



Metro

Los Angeles County
Metropolitan Transportation Authority

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**OPERATIONS COMMITTEE
MARCH 19, 2009**

SUBJECT: SERVICE PERFORMANCE MONITORING PROCESS

ACTION: RECEIVE AND FILE

RECOMMENDATION

Receive and file this update on the new service performance monitoring process.

ISSUE

Staff has developed a new performance monitoring process to replace the existing process. The new process is more comprehensive and focuses more on evaluating the region's mobility improvements and our customers' experience.

In October 2008, staff came to the Board introducing this process. This report provides information on line performance standards and FY09 2nd Quarter results.

DISCUSSION

Various performance indicators are used in evaluating our services on a service type and line level basis. Among these is the Route Performance Index (RPI), which is the formal performance indicator used to flag under-performing lines during the service change process as identified in the Transit Service Policy (TSP). This index is a composite rating based on three measures: passenger boardings per service hour, passenger miles per seat mile, and subsidy per passenger. Each service type is evaluated separately. Services with a score of 1.0 are considered performing at an average level within their service type. Services with a score of .60 or lower are performing at least 40 percent below their service type average and, according to the adopted TSP, are candidates for corrective action. Attachment A shows a listing of the 25 worst performing lines based on the RPI.

The RPI however is focused purely on productivity measures and does not reflect regional mobility and service quality concerns. Therefore, staff developed a new methodology for monitoring service performance that balances the productive use of resources with the region's mobility needs and service quality. Similar to the RPI, lines are evaluated by service type, such as Local, Rapid, etc. However unlike the RPI, in which lines are evaluated as a composite of all time periods and days of week, the new evaluation is done for seven

different weekday time periods plus weekend days. This is important because it is easier to identify when lines are not performing well for a particular indicator. While the RPI is a “scoring” mechanism, the new process is a “screening” mechanism, assisting staff in identifying periods or segments of a line where there are opportunities for improvement.

Staff has produced a 2nd Quarter FY 09 report along with a summary matrix (Attachments C and D, respectively). This report is being presented to the Sector Councils in March. Four core values using 11 performance indicators provide the structure for the new process. Following is a discussion of the core values, performance indicators and observations from the 2nd Quarter FY 09 report.

Availability

The extent that transit service is available measures success in improving the region’s mobility. Two performance indicators measure this: Accessibility and Connectivity. The accessibility indicator ensures that 99% of census tracts with three or more households and/or four or more jobs per acre are within a quarter-mile of transit. Our service exceeds the accessibility indicator standard. Only one census tract, Beachwood Canyon in Hollywood, is not within a quarter-mile of transit service.

The connectivity indicator states that direct transfers should be available for all Rapid-to-Rapid and Tier 1 Local-to-Tier 1 Local connections. Analysis shows that while most such connections are available in the system, there are a few of these connections not available to our customers. An inventory of these unavailable connections are identified in Attachment C.

Quality

Quality is important in retaining our existing customers, and attracting new ones. Three performance indicators measure this: On-Time Performance, Headway Variability and Customer Complaints. On-Time Performance uses the current standard of one-minute early and five-minutes late. Headway Variability is a new indicator that measures bus bunching for our high-frequency lines with the goal of improving schedule regularity. The analysis shows that on-time performance and headway variability degrade in the p.m. peak and early evening time periods.

The Customer Complaint indicator flags those lines that have a greater rate of complaints than other lines in their service type. The reports identify rates of complaints by service type, with the bottom 15% of lines within each service type targeted for improvement. There is a relatively low number of complaints logged for all service operated.

Quantity

Quantity is also important in retaining our existing customers and attracting new ones. Two performance indicators measure this: Frequency and Load Factor. Frequency ensures that the level of service is set to meet the passenger demand in a corridor. The standard for Metro Rapid service is set at a minimum of 20-minute frequency, while all other services

have a minimum of 60-minute frequency during any time period in which service operates. Virtually all our lines meet the frequency standard.

Load Factor ensures that customers have a comfortable experience during their trip. The load factor standard is that the average ratio of passengers to seats does not exceed 1.20 during any hour of operation. The report identifies those lines that do not meet these standards. We meet this criterion very well and there are only a few exceedances of the standard on a daily basis.

