

FLAGLER STREET REVERSIBLE FLOW STUDY

LANES					DISPLAY										OPERATION	
					EASTBOUND					WESTBOUND						
1	2	3	4	5	1	2	3	4	5	1	2	3	4	5		
↓	↓	↘		↑	↑	↘	↘	⊗	⊗	⊗	⊗	⊗	⊗	↘	↘	2-Way Left Turn
↓	↓	↘		↑	↑	↘	↘	⊗	⊗	⊗				↘	↘	Warning
↓	↓			↑	↑	↘	↘	⊗	⊗	⊗						Clear Lane 3
↓	↓	↓		↑	↑	↘	↘	⊗	⊗							Unbalanced 3E 2W

**METROPOLITAN PLANNING ORGANIZATION
DADE COUNTY, FLORIDA**

FLAGLER STREET REVERSIBLE FLOW STUDY

SUMMARY

MPO and FDOT staff made a preliminary evaluation of reversible flow (or unbalanced flow) on numerous arterials to select those which should be given further consideration. West Flagler Street, between approximately West 27th Avenue and the Palmetto Expressway, was selected for more detailed evaluation.

This study provides a more in-depth planning analysis of the potential benefits and disbenefits of reversible traffic flow on this segment of West Flagler Street. Elements of the more in-depth planning evaluation include an assessment of peak period operating conditions, development of a preliminary operating plan for reversible flow sufficient to evaluate planning-level impacts, and formulation of recommendations to determine whether reversible flow project development activity should be pursued.

Reversible flow could be instituted on West Flagler Street during peak periods to provide more travel lanes for motorists in the predominant eastbound direction in the morning, and more lanes for the predominant westbound volume in the afternoon. Reversible flow operations would avoid the cost of major right of way takings and construction of additional lanes for through traffic along the corridor. Relatively low capital funding would be needed for traffic signal controller and signal head display modifications, the installation of overhead lane use control signals, necessary traffic control signing and pavement marking changes along the route, and a program of public information announcements.

Numerous reversible flow scenarios were examined for this section of West Flagler Street. These include the total reversal of the entire street during peak periods or the conversion of one or more lanes to reversible flow while maintaining two-way traffic operations. Peak period traffic characteristics in the corridor indicate that the conversion of one lane for reversible flow would be best of these options.

To introduce peak period reversible flow operations along West Flagler Street requires the conversion of the existing center left turn lane to another lane dedicated to through traffic movements in the predominant direction of peak period traffic flow. To achieve any meaningful through traffic congestion reduction in the predominant traffic direction and to not significantly degrade the safety benefits now provided by the center left turn lane, it would be necessary to prohibit left turn movements from West Flagler Street during periods of reversible flow (unbalanced lane flow) and during the transition periods between reversible flow and normal two-way traffic operations.

Traffic congestion during peak periods and at other times of the day is evident along the entire length of the corridor, but it emanates from a select number of intersections rather than a multitude of locations between the Palmetto Expressway and West 27th Avenue. While traffic congestion tends to be more of a problem in the predominant direction of travel during peak periods, the less predominant direction of traffic demand is also quite high. There is not a high directional imbalance in traffic demand. Motorists traveling in the less predominant direction in peak periods also encounter a certain level of traffic congestion today. In the typically more congested afternoon peak hour, there is only a 3 mph difference in the overall travel speeds between eastbound and westbound through traffic.

