



Title VI Service Equity Analysis: May 2023 Proposed Service Changes

May 2023

Service Equity Analysis: May 2023

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Executive Summary

This document summarizes the analysis of service changes between the January 2023 and May 2023 runboards to ensure changes have not inequitably impacted minority and low-income populations.

Methodology

RTD's established Title VI program methodology defines the process to identify major service changes, disparate impacts, and disproportionate burdens. Analyses were performed at the route and block group levels to identify any potential disparities in service changes based on race/ethnicity or income.

Major Service Changes

RTD proposes changes to 24 bus route/patterns and six rail lines of RTD's forthcoming May 2023 runboard. Of these 30 changes, two services meet established thresholds for a major service change. The routes listed below have proposed adjustments to service that were greater than 25% of baseline service or services being eliminated.

| | |
|--|---|
| Service Adjustments (one service) | Route 10 – East 12th Street: extend service to Colfax and Billings via 11 th and Peoria and terminate westbound trips at Union Station |
| Service Reinstatement (one service) | FF2 – Boulder Express: Reinstate service on the FF2 (Boulder Express) with three trips in each direction |

Findings

Alterations to the proposed May 2023 service changes include extending the alignment of Route 10 and reinstatement of the FF2 Boulder Express pattern of the Flatiron Flyer. Of these routes, both serve high concentrations of low-income populations and Route 10 serves high concentrations of both minority and low-income populations.

When considering the demographics within the service areas of routes with major service changes and as a proportion to the District overall, low-income equity populations received a greater increase in service (i.e., were more positively impacted) compared to higher income populations. Low-income areas had a +1.67% benefit above higher income areas. Minority populations received a slightly lower increase in service (were positively impacted less) compared to non-minority populations. However, this difference did not meet the Disparate Impact threshold, therefore no system-level disparate impact was found with the proposed changes.

Finally, though there were no cumulative adverse impacts at the network level, a potential disparate impact was identified at the individual route-level: of the two routes/lines that had major service changes, FF2 had potential disparate impact finding but no disproportionate burden finding.

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Introduction

Title VI and Environmental Justice

Equity is a core principle of RTD's functional mission to provide mass transit service within the Denver region. An equitable mass transit system fairly distributes the benefits and adverse effects of transit service without regard for race, color, national origin, or low-income status. This principle is detailed and reinforced by Title VI of the Civil Rights Act of 1964 and Executive Order 12898 pertaining to environmental justice.

Title VI of the Civil Rights Act of 1964 prohibits discrimination on the basis of race, color or national origin in programs receiving federal financial assistance. Specifically, Title VI states, "No person in the United States shall, on the ground of race, color or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance."

In 1994, President Clinton issued Executive Order 12898, which states that each federal agency "shall make achieving environmental justice part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

The Federal Transit Administration's (FTA) Circular 4702.1B provides its recipients of FTA financial assistance with instructions for achieving compliance with Title VI and Environmental Justice. In this circular, the FTA requires RTD to evaluate, prior to implementation, any and all service changes that exceed the established major service change threshold, to determine whether those changes will have a disproportionately negative impact on minority or low-income populations.

This equity analysis report has been prepared to document changes that are proposed to occur between the January 2023 and May 2023 runboards. Routes with major service changes include one major increase and one reinstatement of a formerly suspended route pattern. These changes and all others have been reviewed individually at the route/line level and in aggregate at the block group level to identify potential impacts to the communities RTD serves.

Service Change Philosophy

An equity analysis is triggered by proposed major service changes to the transit services provided by RTD. These changes include the addition of new routes/lines, the elimination of existing routes/lines and changes to the alignment and trip frequency within existing routes/lines. RTD has established principles to identify the service changes needed to meet the diverse travel needs of those within the District and maintain a high-performance, sustainable transit system.

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RTD Service Changes Guiding Principles

- Service performance evaluation based on service standards
- The effects on the overall integrity of the transit network and on transit dependent markets
- The availability of alternative services to affected riders
- Cost-effective distribution throughout the District and Family of Services and the ability to enhance service when possible
- Compliance with Title VI of the Civil Rights Act: benefits and services are provided without regard to race, color or national origin; also, disparate effects on low-income and minority populations
- Response to changes in the communities where services are provided

RTD services are divided into various service classes depending on service type, route alignment and frequency. Each service class has its own service standards derived from the performance of all routes within each class. RTD continually and comprehensively adjusts services in response to changes in ridership and operational performance of the transit system. It is also the agency's responsibility to identify services that are underperforming and recommend modifications, curtailment or cancellation of service as warranted. In keeping with Colorado Revised Statutes, RTD utilizes official service standards to establish performance metrics used to identify underperforming services on a class-of-service basis. The agency uses these metrics to identify a series of service changes. Equity analyses examine the impact of the proposed major service changes on minority populations and low-income households at or below 150 percent of the Department of Health and Human Services Poverty Guidelines.

...The general assembly further finds that the district should be organized efficiently, economically, and on a demand-responsive basis and that the district should consider least-cost alternatives in discharging its responsibilities.

Colorado Revised Statutes 32-9-119.7 Farebox Recovery Ratios – Plans

RTD's Title VI Equity Analysis Policies

Per FTA Circular 4702.1B Chapter IV.7, RTD must establish a Major Service Change Policy, a Disparate Impact Policy and a Disproportionate Burden Policy. Collectively, these policies provide foundational requirements for evaluating service change proposals for equity and compliance with Title VI. These policies and their applicable thresholds are listed below:

1. **Major Service Change:** A major service change is defined as a 25% addition or reduction in the service hours of any route that would remain in effect for 12 or more months. All major service changes will be subject to an equity analysis that includes an analysis of adverse effects.
 - a. An **Adverse Effect** is defined as a geographical or temporal reduction in service that includes, but is not limited to, eliminating a route, shortening a route by eliminating segments, rerouting an existing route, and increasing headways. RTD shall consider the degree of adverse effects

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and analyze those effects when planning major service changes.

