

---

---

## REWRITING OUR NATION'S DEADLY TRAFFIC MANUAL

Sara C. Bronin\* & Gregory H. Shill\*\*

*Every day, Americans entrust their lives to a road system that is governed by the Manual on Uniform Traffic Control Devices for Streets and Highways (the Manual). On its face, this Federal Highway Administration (FHWA) publication is a straightforward technical document. It contains over eight hundred pages of engineering guidance on everything from traffic-light placement to the font of highway signs. It also establishes acceptable methods for officials to modify speed limits.*

*While such provisions may sound inconsequential, some of the Manual's provisions have far-reaching, even deadly, consequences. They prioritize vehicular speed over public safety, mobility over other uses of public space, and driving over other modes of mobility. With these car-centric priorities, the Manual has helped generate a nearly constant and fast-moving stream of vehicle traffic that renders road users like pedestrians, wheelchair users, and cyclists vulnerable. Moreover, by giving preference to driving over other modes of transportation, the Manual has indirectly facilitated a rise in transportation-related greenhouse gas emissions that are the single largest contributor to climate change.*

*Despite the evidence stacked against some of its most important provisions, the Manual has stubbornly endured — perhaps because it has been virtually unknown outside of transportation engineering and urban planning. But over the past year, the Manual has finally started to receive the scrutiny it deserves. In 2020, the FHWA proposed a new draft of the Manual that would maintain the current version's most outdated and discredited features. During a recently closed notice-and-comment process, the agency received over 26,500 comments. Even in the unlikely event that the agency rips up the proposed revisions and starts fresh, the core of the Manual will probably remain intact for years to come.*

*This Essay explains how the Manual biases transportation behavior in dangerous and inequitable ways. It urges the FHWA to use its emergency powers to rescind its most damaging provision — the so-called 85th Percentile Rule, which legalizes dangerously high speeds of traffic — and to undertake a complete rewrite that follows a scientifically sound, evidence-based approach; prioritizes safety, access, equity, climate action, and prosperity; and incorporates feedback from diverse stakeholders.*

### INTRODUCTION

By a combination of toxic emissions and crashes, cars kill nearly 100,000 Americans every year.<sup>1</sup> This toll is equal to one and a half times

---

\* Professor, Cornell School of Architecture, Art, and Planning; Associate Member, Cornell Law School Faculty; Faculty Fellow, Cornell Atkinson Center for Sustainability.

\*\* Associate Professor, University of Iowa College of Law; Affiliated Faculty Member, University of Iowa College of Engineering National Advanced Driving Simulator. The authors would like to thank Bryant Walker Smith and the *Harvard Law Review* editors for comments, and Giacomo Cabrera for research assistance.

<sup>1</sup> See Fabio Caiazzo et al., *Air Pollution and Early Deaths in the United States. Part I: Quantifying the Impact of Major Sectors in 2005*, 79 *ATMOSPHERIC ENV'T* 198, 207 (2013) (finding 58,300 premature deaths annually in the United States attributable to auto pollution, with an estimated average loss of twelve life-years per mortality); Nat'l Safety Council, *Car Crash Deaths*

the number of gun homicides and opioid overdoses combined,<sup>2</sup> and is one reason for the lower life expectancy enjoyed by Americans (even wealthy Americans) compared with residents of peer countries.<sup>3</sup> U.S. policy has historically favored driving over all other modes of transportation.<sup>4</sup> The Manual on Uniform Traffic Control Devices (the Manual), the subject of this Essay, is one of several key legal influences on transportation behavior.<sup>5</sup>

First published in 1935, the Manual has been administered by the Federal Highway Administration (FHWA) since 1971 and is in its tenth edition.<sup>6</sup> Its influence is felt not only on federal highways but on nearly

---

*and Rates*, INJURY FACTS, <https://injuryfacts.nsc.org/motor-vehicle/historical-fatality-trends/deaths-and-rates> [<https://perma.cc/3D49-NYAM>] (reporting U.S. motor vehicle deaths as ranging from 37,757 to 40,327 per year for 2015–19, the five most recent years for which full data are available); *see also Sources of Greenhouse Gas Emissions*, U.S. ENV'T PROT. AGENCY, <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions> [<https://perma.cc/84VR-L677>] (documenting that “[t]he transportation sector generates the largest share of greenhouse gas emissions” in the United States).

<sup>2</sup> *See Overdose Death Rates*, NAT’L INST. ON DRUG ABUSE, <https://www.drugabuse.gov/drug-topics/trends-statistics/overdose-death-rates> [<https://perma.cc/AAH8-9AV5>] (reporting 49,860 U.S. overdose deaths involving any opioid in 2019, the most recent year available); *Assault or Homicide*, U.S. CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/nchs/fastats/homicide.htm> [<https://perma.cc/R9SD-FKF9>] (reporting 14,414 U.S. firearm homicides in 2018, the most recent year available).

<sup>3</sup> *See, e.g.,* Derek Thompson, *Why Americans Die So Much*, THE ATLANTIC (Sept. 12, 2021), <https://www.theatlantic.com/ideas/archive/2021/09/america-life-expectancy-spans-death-europe/620028> [<https://perma.cc/Q6H2-YAE8>].

<sup>4</sup> *See* Sara C. Bronin, *Rules of the Road: The Struggle for Safety and the Unmet Promise of Federalism*, 106 IOWA L. REV. 2153, 2164–73 (2021); Gregory H. Shill, *The Future of Law and Transportation*, 106 IOWA L. REV. 2107, 2109–14 (2021); Gregory H. Shill, *Should Law Subsidize Driving?*, 95 N.Y.U. L. REV. 498, 502–04 (2020).

<sup>5</sup> The Manual, known to traffic engineers as the MUTCD, is not the only document governing road design. The American Association of State Highway and Transportation Officials’ “Green Book” dictates road and lane width and intersection design, among other things. *See generally* AM. ASS’N OF STATE HIGHWAY & TRANSP. OFFS., A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS (7th ed. 2018). The National Association of City Transportation Officials’ guides, in particular the *Urban Street Design Guide*, supply additional optional resources for street design. *See, e.g.,* NAT’L ASS’N OF CITY TRANSP. OFFS., URBAN STREET DESIGN GUIDE, at viii (2013). Fire codes also impact road geometries. *See, e.g.,* INT’L FIRE CODE app. D (Int’l Code Council 2020), <https://codes.iccsafe.org/content/IFC2021P1/appendix-d-fire-apparatus-access-roads> [<https://perma.cc/BQT2-4NRQ>] (providing a model code for road geometries that accommodate fire engines). Traffic-engineering culture and local government political dynamics also play important roles. *See generally* CHARLES L. MAROHN, JR., CONFESSIONS OF A RECOVERING ENGINEER: TRANSPORTATION FOR A STRONG TOWN (2021) (discussing the role of traffic engineering culture in complicating reform); JANETTE SADIK-KHAN & SETH SOLOMONOW, STREETFIGHT: HANDBOOK FOR AN URBAN REVOLUTION (2017) (discussing local government constraints in the context of transportation reform).

<sup>6</sup> *See* FED. HIGHWAY ADMIN., U.S. DEP’T OF TRANSP., MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS I-2 tbl.I-1 (2009), <https://mutcd.fhwa.dot.gov/pdfs/2009r1r2/mutcd2009r1r2edition.pdf> [<https://perma.cc/P37D-UN34>] [hereinafter MANUAL] (explaining the evolution of the ten versions of the Manual and identifying two previous manuals, not called the MUTCD, in 1927 and 1930).

every neighborhood block in America because it is adopted (and adapted, in often very minor ways) into state and local laws governing road design.<sup>7</sup> On its face, the Manual is a straightforward technical document. It contains over eight hundred pages of engineering guidance on everything from traffic-light placement<sup>8</sup> to the font of highway signs.<sup>9</sup> It also prescribes acceptable methods for modifying speed limits.<sup>10</sup> While such provisions may sound benign, some of them have life-or-death consequences.

