APPENDIX B

THREE-LANE ALTERNATIVE MEMORANDUM

THE Louis Berger Group, INC.
199 Water Street, 23rd Floor, New York, New York 10038
Tel 212 612 7900 Fax 212 363 4341 www.louisberger.com

DATE: **April 16, 2010**

TO: **I-93 Improvements SEIS Project File**

FROM: **Larry Pesesky**

RE: **Traffic Performance of the Three-Lane Alternative**

Comments on the DSEIS requested an updated analysis of the three-lane alternative analyzed in the 2004 FEIS. This memorandum summarizes the results of the 2004 FEIS analysis of the three-lane alternative and provides the estimated I-93 mainline Level of Service (LOS) for the three-lane alternative that would be expected under Scenario 2 2020 and 2030 conditions.

2004 FEIS Analysis of the Three-Lane Alternative

The three-lane alternative was among the "reasonable range of alternatives" selected for detailed evaluation in the 2002 DEIS and 2004 FEIS. The existing configuration of I-93 includes three-lanes in each direction between the NH/MA Stateline and Exit 1 and two-lanes in each direction north of Exit 1. Therefore, the three-lane alternative would involve widening the portion of the corridor between Exit 1 in Salem and the I-93/I-293 interchange in Manchester to three-lanes in each direction. As with the four-lane 2005 Selected Alternative, the three-lane alternative would include interchange improvements along the corridor.

Table 1 summarizes the directional design hour volume (DDHV) and LOS results from the 2004 FEIS for the I-93 mainline. The results show the three-lane alternative would underperform as a congestion mitigation measure in comparison to the four-lane alternative. Under the three-lane alternative, the Stateline to Exit 1 segment would remain at LOS F and the portion of the corridor between Exit 1 and Exit 3 would be at capacity (LOS E). In contrast, the four-lane alternative would eliminate LOS E and F conditions north of Exit 1 and would improve the Stateline to Exit 1 segment to LOS E. Five lanes in each direction would be required for this segment to achieve LOS D. However, in the design of new roadway facilities, NHDOT policy has established LOS C as desirable and LOS D as minimally acceptable, unless more than four-lanes in each direction would be required.

Table 1
Summary of 2004 FEIS Mainline Traffic Analysis Results, 2020
No Build, Three-Lane Build and Four-Lane Build

Segment	DDHV			LOS		
	No Build	Three-Lane Build	Four-Lane Build	No Build	Three-Lane Build	Four-Lane Build
MA. Line to Exit 1	7,700	8,000	8,100	F	F	E
Exit 1 to Exit 2	5,800	6,400	6,600	F	E	D
Exit 2 to Exit 3	5,500	6,100	6,100	F	E	C
Exit 3 to Exit 4	4,100	4,300	4,300	E	C	B
Exit 4 to Exit 5	4,600	4,700	4,800	E	C	C
North of Exit 5	4,800	5,000	5,000	F	D	C

The 2004 FEIS recommended the four-lane alternative rather than the three-lane alternative as the final configuration, since four lanes would provide an adequate level of service for future traffic projections, with limited additional direct impacts to the environment and at a similar cost (5 percent increase) (See Section 2.8 of the 2004 FEIS).

Methodology

The 2004 FEIS results in Table 1 show that the DDHV of the three-lane alternative is in between the No Build and four-lane alternative conditions. The results also show that the three-lane alternative DDHV is closer to the four-lane alternative DDHV than to the No Build DDHV for a given segment, i.e., well above the average between the No Build and the Build for any segment. Traffic volumes would be higher than the No Build condition because the three-lane alternative would attract traffic from other roadways. Traffic volumes would be less than the four-lane alternative condition because the three-lane alternative provides less capacity and congestion relief, and therefore would not attract as much additional traffic from other roadways as the four-lane alternative. Consequently, this also means that the three-lane alternative results in less relief to the secondary road system.

The same pattern in traffic volumes described above for the 2004 FEIS analysis would hold under Scenario 2 2020 and 2030 conditions. The DDHV for the three-lane alternative under the SEIS Scenario 2 analysis framework would fall in between the Scenario 2 No Build results and the Scenario 2 four-lane alternative results, although closer to the four-lane alternative than to the No Build. Specifically, it is reasonable to assume that at a minimum, the three-lane alternative DDHV would be equal to the average of the No Build DDHV and the four-lane alternative DDHV. The upper limit of the expected three-lane alternative DDHV would be the four-lane alternative DDHV. As a result it is possible to reasonably estimate the range of LOS that would be expected for the three-lane alternative under the SEIS Scenario 2 analysis conditions for 2020 and 2030.

