ALE✗ANDRIA
Transit Vision
Your City. Your Transit Network.

Final Report

February 2020

CITY OF ALEXANDRIA VIRGINIA

DASH

Table of Contents

1. Introduction and Executive Summary

What is the Alexandria Transit Vision?

The Alexandria Transit Vision (ATV) Plan is a project led by the City of Alexandria and DASH to design a future bus network for the City of Alexandria. The purpose of the project — as determined by extensive community outreach and guidance from City/DASH leadership — is to create a more useful and equitable bus network that will encourage more people to get to more places using transit. Additional project background information is available in the "Choices Report" and on the ATV website.

This process was led by the City of Alexandria and the City transit agency, DASH, in close coordination with the Washington Metropolitan Area Transit Authority (WMATA), Arlington County, Fairfax County, and the Northern Virginia Transportation Commission. The City of Alexandria began this conversation in 2018 with the public, stakeholders, riders, and elected officials about whether to change the city's bus transit network, in what direction the system should be changed, and how to invest in the future of transit in Alexandria.

The goals of this process have been to:

Assess the existing transit network in view of the City's demographic and geometric context.

Analyze existing travel patterns and consider changing trends and technologies in transportation.

Engage the public, stakeholders, and elected officials in a conversation about the purpose and goals of transit in Alexandria.

Develop recommendations for changing the transit network to best meet the needs and goals of today's city and the future of Alexandria.

In October 2018, the City published a Choices Report, held 11 public meetings or events, and invited feedback through an online survey about the transit goals in Alexandria.

In February 2019, the City published a Concepts Report that showed different ideas for how a network for Alexandria could be designed based on different goals. The City and DASH held numerous public meetings and events, and invited feedback through an online survey to understand how Alexandrians wanted transit to serve their community.

In October 2019, the City published a Draft Recommended Network Report as the third step in the ATV. In this report, the feedback and policy direction from the first and second phases of input had led the study team to draft short- and long-term recommended networks to guide the future of a new transit network for Alexandria.

Based on public and stakeholder feedback, the Draft Recommended Networks were refined to develop short- and long-term Vision Plan Networks for 2022 and 2030, respectively. These final ATV networks were approved by the Alexandria Transit Company Board (DASH Board) in December 2019.

How does the Vision Plan Network perform?

For most people and most places in Alexandria, the VIsion Plan Network dramatically increases the number of jobs, people, and opportunities accessible by transit (**Figure 1**). It does this by providing more frequent, all-day service along the busiest and densest corridors and by rearranging service in some areas to consolidate routes into higher frequency service. With these changes:

83% The percent of Alexandria residents near frequent, all-day transit (a bus or train coming every 15 minutes or better) would increase from 27 to 83% by 2030.

99% The percent of existing bus boardings in Alexandria that will continue to be within 1/8 of a mile of a future bus stop under the new ATV Plan.

+18% For the average Alexandrian, the number of jobs accessible by transit within 45 minutes would increase by 18% by 2030.

Figure 1: Summary of the access to jobs, people, and opportunities accessible by transit in the Vision Plan Network

Access to Frequent, All-Day Service for Communities of Concern

Resident or job is within 1/4 mile of a route with service every 15 minutes or better

Legend: ■ Existing Network ■ 2022 Vision Plan Network ■ 2030 Vision Plan Network
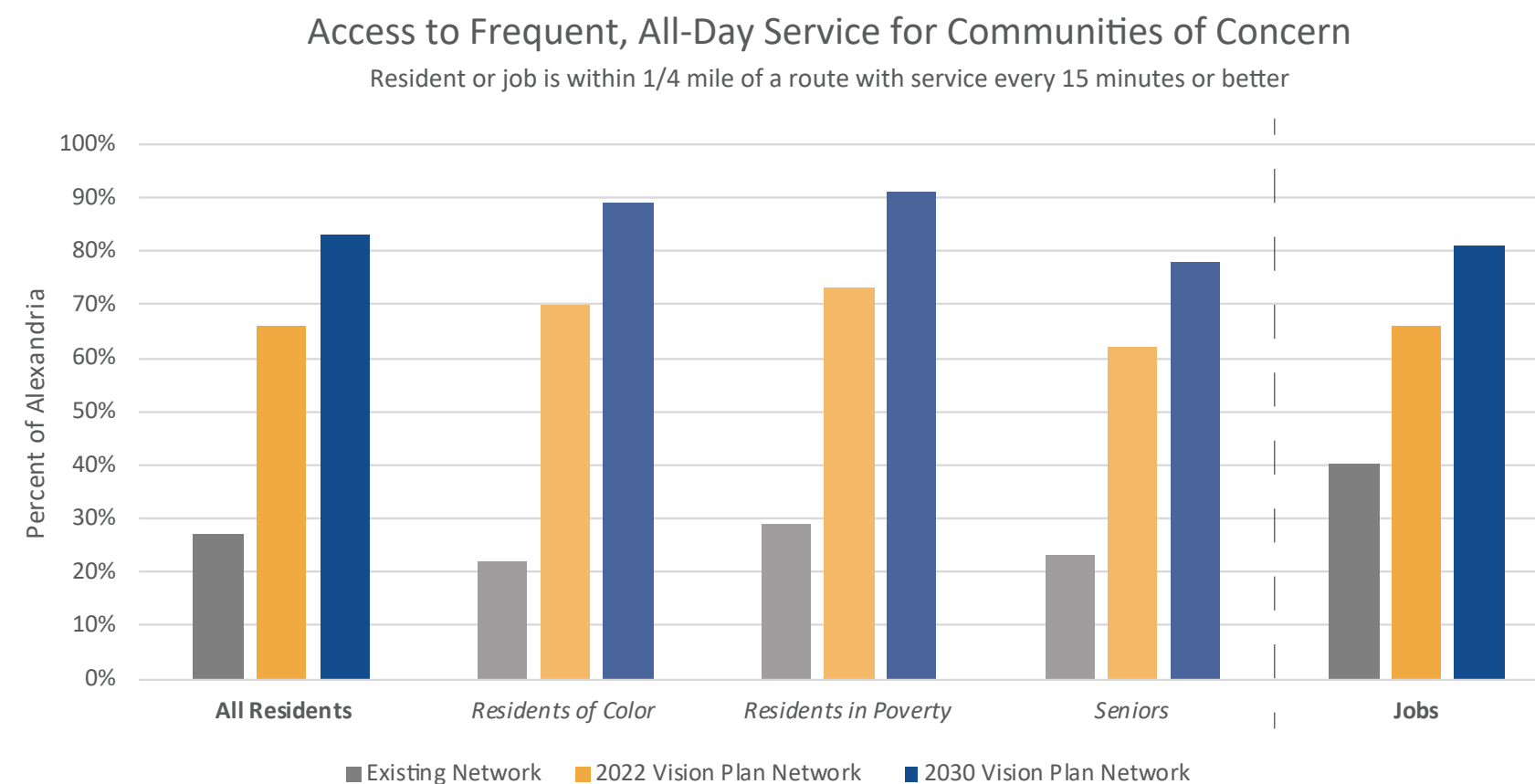
What Goals Does Transit Serve?

Transit planning is not just a technical process. Transit plans reflect values. Difficult choices were made in the course of developing the ATV Plan. Understanding which goals matter most in Alexandria was a key step in developing the Vision Plan Network.

Possible goals for transit include:

» **Economic:** transit can give businesses access to more workers and give workers access to more jobs. Transit can help attract industries, new residents, or tourists. By maintaining access and mobility in the face of congestion, transit also can increase the economic potential of a city.

» **Environmental:** increased transit use can reduce air pollution and greenhouse gas emissions by reducing single-occupancy vehicle usage. Transit also can support more compact development and help conserve land.

» **Health:** transit can be a tool to support physical activity by walking. This is partly because most riders walk to their bus stop, but also because riders will tend to walk more in between their transit trips.

» **Personal Liberty:** By providing people the ability to reach more places than they otherwise would, a transit system can be be a tool for increasing individual liberty, freedom, and access to a a wide range of personal and professional opportunities that will improve overall quality of life.

» **Social:** useful transit can help meet the mobility needs of people who are facing various disadvantages — such as low incomes or disabilities — providing lifeline access to services and jobs.

Some of these purposes are served only when transit has high ridership. For example, the environmental benefits of transit only arise from many people riding the bus rather than driving, taking a taxi, or otherwise getting a ride in a private vehicle and subsidy per rider is lower when ridership is maximized. **We call these ridership goals.**

Other goals are served by the fact that transit is available in a given area. A bus stop in a neighborhood gives residents insurance against isolation, even if the service is infrequent, not very useful, and few people ride it each day. The same service may also help to fulfill political or social obligations, for example by getting service close to every taxpayer. **We call these coverage goals.**

Photo Courtesy of Evan Michio Photography

Photo Courtesy of Evan Michio Photography

The Transit Network as an Instrument of Freedom

High transit ridership results when transit is useful to large numbers of people. A helpful way to illustrate the usefulness of a network is to visualize where a person could go using public transit and walking, from a certain location, in a certain amount of time.

The map in **Figure 2** shows where someone can go if they start from T.C. Williams High School at noon on a weekday. From the selected point, the map shows where someone could be, on public transit combined with walking, in 15, 30, 45, or 60 minutes. The technical term for this illustration is an isochrone map. A more useful transit network is one in which these isochrones are larger, so that each person is likely to find the network useful for more trips.

The example here shows this problem clearly. T.C. Williams is served by multiple bus routes, which is why access is available in many directions. But most of the routes that serve it only come once every 30 minutes. On average, a person will have to wait 15 minutes for a bus, so a large part of a person's travel budget is taken up by wait time for any trip by transit from T.C. Williams.
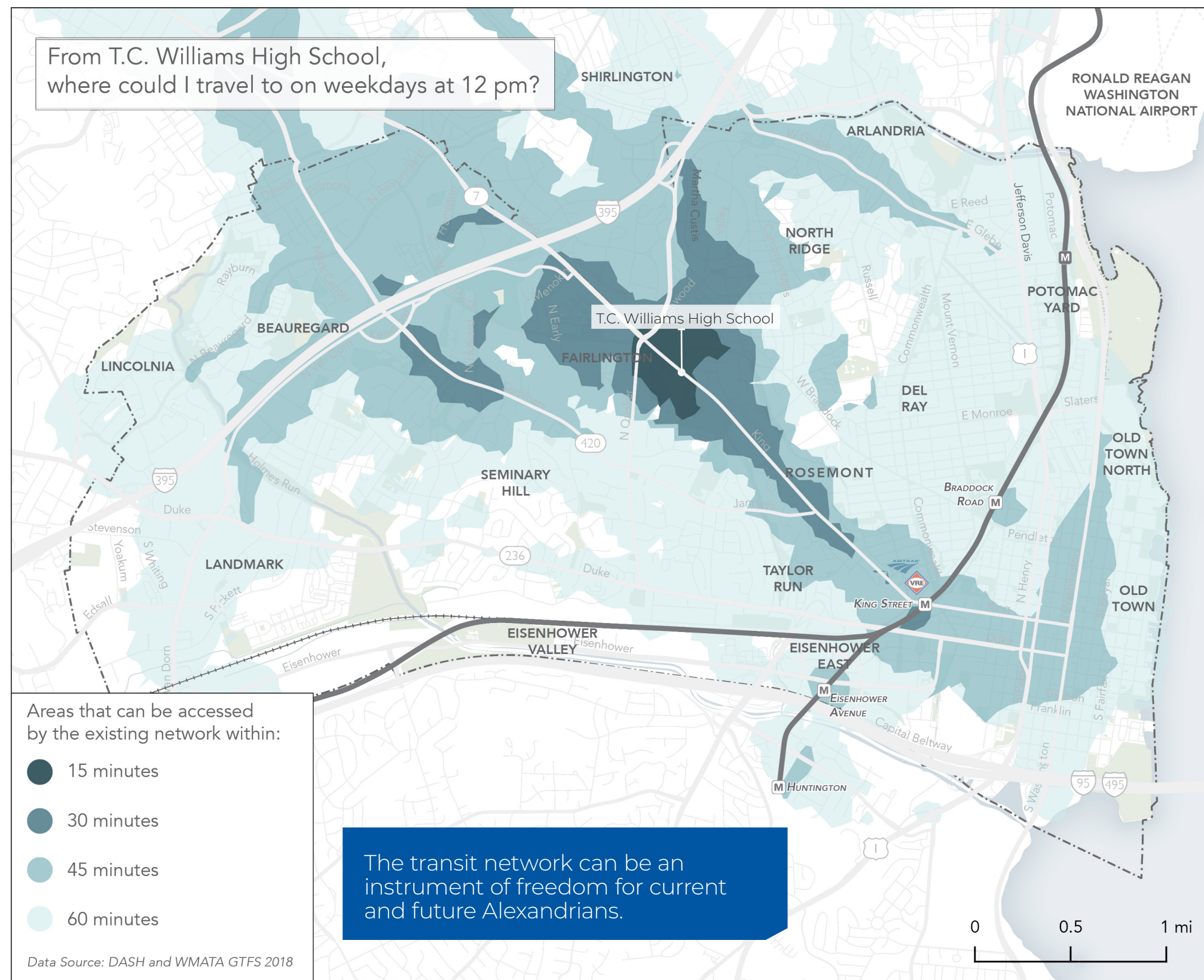
Frequency is Freedom

In transit conversations, there is always a great focus on where transit is provided, but sometimes not enough attention paid to when it is provided. The "when" of transit service can be described as "frequency" or "headway" (how many minutes between each bus) and "span" (how many hours per day and days per 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.**

Increasing Usefulness Increases Ridership

Expanding freedom and opportunity is foundational for ridership growth. While other factors also affect ridership, this measure of freedom and opportunity isolates the transit network's role in attracting ridership. It reveals ways that a transit network can help more people get to more places sooner, so they can do more things.

Figure 2: From T.C. Williams High School only a small part of the city is reachable within 30 minutes, but most is reachable within an hour.

From T.C. Williams High School, where could I travel to on weekdays at 12 pm?

Areas that can be accessed by the existing network within:

- 15 minutes
- 30 minutes
- 45 minutes
- 60 minutes

Data Source: DASH and WMATA GTFS 2018

The transit network can be an instrument of freedom for current and future Alexandrians.

0   0.5   1 mi

Ridership and Coverage Goals Conflict

Ridership and coverage goals conflict. Within a fixed budget, if a city or transit agency wants to do more of one, it must do less of the other.

Consider the fictional city in **Figure 3**. The little dots indicate dwellings, commercial buildings and other land uses. The lines indicate roads. As in many neighborhoods, most activity is concentrated around a few roads.

A city pursuing only ridership would run all its service on the main streets, since many people are nearby, and buses can run direct routes. A high ridership network allocates frequent service to areas with favorable urban development patterns, forming a connected network, resulting in a network like the one at bottom-left.
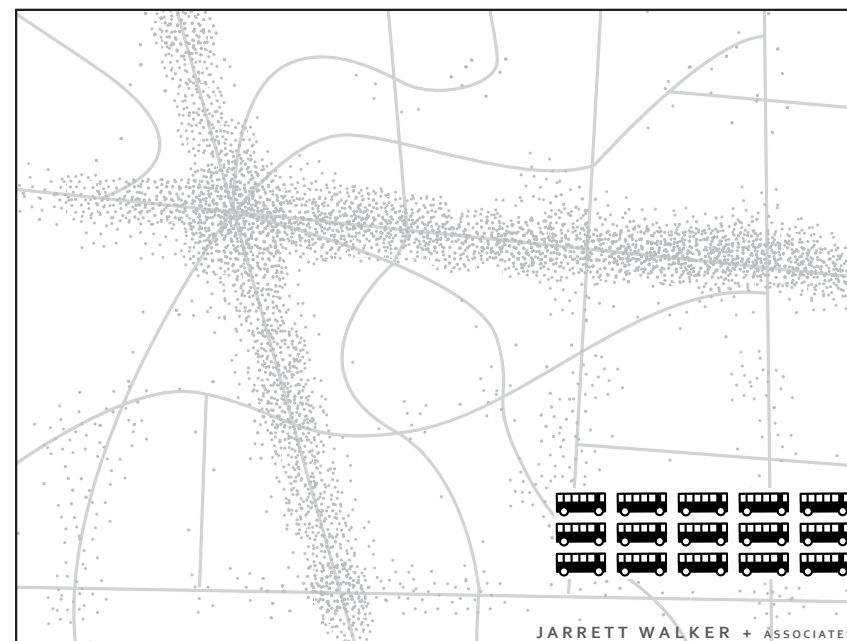
If the city were pursuing only coverage, it would spread out so that every street had some service, as in the network at bottom-right. All routes would then be infrequent, even on the main roads.

These two scenarios require the same number of buses and cost the same amount to operate but deliver very different outcomes. To run buses at higher frequencies on the main roads, neighborhood streets will receive less coverage, and vice versa.
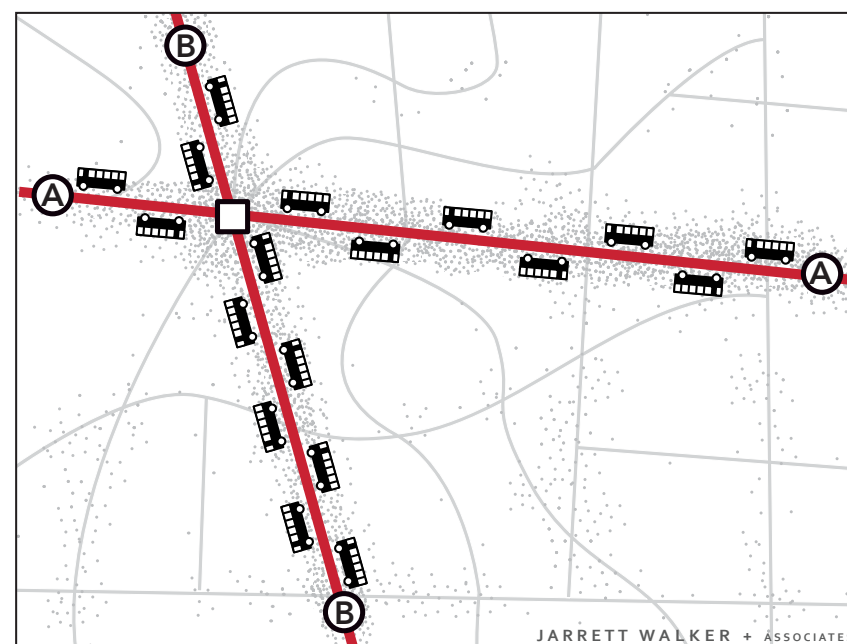
The choice between maximizing ridership and maximizing coverage is not binary. All cities and transit agencies spend some portion of their budget pursuing each type of goal. Cities are often accused of failing to maximize ridership, as if that were their only goal. In fact, cities are often intentionally operating "coverage services" that are not expected to generate high ridership. Cities must balance the competing goals of high ridership and coverage. The balance they choose depends on the values of the city.

A particularly clear way for cities and transit agencies to set a policy balancing ridership and coverage goals is to decide what percentage of their service budget should be spent in pursuit of each. This is precisely the approach taken in the ATV process as the public, riders, stakeholders, and elected leaders considered the differing values and outcomes of these goals in the Concepts Report and the DASH Board provided a policy direction to the study team for how to balance these competing goals.

Figure 3: Ridership and coverage goals are in direct conflict within a fixed budget.

Imagine you are the transit planner for this fictional town.

The dots scattered around the map are people and jobs.

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

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

Maximum Ridership

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

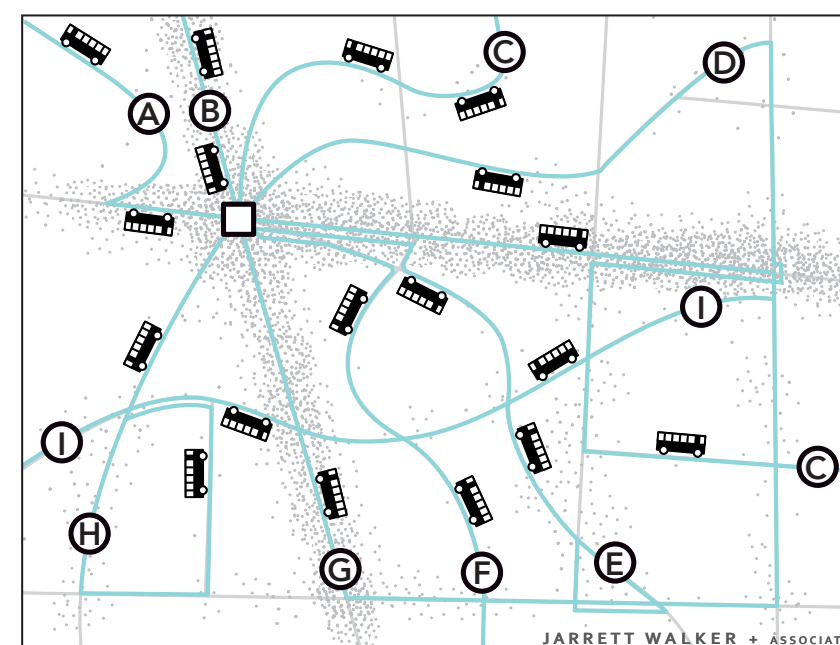### Maximum Coverage

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

How Did We Get Here?

Figure 4 shows the four-phase process used to develop the ATV Plan.

Choices

In the first round of engagement for the ATV, or "Choices" phase, the project team asked the public and community stakeholders about their values and priorities for transit, and how they might balance certain trade-offs related to transit service in Alexandria. These trade-offs are consistent with the findings presented in the Choices Report in October 2018.

In the first phase, a public survey provided input on the key questions. Responses showed that most people preferred a longer walk for a shorter wait, most preferred a higher ridership network, and most preferred a faster trip, even if it meant a connection. For a full summary of the responses in the "Choices Phase" see the Concepts Report.
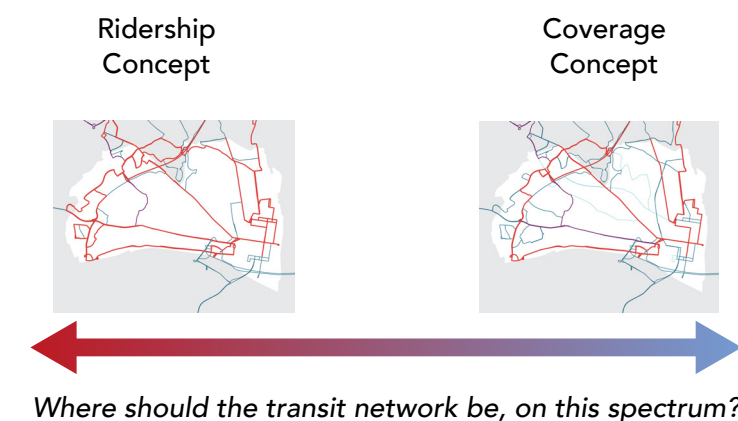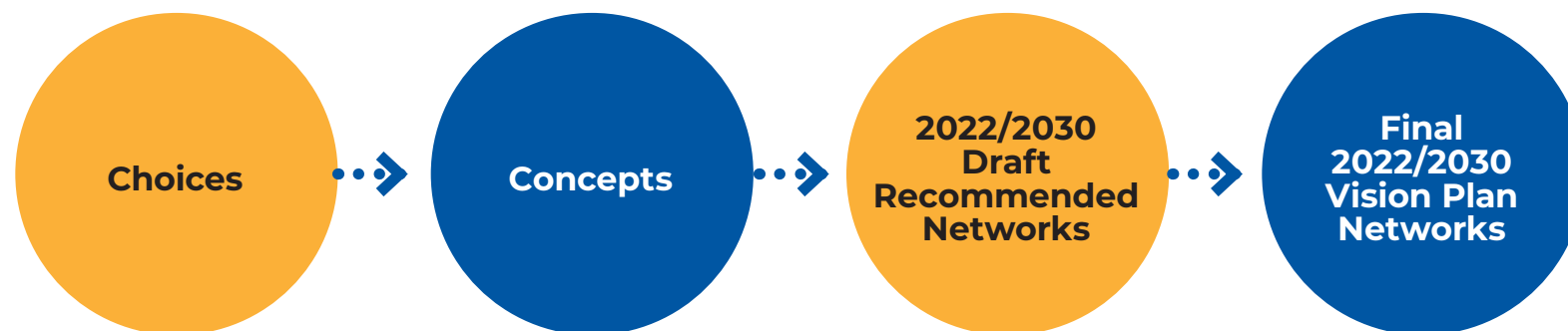
Figure 4: Key Phases in the Vision Plan Development Process

Ridership Concept   Coverage Concept

Where should the transit network be, on this spectrum?

Figure 5: The two concepts show a range of choices for the Alexandria transit system

Concepts

Building off these responses, the study team developed two network concepts to show the range of possible network designs and outcomes from prioritizing different goals. Both concepts assumed about 20 percent more service than today, but each concept had the same amount of service, so they showed different ways of allocating the same total resources.

The two concepts differed in the degree to which they emphasize ridership goals as opposed to coverage goals. These concepts represented a spectrum of possibilities and they were not intended to be an either/or proposition. By showing the public, stakeholders, and decision makers the range of possibilities, the City and DASH were asking, "Now that you see the outcomes of emphasizing one goal over another, how do you balance ridership and coverage goals?" In other words, "If you want better service, what is your definition of better?"

From February through June 2019, the City and DASH held a series of public engagement opportunities. Throughout these outreach efforts, a survey was available online and on paper in English and Spanish.

Responses from the public indicated they preferred both the **Coverage** and **Ridership Concepts** to the **Existing Network** and preferred the **Ridership Concept** over the **Coverage Concept**. The public survey direct feedback, and public hearings culminated in a decision by the DASH Board at their June 12, 2019 meeting.

The DASH Board provided the following policy guidance directing the project team to design the ATV as follows[1]:

» The 2030 ATV Network should be designed with the assumption that DASH and WMATA can provide 20 percent more service hours than today.

» The ATV network should be designed with approximately 85 percent of service hours dedicated to ridership-oriented goals.

» Approximately 15 percent of service hours should be allocated for coverage type services, with an emphasis on maintaining transit access for areas with significant numbers of seniors and individuals with limited mobility.

» In light of extensive public feedback, to the maximum extent possible, existing peak services should be retained in a similar form, particularly the AT3 and AT4.

» For the short-term (2022), the ATV should provide one scenario that assumes an 8 percent increase in service hours for DASH and one scenario that assumes no change in service hours (exclusive of 395/95 Commuter Choice funding described on the next page).

1 Alexandria Transit Company Board of Directors Meeting, June 12, 2019. Summary of board action is available at www.dashbus.com/transitvision

Draft Network

Input received from the public and the DASH Board was used in summer 2019 to develop a Draft Recommended Network. In the third round of engagement during fall 2019, the Draft Recommended Networks for the near term (2022) and long term (2030) scenarios were presented to the public. The goal of this outreach was to get public feedback that would help shape the final plan. During this phase, outreach was conducted through community meetings, an online survey, web and print media, and meetings with the Stakeholder Advisory Group.

The project team received both positive and negative public feedback on the Draft Recommended Network. Most residents were supportive of the overall increases in access to all-day frequent transit, especially for low-income, minority, and senior residents. The improvements to evening and weekend service also were well received. The biggest concern from the community was in response to the proposed elimination of Route AT2 in the central area of Alexandria along Janneys Lane and Seminary Road between King Street-Old Town Metrorail station and Howard Street. In response to the large number of complaints, the project team looked at multiple options that would maintain some level of service along this segment of Seminary Road and Janneys Lane and proposed options for the DASH Board to consider at its November 2019 meeting.

Stakeholder meeting attendees discuss and collaborate on ATV concepts

Vision Plan Network

Based on the feedback received and direction of the DASH Board in November 2019, a few changes were made to the Draft Recommended Networks to arrive at the final Vision Plan Network. Mainly, the Board noted that the AT2 service is important to serving residents, especially disadvantaged residents, and provided guidance to staff to maintain weekday AT2 service with future ridership monitoring. The Board also noted its desire to minimize fiscal impacts and would like staff to provide cost impacts associated with associated service reductions. These specific changes are described in the Phase 3 section of Chapter 2.

At the December 2019 DASH Board meeting, the Vision Plan Networks for 2022 and 2030 were presented to the Board. The Board adopted the final 2030 ATV Network Plan (20 percent added service hours), and the 2022 major growth (8 percent added service hours) ATV Network Plan. These networks are described in Chapter 3.

Who designed this network?

Using the policy direction from the DASH Board, this network was designed through collaboration among City of Alexandria planning and transportation staff, DASH staff, WMATA bus planning staff, Arlington County Transit (ART) staff, Fairfax County staff, and consulting transit specialists from Kimley-Horn and Associates and Jarrett Walker + Associates.

This network reflects some key policy choices and priorities for how transit should be designed in Alexandria. Those choices were made not by the technical experts, but by Alexandria stakeholders, residents, and leaders. The choices, and the many ways that people weighed in on them, are described in the report.
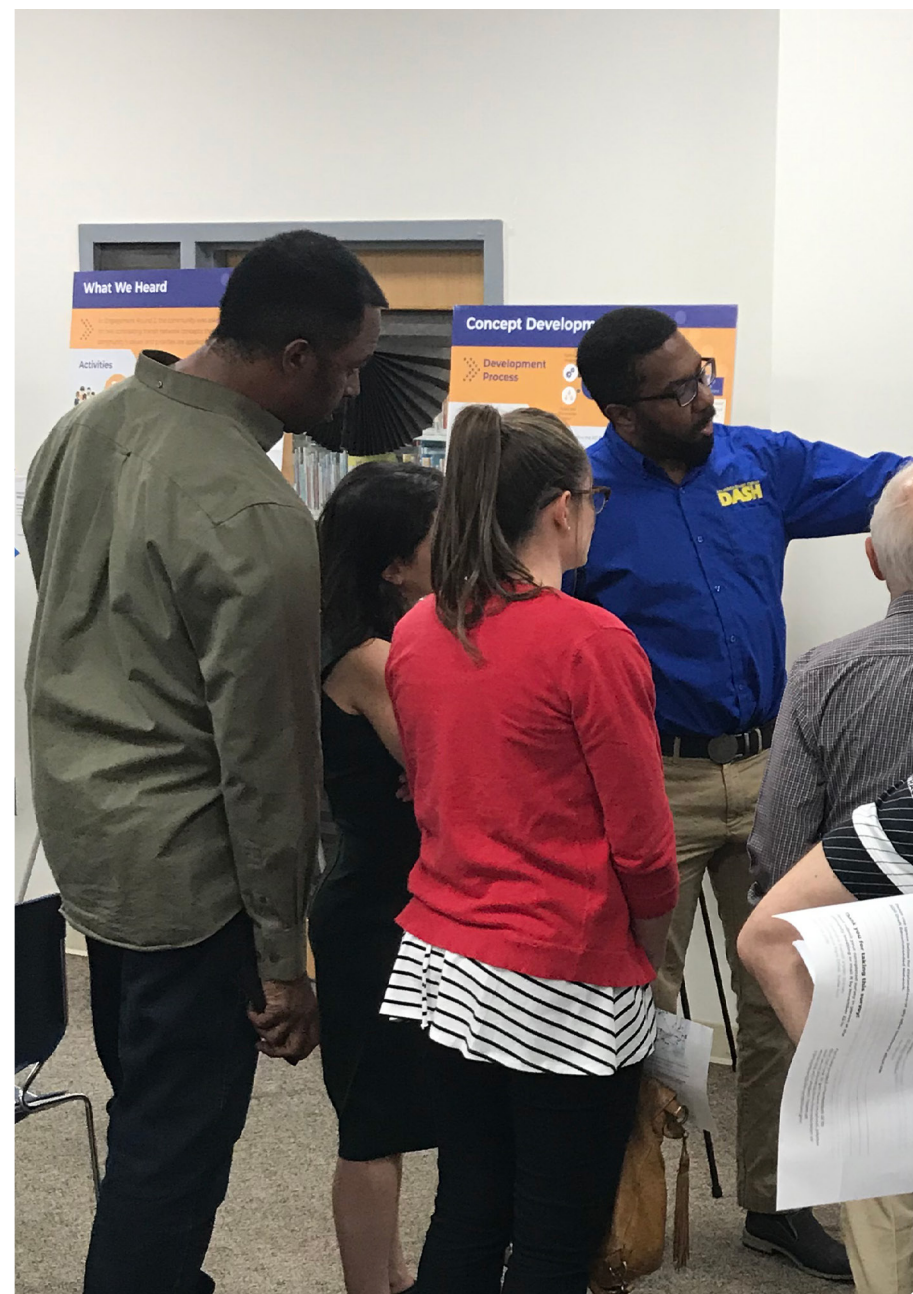
Alexandria residents discuss ATV concepts with City staff during Round 3 engagement
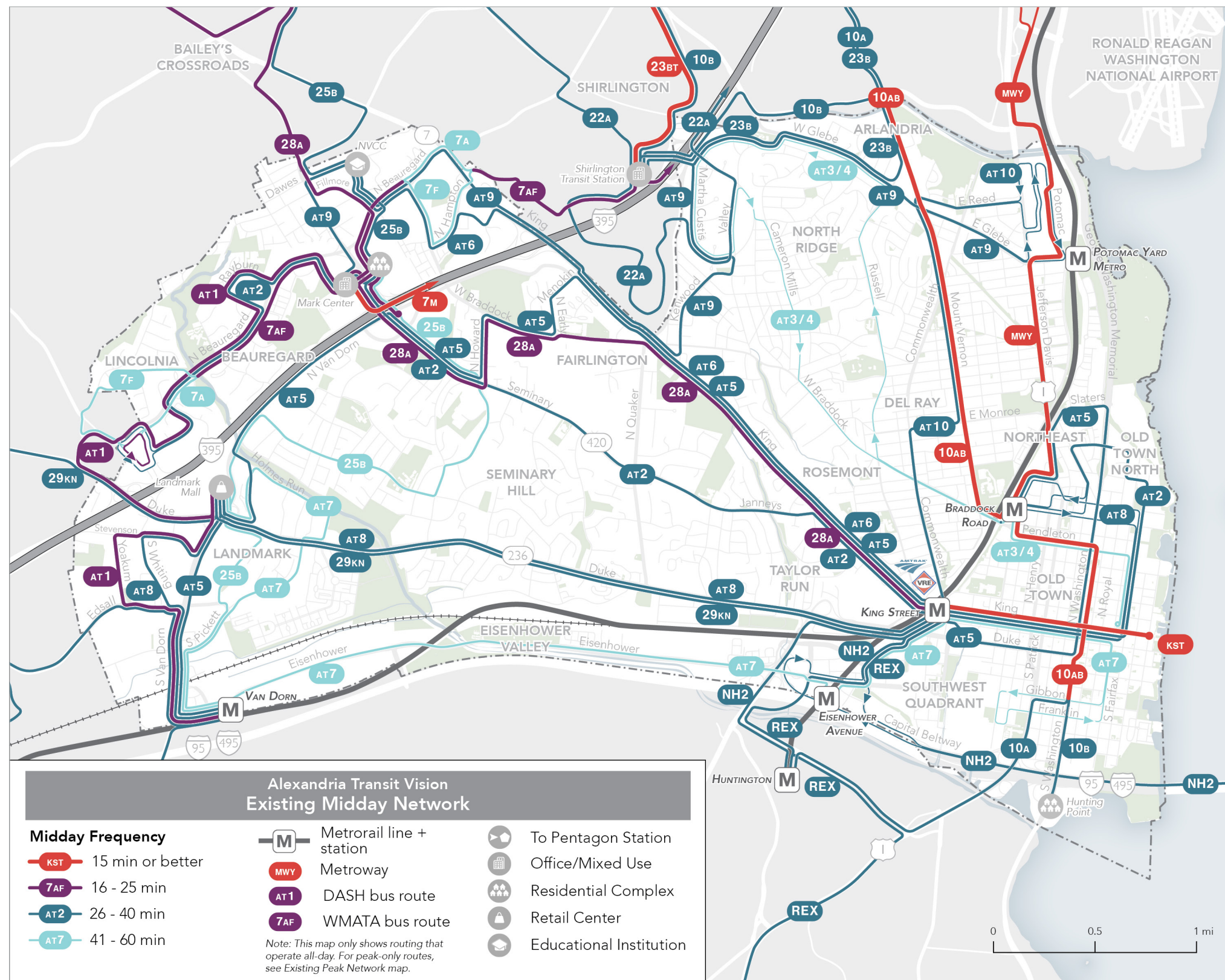
Existing System

Figure 6 shows Alexandria's existing bus network, with every route color-coded based on its frequency midday on a weekday[1]. Midday frequency is the typical experience that a rider can rely on for most of the day. All people, regardless of their income, value flexibility and independence. This should be the point of comparison for understanding how the Vision Plan Networks are different from today's system. Assessing a network based on midday frequency tells us much more about its usefulness to a broad cross section of the community.

>> The map at right reveals that at midday, most Alexandria routes offer 30-minute frequency. **For existing rush hour service, see the map on page 29.**

>> The Existing Network devotes 50 percent of resources to service that one would expect to get high ridership relative to cost.

>> The other 50 percent of resources is going to service that is not likely to get high ridership relative to cost but is meeting other important goals, like covering low density areas with basic lifeline bus service.

>> This network provides frequent, all-day transit service to 27 percent of people and 40 percent of jobs in Alexandria.

>> This network provides some transit service (no matter the frequency) to 97 percent of people and 90 percent of jobs.

>> This network allows the average Alexandrian to reach 20,700 jobs in 45 minutes by walking and transit.

One key difference in this map, compared to previous versions in the Choices and Concepts Reports, is that it shows the improved service on the AT1 and AT9 as a result of 395/95 Commuter Choice funding. The Northern Virginia Transportation Commission (NVTC) administers the I-395/95 Commuter Choice program in cooperation with the Commonwealth of Virginia and the Potomac and Rappahannock Transportation Commission (PRTC). The program funds multimodal improvements in the I-95/395 corridor that benefit I-395 Express Lanes toll payers and more people through the corridor. The inaugural funding awards were made in fall 2019, and the service enhancements have since been implemented for the AT1 and AT9.

1   Midday hours: 9 a.m. - 3 p.m.

Figure 6: Existing System, Midday Weekday Frequency

2030 Vision Plan Network

The 2030 Vision Plan Network (**Figure 7**) assumes a 20 percent increase in service hours for DASH and WMATA service and continued funding from the Commuter's Choice program for additional service in western Alexandria. These additional resources ncrease the frequency of all-day service and expanding evening and weekend service.

» This map shows the midday bus network, which means the frequency of service and routes that are available most of the time, seven days a week. **For 2030 Recommended rush hour service, see map on page 27.**

» The 2030 system would be highlighted by a network of high-frequency bus routes operating every 15 minutes or better, seven days per week across the entire city.

» This network devotes approximately 85 percent of resources to high ridership relative to cost.

» The other 15 percent of resources is going to service covering low density areas with basic lifeline bus service.

» Outcomes

  » This network provides frequent, all-day transit service to **83 percent of people** and 81 percentof jobs in Alexandria.

  » This network provides some transit service (no matter the frequency) to 97 percent of people and 92 percent of jobs in Alexandria.

  » This network allows the average Alexandrian to reach 24,400 jobs in 45 minutes by walking and transit— **18 percent more jobs than are reachable with the existing network**.

  » **91 percent of low-income residents will have access to frequent, all-day transit** (versus 29 percent today).

  » 89 percent of minority residents will have access to frequent, all-day transit (versus 22 percent today).

  » 79 percent of senior residents will have access to frequent, all-day transit (versus 23 percent today).

  » Maintains existing bus service in most areas so that 99.5 percent of existing boardings are still within 1/8 mile of a stop.

This network provides **frequent, all-day transit service to 91% of low-income residents** in Alexandria, as compared to 29% today.

Figure 7: 2030 Vision Plan Network, Midday Weekday Frequency

Any changes to routes outside of Alexandria will be coordinated with the appropriate jurisdiction and WMATA (where applicable).

Existing Arlington Transit (ART) routes are assumed to remain the same.

Alexandria Transit Vision
2030 Midday Network

Midday Frequency

OTC	8 min or better
N7	10-12 min
7M	15 min
28A	20 min
10B	30 min

M — Metrorail line + station
MWY — Metroway
OTC — Old Town Circulator

To Pentagon Station
Office/Mixed Use
Residential Complex
Retail Center
Educational Institution

Note: This map only shows routing that operate all-day. For peak-only routes, see 2030 Peak Network map.

*KST is the extended King Street Trolley.

**OTC -Old Town Circulator- is a combination of routes N3 and N4. Anyone on these routes can ride through the King St. Metro into Old Town without transferring.

Existing Fairfax Connector routes are assumed to remain the same.

0   0.5   1 mi

2022 Vision Plan Network

The 2022 Vision Plan Network (**Figure 8**) assumes an 8 percent increase in service hours for DASH and continued funding from the I-395 Commuter's Choice program for additional service in western Alexandria. The additional resources are invested in increasing the frequency of midday service and improving evening and weekend service.

» This map shows the midday bus network, which means the frequency of service and routes that are available most of the time, seven days a week. **For 2022 Recommended rush hour service, see the map on page 35.**

» The 2022 system would be highlighted by a network of high-frequency bus routes operating every 15 minutes or better, seven days per week across most of the city.

» This network devotes approximately 85 percent of resources to high ridership relative to cost.

» The other 15 percent of resources is going to service like covering low density areas with basic lifeline bus service.

» Outcomes
  » This network provides frequent, all-day transit service to **66 percent of people** and 66 percent of jobs in Alexandria.
  » This network provides some transit service (no matter the frequency) to 96 percent of people and 91 percent of jobs in Alexandria.
  » This network allows the average Alexandrian to reach 23,400 jobs in 45 minutes by walking and transit— **access to 13 percent more jobs than the existing network**.

  » **73 percent of low-income residents will have access to frequent, all-day transit** (versus 29 percent today)

  » 70 percent of minority residents will have access to frequent, all-day transit (versus 22 percent today)

  » 62 percent of senior residents will have access to frequent, all-day transit (versus 23 percent today)

This network provides frequent, all-day transit service to 73% of low-income residents in Alexandria.

Figure 8: 2022 Vision Plan Network, Midday Weekday Frequency
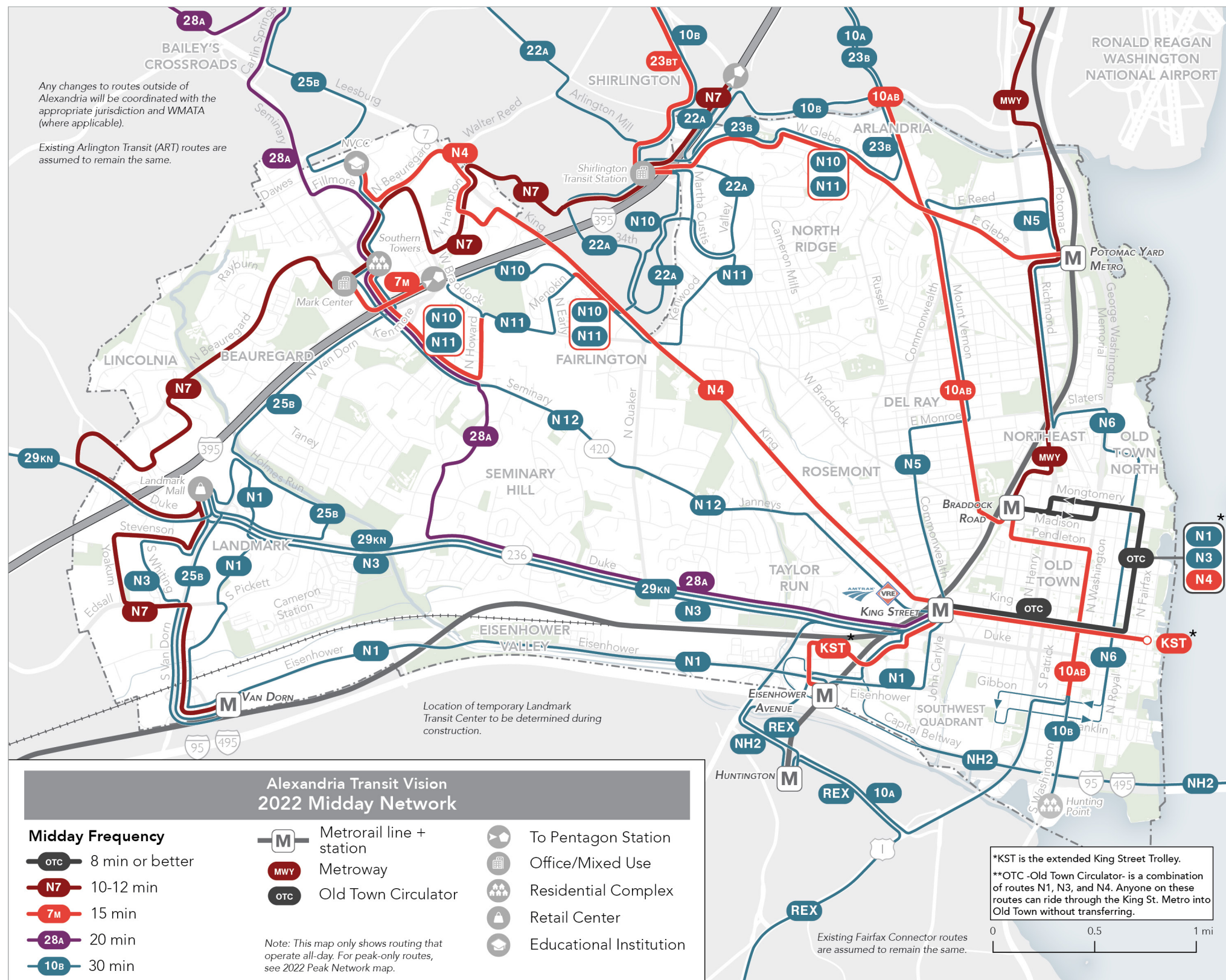
Implementation

The ATV Plan establishes a vision that will guide the City's bus-related decisions over the next ten years. Realizing this vision will take consistent effort and partnership between the City, DASH, WMATA, and other regional stakeholders. It will also require community support in the form of advocacy, and financial backing from Alexandria's leaders to secure funding and implement the service changes. It should also be recognized that implementation cannot happen at once, but rather as a series of intentional and coordinated changes to first achieve the short-term network, and then ultimately the full 2030 Vision Plan Network.

A full overview of the various aspects that will need to continue to occur to support implementation is provided in Chapter 4.

