asked whether the *sheer quantity* of service in the municipality is right. They responded that it is too low.

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7. Alternative Concepts

The Municipality of Anchorage has commissioned these three concepts in order to ask the public how People Mover should balance the competing goals of ridership and coverage. These concepts also contain new service design ideas that warrant public discussion.

A Few Cautions

These Concepts Are Not Proposals

A proposal is something that is being put forward as a recommendation. *At this stage, neither People Mover nor the consultant is recommending anything.* The result of the public conversation about these concepts will help guide the Municipality in developing the Preferred Network.

No Concept is Preferred at this Stage

Neither the consultant nor People Mover staff have any preference among these concepts, and have no desire to steer the conversation to a particular result.

The most important word in this report is the word "*if*." The concepts show what might happen *if* the Municipality chooses to focus more of its resources on areas with high ridership potential.

The Big Picture Matters More than Details

When we sketch network concepts for public discussion, we do so with less attention to detail than we would when developing a final proposal for implementation. Please do not judge any of the Concepts on small routing details, since these can change as the Preferred Network is developed.

The point of these concepts is the "big picture" contrast: *Which of these networks, with its outcomes positive and negative, best reflects how you would balance the competing priorities?*

Design Process

These network concepts were designed collaboratively by Jarrett Walker & Associates, People Mover staff and other Municipality planning staff, in a two-day retreat at the end of the summer of 2016.

The inputs to this design process were the considerable public input received thus far, the land use and demographic maps shown in Chapters 2 and 3, and the performance of existing transit services also reported in Chapter 4.

The concepts were designed to be realistic, technically sound and operable by People Mover. However, none of the concepts were intended as proposals. Rather, the three concepts were designed to illustrate the spectrum of choices for Anchorage, and support the ongoing conversation about how to balance frequency and coverage in the People Mover network.

Frequencies and Spans of Service

On the following pages, transit routes are mapped based on their predominant weekday frequencies. These frequencies are "predominant" meaning that they are provided for at least 12 hours each weekday. Another 3-4 hours of service is typically provided each day, at a lower frequency.

For example, a blue route offers 30-minute frequency for 12 hours each weekday. For an additional 4 hours each weekday (late in the evening, and very early in the morning) that route offers 60-minute frequency. Similarly, a red route represents 15-minute frequency during the day, and a few additional hours of 30-minute frequency at night.

In general, as you move from the Existing Network to the 100% Concept, the hours of *frequent* service offered each day and each week on red and blue routes increases.

The total spans of service – the hours each day and each week when routes operate *at all* – also increase as you move from the Existing Network to the 100% Concept. This is summarized at the top of each map, for weekdays and Sundays. (Total spans of service on Saturday change little, though frequency on Saturdays changes a great deal.)

All of the routes represented in the future Concepts would have "flat" schedules, meaning they would offer a consistent frequency all day long, with no increases in frequency during rush-hours. The exception is the rush-hour-only Eagle River/Chugiak express route, in the 60% Concept, which would *only* run at rush hours.

Overview of Outcomes

The outcomes of transit networks can be measured in several ways, each of which matters to different kinds of public policy or citizen interest.

As you move from the existing system to the higher-ridership concepts:

- **Ridership goes up.**
- More **people can reach more opportunities** (employment, shopping, residential, etc.) in a given amount of time, so transit is simply more useful for more purposes.
- **Larger and larger *areas* are unserved,** and these are very obvious when you compare the network maps. However, because these are low-density areas, the number of people and jobs no longer served is much lower than you might guess from the visual impression made by the maps.
- **The number of people and jobs on the frequent network**, where transit can be used spontaneously because it's always coming soon, increase dramatically. Frequency correlates so strongly with ridership that this also is a reason for high ridership expectations.
- The number of places where the Municipality can encourage **transit-supportive and affordable development** is increased.
- **The network gets simpler,** which makes it easier for people to use the first time. By concentrating service into fewer lines, those lines become more frequent. Fewer lines mean the network is easier to remember, and you do not have to look up a schedule – the bus is always coming soon.

Existing Network

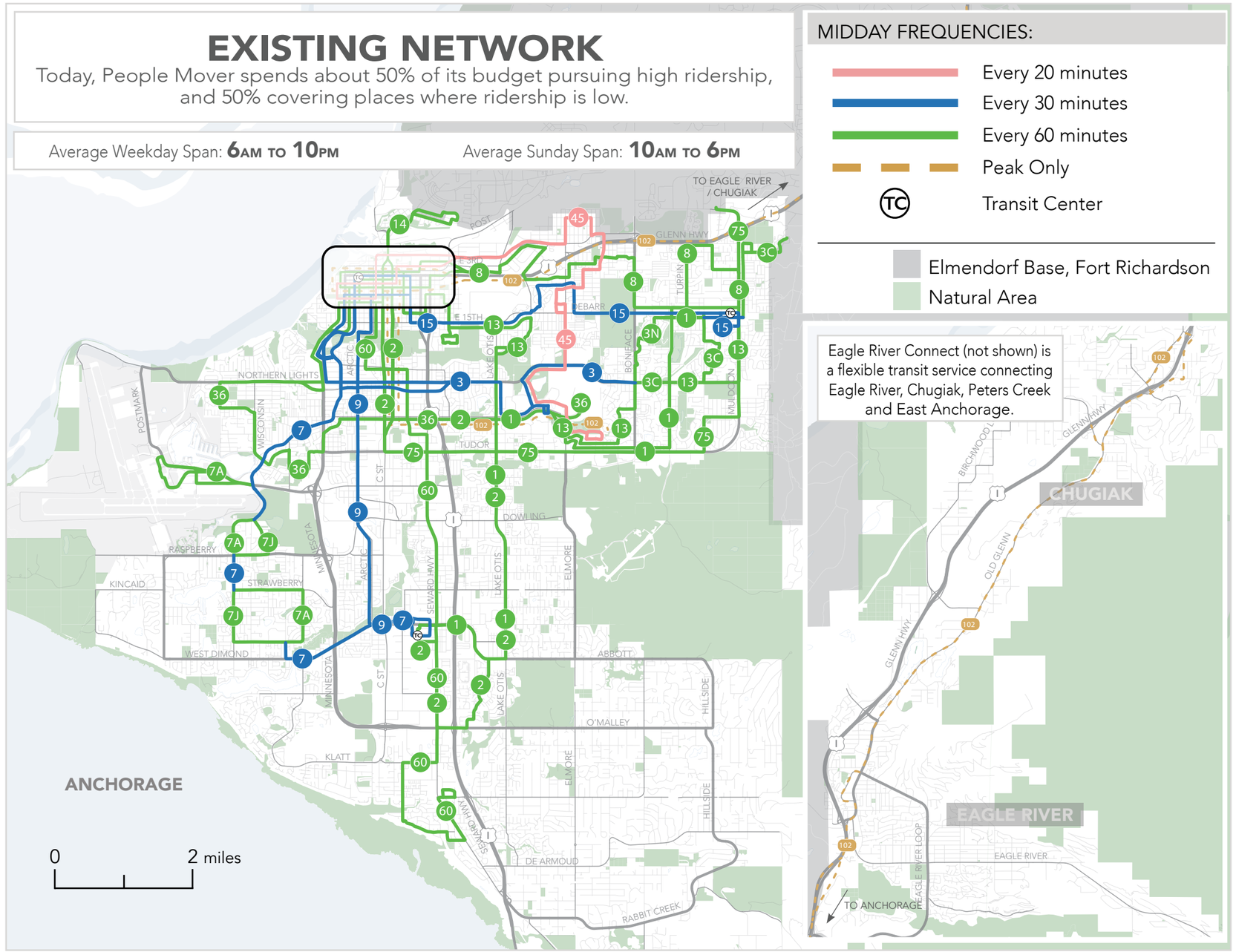
For the purposes of comparison, the map at right shows People Mover's existing network. The features of this network that contrast with some of the following concepts are:

- **Low frequencies.** Only Route 45-Mountain View comes close to offering reliably short waits. It comes every 20 minutes, during the midday only. At other times, waits are longer. All other routes come every 30 minutes, at best.
- **Little weekend service.** No route runs for more than 11 hours on Saturdays, and 8.5 hours on Sundays. Many run for less than that, and on the weekend all routes come just once per hour.
- **High complexity.** Individual routes are very circuitous. Service is divided into many routes, which makes the network complex and hard to decipher.
- **High coverage.** Much of the geographic area of Anchorage is covered by *some* service, even if that service is indirect and infrequent.
- **Short spans.** Service stops running by 10 p.m. on weekdays, and the Saturday span is even shorter. The span of service on Sunday is particularly short - just 8 hours. This makes it hard for retail workers to rely on transit, because it is barely there when they need it most, on weekends.

We estimate that People Mover is currently spending about 50% of its operating budget pursing high ridership, by running service at 20- or 30-minute frequencies in places where the "Ridership Recipe" (described on page 12) is in effect.

The other 50% of People Mover's budget is spent running service at 60-minute frequency (which will get low ridership in any environment) or in places where low densities and the built environment make low ridership a predictable result.

The Existing Network brings some service within 1/4 mile walk of about 189,000 residents and 132,000 jobs. However, most of these residents and jobs are close to service that few of them are likely to consider useful, because it comes so infrequently.



60% Concept

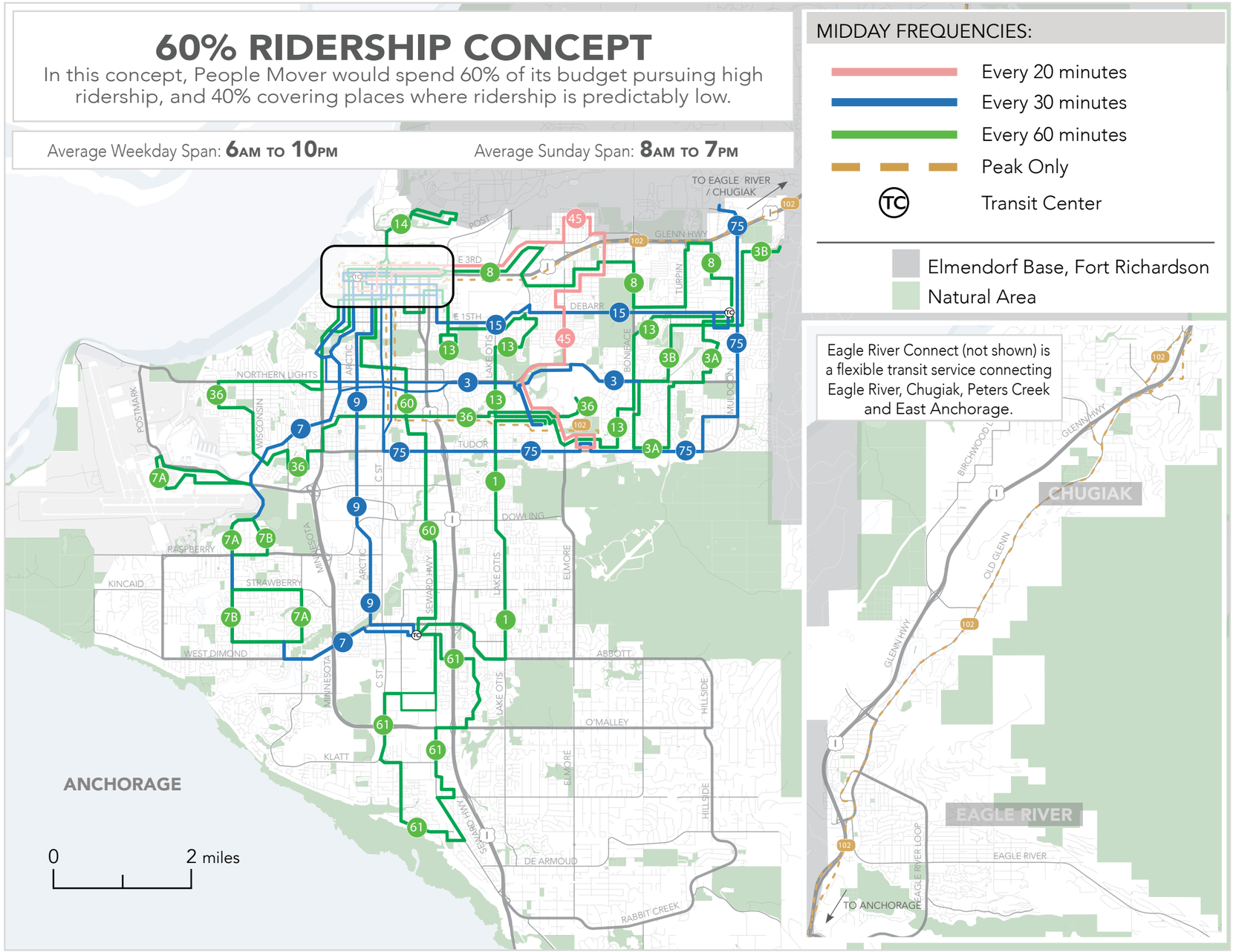
The map at right shows the 60% Ridership Concept. In this Concept, 60% of People Mover's budget would be spent pursuing high ridership. This is slightly more than is spent in the Existing Network.

This concept represents only minor changes from the Existing Network:

- No route would be considered "frequent" (with buses coming every 15 minutes or better).
- Routes 1 and 2, which duplicate one another on Lake Otis, would be changed.
- The savings from changes to Routes 1 and 2 would permit an increase in the frequency of Route 75-Tudor, to every 30-minutes.
- Service south of Dimond Center would be provided by Route 61
- The blue and pink routes would come every 30 minutes during daytimes on Saturday and Sunday, as well as on weekdays. In the Existing Network, all routes come just once an hour on Saturdays and Sundays.
- Service would run three hours longer on Sundays than it does in the Existing Network.

The 60% Concept would actually provide slightly more coverage of Anchorage residents and jobs than the Existing Network. (Charts comparing the coverage provided by these concepts are shown on page 69).

However, as with the Existing Network, few of the people with service near their home or job would likely find it useful, and for that reason relatively few people would ride.



80% Concept

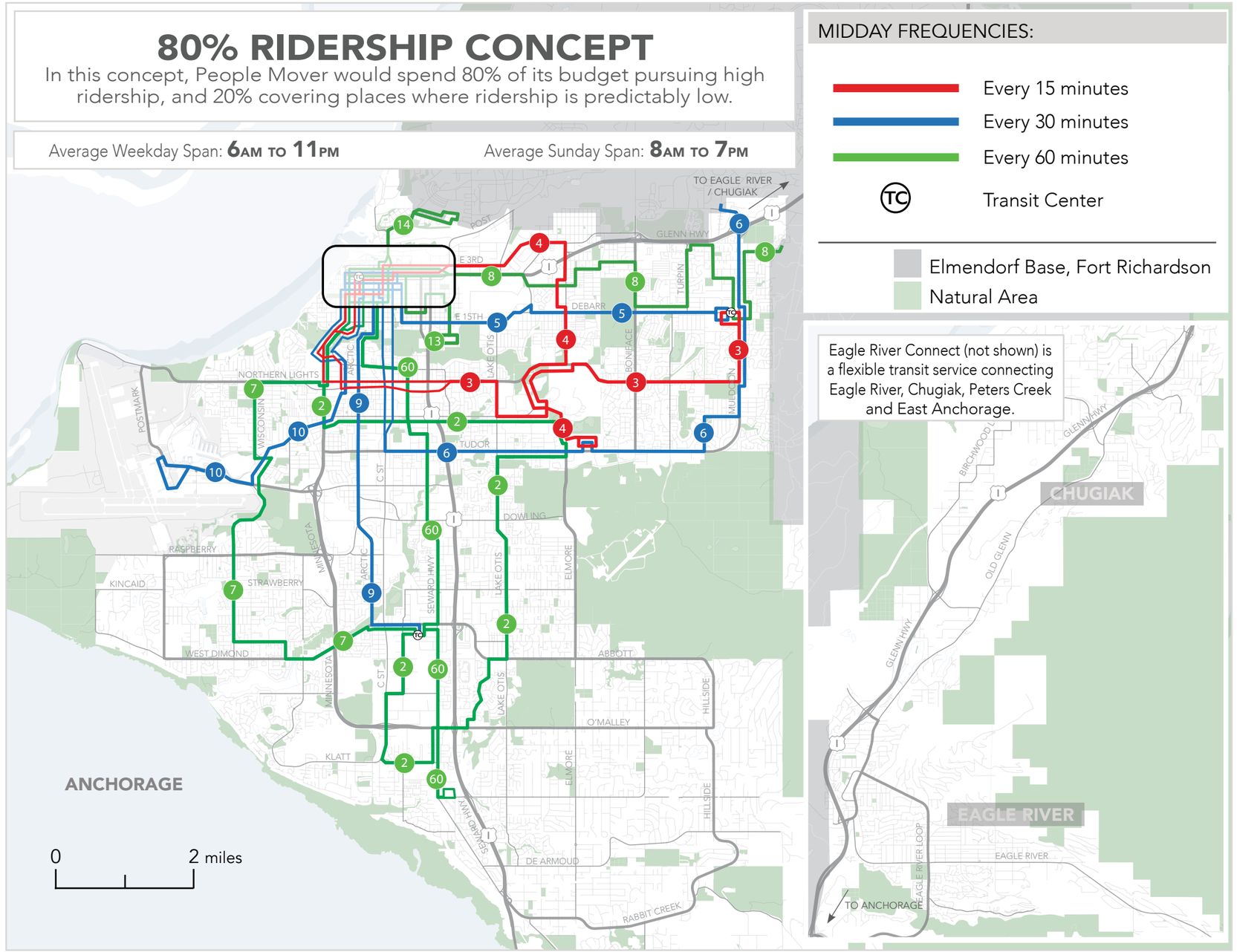
The map at right shows the 80% Ridership Concept, in which 80% of People Mover's budget would be spent pursuing high ridership, rather than the 50% that is spent towards that goal today.

This concept represents larger changes from the Existing Network:

- Frequent service (a bus arriving every 15 minutes) would connect the University and health centers, downtown, Midtown, east Anchorage, and many places in between. (Where two frequent routes cross, people could transfer with just a short wait.)
- No place that has access to service today is *entirely* uncovered. However, fewer bus routes would deviate to go down small streets, or into cul de sacs or parking lots. This means that routes would be faster and more direct. However, as a result, many people who today have a bus stop very close by, would in this Concept need to walk farther to access service, in some cases more than 1/4 mile.
- Service would continue one hour later each weekday evening. On Sundays, service would run three hours longer than in the Existing Network.
- On weekends, all routes shown in red or blue at right would come every 30 minutes, which is twice the frequency of any weekend route in the Existing Network. Those shown in green would come hourly.
- The very low ridership rush-hour-only service to Eagle River and Chugiak is no long offered. In addition, there are no extra services or frequencies offered during rush hour that aren't offered all day.

