

**METRO-DADE TRANSIT AGENCY  
MDTA Metromover Extensions Transfer Analysis**

**FINAL  
Technical Memorandum Number 3  
Analysis of Impacts of Proposed Transfers Between Bus and Mover**



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Prepared for  
Metro-Dade Transit Agency



Prepared by  
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**TECHNICAL MEMORANDUM NUMBER 3**  
**Analysis of Impacts of Proposed Transfers between Bus and Mover**

Technical Memorandum Number 3 analyzes the impacts of the proposed transfers between Metrobus and the new legs of the Metromover scheduled to begin operation in late May 1994. Impacts on passengers walk distance from mover stations versus current bus stops, and station capacity will also be examined.

**STATION CAPACITY**

The following sections briefly describe the bus terminal/transfer locations for the Omni and Brickell Metromover Stations. Bus to mover transfers and bus route service levels are presented for each of the two Metromover stations. Figure 1 presents the Traffic Analysis Zones (TAZ) in the CBD, as well as a graphical representation of the Metromover alignment.

**Omni Station**

The Omni bus terminal adjacent to the Omni Metromover Station is scheduled to open along with the opening of the Metromover extensions in late May 1994. The Omni bus terminal/Metromover Station is bounded by Biscayne Boulevard, 14th Terrace, Bayshore Drive, and NE 15th Street. The station is immediately south of the Omni shopping center.

The Omni bus terminal consists of 10 sawtooth bus bays surrounding an island with shelters and benches. This facility also includes restrooms for the drivers, and a public information booth. Buses will enter and exit the terminal from Bayshore Drive.

Twelve routes are scheduled to directly serve the Omni bus terminal when it opens. Eleven of the routes (3, 9, 10, 16, C, K, M, S, T, 93X (Biscayne Max), Flagler Max) continue on to the CBD and are candidates for truncation at the terminal. The remaining route "F" will travel from Miami Beach through the terminal and on to the west. Four other routes (A, 32, 36, 62) will use the Omni area as the end of the line (EOL), but may stop at bus stops on 15th Street.

Table 1 presents the weekday bus route volumes for the Omni and Brickell corridor routes which will directly serve the stations during the AM, Midday, and PM time periods. As presented in this table, if no routes are truncated there will be a total of 919 bus trips into



**TABLE 1**  
**WEEKDAY BUS ROUTE SERVICE LEVELS**  
**Omni and Brickell Corridor Routes**

ROUTE	Weekday Bus Trips (1)					
	AM (6:00am–9:59am)		MIDDAY (10:00am–2:59pm)		PM (3:00pm–6:59pm)	
	TOTAL	PEAK HOUR	TOTAL	PEAK HOUR	TOTAL	PEAK HOUR
<b>OMNI–CBD ROUTES</b>						
inbound	129	35	142	28	140	36
outbound	134	36	144	27	135	37
<b>OMNI–THROUGH ROUTES (Routes F, Flagler Max)</b>						
inbound	20	6	8	1	20	6
outbound	19	7	8	2	20	6
<b>TOTAL OMNI</b>						
inbound	149	41	150	29	160	42
outbound	153	43	152	29	155	43
Total (in & outbound)	302	84	302	58	315	85
<b>BRICKELL–CBD ROUTES</b>						
inbound	57	16	52	11	58	16
outbound	58	16	54	10	57	16
Total (in & outbound)	115	32	106	21	115	32

Source: MDTA 11–7–93 Rotary

1. Peak Hour for each time period is 7:30am–8:30am; 12:00pm–1:00pm; 4:30pm–5:30pm.

the Omni bus terminal in the three time periods combined. As bus routes are truncated only the outbound trips entering the terminal would be eliminated. The highest peak hour bus trips (85) occurs in the PM peak hour. This number represents 8.5 buses per bus bay in the PM peak hour, or one bus entering a bus bay approximately every 7 minutes.

If all the corridor routes were truncated then only 459 trips would come through the bus terminal, with a high of only 42 buses per hour in the PM peak hour. This number represents 4.2 buses per bus bay in the peak hour, or one bus entering a bus bay approximately every 14 minutes. This number appears reasonable for 10 bus bays.

Only route "A" is scheduled for truncation at the Omni station in conjunction with the opening of the Metromover extensions in May. However, the Brickell Shuttles are planned to be discontinued upon the opening of the Metromover extensions. The next lineup (service change) will occur in July, at which time route 48 is scheduled for truncation at the Brickell Station.

With 12 routes scheduled to use the Omni bus terminal when the Metromover extensions open, the following issues need to be considered to operate the terminal effectively until such time as major route truncation occurs:

- proper signage is needed to distinguish between inbound and outbound bus routes;
- if layover is built into routes as an EOL, this could interfere with the productive use of the bus bay (the on-street bay(s) on 15th Street will be designated for layover buses);
- procedures for the quick removal of a broken down bus must be developed to avoid impacting the flow of buses in the terminal.

Table 2 presents the anticipated transfers between bus and mover based on the screenline counts of bus passengers detailed in Technical Memorandum Number 1. The passengers in this table only represent the AM, Midday and PM time periods, and assume the truncation of all Omni and Brickell corridor Metrobus routes. Additional transfers (assumed to be 10 percent of the total for the three time periods) can be anticipated on a weekday, occurring in the time periods before 6:00am and after 7:00pm. As shown in Table 2, 25,003 passenger are expected to transfer between Metrobus and Metromover going to

TABLE 2  
TRANSFERS BETWEEN BUS AND MOVER EXTENSIONS  
Omni and Brickell Metromover Stations