Implementation Considerations

- Securing Funding
- Coordination with Arlington and WMATA
- Infrastructure Needs
- Alexandria Mobility Plan
- Annual Transit Development Plan (TDP) Process
- Transit Strategic Plan (TSP)
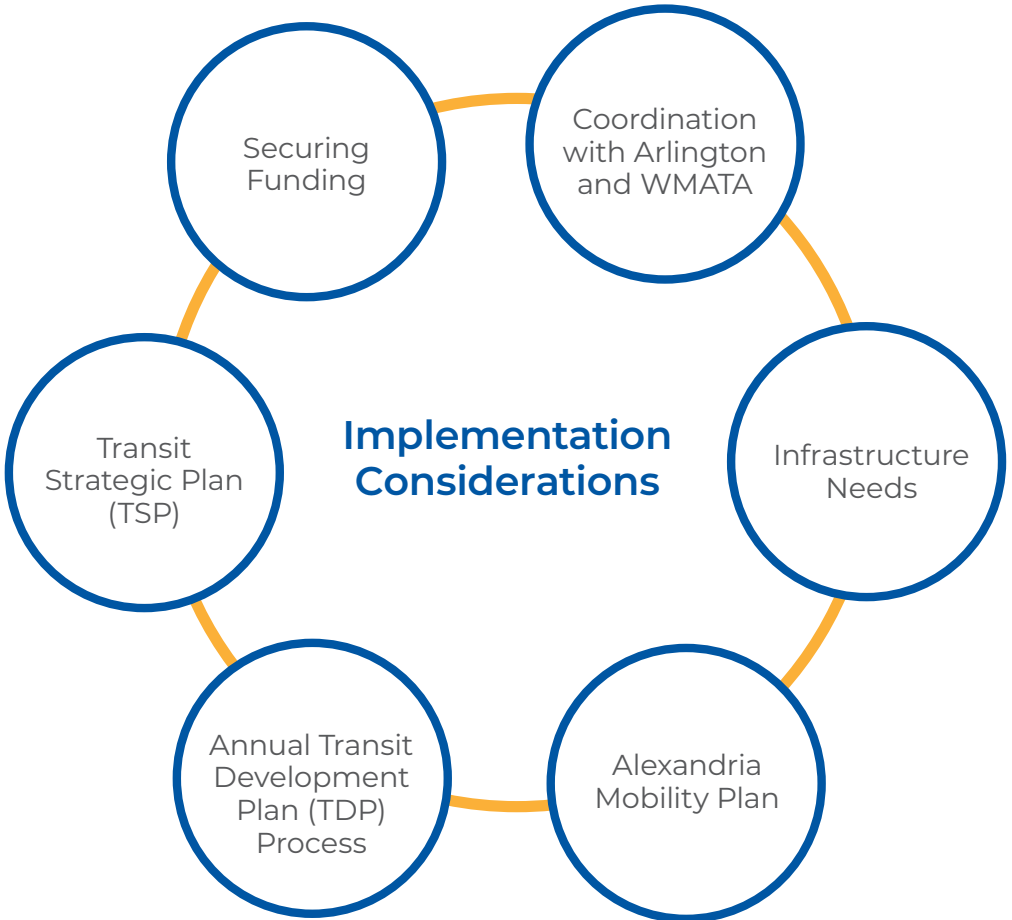
Figure 9: Implementation Considerations

2. How Did We Get Here?

Study Process

The ATV Plan process included three phases of engagement involving outreach with project stakeholders, community groups, members of the public, and DASH/City staff including bus drivers. The three phases are shown in **Figure 10**. Findings and specific methods of outreach are described in Appendix A.

In Phase 1, in the fall of 2018, the City and consulting team presented people with abstract choices and trade-offs, and received the public's general guidance in response. During Phase 1, input was collected through social media, email, public meetings and through a Stakeholder Advisory Committee. More than 300 responses to a web and paper survey were received from the public and riders.

In Phase 2, from winter 2019 to spring 2019, the team presented people with two different, detailed Network Concepts for Alexandria, and received people's responses to the specific trade-offs and ideas shown in those Concepts. During Phase 2, input was collected through 1,199 responses to a web and paper survey of the general public and riders.

Input received during both of these phases - as well as input from the Alexandria Transit Company (DASH) Board and the Transportation Commission - was used, in summer 2019, to develop the Draft Recommended Network. The DASH Board indicated that the Draft Recommended Network should dedicate 85 percent of its budget to frequent service likely to have high ridership. The remaining 15 percent of the budget should be directed to coverage designed to ensure that certain areas and populations have access to some transit, even if these routes have low ridership. This direction represents a shift from the current network which dedicates roughly 50 percent is its budget to ridership service and 50 percent to coverage service.

In Phase 3, during the fall of 2019, the Draft Recommended Networks for the near term (2022) and long term (2030) scenarios were presented to the public. The goal of this outreach was to get public feedback that would help shape the Final 2022 and 2030 ATV Plan bus networks. During this phase of outreach, outreach was conducted through community meetings, an online survey, web and print media, and meeting with the Stakeholder Advisory Group. Based on the feedback received during this phase and direction of the DASH Board in November 2019, a few changes were made to the Draft Recommended Networks to arrive

at the Vision Plan Network, presented in Chapter 3. These changes are described in the Phase III section of this chapter.

At the December DASH Board meeting, the Vision Plan Networks for 2022 and 2030 were presented to the Board. The Board adopted the final 2030 ATV Network Plan (20 percent added service hours), and the 2022 major growth (8 percent added service hours) ATV Network Plan. These networks are described in Chapter 3.

The next sections describe the individual phases of outreach and summarize the feedback received.

Throughout the plan there were:

- Updates to the project website
- Civic engagement opportunities
- Coordination meetings with other jurisdictions and transit providers
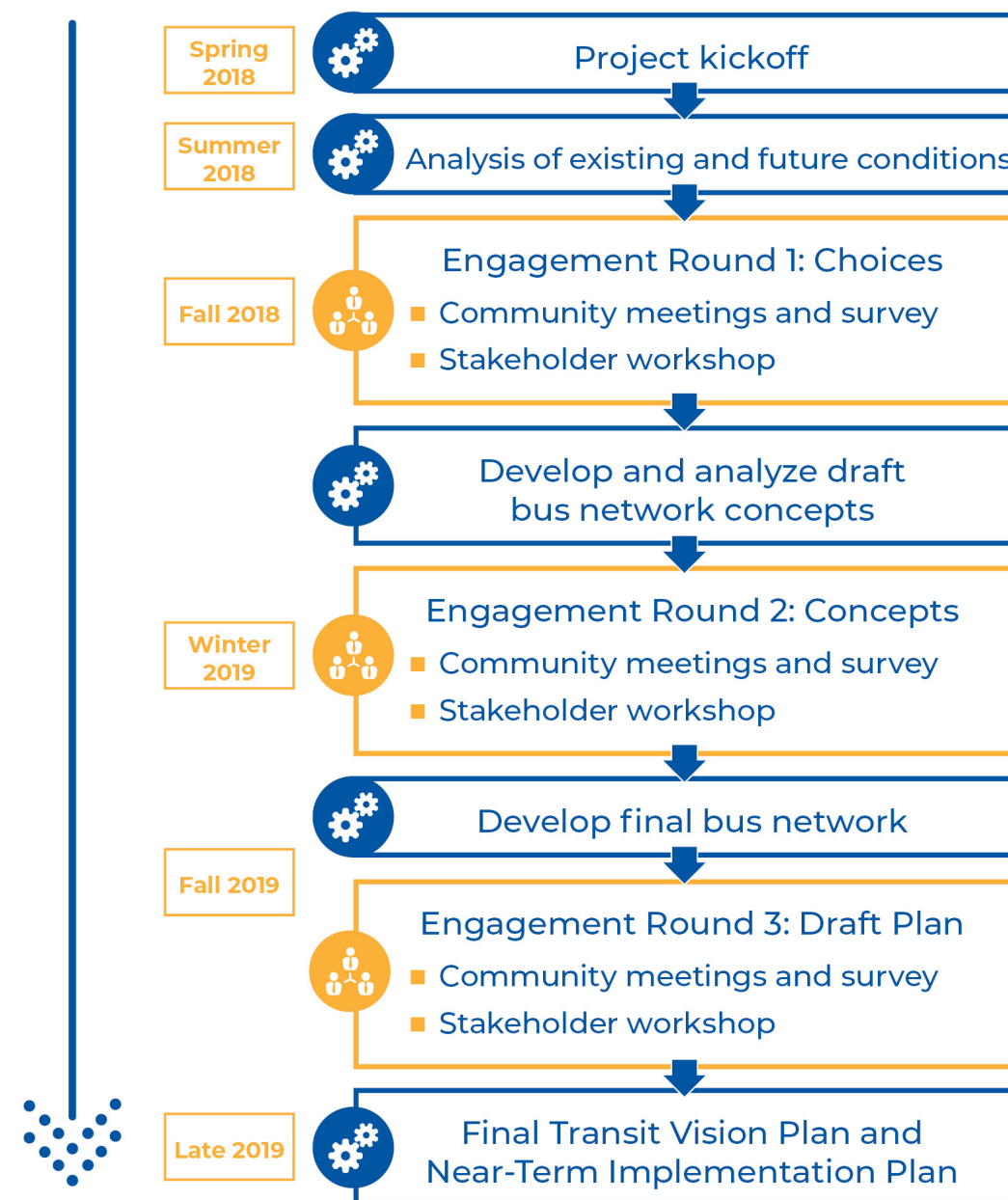- Briefings to City leadership

Technical Work

Engagement

Figure 10: Process and Timeline for Alexandria Transit Vision

Phase 1 - Choices

Choices Report

The first step in the process was to develop a Choices Report, which provided a synopsis of existing conditions and trends in the City of Alexandria. It also presented key tradeoffs that must be addressed in developing the transit vision network.

Phase 1 Input

In the first round of engagement for the ATV, or "Choices" phase, the project team asked the public and community stakeholders about their values and priorities for transit presented in the Choices Report, and how they might balance certain trade-offs related to transit service in Alexandria.

During this first of three phases of engagement, the study team held:

» A stakeholder workshop

» Two in-person community meetings

» Nine pop-up events at activity centers across Alexandria

» A meeting with DASH bus drivers

» Meetings with other City commissions, committees, and community groups

» Briefings to the Alexandria Transportation Commission and DASH Board

» Extensive social media outreach through DASH and City channels on Twitter and Facebook

» Digital outreach via email blasts from the City and DASH and via the project website

» Technical Advisory Committee (TAC) meeting with transit agency stakeholders and other city staff (September 7, 2018)

Throughout these outreach efforts, a Choices Survey was available online and on paper in both English and Spanish. The following summarizes some of the key takeaways from the survey.

Summary of Respondents

In total, the study team received 320 responses from the public to the survey. Of those, 287 (90 percent) either lived or worked in the City of Alexandria. About half of respondents (47 percent) ride the bus more than 15 days per month, while the percentage of frequent Metrorail riders was slightly lower at 37 percent. In general, the demographic characteristics of survey respondents were fairly in-line with the makeup of the city for age and income. In terms of ethnicity, non-Hispanic whites were overrepresented in the survey response and the Hispanic and African American populations were under-represented. Additional efforts were made to reach these groups in the second round of engagement.

The stakeholder group is comprised of civic leaders from across the city, representative of a variety of interests and expertise. Fifty stakeholders attended the Choices Workshop, where they worked in a hands-on manner, exploring trade-offs in transit network design. Based on the day's work, polling was conducted to understand the group's values related to the key transit choices.

The results from the public survey and stakeholder polling were generally consistent, though some questions were asked in different ways. The following sections present a summary of the public survey responses.

Transit Benefits

The first survey question asked respondents to prioritize six benefits of transit. The top four responses (in order) were:

» Allowing people to move around the city efficiently without increasing auto congestion

» Providing access to jobs and services for people who don't have a car, or those with low incomes

» Providing high-quality transit in areas where the service will be used by a lot of people

» Providing basic public transportation to everyone, regardless of where they live

The first and third statements relate to the benefits of ridership-focused networks. The second and fourth statements correlate to coverage goals. This suggests some divergence in the goals that people in Alexandria want transit to achieve. This is understandable, as people often want transit to achieve many goals, even when those goals lead agencies in opposite directions on service design.

Coverage versus Frequency

The next question asked if respondents preferred a transit system that prioritized coverage or ridership and frequency and it provided an example of what each network would look like. **Figure 11** shows the responses. Approximately 56 percent of respondents selected the option that preferred the frequent network but also provided some coverage service. Only 20 of respondents preferred or strongly preferred the high-coverage scenario.

Walking Versus Waiting

The third question asked respondents if they would prefer to walk longer and wait less at a bus stop or wait longer but not have to walk as far. **Figure 12** shows the responses. Approximately 90 percent of respondents preferred or strongly preferred the trip with less waiting, even if it meant more walking. This preference correlates to ridership networks, in which routes would run more frequently on major corridors and walks might be longer.

Transfers

The last question asked respondents if they preferred a faster overall trip, even if it meant transferring, or if they preferred a one-seat ride, even if the overall travel time was longer. Approximately 74 of respondents preferred or strongly preferred the faster trip. This preference correlates to ridership networks, where fewer, high-frequency routes provide faster trips, but tend to require more transfers.

Investment Priorities

The final technical question on the survey asked respondents to rank their priorities for new investment in transit service. Response options included the following choices:

» Providing additional service during the peaks

» Adding service on off-peak or weekends

» Providing service to places that don't have service

» Adding more amenities

» Reducing fares

A plurality of 42 percent of respondents ranked "adding frequency during weekday rush hours to reduce the waiting time between buses" as their first choice. The second highest was "providing service to places that don't currently have service," although only 18 percent of respondents ranked it first. Providing more service during peak would generally correlate with ridership networks, but peak-only service can be very costly, as described in the Choices Report, and therefore adding more peak service is not always the most cost-effective way to get higher ridership.

Respondents could also indicate their priorities for other investments in a free-response option on the survey. A review of these responses indicated various desired improvements, but several themes reoccurred across multiple responses. These common themes are shown in the word cloud below. Note that ideas that were more common in responses are formatted to stand out more than others.

Better Collaboration with Other Service Providers *Improved Reliability* Bikeshare
More Substantial Bus Shelters **More Comfortable Buses**
ELECTRIC VEHICLES *Express Routes* **Dedicated Lanes**
Replace more school buses with transit **Bus Rapid Transit** SAFETY
Marketing **Accurate Real-Time Information** *Trolley*
Reduced fares for children, low income, and transit-dependent populations Reduce environmental impact

Figure 11: Survey respondents generally said they preferred a High Frequency system.

Rating of High Coverage versus High Frequency Scenarios (# of Respondents): Strongly prefer High Coverage ~25, Prefer High Coverage ~42, Prefer High Frequency ~180, Strongly prefer High Frequency ~78
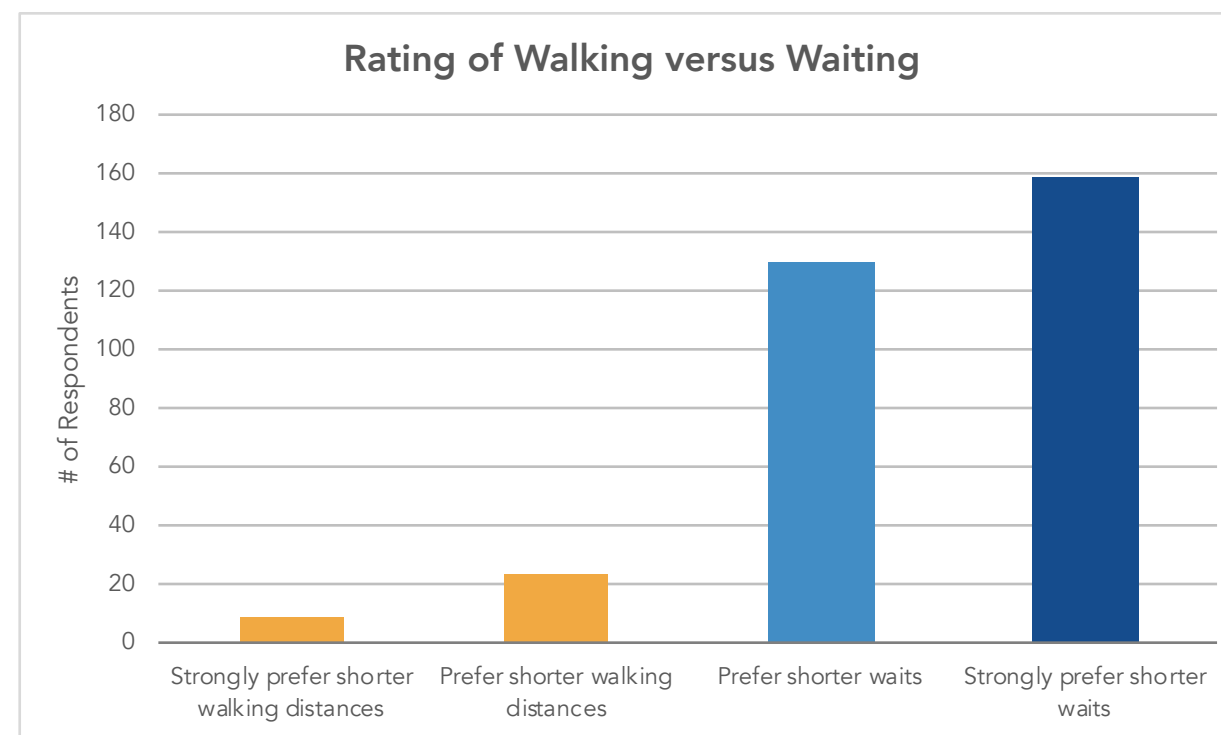
Figure 12: Most survey respondents said they preferred a shorter wait.

Rating of Walking versus Waiting (# of Respondents): Strongly prefer shorter walking distances ~9, Prefer shorter walking distances ~23, Prefer shorter waits ~130, Strongly prefer shorter waits ~159

Phase 2 - Concepts

Concepts

In order to help people understand key trade-offs and develop confident opinions, the consulting team created two different Network Concepts.

These two Concepts illustrated the key choice: how should Alexandria balance ridership and coverage goals? And, relatedly, how should walking and waiting be traded-off?

Maps of the Concepts are shown below (**Figure 13** and **Figure 14**). For more detailed maps and analysis of how each concept would serve Alexandria, see the Concepts Report.

Figure 13: Map of the Coverage Concept, Midday Weekday Frequency
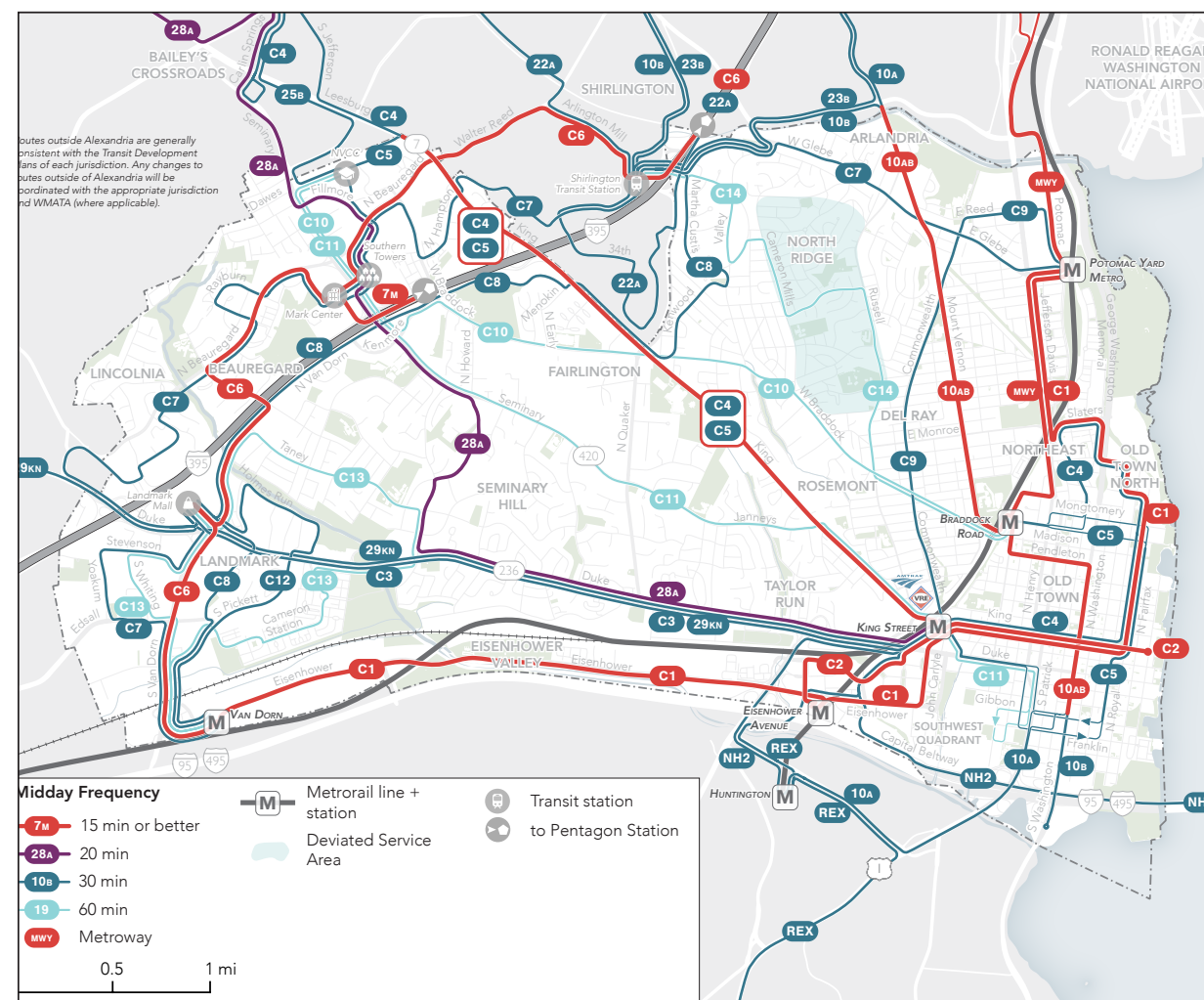
Figure 14: Map of the Ridership Concept, Midday Weekday Frequency
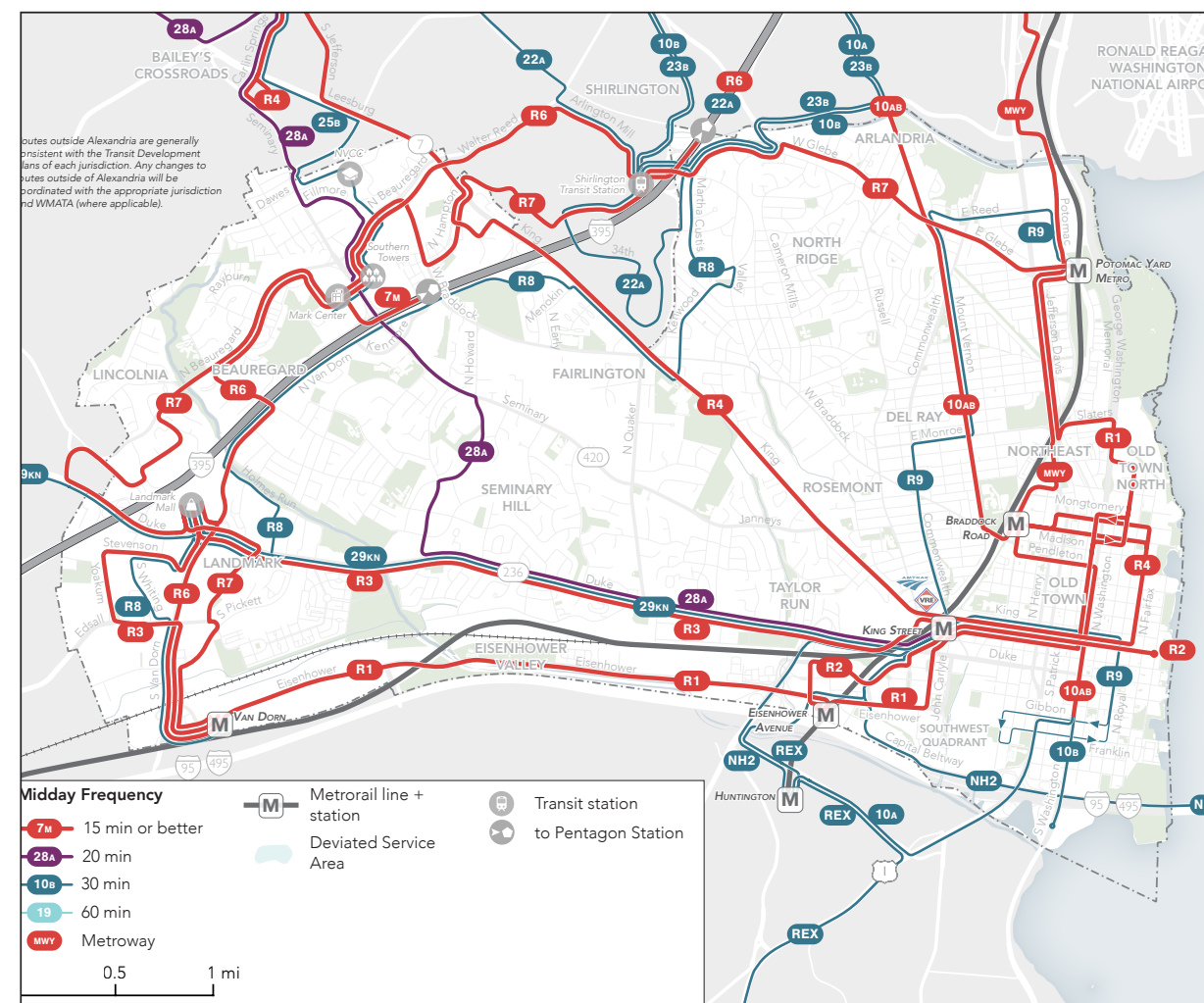
Phase 2 Input

During the second phase of engagement, the study team received feedback from the public through a survey asking people to rate the concepts and key transit priorities. To reach many Alexandrians the study team held:

» A stakeholder workshop

» Three in-person community meetings

» Sixteen pop-up events at activity centers across Alexandria

» A meeting with DASH bus drivers

» Community and neighborhood organization briefings with numerous groups across the city

» Technical Advisory Committee (TAC) meeting with transit agency stakeholders and other city staff (January 18, 2019)

» Briefings to the Alexandria Transportation Commission and DASH Board

» Extensive social media outreach through DASH and City channels on Twitter and Facebook

» Digital outreach via email blasts from the City and DASH and via the project website

» Meetings with other City commissions, committees, and community groups

Summary of Respondents

In total the project team received 1,199 distinct public responses to the public survey. Among the respondents, 94 percent indicated that they live in the City of Alexandria and about half (46 percent) ride the bus more than 15 days per month. In general, the demographic characteristics of survey respondents tended towards middle-aged (41 to 60) and represented higher incomes when compared to the population of Alexandria. In terms of ethnicity, non-Hispanic whites were overrepresented in the survey response and the Hispanic and African American populations were under-represented. Additional efforts were made to prepare analyses related to and conduct outreach with these underrepresented communities.

A stakeholder group was initially engaged in the first phase of the study. During the second round of engagement, 26 community partners attended a workshop to discuss the concepts and were polled on priorities and their opinion of the developed concepts. Both Stakeholder and the public survey results identified similar priorities as well as a preference for a ridership-oriented concept. The following sections present a summary of the public survey responses.

Priorities

The first question asked in the public survey is comparable to question about transit benefits asked in the first round of engagement. Instead of choosing between trade-offs, participants were asked to rank eight competing priorities. Each of the priorities related to either coverage or ridership to demonstrate their individual affinity for how they prefer their transit service to operate.

Figure 16 indicates the number of times each priority was rated as an individual's top 3 priorities. Results indicate that respondents had a greater affinity for ridership-oriented priorities (particularly for high frequency), but desired a greater duration of coverage all day for both weekdays and weekends.

Ridership Concept

Coverage Concept

Where should the transit network be, on this spectrum?

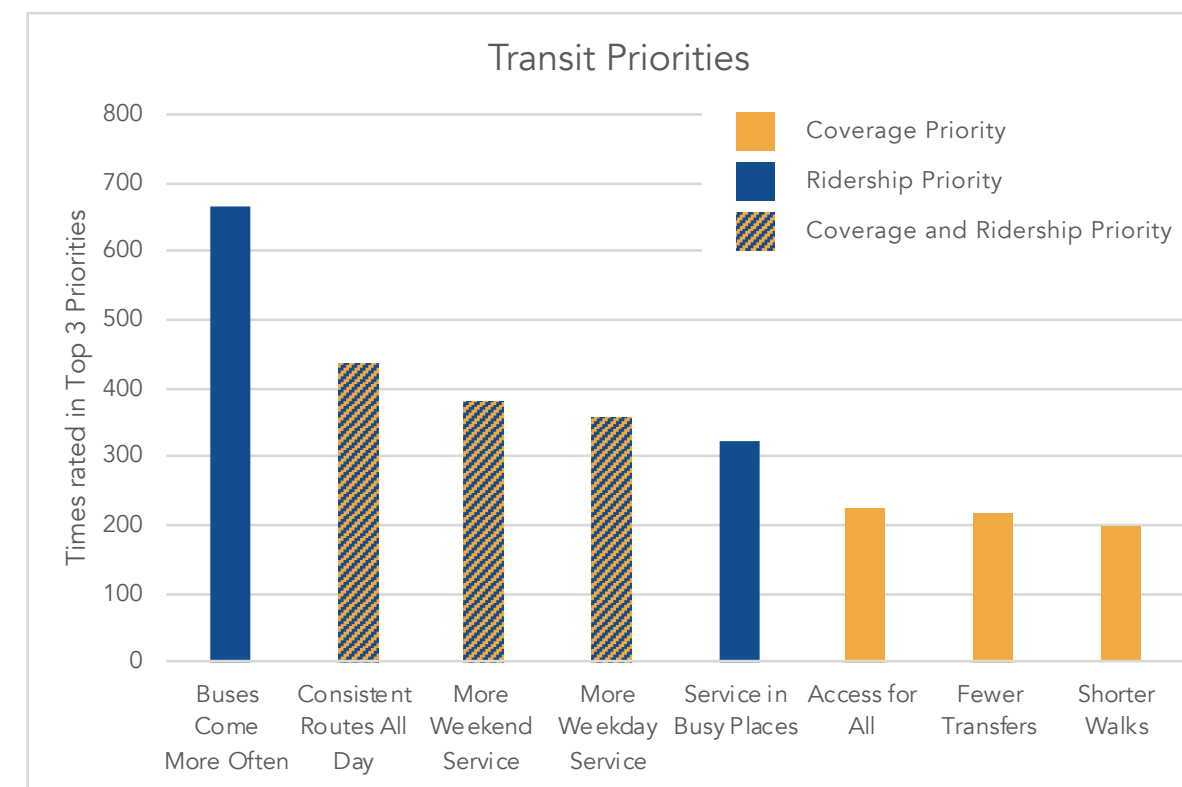**Figure 15: The two concepts show a range of choices for the Alexandria transit system**

Figure 16: Priorities of survey respondents in Phase 2 Survey

Response to Concepts

The next section of the concepts survey asked that participants review and rate each of the two concepts and the existing transit network and a scale of 1 to 5 (with 1 being the lowest and 5 being the highest). Responses are shown in **Figure 17**.

On average, respondents indicated a preference for the ridership concept over the coverage concept; both concepts averaged higher than the existing network. The ridership concept was rated 5 more times than the coverage concept and the existing network. The coverage concept was rated 4 slightly more than the ridership concept and somewhat more than the existing network. The existing network was ranked 3 significantly more times than either of the concepts.

Support for Increased Investment in Transit

The last section of the concepts survey asked participants if they supported increased investment in transit and asked the respondent for comments related to transit investment. Respondents indicated that 91 percent are in favor of transit investment if their individual transit priorities were achieved, as shown in **Figure 18**.

General Feedback

The free response section of the survey included a few key themes which were common among multiple respondents. Those themes and additional takeaways from meetings with community organizations include:

» Concern for the removal of specific routes, including those around North Ridge and Parkfairfax

» Strong support for increased frequency at all times of days

» Respondents want to see buses running full

» Concern over potential loss of service to areas with higher concentrations of seniors and persons with limited mobility

» Support for increased spending if it results in the reduction of traffic and/or of single occupancy vehicles. This was generally mentioned in combination with the desire for dedicated bus lanes which increase transit speed

» While generally supportive of increased spending, respondents have mixed opinions of the source of the money (fares, taxes, or other city budgets).

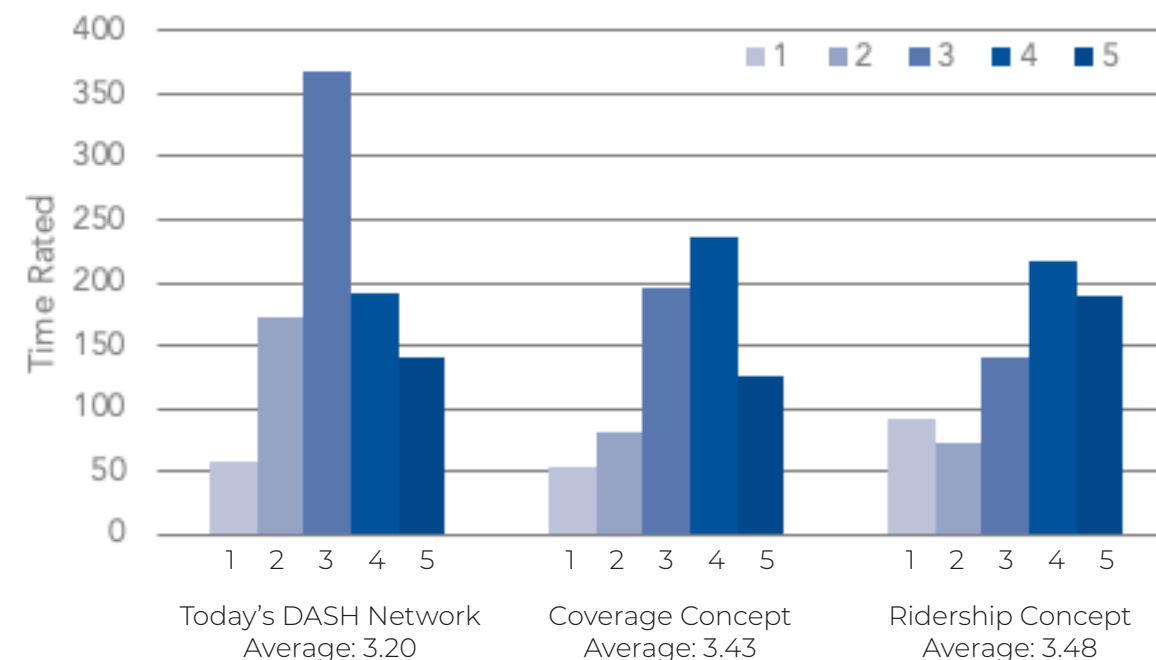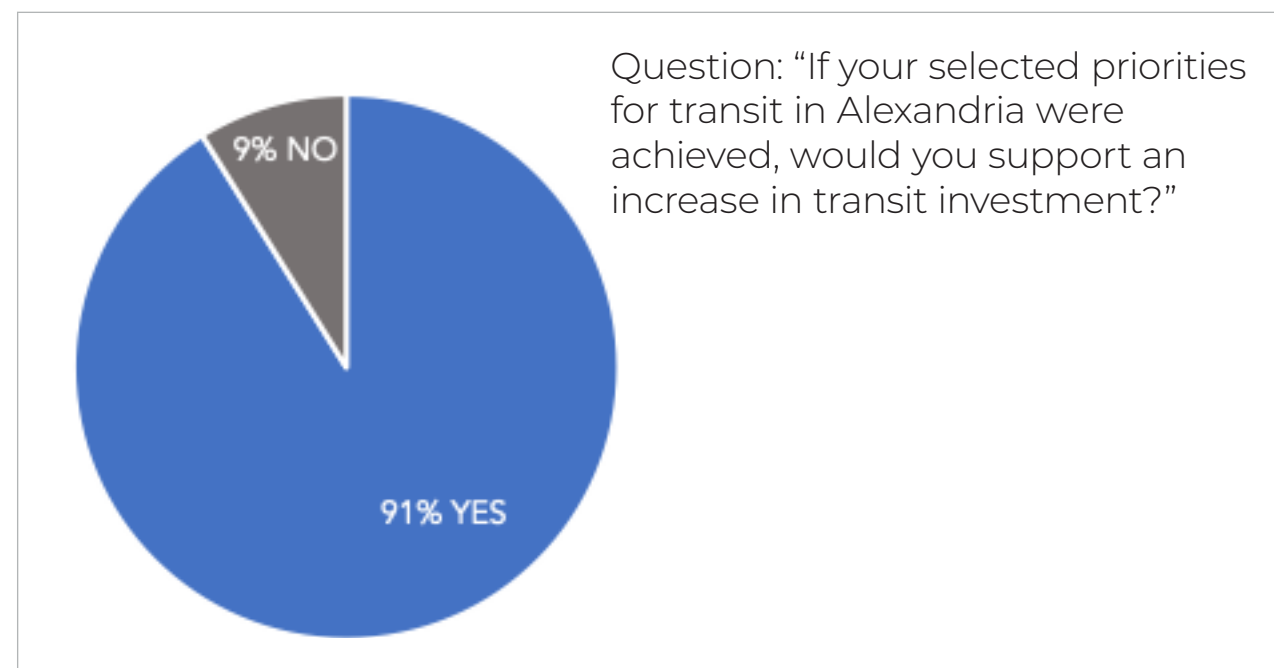**Figure 17: The Ridership Concept received the highest average rating**

Today's DASH Network
Average: 3.20

Coverage Concept
Average: 3.43

Ridership Concept
Average: 3.48

Figure 18: Most respondents said they would support an increase in transit investment

9% NO

91% YES

Question: "If your selected priorities for transit in Alexandria were achieved, would you support an increase in transit investment?"

Policy Direction

Based on feedback received in Round 2, the DASH Board provided the policy direction for the development of the that the 2030 Draft Recommended Network:

» About 85% of the transit budget in the City of Alexandria should be spent on maximizing ridership

» The remaining 15% should be spent covering those places where transit service is valued, even if ridership relative to cost is low

» A 20% increase in transit investment for both DASH and WMATA. It also assumes continued funding from the I-395 Commuter Choice program for service improvements in western Alexandria

» The 2022 Network is designed as a first step to implementation of the 2030 Network

Phase 3 – Draft Recommended Network

Based on community input on the "Ridership" and "Coverage" concepts, and guidance from DASH and City leadership, a series of Draft Recommended Networks for both the near-term (2022) and long-term (2030) scenarios were developed and presented to the public during October and November 2019. The goal of this outreach was to get public feedback that would help shape the Final 2022 and 2030 ATV Vision Plan Networks. The draft 2022 and 2030 networks are described in detail in the Draft Recommended Network Report.

Figure 19: 2030 Draft Recommended Network, Midday Weekday Frequency
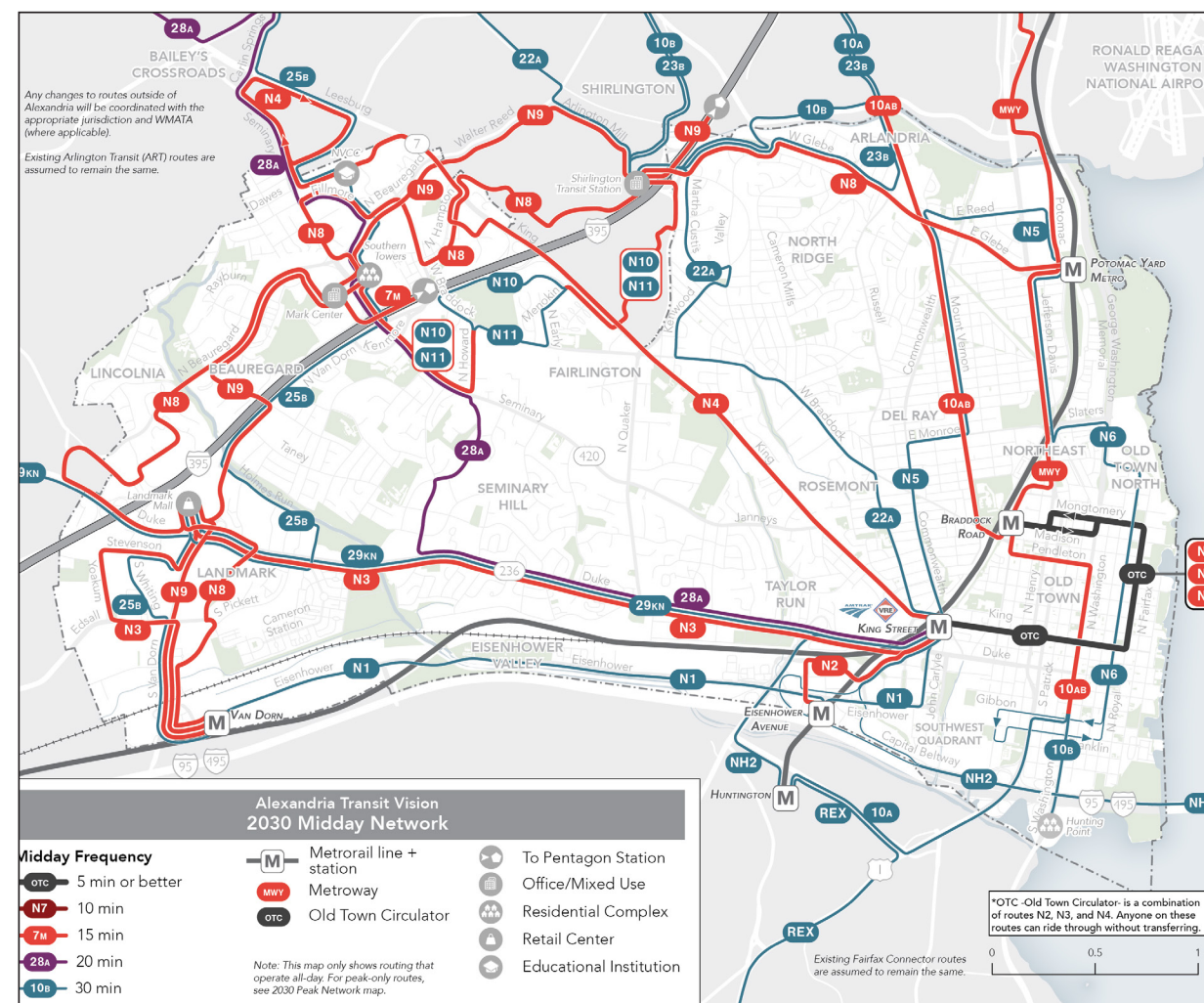
Figure 20: Draft Recommended Network by 2022, Midday Weekday Frequency
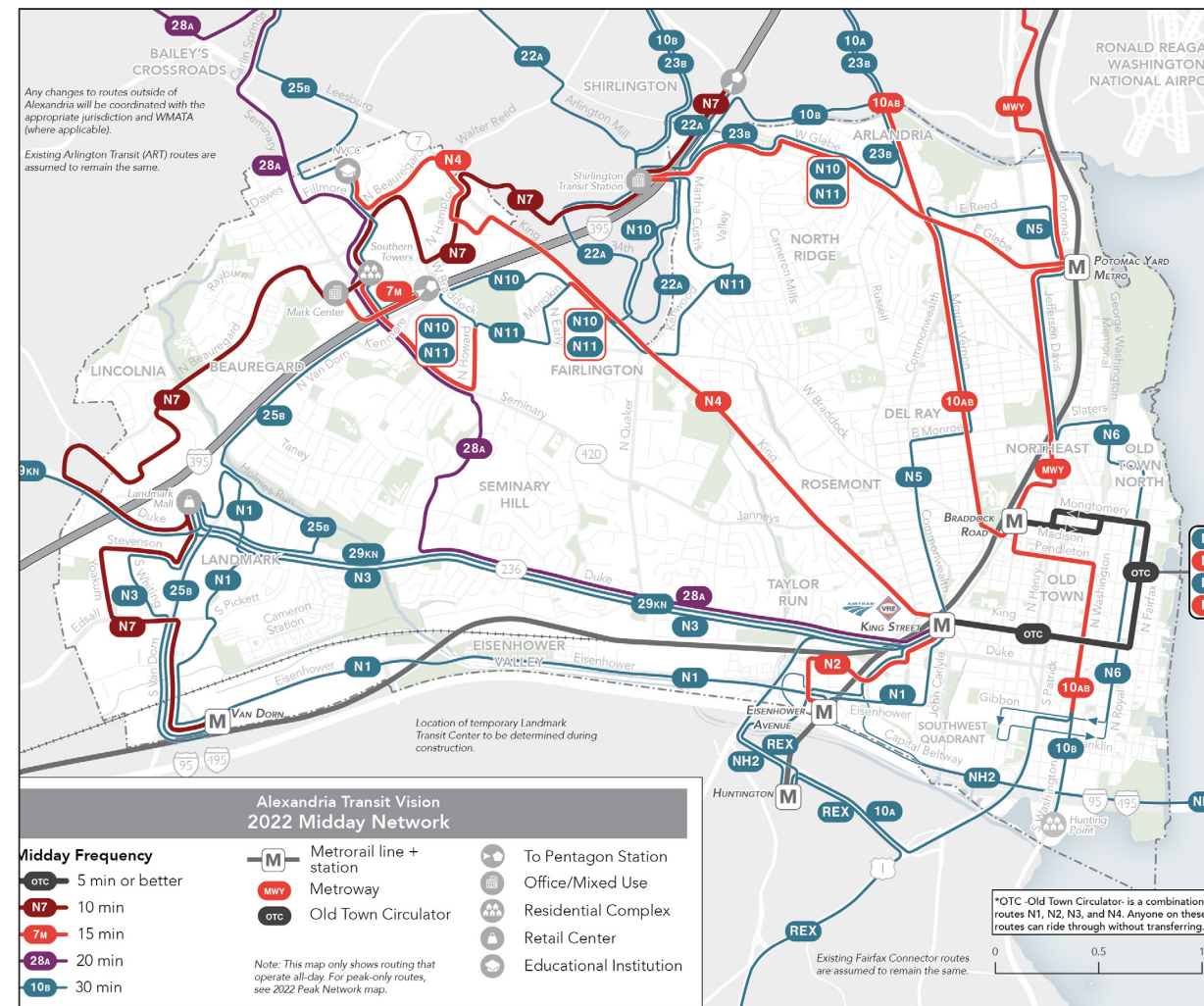
Outreach Efforts

During this third phase of engagement, the ATV project team used the following events and channels to let the public know about the project and to receive feedback:

» Two community meetings (October 15 & 24, 2019), including Facebook live stream.

» DASH Board Public Hearing (November 13, 2019)

» Stakeholder workshop with community representatives from roughly 30 different stakeholder groups (October 10, 2019)

» Technical Advisory Committee (TAC) meeting with transit agency stakeholders and other city staff (October 2, 2019)

» Leadership briefings with the DASH Board and Transportation Commission

» 23 "Pop-Up" or "Route Ride-Along" events at various locations throughout the City.

» Meetings with more than 20 different civic / community groups, commissions, and associations, including those representing seniors, persons with disabilities, minorities and persons with low incomes.

» Work session with DASH bus drivers.

» ATV project website updates (www.dashbus.com/transitvision)

» One-page project flyers in three languages (English, Spanish, Amharic)

» E-News and Social Media outreach (Facebook, Twitter)

» Onboard announcements and posters on DASH buses

» Flyers posted at bus stops that could be impacted by proposed route changes

» Neighborhood-specific flyers for 12 different parts of Alexandria

» Customizable isochrone mapping tool to show net increase/decrease in mobility available on the project website

» Short ATV videos that provided introduction and basic overview of project.

» Interview on "Senior Living" Local Access TV Program

» Online and hard copy surveys (available in both English / Spanish)

In-person meetings to present the Draft Recommended Concepts were one of the many ways the community was engaged to receive feedback

General Feedback

The project team received both positive and negative public feedback on the Draft Recommended Network. Most residents were supportive of the overall increases in access to all-day frequent transit, especially for low-income, minority and senior residents. The improvements to evening and weekend service also were well-received. Residents of Parkfairfax that had expressed concerns in previous rounds about changes to the AT3 and AT4 were generally supportive of the Draft Recommended Network as it addressed many of the concerns that were voiced during the second round of engagement.