After spending decades in relative obscurity, the Manual has received a flood of scrutiny over the past year. In 2020, the FHWA announced a proposed revision to the Manual (“Proposed Manual”).<sup>11</sup> Over 26,500 public comments were submitted,<sup>12</sup> including one from us.<sup>13</sup> We argued that the Proposed Manual would perpetuate some longstanding arbitrary, capricious, or discredited rules, even as it introduced new ones bearing the same defects.<sup>14</sup> On the whole, the Proposed Manual would carry over to the twenty-first century some of the direst transportation policy failures of the twentieth. Moreover, it would make

---

<sup>7</sup> See 23 C.F.R. § 655.603(a) (2020) (“The MUTCD approved by the Federal Highway Administrator is the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel . . .”); *id.* § 655.603(b)(1) (“Where State or other Federal agency MUTCDs or supplements are required, they shall be in substantial conformance with the National MUTCD.”); *Manual on Uniform Traffic Control Devices (MUTCD): Overview*, FED. HIGHWAY ADMIN., U.S. DEP’T OF TRANSP., <https://mutcd.fhwa.dot.gov/kno-overview.htm> [<https://perma.cc/KW9G-WNH6>] (describing the Manual’s status as “the law governing all traffic control devices” and noting that noncompliance “ultimately can result in the loss of federal-aid funds as well as in a significant increase in tort liability”); *Speed Limit Basics*, FED. HIGHWAY ADMIN., U.S. DEP’T OF TRANSP., [https://safety.fhwa.dot.gov/speed-mgt/ref\\_mats/fhwas16076/fhwas16076.pdf](https://safety.fhwa.dot.gov/speed-mgt/ref_mats/fhwas16076/fhwas16076.pdf) [<https://perma.cc/D2HM-QWVK>] (“State and local transportation agencies recommend and set appropriate speed limits by completing engineering speed studies and following the guidance presented in the MUTCD.”); *Who Uses the MUTCD? And How?*, FED. HIGHWAY ADMIN., U.S. DEP’T OF TRANSP., <https://mutcd.fhwa.dot.gov/kno-users.htm> [<https://perma.cc/S34J-MYB9>] (“When a new edition or revision of the national MUTCD is issued, States have two years to adopt it, with or without a State supplement, or to adopt a State MUTCD that is in substantial conformance with the new edition of the National MUTCD.”).

<sup>8</sup> MANUAL, *supra* note 6, §§ 4D.13-16.

<sup>9</sup> *Id.* §§ 2A.13, 2D.05.

<sup>10</sup> *Id.* § 2B.13.

<sup>11</sup> Fed. Highway Admin., U.S. Dep’t of Transp., Corrected MUTCD Proposed Text (Dec. 18, 2020), <https://www.regulations.gov/document/FHWA-2020-0001-0038> [<https://perma.cc/R6FZ-3467>] [hereinafter Proposed Manual].

<sup>12</sup> See *National Standards for Traffic Control Devices; the Manual on Uniform Traffic Control Devices for Streets and Highways; Revision*, FED. HIGHWAY ADMIN., U.S. DEP’T OF TRANSP., <https://www.regulations.gov/docket/FHWA-2020-0001> [<https://perma.cc/KQ5X-DA2R>] (indicating 26,522 comments received on the proposed amendments to the Manual).

<sup>13</sup> Sara C. Bronin & Gregory H. Shill, Public Comment on Proposed Revisions to the Manual on Uniform Traffic Control Devices for Streets and Highways (May 14, 2020), <https://www.regulations.gov/comment/FHWA-2020-0001-15601> [<https://perma.cc/KZP8-3GZ9>].

<sup>14</sup> *Id.* at 2.

---

---

it nearly impossible to accomplish our nation’s official goal of “zero deaths” on the roads.<sup>15</sup>

This Essay reveals how the Proposed Manual would intensify the social costs of the current Manual and sets forth key principles of an alternative vision. In Part I, we explain the original sin of the Manual: it biases transportation behavior in dangerous and inequitable ways, prioritizing the speed of cars and the convenience of drivers over other modes and users. The Proposed Manual continues this “throughput ethos,” the consequences of which we explore in Part II. Part III suggests changes in response. In section III.A, we urge the FHWA to use its emergency powers to eliminate the most damaging provision, the 85th Percentile Rule for modifying speed limits — if not completely, then at least in urban and suburban settings. In section III.B, we call on the FHWA to withdraw a radical new chapter in the Proposed Manual, which would make public safety and welfare contingent on the success of unproven automated vehicles. Finally, in section III.C, we suggest reviewing the remainder of the Manual through the lens of three guiding principles: fostering fairness for all types of road users; incorporating diverse expert and community opinions; and facilitating local flexibility and innovation, especially in cities and communities that are disproportionately harmed by fast vehicular traffic. Where specific provisions hinder achievement of these goals, the Manual should be rewritten.

Overall, we hope these measures can ensure that the next version of the Manual will be grounded in evidence and prioritize safety, access, equity, and climate action.

## I. THE “THROUGHPUT” ETHOS OF THE MANUAL

Under FHWA policy, maximizing “throughput” — or the number of vehicles able to pass through a given marker, such as an intersection, in a given period — is a key measure of effectiveness.<sup>16</sup> The Manual embodies this fast-driving ethos. It establishes a hierarchy of vehicular speed over public safety, vehicular mobility over other uses of public space, and driving over other modes of mobility. The Proposed Manual

---

<sup>15</sup> *Zero Deaths – Saving Lives Through a Safety Culture and a Safe System*, FED. HIGHWAY ADMIN., U.S. DEP’T OF TRANSP., [https://safety.fhwa.dot.gov/zerodeaths/zero\\_deaths\\_vision.cfm](https://safety.fhwa.dot.gov/zerodeaths/zero_deaths_vision.cfm) [<https://perma.cc/A92U-MNET>].

<sup>16</sup> FED. HIGHWAY ADMIN., U.S. DEP’T OF TRANSP., TRAFFIC ANALYSIS TOOLBOX VOLUME VI: DEFINITION, INTERPRETATION, AND CALCULATION OF TRAFFIC ANALYSIS TOOLS MEASURES OF EFFECTIVENESS § 6.1, at 106–07 (2007), <https://ops.fhwa.dot.gov/publications/fhwahopo8054/fhwahopo8054.pdf> [<https://perma.cc/26ZJ-5TP6>]. The FHWA definition acknowledges the possibility that a policymaker might seek to move people rather than vehicles, but the rest of the definition and guidance refers only to maximizing throughput, minimizing delays and travel time, and limiting traffic congestion. *See id.*

is no different. Like other versions of the Manual, it states that its purpose “is to establish national criteria for the use of traffic control devices that meet the needs and expectancy of road users on all streets, highways, bikeways, and site roadways open to public travel.”<sup>17</sup> But the pages that follow interpret “road users” to be primarily drivers of automobiles.

One glaring example of bias in the current and Proposed Manuals alike is the “85th Percentile Rule,” a method that empowers traffic officials to adjust the speed limit to the speed at or below which 85% of vehicles are traveling “in free-flowing traffic.”<sup>18</sup> If as few as 15% of drivers are driving faster than the current posted limit, for example in light traffic, then this method would counsel raising the speed limit to legalize the conduct of that minority, even if doing so would be reckless. The 85th Percentile Rule does not merely favor driving over other forms of mobility; it delegates the interpretation of the law to the subset of drivers who are violating it most aggressively. Worse, as detailed more fully in section III.A, it erases the interests of anyone who is not driving.