2. **Disparate Impact Analysis:** A major service change should not adversely affect a minority population 10 percent more than non-minority populations; this level of impact is considered a disparate impact.
3. **Disproportionate Burden Analysis:** A major service change should not adversely affect a low-income population 10% more than higher income populations; this level of impact is considered a disproportionate burden. A low-income population is a group of households who are at or below 150% of the Department of Health and Human Services Poverty Guidelines.

If a proposed major service change results in a disparate impact or a disproportionate burden, RTD will consider modifying the proposed service change. RTD will then analyze the modification and make sure it removed the potential disparate impact or disproportionate burden. If a less discriminatory option cannot be identified and RTD can demonstrate a substantial legitimate justification for the proposed service change, the FTA may allow RTD to proceed with the proposed change.

Analysis

Data Sources and Methodology

Demographic data used for this analysis comes from the Census Bureau's American Community Survey (ACS) 5-Year Estimates for years 2017 to 2021 and is reviewed at the census block group geographic level. Other data related to the analysis includes route alignments and block group geography. The linking of these datasets into a service-geographic-demographic combination relates equity populations with changes in service at a geographic level to aid in reviewing potential impacts to district equity communities.

The equity analysis for the May 2023 runboard looked at whether an individual route's major service changes impacted the communities it served. The review needed to determine the proportional difference in changes made to equity populations within a route's/line's quarter-mile service area. These proportional differences were compared against district population proportions of equity populations and route/line proportions of equity populations.

Low-income status for population within the District is derived from the Census Bureau and is based on 150% of the United States federal poverty level (Department of Health and Human Services guidelines), based on local context, which is an annual income of \$32,580 for a family of three. Minority status was based on the non-white and Hispanic or Latino count of total population. The service area was based on the collection of block groups within district boundaries.

Route/line service area population was determined using a quarter mile "catchment area" centered around bus stops and rail stations. This catchment area was then used to calculate the percentage overlap of census block-based population underneath. For instance, if a catchment area contained 100% of the underlying block group, 100% of the population would be associated with the services within a quarter mile; if 50% of a block group was contained in the catchment area, only half of the underlying population would count as being included (ratios of population demographics would be unchanged).

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RTD calculated the net change in service hours for each route/line modification to provide the percent difference from baseline service hours. Any change at or above 25% from baseline was flagged as a major service change for further review.

Public Outreach Overview

Three public meetings were conducted February 21-22, 2022. The comments collected on service changes during these meetings are summarized in the table below. In addition to the general outreach, the Transit Equity Office reached out to 68 community-based organizations and schools surrounding the routes/lines to inform and encourage community members to attend the open houses. Table 1 captures the meeting locations, dates, number of attendees and the common themes of attendees' comments pertaining to the three major service changes described in this analysis.

Table 1. Public meeting details

| Date and Time Location | Comment Themes | Number of Attendees |
|------------------------------------|---|---------------------|
| February 21 at 12 p.m. Virtual | Two customers are excited to see the FF2 come back. | 10 |
| February 21 at 5:30 p.m. Virtual | Customer wants more FF2 service than what is being proposed. | 10 |
| February 22 at 12 p.m. Virtual | Customer very appreciative to have FF2 restored Customer asked why Route 10 isn't ending at Del Mar Circle (was told no operator restroom available there) | 14 |
| | | Total – 34 |

The public was also notified of the ability to submit comments to service.changes@rtd-denver.com, by phone at 303-299-2004 and by fax 303-299-2227.

Major Service Change, Disparate Impact and Disproportionate Burden Analysis

Proposed service changes for the May 2023 runboard that resulted in a 25% or greater change in service were categorized by equity population (minority or non-minority, low-income or higher income) for comparison. Routes were categorized as either equity or non-equity based on their identification within the prior network using 2017-2021 ACS five-year demographic data.

A comparative, proportional equity analysis was completed to review the routes/lines individually. This analysis identified the equity and non-equity populations within a route/line service area and compared those against the equity and non-equity populations of the District. If impacted equity populations within the route/line service area received 10% or greater impacts compared to non-equity populations, the route/line had a potential finding of Disparate Impact (for minority populations) or Disproportionate Burden (for low-income populations) and was flagged for a finding of potential impact.

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Major Service Change Test

Identify routes with proposed major service changes (annual trips) of 25% or more

Changes by Transit Mode

As RTD continues to adapt to changes affected by the pandemic, 21 bus routes will undergo service changes. Of these, four routes will see an increase of **bus service by over 49 total weekday revenue service hours**. Changes to Route 10 exceeded the major service change threshold and FF2 is a reinstatement of previously suspended service; both account for almost 41 of the additional daily revenue service hours. Rail services will have service level adjustments to increase service to midnight.

Table 2. Summary of service changes by transit mode

| Mode | Additional Daily Hours |
|----------|------------------------|
| All Rail | 0 |
| All Bus | 49 |
| Overall | 49 |

Major Service Change Review

A complete listing of all service changes can be found in Appendix A. Changes were first reviewed in aggregate equity groupings of routes/lines prior to individual review of routes/lines, route/line block groups, and overall network levels; equity grouping comparison occurred at every level. Major service changes are categorized as the following:

- **Major Service Reductions or Eliminations** (a service reduction of 25% or more)
- **Major Service Increases/Restructuring** (service increases of 25% or more related to new or restructured service)

Major Service Change Reductions/Eliminations

No major reductions/eliminations.

Major Service Change Increases

Two bus routes had major service changes which include service increases of 25% or greater. This includes one modification to alignment on Route 10 and a reinstatement of a route pattern on the Flatiron Flyer. While below the percentage threshold, the reinstatement of service to pattern FF2 is considered a major service change and is therefore included in the review.

