

2020 COVID-19 Emergency Service Plan Title VI Service Equity Analysis

Submitted by

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I. INTRODUCTION

On March 16, 2020, the public health departments in Alameda County, Contra Costa County, and the City of Berkeley instituted an emergency shelter-in-place order in response to the global COVID-19 pandemic.

On March 31, 2020, with dramatically reduced ridership levels (down 74% between March 3, 2020 and March 19, 2020) and concern about the district's future fiscal health, AC Transit responded by instituting an emergency service plan, which reduced service to pre-COVID Sunday service levels throughout the week and discontinued service on lines serving schools and peak-only Transbay commute lines.

On August 9, 2020, AC Transit modified the initial emergency service plan to rebalance service levels. This included the reintroduction of pre-COVID weekday service levels on some of the District's highest ridership lines to ease crowding and promote physical distancing, the suspension of weekend service on some lower ridership lines, and the suspension of all service on other lower-ridership lines.

For a typical service change in a non-emergency environment, Federal Transit Administration (FTA) regulations and the District's Title VI policies require that a service equity analysis must be reviewed by the Board of Directors before implementation, although service changes that last less than 12 months are exempted from this requirement. The pandemic's unprecedented speed, scale, and the commensurate emergency response needed, along with uncertainty as to how long a service change made in response to the emergency might be needed, meant that the equity analysis was not conducted right away; however, staff kept equitable outcomes for protected people of color and low-income populations at the forefront of the planning process for these plans. Compared to the Bay Area region at large, these protected populations are overrepresented in the AC Transit service area and in the pool of essential workers, underscoring the importance of maintaining these communities' access to quality transit during the pandemic.

While the emergency service plans implemented as part of AC Transit's response to the pandemic were intended as temporary measures, the nation's long path to recovery has meant that in March 2021, the major service changes enacted in response to the emergency will have been in place for a full year. FTA regulations state that any such major service change that lasts longer than 12 months is considered permanent and requires a service equity analysis.

This report analyzes the effects of the emergency service changes implemented in response to the pandemic on populations protected by the Civil Rights Act of 1964. The analysis finds no disparate impact of the proposals on people of color and no disproportionate burden on low-income populations.

This report contains a statistical analysis of the process and the final finding. The report also describes how the public, and particularly communities protected by Title VI, was engaged in the

planning process; describes how comments were solicited and obtained; and provides details about comments that were received through different means.

In compliance with FTA requirements, the AC Transit Board of Directors will review this service equity analysis in March 2021 before the expiration of the twelve-month temporary service period. The District anticipates conducting a system-wide planning process to determine the future of the network as the region recovers from the pandemic and its impacts.

II. TITLE VI BACKGROUND

Title VI of the Civil Rights Act of 1964 states:

“No persons in the United States shall, on the grounds 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.”

The FTA issued a circular in 2012 (Title VI Circular 4702.1B) to help transit agencies meet the mandate of Title VI. The FTA issued an Environmental Justice circular in 2012 as well to help FTA funding recipients avoid, minimize, and mitigate disproportionately high and adverse health and environmental effects – including social and economic effects – on people of color and low-income populations. Together these two circulars guide AC Transit’s compliance with federal requirements because AC Transit is a designated recipient of FTA funding.

Commitment to Title VI compliance is an essential element of AC Transit’s strategic plan and the District’s operation. It is AC Transit’s goal to ensure that all transit service is equitably distributed and provided without regard to race, color, national origin, or low-income status. It is also AC Transit’s goal to ensure equal opportunities to all persons to participate in transit planning and decision-making processes related to providing that service without regard to race, color, national origin, or low-income status. Several Board policies provide guidance to ensure these goals are met.

Service Equity Analysis

Board Policy 518 (Title VI and Environmental Justice Service Review and Compliance Report Policy) requires staff to conduct a Title VI service equity analysis whenever there is a major service change. A major service change, also defined in Board Policy 518, is generally one that constitutes a significant aggregate change in route miles or hours, and can include system wide route restructuring, changes in frequency, or adding and deleting service. Under these policies, the 2020 emergency service changes qualified as major service changes.

For such major service changes, the Board policies require staff to assess the quantity and quality of service provided and populations affected. Board Policy 518 states that for a major service equity analysis “the Title VI service equity analysis will assess the quantity and quality of service provided and populations affected; the analysis will measure service in terms of current AC Transit standards for frequency, span of service, and/or distance to bus routes.” The service equity analysis aims to identify if, in implementing proposed changes, people of color or low-income populations or riders would experience any greater adverse effect than non-people of color or not low-income populations or riders.

If the District finds that the service proposals result in disparate impacts on people of color, the District must identify alternatives to the proposal that could serve the same legitimate objective

with less disparate impact. If a less discriminatory alternative does not exist and AC Transit has substantial legitimate justification that cannot otherwise be accomplished, AC Transit must identify measures to mitigate the negative impacts of the changes. Additionally, if the District finds that the service proposals result in disproportionate burdens on low-income communities, the District must identify alternatives available to affected low-income riders and take steps to avoid, minimize, or mitigate impacts where practicable.

Public Engagement

In addition to the basic requirement to conduct a service equity analysis, the District's Title VI program contains requirements to ensure equal opportunities to all persons to participate in planning decision-making and to provide input about major service changes, regardless of race, color, national origin, or low-income status. The program provides guidance on how best to reach people protected by civil rights legislation and regulations.

Outreach to the community recognizes the importance of the diversity inherent within the AC Transit service area from both a racial and economic perspective. The Public Participation Plan (PPP) in the program was created to identify ways of communicating with and engaging communities that may have been traditionally underserved and determine the most effective strategies to encourage the participation of these communities in decision-making processes. The Language Assistance Plan (LAP) contains recommendations for communicating with people who speak English less than very well in ways that make sense for those populations.