Beyond the speed limit, road-design standards also establish a maximum-throughput vision in the Manual. For example, the Proposed Manual leaves in place current guidance that “[c]rosswalk markings should not be used indiscriminately” and that an engineering study must be done before a crosswalk is installed.<sup>19</sup> Such study requirements entrench the status quo by raising the cost of installing new crosswalks. Similarly, the Manual sets forth an array of factors to be taken into account by an engineer to determine when a new traffic signal or crosswalk is warranted.<sup>20</sup> One factor is pedestrian activity. Justifying a mid-block crosswalk signal on a major street, for example, requires the observation of at least 107 pedestrians crossing the street per hour.<sup>21</sup> Neither the Manual nor the Proposed Manual establishes a maximum block length, and “blocks” (distances between intersections) in suburban and rural areas can stretch for a half mile or more.<sup>22</sup> By making it difficult to install a crosswalk, the Manual creates sewers of constant, fast traffic that impede walkability and safety.

---

<sup>17</sup> Proposed Manual, *supra* note 11, § 1A.01.

<sup>18</sup> MANUAL, *supra* note 6, § 2B.13.12; *see also* Proposed Manual, *supra* note 11, § 2B.21. The rule is also sometimes referred to as the Operating Speed Method or 85th Percentile Speed. *See, e.g.*, FED. HIGHWAY ADMIN., U.S. DEP'T OF TRANSP., METHODS AND PRACTICES FOR SETTING SPEED LIMITS 12 (2012), [https://safety.fhwa.dot.gov/speed-mgt/ref\\_mats/fhwas12004/fhwas12004.pdf](https://safety.fhwa.dot.gov/speed-mgt/ref_mats/fhwas12004/fhwas12004.pdf) [<https://perma.cc/8PTZ-MP2W>].

<sup>19</sup> Proposed Manual, *supra* note 11, § 3C.02.

<sup>20</sup> *See, e.g.*, MANUAL, *supra* note 6, §§ 4C.01–.10 (listing various “warrants,” or factors that must be established to justify the installation of a traffic-control signal).

<sup>21</sup> *Id.* § 4C.05 & fig.4C-5.

<sup>22</sup> *See, e.g.*, PATRICK M. CONDON, SEVEN RULES FOR SUSTAINABLE COMMUNITIES 48–49 (2010).

An alternative method of justifying a crosswalk is to require a certain amount of human and material sacrifice. Five or more serious crashes — crashes that exceed the reporting threshold for injury, death, and/or property damage — within a twelve-month period are necessary, though not sufficient, to add a crosswalk under this “Crash Experience” warrant.<sup>23</sup> Since they lack the protection of an automobile, pedestrians bear the brunt of the burden of this minimum-crash requirement. It is aggravated by other rules about striping and signalization that put pedestrians and bikers in dangerous situations,<sup>24</sup> where they are less visible to cars, less protected from cars, or not accounted for at all.

The Proposed Manual charts new terrain for throughput by adding an entire new chapter on automated vehicles.<sup>25</sup> As detailed in section III.B, this technology is too experimental, too unsafe, and too likely to produce racially disparate outcomes to mandate that our roads be rebuilt around it. The fact that the Proposed Manual drafters have included an entire chapter on automated vehicles underscores the drafters’ car-centric bias.

These examples all illustrate how the Manual and Proposed Manual promote fast vehicle travel, trading off important social priorities, such as community vitality, safe access for pedestrians, and clean air, in the service of throughput. These other goals do not appear to be a priority of the principal group that advises the FHWA on the Manual, the National Committee on Uniform Traffic Control Devices; in section III.C, we address this gap by offering ideas for enhancing the quality and diversity of participation in that process.

## II. THE CONSEQUENCES OF THE THROUGHPUT ETHOS

The maximum-throughput approach embodied by the Manual has had many consequences. It makes driving faster and other modes of travel slower and more dangerous, raising the level and risks of driving. One group that benefits little from this approach is nondrivers. Almost 100 million Americans — about one in three — lack a driver’s license and thus are legally unable to drive at all.<sup>26</sup> Tens of millions of these people are old enough, but have disabilities, cost constraints, or other

---

<sup>23</sup> MANUAL, *supra* note 6, § 4C.08.

<sup>24</sup> See, e.g., *id.* § 4E.03.

<sup>25</sup> Proposed Manual, *supra* note 11, §§ 5A.01–5B.06.

<sup>26</sup> FED. HIGHWAY ADMIN., HIGHWAY STATISTICS 2019, at tbl.DV-1C (2019), <https://www.fhwa.dot.gov/policyinformation/statistics/2019/dv1c.cfm> [https://perma.cc/V36Y-X93M] (showing that, in 2019, the total U.S. population was 328 million, and the number of drivers was 229 million).

barriers to licensure.<sup>27</sup> These Americans are by and large excluded from the benefits of the Manual's emphasis on throughput.

One need look no further than the past year and a half for evidence of the direct danger of car-centric policy. Although driving dropped off sharply during the worst of the pandemic, 2020 saw the highest year-over-year increase in roadway death rates on a per-mile-traveled basis in ninety-six years.<sup>28</sup> One widely acknowledged reason for this spike is that the lighter traffic allowed uninhibited, faster driving, a development for which the Manual helped lay the groundwork prior to the pandemic.<sup>29</sup> This phenomenon represents a Monkey's Paw<sup>30</sup> fulfillment of a longstanding wish of highway engineers: amid pandemic shutdowns, the Manual's principal goal of increased traffic flow and decreased congestion was finally achieved, but proved to be deadly.

The Manual's emphasis on maximum throughput comes with indirect consequences as well. By helping to ensure driving is preferable to other modes of transportation, the Manual has facilitated a rise in greenhouse gas emissions. In the United States, the transportation sector is now the number-one source of greenhouse gases,<sup>31</sup> and within that sector the private automobile share of emissions predominates.<sup>32</sup> The non-climate impact of emissions is substantial as well, and cannot be eradicated through electric vehicles alone. Over 90% of deadly, cancer-

---

<sup>27</sup> See, e.g., *Lack of Transportation Options Worry Seniors, People with Disabilities*, METRO MAG. (Dec. 7, 2018), <https://www.metro-magazine.com/10031987/lack-of-transportation-options-worry-seniors-people-with-disabilities> [<https://perma.cc/2RSD-GJRM>]; Alana Semuels, *No Driver's License, No Job*, THE ATLANTIC (June 15, 2016), <https://www.theatlantic.com/business/archive/2016/06/no-drivers-license-no-job/486653> [<https://perma.cc/5UQ3-DTF2>].

<sup>28</sup> *Motor Vehicle Deaths in 2020 Estimated to Be Highest in 13 Years, Despite Dramatic Drops in Miles Driven*, NAT'L SAFETY COUNCIL (Mar. 4, 2021), <https://www.nsc.org/newsroom/motor-vehicle-deaths-2020-estimated-to-be-highest> [<https://perma.cc/C36A-8SFJ>].

<sup>29</sup> See, e.g., Paul Berger & Coulter Jones, *New York City Traffic Deaths Rise During Covid-19 Pandemic*, WALL ST. J. (Dec. 19, 2020, 8:00 AM), <https://www.wsj.com/articles/new-york-city-traffic-deaths-rise-during-covid-19-pandemic-11608382800> [<https://perma.cc/TB7Z-8FJQ>] (attributing a rise in traffic deaths in the New York area to "reckless behavior on the city's emptier roads").

<sup>30</sup> See W.W. JACOBS, THE MONKEY'S PAW (1902). In the story, the protagonist is granted three wishes, but they come true with an enormous price.