The biggest concern from the community was in response to the proposed elimination of Route AT2 in the central area of Alexandria along Janneys Lane and Seminary Road between King Street-Old Town Metrorail station and Howard Street. Under the 2022 ATV Plan, 95 existing weekday riders would effectively lose their bus service. In response to the large number of complaints, the project team looked at multiple options that would maintain some level of service along this segment of Seminary Road and Janneys Lane. Three options were considered, including:

» Retaining some version of weekday-only local bus service on the corridor.

» Working with the Department of Defense (DoD) to allow 3 intermediate stops along the existing express route AT2X during peak periods; or

» Developing a demand response pilot program for the underserved area

While several hundred comments were received about Seminary Road and Janneys Lane, no other single issue received more than 20 comments. A summary table of the most common concerns with the draft ATV networks is included in **Table 1**. These concerns included:

» **AT 3-4 Loop** (19 surveys/comments). Discontinuation of AT3/4 Loop means no off-peak service for parks of Cameron Mills and Russell Road. Route had exceptionally low ridership and was therefore not included in the final recommendations.

» **South Pickett Street** (16 surveys/comments). Service realigned so that DASH buses operate via Reynolds Road instead of South Pickett Street due to route restructuring. Passengers that are able to walk slightly further to Duke Street or Edsall Road will have more frequent, all-day service at those locations that they do currently on the AT7.

» **South Old Town** (12 surveys/comments). Riders expressed concerns about route changes in South Old Town. Existing AT7 riders would no longer have a direct ride to the King Street Metro and would instead need to transfer to the Old Town Circulator. A direct service would still be provided to Potomac Yard Metro via the new N-6 but may take longer.

» **Duke Street Service in Old Town** (10 emails/calls). Current AT5 service on Duke Street in Old Town would be eliminated due to low ridership, and all bus service would be moved to King Street as part of the Old Town Circulator. All phone calls and emails were received from members of the Alfred Street Baptist Church, which is roughly two blocks from King Street. Church also operates private shuttle on Sundays.

Online Survey Results

A short online survey was conducted to collect feedback on how the future ATV networks would affect individuals and the City as a whole. A total of 685 survey responses were received, but more than 300 of the survey responses were about the proposed discontinuation of AT2 service on Seminary Road and Janneys Lane, which has been resolved in the Vision Plan Networks. When considering the responses that were related to Seminary Road/Janneys Lane, participants were more likely to say that they disagreed that the proposed networks were better for themselves and the City. After removing the surveys that were singularly-focused on the AT2 issue, respondents were split on whether the future ATV networks would be better than the existing network for them personally, but most agreed or strongly agreed that the 2022 and 2030 ATV networks would be better for the City of Alexandria as whole.

Alexandria Transit Vision Plan – ARLANDRIA/CHIRILAGUA

The Arlandria/Chirilagua community is generally located in northern Alexandria along Mount Vernon Avenue, north of West Glebe Road. It is currently served by four Metrobus routes (10A, 10B, 10E, 23B), and three DASH routes (AT-3, AT-9 and AT-10).

For Arlandria/Chirilagua, the key changes for the **2030** ATV Network include:

- **AT-9 replaced by the "N8".** The existing AT-9 will be replaced by the new "N8" route with all-day, frequent service from Arlandria to the new Potomac Yard Metro, Shirlington, Mark Center, the West End and Van Dorn Metro. Route will operate every 15 minutes or better, seven days per week, providing significant improvements in transit access for Arlandria residents.

- **DASH AT-3 no longer extends to Old Town.** The AT-3 route will maintain its current alignment and service levels between Braddock Road Metro and the Pentagon but will no longer extend into Old Town or Hunting Point.

- **Metrobus routes largely remain the same.** The 2030 network maintains the existing Metrobus 10A and 10B routes at their existing service levels. Route 10B is assumed to return to its regular routing along South Glebe Road once the Glebe Road bridge repairs are completed, however, the re-route of the 23B to W. Glebe Road via Mount Vernon Avenue is recommended to be made permanent.
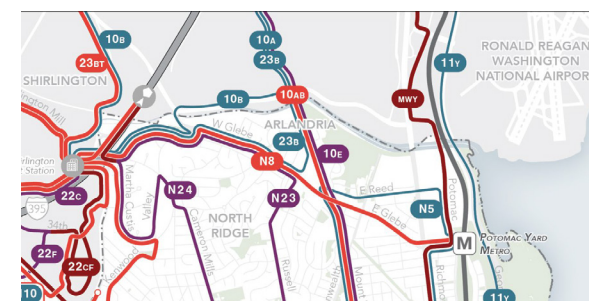
What can I access via transit in 30 minutes from W. Glebe & Old Dominion at 12pm in 2030?

	Existing Network	2030 Network	% Change
Residents	56,061	88,433	+58%
Jobs	21,734	52,856	+143%

ALEXANDRIA Transit Vision
www.dashbus.com/transitvision

(See reverse side for more information.)

As part of Phase 3 outreach, neighborhood-specific sheets were created to depict changes and expected outcomes.

Table 1: Most Common Issues and Concerns with Draft Recommended ATV Networks

Route/Area Impacted	Survey	Emails & Calls	Total	Rider Impact *	Issue	Notes
AT2 - Seminary/Janneys	304	49	353	95	AT2 discontinued on Seminary/Janneys	Staff alternatives identified and included in Final ATV network
AT3/4 Loop (Off-Peak Service)	14	5	19	45	No off-peak service for parts of Cameron Mill/ Russell	Service discontinued due to exceptionally low ridership productivity
AT7 - S. Pickett Street	13	3	16	35	Service discontinued on S. Pickett due to realignments	Longer walk to more frequent, all day service Duke or Edsall/Reynolds; no other routing options that will work.
AT7 - South Old Town	11	1	12	47	Route realignments in South Old Town (N6)	New N6 route serves area and connects to Metrorail via Old Town North; new transfer to Old Town Circulator required to get to King St. Metro
AT5 - Duke St (Old Town)	0	10	10	18	Service discontinued on Duke Street in Old Town	Comments are from Alfred Baptist Church, which would now have a 2 block walk to King Street (Church provides shuttle to/from King St. Metro on Sundays)
AT2/AT5 - Old Town North	8	0	8	74	Serivice realignments in Old Town North	New N6 route replaces AT2 /AT5 with better frequency/span. New stops would be no more than one block from current stops
AT5 - Van Dorn Street	6	0	6	181	AT5 replaced by 25B on Van Dorn, south of Seminary	Existing AT5 riders would need to use the WMATA 25B and connect at Southern Towers or Landmark Mall
AT3 & AT4 End at Braddock Rd Metro	4	1	5	15	AT3 and AT4 riders must transfer at Braddock Rd Metro	Majority of riders get on/off at Braddock Rd Metro; 15 through riders would now transfer to frequent Old Town Circulator or 10A/10B.
N1 Routing in Carlyle	3	2	5	0	Concerns about N1 routing through Carlyle	Potential alternate routings via Jamieson, Dulaney and Holland under consideration.
AT3 - Hunting Point	3	0	3	30	No more peak DASH service to Hunting Point	10B takes riders from Hunting Point to Braddock Rd Metro 3-5 minutes faster.
Montgomery/Madison One-way	2	1	3	0	Montgomery proposed to become two-way street	City proposal unrelated to ATV. Still to be determined.
AT2 - Powhatan/Columbus	1	1	2	16	No service along AT2 segments on Powhatan/ Columbus	Existing AT2 riders would need to walk 1-2 blocks further to Madison/Montgomery (Old Town Circulator) or Washington Street (N6).
AT1/AT2 - Reading/Rayburn	0	0	0	74	DASH routes not longer deviate to Reading/ Rayburn	Riders can walk less than 1/4 mile to all day, high frequency service on Beauregard St

* Rider impact estimates the number of riders who will be impacted by each change on a daily basis. Estimates were developed based on ridership data collected during Spring 2018.

Stakeholder Workshop

The draft 2022 and 2030 ATV networks were presented to community representatives at the third stakeholder workshop on October 10, 2019. The same questions in the survey were asked to the stakeholder participants. The stakeholder workshop resulted in the following input:

» 67% strongly agreed or agreed that the 2030 Draft Recommended Network will be better than the existing network for the communities they represent

» 87% strongly agreed or agreed that the 2030 Draft Recommended Network will be better than the existing network for the City of Alexandria as a whole

» 67% strongly agreed or agreed that the 2022 Draft Recommended Network will be better than the existing network for the communities they represent

» 80% strongly agreed or agreed that the 2022 Draft Recommended Network will be better than the existing network for the City of Alexandria as a whole

DASH Board Public Hearing

The DASH Board held a public hearing at its November 13, 2019 meeting. Following the hearing, the Board noted that the AT2 service is important to serving residents, especially disadvantaged residents, and provided guidance to staff to maintain weekday AT2 service with future ridership monitoring. The Board also noted its desire to minimize fiscal impacts, and would like staff to provide cost impacts associated with reductions to Routes N1, N10 and N11 that would offset the cost of the reinstated AT2 service.

Final DASH Board Recommendations

Based on public feedback and input from DASH and City leadership, staff developed the Vision Plan Networks for 2022 and 2030, which were presented to the Board at its December 11, 2019 meeting. Due to uncertainties with the City budget and the impact of the proposed changes on the WMATA regional subsidy, the Board was encouraged to take a policy-oriented approach and evaluate the final 2022 and 2030 recommendations on how successful the plans would be in achieving the basic goals of the ATV Plan, and less on the specific cost projections. Ultimately, the Board adopted the final 2030 ATV Network Plan (20 percent added service hours), and the 2022 major growth (8 percent added service hours) ATV Network Plan, which represent 85% of resources devoted to ridership-based goals.

In regard to the AT2 segment on Seminary Road and Janneys Lane, the Board supported the inclusion of the proposed "N12" route in the Vision Plan Networks which would maintain 30 minute service on the corridor, but would eliminate weekend service. The Board also recommended that the additional cost of the "N12" should be funded through other service reductions, such as reducing peak headways on the "N1" route along Eisenhower Avenue from every 15 minutes to every 30 minutes in the Final 2022 scenario. Further, the Board recommended that a ridership benchmark should be used to monitor future "N12" ridership performance. The average weekday boardings between Howard Street and King Street-Old Town Metro should increase by a goal of 20 percent by the year 2025. DASH staff would be required to report to the Board annually on its performance with a final recommendation for

continuation/discontinuation no later than the December meeting in 2025.

The final implementation of the 2022 ATV Network Plan will be carried out through the FY 2022 DASH Transit Development Plan (TDP) process, which informs the annual DASH budget request to City Council. If adopted by City Council and pending coordination with WMATA and neighboring jurisdictions, the new Vision Plan Network is planned to be launched by late summer 2021.

The long term 2030 ATV network implementation is anticipated to take place incrementally throughout the next decade through the annual DASH TDP process, which will inform the DASH subsidy request to the City and the allocation of funding by City Council through the City's annual budget processes.
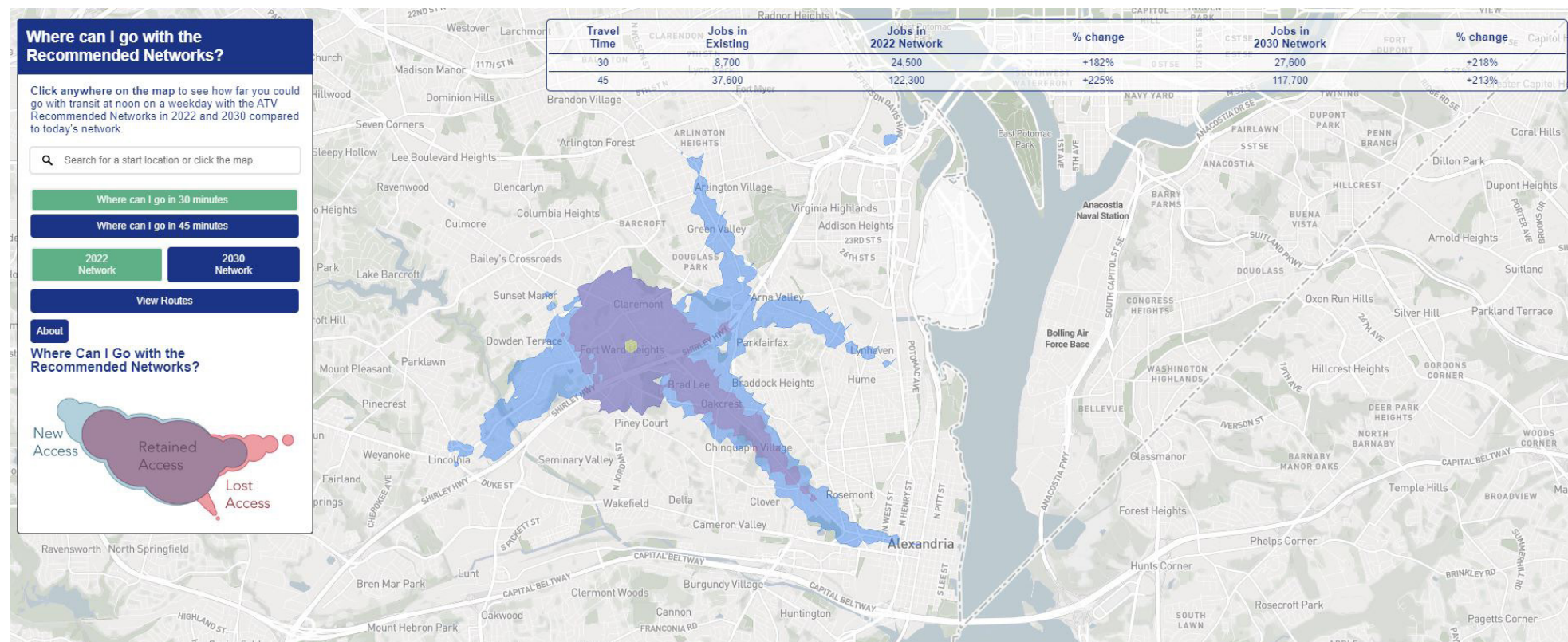
As part of Phase 3 Outreach, a webtool was created to examine the expected outcomes of the Vision Plan Network from any point in Alexandria. This tool can be found: **https://alexandriatransitvision.com/**

3. 2030 and 2022 Vision Plan Networks

Vision Plan Networks

This chapter presents maps of the Approved Vision Plan Networks, information about how the networks would operate, and how they would improve and change accessibility by transit and proximity to service.

These networks were developed by a team of technical experts from the City of Alexandria, DASH, WMATA, and transit planning experts from Kimley-Horn and Associates and Jarrett Walker + Associates. The policies that guided the design of this network are based on public input on key transit choices, as described in the previous chapter, and guidance from the DASH Board of Directors, the City of Alexandria Transportation Commission, and other regional partners.

The maps in this chapter show the 2030 and 2022 Vision Networks, also called the Long-Term and Short-Term Networks. **The first map of each network is the midday network, which is the service generally available all day and on weekends.** The second map of each network shows the weekday peak service network, which generally runs between 6:00 to 9:00am and 3:00 to 6:00pm, and has more frequent service on many routes and additional routes.

The tables after each set of maps show the frequency of each route over the hours of each day and the days of each week. Charts also describe the change in residents and jobs accessible to frequent transit.

Policy Basis

The 2030 VIsion Plan Network is designed to fulfill policy direction from the DASH Board and City Transportation Commission provided in June 2019 and adjusted in November 2019 based on public responses to the Draft Recommended Networks:

» About 85% of the transit budget in the City of Alexandria should be spent on maximizing ridership.

» The remaining 15% should be spent covering those places where transit service is valued, even if ridership relative to cost is low.

» A 20% increase in transit investment for both DASH and WMATA. It also assumes continued funding from the I-395 Commuter Choice program for service improvements in western Alexandria.

The 2022 Network, which represents the equivalent of an increase of 8% over existing DASH service hours, is designed as a first step to implementation of the 2030 Network.

Final policy direction from the DASH Board was provided at the November and December 2019 meetings as a result of public input on the Draft Networks. That policy direction was to ensure that Seminary Road and Janneys Lane kept at least hourly bus service on weekdays to ensure a minimum level of coverage on that corridor. The Approved Vision Plan Networks incorporate this policy direction and other adjustments based on public input.

Network Assumptions

Bus-to-Rail/Rail-to-Bus Transfer

Though it is not essential to the operation of the networks, it is assumed that in the near future, the fare penalty for transferring between Metrorail and bus will be eliminated. This would mean that if you rode Metrorail, a transfer to a local bus would be free. When transferring from bus to Metrorail, the full bus fare would be deducted from the rail fare, since rail fares are variable by distance and time of day and are usually higher than bus fares.

Route Numbering

The Vision Plan Network includes many routes that are similar to today's Metrobus routes or would-be Metrobus routes in the future given how they would operate outside Alexandria. These routes are given the number of existing Metrobus routes, such as 28A or 22A. All other routes shown are given an "N" prefix to indicate that they are new routes, such as N1 or N9, and these numbers are placeholders that will likely change in the future. These new routes could be operated by DASH or WMATA depending on future decisions during implementation. These routes could be take a different number in the future depending decisions made by DASH or WMATA on overall regional and local route numbering.

Potomac Yard Metrorail

The City and WMATA are working together to construct an in-fill station (a new station on an existing transit line) on the Blue and Yellow Metrorail lines in the Potomac Yard neighborhood. There will be facilities provided to accommodate bus-rail connections to the station. Both the 2022 and 2030 Networks assume the station is open and that Metrorail service is operating at its current frequency and span of service.

Expanding Weekend and Evening Service

Evening and weekend service is relatively inexpensive to operate compared to peak service, and it is crucial to a large segment of transit riders. People who work in most retail and entertainment sectors have to work on weekends and often late into the evening.

Houston recently had great success with a network redesign that extended evening service and expanded Saturday and Sunday service to be the same level as weekday service, but without the peak period.

The 2030 Vision Network dramatically expands weekend and evening service and generally makes hours of service more consistent among all routes. The 2022 Vision Network includes better evening and weekend service, but not to the extent of the 2030 Network.

Metroway

Both networks assume that more dedicated space is provided for Metroway through the new development in Potomac Yard and that service is standardized to operate between Pentagon City and Braddock Road Metrorail stations every 10 minutes or better, all-day, seven days per week.

West End Transitway and Duke Street Transitway

In the western parts of Alexandria, the City is proposing a Bus Rapid Transit (BRT) system to provide high-capacity transit service using a combination of dedicated and shared lanes and high-quality stations with rider amenities. The ultimate vision is for the West End Transitway to connect major transit centers, like Van Dorn Metro Station, Mark Center Transit Center, Shirlington Transit Center, and the Pentagon Transit Center, with several neighborhoods along the corridor, including Landmark, a redeveloped Landmark Mall, and Beauregard corridor.

Along Duke Street, the City is studying improvements to increase the speed and reliability of bus service. The City is studying a variety of possible measures, including dedicated lanes, queue jump lanes at intersections, and transit signal priority.

The 2030 Network assumes that the transit signal priority elements of the West End Transitway and Duke Street Transitway have been built. The 2030 Network includes a route (N9) that would use the West End Transitway while the N3 route would use the Duke Street Transitway.

Southern Towers and Landmark Mall

Both networks assume that new transit centers are built on-site at Southern Towers and at the redeveloped Landmark Mall property. The new Southern Towers transit center would replace the multiple stops that routes make today in the parking lot of the towers. Both transit centers would allow people to make easy connections between local routes in Western Alexandria, connect between local routes and the West End Transitway route, and to and from routes that would use the I-395 HOT lanes to get to Pentagon Metrorail station. The timing of when these new transit centers are built is uncertain, but they are important for the long-term connectivity of the 2030 network in particular.

Potomac Yard Development and Amazon

Both networks were designed with the North Potomac Yard Small Area Plan, Crystal City Sector Plan for Arlington County, and the Amazon HQ2 proposals in mind. The North Potomac Yard Small Area Plan envisions a substantial increase the number of jobs and residents in the area. Also, the study team was aware of the high likelihood of substantial development and redevelopment in Potomac Yard, particularly with the Virginia Tech Innovation Campus planned for this area. Therefore, both Networks assume the level of activity in Potomac Yard, Crystal City, and Pentagon City would increase and, therefore, services to these areas are improved in both networks.

Existing System

Figure 21 shows Alexandria's bus network, with every route color-coded based on its frequency during midday on a weekday. This should be the point of comparison for understanding how the Vision Plan Networks are different from today's system.

The map at right reveals that at midday, most of Alexandria does _not_ have access to high-frequency transit (15 minutes or better) as most routes only run every 30-60 minutes; three routes offer 20-minute frequency; and only the Metroway and King Street Trolley offer service every 15 minutes or better (which is the transit industry norm for calling service "frequent"). There also are a few lower frequency routes like AT7 on Eisenhower Avenue that run every 60 minutes.

The Existing Network devotes 50 percent of resources to service that one would expect to get high ridership relative to cost. The other 50 percent of resources is going to service that is not likely to get high ridership relative to cost, but is meeting other important goals, like covering low density areas with basic lifeline bus service. **Thus we would say that this network is 50 percent ridership and 50 coverage.**

For a deeper explanation of the ridership-coverage trade-off and balance between those two goals, see the Choices Report.

Figure 21: Existing System, Midday Weekday Frequency
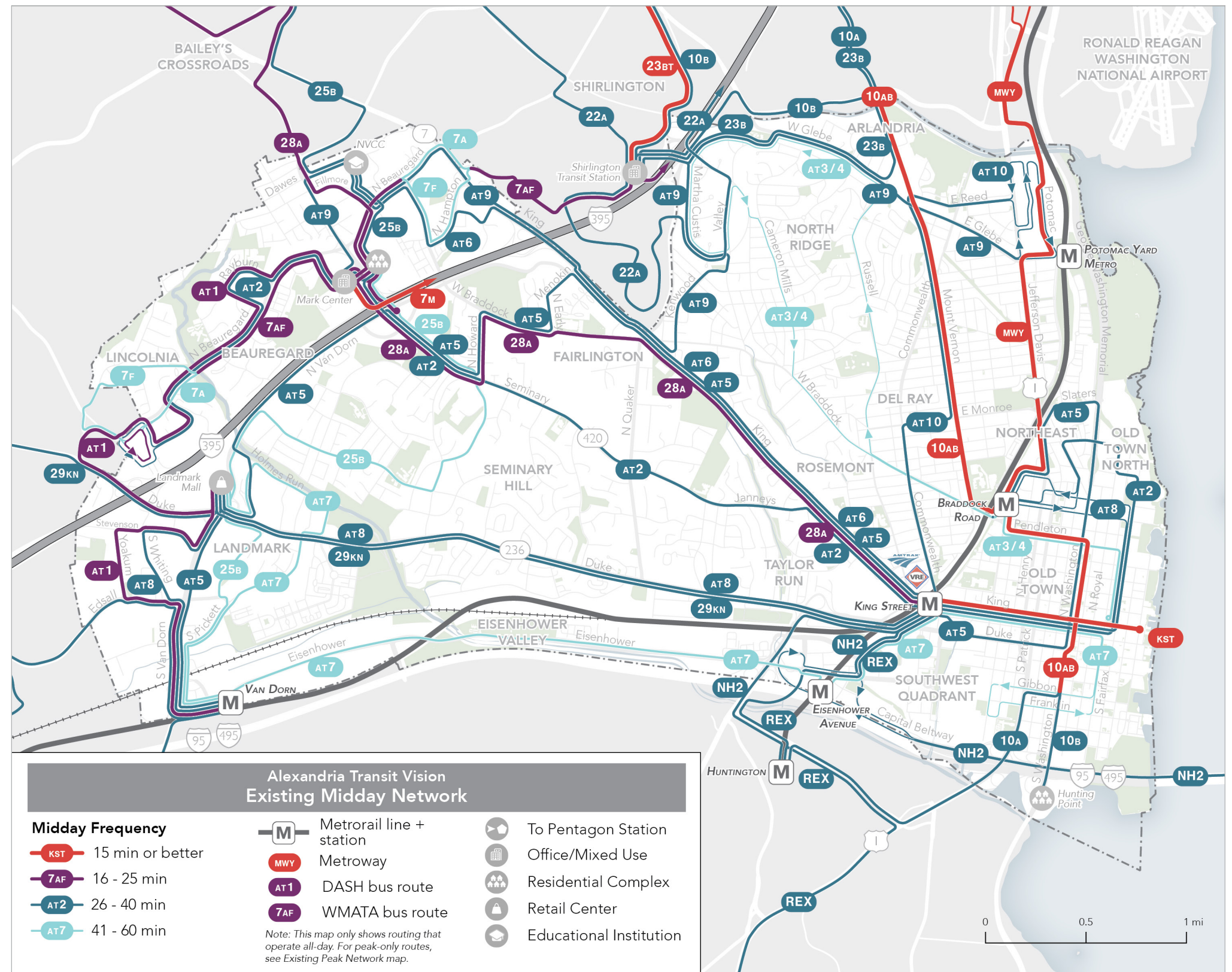
2030 Vision Plan Network

The 2030 Vision Plan Network creates a grid-like network of high frequency routes to get more people to more places in less time. The 2030 Network includes more investment in service and a shift in policy to focus more on ridership with **85 percent of transit resources going towards ridership goals and 15 percent toward coverage goals.**

With this emphasis on ridership, this network can provide frequent all-day service on radial routes from Old Town on Duke Street (N3), King Street (N4), Mount Vernon Avenue (10A/B), Richmond Highway (Metroway), and to Eisenhower East (with an extension of the King Street Trolley) as well as two orbital corridors from the Van Dorn Metro to Shirlington with one going to Pentagon Metro (N9) and the other going to the new Potomac Yard Metro (N8).

The radial routes N3 and N4 combine together at King Street Metro to form the Old Town Circulator. This combined route provides 7 to 8-minute frequency within Old Town between the King Street and Braddock Road Metro via King, Fairfax, and Madison/Montgomery Streets. For more details on the Old Town Circulator, see page 46.

In addition, evening and weekend frequent service has been extended later into the evening and on weekends. Some lower-frequency service remains with several routes with 30-minute service connecting key places:

» N1 serves the Eisenhower corridor from Van Dorn Metro to King Street Metro.

» N6 serves southern and northern parts of Old Town with connection to new Potomac Yard Metro.

» N10 & N11 serve parts of Howard Street, Seminary Road, Bradlee Shopping Center, to Shirlington.

» 25B is similar to today's route, connecting from Ballston to Southern Towers and then south to Landmark via Van Dorn Street to Van Dorn Metro.

» 22A is very different than today. It still connects from Ballston to Shirlington, but then connects to King Street Metro via Parkfairfax and Braddock Road.

» N5 is similar to the current AT10, connecting the Del Ray community with King Street Metro and the future Potomac Yard Metro.

» Route 28A is realigned to provide service on Howard and Jordan Streets and then follow Duke Street to King Street Metro. This realignment better serves these higher density areas and maximizes use of the planned Duke Street Transitway to provide faster service to King Street Metro. Route 28A would make limited stops from Duke and Jordan Streets to King Street Metro like Routes 29K/N do today.

Figure 22: Vision Plan Network by 2030, Midday Weekday Frequency
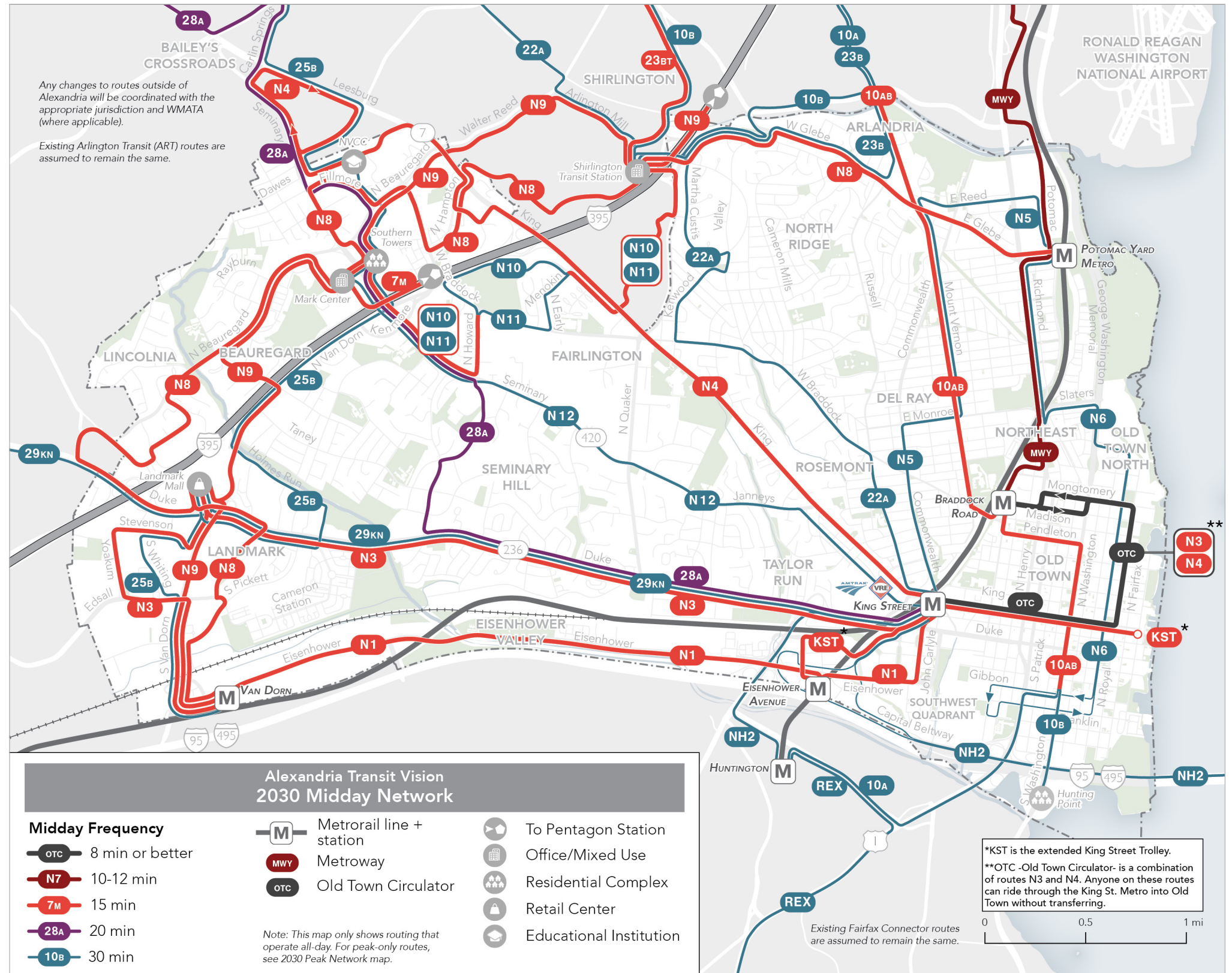
Existing Peak System

In suburban areas, rush hour or peak demand is often different from the all-day demand, and much more intense. In those contexts it often makes sense to run commuter-oriented services only during the peak period, including entire bus routes that may run only during these times.

Such is the case in Alexandria, as shown in the map of the existing peak bus service in **Figure 23**. Many routes run only at peak times, like WMATA routes 8W/Z, 21A/D and DASH routes AT2X, AT3, and AT4. Also many routes run more frequently at peak, at least in the peak direction toward Pentagon or Old Town such as DASH routes AT1, AT6, and AT8. The policy direction from the DASH Board was to maintain, as much as possible, peak service levels to all parts of the city.

The existing route network along the I-395 corridor in western Alexandria is particularly complex at peak times. There are numerous changes in route patterns between peak and midday which means that riders can make some trips by one bus in midday but must take two buses at peak times.

In redesigning the network, the study team has worked to simplify the structure of the peak network, where possible, to ensure that it was overlaid on the all-day network in a logical way. Thus, where possible, the study team maintained all-day route patterns and overlaid rush hour route patterns on the all-day network, for more consistent trip patterns throughout the day.

Figure 23: Existing System, Peak Weekday Frequency

Service continuing to Pentagon Station
Duke: 21A, 21D
Seminary: 7M, 8Z, 8W, 16L, 28F, 393
King: 7P, 28G
Shirlington/W Glebe: AT3, AT4, 7A, 7C, 7Y, 8S, 22A, 22C, 22F

Alexandria Transit Vision
Existing Peak Network

Peak Frequency
- AT1 — 10 min or better
- KST — 11 - 15 min
- 7AF — 16 - 25 min
- AT2 — 26 - 40 min
- AT7 — 41 - 60 min

- M — Metrorail line + station
- MWY — Metroway
- AT1 — DASH bus route
- 7AF — WMATA bus route

- To Pentagon Station
- Office/Mixed Use
- Residential Complex
- Retail Center
- Educational Institution

2030 Peak Network

The 2030 peak network keeps most existing peak-only service with some adjustments to account for changes in the all-day network.

» WMATA Peak-Only Routes 8S/W/Z, 11Y, 21A/D, 28F/G are unchanged from the existing network.

» Some existing WMATA Peak-Only routes remain with some changes:

   » 22C/F operate similar to today except that 22C begins and ends at Shirlington and 22F begins and ends at Southern Towers. The revised Route 22A serves Ballston to Shirlington to King Street Metro via Parkfairfax and Braddock Road every 15 minutes during peak hours, creating a new frequent regional connection between Arlington and Alexandria.

   » 7W is replaced by similar N27 route as part of route restructuring in the West End.

   » 7Y now begins and ends at Park Center, replacing the existing 7P, and goes through North Fairlington to Shirlington and on to Pentagon and Farragut Square. This is changed because the N9 now serves Walter Reed Drive and there is no longer a 7C serving that corridor.

   » 10E continues to serve Hunting Point to Pentagon but follows the 10A/B alignment instead of deviating to serve Powhatan Street, as it does today.

» Some existing DASH Peak-Only routes remain with some changes and the numbers have changed:

   » AT2X is called N22 and runs non-stop from King Street Metro to Mark Center. Currently, the AT2X is funded by the Department of Defense (DoD), which requires that the service be non-stop. If DoD were willing to allow this route (N22) to have intermediate stops, then buses could stop at Taylor Run Parkway, Fort Williams Parkway, and/or Howard Street to provide peak service in addition to the N12 service. Additional coordination with DoD staff would be required for any future changes to this route.

   » AT3 is called N23 and runs from Braddock Road Metro to Pentagon via Russell Road and West Glebe Road, similar to the existing network except that it does not serve Old Town or Hunting Point.

   » AT4 is called N24 and runs from Braddock Road Metro to Pentagon via Cameron Mills Road and Martha Custis Drive, similar to the existing network except that it does not serve Old Town.

In addition to the above, many routes have higher frequency at peak compared to midday, including N1 on Eisenhower Avenue, N3 on Duke Street, N4 on King Street, and Metroway.

Figure 24: Vision Plan Network by 2030, Peak Weekday Frequency
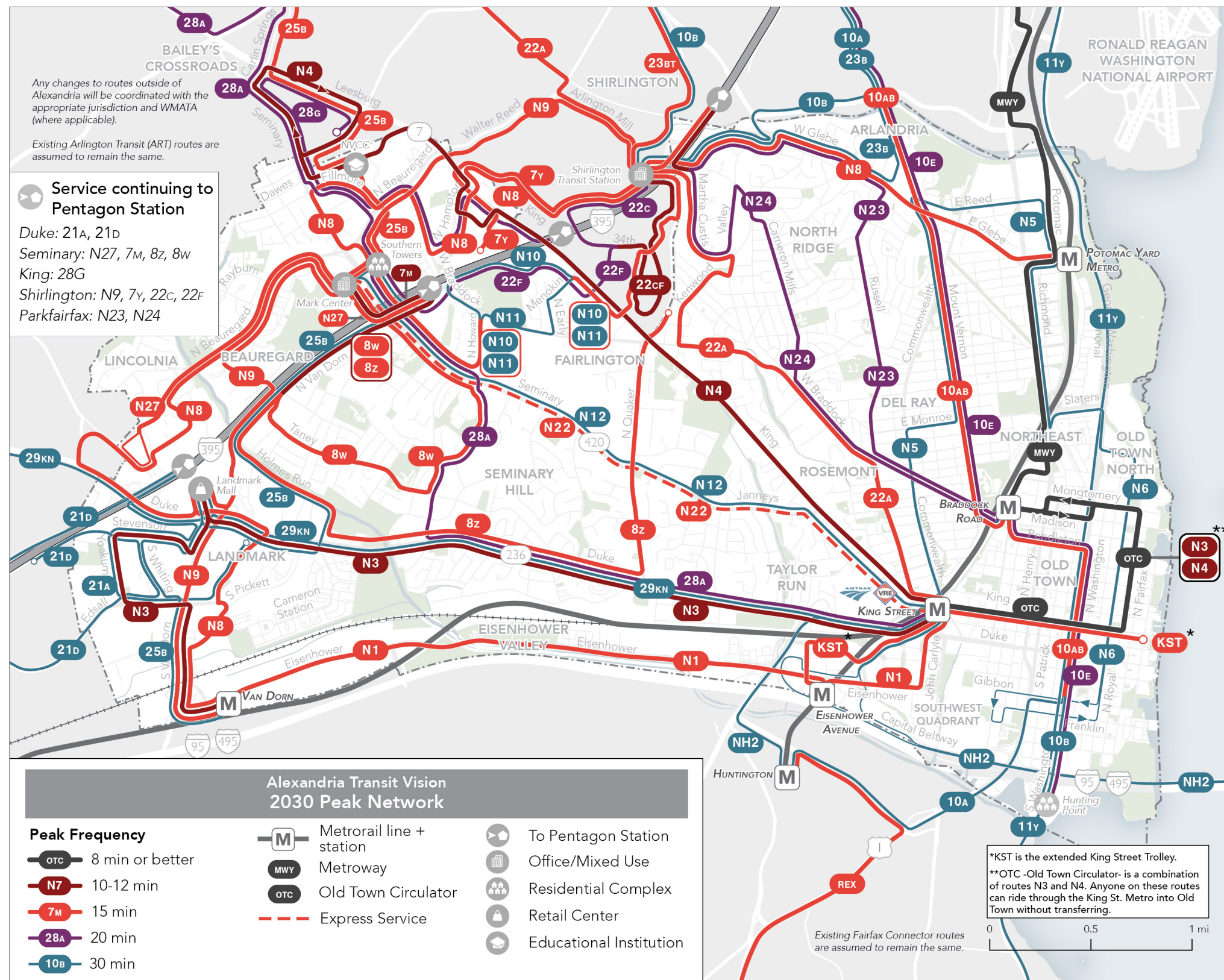
Existing Span of Service

For transit to be useful, it must be there at the times of day you need it. The times of day transit operates is called "span of service." In today's transit network in Alexandria, only three DASH routes provide service after 11 pm, and only one route, AT8, serves customers after midnight. Metrobus provides some service after 11 pm on four routes.

Frequency of service varies dramatically throughout the day and week, with most service concentrated in the weekday rush hours. Only one DASH route provides frequent service at midday, the King Street Trolley; however, the King Street Trolley doesn't operate at all in the morning peak. The AT3, AT4, AT6 and AT7 do not operate at all on weekends and some routes become more complex to make up for those that disappear. For example, on weekdays the AT7 serves Eisenhower Avenue with hourly service, but doesn't run on Saturdays and Sundays. Instead, the existing AT5 is extended to serve Eisenhower Avenue on those days.

The inconsistencies in frequency and which routes are available throughout the day make the network more difficult to understand, and limit the types of trips for which the network can be useful.

> Limited evening and weekend service reduces the usefulness of the existing network for many potential riders.

Figure 25: Frequency/Span Chart for the Existing System

Alexandria Existing Route Frequencies

Data Source: GTFS feed, October 2017 - June 2018
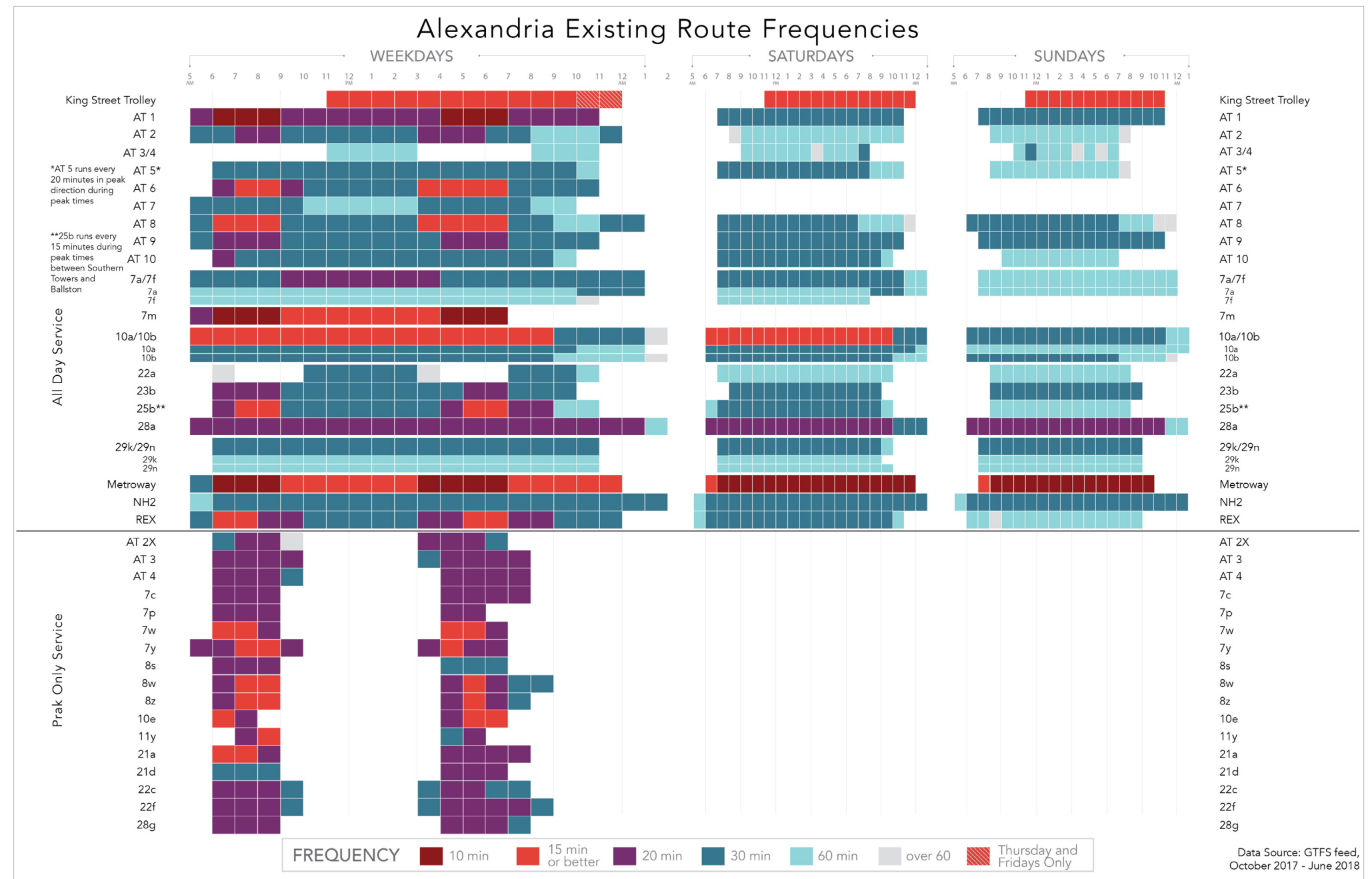
2030 Span of Service

The chart to the right (**Figure 26**) shows the frequency of service by time of day and day of the week for the 2030 Vision Plan Network. Looking at this chart, one can see that Route N1 would have 15-minute service from 6 am to 9 am and 4 pm to 7 pm on weekdays, 30 minute service in the midday and evenings on weekdays, and 30-minute service from 6 am to 1 am on weekends.

In the 2030 Vision Plan Network, most service is more consistent across the day and week. Saturdays and Sundays have frequency of service and spans of service that are much closer to midday on weekdays than in the existing system. By providing weekend service frequencies and spans that are close to weekday service levels, the service is more consistent and reliable throughout the week, leading to higher overall usage. It is also much more useful for service industry workers who typically have to work evenings and weekends and are more likely to rely upon public transit.

For example, the N1, which serves Eisenhower Avenue from Van Dorn Metro to King Street Metro, runs 7 days a week, with a minimum of every 30 minute service from 5 am to 1am on weekdays, 6 am to 1 am on Saturdays, and 6 am to 10 pm on Sundays.

The 2030 Vision Plan Network has more consistent frequency across most routes, seven days a week. It therefore provides a simpler, easier to understand, and more useful network.

Figure 26: Frequency/Span Chart for the 2030 Vision Plan Network
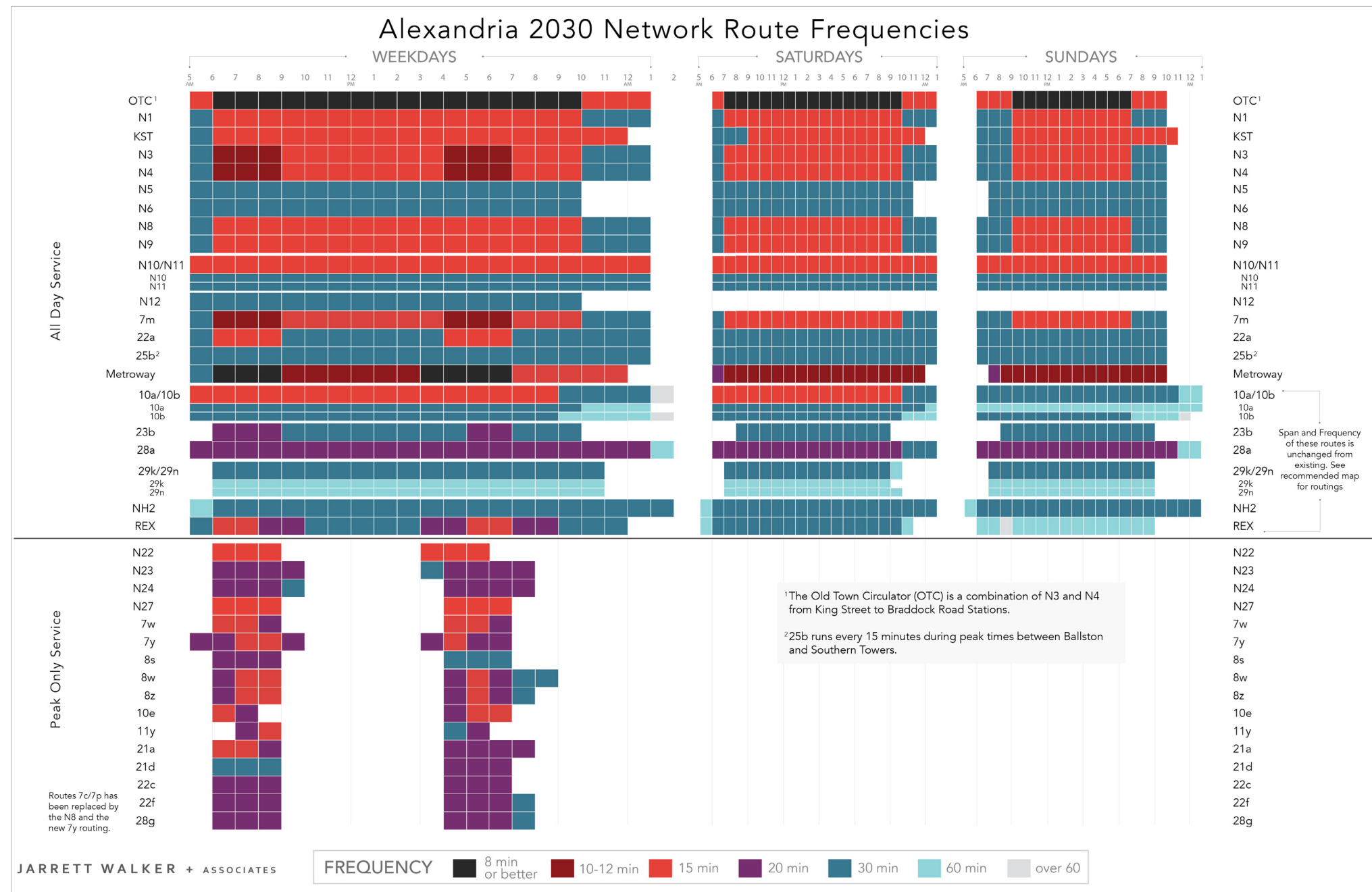
2030 Proximity Analysis

By simply comparing the maps on the previous pages, it is clear that the Vision Plan Network covers most of the same streets as today's network. In fact, 99.5% of existing boardings in Alexandria would still be within 1/8 mile of a future bus stop under the 2030 ATV Plan. Yet that's not the whole story of how the network covers the city and all potential transit users. How many residents and jobs does that geographic coverage represent and how many have access to frequent all-day service?

