Item 7

Findings of the Spring 2008 Aerial Survey of The Washington Area Freeway System

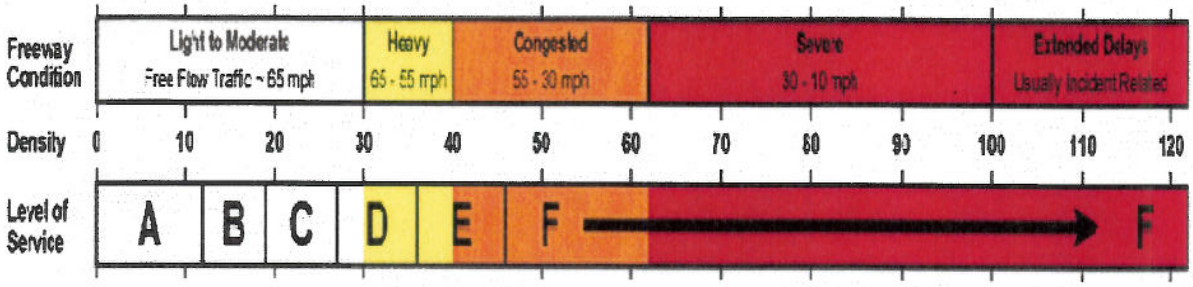
Travel Forecasting Subcommittee

March 20, 2009

FREEWAY CONGESTION MONITORING

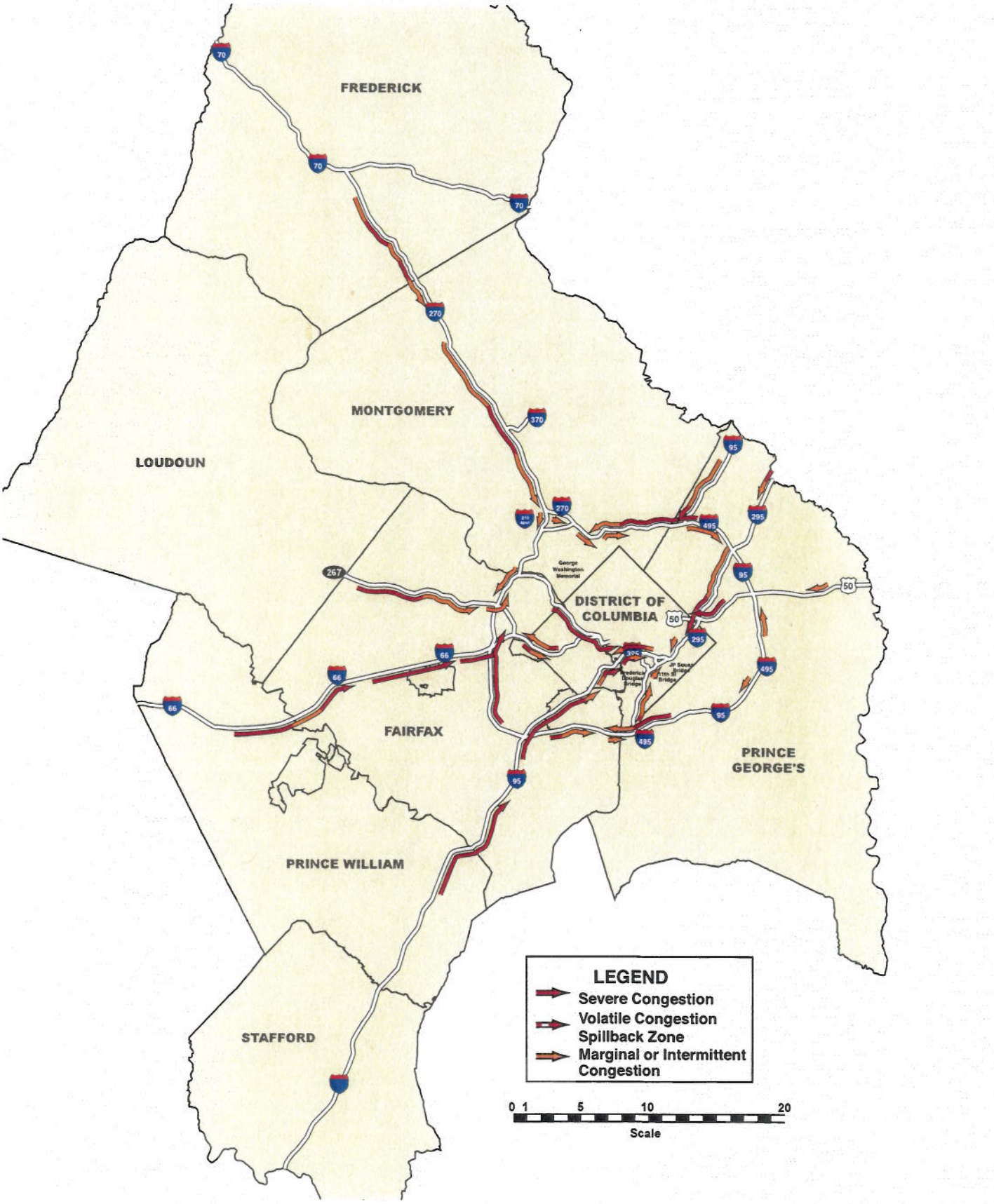
- Background
  - 300+ mile system monitored every 3 years since 1993 (6 surveys to date)
  - 3 hours in the AM and 3 hours in the PM
  - Photographs taken on multiple days (minimum of 3 days) with typical, recurring conditions
  - Density in passenger cars per mile per lane of freeway segments used to identify congestion
  - 2008 survey compared with 2005 survey and prior surveys (2002, 1999, 1996, 1993).

