



Rewrite the Rules to Boost Growth, Not Traffic

All Transportation is Local
A Field Guide for City Leaders

Rewrite the Rules to Boost Growth, Not Traffic



Shape Your City with Smart Regulations

Many regulations make it hard for residents to get around without a car. Old, suburban-oriented standards force developers to build parking garages and widen streets to accommodate traffic, and in the process make it harder to walk and create successful transit. Cities are increasingly flipping the script, updating these old mandates and encouraging developers to make it easier to use other transportation options. Cities are also taking on outdated taxi laws that haven't adapted to a new transportation era.

- 1. Parking policy**
 - **Reduce parking minimums**
 - **Allow shared parking**
 - **Create transit overlay zones**
- 2. Change development review to cause less traffic loading space**
 - **Eliminate Level of Service from transportation impact review**
 - **Rethink Trip-Generation and Parking Standards**
 - **Integrate transportation options into development review**
- 3. Design streets that move people**
- 4. Design walkable, transit-friendly neighborhoods**

1. Parking policy

Reduce parking minimums

How does this strategy help your city?

For the past half-century, zoning codes across the United States have imposed minimum requirements for on-site parking spaces. More “art” than “science,” these requirements were introduced to allay concerns that existing parking supplies were insufficient to handle projected future traffic demands. In nearly every city the resulting requirements have been over-generous, even when perceptions suggest shortages. On average, 65% more parking is provided than is used.¹

This oversupply of parking is expensive to construct and maintain and has serious negative consequences for economic development. The artificial reduction in the supply of developable land leads to higher costs for housing, operating a business, and for goods and services. These parking requirements also inhibit the development of walkable and bikeable streets. Especially in transit-rich neighborhoods, it is critical to rightsize parking at more appropriate levels, generally below current standards, to ensure land is developed efficiently.

1 Eric Jaffe, “Just Because You Can’t Find a Place to Park Doesn’t Mean There Aren’t Way Too Many Parking Spots,” CityLab, January 14, 2015, <http://www.citylab.com/cityfixer/2015/01/just-because-you-cant-find-a-place-to-park-doesnt-mean-there-arent-way-too-many-parking-spots/384509/>.

King County, WA, Right Size Parking Calculator

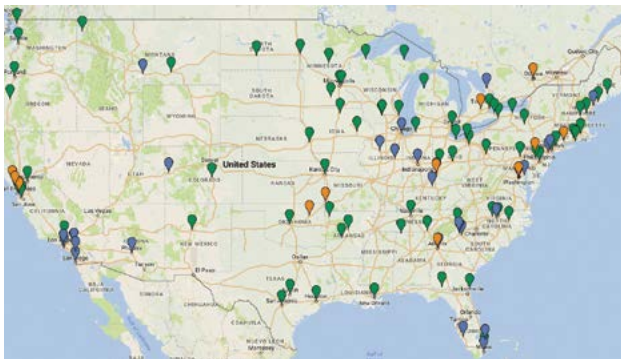
Responding to historic oversupply of parking, King County, Washington, developed its Right Size Parking Calculator to demonstrate to developers how they could have a more balanced approach to parking supply in the region. The calculator is based on current local data of actual parking use collected in the field from more than 200 developments in urban and suburban settings. Occupancy data was correlated to building type, occupancy, parking pricing, population density, and employment density. For more information, see King County Metro’s Right Size Parking Project (metro.kingcounty.gov/programs-projects/right-size-parking/)

Why should I care?

- **Increases level and quality of investment.** An oversupply of parking can limit the viability of affordable housing, mixed-use projects, and proposals that emphasize bike amenities, carshare, transit, and walking and cycling connections over car accommodation.
- **Reduces costs of development.** Parking increases the overall cost of development and often uses more land than the primary use.
- **Helps reduce the cost of living.** Building new parking in urban areas adds considerable project costs. A surface lot costs, on average, \$20k per space. Structured parking can be as much as \$45k per space. Usually, these costs are externalized in higher prices for goods, services, and housing.
- **Helps improve equity.** Higher costs of living associated with building new parking create a particularly unfair burden for low-income households and those who do not drive and make it challenging for developers to construct workforce housing.
- **Improves viability of infill development.** Parking requirements can make smaller sites and historic redevelopment opportunities physically or economically infeasible, limiting their re-investment value and encouraging “greenfield” development.
- **Reduces car ownership and use.** An oversupply of parking has consistently been shown to encourage the use of the automobile over all other modes. By minimizing the amount of parking in strategic locations, cities demonstrate that other modes such as biking, walking, and transit are viable options.
- **Improves pedestrian, bike, and transit networks.** On-site parking requirements increase the number of driveways that create pedestrian conflicts, unpredictable traffic patterns for cyclists to navigate, and turning movements that worsen congestion.

What are the solutions?

- **Rightsize parking requirements based on actual usage.** Base usage estimates on actual usage at comparable locations.
- **Eliminate minimum parking requirements.** Allow developers and owners more freedom to determine and provide the amount of parking they feel the market will support in new or existing developments. This is particularly useful in downtown areas near frequent transit service and in smaller buildings that are not as likely to generate high demand.
- **Institute parking maximums.** Some communities have converted minimum parking requirements to maximums to cap the number of parking spaces allowed.
- **Encourage shared parking.** Allow new and existing developments and nearby buildings with complementary uses to share preexisting spaces to meet their parking requirements. (See the “Allow shared parking” strategy sheet.)
- **Allow in-lieu alternatives.** Allow developers to fund public parking or mobility/access enhancements in lieu of meeting parking requirements.
- **Set parking policies as part of a larger vision.** Parking requirements should be used as a tool to achieve a city’s larger goals and objectives. Connecting parking requirements to broader mode split, economic development, environmental, and health goals can leverage support and dissuade pushback from the community.



The nonprofit Strong Towns has crowd-sourced a map of localities that have eliminated or reduced parking minimums. Dozens of cities—small, medium, and large—have rightsized parking in at least one neighborhood. View the map at <http://www.strongtowns.org/journal/2016/11/22/our-parking-minimums-map-updated>.

Examples

Chicago, IL

In 2015, Chicago announced reforms to its transit-oriented development policies, which were designed to encourage and support development near the city's transit stations. Among the reforms was an amendment to the zoning code that allowed developers to reduce the minimum parking requirements by up to 100% for nonresidential uses and by up to 50% for residential uses within TOD ordinance zones. Reductions in the required minimum of parking spaces are contingent upon the developers providing sufficient access to other transportation options, including providing a carsharing station or bicycle parking on site in lieu of the parking spaces. Residential uses in TOD ordinance zones can further reduce minimum requirements by up to 100%, subject to additional review. For more information, see Chicago's 2015 TOD Ordinance.

Nashville, TN

As one of the fastest-growing cities in the nation, Nashville is taking great strides to invest in public transportation and implement parking policies to ensure the most is made from their investments. In 2010, the Downtown Code was approved; 886 acres in downtown Nashville now have no minimum parking requirements.

Seattle, WA

In Seattle, parking minimums have been eliminated in the downtown area, with a few exceptions, and also in sections of the city classified as Urban Centers. In many other sections of the city, including those classified as Urban Villages as well as other areas with frequent transit service, parking minimums have been reduced. In commercial zones and pedestrian-designated zones, no parking is required for the first 1,500 square feet of each business establishment. In all other zones, no parking is required for the first 2,500 square feet of gross floor area of nonresidential uses in a structure, with certain exceptions. The city has also established parking maximums in some areas. For example, in commercial zones (with a few exceptions) no more than 145 spaces per lot may be provided as surface parking. In all multifamily zones, commercial buildings may not provide more than ten parking spaces per business establishment. For more information, see City of Seattle Municipal Code — Chapter 23, §23.54.015.

What should I do first?

Steps	Actions
1. Set goals and performance measures	<ul style="list-style-type: none">• State the purpose of parking requirements, identifying the role parking plays in larger contexts and establishing parking as a tool for achieving citywide goals• Set performance measures for parking management and operations to track utilization and ensure policies meet community goals
2. Assess the status quo	<ul style="list-style-type: none">• Regularly assess parking supply and parking occupancy to identify oversupply• Allow new development to use existing supply to meet expected use• Consider instituting parking maximums as transit service and land use allow
3. Offer alternatives	<ul style="list-style-type: none">• Develop and provide an in-lieu fee option for developers• Develop a shared-parking policy that allows minimums to be met through existing shared parking resources (see the "Allow shared parking" strategy sheet)
4. Build consensus	<ul style="list-style-type: none">• Be transparent with businesses, city officials, and the public (users) on existing and future conditions• Encourage shared parking by brokering shared-parking agreements• Communicate the economic benefits of reduced parking to developers and lenders• Effectively promote the purpose, goals, and benefits of effective managed parking to the public to reduce opposition

Learn More

Stalled Out: How Empty Parking Spaces Diminish Neighborhood Affordability: This 2016 report from the Chicago nonprofit Center for Neighborhood Technology shows how parking mandates drive up the cost of housing and often force developers to build spaces that go unused. The authors surveyed 41 multifamily residential buildings and found that they provided twice as many parking spaces as were actually used.

