

1 **Guidance for Comprehensive Transportation Review in the District of Columbia:**
2 **A Parking, Design, and TDM-Focused Alternative to the Traditional Traffic Impact**
3 **Study in an Urban Setting**

4
5

6 *100th Transportation Research Board Annual Meeting*

7 *January 2021*

8
9

10

11 Aaron T. Zimmerman, PTP
12 Site Development Program Manager
13 District Department of Transportation (DDOT)
14 Chair, ITE Transportation Planning Council
15 aaron.zimmerman@dc.gov

16
17

18 Anna Chamberlin, AICP
19 Associate Director, Planning and Sustainability Division
20 District Department of Transportation (DDOT)
21 anna.chamberlin@dc.gov

22
23

24 Jamie Henson
25 Associate Engineer/Planner
26 Kittelson & Associates
27 jhenson@kittelson.com

28
29

30 Ryan J. Westrom, PE, PTP
31 Head of Mobility Engagement - East Coast, City Solutions
32 Ford Mobility
33 rwestrom@ford.com

1 **Abstract:** Traffic studies have been the tool of choice for engineers and planners attempting to weigh
2 traffic impacts resulting from new development. However, they have disproportionately focused on
3 automobile impacts. This auto-centric approach does not fit urban settings or places that take a
4 multimodal perspective. This mismatch has long been recognized, but a compelling alternative has not yet
5 coalesced. In the District of Columbia, a planning team at the District Department of Transportation
6 (DDOT) set out to establish a new, more comprehensive, guide for measuring and addressing multimodal
7 transportation impacts from development, as well as better aligning development review goals with other
8 agency and City policy objectives aside from reduced traffic congestion. The process to establish and then
9 mature the guidance outlined in this paper, as well as the factors and variables included in this new model
10 for review, represent a significant leap forward in understanding the transportation impacts resulting from
11 new development. Included in this guidance are new approaches for evaluating the appropriateness of
12 proposed off-street parking supply and the link to induced demand for driving with more consistent
13 mitigation guidelines to allow greater leverage of traffic impacts to realize non-automotive network
14 improvements. This guidance can serve as a template for transportation agencies throughout North
15 America, particularly in cities with high quality transit access.

16

17

18

19 **Acknowledgements:** The Authors would like to thank the following planners, engineers, and
20 researchers who contributed to DDOT’s trip generation and parking demand research and accompanying
21 tools (TripsDC, Park Right DC, District Mobility) that informed the policies in the 2021 *CTR Guidelines*,
22 as well as those who contributed to the development of the new approach to transportation impact
23 analysis during the development review process:

24 Jonathan D. Rogers, Stephanie Dock, Jim Sebastian, Sam Zimbabwe, Stefanie Brodie, Marina Budimir,
25 Emily Dalphy, Dan Emerine, Kristin Calkins, Kristina Currans, Matthew Ridgway and staff at Fehr &
26 Peers DC, Shana Johnson and staff at Foursquare ITP

27 Without their hard work and expertise, DDOT would not have been able to innovate in these areas or
28 have delivered the *Guidance for Comprehensive Transportation Review*, Version 2.0, or Version 1.0 that
29 earned the 2019 Washington DC Section of the Institute of Transportation Engineers (WDCSITE),
30 Project of the Year Award.

1 **1.0 Introduction**

2 The District of Columbia Department of Transportation (DDOT) released the *Guidance for*
3 *Comprehensive Transportation Review* (hereafter referred to as the “*CTR Guidelines*”) Version 1.0 in
4 June 2019 and will be releasing the Version 2.0 update in 2021. The *CTR Guidelines* provide direction to
5 developer teams as to DDOT’s expectations for site design, parking supply, TDM programming, public
6 space design, and multimodal transportation analyses when evaluating new development projects.
7 Inceptive *Guidelines* were established in 2012 as a first attempt at comprehensive multimodal
8 transportation review and represented a major turning point in the shift away from auto-oriented
9 development evaluation. The new 2021 Version 2.0 release reflects the growth in understanding resulting
10 from years of putting this guidance into practice and a maturation of the approach to a place where it can
11 serve as an example for others.

12 There were five (5) major innovations in the *CTR Guidelines* that this paper highlights: 1) repurposing the
13 Level of Service (LOS) analysis to leverage non-automotive network improvements in-lieu of traditional
14 roadway improvements, such as off-site sidewalks, curb extensions, protected bike lanes, upgraded bus
15 shelters, bikeshare stations, and monetary contributions; 2) establishment of standardized Transportation
16 Demand Management (TDM) plans for a project based on land use, type of user, proximity to transit, and
17 vehicle trip mitigation needs; 3) establishment of agency preferred maximum off-street parking ratios that
18 are used as a mitigation test (i.e., higher parking ratio leads to induced demand for driving which means
19 more mitigation is necessary); 4) establishment of criteria for a Low Impact Development CTR/TIA
20 waiver; and 5) incorporation of a Vision Zero perspective into all aspects of site design and public realm
21 design, and guidance for Vision Zero-specific mitigations.

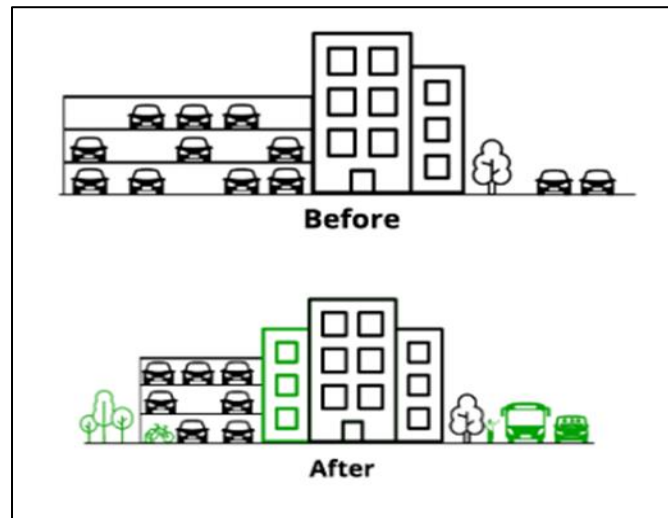
22 A refocused emphasis on pedestrian safety, TDM programming, minimal off-street parking, and quality
23 project design have been critical to streamlining the development review process, attaining better overall
24 development projects, and helping to meet many of the District’s public policy goals. These include
25 producing more affordable housing, reducing automobile dependency, improving pedestrian and bicycle
26 safety, supporting adjacent transit, and allowing for more sustainable population and employment growth
27 with minimal growth in vehicle traffic. Together, this more comprehensive approach represents a
28 tremendous shift forward for transportation review and can serve as a study approach to be emulated by
29 other agencies seeking to modernize their approaches.

30 DDOT’s focus on reduced parking originates from a desire to accommodate more density in the District
31 of Columbia, consistent with the targets of the 2021 Comprehensive Plan, 2016 Zoning Regulations, and
32 subsequent Small Area Plans, while generating minimal accompanying vehicular traffic and preserving
33 network capacity for other uses and modes. The District is projected to grow by 187,000 people by the
34 year 2035 (1). Since the roadway network is fully built out and congested during peak commute periods,
35 additional population and employment growth must be accommodated by non-automotive modes and
36 reduced auto-dependency. In the coming years, it is likely that not only will the number of lane miles not
37 increase in the District, but will instead decrease as road diets, bus-only lanes, and protected bike lanes
38 projects are deployed. For this reason, it is even more imperative that parking ratios with new
39 development be minimized since research has demonstrated that the availability of off-street parking,
40 particularly free parking, induces demand for more driving. (2)

41 There are other benefits to reduced or eliminated on-site parking, as shown in Figure 1 below. The first is
42 that the project saves costs associated with constructing parking spaces and has more site design

1 flexibility. The space and money recouped from reducing car storage can be replaced with more
2 residential units, green space, or bicycle parking, thus advancing the District’s goals of providing more
3 housing supply and reducing the costs to building housing. In almost every situation, less on-site vehicle
4 parking advances at least one of the District’s sustainability goals (e.g., housing affordability, reduced
5 auto-dependency, increased transit usage, reduced impacts to climate change, improved pedestrian safety,
6 etc.). The second is that buildings with little or no parking bring a population of “transit ready” residents
7 and employees to support adjacent public transportation routes. Residents or office workers that choose to
8 live or work in a building with little or no parking, know of the parking constraints prior to moving in and
9 can make the decision to co-locate their home and office along transit lines. The third is that, in many
10 situations, parking supply can be used as a proxy for personal vehicle travel. Since on-site parking is one
11 of the permanent features of a site that will remain constant as lifestyles, commuting patterns, and modes
12 of travel change, capping or eliminating parking will result in fewer spaces to produce or attract personal
13 vehicle trips for the life of the project, thus also having the potential to reduce Vehicle Miles Traveled
14 (VMT) and carbon emissions. DDOT is planning to collect person trip and parking demand data in the
15 coming years at residential buildings with little or no parking to better understand the potential for mode
16 shift from personal vehicle to transit or ride-hailing. These findings could shed more light on VMT
17 implications of reduced parking.

