Section C
Guidelines for Healthy Streets

This section provides guidance on street planning and designs for people, neighborhoods and vehicles. Roadways built in the City of Marina in the past, favor and induce motor vehicle speed. They greatly reduce choice in transportation, making many people feel hostage to their houses and back yards. Street making principles applied in this section will bring out the full vitality, life and health of neighborhood streets. The focus of this plan is to shift emphasis from creating space, to creating place. A focus on place-making celebrates the goodness of neighborhood, village and town life. This commitment to good streets requires significant teamwork, cooperation and understanding by many diverse stakeholder groups and disciplines.

Healthy Street Definitions:
Trails *– ways limited to walking and bicycling*
Alleys *– access ways most often at the backs of properties*
Lanes *– narrow yield travelways with parking limited to one side*
Streets *– narrow yield travelways with parking on two sides. The term "streets" and "street making" are also used in this book to cover the generic family of all travelways.*
Avenues *– wider travelways limited to two travel lanes, allowing higher speeds of 25-35 mph.*
Boulevards *– multiple laned ways with medians or refuge islands*
Grand Boulevards *– boulevards with frontage (local) roads added*
Parkways *– multiple laned ways with highly limited access*
Paseos, Passageways *– pedestrian ways or links in commercial areas*
Walkways *– Any sidewalk or developed travelway used exclusively by people afoot.*
Sidewalks *– Pathways separated from travelways by curbs or planter strips*
Median *– Raised portion of a roadway separating opposing traffic streams*
Refuge Island *– Nontraversable sections of medians or channelization devices*
Yield Street *– Any alley, lane or street designed to require opposing motorists to yield*

Roadway Purposes and Elements

City of Marina roadways shall be planned, designed, constructed, operated and maintained to maximize diversity of services and benefits to land owners and those using these corridors for mobility and access. In addition to providing effective movement of vehicles, all travelways shall be designed to maximize security and safety through low speed designs. Proper land use practices will allow choice in transportation mode and lessen auto-dependency and clogged roadways. Layout and design of travelways shall also provide maximum choice in transportation by providing many links, connections and pleasant walking and bicycling conditions.

Use Land Efficiently
To minimize the visual and environmental effects of motorized transportation, many properties will be designed so that a reasonable percentage of parking is on-street. In future built portions of the City of Marina, auto needs (travelways, parking, other pavement material) will not comprise more than 30-35% of the developed land. Today 50% of Marina and other post-war communities are under pavement, while portions of Los Angeles are now covered by 66% paved materials.

Other Roadway Purposes

Roadways are also vital, living portions of our private and public properties. Since they make up 30-50% of urban and suburban space they greatly influence how we feel about our communities and ourselves.

They establish the framework for our neighborhood's organization, sense of place, pride and respect. Only attractive, well designed streets allow properly oriented homes and businesses on lots. To maximize security of alleys, lanes and streets, buildings must be oriented with visual access to these places. This factor requires attentiveness to lane and travelway widths, maximizing use of yield streets, selection and placement of street trees, proximity of all properties to alleys, lanes, streets, avenues and boulevards.

Through proper design of roadways, the City of Marina will provide significant choice in transportation to encourage walking, bicycling and transit use. Encouragement of alternative modes will reduce auto dependency, need for multiple car ownership and the number of daily car trips per household. The goal of the City of Marina is to reduce vehicle miles traveled per household by 20% by 2020.

Roadways are intended to be healthy places, inviting many to stroll, play, and interact for many hours a day. Increasing our physical activity is one of today's most essential health issues, and it is paramount in achieving high quality of life.

By slowing motorized traffic, people discover that the front portions of their homes and yards are pleasant places. They spend more time in front yards and porches, and meet neighbors along walkways and at street corners.

Encouraging people to spend more time outside further slows traffic and enhances neighborhood security. As more people meet, make friends, and share information, neighborhood bonds are strengthened, and people watch out for each other. Over time, parents feel more comfortable about allowing their children to be outdoors more often, and they permit children to walk or bike to many of their favorite destinations. These attitudes foster activity and personal interaction benefiting the physical, psychological, social and emotional health of children, seniors, and, indeed, every resident who plays a part in creating truly safe and healthy neighborhoods.

Left Photo: Housing and streetscape on Reservation Road in Marina appear stark and unappealing. People walking or driving here feel a need to move along quickly. Fewer bonds develop between people. Research by Donald Appleyard (author of *Livable Streets*) reveals that residents on these streets have less association and friendship with their neighbors. Meanwhile, newly built Embarcadero Boulevard in San Francisco (right) encourages many eyes to watch the street while managing traffic flow and parking.

Measuring a Street's Success

Healthy streets are walkable streets, best measured by how pedestrians act and feel when walking along them. Strolling along healthy streets, pedestrians feel relaxed. They enjoy the experience of walking in this environment and feel connected to their surroundings. Pedestrians in healthy street environments feel confident and in control; they do not feel threatened when encountering strangers.

Pedestrians on the street in the upper left photo appear guarded, highly defensive, even fearful. Their body language depicts their emotions, mood and outlook toward walking in their neighborhood. Speeds are high and uncomfortable for these people. In contrast, pedestrians on a much higher traffic volume but well designed street, Embarcadero Boulevard in San Francisco (upper right photo), appear relaxed, interactive, aware of people and events around them, yet appropriately watchful of their street crossing.

Another measure of successful streets is the number of people walking along them. Streets are working especially well if people stop and talk with others. Walkable streets also foster a sense of ownership by everyone who uses them. People who feel this comfort level have the desire to protect and look after them. When healthy streets become "sick," people who live along them want to nurture them back to health rather than move away. The health and prosperity of a community are often measured by the health of the streets. Other measures used to rate the success of streets include:

1. **Movement Choices**. Healthy streets allow diversity and co-existence of movement. The streets support people who want to walk, bicycle, use transit, or drive to destinations. Shown to the right, State Street in Santa Barbara, is one of America's most balanced and successful streets, operating with 2 and 3 lanes and moving 12-14,000 vehicles daily.

2. **Connectivity.** Healthy streets and neighborhoods connect places where people live, work, attend school, shop and play. Pedestrians, bicyclists, and wheelchair users should have more than one route to get to their destinations.

3. **Number of People.** Healthy streets have many people on them. The presence of people helps the streets feel safe and inviting. People are on the streets many hours a day, not just at noon or during short bursts in the evening. People are on the streets because there are many things to do throughout the day, and the range of ages (including many retired people) allows people to be present during most of the 24-hour cycle.

4. **Diversity of People and Activity.** The most successful streets have the greatest diversity of people, ranging from young children to senior citizens. Healthy streets have people engaged in different activities: dining at sidewalk cafés, shopping, sitting on benches, visiting with friends, reading newspapers, window shopping, strolling, jogging, meeting people, walking dogs — as many activities as can be imagined. People can be seen walking and bicycling on healthy streets in all directions much of the time.

5. **Creation of a Civic Stage.** Healthy streets host people who go there to see and be seen, to meet others and watch the daily "parade" of cars and pedestrians. The "drama" on the street is free theater for many people. When people feel comfortable moving among strangers, the street environment is healthy, safe, and working correctly.

Meeting People's Six Basic Needs

The basic needs of all people as they apply to healthy streets are:

Security. The most basic and essential need. Security must be both real and perceived. Eyes on the travelway, other people and some moving cars are a most essential combination for most public spaces.

Convenience. Having a basic threshold of activity is essential. Traditional streets have a variety of land uses (mixed use) providing many convenient services and goods all in one location. As an example, an entertainment district has many essential, complementary services.

Efficiency. Streets must provide a full range of options for travel. Both people and vehicles need to stay in motion. This motion need not be fast to be successful, just steady. Motion must be across as well as along a corridor. Pedestrians need ease of access across a street. Motorists need easy access to the street and relatively steady movement.

Association. Many people need to meet others in the public realm. Some meetings are planned, but just as many are chance encounters… sometimes with a long lost friend, sometimes with a distant associate or someone never met before.

Comfort. People need comfortable places to rest, to stand and talk, to walk. Some environments call for shade, others a warming sunny place or break from the wind. Close attention must be paid to having a street be comfortable in all seasons and in each climate.

Welcome. Welcome is created by making each block, alley, lane, street or paseo a special place. These areas must be kept clean, tidy, and respectful. The most welcoming places feel as elegant as the front porch of the Ritz, or the town's best hotel.

How Did Current Street Standards Become the Norm?

As researchers examined town codes nationwide, they found that new towns typically copied existing codes or adopted published standards without question. Rarely had anyone conducted research to find the right combination of elements needed to make streets successful. This lack of understanding has often resulted in noisy, high-speed, high-volume roads, which isolate neighborhoods and increase the need for auto trips.

In the book, *Rural By Design*, Randall Arendt captures this copycat code syndrome of neighborhood street-making. He cites *Residential Streets*, published jointly in 1990 by the American Society of Civil Engineers (ASCE), National Association of Home Builders (NAHB) and the Urban Land Institute (ULI), which strongly criticizes current street-making practice.