Weekday Passengers by Time Period

ROUTE	AM (6-10am)		MIDDAY (10am - 3pm)		PM (3-7pm)		TOTAL PASSENGERS (6am - 7pm)	
	Pass/ Hour	Total Passengers	Pass/ Hour	Total Passengers	Pass/ Hour	Total Passengers		
<b>3</b>	inbound	108	432	109	545	61	244	1221
	outbound	76	304	120	600	127	508	1412
<b>9</b>	inbound	86	344	13	65	29	116	525
	outbound	46	184	33	165	76	304	653
<b>10</b>	inbound	57	228	24	120	17	68	416
	outbound	19	76	27	135	46	184	395
<b>16</b>	inbound	106	424	90	450	31	124	998
	outbound	44	176	105	525	64	256	957
<b>C</b>	inbound	77	308	82	410	54	216	934
	outbound	34	136	53	265	51	204	605
<b>K</b>	inbound	98	392	73	365	51	204	961
	outbound	29	116	55	275	49	196	587
<b>M</b>	inbound	55	220	48	240	35	140	600
	outbound	16	64	20	100	20	80	244
<b>S</b>	inbound	199	796	287	1435	206	824	3055
	outbound	78	312	215	1075	271	1084	2471
<b>T</b>	inbound	107	428	50	250	45	180	858
	outbound	52	208	38	190	69	276	674
<b>93X</b>	inbound	122	488		0	63	252	740
	outbound	65	260		0	84	336	596
<b>Subtotal Omni</b>	1474	5896	1442	7210	1449	5796	18902	
<b>inbound</b>	1015	4060	776	3880	592	2368	10308	
<b>outbound</b>	459	1836	666	3330	857	3428	8594	
<b>8</b>	inbound	108	432	122	610	74	296	1338
	outbound	111	444	168	840	109	436	1720
<b>24</b>	inbound	66	264	75	375	45	180	819
	outbound	68	272	103	515	67	268	1055
<b>48</b>	inbound	5	20	18	90	8	32	142
	outbound	21	84	10	50	13	52	186
<b>B</b>	inbound	26	104	24	120	41	164	388
	outbound	71	284	17	85	21	84	453
<b>Subtotal Brickell</b>	476	1904	537	2685	378	1512	6101	
<b>inbound</b>	205	820	239	1195	168	672	2687	
<b>outbound</b>	271	1084	298	1490	210	840	3414	
<b>TOTAL</b>	1950	7800	1979	9895	1827	7308	25003	
<b>inbound</b>	1220	4880	1015	5075	760	3040	12995	
<b>outbound</b>	730	2920	964	4820	1067	4268	12008	

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Source: MDTA Transit Planning and Monitoring, Spring 1993 Survey  
Inbound - Bus to Mover transfer.  
Outbound - Mover to Bus transfer.

\*\* Assumes truncation of all Omni and Brickell corridor routes.

or from the CBD in the three peak periods. Adding in the additional 10 percent brings the total number of daily transfers between bus and mover to approximately 27,500.

While some Metrobus passengers whose destination is immediately to the south of the Omni terminal may elect to walk to their destination if Omni corridor bus routes are truncated at the Omni Station, approximately 1,000 passengers are expected to transfer to the Metromover per hour in the AM peak period. As detailed later in this report, the anticipated level of service for the Omni leg of the Metromover is a 3.4 minute headway operating with single car trains with a crush-load capacity of 96 passengers per car. The projected 1,000 passengers per hour therefore correlates to 57 passengers per train. This represents a load factor of 59 percent (of crush load) for each train. Note that this is an average for the AM peak period; the peak hour load factor will be higher. Also note that the Metromover system is capable of running two car trains should ridership warrant the extra service.

### **Brickell Station**

The Brickell bus staging area consists of five sawtooth bus bays located on SW 1st Avenue adjacent to the east side of the Brickell Metrorail Station. The Brickell Metromover Station is approximately 400 feet south of the bus bays. The on-street bus bays do not have bus shelters or seats.

As shown in Table 1, if no Brickell corridor routes are truncated at the Brickell Metromover Station there will be a total of 336 bus trips into the on-street bus bays in the three peak periods combined. The highest average peak hour number of bus trips is 32, which occurs in both the AM and PM peak periods. This number represents 6.4 buses per hour per bus bay, or approximately one bus using a bus bay every 9.5 minutes. The current five bus bays should have no problem handling the current level of service, and upon truncation of Brickell corridor bus routes, should be able to operate very efficiently.

As presented in Table 2, 205 Metrobus passengers are expected to transfer to the Metromover per hour in the AM peak period. An even greater number (239) are expected to transfer per hour in the Midday period. As detailed later in this report, the anticipated level of service for the Brickell leg of the Metromover is a 3.4 minute headway operating with single car trains. Based on a Metromover crush-load car capacity of 96 passengers, the 239 passengers per hour in the Midday correlates to 14 passengers per car, or a load factor

of 15 percent. Again, the load factor for the single busiest hour in the Midday period will be higher.

## **TRAVEL TIME IMPACTS**

### **Metromover Operating Characteristics**

The Metromover guideway consists of a two track, 1.9 mile loop through the core of the Miami CBD. In late May 1994 two extension legs to the original guideway will open. These legs consist of a two track, 1.1 mile extension south of the loop through the Brickell business district, and a two track, 1.4 mile extension north from the loop to the Omni area. There are a total of 21 stations, with nine stations serving the core loop, and six serving each of the Brickell and Omni extension legs. Figure 1 details the guideway alignment and station locations for the entire Metromover system.

The Metromover system, including the two extensions, is proposed to continue to operate revenue service during the same hours as the Metrorail system. The proposed span of service is from approximately 5:30am to midnight seven days a week. Service start and/or end times will be modified as demand changes and when special events occur.

The existing Metromover system operates an outer loop in a counter-clockwise direction, and an inner loop in a clockwise direction. The two extension legs will utilize the outer loop portion of the existing system. The Omni extension starting at the School Board station will travel through the five remaining extension stations, enter the outer loop in a counter-clockwise direction and proceed to the College North Station. The Omni route will then follow the outer loop of the core system, exit the core loop after serving the College/Bayside station, and then travel north back to the School Board station. The total Omni outer loop round trip travel time is approximately 27 minutes.