<sup>31</sup> *Sources of Greenhouse Gas Emissions*, *supra* note 1. Transportation also emits more carbon dioxide (one greenhouse gas) into the air than industrial, residential, or commercial uses. U.S. ENERGY INFO. ADMIN., DOE/EIA-0035(2021/8), AUGUST 2021 MONTHLY ENERGY REVIEW fig.11.2, at 198 (2021), <https://www.eia.gov/totalenergy/data/monthly/pdf/mer.pdf> [<https://perma.cc/TST5-FR7J>].

<sup>32</sup> Passenger cars contribute 41% of the greenhouse gases submitted by the transportation sector, while light-duty trucks (sport utility vehicles, pickup trucks, and minivans) contribute 17%. U.S. ENV'T PROT. AGENCY, EPA 430-R-21-005, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS, 1990-2019, at ES-13 (2021), <https://www.epa.gov/sites/production/files/2021-04/documents/us-ghg-inventory-2021-main-text.pdf> [<https://perma.cc/JWM6-DMDU>].

causing particulate matter generated by cars in traffic comes from non-exhaust emissions, for example, such as tire- and brake-pad wear.<sup>33</sup> Social policy must target a reduction in the levels and risks of driving, especially to people outside the car.

As has been documented extensively, the lives taken by car crashes are far likelier to be African American, Latino, Indigenous, low income, or belong to people with disabilities than the general population.<sup>34</sup> Even after adjusting for differences in walking rates, African American pedestrians face two-thirds more danger than their white counterparts and Native American pedestrians twice as much.<sup>35</sup> Transportation-related emissions disproportionately affect the health of those same groups.<sup>36</sup> Indeed, significant parts of the road system have been built in ways that have destroyed low-income communities and communities of people of color.<sup>37</sup> The choice to accommodate the rise of the automobile by displacing Black, immigrant, and poor Americans for roadbuilding supercharged racial segregation and health disparities that continue to this day.<sup>38</sup> In the words of U.S. Transportation Secretary Pete Buttigieg, “[t]here is racism physically built into some of our highways.”<sup>39</sup>

<sup>33</sup> See Victor R.J.H. Timmers & Peter A.J. Achten, *Non-exhaust PM Emissions from Electric Vehicles*, 134 *ATMOSPHERIC ENV'T* 10, 14 (2016).

<sup>34</sup> See, e.g., SMART GROWTH AM. & NAT’L COMPLETE STS. COAL., *DANGEROUS BY DESIGN* 26–28 (2021), <https://smartgrowthamerica.org/wp-content/uploads/2021/03/Dangerous-By-Design-2021-update.pdf> [<https://perma.cc/Z42J-Q2ZH>]. Moreover, car crashes are a leading cause of death for children. See U.S. CTRS. FOR DISEASE CONTROL & PREVENTION, *10 LEADING CAUSES OF INJURY DEATHS BY AGE GROUP HIGHLIGHTING UNINTENTIONAL INJURY DEATHS, UNITED STATES* (2018), [https://www.cdc.gov/injury/images/lc-charts/leading\\_causes\\_of\\_death\\_by\\_age\\_group\\_unintentional\\_2018\\_1100w85oh.jpg](https://www.cdc.gov/injury/images/lc-charts/leading_causes_of_death_by_age_group_unintentional_2018_1100w85oh.jpg) [<https://perma.cc/ZXU6-6Z44>].

<sup>35</sup> SMART GROWTH AM. & NAT’L COMPLETE STS. COAL., *supra* note 34, at 27 (reporting Pedestrian Danger Index scores of 53.5 for non-Hispanic white pedestrians, 55.1 for Hispanic/Latinx, 89.6 for Black or African American, and 111.5 for American Indian or Alaska Native); see also *id.* at 31 (appendix explaining the methodology behind the Pedestrian Danger Index and other calculations).

<sup>36</sup> MARIA CECILIA PINTO DE MOURA & DAVID REICHMUTH, UNION OF CONCERNED SCIENTISTS, *INEQUITABLE EXPOSURE TO AIR POLLUTION FROM VEHICLES IN THE NORTHEAST AND MID-ATLANTIC* 1–2 (2019), <https://www.ucsusa.org/resources/inequitable-exposure-air-pollution-vehicles> [<https://perma.cc/TJ3V-7KHW>]; *Disparities in the Impact of Air Pollution*, AM. LUNG ASS’N (Apr. 20, 2020), <https://www.lung.org/clean-air/outdoors/who-is-at-risk/disparities> [<https://perma.cc/Y7SV-Y8KU>].

<sup>37</sup> See Deborah N. Archer, “White Men’s Roads Through Black Men’s Homes”: *Advancing Racial Equity Through Highway Deconstruction*, 73 *VAND. L. REV.* 1259, 1264–65 (2020).

<sup>38</sup> See, e.g., Kevin M. Kruse, *What Does a Traffic Jam in Atlanta Have to Do with Segregation? Quite a Lot.*, *N.Y. TIMES MAG.* (Aug. 14, 2019), <https://www.nytimes.com/interactive/2019/08/14/magazine/traffic-atlanta-segregation.html> [<https://perma.cc/5SVK-FEV9>] (“While Interstates were regularly used to destroy black neighborhoods, they were also used to keep black and white neighborhoods apart. Today, major roads and highways serve as stark dividing lines between black and white sections [in a variety of cities.]”).

<sup>39</sup> Corinne Grinapol, *Biden Administration Seeks to Address the Interstate Highway System’s Racist Past*, *ENG’G NEWS-RECORD* (Apr. 15, 2021), <https://www.enr.com/articles/51593-biden->



The onerous process prescribed by the Manual and Proposed Manual for enhancing pedestrian safety discussed in Part I can also be expected to have a disparate impact on vulnerable groups. For example, people of color, people with disabilities, and other socioeconomically disadvantaged populations have a higher propensity to walk or use wheelchairs for transportation — and are thus more exposed to the risks of vehicle traffic, as they lack the protection of vehicles. The data bear this out.<sup>40</sup> In addition, there may be some bias in where pedestrian-safety infrastructure is installed, as disadvantaged populations are under-resourced and face higher burdens in transportation infrastructure as in other domains.

### III. REWRITING THE MANUAL

We propose several changes to the Manual so that it promotes, or at least no longer impedes, the paramount goals of safety, climate action, racial justice, and prosperity. In this Part, we identify and explain three areas of urgently needed reform: elimination of the 85th Percentile Rule, which undermines safety and the rule of law; withdrawal of a proposal to render millions of miles of American streets<sup>41</sup> more hostile to vulnerable road users in the name of an unproven technology; and the application of principles that reflect broader policy goals and are informed by all the stakeholders affected by the Manual — especially those, like pedestrians in communities of concern, for whom the Manual's rules can mean the difference between life and death.

#### *A. Eliminate the 85th Percentile Rule Allowing the Deadliest Drivers to Set the Speed Limit*

Between a quarter and a third of all traffic deaths each year are speeding related — that is, related to the fact that a driver is exceeding the speed limit.<sup>42</sup> High speeds make it harder to react in time and can

---

administration-seeks-to-address-the-interstate-highway-systems-racist-past [https://perma.cc/NJ33-LP5C].

<sup>40</sup> See, e.g., Cara Hamann et al., *Racial Disparities in Pedestrian-Related Injury Hospitalizations in the United States*, 20 BMC PUB. HEALTH, no. 1459, 2020, at 1, 6 (“Results from this study show that the burden of injury from pedestrian injuries is higher among non-Whites . . .”).

