TRIMET

Date: April 10, 2018

To: Distribution

From: Carl Green Jr, Title VI & Equity Programs Administrator
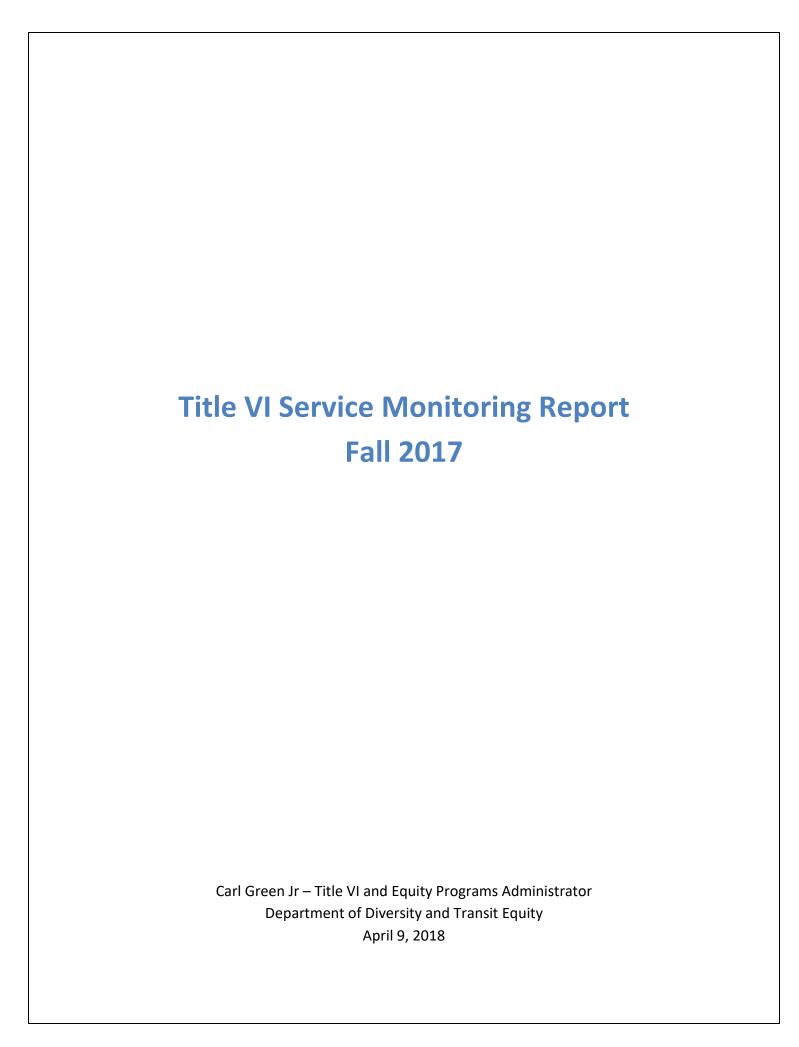
Subject: Title VI Service Monitoring Report – Fall 2017

The enclosed Title VI Service Monitoring Report addresses the following business plan objective: Ensure equitable distribution of service and resources across the TriMet system.

Please feel free to contact me with any questions or comments, greenc@trimet.org or ex.5711.

Distribution:
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Title VI Service Monitoring Report
Fall 2017

Carl Green Jr – Title VI and Equity Programs Administrator
Department of Diversity and Transit Equity
April 9, 2018

Staff Summary

Part of TriMet's compliance with FTA Circular 4702.1B *Title VI Requirements and Guidelines for Federal Transit Administration Recipients* is ongoing performance monitoring across all modes of service (bus, MAX, and WES). Aligned with TriMet's Business Plan, staff will conduct an annual review of resource and service distribution. The objective is to ensure there is an equitable distribution of services and resources across TriMet's system. The forthcoming analysis in this report compared minority and/or low-income access to that of non-minority and/or higher income access across six service and performance metrics:

1. **Service frequency and span** (revenue hours): TriMet evaluates the amount of revenue hours of service provided. The hours while in revenue service include layover/recovery time, and passenger loading time.