Right Size Parking Project: This detailed study was conducted for the Seattle region by King County Metro. It shows parking occupancy in different parts of the region, demonstrating that use of parking decreases substantially in more centrally located, transit-accessible neighborhoods. It also includes a “parking calculator” that allows users to estimate parking demand in hypothetical residential developments.

“Parking Reform Made Easy” (www.accessmagazine.org/articles/fall-2013/parking-reform-made-easy/): This 2015 ACCESS Magazine article, by Dr. Richard Willson of Cal Poly Pomona, suggests 12 steps local planners can take to reform parking in their community. (The article summarizes Dr. Willson’s book of the same name.)

Sustainable Transportation Planning: Tools for Creating Vibrant, Healthy, and Resilient Communities, Chapter 10 (“Parking”): This 2012 book by Jeff Tumlin, the director of strategy at Nelson/Nygaard and interim director of transportation for the City of Oakland, includes a high-level summary of best parking practices from around the country.

1. Parking policy

Allow shared parking

How does this strategy help your city?

Different land uses have different parking needs at different times of the day. For example, if a hardware store that operates primarily in the daytime and a restaurant that experiences peak demand at night share parking facilities, significantly fewer parking spaces are needed to meet overall demand. (Another example is shared parking between a residential building that primarily requires overnight parking and an office that requires daytime parking.)

By requiring each building to cover its unique period of peak demand, the amount of parking supplied exceeds the overall demand, driving up the cost of development (sometimes thereby suppressing development). Another result is that greater distances are created between destinations, making it more difficult to create walkable places. When every building is required to have an individual parking facility, the result is inconvenient for users and more expensive for business owners.

In addition, while buildings themselves are durable, land uses frequently change. Sharing parking creates more flexibility for a new use that may have a greater minimum requirement than a prior use. Without shared parking, the new use would need a variance, which it might or might not receive. With shared parking, any legal use can more easily be located within any existing building.

Some municipal zoning codes allow for or encourage shared parking, but codes are typically not specific enough to guide what is or is not permitted, are too restrictive to be applied, or require a variance or special permit. Beyond zoning codes, shared parking can be complicated—particularly with liability, maintenance, and various other elements. If a zoning code does not explicitly describe shared parking protocols, shared parking is less likely to occur.

Why should I care?

- **Provides more parking for less money.** Sharing parking allows for an increase of accessible parking supply, making better use of each parking space.
- **Creates availability.** A parker is more likely to find a parking space among a larger pool of shared spaces, especially when balanced among different land uses with different parking needs.
- **Provides more opportunity for infill development.** Small sites that cannot accommodate on-site parking can share underutilized parking nearby.
- **Is good for business.** Parkers can use one parking space for multiple trips, which means they can spend more time visiting shops and restaurants and less time circling to find a parking space. Moreover, increased foot traffic can engage new customers and generate sales growth.
- **Uses land efficiently.** Building fewer parking spaces can allow for more residential, office, and commercial space.
- **Reduces circling for a space (and congestion).** More parking spaces available to the public can reduce the need for circling, resulting in less vehicular congestion on streets.



What are the solutions?

Cities can directly or indirectly incentivize shared parking through zoning codes. There are a variety of approaches to allow and encourage shared parking:

- **District Sharing:** Allow for land uses in a defined district to share parking (Montgomery County, MD).
- **Free-Range Sharing:** Allow property owners to use shared-parking agreements to satisfy parking needs (Long Beach, CA).
- **For Mixed-Use Developments:** Include a specific shared-parking schedule for certain land-use types and groupings (Sioux City, IA).
- **Occupancy Based:** Let shared parking occur based on a demand study that shows that existing parking meets or is below a defined occupancy threshold (Marlborough, MA).
- **Minimum Provision:** Require that a certain amount of parking for each land-use type must be shared (Cambridge, MA).
- **Beyond the Minimum:** For developments that share parking beyond the minimum requirement, developers could have access to additional development rights, financial support through impact fees, or other means (Overland Park, KS).
- **Modest Minimums and High Maximums:** Allow for higher parking maximums for developments that build shared parking (Montgomery County, MD).
- **In-Lieu Fees:** Developers pay into a parking fund rather than build their own parking on-site parking spaces, and the municipality provides common parking facilities (Lake Forest, IL).

Though there are a range of ways to encourage and allow for shared parking, all zoning codes should clearly define terms, such as shared parking, reserved parking, remote parking, etc.

Examples

Columbia Pike: Arlington County, VA

Columbia Pike, a dense commercial and residential corridor in Arlington County, Virginia, enacted a form-based zoning code in 2003 that specifies parking goals, including shared-parking requirements for all private development. Shared-parking requirements include the construction of one shared space per 1,000 square feet of nonresidential gross floor area, with no maximum on shared spaces. Parking requirements may be met on-site or within the “parking zone” of a given development. If the development creates new on-street spaces, these count toward the shared-parking requirements. In lieu of providing shared spaces, the county may accept a one-time payment for each space not provided.

Santa Monica, CA

Santa Monica updated its zoning ordinance in 2015 to support and implement its 20-year vision and plan. Required parking is reduced through on-site and off-site shared parking with guidance and restrictions outlined in the ordinance. The code allows for shared parking in all nonresidential zoning districts and sets a minimum for the total number of spaces, which cannot be lower than one space per 500 square feet of floor area in commercial mixed-use developments. In addition, the code requires specific permits for off-site shared parking and allows for sharing on-site parking facilities if the parking demand from adjacent uses does not overlap.

What should I do first?

Steps	Actions
1. Identify Parking Needs and Obstacles	<ul style="list-style-type: none">• Determine parking demand and availability (utilization count, zoning code)• Review land-use trade-offs and economic opportunities (cost/revenue pro forma)
2. Form a Coalition	<ul style="list-style-type: none">• Identify project champions and communicate actively with involved stakeholders to gain community acceptance (developers, businesses, land owners, employees, residents, etc.)
3. Develop a Regulatory Framework	<ul style="list-style-type: none">• Assess zoning code, licensing/assessments, design guidelines, and enforcement protocol• Update necessary elements
4. Support Shared-Parking Efforts	<ul style="list-style-type: none">• Start with a suitable pilot project; coordinate operations and maintenance with nearby businesses and services• Determine revenue-sharing and enforcement frameworks
5. Report and Monitor Performance	<ul style="list-style-type: none">• Establish performance metrics to track parking utilization and supply• Be transparent with businesses, city officials, and public (users)• Conduct regular utilization counts; adjust zoning code as necessary

Learn More

Shared Parking: Sharing Parking Facilities Among Multiple Users: This entry in the Victoria Transport Policy Institute's *TDM Encyclopedia* offers guidance on which uses can easily share parking with each other, as well as an extensive list of technical references and additional case studies. <http://www.vtpi.org/tdm/tdm89.htm>

Parking Management for Smart Growth: This book by Professor Richard Willson of California State Polytechnic University, Pomona is aimed at planners and practitioners who want to learn more about how to maximize the use of parking. It also offers guidance on how to set parking rates, measure performance, incorporate new technology into your city's parking strategy, and deal with the politics of parking.

1. Parking policy

Create transit overlay zones

How does this strategy help your city?

For transit to be truly successful, transit service investments must be paired with investments in placemaking, a rich mix of land uses, and safe bicycle and pedestrian infrastructure. In many places, station areas do not realize their full potential because zoning codes prohibit transit-supportive development. Even worse, zoning codes may require parking minimums or other urban design elements that make driving alone the more attractive option despite the availability of good transit service.

Transit overlay zones are “floating zones” that implement a variety of development regulations or incentives that support transit use and foster vibrant neighborhoods around stations. Such zoning allows station-area development to include characteristics that make an area more supportive of transit ridership, for example, through pedestrian-oriented design, a mix of uses, more transportation options, and denser development.

Why should I care?

- **Builds on investments in transit.** The types of development permitted and encouraged with a transit overlay zone help communities to make transit use attractive and maximize ridership, making the most of transit investments.
- **Creates mixed-use, walkable areas around transit.** Unlike the traditional zoning model, transit overlays allow a mix of compatible uses and more compact development, which both support a more walkable and lively urban center around a transit station.
- **Increases housing variety and affordability.** Higher-density, mixed-use zoning allows a wider variety of housing types to be built that may not be permitted under other types of zoning. Siting housing close to transit, employment, and amenities can reduce household transportation costs, and lower-income households in particular can benefit from this high level of access.
- **Is good for business.** Transit overlays spur economic development. By locating businesses, housing, and transit service in close proximity, there is a natural draw to local businesses.

- **Provides a proof of concept.** Adopting a transit overlay zone is a relatively quick way to get the right zoning around transit if broader zoning reforms require a lengthier and more politically difficult process.

What are the solutions?

Transit overlay zones usually extend a quarter-mile or half-mile radius from a station, which is generally considered a “walkable” distance to high-capacity transit service. Transit-oriented development (TOD) makes walking to transit a safe and convenient option, while it also promotes a thriving neighborhood and active street life around a station. Characteristics of TOD include compact development that is higher density, a vibrant mix of uses, pedestrian-oriented street design and attractive streetscapes, and supportive transportation options like biking and carshare.