The Brickell extension starting at the Financial District Station will travel through the five remaining extension stations, enter the outer loop of the core system in a counter-clockwise direction and proceed to the Knight Center Station. The Brickell route will then continue counter-clockwise around the outer loop and enter back into the Brickell extension after serving the Third Street Station (formerly Fort Dallas Park). The total round trip running time for the Brickell outer loop is approximately 24.5 minutes.

The inner loop routing of the core system will not be affected by the two extension legs. As currently envisioned, both the Omni and Brickell outer loop service will operate on a 3.4 minute headway during the AM (7:00-9:30), and PM (3:30-7:00) peak periods. Service in the Midday period (9:30am-3:30pm) will operate on a 4.2 minute headway. Service prior to the AM peak or after the PM peak will operate on a 5.8 minute headway. The combined headway on the outer loop will be 1.7 minutes in the AM and PM peak periods, and 2.1 minutes in the Midday peak period.

The inner loop service will operate with a 2.2 minute headway in the AM and PM peak periods, and a 2.7 to 3.6 minute headway at other times.

### **Metrobus and Metromover Travel Times**

Table 3 details the AM peak period inbound total travel times to the core CBD Traffic Analysis Zones (TAZ) via Metrobus or Metromover. The Metromover travel times are subsequent to the opening of the two extension legs. The Metrobus travel times are previous to the opening of the extensions. Both travel times include transfer time, wait time, and walk time. Wait time, whether for Metrobus or Metromover is equal to one-half the headway time for that mode. The total travel times are to the centroid of a TAZ from either the nearest bus stop or Metromover station. Walk times were calculated at a speed of 2.5 miles per hour.

Metromover travel times assume a two minute walk time from the Omni bus terminal to the Metromover platform (4 minutes from the Brickell bus stop), and a 1.7 minute wait time to board either of the Metromover legs. The Metromover station to station travel time is derived from recent computer simulation runs (see Appendix A). Finally, a one minute egress time is assumed from the Metromover station to the street, and the walk time to the zone centroid is added to complete the trip.

Many Metromover travel times included either a transfer to the other Metromover extension leg, or a transfer to the inner loop if such a transfer would result in a travel time savings. For example, a passenger making a Metromover trip to Government Center from the Brickell Station would include a transfer to the inner loop at the Knight Center Station, as opposed to travelling the entire outer loop back and around to Government Center. A transfer to the inner loop includes a 1.1 minute wait time for the next Metromover car (the inner loop operates at a 2.2 minute peak headway).

**TABLE 3  
TOTAL TRAVEL TIMES TO CBD TAZs  
(AM Peak Period)**

TAZs	Total Travel Time (min.) Via Metromover	Total Travel Time (min.) Via Metrobus OMNI CORRIDOR ROUTES			Total Travel Time (min.) Via Metromover	Total Travel Time (min.) Via Metrobus BRICKELL CORRIDOR ROUTES			
	OMNI STATION	3, 16, 93X, C, M, S	9, 10	K, T	BRICKELL STATION	8	24	48	B
611	16.3	14.5	11.8	11.8	32.2	22.0	29.8	33.2	30.7
612	11.2	6.0	3.8	3.8	28.4	20.3	22.3	26.5	21.7
616	16.1	10.8	8.5	8.3	22.0	14.0	21.2	26.7	21.5
617	13.4	7.3	5.7	5.3	23.3	14.5	21.5	23.8	20.5
618	10.4	7.2	5.3	4.8	18.2	11.3	18.8	22.2	18.8
619	14.6	9.8	9.0	9.5	19.8	12.2	19.8	25.8	21.0
625	17.9	17.3	14.8	15.2	22.8	18.0	19.2	17.7	17.0
626	15.2	16.2	13.5	12.8	21.5	15.5	18.3	17.0	16.2
627	15.9	15.0	12.5	12.7	20.3	15.3	17.0	15.8	14.8
628	14.2	13.2	10.6	10.2	20.1	12.8	17.7	16.3	15.2
629	13.5	11.0	8.4	7.8	19.7	10.5	15.0	16.5	19.0
630	16.4	9.0	5.6	5.3	19.7	10.3	14.7	16.7	18.5
631	15.3	6.0	5.9	6.3	17.5	13.0	16.7	19.3	17.7
632	14.4	7.8	9.2	9.0	21.2	17.2	16.0	20.8	18.7
633	19.4	8.8	11.5	11.8	20.2	15.2	14.7	12.8	12.5
634	15.0	7.3	6.8	7.3	17.4	12.5	15.3	12.8	17.2
635	15.9	9.3	6.5	5.8	18.0	10.3	14.5	13.3	18.2
636	15.5	11.5	9.0	8.3	20.0	9.8	14.8	13.8	18.2
637	14.9	13.5	9.7	10.7	18.9	12.2	16.5	14.7	13.3
638	14.9	13.3	10.5	11.8	18.8	14.7	15.2	14.0	12.7
639	18.2	15.2	13.2	14.0	22.1	17.2	17.2	16.0	14.7
640	17.0	12.7	10.2	11.5	20.6	14.0	14.7	13.3	12.0
641	16.4	11.0	8.5	9.3	17.4	11.0	13.0	11.7	11.2
642	14.9	12.5	8.3	10.3	19.0	12.2	14.0	13.3	12.7
643	17.7	11.3	7.5	8.7	20.4	10.8	13.5	15.0	17.7
644	18.7	10.5	7.7	8.8	17.6	8.7	12.3	12.5	11.7
645	17.3	9.0	7.8	6.7	18.2	8.7	12.5	10.8	11.2
646	16.5	10.3	6.5	6.3	17.9	9.3	14.0	11.7	17.7
647	15.6	7.5	7.2	8.0	16.2	12.5	15.3	11.7	16.8
648	16.4	8.5	8.2	7.8	17.0	11.7	12.3	10.2	10.5
649	17.5	9.2	12.5	9.3	14.1	12.2	11.1	9.2	9.0
650	19.7	10.3	10.7	7.3	15.9	10.0	10.0	8.5	8.5
651	19.9	9.3	8.7	7.0	16.4	8.2	11.4	9.5	10.0
652	19.3	10.8	10.2	8.5	15.1	8.0	10.0	8.7	8.5
653	17.6	12.3	12.7	9.8	13.2	7.0	8.8	7.8	7.0
654	17.2	12.8	12.5	11.0	13.5	7.0	9.7	9.5	8.8
655	19.4	10.5	9.2	8.8	16.2	8.0	10.8	10.2	10.2
656	18.2	12.7	10.7	11.0	16.4	10.3	10.3	9.3	9.7
657	17.9	12.8	10.0	11.7	19.1	10.2	13.3	11.2	10.7
658	20.0	15.5	13.2	14.3	22.6	13.0	17.7	15.3	14.3
660	15.7	18.3	20.4	17.8	19.8	9.8	10.0	14.3	10.2
661	20.6	16.0	13.8	14.8	19.6	9.7	14.5	13.7	11.5
664	17.7	11.7	13.5	10.7	15.6	10.5	8.8	7.2	6.2
665	19.6	12.8	16.0	12.2	14.1	10.5	7.1	6.5	5.3
667	23.6	16.5	17.3	15.0	13.9	8.5	5.7	4.8	4.7
668	28.4	21.3	23.8	27.7	15.7	10.2	8.0	7.2	8.0
675	20.8	17.7	16.4	17.5	10.4	4.8	9.0	7.5	6.7
676	27.8	20.7	20.8	19.7	6.3	6.3	8.0	12.7	6.3

