

Appendix F: Bus Speed and Reliability

Improving bus speed and reliability is one of the key goals of the South Halsted Bus Corridor Enhancement Project. The roadway treatments proposed as part of Alternative 1, 2, and 3 would improve speed and reliability for CTA and Pace buses operating on the corridor. Bus speed was analyzed by applying accepted factors developed by the Transit Cooperative Research Program (TCRP) and applied to the various elements in each alternative. Reliability was not independently measured but is expected to improve in conjunction with travel time.

Existing PM peak travel times were used as a basis for the analysis, as shown in Table 1. The run times used in the table include the estimate amount of time of travel for each section of the corridor, from 79th Street and Perry Avenue to Pace Harvey Transportation Center plus the travel time between 95th Street Red Line Station and 95th Street & Halsted Street. The average existing bus speeds are based on current scheduled run-time during the PM peak plus average observed delay. Generally, implementing TSP is expected to provide approximately 4 to 8 seconds per intersection, which would result in approximately 3% travel time savings along the entire corridor. Providing an express service offers the largest time savings. It is estimated that upwards of 22% time savings is achieved by reducing the number of instances that a bus must decelerate, stop, board and alight passengers, and accelerate. Queue jumps are estimated to provide approximately 6 seconds of travel time savings per intersection. Implementing queue jumps throughout the corridor, as is proposed for Alternate 1, is anticipated to provide approximately 5% travel time savings. Bus lanes are expected to provide approximately 45 seconds of time savings per mile in a typical urban environment like the South Halsted Corridor. The bus lane improvements proposed as part of Alternative 2 and 3 it is anticipated to provide approximately 8% and 10% additional travel time savings, respectively. Table 1 shows a comparison between each alternative, including the total travel time savings for each alternative when combined with TSP and express service. Table 2 through Table 7 provide additional details regarding the travel time calculations summarized in Table 1.

TABLE 1: ESTIMATED BUS SPEED IMPROVEMENT SUMMARY

Segment	Travel Time (min.)	Travel Time Savings (min.)	Percent Savings
Existing Conditions	60.1	-	-
TSP	58.3	1.8	3%
Express service - 1/2 Mile Stations ¹	47.2	13.0	22%
Alternative 1 Only	57.3	2.8	5%
Alternative 2 Only	55.1	5.0	8%
Alternative 3 Only	53.8	6.3	10%
Alternative 1 with TSP & 1/2 Mile Stations	42.6	17.6	29%
Alternative 2 with TSP & 1/2 Mile Stations	40.4	19.8	33%
Alternative 3 with TSP & 1/2 Mile Stations	39.0	21.1	35%

¹ The time savings percentage calculated is a potential maximum benefit for express service on the corridor for Pace Pulse service and a CTA express route combined. These services may be on different timelines and dependent on available funds.

TABLE 2: ESTIMATED BUS SPEED IMPROVEMENTS – INPUTS

Segment	1	2	3	4	5	6	7	Total
Start	79 th Red Line	95 th Red Line	Halsted & 95 th	Halsted & 103 rd	Halsted & 111 th	Halsted & 119 th	Halsted & 127 th	
End	Halsted & 95 th	Halsted & 95 th	Halsted & 103 rd	Halsted & 111 th	Halsted & 119 th	Halsted & 127 th	Harvey TC	
Single Direction Route Length (miles)	3.0	1.0	1.0	1.0	1.0	1.0	3.7	11.7
Current Average Speed (mph)	8.5	13.4	12.4	13.1	12.4	12.0	14.5	11.7
Current Travel Time (minutes)	21.1	4.5	4.8	4.6	4.8	5.0	15.3	60.1
Intersections (# of intersections)	10	4	4	2	3	3	10	

TABLE 3: ESTIMATED BUS SPEED IMPROVEMENTS – TRANSIT SIGNAL PRIORITY

Segment	1	2	3	4	5	6	7	Total
Start	79 th Red Line	95 th Red Line	Halsted & 95 th	Halsted & 103 rd	Halsted & 111 th	Halsted & 119 th	Halsted & 127 th	
End	Halsted & 95 th	Halsted & 95 th	Halsted & 103 rd	Halsted & 111 th	Halsted & 119 th	Halsted & 127 th	Harvey TC	
Time Savings (min)								
TSP (# of Intersections with)	10.0	4.0	4.0	2.0	3.0	3.0	10.0	36.0
TSP Savings (minutes)	0.5	0.2	0.2	0.1	0.2	0.2	0.5	1.8
Total Savings	0.5	0.2	0.2	0.1	0.2	0.2	0.5	1.8
Total Travel Time (minutes)	20.6	4.3	4.6	4.5	4.7	4.9	14.8	58.3
Distance (Miles)	3.0	1.0	1.0	1.0	1.0	1.0	3.7	11.7
Rate of Travel (minutes per mile)	6.9	4.3	4.6	4.5	4.7	4.9	4.0	5.0
Average Speed (mph)	8.8	14.1	13.0	13.3	12.8	12.3	15.0	12.0
% Improvement	-2%	-4%	-4%	-2%	-3%	-3%	-3%	-3%

