STATE OF NEW HAMPSHIRE
INTRA-DEPARTMENT COMMUNICATION

FROM: Mike Ducas, P.E.
State Highway Safety Engineer

DATE: June 26, 2019
AT (OFFICE): Bureau of Highway Design

SUBJECT: Plaistow Kingston 10044E Safety Improvements

THRU: Tobey Reynolds, P.E.
Chief of Roadway Section

TO: Maggie Baldwin, P. E.
Roadway Section Group Leader

MEMORANDUM

At the request of the Roadway Section, a review of safety data related to proposed improvement alternatives, including a two way left turn lane, referred to as a TWLTL, and a raised median island, was performed.

The first step was to identify crashes that would be susceptible to correction by implementing a TWLTL or raised median island treatment, which in general includes head-on or left turn related crashes. Within the Kingston segment (crashes in Plaistow were not considered based on the limited length of the project in Plaistow), three head-on crashes (one with possible injury) and 11 left turn crashes (seven minor and one incapacitating injury) were reported.

The AASHTO Highway Safety Manual, which is one of the primary resources to quantify and evaluate highway safety performance, was consulted. Initially, the approach was to identify an appropriate safety performance function (SPF). A SPF is an equation used to predict the average number of crashes per year at a location as a function of exposure and, in some cases, roadway or intersection characteristics. However, it was determined that SPFs for two lane divided highways are not discussed/evaluated in this reference, and alternatively, the approach was shifted to consider crash modification factors (CMF) for each treatment. A CMF is a measure of the safety effectiveness of a particular treatment or design element, and is typically applied to the estimated crashes for an existing condition (without or prior to treatment) to compute the estimated crashes for the proposed condition (with treatment). Federal Highway Administration (FHWA) maintains a database of CMFs and supporting documentation, known as the FHWA CMF Clearinghouse. This database helps designers identify the most appropriate countermeasure for their safety needs and estimate the relative safety benefits of alternative treatments.

The CMF Clearinghouse indicated that the CMF for installing a raised median would be 0.61 [CMF #3034] and for a TWLTL would be 0.64 [CMF #583], representing estimated crash reductions of 39% and 36%, respectively, for the two treatments. It is important to note that while these alternative treatments are most beneficial for specific crash types (i.e., raised medians address head-on crashes and TWLTLs reduce left-turn crashes), the estimated crash reductions noted above indicate the estimated safety benefit as it applies to all crash types and all resulting injury severities.

In conclusion, there is not considerable difference in the estimated safety benefit of the TWLTL as compared to the raised median island treatments. As such, it is important to consider other design criteria, such as maintaining convenient access to driveways and minimizing life-cycle costs when selecting the preferred treatment.

MJD/mab