



**“Streets are more than public utilities...more than linear physical spaces that permit people to get from here to there...Streets moderate the form and comfort of urban communities.” –Allan Jacobs**

## **Chapter 2**

### **Pattern 1: Circulation**

The Circulation pattern, as its name implies, is a cornerstone of mobility-friendly community planning. The pattern principles are designed to yield safe, comfortable personal mobility for people of all ages and abilities, as well as efficient transit and freight circulation. Streets and intersections designed according to this pattern knit together rather than dividing communities. Streets and sidewalks are designed for walking, and often serve as public gathering places in their own right.

Street systems have a pervasive influence on how a community functions. They tend to shape local land use patterns, the form of the various districts, the level of access that can be provided to destinations, and the design and function of individual places. The influence of street systems on urban form predates the automobile era; many New Jersey communities show the continuing influence of cartways and Native American trail systems.

To a large degree, a community's circulation system also determines the quality of people's daily experiences while driving, walking, bicycling, or taking the bus or train. Factors such as the width of streets, the condition of sidewalks, the spacing of intersections and the aesthetic character of surrounding areas may work together to create an environment that encourages walking and outdoor activity--or one that is cheerless and forbidding.

The design of streets, pavement markings, and signage can help to orient unfamiliar users of all travel modes, leading to safer, more predictable behavior and a more satisfying experience of place. Well designed roads, bridges, pathways, and trails are distinctive elements of a community's form in their own right, reflecting sensitivity to surroundings and enhancing the experience of those who use them.

## Community Form and Mobility Principles

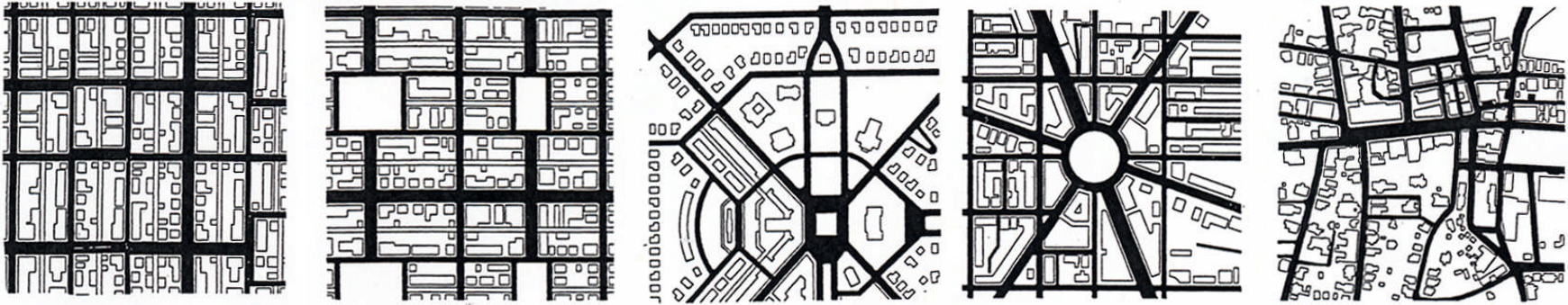
Five key principles define mobility-friendly circulation:

- Connectivity,
- Multi-use Streets,
- Legibility,
- Safety by Design, and
- Sensitivity to Surroundings.

### *Connectivity:*

*Create interconnected street networks with frequently spaced intersections, and interconnected pedestrian pathways and bicycle networks.*

A cornerstone of the mobility-friendly circulation system is a well-connected network of streets and pathways. Networks can take many forms (next page). An interconnected network, whether organized as a grid or a more loosely formed spider web, helps to disperse traffic and allows for narrower, human-scaled streets. The key to connectivity is a high ratio of nodes (intersections) to links (travelway sections). Closely spaced intersections provide more direct and convenient routes to destinations, reducing travel distance.



There are many types of networks. The key to good mobility is a high ratio of nodes to links.

Source: Walter Kulash

The same principle applies to transit, bicycle, and pedestrian networks. Today, many short trips that could be made by other modes are made by car simply because of poor connectivity. Creating better connectivity for these modes can improve an area's vitality and sense of place, reduce traffic congestion, and improve residents' health. Having numerous pedestrian connections also multiplies the opportunities for the chance meetings and social interaction that are fundamental to a lively community. In mixed use or commercial areas, networks also create access and visibility at each corner, helping to attract private investment to these ideal business locations.



Corner location on a street grid in Hoboken contributes to a successful neighborhood café.

The traditional grid-style street layout of older towns provides excellent connectivity. Streets are interlinked at numerous points, intersections are closely spaced, and there are few dead-ends. This not only provides a more direct route to any destination, but also helps to spread the traffic load over multiple streets and intersections. The presence of a grid pattern and parallel streets allows state and county highways to serve their main purpose—moving vehicles over longer distances—while shorter trips can take place on local streets.

