Fitting Roadways to Community Needs:

A Look at the ITE Urban Thoroughfares Report

"To make the simple complicated is easy. To make the complicated simple is brilliant."
– Ivory Soap Slogan

by Hannah Twaddell

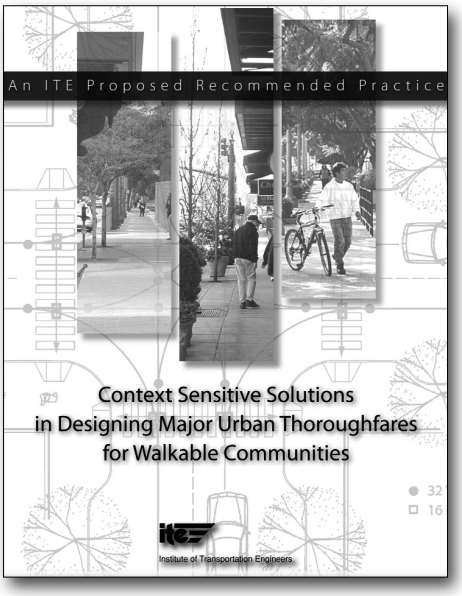
Things were simple in the good old days. Engineers designed roadways; land use planners set urban development policies; transportation planners established regional roadway networks; and architects created buildings and parks. Each group stayed happily within its own dominion, used its own language, and concentrated solely on its own priorities.

But then people started getting wise to the fact that the decisions being made by each of these groups were having a profound effect on the quality of life in our communities, and that we all suffered when those decisions undermined, rather than complemented, one another.

Planning commissioners, elected officials, residents, and businesses from communities large and small began asking engineers to consider the land use impacts of roadway design and location decisions. They directed planning staff to craft land use policies that would help reduce traffic congestion. They required developers – and their architects – to demonstrate how their proposed shopping centers and housing subdivisions would fit into the larger community, and how they would handle increased traffic by means other than just widening roads.

These were all good ideas and concerns, but they made life more complicated for those who hadn't been trained to address them. People in various professions – planning, traffic engineering, design – began to see the need to work collaboratively and expand their knowledge. One result is a host of useful research and recommended practices.

One such product is a draft report recently released by a team of experts from the Institute of Transportation



Engineers and the Congress for New Urbanism (with funding from the Federal Highway Administration and the U.S. Environmental Protection Agency). *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities: A Proposed ITE Recommended Practice* (a title clearly coined by a committee) offers a rich trove of information for the brave souls from each profession – planning, engineering, and urban design – who are venturing together into this complex territory.[1] *See Sidebar, Context Sensitive Solutions: A Team Approach.*

The product of five years of hard work, the report – which I'll refer to simply as *Designing Urban Thoroughfares* – provides a much needed approach to integrating the transportation objectives of roadways with design considerations that take into account the surrounding built environment and pedestrian needs. The goal: to create vibrant, healthy, and walkable urban communities.

Designing Urban Thoroughfares also reflects a growing recognition that the time-honored (some would say fossilized) standards defined in resources such as the "Green Book," published by the American Association of Highway and State Transportation Officials (AASHTO), do not adequately address the kind of urban fabric many communities want to create. That said, the authors of the report are clear that it is not intended to replace the Green Book. Instead, it is designed to help planners and engineers deal with a range of considerations not covered in traditional guidelines.

As reported by Robert Steuteville in *New Urban News*, "the Green Book focuses on three factors – capacity, speed, and topography – in the design of thoroughfares. … The new manual views a host of other considerations – including pedestrians, transit, and placement of adjacent buildings and businesses – as central to the design of urban thoroughfares."[2]

Three Steps to Designing a Walkable Urban Thoroughfare

Designing Urban Thoroughfares sets out a logical, structured approach to the planning and design of urban roadways. The process essentially boils down to three key steps:

1. Identify the roadway's context zone, functional classification, and thoroughfare type;

2. Based on the decisions made in step one, establish parameters for the size and scale of the road, including the roadway's target/design speed and the design/

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1 Check with ITE for updates on the status of the final report: <www.ite.org>.