Effectiveness

Effectiveness ensures that service is provided in the most cost-effective manner using scarce resources. Four performance indicators measure this: Boardings per Service Hour, Cost per Passenger Mile, Passenger Miles per Seat Mile and Service Viability. Boardings per Service Hour, or productivity, flags those lines that are not attracting an acceptable level of passengers, given the amount of service provided for that line's service type. The report identifies line-level productivity rates, with about a third of the system's lines falling below the standard in at least one of the nine time periods.

Cost per Passenger Mile and Passenger Miles per Seat Mile flag those lines that are under-performing in these categories for that line's service type. The report identifies these statistics at the line-level, with about a third of the system's lines falling below the standard in at least one time period.

Service Viability is an indicator that gauges during what time periods a line should operate. A line should operate in time periods where it meets the operating standards in at least two of the other three Effectiveness indicators. The report identifies that about a third of the system's lines do not meet the service viability standard in at least one time period.

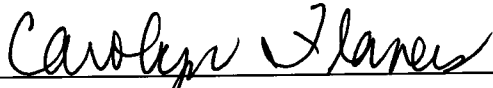
NEXT STEPS

Service Planning & Development is currently presenting the report to the Sector Councils and staff. With Sector concurrence, the new process will be presented to the Board for formal incorporation into the TSP.

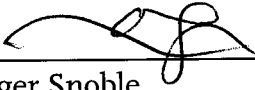
ATTACHMENTS

- A. RPI 25 Worst Performing Lines
- B. Performance Indicator Definitions
- C. 2nd Qtr. FY09 Summary Report
- D. 2nd Qtr. FY09 Summary Report Matrix

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LINE	Line Name	Service Type	Subsidy per Boarding	Boardings per Rev. Hr.	Pass. Miles Per Seat Miles	Index
177	Contract JPL - Pasadena - Sierra Madre Gold Line Station	Local	7.73	9.59	0.11	0.23
126	120TH-YUKON-MANHATTAN BEACH BL.	Local	7.94	15.07	0.09	0.24
608	Contract Crenshaw Connection: Crenshaw Bl. - 39th St. - Westside Av. - Normandie Av	Shuttle	11.30	6.72	0.06	0.25
202	WILLOWBROOK-COMPTON-WILMINGTON	Local	7.56	15.76	0.09	0.25
220	W HOLLYWOOD - CULVER CITY VIA ROBERTSON BL	Local	7.02	16.87	0.12	0.29
214	Contract Broadway/Main Street Loop	Local	4.22	16.47	0.10	0.31
168	CHATSWORTH STA-SAN FERNANDO VIA LASSEN. PAXTON ST	Local	6.34	18.52	0.15	0.33
607	Contract North Inglewood Community Shuttle circular (both directions)	Shuttle	8.53	8.76	0.09	0.36
626	Contract Aviation STA - El Segundo	Shuttle	6.58	11.12	0.06	0.36
211	PRAIRIE AVE. - INGLEWOOD AVE.	Local	4.74	24.01	0.13	0.38
254	Contract Boyle Heights - 103rd St. Station via Lorena St.-Boyle Av	Local	3.37	19.97	0.11	0.38
577	Contract Metro Express (Long Beach - El Monte via 22 Fwy, I-605 Fwy & I-10 Fwy)	Express	8.81	8.49	0.16	0.39
209	VAN NESS-ARLINGTON AVES.	Local	5.35	21.57	0.20	0.41
156	PANORAMA/VAN NUYS-HOLLYWOOD VIA CHANDLER/CAHUENGA	Local	4.45	25.35	0.18	0.44
222	SUN VALLEY - HOLLYWOOD VIA HOLLYWOOD WAY/CAHUENGA	Local	5.35	21.58	0.23	0.44
287	SIERRA MADRE-EL MONTE-MONTBELLO MALL	Local	4.80	23.72	0.20	0.44
256	Contract Eastern Ave. - Ave. 64 - N. Hill Ave.	Local	3.09	21.42	0.16	0.45
154	TARZANA-BURBANK STA VIA OXNARD ST. BURBANK BL	Local	4.65	24.41	0.20	0.45
753	DOWNTOWN LA - IMPERIAL STA VIA CENTRAL AV RAPID	Rapid	4.55	24.87	0.21	0.47
201	SILVERLAKE BL.	Local	4.22	26.57	0.20	0.47
127	COMPTON STA-DOWNEY VIA COMPTON BL & SOMERSET BL	Local	4.22	26.54	0.21	0.48
290	SYLMAR-SUNLAND VIA FOOTHILL BL	Local	4.06	27.43	0.20	0.48
715	LAX- ATLANTIC - RAPID BUS	Rapid	3.29	32.81	0.13	0.49
625	Contract Metro Green Line Shuttle	Shuttle	5.22	13.68	0.10	0.50
258	GARFIELD AV - EASTERN AV - ARIZONA AV	Local	4.07	27.37	0.22	0.50