According to *Residential Streets*, current practices can be attributed to early standard-setting based upon readily available state highway department manuals. Several states still set standards for local and neighborhood street-making. While these standards may be acceptable for major roads, they are out of character in neighborhoods and produce inappropriate driving behavior by motorists.
Street-making is a simple art. However, because it is crucial to neighborhood and community design, many disciplines must collaborate to achieve the best street patterns and designs for each neighborhood. Motorist behavior is primarily dictated by street design. Left solely to traffic engineering, neighborhood street design often reflects the interests of people driving cars rather than the needs of people outside cars and healthy neighborhoods.

Above: Suburban streets such as U.S. 93 through Missoula, Montana, are boring and inefficient for driving, shopping or getting around using any mode. This street follows well established national and state standards for lane widths and follows formulas for the correct number of lanes. There were no requirements for sidewalks, bike lanes, trees, or buildings that relate to the street. In contrast, after many years of using a similar formula street, U.S. A-1-A in Ft Lauderdale was adapted by adding sidewalks, bike lanes, and narrowing travel lanes to 10 feet. Crash numbers have come down, and life along the street is prospering with more people attracted to it and billions in new economic development.

Guidelines

These guidelines are based on "real world" examples of successful streets found in all regions of California and the United States. As a starting point for understanding and evaluating existing streets and planning new ones, the guidelines assemble the best street and town development practices, highlight patterns, language and principles of modern urban designers and incorporate successful practices from previous generations.

How to Use These Guidelines

These guidelines serve as a framework for people in the City of Marina who want to build, operate and maintain high-quality, healthy, traditional neighborhoods, urban villages and city centers.

They require many diverse people to understand the language and vision. These guidelines are a must read for the City of Marina's elected officials, planning commissioners, neighborhood leaders, developers, planners, engineers, architects, emergency responders, and others interested in livable communities and healthy neighborhoods.

These guidelines allow practitioners, from average citizens to professional staff members, to create and maintain healthy streets for healthy communities.

Where These Guidelines Can Be Applied

These guidelines can be used primarily to design streets for new, traditional neighbor-hoods, but they are also useful to help protect historic and existing village-style neighbor-hoods. We share the concern of the Institute of Transportation Engineers' *Traditional Neighborhood Development Street Design Guidelines*, which caution readers not to apply healthy neighborhood street guidelines to conventional neighborhoods. Many of Marina's existing neighborhood roads are so poorly linked, so wide and stark that only traffic calming, connectivity, and landscaping will apply in these portions of town.

Reservation Road is highly overbuilt for its traffic carrying mission. Its vast width creates a stark, endless asphalt–dominated appearance and fails to support community–building. In the photo below this road has been modified to show one possible future by superimposing another existing road of equal dimension. The Pacific Highway in Encinitas, California, was used. The Pacific Highway carries about 15,000 vehicles per day, and uses diagonal parking.

For years convenient diagonal parking has been stripped from streets to allow motorists to move faster. Not only did this practice reduce the ability of towns to develop attractive Main Streets, it further increased speeds and the potential for far more lethal traffic crashes. It also caused reduction in walking, bicycling and transit use.

By sharing this guide with a broad diversity of people, including retailers, emergency responders, roadway maintenance crews, residents and others, it may be possible to adapt Reservation Road to support healthy, village-style centers, allowing many people to live, shop and work in these emerging centers. Thus, in some cases these guidelines may apply to both traditional new village areas of Marina and existing suburban sprawl portions built using conventional models.

Applying the Guidelines to Conventional Neighborhoods

Most of Marina is conventional, sprawl-style subdivision development with highly segregated land uses. Blocks and streets are often wide and long, generating higher speed traffic. There are few ways in and out of a subdivision, and streets are organized on a rigid hierarchy in which minor streets feed into collector streets which then funnel traffic into large arterials. As a result, existing Marina neighborhoods may not benefit — and may even suffer — from designs presented in this chapter.

To counter these effects, this plan calls for more connectivity and reduced speeds on existing streets through a number of street design solutions, as well as a few moderate alterations in land use practices.

These changes include creating a few key connectors for walking and bicycling, marking bike lanes on especially wide streets where narrower visual widths can slow traffic speeds, planting trees — especially in clusters at important locations — and changing zoning to allow some convenience shopping nearby. None of these changes will be immediate. However, some model bike lane markings, connections and other projects are warranted and needed near term. The solution in the lower photo in Brighton, Michigan, cost $15,000 per mile and resulted in sustained speed reductions of 7 mph.

Crescent Street is an example of an excessively wide suburban street. Although retrofitting to a healthy street dimension would be too costly, this street and many others like it can be visually narrowed by adding bike lanes or pigmented bike lanes and leaving out a center line stripe. In other cities impressive speed reductions of 3-7 mph have resulted from these simple changes to the roadway.

Using These Guidelines Successfully

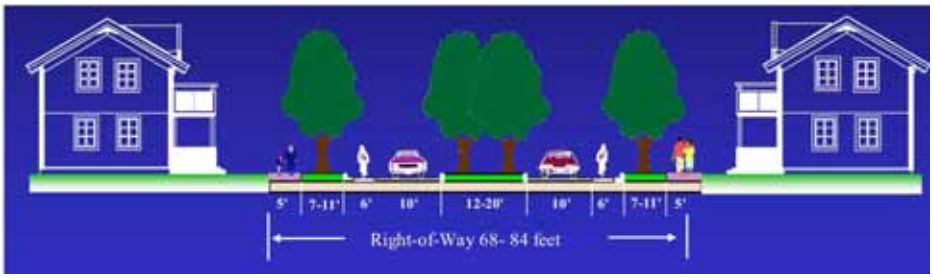
In contrast to the flexibility exhibited in conventional street design and construction, traditional, healthy neighborhood street measurements must be exact. When design specifications dictate that alleys should be 10-12 feet wide, for example, it is not wise to build alleys that are 14 or 16 feet. Meanwhile if in the same alley, building setbacks are to be 8 feet, reducing this width to 6 feet, while holding to a 10 foot wide alleyway, creates a condition with too little turning radii for large vehicle access into garages. To obtain the desired motorist behavior on a traditional street, it must be designed and constructed with precision. Although there is great flexibility in these healthy street guidelines, by not abiding to the underlying principles it is possible to go wrong either way. Too big or too small can have a significant impact.

In some cases, specification values can be reduced; but in very few instances, should they be increased. For instance, although we found that 26-foot-wide roadways are most desirable, we measured numerous 24-foot and even 22-foot wide roadways, which had parking on both sides of the street and allowed delivery, sanitation and fire trucks to pass through unobstructed.

By contrast, Celebration, Florida's 28-foot wide street widths work, but do not reduce speed as well as narrower streets. In traditional, healthy neighborhood street design, the old adage of "more is better" simply does not hold.

The alley in the upper photo has a more than adequate width (24 feet) to meet all operational needs, except turning into and out of garages. If the building setbacks had been just 2 feet further motorists driving SUV's could enter and exit with greater ease. The lower alley has sufficient width for entering/exiting and all operations, and does not create any problems.

A note about street widths



While right-of-way dimensions (from property line to property line) are important in defining "the outdoor room," the critical dimension in creating safe, healthy, civilized streets is the width from curb to curb. In this document, all roadway dimensions are given from curb face to curb face. However, a key feature implied by this approach is that well-designed streets should always have a vertical curb (with the exception of alleys and roads in rural areas or adjacent to natural settings, such as parks). A vertical curb clearly distinguishes the space allocated for the automobile from the space provided for pedestrians and people in wheelchairs.

So-called "rollover curbs" found in many conventional neighborhoods encourage drivers to park their cars on the sidewalk — ironically, to protect them from other cars often traveling at excessive speeds in the roadway. This practice not only creates a hostile environment for pedestrians and people with disabilities, but it defeats the potential street-narrowing effect that parked cars can help provide on many streets. Rollover curbs are also very difficult for people in wheelchairs to negotiate.

If streetscape features, such as tree canopies, must be omitted in portions of Marina because severe soil, wind or other constraints exist, street designers must consider alternative features to retain the quality of place.

Healthy streets such as an avenue will vary from the above recommended cross section. Note the first photo is a classic American favorite, a healthy canopy of live oaks dominate this New Orleans street, while the narrow median houses lighting and helps contain speed.

Meanwhile, another avenue built in the same era, (designed by John Nolan, Myers Park area of Charlotte, NC) has trees in its median, and no curbing. The Nolan designed street is very low speed and has an exceptional safety record and some of the best homes in town.

Meanwhile, another variation of an avenue has on-street parking, no median, but also a canopy. Each of these streets moves the volume of traffic expected by the neighborhood circulation plan, and all at low speed.

Emphasizing again the need to pay attention to details, the travelway in the lowest frame has many of the same features as the avenue above, but is actually a narrow street (not an avenue).

Although this street works well on straight sections, there are some minor problems with vehicular movement in the curved section that could have been solved by widening it slightly.