Figure 27 illustrates how many residents are near—within 1/4 mile—frequent, all-day service (every 15 minutes or better), infrequent service, peak-only service, or not near any service under the Vision Plan Network and the Existing Network.

Only 27 percent of residents are near frequent, all-day service in the Existing Network. The 2030 Vision Plan Network substantially expands the frequent network so that **83 percent of residents are near frequent all-day service.[1]**

Proximity to jobs (**Figure 28** shows a similar pattern. Only about 40 percent of all jobs are near frequent all-day service in the Existing Network. The 2030 Vision Plan Network substantially expands the frequent network **so that 81 percent of jobs in the city are near frequent all-day service**.[1]

Access to frequent, all-day service is a good estimate of potential ridership. While frequency alone is not enough to cause high ridership, frequency deployed along direct routes, in places that are dense, walkable and proximate to one other, does tend to lead to high ridership and lower operating costs.

> The 2030 Vision Plan Network increases the percent of residents near frequent, all-day transit from 27% to 83%. It increases the percent of jobs near frequent, all-day service from 40% to 81%.

Figure 27: Residents near Transit on Weekdays, Existing and 2030 Vision Plan Networks

Residents near Transit on Weekdays
within 1/4 mile of a bus stop in Alexandria, Virginia
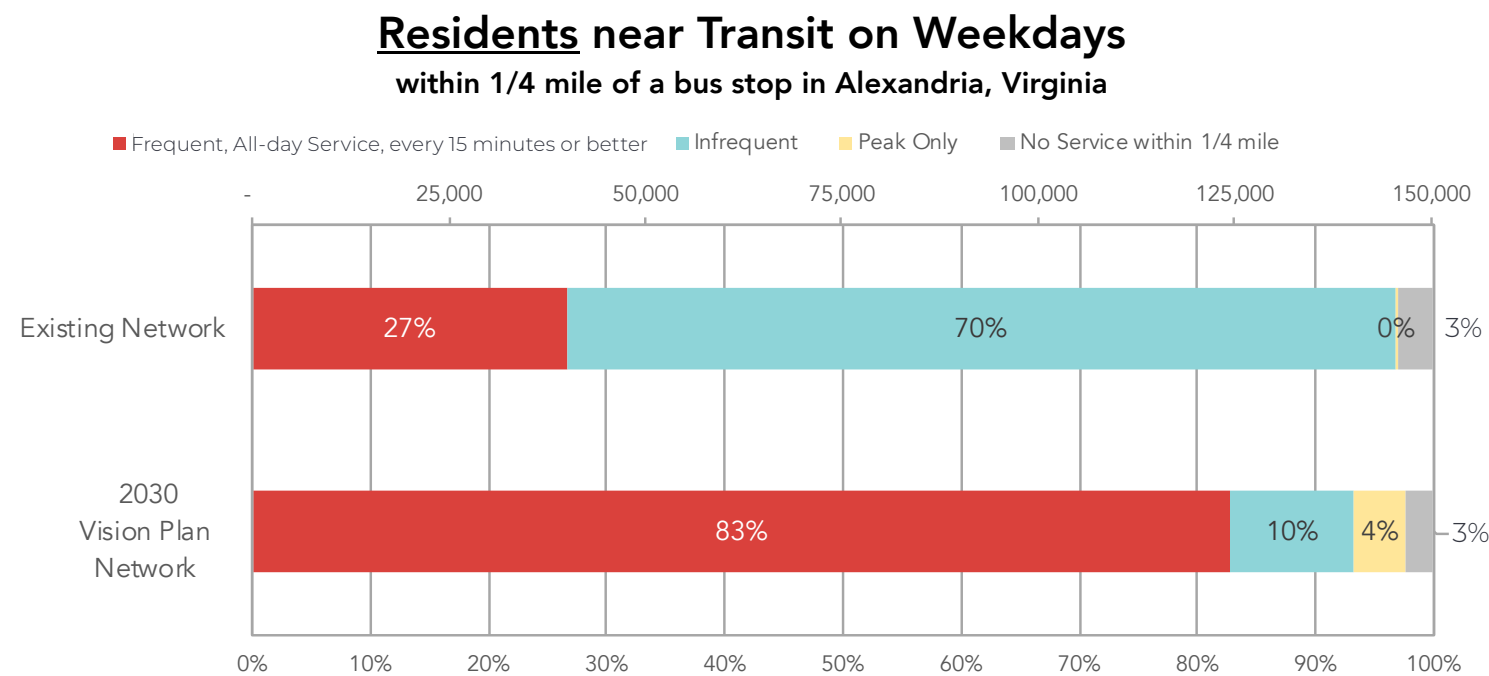
Figure 28: Jobs near Transit on Weekdays, Existing and 2030 Vision Plan Networks

Jobs near Transit on Weekdays
within 1/4 mile of a bus stop in Alexandria, Virginia
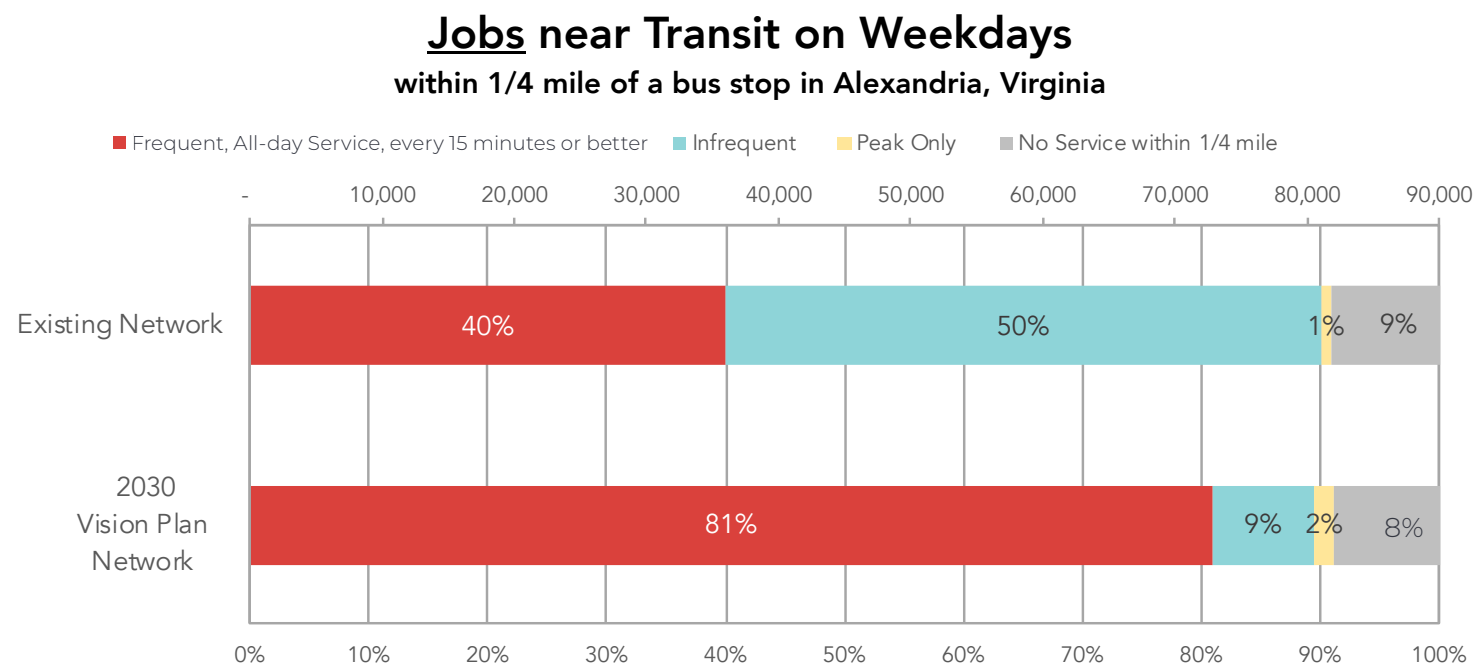
[1] The number and percent of residents and jobs near frequent service in the Existing Network as reported here is lower than what was reported in the Concepts Report published in February 2019. The analysis conducted for that report overstated the residents and jobs near frequent service for the Existing Network and both concepts because it erroneously counted end of line stops on 30-minute routes as having frequent service. This error overstated the residents and jobs near frequent service for the Existing Network most, because that network included the most 30 minute routes and the fewest 15 minute routes. The number and percent of residents and jobs near frequent service in the 2030 Network was understated in the Draft Recommended Network Report due to erroneous stop locations in the underlying network. Thus the values reported here are higher than in that report.

Proximity for Communities of Concern

Based on feedback from the community and City/DASH leadership, the final ATV networks were closely analyzed in terms of how they might impact communities of concern, including low-income residents, minorities, and seniors.
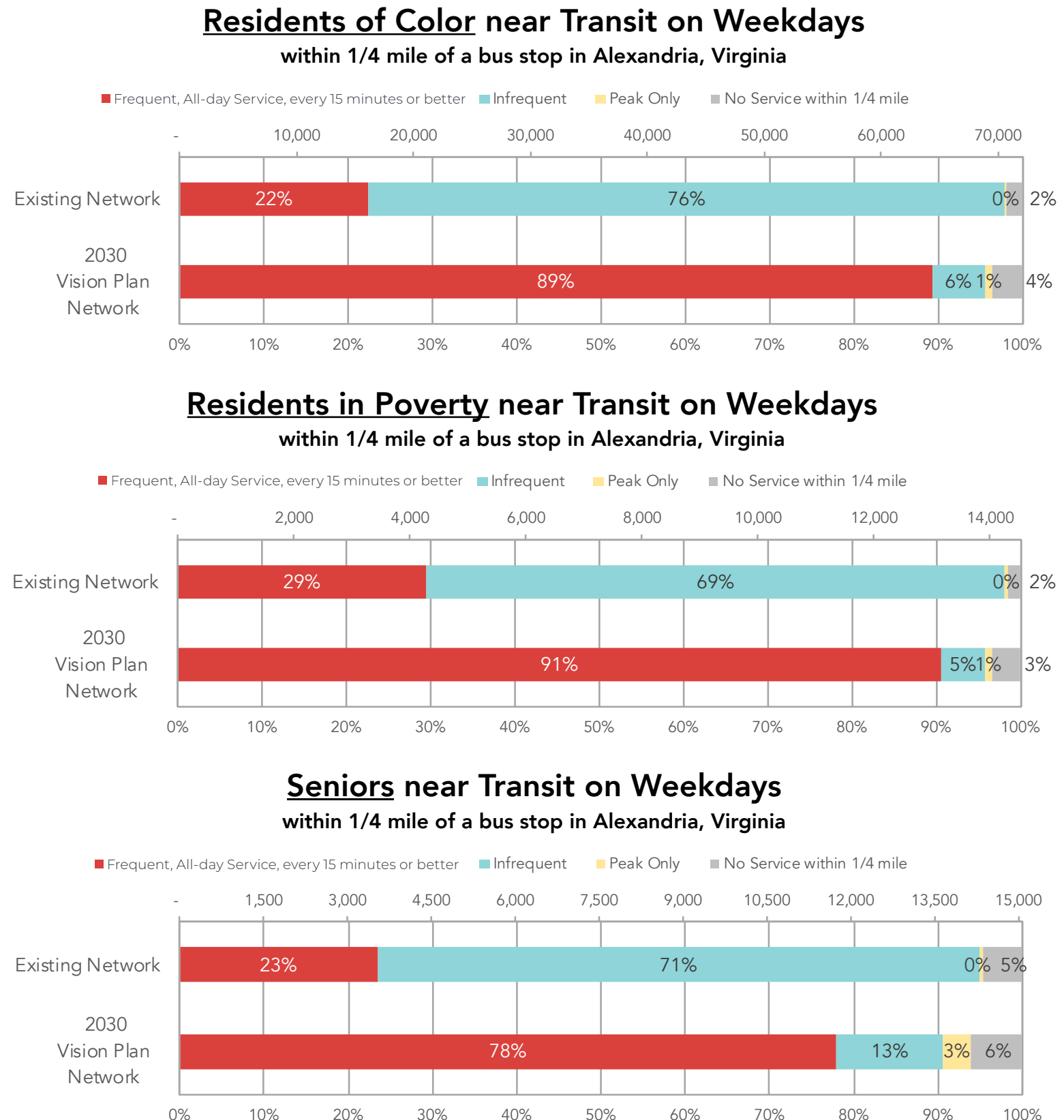
Figure 29 shows the differences in proximity to service for residents of color, residents in poverty, and senior residents. These charts illustrate how many residents in each of these groups are near—within 1/4 mile—frequent, all-day service (every 15 minutes or better), infrequent service, peak-only service, or not near any service under the Vision Plan Network and the Existing Network.

In each case, the number and percent of people near frequent service goes up dramatically. In the Existing Network, only 22 percent of residents of color are near frequent service, while **in 2030 that would increase to 89 percent. Residents in poverty see a similar dramatic increase in access to frequent service, with an increase from 29% today to 91% in 2030.** There is a small increase in the percent of residents of color and residents in poverty who are more than 1/4 mile from service.

The percent of **seniors who are near frequent service increases from 23 percent to 78 percent**. This increase is slightly less than it is for all residents (27 percent to 83 percent). The percent who are more than 1/4 mile from service increases from 5 percent to 6 percent, about the same as for residents of color and those in poverty. In general, seniors are slightly less served by frequent transit or any transit than all residents in both the Existing and 2030 Vision Plan Networks. Seniors are less served by transit today and in the 2030 Network because they are a higher proportion of the population of the lower density parts of the city and thus are already hard to reach by transit. A higher ridership design puts frequent service in higher density parts of the city and thus seniors, on average, do not gain as much as the average resident because the average senior lives in a lower density area.

> This network provides frequent, all-day transit service to 91% of low-income residents in Alexandria, as compared to 29% today.

Figure 29: Residents of Color, Residents in Poverty, and Seniors near Transit, Existing and 2030 Vision Plan Networks

Residents of Color near Transit on Weekdays
within 1/4 mile of a bus stop in Alexandria, Virginia

Legend: ■ Frequent, All-day Service, every 15 minutes or better ■ Infrequent ■ Peak Only ■ No Service within 1/4 mile

- Existing Network: 22% | 76% | 0% | 2%
- 2030 Vision Plan Network: 89% | 6% | 1% | 4%

Residents in Poverty near Transit on Weekdays
within 1/4 mile of a bus stop in Alexandria, Virginia

Legend: ■ Frequent, All-day Service, every 15 minutes or better ■ Infrequent ■ Peak Only ■ No Service within 1/4 mile

- Existing Network: 29% | 69% | 0% | 2%
- 2030 Vision Plan Network: 91% | 5% | 1% | 3%

Seniors near Transit on Weekdays
within 1/4 mile of a bus stop in Alexandria, Virginia

Legend: ■ Frequent, All-day Service, every 15 minutes or better ■ Infrequent ■ Peak Only ■ No Service within 1/4 mile

- Existing Network: 23% | 71% | 0% | 5%
- 2030 Vision Plan Network: 78% | 13% | 3% | 6%

Liberty and Opportunity

The 2030 Vision Plan Network increases the number of people and jobs that have access to frequent, all-day service, meaning that people near these routes or connecting to these routes have much shorter waits for service.

High frequency services, especially in a grid-like pattern where many connections are possible, maximize the range of useful destinations that can be reached quickly, for the maximum possible number of people.

For a person to choose transit over other modes, transit must provide a reasonable travel time to reach their destination. It stands to reason that when transit offers more people access to more destinations within a shorter travel time, it will attract higher ridership.

We can visualize this change in travel times and access, and compare concepts to one another using this measure. We have analyzed over a dozen different locations throughout the city to determine how far one could travel to/from those places using transit in a fixed amount of time. The results of this analysis are called "isochrone" maps.

In the example isochrone in **Figure 30**, you will see a figure (we call her Jane) placed at Landmark Mall in Alexandria. The map shows where you could travel, in 30 minutes, by walking and riding transit. The example shows how far Jane could travel from Landmark Mall in the Existing and 2030 Vision Plan Network in 30 minutes, including areas of gained or lost access as compared between the current and future networks. More importantly, it tells you how many more people and jobs she could reach with the Vision Plan Network. In total, there are 15 isochrone examples in Appendix A, showing how the Vision Plan Network changes access for many different parts of the city.

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 among others, these blobs have to contain enough of the places that make people's lives complete: jobs, education, shopping, services, social opportunities, and so on.

You can use this tool to think about access in the reverse, as well. For a work site or store at the selected point, the isochrones show who could readily get there, the employees it can attract, and the customers who might visit.

Of course, the real measure of usefulness is not just how much geographic area we can reach, but how many useful destinations we can access within that space. All geographically accurate maps tend to emphasize land area, when what really matters is population and activity. That's why each page in this section shows not just isochrones, but also reports the number of jobs and residents within each isochrone, in accompanying tables.

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. Computer models that predict ridership have always been doing this analysis, behind the scenes.

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

Figure 30: Example of Isochrone Maps and Diagram

How far can I travel from Landmark Mall in 30 minutes?

Riders can reach more jobs and opportunities in the 2030 Vision Plan Network than in the Existing network by walking and transit at noon on a weekday.

New Access · Retained Access · Lost Access
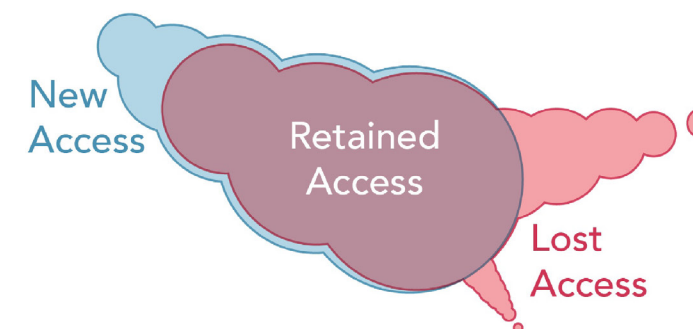
68% more residents and 205% more jobs accessible than existing network
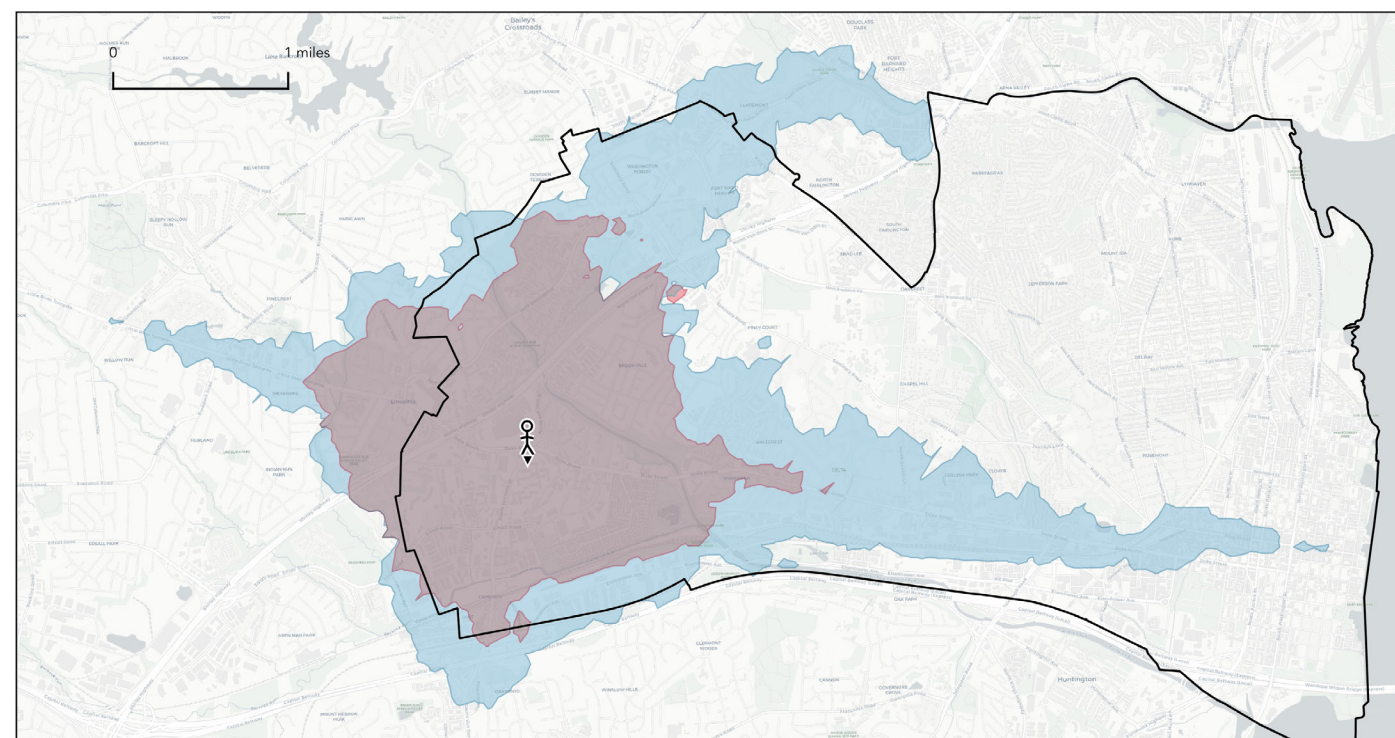
2030 Access to Jobs

The isochrone analysis of liberty and opportunity can be expanded to assess every part of the city and see how it is affected by the new network. This is done by assessing the change in access from points all across the city and then summarizing the results as a heat map or grid of hexagons as shown in **Figure 31**.

The map shows the change in the number of jobs in the region someone can reach by walking and transit within 45 minutes at midday when comparing the Existing and 2030 Vision Plan Networks.[1] Each hexagon on the map is shaded by the increase or decrease in jobs reached by walking and transit within 45 minutes from its center point. Also, each hexagon is sized by the number of residents that live in that area. So smaller hexagons mean there are fewer residents, and larger hexagons mean more residents. The results for this analysis would be better at peak times when frequency of service is higher and there are more routes running.

Most areas see increases in jobs access. A few areas see decreases in jobs access, for example, Braddock Road from Howard Street to King Street sees a decline because WMATA Route 28A has been shifted to Duke Street. Also, Seminary Road east of Howard Street and Janneys Lane see a decrease because the N12 does not go into Old Town from this part of the city. The areas that see decreases in access to jobs are generally low density, as indicated by their small size, and thus relatively few residents would experience a decrease in job access.

The average Alexandrian would see their access to jobs increase by 18 percent with the Vision Plan Network, increasing by about 3,700 the number of jobs they could reach within 45 minutes.

> For the average Alexandrian, the Vision Plan Network would increase the number of jobs accessible within 45 minutes by 18%—an additional 3,700 jobs by 2030.

Figure 31: Change in Midday Access to Jobs within 45 Minutes - 2030 Vision Plan Network Compared to Existing Network
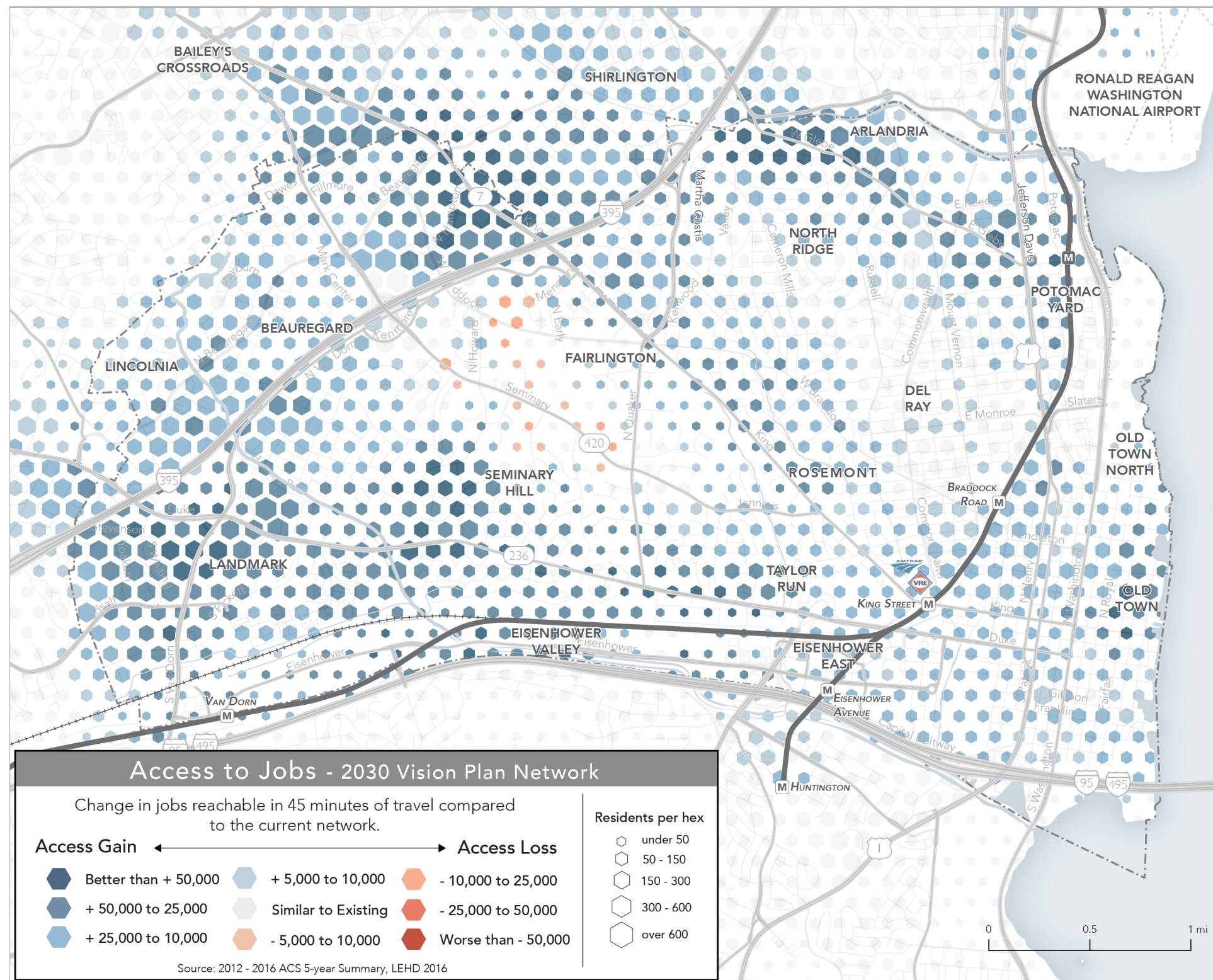
2 Isochrones were calculated at 30 minutes because the smaller areas are easier to discern differences in access within the relatively small geography of Alexandria. This overall access analysis was completed at 45 minutes because the average work commute by transit for residents of Alexandria is about 45 minutes and it provides a clearer estimate of the range of change in jobs and opportunities that would be possible to reach with a larger travel budget.

2022 Vision Plan Network

The map to the right (**Figure 32**) shows the weekday, midday frequency of the Vision Plan Network for 2022. This network was designed as a step toward development of the 2030 Vision Plan. This network assumes that the City invests more in transit so that DASH can increase service by 8 percent over the existing service levels and that the 395 Commuter Choice program continues funding additional service in western and northern Alexandria. If the City and DASH do not increase investment in the system, it is still possible to provide the midday network shown here, but evening and weekend service could not be improved. For more information on options for the 2022 network with less investment, see the Draft Recommended Network Report.

2022 Network Service Improvements

The 2022 Vision Plan Network begins implementing key changes in the transit network by consolidating different patterns of service in western Alexandria. Instead of three different patterns of service along Beauregard with Routes AT1, AT2, and WMATA Route 7, the 2022 Network provides a more frequent Route N7 on one pattern from Van Dorn Metro through Lincolnia, Mark Center, Southern Towers, North Fairlington, Shirlington and on to Pentagon.

The 2022 Network also consolidates service on King Street into one frequent route (N4) from Old Town to Northern Virginia Community College.

Similar to the 2030 Vision Plan, this network removes off-peak service from some low density places like North Ridge. In the 2022 Network there is no new investment for WMATA service, so the changes to the 22A in the 2030 Network that would mitigate the loss of the AT3/4 loop to eastern Braddock Road are not included in this network.

The Old Town Circulator shown in the 2030 network also is implemented. In the 2022 network, the Old Town Circulator would be created by combining Routes N1, N3, and N4 (the Eisenhower, Duke, and King routes). For more details on the Old Town Circulator, see page 46. A connection to the new Potomac Yard Metro from Old Town and Old Town North is also provided by the new N6 route.

Figure 32: 2022 Vision Plan Network, Midday Weekday Frequency

2022 Peak Network

The 2022 peak network keeps most of the existing peak-only service with some adjustments to account for changes in the all day network.

» WMATA Peak-Only Routes 7C/P/Y, 8S/W/Z, 11Y, 21A/D,22C/F, 28F/G are unchanged from the existing network.

» 10E continues to serve Hunting Point to Pentagon but follows the 10A/B alignment instead of deviating to serve Powhatan Street, as it does today.

» WMATA Route 7W becomes the N27 and is extended to Van Dorn Metro

» Some existing DASH Peak-Only routes remain with some changes and the numbers have changed:

  » AT2X is called N22 and runs non-stop from King Street Metro to Mark Center. Currently, the AT2X is funded by the Department of Defense (DoD), which requires that the service be non-stop. If DoD were willing to allow this route (N22) to have intermediate stops, then buses could stop at Taylor Run Parkway, Fort Williams Parkway, and/or Howard Street to provide additional peak service to areas along the N22 where service has been reduced. Additional coordination with DoD staff would be required for any changes to this route.

  » AT3 is called N23 and runs from Braddock Road Metro to Pentagon via Russell Road and West Glebe Road, similar to the existing network except that it does not serve Old Town or Hunting Point.

  » AT4 is called N24 and runs from Braddock Road Metro to Pentagon via Cameron Mills Road and Martha Custis Drive, similar to the existing network except that it does not serve Old Town.

Figure 33: 2022 Vision Plan Network, Peak Weekday Frequency

2022 Span of Service

The chart to the right (**Figure 34**) shows the frequency of service by time of day and day of the week for the 2022 Vision Plan Network. Looking at this chart, one can see that Route N3 would have 10-minute service from 6 am to 9 am and 4 pm to 7 pm on weekdays and 30-minute service from 7 am to 11 pm on weekends. When service frequencies and spans are more consistent across all seven days of the week, it creates a network that is much more useful, and easier to understand.

The 2022 Vision Plan Network provides more evening frequency on Route N3, N4, N5, N6. This is a significant improvement in evening and weekend service for these corridors relative to the existing network, but is only affordable because of the assumed 8 percent increase in service for DASH. For more information on options for the 2022 network with less investment, see the Draft Recommended Network Report.

Figure 34: Frequency/Span Chart for the 2022 Vision Plan Network
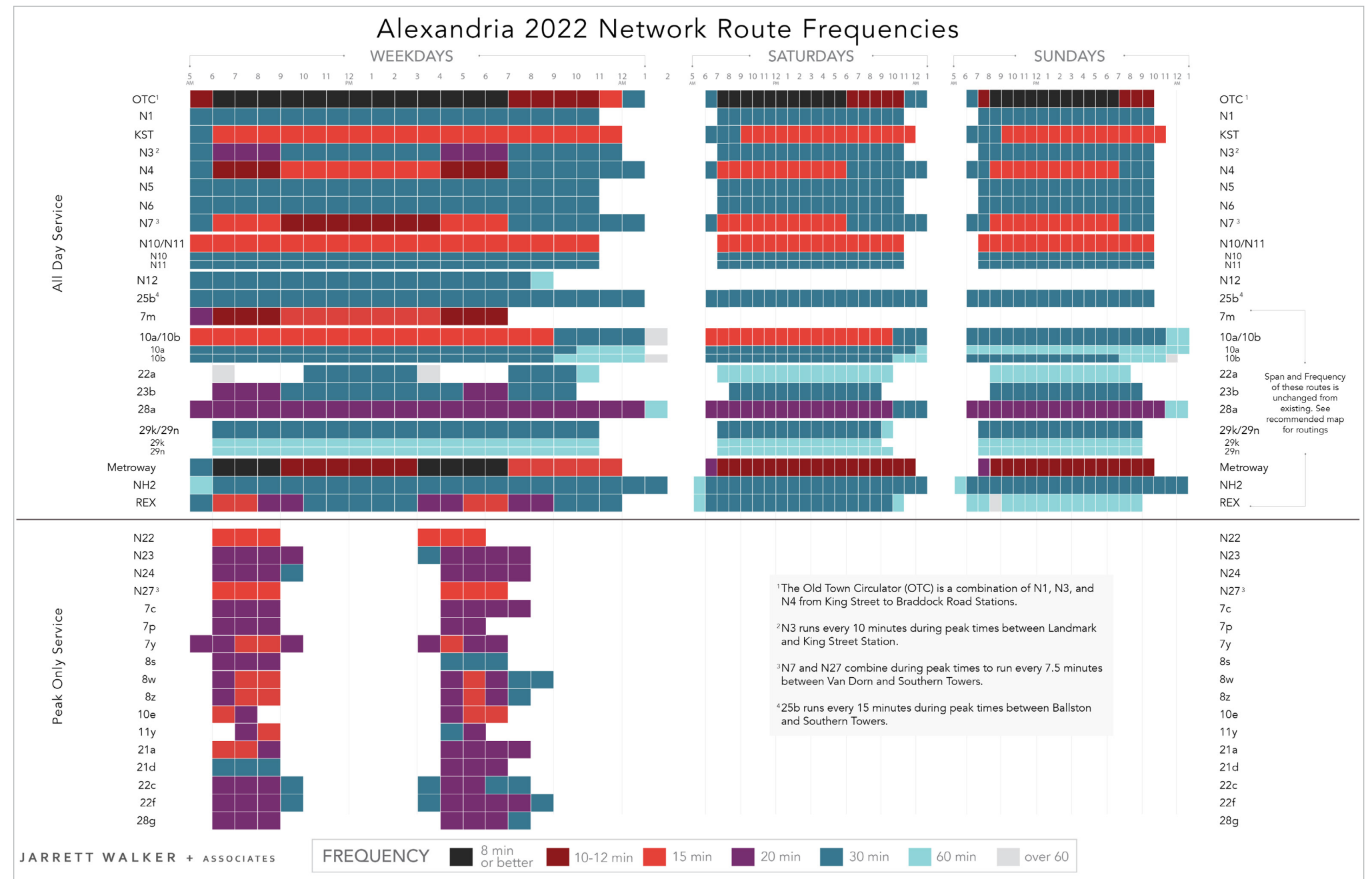
2022 Proximity Analysis

By simply comparing the maps on the previous pages, it is clear that the 2022 Vision Plan Network covers a little less area than today's network. But that's not the whole story of how the networks cover the city. How many residents and jobs does that geographic coverage represent and how many have access to frequent service?

Figure 35 at right shows how the percent of residents who are within 1/4 mile of any transit service (no matter how frequent) and to frequent, all-day service (a bus or train arriving every 15 minutes at midday). **Figure 36** shows the percent of jobs within 1/4 mile of any transit service and frequent service.

The Existing Network provides frequent, all-day service within 1/4 mile of about 27 percent of Alexandria residents. The 2022 Vision Plan Network increases this to 66 percent of residents. Part of the trade-off of this increase in frequent service is that the percent of residents near any transit (no matter how frequent) declines from about 97 percent in the Existing Network to about 96 percent in the 2022 Vision Plan Network.

Proximity to jobs shows a similar pattern. The Existing Network provides frequent service to 40 percent of jobs and the 2022 Vision Plan Network increases this to 66 percent. The percent of jobs near any service stays roughly the same at 91 percent, but slightly more jobs are only reachable by peak-only service, 2 percent in the 2022 Vision Plan instead of 1 percent in the Existing Network.

Access to frequent, all-day service is a good estimate of potential ridership. While frequency alone is not enough to cause high ridership, frequency deployed along direct routes, in places that are dense, walkable and proximate to one other, does tend to lead to high ridership and lower operating costs, and thus to high productivity.

> The 2022 Vision Plan Network brings 66% of residents and 66% of jobs within 1/4 mile of frequent, all-day transit.

Figure 35: Residents near Transit on Weekdays, Existing and 2022 Networks

Residents near Transit on Weekdays
within 1/4 mile of a bus stop in Alexandria, Virginia

Legend: ■ Frequent Service, every 15 minutes or better ■ Infrequent ■ Peak Only ■ No Service within 1/4 mile

- Existing Network: 27% / 70% / 0% / 3%
- 2022 Vision Plan Network: 66% / 27% / 3% / 4%
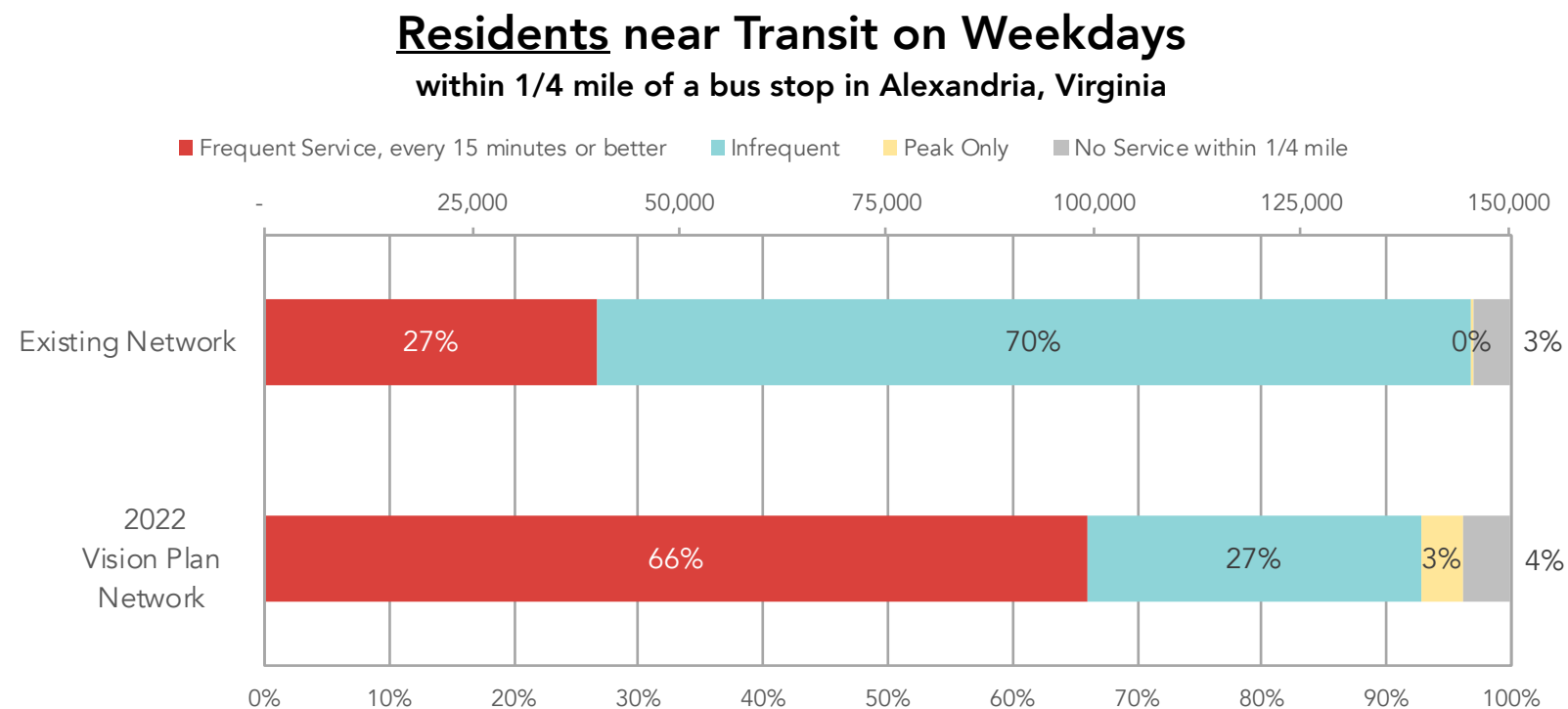
Figure 36: Jobs near Transit on Weekdays, Existing and 2022 Networks

Jobs near Transit on Weekdays
within 1/4 mile of a bus stop in Alexandria, Virginia

Legend: ■ Frequent Service, every 15 minutes or better ■ Infrequent ■ Peak Only ■ No Service within 1/4 mile

- Existing Network: 40% / 50% / 1% / 9%
- 2022 Vision Plan Network: 66% / 23% / 2% / 9%
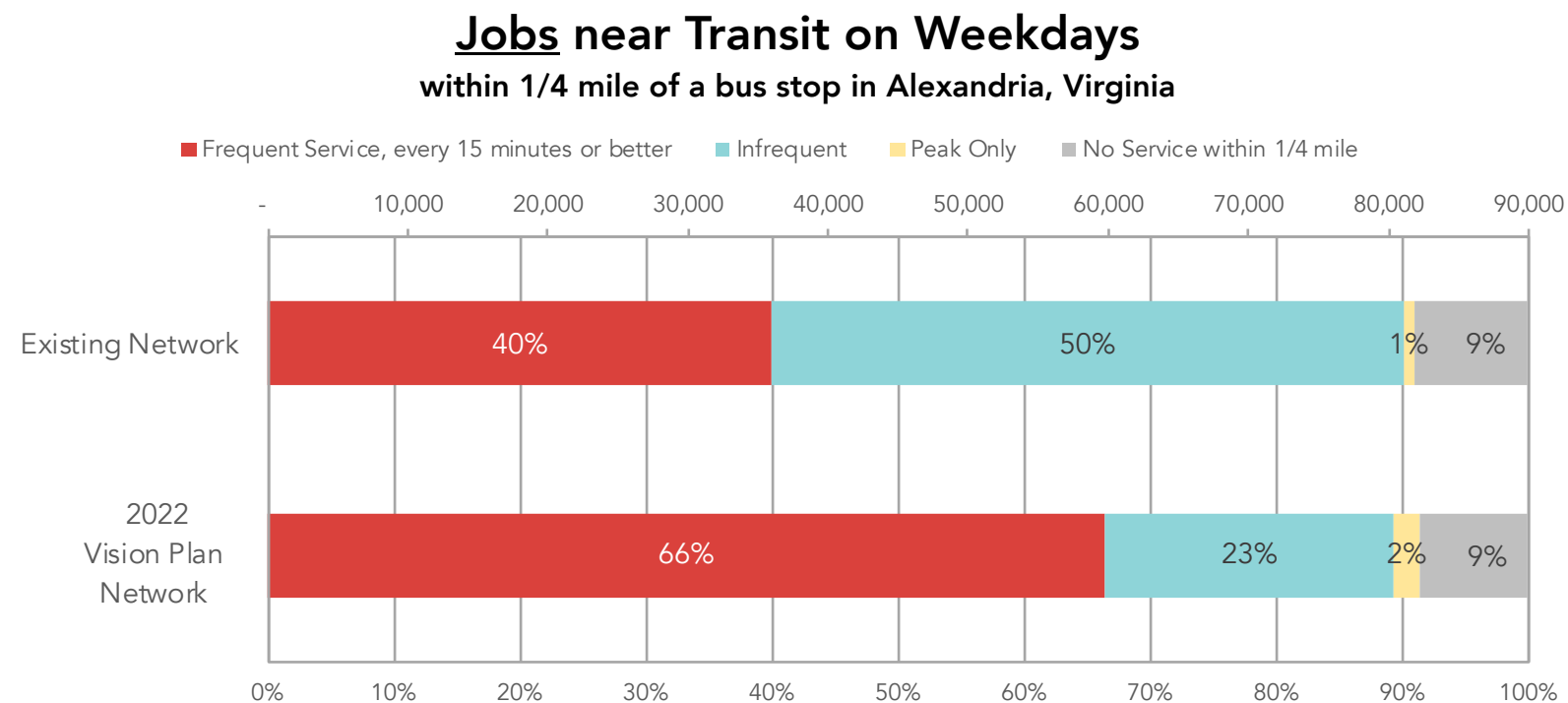
Proximity for Communities of Concern

Figure 37 shows the differences in proximity to service for residents of color, residents in poverty, and senior residents for the Existing Network and 2022 Vision Plan Network. These charts illustrate how many residents in each of these groups are near frequent, all-day service (every 15 minutes or better), infrequent service, peak-only service, or not near any service under the 2022 Network and the Existing Network.

In each case, the number and percent of people near frequent, all-day service goes up dramatically.

» In the Existing Network, only 22 percent of residents of color are near—within 1/4 mile—frequent service, while **in 2022 that would increase to 70 percent**—higher than for residents overall.

» **Residents in poverty see a similar dramatic increase in access to frequent, all-day service (29% to 73%)**

» As with all residents, there is a small increase in the percent of residents of color and residents in poverty who are more than 1/4 mile from service, but that increase is of similar or smaller magnitude than for all residents.

» For seniors, the increase in the percent near frequent, all-day service is a little less than it is for all residents. The increase in the percent of seniors who are more than 1/4 mile from any service is about the same as it is for all residents.