Levels of Service (LOS) Based on Density

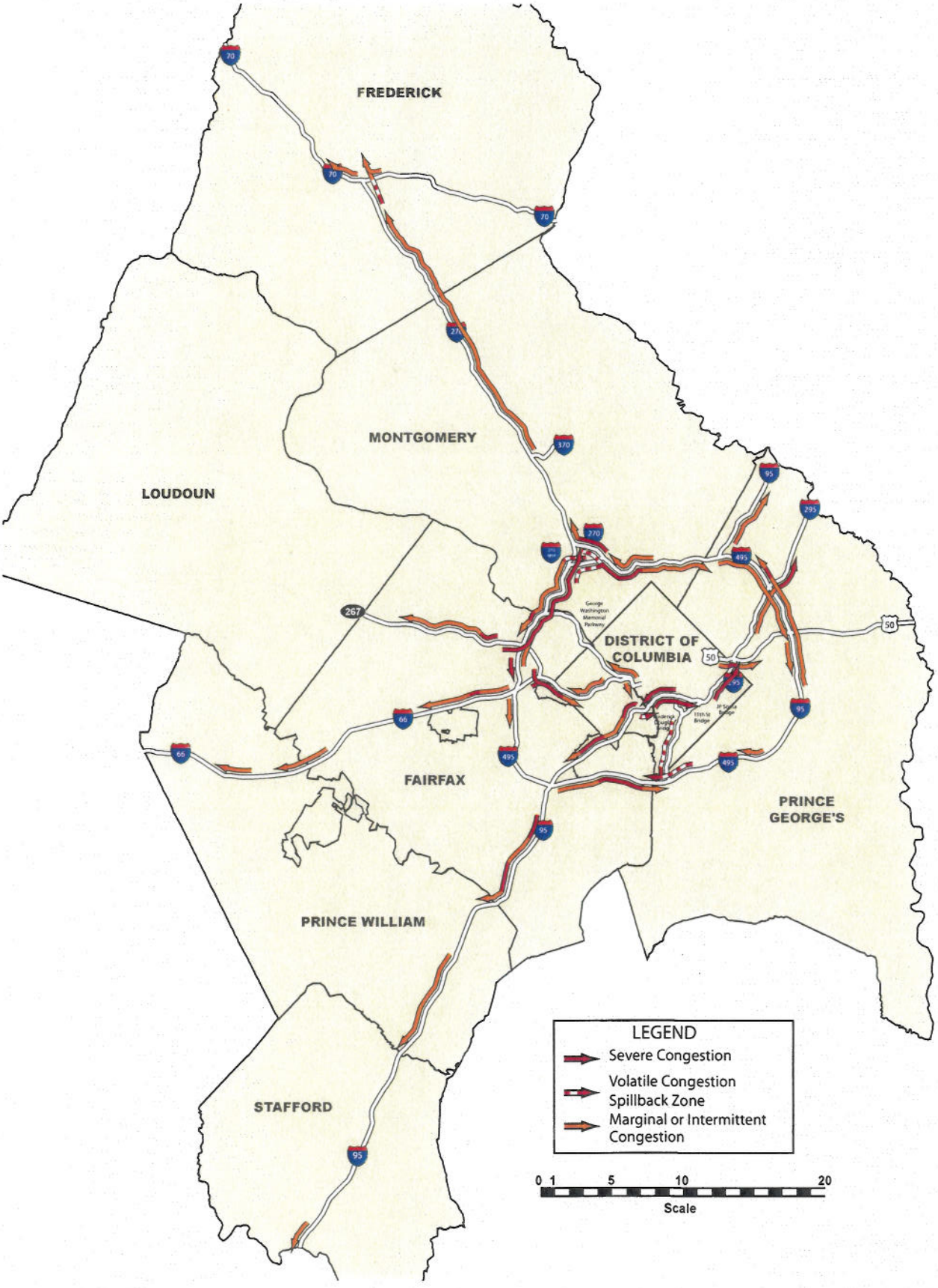


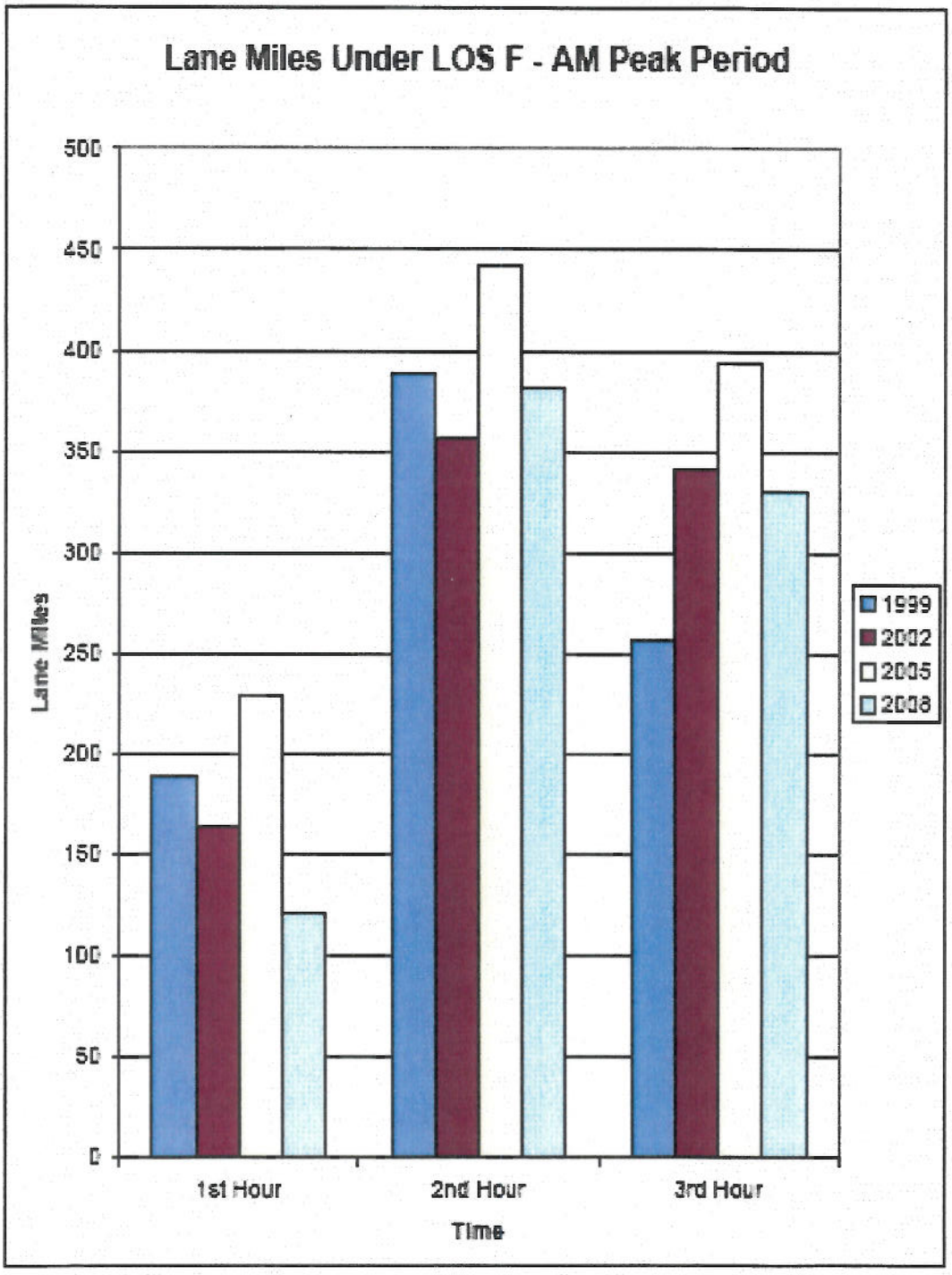
- LOS bar based on the Highway Capacity Manual
- Color represent field observed speeds
- LOS F represented by a density $\geq$ 46 passenger cars per mile per lane
- Density greater 62 pcpmpl represent severe congestion (red color)