Successful street making requires many elements to work together. Medians, curbing, parking, tree canopies, lane widths must be weighed together. Whatever combination creates appropriate attractiveness, low speeds and safe, efficient movement is the best design.

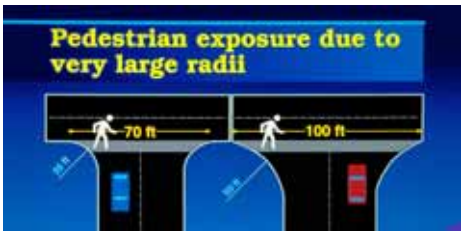
Corner Radius

The City of Marina should provide 5-15 foot corner radii on alley, lane and street intersections, and generally 5-25 foot radii corners on avenues and boulevards. Exceptions apply in industrial areas, skewed intersections and other special applications.

Quite often developers of conventional neighborhood streets are asked to provide more than ample turn radii on intersection corners. This design not only adds to street crossing distances for pedestrians, but it enables higher speed turns, reducing yields to pedestrians. It can reduce the ability of pedestrians to see and get out of the way of danger.

As shown below, the addition of bike lanes or on-street parking on roads provides greater effective turning radius and allows designers to hold the actual corner radius to 5-15 feet on local streets and 5-25 feet on avenues and boulevards.

Wide corner turning radii are doubly lethal to pedestrians. Motorists are able to turn this blind corner at speeds up to 30 mph. Pedestrians cannot see the danger, have a long distance to cross to get out of danger, and may get hit at high speed.



Fifteen-foot curb radius. This large size bus is exiting a narrow 20-foot wide street and entering another 20-foot wide street that also has a tight 15-foot corner radius. Yet the turn is completed every 15 minutes. The tight radius holds down vehicular speeds. Occasionally a bus driver has to wait while a car exits the road he is about to enter. This is both permitted in standard manuals and a best design for low speed, low volume streets.

Centerline Curve Radius

City of Marina centerline curves should be designed for 15-20 mph. A centerline radius is the radius around a curve.

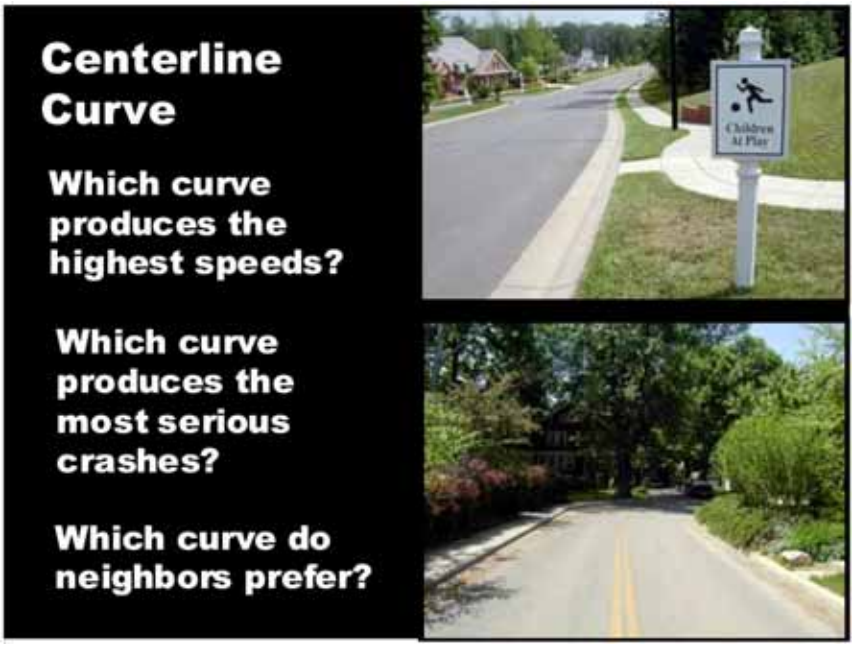
Tight centerline curves are natural slowing points along a street.

In recent years developers have been required to maintain centerline curve radii permitting vehicles to travel at speeds upwards of 30 mph (see top photo).

In some cases engineers believed that fast centerline curves, which allow motorists to see objects better, are safer for neighborhoods. Not so.

Experience shows that the easier it is to speed, the more difficulty motorists will get themselves into.

The lower photo shows a centerline curve radius more appropriate to healthy streets. Motorists cannot turn this corner at speeds higher than 15 mph. Not only does the motorist go through the curve much slower, but most will drive the entire street at lower speeds. Parking is not permitted in such zones.



Roadway Widths

In general, all roadway types (alleys, lanes, streets, boulevards and parkways) should be no wider than necessary to efficiently move all appropriate sizes and volumes of vehicles, people, goods and services needed to fulfill their mission.

In some special locations with high volumes of large trucks or designations as official emergency response routes, or in certain other specific settings, slightly higher curb radii, street widths or other combinations will be allowed. But, these are exceptions. In general, healthy street guidelines are to become the standard for their ability to maintain low speeds and efficient vehicular movements.

Design Purpose Sets Speed

All trails, alleys, lanes and streets are considered local circulators of traffic. Their purpose is to maximize access to properties. Each will be designed to elicit comfortable speeds of no greater than 20 mph. These roadway types feed into avenues and boulevards, which will elicit comfortable driving speeds of 30 mph, and in some locations 35 mph. No urban area avenues or boulevards should be designed to elicit speeds of 40 mph or greater.

Note that the maximum vehicle capacity that an urban roadway can carry is at a speed of 30 mph, not at higher speeds. Higher speeds can effectively move traffic, but at a loss of other qualities needed in urban areas, such as reduced choice in transportation, increased auto dependency, increased noise, danger and loss of life. Thus, the highest possible roadway carrying efficiency for urban avenues and boulevards is with speeds in the 30-35 mph range.

Each of the three roadways above (1) Grandview Road in University Place, Washington, designed for 30-35 mph speeds (2) a boulevard in Sammamish, Washington, and (3) a parkway in Bellevue, Washington, all have substandard 10 foot lanes and medians next to them. However, their design lowers speeds and crashes are at enviably low levels. All three roads accept all size vehicles with no difficulty.

Purchase Appropriately Sized Vehicles

When vehicle users complain that buses cannot handle traditional streets there are two ways to look at a healthy solution: (1) widen streets to accommodate whatever bus, fire truck or garbage truck fleet managers prefer, or (2) purchase appropriately sized vehicles to carry out the mission.

All too many cities have gone the first route without considering the vast sets of consequences. Healthy street standards accommodate large size vehicles in almost all applications. But, if a transit operator or emergency responder's complaint is that they have to slow down too much on an alley, lane, or street, this perspective is not a fair complaint. Many fire and emergency service departments across the country have learned how to negotiate narrower and traffic calmed streets. However, they should always be on the planning team when these facilities are designed and built, so they understand the special design parameters that are included to meet their needs.

Meanwhile, avenues, boulevards, grand boulevards and parkways should always be designed to accommodate moderate to high speed responders and all sizes of normal trucks, buses, and fire apparatus.

In most cases, avenue, boulevard and parkway lane widths can be restrictive. Rare exceptions include avenues or boulevards serving industrial areas, where wider lanes may be warranted.

Emergency responders need good access to and along all avenues, boulevards and parkways. These are all locations where their movements should remain largely unrestricted. Meanwhile, once these vehicles go onto short stretches of well connected streets, lanes and alleys, speed should not be an issue.

Roadway Directionality

In general, all roadways should operate as two-way facilities, to maximize efficiency (allow the shortest route to reach destinations) and to reduce the tendency to speed.

There was a period in American traffic operations history when perfectly healthy two-way streets were converted to one-ways in order to handle added traffic capacity to the suburbs. This movement came at a time when downtowns were already under duress, with retail also fleeing to suburban plazas. Urban renewal programs were also cleaning out the last of effective public space and much needed downtown housing.

The faster speeds and quicker emptying of downtowns only hastened their decline. One-ways tend to encourage vehicles to pick up speed and add extra miles traveled per trip. Both are harmful to downtowns, air quality, and alternative transportation modes.

Meanwhile, there are a few examples of one-way street making that have been beneficial to neighborhoods and downtowns. In some rare cases, where short one-way treatments do not create significant additional driving distances, and where reconfigured street width can be used to add street parking, bicycle lanes, increased sidewalk space and natural buffers, one-way streets can be beneficial.

This one-way side street in Kentlands, Maryland, serves as an example of a design that uses diagonal parking and short block lengths to keep speeds low. Pedestrians benefit from short street crossings made possible with curb extensions.

This one-way in Easton Village, Columbus, Ohio, has no need for moving through traffic. Nearly 100% of drivers are seeking a place to park. Short block lengths, curb extensions and pedestrian scale make this design acceptable. Speeds are in the 10-15 mph range. A change in any of these variables may warrant a conversion to a two-way street section.