Figure 37: Residents of Color, Residents in Poverty, and Seniors near Transit, Existing and 2022 Vision Plan Networks

Residents of Color near Transit on Weekdays
within 1/4 mile of a bus stop in Alexandria, Virginia

Residents in Poverty near Transit on Weekdays
within 1/4 mile of a bus stop in Alexandria, Virginia

Seniors near Transit on Weekdays
within 1/4 mile of a bus stop in Alexandria, Virginia
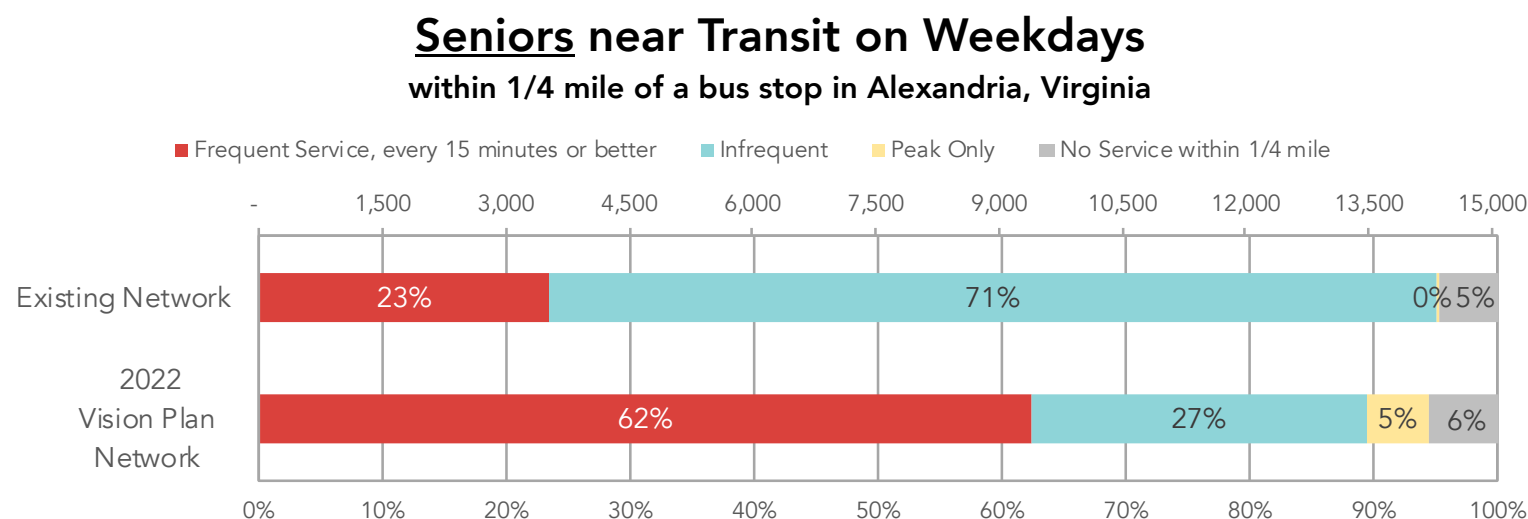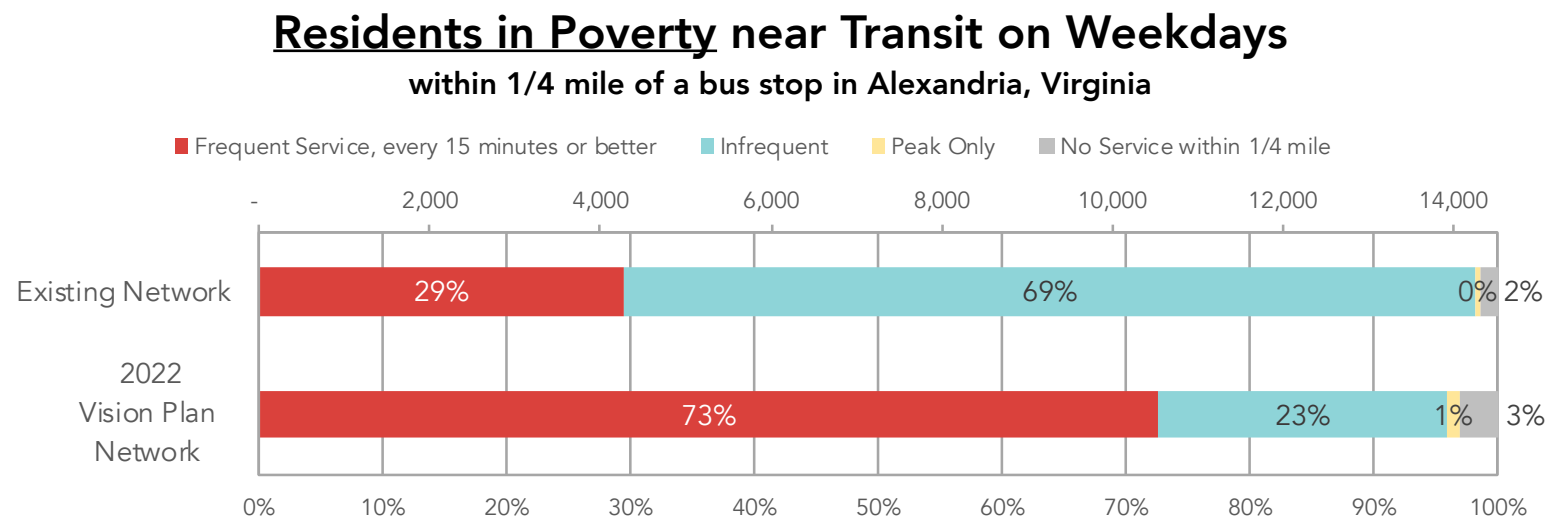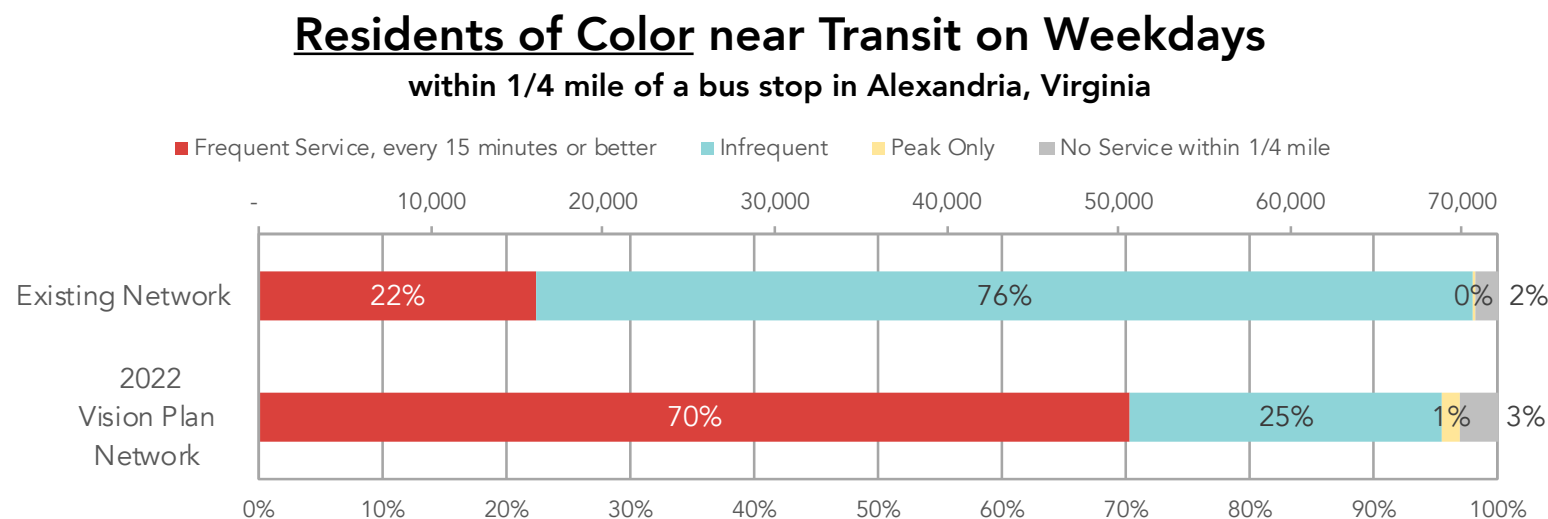
2022 Access to Jobs

Like the isochrone analysis of the 2030 network, we can assess the effects of the 2022 network by counting the number of jobs accessible for all parts of the city. Job access is an indicator of both the work opportunities that can be reached by transit, and the businesses and services customers or clients could choose to travel to.

The map to the right (**Figure 38**) shows the change in the number of jobs someone can reach by walking and transit within 45 minutes at midday when comparing the existing network with the 2022 Vision Plan network. Each hexagon on the map is shaded by the increase or decrease in jobs reached by walking and transit within 45 minutes from its center point. Each hexagon also is sized by the number of residents that live in each area. Thus smaller hexagons have fewer residents. The results for this analysis would be better at peak times when frequency of service is higher and there are more routes running.

> For the average Alexandrian, the 2022 Vision Plan Network would increase the number of jobs accessible within 45 minutes by 13%—an additional 2,700 jobs.

Most areas see increases in jobs access. A few areas see decreases in jobs access. For example, Braddock Road from Howard Street to King Street sees a decline because WMATA Route 28A has been shifted to Duke Street. Also, Seminary Road east of Howard Street and Janneys Lane see a decrease because the N12 route does not go into Old Town as today's AT2 does. The areas that see decreases in access to jobs are generally low density, as reflected by the size of the hexagons, and thus relatively few residents would experience a decrease in job access.

Appendix B has 15 isochrone examples for locations around the city showing how access changes in the 2022 Vision Plan Network compared to today's network.

Figure 38: Change in Midday Access to Jobs within 45 Minutes - 2022 Vision Plan Network Compared to Existing Network
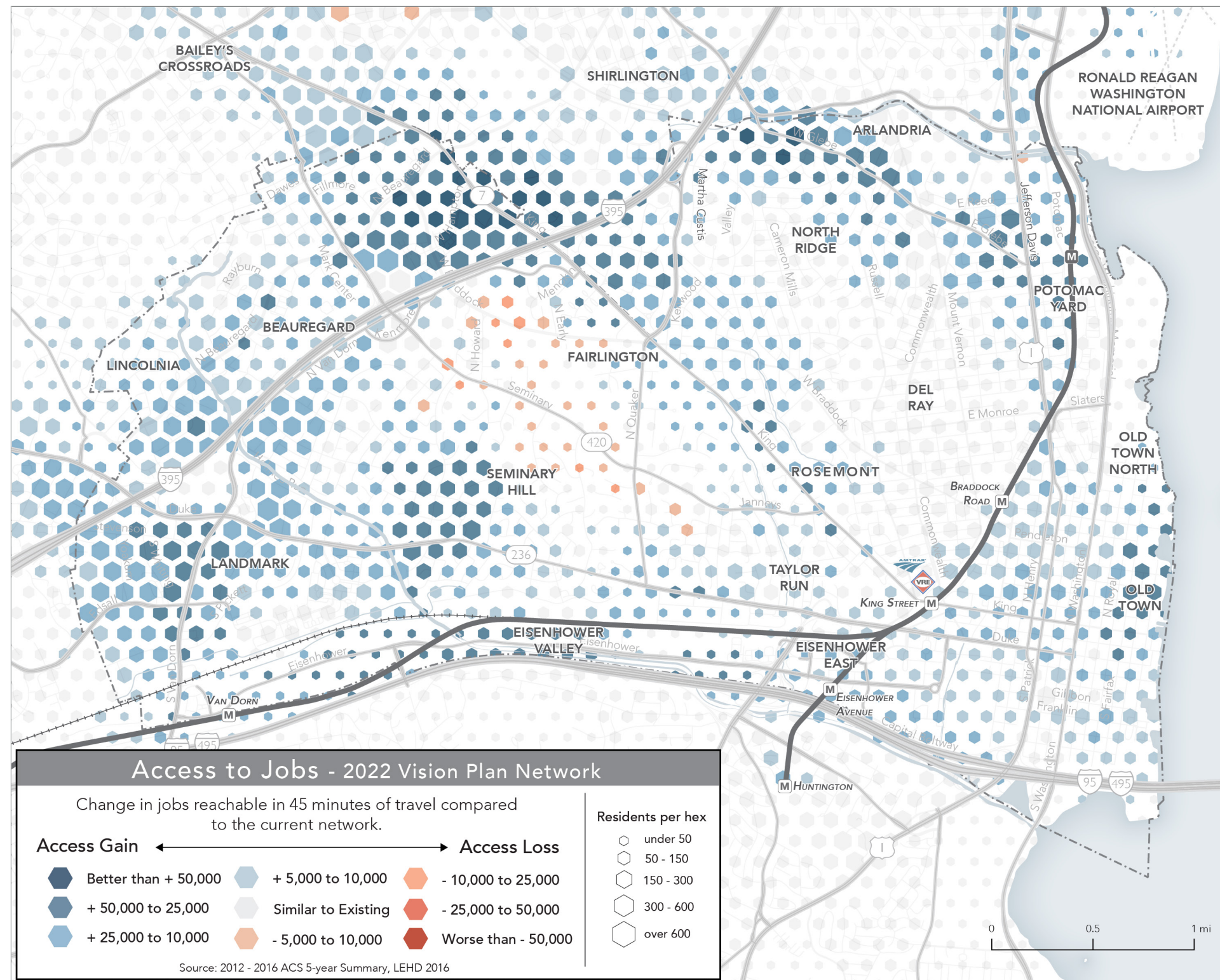
Network Frequency and Proximity to Service on Weekday Evenings (9pm)

The miniature network maps below show the overall pattern of the network at 9pm on weekdays, in the same frequency-based color scheme as the main network maps shown previously. Notice the overall pattern difference in how many red lines (routes with 15 minute or better frequency) compared to blue and light blue lines.

The charts below show the percent of residents and jobs near frequent transit or any transit service. Notice how the percent of residents and jobs near frequent service is much higher in the 2022 and 2030 Vision Plan Networks.

The planned increases in evening service will make substantial improvements in the access and liberty that residents have to access the city later in the day and the evening. This expansion in freedom and access across more of the day can make an enormous difference in a person's willingness to rely on transit.

Existing Network   **2022 Vision Plan**   **2030 Vision Plan**

How many residents are near . . .

🟥 Frequent Service, every 15 minutes or better   🟦 Any Service

	Existing	2022	2030
Frequent	12%	32%	74%
Any	95%	91%	93%

How many jobs are near . . .

🟥 Frequent Service, every 15 minutes or better   🟦 Any Service
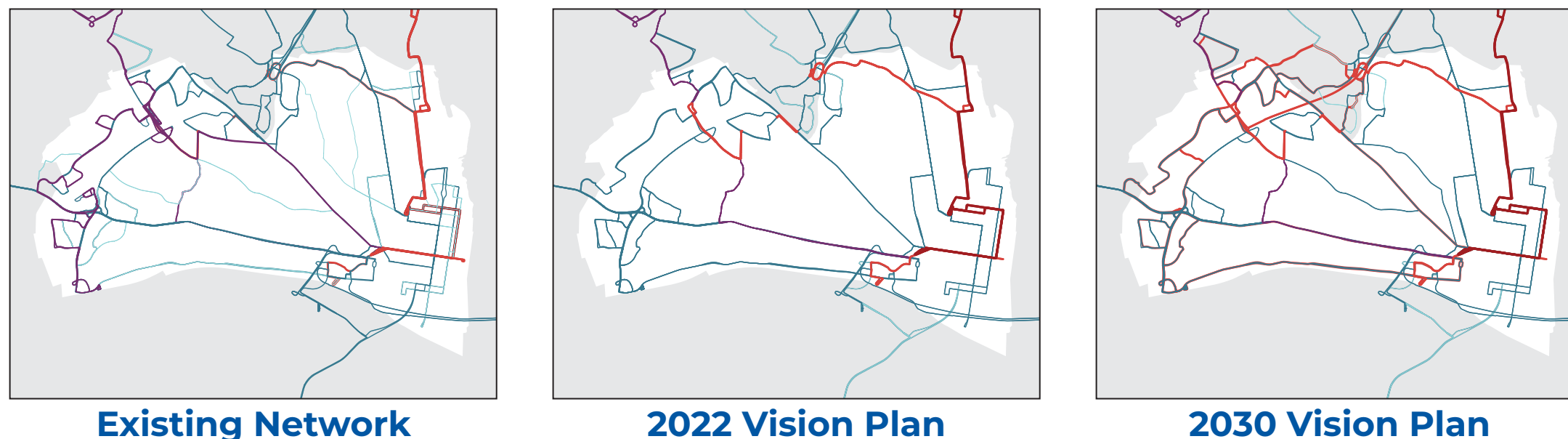
	Existing	2022	2030
Frequent	30%	48%	78%
Any	88%	89%	89%
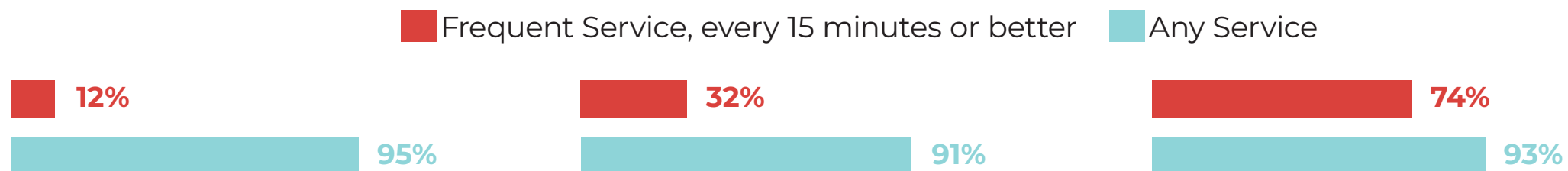
Figure 39: Maps and Charts Contrasting Evening Service in the Existing, 2022 Vision Plan, and 2030 Vision Plan Networks

Note: Near service means within 1/4 mile of a bus stop or transit station. The jobs and population numbers are for existing population and jobs as of 2017 Census estimates.

Network Frequency and Proximity to Service on Saturday (12pm)

The miniature network maps below show the overall pattern of the network at **noon on Saturdays**, in the same frequency-based color scheme as the main network maps shown previously. Notice the overall pattern difference in how many red lines (routes with 15 minute or better frequency) compared to blue and light blue lines.

The charts below show the percent of residents and jobs near frequent transit or any transit service. Notice how the percent of residents and jobs near frequent service is much higher in the 2022 and 2030 networks. For example, in the 2022 Network, the percent of residents near frequent service increases from 24 percent to 66 percent

Existing Network   **2022 Vision Plan**   **2030 Vision Plan**

How many residents are near . . .

🟥 Frequent Service, every 15 minutes or better   🟦 Any Service

24% / 94% — 66% / 91% — 83% / 92%

How many jobs are near . . .

🟥 Frequent Service, every 15 minutes or better   🟦 Any Service

37% / 85% — 66% / 89% — 81% / 89%
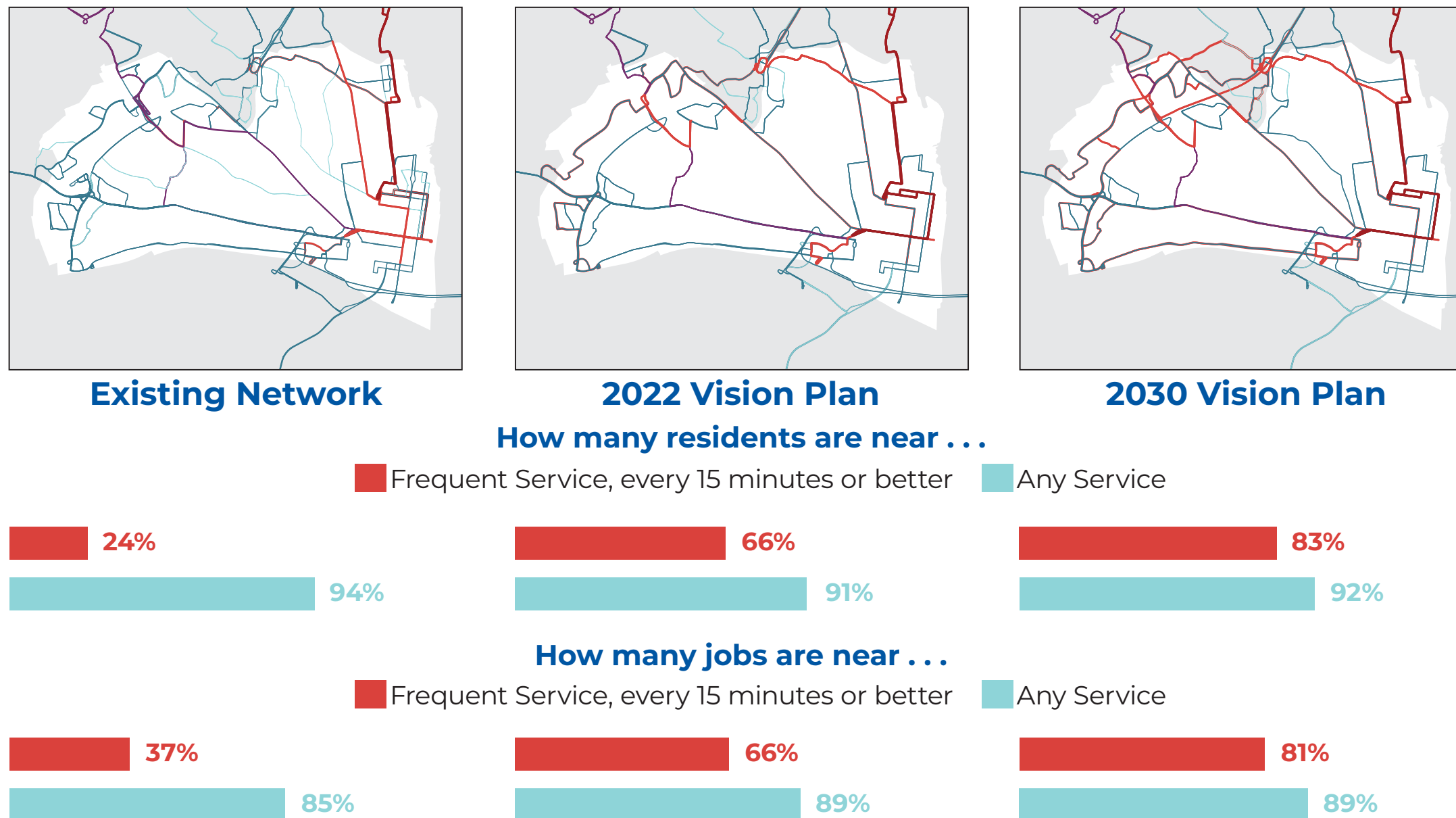
Figure 40: Maps and Charts Contrasting Saturday Service in the Existing, 2022 Vision Plan, and 2030 Vision Plan Networks

Note: Near service means within 1/4 mile of a bus stop or transit station. The jobs and population numbers are for existing population and jobs as of 2017 Census estimates.

Network Frequency and Proximity to Service on Sunday (12pm)

The miniature network maps below show the overall pattern of the network at **noon on Sundays**, in the same frequency-based color scheme as the main network maps shown previously. Notice the overall pattern difference in how many red lines (routes with 15 minute or better frequency) compared to blue and light blue lines.

The charts below show the percent of residents and jobs near frequent transit or any transit service. Notice how the percent of residents and jobs near frequent service is much higher in the 2022 and 2030 networks. For example, in the 2022 Vision Plan Network, the percent of residents near frequent service increases from 12 percent to 60 percent

Existing Network   **2022 Vision Plan**   **2030 Vision Plan**

How many residents are near . . .

■ Frequent Service, every 15 minutes or better   ■ Any Service

12%   60%   77%
91%   91%   92%

How many jobs are near . . .

■ Frequent Service, every 15 minutes or better   ■ Any Service

30%   64%   79%
84%   89%   89%
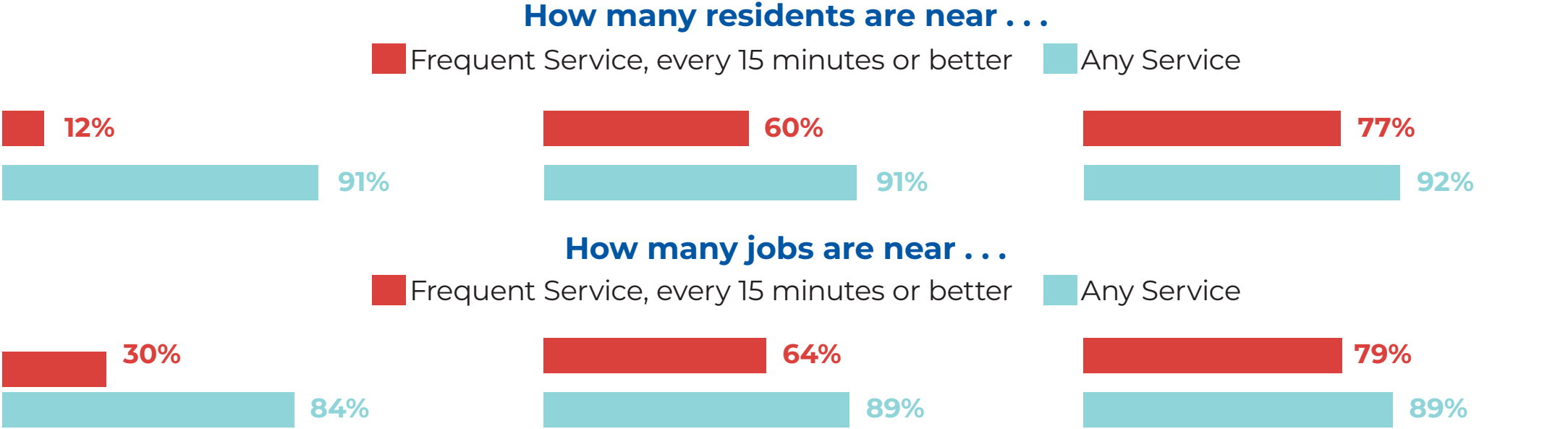
Figure 41: Maps and Charts Contrasting Sunday Service in the Existing, 2022 Vision Plan, and 2030 Vision Plan Networks

Note: Near service means within 1/4 mile of a bus stop or transit station. The jobs and population numbers are for existing population and jobs as of 2017 Census estimates.

Old Town Network

The existing bus network in Old Town spreads service across parallel streets such as King Street and Duke Street which leads to service that is less frequent and poorly coordinated so that buses end up running on top of one another. One of the goals of the Vision Plan is to reorganize service in Old Town so that overlapping routes may be better coordinated with more frequent service for riders getting around within Old Town and coming into and out of Old Town. **Figure 42** shows the differences in the design of the network in Old Town in the Existing Network and the 2030 Vision Plan.

The new "Old Town Circulator" would connect the King Street Metro Station to the Braddock Road Metro Station via King, Fairfax, and Madison/Montgomery Streets every 7 to 8 minutes all-day. In 2030, the Old Town Circulator would be composed of two routes (N3 and N4) that feed into the King Street Metro Station. This allows anyone riding on the N3 or N4

to go into or out of Old Town without needing to transfer at the King Street Metro Station. The 2022 network has a slightly different variation of this, with three routes (N1, N3, and N4) combining into the Old Town Circulator Though some routes like the N1, N5, N12, N23 and N24 would not continue into Old Town, the extremely high frequency of the Old Town Circulator would create an easy transfer with little or no waiting time.

King Street Trolley

The King Street Trolley is a key part of tourism branding in Old Town. The current Trolley schedule starts running at 10:30am or 11:00am and connects the King Street Metro Station to the Waterfront every 10-15 minutes. This limited span means that service is not available for morning commuters, early shift workers, and others coming into Old Town before 10:30am. The Trolley is

currently funded by hotel tax revenues from hotels across the entire city, though its current benefits are confined to Old Town.

The 2030 and 2022 Vision Plan Networks include the King Street Trolley with a potential extension from the King Street Metro to the Eisenhower Metro Station via the Carlyle and Eisenhower East districts. This could provide a frequent connection directly between the large and dense activity center around Eisenhower Avenue Metro and Old Town. The revised King Street Trolley also would operate with more traditional operating hours, including morning service. It should noted, however, that due to the funding arrangement for the operation of the King Street Trolley, any potential changes to the Trolley would require additional coordination and approval by City Council.

Figure 42: Existing Network (Left) and 2030 Vision Plan Network (Right) in Old Town

Alternative Old Town Network

The current King Street Trolley is paid for mostly through hotel tax receipts from hotels across the entire city. This raises an issue about the fairness of funding a free route in one part of the city that is paid for from hotel taxes across the entire city.

The extension of the existing King Street Trolley in both the 2022 and 2030 Networks, as described on the previous page, would be relatively easy to implement in the near term. It would not substantially change how the King Street Trolley route interconnects with the rest of the DASH Network. **If the City and DASH wished to further integrate the King Street services into the citywide bus network, to create a more cohesive and useful service design for Old Town and Alexandria as a whole, it is possible to combine the King Street Trolley route into the Old Town Circulator.**

Figure 41 shows how the King Street Trolley (KST) could be organized as part of the Old Town Circulator, and run from Eisenhower East, through King Street Metro, to King Street and Fairfax and north to Braddock Road Metro. This design has a number of benefits:

» Increased frequency of the Old Town Circulator to every 5 minutes, meaning a bus is always coming very soon.

» Improved connectivity and access across more of Old Town, as frequency of service would be higher on King Street, Fairfax Street, and through Old Town North on Montgomery and Madison Streets.

» Simpler service patterns on King Street as there would be only one, very frequent route so riders would know they could catch any bus that comes down King Street to get to reach destinations on King Street or either Metro station.

This design means there would not be service at the current trolley stop at the Waterfront. Since the City is considering changing this portion of King Street into a pedestrian-only street, this change may be necessary without any other changes to the transit network.

Fare Considerations

One key feature of the current King Street Trolley is that it is free. It is possible to make the entire Old Town Circulator free, including the trips on citywide routes like the N3 and N4, but it would require some new and different approaches to operating the routes. There are also equity impacts that must be considered when part of the City goes fare-free and other parts do not.

It is important to note that the ATV does not make any specific recommendations for fare policy of the King Street Trolley or any related services. Decisions about whether or how to charge fares on either the Old Town Circulator or the King Street Trolley are separable issues from the design of the routes and can be determined at a later time after further consultation and discussion with residents, businesses, other stakeholders, and City leaders.

If the alternative Old Town Network were implemented as shown in **Figure 43**, there are three primary options for handling fares on the Old Town Circulator:

1. Keep the King Street Trolley free, and continue to charge fares for the other trips on other routes that are part of the Old Town Circulator, such as the N3 and N4.

2. Allow everyone to ride free on the Old Town Circulator portion of the route between King Street Metro and Braddock Road Metro, including the N3 and N4, similar to "Fare Free Zones" in other cities.

3. Require all riders to pay, including Trolley passengers, but provide day passes to hotels around the city and retail businesses in Old Town to provide to customers. Additionally, DASH could provide day passes through special promotional options on its mobile app that could be distributed by Visit Alexandria and other tourism promoters.

The first option would keep the existing fare structure, but would disrupt the continuity of the Old Town Circulator. Instead of just catching any of the buses that arrive every five minutes, many riders would wait for the free trolley that only arrives every 15 minutes. This would undermine the usefulness of the Old Town Circulator, and also would result in many more boardings on the King Street Trolley compared to Routes N3 and N4. This would make it difficult to keep trips evenly spaced for consistent service every five minutes.

The second "Fare Free Zone" option would encourage transit use in Old Town, expand the usefulness of the free service, and solve the problem of unbalanced boardings between buses by making all trips on the Old Town Circulator free. The "Fare Free Zone" would likely have an impact on revenues and possible equity concerns for providing free transit service for a relatively affluent part of the city.

The third option would require fares on all routes, including the King Street Trolley. To offset the impact of this change on tourists and visitors, DASH could provide free passes to Visit Alexandria for all Alexandria

hotels and other tourism entities. It would require closer coordination between DASH and tourism operators. New fare options, such as the DASH Bus mobile app, make it easier to distribute free or discounted transit passes to community partners. This approach might be more equitable for hotels and tourism operators outside of Old Town who help fund the existing Trolley. This approaches provides a more direct benefit since the free passes would be valid on all DASH routes in the citywide, frequent, all-day network Additionally, the City's Transportation Demand Management (TDM) program, GO Alex, could also assist DASH in working with Visit Alexandria.

As noted previously, the ATV is not recommending a fare policy for the King Street Trolley, as this is outside the scope of the plan. The scenarios outlined above provide options to improve the design and cohesiveness of the Old Town network for future consideration by City leadership.

Figure 43: Alternative Design of Service in Old Town
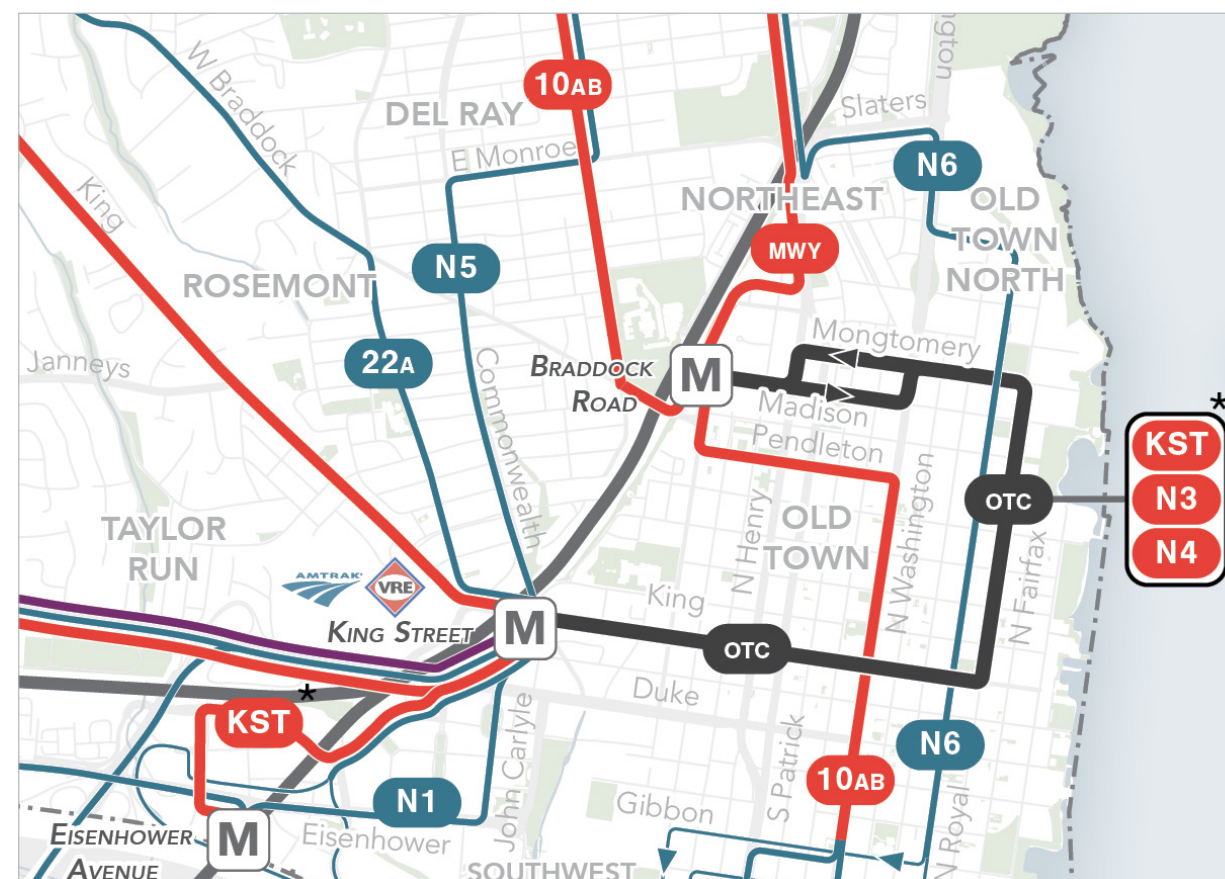
Connection Facilities

The new ATV networks have been restructured so that some trips that are currently possible as a one-seat ride on one infrequent route, must now be completed using two frequent routes with a transfer. Both the 2022 and 2030 networks are designed with the assumption that appropriate facilities will be available at the key connection points between buses and between buses and Metrorail.

The connectivity between routes in western Alexandria is critical to improved access across the city and the region in the new networks. Therefore, improved facilities, particularly at Southern Towers, are essential to providing adequate shelter for riders and adequate layover/restroom accommodations for operators.

Figure 44 shows the peak networks in 2022 and 2030 in the area of Southern Towers and Mark Center. In the Vision Plan networks, Southern Towers becomes a more important connection point between many routes. To ensure sufficient space at Southern Towers for all of these routes to meet effectively, nine bus bays would be needed at the planned transit center. In Fiscal Year 2017, the City of Alexandria applied for and was awarded a $10 million grant for West End Transitway improvements within the Southern Towers site. Planning work is ongoing under this grant to determine the appropriate design of a facility, and this network design will inform that process going forward.

Improving Walk Access

The most efficient way for most people to access transit is to walk, or use their mobility device (e.g. wheelchair), to get from their origin to the bus stop and from their bus stop to their destination. Yet, not all parts of Alexandria are equally well connected with sidewalks, curb ramps, or safe crosswalks. Some parts of the city have street networks that are not well connected, leading to long walks to or from major streets, like King and Duke Streets.

A key priority for the city in its capital budgeting should be to improve walk access to frequent transit corridors in the Vision Plan, so that more people who already live in the city can access these more frequent transit lines more easily. Key areas for improvement include safe crossings at least every 1/4 mile and new pedestrian connections in areas with disconnected street networks.

Figure 44: 2022 and 2030 Vision Plan Peak Network Connections at Mark Center and Southern Towers
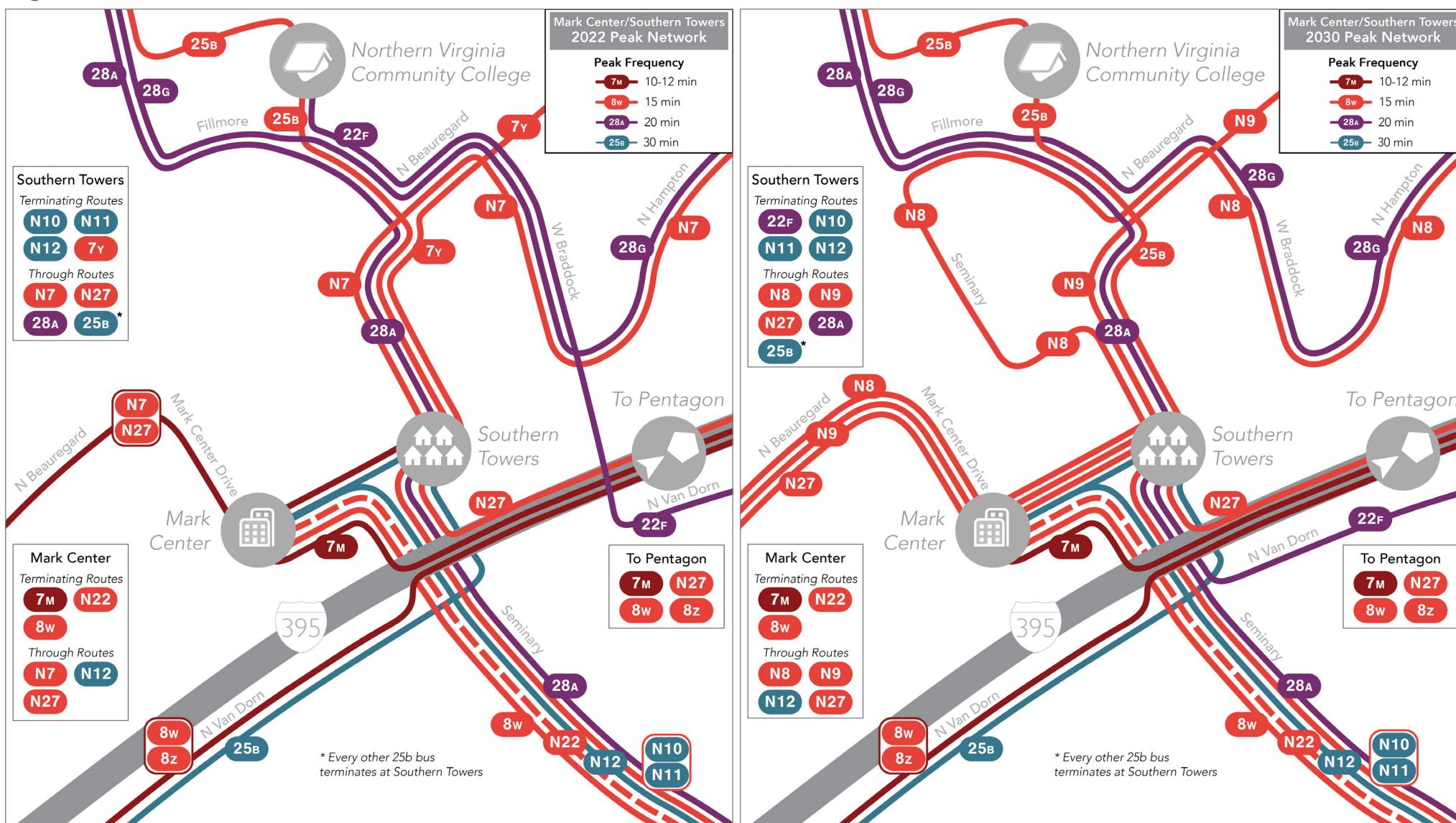
Bus Operator

In the eyes of the user, the agency that operates a particular transit route is usually not a major concern. A user cares how often a bus is coming and if the transit network can take them to more destinations sooner. That is why the Vision Plan Networks have been designed mostly as operator-neutral routes. It is likely that WMATA would continue to operate routes like the 28A that span long distances across multiple jurisdictions. Other routes, like the N8 and N9 could reasonably be operated by either DASH or WMATA.

The presumption in designing these networks is that any operator could run any route in the network. In doing so, these routes have been designed in ways that maximize the liberty and opportunity for existing and potential riders. DASH, WMATA, and other operators like ART and Fairfax Connector, will need to work closely together as the future transit network is implemented because some routes and corridors that have traditionally been served by WMATA might be better served by DASH or another operator and vice versa. This network has been developed to get more people to more places sooner, but it is only possible when agencies and local jurisdictions coordinate to create the most liberating transit networks, regardless of the operator.

Capital Improvements

In addition to the improvements needed for Southern Towers, there are other key transfer stations that will require improvement or expansion to accommodate the 2022 and 2030 Vision Plan Networks. **Table 4** shows the comparison of existing and needed bus bays at key facilities. Key transit center improvements and specific needs at certain facilities include the following:

» **Eisenhower Avenue Metro:** The bus bay numbers shown in **Table 4** assume that there are two on-street bays on adjacent streets, which should not require expansion of the bus loops.

» **King Street Metrorail Station:** Currently, the bus loop at King Street Metro is being expanded to provide 10 bus bays. To accommodate the Old Town Circulator for trips going into Old Town, there will need to be two bus bays on northbound Diagonal Street across from the main bus loop. This is to ensure that there is one branded stop for that service that would be easy for visitors to find the service. With two bays on Diagonal Street, there should

Table 2: Table of Bus Bays Needed at Key Stations

Facility	Existing Bays (2019)	Bays Needed for 2022 Network	Bays Needed for 2030 Network
Van Dorn Metro	6	7	8
Eisenhower Metro	8	4	4
King Street Metro	7	12	12
Braddock Road Metro	7	7	7
Potomac Yard Metro	0	6	6
Mark Center	6	8	8
Southern Towers	0*	7	9
Landmark Mall	1	6	6
Shirlington	7	8	10
NVCC-Alexandria	1	1	1

* while there are no formal bus bays at Southern Towers, there are six designated curbside bus stops.

not be a need to reconfigure the new bus loop facility that is currently under construction.

» **Braddock Road Metro:** The current number of bays at Braddock Road Metro will be adequate for future ATV needs, however, the provision of bus bays, shelters, and other amenities on Braddock Road just west of West Street would be beneficial to improving speed and reliability. This would save significant time for riders passing through this station.

» **Potomac Yard Metrorail Station:** 6 bus bays and sufficient layover facilities for bus operators will be needed to accommodate the buses terminating and stopping there. Particular attention is needed at this station to minimize walking distance to the station entrance because the walk from the station entrance to the platforms will be quite long. Staff will also work to establish temporary bus bays on Potomac Avenue that can be used once the station is open, if the site with the permanent bus bays has not yet been developed.

» **Mark Center Transit Station:** This facility will require at least two additional bays on the north side of Mark Center Avenue.

» **Landmark Mall Transit Station:** With redevelopment of the mall site, at least six bus bays and two layover spaces should be provided to accommodate the 2030 network. It is likely that a temporary space, off-site, will be needed during redevelopment of the mall site. One option for a temporary off-site facility would be for buses to loop Walker Street and Stevenson Avenue and having temporary bus bays along those streets.

» **Shirlington Transit Center:** Existing service to Shirlington Transit Center is using the maximum capacity of the facility. Up to 3 additional bays may be needed to accommodate all routes terminating and passing through that center, assuming ART and other WMATA services remain as is.

In addition to these key transit centers, anywhere that frequent routes cross, larger and more visible bus shelters and stops should be provided to ease transfers. Locations where these amenities would be highly beneficial include:

» King Street and Washington Street where the Old Town Circulator and Metrobus Routes 10A/B would cross.

» Along North Hampton Drive between Ford Avenue and King Street to accommodate connections between Routes N4, N7, and N8.

» At King Street and Beauregard Street/Walter Reed Drive to accommodate connections between Routes N4 and N9.

» In Fairfax County, along Seminary Road near Gorham Street where Route N4 would connect with Routes 28A, 16H, and 16L.

» At Bradlee Shopping Center to facilitate connections between Routes N4 and N10/11.

There also will be additional needs for other capital improvements, such as ongoing bus replacement and fleet expansion, maintenance facility improvements, and other capital facility needs. These needs will be more fully assessed and documented as part of the DASH Transit Development Plan process.

Speed and Reliability Improvements

It can be an enormous challenge to operate reliable bus service in a busy and congested place like Alexandria. Yet reliable operation is essential to building and maintaining ridership in the long term. The City of Alexandria has been planning for investments in speed and reliability in key corridors like the West End and Duke Street Transitways. To the maximum extent possible, these investments should be designed to allow multiple bus routes to benefit from the traffic signal priority, queue jump lanes, and dedicated bus lanes.

Wherever possible, speed and reliability investments like dedicated lanes and queue jump lanes should be provided for all frequent bus routes in the 2030 Vision Plan Network. Additional street improvements outside of the priority bus rapid transit corridors that would greatly benefit overall network performance include:

» King Street from King Street Metro to Fairfax Street: This section will be used by multiple routes for the Old Town Circulator and thus would be key to maintaining reliability for many routes across the city.

» King Street eastbound approaching King Street Metro: This section of King Street sees regular congestion at peak times and the N4 would benefit from a peak period dedicated lane or queue jump lane.

» Improvements at Shirlington Circle to make it easier and faster for buses to get into and out of Shirlington Station and Gunston Road.

» Queue jump lanes at key turns for the N8, for example at Beauregard Street and Little River Turnpike.

Providing dedicated space for transit is part of a set of policies to maximize the use of the limited space in the city. Reserving a lane for transit gives the most space-efficient users priority where they would otherwise be caught in the same delays as all other users.

Stop Spacing

On many routes in Alexandria, stops are extremely close together, particularly within Old Town. For most people, it is easy to walk to any of several stops on a route. But a customer does not need several stops; they need one stop.

There is a geometric trade-off between closer stop spacing and faster bus speeds. **Figure 45** shows the basic trade-off in conceptual terms. As stops are placed farther apart, buses can travel faster and cover more distance in the same time.

This is because most of the time required at a stop is not proportional to the number of passengers served. When there are many stops, passengers spread themselves out among them, so the bus stops more for the same number of people. When passengers gather at fewer stops, stopping time is used more efficiently, resulting in faster operations.