- **Mix of uses.** Encourage a high-intensity mix of uses, including retail, office, residential, civic, and cultural activities.
- **Compact development.** Allow higher-density development, including more compact development and taller, larger buildings.
- **Reduced parking minimums.** Require fewer parking spaces to maximize area for other uses and to encourage travel by modes other than driving (see “Rightsize parking requirements” strategy sheet).
- **Pedestrian-oriented design.** Encourage building design and streetscapes that foster a comfortable, convenient, and accessible pedestrian environment.
- **Alternatives to driving.** Provide carshare, bike parking, and other transportation options, in addition to excellent transit service.
- **Housing variety and affordability.** Require or incentivize the construction of mixed-income housing accessible to a range of household types, sizes, and abilities.

Examples

Chicago, IL

Chicago's transit-oriented development ordinance applies to development within a quarter-mile of a transit station and as far as a half-mile on pedestrian streets, which are designated to preserve a pedestrian-friendly character. Higher density is permitted within the district, and parking minimums are significantly reduced or eliminated altogether for most land uses. The ordinance also provides an increased density bonus in exchange for providing affordable housing but requires that affordable units be included on-site rather than through an "in lieu" fee to the city.

Vancouver, WA

Vancouver established transit overlay district zoning to encourage higher densities and transit-friendly urban design around transit stations. The designation includes voluntary, incentive-based provisions that can be applied to properties within the districts at an applicant's request. Provisions for overlay districts include higher-density development, reduced parking minimums, pedestrian access and circulation, and a comfortable and attractive street environment. The city defines two tiers of districts, supporting either intense or more moderate increases in density.

Charlotte, NC

Charlotte's TOD zoning districts allow compact, mixed-use development. Development standards call for the provision of high-quality walking, biking, and transit facilities. Districts also encourage shared parking and include reduced parking minimums. The city also has a transit-supportive overlay district, which can be applied to areas that are outside designated TOD zoning districts but still within a half-mile of a transit station. The overlay district includes transit-supportive and pedestrian-oriented development regulations and uses and encourages existing properties to transition to more transit-supportive development.

What should I do first?

Steps	Actions
1. Define Goals and Performance Measures	<ul style="list-style-type: none">• Develop an overarching transit-oriented development strategy to guide the process• Work with key stakeholders to develop clearly defined strategic goals for TOD zones• Establish performance metrics to track progress and communicate results
2. Define Geography and Identify Areas Where Overlay Applies	<ul style="list-style-type: none">• Establish walk and bike sheds that are appropriate for the context of each district• Focus initial efforts on the highest-capacity/active transit nodes
3. Establish Development Standards, Regulations, and Incentives	<ul style="list-style-type: none">• Develop context-appropriate, goal-driven standards for TOD zones• Standards should address some or all of the following: uses and housing affordability, development and population densities, parking management, street design, urban form, and transportation options programs
4. Pursue the Zoning Amendment Process	<ul style="list-style-type: none">• Introduce TOD regulations into the formal zoning process• Define conditions upon which TOD overlays can be triggered through the formal zoning process

Learn More

Puget Sound Regional Council. "Featured Tool: TOD Overlays." <http://www.psrc.org/growth/housing/hip/alltools/tod>.

Victoria Transport Policy Institute. "Transit Oriented Development: Using Public Transit to Create More Accessible and Livable Neighborhoods." In *TDM Encyclopedia*. <http://www.vtpi.org/tod/tod45.htm>.

Metropolitan Planning Council. "Chicago's 2015 TOD Ordinance." <http://www.metroplanning.org/tod-ordinance>.

Charlotte-Mecklenburg Planning Department. "Transit-Oriented Development." <http://charlottenc.gov/planning/Rezoning/StakeholderGroups/TextAmendmentStakeholderGroup/Pages/Transit-Oriented-Development.aspx>.

City of Vancouver, Washington. "Transit Overlay District." Chapter 20.550 in *Vancouver Municipal Code*. <http://www.cityofvancouver.us/vmc?tid=334&throbber=1>.

City of Denver, Colorado. *Transit Oriented Denver* TOD Strategic Plan. <https://www.denvergov.org/content/denvergov/en/transit-oriented-development.html>.

2. Change development review to cause less traffic

Eliminate Level of Service from transportation impact review

1. The liveliest and most attractive streets in a city or town often rate poorly on automobile "level of service" measures. If cities measure the success of streets with rigid measures of vehicle delay, it can become harder to create great places



How does this strategy help your city?

Many communities work with developers to assess the impact on the community of a proposed development project and identify appropriate actions to reduce or mitigate any negative impacts. Until recently, most communities measured the transportation impacts of new development in terms of the automobile traffic expected to be generated and did not consider multimodal options for getting around.

As a result, development projects were assessed based on automobile level of service (LOS), which measures vehicular, but not person, mobility. LOS analysis uses an A to F scale, where LOS A means that the number of vehicles on the road is well below the road capacity and LOS E–F indicates that the roadway is at or over capacity. The driving experience is unimpeded under LOS A, while under LOS E–F, drivers are in “stop-and-go” conditions. Ironically, places with the most F-grade intersections tend to be our most vibrant neighborhood commercial strips and urban centers.

When a development is predicted to impact level of service, cities often require developers to “mitigate” that impact by improving automobile traffic flow, for example, by widening a roadway or adding turn lanes. These solutions force roads to be built at excess capacity and engineered for nonstop, high-speed automobile movement, all of which have a negative impact on people walking, bicycling, or riding transit, and can induce the very traffic that they are designed to relieve.

LOS-optimizing solutions can cause a variety of unintended outcomes, including depressed development, degraded walking environments, and undermined placemaking efforts.

The methods used to analyze level of service also tend to focus on traffic conditions during the most congested periods of the day, forcing roads to be built to handle the expected automobile demand that might only occur for 15 or 30 minutes during rush hour. Solutions that “fix” traffic at peak times are all the more inappropriate at off-peak times of day, leaving less space in the roadway for street trees, bicycle facilities, or sidewalks.

Cities are increasingly deciding that LOS measures are just one element in the range of mobility options available in more urban, walkable, and transit-rich neighborhoods. Many cities today aim to attain LOS C–D, but if you’re building a great neighborhood with many transportation options, stop-and-go traffic during the morning and afternoon rush may be a trade-off that businesses, workers, and residents are willing to accept. You should have that conversation through community planning processes instead of forcing developers to widen roads in an effort to avoid impacting level of service.

Why should I care?

- **Improves economic viability of neighborhoods.** Places whose intersections have poor LOS ratings tend to be vibrant neighborhood commercial strips and urban centers. Improving LOS causes harm to the areas in question.
- **Improves efficiency of streets networks.** Building roads to handle congestion that might only occur for 15 or 30 minutes during rush hour leads to excess capacity that could be seen as economic waste for more than 95% of any given day.
- **Improves effectiveness and efficiency of land usage.** In many cases, LOS prevents infill development, encouraging sprawl and greenfield development, and forcing residents to become more reliant on automobiles to reach destinations in ever-expanding exurban and suburban landscapes.
- **Returns focus to people, not vehicles.** LOS focuses on the movement of vehicles, not people. For example, under LOS, the delay to a full transit bus is equivalent to that of a single-occupant car.
- **Improves bicycle and pedestrian access and environments.** Under LOS standards, pedestrians and people riding bicycles are considered impediments to car movement. Therefore mitigations, such as reducing pedestrian crossing-signal time frames or building expensive tunnels and bridges, are often implemented to ensure that pedestrians and people on bicycles do not get in the way of traffic flows.
- **Helps achieve transportation goals.** The effects of LOS mitigations are often detrimental to stated goals, including improving safety, reducing the number of drive-alone trips, and increasing the number of people walking and cycling.

What are the solutions?

In order to manage transportation demand more effectively, many cities throughout the United States have moved away from a sole focus on auto-oriented metrics (e.g., LOS standards) as part of transportation impact and development review processes. Instead, development projects can be evaluated using transportation metrics that better align with the community's environmental, economic, health, and equity goals. Using new metrics and tools in the analysis process will move the analysis away from a focus on intersection congestion and qualitative assessments of the driver's experience and more toward the experience of all types of travelers.

- **Institute LOS Exemptions.** One option is to adopt policy language that states that all project applications within a specific subarea are exempt from requirements to conduct vehicle LOS analysis. This maintains existing LOS thresholds for certain signalized intersections but exempts certain areas where a city is promoting transit-oriented development and walkable neighborhoods.
- **Assess vehicle miles traveled (VMT).** Estimating the VMT a project is expected to generate is an increasingly popular alternative to LOS. The benefit is that it captures the related environmental outcomes these trips have on the broader region, rather than narrowly focusing on intersections within a small radius of the project. Specific thresholds need to be determined on a case-by-case basis to identify the acceptable level of VMT output from a specific project relative to current and future VMT levels.
- **Apply impact fees.** Impact-fee programs can be used for multimodal improvements, allowing cities to improve multimodal infrastructure, and in turn, reduce the desirability of driving alone. This approach is particularly useful when there is a lot of growth in an area, because it generates funds to invest in network improvements that make biking, walking, and taking transit more attractive.
- **Integrate transportation options into the development review process.** Ordinances can require employers and/or developers to establish programs to reduce the number

of people traveling to the site by single-occupancy vehicles (see the “Integrate Transportation Options into the Development Review Process” strategy sheet).