18 **Figure 1 | Building Design Before and After Reduced Parking**



19
20

Source: Boston Metropolitan Area Planning Council (MAPC) Perfect Fit Parking (used with permission)

21 **2.0 A Brief History of the Traffic Impact Study**

22 Traffic Impact Studies (TIS)¹ in their modern form date to the 1970s, with most city and state DOTs
23 implementing guidance for creation of their studies through the 1980s and into the 1990s. (3) A TIS is
24 typically used to document the transportation system impacts resulting from a proposed project or
25 development. Most places now require any new development to complete a TIS as part of their

¹ Alternatively known as Traffic Study, Traffic Impact Analysis (TIA), Traffic Operational Analysis (TOA), or Transportation Impact Study (TIS) amongst others. The very name of these studies reflects an auto-centric approach highlighting concern about vehicular traffic.

1 development review process. These studies compare pre-existing congestion to a proposed scenario with
2 the project’s expected traffic added to the system. The forecast congestion impacts are often used to
3 prescribe impact fees, infrastructure investments, or site design requirements. Various guidance manuals
4 have been created over the years by public agencies (4) (5), advocacy organizations (6), and private
5 entities (7) to guide study originators in creation of traffic studies. Today’s most well-known guidance
6 document is the Institute of Transportation Engineers (ITE) Recommended Practice on the subject,
7 *Transportation Impact Analyses for Site Development*. However, relatively little academic analysis has
8 been conducted on the efficacy of various approaches to traffic studies.

9 It is clear that most traffic studies have historically taken an auto-centric approach, with little focus on
10 modes other than the personal vehicle. Many offer a cursory glance at the local transit, or lack thereof,
11 and leave little room for mitigations focused on upgrading the pedestrian, bicycle, or transit networks or
12 implementing Transportation Demand Management (TDM) measures. The typical approach seems to
13 presume that trips to the site will be made via automobile, perpetuating a land use-transportation cycle
14 that has resulted in more than 85% of all trips in the United States being taken by personal vehicle. (8)
15 Vehicle infrastructure is built to accommodate anticipated new vehicular trips, in turn inducing further
16 demand for vehicular travel.

17 The end goal for most traffic studies is alleviation of congestion. Congestion is a result of more people
18 trying to move through a space via a certain mode than it was designed for, which leaves people feeling
19 like it took them longer to get somewhere than it should have. Congestion can be measured in many
20 ways; typical measures track the amount of time delayed or consider the ratio of travel time to a ‘normal’
21 time. Usually congestion is measured to track its impact on local economies and travel time. (9) The
22 typical prescription is added capacity, usually in the form of new roads or added lanes. In fact, research
23 suggests adding more road capacity is not effective and we cannot build our way out of congestion. (10)
24 Due to the principle of induced demand—where trips are made easier, more will be made—any gains will
25 be short-lived.

26 Society’s negative view of congestion masks a basic misperception. Quite simply, congestion is also a
27 marker of economic success. A recent study states, “Economic productivity is not significantly negatively
28 impacted by high levels of traffic congestion. In fact, the results suggest a positive association between
29 traffic congestion and per capita GDP as well as between traffic congestion and job growth at the
30 [Metropolitan Statistical Area] MSA level.” (11) To eliminate congestion would be to eliminate economic
31 production, a result no city desires. Seeking to mitigate congestion often makes sense, but it is often not
32 the right measure of mobility to evaluate appropriate infrastructure investments associated with
33 developments. Alternative metrics focused on trip reliability, and highlighting accessibility and person
34 throughput, likely make more sense.

35 Since the initial 2012 Beta Version of the *CTR Guidelines* was introduced, there have been several
36 noteworthy changes in the industry that DDOT has tried to stay ahead of and innovate. First, with
37 California’s adoption of SB 743 legislation in 2013, the industry has sought a viable alternative to the
38 Level of Service (LOS) metric which measures the volume of motor vehicles an intersection can process
39 in the peak 15 minutes of the day and has dominated the traffic impact study (TIS) review process for
40 decades. This has led to the overbuilding of roadway capacity in localities and perpetuating a land use and
41 transportation cycle that has resulted in an automobile dependent society. Second, since the early 2010s,
42 DDOT has led the industry in moving from a focus on moving automobiles to a focus on moving *people*
43 by requiring developers to provide *person trip* generation estimates in addition to the traditional vehicle

1 trip generation. Person trip generation captures trips by all other modes, such as transit, walking, and
2 bicycling. In 2017, the Institute of Transportation Engineers (ITE) adopted the person trip methodology in
3 the 3rd Edition of the *Trip Generation Handbook*. DDOT has since contributed person trip data to ITE's
4 database in each new edition of the *Trip Generation Manual*. Third, in the latter half of the 2010s, many
5 jurisdictions sought to begin evaluating non-automotive modes of travel and bringing them up to parity
6 with the automobile. DDOT was also an early national leader in evaluating and mitigating a
7 development's impacts to the pedestrian, bicycle, and transit networks.

8 Interestingly, at the same time DDOT was developing an updated CTR process, the industry seems to
9 have begun recognizing the same shortcomings in the typical TIS approach. For instance, ITE has
10 underway a process to replace their former recommended practice with a new one entitled *Multimodal*
11 *Transportation Impact Assessment for Site Development (MTIA)*, which includes many of the best
12 practices developed for the *CTR Guidelines*. (12) In California, some jurisdictions have begun exploring
13 use of the vehicle miles traveled (VMT) per capita metric and VMT screening tools in the wake of SB
14 743, whereby projects located within low VMT per capita areas of a jurisdiction are screened out and
15 exempt from further traffic analysis. These changes happen as more infill development occurs around the
16 country and a holistic multimodal perspective becomes more widespread within DOTs and Planning
17 Departments. Many DOTs are updating their goals to focus less on congestion and more on reliability,
18 accessibility, safety, and person throughput.

19 In this paper and in the latest version of the *CTR Guidelines*, DDOT proposes using parking ratio as a
20 primary evaluation metric for new developments in transit-rich areas. This turns the evaluation of new
21 development from an exercise in traffic impact assessment into a simplified site design review, with
22 parking ratio serving as a proxy for the automobile mode and acts as a natural cap on the amount of
23 personal vehicle traffic that a project can generate. In addition to meeting DDOT's preferred maximum
24 parking ratios, a development is expected to implement robust Transportation Demand Management
25 (TDM) programming, improve connectivity to transit and other modes, and provide high-quality site and
26 public space design. These items all work in tandem to reduce the amount of vehicle trips generated by a
27 project and in many cases result in DDOT waiving the formal multimodal CTR study and the vehicle-
28 focused TIS.

29 As these industry shifts continue, DDOT anticipates its *CTR Guidelines* can serve as a prototype for
30 emulation as other cities grapple with their own land use challenges and modernize their TIS Guidelines.
31 The old TIS model was intended to solve a traffic problem with a traffic solution that is not consistent
32 with the modern vision of an active and walkable city. Perhaps this guidance reflects a 21st century
33 version of the TIS, updated to reflect the needs of a new century.