In the 80% Concept, fewer residents and jobs are within 1/4 mile walk of *some* service than in the Existing Network or the 60% Concept.

However, for the first time, a large number of Anchorage residents and jobs would be within walking distance of frequent transit. (Charts comparing the coverage provided by these concepts are shown on page 69).



100% Concept

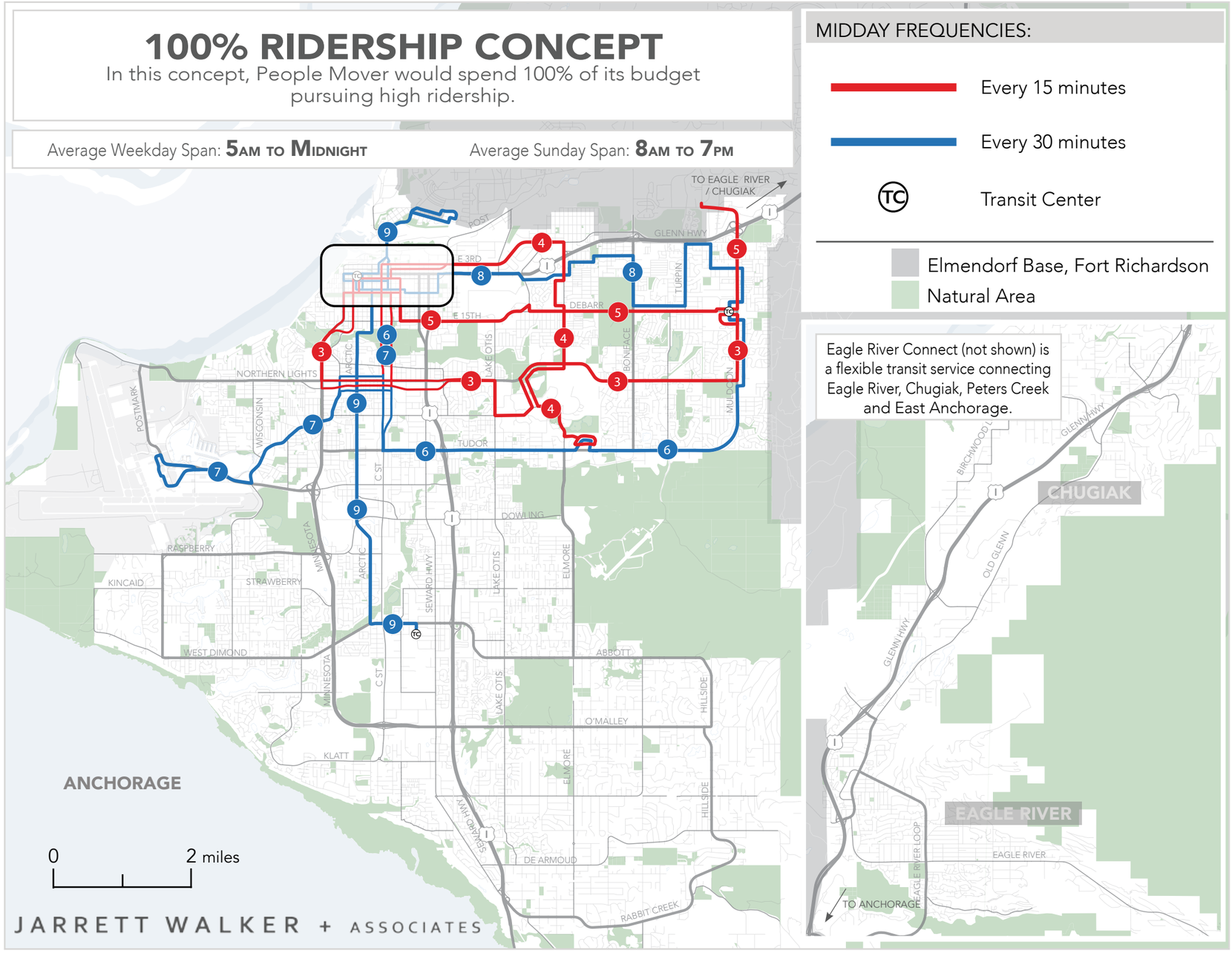
The map at right shows what network People Mover would operate if it spent 100% of its budget pursuing high ridership, and reserve no funds for service in places where ridership potential is low.

This concept is completely different from the Existing Network:

- The densest parts of Anchorage would be covered with frequent transit, forming a connected network that would allow people to quickly travel anywhere on the network.
- There would be *no hourly routes*. Routes with 60-minute frequency can be expected to get low ridership in any development environment, so their expense can only be justified by coverage goals (as in the previous concepts). If every dollar is spent pursuing maximum ridership, none can be spent on 60-minute frequencies.
- Even on weekends, red and blue lines at right would continue to represent, respectively, 15- and 30-minute frequencies. Today, all routes come just once an hour on the weekends.
- Service would run three hours longer on Sundays than it does in the Existing Network.
- Service would continue even later each weekday evening, until midnight. This would make transit viable for the many retail and restaurant workers who need to travel home at night.

Predictably, in the 100% Ridership Concept, fewer residents and jobs are within 1/4 mile walk of *some* service than in the Existing Network or the other concepts. Coverage is reduced substantially, so that service can be concentrated into more frequent routes.

However, a very large number of Anchorage residents and jobs would suddenly be within walking distance of a frequent transit network. (Charts comparing the coverage provided by these concepts are shown on page 69).



Changes in Coverage and Ridership Potential

As you flip through the four maps on the preceding pages, the reduction in coverage is clear: there are simply fewer routes covering the Municipality.

What is not clear is how many people and jobs that geographic area represents. Places that are less dense are home to fewer people, but look just as big and spacious on a map as places that are more dense. For example, looking at the 80% Ridership Concept, if you pick out an area that has lost coverage, and compare it to one of the density maps in Chapters 2 or 3, you will observe that it represents fewer people (or jobs) than the other areas that are still covered.

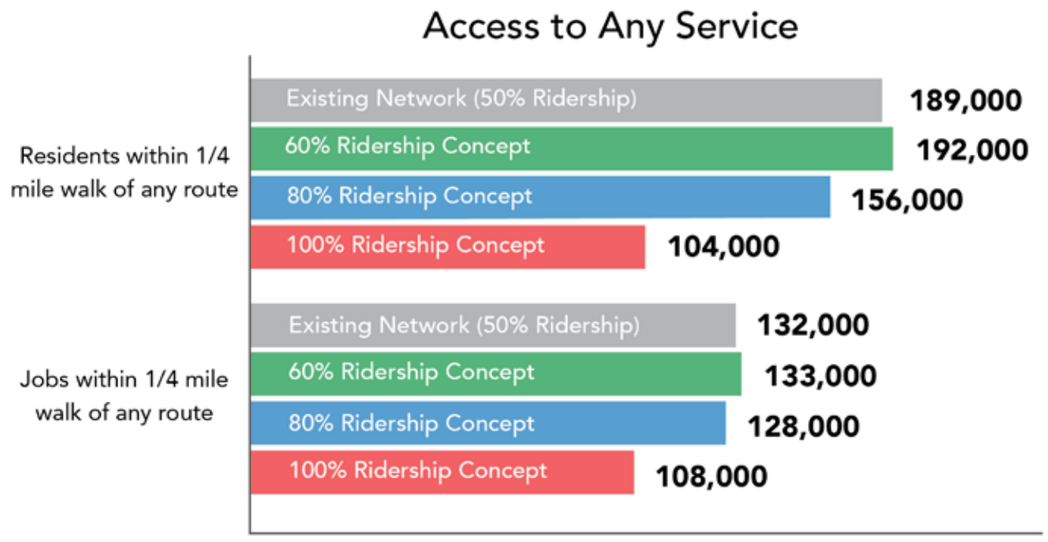
The charts at right illustrate how the Concepts would change the number of people and jobs that have access to *any* service (no matter how useful) and to *frequent* service.

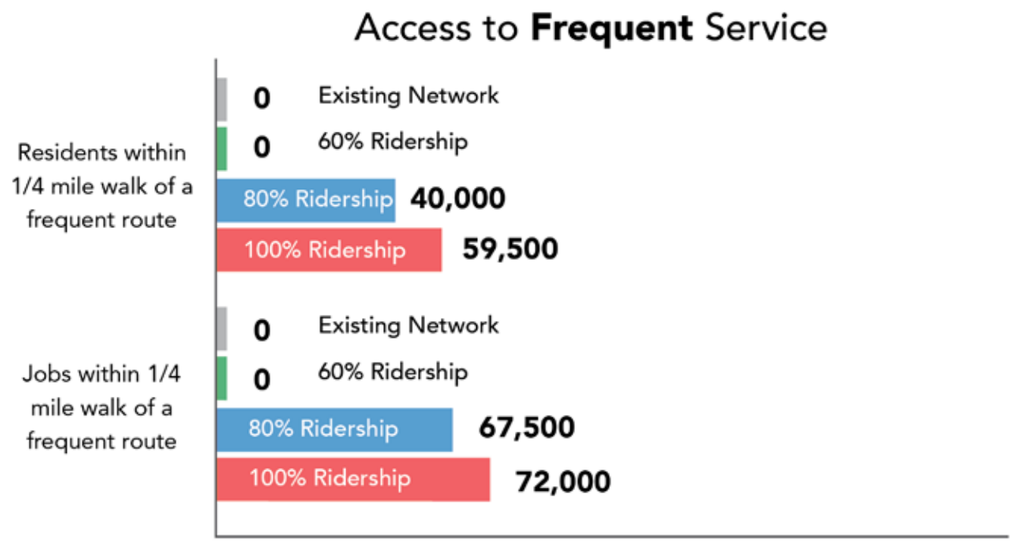
Predictably, as the percent of People Mover's budget spent on coverage goes down, the number of residents and jobs covered by any service goes down. In the top chart, the 60% Concept (in green) achieves the highest coverage, and the 100% Concept the least.

Yet as coverage by any service goes down, access to *frequent* service goes up. The Existing Network and the 60% Concept have no frequent service. No Anchorage residents or jobs are within a 1/4 mile walk of a bus that's always coming soon.

In the 80% and 100% Concepts, a large number of residents and jobs would be served by a completely new thing for Anchorage: a frequent network. This would lead to higher transit ridership, because so many people would now find that the places they live, work, shop and access services are easier to reach by transit.

Access to frequent service is just one way to illustrate future ridership potential. Another is to show how much of the Municipality people could reach within a given travel time. This is illustrated in the following section.





Access to service is measured based on a typical weekday at noon.

Residential calculations are based off of the 2010 Census dataset, while job calculations are based of block level data from LEHD's LODES 2014 dataset.

To understand why the frequent networks in the 80% and 100% Concepts have high ridership potential, it is helpful to consider what they do in geometric terms.

Quite simply, high frequency services arranged in a connected network *maximize the number of useful destinations that can be reached quickly, for the maximum number of people.*

While this point can be proven with data, it also becomes obvious if we think about how travel decisions are made. For a person to choose transit over other modes, transit must provide a reasonable travel time to reach their destination.[1] It stands to reason that when transit offers access to more destinations within a shorter travel time, to more people, it will attract higher ridership.

We can visualize this change in travel times and access, and compare alternatives to one another using this measure. We have analyzed, for five key locations in Anchorage, how much of the municipality can reach them (and be reached from them) in a fixed amount of time. Maps of this information are called "*isochrones.*"

The isochrones on the following pages are centered around a cartoon person, which show where she could be, in a fixed amount of time, by walking and riding transit. The smallest blob, white, is where she could be in 15 minutes. The largest, in pink, is where she could be in an hour.[2]

We sometimes refer to these as *maps of liberty and opportunity* because that's what they are. If someone chooses to rely on transit, they will be constrained by where transit can readily take them, and will experience the blobs in these images as walls around where they can go and what they can do.

For someone to choose to rely on transit, and especially for them to decide to not own a car or to share a car, these blobs have to contain enough of the places that make people's lives complete: jobs, education, shopping, services, social opportunities, and so on.

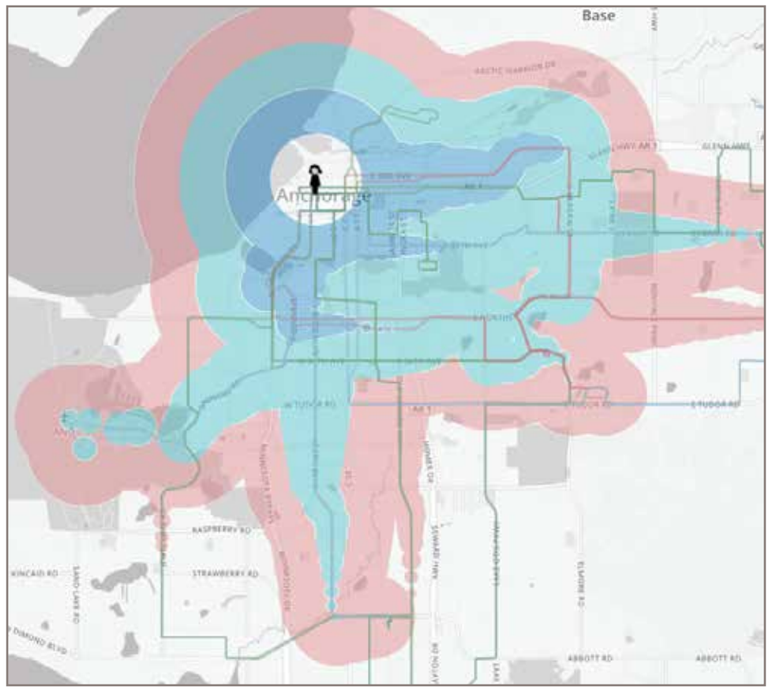


Figure 64: The blobs on this map show how much of the Municipality can access downtown within 15 (white), 30 (in blue), 45 (in green) or 60 (in pink) minutes of travel time. These blobs are called "isochrones." They take into account the time spent walking to transit, waiting for the bus, riding, transferring, and walking to one's final destination.

You use this tool to think about access in the reverse, as well. For a worksite or store at the selected point, the blobs show who could readily get there: the employees it can attract and the customers who can shop there. For a health center, the isochrones show how many Anchorage residents could seek medical care there.

Keep in mind that it isn't simply the geographic area of these isochrones, but the number of people they contain, that speak to a Concept's ridership potential.

Computer models that predict ridership have always been doing this analysis, behind the scenes. It has long been known that a good indicator of the ridership from a place is how many other useful places can be reached quickly from there, weighted by the number of people likely to be attracted to each of those destinations. *More ridership arises from service being useful, for more people, to get to more places.*

Thus larger isochrones – and dramatically larger numbers of jobs and residents within them – have always been a good indicator of ridership potential. This helps to explain why the 100% Concept has the highest ridership potential and Existing Network the lowest. The 100% Concept offers the greatest expansion in where people can go, especially for those who live in the most transit-favorable development patterns. The 100% Concept does this by *not* trying to serve places where ridership will be low or costs will be high, thus requiring people who live in those places to find other options for transportation.

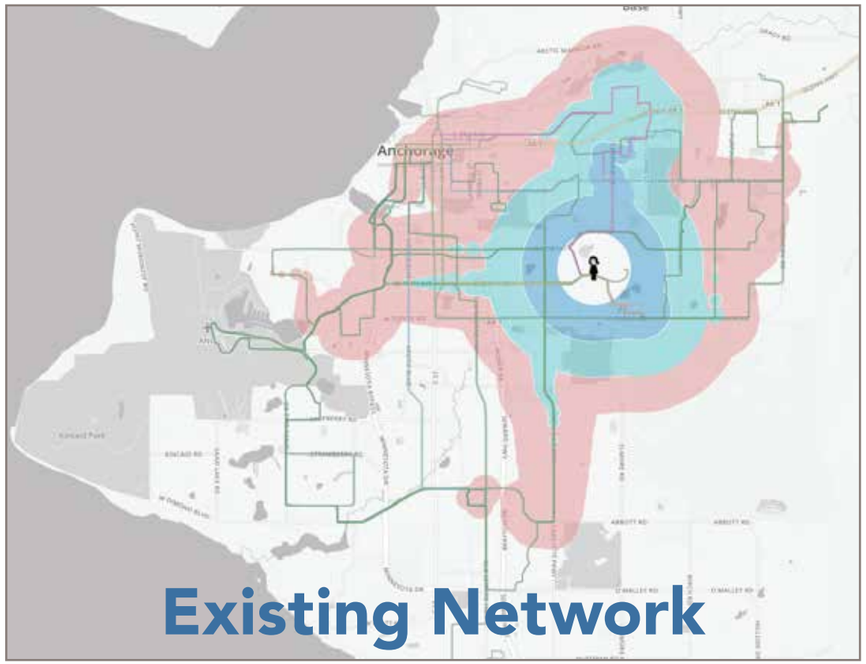
Ridership is not the only payoff of large isochrones. Liberty and opportunity have their own value, aside from how they affect transit ridership. For people with lower incomes, transportation is often the biggest barrier to employment, and can also limit access to education. When people are able to get 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 tends to be a necessary condition for that choice. Subjective features such as comfort, amenity, and perceptions of safety also influence the choice, but none of these is a substitute for usefulness. Those other factors therefore have little influence unless the service is useful -- by which we mean taking people to desired destinations in an amount of time they find reasonable.

