
To: Brent Dillon, P.E., PTOE
State Traffic Design Engineer
SCDOT

From: Jim Fisher, PE
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File: 171001612

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Reference: I-26 & Volvo Car Drive – Supplemental Requirements for Volvo Car Drive Weave Segment

1.0 PURPOSE

Section 4.2.5 of the *I-26 & Volvo Car Drive Interchange Justification Report (IJR)* describes the basis for and results of weaving analyses that were conducted for the segment of Volvo Car Drive between the point where the interchange ramps from eastbound and westbound I-26 merge, to the intersection with the Factory Entrance intersection.

Reference the analysis of peak ingress hour in the memorandum from Stantec to Mr. Brent Dillon dated August 22, 2016. The trip generation in the peak ingress (A.M.) is consistent with Appendix A of the *IJR*, and the directional distribution is derived from Section 3.2.3 of the *IJR*. Figure 3.3 illustrating the projected horizon year peak ingress hour traffic was provided in the aforementioned memo, and is attached for reference.

The purpose of this memo is to preserve desired operational characteristics between the interchange ramp termini and Volvo Manufacturing Factory Entrance, in the event that trip origins during the ingress peak are more heavily weighted from the west along I-26 than from the east as indicated in Section 3.2.3 of the *IJR*. Figure 3.5, attached, illustrates the peak ingress hourly volumes for the interchange ramps assuming the trip origins are reversed from those shown in Figure 3.3. Through volumes on I-26 are intentionally omitted from Figure 3.5, as this relates only to the effects of the weaving on Volvo Car Drive.

2.0 CRITERIA FOR WEAVE – REVERSED ORIGIN

The length of weave segment is assumed for calculating level of service and other parameters is the distance from the painted gore where the two inbound ramps merge to Volvo Car Drive, and the back of the 95th percentile queue at the first Volvo Factory Entrance intersection. The back of queue is derived from the capacity analysis for the a.m. peak hour included in the *IJR*, and is 270 feet from the stop bar for northbound traffic. The resulting length available for the weave, based on the concept plans, is 2,840 feet.

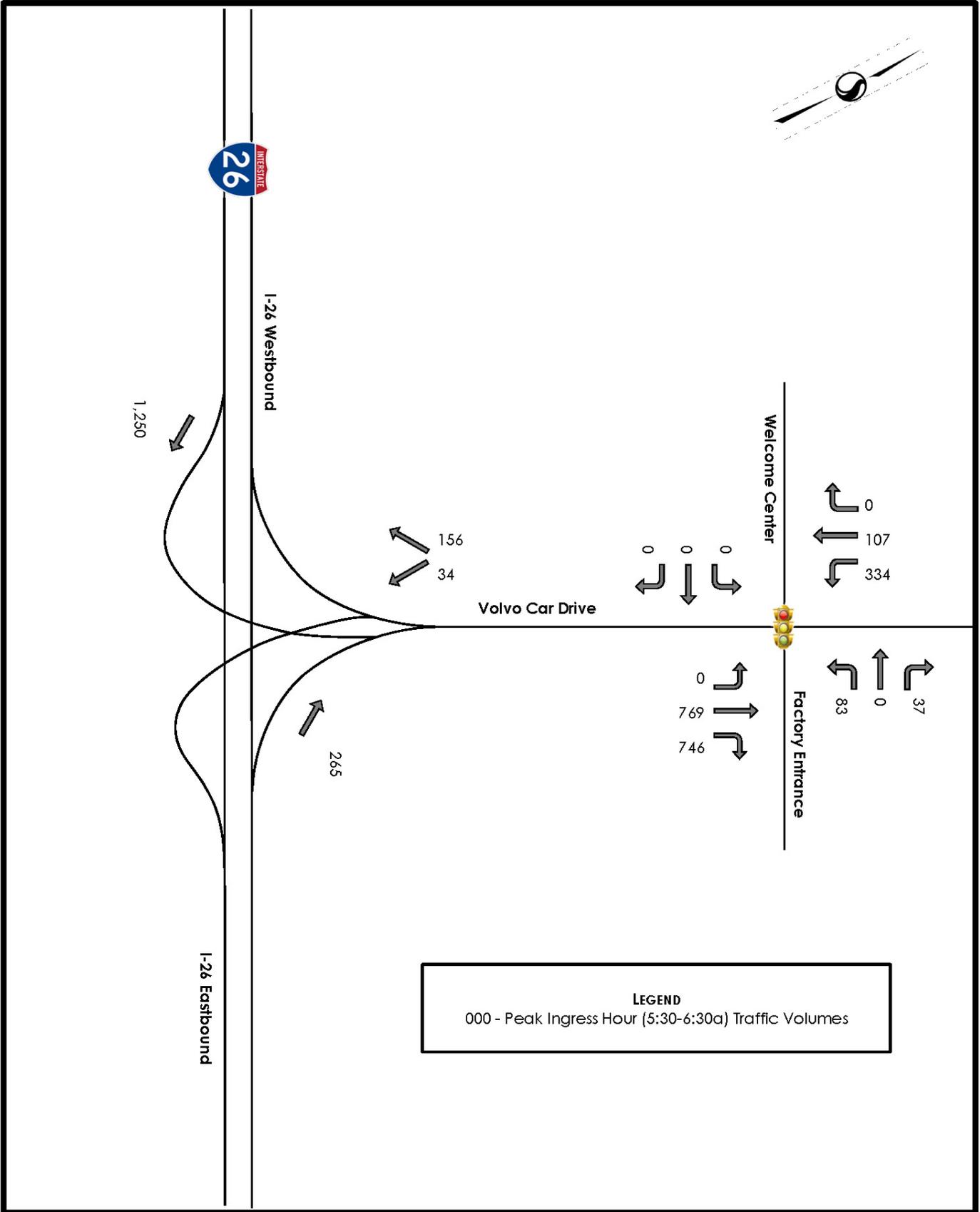
The weave analysis shall conform to the *Highway Capacity Manual 2010, Volume 2*. A two-sided weave shall be assumed, and the allocation of the peak ingress volumes shown in Figure 3.5 shall be as follows:

$$V_{RR} = 746 \times 1250 / (1250 + 265) = 615 \text{ vph (Eastbound Exit to Right Turn at Plant Entrance)}$$

$$V_{FR} = 746 \times 265 / (1250 + 265) = 131 \text{ vph (Westbound Exit to Right Turn at Plant Entrance)}$$

$$V_{RF} = 769 \times 1250 / (1250 + 265) = 635 \text{ vph (Eastbound Exit to Through at Plant Entrance)}$$

$$V_{FR} = 769 \times 265 / (1250 + 265) = 134 \text{ vph (Westbound Exit to Through at Plant Entrance)}$$



Reference: I-26 & Volvo Car Drive –

Based on the above origin-destination paths, the interchange design and the associated weave segment length shall provide the following minimum performance characteristics between the interchange and the Factory Entrance intersection:

Minimum Average Speed of Weaving Vehicles	35 mph*
Minimum Average Speed of All Vehicles in Weave Segment	30 mph*
Level of Service	B
Minimum Length of Weave Segment	2,000 feet

***rounded to nearest 1 mile per hour.**

Please contact me at your earliest convenience if you have any questions or comments.

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