Examples

San Francisco, CA: VMT Analysis

San Francisco is in the process of implementing a citywide transportation options program, inclusion of VMT (and other metrics) in the traffic impact study process, and impact-fee programs. These policies are designed to work together to reduce auto-trip generation from new developments. The changes were driven by a recognition that the previous LOS-based review ran counter to the city’s goals and policies, such as its “Transit First” policy, ambitious bike mode-share goals, and guidelines included in its Better Streets Plan. Policy changes have been pursued through an effort called the Transportation Sustainability Program, which consists of the following:

- Modifications to the environmental review process, replacing automobile delay (LOS) with VMT as the key transportation performance metric
- A Transportation Sustainability Fee, replacing the previous Transportation Impact Development Fee, to fund improvements to transit, bicycle, and pedestrian infrastructure and service
- A TDM ordinance with requirements that scale based on the number of new parking spaces planned on a site

Pasadena, CA — VMT Analysis

During its 2009 General Plan Update process, Pasadena began exploring a new approach to transportation-impact analysis that was more aligned with its Land Use and Mobility Element Update. Following an extensive public outreach process, the city drafted new guidance that relied on VMT as a key metric. Now, in order to incorporate standards that measure multimodal networks more effectively and reflect the General Plan’s expanded emphasis on sustainability and walkability, Pasadena requires that the following metrics also be analyzed when assessing new developments:

- Vehicle trips per capita
- The proximity and quality of the local bicycle network, determined by the percentage of dwelling units and jobs within a quarter-mile of a bike path or protected bike lane
- The proximity and quality of the transit network, determined by the percentage of dwelling units and jobs within a quarter-mile of a transit station or high-frequency bus route
- The quality of pedestrian accessibility, determined by a Pedestrian Accessibility Score, which measures the number of different land-use types within a five-minute walk

Santa Monica, CA — Impact Fees

Santa Monica uses its citywide transportation-impact fee to support both multimodal infrastructure and transit operations. Proceeds from the impact fee can be spent on pedestrian and bicycle infrastructure, transit operations, and other programs and investments that help create “alternative transportation choices and reduce greenhouse gas emissions.”¹

In February 2013, the City of Santa Monica adopted a citywide transportation-impact fee as part of the Land Use and Circulation Element (LUCE) of its General Plan. The LUCE identified a number of policies and programs intended to encourage walking, biking, and transit use, to in turn reduce evening peak-hour vehicle trips. The key metric for evaluating progress toward this goal is the volume of evening peak-hour vehicle trips to and from the city.² An impact fee was determined to be an effective and reliable citywide mechanism to fund infrastructure and services that support new development. The investments in alternative modes from this fee program generally offset vehicle demand, and in turn, developments generated fewer evening peak-hour trips.

1. “Transportation Impact Fee Program.” Chapter 9.66 in Santa Monica Municipal Code. <http://www.qcode.us/codes/santamonica/>
2. Nelson\Nygaard Consulting Associates. City of Santa Monica Transportation Impact Fee Nexus Study. 2012. <https://www.smgov.net/uploadedFiles/Departments/PCD/Transportation/Developers/Santa-Monica-Nexus-Study.pdf>.

Bellingham, WA: Multimodal Level of Service

Cities in Washington are required to comply with state “concurrency” laws, aimed at ensuring that adequate transportation facilities are available when new development occurs. For many years, Bellingham’s concurrency regulations only took into account automobile LOS. Planners realized that this approach restricted the ability of the city to build downtown, and was pushing development further out and worsening overall traffic.

In 2008, the city adopted a multimodal approach.³ The city estimates how much capacity is available on its streets, on transit, and on the biking and walking networks in each of 15 defined neighborhoods or “concurrency service areas” (CSAs). It publishes an annual report describing how many “person trips available” exist in each of the 15 CSAs; new developments are allowed only if they create fewer person-trips than are available. If a development would create more person-trips than are available in the CSA, it must mitigate this (for example, by building sidewalks in priority areas).

3. “Transportation Concurrency.” City of Bellingham <https://www.cob.org/services/planning/transportation/Pages/multimodal-trac.aspx>

While the examples listed above represent current best practice, this policy area is seeing rapid change as more localities update their development review processes to incorporate a multimodal approach.

Learn More

Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities: This 2010 book from the Institute of Transportation Engineers explains the importance of “context sensitive” approaches to road design in walkable neighborhoods. One recommendation is that transportation engineers can justify lower levels of automobile LOS in places where walkability is important. Additional resources are available on ITE’s “Context Sensitive Solutions” webpage.

“Why California Accidentally Encouraged Driving, and How That’s About to Change” (www.spur.org/news/2016-06-30/why-california-accidentally-encouraged-driving-and-how-thats-about-change): This 2016 article, published on the blog of the Bay Area think tank SPUR, provides an accessible overview of how overreliance on automobile LOS has made it harder for cities to build more compact development.

What should I do first?

Steps	Actions
1. Determine the appropriate LOS alternative	<ul style="list-style-type: none"> • LOS alternatives will require strong political and community support; determine which LOS alternative is appropriate for your community • Follow steps #2—#6 according to priorities set above
2. Design contextually appropriate VMT metrics	<ul style="list-style-type: none"> • Determine specific thresholds to identify acceptable levels of VMT output from a specific project relative to current and future VMT levels
3. Ensure that VMT-based metrics are applied with careful attention to land-use and transportation modeling efforts	<ul style="list-style-type: none"> • Determine whether VMT thresholds should be measured against local or regional VMT measurements or within another geographic area • Allow specific transportation metrics to continue to be applied to ensure that the system operates at acceptable service levels and that public safety is maintained
4. Where LOS is retained, amend adopted thresholds of significance to allow lower LOS grades when contextually appropriate	<ul style="list-style-type: none"> • Policy should indicate that it is acceptable for a specific development project or a collection of projects to cause the LOS to fall to and remain at E or F on any arterial, connector, or local street segment or intersection, where appropriate • Provide a more focused review of non-auto needs along major pedestrian, transit, and bicycle corridors and allow for concentrated development that is conducive to active transportation modes and sustainability
5. Integrate transportation options programs as part of the new development process	<ul style="list-style-type: none"> • Coordinate with and among the general community, public agencies, private business, and developers to implement transportation options programs as part of mitigation • Enforce programs geared towards specific uses based on established thresholds, parking standards, and the requirements of transportation options programs (see the "Integrate transportation options into the development review process" sheet)
6. Develop/implement impact fees	<ul style="list-style-type: none"> • Conduct a technical nexus study to determine the economic implications related to traffic and transportation and the measurable amount of impact to transportation facilities caused by development projects • Establish "fair contribution" metrics • Update impact fees on a regular basis to ensure fees are relevant and that they account for inflation and other related fiscal matters

2. Change development review to cause less traffic

Rethink trip-generation and parking standards

How does this strategy help your city?

Communities often work with developers to estimate parking demand and vehicle trip generation for new development. The most common sources of this data are the Trip and Parking Generation manuals published by the Institute of Transportation Engineers (ITE). Historically, the ITE has collected data at single-use, typically suburban sites without transit access or good bicycle and/or pedestrian infrastructure. These data are used as “development comps” and misapplied in mixed-use urban contexts with multiple transportation options. In these areas, the manuals often predict high levels of car traffic—which developers are obligated to build parking for or mitigate by widening roads—that don’t actually materialize.

There’s a growing awareness among cities that onerous requirements may stifle development and that by over-mitigating they may have unwittingly induced additional auto traffic.

In more urban, walkable, and transit-rich neighborhoods, cities are increasingly seeing development with reduced vehicle trip generation and parking demand coupled with increased use of transit, walking, and bicycling. In transit-oriented developments, for example, the ITE Trip and Parking Generation manuals lack data on vehicle trips and parking, resulting in the overestimation of parking needs and vehicle impact on nearby roadways.

Trip Generation Standards vs. Reality in Development Near Transit

Development	ITE vehicle trip estimates (daily)	Actual vehicle trips (daily)	Actual vehicle trips as % of ITE estimates
Englewood, CO	13,544	9,460	70%
Wilshire/Vermont (Los Angeles, CA)	5,180	2,228	43%
Fruitvale Village (Oakland, CA)	5,899	3,056	52%
Redmond, WA	1,767	661	37%
Rhode Island Row (Washington, DC)	5,808	2,017	35%

Researchers from the University of Utah reviewed five developments near transit. These developments generated far fewer vehicle trips than the Institute of Transportation Engineers' *Trip Generation Manual* predicts. An overreliance on this manual can cause developers to overbuild parking. For more information, view the "Trip and Parking Generation at Transit-Oriented Developments" project at the National Institute for Transportation and Communities (nctc.pdx.edu/research/project/767).

Why should I care?

- **Provides a more accurate picture of transportation impact.**

Development in urban areas with more transportation options is likely to generate fewer vehicle trips than in areas with low density and single-use zoning and fewer transportation options. There may also be a greater number of total trips in high-density areas due to more frequent and shorter trips. Trip-generation and parking-demand estimates in urban areas will be more realistic if they are based on observed behavior in a local context.

- **Encourages more appropriate traffic impact mitigations.**

More complete information about the impact of new development allows cities to invest in more appropriate mitigation measures that match actual transportation behavior, such as enhanced pedestrian facilities or on-site transportation options programs. This information can also help cities better communicate about potential impact and address the concerns of residents and stakeholders.