Principles Guiding Healthy Neighborhood Development

Existing neighborhoods can be adapted. These guidelines will work in many new or existing neighborhoods where many of the following elements are applied and favored:

1. Higher Densities typical in "traditional neighborhood design" (6-12 dwelling units/acre), instead of conventional densities (1-5 dwelling units/acre). In photo to the right, owners of this small house added a luxury apartment in the back, helping to achieve a critical neighborhood density of 6-12 du/acre in Birmingham, Michigan.

2. Mixed Uses, including parks each 1/8 or 1/4 mile, schools each mile, convenience stores, plazas or other gathering places, a nearby post office and other destinations that help convert travel modes and reduce the number of trips necessary. Many people will walk to common destinations, while others will drive, but much shorter distances than in the suburbs.

3. Homes that face or "greet" the street with friendly architecture (garages located in the rear or set back behind the façade). These particular homes face into a park and were set 90 degrees from homes costing five times as much to help them blend with the neighborhood. Mixed income elements create a balanced, holistic neighborhood.

4. Parks and homes that have "transparency," or an orientation that allows many eyes on the street and on adjacent properties thus creating safer neighborhoods.

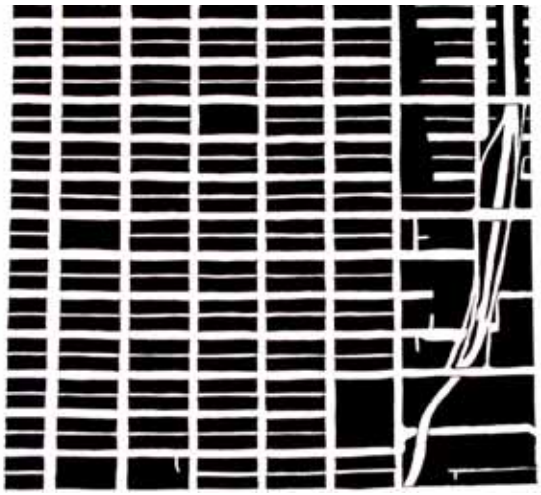
5. Accessible transit stops within one-quarter of a mile, or the added benefits of a transit station or transit hub within one-half mile.

6. High levels of connectivity, using short block lengths and sidewalk connectors to make walking and bicycling easy and direct. A seamless system will encourage alternative modes, better balance transportation modes and reduce higher traffic volumes.

All future Marina roadways should be laid out with many connections, giving people many choices in reaching their homes or other destinations, and minimizing the volume of traffic on all alleys, lanes and streets.

Maximizing connectivity to avenues and boulevards also reduces the volume on key avenues and boulevards. This reduces the need for super-sized intersections which result in lower levels of service and create major obstacles for pedestrians and bicyclists. Ideally block lengths will not exceed 400 feet, and many blocks will be shorter. A full menu of roadway types (alleys, lanes, streets, boulevards and parkways) must be used to create efficient movement.

The town of Seaside, Florida, is one of the first new villages in America designed and built to traditional street patterns. Construction on this project began in the mid-1980's. Walking is emphasized in the street layout. Many interconnecting streets and trails give walking distinct advantages over auto trips.



Traditional Pattern
(Recommended)
High Connectivity,
Low Auto Dependence

Conventional Pattern
(Not Recommended)
Low Connectivity,
High Auto Dependence

Trail Connectors

In addition to having short and frequent block connections, Marina should have the added support of walking and bicycling through provision of trails, links and connectors at frequent intervals.

Arrows in the diagrams indicate locations of connectors in each neighborhood. Most connectors are quite short, running the length of one lot, while a few cross several lots or anchor to an avenue. In general a connector is 20-30 feet wide, generally the normal separation between houses or buildings.

Top Illustration: Fairview Village in Portland, Oregon, has many short blocks, great connectivity and low speed, low volume traffic on all interior streets. High traffic generators, such as a department store, commercial plaza, school and post office are toward the edges, minimizing traffic impacts on the neighborhood. A highly integrated system of trails gives strong support for walking and bicycling.

Bottom Illustration: Proposed new development in Loma Linda, California, has low speed streets, good general connectivity, and added trail connections for maximum walking access.

Function and Performance

There is often confusion about the functional classification of roadways and their designs. Roadways are typically funded and built to meet a functional classification type. Roadway function types include: local streets, minor collectors, major collectors, minor arterials, major arterials, etc. These systems often create moderate to high volumes on some streets, while preserving low volumes on others (local streets).

Too often, this system erodes livability along certain categories of roads (typically collectors and arterials) by allowing speeds too high for the intended adjacent land uses. By designing for functional classification, using old rules and formulas, high speeds and generous capacities were planned. This conventional way of building roadways has led to many unintended results, including induced auto dependency, induced speeding, loss of quality of life, loss of easy access to daily physical activity, erosion of human health and loss of life through increased accident rate and severity.

For the purposes of this guide, the function of City of Marina alleys, lanes, and streets will be for multiple access to properties at low speeds. Only low volume and low speed of traffic will be permitted by design on these types of roadways.

Meanwhile the layout of the predominant settlement type, i.e. villages, will fit these roadway types into the interior network between avenues and boulevards. Avenues are equivalent to the functional category of collector streets, while boulevards are equivalent to arterials. These two types of roadways allow moderately higher speeds and higher volumes of traffic, while maintaining essential high quality edges for bicycling and walking, landscaping and healthy land use.

Most neighborhood villages will have central spine avenues or boulevards, leading toward plazas and some civic and retail services. Traffic will filter in toward the central avenue (two or three lanes) in some cases, or outward toward the larger boulevard (multi-laned roadway).

Healthy Street Types and Names

There has been confusion in recent years on street naming by type of street. For example, a lane should be both the type and name of any roadway connecting single-family homes where parking is found on only one side.

Consistent naming (i.e. trail, alley, lane, street, avenue, boulevard and parkway) will help identify the purpose, function and design of roadways, while suggesting what type of development is appropriate, how homes or other buildings should be positioned to the travelway, width of sidewalks, etc.

We further recommend that names used in conventional neighborhoods, that lack functional or descriptive meaning (i.e. vista, circle, way, etc.), not be used to name roadways in healthy neighborhoods.

To eliminate confusion and navigational challenges for visitors, it is recommended that a standard nomenclature style be used. For instance, travelways in north/south orientations be numbered, while those heading east/west appear in alphabetic sequence. San Diego, for instance, names all of its streets in their downtown outward in sequence after trees, starting with Apple, Banana, Cherry, Date, Eucalyptus, Fig…"

Using the Street Type Definitions page at the opening of this chapter, name each of these travelway types:

Category Travelway or Street Types

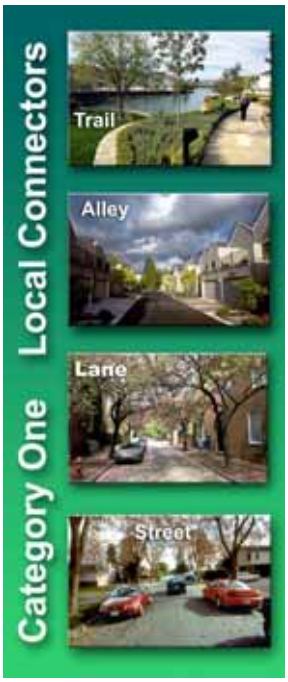
Healthy, traditional streets are categorized by the work they perform for the neighborhood or region. For simplicity, street types are broken into three groups. Streets in each category share similar speeds, styles of streetscaping, levels of access and other traits:

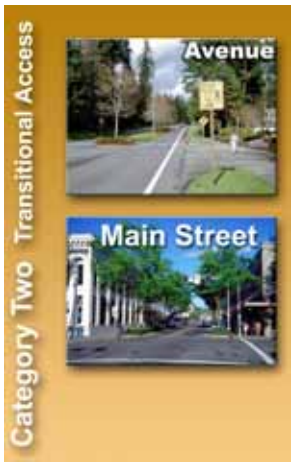
Category One: Local connectors: efficient at providing neighborhood access. These travelways include trails, alleys, lanes and streets.

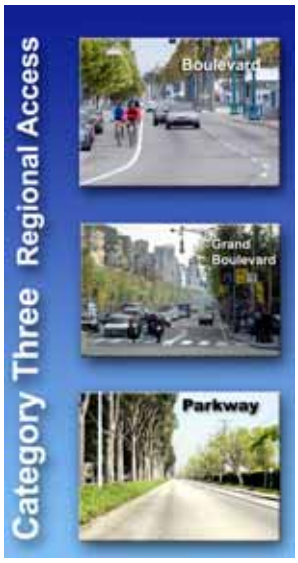
Category Two: These roadways are efficient at providing transitional access to neighborhood streets, i.e., avenues and main streets.

Category Three: These roadways are efficient at providing regional access, i.e., boulevards, grand boulevards and parkways.

The chart to the right exhibits general traits of each category street. In general, speeds on all Category One streets (including trails) operate best at or below 20 mph, while Category Two streets work best between 25-35 mph. Not all motorists will travel at these speeds, but designs should not reward inappropriate driving by making driving comfortable at higher speeds.