2. **On-time performance**: TriMet defines "on-time" as no more than five minutes late or one minute early.

3. **Vehicle loads**: TriMet evaluates whether fixed-route buses or light rail vehicles are overcrowded by comparing the load/seat ratio to the maximum load factor for each vehicle type: bus (1.3), MAX (2.1), and WES (1.0).

4. **Service availability**: TriMet considers persons residing within one-half mile of bus stops and/or rail stations as having service available. Service availability is expressed as number and percentage of District-wide population and is determined by vehicle mode.

5. **Stop amenities**: TriMet analyzes the distribution of stop amenities in the TriMet system (shelters, seating, waste receptacles, etc.) in order to identify any potential disparities.

6. **Vehicle assignment**: TriMet assesses the vehicle assignment practices for fixed-route buses and light rail vehicles. The expectation is that the average age of vehicles on minority and/or low-income lines should be no more than the average age of vehicles on non-minority and/or higher income lines.

Performance Measure Target
The target for the above 6 measures is minority and low-income access must be within 5% or better than non-minority and higher income access.

Minority vs. Non-minority Lines[1]

Equity Metric: Distribution of Amenities Fall 2017				
Metric % of stops with amenity on minority vs. non-minority lines	<= 20% Difference	<=10% Difference	<=5% Difference	As good or better on minority lines
Seating	✓	✓	✓	✓
Lighting	✓	✓	✓	✗
Elevators	✓	✓	✓	✓
Digital Displays	✓	✓	✓	✓
Shelters	✓	✓	✓	✓
Signs, Maps and/or Schedules	✓	✓	✓	✓
Waste Receptacles	✓	✓	✓	✓

Equity Metric: Service Standards Fall 2017												
Metric Minority and non-minority comparison by mode and for the system as a whole	<=20% Difference			<=10% Difference			<=5% Difference			As good or better on minority lines		
	Bus	MAX	Sys	Bus	MAX	Sys	Bus	MAX	Sys	Bus	MAX	Sys
Vehicle Loads If the average load of minority lines is above the maximum load factor, comparison to average load of non-minority lines.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Service Frequency & Span Revenue hours of service provided on minority vs. non-minority lines.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
On-Time Performance Average percent on-time for minority vs. non-minority lines.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗
Vehicle Assignment Average age of vehicles serving minority vs. non-minority lines.	✓	✓	✓	✗	✓	✗	✗	✓	✗	✗	✗	✗
Service Availability Percentage of minority vs. non-minority population within ½ mile of service.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

WES (a minority line) is the only commuter rail line, so it cannot be compared to other commuter rail lines. It is included as part of the overall system analysis.

[1] A minority line is defined by the FTA as having at least one-third of its revenue vehicle hours in census block groups with above-average minority populations.

Distribution of Amenities (See Appendix A for full details)

- The percentage of stops containing each amenity on minority lines exceeds the percentage for non-minority lines in all categories examined with the exception of lighting, which is higher for non-minority lines (64 percent compared to 59 percent of stops).

Vehicle Loads (See Appendix B for full details)

- Average load/seat ratios range from a low of 0.38 to a high of 1.24.
- All average loads by mode are below the maximum load factor for every time period.

Service Frequency & Span (See Appendix C for full details)

- A greater percentage of revenue hours of service are provided on minority lines than non-minority lines (54% vs. 46%, respectively).

On-time performance (See Appendix D for full details)

- Average OTP for minority bus lines is slightly higher than OTP for non-minority bus lines on Sundays (92% vs. 91%, respectively). Weekdays and Saturday OTP are comparable for both lines.
- Average OTP for minority MAX lines is slightly lower than the OTP for the two non-minority MAX lines (Yellow and Orange) for Weekdays, Saturdays, and Sundays.

