February 2, 2024

Re: 2/5/2024 Agenda Items 1 and 3 (lane narrowing)

Carlsbad Traffic Safety & Mobility Commissioners and staff:

I submitted a similar version of this communication on 1/7/2024 to council and your commission, but I guess it was not distributed to the commission for some unknown reason. I have raised some of these issues in the past, but please refer to the new source documents and links I have provided.

QUESTIONS FOR THE COMMISSIONERS TO ASK STAFF

While lane-narrowing may increase safety on some lower-speed, lower-volume streets with few large vehicles, staff's extrapolation of this approach to our high-speed, high-volume suburban arterials is misguided, unsupported by evidence or standards, and potentially dangerous. Here are two simple questions for staff, which they can just answer during their presentation, or, if not, you should ask during questioning. They are based on the two standards (state and federal) that staff has cited as supporting their lane narrowing projects:

1. How are 10 or 10.5 feet wide lanes consistent with the Caltrans Highway Design Manual standard (the state standard cited by staff), which clearly says in Sections 301 and 308 that minimum lane width is generally 12 feet or (under limited circumstances) 11 feet? Requesting a special exception from Caltrans to go lower than these standards is not a way of meeting them.

2. How are 10 or 10.5 feet wide lanes on our 35 to 55 mph arterial streets consistent with the AASHTO Green Book standard (the federal standard cited by staff), which clearly says in the arterial streets section (7.3.3.2) that through-lanes less than 11 feet should be restricted to arterials with speeds **less than 35 mph**?

THROUGH-LANE WIDTHS

The consensus among the design standard-setting organizations, researchers, and other experts is that great caution needs to be exercised when narrowing lanes, and that arterial lane widths less than 11 feet should be restricted to streets with speeds of 30 to 35 mph or less with lower total volumes of vehicles and few large vehicles (buses, trucks). Inconsistent with these standards, staff's lane narrowing projects are being done on many streets with speeds of 40 to 55 mph--some of which carry high volumes and/or are truck/bus routes.

In their staff report, staff cites the largest-ever nationwide study on narrowed lanes, published last year by Hamidi et al.—strong proponents of the practice. However, the authors of this very report cited by staff specifically recommend lanes less than 11 feet **only on streets with speeds of 35 mph or less**. In addition, former ITE President Randy McCourt issued a strong warning about the safety hazards of lane narrowing in an accompanying NPR interview about this study:

> **"It's a slam dunk on the 20 and 25 [mph streets], but when you get to the 35, 40, you got to be very careful."**

Thus, staff's extrapolation of these results to the 40 to 55 mph through-lanes on our high-volume arterials lacks good engineering judgement and is potentially dangerous.

Staff claims that they have analyzed the conditions on all of the streets on which lanes are being narrowed and determined that there are no safety concerns. However, **in response to my public records request for specific safety analyses on each street, none existed**. Instead, staff has only made the generic claim that all of the projects are allegedly consistent with the lane widths in the following national and state standards.

AASHTO "Green Book" (national standard)

Staff cites an introductory sentence in Section 4.3 of the Green Book (the first highlighted sentence below) that describes the fact that city street lane widths are generally between 9 and 12 feet, and they state that their 10-foot lanes are within that range. However, this is extremely deceptive, because that same paragraph goes on to explain how Chapters 5 through 8 need to be used for guidance on **specific street types** (the second highlighted sentence below):

> 4.3 LANE WIDTHS
>
> The lane width of a roadway influences the comfort of driving, operational characteristics, and, in some situations, the likelihood of crashes. Lane widths of 9 to 12 ft [2.7 to 3.6 m] are generally used, with a 12 ft [3.6-m] lane predominant on most high-speed, high-volume highways. A 12-ft [3.6-m] lane width reduces the cost of shoulder and surface maintenance due to lessened wheel concentrations at the pavement edges. A 12-ft [3.6-m] lane also provides desirable clearances between large commercial vehicles traveling in opposite directions on two-lane, two-way highways in rural areas. Chapters 5 through 8 of this policy provide further guidance on appropriate lane widths for specific roadway types. For further information on lane width selection, see NCHRP Synthesis 432, *Recent Roadway Geometric Design Research for Improved Safety and Operations* (*17*) and NCHRP Report 783, *Evaluation of the 13 Controlling Criteria for Geometric Design* (*34*).