Staff followed the recommendations contained in the PPP and the LAP to conduct a range of outreach activities and solicit feedback and opinions in a variety of ways. The specific channels are as follows:

- Digital: carousel, service alerts, eNews, news article and web pages, organized and illustrated by topics for easier consumption;
- At-stop electronic signage and signs;
- Rider Survey;
- Revised Public Service Announcements onboard;
- Curated social media content for both the emergency and modified service changes
- Revisions and updates to maps and schedules, and posting the pre/post information for each affected line;
- Addition of a list of temporarily suspended lines and their service areas to the website
- Print: two separate car cards and rail hangers installed on all buses;
- Created, printed and installed signs at over 250+ highest ridership stops; and
- Flags, bags, schedules, and temporary suspension decals to inform the public about service changes, including supplementary school service.
- Information was shared with local, county, state and federal elected officials representing the AC Transit service area and the information was subsequently shared with their

constituents.

- Information about the changes was shared with stakeholder groups in the AC Transit service area (Community Based Organizations, Faith based leaders, business organizations, chambers of commerce, and a variety of advocacy organizations).

Staff received approximately 225 comments regarding the emergency service levels, ranging from issues with pass-ups to those complaining about suspended service.

III. SERVICE EQUITY ANALYSIS

Because the emergency service changes were system-wide service changes, it was not appropriate to analyze every route change by segment. Instead, staff developed several methods to determine if there were any adverse effects on protected populations. For the purpose of Title VI compliance, the “protected” populations comprise people of color and low-income people.

Methods

District staff conducted two separate analyses, which will be described further in this document:

- The service intensity analysis, which asks how the emergency service changes affected the amount of service available to protected populations compared to non-protected populations.
- The service quality analysis, which asks how the emergency service changes affected the amount of time for protected populations to complete transit trips as compared to non-protected populations

Data Sources

A variety of data sources were used for these analyses.

For the service intensity analysis, staff combined HASTUS schedule outputs with data from the American Community Survey 5-year dataset (2015-2019) using Microsoft SQL Server 2017 spatial functions: to count the number of people who lived within 1/4 mile of bus stops before and after the changes and also to count the number of trips available to those people in existing and proposed service. The process aligned with past AC Transit methodology using different software tools. This analysis was conducted at the system-wide level and at smaller planning area level.

For the service quality analysis, staff used the *r5* and *r5r* software packages, which are free and open-source and primarily developed by Conveyal and the Brazilian Institute for Applied Economic Research. These packages were used to calculate the number of jobs accessible from areas across the District; the pedestrian networks were derived from OpenStreetMap exports, and the transit networks from static AC Transit GTFS feeds. In this case, average job accessibility was calculated by Census block group for persons in people of color and not people of color populations, and low-income and not low-income communities, within 30, 60, and 90 minutes using the schedules for each service change. The analysis also calculated the average travel time from an expansive grid to all Census block groups within walking distance of the AC Transit bus network.

Summary of Findings

The Disparate Impact policy in Board Policy 518 states:

“When the proportion of people of color populations or riders adversely affected by the proposals is 15% (or more) than the proportions of non-people of color populations or riders adversely affected, such changes will be considered to have a disparate impact.”

The Disproportionate Burden policy states:

“When the proportion of low-income populations or riders adversely affected by the proposals is 15% (or more) than the proportion of non-low-income populations or riders adversely affected, such changes will be considered to have a disproportionate burden.”

The analyses described in this report **found no disparate impact** of the emergency service changes on people of color populations and also **no disproportionate burden** of the emergency service changes on low-income populations.

From the outset, the goal of the plans was to minimize impacts on the entire District, with special care to prioritize protected populations’ access to service. The analysis found some differences between the effects of the changes on populations protected and not protected by Title VI, however, none of the differences between effects on different communities met the thresholds contained in AC Transit policies for finding discriminatory effects.

The full contents of the service equity analyses are contained in Appendix A of this report.

APPENDIX A: SERVICE EQUITY ANALYSIS

As stated in the report, District staff used two different methods to conduct the service equity analysis: the Service Intensity and Service Quality analyses.

Throughout the Service Equity Analysis, the following parameters were used:

- Data related to all lines in the AC Transit service area were included in the analysis.
- For lines with varying schedules by day of the week, including many 600-series limited service lines, a typical Monday schedule was chosen to represent service throughout the week.
- “People of color” include all persons who self-identify as not white in the US Census, including all persons who identify as Latino/a or Hispanic. Low-income populations include all persons living in households with income less than 200% of the federal poverty level.

For background information, the AC Transit service area population of over 1.6 million people is approximately 72% people of color and 25% people who live in low-income households (Exhibit 1).

Exhibit 1 – Population in AC Transit Service Area

Total	1,619,969
People of Color	72.38%
Low-Income	24.73%

Service Intensity Analysis

The Service Intensity Analysis asks the question: “how did the service change affect the amount of service available to populations protected by Title VI of the Civil Rights Act compared to non-protected populations?” Staff analyzed access to service and the amount of service to protected and non-protected groups system-wide; the amount of service was also analyzed on a smaller area-wide basis.

Methodology

Staff utilized exported trip and stop data from its HASTUS scheduling software and combined it with data from the American Community Survey 5-year dataset (2015-2019). This analysis was conducted within AC Transit’s in-house Microsoft SQL Server 2017 database software. Spatial database functions were used to count the number of people who lived within 1/4 mile of bus stops pre-COVID and after the major service change and to count the number of trips available to those people in both periods. The process aligns with the past AC Transit methodology used but was implemented with different software tools. This analysis was conducted at the system-

wide level and within more fine-grained planning sub-areas.

The SQL Server 2017 queries generated 1/4-mile buffers around bus stops and estimated the amount of population within the buffers. The queries also automatically counted the amount of bus service (i.e. trips) available in each of the buffers based on the service data contained in the two maps.

Census data provided by the American Community Survey 2015-2019 5-year sample was extracted via the Census' API for this dataset. In this dataset, people of color status is coded by subtracting the white, non-Latino/a population from the total population (*in table B03002*), and low-income status is coded at 200% of the US federal poverty rate (*in table C17002*).