<sup>41</sup> As of 2019 there were 4.1 million miles of public road in the United States, just over 2.9 million of them paved. See Bureau of Transp. Stats., *Public Road and Street Mileage in the United States by Type of Surface*, <https://www.bts.gov/content/public-road-and-street-mileage-united-states-type-surface> [https://perma.cc/VW2R-VCCW].

<sup>42</sup> Nat'l Safety Council, *Speeding*, INJURY FACTS, <https://injuryfacts.nsc.org/motor-vehicle/motor-vehicle-safety-issues/speeding> [https://perma.cc/L2K8-Q3G3] (providing statistics for 2000–2019).

turn human mistakes into tragedies. This is a grave problem, comparable to the share of road deaths attributable to alcohol-impaired driving.<sup>43</sup> However, left uncounted even in this substantial figure are deaths that result from lawful high speeds. In recent years, nearly three-quarters of traffic deaths have *not* been speeding related.<sup>44</sup> Why? Because speed limits themselves are dangerously high, a risk the Manual helped generate and that the Proposed Manual would sustain. Using the emergency rulemaking provisions of the Administrative Procedure Act,<sup>45</sup> the FHWA should revoke the 85th Percentile Rule.

Speed limits are established in the first instance by statute. Once established, the Manual empowers traffic officials to raise the limit to the speed chosen by the driver traveling at the eighty-fifth percentile speed — that is, the driver traveling faster than 85% of other cars.<sup>46</sup> This 85th Percentile Rule thus permits the most reckless 15% of drivers to trigger an increase in the speed limit simply by breaking it. In theory, this rule works in the other direction, too, to authorize a reduction in the speed limit where traffic speeds are lower. In practice, it is closer to a one-way ratchet, as downward departures from the 85th Percentile Rule require more elaborate bureaucratic and engineering justifications, even in situations where the roadway hazards and scientific analysis of crash data show the street is dangerous.<sup>47</sup> The Proposed Manual does not merely repeat these prescriptions; it elevates them from an “Option” to recommended “Guidance,” giving them a higher priority under the Manual’s internal rules.<sup>48</sup>

It is intuitive that high speeds flow in part from high speed limits, but under the Manual, they also help raise the limits. Nonmotorists bear the brunt of excessive speed risk. For example, at twenty miles per hour, a pedestrian has a 95% chance of surviving a collision with a car, but, at forty miles per hour, that chance drops to 15%.<sup>49</sup> When a pedestrian is killed by a motorist obeying the speed limit, her death is likely not recorded as speeding related. Pedestrian deaths increased 46% from the start of the 2010s to the end, nine times the overall rate at which

---

<sup>43</sup> See NAT’L TRANSP. SAFETY BD., NTSB/SS-17/01 PB2017 – 102341, REDUCING SPEEDING-RELATED CRASHES INVOLVING PASSENGER VEHICLES 7 (2017), <https://www.nts.gov/safety/safety-studies/Documents/SS1701.pdf> [<https://perma.cc/C383-L8QY>].

<sup>44</sup> Nat’l Safety Council, *supra* note 42.

<sup>45</sup> See 5 U.S.C. § 553(b)(3)(B).

<sup>46</sup> MANUAL, *supra* note 6, § 2B.13.12.

<sup>47</sup> See FED. HIGHWAY ADMIN., U.S. DEP’T OF TRANSP., *supra* note 18, at 13.

<sup>48</sup> Proposed Manual, *supra* note 11, § 2B.21.

<sup>49</sup> See NAT’L TRANSP. SAFETY BD., *supra* note 43, at 11. These figures predate the increase in height and weight of the typical vehicle on American roads, and thus likely understate the risk to pedestrians. See generally ANGIE SCHMITT, RIGHT OF WAY (2020) (examining the causes of increased traffic violence in the United States).

traffic deaths increased.<sup>50</sup> Excessive speeds and speed limits were not the only factors<sup>51</sup> but they likely played a contributing role.

The 85th Percentile Rule is not well supported by the research. In 2012, the FHWA acknowledged its weak foundation, observing that “[t]he original research between speed and safety which purported that the safest travel speed is the 85th percentile speed is dated research and may not be valid under scrutiny.”<sup>52</sup> The FHWA has stated that often “the 50th percentile operating speed is either near or exceeds that posted speed limit,” so establishing the speed limit at the 85th percentile level is almost certain to result in higher speeds.<sup>53</sup>

Many other agencies and experts have criticized the 85th Percentile Rule’s lack of scientific foundation and propensity to increase crash rates. The National Transportation Safety Board (NTSB), for example, has warned that “[r]aising speed limits to match the 85th percentile speed can result in unintended consequences,” including “higher operating speeds, and thus a higher 85th percentile speed.”<sup>54</sup> Further, the NTSB has called into question the scientific basis of the method and recommended alternative methods, in particular ones that are sensitive to crash history and pedestrian danger.<sup>55</sup>

Though sanctioned by the Manual, the 85th Percentile Rule is anathema to the rule of law. Rather than enhancing predictability, stability, or fairness in administration, it empowers those who violate the law to trigger an opaque administrative process that results in a change in legal regime. The 85th Percentile Rule is perhaps unique in American law in empowering lawbreakers to activate a rewrite of the law to legalize their own unlawful conduct. Given that speeding is a leading factor for deadly crashes and speed itself is undoubtedly a factor in many more, this arbitrary and capricious method has serious real-world consequences.

---

<sup>50</sup> See *Pedestrian Deaths Soar in 2020 Despite Precipitous Drop in Driving During Pandemic*, GOVERNORS HIGHWAY SAFETY ASS’N (May 20, 2021), <https://www.ghsa.org/resources/news-releases/GHSA/Ped-Spotlight-Addendum21> [<https://perma.cc/XQL9-B44M>].

<sup>51</sup> The increase is multicausal and is the subject of a growing body of research and commentary. See, e.g., SCHMITT, *supra* note 49; Robert J. Schneider et al., *United States Fatal Pedestrian Hot Spot Locations and Characteristics*, 14 J. TRANSP. & LAND USE 1, 14–16 (2021); GOVERNORS HIGHWAY SAFETY ASS’N, PEDESTRIAN TRAFFIC FATALITIES BY STATE: 2020 PRELIMINARY DATA (2021), <https://www.ghsa.org/sites/default/files/2021-03/Ped%20Spotlight%202021%20FINAL%203.23.21.pdf> [<https://perma.cc/Z2RR-BWS4>].

<sup>52</sup> FED. HIGHWAY ADMIN., U.S. DEP’T OF TRANSP., *supra* note 18, at 12 n.\*.

<sup>53</sup> *Id.* at 13.

<sup>54</sup> NAT’L TRANSP. SAFETY BD., NTSB/SS-17/01, SAFETY STUDY: REDUCING SPEEDING-RELATED CRASHES INVOLVING PASSENGER VEHICLES, at x (2017), <https://www.nts.gov/safety/safety-studies/Documents/SS1701.pdf> [<https://perma.cc/WX3X-7SAR>].

<sup>55</sup> See *id.* (“In general, there is not strong evidence that the 85th percentile speed within a given traffic flow equates to the speed with the lowest crash involvement rate for all road types. Alternative approaches and expert systems for setting speed limits are available, which incorporate factors such as crash history and the presence of vulnerable road users such as pedestrians.”).

The 85th Percentile Rule also ignores the safety and well-being of most people on or in the area of the public right of way. In affording the lawbreaking minority the power to raise speed limits, it overrides the interests of the 85% of motorists who are traveling more slowly (many or most of them obeying the law); the interests of passengers who do not wish for their risk of injury to increase; the interests of road workers and law enforcement, who must contend with the elevated risks of raised speed limits without any corresponding benefit; and, most of all, the interests of people walking, biking, and using wheelchairs in or adjacent to the right of way, whose interests are definitionally excluded by the 85th Percentile Rule.