34 **3.0 Prior DDOT Research**

35 DDOT has been an industry innovator in the areas of trip generation, parking demand research, and
36 reforms to the TIS review process going back to the beginning of the 2010s. The process to develop an
37 updated transportation review process at DDOT occurred in parallel to various other research that
38 supported the need to take a multimodal and holistic perspective. In that decade, DDOT released the
39 following research papers, studies, posters, presentations and webtools:

- 40 • *Guidance for Comprehensive Transportation Review*, Beta Version (2012)
- 41 • *Transitioning from Traditional TIS to Comprehensive Multi-Modal Transportation Analysis* (2013)

- 1 • *An Innovative Approach for Establishing Vehicular Trip Caps for New Development* (2014)
- 2 • *Estimating Parking Utilization in Multi-Family Residential Buildings in Washington DC* (2015)
- 3 • *Predicting Travel Impacts of New Development in Major Cities: Testing Alternative Trip Generation*
- 4 *Models* (2015)
- 5 • *Methodology to Gather Multi-Modal Urban Trip Generation Data* (2015)
- 6 • Park Right DC <http://parkrightdc.org/> (2016)
- 7 • District Mobility <https://districtmobility.org/> (2016)
- 8 • Trips DC <https://tripsdc.org/> (2017)
- 9 • DDOT TDM Menu Tool (2017)
- 10 • *Multimodal Trip Generation Model to Assess Travel Impacts of Urban Developments in DC* (2017)
- 11 • *Guidance for Comprehensive Transportation Review, Version 1.0* (2019)

12 Each of these DDOT research efforts served as a building block that culminated in the creation of the
 13 2021 *CTR Guidelines* and a new development review approach.²

14 **4.0 Evolution of TIAs and CTRs in the District of Columbia**

15 Since the beginning of the 2010s, DDOT’s requirements for transportation impact assessment in the
 16 development review process have changed significantly. At the turn of the decade, DDOT typically
 17 required a traditional TIS similar to any other urban or suburban jurisdiction in the United States, where
 18 traffic impacts were evaluated and then had to be mitigated with agreed upon roadway improvements. As
 19 the decade progressed, DDOT started taking a harder line on implementing capacity-increasing roadway
 20 improvements due to their detrimental impacts to the pedestrian realm, inducement of additional driving,
 21 and negative impacts on usage of non-automotive modes. This new approach that discourages
 22 implementation of turn lanes and road widenings allowed DDOT to instead negotiate TDM strategies,
 23 reduced parking, and non-automotive network upgrades (e.g., protected bike lanes, curb extensions,
 24 missing sidewalks) in lieu of traditional roadway improvements.

25 In 2012, DDOT released the Beta Version of the *CTR Guidelines* which changed the name of the required
 26 study from Traffic Impact Study to a more multi-modal Comprehensive Transportation Review (CTR).
 27 That initial edition of the *CTR Guidelines* promoted the person-trips methodology that was subsequently
 28 adopted by ITE as the industry standard trip generation methodology. The *Guidelines* also started the
 29 process of repurposing the role of the TIA/TIS in the multimodal CTR study to treat other modes equally
 30 with the roadway capacity evaluation. As the District grew and changed through the mid-2010s, DDOT’s
 31 views also changed on a number of fronts. DDOT wanted more of a focus on pedestrian realm design and
 32 safety. This meant not allowing all transportation decisions to flow out of the vehicle-oriented TIA/TIS,
 33 but instead prioritize the needs of transit riders, pedestrians, and bicyclists ahead of automobile users.
 34 Similarly, there was a change in mindset toward prioritizing the quality of life and safety of District
 35 residents rather than focusing on serving the longer roadway-based trips of suburban vehicle commuters.

36 As DDOT and other researchers in the industry began reviewing trip generation and parking demand
 37 research, it became clear that there was a linkage between availability of parking (particularly free
 38 parking) and personal vehicle driving. (2) This was a pivotal moment because it established that the high
 39 minimum parking requirements were not just a static zoning requirement for new buildings (like a setback

² All the documents, presentations, and tools noted above are available by contacting the DDOT Planning and Sustainability Division (PSD).

1 or bay window projection), but instead had been an underlying driver of vehicle usage and auto
2 dependency for decades. These principles aided in the 2016 update to the District’s parking requirements
3 as part of the rewrite of the prior 1958 zoning regulations. The 2016 zoning update established parking
4 maximums and greatly reduced, and in some districts entirely removed, the parking minimums.

5 As the linkages between availability of parking and driving became clearer, DDOT began experimenting
6 with different methods to account for the parking supply in the CTR/TIA process. DDOT started to allow
7 developers to cap the site’s vehicle trip generation if the parking supply was provided at a low ratio. For
8 example, if a 200-unit residential building provides only 20 on-site parking spaces and is proximate to a
9 Metrorail Station, the maximum amount of exiting morning peak hour traffic and entering evening peak
10 hour traffic would be capped at 20 vehicle trips because the site cannot physically generate more *personal*
11 *vehicle* trips. DDOT uses professional judgment and an understanding of local commuting patterns to
12 adjust trip generation calculations to account for potential *ride-hailing vehicle* trips. In this example, a
13 project that would have otherwise easily met DDOT’s 25 inbound or outbound vehicle trip threshold with
14 a larger parking supply, no longer meets the threshold for a CTR or TIA. This method incentivizes
15 building projects with little or no parking and allows the developer to save costs associated with
16 conducting a study, funding roadway mitigation, and constructing a parking structure, just by eliminating
17 or reducing the on-site parking supply. Conversely, if a project significantly oversupplies parking as it
18 relates to DDOT’s preferred maximum parking ratios, then the assumed auto-mode share is required to be
19 increased (for example from 65% to 85%) to account for induced demand for driving. DDOT planners
20 and engineers take a strong stance against requiring any capacity increasing roadway mitigation resulting
21 from the increased auto mode share distributed through the roadway network, which would further induce
22 driving and negatively impact the pedestrian realm. Instead, any degradation in LOS identified in the
23 CTR/TIA are first mitigated with non-auto network upgrades or other TDM strategies.

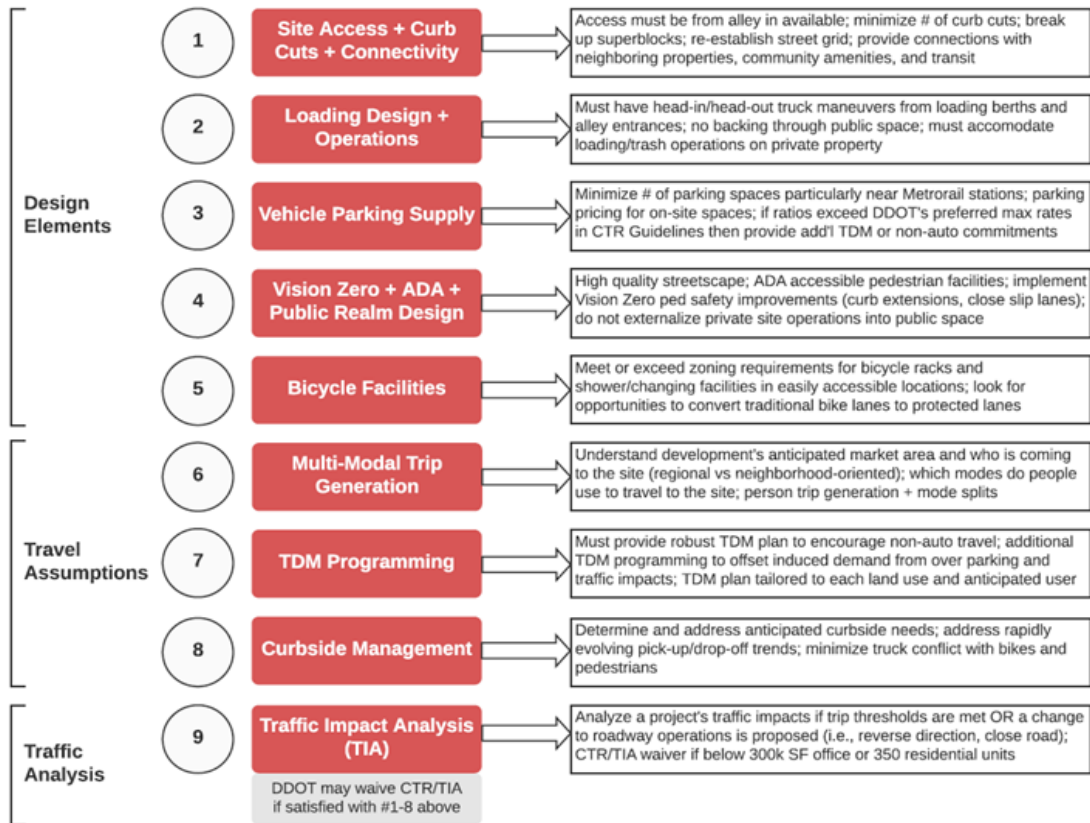
24 The 2021 *CTR Guidelines* update continues the evolution of CTRs/TIAs away from a sole focus on
25 roadway LOS and toward greater attention to site design, Vision Zero, parking supply, TDM, and public
26 space design, while keeping LOS as a tool to utilize when needed depending on the context and location
27 of the project. The *Guidelines* built upon DDOT research and data collected over the past decade and
28 established preferred maximum parking ratios for each major land use and ¼ mile distance increments
29 from high-quality transit (see Section 4.2). Based on a project’s proposed parking supply and any
30 identified impacts in the CTR/TIA, a set of TDM strategies or non-auto network upgrades must be
31 implemented to minimize the amount of vehicle trips generated. Standardized TDM Plans, study waiver
32 criteria, Vision Zero best practices, and clearer mitigation requirements are now provided in the
33 *Guidelines* to ensure consistency and effectiveness. The following sections highlight DDOT’s new
34 approach to comprehensive transportation review.