Access to service

Staff first analyzed how many people of color and low-income people lived within 1/4 mile of a bus stop under the existing service and compared it to how many people of color and low-income people would live within a 1/4 mile of a bus stop with the proposed service.

Exhibit 2 – Overall Population within 1/4 mile of service by service change

People within 1/4 Mile of AC Transit Stops	March 2020 (pre-COVID)	March 2020 (COVID)	June 2020	August 2020	December 2020
Overall	1,593,703	1,559,137	1,559,137	1,572,950	1,572,950
% Difference		-2.2%	-2.2%	-1.2%	-1.2%

This analysis found that the overall population within 1/4 mile of service decreased by 2.2% in March and June 2020, bus rebounded to only a 1.2% decrease compared with pre-COVID service levels with the addition of more service in August 2020.

This analysis was repeated for people of color, non-people of color, low-income, and not low-income people, and the results were compared (Exhibits 3 and 4).

Exhibit 3 – People of Color and Non-People of Color Population within 1/4 mile of service by Service Change

People within 1/4 Mile of AC Transit Stops	March 2020 (pre-COVID)	March 2020 (COVID)	June 2020	August 2020	December 2020
People of Color	1,156,244	1,135,634	1,135,634	1,143,082	1,143,082
Non-People of Color	437,459	423,503	423,503	429,868	429,868
People of Color Change		-20,610	-20,610	-13,162	-13,162
Non-People of Color Change		-13,956	-13,956	-7,591	-7,591
People of Color % Change		-1.8%	-1.8%	-1.1%	-1.1%
Non-People of Color % People of Color		-3.2%	-3.2%	-1.7%	-1.7%
% Difference		1.4%	1.4%	0.6%	0.6%

Exhibit 4 – Low-Income and Not Low-Income Population within 1/4 mile of Service by Service Change

People within 1/4 Mile of AC Transit Stops	March 2020 (pre-COVID)	March 2020 (COVID)	June 2020	August 2020	December 2020
Low-Income	398,012	394,719	394,719	396,013	396,013
Not Low-Income	1,195,616	1,164,343	1,164,343	1,176,862	1,176,862
Low-Income Change		-3,293	-3,293	-1,999	-1,999
Not Low-Income Change		-31,273	-31,273	-18,754	-18,754
Low-Income Change		-0.8%	-0.8%	-0.5%	-0.5%
Not Low-Income Change		-2.6%	-2.6%	-1.6%	-1.6%
% Difference		1.8%	1.8%	1.1%	1.1%

The changes in service coverage were due to the suspension of some lower-ridership lines with the implementation of the emergency service plan March 2020, and the resumption of limited service on some of the discontinued lines in August 2020. The differences between the change in coverage for people of color and non-people-of-color and for low-income and non-low-income populations all fall below the district's threshold of 15% for disparate impacts and disproportionate burdens.

Amount of Service

Along with counting the number of people who lived near transit service, staff counted the amount of service available to the different population groups. This involved counting the number of trips passing through people-of-color census block groups within 1/4 mile of bus stops and multiplying that by the total population in those census block groups, resulting in the number of annual people-of-color-person trips near bus stops. This analysis was repeated for non-people of color, low-income, and non-low-income population groups; and was repeated using both existing and proposed service.

This analysis found that for the March and June 2020 service changes, people of color received slightly less service (1.2% less) than non-people of color (Exhibit 5), but for the August and December 2020 service changes, people of color received slightly more service than non-people of color (3.8% to 4.4% more).

For all pandemic service changes in 2020, low-income populations received more service (2.5% to 4.3% more) than not low-income populations (Exhibit 6).

Neither of these findings represents a discriminatory effect on people of color or low-income persons.

Exhibit 5 – People of Color and Non-People of Color Person Trips by Census Block Group

Annualized Person Trips	March 2020 (pre-COVID)	March 2020 (COVID)	June 2020	August 2020	December 2020
People of Color	134,781,523,166	104,830,064,680	104,904,486,925	119,579,011,275	117,993,983,851
Non-People of Color	52,265,649,843	41,297,378,305	41,280,055,145	44,711,503,005	44,011,006,820
People of Color Change		-29,951,458,486	-29,877,036,241	-15,202,511,891	-16,787,539,315
Non-People of Color Change		-10,968,271,538	-10,985,594,698	-7,554,146,838	-8,254,643,023
People of Color % Change		-22.2%	-28.5%	-14.5%	-14.0%
Non-People of Color % Change		-21.0%	-26.6%	-18.3%	-18.5%
% Difference		-1.2%	-1.9%	3.8%	4.4%

Exhibit 6 – Low-Income and Non-Low-Income Person Trips by Census Block Group

Annualized Person Trips	March 2020 (pre-COVID)	March 2020 (COVID)	June 2020	August 2020	December 2020
Low-Income	58,758,905,976	46,929,624,457	46,978,163,803	52,818,816,978	52,194,103,102
Not Low-Income	128,279,211,908	99,190,427,278	99,198,987,017	111,461,624,427	109,800,872,069
Low-Income Change		-11,829,281,519	-11,780,742,174	-5,940,088,998	-6,564,802,875
Not Low-Income Change		-29,088,784,630	-29,080,224,890	-16,817,587,481	-18,478,339,838
Low-Income % Change		-20.1%	-25.1%	-12.6%	-12.4%
Not Low-Income % Change		-22.7%	-29.3%	-17.0%	-16.6%
% Difference		2.5%	4.2%	4.3%	4.2%