It is assumed that passengers travelling to the College/Bayside, First Street, or Bayfront Park Stations from the Omni leg would transfer to the inner loop at the College North Station. Similarly, passengers travelling to the Miami Avenue or Government Center Station from the Brickell leg would transfer to the inner loop at the Knight Center Station.

A transfer to another leg of the system is assumed to occur at the Third Street Station (formerly Fort Dallas Park) for an Omni to Brickell transfer, and at the College/Bayside Station for a Brickell to Omni transfer. Both transfers include a 1.7 minute wait time for the next Metromover car.

Bus to bus transfers in the CBD include the transfer time of one-half the headway of the route the passenger is transferring to. This occurs for Brickell route passengers destined to zones in the north Omni area, and for Omni corridor bus passengers destined to a southern Brickell area TAZ.

As shown in Table 3, in all but two TAZ's of the Omni corridor, and eight in the Brickell corridor, the total travel time for Metrobus is less than Metromover in travel to the zone centroid. The main difference in travel time between Metrobus and Metromover is accounted for by the transfer walk time from Metrobus to the station platform, the wait time for the next Metromover train, and the egress walk time back to street level from the platform. Metromover travel times will also be more consistent than bus when considering traffic accidents and delays caused by bridge openings.

Table 4 presents the AM peak period through trip travel times for Metrobus passengers prior to the opening of the Metromover extensions. This information was taken from 1992-1993 MDTA Section 15 ridecheck reports. For purposes of comparison to the Metromover through trip travel time, these times are in-bus travel time only and do not include the wait time in transferring from one route to another. As can be seen from the table, total travel time from the Omni Terminal to the Brickell Terminal ranges from 15 to 17 minutes. Total travel time from the Brickell bus stop area to the Omni terminal ranges from 19 to 25 minutes. As noted in the table, the travel time from the CBD terminal to Omni or Brickell represents an average for the routes serving those corridors in an outbound direction. Table 4 is derived from information developed and presented in Table 3 of Technical Memorandum Number 1.

Similar to the previous table, Table 5 presents the AM peak period through trip travel time via the Metromover system. Total travel time is presented for the six possible bus/mover

TABLE 4  
 AM PEAK PERIOD THROUGH TRIP TRAVEL TIME VIA BUS  
 (Current Conditions)

Minutes

ROUTE #'s	Omni to CBD Terminal	CBD Terminal to Brickell (1)	Brickell to CBD Terminal Area	CBD Terminal Area to Omni (2)	TOTAL TRAVEL TIME
3, 16, 93X, C, M, S	10	7	—	—	17
9, 10	8	7	—	—	15
K, T	9	7	—	—	16
-----					
8	—	—	16	9	25
24	—	—	12	9	21
48	—	—	10	9	19
B	—	—	13	9	22
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Transferring from western routes	NA	7			7
2, 7, 11, 21, 77			NA	9	9

\*\* For comparison to Mover travel times neither table contains wait time for transfer to bus.

1. Average AM peak period outbound travel time for Brickell corridor routes.

2. Average AM peak period outbound travel time for Omni corridor routes.

TABLE 5  
AM PEAK PERIOD THROUGH TRIP TRAVEL TIME VIA METROMOVER

Minutes

TRIP (PATH)	Walk Time To Mover	Wait Time For Mover	Mover Travel Time	Walk Time To Bus	Mover to Mover Transfer Time	Mover Travel Time	Walk Time To Bus	TOTAL TRAVEL TIME
OMNI BUS TO CBD BUS (Bus to Omni Mover to Government Center to CBD Bus Terminal)	2	1.7	9.1	4	NA	NA	NA	16.8
OMNI BUS TO BRICKELL BUS (Bus to Omni Mover to Third St. Station to Brickell Mover to Brickell to Bus)	2	1.7	11.2	NA	1.7	5.7	4	26.3
BRICKELL BUS TO CBD BUS (Bus to Brickell Mover to Knight Center Station to Inner Loop to Government Center to Bus)	4	1.7	5.6	NA	1.1	3.1	4	19.5
BRICKELL BUS TO OMNI BUS (Bus to Brickell Mover to College Station to Omni Mover to Omni to Bus)	4	1.7	10	NA	1.7	7.0	2	26.4
CBD BUS TO BRICKELL BUS (Bus to CBD Bus Terminal to Government Center to Mover to Brickell Mover to Brickell Bus Stop)	4	1.7	7.6	4	NA	NA	NA	17.3
CBD BUS TO OMNI BUS (Bus to CBD Bus Terminal to Government Center to Inner Loop to College/Bayside Station to Omni Mover to Omni to Bus)	4	1.1	3.2	NA	1.7	7.2	2	19.2

(Metromover to Metrorail)

	Walk Time To Mover	Wait Time For Mover	Mover Travel Time	Walk Time To Metrorail	TOTAL TRAVEL TIME
OMNI BUS TO METRORAIL (Bus to Omni Mover to Government Center to Metrorail)	2	1.7	9.1	1	13.8

trip paths. Travel times range from a low of 16.8 minutes for the trips from the Omni terminal to the CBD bus Terminal and from the CBD bus terminal to the Brickell bus stop, to a high of 26.4 minutes from the Brickell bus stop to the Omni bus terminal.