- **Reduces costs of development.** Parking increases the overall cost of development and often uses more land than the primary use. Context-sensitive parking estimates can mitigate the cost for developers by providing a more realistic recommendation for parking supply. Reducing this cost can encourage infill and redevelopment opportunities in urban areas.

- **Helps reduce costs of living.** Building new parking in urban areas adds considerable project costs, which in turn increases the price of housing. This is particularly true for housing affordability, as the cost of providing additional parking is frequently bundled into housing costs and passed along to residents, who then bear the cost of potentially unused parking spaces.

What are the solutions?

- **Focus on modally neutral access, not access by one particular mode over others.** There is no external or preexisting demand for either parking or automobile access. There is only demand for access to sites; how that demand is met depends on how the site is designed and on the area-wide transportation system.
- **Develop a localized trip-generation model that accounts for trips by person and mode, not just vehicles.** Estimate trip rates and mode share based on travel behavior at similar sites and community objectives, accounting for the development type, land-use context, and transportation options that are available; identify mitigation strategies using this information.
- **Engage in a “rightsizing parking” project to assess parking requirements and help developers balance parking supply and demand.** Collect data on parking utilization in different types of land-use and development contexts. Base parking-demand estimates for new developments on actual usage at comparable locations. (See the “Rightsize Parking Requirements” strategy sheet.)
- **Identify mitigation strategies that are appropriate to local transportation needs.** Cities can recommend or require several strategies that can mitigate the estimated transportation impact of a new development. These include improvements to the pedestrian environment, on-site bicycle parking, free transit passes for residents, or shared vehicle parking.

Examples

Washington, DC

The District Department of Transportation (DDOT) conducted a study on multimodal trip generation at multiple development sites across the city, collecting data on person trips and mode share, as well as parking supply, available transportation options, and development context. The study confirmed that in a dense setting, person trips were higher and vehicle trips lower than predictions based on the ITE manual. DDOT is working to develop its own trip-generation models and plans to lead a multi-jurisdictional effort to build an urban trip-generation database.

King County, WA

Responding to historic oversupply of parking, King County, Washington, developed a Right Size Parking Calculator to demonstrate to developers how they could have a more balanced approach to parking supply in the region. The calculator is based on current local data of actual parking use collected from more than 200 developments in urban and suburban settings. Occupancy data was correlated to building type, parking pricing, population density, and employment density. The County also pursued several demonstration projects to build on the findings of the Right Size Parking Project and apply them to new developments.

San Francisco Bay Area, CA

TransForm's GreenTRIP (Traffic Reduction + Innovative Parking) Parking Database is the result of an ongoing data-collection effort providing parking-utilization data and development characteristics for 80 multifamily residential sites in the Bay Area. Building on this work, the recently launched GreenTRIP Connect tool allows developers to estimate the potential transportation impact based on location, development characteristics, and utilization of demand-management strategies. In addition, GreenTRIP's Certification Program works with municipalities and developers to incorporate transportation options strategies into new development, with the goal of reducing traffic impact and increasing housing affordability.

Arlington County, VA

Arlington County is a rapidly growing community located in the Washington, DC, metro area, with development ranging from lower density suburban areas to more urban town centers and high-density, transit-oriented development. The county is currently conducting a study to assess actual trip-generation and parking-demand rates at 35 high-density residential developments, including counts of vehicle trips and parking utilization, as well as counts and intercept surveys of users accessing properties by other modes. In addition, the study includes an assessment of access to alternative modes and the presence of transportation options programs. The data collected will ultimately be compared to current local and national methods of calculating vehicle trip generation and parking supply. These results will inform local staff and decision makers as they assess the performance of residential site plans relative to county transportation objectives and guide the ongoing implementation of parking and TDM requirements in Arlington.

What should I do first?

Steps	Actions
1. Measure and Assess Existing Travel Behavior	<ul style="list-style-type: none">• Create a database of existing development and travel behavior, including data on trip generation, parking demand, and access by other modes, as well as information about the development site and context• Perform ongoing data collection to provide more complete information for decision makers
2. Develop Tools for Estimating Development Impact	<ul style="list-style-type: none">• Compare observed rates to those predicted by existing standards or requirements to determine where there are mismatches• Develop a localized trip-generation model based on actual travel behavior that accounts for trips by person and mode, not just vehicles• Perform a "right size parking" study to determine actual parking demand• Develop a model to estimate parking demand at new developments based on the parking utilization and other characteristics of comparable development sites
3. Identify Appropriate Mitigation Strategies and Incentives	<ul style="list-style-type: none">• Develop a selection of strategies and incentives that developers can utilize to mitigate transportation impact for users of all modes, tailored to different land-use contexts and community transportation needs

Learn More

GreenTRIP Connect (connect.greentrip.org/): This easy-to-use tool, developed by the Bay Area nonprofit TransForm, allows anyone to estimate the demand for parking in a hypothetical residential development. It shows how parking demand changes in response to project location. It also shows how changes in the price of parking and the use of incentives (like discounted transit passes and carshare memberships) can lower demand for parking.

Right Size Parking Project (metro.kingcounty.gov/programs-projects/right-size-parking/): This detailed study and toolkit was developed for the Seattle region by King County Metro. It shows the amount of parking that is used in different parts of the region, and also includes a “parking calculator” (somewhat similar to GreenTRIP Connect) that allows users to estimate parking demand in hypothetical residential developments.

Mixed-Use Trip Generation Model (MXD) (www.epa.gov/smartgrowth/mixed-use-trip-generation-model): This Excel-based model was created by the U.S. Environmental Protection Agency for local officials, consultants, and developers to use to estimate trips in new mixed-use developments.

Evaluation of Trip Generation in Highly Urbanized Areas (sites.google.com/a/dc.gov/ddot-research-program/projects-and-studies/current-research/trip-gen): The District Department of Transportation in Washington, DC has been developing multimodal trip generation rates that better reflect the relationship between land use, transportation and travel demand in cities. This ongoing research project is not yet reflected in agency practice, but is a useful illustration of how standard trip-generation practices are inappropriate in dense neighborhoods.

2. Change development review to cause less traffic

Integrate transportation options into the development review Process

How does this strategy help your city?

Developments that support transportation options—for example, by providing on-site carsharing and discounted transit passes—substantially reduce driving by tenants and require less parking overall. Transportation options programs (also called *transportation demand management* or TDM programs) are a cost-effective way to reduce single-occupancy vehicle trips. If these options are not considered as part of the development review process, they might be implemented after-the-fact or not at all.

What are transportation options strategies?

Developers can integrate transportation options strategies to help mitigate the projected impacts of new developments. Strategies include:

- Streetscape improvements to encourage walking connections from transit
- Bicycle parking
- On-site showers and lockers
- Subsidized or free transit passes
- On-site carshare parking
- Rideshare matching services and/or subsidies
- Signs to display real-time information for nearby transit routes
- Priced parking

(The City of San Francisco provides a comprehensive menu for developers to choose from: http://default.sfplanning.org/plans-and-programs/emerging_issues/tsp/TDM_Menu_Options-062316.pdf)

Why should I care?

- **Integrating transportation options requirements into the development process ensures that they happen.** If transportation options are not considered as part of the development review process, they risk not being implemented. Cities can develop requirements for incorporating facilities and programs into new developments that support biking, walking, taking transit, and driving alone, or provide incentives for developers to include them.
- **Transportation options measures that are added later may not be as effective.** If transportation options strategies are not considered as part of the development review process, they might be implemented as afterthoughts and underused, thereby reducing the return on these types of investments. By tying requirements for transportation options measures into the development process, cities can ensure that they are actually implemented, that they are effective, and that they help achieve broader community transportation goals.
- **It can be difficult for cities to make sure that any transportation options program agreements are passed along to the subsequent property holder.** By tying transportation options requirements to a property through the development process, cities can ensure that these measures continue after a property changes hands. Ongoing monitoring is critical to success.

What are the solutions?

- Cities can implement transportation options ordinances that require or incentivize developers to implement transportation options plans as part of the development review process. Such ordinances outline requirements for programmatic or infrastructure elements that will be implemented by the building manager or employer throughout the lifetime of the building.
- The purpose of a transportation options plan is to monitor and mitigate the transportation impacts of a specific site over time. Such a plan details the process through which a developer and subsequent tenants commit to measures that decrease single-occupancy vehicle travel to the facility over time. This process provides a menu-based approach for developers and tenants to implement supportive programs that encourage and educate employees and residents about travel options. The plan includes targets (e.g., mode split, emissions, or reduced vehicle miles traveled), a description of strategies used to meet those targets, and evaluation measures to assess progress toward those targets.