Route- and Line-Level Analysis

Having identified the service changes which meet the definition of Major Service Change, the next step in the analysis is to look at each route/line individually to determine potential Disparate Impacts (DI) and/or Disproportionate Burdens (DB). Both service reductions and service increases are analyzed. For service increases, the analysis examines the extent to which the benefits of the improvements are inclusive of minority

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and low-income populations. For service decreases, the analysis examines the extent to which the adverse effects of the reductions are disproportionately borne by minority and low-income populations.

Disparate Impact and Disproportionate Burden Analysis

For each route/line with a major service change, determine the percent of the route's/line's impacted equity and non-equity populations comprising the District's equity and non-equity populations; if the difference is greater than 10% for equity populations, additional review is required for potential adverse impacts

In concert with RTD's Title VI policies, the demographics of each of major service change routes were reviewed for potential DI or DB findings. For service increases, the following analysis examines the extent to which the benefits of the improvements are inclusive of minority and low-income populations. Because these are proposed service increases, protected populations *falling below* these thresholds are flagged for potential concerns. The narrative analysis of each individual route follows, which includes further considerations of access to jobs, education, health care, food and social services for minority and low-income populations.

Route 10 – East 12th Avenue

Proposal: Extend route into Aurora to Colfax Ave and Billings Street via 9th and 11th Avenues and Peoria Street. Headways between 9th Avenue and Clermont Street would be 60 minutes. All westbound trips would terminate at Denver Union Station.

As shown in Table 4, a higher percentage of the District's minority population stands to benefit from the proposed Major Service Increase as compared to non-minority population (2.41% vs. 2.11%, respectively). This difference does not exceed the 10% disparate impact threshold (1.90%). Therefore, a route-level disparate impact is not found. Moreover, a higher percentage of the District's low-income population stands to benefit from the proposed Major Service Increase as compared to higher population (3.30% vs. 2.06%, respectively). This difference does not exceed the 10% disparate impact threshold (1.85%). Therefore, a route-level Disproportionate Burden is not found.

Table 3. Route 10 Disparate Impact and Disproportionate Burden Analysis

| East 12th Avenue | | | | |
|--|------------------------------|-------------------------|-------------------------------------|-------------------------|
| January 2023 to May 2023 Service Change Analysis | | | | |
| | Non-Minority Population | Minority Population | Higher Income Population | Low-Income Population |
| Route Service Area Impacted | 40,614 | 27,197 | 52,995 | 14,184 |
| District Statistics | 1,922,542 | 1,126,534 | 2,576,564 | 429,175 |
| District Total Base Population | 3,049,076 | | 3,005,739 | |
| % of District Not Impacted | 97.89% | 97.59% | 97.94% | 96.70% |
| % District Impacted | 2.11% | 2.41% | 2.06% | 3.30% |
| Thresholds | Disparate Impact (DI) | | Disproportionate Burden (DB) | |
| <i>DI & DB Thresholds Are 90% for service increases and 110% for service decreases</i> | <i>DI Threshold</i> | <i>Min Pop Impacted</i> | <i>DB Threshold</i> | <i>L-I Pop Impacted</i> |
| | 1.90% | 2.41% | 1.85% | 3.30% |

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The maintenance of Route 10 existing service would maintain access to:

- About 154,224 jobs
 - 28% low-to-medium wage jobs, which is below the RTD District average (45%)
 - 14% jobs held by minorities, which is at the RTD District average (14%)
 - 15% jobs held by Hispanic/Latino workers, which is below the RTD District average (18%)
- 47 retail/convenience stores
- 66 human and social services centers
- 7 senior housing and facilities
- 27 college, high school, middle school, and elementary schools

The extension of Route 10 would provide new access to:

- About 34,615 jobs
 - 31% low-to-medium wage jobs, which is below the RTD District average (45%)
 - 17% jobs held by minorities, which is above the RTD District average (14%)
 - 15% jobs held by Hispanic/Latino workers, which is below the RTD District average (18%)
- 12 retail/convenience stores
- 7 human and social services centers
- 3 senior housing and facilities
- 22 college, high school, middle school, and elementary schools

Route FF2 (Boulder/Denver) – Boulder Express

Proposal: Reinstate route pattern with three eastbound trips (7:07AM, 7:37AM and 4:15PM from Downtown Boulder Station) and three westbound trips (7:45AM, 4:45PM and 5:20PM from Denver Union Station).

As shown in Table 5, a lower percentage of the District's minority population stands to benefit from the proposed Major Service Increase as compared to non-minority population (0.40% vs. 0.81%, respectively). This difference does exceed the 10% disparate impact threshold (0.73%). Therefore, a potential route-level disparate impact is not found requiring further examination (i.e., access to key public service destinations, community engagement and network level analysis). However, a higher percentage of the District's low-income population stands to benefit from the proposed Major Service Increase as compared to higher population (0.93% vs. 0.51%, respectively). This difference does not exceed the 10% disparate impact threshold (0.46%). Thus, there is no Disproportionate Burden at the line-level.

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Table 5. Route FF2 Disparate Impact and Disproportionate Burden Analysis

| FF2 (Boulder/Denver) - Boulder Express | | | | |
|--|------------------------------|-------------------------|-------------------------------------|-------------------------|
| January 2023 to May 2023 Service Change Analysis | | | | |
| | Non-Minority Population | Minority Population | Higher Income Population | Low-Income Population |
| Route Service Area Impacted | 15,634 | 4,534 | 13,222 | 3,998 |
| District Statistics | 1,922,542 | 1,126,534 | 2,576,564 | 429,175 |
| District Total Base Population | 3,049,076 | | 3,005,739 | |
| % of District Not Impacted | 99.19% | 99.60% | 99.49% | 99.07% |
| % District Impacted | 0.81% | 0.40% | 0.51% | 0.93% |
| Thresholds | Disparate Impact (DI) | | Disproportionate Burden (DB) | |
| <i>DI & DB thresholds are 90% for service increases & 110% for service decreases</i> | <i>DI Threshold</i> | <i>Min Pop Impacted</i> | <i>DB Threshold</i> | <i>L-I Pop Impacted</i> |
| | 0.73% | 0.40% | 0.46% | 0.93% |

The reinstatement of the FF2 pattern of the Flatiron Flyer would improve access to:

- About 43,880 jobs
 - 39% low-to-medium wage jobs, which is below the RTD District average (45%)
 - 12% jobs held by minorities, which is below the RTD District average (14%)
 - 14% jobs held by Hispanic/Latino workers, which is below the RTD District average (18%)
- 23 retail/convenience stores
- 28 human and social services centers
- 2 senior housing and facilities
- 12 college, high school, middle school, and elementary schools

Network Analysis

In accordance with RTD’s 2022 Title VI Program update, a network analysis is required in addition to route- and line-level analysis. A network level analysis provides further understanding of changes to service levels for Title VI protected populations at aggregate levels.