35 **4.1 New Approach to Site Design and Public Space Design**

36 A well-designed site will minimize the amount of impact on the surrounding transportation network.
37 Therefore, the developer team should focus first on site access, connectivity, loading design, vehicle
38 parking, and the pedestrian realm design. Once agreement has been reached on these items and a TDM
39 program is developed, the remainder of the project can be designed around those elements and a decision
40 made on whether to conduct or waive any additional traffic or multimodal analyses. To qualify for a Low
41 Impact Development CTR/TIA waiver, a project must be located within ½ mile of a Metrorail station or
42 ¼ mile of Streetcar or Priority Bus Routes, meet the ¼ mile preferred maximum parking ratio, provide no

1 more than 100 total parking spaces (this equates to approx. 300,000 SF of development), provide an
 2 Enhanced Tier TDM Plan, ensure there is a fully complete and ADA accessible pedestrian network
 3 connecting to transit and nearby amenities, provide two (2) electric vehicle (EV) charging stations, and
 4 ensure the curb cuts and loading design meet DDOT standards. Constructing a high-quality site and
 5 pedestrian realm design with new development is also a key pillar of DDOT’s Vision Zero program.
 6 The *CTR Guidelines* provide greater guidance and emphasis on site design and public space design. It
 7 provides best practices for accessibility, high quality pedestrian realm design, and Vision Zero strategies
 8 that all developments are expected to follow. Vision Zero strategies that slow vehicles or shorten
 9 pedestrian crossing distances include removal of channelized right-turn lanes, installation of curb
 10 extensions, minimizing the number of curb cuts, and reducing curb radii, amongst others. With less time
 11 spent scoping, conducting, and reviewing a CTR/TIA, DDOT staff and the developer team can focus on
 12 pedestrian safety and strategies for reducing vehicle trips. Figure 2 below, discusses each of DDOT’s site
 13 review priorities in greater detail.

14 **Figure 2 | DDOT Site Review Priorities**



15

16

Source: 2021 DDOT Guidance for Comprehensive Transportation Review, Version 2.0

17

4.2 New Approach to Off-Street Parking

18

DDOT is the first in the nation to include a parking supply evaluation as part of the TIS process that assesses “impacts” and “mitigation” for potential induced demand due to the over-supply of off-street

19

1 parking. As discussed in 1.0 Introduction, there are several benefits to the transportation system and to the
 2 advancement of other important public policies and societal goals from reduced off-street parking.

3 DDOT developed preferred maximum parking ratios that differ by land use and ¼ mile increments to
 4 high frequency transit. The rates were based on a combination of methodologies including the District’s
 5 desired mode share goal and prior residential parking demand data collection. DDOT’s 2015 MoveDC
 6 Mobility Plan and the District’s 2020 Comprehensive Plan Framework calls for a District-wide 75% non-
 7 automotive mode share goal. Meeting the parking evaluation criteria in the *CTR Guidelines* (Figures 3
 8 and 4 below) in conjunction with implementation of robust Transportation Demand Management (TDM)
 9 strategies are key tools in achieving that vision as new development is approved. Use of parking ratio as
 10 the primary evaluation metric, rather than LOS, has turned DDOT’s evaluation of new transit-oriented
 11 infill development from an exercise in traffic impact assessment to a site-based design review.

12 DDOT’s preferred maximum parking ratios for all uses were calculated based upon mode share goals and
 13 assumptions made for the number of residents/unit, GSF/hotel room, or employees/GSF, as observed in
 14 recently approved developments. Mode share goals increase from 65% to 85% non-automotive as a site
 15 gets closer to a transit station, which on average should match or advance the District-wide 75% non-auto
 16 goal. For residential uses, the max parking ratios were also validated based on prior data collected by
 17 DDOT at 115 residential buildings around the District in 2014-15. (13) The natural demand for parking
 18 observed during that timeframe was slightly higher than the rates selected for the development review
 19 parking supply test in Figure 3 (for example observed demand for residential parking in 2014 was closer
 20 to 0.35-0.40 spaces/unit within ¼ mile of a Metrorail Station). For sites within 1/8 mile from a Metrorail
 21 station, which captures developments on top of and within one block of a station, DDOT encourages the
 22 developer to provide zero (0) on-site parking when possible and to justify the inclusion of any parking.

23 **Figure 3 | DDOT-Preferred Maximum Parking Ratios for Off-Street Parking**

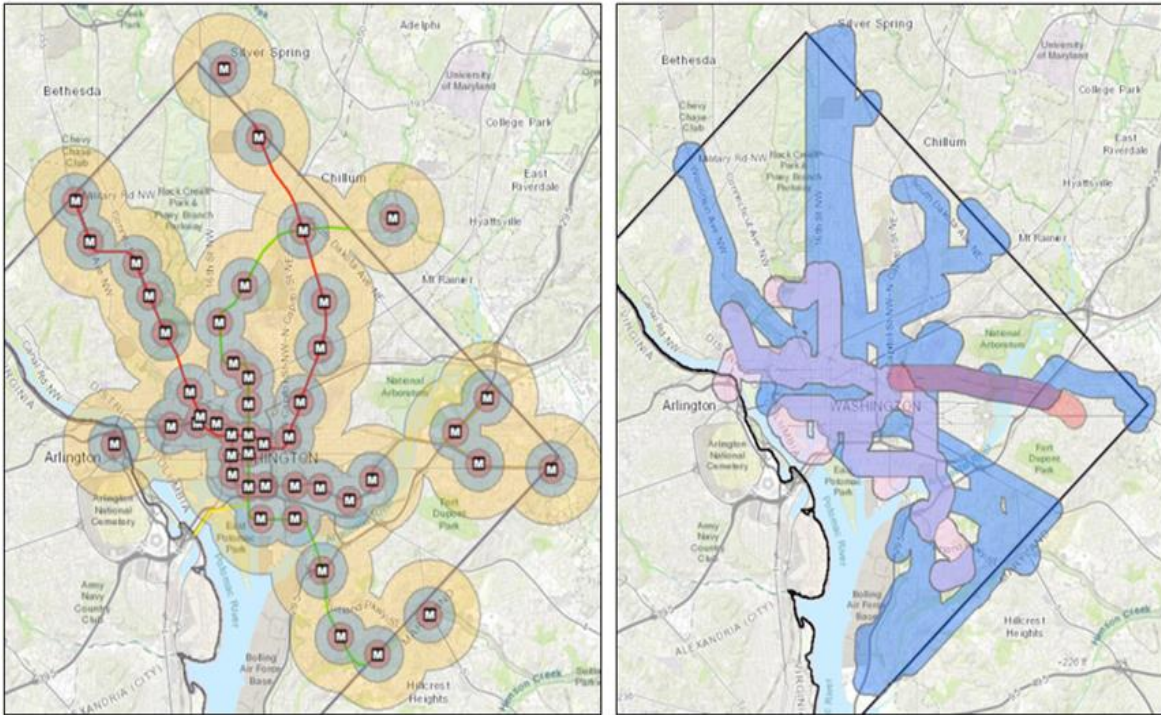
Land Use	< ¼ mile of Metrorail	< ½ mile of Metrorail OR < ¼ mile of Priority Bus/Streetcar	<1.0 mile of Metrorail	>1.0 mile of Metrorail
Based on Mode Share Goal:	85% Non-Auto	80% Non-Auto	75% Non-Auto	65% Non-Auto
Residential	0.25 or less spaces/unit ~1 per 4 units	0.35 or less spaces/unit ~1 per 3 units	0.40 or less spaces/unit ~1 per 2.5 units	0.55 or less spaces/unit ~1 per 2 units
Office	0.40 or less spaces/1k GSF ~1 per 6 employees	0.50 or less spaces/1k GSF ~1 per 5 employees	0.65 or less spaces/1k GSF ~1 per 4 employees	0.85 or less spaces/1k GSF ~1 per 3 employees
Hotel	0.35 or less spaces/1k GSF ~1 per 6 rooms	0.45 or less spaces/1k GSF ~1 per 5 rooms	0.60 or less spaces/1k GSF ~1 per 4 rooms	0.75 or less spaces/1k GSF ~1 per 3 rooms
Retail	1.00 or less spaces/1k GSF	1.25 or less spaces/1k GSF	1.60 or less spaces/1k GSF	2.00 or less spaces/1k GSF