Vehicle Assignment (See Appendix E for full details)

- The average age of vehicles on minority bus lines is about 12% older than the average age of vehicles on non-minority bus lines.
- The average age of vehicles on minority MAX lines is about 3% older than the average age of vehicles on non-minority MAX lines.
- For WES, TriMet does not maintain a detailed database of specific vehicles used for specific trips. The four main vehicles used for WES service were all built in 2007; the remaining two were built in 1952 and 1953 and are typically used as spares. WES is a minority line.

Service Availability (See Appendix F for full details)

- A higher percentage of the TriMet district's minority population lives within ½ mile of bus, MAX, and WES service compared to the district's non-minority population.

Minority and Non-Minority Lines (See Appendix G)

Low-income vs. Higher Income Lines[2]

Equity Metric: Distribution of Amenities Fall 2017				
Metric % of stops with amenity on low-income vs. non-low-income lines	<= 20% Difference	<=10% Difference	<=5% Difference	As good or better on low-income lines
Seating	✓	✓	✓	✓
Lighting	✓	✓	✓	✓
Elevators	✓	✓	✓	✓
Digital Displays	✓	✓	✓	✓
Shelters	✓	✓	✓	✓
Signs, Maps and/or Schedules	✓	✓	✓	✓
Waste Receptacles	✓	✓	✓	✓

Equity Metric: Service Standards Fall 2017												
Metric Low-income and non-low-income comparison by mode and for the system as a whole	<=20% Difference			<=10% Difference			<=5% Difference			As good or better		
	Bus	MAX	Sys	Bus	MAX	Sys	Bus	MAX	Sys	Bus	MAX	Sys
Vehicle Loads If the average load of low-income lines is above the maximum load factor, comparison to average load of non-low-income lines.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Service Frequency & Span Revenue hours of service provided on low-income vs. non-low-income lines.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
On-Time Performance Average percent on-time for low-income vs. non-low-income lines.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✗
Vehicle Assignment Average age of vehicles serving low-income vs. non-low-income lines.	✓	✓	✓	✗	✓	✗	✗	✓	✗	✗	✓	✗
Service Availability Percentage of low-income vs. non-low-income population within ½ mile of service.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

WES (a low-income line) is the only commuter rail line, so it cannot be compared to other commuter rail lines. It is included as part of the overall system analysis. All MAX lines are low-income lines.

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[2] Low-income is defined as households at or below 150% federal poverty. A low-income line is defined as having at least one-half of its revenue vehicle hours in census block groups with above-average low-income populations.

NOTES

Distribution of Amenities (See Appendix A for full details)
- The percentage of stops containing each amenity on low-income lines exceeds the percentage for higher income lines in all categories examined with the exception of lighting, which is as good (i.e., 62 percent of stops for both lines).

Vehicle Loads (See Appendix B for full details)
- Average load/seat ratios range from a low of 0.42 to a high of 1.24.
- All average loads by mode are below the maximum load factor for every time period.

Service Frequency & Span (See Appendix C for full details)
- A greater percentage of revenue hours of service are provided on low-income lines than higher income lines (69% vs. 31%, respectively).

On-time performance (See Appendix D for full details)
- Average OTP for low-income bus lines is slightly lower than the OTP for higher income bus lines for Weekdays and Saturdays. The Sunday average OTP is comparable for both lines.
- All MAX lines are considered low income.

Vehicle Assignment (See Appendix E for full details)
- The average age of vehicles on low-income bus lines is about 13% older than the average age of vehicles on higher income bus lines.
- All MAX lines are considered low-income. The average age is 15.4 years.
- For WES, TriMet does not maintain a detailed database of specific vehicles used for specific trips. The four main vehicles used for WES service were all built in 2007; the remaining two were built in 1952 and 1953 and are typically used as spares. WES is a low-income line.

Service Availability (See Appendix F for full details)
- A higher percentage of the TriMet district's low-income population lives within ½ mile of bus, MAX, and WES service compared to the district's higher income population.

