



Major Change  
and  
Service Equity Analysis

Proposed April 2018 Service Changes  
(Bus Rapid Transit Line and Richmond Transit Network Plan)



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## Table of Contents

Overview .....	5
Service and Fare Equity (SAFE) Policy .....	5
Identifying Fare Change .....	5
Identifying Major Service Change .....	5
a. Change in number of trips (route level)– Major change .....	7
b. Change in service span (route level) .....	8
c. Redirecting a route (route level) .....	8
d. Change in total miles serviced by the route (route level)– Major change .....	8
e. Shortlining or longlining (route level) – Major change .....	8
f. Eliminating routes (route level)– Major change .....	9
g. Adding new route(s) (system level)– Major change .....	10
h. Change total daily revenue hours (system level)– Major change.....	12
Service Change Maps .....	12
Service Equity Analysis – Disparate Impact.....	16
Methodology.....	16
Results.....	16
Service Equity Analysis – Disproportionate Burden.....	18
Methodology.....	18
Results.....	18
Conclusion .....	20
Board Approval Signatures.....	21



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## Overview

This report summarizes the results of the Title VI – Service Equity analysis conducted on the “Your New GRTC Transit System” schedule, which is projected to be implemented April 15, 2018. This schedule includes the restructuring of all local routes within the City of Richmond, trip reduction in one City or Richmond express route, the rerouting of three local routes within Henrico County, the addition of a Bus Rapid Transit line, and a change in overall system span and frequency. The “April 2018” schedule proved to be a Major Service Change from the current August 2017 schedule, requiring the performance of a service equity analysis, per the requirement of GRTC’s Title VI Program – Service and Fare Equity Policy (February 2017). The analysis results determined that the new schedule will not have a disparate impact on minority populations or impose a disproportionate burden on low income populations. The final implementation date for the schedule is dependent on the completion of construction of the Bus Rapid Transit Line, and the certification of safety and security of the line. This dependency could result in a later implementation date; however, the schedule will be referred to as “April 2018” for this report, or Scenario B.

## Service and Fare Equity (SAFE) Policy

GRTC has a fare and service equity analysis policy and process to evaluate proposed service and fare changes. The Service and Fare Equity (SAFE) process shall be performed in any and all of the following conditions:

- Any fare change (increase or reduction) is considered on one or more routes or services (local, express, specialized or other)
- A major service change (increase or reduction) is considered on one or more routes or services

All major service changes shall undergo a service equity analysis to ensure that these changes do not have disparate impacts on minority populations, or impose a disproportionate burden on low-income populations, consistent with the intent and requirements of FTA Circular 4702.1B and Title VI of the Civil Rights Act of 1964.

## Identifying Fare Change

There are no fare changes proposed with the April 2018 schedule.

## Identifying Major Service Change

The table below lists the metrics and thresholds that identify whether a service change is identified as major. There are six metrics (a-f) that determine if a change to an individual route is a major change, and two metrics (g-h) that determine if a change is a system level major change. The table describes the metric, the threshold, provides an example, and lists the identified major changes respective to each metric. All metrics that were triggered as major changes are highlighted in green in the table and have a star. The full analysis for each metric follows the table.

**Route Level Metrics**





Route Level Metric	Level of Change Required to be Classified as a Major Change	Example	April 2018 Scenario B Major Changes
a. Change in number of trips 	25% change in number of scheduled one-way trips on the Weekday, Saturday or Sunday schedule.	Decreasing number of trips from 80 daily one-way trips to 50 one-way trips.	<ul style="list-style-type: none"> <li>• 27 routes were removed, removing 100% of their trips.</li> <li>• 25 routes were added, adding 100% new trips to each route.</li> <li>• Of the 15 routes that remained active from Scenario A to B, route 19 increased trips by 133% in scenario B. Route 64 decreased trips by 39%.</li> </ul>
b. Change in service span	25% change in the number of hours between the beginning and end of the Weekday, Saturday or Sunday schedule, in either direction.	Changing Weekday span on a route from 20 hours to 15 hours or less.	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
c. Re-directing a route	Rerouting at least 25% of a route's path onto a different street or road, measured in single-direction route miles.	Moving two miles of an eight-mile route to another street or road (even if the new routing is very near the current routing).	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
d. Change in total miles serviced by the route 	25% change in total miles on a route's path	Extending or shortening a line.	<ul style="list-style-type: none"> <li>• 50% change in miles on the route 19 path. In scenario A route 19 travels from Pemberton to Downtown which is 12 miles. In scenario B route 19 travels from Pemberton to Willow Lawn which is 6 miles.</li> </ul>
e. Shortlining or Longlining 	25% change in number of scheduled one-way trips ending at a route's terminal points.	On a route originally going from points A to B to C, terminating certain trips at B. On a route originally going from A to B, extending certain trips to travel all the way to point C.	<ul style="list-style-type: none"> <li>• 100% of route 19's trips were shortlined. In scenario A route 19 travels from Pemberton to Downtown. In scenario B route 19 travels from Pemberton to Willow Lawn.</li> </ul>
f. Eliminating Route(s) 	Eliminating one or more routes.	Discontinuing an existing route (even if replacing this route with nearby service).	<ul style="list-style-type: none"> <li>• 27 routes were removed from Scenario A to Scenario B.</li> </ul>

Figure 1

a. Change in number of trips (route level)– Major change

The below image displays the routes for the August 2017 Schedule (Scenario A) and the April 2018 Schedule (Scenario B). The tables represent weekday, Saturday and Sunday schedules and their respective number of revenue trips by route. The routes listed as new in the August 2017 column are routes added in Scenario B. Routes with an x in the April 2018 column were removed in this scenario. All routes listed as No Service/gray do not operate during that schedule type. A red % change is a major change.