24

25

Source: 2021 DDOT Guidance for Comprehensive Transportation Review, Version 2.0

1 **Figure 4 | Distance from Metrorail and Priority Bus/Streetcar Routes for Reduced Parking**



2
3 *Source: 2021 DDOT Guidance for Comprehensive Transportation Review, Version 2.0*

4 **4.3 New Approach to Transportation Demand Management (TDM)**

5 TDM is a set of strategies and policies at a specific development that work in tandem with reduced
6 parking, priced parking, and nearby transit to minimize site-generated vehicle trips. The *CTR Guidelines*
7 provide standardized TDM plans by land use, user type, and project impact. There is no citywide TDM
8 ordinance in the District of Columbia, like in many other jurisdictions, so TDM plans must be negotiated
9 on a case-by-case basis. TDM is also self-enforced by DDOT due the lack of resources within other
10 District government agencies typically tasked with enforcing zoning regulations and proffers. Prior to the
11 launch of the 2021 *CTR Guidelines*, DDOT rolled out new internal processes and procedures, as well as
12 new TDM monitoring strategies, to better ensure developer TDM commitments continue to be
13 implemented years after a building has opened.

14 There are three tiers of plans, each tied to the amount of excess on-site parking and identified traffic
15 impacts. The **Baseline Plan** includes relatively inexpensive and easy to implement strategies like
16 unbundled parking, appointing a site TDM coordinator to work with DDOT's TDM program, providing
17 welcome packets to new residents highlighting non-auto options, and designing bike facilities to
18 accommodate non-traditional bikes. The **Enhanced Plan** builds on the Baseline Plan and includes items
19 that are more expensive to implement. These include installing a digital transit information screen,
20 installing additional bike parking, and agreeing to not lease out excess unused parking to other buildings.
21 The **Enhanced Plus Plan** is for sites that are significantly over-parked or have unmitigated intersection
22 impacts and are intended to be substantive enough that they act as a disincentive to over-parking the site.
23 These include a multi-year commitment to providing bikeshare memberships to all residents or

1 employees, installing a 19-dock Capital Bikeshare station, providing SmarTrip cards preloaded with fares,
2 cash contributions to the Transportation Mitigation Fund, and a package of non-automotive
3 improvements. Refer to Appendix C of the *CTR Guidelines* for standardized TDM plans for the
4 residential, office, retail, and hospitality land uses.

5 In situations where a project exceeds 1 million GSF of development (e.g., DC Wharf or McMillan
6 redevelopment) or is projected to have a high single occupancy vehicle rate (e.g., Campus Master Plans),
7 the TDM Plan must be accompanied by a Performance Monitoring Plan (PMP). The PMP includes trip
8 and mode share goals for the campus, data to be collected annually, reporting requirements, sunseting
9 provisions (if any), and penalties for not meeting trip and mode share targets. PMP parameters for select
10 examples are included Appendix D of the *CTR Guidelines*.

11 Shifting to a parking evaluation metric with TDM programming in order to streamline the development
12 review process has lessened the role of the LOS analysis. Developers can now more easily receive a
13 waiver from the multimodal CTR study or TIA—in many situations if the project has a parking ratio
14 below DDOT’s parking benchmarks and meets other criteria, as discussed in Section 4.1. A TIA is still be
15 required for larger projects, if there is a specific concern about ingress and egress at a site’s driveway(s),
16 or if a major operational roadway change is proposed (e.g., lane reductions, converting one-way to two-
17 way, etc). In situations where a CTR or TIA is waived by DDOT, a more abbreviated Transportation
18 Statement is required which documents the project’s trip generation, site operations, TDM program, and
19 commitments for physical improvements.

20 **4.4 New Approach to Mitigation**

21 DDOT’s approach to mitigation of vehicle impacts is to first make changes on or near the site (e.g.,
22 reduced parking, TDM programming, streetscape, better connectivity, pedestrian improvements) to
23 reduce the demand for vehicles going through intersections projected to fail in the LOS analysis, rather
24 than widen roads and intersections to accommodate projected vehicle trips. DDOT does not accept
25 roadway capacity increasing improvements identified in the LOS analysis for a land development project
26 since they are detrimental to the safety and design of the public realm, further induce vehicular trips, and
27 negatively impact usage of non-auto modes. Instead, mitigation for most traffic impacts can be addressed
28 with reduced parking, strengthened TDM Plan, non-auto network upgrades, and/or cash in-lieu. In fact,
29 DDOT has worked with several developers since 2019 to convert previously negotiated roadway
30 improvements into a cash in-lieu contribution to the newly created Transportation Mitigation Fund. Once
31 in the Mitigation Fund, the monies are available for DDOT to use on other non-auto network
32 improvements, to supplement future data collection and research efforts, or to wrap into a future
33 intersection redesign.

34 Figure 5 below is a simplified matrix outlining DDOT’s TDM and mitigation requirements based on the
35 two (2) mitigation tests (parking supply and traffic impacts) and is intended for projects 500,000 GSF or
36 smaller. Projects that fall into the upper left-hand corner of the table need only provide a Baseline or
37 Enhanced TDM Plan to gain DDOT’s recommendation of approval. For straightforward projects, this
38 agreement can often be completed in the pre-application meeting and may require no further study or
39 follow-up. Projects with more parking and/or traffic impacts falling elsewhere in the table are required to
40 provide an Enhanced Plus Plan and performance monitoring, non-auto network upgrades, or a monetary
41 contribution to the Transportation Mitigation Fund, as DDOT deems necessary. DDOT expects this

1 simplified approach to mitigation will incentivize more development in transit accessible areas with
 2 minimal accompanying off-street parking.

3 As an example, in Fall 2020, DDOT staff reviewed a mixed-use development located less than ¼ mile
 4 from the Navy Yard-Ball Park Metrorail Station, consisting of 608 residential units, 24,000 GSF of first
 5 floor retail, and 311 parking spaces (5 Street SW, ZC 20-14). Based on the parking test criteria outlined in
 6 Section 4.2 above, this project was over-parked by 104 spaces (DDOT’s max parking ratios of 0.30
 7 spaces/residential unit and 1.00 space/1,000 GSF retail near a Metrorail Station yield a preferred
 8 maximum of 207 spaces). Additionally, the project impacted four (4) nearby intersections by degrading
 9 LOS from either E to F or from F to a worse F due to the addition of site-generated traffic. In lieu of the
 10 developer’s recommendation for signal timing adjustments, DDOT utilized the matrix in Figure 5 to
 11 negotiate a package of non-automotive improvements as mitigation for the high parking ratio (i.e., more
 12 induced demand for driving) and the impacted intersections.

13 The mitigation package agreed to by both DDOT and the developer included: 1) Enhanced TDM Plan
 14 (Tier 2 strategies) with annual bikeshare memberships for all residents in the first year after initial lease-
 15 up; 2) installation of two 4-dock Capital Bikeshare expansion plates at a nearby station; 3) construction of
 16 three curb extensions; 4) contribution of \$90,000 to the Transportation Mitigation Fund for bicycle,
 17 pedestrian, or transit improvements within the project’s Advisory Neighborhood Commission boundaries
 18 (ANC 6D) to be determined by DDOT at a later date; and 5) a relocated bus stop with a new bus pad. The
 19 costs and effectiveness of these non-automotive improvements were weighed against traditional roadway
 20 capacity increases and determined to be more beneficial to the residents of the neighborhood while
 21 advancing many of the District’s policy goals.