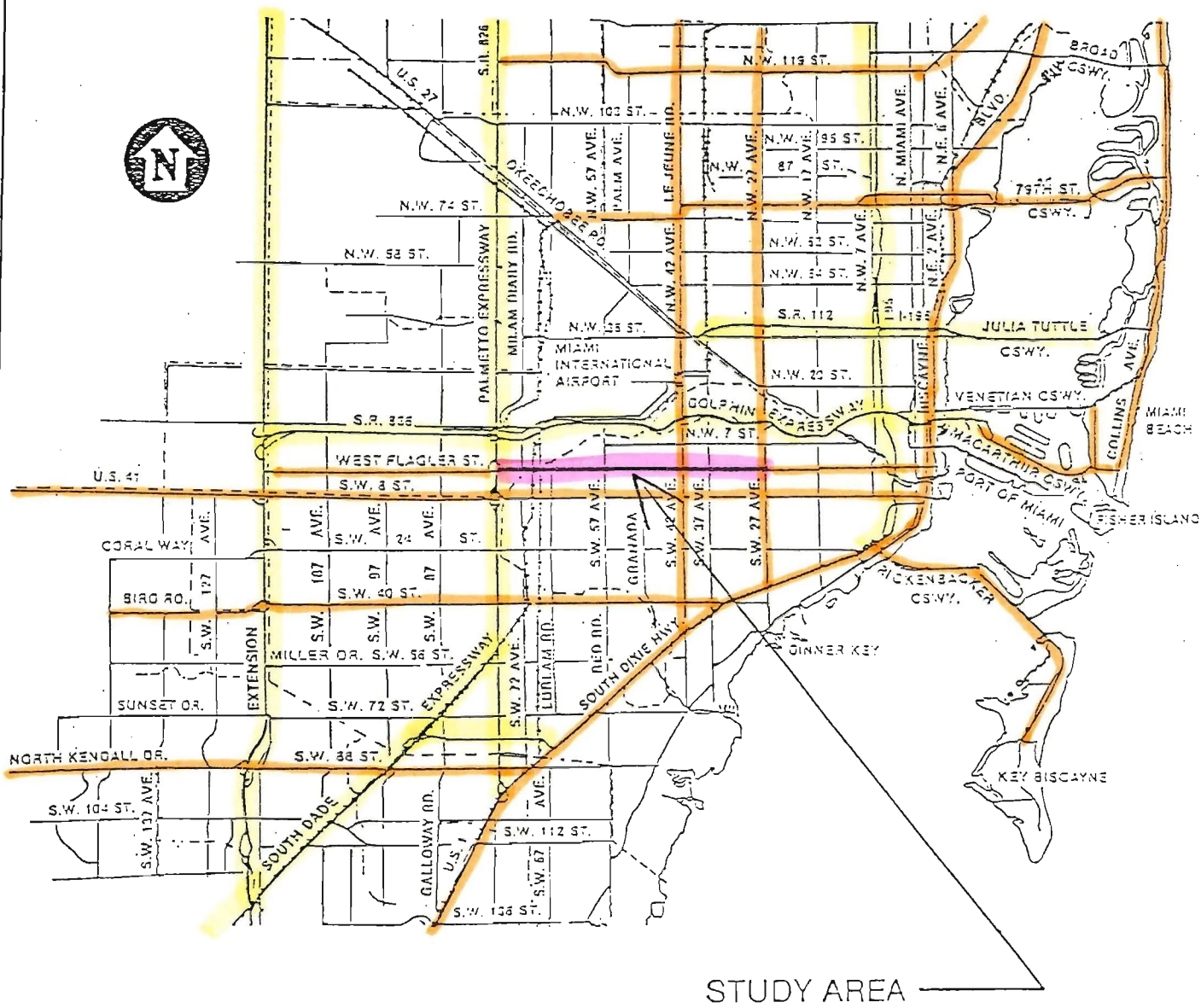
The simulation of reversible flow along West Flagler Street results in reduced congestion and higher travel speeds for those traveling the entire length of the corridor in the predominant direction during peak periods. However, there is an overall net negative benefit when considering the impacts to both directions of travel, safety, access to adjacent residential neighborhoods, increased north-south cross traffic demands, bus operations, etc. The analysis of current operations and the anticipated changes in future demands, coupled with both longer range transit and highway capacity improvements along this general east-west corridor (extending from SR 836 on the north to approximately S.W. 8th Street on the south) suggest that there may be better methods available to improve traffic flow in both directions for through traffic and for those with local destinations along the corridor.

It is recommended that a full-scale reversible flow system (unbalanced flow in peak periods with left turn prohibitions) not be instituted immediately along this corridor. Because reversible flow would require that left turns from Flagler Street be prohibited during the center lane transition periods, it may be found that instituting this change alone at major signalized intersections might achieve most of the through traffic benefits of reversible flow without many of the disbenefits associated with a full-fledged reversible lane system. Operational improvements should be developed at a few key intersections which are responsible for the major part of the congestion experienced by Flagler Street motorists. Changes to the key intersections at West 27th Avenue, LeJeune Road, and Milam Dairy Road could include the restriction of certain but not all turning movements and/or the construction of additional lanes and the associated right-of-way takings needed, together with the associated traffic signal alterations to improve both east and westbound traffic flow along the corridor.