Route	Weekday			Route	Saturday			Route	Sunday		
	August 2017	April 2018	%		August 2017	April 2018	%		August 2017	April 2018	%
	Scenario A	Scenario B	Change		Scenario A	Scenario B	Change		Scenario A	Scenario B	Change
1	53	x	-	1	41	x	-	1	41	x	-
1A	new	68	-	1A	new	62	-	1A	new	36	-
1B	new	28	-	1B	new	26	-	1B	new	No Service	-
1C	new	39	-	1C	new	38	-	1C	new	36	-
2	54	x	-	2	42	x	-	2	42	x	-
2A	new	40	-	2A	new	36	-	2A	new	36	-
2B	new	28	-	2B	new	26	-	2B	new	No Service	-
2C	new	71	-	2C	new	63	-	2C	new	36	-
3	58	x	-	3	51	x	-	3	34	x	-
3A	new	55	-	3A	new	52	-	3A	new	No Service	-
3B	new	56	-	3B	new	52	-	3B	new	No Service	-
3C	new	24	-	3C	new	16	-	3C	new	74	-
4	57	x	-	4	51	x	-	4	32	x	-
4A	new	136	-	4A	new	120	-	4A	new	70	-
4B	new	138	-	4B	new	124	-	4B	new	72	-
5	new	136	-	5	new	124	-	5	new	70	-
6	145	x	-	6	120	x	-	6	82	x	-
7/ (7A/ 7B)	78	82	5%	7/ (7A/ 7B)	No Service	No Service	-	7/ (7A/ 7B)	No Service	No Service	-
8	new	13	-	8	new	68	-	8	-	94	-
10	68	x	-	10	76	x	-	10	46	x	-
12	new	80	-	12	new	68	-	12	new	70	-
13	new	79	-	13	new	70	-	13	new	70	-
14	new	80	-	14	new	69	-	14	new	71	-
16	37	x	-	16	No Service	x	-	16	No Service	x	-
18	26	26	0%	18	No Service	No Service	-	18	No Service	No Service	-
19	21	49	133%	19	No Service	No Service	-	19	No Service	No Service	-
20	new	68	-	20	new	66	-	20	new	66	-
21	18	x	-	21	18	x	-	21	16	x	-
23	2	2	0%	23	No Service	No Service	-	23	No Service	No Service	-
24	44	x	-	24	28	x	-	24	26	x	-
26	14	14	0%	26	No Service	No Service	-	26	No Service	No Service	-
27	19	18	-5%	27	No Service	No Service	-	27	No Service	No Service	-
28	4	4	0%	28	No Service	No Service	-	28	No Service	No Service	-
29	27	27	0%	29	No Service	No Service	-	29	No Service	No Service	-
32	128	x	-	32	99	x	-	32	68	x	-
34	103	x	-	34	101	x	-	34	77	x	-
37	130	x	-	37	103	x	-	37	73	x	-
41	52	x	-	41	50	x	-	41	50	x	-
43	70	x	-	43	47	x	-	43	49	x	-
44	70	x	-	44	49	x	-	44	47	x	-
45	78	x	-	45	44	x	-	45	44	x	-
50	new	72	-	50	new	68	-	50	new	68	-
51	26	x	-	51	20	x	-	51	20	x	-
52	50	x	-	52	36	x	-	52	38	x	-
53	50	x	-	53	38	x	-	53	38	x	-
56	3	3	-	56	No Service	No Service	-	56	No Service	No Service	-
60	68	x	-	60	66	x	-	60	42	x	-
61	50	x	-	61	41	x	-	61	42	x	-
63	42	x	-	63	30	x	-	63	No Service	x	-
64	28	17	-39%	64	No Service	No Service	-	64	No Service	No Service	-
68	47	x	-	68	No Service	x	-	68	No Service	x	-
70	48	x	-	70	35	x	-	70	34	x	-
71	45	x	-	71	29	x	-	71	32	x	-
72	21	x	-	72	No Service	x	-	72	No Service	x	-
73	66	x	-	73	56	x	-	73	56	x	-
74	73	x	-	74	76	x	-	74	75	x	-
75	new	12	-	75	new	No Service	-	75	new	No Service	-
76	new	28	-	76	new	25	-	76	new	25	-
77	new	28	-	77	new	25	-	77	new	25	-
78	new	29	-	78	new	25	-	78	new	25	-
79	new	36	-	79	new	No Service	-	79	new	No Service	-
82	6	6	0%	82	No Service	No Service	-	82	No Service	No Service	-
86	new	28	-	86	new	24	-	86	new	24	-
87	new	28	-	87	new	24	-	87	new	24	-
88	new	26	-	88	new	26	-	88	new	No Service	-
91	26	24	-8%	91	No Service	No Service	-	91	No Service	No Service	-
93	22	22	0%	93	No Service	No Service	-	93	No Service	No Service	-
95	11	11	0%	95	No Service	No Service	-	95	No Service	No Service	-
101	24	x	-	101	24	x	-	101	No Service	x	-
108	new	180	-	108	new	150	-	108	new	150	-

Figure 2

**b. Change in service span (route level)**

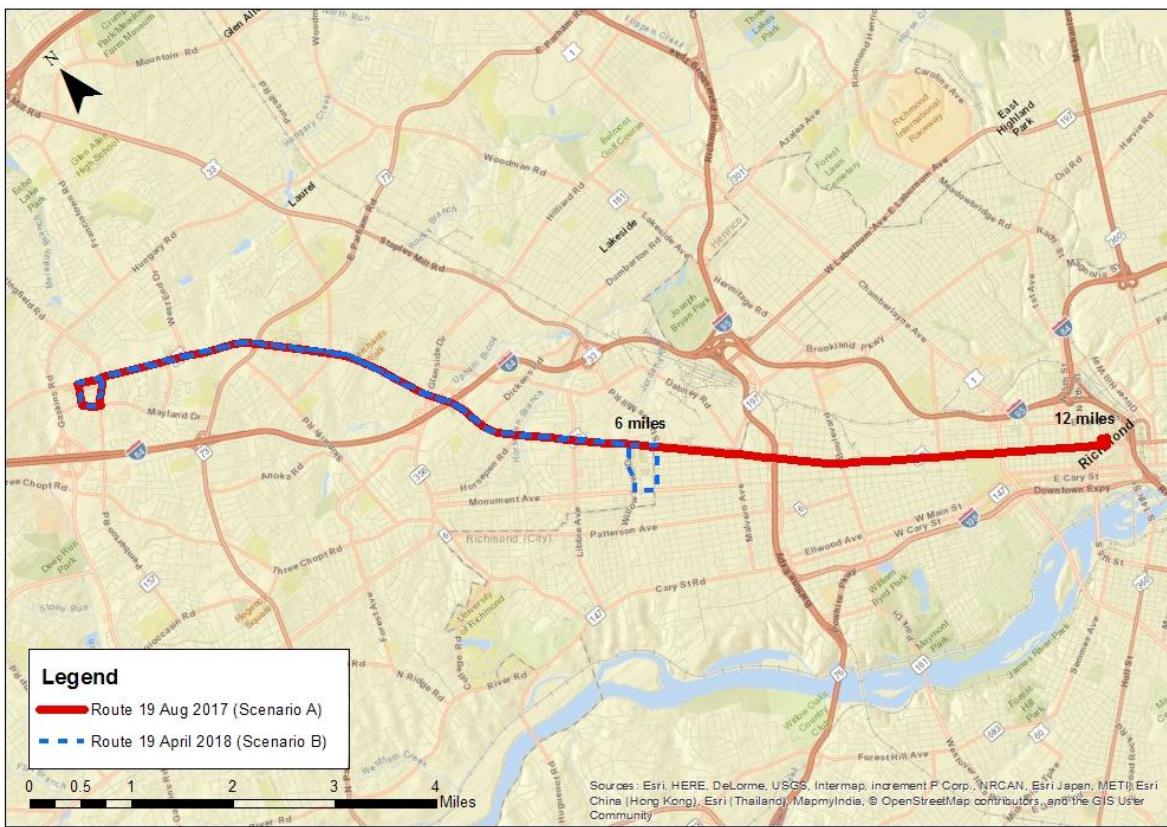
The 15 routes that remain active from Scenario A to Scenario B will not have a change in service span.