22 **Figure 5 | Mitigation and TDM Requirements Based on Parking Supply and Traffic Impacts**

		TRAFFIC IMPACTS			
		No Impacts or No CTR/TIA Required (no intersections degrade to unacceptable levels)	Minor Impacts at One Intersection (signal timing or cycle length adjustments only)	Minor Impacts at Multiple Intersections (signal timing or cycle length adjustments only)	Severe Impacts at One or More Intersections (physical roadway improvements beyond signal timing adjustment)
PARKING SUPPLY (see Table 2 in CTR Guidelines)	At or Below Benchmark	Baseline TDM Plan	Baseline TDM Plan	Enhanced TDM Plan	Enhanced TDM Plan + Direct Mitigation OR Additional TDM OR Monetary Contribution OR Non-Auto Upgrades OR Performance Monitoring TBD
	Up to 10% Over-Parked	Baseline TDM Plan	Enhanced TDM Plan	Enhanced TDM Plan + Additional TDM OR Monetary Contribution OR Non-Auto Upgrades to be negotiated	Enhanced TDM Plan + Direct Mitigation OR Additional TDM OR Monetary Contribution OR Non-Auto Upgrades OR Performance Monitoring TBD
	Up to 20% Over-Parked	Enhanced TDM Plan	Enhanced TDM Plan + Additional TDM OR Monetary Contribution OR Non-Auto Upgrades to be negotiated	Enhanced TDM Plan + Additional TDM OR Monetary Contribution OR Non-Auto Upgrades to be negotiated	Enhanced TDM Plan + Direct Mitigation OR Additional TDM OR Monetary Contribution OR Non-Auto Upgrades OR Performance Monitoring TBD
	Over 20% Over-Parked	Enhanced TDM Plan + Additional TDM OR Monetary Contribution OR Non-Auto Upgrades to be negotiated	Enhanced TDM Plan + Additional TDM OR Monetary Contribution OR Non-Auto Upgrades to be negotiated	Enhanced TDM Plan + Additional TDM OR Monetary Contribution OR Non-Auto Upgrades to be negotiated	Enhanced TDM Plan + Direct Mitigation OR Additional TDM OR Monetary Contribution OR Non-Auto Upgrades OR Performance Monitoring TBD

23

24

Source: 2021 DDOT Guidance for Comprehensive Transportation Review, Version 2.0

4.5 Lessons Learned Upon Implementation

Since the launch of *CTR Guidelines* Version 1.0 in 2019, there have been a number of lessons learned and successes observed during the application of the new development review processes and CTR requirements. These helped inform the 2021 update. For staff, DDOT’s review of developments has evolved from an exercise in traffic impact assessment and all the technical analysis that goes with it (e.g., reviewing Synchro inputs, developing background growth rates, etc.) to more of a project design review. This has resulted in fewer staff hours being spent across multiple agency divisions on the scoping and review of CTRs due to the “right-sized” scoping of studies and in many cases waiving of studies. A greater focus on design, streetscape, public space activation, and tactical urbanism and less focus on Synchro, traffic signals, and traffic operations has changed the skillsets being sought in new employees hired into the DDOT Neighborhood Planning Branch where the development review function resides. Neighborhood Planning staff is able to leverage the expertise of traffic engineers and signal designers within the agency, as needed.

When required, CTRs have been scoped to meet the needs of the project and to answer questions about the project DDOT is asking, rather than a blanket evaluation of numerous intersections surrounding every site. CTR waivers have resulted in a reduction of about 1/3 the number of scoping forms and studies submitted to DDOT for review in 2020 as compared to 2019 and previous years. Fewer studies have resulted in quicker staff reviews of projects and greater frequency of reports submitted on-time to the zoning bodies. Regardless of whether a CTR is required, DDOT staff continues to negotiate lower parking ratios, more robust TDM plans, contributions to the Transportation Mitigation Fund, and more non-automotive physical improvements as compared to previous years.

More comprehensive documentation of DDOT requirements in the *CTR Guidelines* has resulted in site design, parking supply, TDM requirements, and mitigation negotiations being resolved much earlier in the development process, often as early as the pre-application meeting. This has prevented a lot of back-and-forth with the developer team in the week leading up to the zoning hearing. DDOT reports have evolved from calling out items that developers need to remedy to documenting agreements on TDM and mitigation that have already been reached between the parties, allowing for a ‘cleaner’ hearing with the zoning bodies. As previously noted, less time spent on nuanced TIA assumptions is more time spent on improving the project design and discussing which Vision Zero improvements to implement.

Feedback from the development community has been generally positive. DDOT’s CTR and mitigation requirements are now much clearer and asks are more consistent, which allows the developers to better predict and budget for transportation improvements. DDOT’s published preferred maximum parking rates have given developers cover with financial lenders and the adjacent residential communities who generally want to see more off-street parking, not less. One interesting and unexpected outcome of DDOT waiving CTRs has been the advent of “defensive TIA.” These are traffic studies that communities have requested the developer conduct in order to gain the ANC’s recommendation of approval, even when DDOT has determined the analysis is not necessary to gain agency approval. This situation most often occurs with infill developments that have a low parking ratio, mixed land uses, a short walk to transit, and mitigation that has already been negotiated.

1 **5.0 Applicability to Other Jurisdictions**

2 DDOT’s development review approach and *CTR Guidelines* were an evolution over more than a decade
3 to address challenges specific to the District of Columbia and have adapted to local laws and systems that
4 may be different than most other jurisdictions. That said, the authors expect the underlying philosophies,
5 as well as many aspects of the *CTR Guidelines* themselves, will be broadly applicable to urban and
6 transit-rich cities throughout North America. To determine if DDOT’s model should be adopted entirely
7 or only individual components in certain situations, it is best to understand the circumstances these
8 processes and practices have evolved in the District:

- 9 • The District of Columbia has a robust Metrorail network with ½ mile walksheds covering large
10 swaths of the city, as shown in Figure 4 above, allowing much of the city to not be auto
11 dependent. One-half mile is generally considered the maximum expected distance people will
12 walk regularly to access rail transit for the purpose of commuting to work. Many of the areas
13 remaining in the District without Metrorail service are captured with ¼ mile walksheds to
14 Streetcar, Circulator, and Priority Corridor Metrobus Routes. It cannot be stressed enough that
15 access to high-frequency and high-quality mass transit is the linchpin that allows a city to permit
16 much higher densities, greatly reduce auto-dependency, and make a significant shift in how new
17 development is reviewed.
- 18 • The Height Act of 1910 caps the height of buildings at 130 feet throughout the District, which has
19 resulted in no buildings constructed taller than approximately 13 stories. As such, this paper and
20 the *CTR Guidelines* do not contemplate taller buildings and higher densities that may be
21 permitted in other cities. However, very few cities are building at a scale denser than the District.
- 22 • DDOT has wider flexibility to negotiate with developers through the land development approval
23 process and more ability to impose conditions during curb cut approval (for by-right projects that
24 do not require zoning approval) than many other cities. The District’s zoning approval process
25 allows for mitigation to be negotiated with District agencies and the developers and other
26 community benefits and amenities be negotiated through the ANC³ (depending on type of
27 development application). Unlike many other jurisdictions, the District has no “adequate public
28 facilities ordinance” and DDOT is not required to accept TIA-recommended road widening or
29 other vehicle-inducing auto-oriented improvements.
- 30 • DDOT has been given the regulatory authority to determine what a “transportation impact” is and
31 what appropriate “mitigations” should be required. The ability to replace roadway improvements
32 recommended by a TIA with non-automotive improvements or monetary contribution of
33 comparable cost, effectiveness, or quality of life improvement was critical to the evolution of
34 CTRs and the *Guidelines* over the last decade. Additionally, the *CTR Guidelines* are not approved
35 by the District Council or Zoning Commission, so DDOT has more ability to experiment with
36 best practices and incorporate new research into the requirements more quickly. Additionally, the
37 District does not have an impact fee mechanism. While this approach would inform such fee
38 structures, DDOT individually negotiates improvements on a project by project basis.

³ Advisory Neighborhood Commissions (ANC) are a unit of District government made up of elected representatives from the community. Each of DC’s 8 wards has 6-8 ANCs each consisting of 6-8 Single Member Districts (SMD).