Category One — Local Connectors: Trails, Alleys, Lanes, and Streets

Category One Local Connectors form the heart of safe, quiet neighborhood travelway systems. Their primary function is to provide access to neighborhood destinations. They distribute traffic evenly, making numerous convenient car, bike and walking connections within neighborhoods.

All of these connectors (with the exception of trails) provide access for cars, bicycles, pedestrians, utilities, deliveries, and emergency response. Traffic speeds of 15-20 mph are appropriate to such functions. When properly designed, few people will feel comfortable traveling at higher speeds.

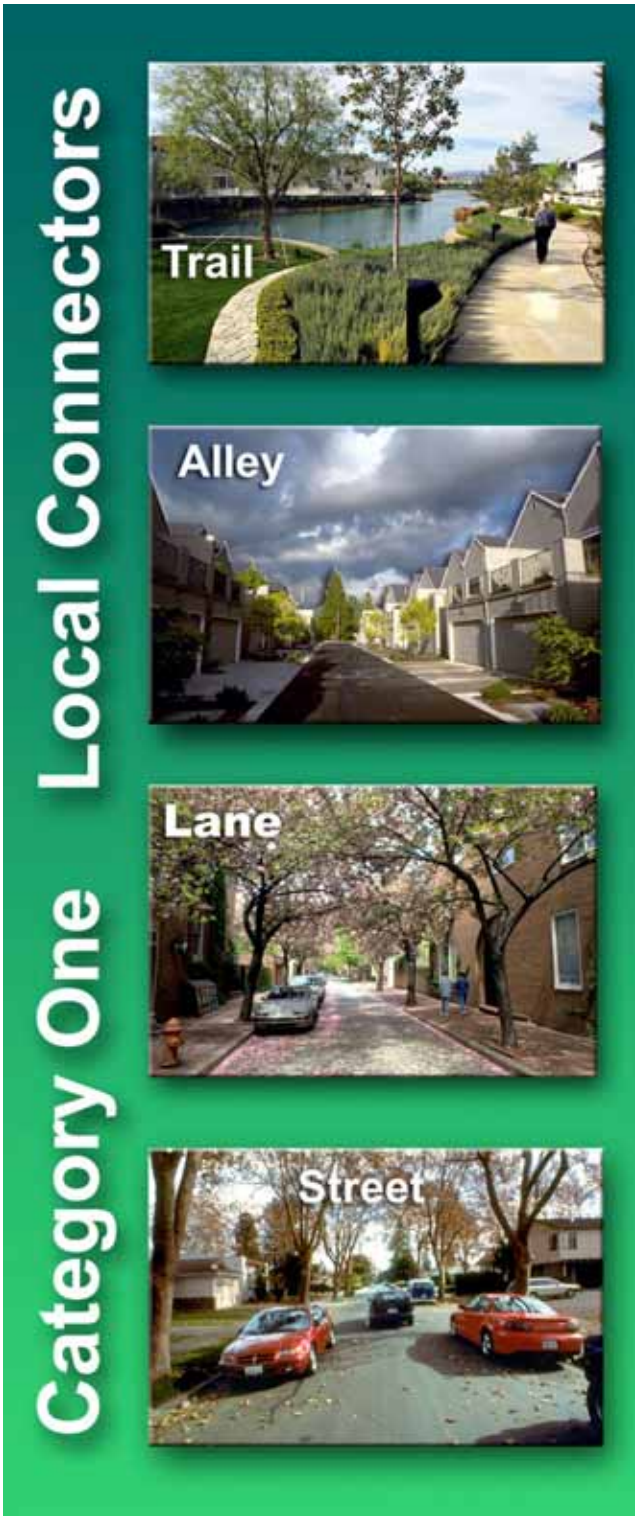
Alleys, lanes and streets are measured on how well they add to the quality of the neighborhood by offering access, parking, tranquility, and safety.

Just like plant or animal cells, neighborhoods work best with many connections from the edges. Connections to centers of neighborhoods are appropriate too, but they should not move significant amounts of traffic, nor move that traffic too quickly.

People entering neighborhoods should feel rewarded by ease of access to specific locations, but also encouraged to travel by foot or bicycle.

Most local connectors are well landscaped, and many have tree canopies, helping cool, calm and add a sense of place to neighborhood environments. Even alleys can have some green, or other use of color to offset the potential drabness of pavement.

On-street parking is common along most of the roadways. Two-way yield-style travel is the most common movement.



Trails

Trails are non-motorized connectors through neighborhoods. Trails tend to be lengthy, 1000 feet or longer. They sometimes provide continuous travel for 5, 10, 20, 100 miles or more. They often follow their own independent right-of-ways or utility corridors. Some trails also serve as emergency responder connectors.

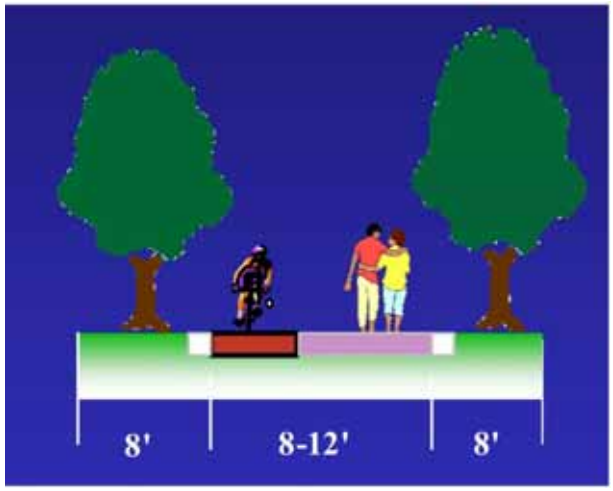
Generally trails do not parallel roads having numerous driveways or other points of conflict. Trails can be wide open, have clusters or oases of trees, or be lined with trees in the same way as boulevard streets.

Trails serve as independent alternative transpor-tation systems. Trails connect many homes to parks, schools, transit stops, and other common destinations. Trails can provide access into commercial districts, linking with bike lanes for added access to more distant commercial districts, employment centers and major transit hubs.

Neighborhood trails also make connections to natural areas and parks, and they should provide links to regional greenways and open spaces. In a healthy neighborhood, trails may comprise 20-40% of the total residential connectors. For example, Village Homes, a 1970's development in Davis, California, has more miles of trails than roadways.

Under normal circumstances trails require 20 to 40 feet of right-of-way or a similar width easement between properties.

For security purposes trails need to be kept clear of dense ground cover. Landscaped or other pruned areas should be immediately next to trails. Often grubbing back 50 to 100 feet creates appropriate feelings of openness and protection.



Benefits: Trails are the most cost effective of all facilities. Appropriate placement of trails provides essential linkages while minimizing the number of miles of roads needed in neighborhoods, as well as the associated drainage and traffic issues.

Other Uses: Trails are used for utilities (above or below grade), drainage, open space requirements, added access for fire protection, exercise, recreation and association.

General Rules: As a general rule, trails must encourage many "eyes" overseeing the physical space. This element is achieved through design. In more wild or open areas make sure that areas surrounding trails are properly grubbed; trees are trimmed of low hanging branches, and appropriate landscaping is maintained. Parking is generally not permitted along a trail, but in specially marked lots. Much of the right of way can be left unpaved.

Design Speed: Trails are designed so that wheeled vehicles such as bicycles are not comfortable moving faster than 20 mph. Some heavily used trails will be restricted to speeds of 10 mph. Speed can be controlled through proper selection of materials and treadway design.

Variations: Trail surfaces can be simple gravel treatments to asphalt or concrete pathways. Trails can also be made of different parallel strips of material, i.e. one for running or walking, another for wheeled movement.

Drainage: Run-off treatments are often toward one edge with water percolating into the ground. Other special treatments can apply near sensitive wetlands.

Lighting: Trails are generally not lit. However, in some areas of villages emphasis lighting can be quite beneficial.

Universal Design: Trails should be fully supportive of people of all abilities. When rough or rugged terrain prohibits reasonable trail access suitable alternative transportation routes (streets) will meet the objective.

Connectors

Connectors are short connections or links between lanes, streets or key village features. They most often provide 100 to 300 feet of linear travelway. In rare cases they may be as much as 1,000 feet long. As a general rule they are constructed for walking or very low speed bicycle movement. They are almost universally ADA supportive, except when vertical terrain does not permit. In some cases they are designed for emergency access, especially when repairing connections through cul-de-sac pattern neighborhoods.

Connectors serve as vital parts of walking and bicycling systems within neighborhoods. Connectors may also connect many homes to parks, schools, transit stops, and other common destinations inside or alongside the neighborhood. Connectors provide access into commercial districts, linking with bike lanes for added access to more distant commercial districts, employment centers and major transit hubs.

In Main Street environments, connectors are often referred to as paseos, passageways or pedestrian malls.

Neighborhood connectors also make connections to natural areas and parks, and should provide links to regional greenways and open spaces.

