# THE WORLD ON THE STREET

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Introduction

We used to grow up on the street. We'd play, we'd walk to neighbors with a casserole for the block potluck, we'd ride bikes, play games, hang out, socialize. So would our pets. Drivers knew enough to watch out for us. We all survived and thrived. We want that again.

So let's design streets for living, not just driving. That's the basic premise of this book: reconsider America's public realm—going the next step beyond travel lanes and bike lanes, sidewalks and crosswalks. Let's rediscover all the benefits that streets can offer communities.







# **HOW DID WE GET HERE?**

Dirt, paved, brick, cobblestone, concrete or asphalt, the street as a public right-of-way has served humans for thousands of years. Pedestrians, horses and horsedrawn carts shared the road for centuries, along with the occasional chicken, cow and goat.

The bicycle joined the street in the second decade of the 1800s, with the first bike path in America opening in 1894, running along the Ocean Parkway in Brooklyn. As bicycles became safer and cheaper and more women had access to the personal freedom bicycles provided, the bicycle came to symbolize the New Woman of the late 19th century, especially in Britain and the United States.<sup>1</sup> The first U.S. on-street dedicated bike lanes opened in Davis, California, in 1967, which led to similar bike facilities nationwide. Today, bikes outnumber cars worldwide by two to one.<sup>2</sup>

Those new-fangled motorized vehicles first hit the streets in 1886. Initially their numbers grew slowly and, in fact, some thought they would never amount to much: "There will never be a mass market for motor cars—about 1,000 in Europe—because that is the limit on the number of chauffeurs available!"<sup>3</sup> That threshold was blown past in 1908 when America fell in love with the Ford Model T, the first car for the masses. The love affair lasted for a hundred years. Cars became a symbol of freedom freedom to go wherever we want, whenever we want. And our streets have accommodated this.





REVIOUS: West Capitol Areme, Sacamento. Project design and photo by MIG, Inc. FACING: Nueva Street, San Antonio. Project design and photo by MIG, Inc. ABOVE RIGHT: Lincoln Highway between Gettysburg and Chambersburg. Pennsylvania, 1921. Photo courtesy The Lincoln Highway Digital Image Collection, Tansportation History Collection, University of Michigan Library (Special Collections Research Center). BELOW RIGHT: Syramore at Russell, 1967. Photo courtesy City of Davis and Bob Sommer.

Construction of a national roadway network starting with the Lincoln Highway in 1913, the early national highway system in the 1920s and the more comprehensive Interstate Highway System in the 1950s led to unprecedented growth in private transportation and mobility and greatly contributed to the nation's economic output. It made the automobile the preferred mode of transportation for most Americans and signaled the end of the railroads as the predominant method of transportation for people. Passenger transportation is now dominated by private passenger vehicles (cars, trucks, vans and motorcycles), which account for 86 percent of passenger-miles traveled.<sup>4</sup> The automobile took over the road and overwhelmed other uses of the street. Street designs in the U.S. were based on the turning radius of fire trucks; the main goal was to keep vehicular traffic flowing. Streets became conflict zones between cars, bicyclists and pedestrians.

# WHERE ARE WE?

The typical American car is parked 95 percent of the time.<sup>5</sup> Yet our roadways and parking systems are designed to ensure fast travels for the two hours of peak car use a day: getting to work in the morning and getting home in the evening. The results are often overbuilt streets that take tremendous amounts of public space, yet often don't help people successfully navigate through them. Today the vast amount of land devoted to roads—more than 4 million miles of paved and unpaved roads—is more than the land for either parks or government buildings.<sup>6</sup> It's roughly one-third of all city lands.<sup>7</sup> The large amount of land devoted to our roads has not actually provided the desired mobility benefits. The 2010 Annual Urban Mobility Report found that traffic congestion cost the U.S. almost \$115 billion in 2009. This cost the average commuter more than \$800 and about 34 hours per year.<sup>8</sup> And, unfortunately, the decades-long focus on vehicular mobility at the expense of safety and non-motorized users of the streets has resulted in unsafe and unfriendly pedestrian and bicycle environments.