**c. Redirecting a route (route level)**

The 15 routes that remain active from Scenario A to Scenario B will not be redirected greater than 10%. This minor change is a one mile extension on Route 7 to serve Wal-Mart on Nine Mile Road and Laburnum in Henrico County. The route has a path length of 11 miles in August 2017 and increases to 12 miles in Scenario B.

**d. Change in total miles serviced by the route (route level)– Major change**

The total miles on the route 19 path are decreased by 50% from scenario A to scenario B. In August 2017, the route travels from Pemberton in Henrico County to Downtown Richmond on Broad Street. In April 2018, the route travels from Pemberton in Henrico County to Willow Lawn in Henrico County.



Route 19 Path Changes Scenario A to B



Figure 3

**e. Shortlining or longlining (route level) – Major change**

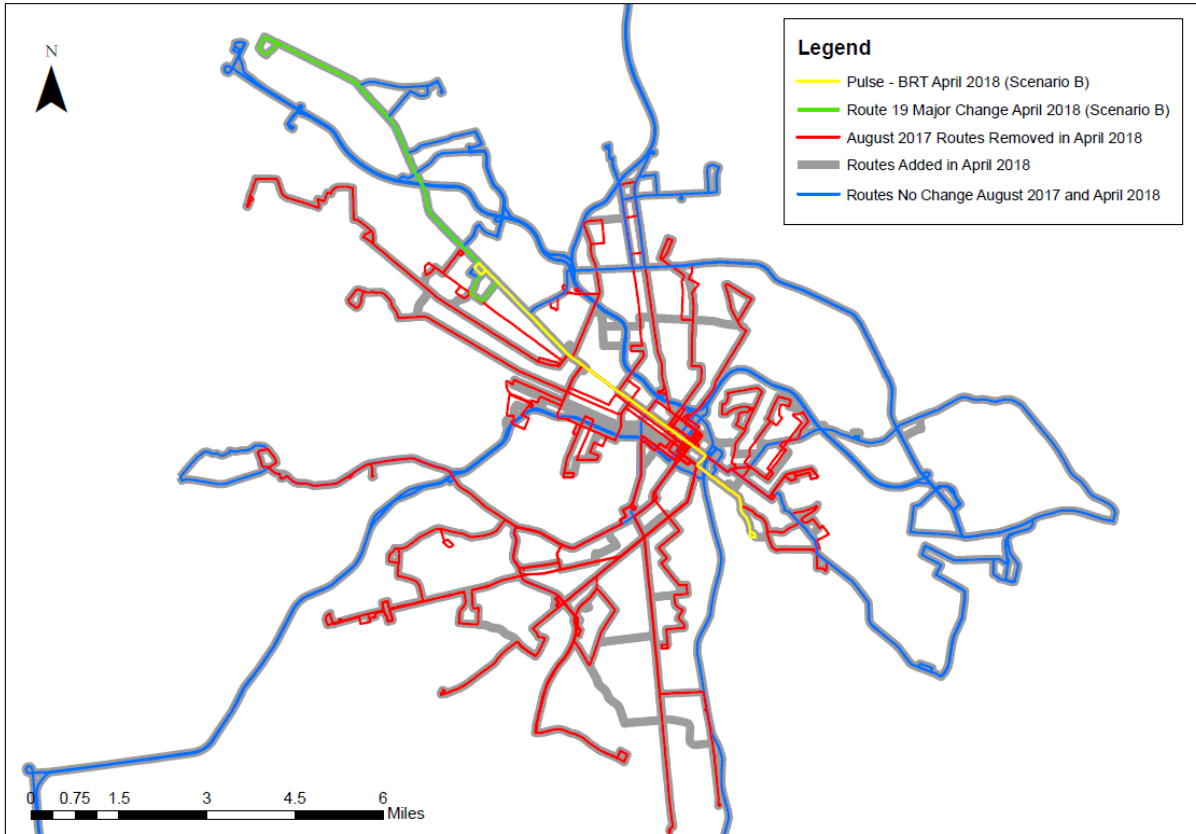
100% of route 19’s trips are shortlined. Figure 3 above represents the change in termination points for route 19 from scenario A to scenario B.

Schedule	West	East
Scenario A	10 trips	11 trips
August 2017	12 miles	12 miles
Scenario B	24 trips	25 trips
April 2018	6 miles	6 miles



f. Eliminating routes (route level)– Major change

The image below displays the changes from scenario A to scenario B. The red lines represent the 27 routes that will be removed from Scenario A to Scenario B. The gray lines represent the 25 routes that will be added in scenario B. In most places, the gray routes are replacing the red routes still providing service to most of the corridors. The blue routes are routes that will not change or have minimal change from scenario A to scenario B. The green represents route 19, which will have added trips, enhanced frequency, and be shortlined in scenario B. The yellow represents the Pulse, which is the BRT line that is being added in scenario B.



