Title VI Evaluation of Revised Service Adjustments Plan
February 2010

Submitted by

Tina Spencer
Manager of Long Range Planning

With

Campbell Jung
Statistician

Ipeleng Kgositsile
Planning Intern

Huaqi Yuan
Senior Transportation Planner

Matt Chew
Planning Intern

Howard Der
Senior Transportation Planner

February 24, 2010

I. INTRODUCTION

In January 2009, the AC Transit Board of Directors received a report outlining an 18 month financial projection that indicated a $57 Million deficit by the end of June 2010. Subsequently, the Board adopted Resolution No. 09-037 declaring a Fiscal Emergency for the 2009-2010 fiscal year.

In response to this fiscal crisis, Service Development staff developed the 2009 Draft Service Adjustments Plan (SAP) presented before the Board on June 24, 2009 (GM Memo 09-161). The SAP proposed service reductions, adjustments and re-alignments resulting in the elimination of 15% of the District's Platform hours. A final set of proposals was presented to the Board on August 26, 2009, that included three (3) minor revisions to the original SAP (GM Memo 09-161a). During the development of the SAP, planning staff took great care to consider social equity issues when proposing service elimination, route consolidation or frequency adjustments.

In September 2009, while conducting the public comments process of the SAP, District management began the process to divert funds from a capital project to assist with minimizing the service cut impacts of the SAP (GM Memo 09-228). The Board affirmed its support for the diversion of $35 Million of Congestion Mitigation/Air Quality (CMAQ) funding from the District's Bus Rapid Transit (BRT) capital project to operating expenses (GM Memo 09-247) on October 28, 2009.

On November 18, 2009, a Revised Service Adjustments Plan (RevSAP) was presented before the Board. The RevSAP is based on the assumption of receipt of these revenues, resulting in only a net 8% service reduction. Generally, the RevSAP calls for the implementation of a new service design, along with all trunk-line service levels at original frequencies and span. Additionally, the span for several lines has been restored, and service to a key regional destination previously proposed for discontinuation has been restored.

Adopted by the Board on December 16 2009, Resolution No. 09-053 approves the Revised Service Adjustments Plan, effective March 2010, pending the receipt of a Title VI Disparate Impacts Study. Part of the decision making process includes a Title VI analysis to assess how the RevSAP will affect minority rider populations, as well as to determine if any of the service changes result in disproportionately high and adverse effects on minority populations within the District.

II. TITLE VI BACKGROUND

Title VI of the Civil Rights Act of 1964, Section 601 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."

It is AC Transit's responsibility to ensure that all transit service, and access to its facilities is equitably distributed and provided without regard to race, color, or national origin. It is also the goal of AC Transit to ensure equal opportunities to all persons without regard to race, color, or national origin to participate in all local, subregional and regional transit planning and decision-making processes under the District's control.

According to the Federal Department of Transportation, equity in the provision of transit service is described as "providing equal levels of service to minority and non-minority residents of the urbanized area. Levels of service, in turn, are defined in terms of capital allocation and accessibility."[1] The indices of discrimination that could be monitored for disparate treatment include fare structure or service design that could consistently cause minority-group riders to bear a higher average fare than non-minority group riders.

To codify the Title VI requirements relative to AC Transit, the Board adopted Policy 551 in order to ensure that service decisions would not discriminate against any one community by establishing steps to assess the impacts that service or fare changes may have on minority communities. Consequently, whenever service changes are being planned, Environmental Justice issues are analyzed and considered.

Policy 551 states that a Title VI analysis must occur whenever there is a major service adjustment representing an aggregate change of 25% or more in daily route miles or hours. This analysis should be conducted that uses data and other information to:

- Determine benefits to and potential negative impacts on minority populations from proposed investments or actions.
- Quantify expected effects (total, positive and negative) and disproportionately high and adverse effects on minority populations .
- Determine the appropriate course of action, whether avoidance, minimization, or mitigation.

[1] Transit Cooperative Research Program, Legal Research Digest: "The Impact of Civil Rights Litigation Under Title VI and Related Laws on Transit Decision Making", TCRP Project J-5, Washington, D.C. June 1997

III. METHODOLOGY AND DATA SOURCES

Because the RevSAP was a system-wide service restructuring, it is not possible to analyze every frequency or route change by segment within the timeframe allowed. As a result, staff developed several methods to determine disparate impacts.

District staff utilized three (3) main sources of data and analysis for the Title VI analysis, which will be described further in this document:

- U.S. Bureau of the Census, Census 2000, Summary Files.
- The 2009/10 ***Transit Service Intensity Analysis*** representing frequencies, daily trips and routes for all census tracts within the District.
- Transit Service Quality Analysis, which indicates travel distance, time and cost averages derived from the 2009/10 Select Link Analysis. (Attachment B)

Results of these analyses were then forwarded to the District Statistician to determine the thresholds of significance and explain the findings. The Statistician then performed an *independent-samples t-test* on a variety of the data points in the data set. This statistical procedure tests the significance of the difference between sample means. Attachment A presents the Statistician's review of the data.

- **U.S. Bureau of the Census, Census 2000, Summary Files).**

The 2000 Census represents the most accurate data the District has regarding AC Transit passengers at the census tract level. However, it is important to note that the data is ten years old and will not be updated until the decennial census this year. Despite these limitations, the District utilizes data resulting from the 2000 Census because it provides the most comprehensive demographic data on a micro-level.

Staff established the District's majority minority and non-minority census tracts utilizing Census 2000, Summary File 1 (SF-1 SF-1 contains detailed demographic data for all U.S. households down to the block group level, while P3 represents race and P53 represents income. According to the 2000 Census, the District service area contains 331 census tracts. One hundred fifty-nine census tracts (48%) contain populations with a majority of minority residents, representing just under half of the entire AC Transit service area. Based on this information, the AC Transit service district is approximately 56% minority.

Income data is derived from Census 2000, Summary file 3. For income, the Title VI analysis used the definition of Low Income that was used in the development of the RevSAP; that is, less than 80% of the median income of the San Francisco-Oakland-San Jose Consolidated Metropolitan Statistical Area. Of the minority tracts within the service area, about 2/3 are low income and 1/3 are not low income. Of the non-minority tracts about 26% are low income, while 73% of the tracts are not low income.

- ***Service Intensity Analysis***

Because the RevSap was a system-wide service restructuring, it was not possible to analyze the impacts of every route segment that was proposed for change. As a result, staff developed the *Service Intensity Analysis* as a means to capture the changes at a census tract level to determine if the RevSAP resulted in disparate impacts.

The 2009/10 *Service Intensity Analysis* presents peak/off-peak frequencies, number of daily trips and number of routes for all census tracts within the District. For comparison, staff examined each variable under current and proposed service hours. The average peak/off-peak headways, daily trips and routes were then calculated under current and proposed conditions to determine if any of the service changes result in disproportionately high and adverse effects on minority populations within the District.