Moving on to the **relevant** guidance on **arterial streets**, Chapter 7 of the Green Book indicates that 12-foot through-lanes are desirable on high-speed, free-flowing principal arterials, while narrower 11-foot lanes are normally adequate for 45-mph or less arterials, but 10-foot lanes are only appropriate on arterials with speeds **less than 35 mph** and few large vehicles (buses, trucks):

> 7.3.3.2 Lane Widths
>
> Lane widths on through-travel lanes may vary from 10 to 12 ft [3.0 to 3.6 m]. Lane widths of 10 ft [3.0 m] may be used in more constrained areas where truck and bus volumes are relatively low and speeds are less than 35 mph [60 km/h]. Lane widths of 11 ft [3.3 m] are used quite extensively for urban arterial street designs. The 12-ft [3.6-m] lane widths are desirable, where practical, on high-speed, free-flowing, principal arterials.

Caltrans "Highway Design Manual" Sections 301 and 308 (state standard)

In Carlsbad, Caltrans generally only regulates the portions of the city's streets at the highway interchanges, while they more broadly regulate city streets in unincorporated areas. In any event, the references to lane widths in the manual requires **12 feet** in most circumstances, with an absolute minimum of **11 feet** under certain conditions when speeds are 40 mph or less. In fact, Carlsbad staff has been forced to seek special exceptions from Caltrans outside of Caltrans standards to allow lane widths less than 11 feet at the interchanges. Thus, staff's citation of this standard to justify widths of 10 or 10.5 feet is mystifying. Read it for yourself in the linked documents.

Although not cited by staff, one of the most comprehensive and modern "complete streets" design standards is **ITE's "Designing Walkable Urban Thoroughfares." ** Similar to the Green Book, it emphasizes street context and restricts the narrowing of arterial lanes to less than 11 feet to streets with speeds **less than 35 mph**. Read it for yourself in the linked document.

SPEEDS AFTER NARROWING

Some small studies suggest that lane narrowing might reduce speeds by a few mph on some street types (e.g., NCHRP Project 03-72). However, results are very mixed, and more robust, nationwide studies have concluded that lane widths have little or no effect on speeds on high-speed suburban arterials, (e.g., NCHRP Project 17-53). Due to the much larger sample sizes and wider geographic distribution, the latter results are considered more credible by the Transportation Research Board (NHCRP Report 783).

Even if one assumes that narrowed lanes can reduce arterial speeds by a few mph, I am unaware of any published evidence directly linking that to better injury outcomes—it is all assumptions layered upon other assumptions. The lack of any meaningful change in speeds is instead coupled with increases in lane encroachments and sideswipes that can make things more dangerous for all users, including cyclists (Dai et al., 2020).

NARROWED CENTER TURN LANES

The Caltrans Highway Design Manual and the Texas Department of Transportation indicate that the preferred width of two-way left-turn lanes (TWLTLs) is 14 feet, and that the minimum width must be 12 feet, with exceptions down to 11 feet on very low-speed urban streets. Iowa also includes a preferred width of 14 feet and an absolute minimum of 12 feet.

However, many of these narrowing projects now also include striping TWLTLs down to 10 feet, which is further exacerbated by the fact that they are often sandwiched between two 10-foot through-lanes going in opposite directions. The mirrors on larger vehicles span 10-1/2 feet. Can you imagine entering a 10-foot wide TWLTL with cars traveling at significant speeds on either side of you?

Best regards,
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Carlsbad