The major service change threshold of 25% or greater used for individual route-level analyses was used as precedent to determine potential adverse impacts overall and to identify structural issues in areas requiring further review. Once average district thresholds for low-income and minority populations were established, subsequent equity analyses focused on the subset of district block groups that experienced major service changes of 25% or greater (additions or reductions in service), and whether equity block groups with major service changes experienced service changes of 10% or more compared to non-equity block groups. Routes with major service changes are later comparatively reviewed for potential adverse effects at route-block group levels (block groups within route service areas).

The analysis of all service changes identified the following:

- Systemwide, bus service was increased by over 49 weekday revenue hours.
- Of the almost 88,000 people served by stops within the service area with major service changes, low-income populations represented a higher share of population than District averages. Of this cumulative figure, nearly 50,000 would receive service improvements for equity populations.

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- At the network level, equity routes and non-equity routes¹ were compared only for those with major service changes. The two bus routes with major service changes serve above-average low-income populations.

In review of Routes 10 and FF2 at the network level, there are no potential disparate impact or disproportionate burden findings.

An analysis of all district block groups and their service levels was conducted to establish the baseline equity thresholds for low-income and minority populations and to determine the systemwide magnitude of impacts of the January 2023 to May 2023 service change. Block groups with low-income and minority populations at or above the district average are referred to in this analysis as “equity” block groups whereas higher income and non-minority block groups are referred to as “non-equity” block groups.

Network Analysis Process

Determine block groups at/above district averages for low-income population (14.3%) and minority population (36.9%).

Determine which block groups experienced service changes of 25% or more.

Of block groups with a major service change, compare the difference in annual trips for equity versus non-equity block groups; if the difference is more than 10%, review for potential adverse impacts.

There are 2,197 block groups defined as being wholly within or mostly within the District². Using the 2017-2021 5-Year ACS Estimates, total population residing within these block groups was calculated as well as the total minority population and total low-income population, calculated separately, to determine the District-wide low-income and minority rates which set the thresholds for which block groups are classified as above average. While the percent minority figure of 36.9% was derived by using the base population of the service area (3.049 million) the low-income population percentage of 14.3% is derived from a slightly smaller population figure (3.005 million). This is due to the smaller population whose poverty status the Census Bureau can determine³. The thresholds summarized in Table 6 yielded 831 (38% of all) block groups above the district average for low-income population, and 830 (38%) block groups above the district average for minority population.

Table 6. District averages; NTD 2018; ACS 2017-2021 5-Year estimates

| Service Area (sq. mi.) | Total Block Groups | Total Population | Percent Minority | Total Population (assessed) | Percent Low-Income |
|------------------------|--------------------|------------------|------------------|-----------------------------|--------------------|
| 2,342 | 2,197 | 3,049,076 | 36.9% | 3,005,739 | 14.3% |

¹ Based on existence of the route within the January 2023 network and the population within a quarter mile of bus stops or rail stations. 2017-2021 5-Year ACS estimates were used for population identification.
² Some block groups are not completely contained within district boundaries due to differences in boundaries between the District and Census-defined geographies.
³ The total population whose poverty status is determinable/assessed is lower than the estimate of total population and results in a different base population used to determine low-income percent of population.

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The proposed major service changes were examined in aggregate by transit mode to determine overall impacts to underlying population. Table 7 summarizes the change in service for block group population within one quarter mile of bus stops with proposed major service changes proportionally compared to population in the District. This comparison reviews the equity composition of those who may be impacted by proposed service changes compared to the overall equity composition of the District overall. No major changes were proposed for rail services with the May 2023 runboard.

Table 7. Systemwide disparate impact and disproportionate burden equity analysis summary for all bus major service changes

| Systemwide Disparate Impact and Disproportionate Impact Analysis: All Bus | | | | |
|--|------------------------------|------------------------------|-------------------------------------|------------------------------|
| | Non-Minority Population | Minority Population | Higher Income Population | Low-Income Population |
| Route Service Area Impacted | 56,249 | 31,730 | 66,217 | 18,182 |
| District | 1,922,542 | 1,126,534 | 2,576,564 | 429,175 |
| District Total | 3,049,076 | | 3,005,739 | |
| % District Not Impacted | 97.07% | 97.18% | 97.43% | 95.76% |
| % District Impacted | 2.93% | 2.82% | 2.57% | 4.24% |
| Thresholds | Disparate Impact (DI) | | Disproportionate Burden (DB) | |
| <i>DI & DB thresholds are 90% for service increases & 110% for service decreases</i> | <i>DI Threshold</i> | <i>Minority Pop Impacted</i> | <i>DB Threshold</i> | <i>Low Inc. Pop Impacted</i> |
| | 2.63% | 2.82% | 2.31% | 4.24% |

For system-level bus service changes, **non-minority populations stand to benefit slightly more than minority populations**, (2.93% vs. 2.82%, respectively). However, the difference does not meet the Disparate Impact Threshold of 2.63%. Therefore, no system-level disparate impact findings are found with the proposed major service changes. **Low-income populations stand to benefit more than higher income populations** (4.24% vs. 2.57% respectively), with low-income areas benefitting 1.67% more than higher income areas. Therefore, no system-level disproportionate burden is found with the proposed major service changes.