Service Coverage Changes Scenario A to B



Figure 4

**System Level Metrics**



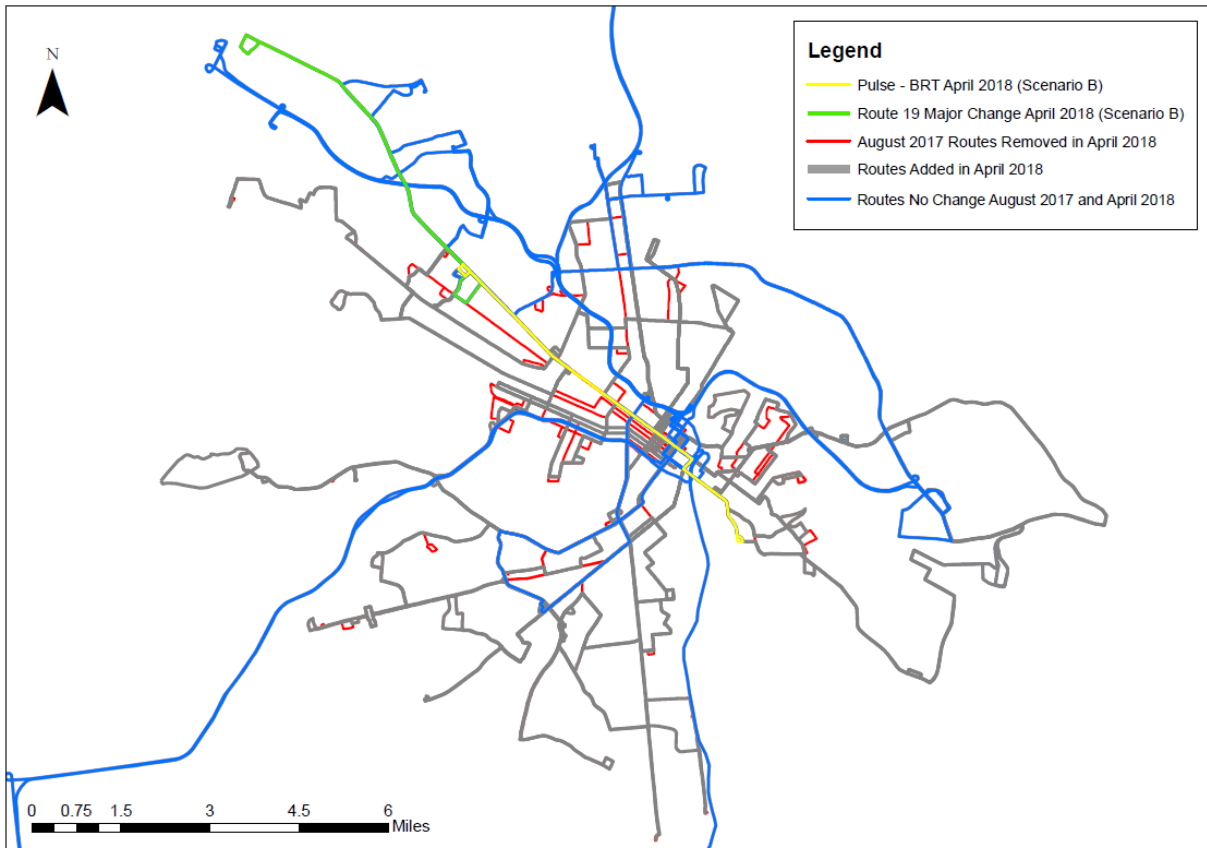
System Level Metric	Level of Change Required to be Classified as a Major Change	Example	April 2018 Scenario B Major Changes
g. Adding new route(s) 	Adding one or more new routes.	Creating a new route to reaching a previously unserved area.	<ul style="list-style-type: none"> <li>• 25 new routes were added in Scenario B.</li> </ul>
h. Change total daily revenue hours 	25% change in revenue hours over the system on the Weekday, Saturday or Sunday schedule.	Reduction of 30% of weekday revenue hours due to a budget shortfall.	<ul style="list-style-type: none"> <li>• Weekday: 5% decrease from Scenario A to Scenario B.</li> <li>• Saturday: 23% increase from Scenario A to Scenario B.</li> <li>• Sunday: 26% increase from Scenario A to Scenario B.</li> </ul>

Figure 5

**g. Adding new route(s) (system level)- Major change**

25 routes were added in Scenario B. The routes are identified in gray and yellow in the map below. The gray lines represent local routes, the yellow line represents the addition of a BRT line. Most of the added routes cover service that was provided by the routes that were eliminated from scenario A to B.



Service Coverage Changes Scenario A to B



Figure 6

Jurisdiction	Type	Number	Status
Richmond	Local	1A	New
Richmond	Local	1B	New
Richmond	Local	1C	New
Richmond	Local	2A	New
Richmond	Local	2B	New
Richmond	Local	2C	New
Richmond	Local	3A	New
Richmond	Local	3B	New
Richmond	Local	3C	New
Richmond	Local	5	New
Henrico	Local	7A	Remain Active
Henrico	Local	7B	
Richmond	Local	8	New
Richmond	Local	12	New
Richmond	Local	13	New
Richmond	Local	14	New
Henrico	Local	18	Remain Active - No Change
Henrico	Local	19	Remain Active - Changed
Richmond	Local	20	New
Henrico	Express	23	Remain Active
Henrico	Express	26	Remain Active
Henrico	Express	27	Remain Active
Henrico	Express	28	Remain Active
Henrico	Express	29	Remain Active
Richmond	Local	50	New
Henrico	Local	56	Remain Active
Richmond	Express	64	Remain Active - Changed
Richmond	Local	75	New
Richmond	Local	76	New
Richmond	Local	77	New
Richmond	Local	78	New
Henrico	Local	79	New
Chesterfield	Express	82	Remain Active - No Change
Richmond	Local	86	New
Richmond	Local	87	New
Richmond	Local	88	New
Henrico	Local	91	Remain Active - No Change
Henrico	Local	93	Remain Active - No Change
Petersburg	Express	95	Remain Active - No Change
Richmond	Express	102	Remain Active - No Change
Richmond	BRT	108	New

Figure 7

Scenario A to B Changes

Status	Count
Removed	27
Added	25
Remain Active - Changed	2
Remain Active - No Change	13

August 2017	Total	Henrico	Petersburg	Richmond	Chesterfield
Local	33	6	0	27	0
Express	9	5	1	2	1
BRT	0	0	0	0	0

Scenario B

April 2018	Total	Henrico	Petersburg	Richmond	Chesterfield
Local	31	8	0	23	0
Express	9	5	1	2	1
BRT	1	0	0	1	0