Methodology

Staff initiated the exercise by utilizing GIS software to export data into Microsoft Excel for purposes of analyzing two files--minority and non-minority. Staff also completed the analysis for low income and non-low income groups. As previously noted, the analysis used the definition of low income that was used in the development of the RevSAP; that is, less than 80% of the median income of the San Francisco-Oakland-San Jose Consolidated Metropolitan Statistical Area. After the data was divided into minority and non-minority census tracts, data was then further separated by weekday and weekend hours, then into three service type categories (local, Owl and Transbay), two frequency categories (peak and off-peak), number of daily trips, and total routes. For weekend hours, the data was presented collectively, as there is only off-peak service offered on Saturdays and Sundays.

Using GIS software, staff identified each route intersecting with each census tract. Peak and off-peak frequencies for each line were then determined using one of three documents: the District Adopted SAP Workbook, presented and adopted by the Board on December 16, 2009; current timetables for all District routes; and the Maps and Schedules link to the District website. For variations in trip patterns, staff added another column representing separate trip patterns for each line. To determine the number of daily trips for each route, staff then generated a report using HASTUS scheduling software. The average peak/off-peak headways, daily trips and routes were then calculated to determine disparate impacts among riders living within the District's minority census tracts.

Results of Service Intensity Analysis:

As shown in Tables 1a and 1b, the number of average daily trips on local, Owl and Transbay lines decreases within all census tracts. However, there appeared to be a negative impact on minority riders for some service types. For local service, negative impacts are slightly greater for non-minority tracts than for minority tracts. On local and Owl lines, there is only a -3.5% change in average daily trips within minority census tracts, compared to -5.1% in non-minority census tracts. By contrast, there is a -27.0% change in average daily trips for minority riders on Transbay routes, compared to only -17.2% for non-minority passengers.

Additionally, when viewing the peak and non-peak frequency change in Transbay service, there appeared to be disparate impacts between minority and non-minority tracts that required further scrutiny. In the off-peak period, the disparities were more pronounced: minority tracts experienced a 23% decrease, while non-minority tracts experienced only a

10.7% decrease. However, in absolute terms, these disparities amount to a matter of minutes in either period. As a result, the following factors were highlighted for statistical analysis: average peak/non peak frequency (in minutes) and average daily trips.

Statistical Results:
Results from the Service Intensity Analysis were forwarded to the District's Statistician, who performed an *independent-samples t-test* to determine the significance of the average peak/non peak frequency and average daily trips for both weekday and weekend periods as well as local and Transbay service. As a result, there were no findings of disparate impacts on minority populations compared with non-minority populations. Additionally, the Statistician reviewed the income data to determine if there were disparities between the low income group and the non-low income group. There were also no findings of disparity within the income category.

Table 1a – 2009/2010 Service Intensity Comparative Analysis for Local and Owl Routes

Local and Owl						
	2009 Minority	2010 Minority	% Change	2009 Non Minority	2010 Non Minority	% Change
Average Peak (frequency)	24:21	26:37	-9.3%	29:11	32:49	-12.5%
Average Off-Peak (frequency)	31:21	33:13	-6.0%	35:27	37:23	-5.5%
Average Daily Trips	422.7	408.1	-3.5%	275.0	261.0	-5.1%
Total Routes	843.0	876.0	3.9%	655.0	641.0	-2.1%
Average Routes	5.4	5.6	3.9%	3.8	3.8	NC

Table 1b – 2009/2010 Service Intensity Comparative Analysis for Transbay Routes

Transbay						
	2009 Minority	2010 Minority	% Change	2009 Non Minority	2010 Non Minority	% Change
Average Peak (frequency)	23:02	25:57	-12.7%	23:48	24:01	-1.0%
Average Off-Peak (frequency)	36:09	44:27	-23.0%	45:10	50:00	-10.7%
Average Daily Trips	69.3	50.6	-27.0%	47.4	39.2	-17.2%
Total Routes	138.0	146.0	5.8%	220.0	217.0	-1.4%
Average Routes	1.7	1.9	7.2%	1.8	1.8	NC

- **Service Quality Analysis**

The rich data set derived from the 2009/10 Service Intensity Analysis served as the basis for the 2009/10 Service Quality Analysis. Board Policy 551 requires an analysis of accessibility and quality to key destinations within the transit district service area. To determine whether the quality of service is consistent among different user groups and the degree to which transit is responsive to minority needs, the following methodology was used, based on input from the District's Statistician:

- Five of the most popular destinations were selected for the analysis—Kaiser Hospital (Richmond), University of California Berkeley, Downtown Oakland, Chabot College, and New Park Mall (Newark)

.

- 15 minority and 15 non-minority census tracts were randomly generated within the following concentrations: 3 from West County; 6 from Oakland/Berkeley Area; 3 from Alameda/Hayward Area; and, 3 from Fremont/Newark Area. Of those census tracts, the low income percentages were relatively the same between minority and non-minority. These census tracts were then matched to the reasonable destinations.

- An 8:00 a.m. peak arrival time was established for each trip.

- The most efficient local routes were selected for each trip.

Methodology:
In order to conduct the *Service Quality Analysis* provided in Table 2, staff created a trip origin location using the centroid point of the fifteen (15) randomly selected census tracts within the District. Route and walk distance were calculated using GIS software. Walk time was calculated at three miles per hour, while wait time was based on the frequencies presented in the 2009/10 Transit Service Intensity Analysis. Current vehicle time was based on the regional 511 Trip Planner provided by the Bay Area Metropolitan Transportation Commission (MTC), while proposed vehicle times are based on times using HASTUS scheduling software. The total cost per trip mile is a function of Microsoft Excel. Additionally, the percentages of low-income tracts were relatively the same between the minority and non-minority groups. Consequently, the analysis only reviewed the disparity between minority and non-minority status. Detailed analyses of all trips are presented as Attachment B.

Results of Planning Analysis:
While there were apparent disparities noted in areas such as “Walking Distance” and associated “Walk Time”, as well as “Total Cost per Trip Mile” and “Total Travel Time”, the most prominent disparity is related to average wait time--which is directly related to service frequencies that were adjusted as part of the RevSAP. From 2009 to 2010, there was a 9.1% increase in average wait time within minority census tracts, compared to a decrease of 1.7% for non-minority riders.