Low-Income and Higher Income Lines (See Appendix H)

Appendix A: Stop Amenities Tables

Category of Amenity	Pct. of Stops on Minority Lines	Pct. of Stops on Non-Minority Lines
Seating	38%	31%
Lighting	59%	64%
Elevators	<1%	<1%
Digital Displays	2%	2%
Shelters	19%	17%
Signs, Maps and/or Schedules	87%	80%
Waste Receptacles	17%	14%

Category of Amenity	Pct. of Stops on Low-Income Lines	Pct. of Stops on Higher Income Lines
Seating	41%	28%
Lighting	62%	62%
Elevators	<1%	<1%
Digital Displays	4%	1%
Shelters	24%	12%
Signs, Maps and/or Schedules	85%	80%
Waste Receptacles	21%	10%

Appendix B: Vehicle Loads Tables

Vehicle Type	Time Period	Minority Lines		Non-Minority Lines	
		Load/Seat Ratio	Mean Load	Load/Seat Ratio	Mean Load
Bus (28 or 39 seats)	AM Peak	0.39	16.34	0.38	17.74
	Midday	0.38	14.78	0.38	14.48
	PM Peak	0.47	17.31	0.46	18.14
MAX Light Rail (128 seats)	AM Peak	0.88	122.55	1.24	130.82
	Midday	0.68	87.52	0.51	68.25
	PM Peak	1.18	135.74	0.50	107.80
WES Commuter Rail (146 seats)	AM Peak	0.51	48.50	n/a	n/a
	PM Peak	0.63	63.50	n/a	n/a

Vehicle Type	Time Period	Low-Income Lines		Higher Income Lines	
		Load/Seat Ratio	Mean Load	Load/Seat Ratio	Mean Load
Bus (28 or 39 seats)	AM Peak	0.42	18.3	0.59	25.12
	Midday	0.43	16.91	0.52	20.93
	PM Peak	0.53	20.08	0.66	26.41
MAX Light Rail (128 seats)	AM Peak	0.88	122.55	1.24	130.82
	Midday	0.68	87.52	0.51	68.25
	PM Peak	1.18	135.74	0.50	107.80
WES Commuter Rail (146 seats)	AM Peak	0.51	48.50	n/a	n/a
	PM Peak	0.63	63.50	n/a	n/a

Appendix C: Revenue Hours Tables

Mode of Service	Minority Lines	Non-Minority Lines	Difference; Minority to Non-Minority +/(-)
Bus	54%	46%	8
MAX Light Rail	79%	21%	58
WES Commuter Rail	100%	n/a	n/a

Mode of Service	Low Income Lines	Higher Income Lines	Difference; Low Income to Higher Income +/(-)
Bus	69%	31%	38
MAX Light Rail	100%	n/a	n/a
WES Commuter Rail	100%	n/a	n/a

Appendix D: On-Time Performance Tables

Mode of Service	Day	Avg. % On-Time (weighted)		Difference; Minority to Non-Minority +/(-)
		Minority Lines	Non-Minority Lines	
Bus	Weekday	86%	86%	0
	Saturday	89%	89%	0
	Sunday	92%	91%	1
MAX Light Rail	Weekday	89%	92%	(3)
	Saturday	91%	94%	(3)
	Sunday	91%	93%	(2)
WES Commuter Rail	Weekday	97%	n/a	n/a

Mode of Service	Day	Avg. % On-Time (weighted)		Difference; Low Income to Higher Income +/(-)
		Low Income Lines	Higher Income Lines	
Bus	Weekday	84%	87%	(3)
	Saturday	88%	91%	(3)
	Sunday	92%	92%	0
MAX Light Rail	Weekday	90%	n/a	n/a
	Saturday	92%	n/a	n/a
	Sunday	92%	n/a	n/a
WES Commuter Rail	Weekday	97%	n/a	n/a

Appendix E: Vehicle Assignment Tables

	Avg. Age of Vehicles (Years)		
Mode of Service	Minority Lines	Non-Minority Lines	Difference; Minority to Non-Minority +/(-)
Bus	7.7	6.8	0.94
MAX Light Rail	15.6	15.1	0.43
WES Commuter Rail	Primary: 10.0 Spares: 64.5	n/a	n/a