Given that the 85th Percentile Rule is already present in the Manual, merely scrapping the Proposed Manual is not sufficient. The FHWA should eliminate the 85th Percentile Rule and make clear that government agencies that rely on it are not acting in conformance with the Manual.

*B. Withdraw the Proposed Chapter Concerning  
Automated Vehicles*

“Science promises a future free of traffic accidents.

THE ELECTRIC HIGHWAY. Cars using this expressway ‘hook-in’ to an electronic beam, which controls speeds, prevents accidents.

THE JAM-PROOF EXPRESSWAY. Through-city free-ways . . . speed cars to their destinations, ending traffic jams.

THE AIR CAR. A car without wheels rides on a cushion of air, achieving great speeds with unexcelled safety features.”

The above slogans appear in an advertisement placed by officials for the Commonwealth of Pennsylvania, including O.D. “Mike” Shipley, State Commissioner of Traffic Safety.<sup>56</sup> The year: 1961.<sup>57</sup>

The Proposed Manual includes a new chapter, Part 5, concerning automated vehicles (the Chapter). Despite being written sixty years after the promise of a “jam-proof expressway,” this Chapter remains premature to the extent that it is intended to provide for fully-automated (or autonomous) vehicles (AVs). It also expresses an outdated, narrow view

---

<sup>56</sup> See *Science Promises a Future Free of Traffic Accidents*, PITT. POST-GAZETTE, July 30, 1961, at 107.

<sup>57</sup> See *id.* This ad was issued by the Governor’s Highway Safety Program of the Commonwealth of Pennsylvania and appeared in multiple newspapers. *Id.* The authors thank Peter Norton, who unearthed this advertisement, for making it available for our research.

of transportation policy objectives. For these reasons, it should be stricken from the Proposed Manual.

In anticipation of the arrival of AVs, the Chapter seeks to maximize uniformity over and above important alternative goals. For example, the Chapter warns against streets with decorative crosswalks.<sup>58</sup> Many legal crosswalks are not marked at all;<sup>59</sup> the Chapter fails to address how AVs should interact with them, nor does it advise road engineers to mark crosswalks in preparation for AVs.

Other provisions of the Chapter prescribe affirmative changes that are harmful. One section encourages wider roads,<sup>60</sup> which have been shown to promote faster and more dangerous driving.<sup>61</sup> With regard to bicycle facilities (a topic that receives a treatment two sentences in length), the Chapter suggests separated bike lanes protected by “physical barriers *where practicable*.”<sup>62</sup> It is silent as to what should happen when such safety measures are deemed not “practicable” — a subjective concept that is sure to be influenced by the twin constraints of throughput and the technological limitations of AVs. Intersections are already one place where physical barriers between bicycle and vehicular traffic are impossible and where traffic engineers have a propensity to “give up”;<sup>63</sup> the Chapter’s failure to specify the priority of safety in the determination of practicability may encourage more areas to be seen in the same way.

Automated vehicles have been in development since before World War II.<sup>64</sup> With a prototype of the automatic transmission having been

<sup>58</sup> Proposed Manual, *supra* note 11, § 5B.02.I.

<sup>59</sup> See FED. HIGHWAY ADMIN., HRT-04-100, U.S. DEP’T OF TRANSP., SAFETY EFFECTS OF MARKED VERSUS UNMARKED CROSSWALKS AT UNCONTROLLED LOCATIONS 2 (2005), <https://www.fhwa.dot.gov/publications/research/safety/04100/04100.pdf> [<https://perma.cc/6KXC-ARL4>] (“[A] crosswalk at an intersection is defined as the extension of the sidewalk or the shoulder across the intersection, regardless of whether it is marked or not.”); see also NAT’L COMM. ON UNIF. TRAFFIC L. & ORDINANCES, UNIFORM VEHICLE CODE AND MODEL TRAFFIC ORDINANCE § 1-118(a) (2000) (including in the definition of a legal “crosswalk” intersections that meet certain common criteria).

<sup>60</sup> See Proposed Manual, *supra* note 11, § 5B.02.B (suggesting continuous edge markings of six inches on each side of roads with speed limits of less than forty miles per hour).

<sup>61</sup> See Subha Ranjan Banerjee & Ben Welle, *Bigger Isn’t Always Better: Narrow Traffic Lanes Make Cities Safer*, THECITYFIX (Dec. 6, 2016), <https://thecityfix.com/blog/bigger-isnt-always-better-narrow-traffic-lanes-make-cities-safer-subha-ranjan-banerjee-ben-welle> [<https://perma.cc/7DVS-ZKX5>]; Angie Schmitt, *Compelling Evidence That Wider Lanes Make City Streets More Dangerous*, STREETS BLOG USA (May 27, 2015), <https://usa.streetsblog.org/2015/05/27/compelling-evidence-that-wider-lanes-make-city-streets-more-dangerous> [<https://perma.cc/EQK4-FNGF>].

<sup>62</sup> Proposed Manual, *supra* note 11, § 5B.06 (emphasis added).

<sup>63</sup> A leading urban transportation safety organization even publishes a guide on this subject. See generally NAT’L ASS’N OF CITY TRANSP. OFFS., DON’T GIVE UP AT THE INTERSECTION (2019), [https://nacto.org/wp-content/uploads/2019/05/NACTO\\_Dont-Give-Up-at-the-Intersection.pdf](https://nacto.org/wp-content/uploads/2019/05/NACTO_Dont-Give-Up-at-the-Intersection.pdf) [<https://perma.cc/KQ8T-FNGS>].

<sup>64</sup> See Bryant Walker Smith, *How Reporters Can Evaluate Automated Driving Announcements*, 2020 J.L. & MOBILITY 1, 2.

completed in 1921,<sup>65</sup> in a broader sense we are now in the 101st year of the quest to fully automate driving. Many cars already have automated features, some of them identified by the Manual.<sup>66</sup> At this stage, however, AVs remain an unproven technology. In 2015, Tesla CEO Elon Musk predicted “complete autonomy in approximately two years.”<sup>67</sup> Six years later, the most successful completely automated vehicle is arguably a vacuum cleaner, the Roomba. As Professor Bryant Walker Smith, a leading scholar of the law governing automated vehicles, has written, “AVs were 20 years away from the late 1930s until the early 2010s and have been about five years away ever since.”<sup>68</sup>

At present, several companies operate AVs on public roads on an experimental basis.<sup>69</sup> These machines are technically constrained in where, and under what conditions, they can operate safely.<sup>70</sup> They require extremely expensive equipment, and they rely on machine learning and artificial intelligence — technology whose algorithms in other contexts have been shown to develop racial biases.<sup>71</sup> They also struggle with certain real-world conditions, such as construction<sup>72</sup> and weather hazards.<sup>73</sup> Even their potential to reduce crashes by eliminating driver error has been estimated to be limited.<sup>74</sup>

Recently, some of the deepest skepticism has come from AV executives themselves. A senior manager at Volkswagen has warned of the

---

<sup>65</sup> See Hearst Autos Rsch., *What Is an Automatic Car?*, CAR & DRIVER, <https://www.caranddriver.com/research/a31884931/what-is-an-automatic-car> [<https://perma.cc/CCP3-ET6C>].

<sup>66</sup> Proposed Manual, *supra* note 11, § 5A.02 (including in this category “adaptive cruise control, adaptive headlights, automatic emergency braking, lane tracking assist, or other technology based features used to control some or all aspects of the vehicle”).