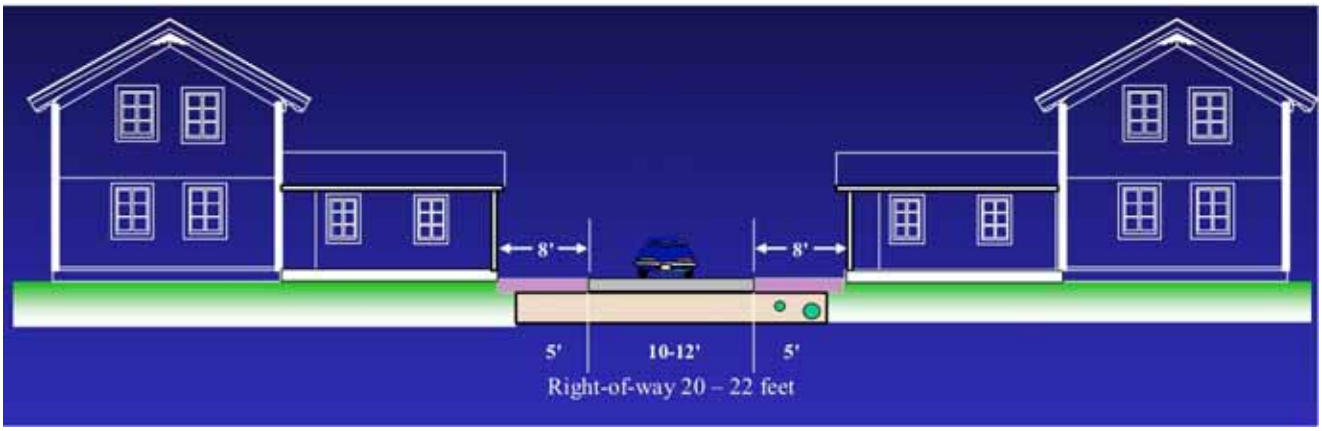
Under normal circumstances connectors require 10 20 feet of right-of-way or a similar width easement between properties.

Although it is possible to restrict connectors by time of day to address security concerns, most connectors are 24-hour facilities.

Connectors should always be built concurrent with roadway and sewer construction phases of development. Delaying construction can raise concerns with adjacent property owners who may prefer to not have a trail constructed or used near their dwellings.

Description: Connectors are short trails providing friendly links between streets or to housing. Many styles of housing, such as garden homes, those with courtyards and even some townhouses are easily served by connectors.
Other Uses: Connectors may double as below-grade utility easements, fire breaks or other general service corridors.
General Rules: As a general rule, connectors must have many peoples' "eyes" overseeing the physical space. This element is achieved through proper building placement, orientation and other design.
Design Speed: Connectors are designed so that pedestrians and bicyclists are not comfortable moving more than 10 mph. In some cases a finely ground stone or pebble material that is still ADA accessible is used to encourage all users to go slow.
Variations: Connectors can have simple stone or concrete paving to highly elaborate surfaces made of paver stones resembling those used in European village centers.
Drainage: Often flowing toward one side, water should percolate into the ground.
Tree Canopy and Landscaping: Often trees are not an issue. However, attractive landscaping is a key feature of all connectors. As a general rule landscaping should be kept natural, making maximum use of native plants and other low maintenance plant materials.
Lighting: Connectors are often lit, but should be done so with sensitivity to adjacent properties. Often low level lighting is appropriate.
Universal Design: Connectors should be fully supportive of people of all abilities. When vertical terrain prohibits reasonable access, suitable alternative transportation routes (streets) meet the objective.

Alleys



Alleys

Alleys are slow-speed (10-mph) service easements running behind and sometimes between rows of houses. Alleys are universal tools in the travelway system. They can be placed in developments with very low densities of 1-3 du/acre or in higher density areas ranging from 16-40 du/acre.

Alleys (typically 10-15 feet wide) provide public service workers easy access to utilities and sanitation, and they allow residents easy access to garages, backyards and any accessory units.

By providing alleys, traditional neighborhoods are free of overhead wires on streets fronting homes. This space allows tree canopies to evolve unhampered by wires.

Alleys also allow easy access to garages from the rear, eliminating most driveways. This design makes pedestrian travel in front of homes more enjoyable, with reduced risks and discomfort.

Alleys provide access to back lot housing stock, making it possible to have granny flats or other alternative housing. This access helps many communities provide essential affordable housing stock.

Alleys also offer second, third or fourth approaches for fire response. Security issues are addressed through proper design, placement and orientation of buildings.

Description: Alleys are fundamental building blocks of healthy communities. Effective placement of alleys provides access to essential affordable housing with studios, carriage houses, granny flats or similar housing stock.
Other Uses: Alleys are used for utilities (above or below grade), drainage, added access for fire protection, play, association, mail delivery. Use of alleys allows streets fronting homes to be free of utility wires, driveways and other challenges to quality street making and pleasant walking conditions.
General Rules: As a general rule, alleys must have many "eyes" overseeing the physical space. This is achieved through design. Parking is generally not permitted in alley ways, but in specially marked lots or garages.
Design Speed: Alleys are designed so that motorists are not comfortable driving more than 10 mph.
Variations: Alleys can be simple stone, concrete or asphalt surfaces to highly elaborate courtyards of paver stones resembling European village centers and serving a number of families.
Drainage: Often toward the center, to one side or in simple designs, alley drainage systems encourage water to percolate into the ground.
Widths: Widths vary, but generally should be kept to 10-12 feet of carriage space, and operated as two-way facilities.

Alleys need to be well lit. These self-lit building units provide direct lighting without poles, lines and other ugly features.

Parking can be largely contained in a combination of garage space and inset wells for outdoor parking. In large complexes parking is often placed in a courtyard with many eyes on the lot. When large lots are created, pay close attention to landscaping, lighting, utilities, services and clearly defined pathways for pedestrians. Below: Orenco Station in Portland, Oregon, provides an excellent example of a comfortable high security design.

Alley Issues: Many years of urban neglect allowed alleys to fall into ruin. Some towns deeded over alley spaces to property owners. Once lost, alleys are impossible to reclaim. Successful village life of the future will make better use of alleys, providing access to economical living units, renewed attentiveness to all village space, and expanded choice in town center housing. Designers and other stakeholders must work in close coordination, detailing the highest and best levels of use. Pay close attention to the way alleys link to connecting streets. When the 10-foot wide minimum carriage way is provided, this facility requires a minimum 8-foot setback to garages. Do not overbuild alleys. Alleys must be properly managed and maintained with pride.

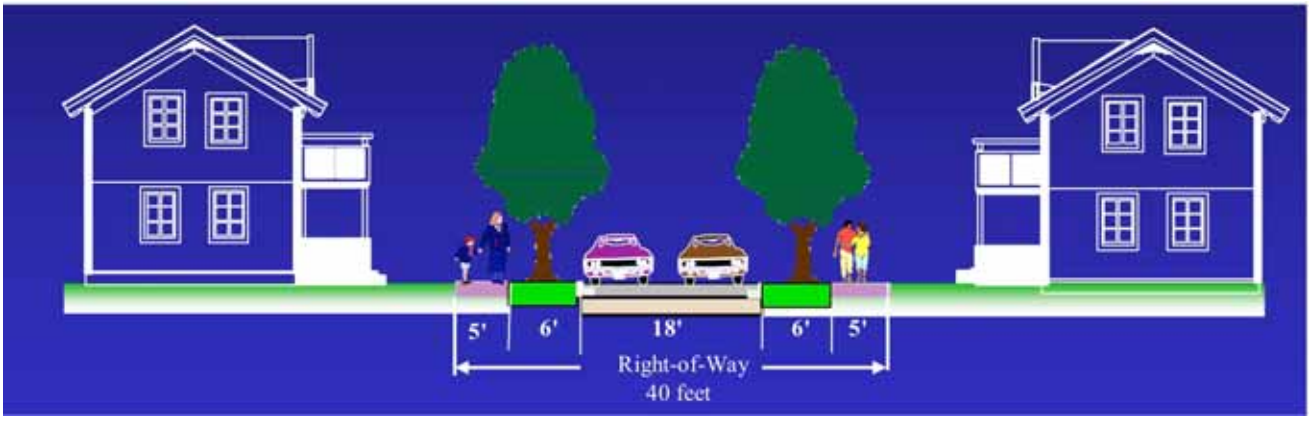
When creating access to streets from alleys, place emphasis on the motorist's intrusion into the pedestrian realm. The scene above has well defined pedestrian and motorist zones. The motorist is clearly being informed that they are about to intrude into pedestrian space.

The alley to the right is typical of Midwestern neighborhoods built in the early to late forties and into the fifties. As shown here, alleys house needed utilities, including sewer and water lines, overhead utilities, and sanitation.

The cost to build and maintain this alley is minimal. The author (Dan Burden) spent his early years living and playing in this back alley and the adjacent lot. As testimonial to its security, even without adjacent windowed buildings, within 5 minutes of having arrived to take this picture, four separate people came to check on the photographer. If higher fences had been used or people had abandoned their back yards, security would be an issue with this design.