	Avg. Age of Vehicles (Years)		
Mode of Service	Low Income Lines	Higher Income Lines	Difference; Low Income to Higher Income +/(-)
Bus	7.7	6.8	0.94
MAX Light Rail	15.4	n/a	n/a
WES Commuter Rail	Primary: 10.0 Spares: 64.5	n/a	n/a

Appendix F: Service Availability Table

Demographic Analysis of Proximity to TriMet Service (Percent)		TM District Totals (Raw Num)	Totals (Pct.)	Percent within 1/2* Mile of…			Frequent Service	
				Bus	MAX	WES	Bus	Bus & MAX
Population	Total (ACS 5 year estimate, 2012-2016)	1,570,303	100.0%	88.2%	16.1%	0.8%	53.7%	69.8%
Minority	All Minorities**	447,829	28.5%	90.2%	20.1%	1.2%	54.7%	74.9%
Non-Minority	White (Non-Hispanic)	1,122,471	71.5%	87.4%	14.4%	0.7%	53.3%	67.7%
Population	Total population with known income (ACS 5 year estimate, 2012-2016)***	1,547,395	100.0%	88.1%	16.0%	0.8%	53.4%	69.4%
Income	Below 150% of Poverty Level	333,680	21.6%	94.0%	23.1%	1.4%	64.6%	87.6%
Income	Above 150% of Poverty Level	1,213,715	78.4%	86.5%	14.0%	0.7%	50.4%	64.4%

Sources: TriMet GIS, Metro Regional Land Information System, and US Census American Community Survey Tables: 2012 - 2016 (5-Year Estimates), Table B03002. Hispanic or Latino Origin By Race, and Table C17002. Ratio Of Income To Poverty Level In The Past 12 Months (Block Group Level Data)

To adjust for the fact that some census block groups are only partially within the TriMet Transit District, staff estimated the fraction of each block group's population within the transit district by calculating the percentage of residential address points that fell within the district. Staff then multiplied this address fraction by the Census counts to get the estimated TriMet District population. Staff used Oregon Metro's Master Address File (with non-residential and vacant addresses removed) as the address points for this analysis.

* Distance calculations based on March 2018 stop and station locations. Similar to the TriMet District level population estimates, we multiplied each block group's counts by the fraction of addresses within it that also fell within a half-mile buffer of a transit stop of the specified type.

** All Minorities include Black (non-Hispanic), Hispanic, Asian (non-Hispanic), Native American (non-Hispanic), Hawaiian Native and Pacific Islander (non-Hispanic), and Other (Including Mixed Race, non-Hispanic).

*** Population totals for the TriMet district vary between statistics for race and income/poverty in part due to the fact that the Census is a full count and the ACS is an extrapolation based on a sample, and in part because the ACS total excludes those whom poverty status is not determined.