Morning Regional Congestion (Peak Period)-Spring 2008

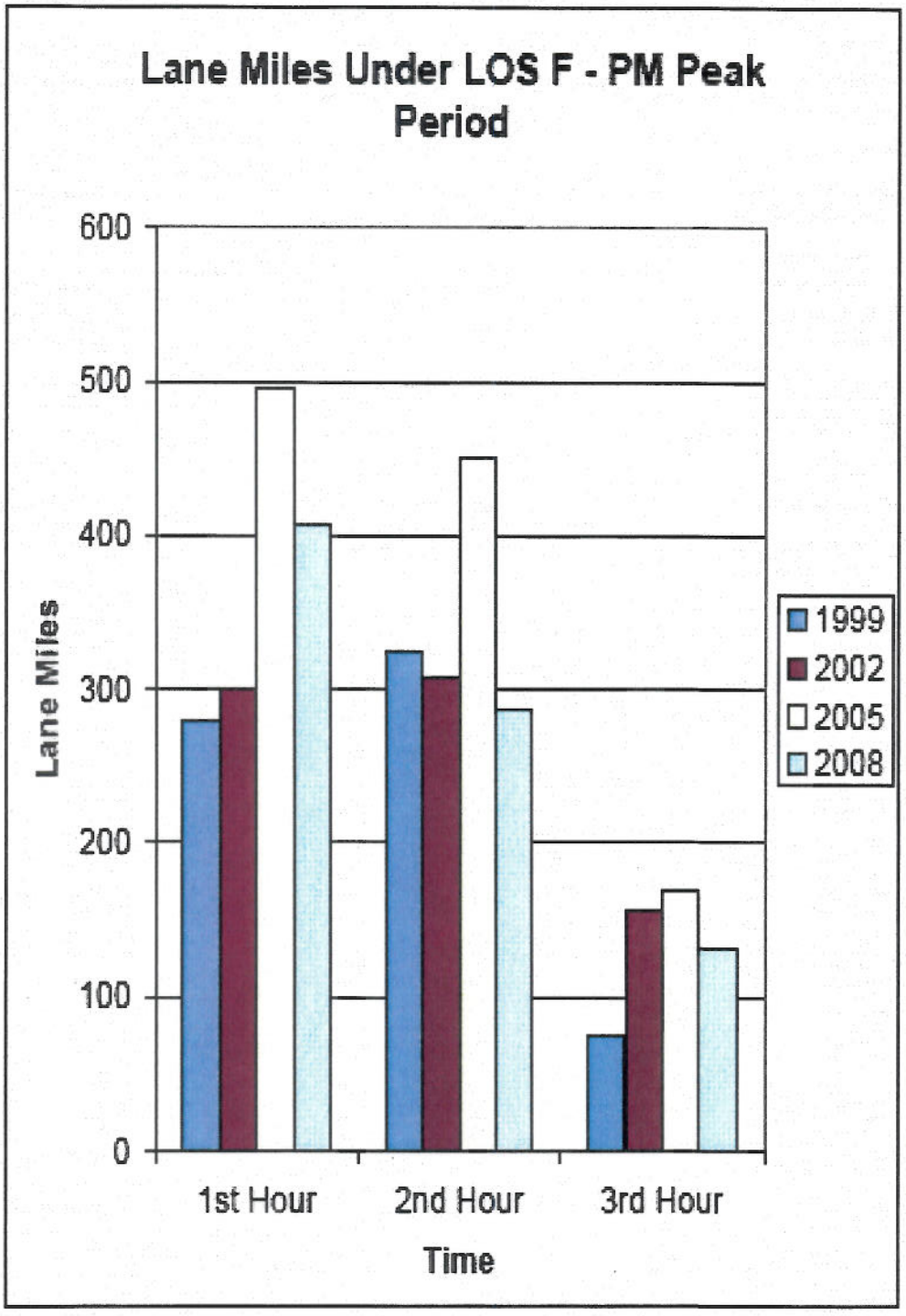


Evening Regional Congestion (Peak Period)-Spring 2008



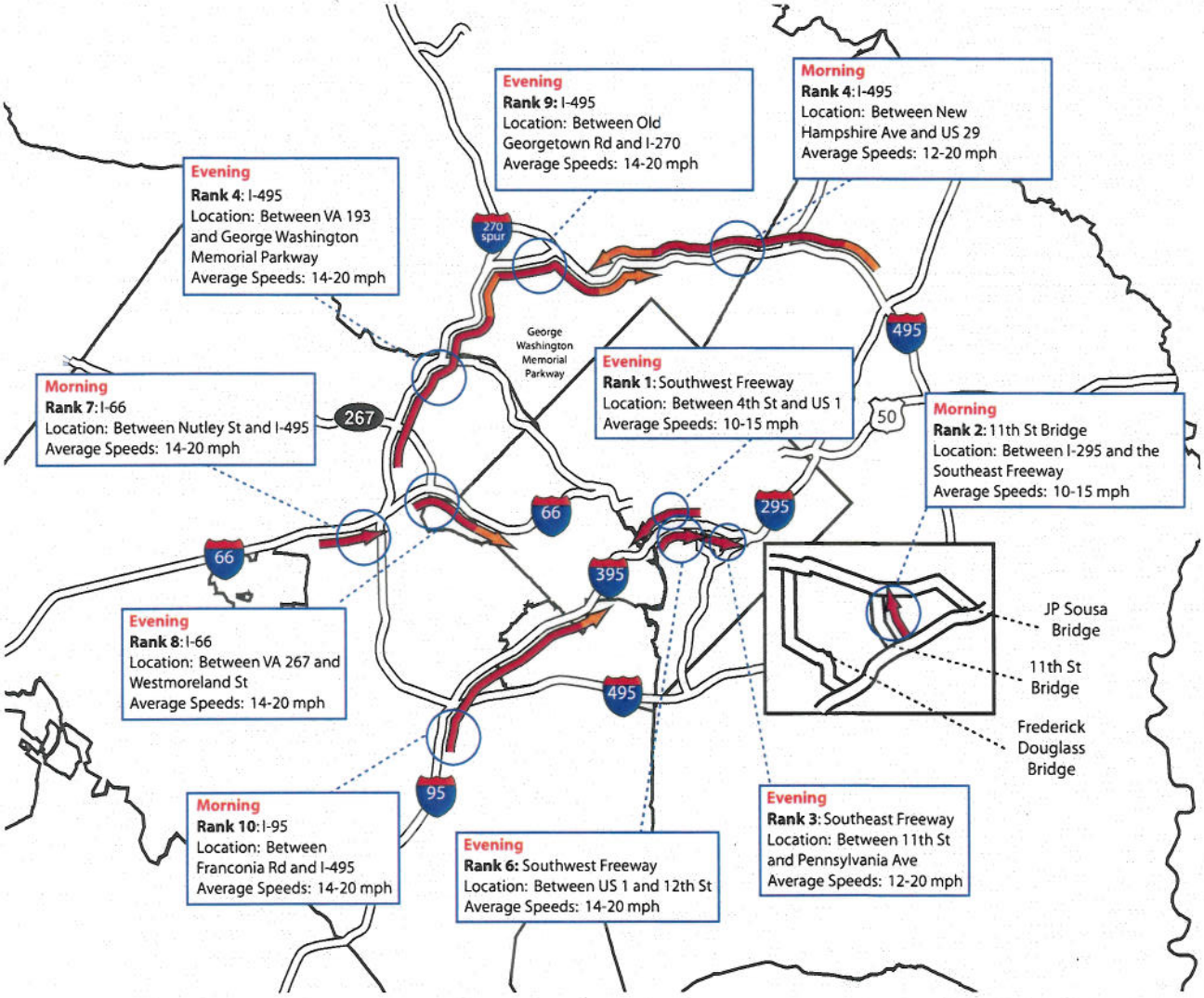


1st hour 6-7AM;2nd hour 7-8AM;3rd hour 8-9AM; Inside Beltway 1/2 hour later



*1st hour 4-5PM; 2nd hour 5-6PM; 3rd hour 6-7 PM;Inside beltway 1/2 early

Top Ten Congested Locations



Top Ten Congested Segments on the Freeway System (2008)

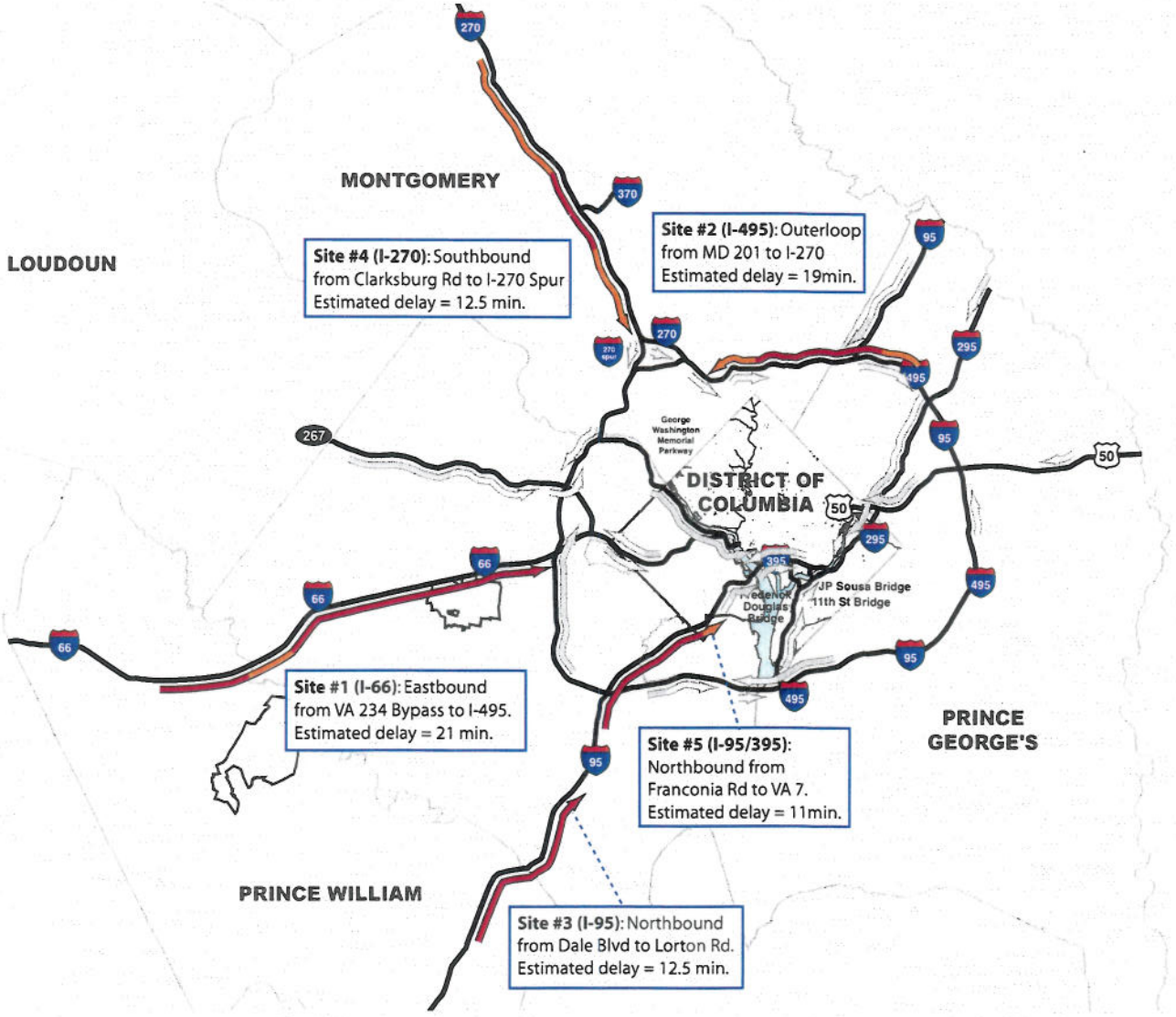
Rank	Route	From	To	Density	Speed Range
1	SB I-395 (5:30 to 6:30 PM)	4th St	US Route 1	115	10 to 15 MPH
2	WB 11th St Bridge (8 to 9 AM)	I-295	Southeast Fwy	110	10 to 15 MPH
3	NB I-395 (4:30 to 6:30 PM)	11th Street	Pennsylvania Ave	105	12 to 20 MPH
4	OL I-495 (8 to 9 AM)	MD 650 (New Hampshire Ave)	US 29 (Colesville Rd)	100-105	12 to 20 MPH
5A	IL I-495 (5:30 to 6:30 PM)	VA 193 (Georgetown Pike)	George Washington Pkwy	100	14 to 20 MPH
5B	NB I-395 (4:30 to 5:30 PM)	US Route 1	12th St	100	14 to 20 MPH
5C	EB I-66 HOV (8 to 9 AM)	VA 243 (Nutley St)	I-495	100	14 to 20 MPH
5D	EB I-66 (6:30 to 7:30 PM)	VA 267	VA 693 (Westmoreland St)	100	14 to 20 MPH
5E	IL I-495 (5:30 to 6:30 PM)	MD 187 (Old Georgetown Rd)	MD 355 / I-270	100	14 to 20 MPH
5F	NB I-95 VA (7 to 8 AM)	VA 644 (Franconia Rd)	I-495	100	14 to 20 MPH

Longest Delay Corridors- Morning Peak Period

Site Name	Road Name	Time	Direction	From	To	Queue Length (miles)	Estimated Travel Time (minutes)	Estimated Speed (mph)	Estimated Delay (minutes)
Site #1	I-66	8:00 – 9:00	Eastbound	VA 234 Bypass	I-495	19.5	41	30	21
Site #2	I-495	8:00 – 9:00	Outerloop	MD 201	I-270	12	31	25	19
Site #3	I-95	7:00 – 8:00	Northbound	Dale Blvd	Lorton Rd	7	19.5	20	12.5
Site #4	I-270	8:00 – 9:00	Southbound	Clarksburg Rd	I-270 Spur	16	28.5	35	12.5
Site #5	I-395	7:30 – 8:30	Northbound	Franconia Rd	VA 7	7	18	25	11

* Free flow travel times based on speed of 60 mph

Note: Congestion on I-495 in the vicinity of the Woodrow Wilson Bridge was excluded due to ongoing construction