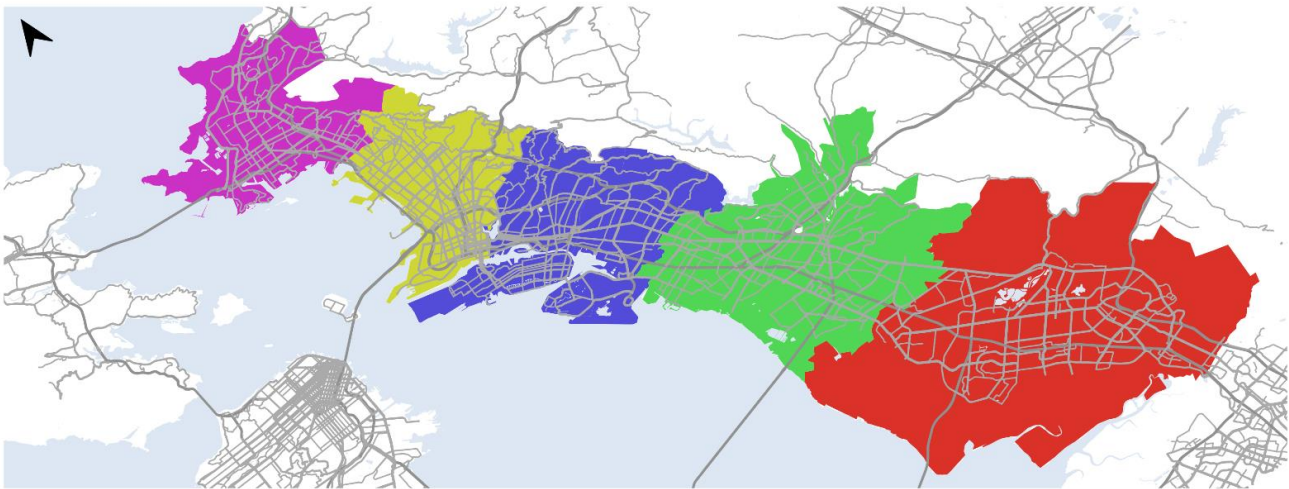
Staff then took a closer look at the service intensity analysis by smaller areas. The following 5 geographic sub-areas as follows were used (Exhibit 7):

- Area A: The portion of West Contra Costa County included in the AC Transit service area.
- Area B: Northern portions of Alameda County, from the border with Contra Costa to downtown Oakland, including the cities of Albany, Berkeley, Emeryville, and Piedmont.
- Area C: East Oakland, Piedmont, and the city of Alameda – from downtown Oakland to the border with San Leandro.
- Area D: San Leandro, Hayward, unincorporated Alameda County, and Union City; what's commonly referred to in the Planning department as Central Alameda County.

- Area E: The cities of Fremont & Newark; what's commonly referred to in the Planning department as South Alameda County.

The amount of service assigned to each analysis area was then calculated using the same series of SQL Server queries, but grouped by the geography areas denoted.

Exhibit 7 – Analysis areas in Emergency Service Plan



Findings:

In all analysis areas, people living within 1/4 mile of bus stops experienced decreases in service and in ridership (person-trips). However, in all analysis areas, person-trips for protected populations decreased less than for non-protected populations. Tables 7 through 16 for each individual geographic area are depicted below.

Exhibit 8 – People of Color and Non-People of Color Person Trips (Area A)

Annualized Person Trips	March 2020 (pre-COVID)	March 2020 (COVID)	June 2020	August 2020	December 2020
People of Color	13,105,415,928	10,382,425,365	10,382,425,365	10,878,976,755	10,389,667,455
Non-People of Color	3,408,490,568	2,677,576,490	2,677,576,490	2,682,448,745	2,560,735,205
People of Color Change		-2,722,990,563	-2,722,990,563	-2,226,439,173	-2,715,748,473
Non-People of Color Change		-730,914,078	-730,914,078	-726,041,823	-847,755,363
People of Color % Change		-20.8%	-26.2%	-21.4%	-25.0%
Non-People of Color % Change		-21.4%	-27.3%	-27.1%	-31.6%
% Difference		0.7%	1.1%	5.7%	6.6%

Exhibit 9 – Low-Income and Not Low-Income Person Trips (Area A)

Annualized Person Trips	March 2020 (pre-COVID)	March 2020 (COVID)	June 2020	August 2020	December 2020
Low-Income	5,630,467,666	4,474,109,645	4,474,109,645	4,724,892,335	4,505,862,396
Not Low-Income	10,883,438,830	8,585,892,210	8,585,892,210	8,836,533,165	8,444,540,264
Low-Income Change		-1,156,358,021	-1,156,358,021	-905,575,331	-1,124,605,270
Not Low-Income Change		-2,297,546,620	-2,297,546,620	-2,046,905,665	-2,438,898,566
Low-Income % Change		-20.5%	-25.8%	-20.2%	-23.8%
Not Low-Income % Change		-21.1%	-26.8%	-23.8%	-27.6%
% Difference		0.6%	0.9%	3.6%	3.8%

Exhibit 10 – People of Color and Non-People of Color Person Trips (Area B)

Annualized Person Trips	March 2020 (pre-COVID)	March 2020 (COVID)	June 2020	August 2020	December 2020
People of Color	40,820,118,152	34,469,850,180	34,278,530,695	35,531,359,310	35,445,147,224
Non-People of Color	29,341,481,195	24,503,205,635	24,362,824,920	24,784,934,285	24,645,324,528
People of Color Change		-6,350,267,972	-6,541,587,457	-5,288,758,842	-5,374,970,928
Non-People of Color Change		-4,838,275,560	-4,978,656,275	-4,556,546,910	-4,696,156,667
People of Color % Change		-15.6%	-19.0%	-15.4%	-15.1%
Non-People of Color % Change		-16.5%	-20.3%	-18.7%	-18.9%
% Difference		0.9%	1.3%	3.3%	3.8%

Exhibit 11 – Low-Income and Not Low-Income Person Trips (Area B)

Annualized Person Trips	March 2020 (pre-COVID)	March 2020 (COVID)	June 2020	August 2020	December 2020
Low-Income	24,139,757,296	20,496,916,248	20,435,471,177	21,267,095,443	21,258,485,778
Not Low-Income	46,021,842,051	38,476,139,567	38,205,884,438	39,049,198,152	38,831,985,974
Low-Income Change		-3,642,841,048	-3,704,286,119	-2,872,661,853	-2,881,271,519
Not Low-Income Change		-7,545,702,484	-7,815,957,613	-6,972,643,899	-7,189,856,076
Low-Income % Change		-15.1%	-18.1%	-14.1%	-13.5%
Not Low-Income % Change		-16.4%	-20.3%	-18.3%	-18.4%
% Difference		1.3%	2.2%	4.2%	4.9%