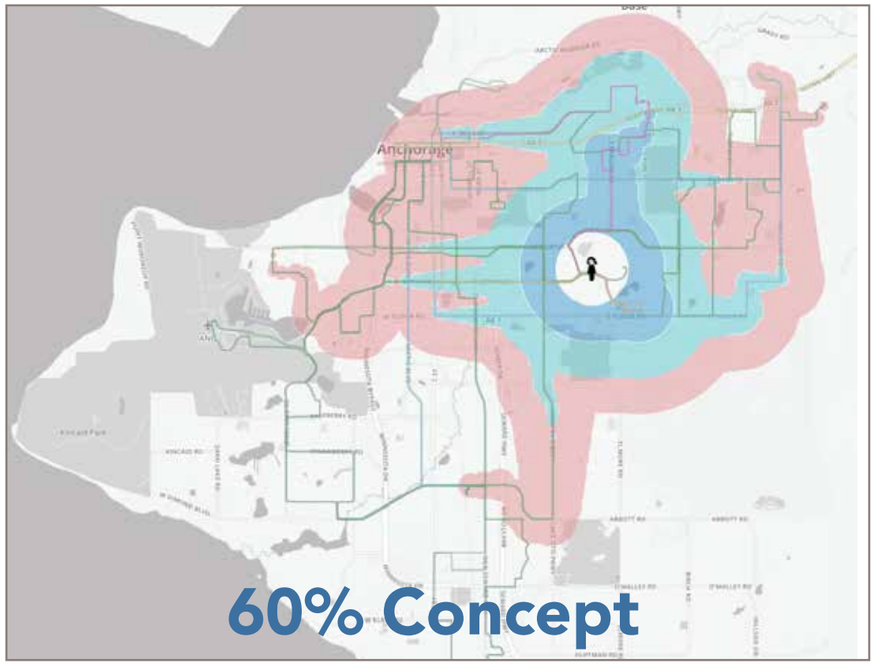
2 To create the isochrones, we use a web app called Remix. Each of the networks re created in or imported into the web app, along with their frequencies, spans, and vehicle speeds. The frequencies, spans, and speeds are used to generate a schedule for stops along the route, which then allows the software to determine how far Jane - the cartoon figure - can travel from a location chosen by the user.

From Remix (http://getremix.com/guide): *"Jane's travel includes a combination of walking (at a walk speed of approximately 3 miles per hour) and taking transit. Transit choices are based on the routes shown on the map, including potential transfers. If a transfer is taken, we assume that Jane must wait for half the headway of the next route."*

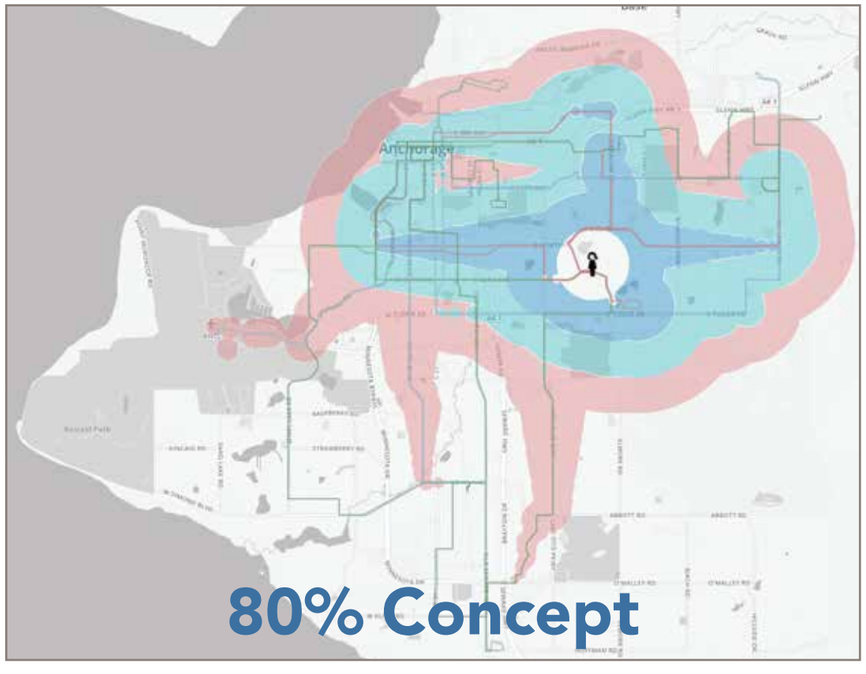
How much of the municipality is within 15 30 45 *or* 60 *minutes of the U. Med. District?*



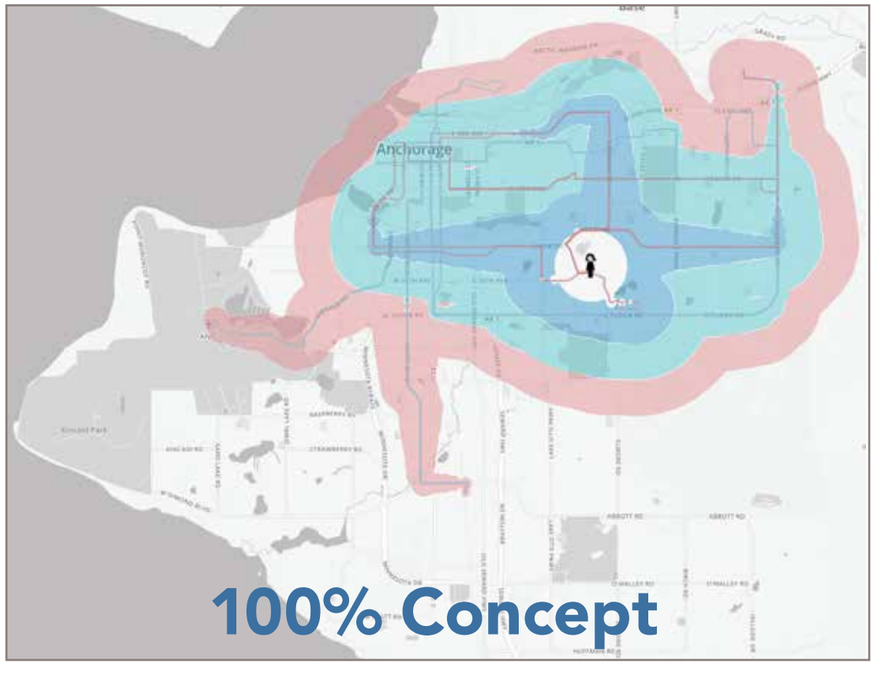
Existing Network



60% Concept

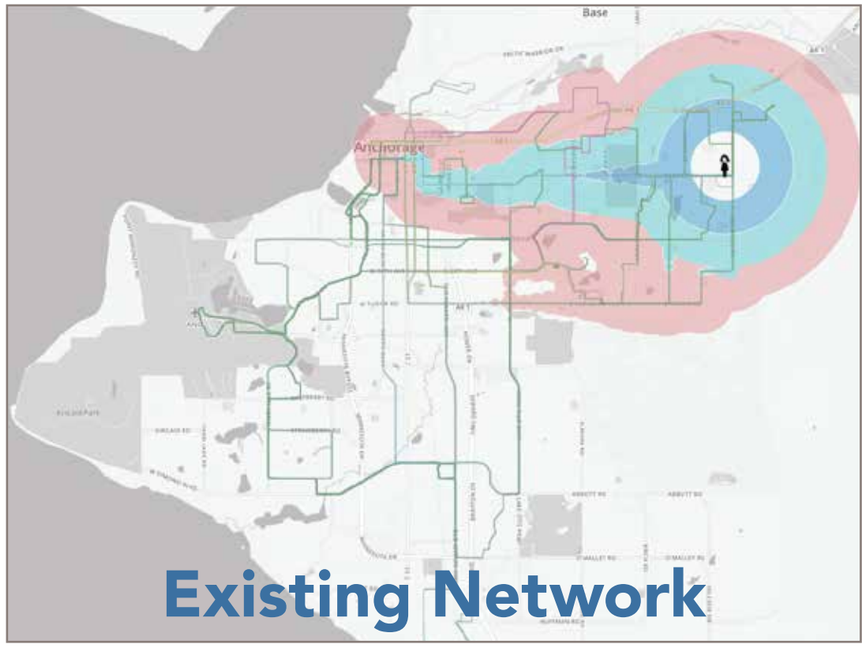


80% Concept

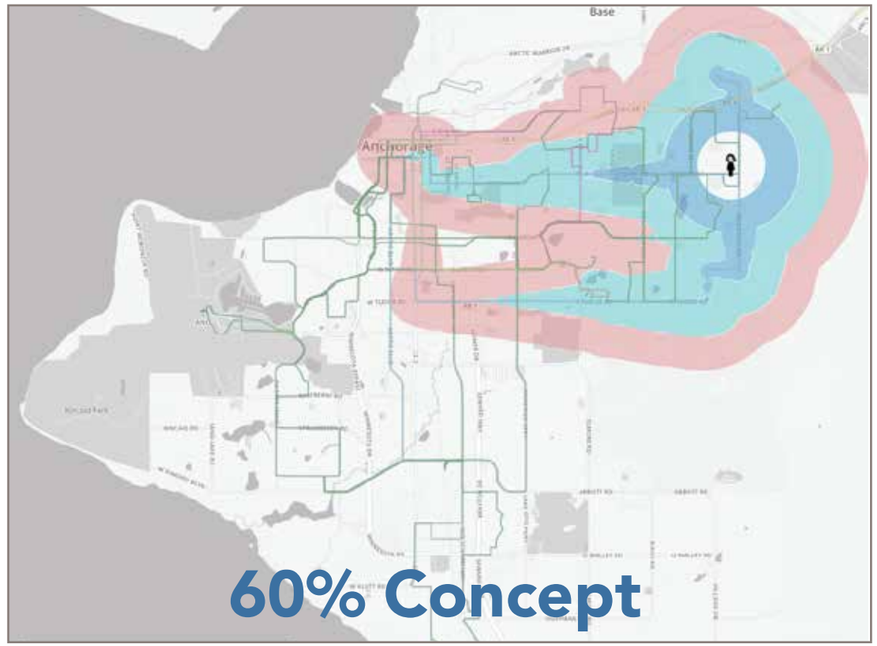


100% Concept

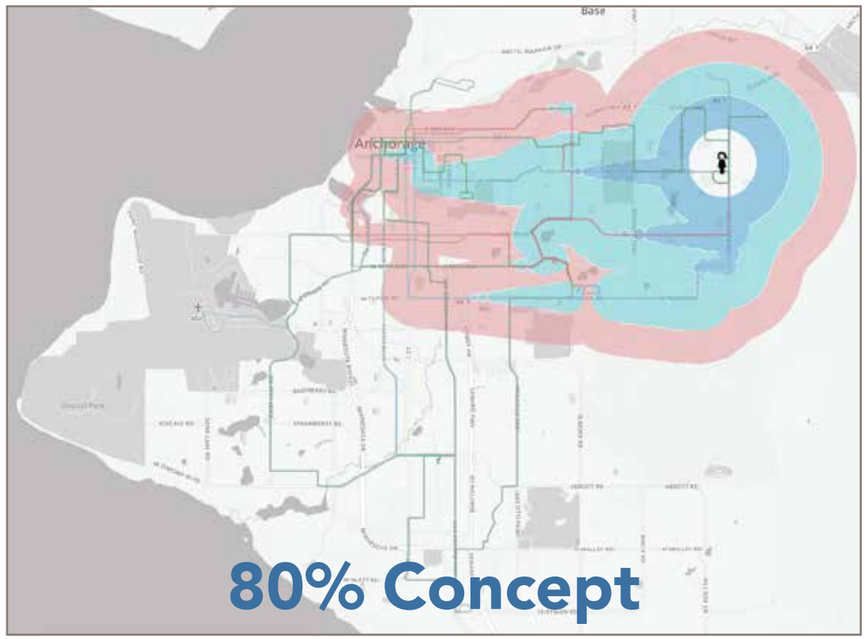
How much of the municipality is within 15 30 45 *or* 60 *minutes of the Muldoon Transfer Center?*



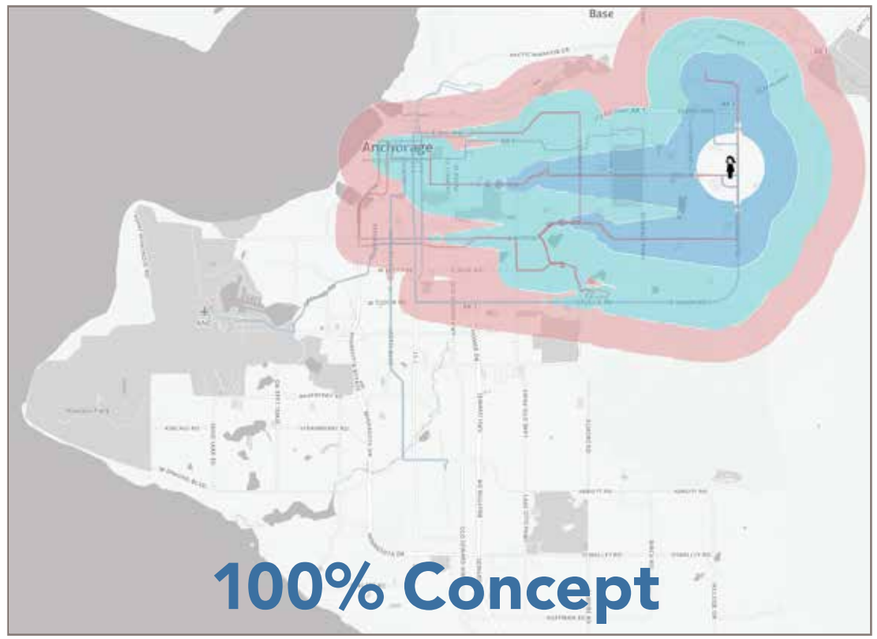
Existing Network



60% Concept

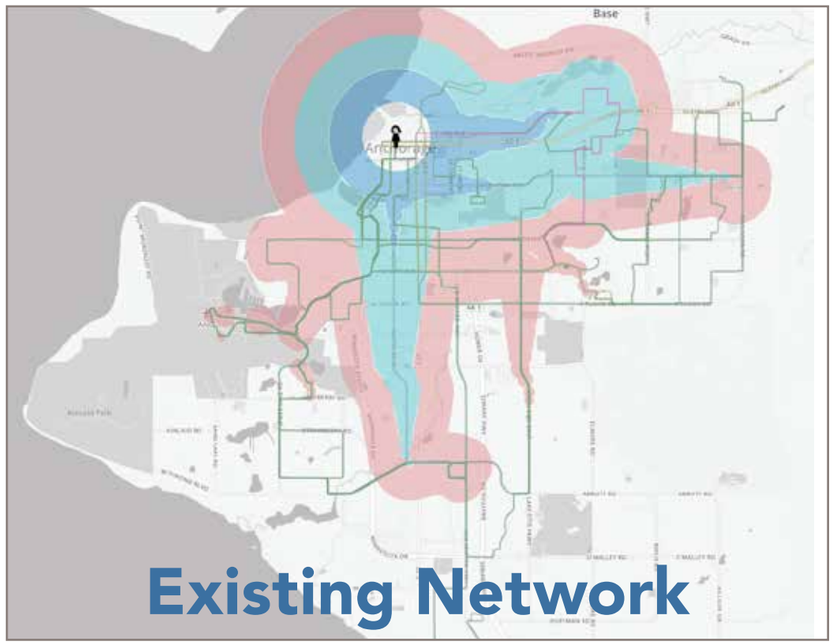


80% Concept

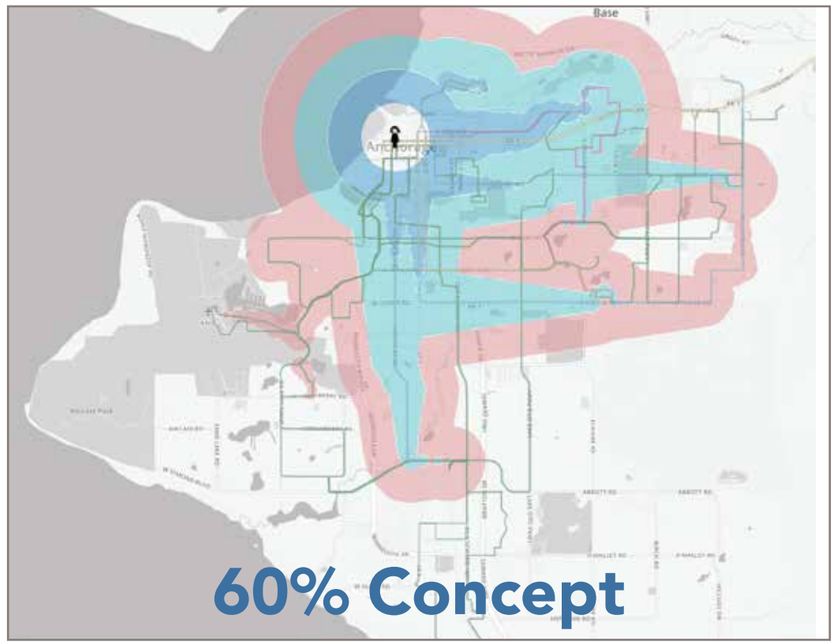


100% Concept

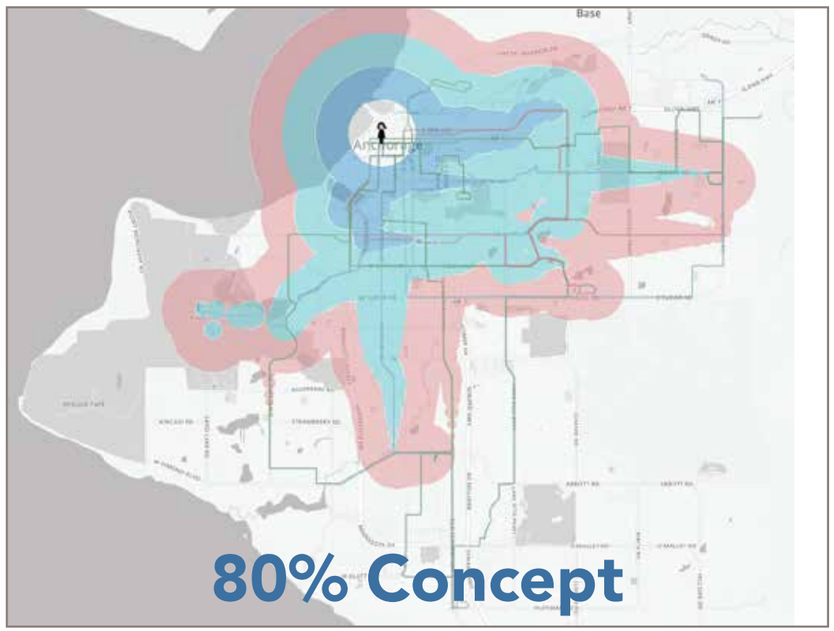
How much of the municipality is within 15 30 45 *or* 60 *minutes of downtown?*