- 1 • As a State, County, and City Department of Transportation wrapped into one, DDOT controls
2 virtually all roads in the District, except for streets around the National Mall and nearby
3 monuments and Federal facilities.⁴ This means DDOT issues all curb cut permits and has entire
4 decision-making power over the design of streets. One challenge many local jurisdictions face is
5 that State DOTs often control roads through a town or city’s downtown and they frequently opt to
6 make those streets as wide as possible, in conflict with local goals for slower traffic and safer
7 spaces for pedestrians and cyclists. Additionally, policies are not imposed on the District by a
8 state government, like with California and SB 743.
- 9 • The District is faster-growing than most American cities and most new developments are transit-
10 oriented. Between 2005 and 2019, the District’s population grew by nearly 139,000 to 706,000
11 residents, approximately 24% growth over 15 years. (14) In the 2010s, approximately 88% of
12 new residents to the District were car-free according to the American Household Community
13 Survey (15) and 78% of all new development was within ½ mile of a Metrorail Station. (16) (17)
- 14 • The District does not have a city-wide Transportation Demand Management (TDM) ordinance,
15 like some other cities, so TDM plans must be negotiated on a project by project basis and agreed
16 to plans codified in a myriad of different types of approvals, depending on whether it is a by-right
17 project or not (e.g., zoning order, curb cut permit, etc.). This paper does not necessarily advocate
18 exclusively for this method as there are numerous other models and examples around the world,
19 such as establishing a Transportation Management Association (TMA)⁵ for a college, hospital
20 campus, or central business district of a city or implementing an impact fee program, as
21 aforementioned, whereby funds are pooled for best use by the transportation agency.

22 DDOT’s new development review model, as discussed throughout this paper, is best suited in a
23 jurisdiction or sub-area that is relatively dense and has high quality and high frequency transit. DDOT and
24 the DC Office of Planning coordinate land use and transportation planning to ensure that uses are
25 adequately mixed and density is clustered near transit. Even if other jurisdictions opt not to take DDOT’s
26 *CTR Guidelines* regime wholesale, there are a number of strategies and takeaways that can be “food for
27 thought” as policies and TIA Guidelines are developed. DDOT encourages the following most effective
28 practices be considered regardless of jurisdiction size, transit coverage, culture of auto-dependency, or
29 relative population and economic growth:

- 30 • Understand that planning for auto-oriented development will yield higher traffic-generating
31 development. As such, consider not letting roadway capacity be the limiting factor with adjacent
32 land development density, especially in transit adjacent areas. To accomplish this, cultivate a
33 culture of pushing back against roadway capacity increases with new development and formulate
34 policies and processes for accepting non-automotive network improvements or cash in-lieu of
35 additional roadway capacity. This may require changes to agency policy, a jurisdiction’s laws, or
36 planning framework.
- 37 • Improve the coordination of land use and transportation planning at the Comprehensive
38 Plan/Master Plan level and conduct adequate analysis to ensure transit and other modes

⁴ These are controlled by the National Park Service (NPS) or Architect of the Capitol (AOC).

⁵ Sometimes known as a Transportation Management Organization (TMO) or Transportation Management District (TMD).

1 appropriately support the planned densities and land use mix. Then, at the time of site
2 development, the review should focus on conformance to the Comprehensive/Master Plan, site
3 access, site operations, parking supply, surrounding streetscape design, and TDM programming.

- 4 • Focus on site design, pedestrian safety, and multimodal person-trip options first before traditional
5 traffic impact study considerations. In a 21st century city, every development should be
6 considered multimodal. Sidewalks providing ingress and egress to and from the development to a
7 robust pedestrian network as well as on-site bicycle accommodations should be an absolute bare
8 minimum requirement for any development. As such, policies should be in place such that every
9 jurisdiction can require every development fulfill the basic infrastructure requirements to provide
10 such a multimodal environment. Also, consider other policy goals, aside from vehicle congestion
11 relief, including equitable mobility options, Vision Zero, impacts to housing and access to the job
12 market, etc., depending on the jurisdiction's unique needs.
- 13 • Develop criteria for determining whether a project has de minimis impacts to the transportation
14 network and create a TIA waiver based on the criteria deemed most important (for example the
15 DDOT waiver is based on size of project, proximity to transit, parking supply, and completeness
16 of pedestrian network). Right-size the scope of transportation studies to answer questions the
17 jurisdiction is seeking to be answered.
- 18 • If looking for an alternate metric to LOS, consider establishing parking caps similar to DDOT,
19 focusing first on Metrorail, light-rail, and bus rapid transit station areas. Ensure there is an
20 adequate land use mix so if a resident or employee forgoes owning a personal vehicle, other
21 amenities are within walking or biking distance. This method can be done in conjunction with a
22 vehicle-miles travelled (VMT) metric (see California) or pro-rata share district (see Montgomery
23 County, MD) and established at the comprehensive plan, sector plan, zoning ordinance, or TIA
24 study guidelines level, depending on the jurisdiction.
- 25 • When conducting a TIA, compare the vehicle trip generation estimates with the parking supply
26 and use professional judgment to determine if the assumed automobile mode split should be
27 adjusted upward or downward. This method can account for induced demand for driving or cap
28 the vehicle trip generation at a low amount where those trips cannot physically be generated due
29 to limited on-site parking. Also use professional judgment to account for the potential of ride-
30 hailing trips if trip generation is capped due to the presence of fewer parking spaces.
- 31 • Move the development review function out of the traffic engineering group and into
32 transportation planning or urban design group. DDOT placed this function within the
33 Neighborhood Planning Branch which is made up of urban planners, urban designers, and
34 transportation planners. This group views development through the prism of place-making,
35 streetscape design, and pedestrian safety. The development review team can still leverage the
36 expertise of traffic engineers and signal designers when needed. Additionally, agency managers
37 and planners should embrace a culture of innovation and experimentation in the development
38 review function.

39 In short, most cities are similar enough to the District for this new approach to transportation impact
40 analysis to make sense for them to explore the tactics presented in the new *CTR Guidelines*. Importantly,
41 this means accounting for induced demand, prioritizing pedestrian infrastructure investment, providing

1 incentive for developers to meet site design and TDM minimums, using LOS to understand areas of
2 multimodal conflict, and focusing on the proposed parking ratio.

3 **6.0 Further Research and Exploration**

4 Following the release of the forthcoming 2021 *CTR Guidelines*, DDOT planners and researchers will
5 continue to stay abreast of and participate in various research efforts to develop best practices in a number
6 of important areas that can be incorporated into future *Guidelines* updates.⁶ These include 1) inclusion of
7 equity considerations in the development review process (e.g., mobility for different lifestyles, stages of
8 life, geographic areas, and socioeconomic groups); 2) continued exploration of linkages between parking,
9 auto-ownership, trip generation, and shared mobility service; 3) innovations in trip generation
10 methodologies that specifically break out vehicle trips by ride-hailing services; 4) implications to mode
11 shift, transit ridership, auto ownership, and curbside usage as a result of reduced off-street parking; 5)
12 quantifying the impacts of individual and cumulative TDM strategies; 6) usage of a VMT metric, as in
13 California, at the site development level, 7) exploration of the factors that make an area non-auto
14 dependent and how to incorporate new tools (i.e., Walk Score) and policies into the development review
15 program to advance this goal; and 8) preparation for connected and autonomous vehicles (CAV) and
16 ensuring these technologies do not encourage more single-occupancy vehicle usage, sprawl and longer
17 VMTs, or undermine public transit usage.

18 **7.0 Conclusion**

19 The planning team at DDOT set out in the early 2010s to establish a new, more comprehensive, prototype
20 for measuring and mitigating multimodal transportation impacts from development. The *CTR Guidelines*
21 were developed as part of this effort to streamline DDOT’s development review process, get better quality
22 development, and better align mitigation ‘asks’ with agency and District policy goals (such as increased
23 housing production and reduced auto dependency), all while reducing the amount of staff resources
24 dedicated to this function. The process to establish and then mature this guidance, as well as the factors
25 and variables included in this new review, represent a significant leap forward for understanding the
26 transportation impacts resulting from new development. Included in the *CTR Guidelines* are new
27 approaches for evaluating the appropriateness of proposed off-street parking supply, linking the proposed
28 parking supply to induced demand for driving, and providing more consistent mitigation guidelines that
29 allow greater leverage of traffic impacts to realize offsetting non-auto network improvements. This
30 guidance can serve as a template for other transportation agencies throughout North America, particularly
31 in cities with high quality transit access.