1. A Portland WES commuter rail train just outside of Beaverton Transit Center.



Examples

Cambridge, MA

In the late 1990s, Cambridge adopted two transportation management policies that regulate development review. The Parking and Transportation Demand Management Ordinance (PTDM), adopted into the city's zoning code, sets forth TDM and mode-share reduction requirements based on the scale of project and the amount of parking provided. New developments that exceed a threshold of 50,000 square feet are required to conduct a detailed traffic review that also identifies other possible parking and traffic-mitigation measures, including transportation demand management measures. This program has proven very successful: in 2011, the average drive-alone mode split for participating businesses was 55%. By 2015, the actual drive-alone rate for PTDM properties was 38%, compared to an average target of 45%. Over 100 projects have detailed monitoring plans, encompassing 24.3 million square feet, 18,000 parking spaces, 21,000 employees, and 12,000 commuting graduate students.²

Arlington County, VA

Arlington County Commuter Services (ACCS) established the Transportation Demand Management Program for Site Plan Development in 1990 to work with developers and property managers to mitigate the transportation impacts of residential and commercial development by increasing the availability, awareness, and use of transit, ridesharing, carsharing, biking, bikesharing, and walking. Site Plan Review is voluntary but incentivized through density bonuses. Approximately 90% of all development is now conducted through the Site Plan review program; the remaining 10% primarily consists of single-family homes or small townhome developments. This leverage has allowed the county to achieve high levels of transit-oriented development supported by a renowned travel options program.

2. Correspondence with City of Cambridge Parking and Transportation Demand Management staff.

San Francisco, CA

San Francisco created a Transportation Demand Management (TDM) Program to compel developers to incorporate more transportation options in new buildings, with the goal of reducing traffic in the city. The program applies to most new development—buildings with at least ten dwelling units, ten or more beds in a group housing or residential care facility, or 10,000 square feet of nonresidential space—and changes of use of nonresidential space greater than 25,000 square feet. Under the ordinance, developers must provide measures from a menu of transportation options programs, each of which is assigned a point value. For example, providing subsidized transit passes to tenants is worth up to 8 points; an on-site bicycle repair station is worth 1 point. The more car parking is planned in the building, the more transportation options measures it must include.

Pasadena, CA

The City of Pasadena adopted requirements for transportation management programs into their code of ordinances in order to implement the requirements of the Los Angeles County Metropolitan Transportation Authority's Congestion Management Program. Under the city's ordinance, development projects that meet certain thresholds are required to provide employee transportation information services and a transportation plan, as well as report on progress annually. Development projects subject to the ordinance generally include larger multifamily residential and mixed-use projects, and nonresidential projects between 25,000 and 75,000 square feet gross floor area. The transportation plan must be approved by the Director of Transportation prior to the issuance of a building permit. Progress must be documented through an annual survey.

What should I do first?

Steps	Actions
1. Review existing policies and regulations	<ul style="list-style-type: none"> Review local policy documents (plans, policies, and development regulations) to determine whether they can provide any support for an expanded local transportation options program (for example, existing requirements for on-site bicycle facilities)
2. Determine eligible facilities, programs, and other strategies	<ul style="list-style-type: none"> Determine the appropriate thresholds that would trigger a site-based transportation options plan, such as developments within a specific district, those that are over a certain square footage, or those with a certain number of employees
3. Identify appropriate strategies to incorporate transportation options requirements into the development process	<ul style="list-style-type: none"> Provide a menu of options that developers can choose to incorporate, based on community goals, the type of development project, and the surrounding environment Provide a template for the transportation options plan for developers to use
4. Update zone code or administrative rules	<ul style="list-style-type: none"> Require development of a transportation options plan in conjunction with incentives or bonuses, such as an increased floor area ratio (FAR) or reduced parking requirements Require prospective developers to submit a transportation options plan with each land-use application Require an approved TDM plan as a condition of a project's approval Apply requirements for supporting transportation options to specific zones or districts Apply requirements to certain types of developments or users, such as large employers
5. Establish performance monitoring and enforcement mechanisms	<ul style="list-style-type: none"> Establish how requirements, especially programmatic measures, will be passed on to subsequent tenants or owners during the lifetime of the development Tie requirements and targets back to community plans and goals Monitor performance measures annually or biannually to determine which programs are successful and how building tenants are choosing to travel

Existing Process



Developer applies
for a building permit



Transportation impact
study is triggered



Vehicle trip generation
is estimated using
ITE standards



Transportation impacts are
estimated using auto-
centric level of service
(LOS) standards



Mitigation requirements
are set based on auto
traffic during the busiest
times of day



More parking is built

Building Permit



Transportation Study



Estimating Multimodal Trip Generation



Estimating Travel and Transportation Impacts



Mitigating Impacts



The Result

Ideal Process



Developer applies
for a building permit



Transportation impact
study is triggered



Vehicle trip generation
is estimated based
on the local context



Transportation impacts
are set based on local
context; LOS standards
are relaxed or replaced



Strategies such as transit
pass programs and bus stop
improvements mitigate
potential impacts



More walkable, vibrant
communities are built

Learn More

Examples of local and state regulations that apply to developments:

City of Cambridge. "Parking and Transportation Demand Management Ordinance." <https://www.cambridgema.gov/CDD/Transportation/fordevelopers/ptdm>.

Arlington County Commuter Services. "Transportation Demand Management for Site Plan Development." <http://www.commuterpage.com/pages/special-programs/tdm-for-site-plans/>.

San Francisco Planning Department. "SHIFT: Transportation Demand Management." <http://sf-planning.org/shift-encourage-sustainable-travel>.

City of Pasadena. "Transportation Management Program." Chapter 10.64 in *Code of Ordinances*. https://www.municode.com/library/ca/pasadena/codes/code_of_ordinances?nodeId=TIT10VETR_CH10.64TRMAPR.

Oregon Department of Transportation. *Transportation Demand Management (TDM) Plans for Development*. www.oregon.gov/LCD/TGM/docs/TDM%20guide%20and%20model%20code%20final.pdf

3. Design streets to move more people

Making transit work in cities means raising the level of design across the entire street network to prioritize transit and walking. Cities control their streets and can take the lead on transit-friendly streets, creating dedicated lanes and transitways, comfortable stops and stations, and coordinating with transit agencies on improvements to intersections and signals. Cities should treat walking as the foundation of the transportation system; this means wider sidewalks and narrower car lanes, traffic islands, and other pedestrian amenities.

Understanding of how street design and public transit interact is important not just for busy commercial districts, but also for residential neighborhoods. The choice for street designers is not “bus lane or nothing.” Careful curbside management, boarding bulbs, and high-quality shelters can make transit more reliable and pleasant. Even seemingly minor decisions, like whether to place bus stops before or after intersections, affect transit reliability and travel time.

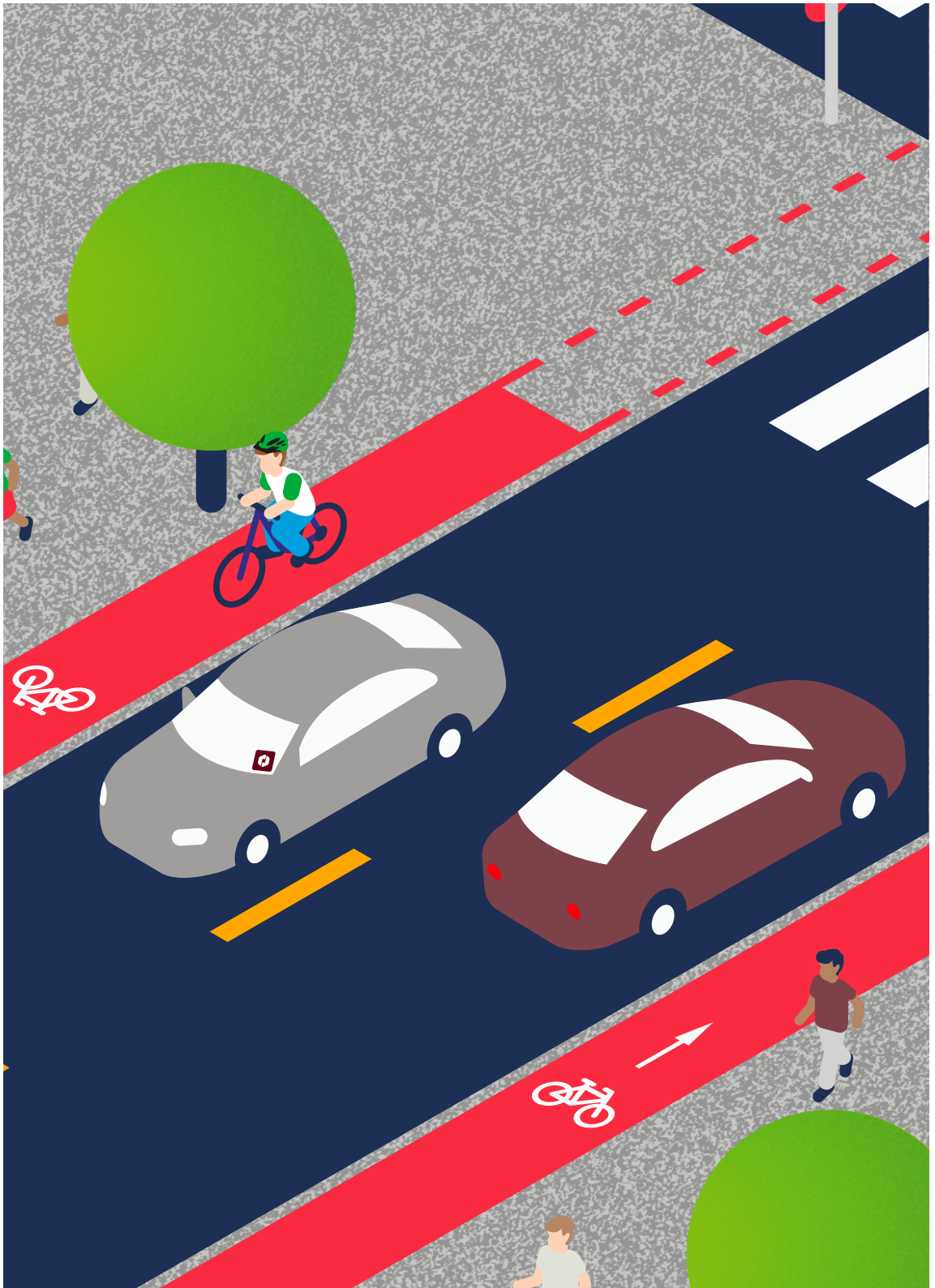
Luckily, city leaders now have a comprehensive resource to help them understand this interaction. The *Transit Street Design Guide*, published in 2016 by the National Association of City Transportation Officials (NACTO), summarizes leading practice on how cities can create streets that are safe, pleasant, and support multiple transportation options.