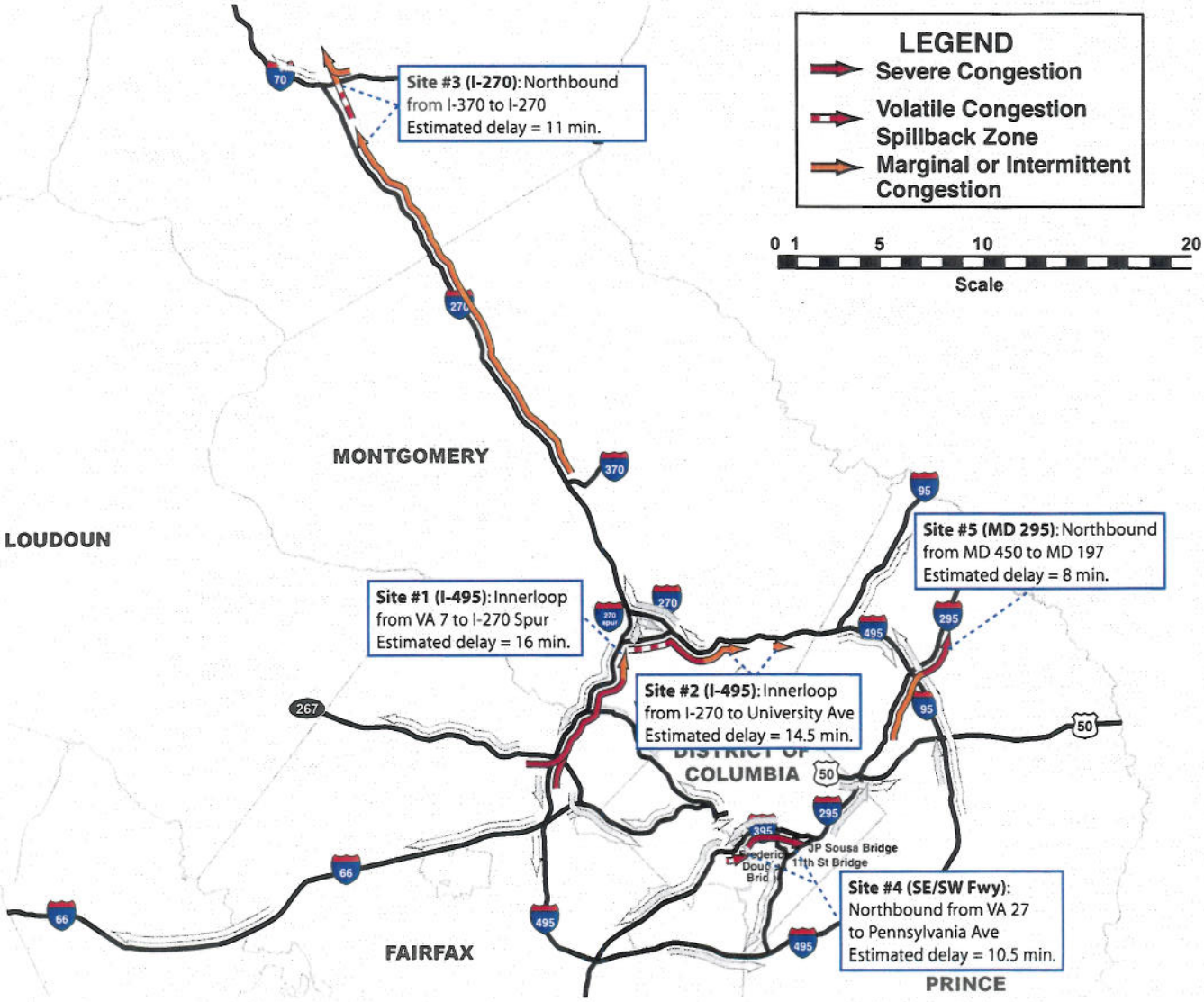


Longest Delay Corridors- Evening Peak Period

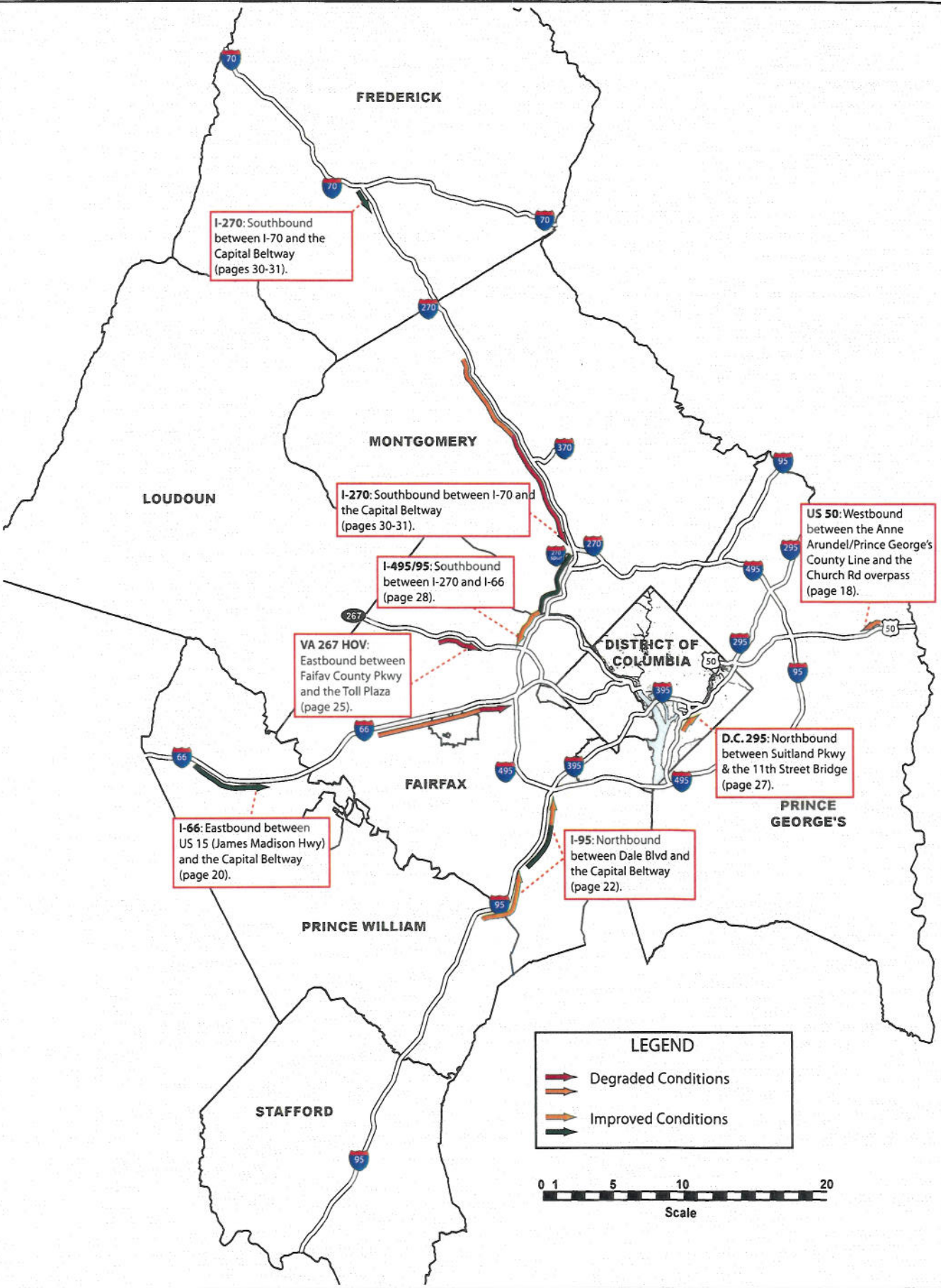
Site Name	Road Name	Time	Direction	From	To	Queue Length (miles)	Estimated Travel Time (minutes)	Estimated Speed (mph)	Estimated Delay (minutes)
Site #1	I-495	5:30 – 6:30	Innerloop	VA 7	I-270 Spur	8	24	20	16
Site #2	I-495	4:30 – 5:30	Innerloop	I-270 Spur	University Ave	10	24.5	25	14.5
Site #3	I-270	4:30 – 5:30	Northbound	I-370	I-70	23	34	40	11
Site #4	SE/SW Freeway	5:00 – 6:00	Northbound	VA 27	Pennsylvania Ave	5	15.5	20	10.5
Site #5	MD 295	4:30 – 5:30	Northbound	MD 450	MD 197	9.5	17.5	35	8