### **Connectivity Index Variations**

*A Connectivity Index can be used to quantify how well a roadway network connects destinations. Indices can be measured separately for motorized and non-motorized travel, taking into account non-motorized shortcuts, such as paths that connect cul-de-sacs, and barriers such highways and roads that lack sidewalks. Several different methods can be used.*

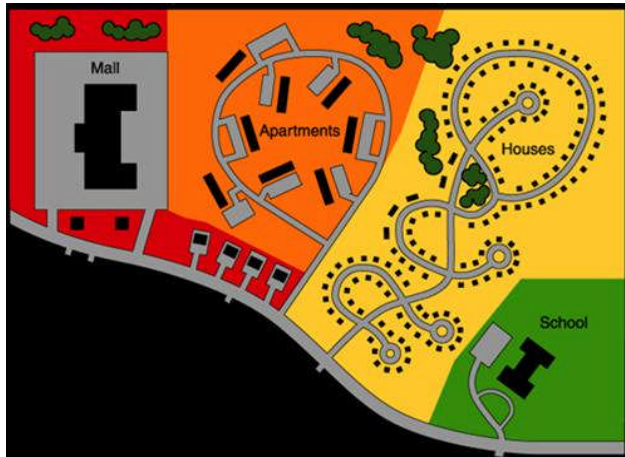
- *The number of roadway links divided by the number of roadway nodes (Ewing, 1996). Links are the segments between intersections, node the intersections themselves. Cul-de-sac heads count the same as any other link end point. A higher index means that travelers have increased route choice, allowing more direct connections for access between any two locations. According to this index, a simple box is scored a 1.0. A four-square grid scores a 1.33 while a nine-square scores a 1.5. Dead-end and cul-de-sac streets reduce the index value. This sort of connectivity is particularly important for non-motorized accessibility. A score of 1.4 is the minimum needed for a walkable community.*
- *The ratio of intersections divided by intersections and dead-ends, expressed on scale from zero to 1.0 (USEPA, 2002). An index over 0.75 is desirable.*
- *The number of surface street intersections within a given area, such as a square mile. The more intersections, the greater the degree of connectivity.*
- *An Accessibility Index can be calculated by dividing direct travel distances by actual travel distances. For example, if streets are connected, relatively small, and have good sidewalks, people can travel nearly directly to destinations, resulting in a low index. If the street network has many unconnected dead-ends and blocks are large, people much travel farther to reach destinations, resulting in a higher index. A WPDI of 1.0 is the best possible rating, indicating that pedestrians can walk directly to a destination. An average value of 1.5 is considered acceptable.*
- *Consider calculating connectivity separately for motorized vehicles, bicycles, and pedestrians. This will help focus attention on creating separate networks for each.*
- *Consider expanding the power of the connectivity index by linking it with land use intensity (i.e., the number and type of origins and destinations in a given area) to measure the balance between land development and the transportation system.*

*These indices are affected by how each area is defined, such as whether parklands and industrial areas are included in analysis. It is therefore important to use professional judgment in addition to quantitative measurements when evaluating connectivity.*

*Adapted from: TDM Encyclopedia; Victoria Transport Policy Institute*

The way that many communities have developed since the mid 20<sup>th</sup> century has been very different, however. Individual, isolated cul-de-sac developments often mean that almost every outing—even a short hop to school or to buy a newspaper—requires a separate car trip on the state highway. The hierarchical street systems typical of these newer developments create congestion by overloading the limited number of intersections provided.

A lack of connectivity is one reason for the serious congestion on so many of New Jersey's main arterials, such as Route 31 in Hunterdon County and Route 9 in Ocean County. As New Jersey's planners and communities have become more aware of the link between connectivity and traffic flow, some are questioning cul-de-sac development and once again considering traditional grid patterns.



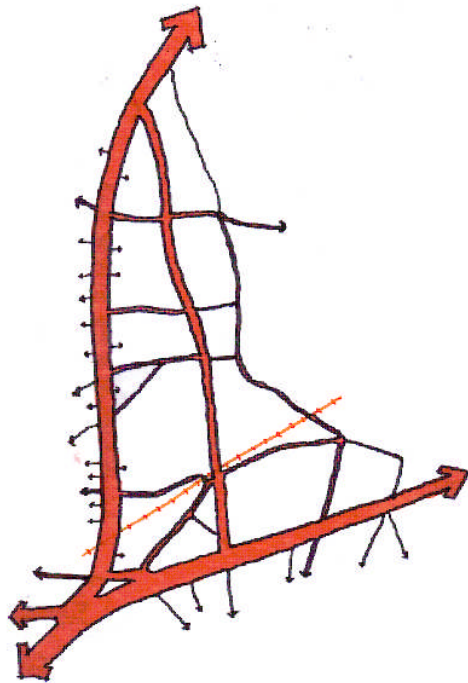
**Typical suburban development consists of single use lands and lacks street connectivity.**

Image source: Walter Kulash

Thinking about transportation and land use issues during preparation of a master plan is an opportune time to review the structure of the local roadway network and consider the potential to enhance it through new connections that can serve shorter trips. Network enhancements can include connector streets, new streets parallel to arterial highways, or bike paths constructed to link residential developments to one another or to destinations such as schools.

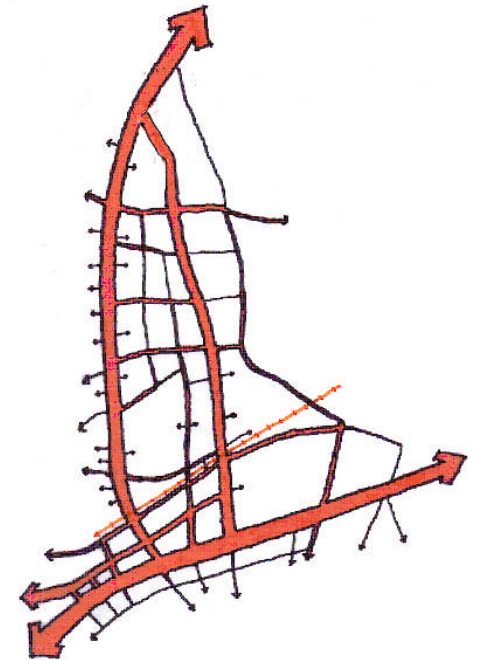
As part of the subdivision process, a municipality can require that streets and paths be designed to connect to neighboring parcels, so that a system of connected roads and sidewalks evolves over time. A proactive approach to developing a network is to define street and block locations through a street regulating plan, and establish development standards for these areas so that the block pattern emerges with new development.