Figure 8

h. Change total daily revenue hours (system level)– Major change

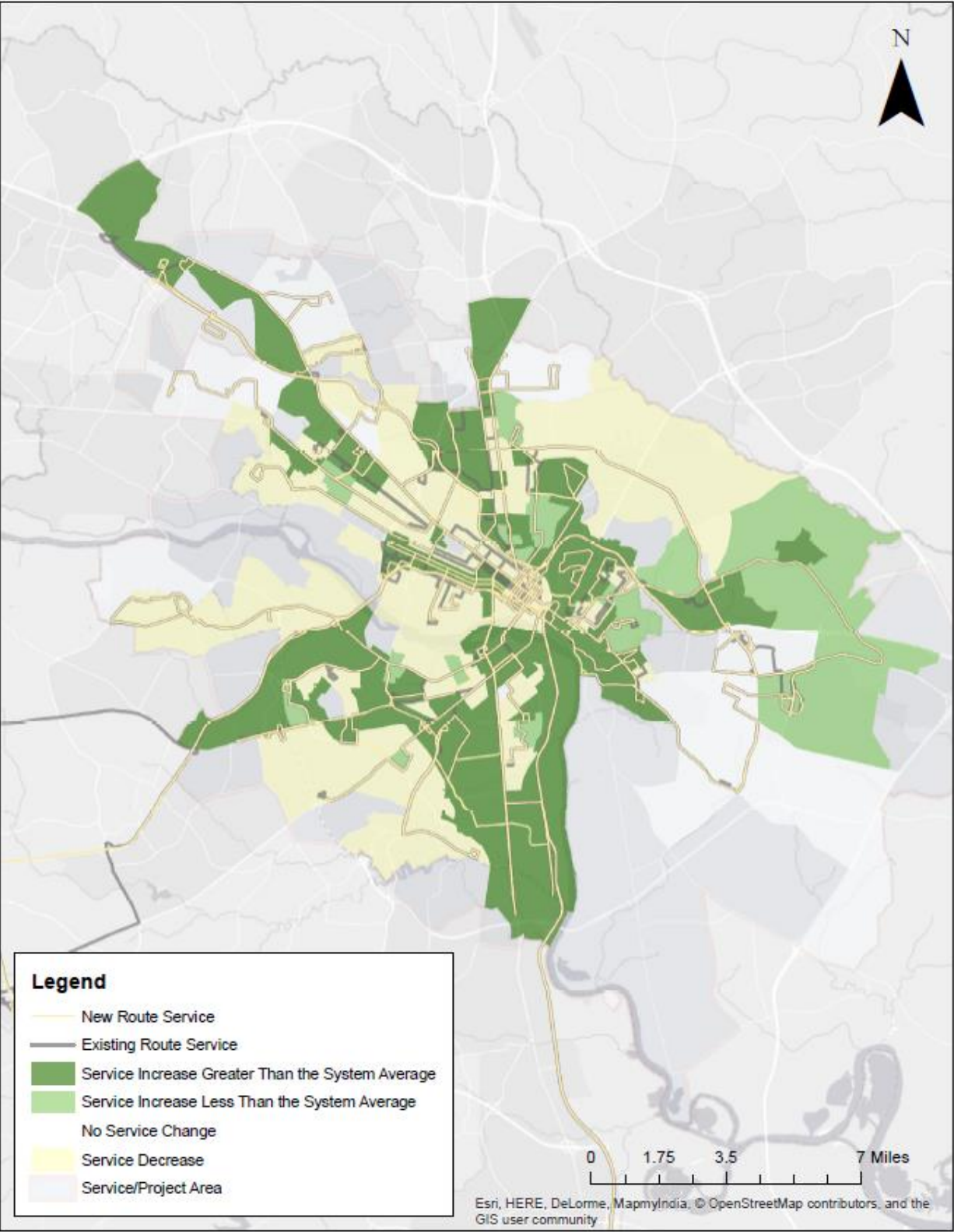
The Sunday change in revenue hours from August 2017 (scenario A) to April 2018 (scenario B) is identified as a major system change as it is above the 25% threshold. The Saturday schedule is not identified as a major change as it is 2% below threshold. The weekday schedule is not identified as a major change as it is a minimal change with a 5% reduction in service from scenario A to B.

Schedule	August 2017 Scenario A	April 2018 Scenario B	% Change
Weekday	1,295	1,232	-5%
Saturday	718	883	23%
Sunday	561	705	26%