Based on the planner’s analysis provided in Table 2, several factors were highlighted and forwarded to the Statistician for an *independent-samples t-test,* to determine if the disparities were significant. These included:

- Total travel time (which is a combination of walk time, wait time and in-vehicle time)
- Wait time (which is calculated at ½ of a headway)
- Cost per trip mile (which is based on Total Cost per Trip and Total Distance)

Table 2 – 2009/2010 Service Quality Analysis Comparison Table

	2009 Minority Census Tracts	2010 Minority Census Tracts	Percent Change ('09 to'10)	2009 Non-Minority Census Tracts	2010 Non-Minority Census Tracts	Percent Change ('09 to '10)
Walking Distance (Miles)	**0.84**	**0.98**	**17.4%**	**0.72**	**0.75**	**4.9%**
Route Distance (Miles)	**6.12**	**6.58**	**7.6%**	**5.56**	**5.60**	**0.6%**
Total Distance (Miles)	**6.95**	**7.57**	**8.8%**	**6.28**	**6.35**	**1.1%**
Walk Time (Minutes)	**16:44**	**19:39**	**17.3%**	**14:18**	**14:56**	**4.5%**
Wait Time (Minutes)	**16:16**	**17:44**	**9.1%**	**31:24**	**30:51**	**-1.7%**
Vehicle Time (Minutes)	**25:26**	**25:37**	**0.7%**	**22:29**	**22:57**	**2.1%**
Total Travel Time (Minutes)	**58:26**	**1:03:00**	**7.8%**	**1:08:11**	**1:08:45**	**0.8%**
Number of Transfers	**0.57**	**0.52**	**-8.3%**	**0.48**	**0.43**	**-10.0%**
Total Cost per Trip $	**$2.39**	**$2.13**	**-10.9%**	**$2.29**	**$2.10**	**-8.3%**
Total Cost per Trip Mile $	**$0.75**	**$0.74**	**-1.5%**	**$0.64**	**$0.55**	**-14.1%**

Result of Statistical Analysis:
It appears that even though the planner's analysis suggests that disparate impacts occur in several categories as a result of the RevSAP, the thresholds of significance indicate that the RevSAP does ***not*** result in disparate impacts. For the minority group, the average *total travel time* increased 4.57 minutes, *wait time* increased 1.48 minutes, and *cost per trip mile* stayed relatively the same (decrease of $0.01). A standard statistical t-test was conducted and showed that the mean differences from the 2009 to 2010 data were not significant. For the non-minority group, the changes in mean values were also very small and were not significant.

- **Summary and Mitigation:**

It is a testament to careful planning that the RevSAP did not generate any disparate impacts between minority and non-minority areas, nor between low income and non-low income groups. As such, no changes or mitigations to the RevSAP are required.

Attachment A

Title VI
Statistical Analysis

Summary of Analysis:

The following analysis compares minority/non-minority tract data on the following factors: travel time, wait time, cost per trip mile, average peak/non-peak (frequency in minutes), and average daily trips. An *independent-samples t-test* was the selected method to conduct this analysis. This statistical procedure tests the significance of the difference between sample means. Overall, there were no disparate impacts on the minority group when comparing minority/non-minority groups.

Minority Group 2009/2010

Group Statistics

	Minority/Non-Minority	N	Mean	Std. Deviation	Std. Error Mean
Total Travel Time	Minority (Spring 2010)	21	63.0012	35.80458	7.81320
	Minority (Winter 2009)	21	58.4271	30.86223	6.73469
Wait Time	Minority (Spring 2010)	21	17.7381	9.50081	2.07325
	Minority (Winter 2009)	21	16.2619	8.62644	1.88244
Cost Per Trip Mile	Minority (Spring 2010)	21	.7343	1.15164	.25131
	Minority (Winter 2009)	21	.7467	1.12680	.24589

Independent Samples Test

Assumptions=Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Total Travel Time	.345	.560	.443	40	.660	4.57408	10.31514	-16.27360	25.42176
Wait Time	.854	.361	.527	40	.601	1.47619	2.80035	-4.18352	7.13591
Cost Per Trip Mile	.020	.887	-.035	40	.972	-.01238	.35159	-.72297	.69821

For the minority group, the average *total travel time* increased 4.57 minutes, *wait time* increased 1.48 minutes, and *cost per trip mile* stayed relatively the same (decrease of $0.01). A standard statistical t-test was conducted and showed that the mean differences from the 2009 to 2010 data were not significant.

Non-Minority Group 2009/2010

Group Statistics

	Minority/Non-Minority	N	Mean	Std. Deviation	Std. Error Mean
Total Travel Time	Non-Minority (Spring 2010)	21	68.7471	90.26630	19.69772
	Non-Minority (Winter 2009)	21	68.1819	90.38046	19.72263
Wait Time	Non-Minority (Spring 2010)	20	32.4000	81.06732	18.12720
	Non-Minority (Winter 2009)	21	31.4048	82.58838	18.02226
Cost Per Trip Mile	Non-Minority (Spring 2010)	21	.5471	.56683	.12369
	Non-Minority (Winter 2009)	21	.6376	.64898	.14162

Independent Samples Test

Assumptions=Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Total Travel Time	.002	.963	.020	40	.984	.56524	27.87441	-55.77104	56.90152
Wait Time	.000	.999	.039	39	.969	.99524	25.57353	-50.73211	52.72258
Cost Per Trip Mile	.245	.624	-.481	40	.633	-.09048	.18803	-.47050	.28955

For the non-minority group, the changes in mean values were very small. On average, total travel time decreased by 0.56 minutes, wait time increased by 0.99 minutes, and cost per trip mile decreased by $0.09. The mean differences between the 2009 and 2010 data were not significant.

Analysis of Average peak minutes, non-peak minutes, and daily trips

Weekday – Local & Owl

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Avg Peak	Minority (Weekday - Local & Owl)	156	26.6186	9.80393	.78494
	Non-Minority (Weekday - Local & Owl)	168	32.8220	12.38282	.95536
Avg Off-Peak	Minority (Weekday - Local & Owl)	157	33.2121	8.00450	.63883
	Non-Minority (Weekday - Local & Owl)	170	37.3941	10.16772	.77983
Avg Daily Trips	Minority (Weekday - Local & Owl)	157	408.0892	304.74702	24.32146
	Non-Minority (Weekday - Local & Owl)	170	261.0412	204.46948	15.68209

Independent Samples Test

Assumptions=Equal variances not assumed

	t-test for Equality of Means						
						95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Avg Peak	-5.017	314.271	.000	-6.20343	1.23646	-8.63622	-3.77064
Avg Off-Peak	-4.148	317.186	.000	-4.18202	1.00808	-6.16539	-2.19864
Avg Daily Trips	5.081	269.654	.000	147.04800	28.93893	90.07303	204.02297

For *weekday (local & owl*), average peak frequency in minutes were 6.2 minutes greater for non-minority over minority, and average off-peak minutes were 4.2 minutes greater for non-minority over minority. In addition, on average, there were 147 more daily trips for minority tracts than for non-minority. The significantly greater number of trips for the minority tracts helps explain why the mean differences for peak/non-peak minutes are statistically significant. The greater number of trips for the minority tracts results in more frequent peak and off-peak trips for the minority group.