Also presented in Table 5 is the Metromover to Metrorail total travel time from the Omni bus terminal to the Government Center Rail Station. Total travel time for this trip is projected to be 13.8 minutes in the AM peak period.

Table 6 compares the Metrobus and Metromover travel times presented in the previous two tables. For purposes of comparison, the trip path destined to the CBD assumes the passenger is going to the Government Center. A three minute walk time is assumed from the CBD bus terminal to the ground floor of the Government Center. Also, a one minute walk time is assumed from the Metromover to the ground floor of Government Center. As can be seen from this table, the Metrobus total trip times are faster than the Metromover, ranging from 0.2 to 11.2 minutes faster. This does not necessarily imply that the Metrobus is a faster mode as it relates to average speed, only that the total trip times which include the walk times and wait times associated in transferring from bus to mover create an overall longer travel time by Metromover. A patron travelling from Omni to Government Center to transfer to Metrorail can make the trip by Metromover in approximately the same time as bus. Given the variations in the bus travel times and the number of assumptions required for an analysis of this type, a difference of under two minutes is considered marginal.

## **RECOMMENDATIONS**

Based on the information presented in Technical Memorandums 1; and 3, the following recommendations are made regarding the issue of Metrobus route truncation related to the opening of the Metromover extensions.

### **Truncation of Metrobus Service**

As stated earlier, the FEIS assumed the truncation of Metrobus service prior to entering the CBD. In this scenario the Metromover system would be the distributor for Metrobus riders, similar to its current function for Metrorail riders. In order to lessen the impact of truncating all of this Metrobus service at once, it is recommended that the service truncations be phased in over an approximate two year time period after the opening of the Metromover extensions in late May 1994.

**TABLE 6**  
**AM PEAK PERIOD TRAVEL TIME COMPARISONS**  
**(Bus/Metromover Extensions)**

TRAVEL TIME (min.)

TRIP PATH	MOVER ONLY	BUS ONLY	DIFFERENCE
<b>Omni Bus Terminal to Government Center</b>			
- Routes 3, 16, 93X, C, M, S	13.8	13	+0.8
- Routes 9, 10	13.8	11	+2.8
- Routes K, T	13.8	12	+1.8
<b>Omni Bus Terminal to Brickell Bus Terminal</b>			
- Routes 3, 16, 93X, C, M, S	26.2	17	+9.2
- Routes 9, 10	26.2	15	+11.2
- Routes K, T	26.2	16	+10.2
<b>Brickell Bus Bays to Government Center</b>			
- 8	16.2	14 (1)	+2.2
- 24	16.2	15	+1.2
- 48	16.2	13	+3.2
- B	16.2	16	+0.2
<b>Brickell Bus Bays to Omni Bus Terminal</b>			
- 8	25.9	25	+0.9
- 24	25.9	21	+4.9
- 48	25.9	19	+6.9
- B	25.9	22	+3.9

\* Assumes a 1 minute walk time from mover to ground floor of Government Center.

\* Assumes a 3 minute walk time from CBD bus terminal to ground floor of Government Center.

1. Assumes riders on route 8 would walk to Government Center from NE 1st Ave & 1st Street instead of travelling loop to bus terminal.

Table 7 presents a process for prioritizing the Omni and Brickell corridor bus routes for truncation. Routes are prioritized only within the specific corridor. Factors considered in the prioritization process include total daily ridership, percentage of patrons who are over 65 years old or who have a physical disability, transfers, and difference in travel time between the mover and bus. While no single measure is specifically weighted to give it more importance, three measures include transfer activity, and two measures include travel time comparisons. Routes were ranked from 1 to 10 (1 to 4 for Brickell corridor routes), and an average ranking was derived from the scores.

As can be seen from Table 7, routes M, 16, and 93X (Biscayne Max) are ranked in the top third for route truncation in the Omni corridor. Route 48 ranks the highest in the Brickell corridor, with route B the second highest.

Aside from the technical process of ranking the routes for truncation, another factor to be considered in the prioritization of the routes is whether there is other bus service on this particular alignment into the CBD. Initially this is not an issue for the top three Omni corridor, or top two Brickell corridor routes recommended for truncation.

Regarding the issue of whether to truncate all of the Omni and Brickell corridor routes as assumed in the FEIS, it is recommended that MDTA monitor the bus and mover ridership into the CBD and transfer activity after the first phase of truncations to see

- if patrons of the truncated routes are transferring to the Metromover or to another bus destined to the CBD;
- if patrons of non-truncated routes are transferring to the Metromover.

Based on the travel behavior of riders and other efficiency considerations, the decision of which additional routes to truncate can be made at that time.

It is recommended that any service miles truncated as a result of the Metromover extensions be put back into Metrobus service which was truncated. This will allow the bus service to the perimeter of the CBD to be improved, reducing the headway, which in turn decreases a patron's total travel time. This can help to offset both the inconvenience of transferring to the Metromover at Omni and Brickell, and the corresponding added travel time in making the transfer.