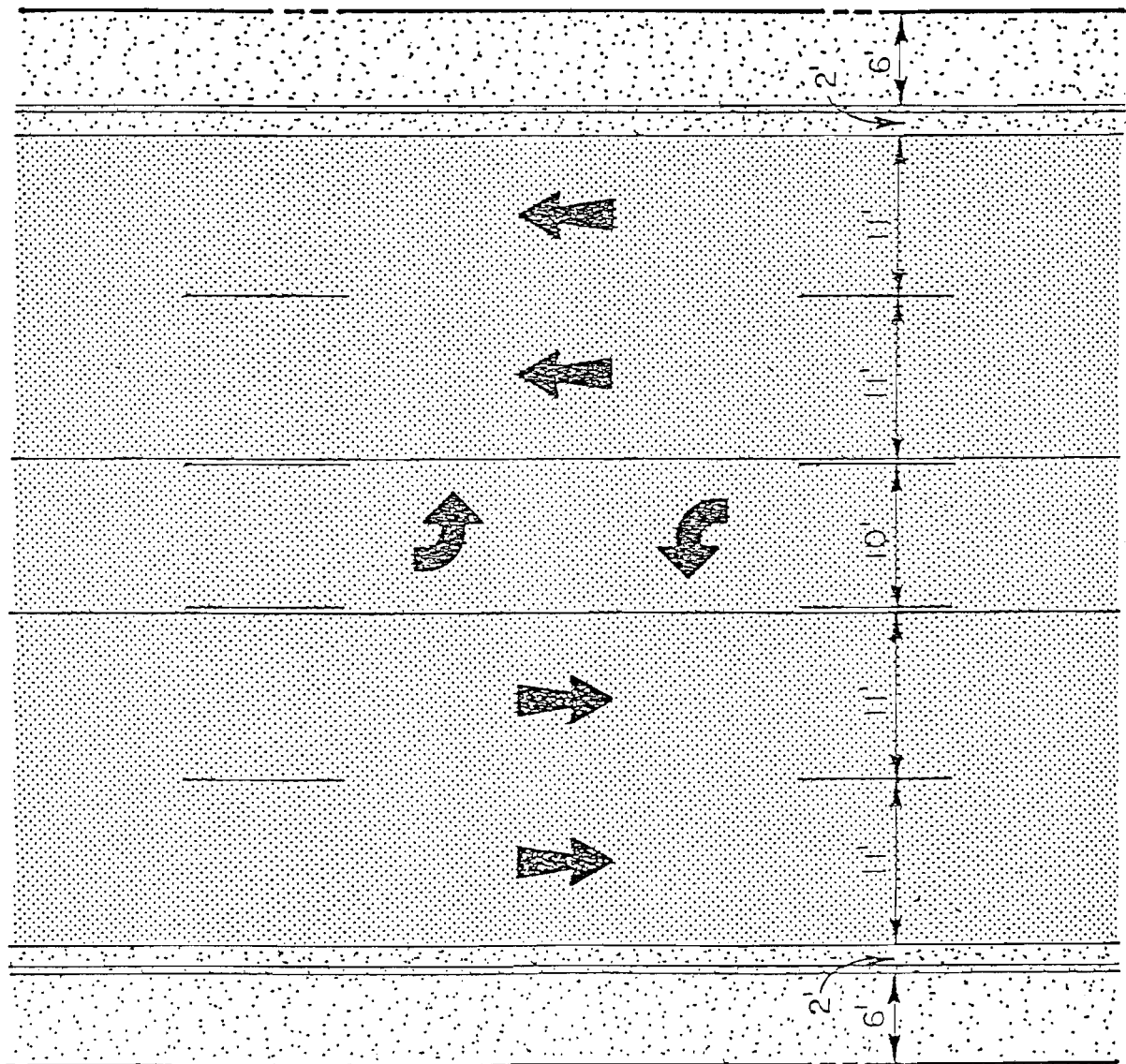
MPO staff are encouraged to again re-evaluate other potential corridors throughout Dade County where reversible flow operations may prove to be more positive and beneficial to travelers in all modes during peak periods than was found along the West Flagler Street corridor. A key to a reassessment of potential corridors on a County-wide level would be the potential selection based not only on the physical characteristics of a median (raised median versus painted median) and the associated capital cost to make reversible flow improvements, but primarily upon those corridors that now experience significant traffic congestion and also possess highly directional peak period travel characteristics. The major shortcoming found in not selecting the Flagler Street corridor for immediate implementation of full-scale reversible flow is not the capital cost of such a system, rather the lack of a significant directional imbalance in peak period travel demand.