Weekday – Transbay

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Avg Peak	Minority (Weekday - Transbay)	78	25.9474	7.17388	.81228
	Non-Minority (Weekday - Transbay)	123	24.0211	6.81301	.61431
Avg Off-Peak	Minority (Weekday - Transbay)	36	44.4444	31.84287	5.30714
	Non-Minority (Weekday - Transbay)	29	50.0000	29.64071	5.50414
Avg Daily Trips	Minority (Weekday - Transbay)	78	50.5513	31.82078	3.60299
	Non-Minority (Weekday - Transbay)	123	39.5447	30.70303	2.76840

Independent Samples Test

Assumptions=Equal variances assumed*; equal variances not assumed**

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Avg Peak*	.175	.676	1.914	199	.057	1.92630	1.00667	-.05881	3.91141
Avg Off-Peak*	.417	.521	-.721	63	.474	-5.55556	7.70608	-20.95492	9.84381
Avg Daily Trips**	4.284	.040	2.442	159.638	.017	11.00657	4.54374	2.03297	19.98017

For *weekday – Transbay*, no significant differences were identified for average peak or non-peak minutes. Mean values showed a difference of 1.9 minutes for average peak minutes, and 5.6 minutes for off-peak minutes. A significant difference was identified for average daily trips. There are 11 more daily trips for minority tracts than for non-minority.

Weekend – All routes

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Avg Off-Peak	Minority (Weekend - all routes)	156	38.3500	10.35457	.82903
	Non-Minority (Weekend - all routes)	163	45.7515	11.86836	.92960
Avg Daily Trips	Minority (Weekend - all routes)	156	288.3910	236.69326	18.95063
	Non-Minority (Weekend - all routes)	163	171.6871	136.82789	10.71719

Independent Samples Test

Assumptions=Equal variances not assumed; Avg Peak data N/A

	t-test for Equality of Means						
						95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Avg Off-Peak	-5.942	314.343	.000	-7.40153	1.24557	-9.85225	-4.95082
Avg Daily Trips	5.360	245.932	.000	116.70391	21.77118	73.82215	159.58567

For *weekend routes*, significant differences were identified for off-peak minutes and for daily total trips. Off-peak minutes were 7.4 minutes greater for non-minority tracts than for minority. There were 117 more daily trips for minority tracts than for non-minority.

2009/2010 Statistical Analysis: Total Travel Time; Wait Time and Cost per Trip Mile

A standard t-test was conducted for each of the following three variables – 1) Total travel time, 2) Wait Time, and 3) Cost per Trip Mile. These statistical tests compare the mean values for the minority and non-minority tracts to determine if any significant difference exists between the two groups. A significant difference suggests a disparity may exist, while no significant difference suggests that actual differences are likely due to chance. No significant differences were found for any of the variables tested. Results are provided below.

Results for Winter 2009 Analysis

Total travel time (Table 1a, 1b)

There was no significant difference between the mean values for minority (M =58.43, SD=30.86) and non-minority (M=68.18, SD=90.38.) groups; t(40)=-.468, p=.642.

Wait time (Table 2a, 2b)

There was no significant difference between the mean values for minority (M=16.26, SD=8.63) and non-minority (M=31.40, SD=82.59) groups; t(40)=-.836, p=.408.

Cost per trip mile (Table 3a, 3b)

There was no significant difference between the mean values for minority (M=.747, SD=1.13) and non-minority (M=.638, SD=.65) groups; t(40)=.384, p=.703.

Results for Spring 2010 Analysis

Total travel time (Table 4a, 4b)

There was no significant difference between the mean values for minority (M=63.00, SD=35.80), and non-minority (M=68.75, SD=90.27) groups; t(40)=-.271, p=.788.

Wait time (Table 5a, 5b)

There was no significant difference between the mean values for minority (M=17.74, SD=9.50) and non-minority (M=32.40, SD=81.07) groups; t(39)=-.823, p=.415.

Cost per trip mile (Table 6a, 6b)

There was no significant difference between the mean values for minority (M=.734, SD=1.15) and non-minority (M=.547, SD=.57) groups; t(40)=.668, p=.508.

Results – Tables

Winter 2009

Table 1a

Group Statistics

	Minority/Non-Minority	N	Mean	Std. Deviation	Std. Error Mean
Total Travel Time	Minority (Winter 2009)	21	58.4271	30.86223	6.73469
	Non-Minority (Winter 2009)	21	68.1819	90.38046	19.72263

Table 1b

Independent Samples Test

Assumptions=Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Total Travel Time	1.472	.232	-.468	40	.642	-9.75476	20.84079	-51.87556	32.36604

Table 2a

Group Statistics

	Minority/Non-Minority	N	Mean	Std. Deviation	Std. Error Mean
Wait Time	Minority (Winter 2009)	21	16.2619	8.62644	1.88244
	Non-Minority (Winter 2009)	21	31.4048	82.58838	18.02226

Table 2b

Independent Samples Test

Assumptions=Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Wait Time	3.009	.091	-.836	40	.408	-15.14286	18.12031	-51.76536	21.47965

Table 3a

Group Statistics

	Minority/Non-Minority	N	Mean	Std. Deviation	Std. Error Mean
Cost Per Trip Mile	Minority (Winter 2009)	21	.7467	1.12680	.24589
	Non-Minority (Winter 2009)	21	.6376	.64898	.14162

Table 3b

Independent Samples Test

Assumptions=Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Cost Per Trip Mile	.771	.385	.384	40	.703	.10905	.28376	-.46444	.68254

Spring 2010

Table 4a

Group Statistics

	Minority/Non-Minority	N	Mean	Std. Deviation	Std. Error Mean
Total Travel Time	Minority (Spring 2010)	21	63.0012	35.80458	7.81320
	Non-Minority (Spring 2010)	21	68.7471	90.26630	19.69772

Table 4b

Independent Samples Test

Assumptions=Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Total Travel Time	.885	.352	-.271	40	.788	-5.74592	21.19071	-48.57395	37.08211

Table 5a

Group Statistics

	Minority/Non-Minority	N	Mean	Std. Deviation	Std. Error Mean
Wait Time	Minority	21	17.7381	9.50081	2.07325
	Non-Minority	20	32.4000	81.06732	18.12720

Table 5b

Independent Samples Test

Assumptions=Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Wait Time	2.843	.100	-.823	39	.415	-14.66190	17.80634	-50.67862	21.35481

Table 6a

Group Statistics

	Minority/Non-Minority	N	Mean	Std. Deviation	Std. Error Mean
Cost Per Trip Mile	Minority	21	.7343	1.15164	.25131
	Non-Minority	21	.5471	.56683	.12369