The majority of pedestrian and bicyclist fatalities share a common thread: they occurred along "arterial" roadways that were dangerous by design; streets engineered for speeding traffic often with little or no provision for people on foot, in wheelchairs or on bicycles.<sup>9, 10</sup> Between



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2010 and 2015 pedestrian deaths increased dramatically. But more cities are now embracing the concept that it is simply not acceptable for so many people to die or be injured on our streets. It has to stop.

Many cities and towns have begun to reverse this trend by better addressing the needs of pedestrians and bicyclists, building on the principles of the Complete Streets and Livable Streets movements. In New York alone, from 2006 to 2010, more than 250 miles of dedicated bicycle lanes were created and several laws to promote cycling were passed.<sup>11</sup> More than 700 cities in 50 countries now have bike-share programs; that number is increasing exponentially.

Many approaches to travel way design in America, such as multi-way boulevards and corridors with roundabouts, have successfully maintained or increased the roadway capacity for automobiles, while allowing streets to provide safer and more welcoming environments to pedestrians, cyclists and transit users. And jurisdictions are retrofitting sidewalks and crosswalks with ADAcompliant ramps and cross slopes and cues such as truncated domes.

Streets designed for bicyclists and pedestrians show a clear improvement in overall safety of street users and a dramatic decrease in accidents and injuries. More and more agencies are realizing that retrofitting existing roads to accommodate non-automobile users need not be viewed as a "zero sum game." Virtually always,





180YE RIGHT: San Francisco Vision Zero Campaign design and photo by MIG, Inc. BELOW RIGHT: South 11th Avenue, Bozeman, Montana. Photo: Catherine Courtenaye/MIG, Inc.

better mobility for pedestrians and bicyclists can be added *without* diminishing the mobility of motorists. And, pedestrian and bicycle infrastructure construction projects also create more jobs than road construction jobs.<sup>12</sup> There's simply no need for warfare between modes of travel.

With the Complete Streets movement, many roadway designs are more sensitive to surrounding land uses and to the needs of bicyclists and pedestrians, supporting walkable and bikeable communities, compact development and mixed land use.<sup>13</sup> But the objectives for streets remained the same: move things around. Now, the Complete Streets concepts can be the basis of an even more ambitious transformation of streets to come.

# WHERE ARE WE GOING?

We're going places with different ideas about the cars we're driving—or not driving. The current Baby Boomer cohort of retirees is the first in which almost everyone has driven; more than 90 percent of Americans aged 60–64 drive. But those older drivers are now driving less. Younger drivers are getting their licenses later and they're not necessarily traveling in cars they own. People of all ages are making more virtual trips via online buying, telecommuting and social media. And with 77 percent of Millennials living in urban areas (up from 69 percent of Generation Xers when they were that age), they don't need to drive as much or as far.<sup>14</sup> Millennials have entered adulthood with no memory of cheap gas and affordable car insurance. In a 2014 survey, 64 percent of Millennials surveyed said they don't want a car because it's too expensive.<sup>15</sup> They also have a different ownership model, comfortable with on-demand services and peer-to-peer sharing rather than owning content or devices. Layer on car share, bike-share and ride-share services, and real-time arrivals apps for public transit, and they find little reason to own a car. In the same survey, 81 percent said they use shared services because they have the same advantages of owning a car or bike, without the inconvenience and cost. And their attitudes about public transit are different from Baby Boomers. People aged 16 to 34, with jobs in households with incomes over \$70,000—clearly not transit-dependent increased their public transit use by 100 percent between 2000 and 2009.

That doesn't mean there won't be more cars; cars sales usually spike whenever gas prices drop. But, at least in western world urban areas, those cars are just parked more than ever. The International Transport Forum predicts that by 2050—if the *developing* world follows the historic consumption patterns of richer cities—the total number of cars could triple. Which makes reconsidering streets even *more* important for them.