The County-wide reassessment in search of facilities which may prove worthy of additional consideration for reversible flow should focus on those arteries (1) with a high degree of peak period congestion, (2) where congestion is predominant at numerous intersections rather than only a few, (3) where a directional distribution of peak hour traffic is in a range of approximately 65% in one direction compared to 35% in the other, and (4) where "ground loops" are relatively easy to accomplish in a safe manner if peak period left turn restrictions are needed for reversible flow operations. Most of these characteristics were not found along West Flagler Street.

LOCATION MAP

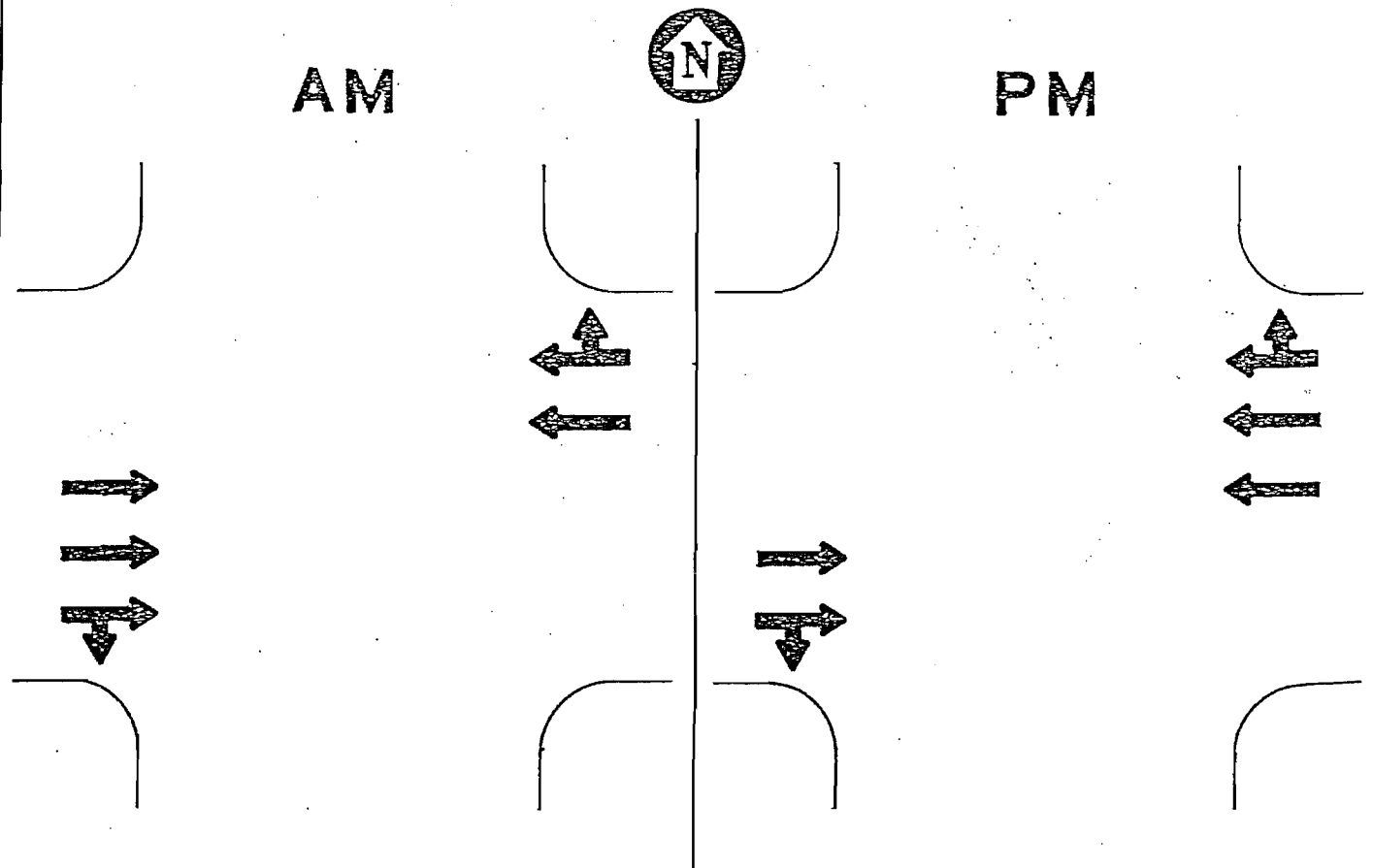


TYPICAL ROADWAY SECTION



FLAGLER STREET REVERSIBLE FLOW OPTIONS

REVERSIBLE FLOW CENTER LANE
LEFT TURN RESTRICTION WITH GROUND LOOPS



LANE USE CONTROL SIGNALS

LANES					DISPLAY										OPERATION
					EASTBOUND					WESTBOUND					
1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	
															2-Way Left Turn
															Warning
															Clear Lane 3
															Unbalanced 3E 2W
															Clear Lane 3
															2-Way Left Turn
															Warning
															Clear Lane 3
															Unbalanced 2E 3W
															Clear Lane 3

TYPICAL WEEKDAY OPERATING PLAN

<u>Time of Day</u>	<u>Operating Regime</u>
12:01 - 06:00 AM	Normal two-way operation
06:00 - 06:20 AM	Transition; use of the center lane and left turns prohibited
06:20 - 09:40 AM	Reversible flow use of center lane for eastbound traffic
09:40 - 10:00 AM	Transition; use of center lane and left turns prohibited
10:00 AM - 03:10 PM	Normal two-way operation
03:10 - 03:30 PM	Transition; use of center lane and left turns prohibited
03:30 - 06:40 PM	Reversible flow use of center lane for westbound traffic
06:40 - 07:00 PM	Transition; use of center lane and left turns prohibited
07:00 - 12:00 PM	Normal two-way operation

WEST FLAGLER STREET REVERSIBLE FLOW SUMMARY

Corridor Characteristics - SR 826 to W. 27th Avenue:

1. Length: 4.9 miles
2. Posted Speed: 40 mph
3. Cross Section: 70' typical: 5-lane, center two-way left turn lane (except west of W. 69th Avenue with raised median), curb & gutter, 6' sidewalk, street lighting, no parking (except 3 blocks near W. 39th Avenue where wider right of way exists and parking is in recessed bays).
