

VIRGINIA DEPARTMENT OF TRANSPORTATION

TRAFFIC ENGINEERING DIVISION

INSTRUCTIONAL & INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: Administrative Traffic Signals		NUMBER: IIM-TE-387.0
		SUPERSEDES: None
SPECIFIC SUBJECT: Requirements for Signal Justification Reports (SJR) For New and Reconstructed Signals		DATE: July 5, 2017
APPROVAL: Raymond J. Khoury, P.E. State Traffic Engineer Richmond, VA July 5, 2017		

BACKGROUND

Since the Corridors of Statewide Significance (CoSS) were established in 2009, Virginia has prioritized multimodal mobility and safety improvements on a corridor level and continued to focus advancements on integrated corridors that: connect regions and major activity centers, promote the safe and efficient movement of people and goods on high volume corridors essential to the economic prosperity of the state, and address statewide goals.

With greater operational and technological solutions available today to address transportation challenges, VDOT is also seeking more suitable alternatives to traditional traffic signal control that enhance arterial corridor operations and throughput. This is further established in VTrans 2040's Guiding Principle #4 to *"Maximize capacity of the transportation network through increased use of technology and operational improvements as well as managing demand for the system before investing in major capacity expansions."*

In order to advance this Guiding Principle, certain roads within Virginia will be designated¹ as the **Arterial Preservation Network** (depicted in [this online mapping](#)). This Network consists of two components:

- "Mobility Preservation Segments" (MPS's) – arterials outside of Urban Areas (population of 50,000 or more) that serve a critical function for interurban mobility where no parallel Interstate/freeway route exists.
- "Mobility Enhancement Segments" (MES's) – arterials within Urban Areas that serve a critical function for commerce, commuting, and multimodal mobility.

¹ The Arterial Preservation Network will be formally adopted by the Commonwealth Transportation Board (CTB) as a part of its VTrans2040 adoption, anticipated to occur Fall 2017.

The Commonwealth Transportation Board (CTB) has expressed concern that the proliferation of new signals on the Arterial Preservation Network, whether due to land use development or installed via VDOT construction project, collectively degrade the travel time and travel experience within and between urban centers, adversely impacting the Commonwealth's economy.

VDOT is currently promoting multiple strategies to enhance and/or preserve mobility on these arterial corridors. One of those strategies is to ensure that requests for new signals on the Arterial Preservation Network are reviewed at the appropriate levels and with the necessary scrutiny within VDOT.

This Memorandum serves to:

- Establish Signal Justification Report (SJR) policies and procedures that apply to all new traffic signals
- Establish additional policies that apply to new traffic signals proposed on the Arterial Preservation Network

STANDARDS

1.0 Signal Justification Report (SJR) Basic Requirements

Traffic signals shall not be installed without prior VDOT approval of a SJR that has been signed and sealed in accordance with the latest effective revision to [IIM-TE-362](#).

A SJR shall include signal warrant analyses in accordance with the [Manual on Uniform Traffic Control Devices \(MUTCD\)](#) and the [Virginia Supplement to the MUTCD](#). In addition, the SJR shall justify why a signal is not merely warranted but also necessary, as per the standard statements in Section 4C.01 of the VA Supplement, "*The satisfaction of a signal warrant or warrants shall not in itself require the installation of a traffic control signal ... In order for a traffic signal to be justified, evidence of the need for right of way assignment beyond that which could be provided by a stop sign or other unsignalized intersection configuration² shall be demonstrated. Examples of such a need include: excessive delay, congestion, unfavorable approach conditions, or surrounding conditions that cause driver confusion.*"

State Traffic Engineer approval and District Engineer/Administrator concurrence is required for SJR reports justifying new traffic signals on the Arterial Preservation Network. SJRs prepared external to VDOT shall be submitted first to the District Traffic Engineer for their review. If the District Traffic Engineer (DTE) and District Engineer/Administrator (DE/DA) concur with the request, then the DTE will forward the SJR to the State Traffic Engineer with a recommendation for approval. The DE/DA is also responsible for informing the District's CTB Representative of the proposed signal.

For proposed traffic signals not on the Arterial Preservation Network, Signal Justification Reports (SJRs) require DTE approval but do not require submission to or approval by the State Traffic Engineer.

² The requirement to consider other unsignalized intersection configurations will be added to the next revision to the VA Supplement to the MUTCD.

2.0 Consideration for Roundabouts & Other Alternative Intersection (AI) Designs

Roundabouts and Alternative Intersection (AI) designs shall be considered as follows:

Design		Proposed Arterial Preservation Network Signals	All Other Signals
Roundabouts		Roundabouts shall be considered in the SJR report as per the Road Design Manual.	
Unsignalized designs	AI	If the major street is a multilane divided road, then unsignalized AI designs (for example, unsignalized RCUTs) shall be considered in the SJR report.	
Signalized designs	AI	If a roundabout or unsignalized AI design is deemed to be inappropriate, then other signalized AI designs shall be considered as alternatives to a conventional signalized intersection.	If a roundabout or unsignalized AI design is deemed to be inappropriate, then other signalized AI designs should be considered as alternatives to a conventional signalized intersection.