The guide offers guidance on:

- How to use transit-only lanes, boarding bulbs, and other street design features.
- How the placement and design of transit stops and stations affect transit reliability and integration with walking, biking, and driving.
- How intersection design and traffic signals can be used to optimize transit, pedestrian, and cycling movement.
- How to make transit-first design work on both neighborhood streets and major corridors.

High-quality transit allows a city to grow without slowing down. Transit that can be relied on makes it possible to develop vibrant, walkable urban places—the kinds of places that city residents increasingly demand.

(For more information on speeding up transit, see our sheet “You may not run transit, but you can lead.”)



Examples

Seattle RapidRide corridors

The city of Seattle worked with transit agency King County Metro to identify ways to speed up transit on several RapidRide corridors with high-frequency bus service. These corridors don't include dedicated lanes from end to end, but instead use a variety of measures like "queue jump" lanes and bus bulbs to keep the bus moving.

First and Second Avenue, New York City

In 2010, New York rebuilt First and Second Avenue as "complete streets" with bus-only lanes, protected bike lanes, and pedestrian islands. Bus speeds improved by over 15%, bus ridership increased by 9%, and traffic injuries fell by 14%.

1. Bus lanes for Select Bus Service in New York City, on Webster Avenue in the Bronx.

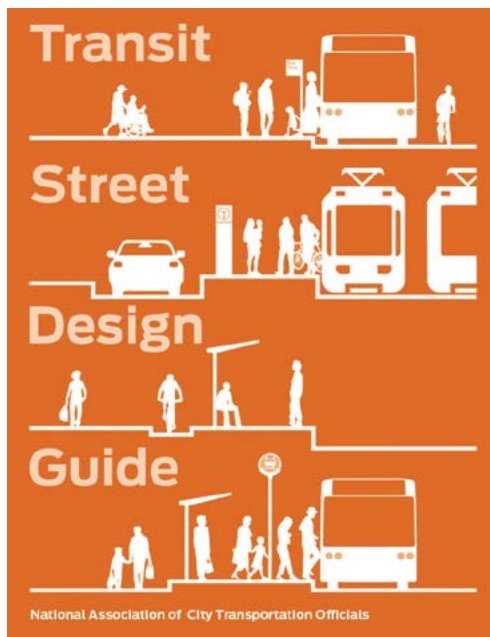


Resources

The National Association of City Transportation Officials offers several design guides that cities can use to design streets that balance transit, walking, cycling, and driving. The *Transit Street Design Guide* is described above. NACTO has also developed the *Urban Street Design Guide* and *Urban Bikeway Design Guide*.

The Institute for Transportation Engineers also offers a manual, *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*, that engineers can use to assist them in the design of pedestrian-friendly city streets.

2. NACTO's publication
Urban Street Design Guide.



4. Design walkable, transit-friendly neighborhoods

How does this strategy help your city?

Walkable cities and neighborhoods are the foundation of vibrant cities that attract people, which is good for public life and for businesses. Transit helps these areas to thrive, but investments in transit must be supported by well-designed streets and sidewalks, because that's where every trip begins and ends. Sidewalks and streets that are safe and appealing for walking also encourage greater levels of physical activity, which positively influences public health. With a greater share of trips made through walking and transit, cities can reduce the overall number of vehicle miles traveled by their residents, which in turn helps cities reduce emissions of greenhouse gases that contribute to global climate change and reduces local air pollution that contributes to respiratory illnesses.



Why should I care?

- **Pedestrian friendly streets foster business.** When streets are pleasant places to be and designed with the walking environment in mind, more people are likely to use them. Increased pedestrian traffic translates into increased sales. A worldwide survey of cities revealed that investments in pedestrian infrastructure improvements resulted in increased retail activity in those areas, decreased retail vacancies, and increased sales tax revenue.² Other studies show that while shoppers who drive to retail locations spend more per visit than people who walk and take transit, the latter two groups visit more frequently, resulting in greater overall spending.
- **Well-designed streets slow traffic speed and improve safety.** For many years, cities have designed streets primarily for one intended use: to move motorized traffic quickly and efficiently. This focus on vehicular needs, rather than the needs of people in the street environment, has resulted in streets that are unsafe for people biking and taking transit, people walking, and people with physical limitations. Shifting the focus of streets to serve all users' needs by improving pedestrian infrastructure and slowing vehicle speeds reduces the number and severity of collisions and makes neighborhoods more comfortable and livable. Careful street-design considerations naturally encourage slower speeds, increasing the safety for everyone.

2. Richard Campbell and Margaret Wittgens, *The Business Case for Active Transportation: The Economic Benefits of Walking and Cycling*, (Gloucester, ON: Go for Green, 2004), http://thirdwavecycling.com/pdfs/at_business_case.pdf.

What are the solutions?

- **Street network.** A street network with short block lengths (200—400 feet), high street connectivity, and a higher density of intersections per square mile provides multiple routes to and from destinations, creating many route options. People who live in neighborhoods with fine-grained street networks walk more, use transit more, and drive less than people who live in neighborhoods with large blocks and cul-de-sacs.
- **Building massing.** Building massing refers to the ratio of building height to street width (as measured from building front to building front, across the street). Successful public spaces and streets that feel inviting to people walking are often characterized by a ratio between 3:2 and 1:2. If buildings are to exceed heights that would define a ratio greater than 3:2 or 3:1, regulations that reduce or step back the bulk of the upper floors of such buildings can maintain a beneficial level of sunlight and view of the sky, reducing the “urban canyon” effect and making high-density areas more inviting for people walking.
- **Frontage zones.** Especially in commercial and high-density areas, sidewalks should be divided into designated zones: a curb/buffer zone, a furnishing zone, a walking zone, and a frontage zone. The curb zone (roughly 18") provides minimum clearance for vehicle doors to open without obstructing the sidewalk. The furnishing zone provides space for street trees and other landscaping and also keeps streetlights, bicycle parking, and other permanent fixtures from impeding pedestrian flow in the walking zone. The frontage zone functions as an extension of the building and consists of the building façade and the space immediately adjacent to the building. This is the area for sidewalk café seating and retail displays and also works well for placing permanent benches. Wider sidewalks also allow for the placement of transit-stop shelters in the furnishing zone without impeding the walking zone.

- **Site design.** Building fronts define the public space, creating the “wall” that encloses the “room” of the street or plaza. People walking tend to feel more comfortable when they feel a sense of enclosure from the buildings around them, and motorists will naturally slow their speeds due to increased enclosure. One way to successfully define the street space is through the use of build-to lines instead of requirements for minimum setbacks. Minimum setbacks permit buildings to abut the street at a variety of distances as long as they do not infringe on the defined minimum, which creates an uneven street wall and squanders an opportunity to create an inviting sense of enclosure. A build-to line creates a defined wall for the street, allowing variation in construction to the rear of the building lot but creating a more uniform façade.
- **Landscaping and streetscape.** Landscape and streetscape elements are key to creating pleasant walking environments. Street trees protect pedestrians, shade the sidewalk, slow vehicle speeds, provide a sense of enclosure to a street space, absorb stormwater and air pollution, and can increase real estate values. Rain gardens can be incorporated to treat stormwater and reduce flow into storm drains. Ground floor façades that are rich in variation and detail offer the most engaging pedestrian environment, and can make longer walking distances feel shorter. Requiring landscaped buffers between adjoining areas of incompatible land uses can screen unpleasant or noxious views and sounds to benefit commercial or residential zones.
- **Security.** Various elements influence the objective safety and perception of security, including street lighting, building frontages, and the quantity and type of traffic on the street. More people using a space means greater safety, and places designed to increase the feeling of safety will naturally attract more users. Increasing the number of windows and doors, mixing uses, and creating active, varying façades on a block will increase visibility and safety. Street lighting should be oriented to the pedestrian realm.

Excerpt from Denver Commons Design Standards and Guidelines

16th Street (Wewatta
Street to Chestnut Street)

Design standards

Proposed public right-of-way: 115'

Light-rail corridor: 25'

Safety median: 6'

Auxiliary lane: North side of street

Sidewalks: 10' minimum

walking zone on both sides

Public amenity zone: 5'

Pedestrian sidewalk lighting

Street lighting

Special paving in pedestrian

zone: Both sides

Design guidelines:

Street trees spaced 30'

Private amenity zone: 12'

Special amenities: café tables,
seating, kiosks, etc.