4. Signals: 21 signalized locations, numerous school zones.
5. Volume: 31,000 daily; 2400 to 2800 vph in peak hour; 55%/45% directional split - 1400 to 1500 vph in predominate peak direction, 1200 to 1300 in less predominate; approximately 50% turn off at intermediate points.
6. Bus: 4 Metrobus routes, only one (Route #11) extends full length; 230 to 330 Metrobus volume potentially affected during 7 hour 20 minute reversible flow and transition periods.
7. Overall PM Peak Travel Speeds: 17.9 mph EB
15.0 mph WB
8. Congestion: Emanates from a few intersections (such as W. 42nd Avenue, W. 27th Avenue).

Reversible Flow:

1. Conversion of center lane for through movements with left turns prohibited.
2. Bus exceptions to left turn prohibition needed at W 37th, 42nd, 67th and 72nd Avenues.
3. Ground loops awkward or unreasonable at following locations:
 - SR 826 to Tamiami Canal (W. 71 Ave.) (impossible)
 - Near Flagler Memorial Cemetery (W. 55 Ave.)
 - Near St. Michael's Parish and Dade County Auditorium (W. 29 Ave.)

4. Capital cost of \$0.5 to \$1.0 million, most likely in area of \$0.7 to \$0.8 million for installation of overhead lane use control signals, controllers, signal head display modifications, signing and pavement marking changes, public information announcements.
5. Travel time savings of 2½ minutes for EB through movements in morning (14%) and 3 minutes for WB through movements in afternoon (16%). Through movement travel speed increases of 2½ to 3 mph.
6. FHWA study of 19 reversible flow sites using 2WLT lanes: 10% to 25% travel time savings, 11% to 50% increase for opposite direction; 4 of 19 sites later eliminated, primarily due to accident rate increases. AASHTO "greenbook": reversible lanes may be justified if directional split is 65% or greater. Only 3 of 19 sites in FHWA survey did not meet this criteria. Increased travel time in less predominate direction more than offset savings in predominate direction at one location; total vehicle hours of travel increased.
7. Travel time savings to predominate direction through movement for entire length of W. Flagler corridor (about 28% of all traffic). Opposite direction travel not improved and increased travel associated with intermediate left turn demands in both directions offsets much of travel time savings.
8. Physical characteristics of W. Flagler are "ideal"; traffic characteristics and ground loop capability are not.