TABLE 7  
 PRIORITIZATION OF ROUTE TRUNCATION  
 Omni and Brickell Corridor Routes

ROUTE #	TOTAL WEEKDAY RIDERS TO/FROM		% SENIOR OR W/PHYSICAL DISABILITY (2)		% OF THROUGH BUS TO WESTBOUND BUS ROUTE TRANSFERS		% OF THROUGH BUS TRANSFERS BETWEEN OMNI/BRICKELL		% OF THROUGH BUS TO METRORAIL TRANSFERS		AM PEAK PERIOD CHANGE IN AVERAGE TRAVEL TIME TO GOV. CENTER (3) MOVER VS. BUS (In-vehicle minutes)		AM PEAK PERIOD (4) CHANGE IN AVERAGE TRAVEL TIME TO GOV. CENTER MOVER VS. BUS (Passenger minutes)		AVERAGE RANKING	PRIORITY RANKING	
	CBD (1)	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank			
OMNI CORRIDOR ROUTES	3	2,896	9	10%	3	1%	1	9%	8	6%	10	0.8	1	346	4	5.1	6
	9	1,296	3	13%	7	3%	7	9%	8	18%	1	2.8	9	963	10	6.4	10
	10	892	1	10%	3	3%	7	4%	1	16%	2	2.8	9	638	7	4.3	4
	16	2,151	8	7%	1	3%	7	5%	2	8%	5	0.8	1	339	3	3.9	3
	C	1,693	6	13%	7	2%	3	11%	10	9%	4	0.8	1	246	2	4.7	5
	K	1,703	7	12%	5	2%	3	8%	6	8%	5	1.8	7	706	8	5.9	8
	M	928	2	13%	7	1%	1	7%	4	7%	7	0.8	1	176	1	3.3	1
	S	6,079	10	18%	10	2%	3	5%	2	7%	7	0.8	1	637	6	5.6	7
	T	1,685	5	12%	5	2%	3	8%	6	7%	7	1.8	7	770	9	6.0	9
	93X	1,336	4	8%	2	3%	7	7%	4	12%	3	0.8	1	390	5	3.7	2
BRICKELL CORRIDOR ROUTES	8	3,364	4	14%	3	3%	1	15%	3	10%	1	2.2	3	950	4	2.7	3
	24	2,061	3	13%	1	5%	4	16%	4	1%	3	1.2	2	317	3	2.9	4
	48	361	1	13%	1	3%	1	8%	1	3%	2	3.2	4	64	2	1.7	1
	B	925	2	16%	4	4%	3	13%	2	1%	3	0.2	1	21	1	2.3	2

1. Ridership by route from screenline counts for AM, Midday, and PM peak periods, factored up 10% for total weekday ridership.
2. From 1993 Metrobus Onboard survey.
3. Assumes average rider from Omni or Brickell travels to the Government Center.
4. Weighted by multiplying difference in Mover/Bus "travel time" times total inbound AM peak period ridership.

TABLE 7  
 PRIORITIZATION OF ROUTE TRUNCATION  
 Omni and Brickell Corridor Routes

ROUTE #	TOTAL WEEKDAY RIDERS TO/FROM CBD (1)		% SENIOR OR W/PHYSICAL DISABILITY (2)		% OF THROUGH BUS TO WESTBOUND BUS ROUTE TRANSFERS		% OF THROUGH BUS TO TRANSFERS BETWEEN OMNI/BRICKELL		% OF THROUGH BUS TO METRORAIL TRANSFERS		AM PEAK PERIOD CHANGE IN AVERAGE TRAVEL TIME TO GOV. CENTER (3) MOVER VS. BUS (In-vehicle minutes)		AM PEAK PERIOD (4) CHANGE IN AVERAGE TRAVEL TIME TO GOV. CENTER MOVER VS. BUS (Passenger minutes)		AVERAGE RANKING	PRIORITY RANKING	
		Rank		Rank		Rank		Rank		Rank		Rank		Rank			
OMNI CORRIDOR ROUTES	3	2,896	9	10%	3	1%	1	9%	8	6%	10	0.8	1	346	4	5.1	6
	9	1,296	3	13%	7	3%	7	9%	8	18%	1	2.8	9	963	10	6.4	10
	10	892	1	10%	3	3%	7	4%	1	16%	2	2.8	9	638	7	4.3	4
	16	2,151	8	7%	1	3%	7	5%	2	8%	5	0.8	1	339	3	3.9	3
	C	1,693	6	13%	7	2%	3	11%	10	9%	4	0.8	1	246	2	4.7	5
	K	1,703	7	12%	5	2%	3	8%	6	8%	5	1.8	7	706	8	5.9	8
	M	928	2	13%	7	1%	1	7%	4	7%	7	0.8	1	176	1	3.3	1
	S	6,079	10	18%	10	2%	3	5%	2	7%	7	0.8	1	637	6	5.6	7
	T	1,685	5	12%	5	2%	3	8%	6	7%	7	1.8	7	770	9	6.0	9
	93X	1,336	4	8%	2	3%	7	7%	4	12%	3	0.8	1	390	5	3.7	2
BRICKELL CORRIDOR ROUTES	8	3,364	4	14%	3	3%	1	15%	3	10%	1	2.2	3	950	4	2.7	3
	24	2,061	3	13%	1	5%	4	16%	4	1%	3	1.2	2	317	3	2.9	4
	48	361	1	13%	1	3%	1	8%	1	3%	2	3.2	4	64	2	1.7	1
	B	925	2	16%	4	4%	3	13%	2	1%	3	0.2	1	21	1	2.3	2

1. Ridership by route from screenline counts for AM, Midday, and PM peak periods, factored up 10% for total weekday ridership.
2. From 1993 Metrobus Onboard survey.
3. Assumes average rider from Omni or Brickell travels to the Government Center.
4. Weighted by multiplying difference in Mover/Bus "travel time" times total inbound AM peak period ridership.