Figure 9

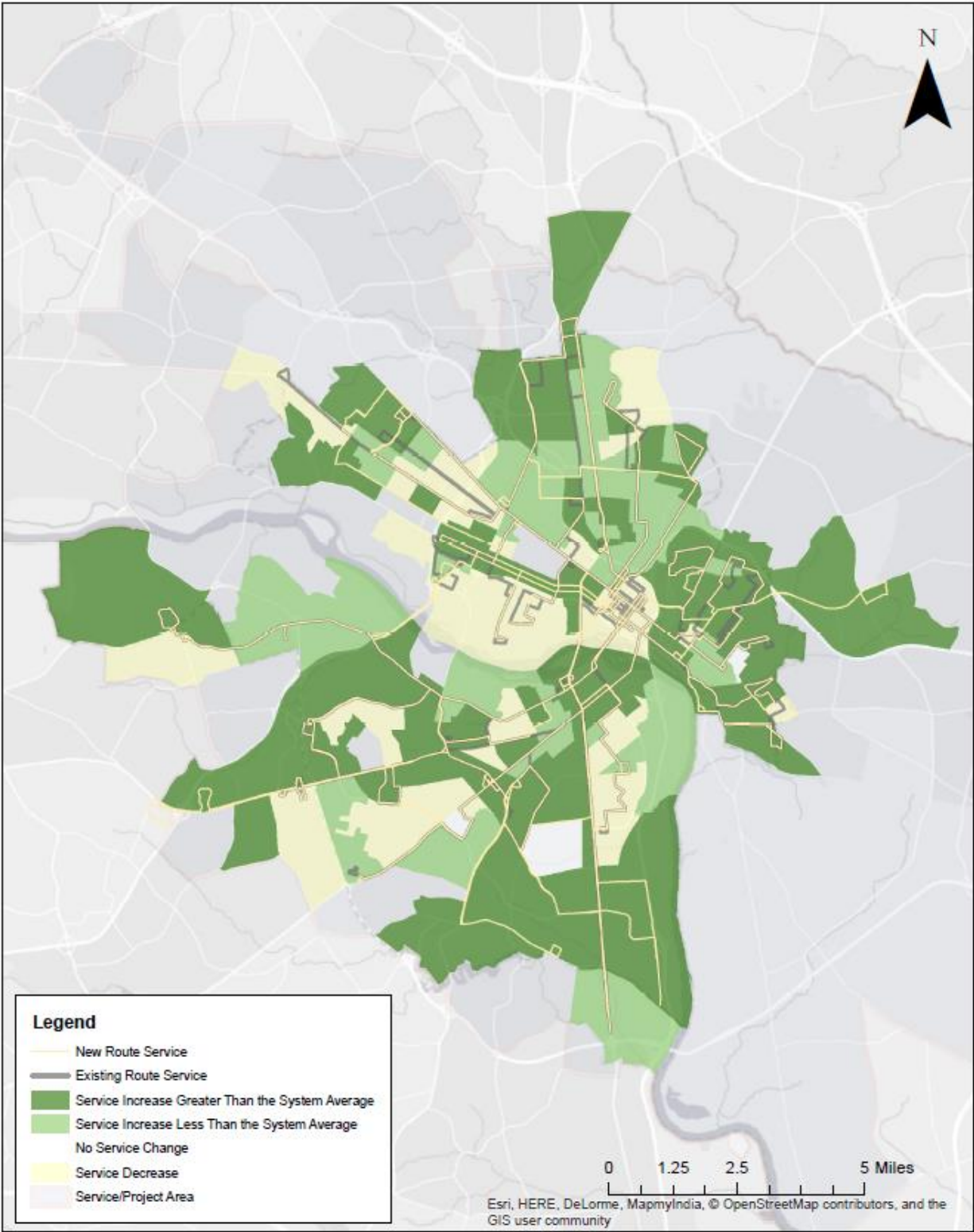
Service Change Maps

The maps on pages 11 through 13 (figures 10,11, and 12) provide a display of the distribution of service changes across the service area by weekday, Saturday and Sunday schedule types.



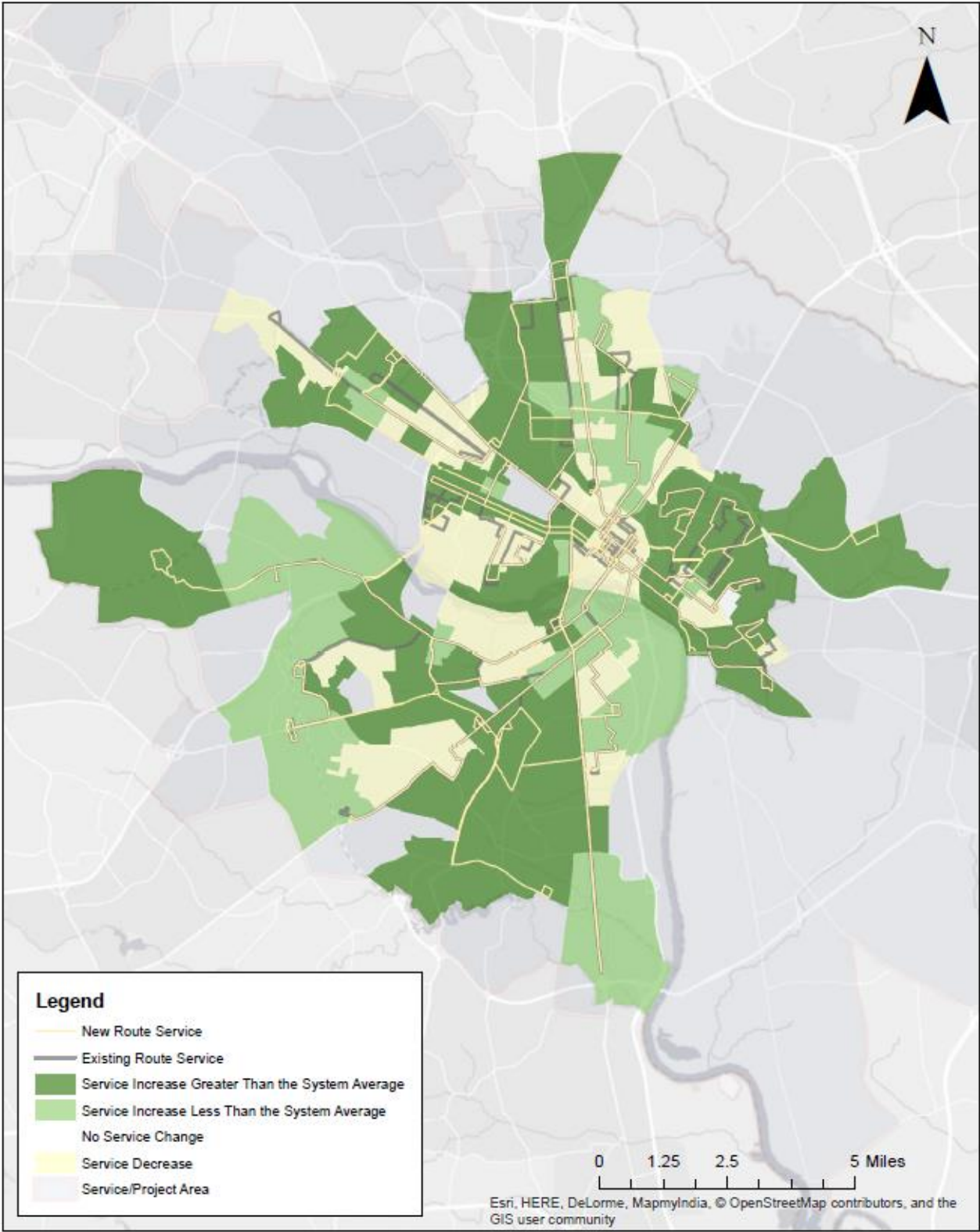
### Weekday Service Change

Figure 10



### Saturday Service Change

Figure 11



### Sunday Service Change

Figure 12

## Service Equity Analysis – Disparate Impact

“Disparate impact refers to a facially neutral policy or practice that disproportionately affects members of a group identified by race, color, or national origin, where the recipient’s policy or practice lacks a substantial legitimate justification and where there exist one or more alternatives that would serve the same legitimate objectives but with less disproportionate effect on the basis of race, color, or national origin.” (FTA) Title VI of the Civil Rights Act prevents discrimination based on race, color and national origin in federally-funded programs or activities. GRTC will ensure that all service changes will be equitable in terms of Title VI. In order to ensure equity in access to transit service across the service area, major service changes shall not adversely affect minority populations more than non-minority populations, by more than the threshold defined below. Furthermore, service changes that result in increases in service shall not benefit non-minority populations more than minority populations, by more than that same threshold defined below. If the difference in measured effects on minority and non-minority populations is greater than the set threshold, the proposed change would be considered to have a **disparate impact** on minority populations.