Table 6b

Independent Samples Test

Assumptions=Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Cost Per Trip Mile	1.936	.172	.668	40	.508	.18714	.28010	-.37896	.75324

2009/2010 Low-income/Non Low-income analysis

Local & Owl Routes

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Avg Peak	Low Income (Local & Owl Routes)	151	25.3086	10.16725	.82740
	Not Low Income (Local & Owl Routes)	170	33.8529	11.48025	.88050
Avg Off-Peak	Low Income (Local & Owl Routes)	151	33.1623	7.33067	.59656
	Not Low Income (Local & Owl Routes)	172	37.4640	10.60401	.80855
Avg Daily Trips	Low Income (Local & Owl Routes)	151	460.0662	307.27008	25.00528
	Not Low Income (Local & Owl Routes)	172	225.3547	160.62836	12.24780

Independent Samples Test

Assumptions=Equal variances assumed*; Equal variances not assumed**

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Avg Peak	3.024	.083	-7.021	319	.000	-8.54433	1.21695	-10.93859	-6.15007
Avg Off-Peak**	17.900	.000	-4.281	305	.000	-4.30170	1.00481	-6.27894	-2.32447
Avg Daily Trips**	26.679	.000	8.430	219	.000	234.71157	27.84372	179.83635	289.58679

Results indicate there is a significant difference between low-income and non low-income groups on local and owl routes for average peak minutes, average non-peak minutes, and average daily trips. Average peak minutes are 8.54 minutes lower for low income group; average off-peak minutes are 4.30 minutes lower for low-income group; there is an average of 234 more daily trips for low income groups over non-low-income groups.

Transbay

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Avg Peak	Low Income (Transbay)	82	23.1683	6.98050	.77087
	Not Low Income (Transbay)	118	25.9636	6.78229	.62436
Avg Off-Peak	Low Income (Transbay)	42	40.0000	22.52370	3.47548
	Not Low Income (Transbay)	22	59.5455	40.29383	8.59067
Avg Daily Trips	Low Income (Transbay)	82	55.0244	31.29548	3.45601
	Not Low Income (Transbay)	119	35.6471	29.54703	2.70857

Independent Samples Test

Assumptions=Equal variances assumed*; equal variances not assumed**

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Avg Peak*	.314	.576	-2.833	198	.005	-2.79527	.98684	-4.74134	-.84919
Avg Off-Peak**	11.939	.001	-2.109	28	.044	-19.54545	9.26707	-38.52661	-.56430
Avg Daily Trips**	5.937	.016	4.413	168	.000	19.37733	4.39094	10.70867	28.04599

Results indicate there is a significant difference between low-income and non low-income groups on Transbay routes for average peak minutes, average non-peak minutes, and average daily trips. Average peak minutes are 2.80 minutes lower for low income group; average off-peak minutes are 19.55 minutes lower for low-income group; there is an average of 19.38 more daily trips for low income groups over non-low-income groups.

Attachment B

2009 Service Quality Analysis – Minority Census Tracts

Origin Destination Analysis Minority Census Tracts	Kaiser Permanente, Richmond, CA			Downtown Oakland, Oakland, CA						University California Berkeley, Berkeley, CA						Chabot College, Hayward, CA			Newpark Mall, Newark, CA			Average
Tract ID	3690.01	3671.00	3790.00	4018.00	4031.00	4065.00	4090.00	4100.00	4240.02	4018.00	4031.00	4065.00	4090.00	4100.00	4240.02	4325.00	4340.00	4373.00	4403.08	4413.01	4420.00	**ALL**
Route ID	70	71	76	13	51	14	50, 56, 1R	98, 1R	72	19	1R	40, 1R	50, 56, 1R	98, 1R	88, 51	55, 85, 97	99, 97	97	232	232	217, 214	
Walking Distance (Miles)	**0.65**	**0.21**	**0.58**	**0.19**	**0.25**	**0.42**	**1.06**	**1.52**	**0.33**	**0.90**	**0.74**	**0.99**	**0.84**	**1.81**	**0.38**	**0.63**	**0.51**	**0.69**	**0.67**	**2.95**	**1.25**	**0.84**
Route Distance (Miles)	**2.32**	**4.59**	**0.88**	**1.81**	**0.13**	**3.71**	**9.19**	**11.30**	**3.57**	**7.74**	**4.76**	**8.01**	**12.57**	**14.79**	**2.90**	**7.95**	**5.90**	**0.37**	**9.98**	**9.20**	**6.78**	**6.12**
Total Distance (Miles)	**2.98**	**4.80**	**1.46**	**2.00**	**0.38**	**4.13**	**10.25**	**12.82**	**3.91**	**8.64**	**5.49**	**9.00**	**13.41**	**16.60**	**3.28**	**8.57**	**6.40**	**1.06**	**10.65**	**12.16**	**8.02**	**6.95**
Walk Time (Minutes)	**0:13:04**	**0:04:17**	**0:11:36**	**0:03:52**	**0:04:55**	**0:08:28**	**0:21:10**	**0:30:27**	**0:06:40**	**0:18:03**	**0:14:42**	**0:19:49**	**0:16:42**	**0:36:09**	**0:07:37**	**0:12:36**	**0:10:06**	**0:13:46**	**0:13:27**	**0:59:05**	**0:24:56**	**0:16:44**
Wait Time (Minutes)	**0:15:00**	**0:15:00**	**0:15:00**	**0:10:00**	**0:04:00**	**0:07:30**	**0:21:00**	**0:21:00**	**0:15:00**	**0:15:00**	**0:06:00**	**0:06:00**	**0:21:00**	**0:21:00**	**0:14:00**	**0:37:30**	**0:15:00**	**0:07:30**	**0:15:00**	**0:30:00**	**0:30:00**	**0:16:16**
Vehicle Time (Minutes)	**0:13:00**	**0:19:00**	**0:03:00**	**0:11:00**	**0:01:00**	**0:21:00**	**0:34:00**	**0:41:00**	**0:20:00**	**0:38:00**	**0:21:00**	**0:37:00**	**0:54:00**	**1:01:00**	**0:15:00**	**0:32:00**	**0:23:00**	**0:01:00**	**0:34:00**	**0:31:00**	**0:24:00**	**0:25:26**
Total Travel Time (Minutes)	**0:41:04**	**0:38:17**	**0:29:36**	**0:24:52**	**0:09:55**	**0:36:58**	**1:16:10**	**1:32:27**	**0:41:40**	**1:11:03**	**0:41:42**	**1:02:50**	**1:31:42**	**1:58:09**	**0:36:37**	**1:22:06**	**0:48:06**	**0:22:16**	**1:02:27**	**2:00:05**	**1:18:56**	**0:58:26**
Walk Time (Minutes)	**13.06**	**4.29**	**11.61**	**3.87**	**4.92**	**8.46**	**21.17**	**30.45**	**6.67**	**18.05**	**14.70**	**19.83**	**16.70**	**36.14**	**7.61**	**12.59**	**10.11**	**13.77**	**13.45**	**59.08**	**24.94**	**16.74**
Wait Time (Minutes)	**15**	**15**	**15**	**10**	**4**	**8**	**21**	**21**	**15**	**15**	**6**	**6**	**21**	**21**	**14**	**38**	**15**	**8**	**15**	**30**	**30**	**16.26**
Vehicle Time (Minutes)	**13**	**19**	**3**	**11**	**1**	**21**	**34**	**41**	**20**	**38**	**21**	**37**	**54**	**61**	**15**	**32**	**23**	**1**	**34**	**31**	**24**	**25.43**
Total Travel Time (Minutes)	**41.06**	**38.29**	**29.61**	**24.87**	**9.92**	**36.96**	**76.17**	**92.45**	**41.67**	**71.05**	**41.70**	**62.83**	**91.70**	**118.14**	**36.61**	**82.09**	**48.11**	**22.27**	**62.45**	**120.08**	**78.94**	**58.43**
Number of Transfers	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**1**	**2**	**1**	**1**	**2**	**1**	**0**	**0**	**0**	**1**	**0.57**
Total Cost per Trip $	**$2.00**	**$2.00**	**$2.00**	**$2.00**	**$2.00**	**$2.00**	**$4.25**	**$2.25**	**$2.00**	**$2.00**	**$2.00**	**$2.25**	**$4.25**	**$2.25**	**$2.25**	**$4.25**	**$2.25**	**$2.00**	**$2.00**	**$2.00**	**$2.25**	**$2.39**
Total Cost per Trip Mile $	**$0.67**	**$0.42**	**$1.37**	**$1.00**	**$5.29**	**$0.48**	**$0.41**	**$0.18**	**$0.51**	**$0.23**	**$0.36**	**$0.25**	**$0.32**	**$0.14**	**$0.69**	**$0.50**	**$0.35**	**$1.89**	**$0.18**	**$0.16**	**$0.28**	**$0.75**