* Free flow travel times based on speed of 60 mph

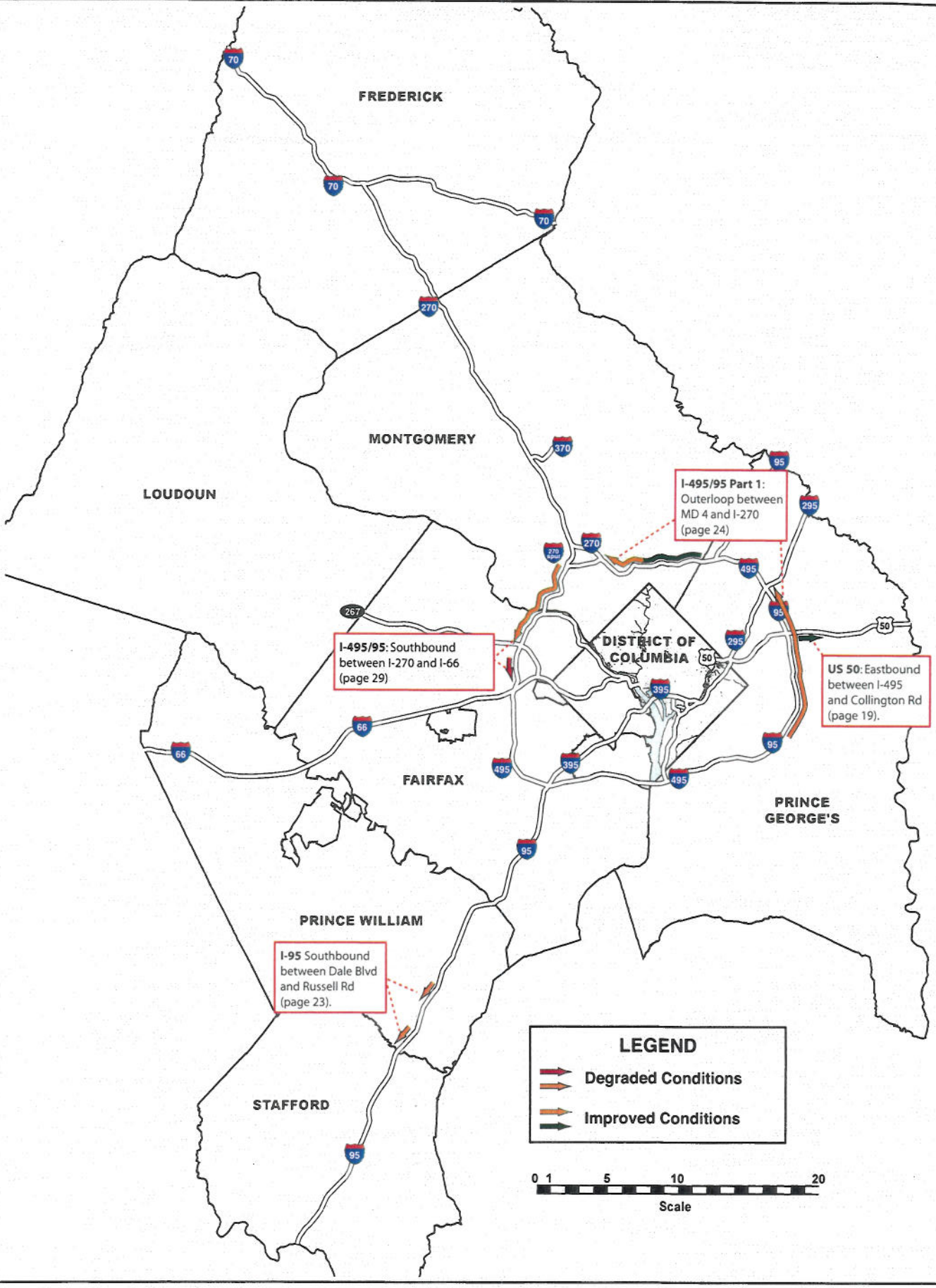
Note: Congestion on I-495 in the vicinity of the Woodrow Wilson Bridge was excluded due to ongoing construction



Significant Changes (2005 - 2008) - Morning Peak Period



SIGNIFICANT CHANGES (2005 - 2008) - EVENING PEAK PERIOD

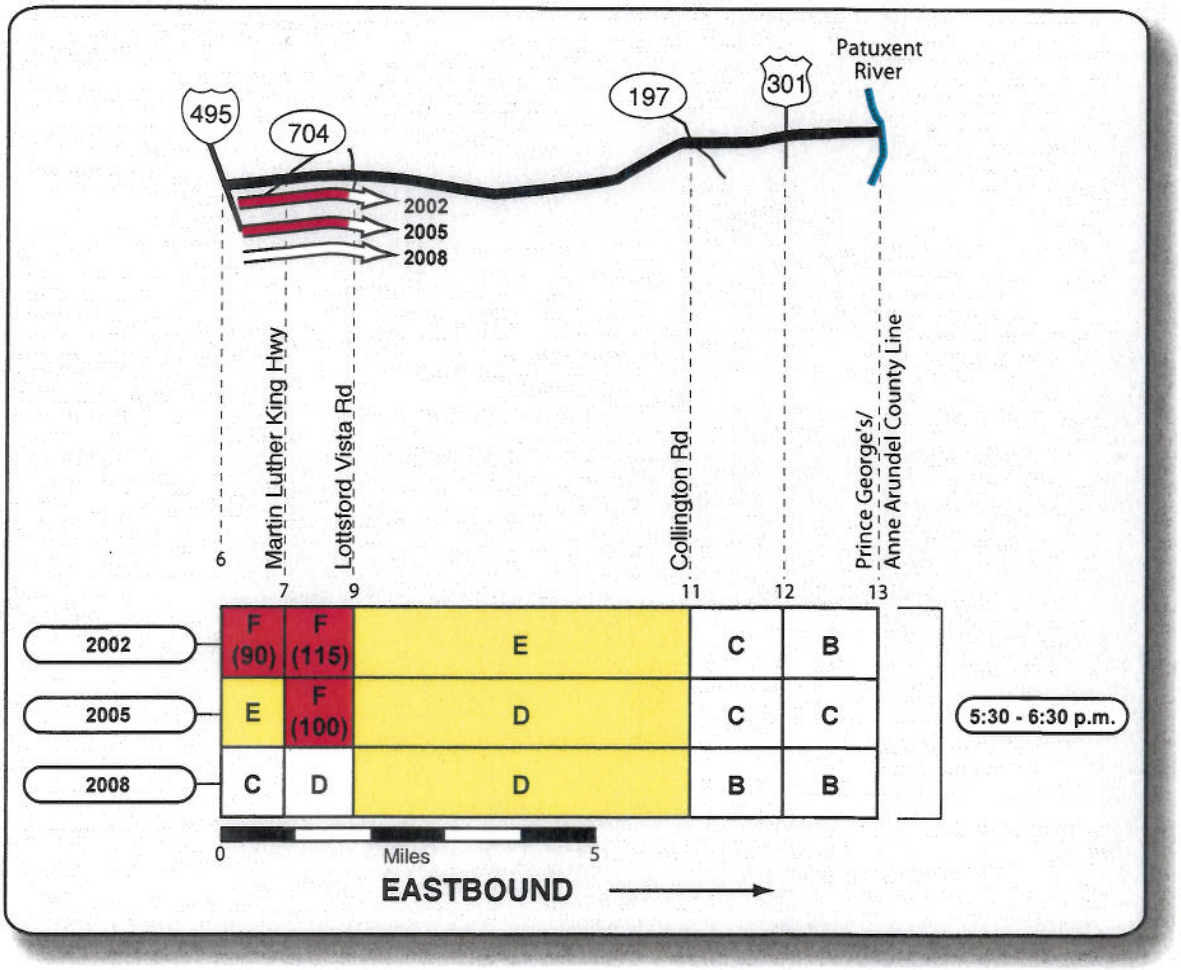


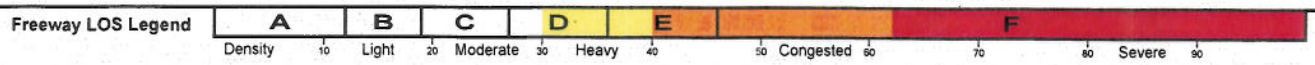
US 50 MARYLAND (PRINCE GEORGE'S COUNTY) - EVENING

Location:	Eastbound between I-495 and Collington Rd
Time Period:	Evening (5:30 - 6:30 p.m.)
Type of Change:	Improved
Potential Cause of	None identified

During the evening survey period in 2005, eastbound traffic flow on US 50 beyond the beltway had improved vs. 2002 approaching the lane drop at Lottsford Vista Rd; this apparently was a benefit from the operation of the recently-built concurrent-flow HOV lane. Nevertheless, congestion in 2005 still measured at the "severe" threshold, with average density equal to 100 pcplpm during the peak hour. In 2008, significant delays were only found during one of four flights, and that apparently was caused by driver diversion away from an incident on I-95 (beltway outer loop). Otherwise, only minor slowing was found on US 50 approaching the lane drop, and that was only between 4:30 and 5:30 pm (during the hour of 5:30 to 6:30 pm, which is depicted below, no delays were found).

There was no evidence found in the photography (such as widening or striping changes) that seemed to explain why a short, severely congested zone such as this measured significantly better in 2008 than in 2005. An overall decrease in volume appears to have contributed to the improvement.