**A new network is proposed to alleviate congestion near Flemington in Hunterdon County. On the left is the original limited access bypass proposal. In the current proposal, an at-grade highway with signalized intersections replaces the bypass.**

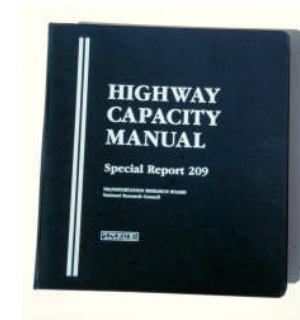
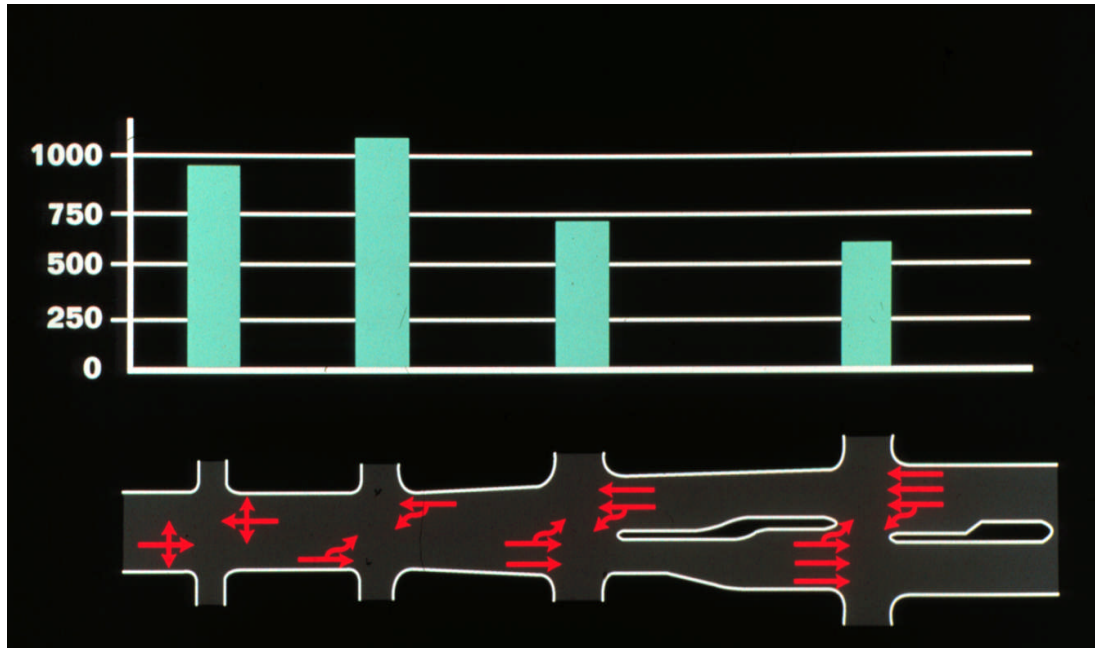
Image source: NJDOT/Glatting Jackson Kircher Anglin



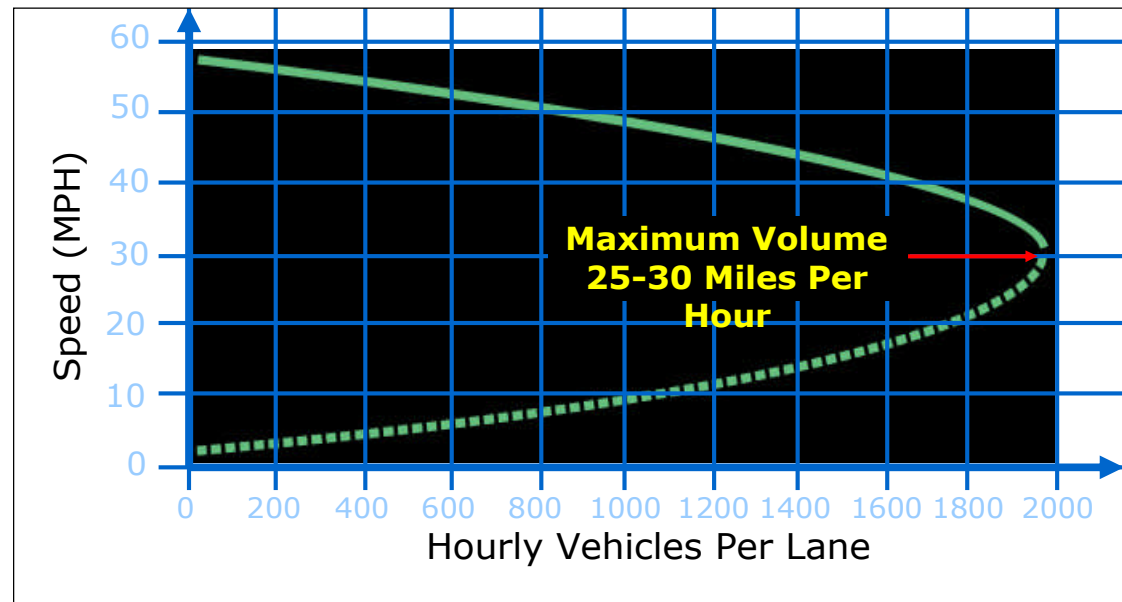
Connectivity is important not only for motor vehicle traffic but for all travel modes. Pedestrian connectivity can be enhanced through public investment and through development regulations. For example, Bedminster Township recently identified the need for improved pedestrian connections between its two historic village centers and included a program of improvements for this purpose in its Circulation Element. Municipalities can set standards for internal bicycle and pedestrian circulation systems in commercial centers or office parks. Local governments also play a role in the formation of regional bicycle networks, by creating local links to regional trail facilities such as the Delaware & Raritan Canal or the East Coast Greenway. Cities and towns may also be called upon to help maintain truck connections through cooperative approaches to corridor management, working with state and county transportation agencies.