Figures 1 and 2 illustrate the locations of above average low-income and minority block groups within the District, as well as highlight the two bus routes with major service changes (orange). The Route 10 benefits low-income and minority populations, serving the 9th and 11th Avenue and Peoria Street corridors with a longer alignment and more connections into Aurora. The FF2 pattern of the Flatiron Flyer is currently suspended and is proposed to be reinstated with three trips in each direction/peak period.

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Service and Service Area with Low-Income Population

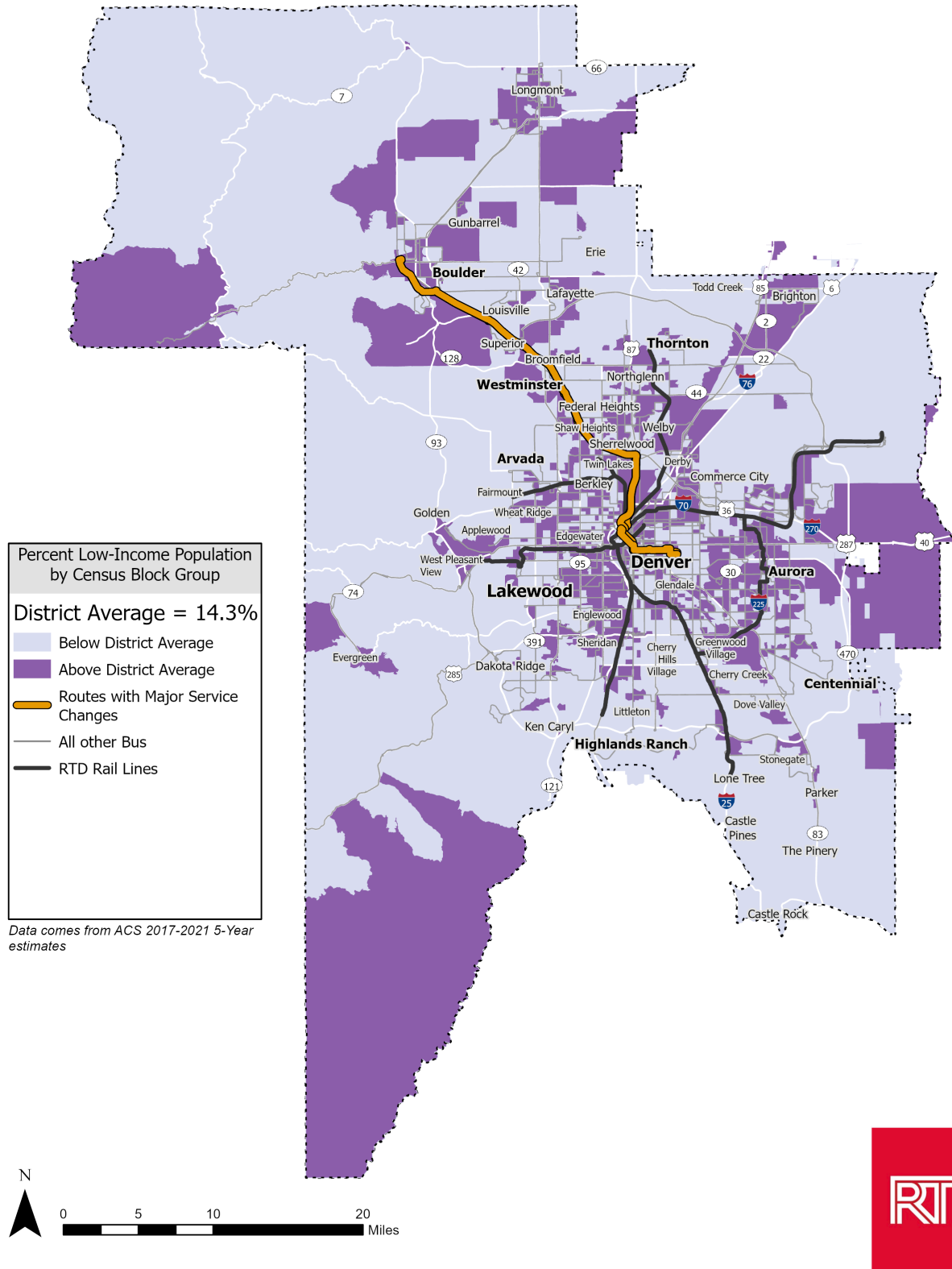


Figure 1. District block groups with above-average low-income population (red); US Census Bureau 2017-2021 5-Year Estimates

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Service and Service Area with Minority Population