2009 Service Quality Analysis – Non-Minority Census Tracts

Origin Destination Analysis Non-Minority Census Tracts	Kaiser Permanente, Richmond, CA			Downtown Oakland, Oakland, CA						University California Berkeley, Berkeley, CA						Chabot College, Hayward, CA			Newpark Mall, Newark, CA			Average
Tract ID	3902.00	3830.00	3690.02	4032.00	4038.00	4040.00	4217.00	4227.00	4239.01	4032.00	4038.00	4040.00	4217.00	4227.00	4239.01	4272.00	4324.00	4337.00	4412.00	4426.00	4441.00	**ALL**
Route ID	72M	72M	70	72R	13	51	18	51	18	72R, 1R	57, 51	51	7	7	18, 1	51, 1R, 97	55, 97	93, 97	625, 212, 214	213, 214	232	
Walking Distance (Miles)	**0.58**	**0.49**	**4.00**	**0.12**	**0.24**	**0.45**	**0.06**	**0.41**	**0.13**	**0.40**	**1.26**	**0.92**	**0.43**	**0.34**	**0.62**	**0.74**	**0.37**	**0.30**	**1.10**	**1.40**	**0.65**	**0.72**
Route Distance (Miles)	**4.82**	**3.76**	**3.41**	**0.63**	**2.43**	**1.57**	**5.99**	**4.64**	**4.06**	**10.63**	**4.88**	**3.16**	**1.55**	**0.56**	**8.82**	**21.75**	**12.22**	**6.14**	**7.03**	**6.03**	**2.76**	**5.56**
Total Distance (Miles)	**5.40**	**4.25**	**7.41**	**0.75**	**2.66**	**2.02**	**6.05**	**5.05**	**4.19**	**11.03**	**6.15**	**4.09**	**1.97**	**0.90**	**9.44**	**22.49**	**12.58**	**6.44**	**8.13**	**7.43**	**3.41**	**6.28**
Walk Time (Minutes)	**0:11:40**	**0:09:42**	**1:20:00**	**0:02:22**	**0:04:43**	**0:08:57**	**0:01:12**	**0:08:17**	**0:02:40**	**0:07:55**	**0:25:18**	**0:18:26**	**0:08:32**	**0:06:45**	**0:12:23**	**0:14:46**	**0:07:21**	**0:06:04**	**0:22:06**	**0:28:05**	**0:13:03**	**0:14:18**
Wait Time (Minutes)	**0:15:00**	**0:15:00**	**0:15:00**	**0:06:00**	**0:10:00**	**0:04:00**	**0:07:30**	**0:04:00**	**0:07:30**	**0:12:00**	**0:12:00**	**0:04:00**	**0:10:00**	**0:10:00**	**0:15:00**	**0:17:30**	**0:22:30**	**0:37:30**	**6:30:00**	**0:30:00**	**0:15:00**	**0:31:24**
Vehicle Time (Minutes)	**0:22:00**	**0:17:00**	**0:17:00**	**0:03:00**	**0:14:00**	**0:11:00**	**0:34:00**	**0:28:00**	**0:21:00**	**0:23:00**	**0:24:00**	**0:16:00**	**0:11:00**	**0:03:00**	**0:09:00**	**1:27:00**	**0:42:00**	**0:24:00**	**0:31:00**	**0:26:00**	**0:09:00**	**0:22:29**
Total Travel Time (Minutes)	**0:48:40**	**0:41:42**	**1:52:00**	**0:11:22**	**0:28:43**	**0:23:57**	**0:42:42**	**0:40:17**	**0:31:10**	**0:42:55**	**1:01:18**	**0:38:26**	**0:29:32**	**0:19:45**	**0:36:23**	**1:59:16**	**1:11:51**	**1:07:34**	**7:23:06**	**1:24:05**	**0:37:03**	**1:08:11**
Walk Time (Minutes)	**11.67**	**9.70**	**80.01**	**2.37**	**4.72**	**8.96**	**1.20**	**8.28**	**2.66**	**7.92**	**25.29**	**18.43**	**8.54**	**6.75**	**12.38**	**14.77**	**7.36**	**6.07**	**22.10**	**28.09**	**13.05**	**14.30**
Wait Time (Minutes)	**15.00**	**15.00**	**15.00**	**6.00**	**10.00**	**4.00**	**7.50**	**4.00**	**7.50**	**12.00**	**12.00**	**4.00**	**10.00**	**10.00**	**15.00**	**17.50**	**22.50**	**37.50**	**390.00**	**30.00**	**15.00**	**31.40**
Vehicle Time (Minutes)	**22**	**17**	**17**	**3**	**14**	**11**	**34**	**28**	**21**	**23**	**24**	**16**	**11**	**3**	**9**	**87**	**42**	**24**	**31**	**26**	**9**	**22.48**
Total Travel Time (Minutes)	**48.67**	**41.70**	**112.01**	**11.37**	**28.72**	**23.96**	**42.70**	**40.28**	**31.16**	**42.92**	**61.29**	**38.43**	**29.54**	**19.75**	**36.38**	**119.27**	**71.86**	**67.57**	**443.10**	**84.09**	**37.05**	**68.18**
Number of Transfers	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**1**	**2**	**1**	**1**	**2**	**1**	**0**	**0.48**
Total Cost per Trip $	**$2.00**	**$2.00**	**$2.00**	**$2.00**	**$2.00**	**$2.00**	**$2.00**	**$2.00**	**$2.00**	**$2.25**	**$2.25**	**$2.00**	**$2.00**	**$2.00**	**$2.25**	**$4.25**	**$2.25**	**$2.25**	**$4.25**	**$2.25**	**$2.00**	**$2.29**
Total Cost per Trip Mile $	**$0.37**	**$0.47**	**$0.27**	**$2.67**	**$0.75**	**$0.99**	**$0.33**	**$0.40**	**$0.48**	**$0.20**	**$0.36**	**$0.49**	**$1.01**	**$2.23**	**$0.24**	**$0.19**	**$0.18**	**$0.35**	**$0.52**	**$0.30**	**$0.59**	**$0.64**