Exhibit 12 – People of Color and Non-People of Color Person Trips (Area C)

Annualized Person Trips	March 2020 (pre-COVID)	March 2020 (COVID)	June 2020	August 2020	December 2020
People of Color	41,340,882,842	32,354,347,640	32,517,083,760	39,791,123,650	39,061,774,441
Non-People of Color	10,010,691,201	7,544,556,545	7,600,246,535	9,206,782,580	8,872,904,250
People of Color Change		-8,986,535,202	-8,823,799,082	-1,549,759,192	-2,279,108,401
Non-People of Color Change		-2,466,134,656	-2,410,444,666	-803,908,621	-1,137,786,951
People of Color % Change		-21.7%	-27.3%	-4.8%	-5.7%
Non-People of Color % Change		-24.6%	-31.9%	-10.6%	-12.4%
% Difference		2.9%	4.7%	5.8%	6.6%

Exhibit 13 – Low-Income and Not Low-Income Person Trips (Area C)

Annualized Person Trips	March 2020 (pre-COVID)	March 2020 (COVID)	June 2020	August 2020	December 2020
Low-Income	20,304,368,101	16,011,131,090	16,090,593,453	19,689,938,002	19,357,893,372
Not Low-Income	31,043,174,317	23,884,104,845	24,023,068,592	29,301,441,728	28,570,220,569
Low-Income Change		-4,293,237,012	-4,213,774,648	-614,430,100	-946,474,730
Not Low-Income Change		-7,159,069,471	-7,020,105,725	-1,741,732,588	-2,472,953,747
Low-Income % Change		-21.1%	-26.3%	-3.8%	-4.8%
Not Low-Income % Change		-23.1%	-29.4%	-7.3%	-8.4%
% Difference		1.9%	3.1%	3.4%	3.6%

Exhibit 14 – People of Color and Non-People of Color Person Trips (Area D)

Annualized Person Trips	March 2020 (pre-COVID)	March 2020 (COVID)	June 2020	August 2020	December 2020
People of Color	23,716,601,095	16,282,609,305	16,346,801,955	18,831,273,510	18,847,983,515
Non-People of Color	5,599,883,278	3,798,850,030	3,810,442,580	4,305,533,838	4,293,598,950
People of Color Change		-7,433,991,790	-7,369,799,140	-4,885,327,585	-4,868,617,580
Non-People of Color Change		-1,801,033,248	-1,789,440,698	-1,294,349,440	-1,306,284,328
People of Color % Change		-31.3%	-45.3%	-29.9%	-25.9%
Non-People of Color % Change		-32.2%	-47.1%	-34.0%	-30.3%
% Difference		0.8%	1.8%	4.1%	4.5%

Exhibit 15 – Low-Income and Not Low-Income Person Trips (Area D)

Annualized Person Trips	March 2020 (pre-COVID)	March 2020 (COVID)	June 2020	August 2020	December 2020
Low-Income	6,900,586,559	4,785,159,037	4,801,901,588	5,543,978,949	5,550,191,351
Not Low-Income	22,415,897,814	15,296,300,298	15,355,342,947	17,592,828,399	17,591,391,114
Low-Income Change		-2,115,427,522	-2,098,684,970	-1,356,607,610	-1,350,395,207
Not Low-Income Change		-7,119,597,516	-7,060,554,868	-4,823,069,415	-4,824,506,701
Low-Income % Change		-30.7%	-43.9%	-28.3%	-24.4%
Not Low-Income % Change		-31.8%	-46.2%	-31.4%	-27.4%
% Difference		1.1%	2.3%	3.2%	3.1%

Exhibit 16 – People of Color and Non-People of Color Person Trips (Area E)

Annualized Person Trips	March 2020 (pre-COVID)	March 2020 (COVID)	June 2020	August 2020	December 2020
People of Color	23,716,601,095	16,282,609,305	16,346,801,955	18,831,273,510	18,847,983,515
Non-People of Color	5,599,883,278	3,798,850,030	3,810,442,580	4,305,533,838	4,293,598,950
People of Color Change		-7,433,991,790	-7,369,799,140	-4,885,327,585	-4,868,617,580
Non-People of Color Change		-1,801,033,248	-1,789,440,698	-1,294,349,440	-1,306,284,328
People of Color % Change		-31.3%	-45.3%	-29.9%	-25.9%
Non-People of Color % Change		-32.2%	-47.1%	-34.0%	-30.3%
% Difference		0.8%	1.8%	4.1%	4.5%

Exhibit 17 – Low-Income and Not Low-Income Person Trips (Area E)

Annualized Person Trips	March 2020 (pre-COVID)	March 2020 (COVID)	June 2020	August 2020	December 2020
Low-Income	6,900,586,559	4,785,159,037	4,801,901,588	5,543,978,949	5,550,191,351
Not Low-Income	22,415,897,814	15,296,300,298	15,355,342,947	17,592,828,399	17,591,391,114
Low-Income Change		-2,115,427,522	-2,098,684,970	-1,356,607,610	-1,350,395,207
Not Low-Income Change		-7,119,597,516	-7,060,554,868	-4,823,069,415	-4,824,506,701
Low-Income % Change		-30.7%	-43.9%	-28.3%	-24.4%
Not Low-Income % Change		-31.8%	-46.2%	-31.4%	-27.4%
% Difference		1.1%	2.3%	3.2%	3.1%

AC Transit Board Policy 518 indicates:

“When people of color populations or riders as a whole will experience a 15% (or more) greater adverse effect than that borne by the non-people of color populations or riders, such changes will be considered to have a disparate impact. An adverse effect is defined as a geographical or time-based reduction in service which includes but is not limited to: elimination of a route, short turning a route, rerouting an existing route, or an increase in headways.”