Appendix G: Minority and Non-Minority Lines

Minority Lines	Non-Minority Lines
10-Harold St	1-Vermont
11-Rivergate/Marine Dr	12-Barbur/Sandy Blvd
155-Sunnyside	14-Hawthorne
156-Mather Rd	15-Belmont/NW 23rd
17-Holgate/Broadway	152-Milwaukie
19-Woodstock/Glisan	16-Front Ave/St Helens Rd
20-Burnside/Stark	18-Hillside
21-Sandy Blvd/223rd	24-Fremont
22-Parkrose	29-Lake/Webster Rd
23-San Rafael	291-Orange Night Bus
25-Glisan/Rockwood	30-Estacada
4-Division/Fessenden	32-Oatfield
46-North Hillsboro	33-McLoughlin/King Rd
47-Main/Evergreen	34-Linwood/River Rd
48-Cornell	35-Macadam/Greeley
52-Farmington/185th	36-South Shore
53-Arctic/Allen	37-Lake Grove
57-TV Hwy/Forest Grove	38-Boones Ferry Rd
59-Walker/Park Way	39-Lewis & Clark
6-Martin Luther King Jr Blvd	43-Taylors Ferry Rd
62-Murray Blvd	44-Capitol Hwy/Mocks Crest
67-Bethany/158th	45-Garden Home
71-60th Ave	50-Cedar Mill
72-Killingsworth/82nd Ave	51-Vista
73-122nd Ave	54-Beaverton-Hillsdale Hwy
76-Beaverton/Tualatin	55-Hamilton
79-Clackamas/Oregon City	56-Scholls Ferry Rd
80-Kane/Troutdale Rd	58-Canyon Rd
81-Kane/257th	61-Marquam Hill/Beaverton
84-Powell Valley/Orient Dr	64-Marquam Hill/Tigard
87-Airport Way/181st	65-Marquam Hill/Barbur Blvd
88-Hart/198th	66-Marquam Hill/Hollywood
9-Powell Blvd	68-Marquam Hill/Collins Circle
92-South Beaverton Express	70-12th/NE 33rd Ave
96-Tualatin/I-5	75-Cesar Chavez/Lombard
97-Tualatin-Sherwood Rd	77-Broadway/Halsey
MAX Blue Line	78-Beaverton/Lake Oswego
MAX Green Line	8-Jackson Park/NE 15th
MAX Red Line	93-Tigard/Sherwood
WES Commuter Rail	94-Pacific Hwy/Sherwood
	99-Macadam/McLoughlin
	MAX Orange Line
	MAX Yellow Line
	154-Willamette/Clackamas Heights
	63-Washington Park/Arlington Hts
	85-Swan Island

Appendix H: Low-Income and Higher Income Lines

Low Income Lines	Higher Income Lines
10-Harold St	11-Rivergate/Marine Dr
12-Barbur/Sandy Blvd	152-Milwaukie
14-Hawthorne	154-Willamette/Clackamas Heights
15-Belmont/NW 23rd	155-Sunnyside
17-Holgate/Broadway	156-Mather Rd
19-Woodstock/Glisan	16-Front Ave/St Helens Rd
20-Burnside/Stark	18-Hillside
21-Sandy Blvd/223rd	1-Vermont
22-Parkrose	24-Fremont
23-San Rafael	25-Glisan/Rockwood
291-Orange Night Bus	29-Lake/Webster Rd
44-Capitol Hwy/Mocks Crest	30-Estacada
4-Division/Fessenden	32-Oatfield
52-Farmington/185th	33-McLoughlin/King Rd
53-Arctic/Allen	34-Linwood/River Rd
56-Scholls Ferry Rd	35-Macadam/Greeley
57-TV Hwy/Forest Grove	36-South Shore
62-Murray Blvd	37-Lake Grove
64-Marquam Hill/Tigard	38-Boones Ferry Rd
66-Marquam Hill/Hollywood	39-Lewis & Clark
68-Marquam Hill/Collins Circle	43-Taylors Ferry Rd
6-Martin Luther King Jr Blvd	45-Garden Home
72-Killingsworth/82nd Ave	46-North Hillsboro
73-122nd Ave	47-Main/Evergreen
76-Beaverton/Tualatin	48-Cornell
77-Broadway/Halsey	50-Cedar Mill
78-Beaverton/Lake Oswego	51-Vista
79-Clackamas/Oregon City	54-Beaverton-Hillsdale Hwy
80-Kane/Troutdale Rd	55-Hamilton
81-Kane/257th	58-Canyon Rd
84-Powell Valley/Orient Dr	59-Walker/Park Way
87-Airport Way/181st	61-Marquam Hill/Beaverton
88-Hart/198th	63-Washington Park/Arlington Hts
8-Jackson Park/NE 15th	65-Marquam Hill/Barbur Blvd
94-Pacific Hwy/Sherwood	67-Bethany/158th
97-Tualatin-Sherwood Rd	70-12th/NE 33rd Ave
9-Powell Blvd	71-60th Ave
MAX Blue Line	75-Cesar Chavez/Lombard
MAX Green Line	85-Swan Island
MAX Orange Line	92-South Beaverton Express
MAX Red Line	93-Tigard/Sherwood
MAX Yellow Line	96-Tualatin/I-5
WES Commuter Rail	99-Macadam/McLoughlin