MEMORANDUM

To: Performance Monitoring &
             External Relations Committee

From: Chris White
             Manager of Service Development

Re: Analysis of Very Late Buses

Date: December 6, 2010

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 We regularly report on service that is either on-time or late. On-time is defined as buses that are arrive at the timepoint from 0 to 5 minutes after the scheduled time. This includes buses that arrive ahead of schedule, which do not depart until the scheduled time. Late buses are those that are more than 5 minutes behind schedule.

Generally, all we report is whether buses are late, and not how late. From the point of view of a rider, not all late buses are equal. There is a big difference between a bus that is 6 minutes late and one that is 12 or 18 minutes behind schedule.

The AOS system also provides a record of the time each bus reaches a scheduled timepoint and the status compared to the schedule. This is known as a "timepoint crossing." I compiled the data for each route for the month of October to determine the frequency at which buses on each route were on time, 6-10 minutes behind schedule, 11-15 minutes behind schedule, 16-20 minutes behind schedule, and 21 or more minutes behind schedule.

Two charts are attached. The first shows the number of timepoint crossings in each category by route; the second chart shows the same information as a percent of the total timepoint crossings for each route. Only the weekday data is presented here.

As you can see, very late buses occur relatively infrequently. On average, buses 21 or more minutes behind schedule occurred 2 times in 1,000 timepoint crossings (0.2%). Buses more 16 or more minutes late occurred 6 times in 1,000 timepoint crossings (0.4% + 0.2%). Please keep in mind that if a bus is very late for an entire trip, it will generate between 5 and 11 timepoint crossings. If a bus gets late and stays late, the number of very late timepoint crossings will grow rapidly.

The frequency of very late buses varies considerably by route. The #18 Miller-University is the worst route by percentage in each category. We had previously identified this problem on the #18 route, and we will implement a revised schedule in January intended to significantly improve on-time performance.

Very late buses are almost always the result of a significant traffic back-up and delay, not bus schedules with too little time. However, routes that are tight on-time are more subject to becoming very late, and have more difficulty recovering. Very late buses occur much more frequently in the afternoon peak hours because traffic congestion is greater, and a relatively small incident causes much greater traffic delays.
The traffic delays come in three flavors:

- Non-recurring – Traffic crashes, short-term lane closures, and other incidents that delay a bus or buses. These cannot be anticipated and have to be dealt with when they occur.
- Recurring – Congestion or delays that happen with some regularity, but not all the time. For example, nearly all of the very late buses on route #6 and #36 occurred on a Friday afternoon before a UM home football game. On these occasions, traffic on St. State Street caused delays of 15 minutes or more. Road construction also falls into this category. Recurring events can often be predicted and we can be pro-active in keeping buses on-time and notifying riders about potential delays.
- Areawide or systemwide – Events that cause delays on many routes are much more difficult to address and recover from, and can result in a large number of very late timepoint crossings. Snowstorms are an obvious example.

Our AOS system provides real-time information on the status of each bus. A major function of the AATA transportation supervisors in the dispatch office is to use the real-time information to identify and take corrective action for very late buses. One frequent method is to add a bus to complete a late trip in order to pick up riders on-time and catch up the late bus. The data are clear that while very late buses happen, they do not usually stay very late for very long.