Alternative Intersections are also considered an important tool for achieving the Department's "Common Sense Engineering" philosophy, as outlined in [IIM-LD-255](#).

Viable AI design options shall be screened using the VDOT Junction Screening Tool (VJuST). The VJuST input and results worksheets shall be included in the SJR report.

If a roundabout is considered to be a potentially feasible alternative, then the VDOT Roundabout Tool may be used to develop a planning-level cost comparison between the roundabout and the conventional signalized intersection alternatives.

For Alternative Intersection designs that potentially involve multiple signalized junctions, a single SJR report should be used to justify the proposed alternative intersection configuration since all the signalized "intersections" are part of the same Alternative Intersection operation. However the SJR report should separately analyze whether signals are both warranted and prudent at each junction. Warrant 8, Roadway Network, may be applicable when examining potential signalization of the various junctions that comprise the AI treatment. For example:

- At Restricted Crossing U-Turn (RCUT) intersections, the U-turn crossovers may be signalized or unsignalized.
- At Quadrant Roadway (QR) intersections, the end points of the quadrant roadway may be signalized or unsignalized.

If the proposed signal is on the Arterial Preservation Network and is located at an intersection flagged for future signalization in an Arterial Management Plan or Corridor Master Plan that has been approved by VDOT and the locality, then a SJR shall still be prepared. However, if the land use development and traffic conditions at that location are not significantly different than the conditions anticipated in the Plan, then the SJR does not require State Traffic Engineer approval. Refer to [IIM-TMPD-2.0](#) for Arterial Management Plan requirements.

3.0 SJRs Based on Anticipated Future Development

If the justification for a proposed traffic signal is primarily driven by traffic anticipated to be generated by a future large land use development, then the SJR report shall include a conceptual analysis of the threshold (e.g. number of completed housing units or percent completion of commercial development) necessary to reach the volume signal warrant thresholds. Trip generation calculations shall be as per VDOT's [Traffic Impact Analysis \(TIA\) regulations](#) and as approved by the District Traffic Engineer or designee.

When traffic signals are proposed in conjunction with land use developments with multiple phases of development, and it is determined that the signal will not be warranted or justified until later stages of development, then VDOT may require that traffic signal construction be delayed if or until that later stage of development begins active construction.

EFFECTIVE DATE

Arterial Preservation Network: Any portion of this IIM that applies solely to traffic signals on the Arterial Preservation Network does not apply prior to official adoption of the Arterial Preservation Network by the CTB.

Existing traffic signals: This Memorandum does not apply to existing traffic signals, nor does it apply to projects involving reconstruction of existing signal equipment. Roundabouts and other AI designs shall be considered during the scoping phase of projects that involve partial or full widening of an existing signalized intersection in accordance with this Memorandum; however, neither District Engineer/Administrator nor State Traffic Engineer approval is required if the decision is made to maintain the intersection as a conventional signalized intersection.

Where existing traffic signals on the Arterial Preservation Network require reconstruction due to the life-cycle needs of the existing signal supports, the District Traffic Engineer shall conceptually consider whether:

- The existing traffic signal can reasonably be removed as per Section 4B.02 of the VA Supplement, without requiring geometric improvements beyond the scope of a typical signal reconstruction project, or
- The signal phasing can reasonably be modified/simplified to improve mobility on the major street.

This policy does not apply to situations where existing signal supports require emergency replacement due to vehicle strike or other structural issue.

Existing construction projects involving intersections not currently signalized: This Memorandum shall be effective for existing projects that have not yet advanced beyond the Design Approval phase.

Land use permits for private developments: This Memorandum shall be effective for all projects where the final signal warrant analysis has not yet been approved by VDOT as of the publishing date of this IIM.

If the locality has approved a proffer agreement that included a traffic signal as a condition of rezoning or other land use decision, and this proposed proffer was reviewed by VDOT prior to finalizing with no objections having been submitted to the locality, then this Memorandum does not apply.

If VDOT has completed its review of a Traffic Impact Analysis (TIA) for a proposed development that included a recommendation for a new traffic signal, and did not add any qualifying conditions for the traffic signal, this Memorandum does not apply as long as the proposed development is under construction within 2 years and the traffic signal is under construction within 4 years following the TIA's completion date.

Design-Build or PPTA projects: This Memorandum shall be effective for projects in which the design criteria package has not been completed for advertisement as of December 1, 2017.

REFERENCES

- [Road Design Manual](#), Appendices A and F (including July 2017 revisions thereto)
- [Traffic Operations and Safety Analysis Manual](#)
- [2009 Manual on Uniform Traffic Control Devices \(MUTCD\), with revisions](#)
- [Virginia Supplement to the MUTCD](#)
- [IIM-LD-255](#), Fundamentals of Common Sense Engineering
- [IIM-TMPD-2.0](#), Process for Conducting Planning Studies on the Arterial Preservation Network
- [IIM-LU-100](#), Review of Comprehensive Plans and Comprehensive Plan Amendments
- [IIM-LU-200](#), Review of Rezoning Proposals
- [IIM-LU-500](#), Review of Site Plans and Subdivision Plats
- [IIM-LU-501](#), Access Management Spacing Exceptions/Waivers