Design standards noted above have influenced the redevelopment of Denver's Central Platte Valley District into one of the liveliest mixed-use areas in downtown Denver, including a riverfront park (Commons Park), Confluence Park and Plaza, three pedestrian bridges that connect the district to the rest of the city across railroad tracks and the river, commercial retail, and many new apartment, townhome, condo, and senior housing developments. Three light-rail routes now pass through this neighborhood.

Examples

Denver, CO

Denver's Central Platte Valley District provides an early example of form-based code that has resulted in a quality built environment over time. Originally an industrial area and major rail yard, the City and County of Denver developed the Denver Commons Design Standards and Guidelines in 1997 to redevelop the area after it had deteriorated because of the decline in the rail industry.

The plan specifies design standards for streets, blocks, and buildings in great detail, including streetscape and landscape design; vehicle circulation and access; standards for blocks and zone lots to create an orderly grid; pedestrian active-use requirements on ground floors; setback and build-to requirements; criteria for buildings over a certain height to reduce bulk; sunlight access; commercial, residential, and mixed-use building design; and parking garage design. Read more at formbasedcodes.org/content/uploads/2014/02/denver-commons-design-standards.pdf

Santa Ana, CA

The City of Santa Ana Transit Zoning Code (formbasedcodes.org/content/uploads/2014/01/santa-ana-transit-zoning-code.pdf) is a more recent example of a form-based code for an existing mixed-use district adjacent to regional, high-capacity transit. The Transit Zoning Code will help guide intensified development in Santa Ana to support increased transit services. The code divides the 457-acre community into a set of zones based on development intensity and their role in the district, including the Transit Village, Downtown, Urban Center, Corridor, Urban Neighborhood 2, and Urban Neighborhood 1. For example, the Transit Village zone is the most densely developed, with transit-supportive, mixed-use development and pedestrian-oriented uses at street level.

Urban form elements are specified for each zone, such as building types and height, frontage types (arcade, gallery, shopfront, etc.), and building setbacks for all sides of the parcel. The code also specifies driveway standards and parking requirements, including setbacks for off-street parking. For example, the Transit Village zone requires the following:

Santa Ana Transit Village Zone Building Setbacks

Building Setbacks	In feet
Front yard	0'-10'
Side Street	0'-10'
Side yard	0'
Rear yard	15'
Alley rear yard	3'

Santa Ana Transit Village Zone Parking Setback Standards

Setback	Above Grade	Subterranean
Front yard	Min. 40% design lot depth	0' min.
Side Street	10' min.	0' min.
Side yard	0' min.	0' min.
Rear yard	10' min.	3' min.
Alley yard	3' min.	3' min.

Santa Ana Transit Village Zone Parking Driveway Standards

Type	Min. Width	Max Width
1-way	8'	12'
2-way	20'	25'
Parking	Not permitted	Not permitted

Lacey, WA

Lacey has historically functioned as a bedroom community for the nearby employment centers of Olympia (the state capital) and the Lewis—McChord military base. Recently the city adopted a new “hybrid” form-based code that integrates land-use and urban-form regulations. The hybrid code aims to convert zones of use-based retail and typical automobile-oriented suburban development patterns into streets and blocks that are highly walkable and primed for future transit expansion. It coordinates street design and building design, requires and creates definitions and illustrations of street intersection types, and creates new street connections and urban-scaled infill blocks. The code is sensitive to current land uses and property owners in the designated districts, permitting them to flexibly and incrementally address portions of the new code over time. The code can be viewed at www.codepublishing.com/WA/Lacey/#!/Lacey16/Lacey1624.html. Read more about the development context of the code in the Woodland District Strategic Plan (www.trpc.org/DocumentCenter/View/265).

Pleasant Hill, CA

Years of challenges related to reaching consensus around the redevelopment of large areas of surface parking lots surrounding the BART train station in Pleasant Hill led to the creation of property codes and architectural standards that apply to this small district of the city. The code specifically addresses elements that directly contribute to a friendly walking environment and support the area’s existing transit connectivity. The property code includes requirements for building frontage designs and approved materials, lighting plans, using building frontages as street walls to define the streetscape, and landscape standards.

To learn more, read the Pleasant Hill Property Code (www.co.contra-costa.ca.us/depart/cd/charrette/outcome/PHCODEfinal.PDF) and Architectural Standards (www.co.contra-costa.ca.us/depart/cd/charrette/outcome/PH Arch CODE Final.PDF)

What should I do first?

Steps	Actions
1. Identify streets and areas or zones most appropriate for infrastructure improvements or code changes to support active transportation and transit use	<ul style="list-style-type: none">• Consider streets that are candidates for road diets (converting four travel lanes to two lanes plus center turn lane, plus bicycle and pedestrian facility upgrades)• Limit one-way streets and consider converting some to two-way traffic• Analyze potential for reconstruction as complete streets• Identify problem corridors and hot spots of collisions• Engage with stakeholders in business districts to gather suggestions for walkability improvements• Review current code and identify points that need to be refined or updated• Establish data-collection needs and methods (transit trips, counts of people walking and bicycling, rates of serious-injury crashes, business data such as number of visitors and sales)• Collect baseline data before interventions
2. Implement infrastructure upgrades or code changes	<ul style="list-style-type: none">• Consider implementing the most cost-effective interventions first (for example, restriping streets to encourage slower vehicle traffic and lowering speed limits)• Target the greatest investments in areas of highest impact for business districts and highest density of people walking and taking transit
3. Track and analyze improvements	<ul style="list-style-type: none">• Compare baseline data with change over time• Refine regulations and expand implementation areas if needed

It is important to understand that ‘transit-oriented’ really means ‘pedestrian-oriented.’ The benefit of transit is that it allows you to build the walkable, compact neighborhoods where people want to live, work, and play. Walkable design is the key.

Chris Zimmerman, Vice President for Economic Development, Smart Growth America | former Arlington County Board member (1996-2014)

Learn More

- Washington, DC: Public Realm Design Manual (including sidewalks, landscaping, and building façades): http://ddot.dc.gov/sites/default/files/dc/sites/ddot/publication/attachments/ddot_public_realm_design_manual_2011.pdf
- City of Los Angeles Downtown Design Guide: Sidewalks and setbacks, pp. 10–16; ground floor treatments, pp. 17–19; street wall and building massing, pp. 26–29; street lights, p. 47: <http://urbandesignla.com/resources/docs/DowntownDesignGuide/lo/DowntownDesignGuide.pdf>
- City of Los Angeles Urban Design Studio: Guidelines and Principles: <http://urbandesignla.com/resources/index.php>
- Austin, Texas: Urban Design Guidelines including streetscapes, buildings, plazas, and open space: https://www.austintexas.gov/sites/default/files/files/Boards_and_Commissions/Design_Commission_urban_design_guidelines_for_austin.pdf
- City of Melbourne, Australia: Active façade policy (p. 4): http://planningschemes.dpcd.vic.gov.au/schemes/melbourne/ordinance/22_lpp01_melb.pdf
- Discussion of city block size from *Streetsblog* NYC: <http://www.streetsblog.org/2008/02/22/lets-chop-up-superblocks/>
- Lighting: a discussion of the costs and benefits of converting traditional streetlights to LED fixtures in Flagstaff, AZ: <http://www.flagstaffdarkskies.org/led-lighting-dark-skies/> The Project for Public Spaces discussion of lighting use and design: <http://www.pps.org/reference/streetlights/>
- Lighting: "Best Practices in Placemaking Through Illumination," a Virginia Tech study, provides several case studies of city lighting plans.
- Stormwater treatment facilities on streets and sidewalks: The Stormwater Management Manual of Portland, Oregon, includes details for integrating green infrastructure with existing street facilities. See also specific example sheets for infiltration planters and flow-through planters.
- "Ground floor vitality" policy and optimized street networks: A plan for the Central City of Portland, Oregon, includes policies to promote "active but compatible ground floor uses" to create vibrant streets (p. 62) and policies that promote a street network emphasizing "efficiency, safety, connectedness" for all users and modes: <https://www.portlandoregon.gov/bps/article/581227>
- One-way to two-way conversions: Cities that are converting some one-way streets to two-ways include South Bend, IN (http://www.southbendtribune.com/news/business/will-two-way-streets-bring-success-to-south-bend/article_e333b7b1-202b-5691-8e7f-3773da0bb07d.html) and Cedar Rapids, IA (http://www.cedar-rapids.org/local_government/departments_g_-_v/public_works/downtown_traffic_changes.php)
- Transportation Research Board study examining the effects of one-way streets on downtown districts: http://onlinepubs.trb.org/onlinepubs/circulars/ec019/Ec019_f2.pdf
 - Perth, Australia: infographic regarding the benefits of one-way to two-way conversion: http://www.perth.wa.gov.au/sites/default/files/Two%20Way%20Streets%20Infographic_WEB_0.pdf
- The Business Case for Active Transportation: discussion of the economic benefits of walking and bicycling: http://nacto.org/docs/usdg/business_case_for_active_transportation_campbell.pdf

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