Ann Arbor Transportation Authority

On Time Performance - October, 2010   Total Timepoint Crossings

WEEKDAY SERVICE

Route Name and Number		Minutes after scheduled time				
		0-5 min. (on-time)	6-10 minutes	11-15 minutes	16-20 minutes	21+ minutes
1	Pontiac	6,349	735	74	10	0
1U	Pontiac University	704	46	6	0	1
2A/B	Plymouth	12,552	1,842	205	40	28
2C	Plymouth	2,604	238	31	12	2
3	Huron River	6,365	1,234	214	33	22
4	Washtenaw	14,843	2,920	386	128	108
5	Packard	11,611	3,592	635	114	36
6	Ellsworth	9,003	1,772	318	82	73
7	S. Main - East	8,270	894	20	1	0
8	Pauline	4,090	621	30	0	0
9	Jackson	3,124	570	47	4	2
609	Jackson University	1,269	382	58	6	0
10	Ypsilanti Northeast	1,750	465	9	0	0
11	Ypsilanti South	2,037	214	0	0	0
12A/B	Miller Liberty	3,884	255	14	0	0
13	Newport	1,388	303	41	7	14
14	Geddes - E. Stadium	1,376	356	40	4	16
15	Scio Church - W. Stadium	2,469	379	47	15	4
16	Ann Arbor - Saline Rd.	4,285	259	21	7	5
17	Amtrak - Depot	1,613	60	4	2	0
18	Miller-University	2,465	1,256	263	47	11
20	Ypsilanti Grove - Ecorse	4,900	450	9	0	0
22	North - South Connector	5,276	667	37	13	2
33	EMU Shuttle	3,779	375	23	1	4
36	Wolverine Tower Shuttle	6,711	795	154	57	32
TOTAL		122,717	20,680	2,686	583	360

Ann Arbor Transportation Authority

On Time Performance -
October, 2010

Percent of Total Timepoint Crossings

Based on 147,026 total timepoint crossings for the month

WEEKDAY SERVICE

Route Name and Number		Minutes after scheduled time				
		0-5 min. (on-time)	6-10 minutes	11-15 minutes	16-20 minutes	21+ minutes
1	Pontiac	88.6%	10.3%	1.0%	0.1%	0.0%
1U	Pontiac University	93.0%	6.1%	0.8%	0.0%	0.1%
2A/B	Plymouth	85.6%	12.6%	1.4%	0.3%	0.2%
2C	Plymouth	90.2%	8.2%	1.1%	0.4%	0.1%
3	Huron River	80.9%	15.7%	2.7%	0.4%	0.3%
4	Washtenaw	80.7%	15.9%	2.1%	0.7%	0.6%
5	Packard	72.6%	22.5%	4.0%	0.7%	0.2%
6	Ellsworth	80.0%	15.8%	2.8%	0.7%	0.6%
7	S. Main - East	90.0%	9.7%	0.2%	0.0%	0.0%
8	Pauline	86.3%	13.1%	0.6%	0.0%	0.0%
9	Jackson	83.4%	15.2%	1.3%	0.1%	0.1%
609	Jackson University	74.0%	22.3%	3.4%	0.3%	0.0%
10	Ypsilanti Northeast	78.7%	20.9%	0.4%	0.0%	0.0%
11	Ypsilanti South	90.5%	9.5%	0.0%	0.0%	0.0%
12A/B	Miller Liberty	93.5%	6.1%	0.3%	0.0%	0.0%
13	Newport	79.2%	17.3%	2.3%	0.4%	0.8%
14	Geddes - E. Stadium	76.8%	19.9%	2.2%	0.2%	0.9%
15	Scio Church - W. Stadium	84.7%	13.0%	1.6%	0.5%	0.1%
16	Ann Arbor - Saline Rd.	93.6%	5.7%	0.5%	0.2%	0.1%
17	Amtrak - Depot	96.1%	3.6%	0.2%	0.1%	0.0%
18	Miller-University	61.0%	31.1%	6.5%	1.2%	0.3%
20	Ypsilanti Grove - Ecorse	91.4%	8.4%	0.2%	0.0%	0.0%
22	North - South Connector	88.0%	11.1%	0.6%	0.2%	0.0%
33	EMU Shuttle	90.4%	9.0%	0.5%	0.0%	0.1%
36	Wolverine Tower Shuttle	86.6%	10.3%	2.0%	0.7%	0.4%
	TOTAL	**83.5%**	**14.1%**	**1.8%**	**0.4%**	**0.2%**