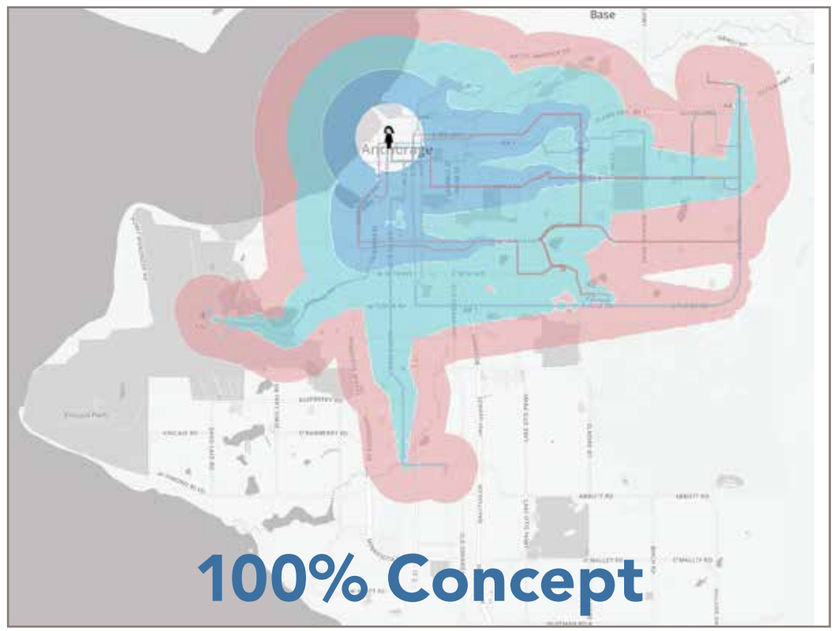
Existing Network



60% Concept

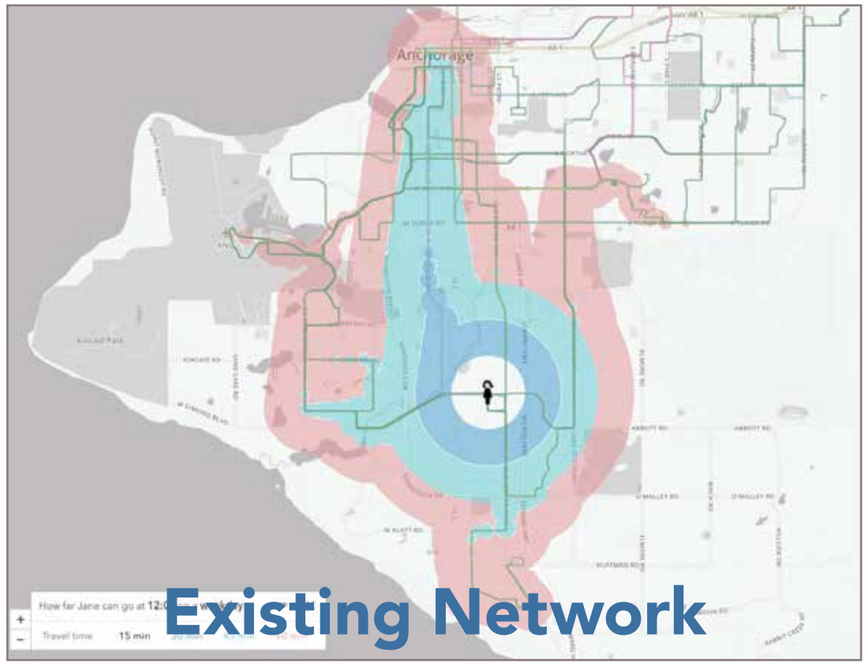


80% Concept

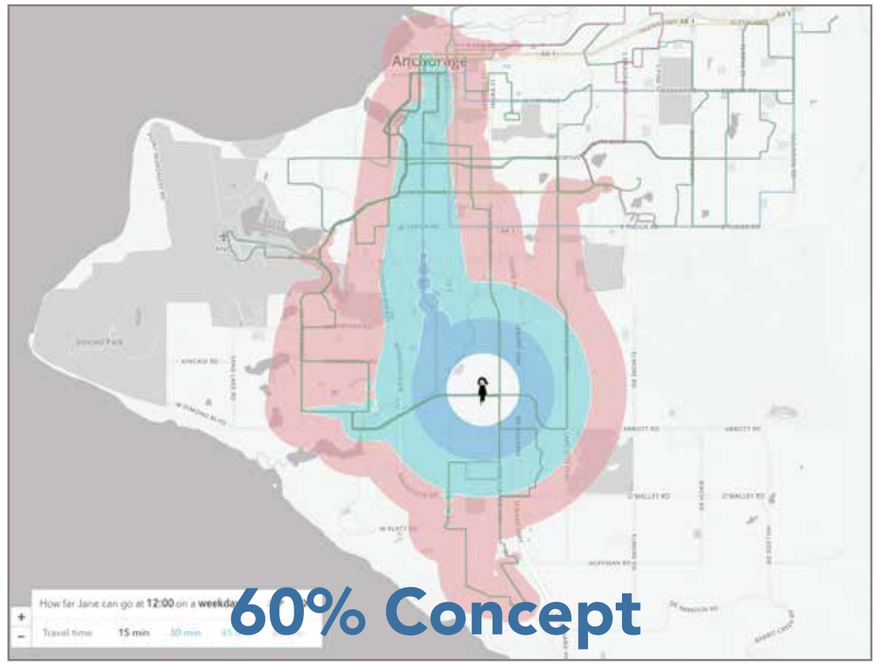


100% Concept

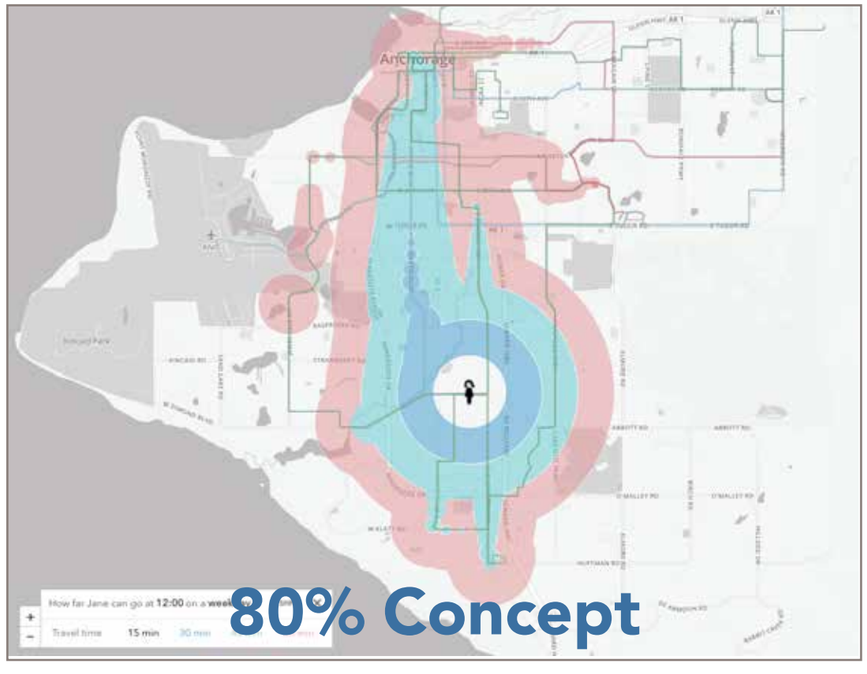
How much of the municipality is within 15 30 45 *or* 60 *minutes of the Dimond Center?*



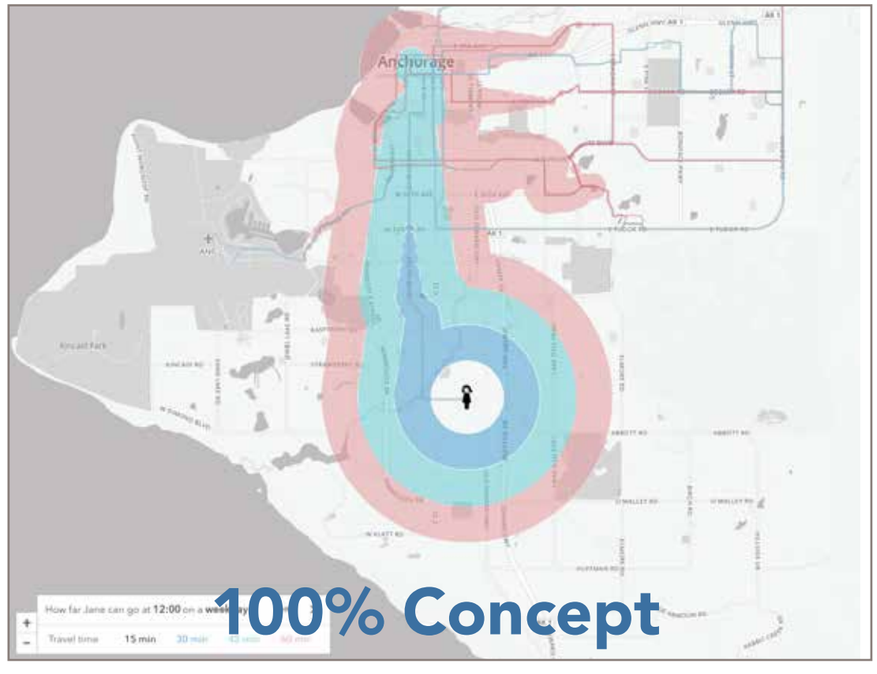
Existing Network



60% Concept



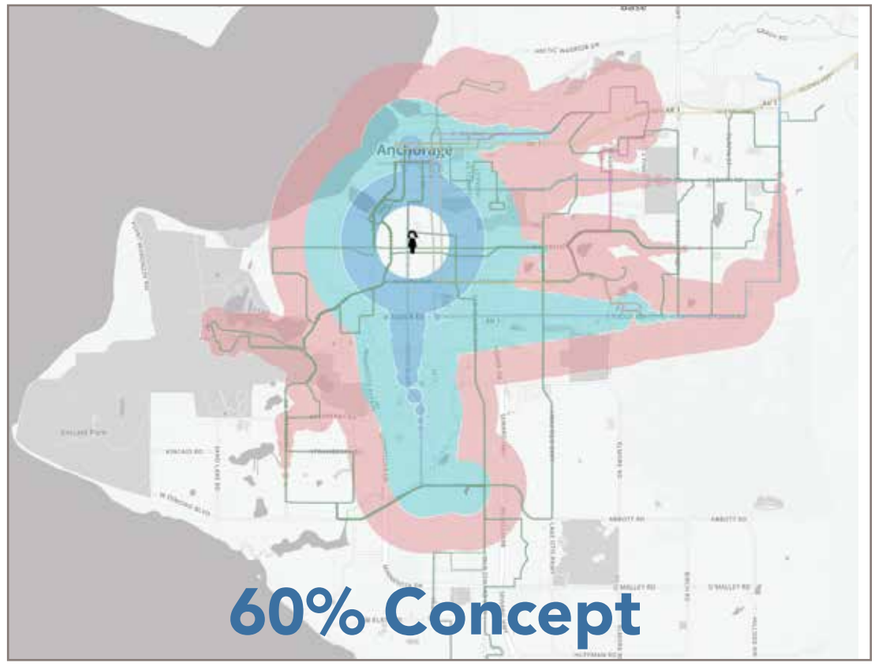
80% Concept



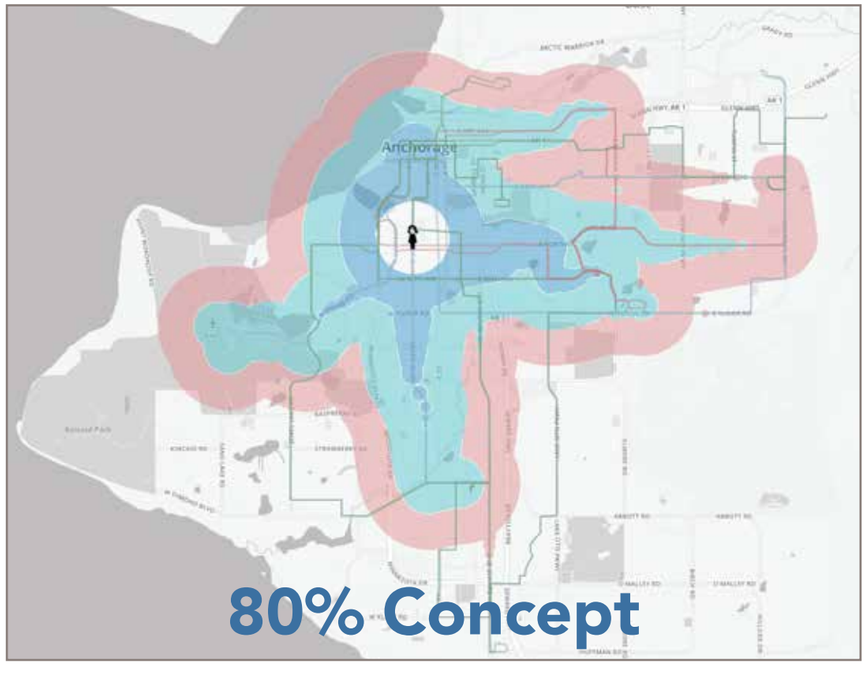
100% Concept

How much of the municipality is within 15 30 45 *or* 60 *minutes of Midtown?*

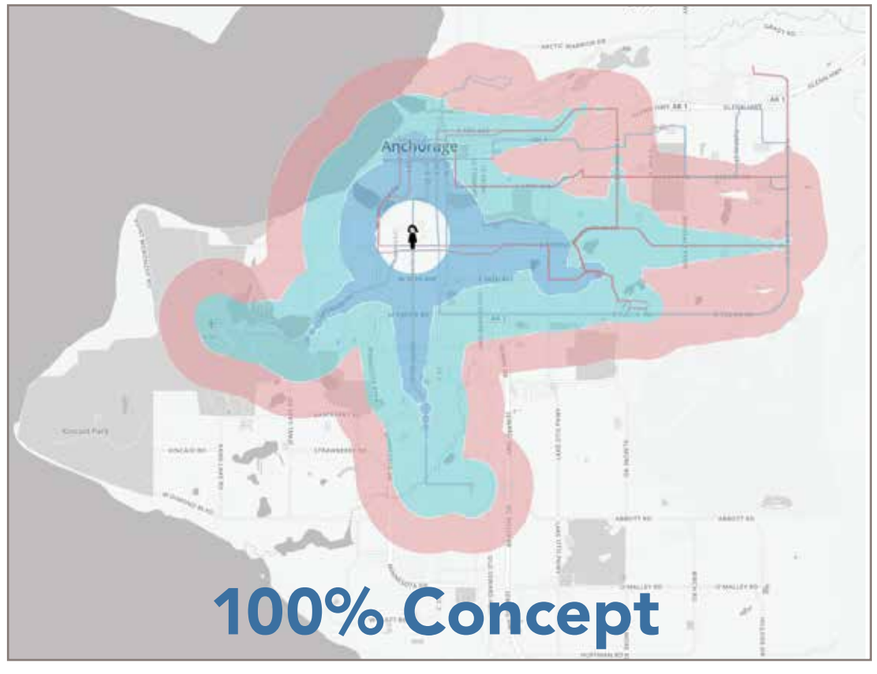
Existing Network



60% Concept



80% Concept



100% Concept

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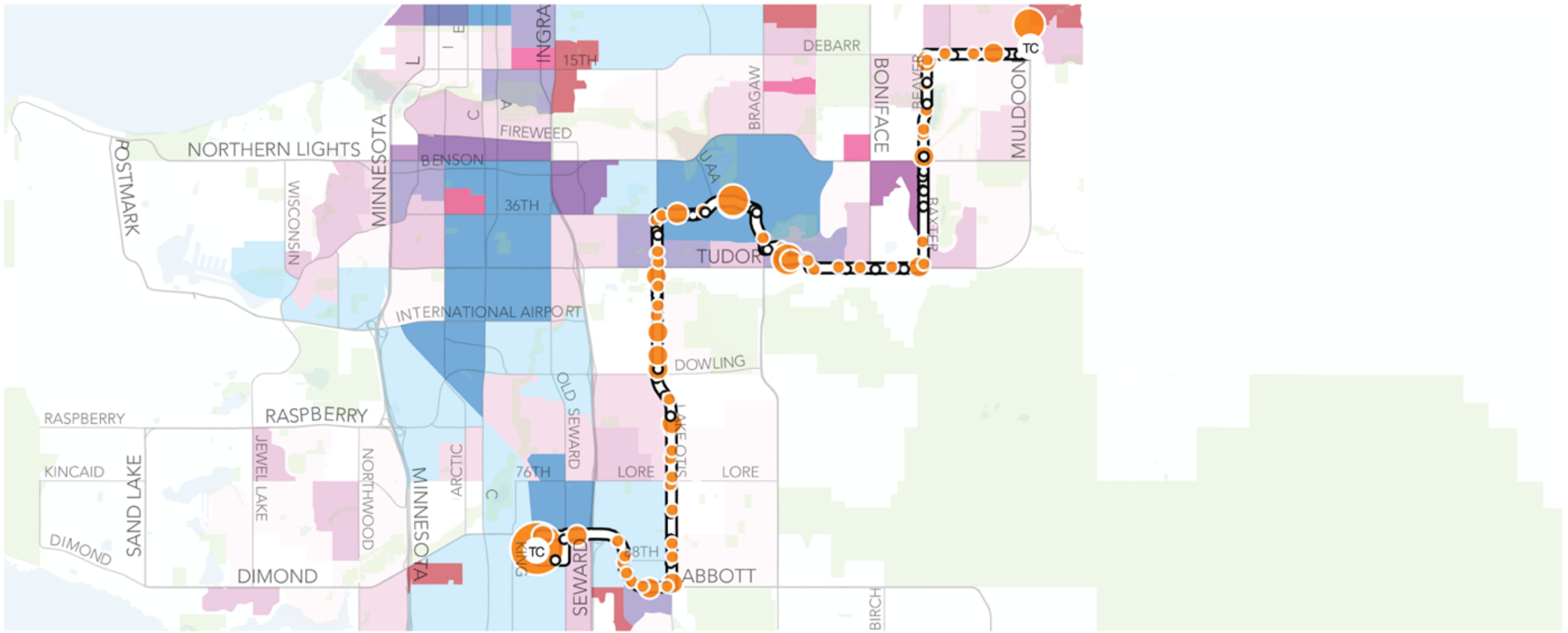
Appendix A: Existing Route Atlas