Attachment B

2010 Service Quality Analysis

Origin Destination Analysis Minority Census Tracts	Kaiser Permanente, Richmond, CA			Downtown Oakland, Oakland, CA						University California Berkeley, Berkeley, CA						Chabot College, Hayward, CA			Newpark Mall, Newark, CA			Average
Tract ID	3690.01	3671.00	3790.00	4018	4031.00	4065	4090.00	4100.00	4240.02	4018.00	4031.00	4065.00	4090.00	4100.00	4240.02	4325.00	4340.00	4373.00	4403.08	4413.01	4420.00	ALL
Current Route ID	70	71	76	13	51	14	50, 56, 1R	98, 1R	72	19	1R	40, 1R	50, 56, 1R	98, 1R	88, 51	55, 85, 97	99, 97	97	232	232	217, 214	
Spring 2010 Route ID	70	72, 71	76	26*	51A	14*	73, 1R	46, 1R	72	26*, 1R	1R	40, 1R	73, 1R	46, 1R	88, 51B	85, 97	99, 97	97	232	232	217, 242	
Walking Distance (Miles)	0.65	0.38	0.68	0.13	0.25	0.42	0.97	2.64	0.34	0.65	0.74	0.99	1.41	3.09	0.38	1.17	0.51	0.72	0.75	2.39	1.36	0.98
Route Distance (Miles)	2.32	5.50	0.43	1.82	0.13	3.71	8.74	8.82	3.56	12.21	4.76	8.01	19.77	20.36	2.90	7.36	5.90	0.37	8.32	7.42	5.85	6.58
Total Distance (Miles)	2.98	5.87	1.12	1.95	0.38	4.13	9.71	11.47	3.90	12.86	5.49	9.00	21.18	23.45	3.28	8.53	6.40	1.09	9.07	9.80	7.21	7.57
Walk Time (Minutes)	0:13:04	0:07:31	0:13:41	0:02:35	0:04:55	0:08:28	0:19:22	0:52:54	0:06:49	0:12:57	0:14:42	0:19:49	0:28:17	1:01:49	0:07:37	0:23:29	0:10:06	0:14:25	0:15:02	0:47:44	0:27:17	0:19:39
Wait Time (Minutes)*	0:15:00	0:30:00	0:15:00	0:07:30	0:04:00	0:07:30	0:13:30	0:21:00	0:15:00	0:13:30	0:06:00	0:11:00	0:21:00	0:21:00	0:14:00	0:37:30	0:22:30	0:07:30	0:30:00	0:30:00	0:30:00	0:17:44
Vehicle Time (Minutes)	0:13:00	0:21:00	0:02:00	0:09:00	0:01:00	0:21:00	0:43:00	0:43:00	0:20:00	0:29:00	0:21:00	0:37:00	1:05:00	1:01:00	0:15:00	0:29:00	0:23:00	0:01:00	0:31:00	0:28:00	0:25:00	0:25:37
Total Travel Time (Minutes)*	0:41:04	0:58:31	0:30:41	0:19:05	0:09:55	0:36:58	1:15:52	1:56:54	0:41:49	0:55:27	0:41:42	1:07:49	1:54:17	2:23:49	0:36:37	1:29:59	0:55:36	0:22:55	1:16:02	1:45:44	1:22:17	1:03:00
Walk Time (Minutes)	13.06	7.51	13.68	2.58	4.92	8.46	19.36	52.90	6.82	12.94	14.70	19.83	28.29	61.82	7.61	23.49	10.11	14.42	15.03	47.73	27.28	19.64
Wait Time (Minutes)*	15.00	30.00	15.00	7.50	4.00	7.50	13.50	21.00	15.00	13.50	6.00	11.00	21.00	21.00	14.00	37.50	22.50	7.50	30.00	30.00	30.00	17.74
Vehicle Time (Minutes)	13	21	2	9	1	21	43	43	20	29	21	37	65	61	15	29	23	1	31	28	25	25.62
Total Travel Time (Minutes)*	41.06	58.51	30.68	19.08	9.92	36.96	75.86	116.90	41.82	55.44	41.70	67.83	114.29	143.82	36.61	89.99	55.61	22.92	76.03	105.73	82.28	63.00
Number of Transfers	0	1	0	0	0	0	1	1	0	1	0	1	1	1	1	1	1	0	0	0	1	0.52
Total Cost per Trip $	$2.00	$2.25	$2.00	$2.00	$2.00	$2.00	$2.25	$2.25	$2.00	$2.25	$2.00	$2.25	$2.25	$2.25	$2.25	$2.25	$2.25	$2.00	$2.00	$2.00	$2.25	$2.13
Total Cost per Trip Mile $	$0.67	$0.38	$1.79	$1.02	$5.29	$0.48	$0.23	$0.20	$0.51	$0.17	$0.36	$0.25	$0.11	$0.10	$0.69	$0.26	$0.35	$1.83	$0.22	$0.20	$0.31	$0.74

*Peak frequencies for trips utilizing Line 14, Line 26 and Line 89 provided by HASTUS. Waiting times for remaining new and re-routed lines provided by Adopted SAP Workbook. For routes that are not all impacted by the RevSAP, waiting and total travel times are based on the 2009/2010 Service Intensity Analysis.