The threshold shall be a **20-percentage point** difference between:

1. The percentage of impacts borne by minority populations in the proposed service change.
2. The percentage of minority populations in GRTC’s service area.

Using 2013 ACS 5 year estimate data, minorities are approximately an average of 54% of the population of the GRTC service area, this means that:

- If service increases, minorities must receive at least 34% of the benefit.
- If service decreases, minorities cannot bear more than 74% of the burden.

## Methodology

GRTC uses the methodology of people trips to analyze the burden of service change borne by minority populations. The 4/5<sup>th</sup> rule is used identifying 20% as the threshold against the system minority average based on ACS census block ground data. GRTC’s service area includes Henrico County, City of Richmond, and Chesterfield County. 2013 ACS 5 year estimates were used as the data source for population. Total population by block group is identified using line for local routes, and stop for express routes. Total minority population is identified, and non-minority. These population numbers are multiplied by the number of annual trips traveling through each block group and aggregated. This process is done for both the status quo service scenario and the service change scenario. The resultant changes in minority and non-minority people trips between scenarios is contrasted. The minority burden of the change is identified. This number is subtracted from the system minority average. If the difference between two numbers is less than 20% then the proposed scenario service change does not have a disparate impact on the minority population. Transit Boardings Estimation and Simulation Tool (TBEST) was used in the Service Equity Analysis.

## Results

The below table (figure 13) displays the results of the analysis for annual people trips, concluding that the schedule changes proposed for April 2018 (Scenario B) do not have a disparate impact on minority populations. The table displays the total number of annual people trips for minority, non-minority, and



total population in August 2017 compared to April 2018. The results show that there is an overall annual increase of 3.7 million people trips in Scenario B, which expresses enhanced service for all populations. Minority people trips increase by 2.7 million, representing 68% of the increase in service. Non-minority people trips increase by 1.2 million, representing 32% of the increase in service. The service change impacts for the minority population prove to benefit the minority population, with the burden being above 34% at 68%.

	Description	Minority	Non-Minority	Total
<b>Scenario A (August 2017) vs Scenario B (April 2018)</b>	August 2017 People-Trips	10,828,580	9,564,680	20,393,260
	April 2018 People-Trips	13,393,420	10,776,250	24,169,670
	Change	2,564,840	1,211,570	3,776,410
	Change	24%	13%	19%
	Percent of burden/benefit	68%	32%	100%
	Allowed range for percent of benefit	+34% or higher		

Figure 13

The table below (figure 14) provides the people trip changes from scenario A to scenario B by weekday, Saturday, Sunday and annual schedules. The annual numbers are the same numbers reflected as change in the table above. The results determine that there is not a disparate impact for minority population for any schedule type.

Minority Disparate Analysis - Service Change Impact			
<b>Weekday Impact</b>			
	<b>Total</b>	<b>Minority</b>	<b>Non-Minority</b>
Population Trip Change (millions)	2,201.5	1,594.5	607.1
Service Change Impacts		72.4 %	27.6 %
System Average Minority Distribution (54.1%) - Minority Impact (72.4%) = -18.3%			
<b>Saturday Impact</b>			
	<b>Total</b>	<b>Minority</b>	<b>Non-Minority</b>
Population Trip Change (millions)	899.0	575.7	323.3
Service Change Impacts		64.0 %	36.0 %
System Average Minority Distribution (54.1%) - Minority Impact (64%) = -9.9%			
<b>Sunday Impact</b>			
	<b>Total</b>	<b>Minority</b>	<b>Non-Minority</b>
Population Trip Change (millions)	675.8	394.7	281.2
Service Change Impacts		58.4 %	41.6 %
System Average Minority Distribution (54.1%) - Minority Impact (58.4%) = -4.3%			
<b>Total Annual Impact</b>			
	<b>Total</b>	<b>Minority</b>	<b>Non-Minority</b>
Population Trip Change (millions)	3,776.4	2,564.8	1,211.6
Service Change Impacts		67.9 %	32.1 %
System Average Minority Distribution (54.1%) - Minority Impact (67.9%) = -13.8%			

Figure 14

## Service Equity Analysis – Disproportionate Burden

“Disproportionate burden refers to a neutral policy or practice that disproportionately affects low-income populations more than non-low-income populations. A finding of disproportionate burden requires the recipient to evaluate alternatives and mitigate burdens where practicable.” (FTA) Per the requirements of FTA Circular 4702.1B, and understanding the linked nature of civil rights and environmental justice issues, GRTC will also ensure that all service changes will be equitable with respect to low-income populations. In order to ensure equity in access to transit service across the service area, major service changes shall not adversely affect low-income populations more than non-low-income populations, by more than the threshold defined below.

Furthermore, service changes that result in increases in service shall not benefit non-low-income populations more than low-income populations, by more than that same threshold defined below. If the difference in measured effects on minority and non-minority populations is greater than the set threshold, the proposed change would be considered to have a **disproportionate burden** on low-income populations. GRTC shall also describe alternatives available to low-income passengers affected by the service change.

The threshold shall be a **20-percentage point** difference between:

1. The percentage of impacts borne by low-income populations in the proposed service change.
2. The percentage of low-income populations in GRTC’s service area.

Using 2013 ACS 5 year estimate data low-income populations are approximately an average of 28% of the population of the GRTC service area, this means that:

- If service increases, low-income populations must receive at least 8% of the benefit.
- If service decreases, low-income populations cannot bear more than 48% of the burden

## Methodology

GRTC uses the methodology of people trips to analyze the burden of service change borne by low-income populations. The 4/5<sup>th</sup> rule is used identifying 20% as the threshold against the system low-income average based on ACS census block ground data. GRTC’s service area includes Henrico County, City of Richmond, and Chesterfield County. 2013 ACS 5 year estimates were used as the data source for population. Total population by block group is identified using line for local routes, and stop for express routes. Total low-income population is identified, and non-low income. These population numbers are multiplied by the number of annual trips traveling through each block group and aggregated. This process is done for both the status quo service scenario and the service change scenario. The resultant changes in low-income and non-low-income people trips between scenarios is contrasted. The low-income burden of the change is identified. This number is subtracted from the system low-income average. If the difference between two numbers is less than 20% then the proposed scenario service change does not have a disproportionate burden on the low-income population. Transit Boardings Estimation and Simulation Tool (TBEST) was used in the Service Equity Analysis.