<sup>67</sup> Fred Lambert, *Tesla CEO Elon Musk Drops His Prediction of Full Autonomous Driving from 3 Years to Just 2*, ELECTREK (Dec. 21, 2015, 6:26 PM), <https://electrek.co/2015/12/21/tesla-ceo-elon-musk-drops-prediction-full-autonomous-driving-from-3-years-to-2> [<https://perma.cc/JZ74-WWNT>].

<sup>68</sup> Smith, *supra* note 64, at 2.

<sup>69</sup> See, e.g., Kris Holt, *Waymo's Autonomous Vehicles Have Clocked 20 Million Miles on Public Roads*, ENGADGET (Aug. 19, 2021), <https://www.engadget.com/waymo-autonomous-vehicles-update-san-francisco-193934150.html> [<https://perma.cc/6M5W-F9XP>].

<sup>70</sup> See, e.g., Smith, *supra* note 64, at 12–13; Eric Adams, *Why We're Still Years Away from Having Self-Driving Cars*, VOX (Sept. 25, 2020, 3:40 PM), <https://www.vox.com/recode/2020/9/25/21456421/why-self-driving-cars-autonomous-still-years-away> [<https://perma.cc/7S4N-23QN>].

<sup>71</sup> See, e.g., Ifeoma Ajunwa, *The Paradox of Automation as Anti-bias Intervention*, 41 CARDOZO L. REV. 1671, 1673 (2020); Sandra G. Mayson, *Bias In, Bias Out*, 128 YALE L.J. 2218, 2221 (2019).

<sup>72</sup> See, e.g., *Waymo Self-Driving Taxi Confused by Traffic Cones Flees Help*, BBC NEWS (May 17, 2021), <https://www.bbc.com/news/technology-57144755> [<https://perma.cc/36AG-NZQV>].

<sup>73</sup> See Will Knight, *Snow and Ice Pose a Vexing Obstacle for Self-Driving Cars*, WIRED (Feb. 3, 2020, 7:00 AM), <https://www.wired.com/story/snow-ice-pose-vexing-obstacle-self-driving-cars> [<https://perma.cc/3562-TN84>] (interviewing researchers on the challenges inclement weather poses to autonomous vehicles).

<sup>74</sup> See *Self-Driving Vehicles Could Struggle to Eliminate Most Crashes*, INS. INST. FOR HIGHWAY SAFETY (June 4, 2020), <https://www.iihs.org/news/detail/self-driving-vehicles-could-struggle-to-eliminate-most-crashes> [<https://perma.cc/5NP9-VL63>].

astronomical costs of truly effective self-driving cars, observing that “the complexity of solving this problem is like a manned mission to Mars”; he predicted that full self-driving capability, known as Level 5, “will never happen globally.”<sup>75</sup> In 2018, the CEO of an AV technology company expressed similar skepticism about the potential for truly automated Level 5 cars.<sup>76</sup> In 2019, another self-driving car company CEO and robotics professor went further, estimating that automated vehicles were then “0.01% as good as humans,” and that even if their performance *doubled* every 16 months, parity would not arrive until 2035.<sup>77</sup>

The technical limitations of AVs suggest the possibility of destructive accommodations. To help them succeed, AV companies and civic planners may deem terrible tradeoffs to be necessary — for example, the prioritization once again of (typically white) suburban car commuters over (frequently nonwhite) urban dwellers. One auto industry official went so far as to advocate this dark possibility in *The New York Times*, suggesting that cities install pedestrian gates on every corner to keep people from crossing the street in ways the vehicles’ computers do not expect.<sup>78</sup>

If AV development were to defy technological expectations and achieve viability quickly, it would aggravate rather than ameliorate many existing problems of the road system. Experts predict that, if commercialized, AVs would substantially increase vehicle miles traveled, especially in cities — the very places that already suffer from elevated levels of pollution and vehicle exposure because of the transportation policy decisions of the past. It is perhaps unsurprising that the National Association of City Transportation Officials has called for jettisoning the Proposed Manual’s AV section as well.<sup>79</sup>

While the AV industry as a whole has become more measured in its predictions, this Chapter would have cities begin to rebuild their streets

<sup>75</sup> Edward Taylor, *VW Says Driverless Vehicles Have Limited Appeal and High Cost*, REUTERS (Mar. 5, 2019, 12:49 PM), <https://reut.rs/2ENwEQW> [<https://perma.cc/56ZW-WUMP>].

<sup>76</sup> The Future of Everything, *WSJ Tech D.Live: Are We There Yet? The Future of Driverless Cars*, WALL ST. J., at 03:45 (Nov. 14, 2018, 3:18 AM), <https://www.wsj.com/podcasts/wsj-the-future-of-everything/wsj-tech-dlive-are-we-there-yet-the-future-of-driverless-cars/aoc1b34e-fe21-4c19-8b98-8e74b0c0643f> [<https://perma.cc/Y5BV-U9WW>] (featuring CEO of Waymo acknowledging weather and geography as difficult, sometimes insuperable, constraints, and stating: “I’m not sure [the industry is] ever going to achieve an L5 level of automation . . . It’s important, I think, for all of us to be really clear on the language around self-driving”).

<sup>77</sup> Edwin Olson, *The Moore’s Law for Self-Driving Vehicles*, MEDIUM (Feb. 27, 2019), <https://medium.com/may-mobility/the-moores-law-for-self-driving-vehicles-b78b8861e184> [<https://perma.cc/MXB7-QA2J>] (calculating improvement at rates that double performance every 16 months).

<sup>78</sup> Eric A. Taub, *How Jaywalking Could Jam Up the Era of Self-Driving Cars*, N.Y. TIMES (Aug. 1, 2019), <https://www.nytimes.com/2019/08/01/business/self-driving-cars-jaywalking.html> [<https://perma.cc/DZP8-FB8N>].

<sup>79</sup> *Modernizing Federal Standards: Making the MUTCD Work for Cities*, NAT’L ASS’N OF CITY TRANSP. OFFS., <https://nacto.org/program/modernizing-federal-standards> [<https://perma.cc/AG2E-VX7G>].

---

---

for AVs anyway. It would make roads more dangerous to vulnerable users solely for the purpose of accommodating a technology that remains experimental. The AV Chapter is both premature and pernicious, and should be withdrawn.

*C. Rewrite the Manual with New Guiding Principles*

After eliminating the 85th Percentile Rule and withdrawing Part 5 of the Proposed Manual, the FHWA should review the remainder of the Manual through the lens of three guiding principles: fostering fairness for all types of road users; incorporating diverse expert and community opinions; and facilitating local flexibility and innovation, especially in cities and communities that are disproportionately harmed by fast vehicular traffic. Many provisions will remain untouched by a review based on these principles. But where specific provisions hinder achievement of these provisions, the Manual should be rewritten.

Fostering equity for all types of road users requires more than treating all road users with the same priority. After generations of the Manual's prioritization of vehicle throughput, the next version must ensure safety and fairness for nondrivers. Realizing these values will require using tools and language that prioritize pedestrians, even if it affects vehicle throughput. The same priority should be given to bicyclists, wheelchair users, and other vulnerable road users to foster a safer, more just, and more sustainable vision of the public street.

When the FHWA reviews the Manual to ensure it is true to these goals, many provisions — those that are unlikely to present conflicts between vehicles and people using other forms of transportation — will be unaffected. Examples of such provisions include road markings to shift lanes on a freeway or highway-rail grade crossing signs on low-volume roads, both of which are articulated by the Manual.<sup>80</sup> But where there are clear potential conflicts, including for pedestrian intersection crossing signals or bicycle cycle-track signage, priority should be for the design solution that is most protective of nondrivers, given their vulnerability.