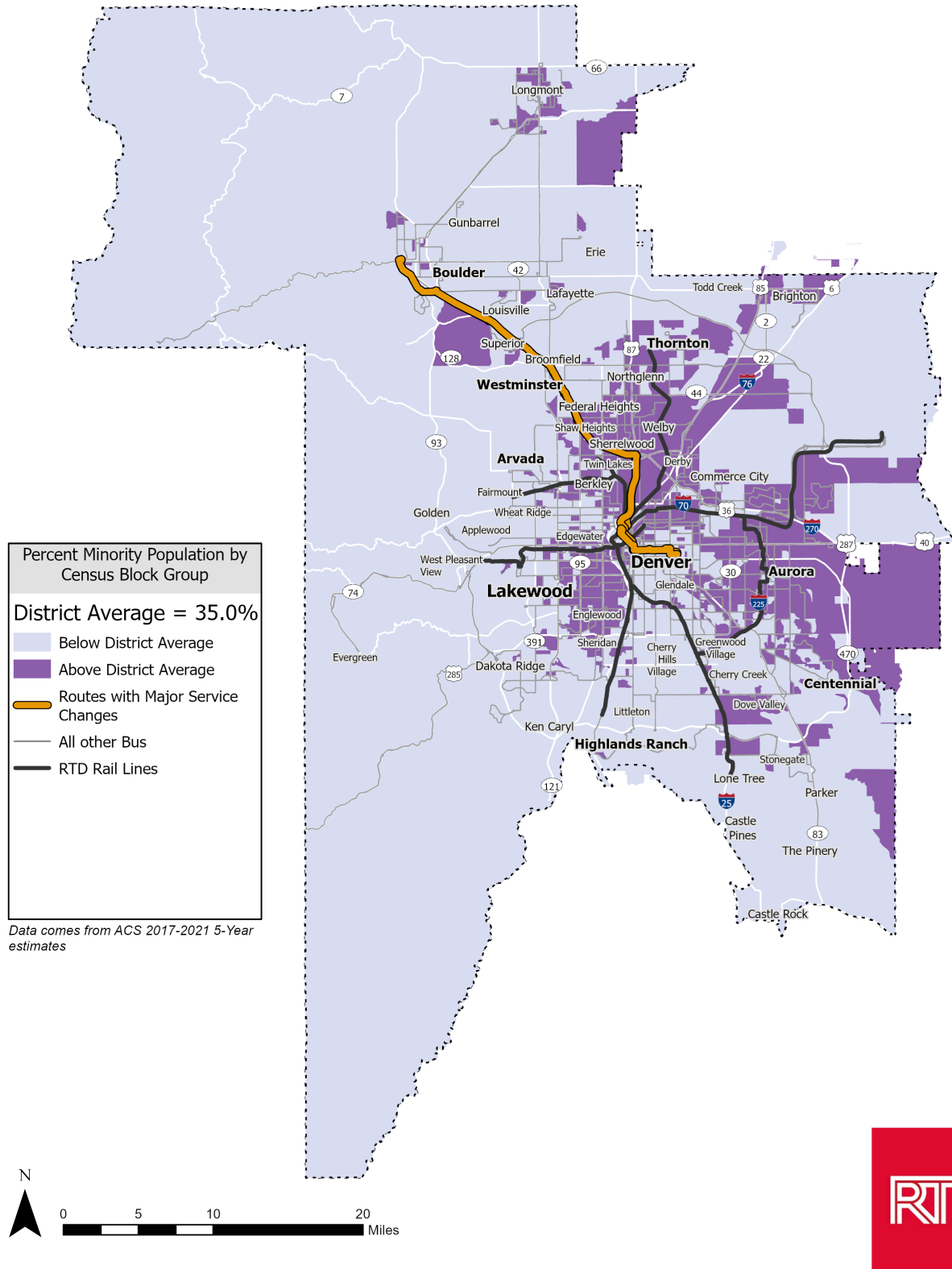


Figure 2. District block groups with above-average minority population (green); US Census Bureau 2017-2021 5-Year Estimates

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The January 2023 to May 2023 service changes are captured in Figure 3 and vary by the extent of the route and segment changes. This map provides a generalized view of where service is changing at the route pattern level. The January 2023 bus network is colorized according to the percentage change in service hours. The FF2 is shown in green (7% service change). The network also includes Route 10 in teal, representing significant modifications to its alignment and accompanying service hours (74%). All other bus routes, shown in gray, are programmed to undergo minimal (e.g., schedule adjustments, minor realignments) or no service changes in May 2023.