Based on the range of expected DDHV, the corresponding range of LOS for the three-lane alternative was estimated using HCS+, the same software used for the SEIS capacity analyses of the four-lane alternative.

Results

Table 2 provides the expected LOS of the three-lane alternative for Scenario 2 2020 and 2030. The results show that, in 2020, the performance of the three-lane alternative would be similar to the performance reported in the 2004 FEIS. In neither analysis year would the three-lane alternative meet NHDOT standards and policies for LOS for planning freeway capital improvements (e.g., LOS C as desirable, LOS D as minimally acceptable, unless more than four-lanes would be needed). The segment south of Exit 1 would be at LOS F in 2020 and 2030. The segments between Exit 1 and Exit 3 would be at or approaching LOS E in 2020 and would further deteriorate to LOS E or LOS F with additional traffic by 2030. With the possible exception of the segment between Exit 4 and Exit 4A, the remainder of the corridor north of Exit 3 would be at LOS D or LOS E by 2030.

In addition to the design hour LOS results, the three-lane alternative would be substantially less effective than the four-lane alternative in reducing the duration of peak period congestion. The three-lane alternative would divert less traffic from other congested roadways in the area and as a result

would have much less benefit in terms of overall safety and traffic relief on the secondary road system.

Conclusion

The estimated traffic volumes and LOS for the three-lane alternative under Scenario 2 show that the three-lane alternative would perform similar to, or worse than, reported in the 2004 FEIS. The three-lane alternative underperformed as a congestion mitigation measure for 2020 and would continue to provide inadequate LOS for 2030. In addition, the conclusions of the 2004 FEIS with respect to the cost and environmental impacts of the three-lane alternative in comparison to the four-lane alternative remain valid. As part of the response to comments on the DSEIS, NHDOT has prepared an updated cost estimate for the three-lane alternative for comparison to the current cost estimates for the four-lane alternative. The updated estimate still shows that the three-lane alternative would not substantially reduce the cost of the project in comparison to the four-lane alternative. The three-lane alternative would cost $590 million or four percent less than the four-lane alternative. The "footprint" environmental impacts of the three-lane alternative (e.g. wetlands, wildlife habitat etc.) would continue to be similar to the four-lane alternative impacts. Therefore, the information used in the decision to select the four-lane alternative remains valid and a detailed analysis of the three-lane alternative in the FSEIS is not warranted.

Table 2
Expected Three-lane Alternative Level of Service
Scenario 2, 2020 and 2030

	2020				2030			
Segment	No Build DDHV	Expected Three-Lane Build DDHV Range[1]	Expected Three-Lane Build LOS Range	Four-Lane Build LOS	No Build DDHV	Expected Three-Lane Build DDHV Range[1]	Expected Three-Lane Build LOS Range	Four-Lane Build LOS
MA. Line to Exit 1	6,900	7,300-7,700	F*	E	7,300	7,950-8,600	F*	E
Exit 1 to Exit 2	5,500	6,100-6,700	D - E	D	5,700	6,650-7,600	E - F	D
Exit 2 to Exit 3	5,300	5,950-6,600	D - E	D	5,500	6,600-7,700	E - F	D
Exit 3 to Exit 4	4,300	4,800-5,300	C - D	C	4,500	5,300-6,100	D*	C
Exit 4 to Exit 4A	3,900	4,450-5,000	C - D	C	4,100	4,900-5,700	C - D	C
Exit 4A to Exit 5	4,600	5,150-5,700	D*	C	4,800	5,650-6,500	D - E	C
North of Exit 5	4,400	4,950-5,500	D*	C	4,600	5,500-6,400	D - E	C

1. The lower end of expected three-lane alternative DDHV range is based on the average of the Scenario 2 No Build and the Scenario 2 four-lane alternative results. The upper end of the expected DDHV range is based on the Scenario 2 four-lane alternative.

*Both the upper and lower end of the expected three-lane alternative DDHV range result in the same LOS for these segments.