In no analysis area were service levels for non-protected populations prioritized over those for protected populations: the difference between the change of person-trips for people of color and non-people of color is lower than the threshold, and because there is an increase in all trips there are no adverse effects. So, this analysis finds **no disparate impacts** on people of color.

It is worth noting that service levels in Areas D and E saw significantly higher decreases in service for both protected and non-protected populations, particularly with the March and June service changes. With the August and December service, these impacts were addressed. In Area D Line 97 – a key trunk line – was brought back to full weekday service levels, with 15- and 20-minute frequency. In Area E Line 239 – a weekday-only service that was deactivated in March 2020 – was reactivated, adding service in this area.

AC Transit Board Policy 518 also says:

“When the proportion of low-income populations or riders as a whole adversely affected by the proposals is 15% (or more) than the proportion of non-low-income populations or riders adversely affected, such changes will be considered to have a disproportionate burden.”

In all planning areas, low-income person-trips increased by a greater percentage than non-low-income person trips. There are no adverse effects on low-income persons, and **no disproportionate burdens**.

Service Quality Analysis

The Service Quality Analysis asks the question: how did the service change affect access to economic opportunity for protected populations compared to non-protected populations? In this case, staff used the number of jobs accessible by walking and by transit as a proxy for economic opportunity.

To accomplish this, staff carried out an Origin-Destination (or O-D) exercise using employment data from the U.S. Census Longitudinal Employer-Household Dynamics Origin-Destination Employment Statistics (LEHD LODES, or LODES) 2018 dataset. The LODES dataset provides employment numbers summarized at the block level and were aggregated by block group for this analysis.

Methodology

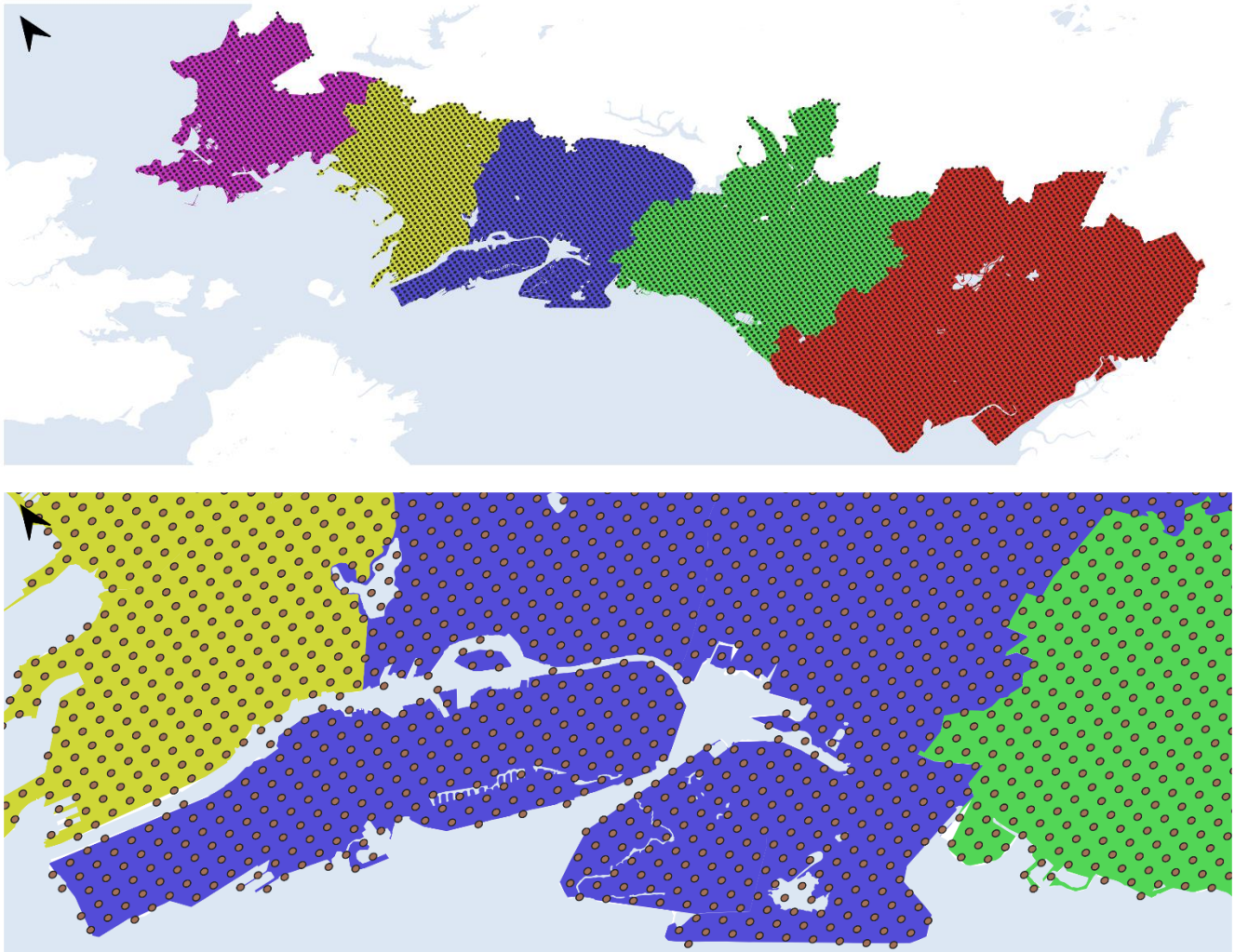
Staff used the open source *r5* multimodal routing software package and its companion R programming language package *r5r* to generate combined pedestrian and AC Transit network analysis datasets reflective of the entire AC Transit service area. The *r5* package is primarily

developed by Conveyal and is derived in part from the OpenTripPlanner project. The *r5r* package is primarily developed by IPEA, Brazil's national Institute for Applied Economic Research.