This increased speed has two benefits. First, riders can get farther faster and reach their destinations sooner. Second, as speeds increase across the entire transit system, more service can be provided for the same cost. Because the primary cost of transit service is the cost for labor which is paid based on time worked, the faster buses operate, the more service that can be provided for the same cost. So, higher frequency can be provided or routes can be extended to go farther for the same cost.

This is why standards for stop spacing in the US are generally in the range of 750 to 1,500 feet on high-frequency bus routes. By contrast, in Old Town, buses stop about 500 feet apart on average, and in some places as little as 250 feet apart, as shown in **Figure 46**. Stop spacing on corridors outside Old Town varies, but are often around 800 to 900 feet.

There are two major downsides to widening stop spacing. First, some people have difficulty walking and will be inconvenienced by a longer walk. Seniors and people with disabilities are more likely to feel inconvenienced by this change. Second, as stops are spaced farther apart, transit becomes less useful for very short trips. This is because walking distances at each end of the trip increase to the point that very short trips would be faster by walking or biking. Some cities and agencies view this as a good thing, arguing that the point of transit is to provide an alternative to driving, not an alternative to walking.

In Old Town, east-west blocks are typically about 320 feet long while north-south blocks are about 420 feet long. Widening stop spacing to every 3 blocks would result in stops about every 960 feet for east-west blocks and about 1,200 feet apart for north-south blocks. The exact location of stops will vary depending on the specific land use conditions and the need to provide stops where routes cross, so that passengers can easily connect between routes, but working to maintain an overall stop spacing pattern and consistency across the network can improve travel times for passengers.

As always, the key to a successful revision of stop spacing is for it to be consistent across the city and tied to a clear citywide benefit in travel times. Many transit agencies have successfully widened stop spacing and provided clear benefits to their customers.

> As stop placement widens, bus speed and distance traveled increases. This trade-off allows quicker and more reliable service, in exchange for asking passengers to walk farther to their stop.

Figure 45: Trade-off between Stop Spacing and Travel Speed
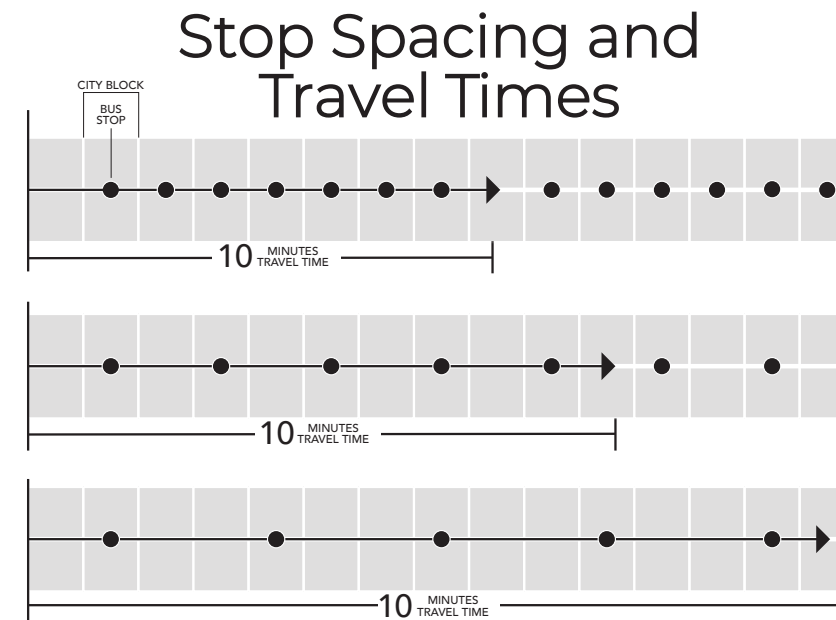
Figure 46: Existing Stop Spacing on King Street in Old Town

King Street Stop Spacing

🚌 Westbound Stop
🚌 Eastbound Stop
Average Stop Spacing 528 feet

0   0.25   0.5 mi

4. Implementation

Overview

The ATV Plan establishes a vision that will guide the city's bus-related decisions over the next ten years. Realizing the vision will take consistent effort and partnership between the City, DASH, and other regional stakeholders. It also will require support in the form of advocacy and financial backing from Alexandria's leaders to secure funding and implement the service changes. It should also be recognized that implementation cannot happen at once, but rather as a series of intentional and coordinated changes to first achieve the short-term network, and then ultimately the full 2030 vision. This chapter provides a general overview of the various aspects that will need to continue to occur to support implementation. The shorter-term steps and timeline for implementation are noted on **Figure 45** on the following page. Updates on implementation will be shared on the project website[1] and through normal City and DASH communication channels.
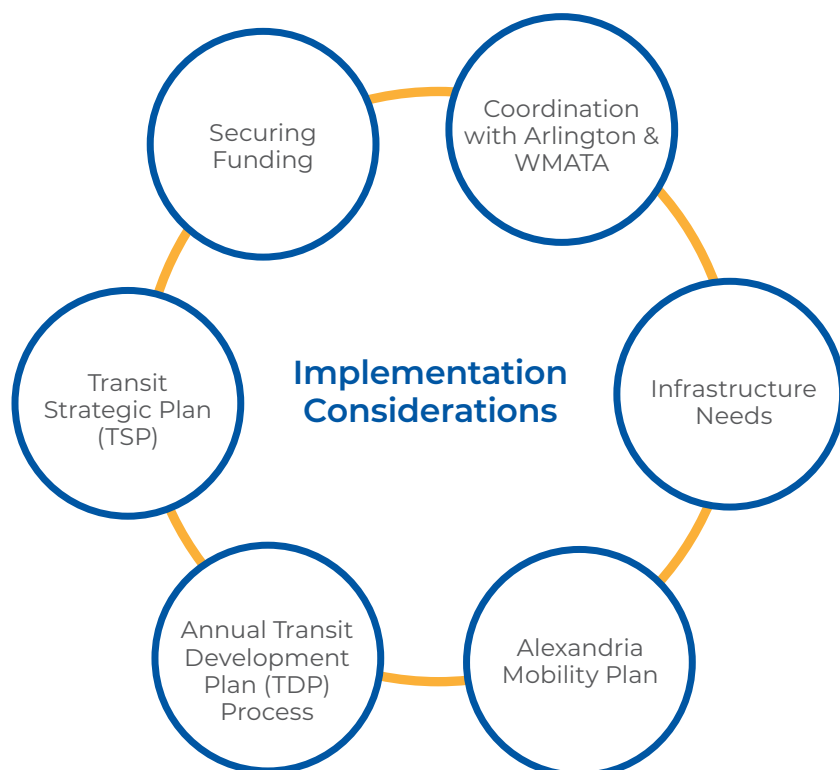
Figure 47: Implementation Considerations

Coordination with WMATA and Arlington

Throughout the Vision Plan process both WMATA and Arlington County were key stakeholders at the table at network design workshops, participating in follow-up meetings regarding specific service changes, and providing insight to potential changes in their network. Due to the overlapping nature of the services, this close coordination will need to continue. Some of the specific topics will include:

» Determining how service within Alexandria will be divided between WMATA and DASH

» Allocation of bus bays and other infrastructure at transfer centers

» Potential for DASH-operated service outside of Alexandria borders

» Other planned changes to WMATA or Arlington routes that may affect service in Alexandria

» Coordination with the recently completed Bus Transformation Project[2] which provides a strategy and recommendations to create a better bus system throughout the region

DASH will lead coordination with WMATA and Arlington throughout the implementation process. It is critical that coordination happens early as the process for WMATA service changes for Fiscal Year 2022 (July 2021) begins in late Spring 2020.

Infrastructure Needs

Due to the increases in service planned, especially during peak periods, there will be a need for expansion of bus bays at key facilities. **Table 4** in Chapter 3 shows that a significant number of new bus bays will be needed. Without these improvements, full implementation of the vision plan networks may not be possible. Similarly, there will be a need for additional vehicles. The specifics of how many vehicles and associated costs will need to be identified during the Transit Development Plan (TDP) process, described below. The City of Alexandria and DASH are currently in the process of analyzing the use of electric buses for their fleet, which will be considered when purchasing additional vehicles.

It can be an enormous challenge to operate reliable bus service in a busy and congested place like Alexandria. Yet reliable operation is essential to building and maintaining ridership in the long term. The City of Alexandria has been planning for investments in speed and reliability in key corridors like the West End and Duke Street Transitways. To the maximum extent possible, these investments should be designed to allow multiple bus routes to benefit from the traffic signal priority, queue jump lanes, and dedicated bus lanes.

Alexandria Mobility Plan

The City of Alexandria is currently in the process of updating its Transportation Master Plan with the Alexandria Mobility Plan (AMP)[3] . The process began in Summer of 2019 and is expected to conclude by early 2021. While transit is one of the chapters that will be updated, the AMP process will not seek to change the vision network. The AMP project will help develop policies and recommendations to support the implementation of the AMP plan. Policies and recommendations may consider such elements as strategies for funding, delivering infrastructure needs, integration with technology and other modes of transportation, and improvements to streets to prioritize the flow of transit.

Transit Development and Transit Strategic Plans

Each year, DASH completes an update to its Transit Development Plan (TDP) to identify and document specific changes to its transit network for the upcoming six years from a capital (buses and infrastructure needs) and operating (service) perspective. TDPs help DASH to execute specific changes and help support funding requests to the City of Alexandria and the Virginia Department of Rail and Public Transportation (DRPT). To date, DASH's TDPs have focused on relatively minor updates to the network. This next TDP will identify changes that will begin in FY 2022 and continue for the upcoming years to work towards the 2022 and 2030 Vision Plan Network. In September 2018, DRPT updated the requirements which now would require DASH to complete a Transit Strategic Plan (TSP) by FY 2023. A TSP is similar to the TDP but requires some additional information about the overall organization goals and vision, the organization's philosophy of providing transit service, and some more detailed operational analysis. Many of the elements of the Transit Vision Plan will be able to be incorporated into the TSP when it is prepared.

Securing Funding

Through the TDP and TSP process, DASH will create more detailed analysis of how much additional funding is needed on an annual basis to support the eight and 20 percent increases in service required by the 2022 and 2030 Vision Plan Networks, respectively. The ultimate decisions on the timing and extent to which these networks can be implemented will be determined by City Council through the city's annual budget process. If City Council determines that there is not enough funding available to fully implement the 2022 Transit Vision in FY 2022, staff will use whatever funding is available to launch the new network. Staff developed several scenarios with zero-growth of four percent growth, which implemented the final network but included significantly reduced service on evenings and weekends. If necessary, one of these reduced scenarios could be implemented, but the full benefits touted throughout the ATV process would not be realized unless the plans are implemented in the versions that were adopted by the ATC Board of Directors.

Other funding sources should also be explored such as the I-395 Commuter Choice Program. DASH and Alexandria are already taking advantage of this program and have received funding for service increases on the DASH AT1 and AT9 routes, both of which help build toward the short-term 2022 Vision Plan Network. **Figure 46** outlines the short-term implementation process for ATV.
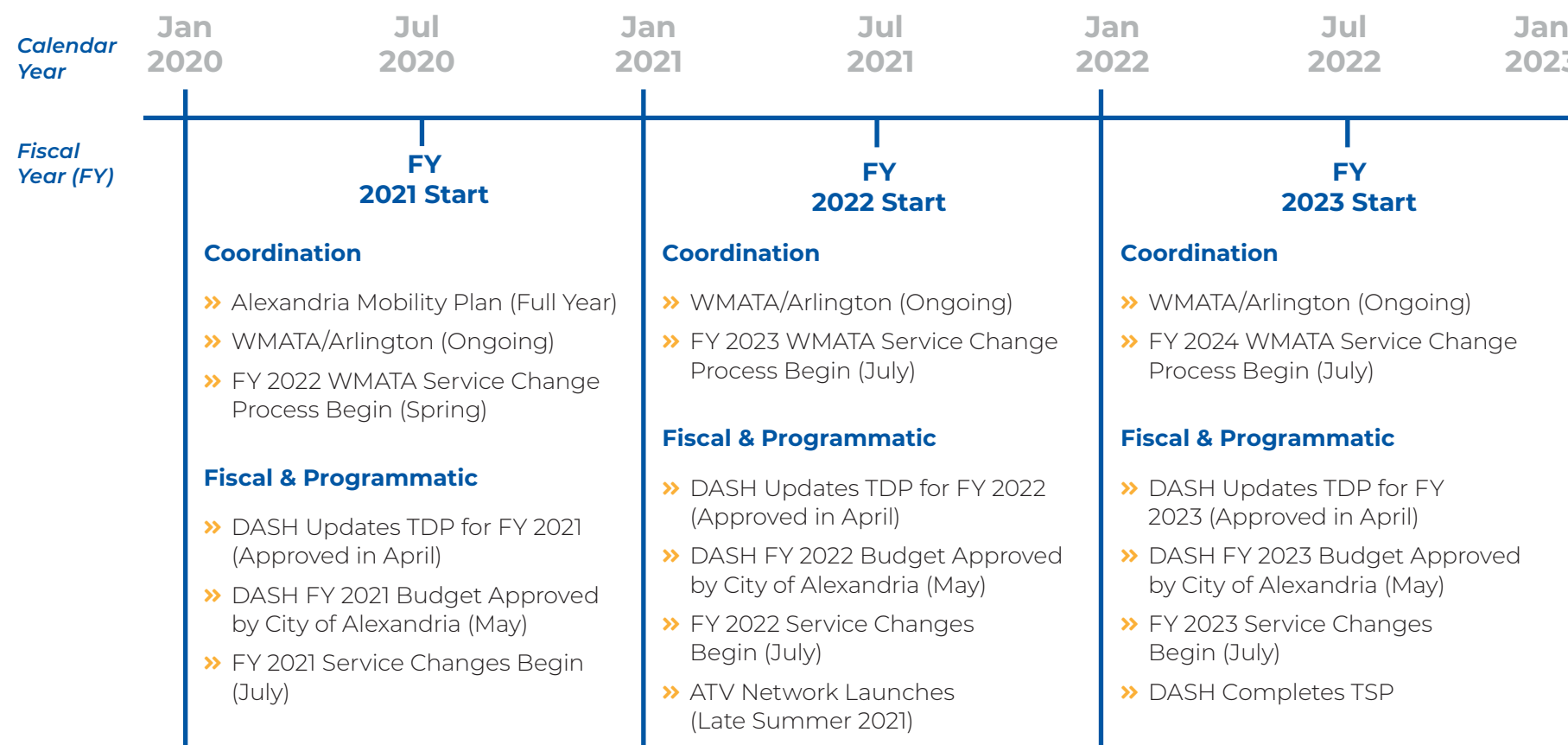
Figure 48: Short-Term Implementation Process for ATV. This timeline outlines the initial coordination, fiscal and programmatic steps to deliver the Vision Plan Network.

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The ATV Project Team would like to thank the following individuals for their extensive time, hard work, and input, without which this project would not have been possible:

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Yon Lambert, Vice President

Ian Greaves

Matt Harris

James Kapsis

Stephen Klejst

Richard Lawrence

Meredith MacNab (former)

Transportation Commission

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Melissa McMahon, Vice Chair

Canek Aguirre, Councilman

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John Chapman, Councilman

Alyia Gaskins

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Francisca Fuentes Vasquez, Casa Chirilagua

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Chris Harris, Alexandria Human Rights Commission

Bob Hartt, National Federation of the Blind

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Susan Richards, Potomac Yard Civic Association

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Kevin Sitzman, National Association of Industrial and Office Properties

Alyia Gaskins, Alexandria Transportation Commission

Charles Stone, Alexandria City Public Schools

Susan Tatum, Alexandria Residential Treatment Center

Patricia Washington, Visit Alexandria

Mila Yochum, Potomac Yard Civic Association

Appendix A:

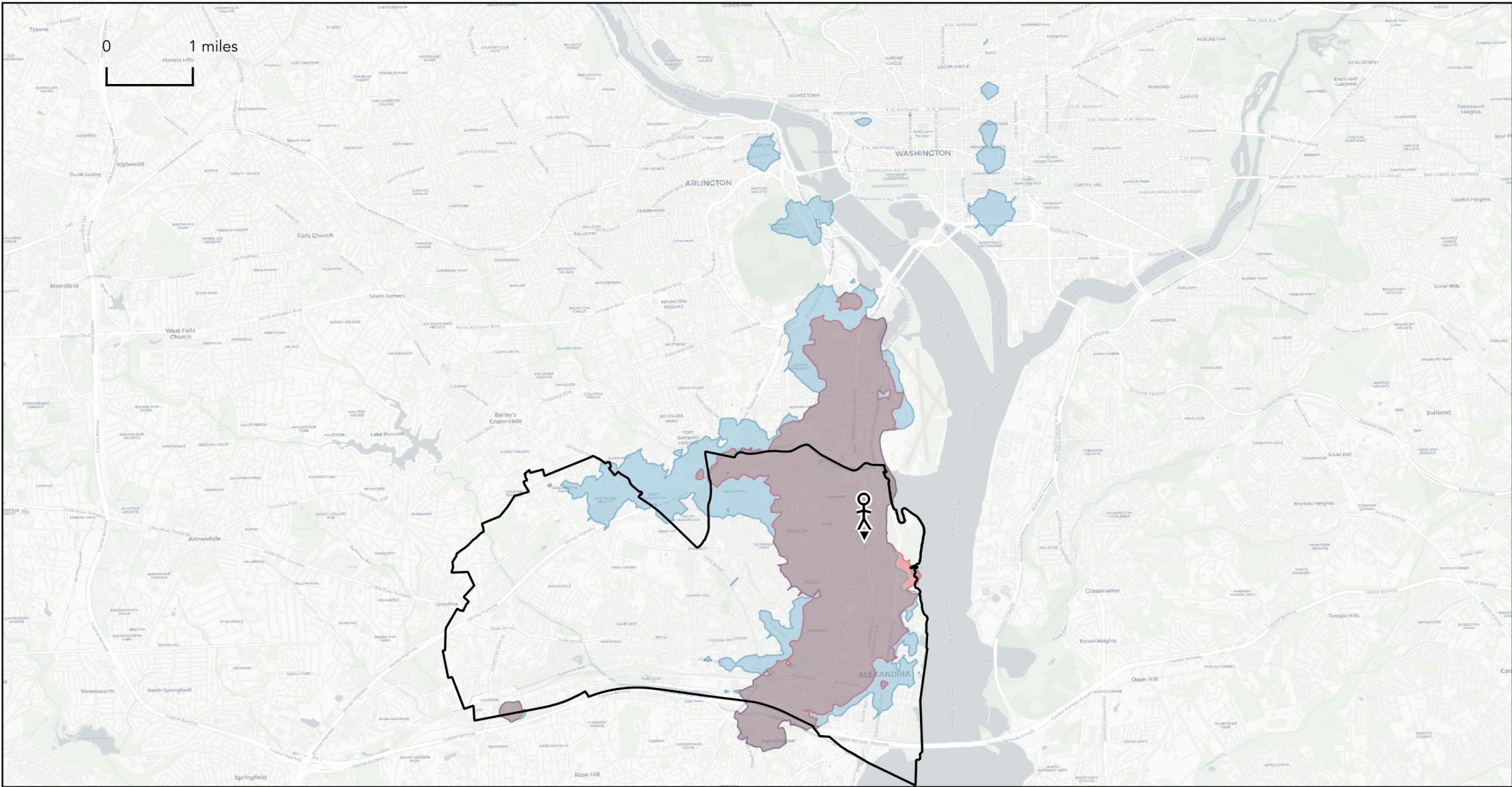## 2030 Vision Plan Network Isochrone Maps

Figure 49: Isochrone showing the change in access from Beauregard Street and Sanger Avenue

How far can I travel in **30 minutes** from **Beauregard St & Sanger Ave** at **12 pm**?

New Access

Retained Access

Lost Access

2030 Vision Plan Network

64% more residents and 88% more jobs accessible than existing network

0   1 miles
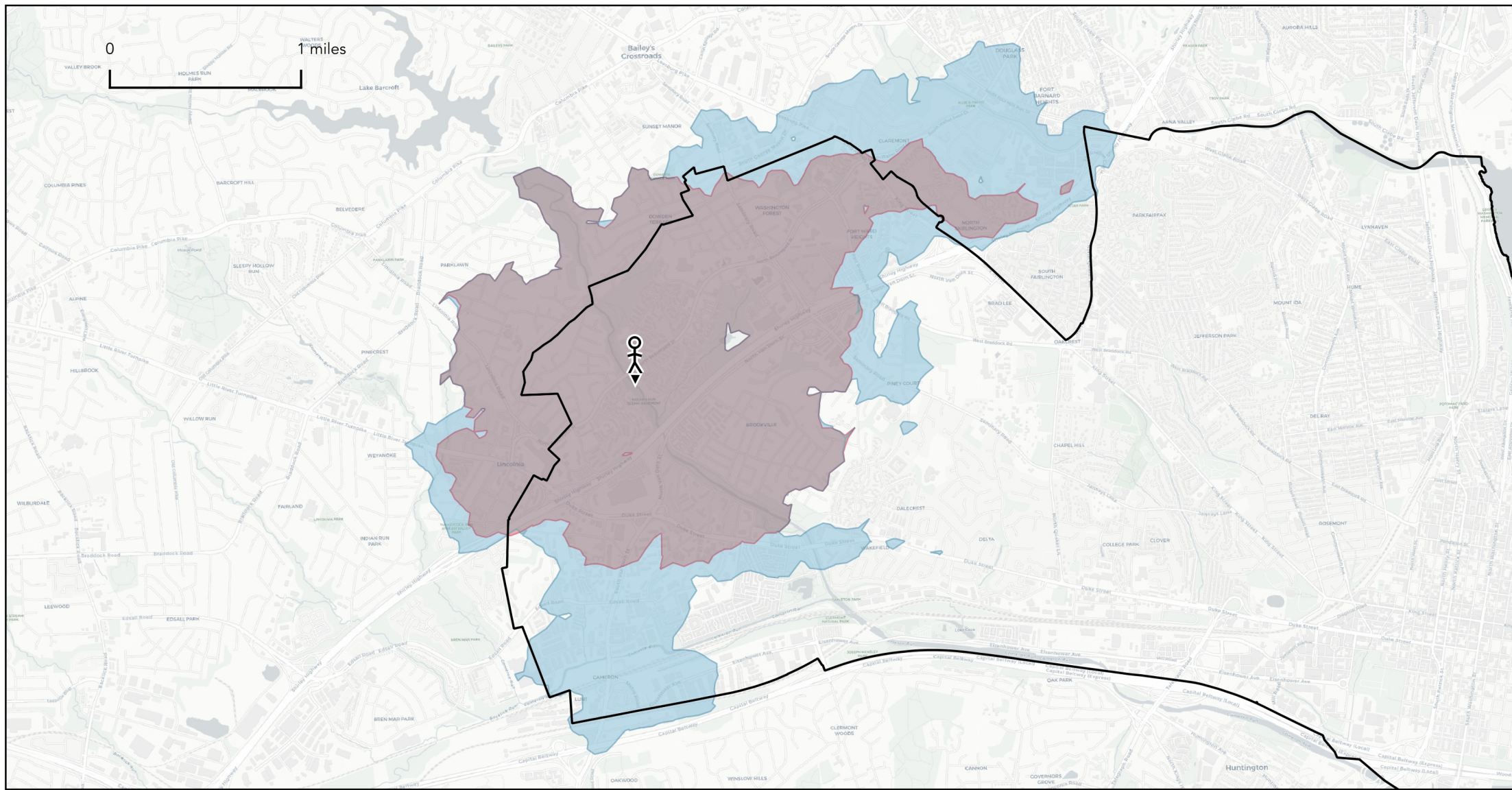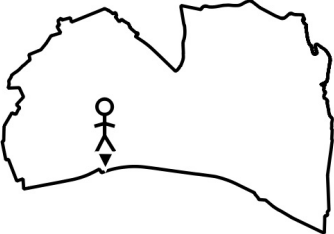
Figure 50: Isochrone showing the change in access from Duke Street and Jordan Street

How far can I travel in **30 minutes** from **Duke St & Jordan St** at **12 pm**?

New Access

Retained Access

Lost Access

2030 Vision Plan Network
140% more residents and 295% more jobs accessible than existing network
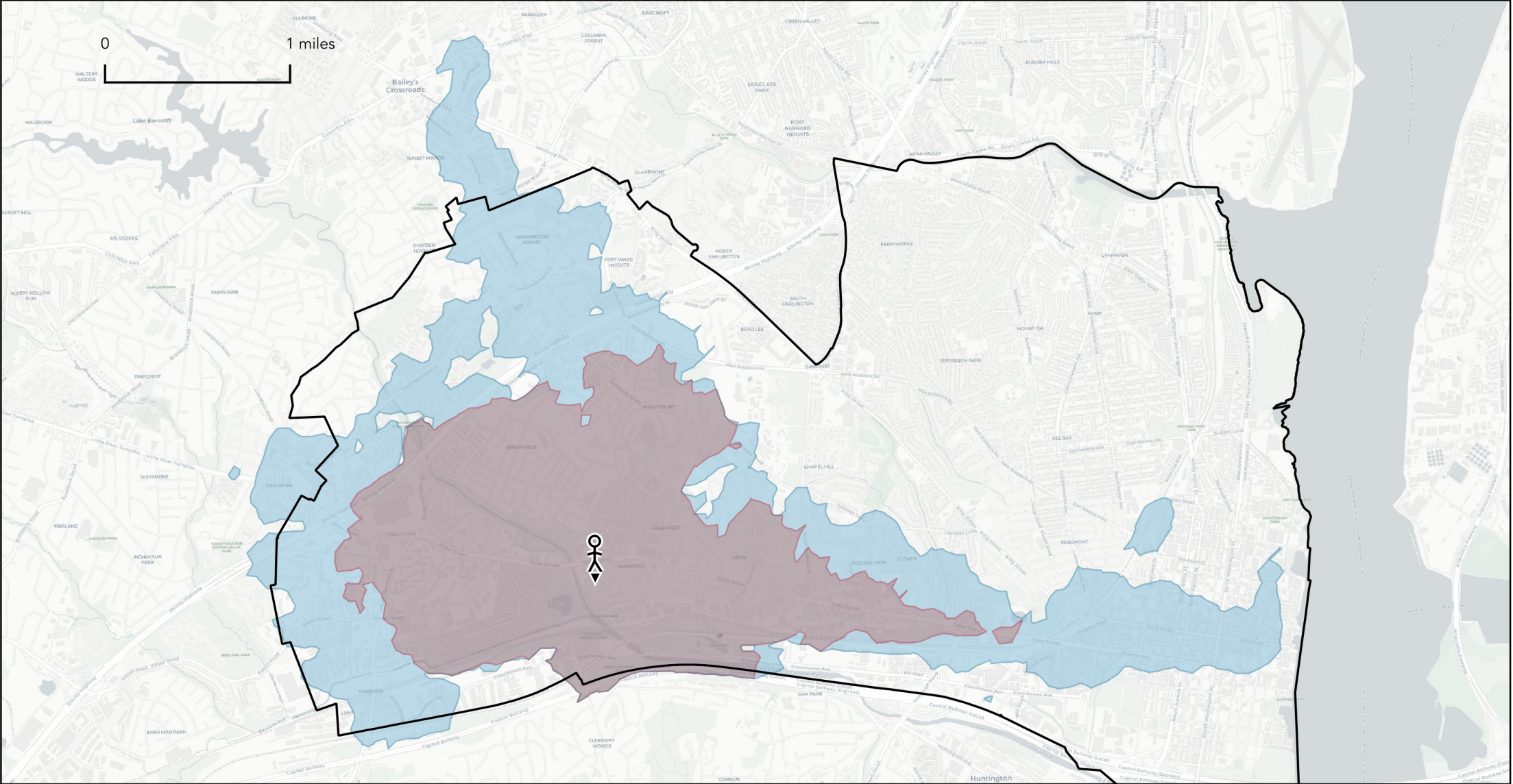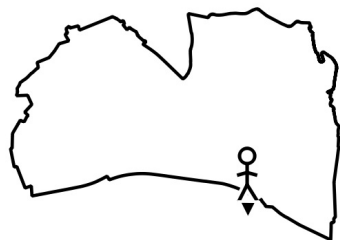
Figure 51: Isochrone showing the change in access from Eisenhower East Metrorail Station

How far can I travel in **30 minutes** from **Eisenhower East** at **12 pm**?

New Access

Retained Access

Lost Access

2030 Vision Plan Network

30% more residents and 36% more jobs accessible than existing network
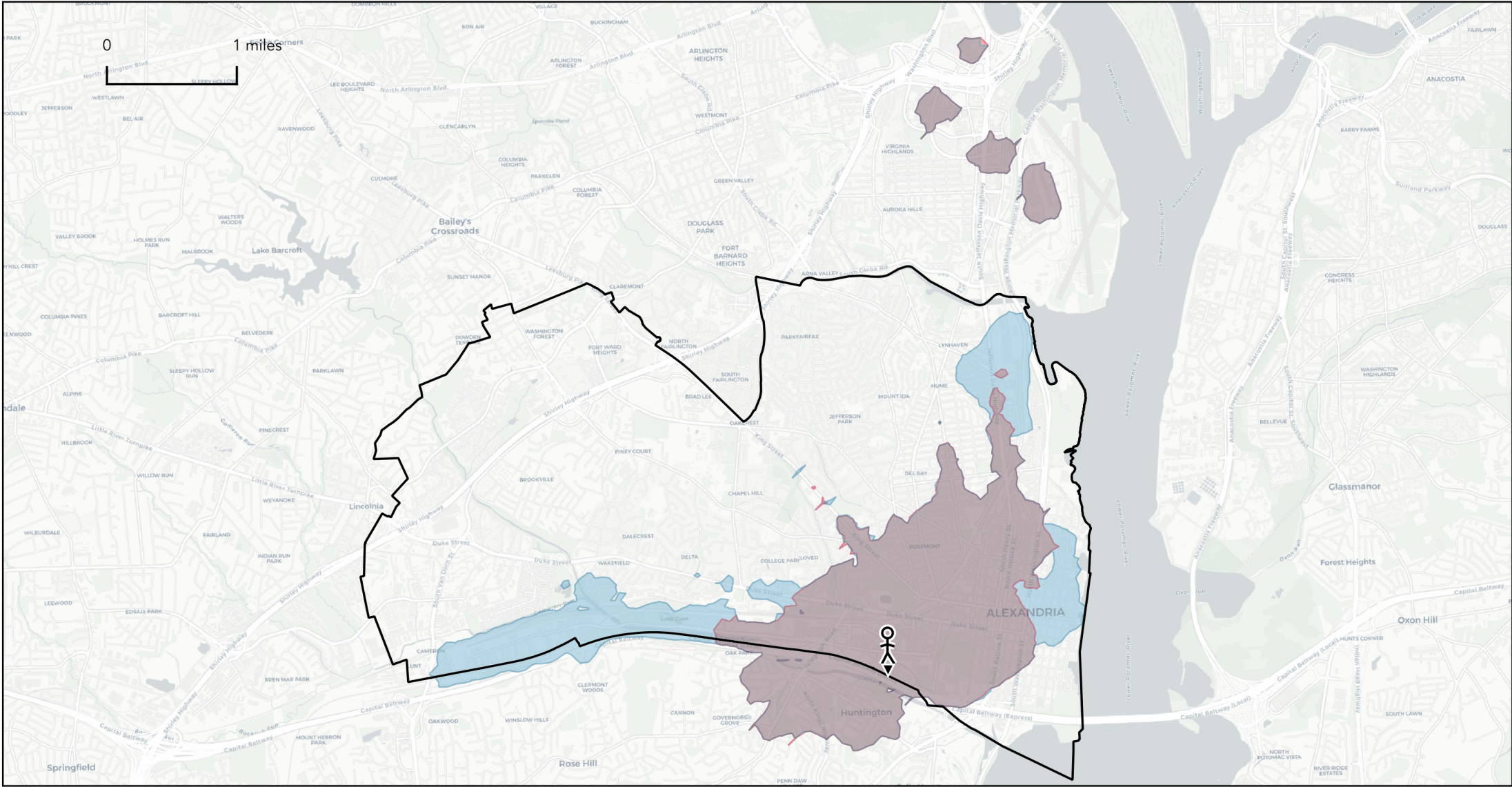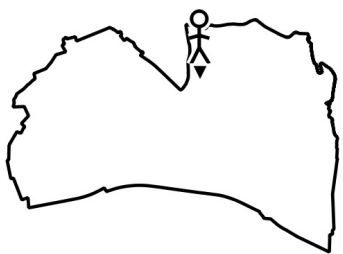
Figure 52: Isochrone showing the change in access from Parkfairfax (Gunston Road and Valley Drive)

How far can I travel in **30 minutes** from **Gunston Rd & Valley Dr** at **12 pm**?

New Access

Retained Access

Lost Access

2030 Vision Plan Network

68% more residents and 98% more jobs accessible than existing network
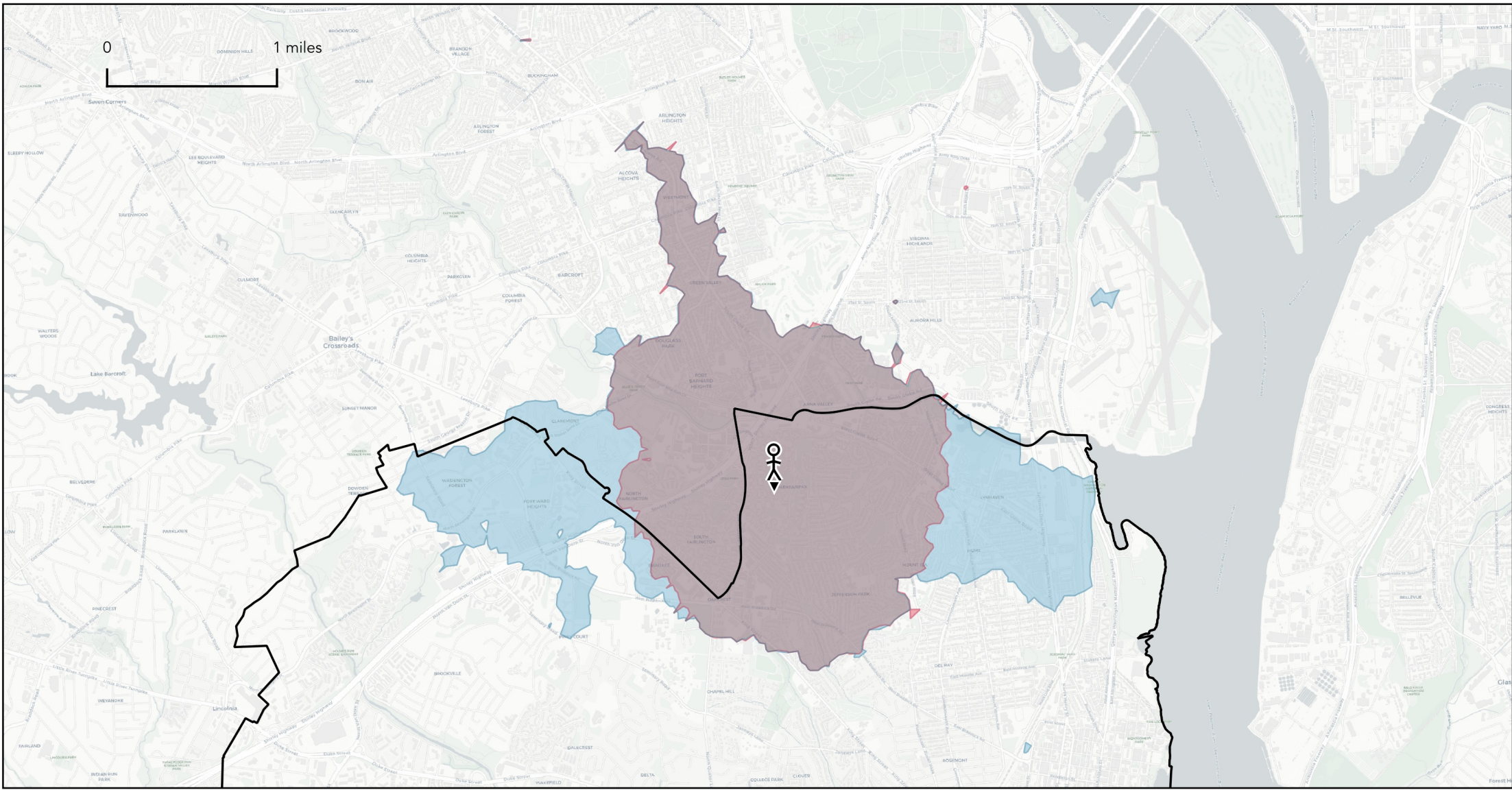
Figure 53: Isochrone showing the change in access from Inova Alexandria Hospital (Seminary Road and Howard Street)

How far can I travel in **30 minutes** from **Inova Alexandria Hospital** at **12 pm**?

New Access

Retained Access

Lost Access
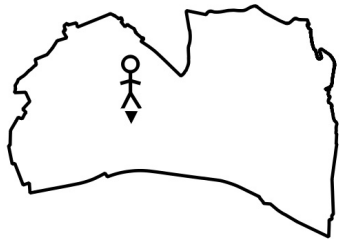
2030 Vision Plan Network

23% more residents and 27% more jobs accessible than existing network
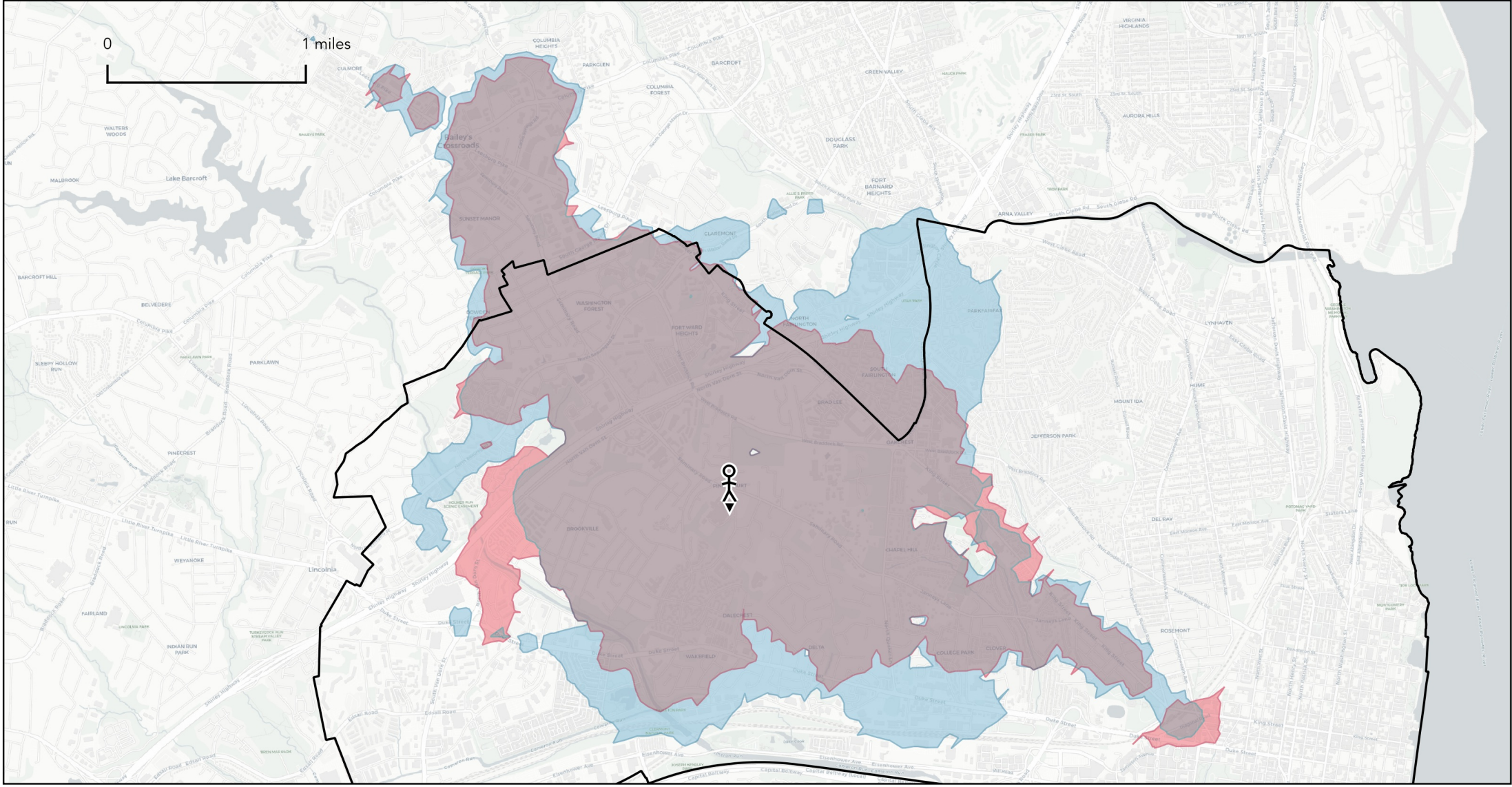
Figure 54: Isochrone showing the change in access from King Street and Quaker Lane (near Bradlee Shopping Center)
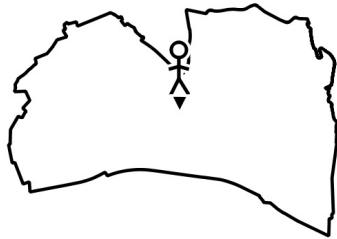
How far can I travel in **30 minutes** from **King St & Quaker Ln** at **12 pm**?

New Access
Retained Access
Lost Access

2030 Vision Plan Network

54% more residents and 124% more jobs accessible than existing network
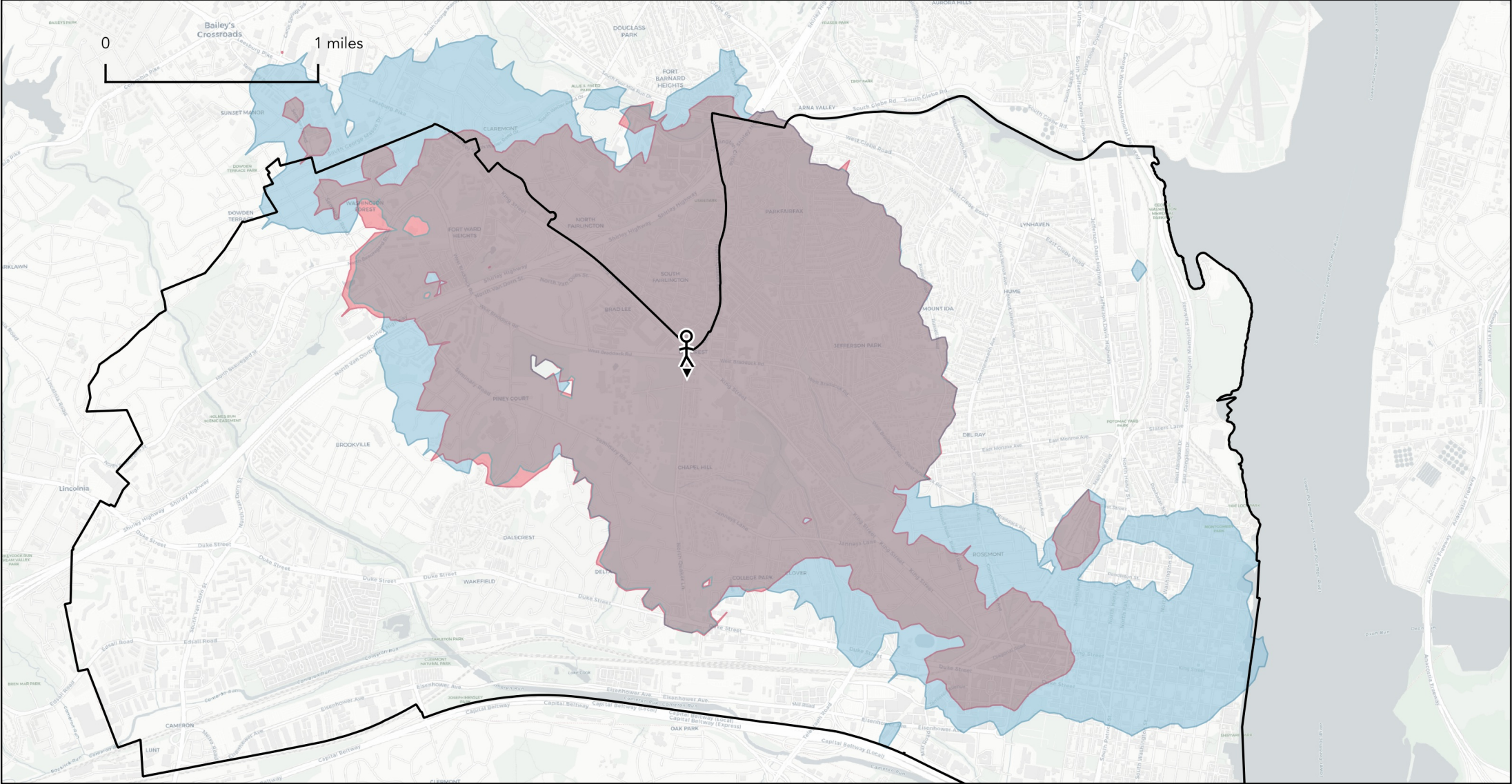
Figure 55: Isochrone showing the change in access from Landmark Mall
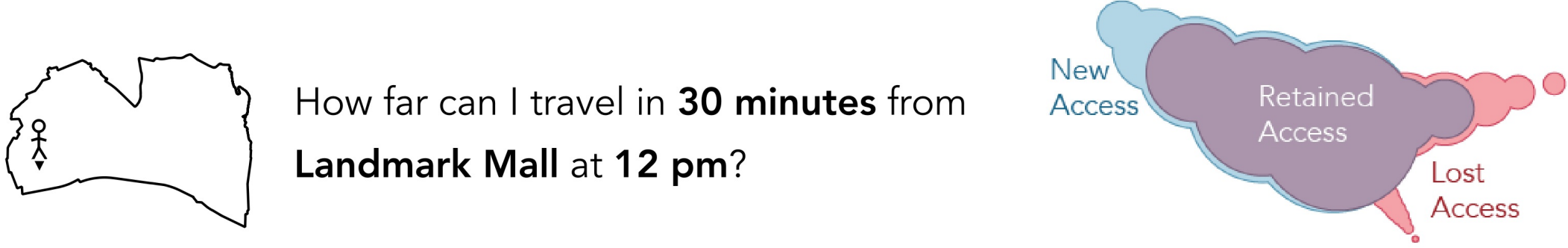
How far can I travel in **30 minutes** from **Landmark Mall** at **12 pm**?