PERFORMANCE MEASURES	DEFINITIONS & PERFORMANCE THRESHOLDS								
AVAILABILITY									
-- Accessibility	Service is to be provided to within 1/4 mile of all census tracts having at least 3 households/acre and/or 4 jobs/acre								
-- Connectivity	Direct transfers should be available for all Rapid-to-Rapid and Tier 1 Local-to-Tier 1 Local connections								
QUALITY									
-- On-Time Performance	[In Service On-Time Performance] At least 60% of trips in each time period should be no more than one minute early or five minutes late at all non-terminal time points								
-- ISOTP									
-- Headway Variability	[COV = Coefficient of Variation] For services operating every 12 minutes or better, the headway standard deviation divided by the mean headway should be less than 0.30 at major stop locations in each time period								
-- Customer Complaints	Complaints per 100,000 boardings should be less than the ratio achieved by the poorest 15% of bus lines in each service type in FY2008								
	<table border="0"> <tr> <td>Local Service</td> <td>8.70</td> </tr> <tr> <td>Express Service</td> <td>30.00</td> </tr> <tr> <td>Shuttle Service</td> <td>24.00</td> </tr> <tr> <td>Rapid Service</td> <td>4.00</td> </tr> </table>	Local Service	8.70	Express Service	30.00	Shuttle Service	24.00	Rapid Service	4.00
Local Service	8.70								
Express Service	30.00								
Shuttle Service	24.00								
Rapid Service	4.00								
QUANTITY									
-- Frequency of Service	Service should be operated at least every 60 minutes, and Rapid service at least every 20 minutes between 6am-6pm								
-- Load Factor	The ratio of passengers to seats should not exceed 1.20 during any hour at the peak load point of a line								

Metro Service
Performance Indicator Report
2nd Qtr FY09
February 2009



Metro Operations has used a variety of performance indicators to evaluate its service delivery. Since FY04 a Route Performance Index (RPI) has been used to assess service performance. The RPI is resource-based and does not reflect regional mobility and customer experience concerns. Staff has developed a new performance monitoring process that is more comprehensive and focuses more on the region's mobility and our customers' experience.

The new process identifies four core values with nine performance indicators to measure different aspects of providing transit service. The core values are: Availability, Quality, Quantity, and Effectiveness.

Availability

These measures assess the extent to which the region's mobility needs are met. Two performance indicators are used: Accessibility and Connectivity. The Accessibility indicator ensures that 99% of census tracts with three or more households per acre and/or four or more jobs per acre are within a quarter-mile of transit. The Connectivity indicator assesses the extent to which Rapid-to-Rapid and Tier 1 Local-to-Tier 1 Local connections are available.

Quality

Quality is important in retaining our existing customers, and attracting new ones. Two performance indicators measure this: In-Service On-Time Performance and Customer Complaints. In-Service On-Time Performance will be reported on the same basis as current management reports (service is on time when no more than one-minute early or five-minutes late). A new methodology will also be introduced for our high-frequency lines with the goal of improving bus headway consistency through measurement of headway variability. The Customer Complaint indicator will measure the rate of complaints that are line specific.

Quantity

Quantity is also important in retaining our existing customers and attracting new ones. Two performance indicators measure this: Frequency and Load Factor. The Frequency indicator ensures that a minimum level of service is provided in a corridor. The Load Factor (Passenger Miles per Seat Mile) indicator ensures that our customers do not experience excessive crowding during their trip.

Effectiveness

Effectiveness ensures that we provide service in the most cost-effective manner using scarce resources. Four performance indicators are used: Boardings per Service Hour, Cost per Passenger Mile, Passenger Miles per Seat Mile and Service Viability.