# **ARE WE THERE YET?**

The future of transportation—and our streets—is already here. There will likely be fewer cars in most



RIGHT: Bell Street, Seattle. Project design and photo by MIG, Inc.



major urban cities as we change to more of a shared car model. And they will be different because digital technology has changed everything.

Semiautonomous cars have been on the road with cameras, radar and ultrasonic systems that can see the world around. In fact, fully autonomous driverless electric cars are on the road too, opening up new possibilities for those with impaired vision to "drive" themselves anywhere they want to go (photo on facing page). Companies like GM are developing fleets of robot taxis to hit the roads, promising "zero crashes, zero emissions and zero congestion."<sup>16</sup> Many car engineers predict that cars and transportation will change more in the next 20 years than they have in the past 75 years.<sup>17, 18</sup> In 2017, Silicon Valley-based electric car company Tesla, Inc., passed iconic Ford Motor Company in market value—a company exactly 100 years older. The market clearly sees the future.

Communications systems and sensors installed in both streets and cars will create intelligent roads, keeping track of vehicles and the infrastructure around them. The Federal Communications Commission has already reserved a radio spectrum for communications among cars and between cars and infrastructure. Driving apps can monitor a car's braking and acceleration times, then share the information to create real-time congestion maps. And cars wouldn't crash with each other, or with bicyclists and pedestrians. Cars could then be made of lighter materials and could pack closer together, traveling in platoons to reduce congestion—and opening areas of streets for other uses.

Mandating new technologies for safety is not new. Seatbelts, airbag, anti-lock brakes and stabilization systems are now required. Cars with anti-collision and traffic-calming technologies are becoming the norm, as will autonomous cars. And when commuters are able to work, chat, check emails and even sleep in cars as they currently do on trains and many buses, a commute will be part of a work day or the evening's entertainment.

# **HOW MUCH LONGER?**

America built about 40,000 miles of interstate highways to get the country moving after World War II. During the 1990s, when gas was cheap, the economy booming and driving increasing, the nation built about 17,000 lane-miles a year. From 2005 to 2013, the nation built 317,000 lane-miles of new roads—about 40,000 miles every year.<sup>19</sup> Road construction continues as if demand will always be increasing. And it costs a lot of money. States and the federal government spend about \$27 billion a year on road expansion, spread pretty evenly between highways and surface streets. Not road maintenance. Road expansion.

That's the fatal flaw in America's transportation infrastructure policy: It's still vehicle-oriented planning. Much of transportation planning is based on policies, design manuals and ways of thinking of the 1990s.



We're building more and more roads and parking with the aim of shaving a few seconds off of a half-hour commute. And we're not investing at the same pace in transit, maintenance, and ensuring a multimodal mobility balance on our streets.

It's time to be bold.

# WE ARE THERE

Let's reconsider how streets can expand the public realm and provide real social and economic benefits to all our communities and neighborhoods.

We now have the tools to incorporate uncertainty into transportation planning. Transportation investment decisions can reflect that driving will decline in the developed world. The changed driving habits among younger generations must be factored into community and transportation planning, starting now, to ensure that transportation investments serve the needs and desires of communities today and in the decades to come. And the developing world can learn from the historic prioritization of cars—and build it better.

The very nature of streets can change. Streets *are* the public realm. By designing for what might be coming in the future—driverless cars, big data traffic operations, no cars at all—cities can create streets that change to meet changing needs. They can become true public space, with social gathering, events, play, commerce and urban agriculture and green space—all of the potential street functions covered in the next chapters.

This book examines how streets can function in many different ways and still provide mobility for moving goods and people. It explores how street innovations such as various types of traffic calming, flexible street design, slow zones, narrower lanes, fewer road markings and signage and more shared space will expand the function of streets—because they are for living, not just driving.