New Access

Retained Access

Lost Access

2030 Vision Plan Network

68% more residents and 205% more jobs accessible than existing network
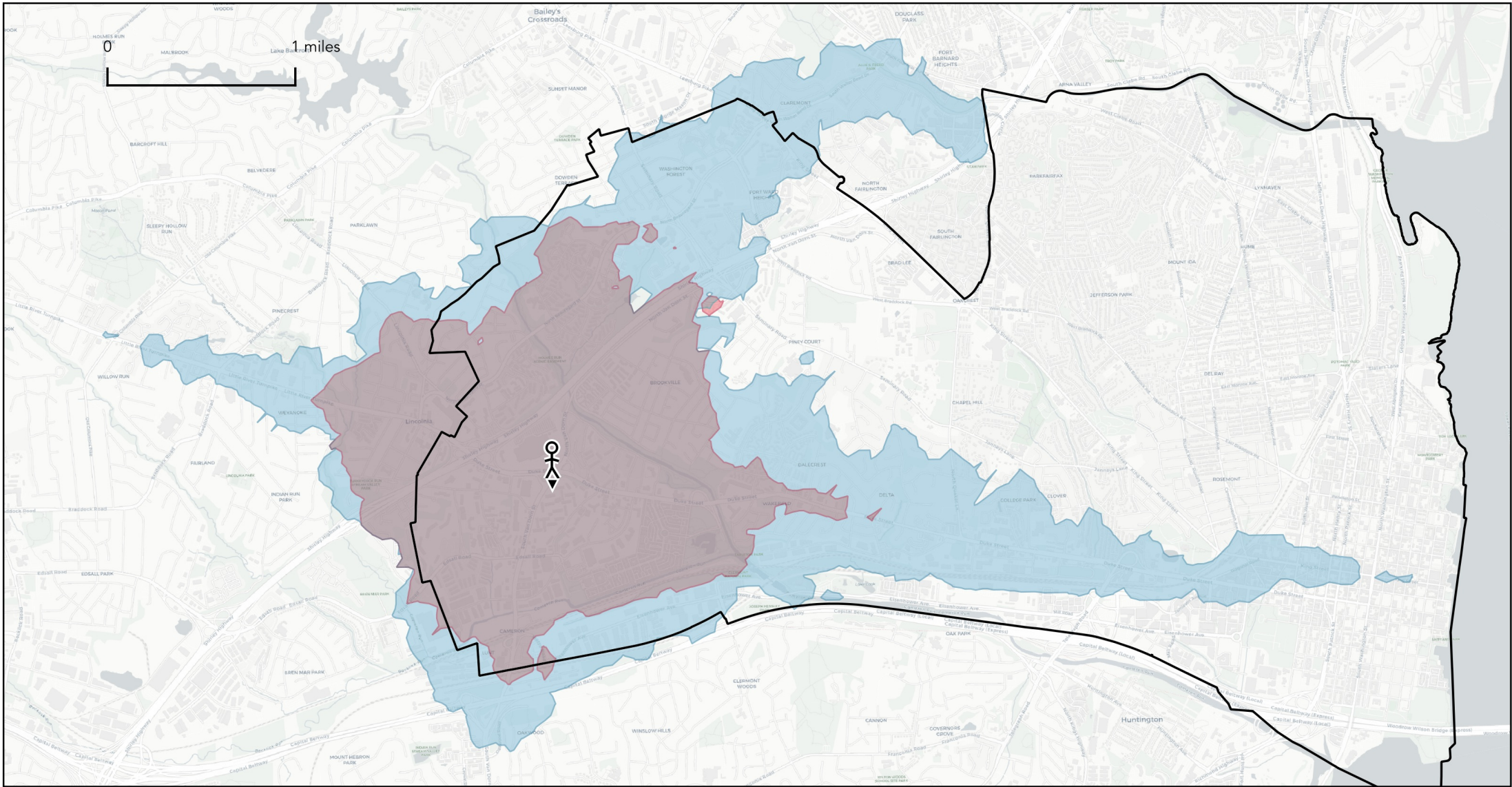
Figure 56: Isochrone showing the change in access from Mark Center

How far can I travel in **30 minutes** from **Mark Center** at **12 pm**?

New Access

Retained Access

Lost Access

2030 Vision Plan Network

60% more residents and 31% more jobs accessible than existing network
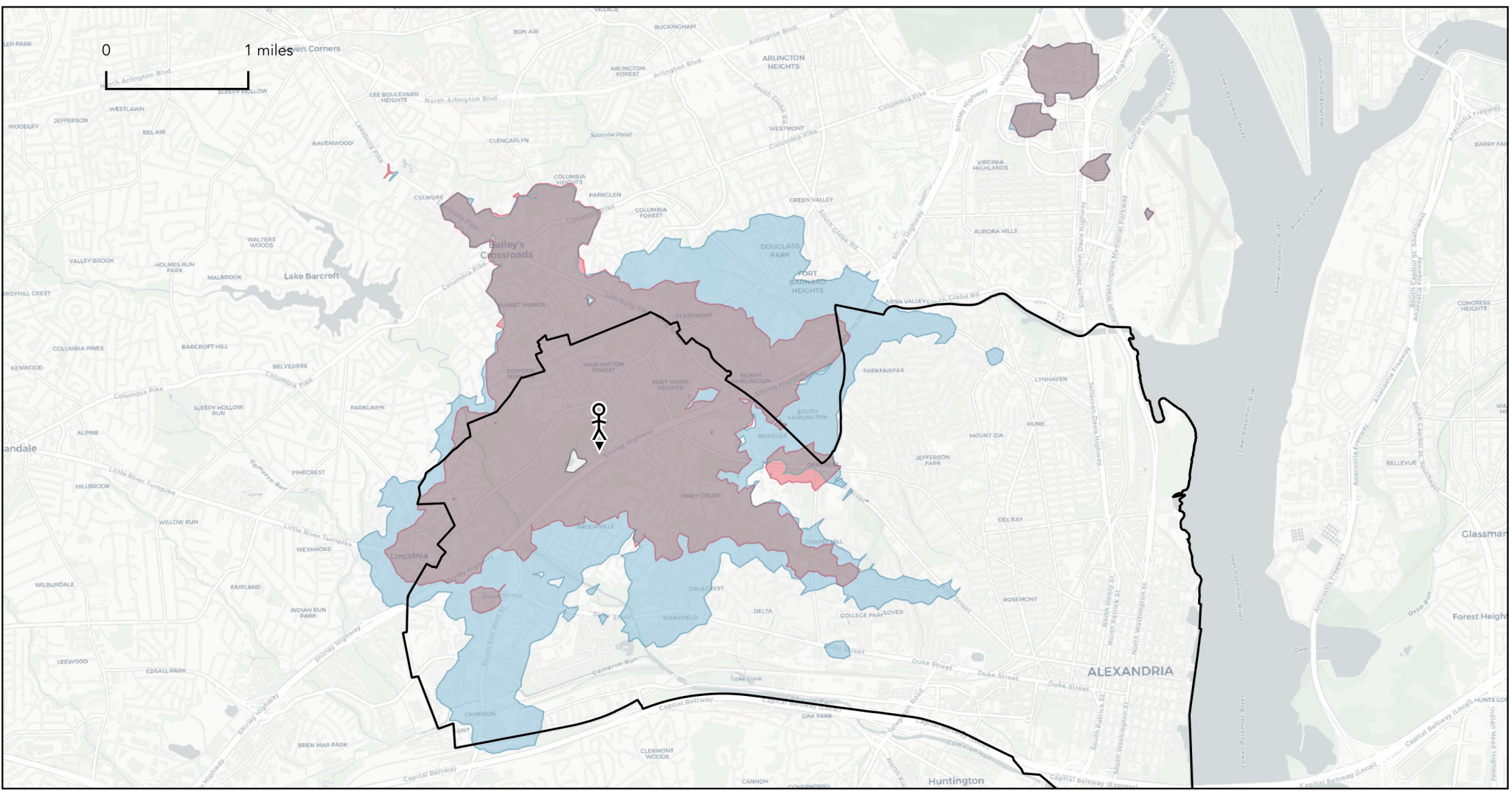
Figure 57: Isochrone showing the change in access from Old Town (King and Washington Streets)
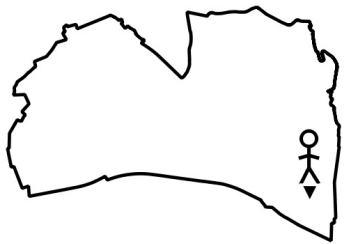
How far can I travel in **30 minutes** from **Old Town** at **12 pm**?

New Access

Retained Access

Lost Access

2030 Vision Plan Network

46% more residents and 22% more jobs accessible than existing network
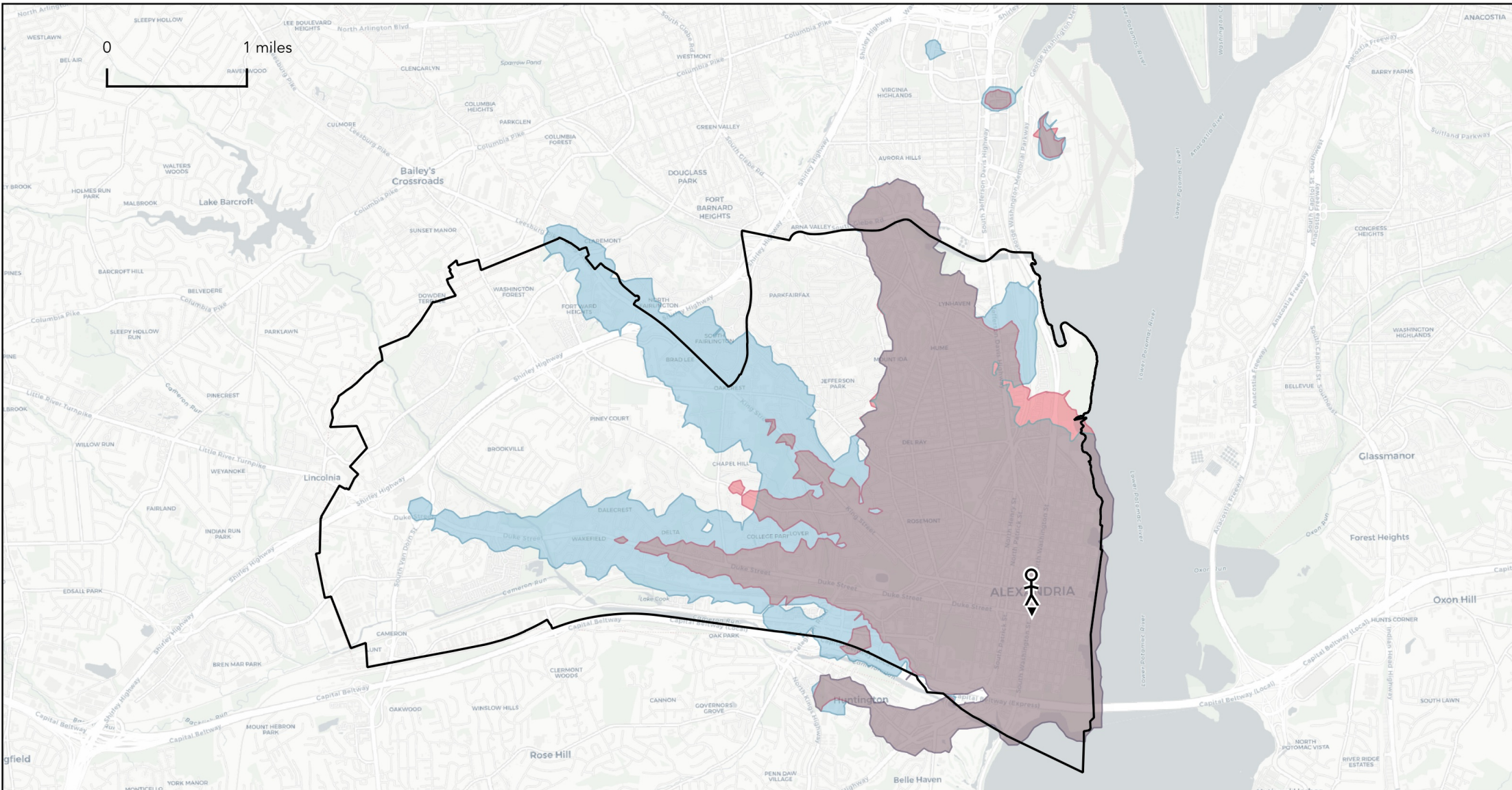
Figure 58: Isochrone showing the change in access from the Potomac Yard Metrorail Station

How far can I travel in **30 minutes** from **Potomac Yard** at **12 pm**?

New Access

Retained Access

Lost Access

2030 Vision Plan Network

55% more residents and 43% more jobs accessible than existing network

Figure 59: Isochrone showing the change in access from Reading Avenue and Rayburn Avenue

How far can I travel in **30 minutes** from **Reading Ave & Rayburn Ave** at **12 pm**?

New Access
Retained Access
Lost Access

2030 Vision Plan Network

37% more residents and 56% more jobs accessible than existing network
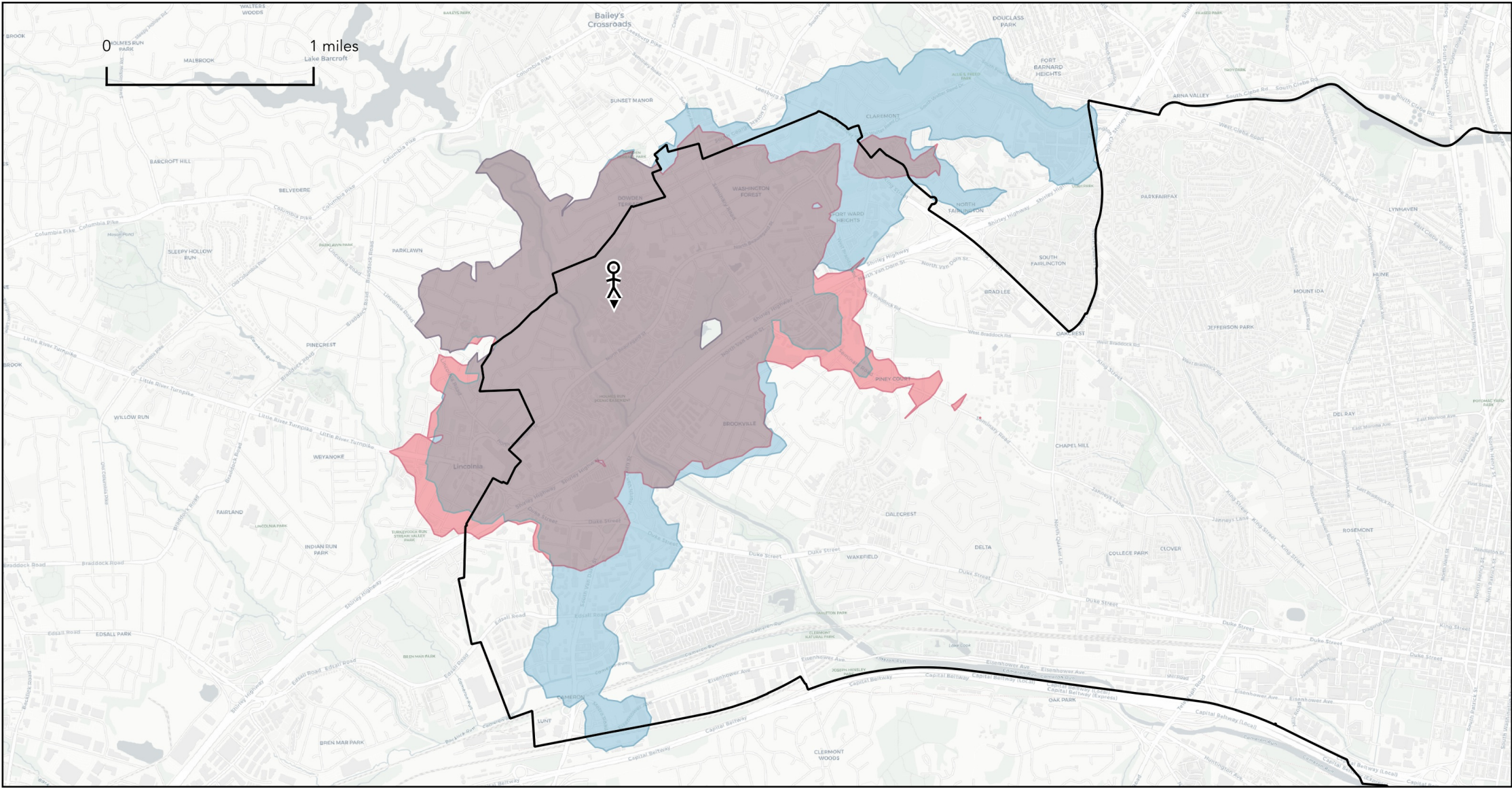
Figure 60: Isochrone showing the change in access from Southern Towers

How far can I travel in **30 minutes** from **Southern Towers** at **12 pm**?

New Access

Retained Access

Lost Access
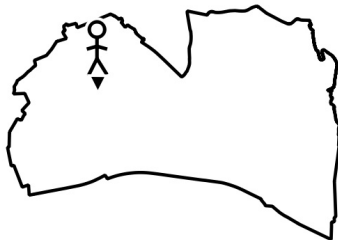
2030 Vision Plan Network

56% more residents and 35% more jobs accessible than existing network
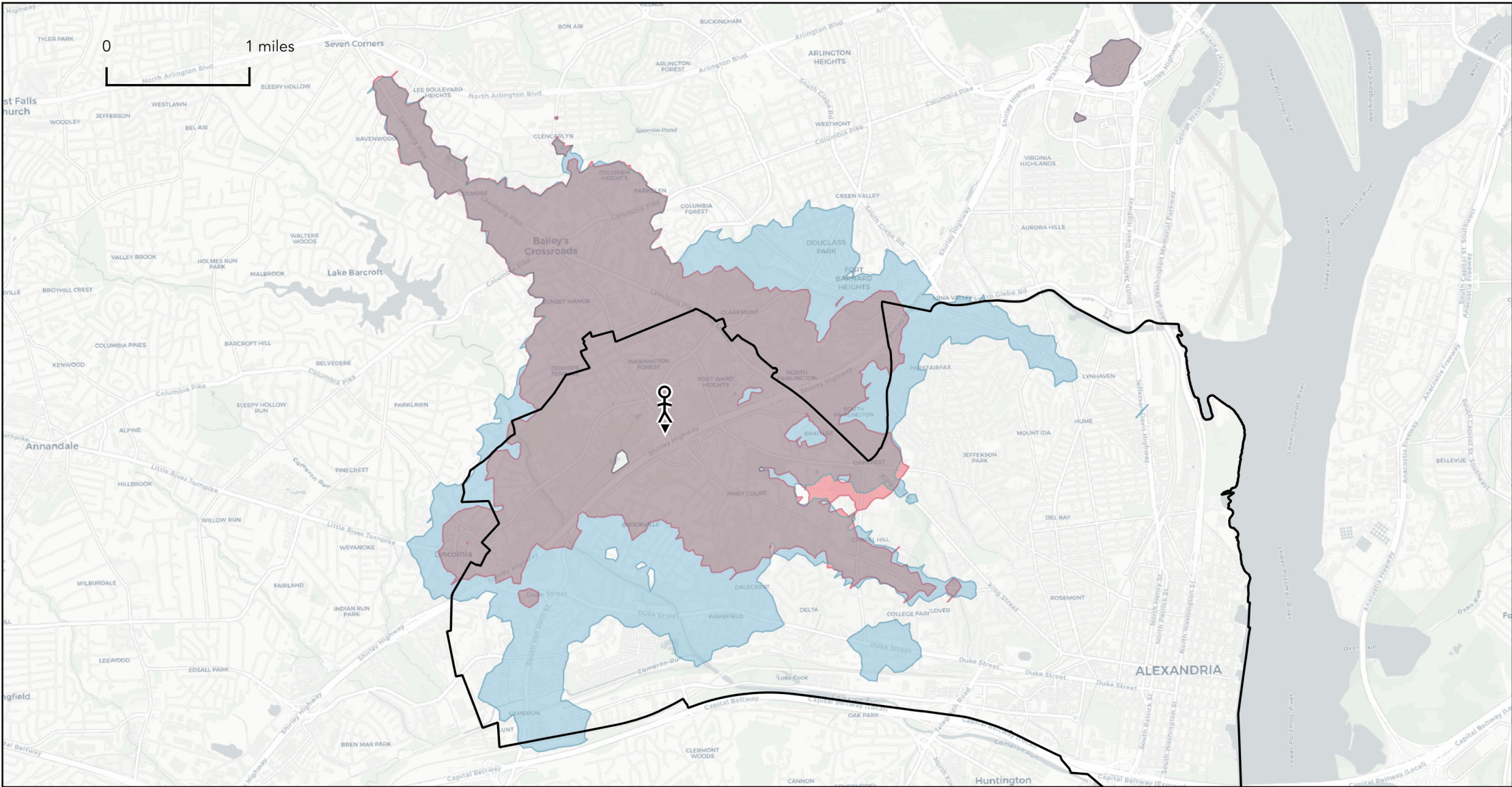
Figure 61: Isochrone showing the change in access from the Van Dorn Metrorail Station

How far can I travel in **30 minutes** from **Van Dorn Station** at **12 pm**?

New Access
Retained Access
Lost Access
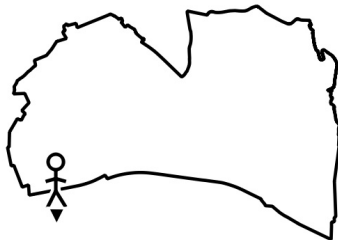
2030 Vision Plan Network

117% more residents and 62% more jobs accessible than existing network
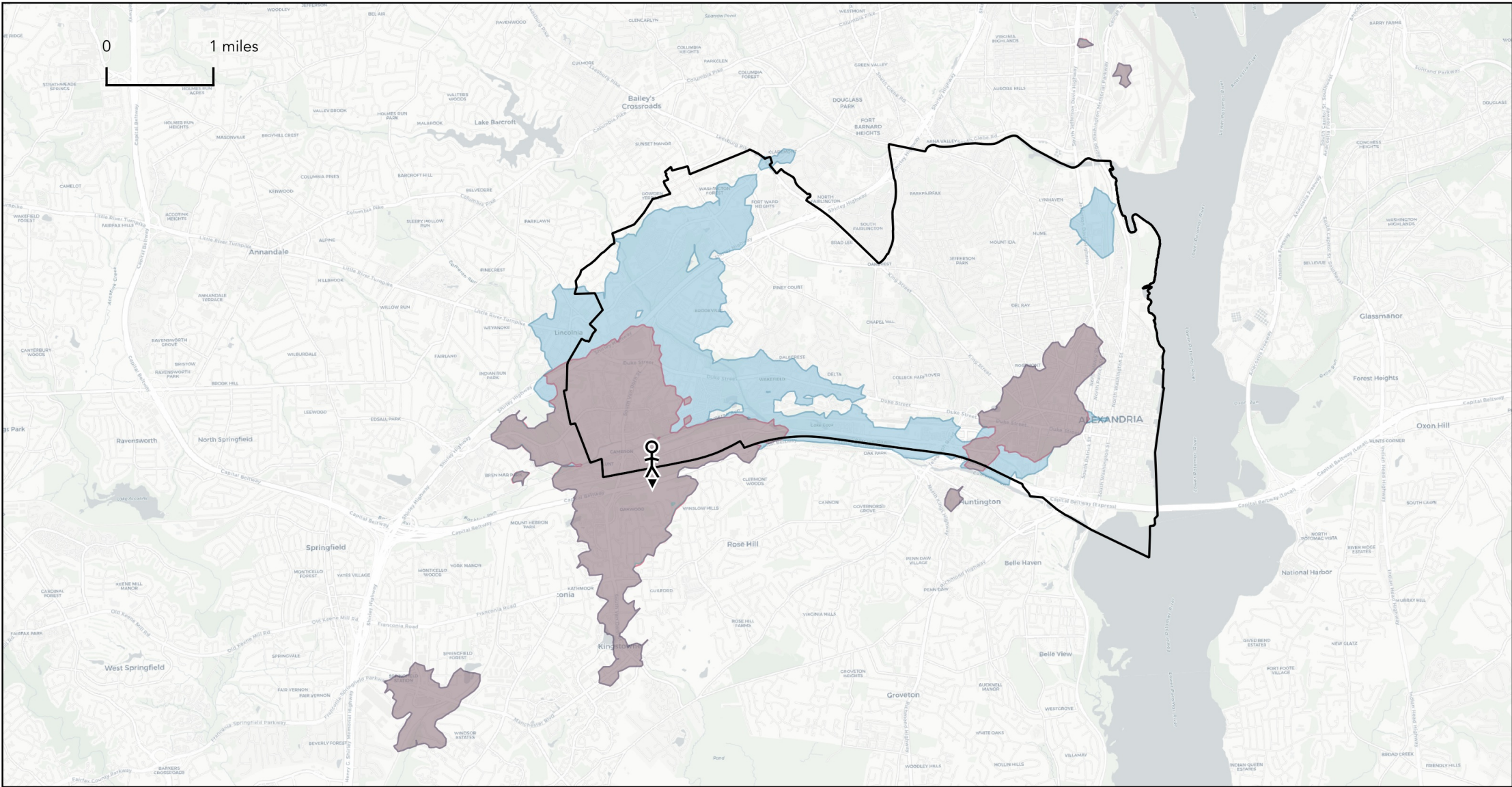
Figure 62: Isochrone showing the change in access from Arlandria (West Glebe and Old Dominion)
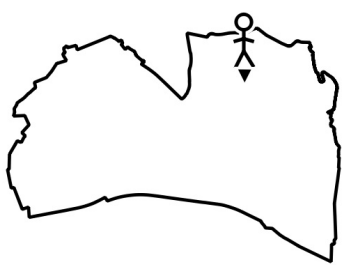
How far can I travel in **30 minutes** from **W Glebe & Old Dominion** at **12 pm**?

New Access

Retained Access

Lost Access

2030 Vision Plan Network

58% more residents and 143% more jobs accessible than existing network
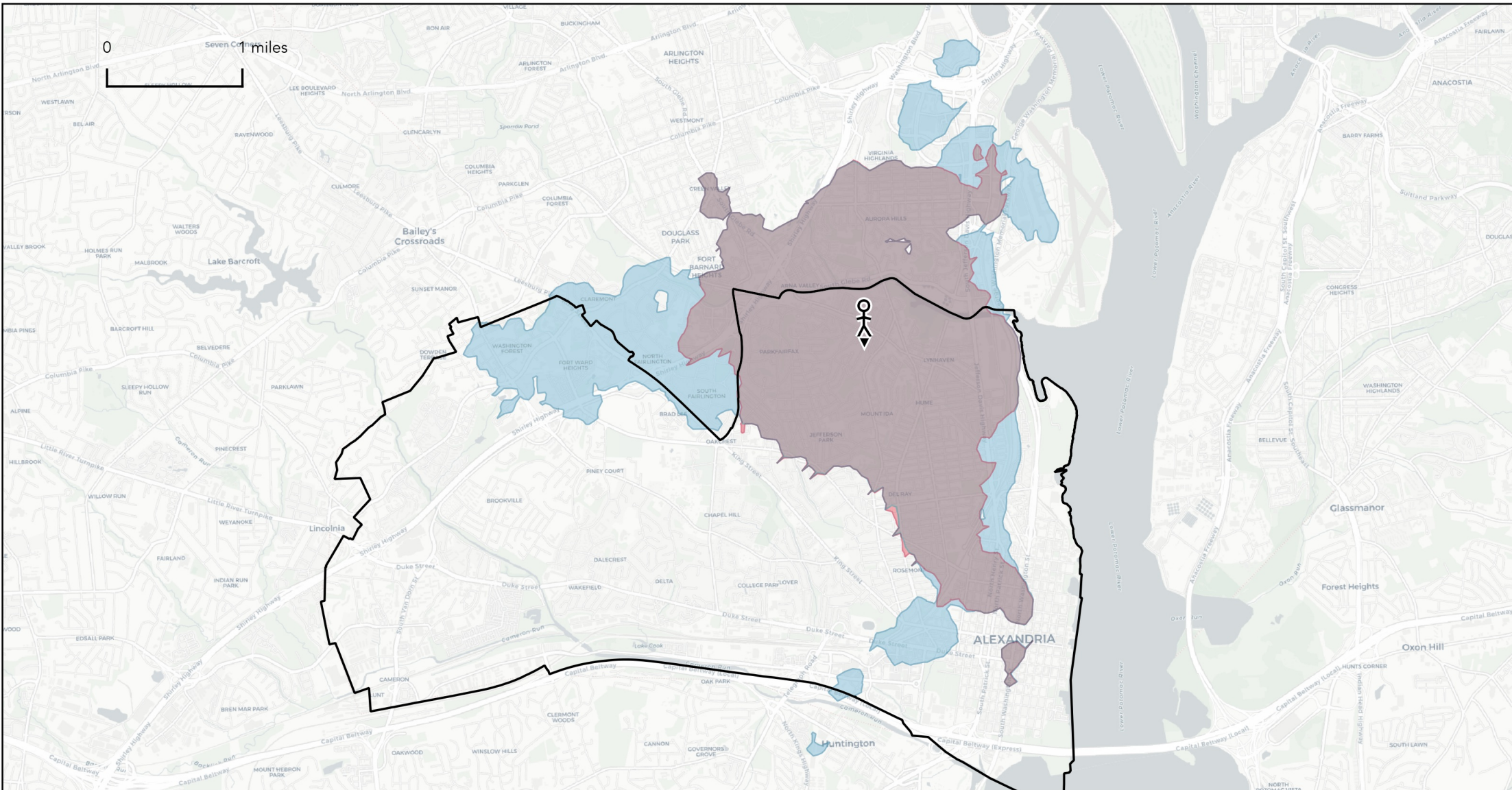
Figure 63: Isochrone showing the change in access from Shirlington (Randolph Street and Quincy Street)

How far can I travel in **30 minutes** from **Randolph St & Quincy St** at **12 pm**?

New Access

Retained Access

Lost Access
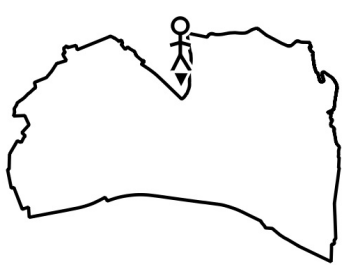
2030 Vision Plan Network

30% more residents and 28% more jobs accessible than existing network
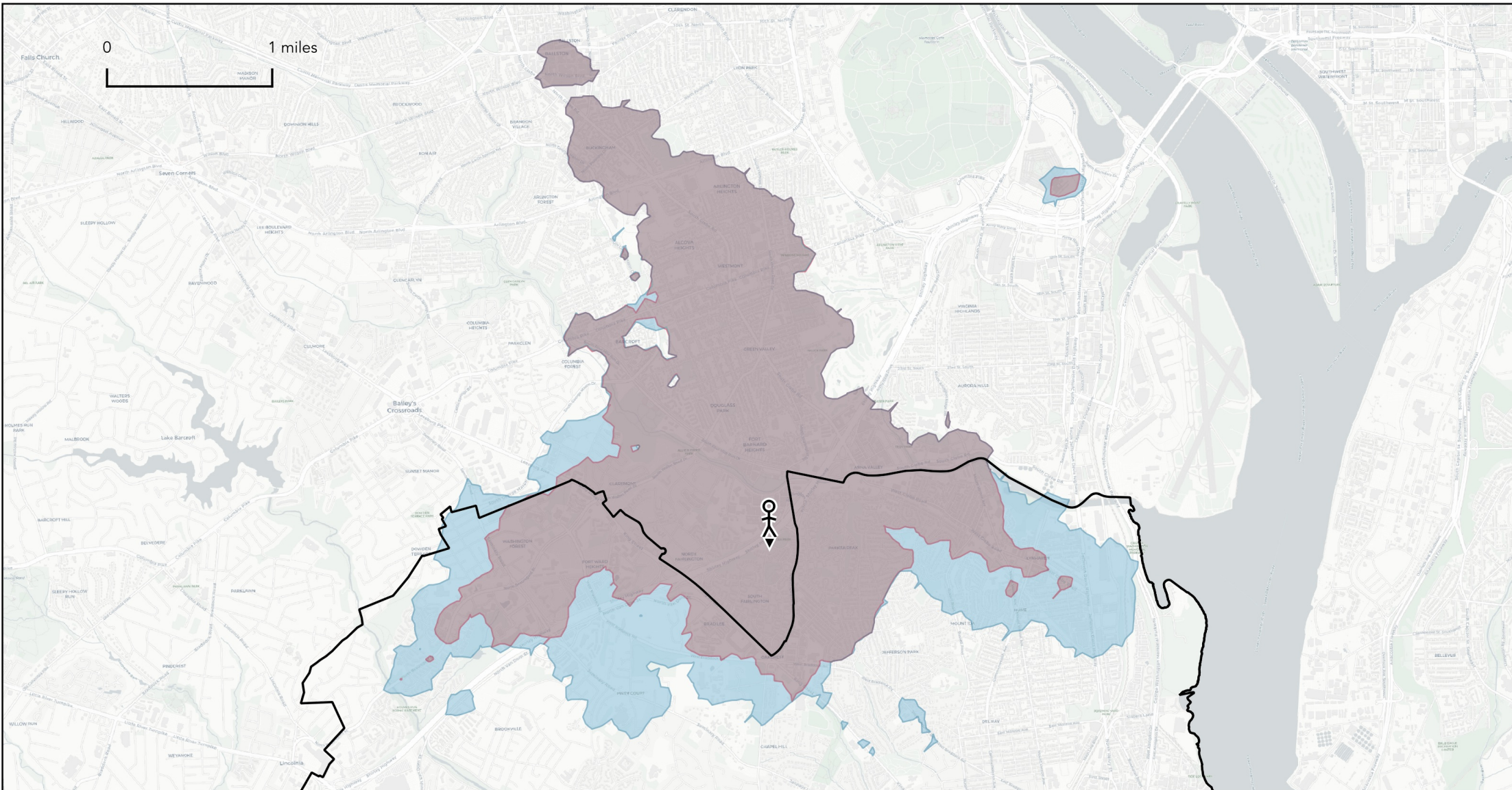
Appendix B

2022 Vision Plan Network Isochrone Maps

Figure 64: Isochrone showing the change in access from Beauregard Street and Sanger Avenue in 2022 Network

How far can I travel in **30 minutes** from **Beauregard St & Sanger Ave** at **12 pm**?

New Access — Retained Access — Lost Access

2022 Vision Plan Network

57% more residents and 63% more jobs accessible than existing network
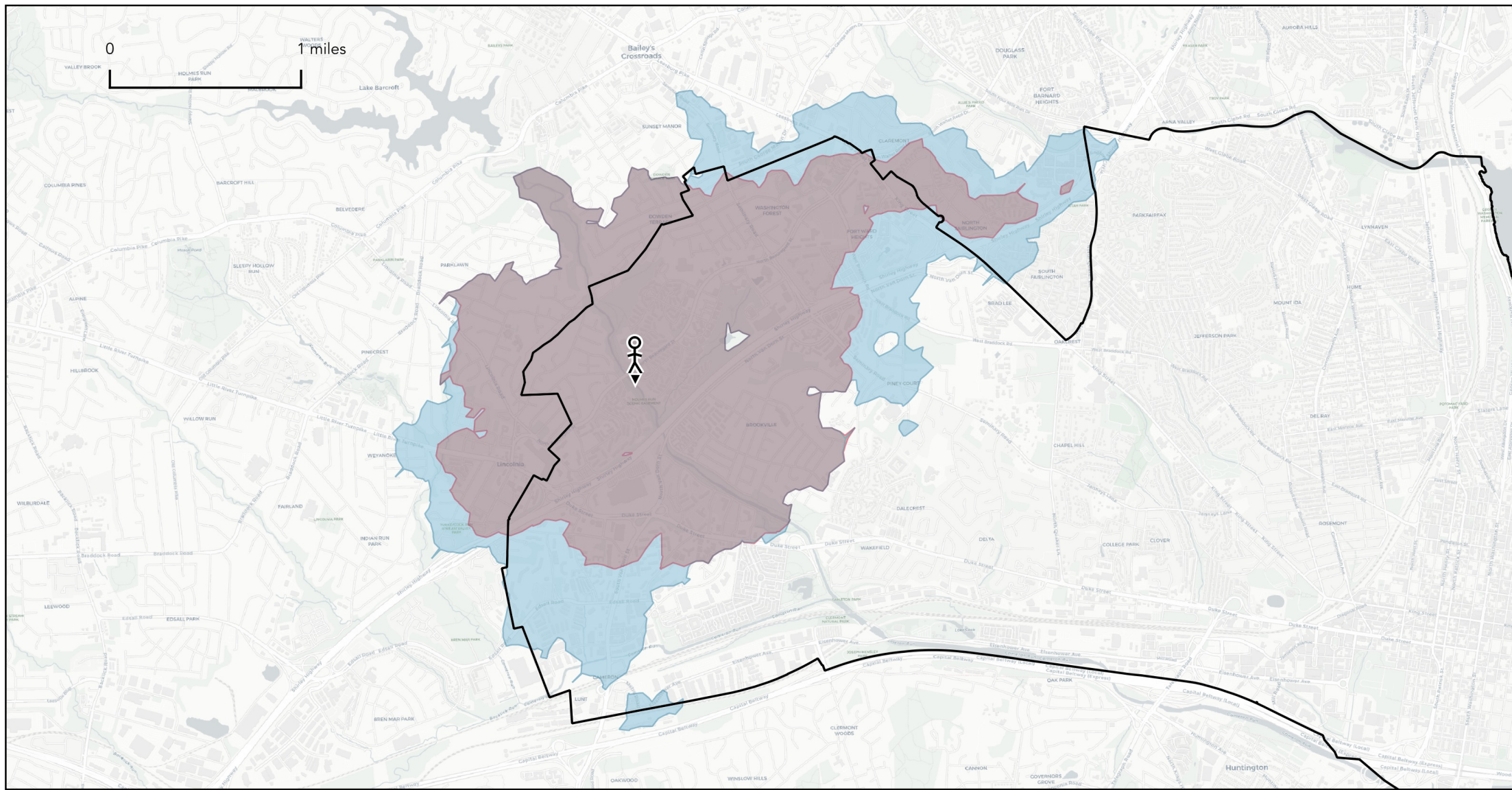
Figure 65: Isochrone showing the change in access from Duke Street and Jordan Street in 2022 Network

How far can I travel in **30 minutes** from **Duke St & Jordan St** at **12 pm**?

New Access

Retained Access

Lost Access

2022 Vision Plan Network

65% more residents and 99% more jobs accessible than existing network
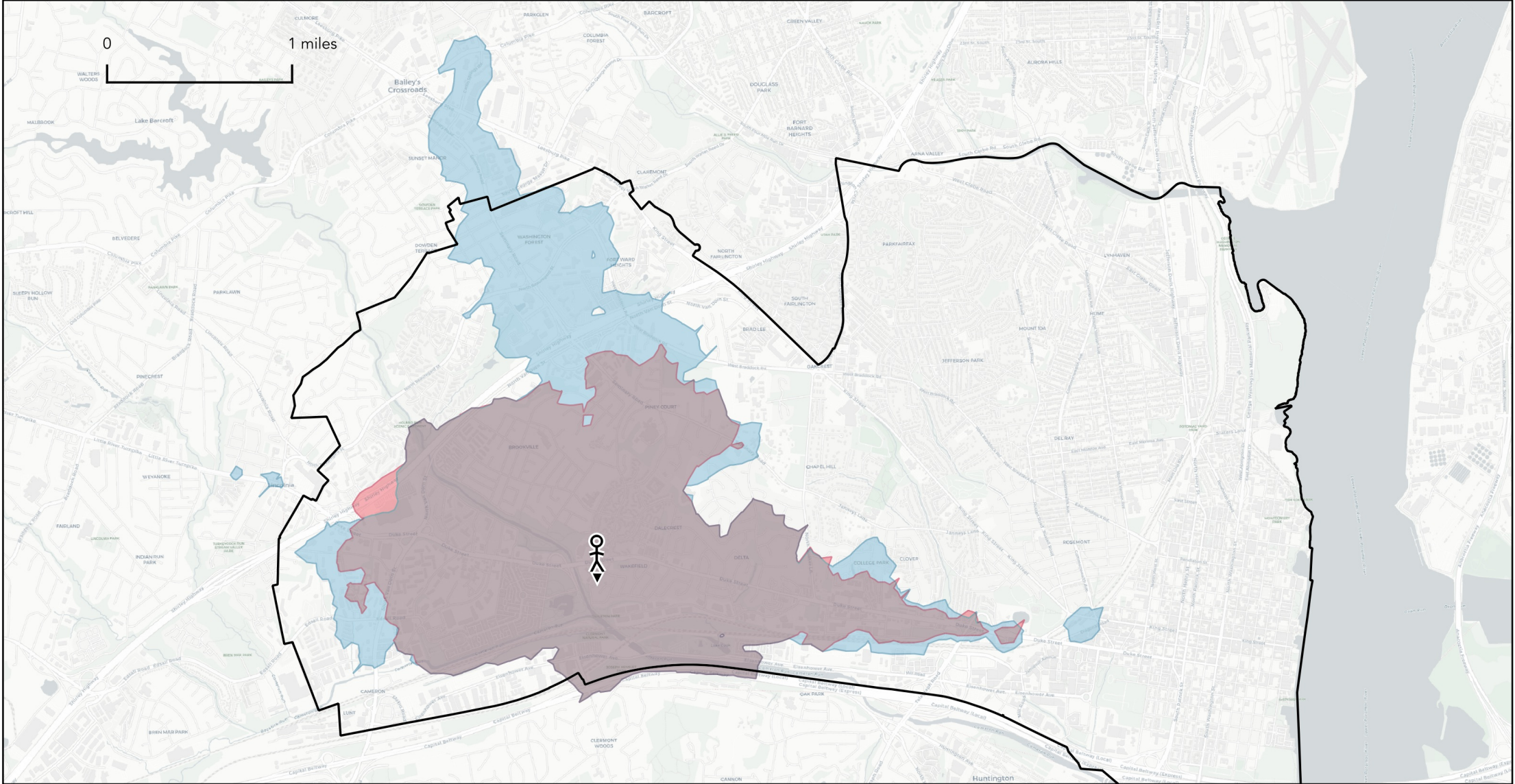
Figure 66: Isochrone showing the change in access from Eisenhower East Metrorail Station in 2022 Network

How far can I travel in **30 minutes** from **Eisenhower East** at **12 pm**?

New Access — Retained Access — Lost Access

2022 Vision Plan Network

25% more residents and 36% more jobs accessible than existing network
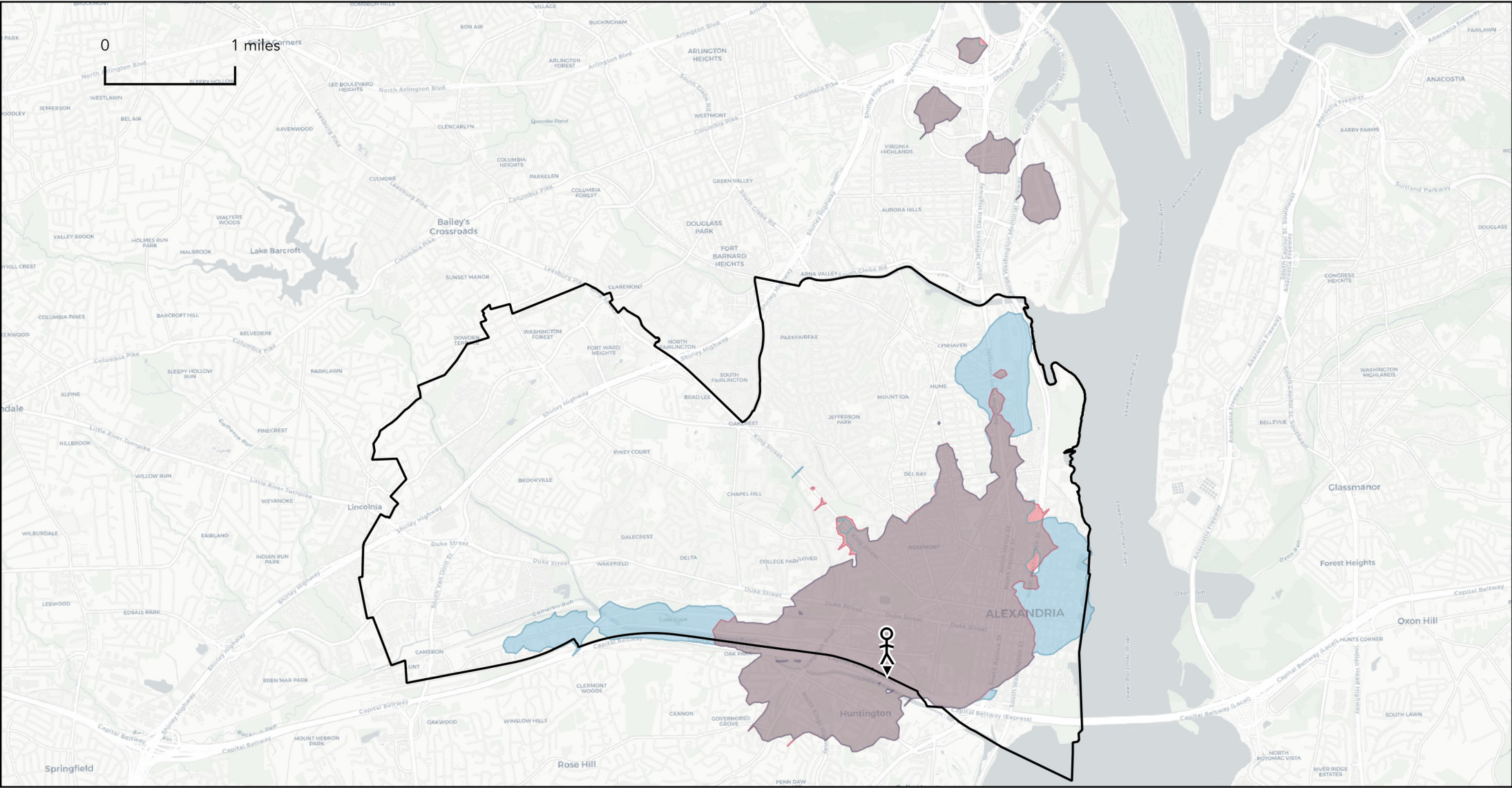
Figure 67: Isochrone showing the change in access from Inova Alexandria Hospital (Seminary Road and Howard Street) in 2022 Network
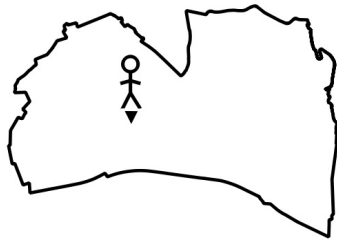
How far can I travel in **30 minutes** from **Inova Alexandria Hospital** at **12 pm**?