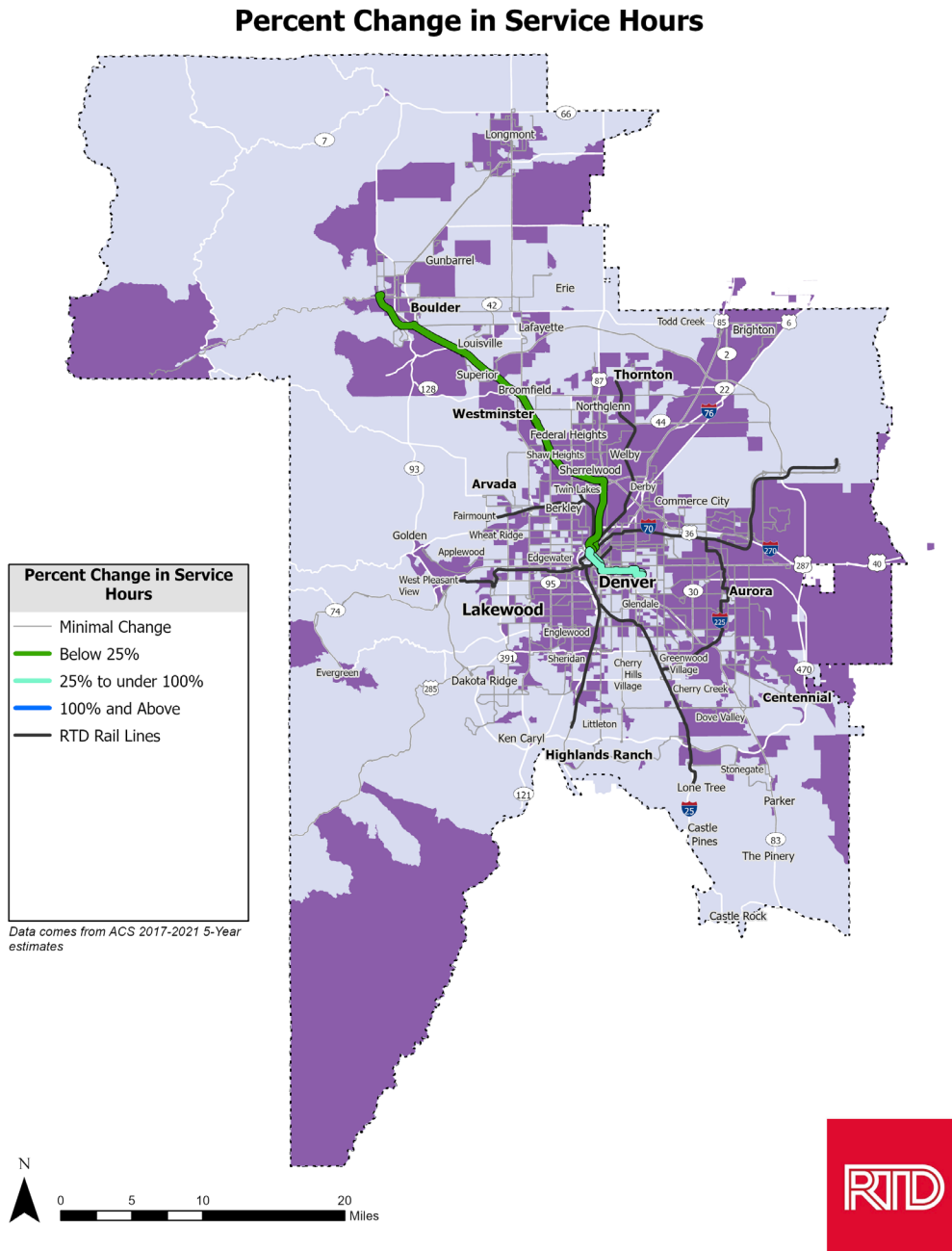


Figure 3. Depiction of route and segment changes by severity of change, January 2023 to May 2023

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Summary of Findings

The network changes that are proposed between January 2023 and May 2023 include modifications to service that include schedule adjustments, changes to summer schedules and trip availability, additional trips, and longer spans of service. The major service change increases were entirely invested in bus services. No major service reductions were included.

Route-level Findings:

- Of the 30 total services with proposed changes, taken individually, **one had a potential disparate impact finding.**
- **Route FF2 has a potential disparate impact finding** due to minority populations receiving -0.11% less of a benefit than non-minority populations.
- Route 10 had no potential disparate impact and no disproportionate burden findings.

Table 8 summarizes major service changes by change type, provides findings of potential disparate impacts and disproportionate burdens based on a comparative difference analysis, and provides the individual route service change.

Table 8. Summary of major service changes by change type and impact

| Change Type | Number | Route | Potential Disparate Impact? | Potential Disproportionate Burden? | Service Change Pct |
|-------------------|--------|--|-----------------------------|------------------------------------|--------------------|
| Service Increases | 10 | East 12 th Street | No | No | 74% |
| | FF2 | FF2 (Boulder/Denver) – Boulder Express | Yes | No | 7% |

Next Steps for Potential Disparate Impacts and Disproportionate Burden Findings

Given a potential disparate impact or disproportionate burden, RTD will evaluate whether there is an alternative that would serve the same objectives and with a more equitable impact. Otherwise, RTD will either:

- Alter the service proposal to avoid, minimize, or mitigate potential disparate impacts/disproportionate burdens, or
- Provide a substantial legitimate justification for keeping the proposal as-is and show that there are no alternatives that would have a less disparate impact on minority riders or disproportionate burden on low-income customers but would still accomplish the project or program goals.

Alterations to the initial proposed May 2023 service changes⁴ include adding improvements to Route 10 and FF2, both of which serve low-income populations at rates higher than the District average. These service changes signify the agency's commitment to ensure an equitable distribution of service improvements.

⁴ <https://www.rtd-denver.com/service-changes/may-2023>

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In addition to the systemwide-level findings below, RTD's on-going pandemic response, the substantial ridership decline, personnel impacts, resource allocation (human and capital) and recovery uncertainty serves as justification for maintaining the May 2023 service changes proposal.

Systemwide-level Findings:

- Of the almost 88,000 people with access to bus stops within the service area of the bus routes with a major service improvement (Routes 10 and FF2), low-income groups represented a higher share of the population than district averages, indicating targeted services to low-income populations.
- When considering the demographics within the service areas of the bus routes with a major service change and as a proportion to the District overall, **low-income populations received a greater increase in service (were positively impacted more) compared to higher income populations.** Low-income areas benefited +1.67% more compared to higher-income areas. Additionally, **minority populations received a slightly lower increase in service (were positively impacted less) compared to non-minority populations.** However, this difference did not meet the Disparate Impact threshold, therefore no system-level disparate impact was found with the proposed changes.

Service Equity Analysis: May 2023

Appendix A: Systemwide Service Changes

| Change Type | Service Changes | |
|-----------------|-----------------|--|
| | Route | Description |
| <i>Modified</i> | 0 | Schedule adjustments resulting from running time analysis, aimed at improving on-time performance are proposed. |
| | 3L | Perform a running time analysis to improve on-time performance of the route. |
| | 10 | In accordance with the RTD Board-approved System Optimization Plan (SOP), extend route to Aurora at Colfax Ave and Billings St via 11th Ave and Peoria St. Headways on new alignment at 60 minutes. Existing headways maintained on 9th Ave and Clermont Rd pattern. All westbound trips terminate at Union Station. |
| | 20 | Schedule adjustments resulting from running time analysis, aimed at improving on-time performance are proposed. Additionally, school tripper would be discontinued for summer. |
| | 28 | Minor schedule adjustments. |
| | 32 | Minor schedule adjustments. |
| | 34 | Merge with Route 38 at 30th/Downing Stn to create new Route 38 - 38th Ave Crosstown. Discontinue service at stops #19044 and #10945. |
| | 38 | Merge with Route 34 at 30th/Downing Stn to create new Route 38 - 38th Ave Crosstown. Eastbound routing on Stout from 17th to 32nd, R - Downing, R - California, enter station and continue on former Route 34. |
| | 169 | Schedule adjustments resulting from running time analysis, aimed at improving on-time performance are proposed. |
| | 169L | Schedule adjustments resulting from running time analysis, aimed at improving on-time performance are proposed. |
| | FF2 | Reinstate FF route pattern. Add 3 eastbound Boulder Express trips at 7:07 AM, 7:37 AM, and 4:15 PM from Downtown Boulder Station and 3 westbound trips at 7:45 AM, 4:45 PM, and 5:20 PM from Union Station. |
| | FF5 | Add 6:30 AM eastbound trip from Downtown Boulder Station to Anschutz Campus and shift current 7:30 AM trip to 7:50 AM. |
| | D Line | Reduce service to 30 minutes between 6:30 PM to 8:00 PM, Mondays through Thursdays and Sundays and extend span to midnight. Reduce Friday service to 30 minutes between 7:30 PM and 9:00 PM and extend span to 2:00 AM. Reduce Saturday service to 30 minutes between 8:00 AM and 10:00 AM and between 7:00 PM and 8:00 PM and extend span to 2:00 AM. |
| | E Line | Extend span on 30 minute headways to midnight Mondays through Thursdays. Reduce Sunday service to 30 minutes between 8:00 AM to 10:00 AM and extend span to midnight. |