The principle of connectivity also applies to the transit system. Future extensions and transfer points on the state's transit network will require effective partnerships between NJ Transit and other transit providers and the communities located along planned facilities. Bus operations often require interconnecting routes or timed transfers from a central station. Though seldom operated by municipalities, these services may depend on effective local traffic management in the station vicinity.

## Roadway Size, Design Speed and Efficiency



The Highway Capacity Manual tells us that wider roads and higher speeds may not be the most efficient means of moving vehicles.



Graphics: Walter Kulash

### ***Multi-use Streets:***

***Design “complete streets” and intersections that serve pedestrians, persons with disabilities, bicyclists, transit vehicles, and trucks as well as motorists.***

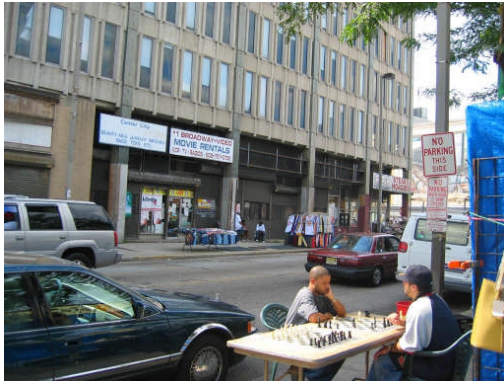
In a mobility-friendly community, streets are designed to serve all categories of users. They serve community members throughout the entire lifecycle, from the earliest jaunts in a stroller to an elderly person’s weekly grocery trip—and the trucks bringing strollers and groceries to local stores in the first place.

Serving all users effectively can be difficult. It requires balancing the needs of each category of users, and determining who should have priority in different situations. For example, some New Jersey highways are critical truck routes that support local industry. Their design must reflect the need to accommodate high volumes of truck traffic while providing at least minimal accommodation for other users. Other roads support frequent bus operations, and their characteristics should reflect transit priorities, with bus pull-off areas and signal preemption systems to cut down on transit travel time. Roads that serve as “Main Streets,” on the other hand, should discourage high speed travel and give priority to pedestrians.



Multi-use streets are not only transportation channels but public gathering places in their own right. In good weather, their ample sidewalks often serve as small parks and accommodate vendors, local performers, café tables and an occasional game of chess. From time to time, a street may be closed to traffic to accommodate a street festival, such as the Lambertville Shadfest or the Trenton Heritage Days. Requests for block parties, bicycle races and Halloween parades can usually be accommodated by diverting traffic to a parallel street. With furniture, shade trees and pedestrian-scale lighting, the street becomes a true “outdoor living room.”





Chess game on a Camden sidewalk.

A multi-use street must provide adequate space for each type of user and suitable provisions at intersections, including pedestrian crossing time that is sufficient for slower walkers and wheelchair users. Critical minimum dimensions for pedestrian and bicycle facilities are summarized in the table below.

### Minimum Widths for Pedestrian and Bicycle Facilities

Sidewalks:	5 feet (more in downtowns)
Raised median refuge islands:	6 feet (8 preferred)
Bike lanes:	5 feet (more if high parking volume)
Bike-compatible road shoulders:	5 feet
Shared motor vehicle/bicycle lanes:	10-15 feet*
Multi-use paths (2-directional):	8 feet (10-12 preferred)

\*Minimum varies depending on traffic volumes, speeds, presence of parking and rural/urban condition. On a 25 mph urban road with moderate traffic volumes and on-street parking, shared lanes should be at least 14 feet wide.

Sources: NJDOT Bicycle Facilities and Pedestrian Facilities guidelines; FHWA; AASHTO

**“All too often...walkways are thought of only as insignificant adjuncts to the streets.” –Kevin Lynch**

### **Sidewalks**

Sidewalks are the foundation of a walkable community, and wide sidewalks are the basis for creating lively public spaces. As indicated in the table, sidewalks should be at least 5 feet wide, allowing people to pass comfortably and to walk side-by-side. Wider sidewalks are appropriate in urban centers, near schools, at transit stops, or anywhere where high pedestrian demand exists. Sidewalks should be continuous along both sides of a street and accessible to all users. A level surface is important, particularly for senior citizens at risk of falls.

A buffer zone of 4 to 6 feet is recommended between the sidewalk and the street in order to maximize pedestrian comfort levels. This buffer zone can take the form of parked cars or street furniture in urban areas, or a landscaped tree lawn can provide an acceptable buffer in residential or suburban areas.