A final consideration in the decision to truncate bus routes is the possibility of encouraging renewed illegal jitney activity. The illegal jitneys have virtually disappeared from downtown over the past 18 months, due to the post-hurricane FEMA sponsored service, passage of stricter legislation, and increased enforcement. If routes are truncated, illegal jitneys may attempt to re-enter certain corridors and compete by offering direct service to the CBD. Thus, any truncation of routes must be closely monitored, and enforcement strategies must be planned in advance.

Currently 10 of the 15 Metrobus routes analyzed operate service into or out of the CBD earlier or later than the proposed operating hours (5:30am-Midnight) for the Metromover system. It is recommended that the service hours in the operation of the Metromover be revised to reflect the extended hours of the Metrobus service. If this is not possible, then these 10 routes must continue to operate into the CBD during the late night and early morning hours. It will be necessary to reroute these buses in that the existing route and corresponding signage will have been eliminated once the bus route truncation is completed. Further, it is important that the service be clearly marked on the schedules so as not to confuse the riders into thinking the service continues into the CBD at all hours. Finally, bus stop signage will be necessary in the core of the CBD to allow for boardings and transfers, while at the same time making it clear that these routes only serve these stops when the Metromover is not in scheduled operation.

APPENDIX A

Metromover Extensions Station to Station Simulated Run Times

Miami Outerloop/Northern Extension Station to Station Run-Times

DWELL	KC	DP	BF	FT	CO	FR	PW	EL	BP	HP	OM	SB	OM	HP
	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	20.0	20.0	20.0	15.0
TS	38.6	96.2	165.6	260.0	308.6	464.0	514.6	570.0	644.4	717.0	784.0	866.4	971.2	1046.6
KC	1689.8	42.6	112.0	206.4	255.0	410.4	461.0	516.4	590.8	663.4	730.4	812.8	917.6	993.0
DP	1632.2	1689.8	54.4	148.8	197.4	352.8	403.4	458.8	533.2	605.8	672.8	755.2	860.0	935.4
BF	1562.8	1620.4	1689.8	79.4	128.0	283.4	334.0	389.4	463.8	536.4	603.4	685.8	790.6	866.0
FT	1468.4	1526.0	1595.4	1689.8	33.6	189.0	239.6	295.0	369.4	442.0	509.0	591.4	696.2	771.6
CO	1419.8	1477.4	1546.8	1641.2	1689.8	140.4	191.0	246.4	320.8	393.4	460.4	542.8	647.6	723.0
FR	1264.4	1322.0	1391.4	1485.8	1534.4	1689.8	35.6	91.0	165.4	238.0	305.0	387.4	492.2	567.6
PW	1213.8	1271.4	1340.8	1435.2	1483.8	1639.2	1689.8	40.4	114.8	187.4	254.4	336.8	441.6	517.0
EL	1158.4	1216.0	1285.4	1379.8	1428.4	1583.8	1634.4	1689.8	59.4	132.0	199.0	281.4	386.2	461.6
BP	1084.0	1141.6	1211.0	1305.4	1354.0	1509.4	1560.0	1615.4	1689.8	57.6	124.6	207.0	311.8	387.2
HP	1011.4	1069.0	1138.4	1232.8	1281.4	1436.8	1487.4	1542.8	1617.2	1689.8	52.0	134.4	239.2	314.6
OM	939.4	997.0	1066.4	1160.8	1209.4	1364.8	1415.4	1470.8	1545.2	1617.8	1684.8	62.4	167.2	242.6
SB	857.0	914.6	984.0	1078.4	1127.0	1282.4	1333.0	1388.4	1462.8	1535.4	1602.4	1684.8	84.8	160.2
OM	752.2	809.8	879.2	973.6	1022.2	1177.6	1228.2	1283.6	1358.0	1430.6	1497.6	1580.0	1684.8	55.4
HP	681.8	739.4	808.8	903.2	951.8	1107.2	1157.8	1213.2	1287.6	1360.2	1427.2	1509.6	1614.4	1689.8
BP	616.8	674.4	743.8	838.2	886.8	1042.2	1092.8	1148.2	1222.6	1295.2	1362.2	1444.6	1549.4	1624.8
EL	539.8	597.4	666.8	761.2	809.8	965.2	1015.8	1071.2	1145.6	1218.2	1285.2	1367.6	1472.4	1547.8
PW	477.4	535.0	604.4	698.8	747.4	902.8	953.4	1008.8	1083.2	1155.8	1222.8	1305.2	1410.0	1485.4
FR	418.6	476.2	545.6	640.0	688.6	844.0	894.6	950.0	1024.4	1097.0	1164.0	1246.4	1351.2	1426.6
CN	293.6	351.2	420.6	515.0	563.6	719.0	769.6	825.0	899.4	972.0	1039.0	1121.4	1226.2	1301.6
SP	234.0	291.6	361.0	455.4	504.0	659.4	710.0	765.4	839.8	912.4	979.4	1061.8	1166.6	1242.0
GC	154.2	211.8	281.2	375.6	424.2	579.6	630.2	685.6	760.0	832.6	904.6	987.0	1091.8	1162.2

BP	EL	PW	FR	CN	SP	GC	TS
15.0	15.0	15.0	15.0	15.0	15.0	20.0	15.0
1111.6	1188.6	1251.0	1309.8	1434.8	1494.4	1569.2	1689.8
1058.0	1135.0	1197.4	1256.2	1381.2	1440.8	1515.6	1636.2
1000.4	1077.4	1139.8	1198.6	1323.6	1383.2	1458.0	1578.6
931.0	1008.0	1070.4	1129.2	1254.2	1313.8	1388.6	1509.2
836.6	913.6	976.0	1034.8	1159.8	1219.4	1294.2	1414.8
788.0	865.0	927.4	986.2	1111.2	1170.8	1245.6	1366.2
632.6	709.6	772.0	830.8	955.8	1015.4	1090.2	1210.8
582.0	659.0	721.4	780.2	905.2	964.8	1039.6	1160.2
526.6	603.6	666.0	724.8	849.8	909.4	984.2	1104.8
452.2	529.2	591.6	650.4	775.4	835.0	909.8	1030.4
379.6	456.6	519.0	577.8	702.8	762.4	837.2	957.8
307.6	384.6	447.0	505.8	630.8	690.4	765.2	885.8
225.2	302.2	364.6	423.4	548.4	608.0	682.8	803.4
120.4	197.4	259.8	318.6	443.6	503.2	578.0	698.6
50.0	127.0	189.4	248.2	373.2	432.8	507.6	628.2
1689.8	62.0	124.4	183.2	308.2	367.8	442.6	563.2
1612.8	1689.8	47.4	106.2	231.2	290.8	365.6	486.2
1550.4	1627.4	1689.8	43.8	168.8	228.4	303.2	423.8
1491.6	1568.6	1631.0	1689.8	110.0	169.6	244.4	365.0
1366.6	1443.6	1506.0	1564.8	1689.8	44.6	119.4	240.0
1307.0	1384.0	1446.4	1505.2	1630.2	1689.8	59.8	180.4
1227.2	1304.2	1366.6	1425.4	1550.4	1610.0	1689.8	100.6