2 Robert Steuteville, "Design Manual for Urban Thoroughfares Ready for Release," New Urban News (March 2006) (citing remarks by Brian Bochner, a senior research engineer at the Texas Transportation Institute).

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control vehicle; and

3. Design the roadway to best fit the characteristics of its context zone and thoroughfare type, focusing on four major elements or "realms":

• Context (e.g., building scale, facades, and orientation);

• Roadside (e.g., sidewalks, landscaping, street furniture, and transit stops);

• Traveled way (e.g., bicycle, transit and vehicle lanes, and medians); and

• Intersections (e.g., corner and mid-block crossings, signals, striping, and turn lanes).

I realize that what I just said may sound like a lot of mumbo-jumbo jargon. So let's take a closer look at what's behind some of these words and phrases.

1. Identify the roadway's context zone, functional classification, and thoroughfare type.

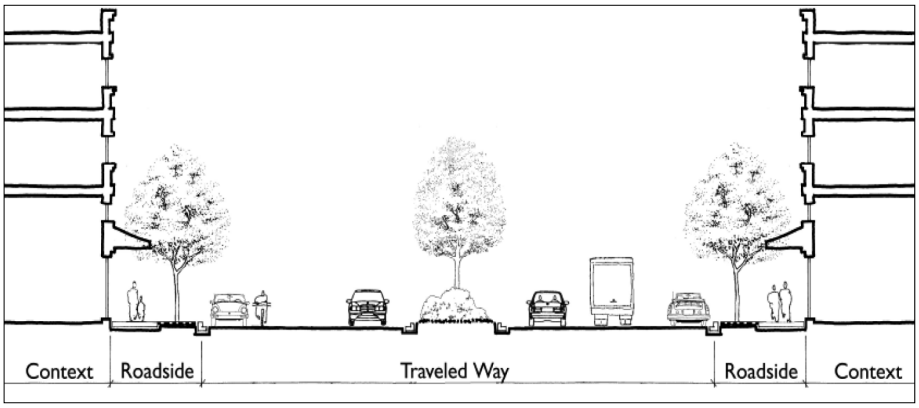
Context Zone: The context zone is shorthand for the overall character of the built environment through which the thoroughfare passes. *Designing Urban Thoroughfares* draws on a concept called the "Transect" (developed by the firm of Duany Plater-Zyberk and Company) which sets out a progressive range of development patterns from rural to urban. Take a look at the illustration on page 16.

Designing Urban Thoroughfares focuses on planning for integrated, walkable streets in four context zones: suburban, general urban, urban center, and urban core. Although rural settings are not addressed in the ITE report, smaller towns can apply the recommended methods to improve their main streets.

If you take a minute to browse through the following chart, the general idea behind context zones will become clearer.

Again, the first step set out in Designing Urban Thoroughfares is to identify which context zones the planned roadway will be going through.

Functional Classification: Familiar to many transportation planners, "functional classification systems" have for many years been used to define the purpose and character of each street in the broader, regional transportation network.



Each level in the system, from local and collector streets to minor and principal arterials, is subject to progressively higher standards for vehicle travel speed. As these standards go up, so does the size of the road. The number and width of travel lanes must be increased, and the road made flatter (e.g., lower "vertical curvature") and straighter (e.g., lower "horizontal curvature") to ensure that fast-moving drivers have enough space and time to make decisions and recover from mistakes. Because of their importance to the overall network, major urban streets are usually assigned a high functional classification, such as a collector or arterial.

Designing Urban Thoroughfares does not propose to discard the use of functional classification systems when planning for urban roadways. But it does supplement functional classification in a very significant way by incorporating consideration of the roadway's context zone. By considering both, planners can better define the type of thoroughfare they will be developing.