Service Equity Analysis: May 2023

| Change Type | Service Changes | |
|-----------------------------|---|--|
| | Route | Description |
| <i>Seasonal Adjustments</i> | H Line | Reduce service to 30 minutes between 6:30 PM to 9:00 PM weekdays and 6:00 PM and 9:00 PM on weekends. Extend span to midnight Mondays through Thursdays and Sunday. Extend span to 2:00 AM on Fridays and Saturdays. |
| | R Line | Schedule adjustments resulting from running time analysis, aimed at improving on-time performance are proposed. |
| | W Line | Extend span to midnight weekdays. Reduce service to 30 minutes 8:00 AM to 10:00 AM Sundays. |
| | 11 | Seasonal adjustment, discontinuing school tripper for summer |
| | 30 | Seasonal adjustment, discontinuing school tripper for summer |
| | 51 | Seasonal adjustment, discontinuing school tripper for summer |
| | 65 | Seasonal adjustment, discontinuing school tripper for summer |
| | 73 | Seasonal adjustment, discontinuing school tripper for summer |
| | 225 | Seasonal adjustment, reducing weekday frequency for summer |
| | DASH | Seasonal adjustment, reducing weekday frequency for summer |
| JUMP | Seasonal adjustment, reducing weekday frequency for summer | |
| NB | Seasonal adjustment, short turns at Nederland H.S. due to Eldora ski resort not being in operation. | |
| SKIP | Seasonal adjustment, reducing weekday frequency for summer | |



Appendix B: Analysis of Impact on Access to Employment, Social Services, Senior Housing & Facilities, Schools, Retail and Convenience Stores

Service Equity Analysis: May 2023

Route 10 – East 12th Avenue

Extension to Colfax Ave/Billings St via 11th Avenue and Peoria Street

| | Employment | Total POI | Social Services | Senior Housing & Facilities | Elementary Schools | Middle Schools | High Schools | Colleges | Retail (Includes Grocery) | Convenience Stores |
|-----------------|--|------------|-----------------|-----------------------------|--------------------|----------------|--------------|----------|---------------------------|--------------------|
| Maintain Access | Maintains access to an estimated 154,224 jobs | 146 | 66 | 6 | 9 | 2 | 2 | 14 | 24 | 23 |
| | <p>■ Route 10 ■ District</p> | | | | | | | | | |
| New Access | Creates access to an estimated 34,615 jobs | 44 | 7 | 3 | 12 | 6 | 3 | 1 | 4 | 8 |
| | <p>■ Route 10 ■ District</p> | | | | | | | | | |

* Low/Medium wage jobs defined as having earnings of under \$3,333 per month, or about \$40,000 per year. Jobs held by workers of color include jobs where the race indicated was not "White Alone." Jobs held by Hispanic/Latino workers include jobs where the ethnicity indicated was Hispanic/Latino. Source: US Census Bureau, 2019.

Service Equity Analysis: May 2023

Route FF2 – Boulder Express

Reinstatement of FF2 pattern with 3 trips in each peak period

| | Employment | Total POI | Social Services | Senior Housing & Facilities | Elementary Schools | Middle Schools | High Schools | Colleges | Retail (Includes Grocery) | Convenience Stores | | | | | | | | | | | | |
|---------------------------------------|--|----------------|-----------------|-----------------------------|-----------------------|----------------|--------------|--------------------------------|---------------------------|--------------------|---------------------------------------|-----|-----|--|--|--|--|--|--|--|--|--|
| New Access | Creates access to an estimated 43,880 jobs | 65 | 28 | 2 | 7 | 0 | 2 | 3 | 15 | 8 | | | | | | | | | | | | |
| | <table border="1"> <caption>Job Characteristics Comparison</caption> <thead> <tr> <th>Characteristic</th> <th>FF2 (%)</th> <th>District (%)</th> </tr> </thead> <tbody> <tr> <td>Low/Medium Wage Jobs*</td> <td>39%</td> <td>45%</td> </tr> <tr> <td>Jobs Held by Workers of Color*</td> <td>12%</td> <td>14%</td> </tr> <tr> <td>Jobs Held by Hispanic/Latino Workers*</td> <td>14%</td> <td>18%</td> </tr> </tbody> </table> | Characteristic | FF2 (%) | District (%) | Low/Medium Wage Jobs* | 39% | 45% | Jobs Held by Workers of Color* | 12% | 14% | Jobs Held by Hispanic/Latino Workers* | 14% | 18% | | | | | | | | | |
| Characteristic | FF2 (%) | District (%) | | | | | | | | | | | | | | | | | | | | |
| Low/Medium Wage Jobs* | 39% | 45% | | | | | | | | | | | | | | | | | | | | |
| Jobs Held by Workers of Color* | 12% | 14% | | | | | | | | | | | | | | | | | | | | |
| Jobs Held by Hispanic/Latino Workers* | 14% | 18% | | | | | | | | | | | | | | | | | | | | |

* Low/Medium wage jobs defined as having earnings of under \$3,333 per month, or about \$40,000 per year. Jobs held by workers of color include jobs where the race indicated was not "White Alone." Jobs held by Hispanic/Latino workers include jobs where the ethnicity indicated was Hispanic/Latino. Source: US Census Bureau, 2019.