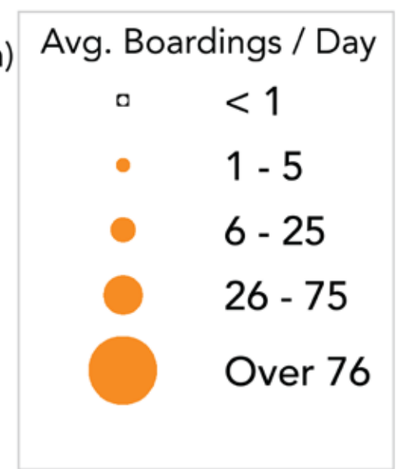
1 Crosstown

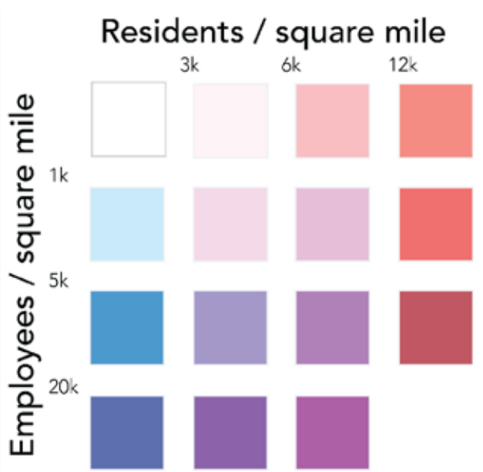
Weekday Headways (min)			
AM	Midday	PM	Evening
60	60	60	60



Service Begins	Service Ends	Hrs/Day	Length (mi)	Run Time (min)	Speed (mph)
6:10 AM	10:17 PM	16:07	22.8	83.3	16.42

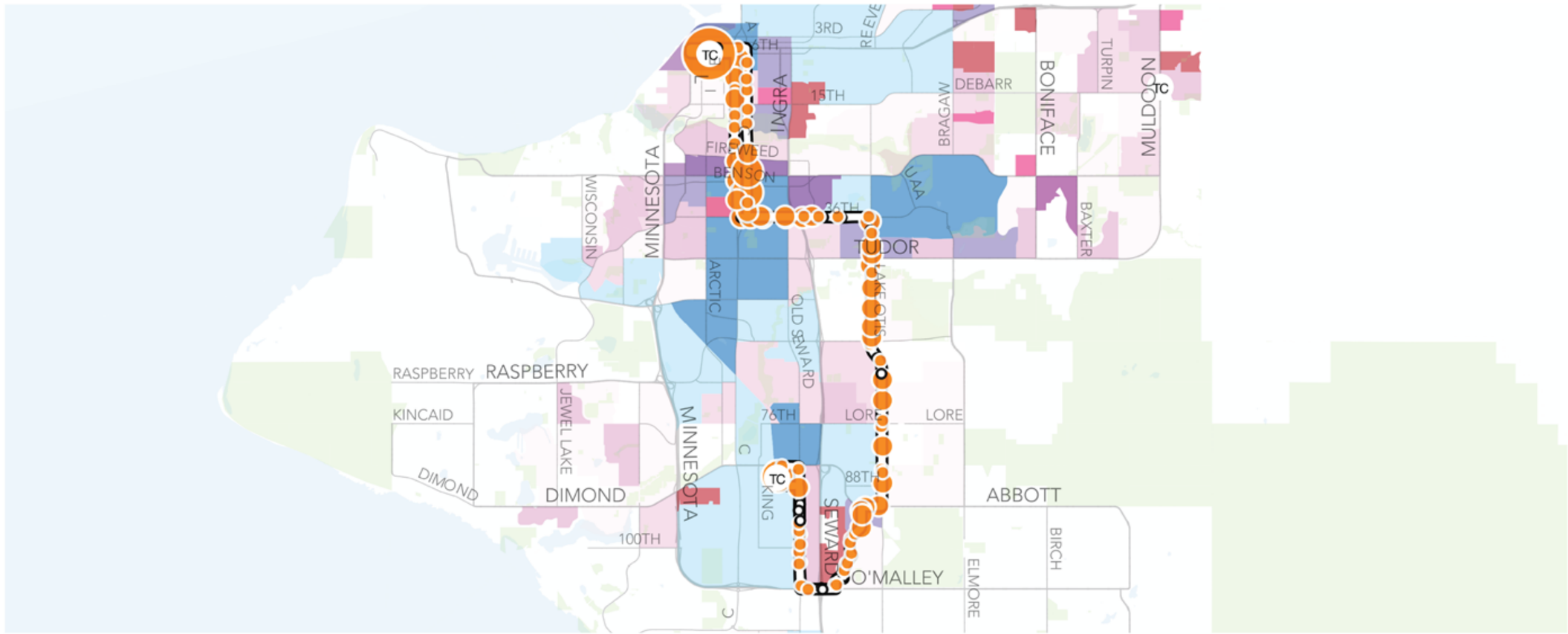
Weekday Trips	Wkd Ridership	Wkd Hours	Wkd Productivity	Wkd OTP
32	622.65	22.2	28	83.60%
Saturday Trips	Sat Ridership	Sat Hours	Sat Productivity	Sat OTP
24	304.92	14.8	20.6	76.30%
Sunday Trips	Sun Ridership	Sun Hours	Sun Productivity	Sun OTP
18	219.18	10.3	21.3	87.90%





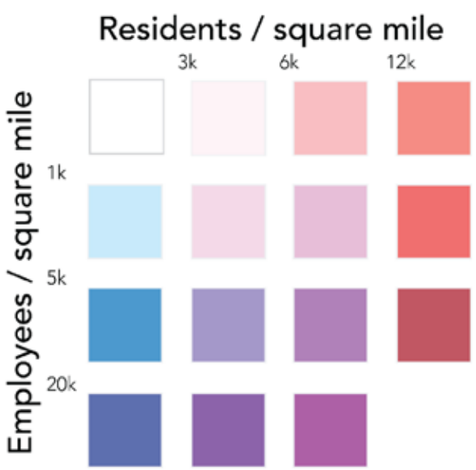
2 Lake Otis

Weekday Headways (min)			
AM	Midday	PM	Evening
60	60	30	60



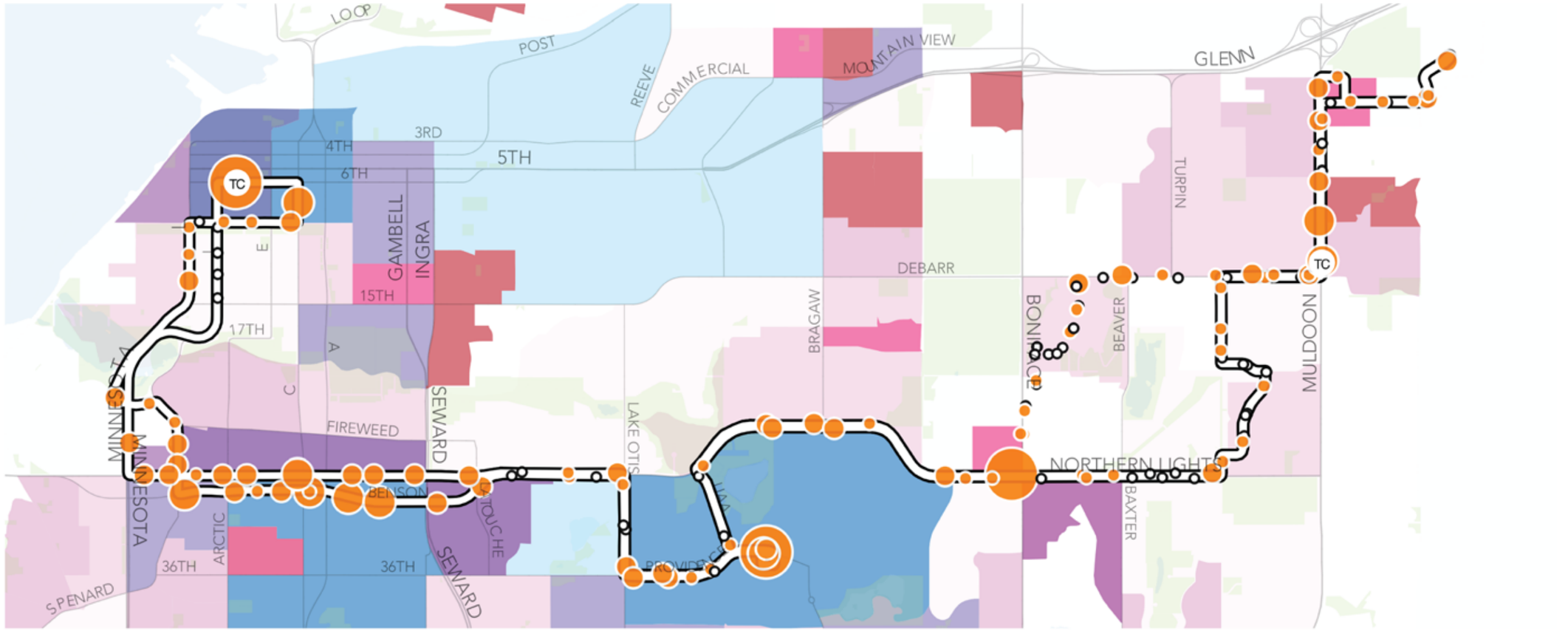
Service Begins	Service Ends	Hrs/Day	Length (mi)	Run Time (min)	Speed (mph)
5:45 AM	10:29 PM	16:44	22.6	91.4	14.84

Weekday Trips	Wkd Ridership	Wkd Hours	Wkd Productivity	Wkd OTP
41	887.63	31.2	28.5	84.20%
Saturday Trips	Sat Ridership	Sat Hours	Sat Productivity	Sat OTP
22	509.83	16.1	31.7	68.90%
Sunday Trips	Sun Ridership	Sun Hours	Sun Productivity	Sun OTP
17	318.97	11.6	27.6	82.70%



3 Northern Lights

Weekday Headways (min)			
AM	Midday	PM	Evening
30	30	30	60



Service Begins	Service Ends	Hrs/Day	Length (mi)	Run Time (min)	Speed (mph)
5:56 AM	11:30 PM	17:34	25.8	102.9	15.04

Weekday Trips	Wkd Ridership	Wkd Hours	Wkd Productivity	Wkd OTP
59	1464.38	50.6	28.9	73.40%
Saturday Trips	Sat Ridership	Sat Hours	Sat Productivity	Sat OTP
26	639.15	21.9	29.2	76.80%
Sunday Trips	Sun Ridership	Sun Hours	Sun Productivity	Sun OTP
16	374.17	12.8	29.2	76.00%

Avg. Boardings / Day

- < 1
- 1 - 5
- 6 - 25
- 26 - 75
- Over 76

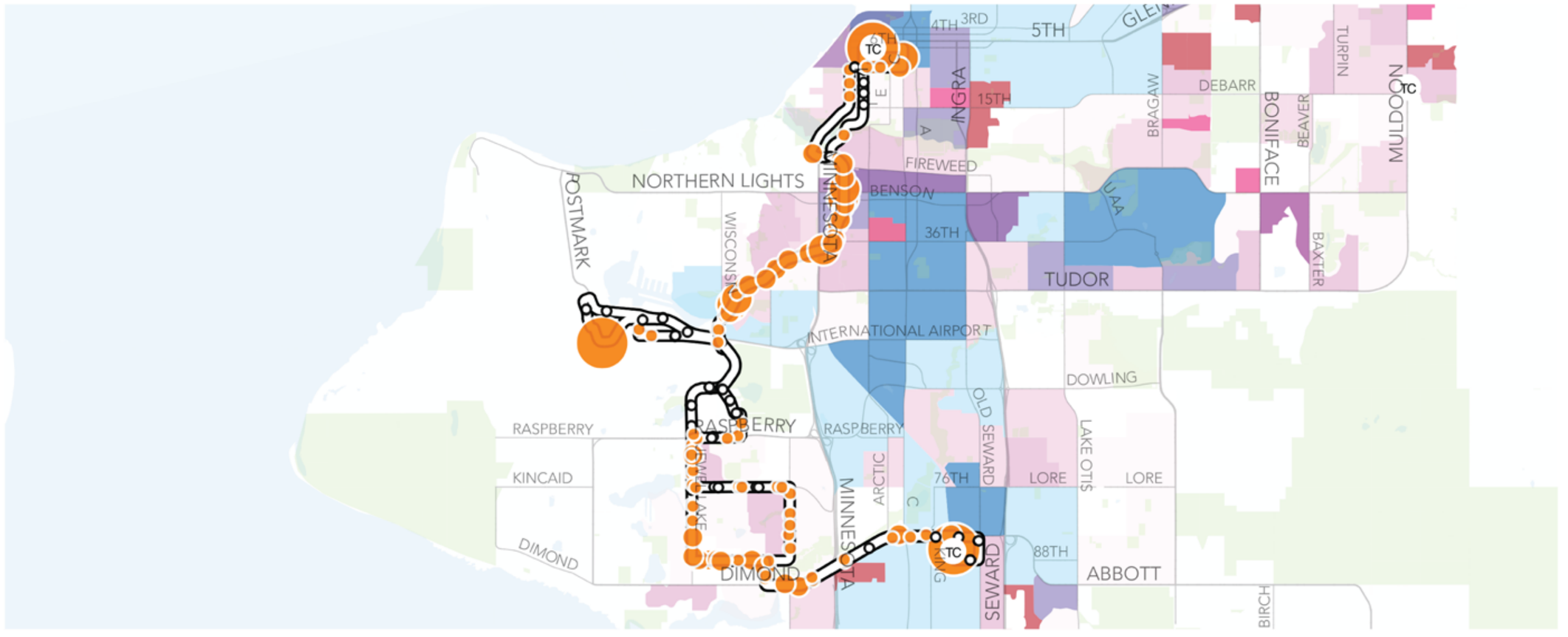
Residents / square mile

Employees / square mile

	3k	6k	12k
1k			
5k			
20k			

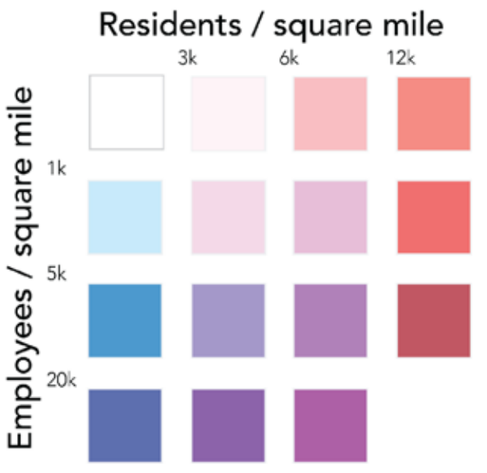
7 Spenard

Weekday Headways (min)			
AM	Midday	PM	Evening
30	30	30	60



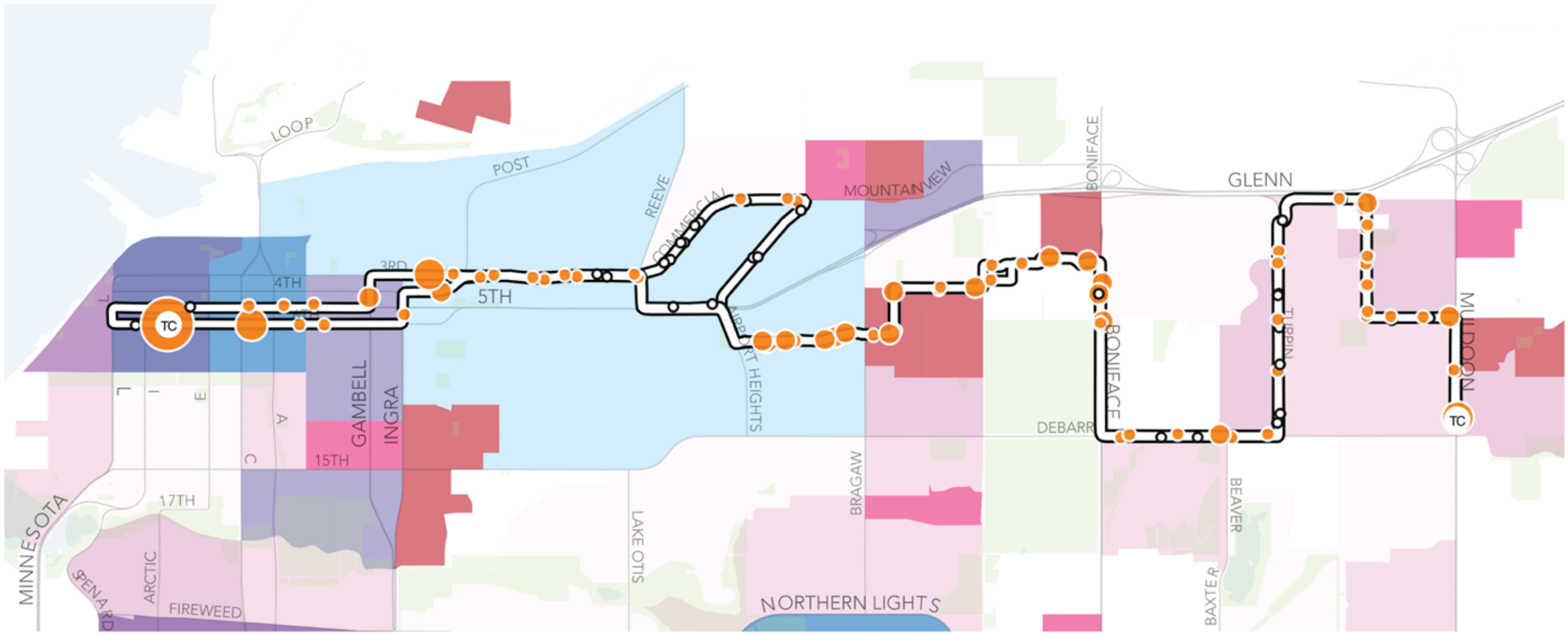
Service Begins	Service Ends	Hrs/Day	Length (mi)	Run Time (min)	Speed (mph)
6:00 AM	11:30 PM	17:30	25.4	93.7	16.26

Weekday Trips	Wkd Ridership	Wkd Hours	Wkd Productivity	Wkd OTP
60	1304.61	46.9	27.9	81.70%
Saturday Trips	Sat Ridership	Sat Hours	Sat Productivity	Sat OTP
26	658.02	22.5	29.2	68.80%
Sunday Trips	Sun Ridership	Sun Hours	Sun Productivity	Sun OTP
18	400.28	14.8	27	74.40%