Availability Indicators

Accessibility

The standard of performance for this measure is to ensure that 99% or more of census tracts within our service area having 3 or more persons per acre and/or 4 or more jobs per acre are within one-quarter mile of fixed route transit. The transit provider(s) in each case need not be Metro. Based upon June 2008 routes all except one tract in Beachwood Canyon (above Hollywood) meet this standard.

Connectivity

The standard for this measure is that direct transfers should be available for all Rapid-to-Rapid and Tier 1 Local-to-Tier 1 Local connections (1/8 mile criterion).

Missing Rapid to Rapid Connections

Route	Intersection	Line Direction(s)	Intersecting Route(s)
705	Venice & Fairfax	North & South	780
705	La Cienega & Olympic	North & South	728
720	6th St & Central	East & West	753
730	Broadway & Olympic	East & West	728
730	Broadway & 7th St	East & West	760
740	Broadway & Olympic	North & South	728
740	Broadway & 7th St	North & South	760
745	Broadway & Olympic	North & South	728
745	Broadway & 7th St	North & South	760
760	7th St & Central	North & South	753
762	Artesia & Long Beach	North & South	760
770	1st St & Hill	East & West	794

Missing Tier 1 Local-to-Tier 1 Local Connections

Route	Intersection	Line Direction(s)	Intersecting Route(s)
358	Slauson & Main	East & West	48
358	Slauson & Compton	East & West	55, 355
378	Mission & N. Main	East & West	76

Quality Indicators

On-Time Performance

Two performance measures have been used to assess on-time performance: In-Service On Time Performance which assesses conformance with scheduled departure times at Time Points, and Headway Variability which looks at the evenness of time gaps between trips.

In-Service On Time Performance - This has been used as a management reporting indicator for several years. It has been tracked at the line level using the variance between departure times at non-terminal Time Points to assess the percentage of service that is Early (up to one minute ahead of schedule), On Time (up to five minutes behind schedule), and Late (more than five minutes behind schedule). Because Rapid bus lines generally do not have non-terminal Time Points they are not monitored for this indicator. Contract buses do not have APC's and cannot be monitored. Also, data for Rail lines is not yet available from SCADA. The standard of performance for this measure was established as the lowest target previously used by any sector; 60% or better on time.

Headway Variability – This is a new performance measure which uses the Coefficient of Variance between the scheduled and observed gaps between buses as a measure of service regularity. The more even the time gaps between buses, the lower the value of this measure. In fact, if buses were to arrive at precisely the same number of minutes apart trip after trip, then the value of this indicator would be 0.00. As the value of the indicator increases, bus bunching becomes more common. The industry standard for performance on this measure is a value of 0.30 or less (e.g. the gaps between buses are varying an average of 30% from the scheduled gaps). This performance indicator is only applied to relatively frequent services as In-Service On Time Performance is a better measure of performance for wider headway bus lines. For us, Headway Variability is only calculated for time periods when the frequency of service during the time period averages 12 minutes or better. Rapid bus lines are monitored for this indicator, but contract lines cannot be monitored and Rail data is not yet available from SCADA.

For traditional ISOTP, 73 of 111 lines do not meet the DX threshold, with the early and late evening periods having the worst performance. Further, 33 of 93 lines do not meet the threshold for Saturdays and 19 of 90 for Sundays. For Headway Variability, 57 of 68 lines scored greater than 0.3, thus showing that bunching is a problem.

Customer Complaints

Line specific Customer Complaints were compiled for FY08. Since complaints are not generally time period specific, they are compiled in the aggregate by line and expressed as a ratio of Complaints per 100,000 Boardings. The targeted performance standard for this indicator was established at the 85th percentile of observed Complaint ratios by service type (e.g. the lowest 15% of values within any service type will fall below the standard). A standard of performance has not been established for the Metro Orange Line (a single line mode) nor for Rail lines.

Values

The following depicts average performance by service type along with proposed target values:

Complaints Service Type	Avg. Complaints per 100k Boardings	Target Maximum per 100k Boardings
Local	2.66	8.70
Express	10.11	30.00
Shuttle	3.44	24.00
Rapid	2.53	4.00
Orange Line	1.29	n/a
Rail	0.66	n/a

System-wide, 25 of 159 bus lines do not meet the threshold.