### **Intersections**

At intersections, the balancing act among motorists, cyclists, pedestrians and trucks becomes especially tricky. From a traffic management standpoint, signalized intersections are the choke points of congested corridors. Traffic engineers seeking to increase corridor through-put capacity for vehicles often limit the “green time” available to side streets and pedestrians. They may also use dedicated right-turn lanes to help address congestion, resulting in the loss of a shoulder bikeway at intersections.

Mobility-friendly intersections are designed to provide minimum standards of safety and comfort for all users, even if this results in some additional delay to motorists. While traffic congestion is recognized as an important concern, it is not the only factor dictating intersection design. Again, the critical point is determining which users should have priority in a given situation, as well as giving users clear behavioral cues.



For pedestrians, techniques to consider include lead pedestrian intervals, which give pedestrians a few seconds of “walk” time in advance of conflicting turning movements, and curb extensions or “bulbouts” that reduce walking distances. Curb extensions can be designed for compatibility with most classes of trucks, depending on the dimensions of the adjoining roadways. For bicyclists, features to consider include bike-sensitive loop detectors and pavement markings indicating where cyclists should position themselves.

Intersections should fully accommodate persons with disabilities. Walking surfaces should be smooth; separate curb ramps should lead to each crossing; a level landing should be provided at the top of each ramp, and a flush transition at the gutter. Pedestrian push buttons, if used, should be placed within reach of a wheelchair user and close to the crosswalk. Cues for pedestrians with

limited vision include tactile treatments to demarcate transitions from the sidewalk to the street and audible signals.

Attention should also be given to the needs of senior drivers and pedestrians. In designing signal timing, a walk rate of 3.0 feet per second will accommodate slower walkers. Placing benches at intersections frequented by senior pedestrians is also helpful. Senior drivers often benefit from the use of a protected left-turn phase, turning bays, and retroreflective curb markings. Signal visibility for seniors can be improved through the use of backplates to reduce glare.



**This intersection includes raised “speed tables”**



## Crosswalks

Two general types of crosswalks need to be considered: those placed at signalized or stop-controlled intersections, and those without traffic controls. In a mobility-friendly community, a population of walkers can be assumed, and marked crosswalks and pedestrian signal heads will be needed at most signalized intersections. Pedestrian signal phasing should accommodate walkers of various speeds and abilities. NJDOT recommends the use of countdown pedestrian timers that help pedestrians determine how much time they have to finish crossing. Where pushbutton actuation is used, pedestrian delays of over 30 seconds should be avoided.



Clearly marked stop bars in advance of the pedestrian crossing area are needed at both signalized and stop-controlled intersections. Crosswalks need not be marked on low-volume residential streets with low traffic speeds; in fact, this is counterproductive, as it diminishes motorist awareness of those in more critical locations.

The best practices for the placement and design of crosswalks at uncontrolled locations—either at midblocks or from stop-controlled side streets—is a subject of debate in the transportation community. There is a clear need for improved midblock crossing facilities in New Jersey, as evidenced by the state’s relatively high number of pedestrian fatalities, most of which occur away from intersections. However, national research suggests that simply marking a crosswalk, without any other action to slow traffic or make pedestrians more visible, may not increase pedestrian safety.

One of the most important concepts for improving crossing safety on wider, high speed roads is the use of raised median refuge islands that provide a safe place to wait, allowing a road to be crossed in two stages. Curb extensions that shorten the crossing distance are also helpful.



These bumpouts are adopted by businesses.

Features that may enhance motorist attention and compliance with crosswalks include:

- Traffic calming, including pavement markings and other visual cues that encourage reduced speeds;
- Pedestrian-oriented lighting that makes the pedestrian clearly visible to motorists at a distance;
- Fluorescent green-yellow pedestrian warning signs with an accompanying arrow placard;
- In-pavement “Yield to Pedestrian” signs;
- Lighted overhead warning signs;
- In-pavement crosswalk lighting, and
- Raised crosswalks.

Crosswalks should be free of visual obstructions, including parked cars: on-street parking should be restricted within 20 feet of a crosswalk. When communities ignore this guideline and permit parking right up to the crosswalk, they compromise pedestrian safety. In locations where jaywalking is a significant problem, sidewalk fencing can help to steer pedestrians to the appropriate spot to cross.



A lighted crosswalk in Metuchen.



A good crosswalk:

- Is located where pedestrians want to cross;
- Sends the message that pedestrians want to cross;
- Slows traffic down;
- Allows drivers to react and yield, and
- Enables pedestrians to cross safely.

**Tactile warning (truncated domes)**



for pedestrians with visual limitations.

### **Curb Ramps and Tactile Warnings**

Curb ramps provide access between the sidewalk and roadway for people with special mobility needs, including wheelchair users and those pushing carriages or carrying large items. Federal law requires that all new roadway construction and rehabilitation include curb ramps. Municipalities should make efforts to ensure that existing facilities feature curb ramps as well. This can be done through sidewalk and curb ramp audits, beginning with priority locations for pedestrians.

The Americans with Disabilities Act specifies design guidelines for curb ramp design and placement, and these should be followed by municipalities.

ADA requirements (1973 Rehabilitation Act and ADA 1990) specify that curb ramps be installed at any location where pedestrian crossings might exist. Curb ramps must have a slope of no more than 1:12 or a maximum grade of 8.33 percent.