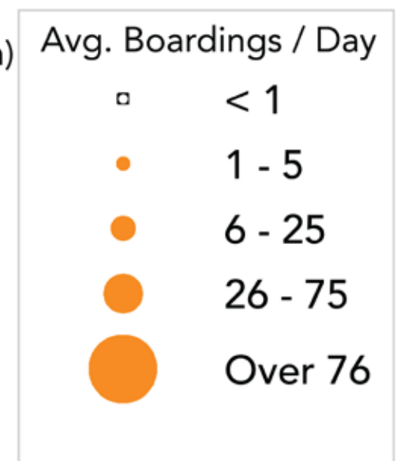
8 Northway

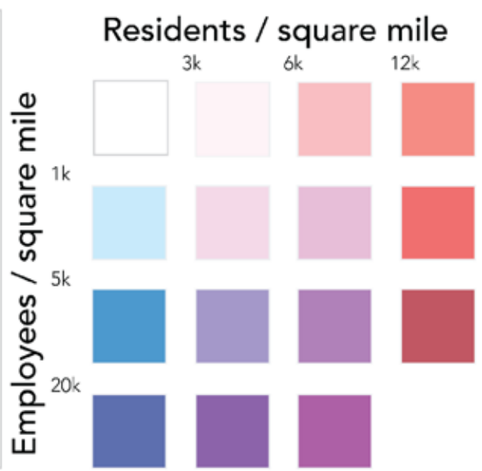
Weekday Headways (min)			
AM	Midday	PM	Evening
60	60	60	60



Service Begins	Service Ends	Hrs/Day	Length (mi)	Run Time (min)	Speed (mph)
6:17 AM	10:11 PM	15:54	18	84.5	12.75

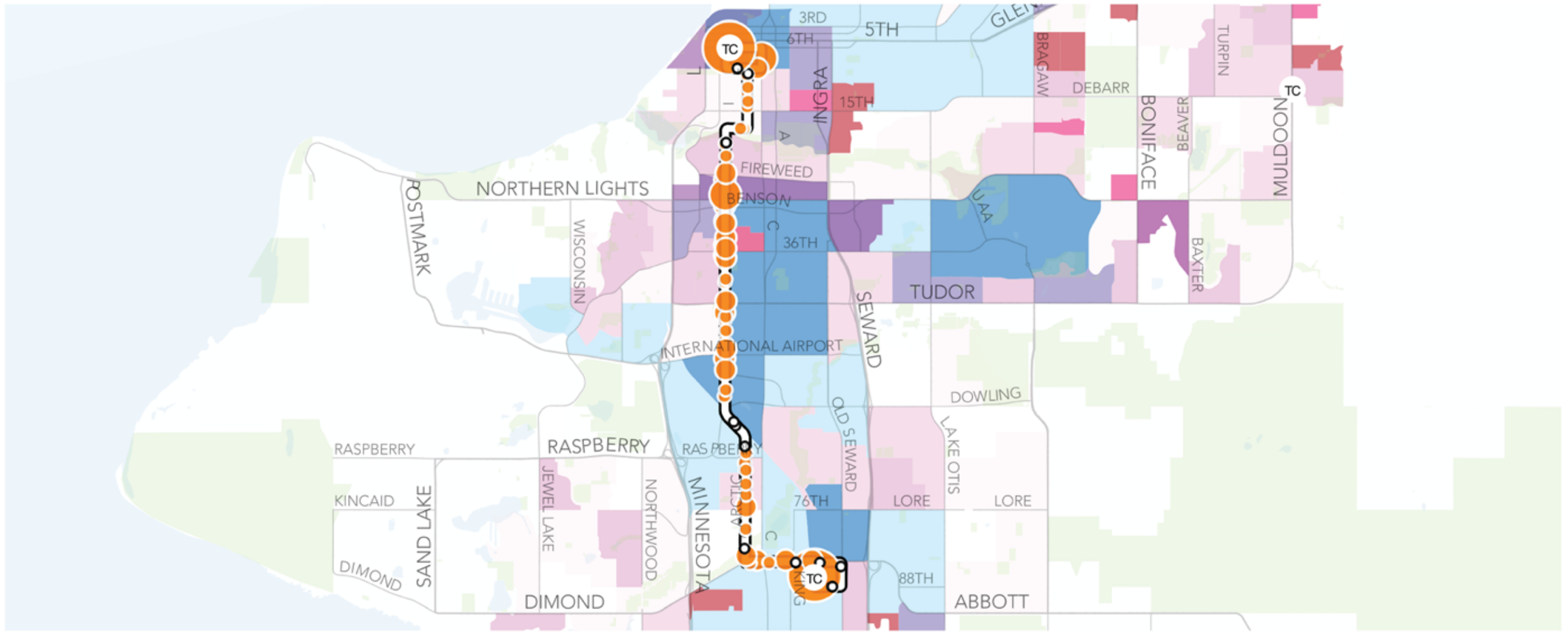
Weekday Trips	Wkd Ridership	Wkd Hours	Wkd Productivity	Wkd OTP
33	649.86	23.2	28	80.60%
Saturday Trips	**Sat Ridership**	**Sat Hours**	**Sat Productivity**	**Sat OTP**
21	385.47	14.3	26.9	80.70%
Sunday Trips	**Sun Ridership**	**Sun Hours**	**Sun Productivity**	**Sun OTP**
16	268.38	10.1	26.5	75.90%





9 Arctic

Weekday Headways (min)			
AM	Midday	PM	Evening
30	30	30	60



Service Begins	Service Ends	Hrs/Day	Length (mi)	Run Time (min)	Speed (mph)
6:43 AM	10:26 PM	15:43	13.5	57.3	14.15

Weekday Trips	Wkd Ridership	Wkd Hours	Wkd Productivity	Wkd OTP
53	775.9	25.4	30.6	84.70%
Saturday Trips	**Sat Ridership**	**Sat Hours**	**Sat Productivity**	**Sat OTP**
24	395.27	11.4	34.6	76.00%
Sunday Trips	**Sun Ridership**	**Sun Hours**	**Sun Productivity**	**Sun OTP**
16	201.65	7	28.8	78.00%

Avg. Boardings / Day

- < 1
- 1 - 5
- 6 - 25
- 26 - 75
- Over 76

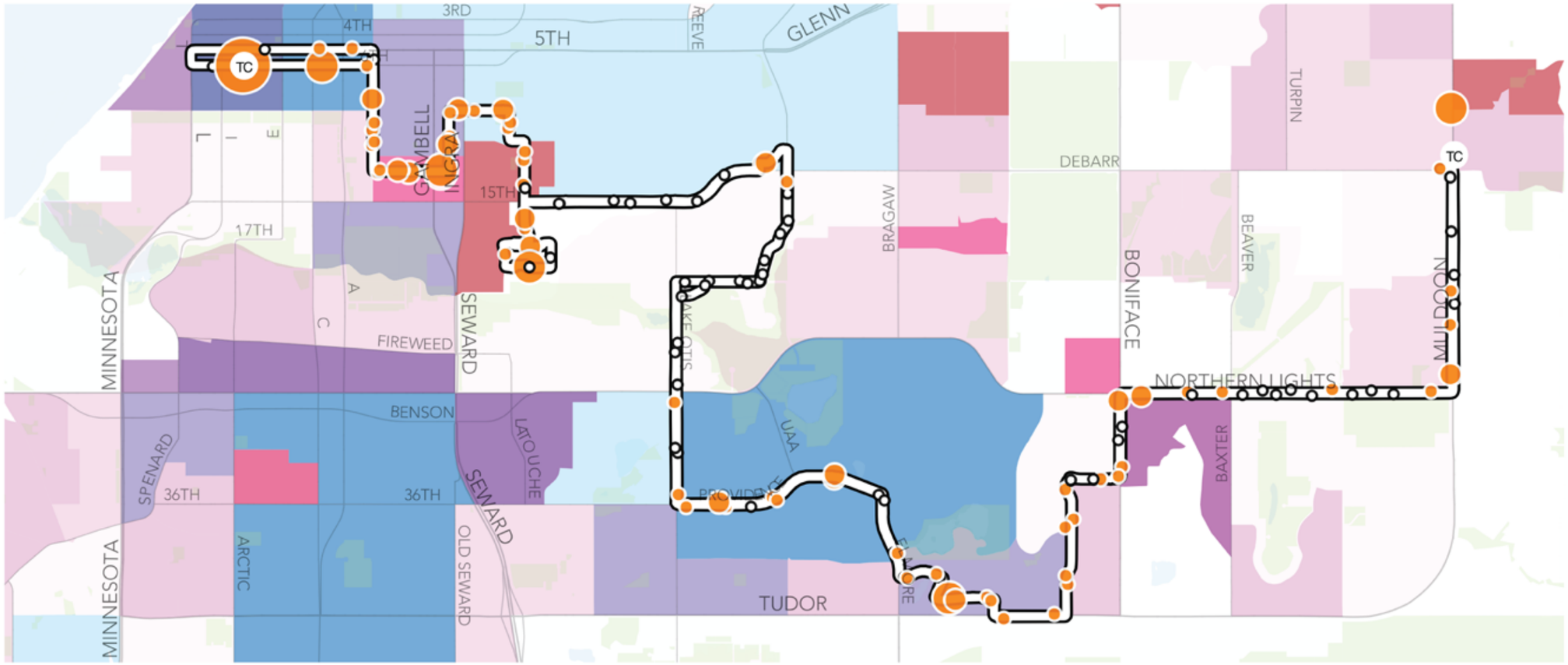
Residents / square mile

Employees / square mile

	3k	6k	12k
1k			
5k			
20k			

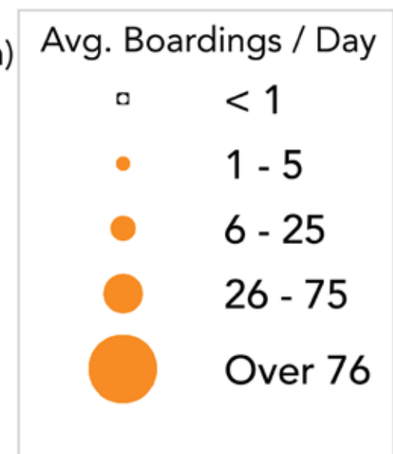
13 University / Hospitals

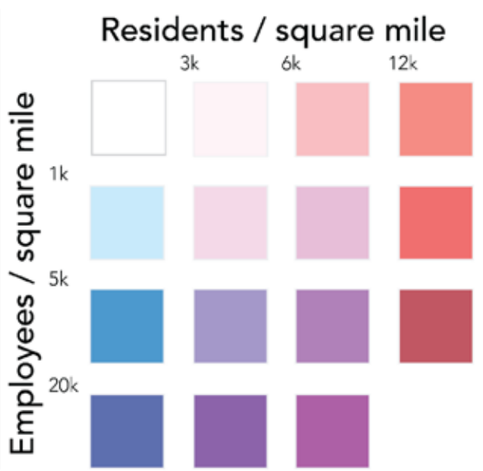
Weekday Headways (min)			
AM	Midday	PM	Evening
60	60	60	60



Service Begins	Service Ends	Hrs/Day	Length (mi)	Run Time (min)	Speed (mph)
5:45 AM	11:00 PM	17:15	26.5	116.9	13.59

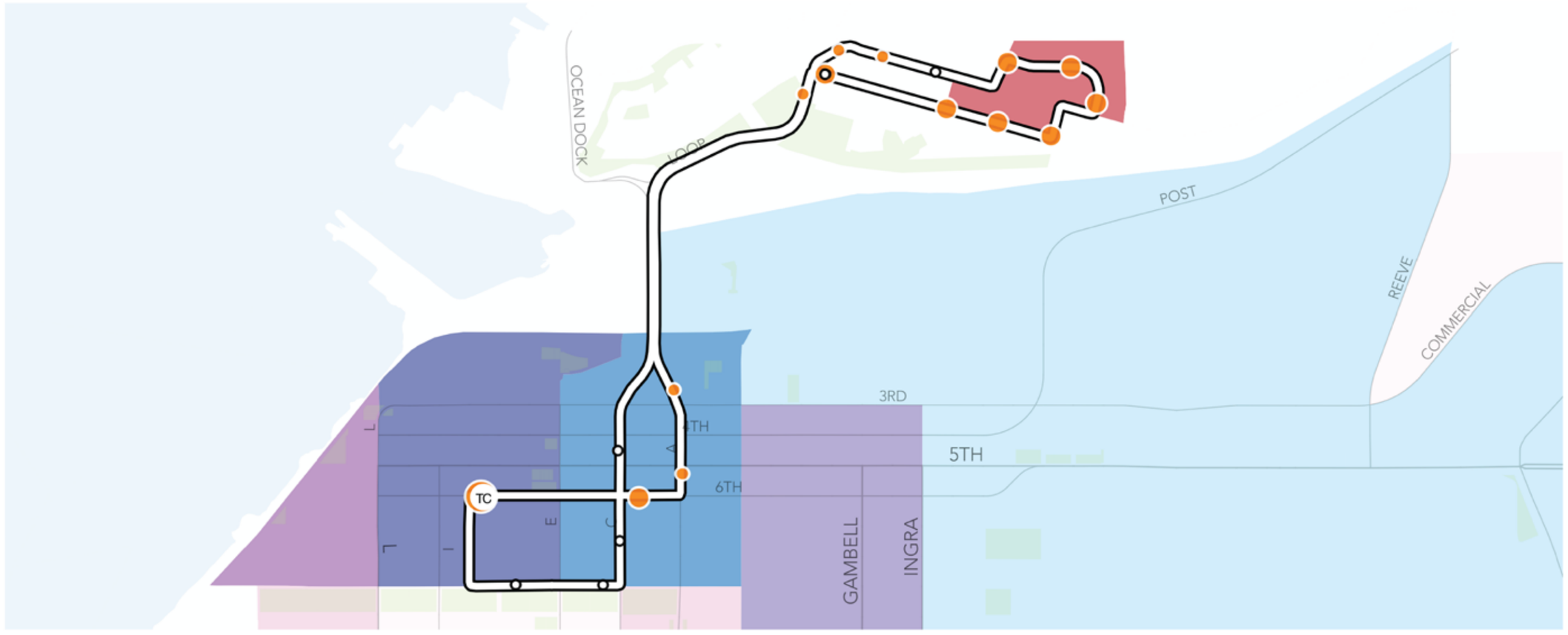
Weekday Trips	Wkd Ridership	Wkd Hours	Wkd Productivity	Wkd OTP
35	665.73	34.1	19.5	82.20%
Saturday Trips	**Sat Ridership**	**Sat Hours**	**Sat Productivity**	**Sat OTP**
24	361.23	21.9	16.5	83.80%
Sunday Trips	**Sun Ridership**	**Sun Hours**	**Sun Productivity**	**Sun OTP**
17	220.53	14.9	14.8	77.10%





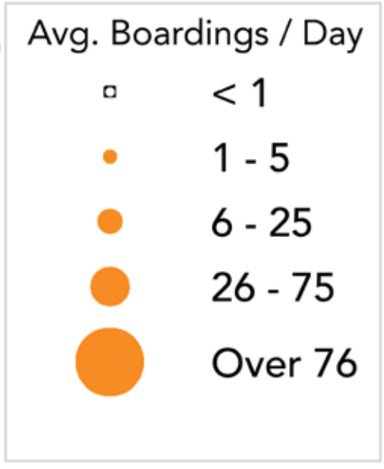
14 Government Hill

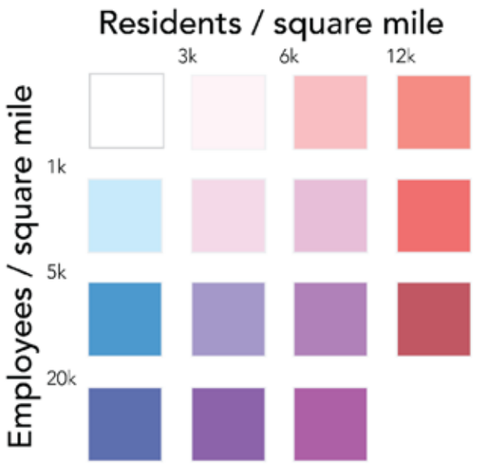
Weekday Headways (min)			
AM	Midday	PM	Evening
60	60	60	60



Service Begins	Service Ends	Hrs/Day	Length (mi)	Run Time (min)	Speed (mph)
6:41 AM	10:00 PM	15:19	5.1	21.4	14.32

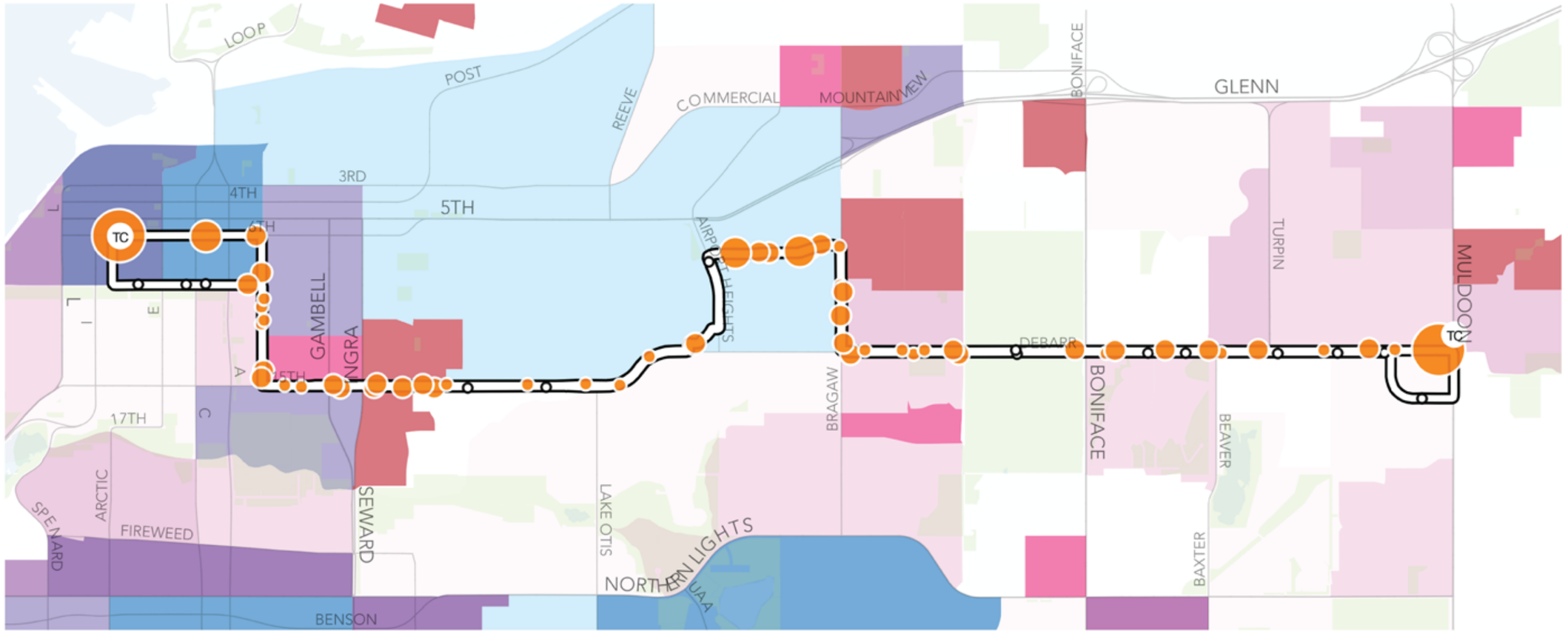
Weekday Trips	Wkd Ridership	Wkd Hours	Wkd Productivity	Wkd OTP
16	188.87	5.7	33.1	82.10%
Saturday Trips	**Sat Ridership**	**Sat Hours**	**Sat Productivity**	**Sat OTP**
12	95.27	4.2	22.7	83.70%
Sunday Trips	**Sun Ridership**	**Sun Hours**	**Sun Productivity**	**Sun OTP**
9	63.17	3.2	20.1	85.90%