In practice, assessing priorities and developing new design solutions may be hindered by the narrow, engineering-focused perspective of Manual drafters and the FHWA. Certainly, the Manual fashions itself as an engineering document; the Proposed Manual's first section states that it "presumes sufficient working knowledge, professional training and experience, and education in the principles of engineering."<sup>81</sup> But in order to better represent public values and the variety of lawful and valuable uses of roads beyond motor vehicle transportation, in seeking advice the FHWA should no more confine itself to the input of the traffic

---

<sup>80</sup> See, e.g., MANUAL, *supra* note 6, §§ 2E.24, 6H.01.

<sup>81</sup> Proposed Manual, *supra* note 11, § 1A.01.



---

---

engineering profession than the Securities and Exchange Commission limits itself to investment bankers.

One way to diversify decisionmaking is to ensure that the composition of the National Committee on Uniform Traffic Control Devices (National Committee), which guides the drafting of the Manual, reflects more types of road users, not just drivers.<sup>82</sup> Currently, National Committee members must be selected by an eligible sponsoring organization.<sup>83</sup> Most such organizations specialize in traffic engineering, so the narrow perspective of the end product — the Manual — should not be surprising.<sup>84</sup> Greater diversity could be accomplished by opening up the membership nominating process or creating specific positions for key stakeholder groups.

Changes in the National Committee's composition have the potential to generate more well-rounded regulations. Environmental and public health experts, along with people representing the concerns of low-income and minority groups, may bring a more inclusive, broad-minded perspective to rulemaking in this area. Ideally, these changes would better reflect a diverse set of values and ideas about who roads are for, and how they should be designed. But good process does not guarantee good results. At a minimum, these changes would help ensure representation of key stakeholders who are currently frozen out by the National Committee process.

Alternatively or additionally, National Committee drafting discussions could be opened to the public rather than limited to paying members meeting behind closed doors. Doing so could also help with transparent, sound decisionmaking. Such transparency may be facilitated if the official advisory committee is subject to the Federal Advisory Committee Act. While the Manual purports to be an engineering document, its impact is far-reaching and affects all Americans. It codifies important policy choices and should serve the interests of all Americans.

Facilitating local flexibility and innovation, the third guiding principle we propose in this Essay, may seem to cut against the “U” (for “Uniform”) in the Manual's very name. Indeed, the Proposed Manual states that it aims to “[p]romote national uniformity in the meaning and appearance of traffic control devices.”<sup>85</sup> For the majority of Manual

---

<sup>82</sup> We also note that individual members have sometimes wielded their technical authority for narrow ideological purposes. Illustrating the point, one member of the National Committee recently accused Americans participating in the legally mandated Proposed Manual administrative comment process of engaging in “political maneuvering” and “cancel-culture.” Jessica Wehrman, *A Traffic Manual “to Fall Asleep by” Stirs Road Rage*, ROLL CALL (Apr. 5, 2021, 7:00 AM), <https://www.rollcall.com/2021/04/05/a-traffic-manual-to-fall-asleep-by-stirs-road-rage> [<https://perma.cc/5FPB-KJLJ>].

<sup>83</sup> *How to Join the National Committee*, NAT'L COMM. ON UNIF. TRAFFIC CONTROL DEVICES, <https://nctcd.org/how-to-join-the-national-committee> [<https://perma.cc/UD7N-BMKU>].

<sup>84</sup> See *Sponsoring Organizations*, NAT'L COMM. ON UNIF. TRAFFIC CONTROL DEVICES, <https://nctcd.org/aboutus/sponsoring-organizations> [<https://perma.cc/E6A8-FFSW>].

<sup>85</sup> Proposed Manual, *supra* note 11, § 1A.01.

provisions, uniformity enhances safe and efficient transportation. It gives people, and especially drivers, the comfort of knowing that basic rules will not change when they cross invisible jurisdictional boundaries. That state and local officials have typically adopted the Manual with only very minor adaptations suggests that policymakers see the value in uniformity as well. Many Manual designs are sensible to standardize, including stop signs, interstate highway signage, toll road entrance markings, and railroad crossing signalization.

In other cases, total uniformity has suffocated flexibility and innovation. If deviations from the rules require permission or an engineering study, it becomes a more expensive and more time-consuming process to innovate. And if too many practices are prohibited, creativity is effectively prohibited as well. For example, with uniformity as the rationale, the Proposed Manual requires that crosswalks be white.<sup>86</sup> Yet the reality is that creating variety in crosswalks actually slows drivers, which improves safety.<sup>87</sup> Moreover, colorful crosswalks can create a sense of place and enliven a streetscape. Yet cities that have tried to implement such features are not in compliance with the Manual, and may be subject to legal liability for daring to deviate. The FHWA has requested comment on colored crosswalks and how they would “maintain the uniformity and recognition of crosswalk markings,” with comments to be supported by “quantifiable and objective data.”<sup>88</sup> But if these practices have not been allowed, how can empirical studies be carried out to provide quantifiable data? This is one illustration of how focusing on uniformity makes it difficult to explore new practices and inhibits the development of more pedestrian-friendly measures.

Moreover, uniformity primarily inures to the benefit of drivers, as it allows them to instantly recognize signs and road markers without having to slow down. When combined with the Manual’s other provisions, which seek to maximize vehicular throughput, uniformity has the effect of fostering constant streams of fast motor vehicle traffic to the detriment of other road users and community members. The Manual needs to provide guidance that does not merely favor fast driving. No one likes sitting in traffic, but the Manual must also recognize that, in some instances, slowing vehicle speeds through road design may be beneficial — and that experimentation by individual communities will be key to identifying best practices and fostering local support. A reworked Manual should prioritize flexibility and innovation over uniformity, and

---

<sup>86</sup> *Id.* § 3C.03.

<sup>87</sup> See Emily S. Rueb, *The Government Says Rainbow Crosswalks Could Be Unsafe. Are They Really?*, N.Y. TIMES (Oct. 7, 2019), <https://www.nytimes.com/2019/10/07/us/crosswalks-ames-iowa-safety.html> [<https://perma.cc/QPU7-WAG7>].

<sup>88</sup> Proposed Revisions to the Manual on Uniform Traffic Control Devices for Streets and Highways, 85 Fed. Reg. 80,898, 80,945 (proposed Dec. 14, 2020) (to be codified at 23 C.F.R. pt. 655).

especially in urban and dense suburban locations where there will be more potential conflicts between cars and nondrivers, innovation should be encouraged. Communities should not be forced to choose between implementing more modern street designs and complying with the Manual.<sup>89</sup>

### CONCLUSION

Improving safety for all road users is essential for progress on economic prosperity, climate, and racial justice in the United States, yet the current Manual undermines those bedrock goals. The Proposed Manual is no better, and, in several ways, it is worse. It doubles down on the mistakes of prior generations of the document, which embody an early-twentieth-century goal of increasing car ownership and vehicle miles traveled. In addition, it adds an entirely new chapter to accommodate a technology, automated vehicles, that remains experimental and problematic. The biases enshrined in the Manual undermine safety, equity, and economic development, and its continued narrowness reflects a decisionmaking process that has remained closed to diverse input for nearly a century.

We believe fundamental changes to the Manual and Proposed Manual are imperative. A freshly rewritten Manual can advance rules of design that minimize rather than amplify the unique dangers to which speeding motorists expose vulnerable road users like pedestrians, wheelchair users, and bicyclists. As that process gets underway, we suggest that the FHWA also act swiftly to engage its authority under the Administrative Procedure Act to withdraw the 85th Percentile Rule for raising speed limits.

---

<sup>89</sup> Defying the Manual can expose transportation planners to liability and imperil funding. *See, e.g.*, 23 C.F.R. § 655.603(b)(1) (2020) (providing that, where state and federal agency Manuals or Manual supplements are required, they “shall be in substantial conformance with the National MUTCD”).