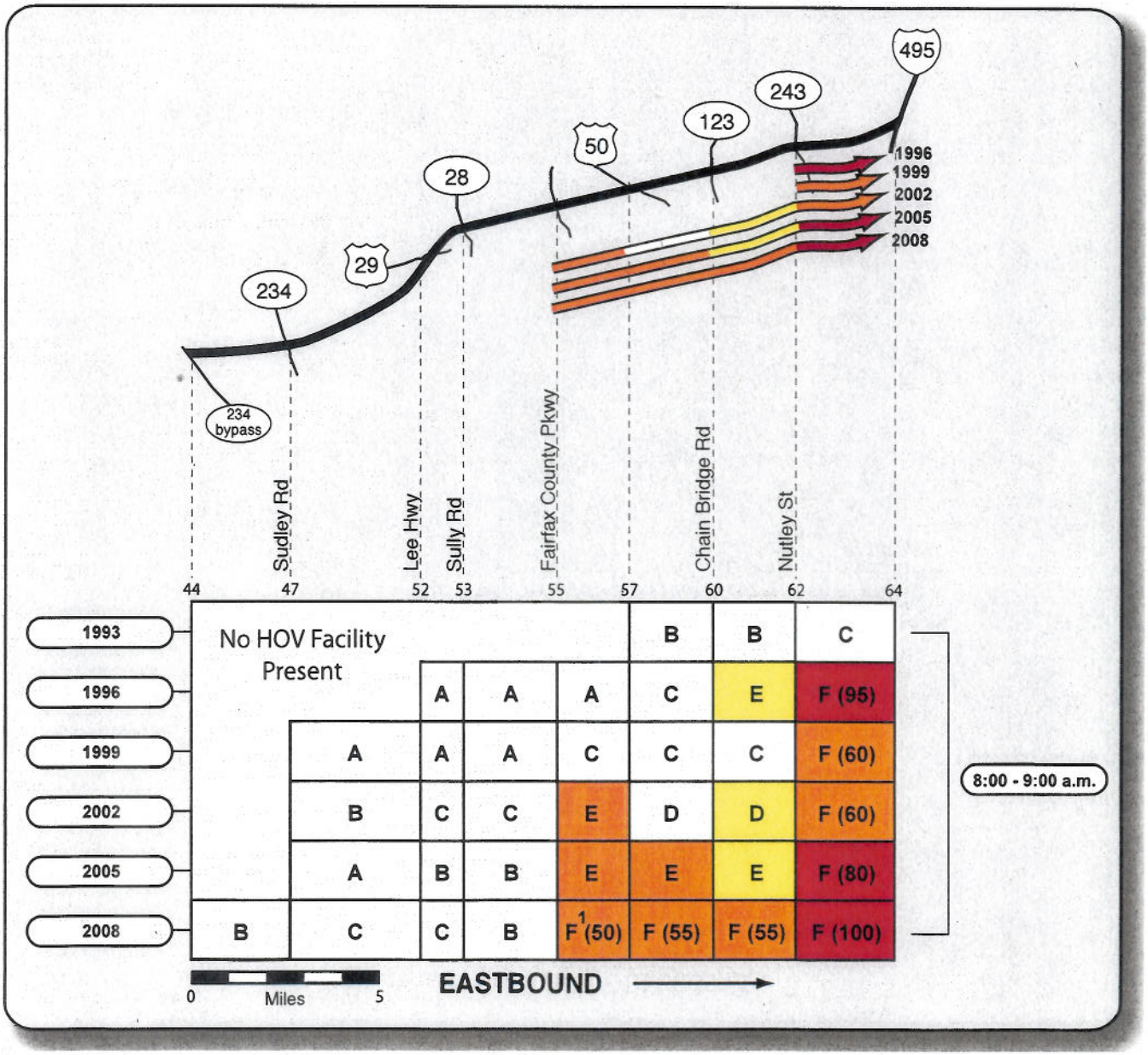




I-66 HOV (PRINCE WILLIAM & FAIRFAX COUNTIES) - MORNING

Location:	Eastbound between Fairfax County Parkway and the Capital Beltway
Time Period:	Morning (8:00 - 9:00 a.m.)
Type of Change:	Degraded
Potential Cause of	Increased Demand

During the 1996 survey, severe congestion was found in the I-66 HOV lane approaching the Beltway. Between the 1996 and 1999 surveys, a dedicated HOV ramp to the outer loop of the Capital Beltway was opened; HOV users no longer were required to merge across the "general-purpose" lanes of I-66 to access the outer loop. The table below depicts the improvement in level-of-service after the construction of the ramp and the gradual degradation in conditions likely caused by increased demand since the 1999 survey.



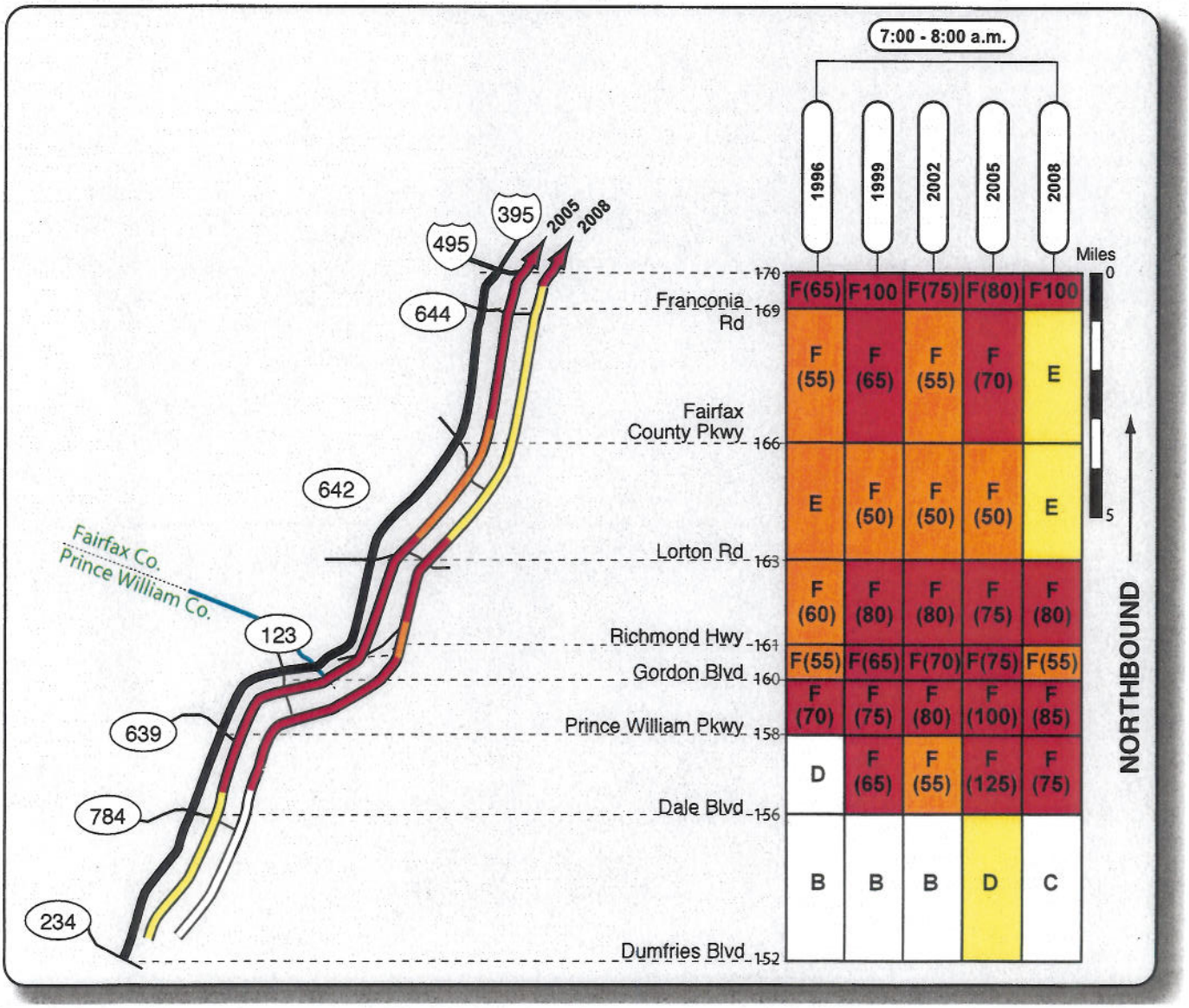
Freeway LOS Legend: A (Density 10, Light) B (20, Moderate) C (30, Heavy) D (40) E (50, Congested) F (60, 70, 80, Severe 90)

I-95 Virginia (Prince William & Fairfax Counties) - Morning

Location:	Northbound between Dale Blvd and the Capital Beltway
Time Period:	Morning (7:00-8:00 a.m.)
Type of Change:	Improved
Potential Cause of	The completion of construction projects on I-95 at the Springfield Interchange and on Prince William Parkway between I-95 and US 1.

During the 1996 through 2005 surveys, northbound congestion was found on I-95 approaching and through the Springfield Interchange; the head of the queue was found on I-395 in the vicinity of VA 7. Northbound travelers on I-95 bound for I-395 and the Capital Beltway typically encountered the tail of the queue in the vicinity of Fairfax County Parkway (VA 7100). During the 2008 spring survey (after completion of construction on the Springfield Interchange), the tail of the queue approaching VA 7 was found in the vicinity of Franconia Rd; Beltway-bound travelers were typically able to bypass this queue with little or no delay (the ramps from I-95 to the Beltway begin in the vicinity of Franconia Rd).