15 Debarr

Weekday Headways (min)			
AM	Midday	PM	Evening
30	30	30	60



Service Begins	Service Ends	Hrs/Day	Length (mi)	Run Time (min)	Speed (mph)
6:12 AM	10:33 PM	16:21	14.2	56.7	15.03

Weekday Trips	Wkd Ridership	Wkd Hours	Wkd Productivity	Wkd OTP
56	831.93	26.5	31.5	82.60%
Saturday Trips	**Sat Ridership**	**Sat Hours**	**Sat Productivity**	**Sat OTP**
24	353.67	10.7	33.2	71.60%
Sunday Trips	**Sun Ridership**	**Sun Hours**	**Sun Productivity**	**Sun OTP**
16	205	6.7	30.8	77.00%

Avg. Boardings / Day

- < 1
- 1 - 5
- 6 - 25
- 26 - 75
- Over 76

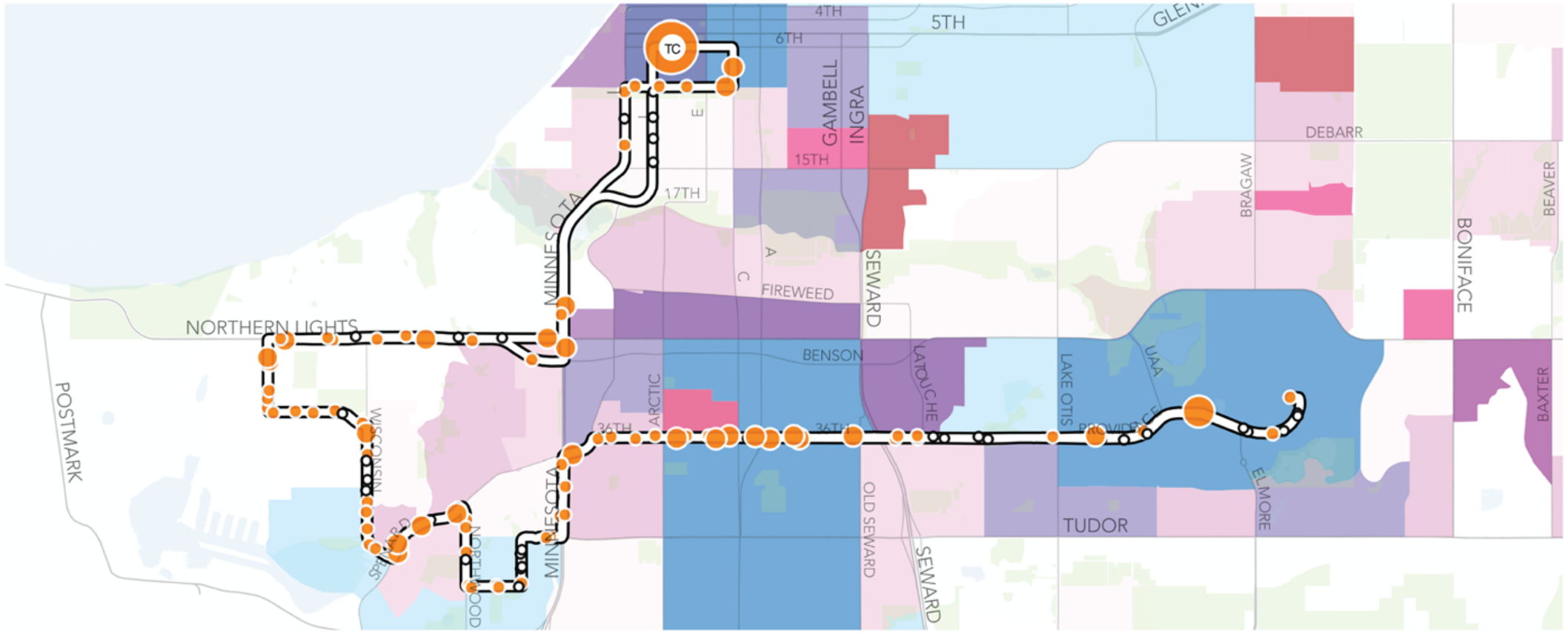
Residents / square mile

Employees / square mile

	3k	6k	12k
1k			
5k			
20k			

36 West Anchorage / U-Med

Weekday Headways (min)			
AM	Midday	PM	Evening
60	60	60	60



Service Begins	Service Ends	Hrs/Day	Length (mi)	Run Time (min)	Speed (mph)
6:05 AM	10:53 PM	16:48	22.6	88.7	15.32

Weekday Trips	Wkd Ridership	Wkd Hours	Wkd Productivity	Wkd OTP
36	466.37	26.6	17.5	79.00%
Saturday Trips	**Sat Ridership**	**Sat Hours**	**Sat Productivity**	**Sat OTP**
20	259.38	13.3	19.5	46.70%
Sunday Trips	**Sun Ridership**	**Sun Hours**	**Sun Productivity**	**Sun OTP**
14	150.65	9	16.8	69.10%

Avg. Boardings / Day

- < 1
- 1 - 5
- 6 - 25
- 26 - 75
- Over 76

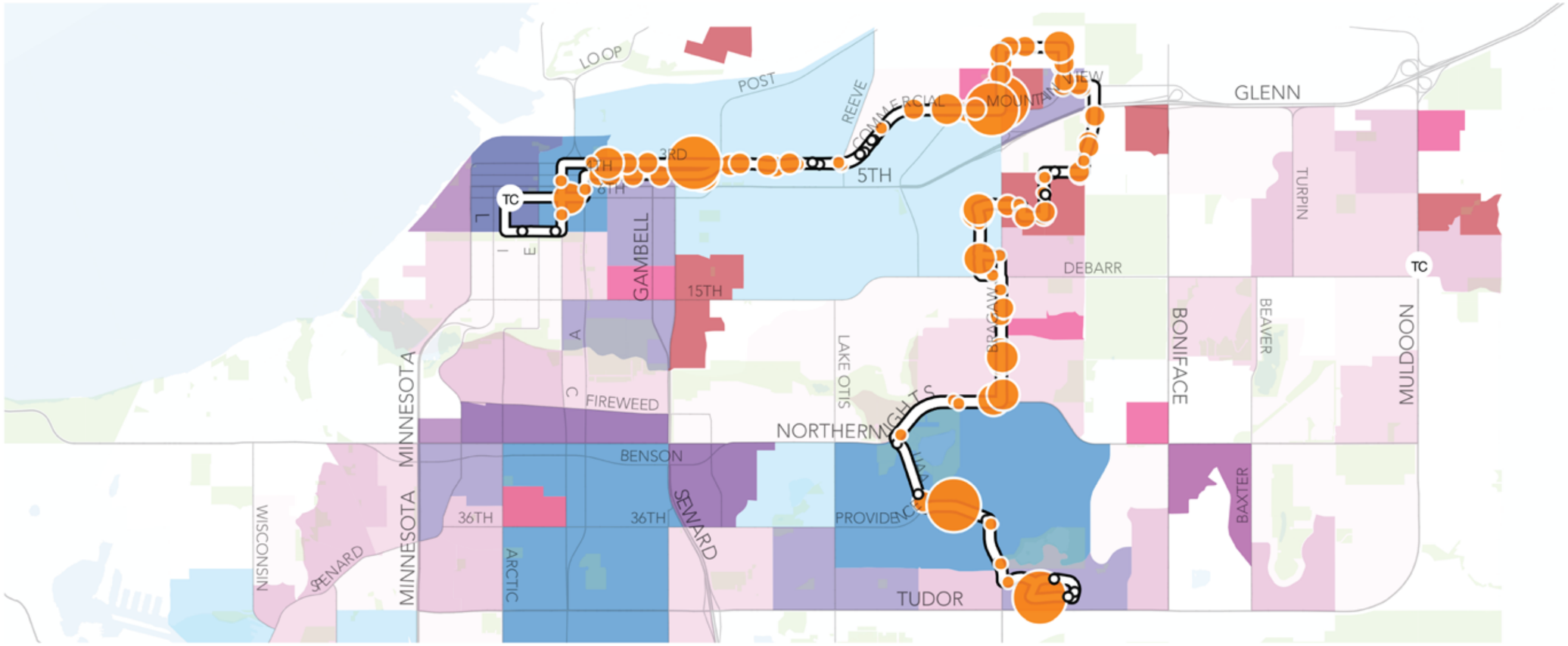
Residents / square mile

Employees / square mile

	3k	6k	12k
1k			
5k			
20k			

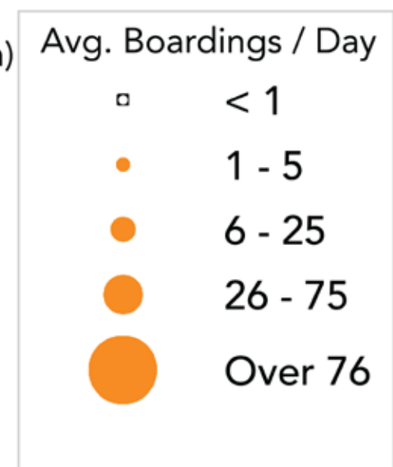
45 Mountain View

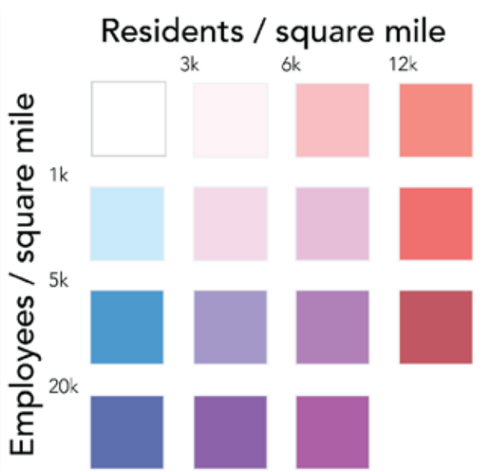
Weekday Headways (min)			
AM	Midday	PM	Evening
30	20	30	30



Service Begins	Service Ends	Hrs/Day	Length (mi)	Run Time (min)	Speed (mph)
5:49 AM	11:21 PM	17:32	19.9	91.4	13.04

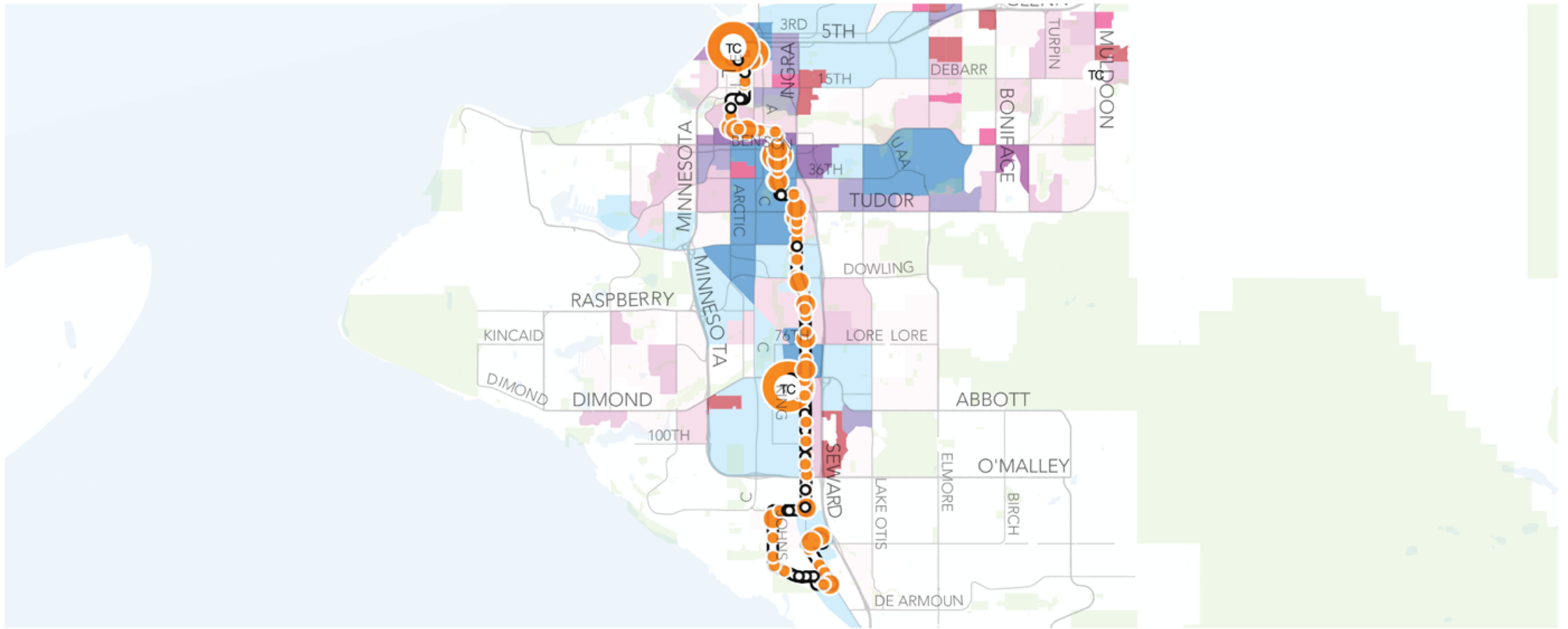
Weekday Trips	Wkd Ridership	Wkd Hours	Wkd Productivity	Wkd OTP
69	2128.36	52.5	40.5	87.00%
Saturday Trips	Sat Ridership	Sat Hours	Sat Productivity	Sat OTP
25	823.92	18.3	45.1	71.60%
Sunday Trips	Sun Ridership	Sun Hours	Sun Productivity	Sun OTP
18	476.23	12.4	38.3	67.40%





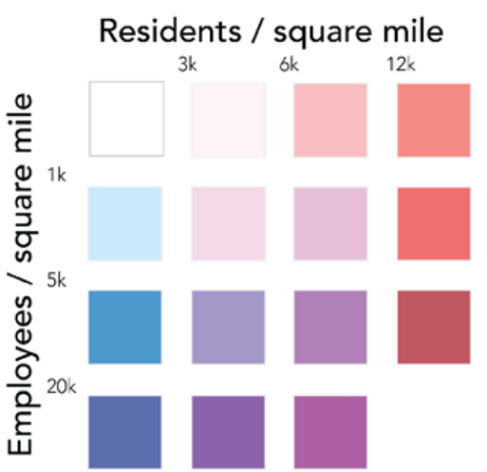
60 Old Seward

Weekday Headways (min)			
AM	Midday	PM	Evening
60	60	60	60



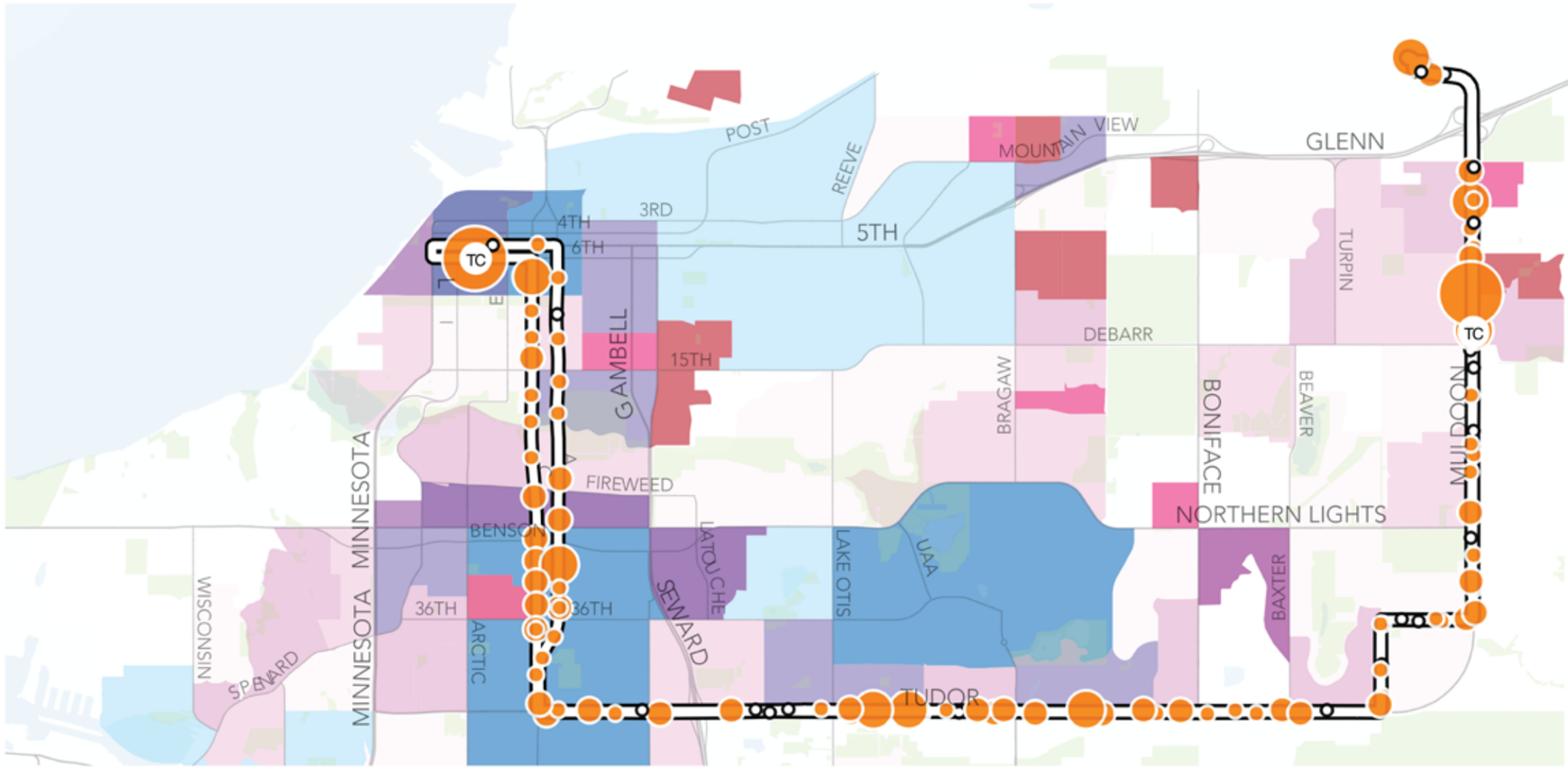
Service Begins	Service Ends	Hrs/Day	Length (mi)	Run Time (min)	Speed (mph)
6:15 AM	10:02 PM	15:47	25.3	102.9	14.73