Thoroughfare Type: Urban thoroughfare types include a range of streets, avenues, and boulevards. Each has different distinguishing features. Streets feature vehicle speeds of about 25 mph, have two lanes, and are found in primarily residential areas. Avenues feature speeds of 30-35 mph, have up to four lanes, sometimes with medians, and typically serve a more diverse mix of land uses than streets. Boulevards feature speeds of 35-45 mph, have six to eight lanes with medians, and serve a broad mix of uses.

Thoroughfare type and functional classification are related. For example, the report notes that "in general, boulevards serve an arterial function, avenues may be arterials or collectors and streets typically serve a collector or local function in the highway network."

By determining both the functional classification and thoroughfare type, engineers and planners can mutually establish the roadway's purpose in the broader transportation network and its role in shaping the urban environment it serves. This will help a great deal in making tough decisions about important design elements.

2. Establish broad parameters for the size and scale of the road.

Target Speed/Design Speed: As noted earlier, the functional classification system identifies travel speeds appropriate to each level of roadway. Arterials, for example, typically have a target speed of 35-45 mph, while drivers on collectors should be going 30-35 mph.

What many outside the field of transportation planning don't realize is that engineers traditionally design roadways for speeds higher than the target speeds. Why? Because highway research indicates that about 15 percent of motorists will drive above the speed limit. Engineers typically set design speeds of about 5-10 mph higher than the "85th percentile" target speed to account for this. This means the requirements for certain roadway features, such as sight distance,

Context Zone	Distinguishing Characteristics	General Character	Building Placement	Frontage Types	Typical Building Height	Type of Public Open Space
C-1 Natural	Natural landscape	Natural features	Not applicable	Not applicable	Not applicable	Natural open space
C-2 Rural	Agricultural with scattered development	Agricultural activity and natural features	Large setbacks	Not applicable	Not applicable	Agricultural and natural
C-3 Suburban	Primarily single family residential with walkable development pattern and pedestrian facilities, dominant landscape character	Detached buildings with landscaped yards	Varying front and side yard setbacks	Lawns, porches, fences, naturalistic tree planting	1 to 2 story with some 3 story	Parks, greenbelts
C-4 General Urban	Mix of housing types including attached units, with a range of commercial and civic activity at the neighborhood and community scale	Predominantly detached buildings, balance between landscape and buildings, presence of pedestrians	Shallow to medium front and side yard setbacks	Porches, fences	2 to 3 story with some variation and few taller workplace buildings	Parks, greenbelts
C-5 Urban Center	Attached housing types such as townhouses and apartments mixed with retail, workplace, and civic activities at the community or sub-regional scale.	Predominantly attached buildings landscaping within the public right-of-way, substantial pedestrian activity	Small or no setbacks, buildings oriented to street with placement and character defining a street wall	Stoops, dooryards, storefronts, arcaded walkways	3 to 5 story with some variation	Parks, plazas and squares, boulevard median landscaping
C-6 Urban Core	Highest-intensity areas in sub-region or region, with high-density residential and workplace uses, entertainment, civic and cultural uses	Attached buildings forming sense of enclosure and continuous street wall landscaping within the public right-of-way, highest pedestrian and transit activity	Small or no setbacks, building oriented to street, placed at front property line	Stoops, dooryards, forecourts, storefronts, arcaded walkways	4+ story with a few shorter buildings	Parks, plazas, and squares, boulevard median landscaping
Districts	To be designated and described locally, districts are areas that are single-use or multi-use with low-density development pattern and vehicle mobility priority thoroughfares. These may be large facilities such as airports, business parks and industrial areas.					

(Based on transect zone descriptions in SmartCode V-6.5, Spring 2005 Credit: Duany Plater-Zyberk & Company.)

Shaded cells represent context zones that are not addressed in this report.

curvature, and grade are high enough to give the scofflaws extra room to avoid crashes.

This "margin of error" approach, at first blush, sounds good. And, in fact, it makes eminent sense on interstates and freeways where just about all travelers are operating cars, buses, or trucks. But it presents a problem for roadways in urban settings, because roads engineered to accommodate speeding often encourage it. And most of us recognize that as travel speeds go up, walkability goes down.