The pedestrian network was derived from OpenStreetMap street centerline data and transit networks from AC Transit's static GTFS feeds for each service change that took place between March 2020 and December 2020. The *r5* network parameters assume standard walking speeds of 1.5 meters per second (or just under three miles per hour) for pedestrian links, and average transit travel times during these periods based on GTFS transit schedules.

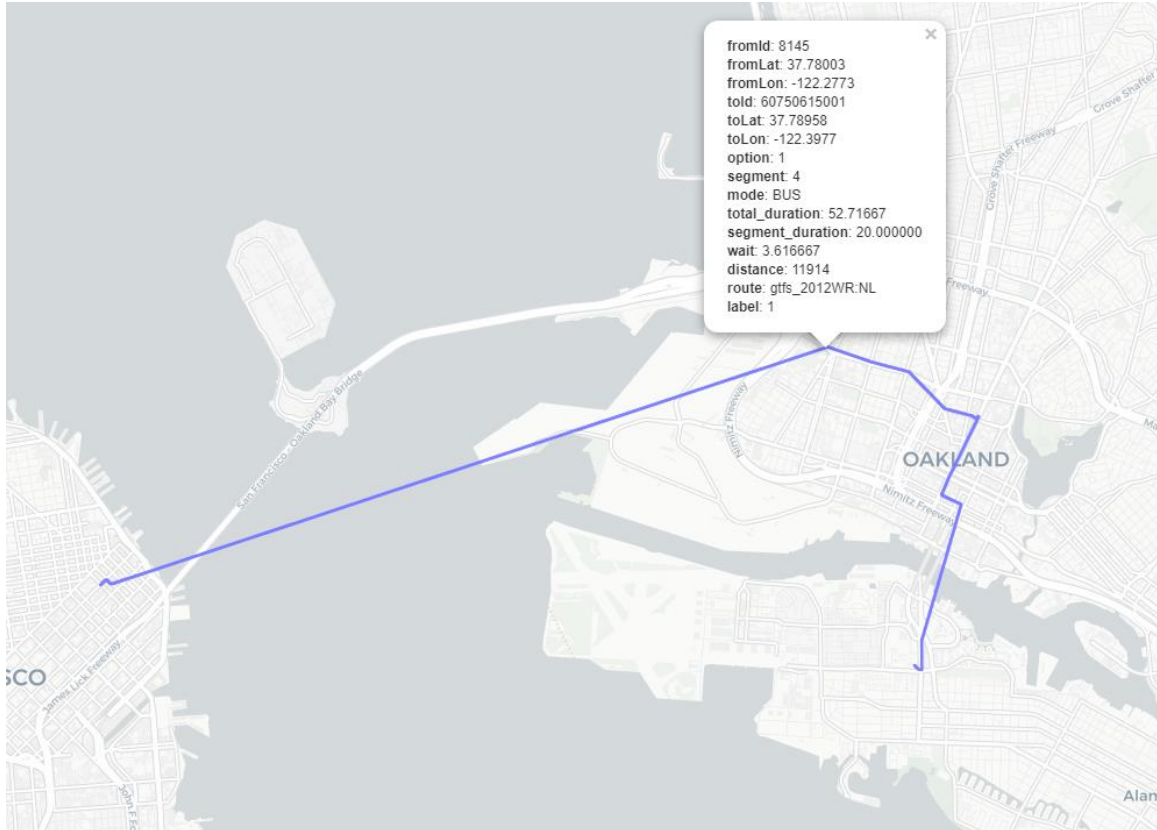
Using the *r5r* package, staff calculated travel time estimates for departures spaced every four minutes (7:00 a.m., 7:04 a.m., and so on) for the weekday AM peak period (6:00 a.m. to 10:00 a.m.). For origins, 7,999 points on a 1/5-mile grid within the AC Transit service area (Exhibit 18 3) were used. For destinations, 3,803 ACS block group centroids within a two-mile radius of stops in the AC Transit bus network were used. For this analysis, 1.37 billion one-way travel times were calculated for each service change, which totals to nearly 5.5 billion origin-destination pairs for all service changes between March and December 2020.

Exhibit 18 – Origin Grid at District-Wide Scale and 1:50,000



Using this as a starting point, each origin point was buffered by 200 feet and grouped by origin and destination block groups to ensure all origin block groups were covered in the model. Average travel times were then calculated between block groups (including walk times, out-of-vehicle wait times, and in-vehicle travel times) and the average number of jobs accessible within 30-, 60-, and 90-minute thresholds were tabulated. These job figures were then multiplied by population to make job access comparisons for people of color, non-people of color, low-income, and not low-income census block groups. Exhibit 19 depicts the results of a sample origin-destination calculation between a point on the model's grid for analysis within the City of Alameda's West End and a census block group in downtown San Francisco. For this sample trip beginning at 6:00 a.m., *r5r* generated a two-seat trip utilizing AC Transit's local Line 51A and Transbay Line NL, complete with total estimated walk and wait times.

Exhibit 19 – A sample origin-destination calculation for the December 2020 service change



Findings

Staff evaluated the number of accessible jobs within 30-, 60-, and 90-minute average travel times (which includes both average out-of-vehicle wait times and in-vehicle travel times), and found there were **no disparate impacts** or **disproportionate burdens** as a result of the service changes between pre-pandemic and March 2020 service.

In some cases, overall job access for some populations improved during the pandemic, which can be attributed to shorter travel times (due to less traffic on the roadways and implementing Sunday schedules on many lines) and adding trips to address overcrowding (due to public health-related passenger limitations), offsetting the reduced frequency implemented in many communities throughout the AC Transit service area.

Analysis of Job Access within 30 Minutes

The exhibits below show the differences in job accessibility at a 30-minute travel time threshold.