Separate perpendicular curb ramps should be placed leading to each crosswalk, rather than using a single diagonal curb ramp for two crosswalks. This can help prevent visually impaired individuals from accidentally entering the center of an intersection outside of a crosswalk. Tactile warnings, such as “truncated domes,” should be utilized to alert pedestrians when they are at the street edge.

### **Bicycle Facilities**

Bicycling can be accommodated through the use of shoulders, wide outside travel lanes, signed shared roadways, dedicated bike lanes within the right-of-way, or off-street bike paths separated from the roadway. The choice of an appropriate facility type depends on roadway conditions, local origins and destinations, and projected users. Low volume, low-speed roadways require no special facilities for bicyclists, while higher speed, high volume roads typically require a separate bike lane. Bicycle-safe designs should be used for drainage grates and catch basins along all roadways.



**Decorative iron fencing guides pedestrians to crosswalks, deterring jaywalking.**





Striping to create wide outside lanes may be applicable in urban areas where shoulders are not normally provided; these facilities permit motorists to safely pass bicyclists within the existing roadway width. This treatment allows multiple users to use the same roadway, and is especially appropriate for skilled bicyclists.

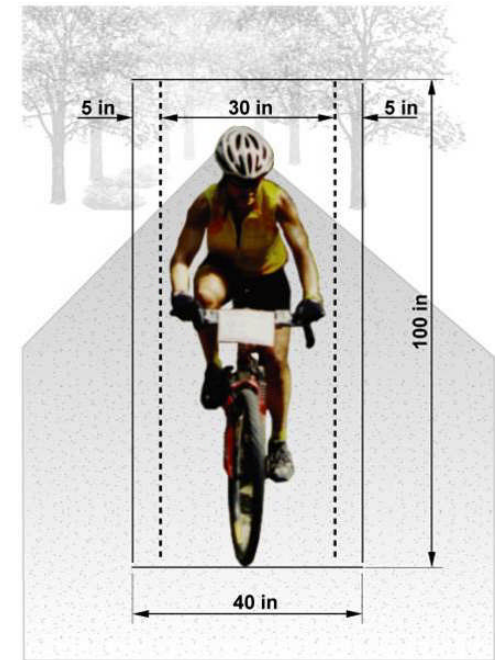
Bike lanes, commonly identified with bicycle stencil markings, are designed to be used exclusively by bicyclists. This can improve bicycle safety and result in more predictable behavior by both motorists and bicyclists. Bike lanes should be one-directional, carrying bicyclists in the same direction as the adjoining travel lane. They should be located on the right side of the roadway, and if applicable, between the parking lane and travel lane.

There are several approaches that can be used to add a bike lane to an arterial roadway, including reducing the width of existing travel lanes, reducing the number of travel lanes, or reducing or reconfiguring parking. A four-lane arterial can often be reconfigured to provide three motor vehicle lanes (two travel lanes and a center turn lane), freeing up space to add bicycle lanes.



**Bicycle lane in University City, Philadelphia**

Image courtesy of A. Nelesen Associates



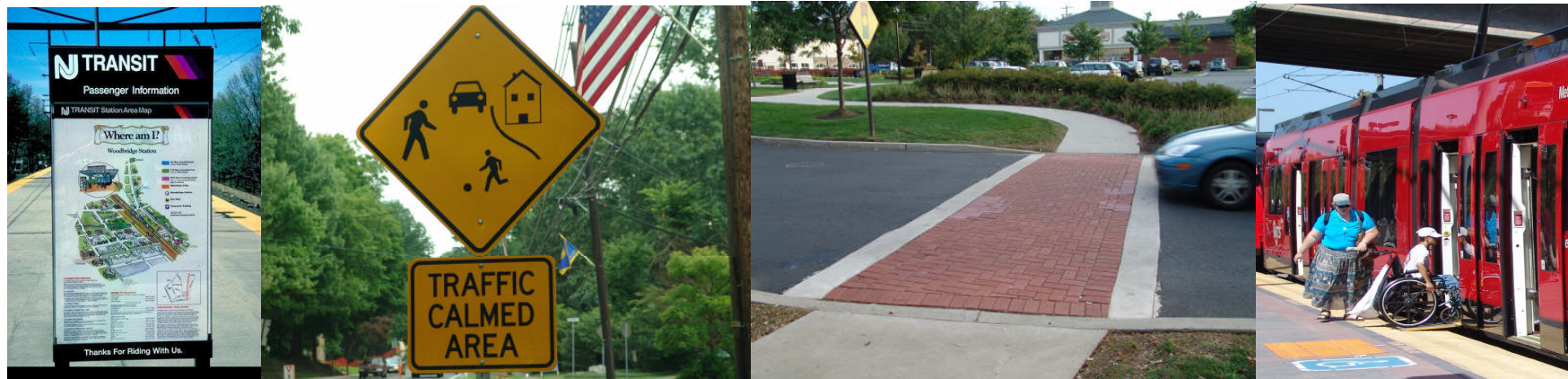


## *Legibility:*

*Provide a legible environment that helps users orient themselves, navigate, and understand their surroundings.*

A legible environment is one that makes sense to its users. People know where they are at any given moment, and how to move about comfortably. As visitors, they quickly form a mental map of the area from the logical arrangement of space and distinctive landmarks. As users of the transportation system, they know precisely what behavior is expected of them: which lane is for left turns only; where to cross the street safely; how to find the Turnpike or Garden State Parkway.