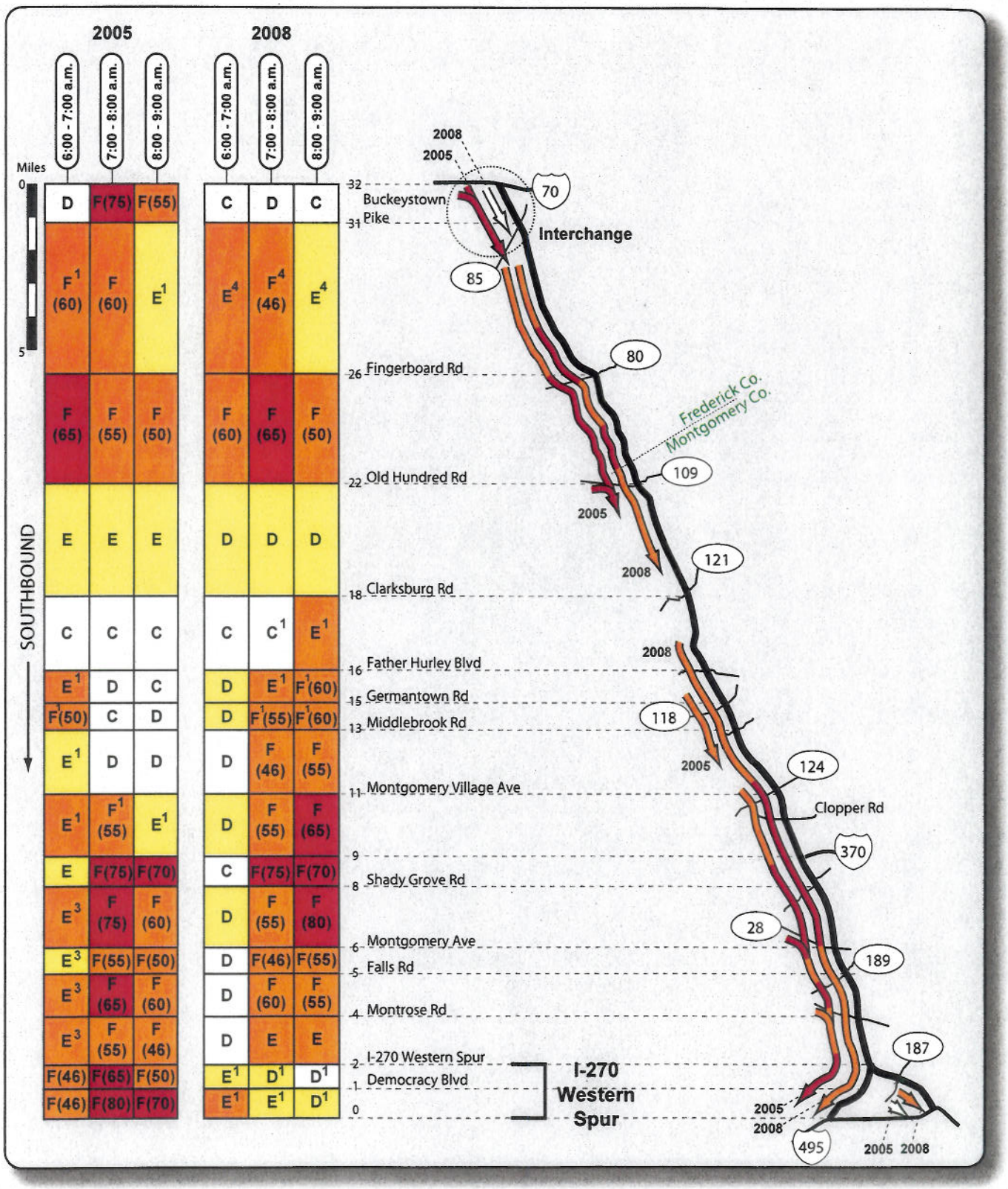
Further south, improved conditions were found on I-95 between Dale Blvd and Lorton Rd (2005 vs. 2008). It appeared that the completion of construction on Prince William Parkway between I-95 and US 1 may have contributed to the improved conditions; Prince William Parkway provided travelers an alternate route to US 1 and across the Occoquan River.



Freeway LOS Legend: A | B | C | D | E | F

Density: 10 Light 20 Moderate 30 Heavy 40 50 Congested 60 70 80 Severe 90

I-270 (Frederick & Montgomery Counties) - Morning



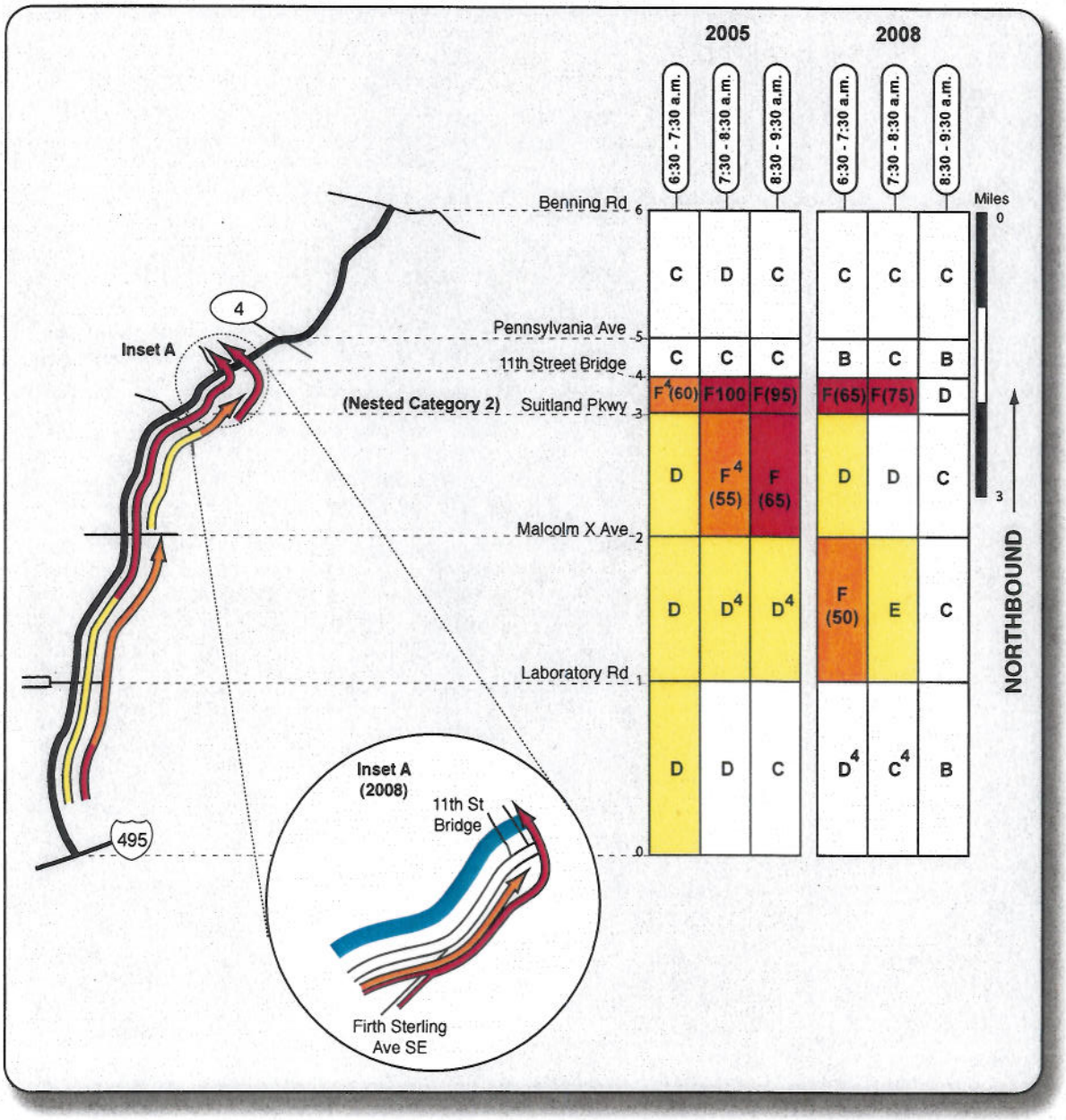
Freeway LOS Legend

A	B	C	D	E	F
Density 10	Light 20	Moderate 30	Heavy 40	50 Congested 60	70 80 Severe 90

D.C. 295 (WASHINGTON D.C.) - MORNING

Location:	Northbound between Suitland Pkwy and the 11th Street Bridge
Time Period:	Morning & Evening
Type of Change:	Improved
Potential Cause of	Completed project (widened entrance ramp)

Between the 2005 and 2008 survey flights, a simple improvement was made to the entrance ramp to I-295 from Firth Sterling Ave (this ramp carries traffic from the Suitland Pkwy). Previously, traffic on this one-lane ramp was required to merge entirely onto the three lanes of I-295, weaving with I-295 traffic while drivers from both origins were preparing to exit to the 11th Street Bridge. The modification was to widen the entrance ramp to two lanes, and extend the acceleration lane to join it with the deceleration lane for the 11th Street Bridge. There are now four lanes between these two points, so that Suitland Parkway traffic bound for the 11th Street Bridge is no longer required to merge onto I-295. Most weaving now takes place in the 2nd lane from the right, leaving two left lanes on I-295 for through-traffic to avoid the queue to the 11th Street Bridge. The result overall has been a shorter congested zone on I-295, often with no significant delays for through-drivers.