Many such alleys have fallen into ruin. In order to ensure that future alleys are kept in good condition, it is essential that a reasonable number of properties be built with proper building orientation. The bottom five photos are part of the heavily alley-loaded Ash Street neighborhood in Brea, California. Only one street runs through the entire neighborhood.

Lanes



Lanes

Lanes are among the most desired types of access roadways in traditional, healthy neighborhoods. These narrow roads (typically 16-18 feet wide) are the most compact and intimate means of access to single-family residences.

Lanes allow parking on one side only. Forty-foot right-of-ways are usually required. One-way lanes can operate around parks or nature preserves, where slightly elevated traffic volumes are anticipated.

Lanes also work well as two-way facilities in many other contexts. Landscaping and sidewalks fill the remainder of the available public right-of-way. Lanes are short, purposefully running only two to six blocks before they terminate.

Top photo: Celebration, Florida, makes use of lanes in a number of different locations. As a general rule, lanes provide parking on the housing side, not on the side adjoining parks or open space.

Bottom photo: A more common lane type makes use of brick streets and wide sidewalks.

Description: Lanes are fundamental building blocks of healthy communities. Lanes are highly favored roadways for housing, providing access to compact land use and many essential housing types from small craftsman cottages, garden homes to larger single family homes, courtyards, mid-size estates, and even townhouses. To provide ample parking and to eliminate driveways, garages for homes on lanes are often alley-loaded.

Other Uses: Lanes operate either as two-way or one way travelways. When used as two-way yield streets, they often have a place for motorists to pull in every 200 feet or so, allowing opposing motorists to get by. Access needs can also be enhanced with a central location for mail boxes, two driveways ganged together to provide more space for emergency responders and space for other operational needs.

General Rules: As a general rule, lanes are restricted to parking on one side. In some cases, where there is a desire to have lanes even narrower or when lanes are used to form a "close" (short u-shaped loop street) parking can be fully restricted. Such designs still allow deliveries, emergency response and other temporary vehicle stopping in the street.

Design Speed and Volume: Lanes are designed so that motorists are not comfortable driving more than 20 mph. Lanes are normally on short blocks of 100-250 feet, so that there is very light traffic. Usually traffic is limited to 100-200 cars daily.

Variations: Lanes can have permeable surfaces on up to highly elaborate pavements or courtyard treatments made of paver stones resembling European village centers and serving a number of families. At times lanes are made into true woonerfs ("living yards") with all movements at pedestrian or bicycle speed.

Drainage: Designs often channel water toward one or both sides and sometimes toward the middle. In rural designs, water percolates into the ground.

Widths: Widths vary, but generally they should be kept to 17-19 feet of carriage space. Lanes should be operated as two-way yield-style facilities.

Lane Details

Lanes are most often found on neighborhood roadway systems with almost all residential stock and open space. However, the travelway can be a good partner to some retail districts, and it is used in many locations seeking maximum pedestrian-friendly features.

If anticipated parking needs will be highly saturated during critical times or most of the time, then natural "yield points" for two way lanes can be created by "ganging" two driveways close together, or dedicating portions of midblock areas where no one turns. Special care must be applied to assure easy entry to lanes. This element can be achieved with curb extensions and other treatments prohibiting motorists from parking near corners.

In the illustration below, note that entering a lane from a street is prevented if cars are parked illegally. Several solutions are available. Entering a lane from the added width of an Avenue solves most problems. When a street is preferred, turns can be assured through designs that both prohibit and make very clear and obvious that motor vehicles are not to stand or park in such locations. A slight raised deck with different paver materials, or planters, emphasizes the no parking zone.

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Streets

Streets are the other most common type of access road in healthy neighborhoods. Paved portions of these roadways are generally 24 to 26 feet wide, and some are as wide as 28 feet (see photo of Celebration, Florida, top right).

Streets provide access to single- or multi-family housing. Quite often streets are used in combination with alleys, restricting the number of driveways and allowing moderate housing densities. Parking is provided on both sides of all streets.

Rights-of-way of 48 to 50 feet are typically required. Landscaping and sidewalks use the remainder of the available public right-of-way. Streets should be short, terminating in two to six blocks before being intercepted by avenues. They can also encircle a square or other public space. On-street parking should be encouraged. If on-street parking is light, non-existent, or limited to only one side, streets will fail to properly slow traffic.

Streets are almost always operated as two way facilities. This operational style creates “yield streets” which help keep traffic speeds under control, while allowing convenient access.

Description: Streets make up the greatest number of miles of roads in villages. Streets support compact land use and host many essential housing types, from small craftsman cottages and garden homes, to larger single family homes, courtyard or mid-size estates, and even townhouses. Streets are often alley-loaded.

Other Uses: Streets operate as two-way roads, or in some rare cases as one way roads. Streets operate as yield streets, with places for motorists to pull in each 200 feet or so, to allow opposing motorists to get by. This space need is most often handled with anticipated light to moderate parking saturation. In dense housing neighborhoods this space can be provided at central locations for assembled mail boxes where two driveways are ganged, or at curb extensions where emergency responders can set up and other operational needs can be met.

General Rules: As a general rule, streets have parking on both sides. If exceptionally long blocks (600 feet or longer) and road widths of more than 30 feet are created, angled parking can be introduced. By alternating angled with parallel parking at mid-block locations, small parks or community gathering spots can be created. This design helps hold speeds down. Parking can also be inset with curb extensions, creating clean attractive travel ways. Another variation is to add a median for short stretches (up to 150 feet) allowing added green space (see bottom photo). This design is often used in locations seeking boulevard appearance, where on-street parking is not essential.

Design Speed and Volumes: Streets are designed so that motorists are not comfortable driving more than 20 mph. Street block lengths are kept short, providing high levels of connectivity and low volumes on any given street. Many streets carry from 200-600 cars daily.

Variations: Streets are constructed of asphalt, concrete, pavers or other durable, all weather surfaces. They can be colorized or patterned. It is possible to have some streets wider, with inset parking. In order to control speeds under such conditions significant other elements are needed such as brick or other pavers, use of short blocks or other design features to keep speeds to the 20 mph range.

Drainage: Consider valley gutters to create clean, crisp lines. Non-curb sections can work under some soil and hydrology conditions.

Widths: Widths vary, but generally should be kept to 24-28 feet of carriage space, with roadways operated as two-way facilities. If angled parking is used on one side, widths can be adjusted upward to 34-36 feet, allowing a twelve-foot travel way. It may be necessary to either widen the cross section through curves or eliminate parking on one side, in order to provide adequate passage.

Street Details
The Important Role of Trees

Each of the four photos on this page shows the same street. Motorists first travel down six blocks of a canopied 20-foot wide street, and then enter five blocks without trees. As a general rule, motorists pick up speed from 7-15 mph when they reach the portion without trees. The author has noticed the same phenomenon on a dozen other streets where some portions have canopies and others do not.

It is essential for the development community, utility companies, home owners, planners, traffic engineers — everyone — to understand that roadway geometrics alone do not assure civil driving behavior. Streets encourage well behaved drivers when all of the essentials are brought into play.

Life and Issues with Trees

Trees are not free. It costs upwards of $200-300 per tree to plant and nurture them through their first years of life. And there will be a minimum annual civic or private investment per tree (typically $4-6 annually) to maintain them after that. Trees create droppings (leaves and branches), which can get into storm sewers. Trees attract birds that may create added droppings and chatter. Poorly located trees may get struck by autos. If spaced too close together or too near intersections, trees create sight impairments. Trees complicate street lighting. Trees impact underground and above ground utilities.

Despite all of these issues, trees are one of the smartest urban investments. The U.S. Forest Service documents that urban street trees absorb and convert four times the pollutants of trees located elsewhere (and at the source). Trees absorb rain water, reducing the amount of runoff that must be treated elsewhere. Properly spaced street trees reduce air conditioning costs for homeowners 15-25%.

But that is not all. California studies reveal that the shade provided by street trees can extend the life of asphalt up to 40% (reducing expansion and shrinkage of asphalt). Some real estate studies reveal that 2 street trees and a sidewalk in front of each house on a block increase the value of that property an average of $5,000. Urban trees also screen inconsistent land uses, slow cold winter winds, and moderate an entire community's climate.

Other data from U.S. Forest Service documents: The average street tree returns $50,000 plus to the community for the investment. This accounting does not take into consideration reduced speeding, loss of life, injuries and other associated quality of life gains from street trees. (*Missouri Urban Trees 1997*, Conservation Commission of the State of Missouri.)