## Results

The below table (figure 15) displays the results of the analysis for annual people trips, concluding that the schedule changes proposed for April 2018 (Scenario B) do not have a disproportionate burden on low-income populations. The table displays the total number of annual people trips for low-income, non-low-income, and total population in August 2017 compared to April 2018. The results show that there is an overall annual increase of 1.6 million people trips in Scenario B, which expresses enhanced service for all

populations. Low-income people trips increase by 400,000, representing 24% of the increase in service. Non-low-income people trips increase by 1.2 million, representing 76% of the increase in service. The service change impacts for the low-income population prove to benefit the low-income population, with the burden being above 8% at 24%.

	Description	Low-income	Non-low-income	Total
Scenario A (August 2017) vs Scenario B (April 2018)	Scenario A People-Trips	3,027,060	5,683,810	8,710,870
	Scenario B People-Trips	3,421,000	6,927,790	10,348,790
	Change	393,940	1,243,980	1,637,920
	Change	13%	22%	19%
	Percent of burden/benefit	24%	76%	100%
	Allowed range for percent of burden	+8% or higher		

Figure 15

The table below (figure 16) provides the people trip changes from scenario A to scenario B by weekday, Saturday, Sunday and annual schedules. The annual numbers are the same numbers reflected as change in the table above. The results determine that there is not a disproportionate burden for low-income population for any schedule type.

Low Income Disparate Analysis - Service Change Impact			
Weekday Impact	Total	Low Income	Non-Low Income
Households Trip Change (millions)	952.5	205.6	746.9
Service Change Impacts		21.6 %	78.4 %
System Average Low Income Distribution (27.9%) - Low Income Impact (21.6%) = 6.3%			
Saturday Impact	Total	Low Income	Non-Low Income
Households Trip Change (millions)	387.0	111.6	275.4
Service Change Impacts		28.8 %	71.2 %
System Average Low Income Distribution (27.9%) - Low Income Impact (28.8%) = -0.9%			
Sunday Impact	Total	Low Income	Non-Low Income
Households Trip Change (millions)	298.4	76.7	221.7
Service Change Impacts		25.7 %	74.3 %
System Average Low Income Distribution (27.9%) - Low Income Impact (25.7%) = 2.2%			
Total Annual Impact	Total	Low Income	Non-Low Income
Households Trip Change (millions)	1,637.9	393.9	1,244.0
Service Change Impacts		24.1 %	75.9 %
System Average Low Income Distribution (27.9%) - Low Income Impact (24.1%) = 3.9%			

Figure 16

## Conclusion

The service changes planned for April 2018 were identified as major changes, triggering four of the six route level major change thresholds, and two out of two system level major change thresholds. This major change identification required GRTC to perform a fare and service equity analysis to determine if the changes would cause a disparate impact for minority populations or disproportionate burden for low-income populations. The results of the analysis determined that the planned April 2018 changes would not trigger the 20% thresholds for both minority and low-income populations. They are both within the acceptable change limits resulting in an equitable distribution of service.

### Disparate Impact Results – Less than 20%

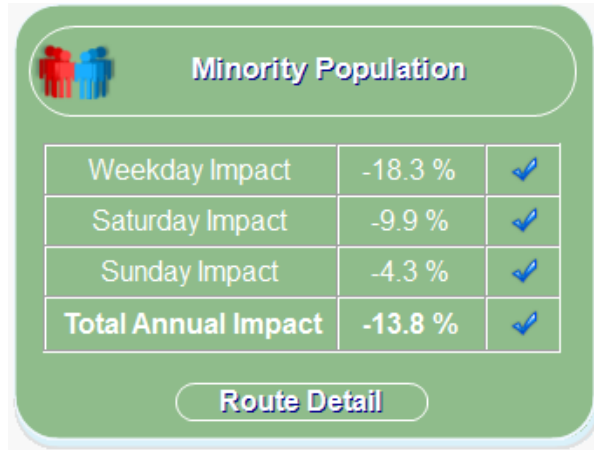


Figure 17

### Disproportionate Burden Results – Less than 20%

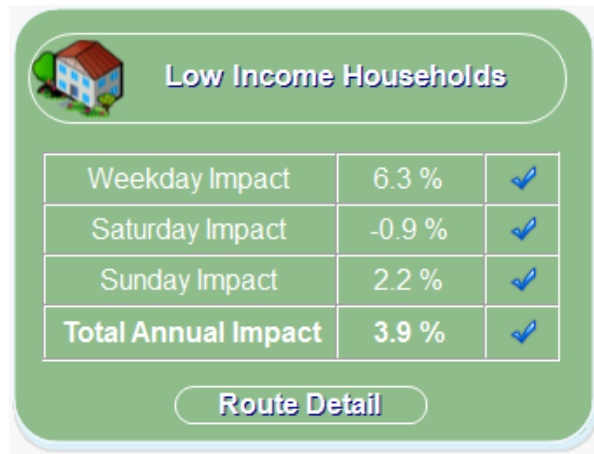
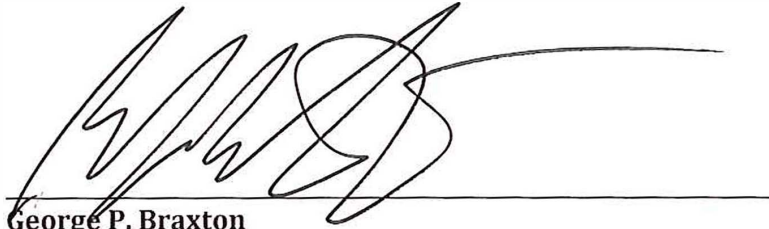


Figure 18

### Board Approval Signatures

The GRTC Board of Directors has reviewed the Title VI Service and Fare Equity Analysis and agrees with its findings, acknowledging that there is not a disparate impact borne by minority populations, nor a disproportionate burden on low income populations as a result of the service changes planned with the April 2018 schedule. Based on the positive results of the analysis, the GRTC board of directors approves the schedule changes proposed for April 2018.



**George P. Braxton**  
President/ Chair (City of Richmond)

Oct. 11, 2017  
Date



**Daniel K. Smith**  
Vice-President/ Vice-Chair (Chesterfield County)

10-11-17  
Date