People make sense of their environment through the myriad cues it provides. Signs and pavement markings are only one part of a legible street system. The placement and design of buildings, the use of color and texture to demarcate transitions, and the provision of adequate lighting are all factors working to create legibility. The transportation system should be designed to work together with local landmarks and other features to provide these consistent cues.



A lack of legibility leads to confusion and unpredictable behavior. For example, exclusive turning lane markings that are posted too close to an intersection often lead to a scramble as motorists find themselves in the wrong lanes. Lost trucks tie up traffic as they try to turn around. Shoppers vie for a few on-street parking spaces despite ample capacity in poorly marked off-street lots. Besides the safety risks inherent in a confusing environment, such a place is less enjoyable to visitors and less likely to invite repeat business or new investment. Conversely, improving the legibility of an area can help increase the marketability of underutilized sites, allowing them to be effectively redeveloped.



**This multi-use path in Hoboken gives cyclists and pedestrians clear behavioral cues with color, texture, and striping.**

**“Paths, the network of habitual or potential lines of movement through the urban complex, are the most potent means by which the whole can be ordered. The key lines should have some singular quality which marks them off from the surrounding channels: a concentration of some special use or activity along their margins...a special texture of floor or façade, a particular lighting pattern...a typical mode of planting.” – Kevin Lynch**

Wayfinding programs have been implemented in a number of New Jersey municipalities, including Jersey City, to help visitors find local attractions such as commercial centers, waterfront areas, and parking facilities. Truck routing signs can be used to direct commercial through-traffic onto appropriate roadways away from potential conflicts and residential areas. They can also help to direct traffic away from hazardous obstacles, including narrow streets, low underpasses, or weight-restricted bridges.

Legibility is linked to safety: for example, the use of bright white edge lines helps users recognize the edge of a roadway and drive more consistently. Edge lines are especially important on rural roads with soft shoulders, as well as for senior drivers. Predictable, unambiguous signals and consistency in intersection design treatments are also factors in legibility, and hence, safety.

Many communities have used specially designed “gateways” to enhance awareness of their local identity and to signal to motorists visitors that they are entering a town center and should slow down. NJDOT is currently working with five historic villages along Route 57 in Warren County to develop consistent gateway treatments and traffic calming. The treatment includes a slight narrowing of the travel lane, the use of a colorized shoulder, and village entrance signs.



***Safety by Design:***

***Encourage safe and predictable behavior by all road users. Road features should enforce desired speeds, accommodate safe use by senior drivers and encourage shared use by motorists, bicyclists, and pedestrians.***

Transportation safety, once considered an operational issue, is increasingly viewed as an integral part of the transportation planning process. At each level of government, safety data such as crash history is becoming a more important factor in prioritizing transportation improvement projects. There is also a greater emphasis on “self-enforcing” roadway design and the effects of design speeds on pedestrian mobility and the surrounding environment.



**Gateway concept for Bordentown City. Source: Clarke Caton Hintz**

Self-enforcing roads make it *more difficult to speed*, and *more natural to slow down* when approaching a town center or other pedestrian environment. Through careful design, the multi-use streets described earlier in this chapter can convey to each user the behavior that is appropriate at that location, encouraging safe, shared use by motorists, bicyclists, and pedestrians. This concept is also related to the notion of legibility described above.

Safety-oriented design principles can help to reduce both the number of crashes and the severity of those that occur. They provide a sense of security and comfort in using the transportation system, encourage walking and bicycling, and improve mobility and safety for senior citizens, school children, and other residents.



**“Speed in locomotion should be a function of human purpose. If one wants to meet and chat with people on an urban promenade, three miles an hour will be too fast; if a surgeon is being rushed to a patient a thousand miles away, 300 miles an hour may be too slow.” --Lewis Mumford**



**This overly wide residential street encourages speeds far above the 25 mph limit.**

Pavement width is among the most important factors affecting travel speeds. In general, the wider and straighter a roadway is, and the farther motorists can see ahead, the faster people will tend to drive, regardless of posted speed limits. Overly wide streets in residential areas compromise pedestrian safety and tend to diminish the quality of neighborhood life by encouraging speeding. This problem can often be addressed through traffic calming. Municipalities can also regulate street width in new residential or mixed use developments to prevent speeding problems in the first place.

Traffic calming involves changes in roadway alignment or the installation of physical devices and design features that encourage lower speeds, discourage cut-through traffic, and improve safety for all modes. It relies on physical rather than regulatory measures to encourage desired behaviors.

Traffic calming techniques include both speed-control and volume-control measures. Speed control measures fall into two basic categories: vertical deflection and horizontal deflection. Examples of vertical deflection methods include speed humps, speed tables, raised crosswalks, and raised intersections. Vertical deflection introduces a change in the height of an otherwise level roadway, encouraging vehicles to slow down. Horizontal deflection creates a curve in an otherwise straight roadway segment, or narrows a section of roadway. Horizontal deflection measures include traffic circles, roundabouts, bulb-outs, chokers, realigned intersections, chicanes, and center islands. If speed control measures are well designed and properly placed, they are generally well-accepted, effective, and cause minimum inconvenience for local drivers and residents

**A raised crosswalk acts to slow traffic, as well as increasing pedestrian visibility.**



**Curb extension in Jamesburg helps slow traffic and shortens the crossing distance for pedestrians.**





**Roundabout in Rutherford slows and channels traffic.**

Image Source: NJ Transit

### *Sensitivity to Surroundings:*

#### *Design roads and bridges in context, with respect for the surrounding environment.*

The first four principles of the Circulation pattern focused on providing a mobility-friendly transportation system by planning for multiple users, connectivity, legibility, and traffic calming. The final principle, Sensitivity to Surroundings, is related to each of the others, but turns the focus outward to the roadway environment.