Wider streets are harder for pedestrians to cross. Straighter, flatter roads invite drivers to go faster, regardless of the posted speed limit. And, while design factors such as the degree of separation between cars and pedestrians are critical to pedestrian safety, vehicle speed is the number one influence on pedestrian fatality rates. Every notch in the mph makes a huge difference. A healthy adult pedestrian has a five percent chance of being killed if struck by a vehicle going 20 mph. The rate jumps to 40 percent if the vehicle speed is 30 mph, and doubles to 80 percent at 40 mph. The risks for children and the elderly are higher across the board.[3]

Therein lies the conundrum: in urban contexts, should we allow extra room for speeding drivers to get around curves and hit the brakes without running off the road? Or would sharper curves and narrower lanes keep drivers from going too fast in the first place? Transportation planners, including those involved in putting together *Designing Urban Thoroughfares*, have argued about this for years. The report proposes a compromise of setting the design speed no more than five mph over the target speed, and also encouraging traffic calming features like landscaping and medians.

Design Vehicle/ Control Vehicle: Another little-known, but critical, decision made at the beginning of the design process is the selection of "design vehicles" and "control vehicles."

The design vehicle represents the largest type of vehicle that will *most often* use the roadway being planned (e.g., a delivery truck). Control vehicles, in contrast, are the largest vehicles that will only *occasionally* use the roadway (e.g., an 18-wheeler or a fire engine). Similar to the tradition of assuming that we must always supply extra room for speeding drivers, engineers have historically assumed we should always design the road for the control vehicle. *Designing Urban Thoroughfares* suggests orienting plans around the design vehicle, while building in accommodations as needed for control vehicles.

For example, a residential street would rarely need lanes wider than nine or ten feet in order to accommodate the cars that traverse it. But standard practice has been to make the lanes wider because a fire engine may occasionally need to use the street. Wider lanes, however, may encourage motorists to exceed speed limits, and can make the street less pedestrian-friendly. Yet providing for fire and other emergency access is an important concern. In fact, *Designing Urban Thoroughfares* stresses that "emergency vehicle access and operations should always be considered in thoroughfare and site design" (the report also notes that fire and police representatives should be part of the planning and design team for any project).

Instead of defaulting to wider lanes as the only solution, the report encourages planners and roadway designers to employ more pinpointed strategies – like broadening the turning radius or putting in mountable curbs at corners – to allow room for large vehicles. And the report emphasizes the importance of ensuring good street connectivity so that all vehicles have a choice of routes. *Editor's Note: for more on street connectivity, see Hannah Twaddell's "Making the Connection," in PCJ #58; available to order & download at: <www.plannersweb.com/wfiles/w216.html>*

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3 *Dangerous by Design* (Surface Transportation Policy Project, September 2000), <www.transact.org>.

Context Sensitive Solutions: A Team Approach

As its title indicates, this new ITE report incorporates what has come to be known in transportation planning as "context sensitive solutions," CSS for short.

The report sums up CSS in the following way:

CSS is a different way to approach the planning and design of transportation projects. It is a process of balancing the competing needs of many stakeholders starting in the earliest stages of project development. It is also flexibility in the application of design controls, guidelines and standards to design a facility that is safe for all users regardless of the mode of travel they choose.

There are many definitions of CSS … but they share a common set of tenets:

- *Balance safety, mobility, community and environmental goals in all projects;*
- *Involve the public and stakeholders early and continuously throughout the planning and project development process;*
- *Use an interdisciplinary team tailored to project needs;*
- *Address all modes of travel;*
- *Apply flexibility inherent in design standards; and*
- *Incorporate aesthetics as an integral part of good design.*

What's so different about this new CSS approach, and why is this ITE report important? Perhaps its greatest value is that it provides a language and a process that can help professionals and laypeople communicate with one another. By linking the principles, language, and techniques of transportation planning and engineering with those of land use planning and urban design, the report's authors have forged bridges that can help us cross the chasms of misunderstanding that so often divide us.