New Access
Retained Access
Lost Access

2022 Vision Plan Network

22% more residents and 23% more jobs accessible than existing network
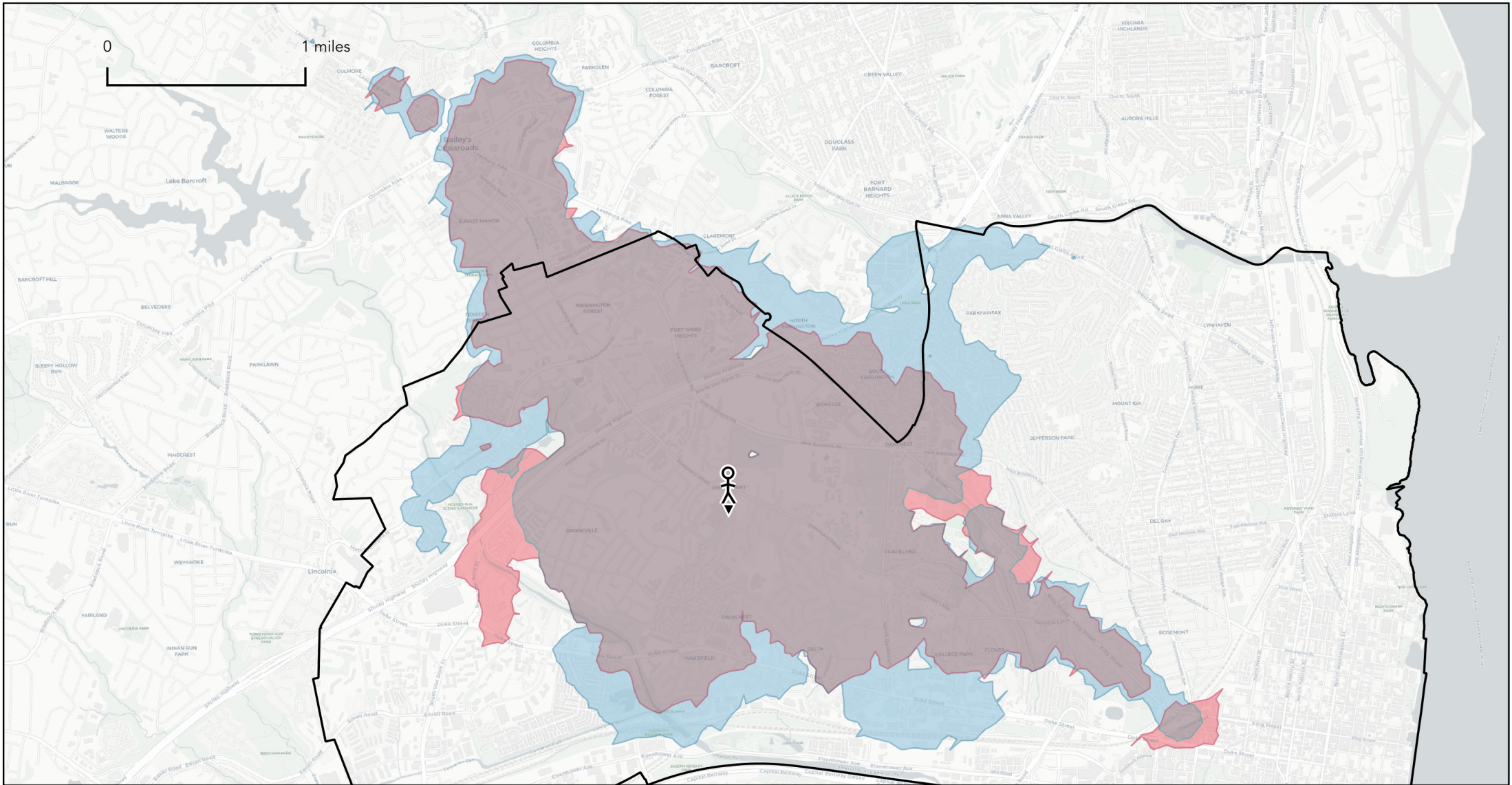
Figure 68: Isochrone showing the change in access from Parkfairfax (Gunston Road and Valley Drive) in 2022 Network

How far can I travel in **30 minutes** from **Gunston Rd & Valley Dr** at **12 pm**?

New Access

Retained Access

Lost Access

2022 Vision Plan Network

37% more residents and 48% more jobs accessible than existing network

0   1 miles
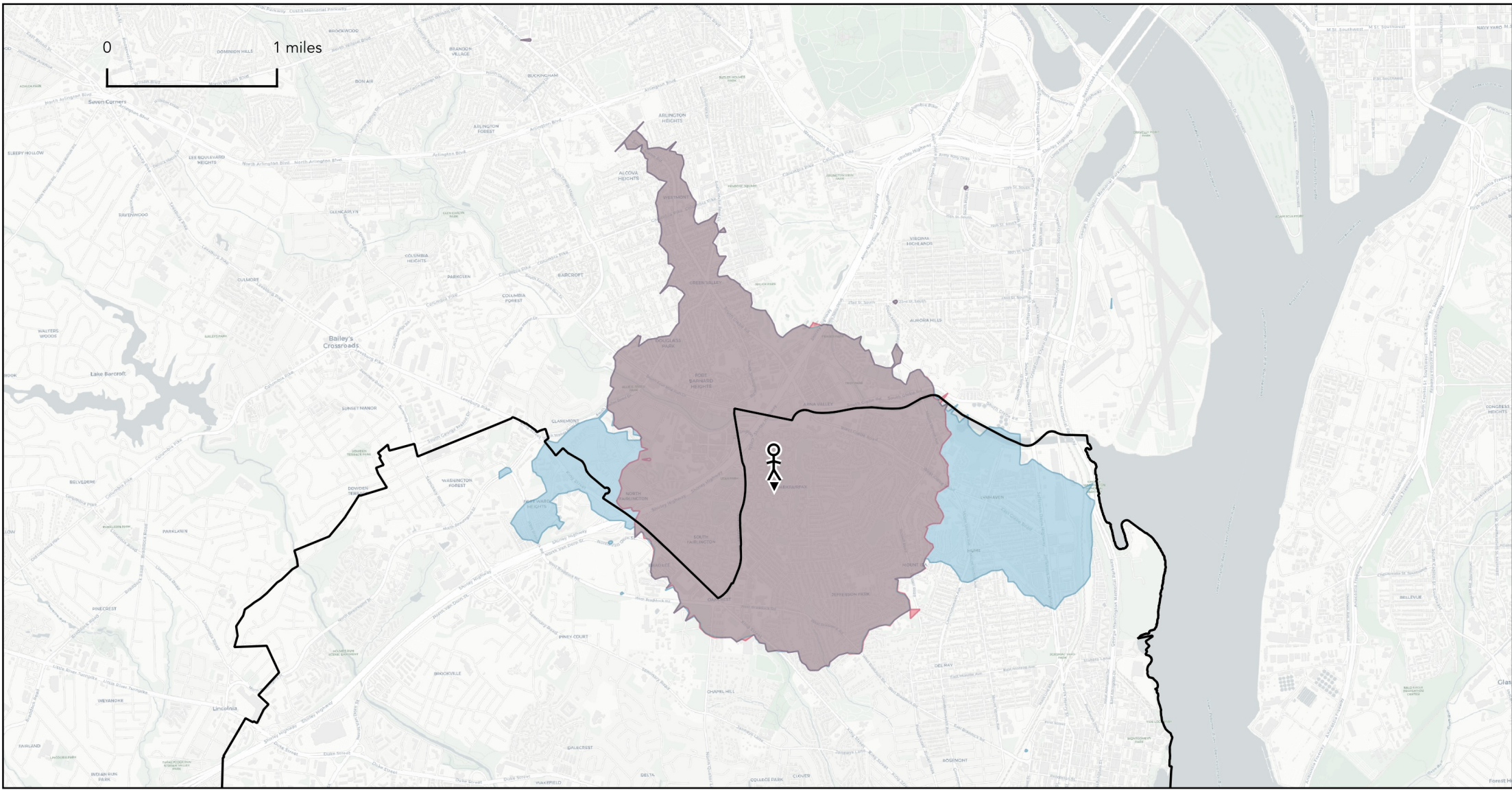
Figure 69: Isochrone showing the change in access from King Street and Quaker Lane (near Bradlee Shopping Center) in 2022 Network
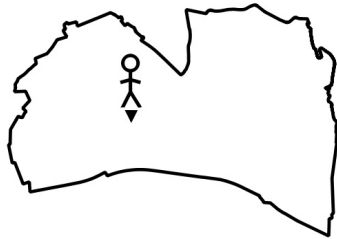
How far can I travel in **30 minutes** from **Inova Alexandria Hospital** at **12 pm**?

New Access

Retained Access

Lost Access

2022 Vision Plan Network
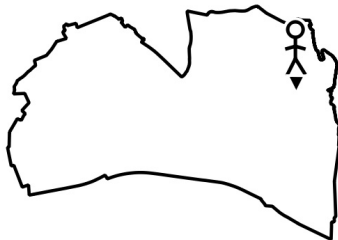
22% more residents and 23% more jobs accessible than existing network
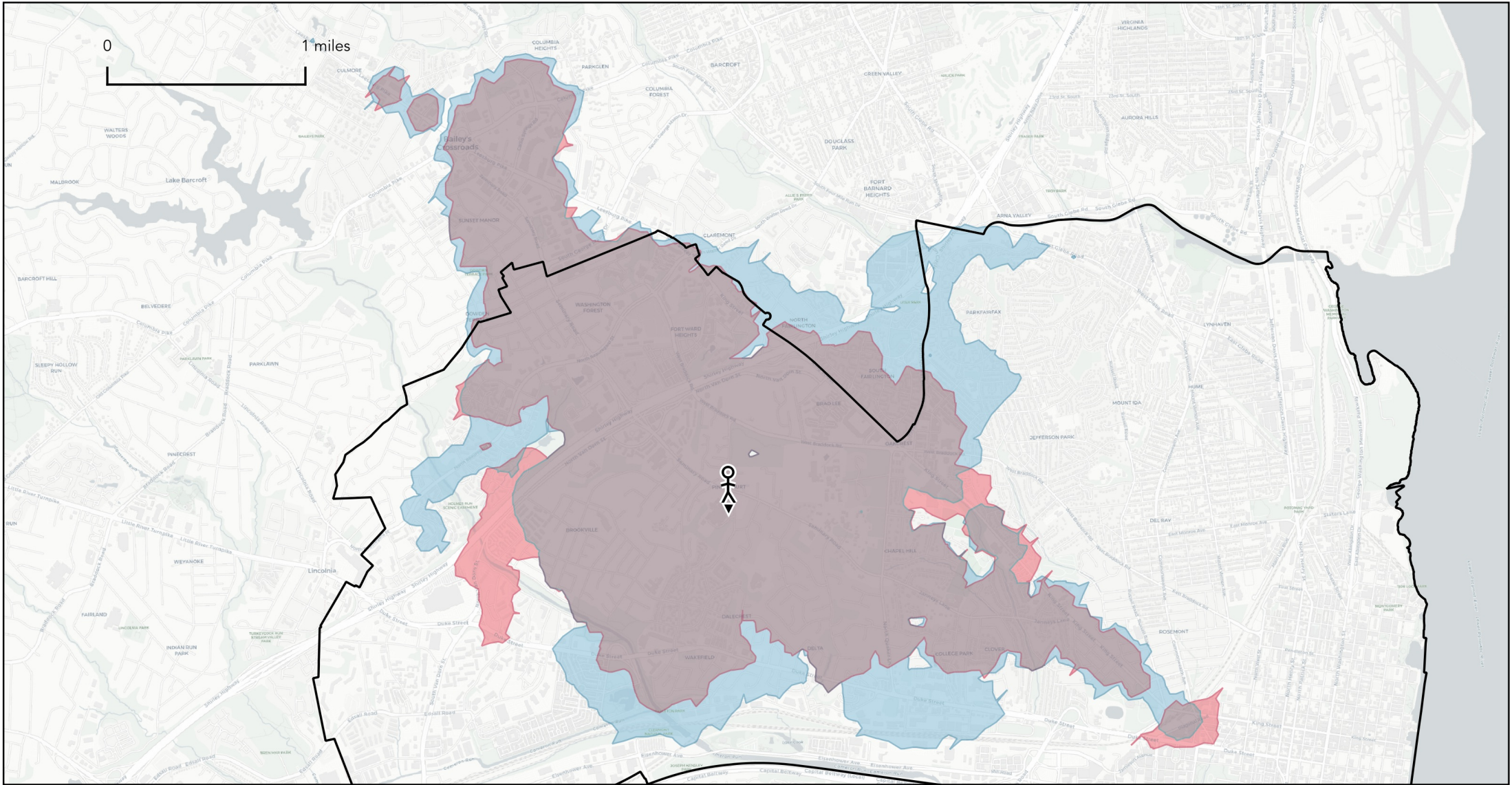
Figure 70: Isochrone showing the change in access from Landmark Mall in 2022 Network

How far can I travel in **30 minutes** from **Landmark Mall** at **12 pm**?

New Access

Retained Access

Lost Access
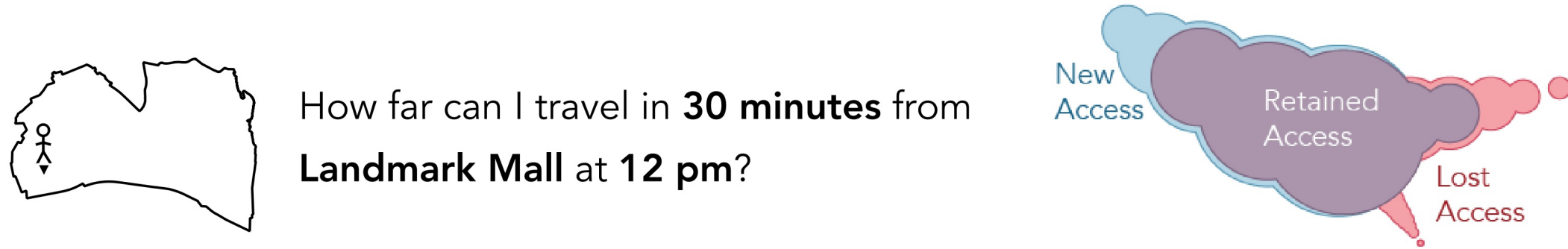
2022 Vision Plan Network
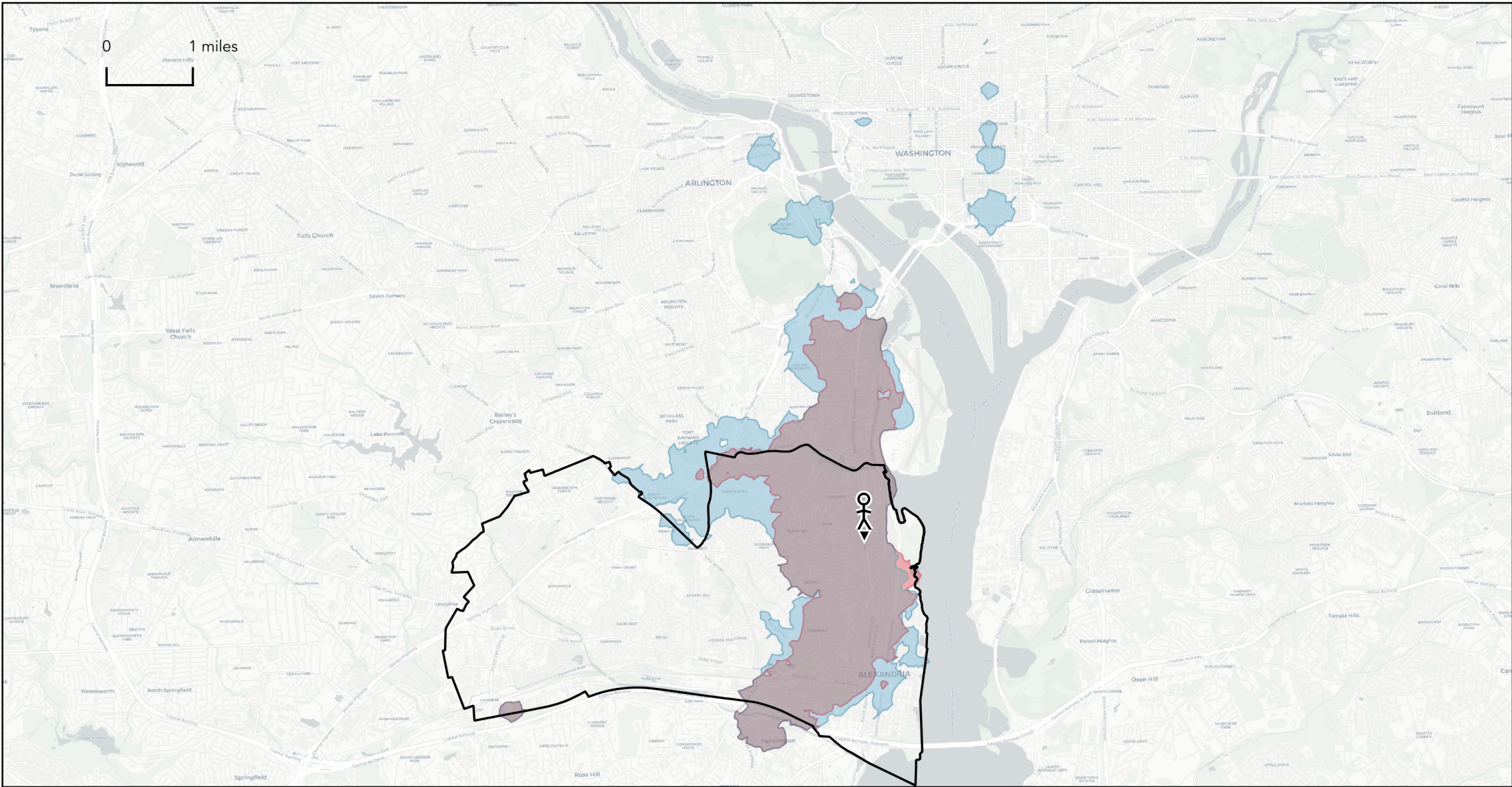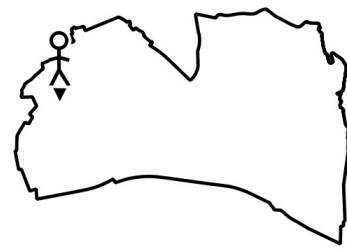
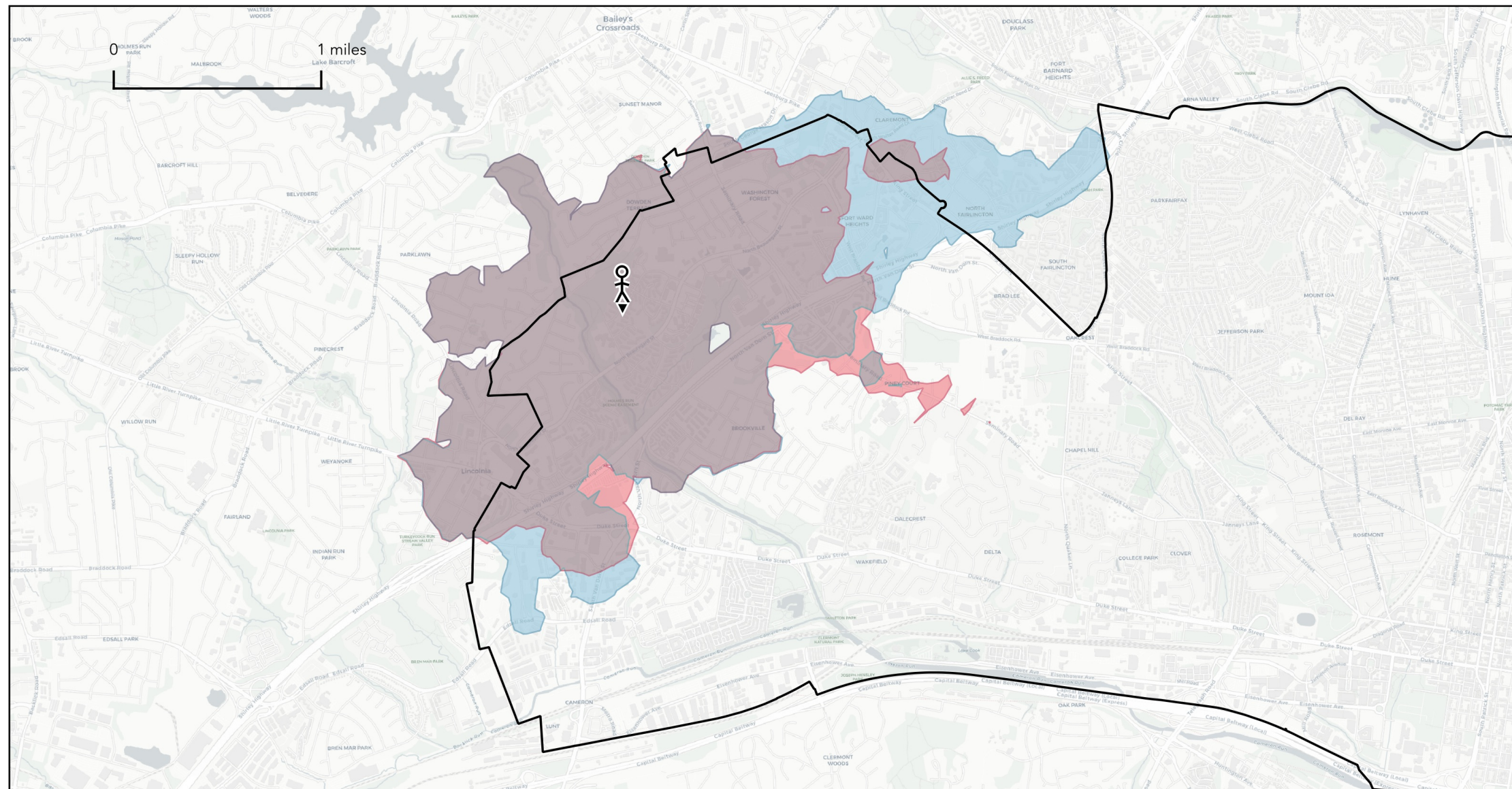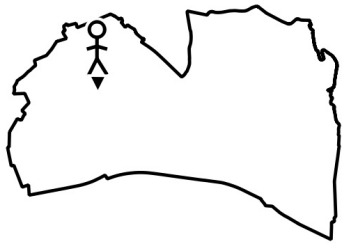19% more residents and 33% more jobs accessible than existing network
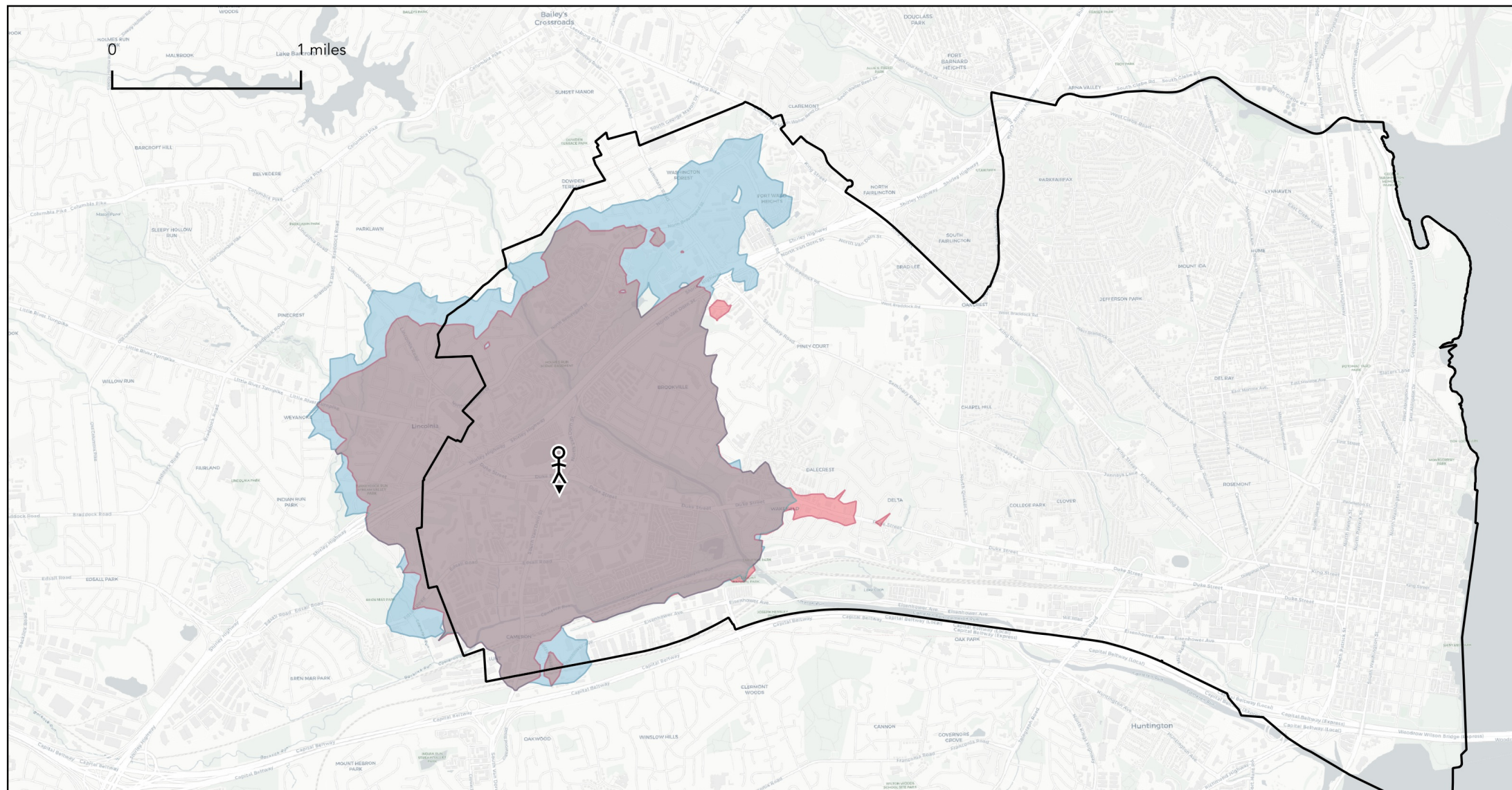
Figure 71: Isochrone showing the change in access from Mark Center in 2022 Network

How far can I travel in **30 minutes** from **Mark Center** at **12 pm**?

New Access
Retained Access
Lost Access

2022 Vision Plan Network

47% more residents and 22% more jobs accessible than existing network
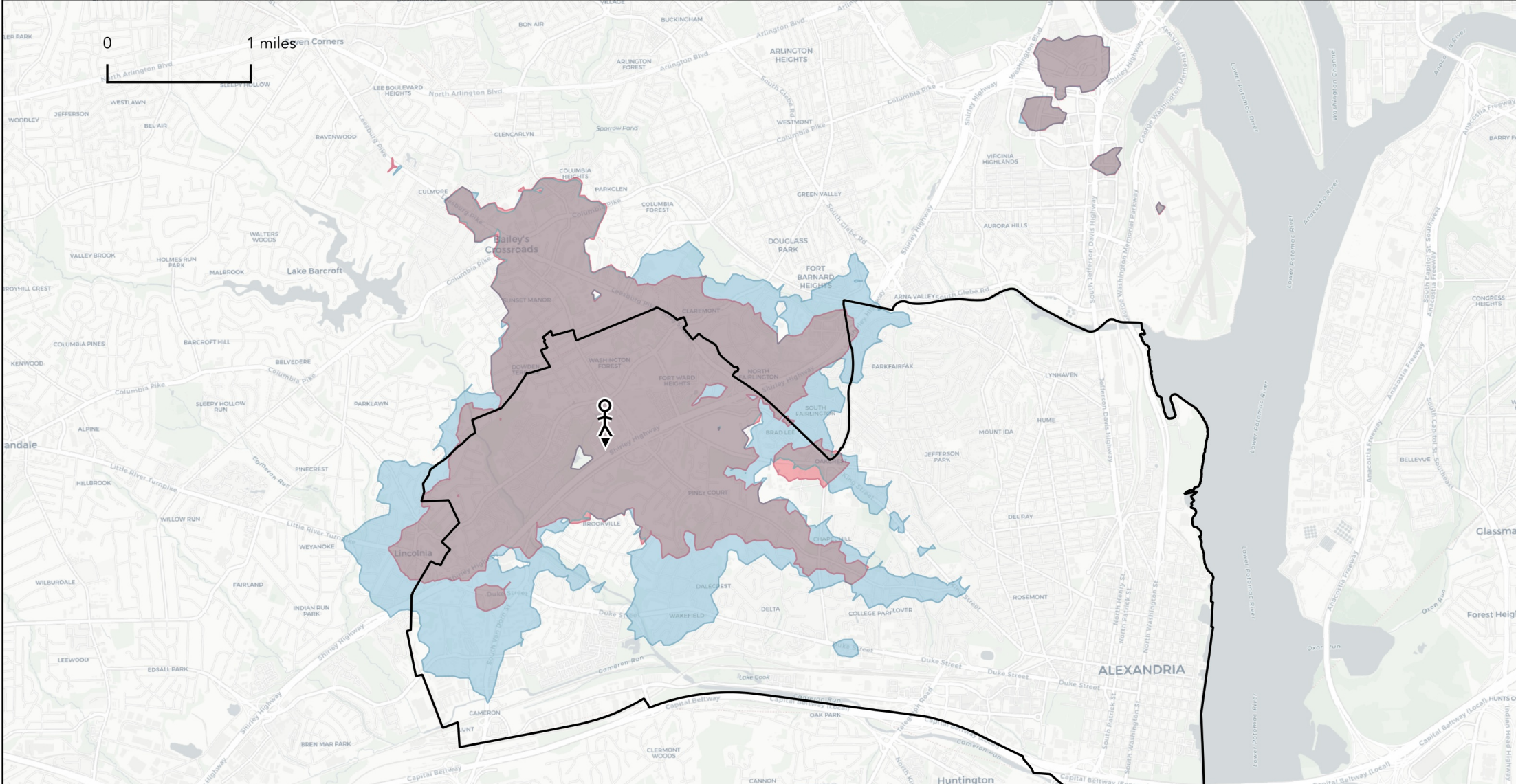
Figure 72: Isochrone showing the change in access from Old Town (King and Washington Streets) in 2022 Network

New Access — Retained Access — Lost Access
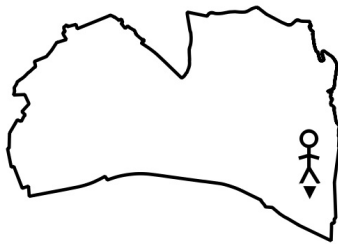
How far can I travel in **30 minutes** from **Old Town** at **12 pm**?

2022 Vision Plan Network

24% more residents and 12% more jobs accessible than existing network
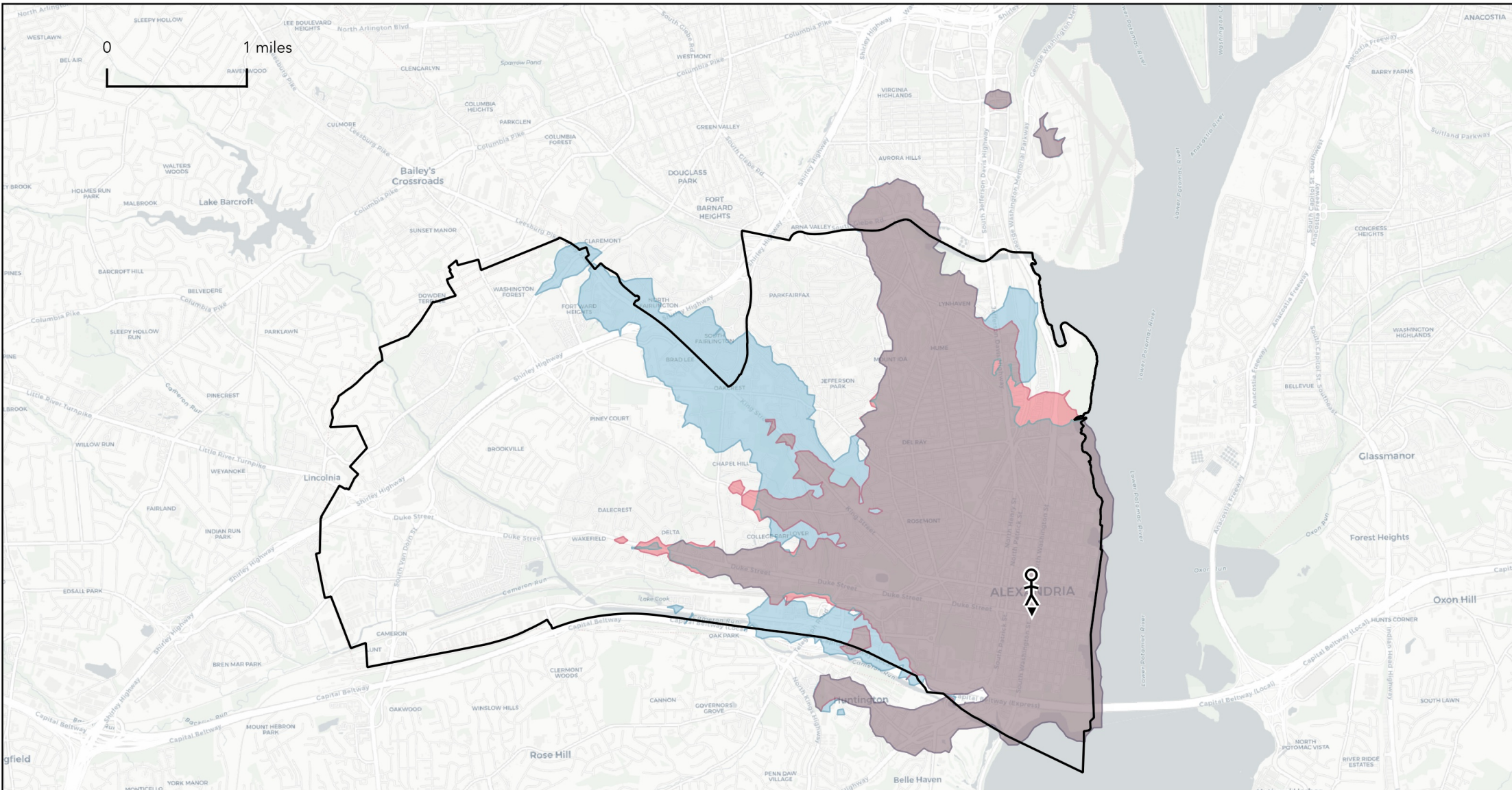
Figure 73: Isochrone showing the change in access from the Potomac Yard Metrorail Station in 2022 Network

How far can I travel in **30 minutes** from **Potomac Yard** at **12 pm**?

New Access

Retained Access

Lost Access

2022 Vision Plan Network

46% more residents and 38% more jobs accessible than existing network

0   1 miles

Figure 74: Isochrone showing the change in access from Reading Avenue and Rayburn Avenue in 2022 Network

How far can I travel in **30 minutes** from **Reading Ave & Rayburn Ave** at **12 pm**?

New Access
Retained Access
Lost Access

2022 Vision Plan Network

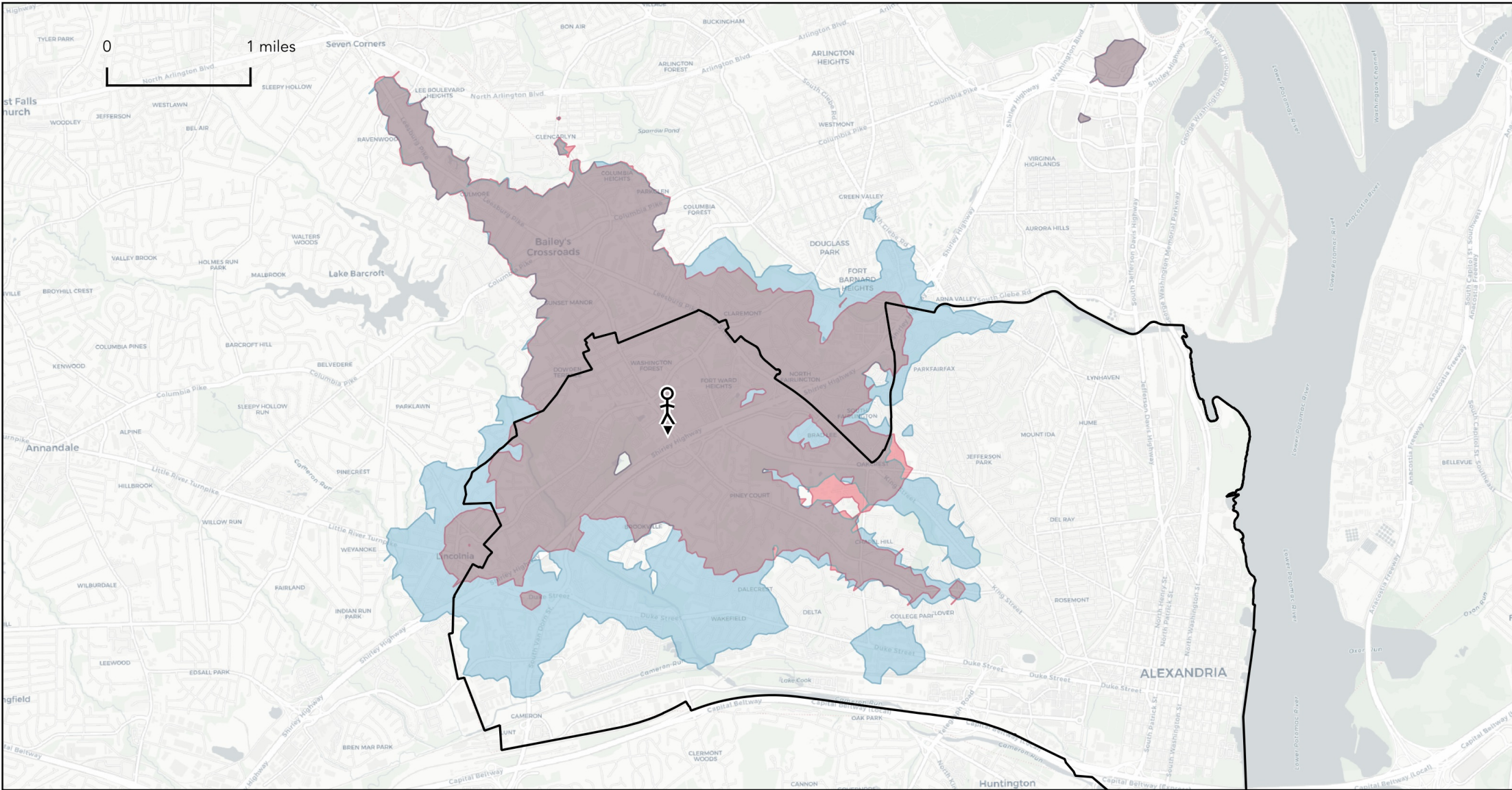36% more residents and 48% more jobs accessible than existing network

0   1 miles

Figure 75: Isochrone showing the change in access from Southern Towers in 2022 Network

How far can I travel in **30 minutes** from **Southern Towers** at **12 pm**?

New Access

Retained Access

Lost Access

2022 Vision Plan Network

49% more residents and 28% more jobs accessible than existing network

Figure 76: Isochrone showing the change in access from the Van Dorn Metrorail Station in 2022 Network

How far can I travel in **30 minutes** from **Van Dorn Station** at **12 pm**?

New Access
Retained Access
Lost Access

2022 Vision Plan Network
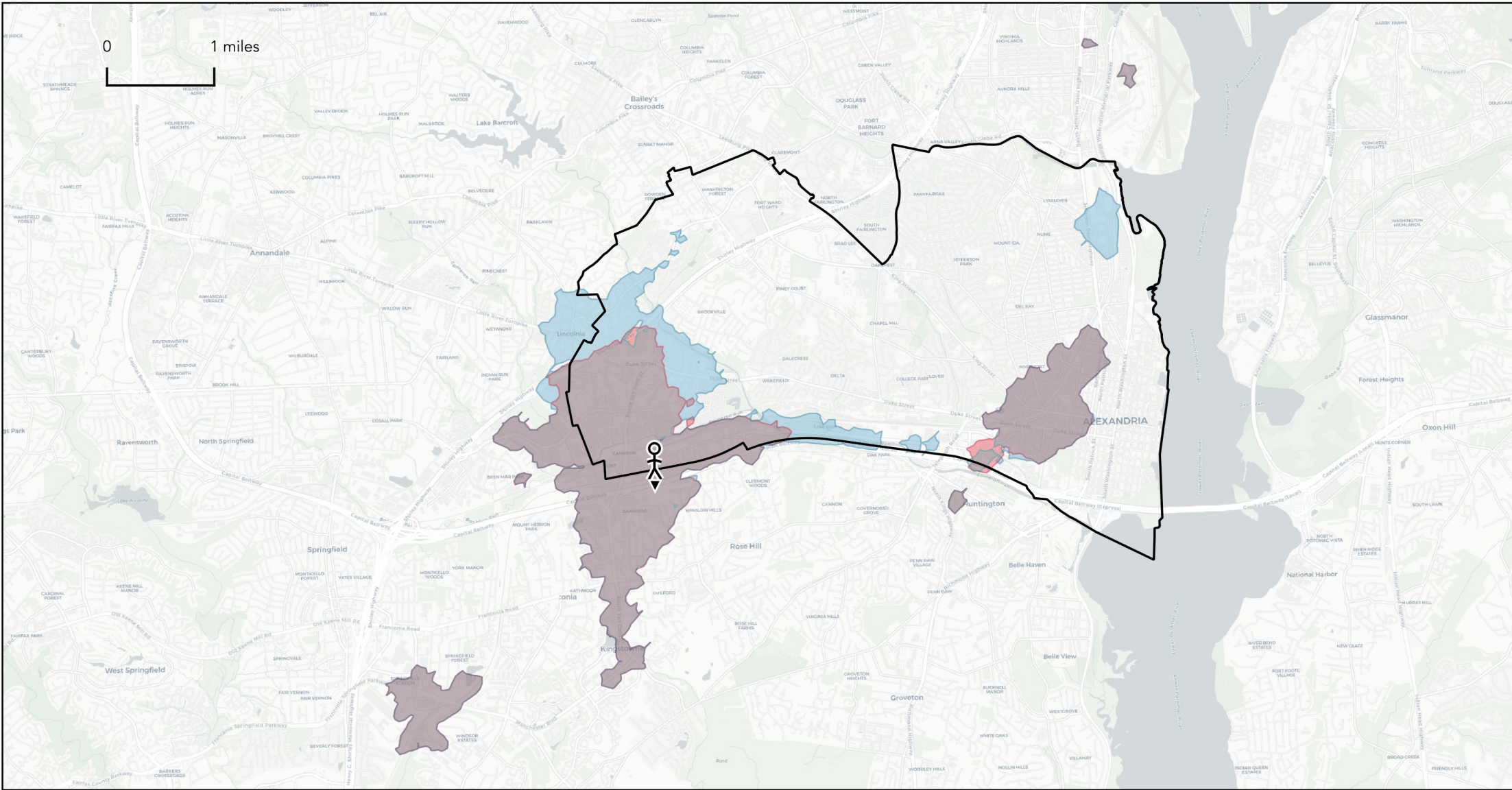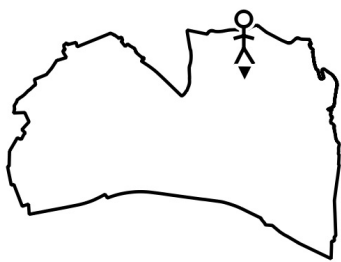44% more residents and 15% more jobs accessible than existing network

Figure 77: Isochrone showing the change in access from Arlandria (West Glebe and Old Dominion) in 2022 Network

How far can I travel in **30 minutes** from **W Glebe & Old Dominion** at **12 pm**?

New Access

Retained Access

Lost Access

2022 Vision Plan Network

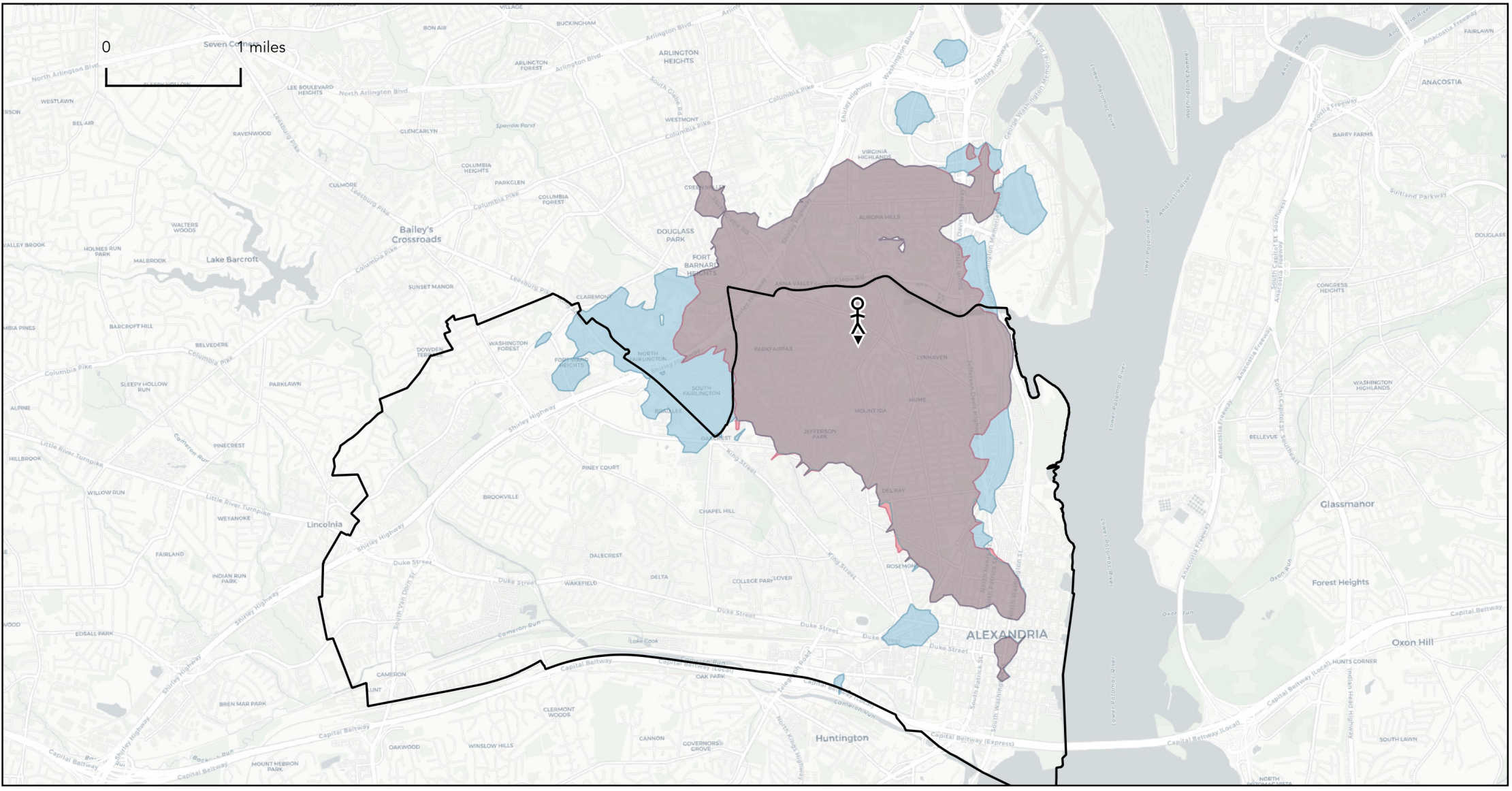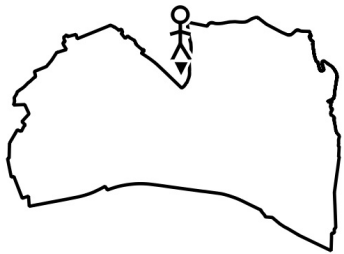28% more residents and 70% more jobs accessible than existing network

Figure 78: Isochrone showing the change in access from Shirlington (Randolph Street and Quincy Street) in 2022 Network

How far can I travel in **30 minutes** from **Randolph St & Quincy St** at **12 pm**?

New Access

Retained Access

Lost Access

2022 Vision Plan Network

29% more residents and 21% more jobs accessible than existing network