Miami Outerloop/Southern Extension Station to Station Run-Times

DWELL	RW 15.0	FS 15.0	ET 15.0	TN 15.0	BR 20.0	FD 20.0	BR 20.0	TN 15.0	ET 15.0	FS 15.0	RW 15.0	KC 15.0	DP 15.0	BF 15.0
TS	93.2	145.6	196.8	264.2	342.4	436.6	544.4	628.6	695.2	753.6	806.4	898.0	955.6	1025.0
RW	1495.0	37.4	88.6	156.0	234.2	328.4	436.2	520.4	587.0	645.4	698.2	789.8	847.4	916.8
FS	1442.6	1495.0	36.2	103.6	181.8	276.0	383.8	468.0	534.6	593.0	645.8	737.4	795.0	864.4
ET	1391.4	1443.8	1495.0	52.4	130.6	224.8	332.6	416.8	483.4	541.8	594.6	686.2	743.8	813.2
TN	1324.0	1376.4	1427.6	1495.0	63.2	157.4	265.2	349.4	416.0	474.4	527.2	618.8	676.4	745.8
BR	1240.8	1293.2	1344.4	1411.8	1490.0	74.2	182.0	266.2	332.8	391.2	444.0	535.6	593.2	662.6
FD	1146.6	1199.0	1250.2	1317.6	1395.8	1490.0	87.8	172.0	238.6	297.0	349.8	441.4	499.0	568.4
BR	1038.8	1091.2	1142.4	1209.8	1288.0	1382.2	1490.0	64.2	130.8	189.2	242.0	333.6	391.2	460.6
TN	959.6	1012.0	1063.2	1130.6	1208.8	1303.0	1410.8	1495.0	51.6	110.0	162.8	254.4	312.0	381.4
ET	893.0	945.4	996.6	1064.0	1142.2	1236.4	1344.2	1428.4	1495.0	43.4	96.2	187.8	245.4	314.8
FS	834.6	887.0	938.2	1005.6	1083.8	1178.0	1265.8	1370.0	1436.6	1495.0	37.8	129.4	187.0	256.4
RW	781.8	834.2	885.4	952.8	1031.0	1125.2	1233.0	1317.2	1383.8	1442.2	1495.0	76.6	134.2	203.6
KC	690.2	742.6	793.8	861.2	939.4	1033.6	1141.4	1225.6	1292.2	1350.6	1403.4	1495.0	42.8	112.0
DP	632.6	685.0	736.2	803.6	881.8	976.0	1083.8	1168.0	1234.6	1293.0	1345.8	1437.4	1495.0	54.4
BF	563.2	615.6	666.8	734.2	812.4	906.6	1014.4	1098.6	1165.2	1223.6	1276.4	1368.0	1425.6	1495.0
FT	468.8	521.2	572.4	639.8	718.0	812.2	920.0	1004.2	1070.8	1129.2	1182.0	1273.6	1331.2	1400.6
CO	420.2	472.6	523.8	591.2	669.4	763.6	871.4	955.6	1022.8	1080.6	1133.4	1225.0	1282.8	1352.0
CN	348.0	400.4	451.6	519.0	597.2	691.4	799.2	883.4	950.0	1008.4	1061.2	1152.8	1210.4	1279.8
SP	288.4	340.8	392.0	459.4	537.6	631.8	739.6	823.8	890.4	948.8	1001.6	1093.2	1150.8	1220.2
GC	208.6	261.0	312.2	379.6	457.8	552.0	659.8	744.0	810.6	869.0	921.8	1013.4	1071.0	1140.4

FT	CO	CN	SP	GC	TS
15.0	15.0	15.0	15.0	20.0	15.0
1119.4	1168.0	1240.2	1299.8	1374.6	1495.0
1011.2	1059.8	1132.0	1191.6	1266.4	1386.8
958.8	1007.4	1079.6	1139.2	1214.0	1334.4
907.6	956.2	1028.4	1088.0	1162.8	1283.2
840.2	888.8	961.0	1020.6	1095.4	1215.8
757.0	805.6	877.8	937.4	1012.2	1132.6
662.8	711.4	783.6	843.2	918.0	1038.4
555.0	603.6	675.8	735.4	810.2	930.6
475.8	524.4	596.6	656.2	731.0	851.4
409.2	457.8	530.0	589.6	664.4	784.8
350.8	399.4	471.6	531.2	606.0	726.4
298.0	346.6	418.8	478.4	553.2	673.6
206.4	255.0	327.2	386.8	461.6	582.0
148.8	197.4	269.6	329.2	404.0	524.4
79.4	128.0	200.2	259.8	334.6	455.0
1495.0	33.6	105.8	165.4	240.2	360.6
1446.4	1495.0	57.2	116.8	191.6	312.0
1374.2	1422.8	1495.0	44.6	119.4	239.8
1314.6	1363.2	1435.4	1495.0	59.8	180.2
1234.8	1283.4	1355.6	1415.2	1490.0	100.4