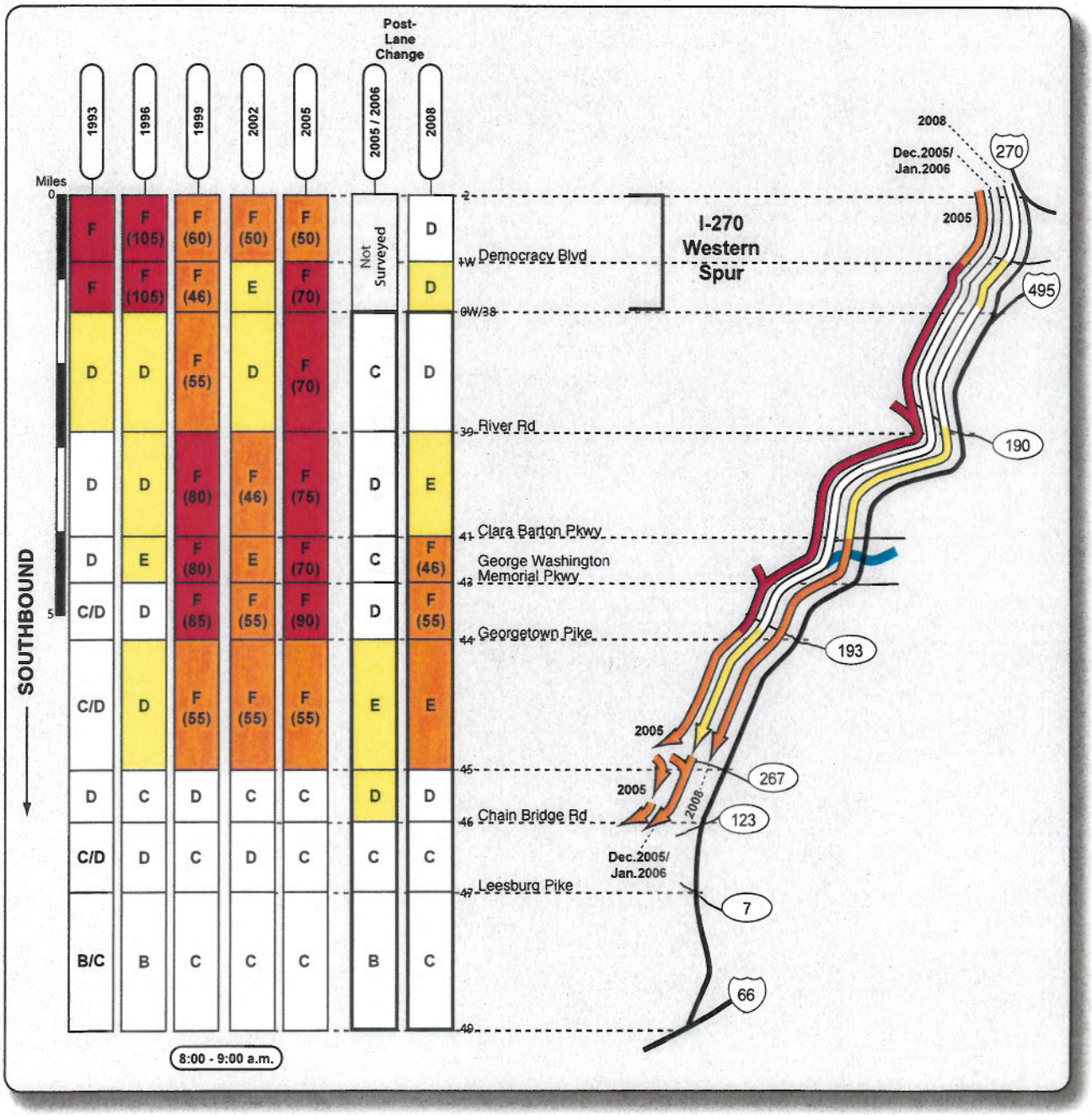


Freeway LOS Legend: A Density 10 Light; B 20 Moderate; C 30 Heavy; D 40; E 50 Congested 60; F 70 80 Severe 90

I-495/95 Capital Beltway (Outer Loop) & I-270 Western Spur - Morning

Location:	Southbound between I-270 and I-66
Time Period:	Morning (8:00 - 9:00 a.m.)
Type of Change:	Improved
Potential Cause of	Widened ramp

Widening in 2005 of the ramp at the Dulles Toll Road (VA 267), opened after the completion of all spring 2005 survey flights) apparently eliminated about 8 miles of severe morning congestion between the split to the I-270 spur and the exit ramp to the Dulles Toll Road, especially between 8:00 and 9:00 a.m. Because the ramp was widened after completion of the spring 2005 survey flights, supplementary flights near the end of the year (December 2005 and January 2006) showed how the congestion on the beltway no longer formed. This finding was confirmed in 2008, with only minor delays documented (all after 8:30 a.m.) near the Georgetown Pike interchange.



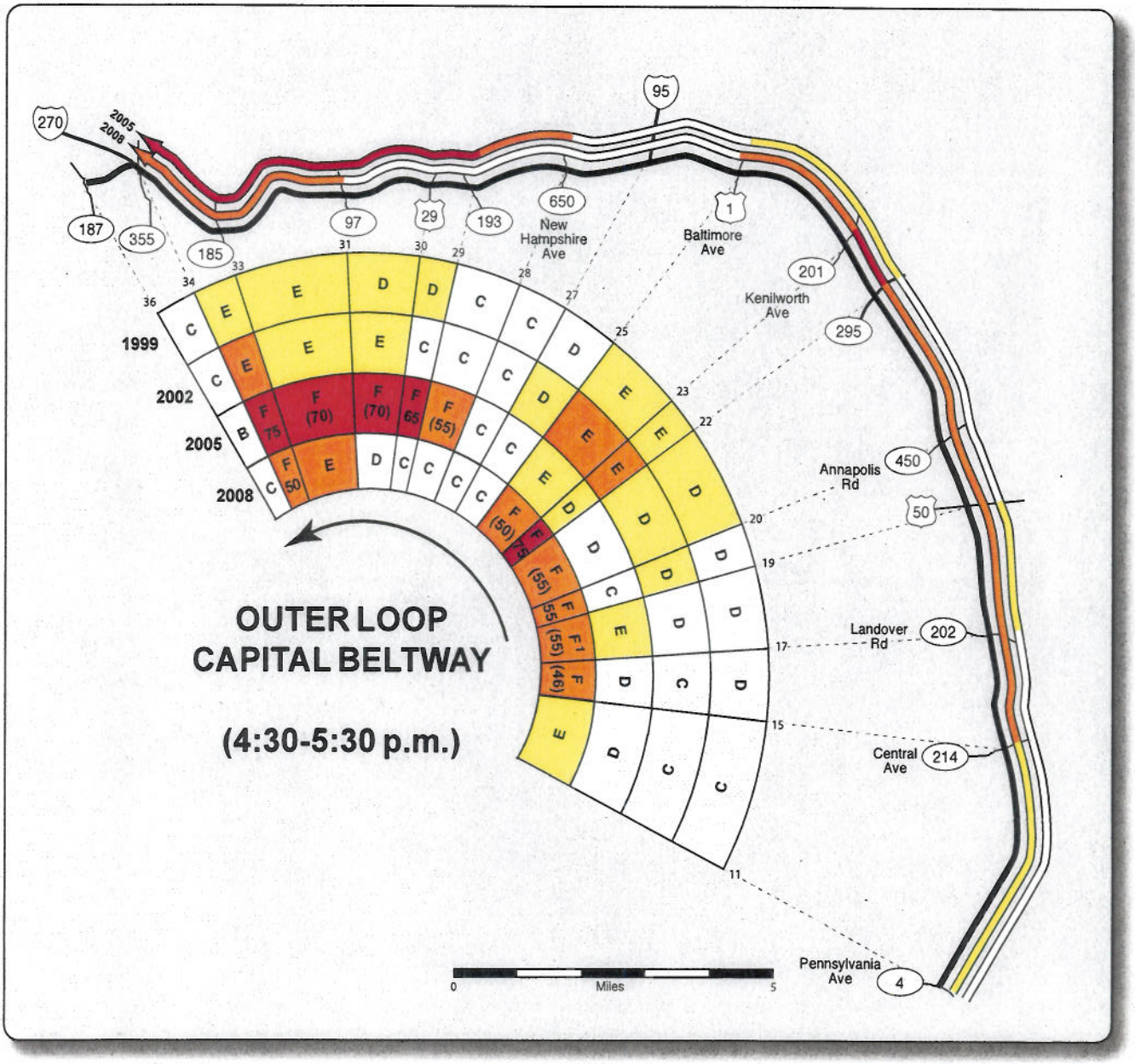
Freeway LOS Legend: A (Density 10, Light) | B (20, Moderate) | C (30, Heavy) | D | E (40, 50 Congested) | F (60, 70, 80 Severe)

I-495/95 Capital Beltway (Outer Loop) - Evening

Location:	Outerloop between MD 4 and I-270
Time Period:	Evening (4:30 - 5:30 p.m.)
Type of Change:	Improved / Degraded
Potential Cause of	None identified

Part 1: Over the course of this 15 year survey period, the capitol beltway in Maryland between I-95 and Central Ave has usually generated little or no delay on a recurring basis. Evidence was found in 2008 of degradation, however, with the finding of heavy traffic flow and intermittent delays, particularly in the vicinity of MD 295 (BW Parkway).

Part 2: In 2005, new westbound delays were consistently found on the capitol beltway outer loop between University Ave (MD 193) and the exit to I-270. This degradation was not confirmed in 2008, as traffic flowed with only minor slowing during all survey flights. Overall, 2008 congestion measurements were almost the same as recorded in 2002. (Neither in 2005 or 2008 was there evidence in the photography of lane configuration changes or other factors that may account for this variability.)



Freeway LOS Legend

A	B	C	D	E	F
Density 10	Light 20	Moderate 30	Heavy 40	50 Congested 60	70 Severe 80 90

- Next Steps
  - Comments until March 27, 2009
  - Review CLRP/TIP and identify projects along congested corridors
  - Presentation to TPB Tech. Committee in April
  - Possible presentation to TPB in April
  - Final Report will be available mid-April.