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# **GET THE MOST FROM THIS BOOK**

We've designed this book to offer ideas and concepts about how we're reconsidering streets and the public realm. But it's also a workbook, with case studies and best practices from around the world—advice from the trenches of successful street transformations.

We begin with "Street Design Principles," a set of things to keep in mind while considering a street redesign.

We then grouped types of activities streets can support into six chapters: mobility and wayfinding (move), social streets (gather), play streets (play), shopping streets (shop), farm streets (grow) and resilient streets (green).

Within each chapter you will find:

**An activities burst.** We started our thinking with the basic types of activities people might do on a street (see facing page). In each chapter we suggest both the activities you might find on that specific type of street (for example, a play street or a shopping street), and some activities from another type of street that might also be appropriate on that street.

**Case studies.** We go into great analytical depth for at least two example streets per chapter, providing photos and measured plans and elevation schematics so you can see precisely how the street works. We also provide many short case studies and references. Case studies are a snapshot in time—communities change, technology changes and a street might be redesigned again. But that's the point of this book: flexible streets can respond to future opportunities.

**Physical elements.** Introducing specific physical elements on a street induces behavior change in people, encouraging them to interact, socialize or play. While there are necessary elements that are common to all streets, we also provide examples of elements to consider specific to each type of street.

**Best practices.** Based on all the case studies and our own work designing streets, we developed best practices, with photos and illustrations, to help you plan and design your own great streets.

**Before and after photo simulation.** And last, a snapshot of a real street undergoing a transformation.

You might just want to zip through, reading from cover to cover. We also encourage you to spend some time with each street, getting to know it and how you might apply its best practices to your own streets.

Driving Walking Riding Service Biking Orienting Strolling Running Navigating Managing waste People watching -Harvesting water Interpreting Rolling/skating Networking Demonstrating Locating Parking Teaching Reusing Daning Resting Recycling Learning Parading Creating habitat Eating **ACTIVITIES ON THE STREET** Generating energy Talking "Design is not our end goal. Our end goal is to Sitting Doubling nations connect people to each other."<sup>20</sup> Great street playing music design supports human behavior. We have Meeting Cleansing water Singing grouped activities into six types of streets, but activities in different groups can occur on the same street. Not all activities can We want the second second Irrigating occur on every street, but flexible streets can - Dining incorporate a range of activities for people of Mulching all ages and abilities at different times of the Producing day and for different days of the week. (Watch Planting for this activities burst in each chapter.) Cooking Browsing Weeding Buying Selling Propagating Storing Displaying Bargaining . Bartering Performing -Harvesting sliding Sensing Composting Thinking Climbing Playing games Jumping Geocaching Balancing Oscovering Drawing Building Exercising Reading

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Living Streets

Many different types of streets serve different purposes, but all streets should be designed recognizing that *humans* will be using the street. Streets operate differently when designed for high volume, fast traffic or for slow moving, low volumes. People behave differently according to age, abilities, interests and family situation, at different times of day, day of the week or season of the year.

A well-designed grid of streets will provide the community with different experiences—both when traveling and when lingering. Here are some overarching principles to keep in mind while considering a street redesign, to help determine the appropriate expanded functions, elements and programming for a range of streets.





# **BASIC STREET PRINCIPLES**

When embarking on a street redesign, consider these five guiding principles and the design principles that follow:

**Design for Humans.** Most of our streets are too large, too wide (often wide enough to land a passenger plane) and monotonously long, with little detail to engage the human eye. They lack the intimate feel that allows users, especially pedestrians and bicyclists, to feel safe and comfortable. Street corridors don't need to have any more than 50 percent of the space devoted to cars, and all excess space not used by cars can then be repurposed. Reducing street width, breaking up the length, and adding medians, trees, art and vertical elements can create a series of interconnected living rooms with a beginning, middle and an end.