Weekday Trips	Wkd Ridership	Wkd Hours	Wkd Productivity	Wkd OTP
35	667.67	30	22.3	82.60%
Saturday Trips	Sat Ridership	Sat Hours	Sat Productivity	Sat OTP
25	390.2	21	18.6	78.10%
Sunday Trips	Sun Ridership	Sun Hours	Sun Productivity	Sun OTP
17	206.53	13	15.8	83.10%



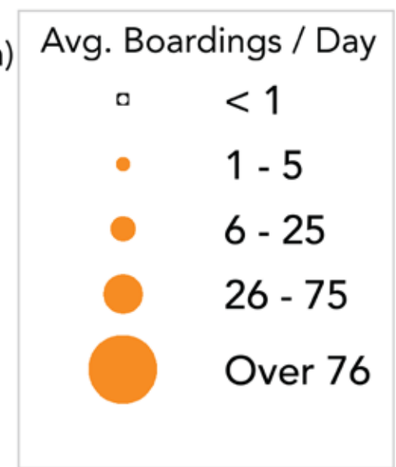
75 Tudor

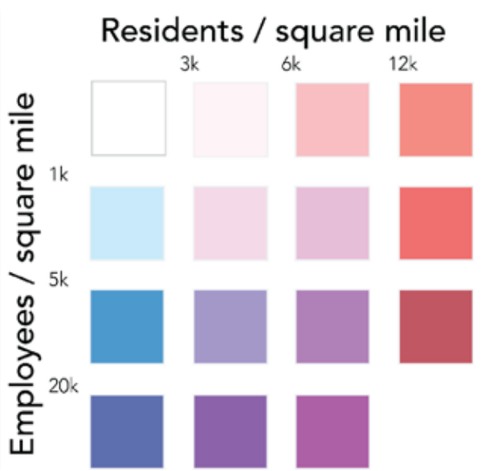
Weekday Headways (min)			
AM	Midday	PM	Evening
60	60	60	60



Service Begins	Service Ends	Hrs/Day	Length (mi)	Run Time (min)	Speed (mph)
5:25 AM	9:47 PM	16:22	24.2	92	15.78

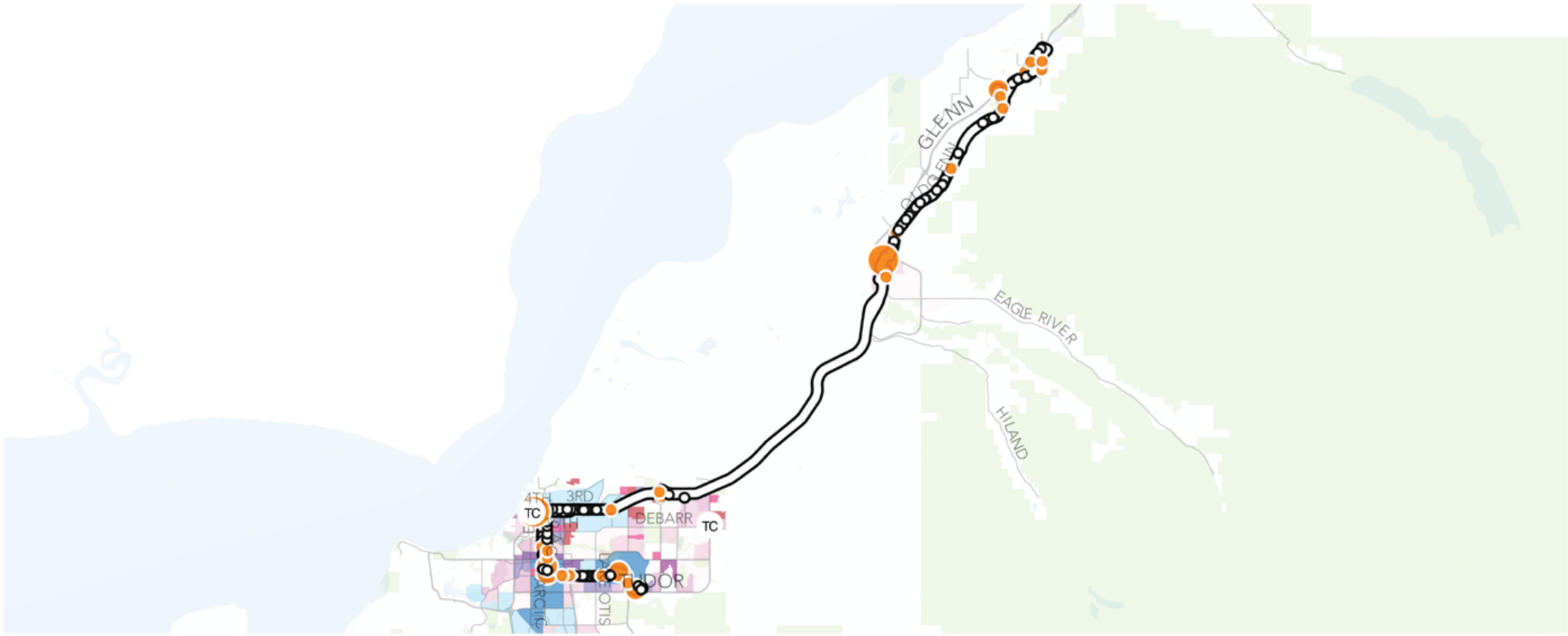
Weekday Trips	Wkd Ridership	Wkd Hours	Wkd Productivity	Wkd OTP
45	1192.11	34.5	34.6	83.40%
Saturday Trips	Sat Ridership	Sat Hours	Sat Productivity	Sat OTP
25	584.28	17.8	32.9	82.70%
Sunday Trips	Sun Ridership	Sun Hours	Sun Productivity	Sun OTP
17	345	10.9	31.7	81.90%





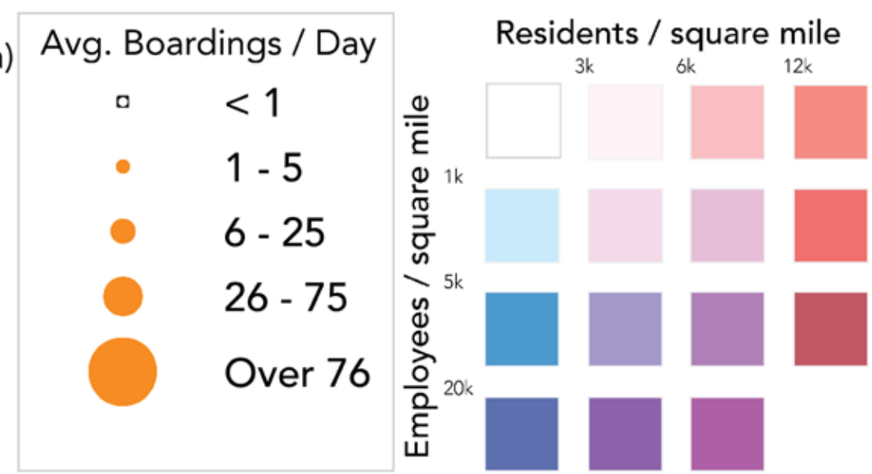
102 Eagle River / Chugiak

Weekday Headways (min)			
AM	Midday	PM	Evening
30	0	30	0



Service Begins	Service Ends	Hrs/Day	Length (mi)	Run Time (min)	Speed (mph)
5:25 AM	7:13 PM	13:48	65.5	167.7	23.44

Weekday Trips	Wkd Ridership	Wkd Hours	Wkd Productivity	Wkd OTP
9	199.02	12.2	16.3	72.20%
Saturday Trips	**Sat Ridership**	**Sat Hours**	**Sat Productivity**	**Sat OTP**
0	0	0	0	
Sunday Trips	**Sun Ridership**	**Sun Hours**	**Sun Productivity**	**Sun OTP**
0	0	0	0	



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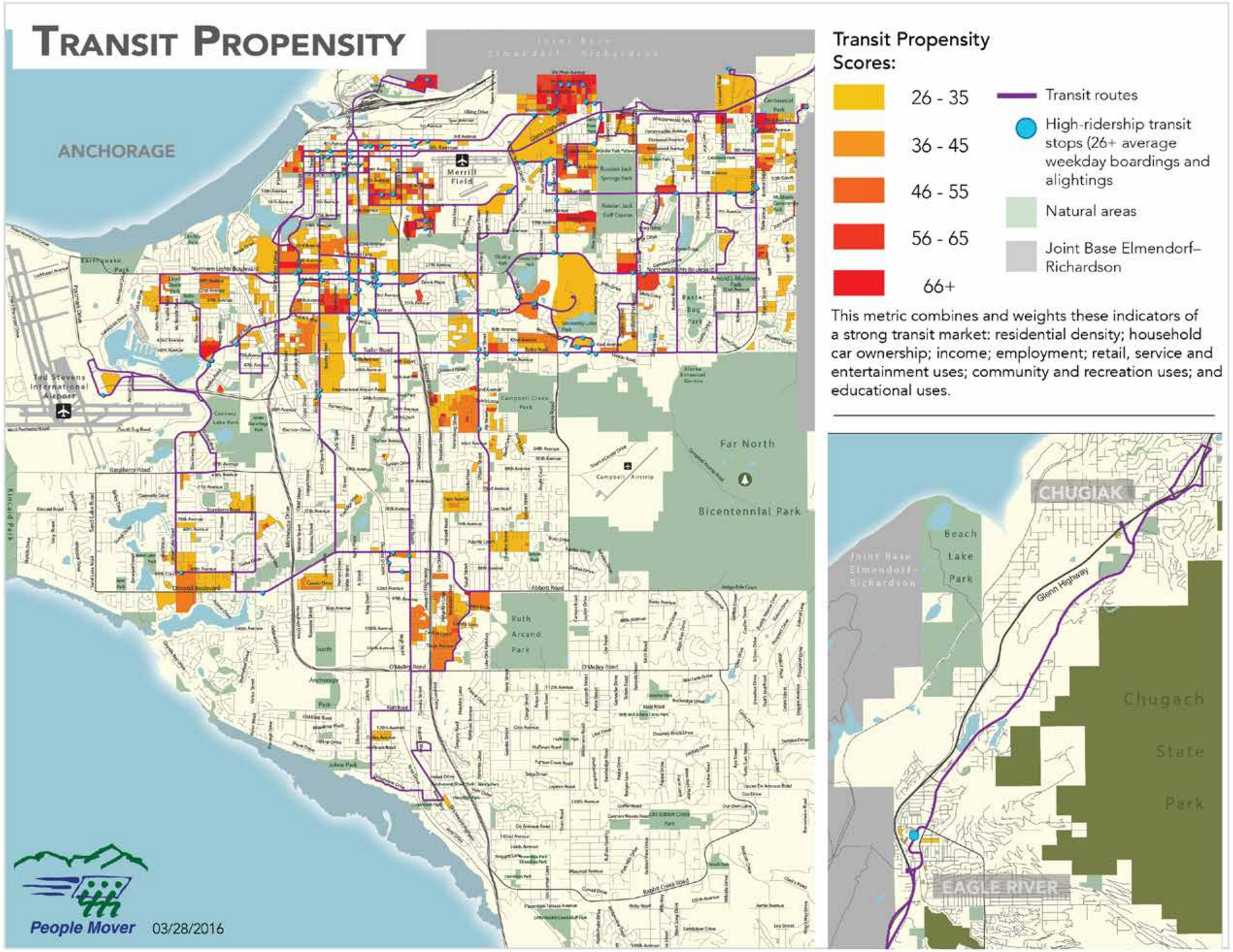
Appendix B: Transit Propensity Analysis

Figure 65: The map in Figure 11 on page 19 is based on Transit Propensity scores for individual census blocks. This map, at right, shows the original census block scores.



Data Inputs & Sources

Weighting (points & percentage)

Population Density
2010 Decennial Census

People / sq mile:
6,001 - 8,000 = 10
8,001 - 15,000 = 20
15,001 - 25,000 = 30
> 25,000 = 40

27%

Density of Residents Earning < $1,200 / month
2013 Census LODES

People / sq mile:
751 - 1,500 = 5
1,501 - 2,000 = 10
2,001 - 3,500 = 15
> 3,500 = 20

13%

Density of Non-Service Jobs
2013 Census LODES

Jobs / sq mile:
5,001 - 10,000 = 5
10,001 - 20,000 = 10
20,001 - 30,000 = 15
> 30,000 = 20

13%

Density of 0-1 Vehicle Households
2014 American Community Survey

Households / sq mile:
1,000 - 2,000 = 5
2,001 - 3,000 = 10
3,001 - 4,000 = 15
> 4,000 = 20

13%

Density of Ages 18 - 34
2014 American Community Survey

People / sq mile:
2,001 - 3,000 = 2.5
3,001 - 4,000 = 5
4,001 - 5,000 = 7.5
> 5,001 = 10

7%

Density of Ages 65+
2014 American Community Survey

People / sq mile:
751 - 1,000 = 2.5
1,001 - 1,500 = 5
1,501 - 2,000 = 7.5
> 2,001 = 10

7%

Shopping, Services & Entertainment
2013 Census LODES
Municipality of Anchorage

Type of destination:
Elementary School = 1
Library = 3
High School = 3
Middle School = 2
Elementary School = 1
Rec Center = 2
University = 6
Hospital = 6

+

Shopping, service, or entertainment jobs:
35 - 110 = 3
111 - 230 = 4
231 - 475 = 5
> 475 = 6

20%

People Mover

Summation

Data Processing

Total "Score" per Census Block

Max Score per Census Block = 150

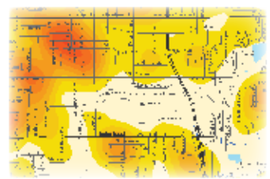
Spatial Join

Census Block Centroids Converted to Points

Kernel Density

Weighted Transit Propensity (Heat Map)

Quarter-Mile Search Radius



Results

Figure 66: This flowchart describes the weighting given to each type of geographic data in the Transit Propensity Analysis, shown in the map in Figure 11. These weights were based on an origin-destination survey of transit riders in Anchorage, and academic findings about the effects of these factors on transit ridership.

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Appendix C: Outreach List

Figure 67: This list summarizes the ways in which People Mover engaged Anchorage's diverse transit stakeholders in the choices presented in this report.

List of Outreach and Engagement Efforts

Organizations Engaged

Access Alaska
ADA Advisory Commission
AFACT
Alaska Career College
Alaska Community Transit
Alaska Department of Health & Human Services
Alaska DOT
Alaska Institute for Justice (AIJ)
Alaska Literacy Program
Alaska Mobility Coalition
Alaska Native Medical Health Center
Alaska Pacific University
Alaska Regional Hospital
All Community Councils *(email or in-person)*
All Refugee Meeting
AMATS
Anchorage Chamber of Commerce
Anchorage Community Development Authority (ACDA)
Anchorage Community Land Trust
Anchorage Economic Development Corp (AEDC)
Anchorage Library
Anchorage Museum
Anchorage Neighborhood Health Center
Anchorage School District
Anchorage Senior Activity Center
Bike Anchorage
Boys and Girls Club
Bridge Builders
Building Owners & Managers Association
Catholic Social Services
Charter College
Chugiak-Eagle River Chamber of Commerce
Code for Anchorage
Cook Inlet Housing Authority
Chugiak-Eagle River Senior Center
Cook Inlet Tribal Council
Covenant House
Dimond Mall
Downtown Partnership
Eklutna Native Corps
Fairview Recreation Center
Governor's Council on Disabilities & Special Education
JBER
Language Interpreter Center (AIJ)
MOA Community Development & Planning
MOA Cultural Ambassadors
MOA Homeless Coordinator
MOA Public Transportation Advisory Board
MOA Traffic / Engineering
Muldoon Chamber of Commerce
NAACP
Native Village of Eklutna
Providence Alaska Medical Center
Refugee Assistance & Immigration Services (RAIS)
Senior Advisory Commission
Southcentral Foundation
Spenard Recreation Center
St Mary's Native Corporation
Statewide Independent Living Council
University of Alaska – Anchorage
Visit Anchorage
Welcoming Anchorage
YMCA
Youth Advisory Commission
YWCA

Community Council Presentations

Abbott Loop Community Council
Birchwood Community Council
Downtown Community Council
Federation of Community Councils
Government Hill Community Council
Mountain View Community Council
North Star Community Council
Northeast Community Council
Rogers Park Community Council
Russian Jack Community Council
Sand Lake Community Council
Scenic Foothills Community Council
South Addition Community Council
Spenard Community Council
Spenard Community Council
Taku-Campbell Community Council
Tudor Area Community Council
University Area Community Council

Online / Social Media Engagement

Alaska Daily News online advertisement
Facebook (English posts & translated posts)
KTVA / CBS 11 online advertisment
KTUU / NBC 2 online advertisement
MetroQuest Web Survey (five languages available)
Nextdoor
Twitter

Media Outreach

Alaska Business Monthly
Alaska Daily News print advertisment
Alaska Daily News story
Kenai AM 650
Press release through Mayor's Office

Open Houses / Pop-Up Visits

Anchorage Transportation Fair
Dimond Transit Center (pop-up iPad survey tabling)
Downtown Transit Center (pop-up iPad survey tabling)
Mountain View Street Fair
Vision Zero Public Meeting

Public Meetings

Chugiak - Eagle River Public Meeting
East Anchorage Public Meeting
May 5th Kickoff Event
Mountain View Public Meeting
South Anchorage Public Meeting

Public Notices

Flyers posted in Mountain Viewv in five languages
Flyers posted throughout Anchorage in five languages
Meeting & survey notices on buses in five languages
Survey & meeting notices at Downtown Transit Center
Survey, meeting, & project notices at Customer Service