New Jersey is part of a growing national movement to design roads, bridges and other facilities for greater harmony with their surrounding contexts, both natural and human. This approach, part of an overall philosophy known as Context-Sensitive Solutions (CSS) or Context-Sensitive Design (CSD), seeks to develop transportation projects in a manner that enhances rather than disrupts communities and ecosystems. Projects are often designed to help stimulate local economies, by creating attractive streetscapes that support private investment and revitalization. Context-sensitive projects also help preserve a community's historic landmarks, helping to foster collective memories and an enduring sense of place.



**When NJDOT replaced the deficient 1925 Cooper's Bridge with a new structure, great care was taken to design a bridge that would both meet the transportation needs and fit in with the historical environment of the nearby communities. The bridge over the Navesink River opened in 2000 and now provides a safe, aesthetically pleasing link between Red Bank Borough and Middletown Township.**

Achieving sensitivity to surroundings requires an understanding of how to manage transitions between the place types of the Transect and match the needs of each. For example, a road's cross section may need to change as it moves from serving highway-oriented commercial zones to traversing a town's Main Street.



A utilitarian bridge design appropriate in one location may not work well in an historic district. Lighting suitable for a rural area may be inadequate for an urban location. Contextual design requires identifying these areas, working with citizens and stakeholders to understand their distinct needs, and creating strategies for enhancing community character and managing traffic speeds, as discussed above. For local projects, these concepts can be included in the visioning process for the Circulation Element and reflected in municipal design guidelines. Where state highways are concerned, municipalities may enter into partnerships with NJDOT to investigate CSS opportunities.

Sensitivity to surroundings is important across the Transect. In agricultural areas, it may mean providing occasional pull off areas along a road for tractors or farm stands. In one NJDOT project, a truck weigh station was designed to resemble a farm silo in order to avoid disrupting the local landscape.



**Rear alleys, such as this one in Washington Town Center, can enhance the character of local streets by removing residential parking and trash collection to the rear of homes.**



**Alexandria Township in Hunterdon County uses conservation zoning to protect scenic roadside views.**

Transportation projects in the urban core should be designed to support a secure environment for a project's neighbors. Adequate lighting of transit stations and pedestrian environments is critical. In urban areas, boulevard-style roadway treatments can be effective in providing traffic capacity while buffering adjacent land uses from traffic impacts through the use of local service lanes and parking areas. Landscaped medians add visual interest and if wide enough, may serve as linear parks.



## Resources for Circulation Pattern

*Boulevard Book: History, Evolution, Design of Multiway Boulevards.* Allan Jacobs et al, Cambridge: MIT Press, 2001.

*Context Sensitive Solutions.org.* 2005. Context Sensitive Solutions. <http://www.contextsensitivesolutions.org>

*Design and Safety of Pedestrian Facilities.* ITE, Washington, DC: ITE, 1998.

*Flexible Design of New Jersey's Main Streets.* Reid Ewing and Michael King. Voorhees Transportation Policy Institute.

*Flexibility in Highway Design.* Federal Highway Administration.

*Great Streets.* Allan Jacobs, Cambridge: MIT Press, 1994

*Guide for the Planning, Design, and Operation of Pedestrian Facilities.* Washington, DC, AASHTO, 2004.

*Guide for the Development of Bicycle Facilities,* Washington, DC, AASHTO, 1999.

*Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians.* Federal Highway Administration.

*Guidelines for the Location and Design of Bus Stops,* National Research Council, Transportation Research Board, Transit Cooperative Research Program, Report 19, 1996.

"Innovative Bicycle Treatments: An Informational Report of the Institute of Transportation Engineers (ITE) and the ITE Pedestrian and Bicycle Council," Jumana Nabti and Matthew D. Ridgway, ITE, 2002.

*Let's Complete America's Streets!* 2005. Complete the Streets. <http://Completestreets.org>.

National Center for Bicycling and Walking. [www.bikewalk.org](http://www.bikewalk.org)

Pedestrian and Bicycle Information Center. 2006. University of North Carolina. [www.walkinginfo.org](http://www.walkinginfo.org)

*Pedestrian Facilities Users Guide: Providing Safety and Mobility.* United States Department of Transportation, 2002.

“Pedestrian Safety Guide and Countermeasure Selection System.” *PEDSAFE*. CD-ROM. Federal Highway Administration, 2004.

*Planning for Street Connectivity: Getting From Here to There.* Kent Butler, Susan Handy and Robert G. Patterson. APA Planning Advisory Service, 2003.

*Recommended Lighting for Walkways and Class 1 Bikeways,* ANSI/IESNA DG-5-94. Illuminating Engineering Society of North America. New York: Illuminating Engineering Society of North America, 1994.

*Roadway Connectivity: Creating More Connected Roadway and Pathway Networks.* December, 2005. Victoria Transport Policy Institute.

*Streets and Sidewalks, People and Cars: The Citizens' Guide to Traffic Calming.* Dan Burden, Local Government Commission, Center for Livable Communities, 2000.

*Traffic Calming: State of the Practice.* Reid Ewing, Federal Highway Administration, 1999.

*Urban Transportation Systems: Choices for Communities,* Sigurd Grava, New York: McGraw Hill, 2003.