Exhibit 20 – People of Color and Non-People of Color Job Accessibility within 30 minutes by Service Change

Service Change	Accessible Person-Jobs within 30 minutes		% Change from pre-COVID		% Difference
	People of Color	Non-People of Color	People of Color	Non-People of Color	
March 2020 (pre-COVID)	16,098,675,328	8,106,793,326	0.0%	0.0%	0.0%
March 2020 (COVID)	15,686,809,003	8,088,853,181	-2.6%	-0.2%	-2.3%
June 2020	15,556,057,627	8,076,021,952	-3.4%	-0.4%	-3.0%
August 2020	17,648,670,965	8,863,681,786	9.6%	9.3%	0.3%
December 2020	17,828,133,411	9,141,522,274	10.7%	12.8%	-2.0%

Within a 30-minute travel time threshold, people of color experienced a greater decrease in access to jobs as compared to non-people of color with the March and June pandemic service changes (by -2.3 percent, and -3.0 percent, respectively). While people of color experienced a relative reduction in access following the March and June service changes, the difference between them was less than 3 percent, which is below the Disproportionate Burden threshold in Board Policy 518.

Exhibit 21 – Low-Income and Non-Low-Income Job Accessibility within 30 minutes by Service Change

Service Change	Accessible Person-Jobs within 30 minutes		% Change from pre-COVID		% Difference
	Low-Income	Not Low-Income	Low-Income	Not Low-Income	
March 2020 (pre-COVID)	8,157,297,164	16,047,873,890	0.0%	0.0%	0.0%
March 2020 (COVID)	8,034,345,418	15,741,019,166	-1.5%	-1.9%	0.4%
June 2020	7,977,034,634	15,654,747,345	-2.2%	-2.4%	0.2%
August 2020	9,012,187,318	17,499,867,833	10.5%	9.0%	1.4%
December 2020	9,061,494,978	17,907,863,107	11.1%	11.6%	-0.5%

Low-income populations experienced a slight difference in job accessibility at a 30-minute travel time threshold with the March and June service changes and the difference between them was less than 3 percent, which is below the Disproportionate Burden threshold in Board Policy 518.

Analysis of Job Access within 60 Minutes

Exhibits 22 and 23 below show the differences in job accessibility at a 60-minute travel time threshold.

Exhibit 22 – People of Color and Non-People of Color Job Accessibility within 60 minutes by Service Change

Service Change	Accessible Person-Jobs within 60 minutes		% Change from pre-COVID		% Difference
	People of Color	Non-People of Color	People of Color	Non-People of Color	
March 2020 (pre-COVID)	134,713,059,841	68,694,872,143	0.0%	0.0%	0.0%
March 2020 (COVID)	131,361,801,422	65,559,874,587	-2.5%	-4.6%	2.1%
June 2020	131,546,476,002	65,515,495,782	-2.4%	-4.6%	2.3%
August 2020	138,129,673,979	66,488,094,555	2.5%	-3.2%	5.7%
December 2020	141,665,310,074	69,611,271,120	5.2%	1.3%	3.8%

Within a 60-minute travel time threshold, people of color populations retained access to more jobs than non-people of color populations with the March and June pandemic service changes (by +2.1 percent, and -2.3 percent, respectively). With the August and December changes, people of color populations saw marked gains in job accessibility over pre-COVID service.

Exhibit 23 – Low-Income and Non-Low-Income Job Accessibility within 60 minutes by Service Change

Service Change	Accessible Person-Jobs within 60 minutes		% Change from pre-COVID		% Difference
	Low-Income	Not Low-Income	Low-Income	Not Low-Income	
March 2020 (pre-COVID)	62,548,178,873	140,850,945,486	0.0%	0.0%	0.0%
March 2020 (COVID)	62,411,829,817	134,501,209,192	-0.2%	-4.5%	4.3%
June 2020	62,458,121,023	134,594,925,611	-0.1%	-4.4%	4.3%
August 2020	64,790,319,080	139,818,267,429	3.6%	-0.7%	4.3%
December 2020	66,640,953,714	144,626,694,680	6.5%	2.7%	3.9%

Within a 60-minute travel time threshold, low-income populations retained access to more jobs than not low-income populations with each service change, and with the August and December changes, low-income populations saw marked gains in job accessibility over pre-COVID service.

Analysis of Job Access within 90 Minutes

Within a 90-minute travel time threshold, people of color retained access to more jobs than non-people of color with the March and June pandemic service changes. With the August and December changes, people of color saw gains in job accessibility over pre-COVID service.

Exhibit 24 – People of Color and Non-People of Color Job Accessibility within 90 minutes by Service Change

Service Change	Accessible Person-Jobs within 90 minutes		% Change from pre-COVID		% Difference
	People of Color	Non-People of Color	People of Color	Non-People of Color	
March 2020 (pre-COVID)	365,122,450,130	176,724,356,168	0.0%	0.0%	0.0%
March 2020 (COVID)	410,195,816,137	199,822,203,673	12.3%	13.1%	-0.7%
June 2020	411,521,373,996	200,140,468,927	12.7%	13.3%	-0.5%
August 2020	415,225,724,189	194,692,918,612	13.7%	10.2%	3.6%
December 2020	419,679,759,537	201,394,355,783	14.9%	14.0%	1.0%

Within a 90-minute travel time threshold, low-income populations retained access to more jobs than not low-income populations with each service change, and with the August and December changes, low-income populations saw gains in job accessibility over pre-COVID service.

Exhibit 25 – Low-Income and Non-Low-Income Job Accessibility within 90 minutes by Service Change

Service Change	Accessible Person-Jobs within 90 minutes		% Change from pre-COVID		% Difference
	Low-Income	Not Low-Income	Low-Income	Not Low-Income	
March 2020 (pre-COVID)	160,844,951,601	380,974,675,597	0.0%	0.0%	0.0%
March 2020 (COVID)	187,088,088,017	422,900,340,018	16.3%	11.0%	5.3%
June 2020	187,795,226,928	423,836,012,170	16.8%	11.3%	5.5%
August 2020	188,064,850,754	421,820,250,547	16.9%	10.7%	6.2%
December 2020	189,539,738,728	431,497,540,042	17.8%	13.3%	4.6%