Imagine the following people have been brought in to work with your community to work on a major roadway project. Each one must use – and stretch – his or her knowledge and perspective in order to come up with solutions that support your community's values, desires, and needs. Do you see yourself or someone you know as one of these hypothetical people?

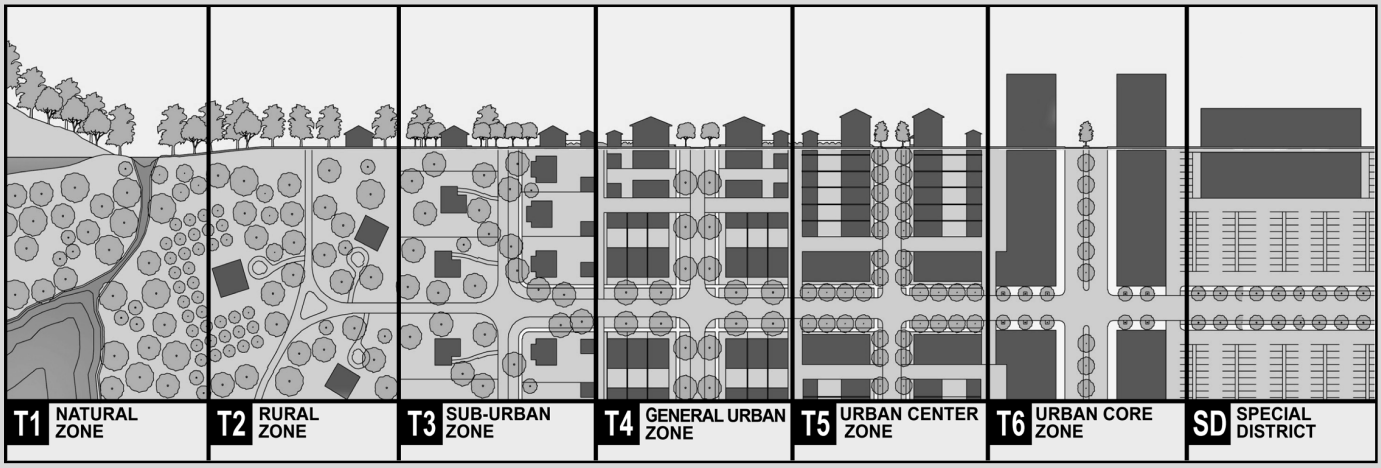
Susan, the transportation planner, principally views streets in a big-picture way, as functional connections. Her expertise is in designing systems of routes that optimize vehicle traffic flow throughout cities and regions. She will be particularly helpful in identifying the functional classification of the roadway. Under a CSS approach, she must also consider the economic and environmental impacts of the network configuration, as well as the scale and shape of each street.

James, the highway engineer, principally views streets as travel facilities. His skills have usually been used to design travel lanes and intersections that maximize traffic flow and minimize conflicts between vehicles. Under a CSS approach, he must consider the safety of pedestrians and bicyclists an equal priority to that of drivers, if not a higher one. In addition, he must consider ways to enhance the quality of the places served by the streets in question. The journey for all who traverse the roadway must be not only safe, but enjoyable.

Rich, the land use planner, principally views streets as regional economic resources. His work has often involved locating commercial and residential growth in strategic ways, making the most of the available roadway and transit accessibility. He will be particularly helpful in identifying the context zone and thoroughfare type, and will pay keen attention to the aspects of the street that affect economic vitality such as room for sidewalk cafes, parking, and access for delivery vehicles. Under a CSS approach, he must consider the impacts of development patterns on the functionality of the network, and the ways in which the desired density, diversity, and design of neighborhoods and commercial centers relate to the streets that serve them.

Heather, the urban designer, principally views streets in a site-specific way, as civic spaces. Her expertise is in designing buildings, open spaces, and streets in ways that create enjoyable, functional places. She will contribute readily to tasks such as identifying the thoroughfare type and the detailed elements of the context and roadside realms. Under a CSS approach, she must also consider the impact of decisions about the proportion and scale of development on a street's functionality and on the performance of the larger transportation network.