Attachment B
2010 Service Quality Analysis

Origin Destination Analysis Non-Minority Census Tracts	Kaiser Permanente, Richmond, CA			Downtown Oakland, Oakland, CA						University California Berkeley, Berkeley, CA						Chabot College, Hayward, CA			Newpark Mall, Newark, CA			Average
Tract ID	3902.00	3830.00	3690.02	4032.00	4038.00	4040.00	4217.00	4227.00	4239.01	4032.00	4038.00	4040.00	4217.00	4227.00	4239.01	4272.00	4324.00	4337.00	4412.00	4426.00	4441.00	**ALL**
Current Route ID	72M	72M	70	72R	13	51	18	51	18	72R, 1R	57, 51	51	7	7	18, 1	51, 1R, 97	55, 97	93, 97		213, 214	232	
Spring 2010 Route ID	72M	72M	70	72R	58L	51A	18	51B, 51A	18	72R, 1R	57, 1R	51A, 51B	7	None**	18	51A, 1R, 97	89*, 97	93, 97	625***, 212	242	232	
Walking Distance (Miles)	**0.58**	**0.49**	**4.00**	**0.12**	**0.66**	**0.45**	**0.06**	**0.72**	**0.13**	**0.40**	**1.26**	**0.96**	**0.90**	**0.68**	**1.08**	**0.74**	**0.54**	**0.30**	**1.10**	**0.52**	**0.08**	**0.75**
Route Distance (Miles)	**4.82**	**3.76**	**3.41**	**0.63**	**1.97**	**1.57**	**5.99**	**5.69**	**3.95**	**10.63**	**4.88**	**3.45**	**0.81**	**0.00**	**4.94**	**21.75**	**13.40**	**7.16**	**13.51**	**1.86**	**3.38**	**5.60**
Total Distance (Miles)	**5.40**	**4.25**	**7.41**	**0.75**	**2.62**	**2.02**	**5.98**	**6.41**	**4.08**	**11.03**	**6.15**	**4.41**	**1.71**	**0.68**	**6.02**	**22.49**	**13.94**	**7.46**	**14.62**	**2.38**	**3.45**	**6.35**
Walk Time (Minutes)	**0:11:40**	**0:09:42**	**1:20:00**	**0:02:22**	**0:13:08**	**0:08:57**	**0:01:12**	**0:14:19**	**0:02:40**	**0:07:55**	**0:25:18**	**0:19:07**	**0:17:59**	**0:13:30**	**0:21:39**	**0:14:46**	**0:10:48**	**0:06:04**	**0:22:06**	**0:10:27**	**0:00:02**	**0:14:56**
Wait Time (Minutes)	**0:15:00**	**0:15:00**	**0:15:00**	**0:06:00**	**0:15:00**	**0:04:00**	**0:07:30**	**0:08:00**	**0:07:30**	**0:12:00**	**0:10:00**	**0:08:00**	**0:20:00**	**0:00:00**	**0:07:30**	**0:17:30**	**0:22:30**	**0:37:30**	**6:15:00**	**0:15:00**	**0:30:00**	**0:30:51**
Vehicle Time (Minutes)	**0:22:00**	**0:17:00**	**0:17:00**	**0:03:00**	**0:10:00**	**0:10:00**	**0:31:00**	**0:34:00**	**0:20:00**	**0:23:00**	**0:24:00**	**0:37:00**	**0:11:00**	**0:00:00**	**0:06:00**	**1:27:00**	**0:44:00**	**0:24:00**	**0:47:00**	**0:06:00**	**0:09:00**	**0:22:57**
Total Travel Time (Minutes)	**0:48:40**	**0:41:42**	**1:52:00**	**0:11:22**	**0:38:08**	**0:22:57**	**0:39:42**	**0:56:19**	**0:30:10**	**0:42:55**	**0:59:18**	**1:04:07**	**0:48:59**	**0:13:30**	**0:35:09**	**1:59:16**	**1:17:18**	**1:07:34**	**7:24:06**	**0:31:27**	**0:39:02**	**1:08:45**
Walk Time (Minutes)	**11.67**	**9.70**	**80.01**	**2.37**	**13.13**	**8.96**	**1.20**	**14.31**	**2.66**	**7.92**	**25.29**	**19.11**	**17.99**	**13.50**	**21.65**	**14.77**	**10.80**	**6.07**	**22.10**	**10.45**	**0.03**	**14.94**
Wait Time (Minutes)	**15.00**	**15.00**	**15.00**	**6.00**	**15.00**	**4.00**	**7.50**	**8.00**	**7.50**	**12.00**	**10.00**	**8.00**	**20.00**	**0.00**	**7.50**	**17.50**	**22.5**	**37.50**	**375.00**	**15.00**	**30.00**	**30.86**
Vehicle Time (Minutes)	**22**	**17**	**17**	**3**	**10**	**10**	**31**	**34**	**20**	**23**	**24**	**37**	**11**	**0**	**6**	**87**	**44**	**24**	**47**	**6**	**9**	**22.95**
Total Travel Time (Minutes)	**48.67**	**41.70**	**112.01**	**11.37**	**38.13**	**22.96**	**39.70**	**56.31**	**30.16**	**42.92**	**59.29**	**64.11**	**48.99**	**13.50**	**35.15**	**119.27**	**77.30**	**67.57**	**444.10**	**31.45**	**39.03**	**68.75**
Number of Transfers	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**1**	**1**	**0**	**0**	**0**	**2**	**1**	**1**	**1**	**0**	**0**	**0.43**
Total Cost per Trip $	**$2.00**	**$2.00**	**$2.00**	**$2.00**	**$2.00**	**$2.00**	**$2.00**	**$2.25**	**$2.00**	**$2.25**	**$2.25**	**$2.25**	**$2.00**	**0**	**$2.00**	**$4.25**	**$2.25**	**$2.25**	**$2.25**	**$2.00**	**$2.00**	**$2.10**
Total Cost per Trip Mile $	**$0.37**	**$0.47**	**$0.27**	**$2.67**	**$0.76**	**$0.99**	**$0.33**	**$0.35**	**$0.49**	**$0.20**	**$0.36**	**$0.51**	**$1.17**	**0**	**$0.33**	**$0.19**	**$0.16**	**$0.30**	**$0.15**	**$0.84**	**$0.58**	**$0.55**

*Peak frequencies for trips utilizing Line 14, Line 26 and Line 89 provided by HASTUS. Waiting times for remaining new and re-routed lines provided by Adopted SAP Workbook. For routes that are not all impacted by the RevSAP, waiting and total travel times are based on the 2009/2010 Service Intensity Analysis. **Due to re-routing, this trip is no longer accessible by AC Transit. Trip is from 15 Hillside Ct, Berkeley to UCB. ***Line 625 is a school tripper with one bus operating during peak service.