Quantity Indicators

Frequency

The standard is that service should be operated at least every 60 minutes, and Rapid service at least every 20 minutes between 6:00 a.m. and 6:00 p.m.

System-wide, three lines do not meet this criterion: Lines 126, 175 and 290.

Load Factor

The proposed Load Factor standard is that the average ratio of passengers onboard to seats not exceed 1.20 during any hour of operation at the peak load point. This indicator is monitored on an hourly basis throughout the service day using quarterly APC data. Contract services and Rail cannot be monitored as they do not have onboard passenger counting devices.

System-wide, only 12 of 159 DX lines exceeded this threshold, 26 of 122 Saturday lines, and 8 of 112 Sunday lines.

Effectiveness Indicators

Productivity

Productivity is measured by the ratio of Boardings to Revenue Hours by line by time period. The targeted performance standard for this indicator was established at the 85th percentile of observed ratios by service type (e.g. the lowest 15% of values within any service type will fall below the standard). A standard of performance has not been established for the Metro Orange Line (a single line mode) nor for Rail lines. Contract services cannot be monitored on a quarterly basis as they do not have APC's available.

System-wide, 56 of 159 DX lines are below this threshold, 14 of 122 Saturday lines, and 14 of 112 Sunday lines.

Cost per Passenger Mile

The targeted performance standard for this indicator was established at the 85th percentile of observed ratios by service type (e.g. the lowest 15% of values within any service type will fall below the standard). A standard of performance has not been established for the Metro Orange Line (a single line mode) nor for Rail lines. Contract services cannot be monitored on a quarterly basis as they do not have APC's available

System-wide, 61 of 159 DX lines are below this threshold, 21 of 122 Saturday lines, and 16 of 112 Sunday lines.

Passenger Miles per Seat Mile

The targeted performance standard for this indicator was established at the 85th percentile of observed ratios by service type (e.g. the lowest 15% of values within any service type will fall below the standard). A standard of performance has not been established for the Metro Orange Line (a single line mode) nor for Rail lines. Contract services cannot be monitored on a quarterly basis as they do not have APC's available

System-wide, 56 of 159 DX lines are below this threshold, 23 of 122 Saturday lines, and 23 of 112 Sunday lines.

Service Viability

The Span of Service performance indicator is being replaced by a new indicator: Service Viability. A line is considered viable if it achieves the thresholds for at least two of the three other Effectiveness indicators in the given time periods.

System-wide, 53 lines did not achieve the threshold in one or more time periods for weekdays, 20 on Saturdays and 19 on Sundays.

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Summary Matrix FY 2009 Second Quarter Results

LINE	AVAILABILITY										QUALITY										EFFECTIVENESS										
	Accessibility		Connectivity		On-Time Performance		Headway Variability		Customer Complaints		Frequency		Load Factor		Boardings per Service Hour		Cost per Passenger Mile		Passenger Miles per Seat Mile		Service Viability										
	System	Line	EA	AM	MD	PM	EE	LE	OW	SA	SU	EA	AM	MD	PM	EE	LE	OW	SA	SU	EA	AM	MD	PM	EE	LE	OW	SA	SU		
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Shading represents service periods below the standard

Summary Matrix FY 2009 Second Quarter Results

LINE	QUALITY												EFFECTIVENESS																
	AVAILABILITY				Customer				QUANTITY				Passenger Miles per Seat Mile				Service Viability												
	Connectivity System	On-Time Performance	Headwear Variability	Complaints	Frequency	Load Factor	Boardings per Service Hour	Cost per Passenger Mile	Passenger Miles per Seat Mile	Service Viability	EA	AM	MID	PM	EE	LE	OW	SA	SU	EA	AM	MID	PM	EE	LE	OW	SA	SU	
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* Contract Services

- Shading represents service periods below the standard

Service Periods Analyzed	
Early AM (4a-6a)	EA
AM peak (6a-9a)	AM
Mid-Day (9a-3p)	MID
PM Peak (3p-7p)	PM
Early Evening (7p-9p)	EE
Late Evening (9p-12a)	LE
Owl Period (12a-4a)	OW
Saturday	SA
Sunday	SU