TABLE 4: ESTIMATED BUS SPEED IMPROVEMENTS – EXPRESS SERVICE

Segment	1	2	3	4	5	6	7	Total
Start	79 th Red Line	95 th Red Line	Halsted & 95 th	Halsted & 103 rd	Halsted & 111 th	Halsted & 119 th	Halsted & 127 th	
End	Halsted & 95 th	Halsted & 95 th	Halsted & 103 rd	Halsted & 111 th	Halsted & 119 th	Halsted & 127 th	Harvey TC	
Bus Stops (# of stops)								
Current CTA Stops	24	8	8	8	8	8	-	63
Current Pace Stops	-	2	2	2	2	6	15	29
Proposed CTA Stops	6	1	2	2	2	3	-	16
Proposed Pace Stops	-	1	2	2	2	3	6	16
Time Savings (minutes)								
Dwell/Stop (sec)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	
Express Service Time Savings (minutes)	5.3	1.1	0.9	0.9	0.9	1.2	2.7	13.0
Total Savings	5.3	1.1	0.9	0.9	0.9	1.2	2.7	13.0
Total Travel Time (minutes)	15.8	3.3	3.9	3.7	3.9	3.8	12.6	47.2
Distance (Miles)	3.0	1.0	1.0	1.0	1.0	1.0	3.7	11.7
Rate of Travel (minutes per mile)	5.3	3.3	3.9	3.7	3.9	3.8	3.4	4.0
Average Speed (mph)	11.4	17.9	15.3	16.2	15.2	15.7	17.6	14.9
% Improvement	-25%	-25%	-19%	-20%	-19%	-24%	-18%	-22%

TABLE 5: ESTIMATED BUS SPEED IMPROVEMENTS – ALTERNATIVE 1

Segment	1	2	3	4	5	6	7	Total
Start	79 th Red Line	95 th Red Line	Halsted & 95 th	Halsted & 103 rd	Halsted & 111 th	Halsted & 119 th	Halsted & 127 th	
End	Halsted & 95 th	Halsted & 95 th	Halsted & 103 rd	Halsted & 111 th	Halsted & 119 th	Halsted & 127 th	Harvey TC	
Time Savings (min)								
Bus Lanes (miles)	-	-	-	-	-	-	-	-
Bus Lane Time Savings (minutes)	-	-	-	-	-	-	-	-
Queue Bypass (# of Intersections with)	9.0	3.0	4.0	2.0	3.0	3.0	4.0	28.0
Queue Bypass Savings (minutes)	0.9	0.3	0.4	0.2	0.3	0.3	0.4	2.8
Total Savings	0.9	0.3	0.4	0.2	0.3	0.3	0.4	2.8
Total Travel Time (minutes)	20.2	4.2	4.4	4.4	4.5	4.7	14.9	57.3
Distance (miles)	3.0	1.0	1.0	1.0	1.0	1.0	3.7	11.7
Rate of Travel (minutes per mile)	6.7	4.2	4.4	4.4	4.5	4.7	4.0	4.9
Average Speed (mph)	8.9	14.4	13.6	13.6	13.2	12.7	14.9	12.2
% Improvement	-4%	-7%	-8%	-4%	-6%	-6%	-3%	-5%

TABLE 6: ESTIMATED BUS SPEED IMPROVEMENTS – ALTERNATIVE 2

Segment	1	2	3	4	5	6	7	Total
Start	79 th Red Line	95 th Red Line	Halsted & 95 th	Halsted & 103 rd	Halsted & 111 th	Halsted & 119 th	Halsted & 127 th	
End	Halsted & 95 th	Halsted & 95 th	Halsted & 103 rd	Halsted & 111 th	Halsted & 119 th	Halsted & 127 th	Harvey TC	
Time Savings (min)								
Bus Lanes (miles)	-	-	-	-	-	-	3.7	3.7
Bus Lane Time Savings (minutes)	-	-	-	-	-	-	2.6	2.6
Queue Bypass (# of Intersections with)	9.0	3.0	4.0	2.0	3.0	3.0	-	24.0
Queue Bypass Savings (minutes)	0.9	0.3	0.4	0.2	0.3	0.3	-	2.4
Total Savings	0.9	0.3	0.4	0.2	0.3	0.3	2.6	5.0
Total Travel Time (minutes)	20.2	4.2	4.4	4.4	4.5	4.7	12.7	55.1
Distance (miles)	3.0	1.0	1.0	1.0	1.0	1.0	3.7	11.7
Rate of Travel (minutes per mile)	6.7	4.2	4.4	4.4	4.5	4.7	3.4	4.7
Average Speed (mph)	8.9	14.4	13.6	13.6	13.2	12.7	17.4	12.7
% Improvement	-4%	-7%	-8%	-4%	-6%	-6%	-17%	-8%

TABLE 7: ESTIMATED BUS SPEED IMPROVEMENTS – ALTERNATIVE 3

Segment	1	2	3	4	5	6	7	Total
Start	79 th Red Line	95 th Red Line	Halsted & 95 th	Halsted & 103 rd	Halsted & 111 th	Halsted & 119 th	Halsted & 127 th	
End	Halsted & 95 th	Halsted & 95 th	Halsted & 103 rd	Halsted & 111 th	Halsted & 119 th	Halsted & 127 th	Harvey TC	
Time Savings (min)								
Bus Lanes (miles)	-	-	0.6	1.0	1.0	1.0	3.7	7.3
Bus Lane Time Savings (minutes)	-	-	0.4	0.7	0.7	0.7	2.6	5.1
Queue Bypass (# of Intersections with)	9.0	3.0	-	-	-	-	-	12.0
Queue Bypass Savings (minutes)	0.9	0.3	-	-	-	-	-	1.2
Total Savings	0.9	0.3	0.4	0.7	0.7	0.7	2.6	6.3
Total Travel Time (minutes)	20.2	4.2	4.4	3.9	4.1	4.3	12.7	53.8
Distance (miles)	3.0	1.0	1.0	1.0	1.0	1.0	3.7	11.7
Rate of Travel (minutes per mile)	6.7	4.2	4.4	3.9	4.1	4.3	3.4	4.6
Average Speed (mph)	8.9	14.4	13.6	15.4	14.5	13.9	17.4	13.0
% Improvement	-4%	-7%	-9%	-15%	-14%	-14%	-17%	-10%