**Right Size.** If travel lanes are too wide, they encourage speeding. If bike facilities are too wide and unprotected, they encourage vehicles to use them as an additional lane, or just drive faster. If sidewalks are too wide and not activated by adjoining ground floor uses, they feel stark and uninviting. Ensuring that travel lanes, bike facilities, pedestrian pathways and crosswalks are appropriately sized in relation to each other creates mutual respect between the different modes of travel.

**Provide Multiple Benefits.** Especially in today's economic climate, it's important to maximize impact by designing and locating streetscape elements that offer multiple benefits.

RIGHT AND PRECEDING PAGE: Tower of the Americas Way, San Antonio. Project design and photo by MIG, Inc.





For example, a tree provides shade, helps clean the air, and can be positioned to calm traffic. Lighting illuminates an area, while also providing a feeling of enclosure, safety and a sense of identity for the area. And sidewalks provide areas for pedestrians to walk and stroll, while allowing opportunities for outdoor dining and other commercial activities. These are critical economic development opportunities for small and large businesses, and can provide a valuable source of income for towns and cities.

**Design for multimodal shift.** Ensuring that walking, biking and taking transit feels safe, convenient and comfortable is the basic foundation for shifting short and medium trips away from cars. Envisioning walking, biking and transit as the primary modes of travel is a paradigm shift in how we design streets.

**Design for Tomorrow.** Technology is constantly evolving, as are the sizes and types of vehicles we drive. Technological advancements in traffic signalization have already increased the overall capacity of roads, as will driverless technology. So design streets to ensure that streetscape improvements like redesigned curbs don't impede future opportunities. For example, flexible sidewalks can be designed at the same grade as rest of the street, with bollards and planter boxes providing the same sense of safety as concrete curbs. As travel lanes for cars decrease in size, the extra space created can be used for wider sidewalks, more trees, and more bicycle and pedestrian amenities.

LEFT: First Street, Long Beach, California. Project design and photo by MIG, Inc.

# AestheticallyPleasing

Human beings are naturally sensitive to the physical world and respond to beauty. Street benches don't need to be hard, flat plastic. Wood, art, trees, lights and details attract the eye and humanize the environment. Color, textures, natural elements, sounds, smells and level of detail should work together to engage people and invite them in.

RIGHT: City of Funchal, Madeira, Portugal. Photo by Anton Zelenov/Shutterstock.com







# **O** Connectivity

Streets are one part of a larger jigsaw puzzle; what happens on one street affects other streets around it. Some streets clearly need to function as arterials that keep cars moving; others can focus more on pedestrian and bicyclist shared space. Block sizes of 200 feet by 200 feet make Downtown Portland a most walkable grid. A well-connected grid encourages people to walk and bike; the more intersections and crossing points, the more pedestrian-friendly the street is. The grid also slows cars, giving the occupants time to view what's available on the street and maybe decide to stop and walk too.

LEFT: Downtown Portland. Photo by Google Earth.



Safety includes both avoiding conflicts between travel modes and personal security to increase comfort level. The physical design of a street should be safe enough that, for example, parents don't feel they must cling to a child's hand at all times. That may require a buffer from quickly moving traffic or increasing the width of a pedestrian-only zone. Surfaces should be maintained to reduce tripping and there should not be any places for people to hide. Adjoining uses are also important. Buildings with windows instead of blank walls increase eyes on the street and provide a perceived sense of safety. Finally, streets should be well lit to be safe at all times of day.

RIGHT: Main Street, Lyons, Colorado. Project design and photo by MIG, Inc.





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Streets should ensure that people of all abilities—using canes, wheelchairs, dogs and assistive devices—and using all modes of travel can use them, including skateboards, roller blades, tricycles and strollers. There should be different types of cues for people with low vision, people in wheelchairs and those with difficulty hearing. The elderly may need more places to sit along the street; bladers and bicyclists may need their own lane.

LEFT: West Capitol Avenue, West Sacramento. Project design and photo by MIG, Inc.