By sharing their expertise in a structured CSS planning process, the big-picture planners can learn ways to "zoom in" and consider the design and safety impacts of their decisions; while the designers and engineers who worry about site-specific details can "zoom out" and consider the network performance and economic impacts of their decisions. Working together as an interdisciplinary team, they can engage community residents, government leaders, public agencies, and private sector interests in productive discussions that result in an effective, broadly supported plan.



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One of the biggest challenges is safely accommodating cars, bicycles, and buses within the traveled way.

Crossings should be designed so pedestrians don't have to dash to get across.

Planning for urban thoroughfares also means planning for the pedestrian environment. In "pedestrian-rich" places, wide sidewalks and amenities such as benches are essential.

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3. Design the roadway to best fit its context zone and thoroughfare type.

Context: The context of a roadway, defined broadly by its context zone and more specifically here, is identified by the way in which buildings, open spaces, and activities are organized around it. This includes elements such as the mix of commercial, residential, and civic uses; the size, orientation, and pedestrian accessibility of the buildings; the amount of land devoted to surface parking; and the length of blocks.

The context of urban streets usually changes along its length, creating a range that can shift from a busy downtown center to a quiet residential neighborhood within just half a mile. The roadway design must support each given context, as well as provide travelers with ways to transition from one area to another.

Roadside: The roadside is made up of the sidewalks, plantings, and other elements in the public right-of-way between the curb and the private property line. Within this environment, engineers and designers must pay attention to:

• the width of the sidewalk (up to ten feet in pedestrian-rich places);

• the location of plantings, transit stops, sidewalk cafes, mailboxes, and street signs (all arranged so that the pedestrian has a straight, clear, and ample amount of sidewalk for their journey); and

• the amount of clearance needed (to ensure that just-parked drivers and passengers can open their car doors without whacking a cyclist, a pedestrian, or even a tree).

Traveled way: Everything between the curbs is considered the traveled way. This includes parking, bicycle, and vehicle lanes, as well as medians. Critical decisions here include the number and width of each type of lane, and the amount of separation between drivers and cyclists or people on foot.

One of the big challenges, especially in older cities, is that accommodating different kinds of needs can demand a lot of room. It may be difficult to assemble enough right-of-way to provide four 11-foot wide travel lanes, a 16-foot median, two six-foot bike lanes, and two eight-foot parking lanes (that's a total of 88 feet), not to mention two ten-foot sidewalks, and two rows of trees beyond the traveled way!

Deciding which elements may have to be downsized or left out is a tough process, and must be guided by both the community's priorities and safety considerations. If the presence of a broad sidewalk and street trees is paramount, the travel lanes may have to become narrower than the design speed dictates. Or the parking lanes on one or both sides of the street may have to go.

Intersections: The risk of crashes between vehicles and pedestrians is heightened at every cross street and driveway. It's important to decide how many driveways will be permitted in a given space, and how drivers will navigate to places that don't have a direct opening to the street.

Driveways may need to be textured and designed so that drivers and pedestrians can anticipate the fact that they will be sharing the sidewalk at these points, and that the pedestrian always has the right of way. Cross-street intersections should be as flat and narrow as possible in order to maximize sight distance and minimize crossing distance. It may make sense to break up multi-lane crossings into a series of one- to two-lane sections separated by medians.

The *Designing Urban Thoroughfares* report provides in-depth analyses of all the design-related topics I touched on in the preceding paragraphs.

Summing Up:

Building new roadways is no longer just a matter of focusing on the best ways to move vehicles through a city or town. Because of pressure brought by citizens, planning board members, and elected officials, transportation planners have increasingly come to realize that roadway planning and design must be done by an interdisciplinary team. As the ITE report spells out, this team needs to consider not just how the road fits into the broader transportation network, but also the communities it serves; and not just the needs of motorists, but the desires of everyone who uses it. ◆

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