32 The *CTR Guidelines* are a product of nearly a decade of research, data collection, and industry
33 collaboration by DDOT planners. DDOT has carved out a niche expertise in the areas of urban trip
34 generation, parking demand, and reforms to the TIA process, and has presented on these topics at
35 numerous ITE and TRB conferences.⁷ These guidelines represent, in many ways, the culmination of this

⁶ If any public agencies, research organizations, or private entities are currently innovating in these areas or would like to collaborate on a future effort, contact the lead author.

⁷ In 2020, DDOT presented this new approach at the ITE Annual Meeting and Vision Zero Cities Conference and on two (2) webinars in 2019, one for ITE and one for the TRB Transportation and Land Use Committee. The *CTR Guidelines* and an accompanying summary presentation can be found at <https://ddot.dc.gov/node/470382>.

1 decade of research and the guidance developed is well suited for other jurisdictions to use and allow the
2 entire transportation industry to take a step forward in the realm of transportation impact analyses.

3 Specifically, there are five (5) key areas of innovation other cities should implement policy around. These
4 include:

- 5 • Repurposing LOS analysis to guide selection of non-auto infrastructure improvements;
- 6 • Establishing prototype TDM plans with increasing requirements dependent on trip production;
- 7 • Establishing off-street preferred maximum parking ratios;
- 8 • Establishing criteria for a waiver from a CTR or TIA;
- 9 • Incorporating a Vision Zero perspective in development impacts mitigation.

10 Further, transportation agencies must account for induced demand in traffic analysis, prioritize pedestrian
11 infrastructure investment, and provide strong incentive for developers to meet site design and TDM
12 minimums. DDOT looks forward to seeing industry guidance shift to incorporate these understandings.⁸

13 Cities should continuously evaluate and modernize their approaches to development review and
14 transportation analyses to ensure their methods match their stated mobility missions. In many cases,
15 adjustments are possible that will incentivize positive change while disincentivizing development
16 components that will not further their City or agency goals. The Authors hope the *CTR Guidelines* from
17 the District of Columbia’s Department of Transportation help others prioritize multimodal and people-
18 centered approaches to transportation reviews.

⁸ DDOT is ready and willing to provide technical assistance or resources to other jurisdictions contemplating changes in these areas, and interested jurisdictions are encouraged to reach out to the lead author. Since the 2019 Version 1.0 release, DDOT has engaged in conversations with large and medium-sized cities about incorporating components of the *CTR Guidelines* approach into their latest TIA Guidelines update, including Boston, Austin, Seattle, San Francisco, Buffalo, Madison, Toledo, and Pittsburgh.

1 Citations

- 2 (1) *Forecasting DC Growth 2015-2045 Results and Methodology*; District of Columbia Office of Planning;
3 November 2016. <https://planning.dc.gov/publication/dc-forecasts>
- 4 (2) Currans, Abou-Zeid, Iroz-Elardo; *Linking Residential Parking to Automobile Transportation Impact Outcomes*
5 *at a Development Level*; 2020 TRB Annual Meeting Presentation.
- 6 (3) Dey, Soumya and Fricker, Jon; *Guidelines for Traffic Impact Analysis of Developments Along State Highways*;
7 Indiana DOT; JHRP-92/4. <https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1822&context=jtrp>
- 8 (4) Federal Highway Administration, Office of Operations; *Traffic Analysis Tools*.
9 <https://ops.fhwa.dot.gov/trafficanalysistools/index.htm>
- 10 (5) *Handbook of Simplified Practice for Traffic Studies*; Iowa Department of Transportation and Iowa Highway
11 Research Board; Project TR-455; November 2002. [https://intrans.iastate.edu/app/uploads/2002/11/Handbook-of-](https://intrans.iastate.edu/app/uploads/2002/11/Handbook-of-Simplified-Practice-TrafficStudies.pdf)
12 [Simplified-Practice-TrafficStudies.pdf](https://intrans.iastate.edu/app/uploads/2002/11/Handbook-of-Simplified-Practice-TrafficStudies.pdf)
- 13 (6) Recommended Practice: *Transportation Impact Analyses for Site Development* (TIASD); Institute of
14 Transportation Engineers (ITE); 2010.
- 15 (7) Spack, Mike and Ficek, Bryant; *Traffic Study Manual: The Insider's Guide to Studying the Traffic Impacts of a*
16 *Proposed Development*; 2013. <http://www.spackacademy.com/dd-product/traffic-study-manual/>
- 17 (8) National Household Travel Survey Daily Travel Quick Facts. [https://www.bts.gov/statistical-](https://www.bts.gov/statistical-products/surveys/national-household-travel-survey-daily-travel-quick-facts)
18 [products/surveys/national-household-travel-survey-daily-travel-quick-facts](https://www.bts.gov/statistical-products/surveys/national-household-travel-survey-daily-travel-quick-facts)
- 19 (9) *New Reports Highlight Cost of Congestion to Communities and Economy*; American Association of State and
20 Highway Transportation Officials (AASHTO); February 15, 2019. [https://aashtojournal.org/2019/02/15/new-](https://aashtojournal.org/2019/02/15/new-reports-highlight-cost-of-congestion-to-communities-and-economy/)
21 [reports-highlight-cost-of-congestion-to-communities-and-economy/](https://aashtojournal.org/2019/02/15/new-reports-highlight-cost-of-congestion-to-communities-and-economy/)
- 22 (10) Litman, Todd; *Generated Traffic: Implications for Transport Planning*; Victoria Transport Policy Institute
23 (VTPI); July 1, 2020. <https://www.vtpi.org/gentraf.pdf>
- 24 (11) Marshall, Wesley and Dumbaugh, Eric; *Revisiting the Relationship Between Traffic Congestion and the*
25 *Economy: A Longitudinal Examination of US Metropolitan Areas*; May 23, 2018.
26 [https://www.researchgate.net/publication/325322099_Revisiting_the_relationship_between_traffic_congestion_and](https://www.researchgate.net/publication/325322099_Revisiting_the_relationship_between_traffic_congestion_and_the_economy_a_longitudinal_examination_of_US_metropolitan_areas)
27 [the_economy_a_longitudinal_examination_of_US_metropolitan_areas](https://www.researchgate.net/publication/325322099_Revisiting_the_relationship_between_traffic_congestion_and_the_economy_a_longitudinal_examination_of_US_metropolitan_areas)
- 28 (12) Proposed Recommended Practice: *Multi-modal Transportation Impact Analysis for Site Development*
29 *(MTIASD)*; Institute of Transportation Engineers (ITE); Forthcoming 2021. MTIASD Purpose and Need Paper
30 (August 9, 2017): <https://www.ite.org/pub/?id=00E34098-C5AA-936A-62FC-6F86906FD000>
- 31 (13) Rogers, Jonathan et al; *Estimating Parking Utilization in Multi-Family Residential Buildings in Washington*
32 *DC*; TRB Annual Meeting Paper; November 2015.
- 33 (14) Clebaugh, Jeff; *DC Population Grows to 706,000 but Growth is Slowing*; WTOP News; January 15, 2020.
34 <https://wtop.com/business-finance/2020/01/dc-population-climbs-to-nearly-706000-but-growth-is-slowing/>
- 35 (15) Chung, Payton; *88% of New DC Households are Car-Free*; Greater Greater Washington; September 12, 2014.
36 <https://ggwash.org/view/35905/88-of-new-dc-households-are-car-free>
- 37 (16) *DC Has 159M SF of Development in the Pipeline*; Bisnow; 2015. [https://www.bisnow.com/washington-](https://www.bisnow.com/washington-dc/news/other/78-of-all-future-development-in-dc-is-near-a-metro-51907)
38 [dc/news/other/78-of-all-future-development-in-dc-is-near-a-metro-51907](https://www.bisnow.com/washington-dc/news/other/78-of-all-future-development-in-dc-is-near-a-metro-51907)
- 39 (17) *DC Development Report: 2014/2015 Edition*; Washington DC Economic Development Partnership (WDCEP);
40 2015. http://wdcep.com/wp-content/uploads/2015/01/DCDR14_150dpi-C.pdf