Category Two — Transitional Access: Avenues and Main Streets

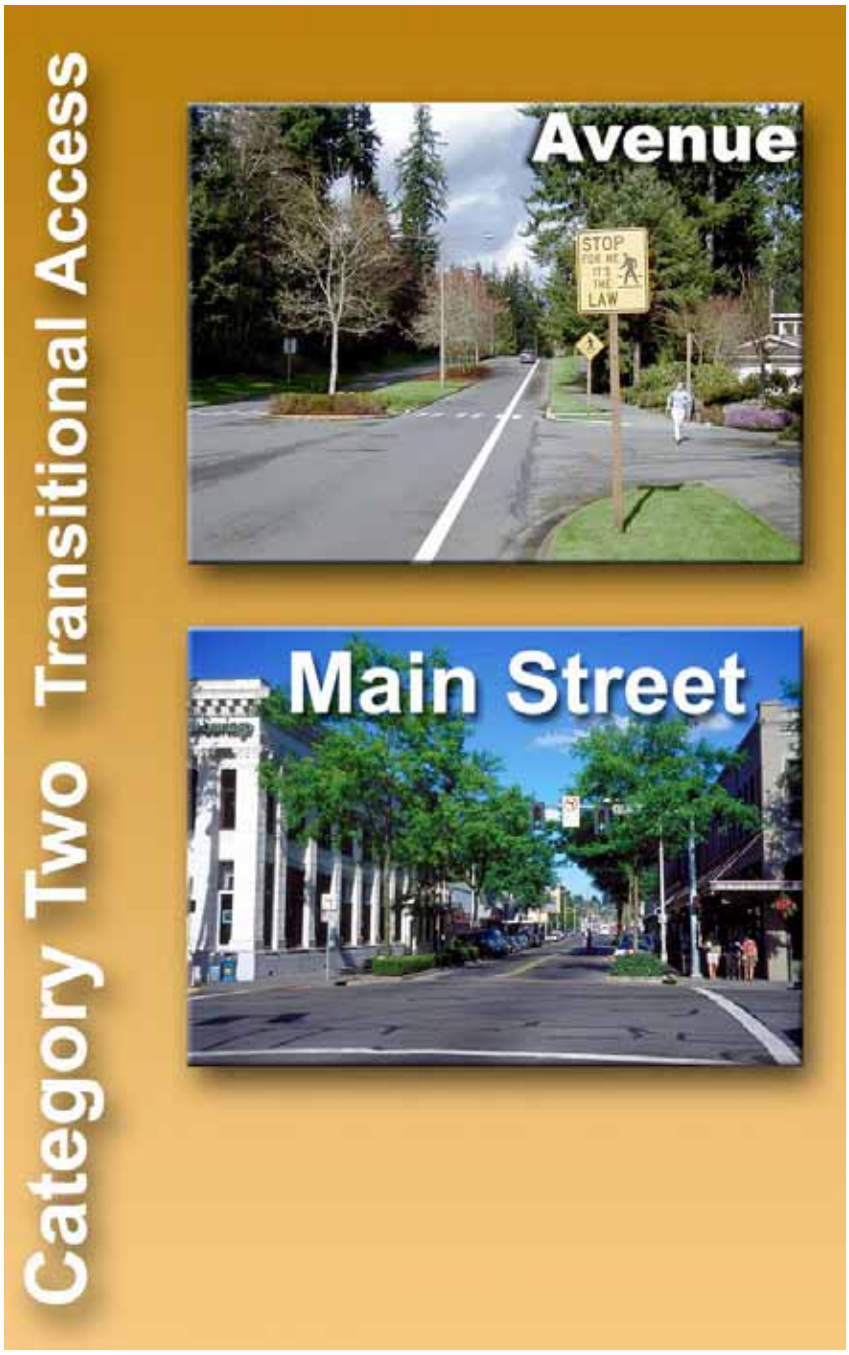
Category Two roadways connect neighborhoods to commercial centers and other parts of the community. Avenues and main streets are "transitional" roadways: in addition to providing access, they carry large and more diverse amounts of traffic and at moderately higher speeds (25-35 mph). Both avenues and main streets can and must handle more traffic volume. Generally volumes of 2,000 to 20,000 vehicles per day are handled on each type of roadway.

Avenues and main streets host deliveries and efficient emergency responses. They anchor neighborhood commerce, serve bicyclists and pedestrians, and improve transit operations.

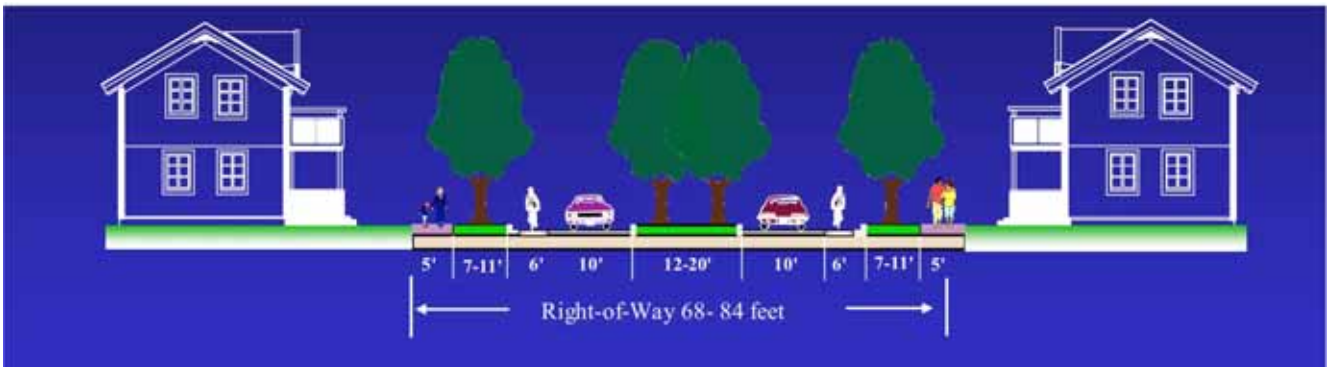
Category Two streets must operate at low to moderate speeds, since many people live, work, shop, and play within these street environments. On-street parking is found on many, but not all, avenues and main streets.

Many new built avenues and main streets make extensive use of curb extensions and inset parking. Most avenues are either two-lane or three-lane facilities. In some cases avenues will operate better as four lane facilities, but this condition creates many new problems, including speeding, so emphasis is placed on managing volumes and keeping lanes down to two or three.

Main streets may have four lanes in many applications. In many cases, once main streets reach higher volumes requiring four or more lanes, medians are useful additions.



Avenues

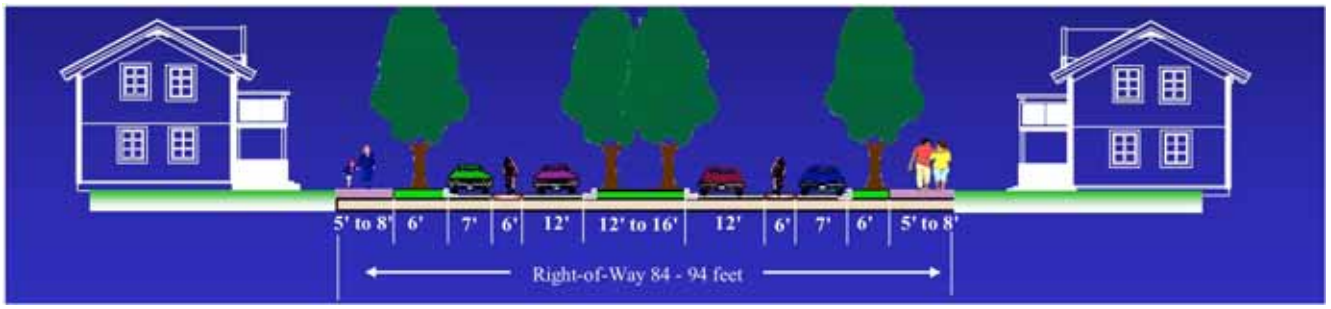


Avenues

Avenues connect neighborhoods to other neighborhoods and town centers, and as such can extend up to one mile before meeting up with a Boulevard. When avenues are well designed motorists feel comfortable going 30-35 mph, and not faster.

Well designed low speed avenues generally are 17 feet wide on each side of a median. In these conditions 10 or 11 feet is provided for the motorist, and 6-7 feet for the bicyclist. Avenues can also operate without a median, although the raised center island is often preferred.

On-street parking is optional, and is based on adjacent land uses. Avenues are richly landscaped, since they are civic spaces that often serve as gateways to town centers. Avenues should have the tallest, most spectacular tree canopies.



Avenues

Description: Avenues are vital movers of traffic. Avenues vary widely in the amount of traffic carried, and are designed for the broadest possible range of human and vehicle activity.

Other Uses: Avenues operate almost universally as two-way roads, and in some rare cases as one way roads. Avenues are two-lane facilities, with some variations. A third lane is used for turning movements and refuge islands. Medians with turning pockets are also common. Avenues are used for commercial deliveries, and often support convenience parking.

General Rules: As a general rule, avenues have bike lanes, parking on both sides and curb extensions. When land uses do not call for parking, it is omitted. If exceptionally long blocks are used, or if signals are widely spaced, consider pedestrian crossings every 600 feet. If parking is dense consider angled parking on one or both sides. This helps hold speeds down. Parking should be inset with curb extensions, creating clean, crisp lines and attractive travel ways. Avenues need to be efficient with the lowest possible number of driveways in order to maximize safety and efficient movement.

Design Speed: Avenues are designed so that motorists are not comfortable driving more than 30-35 mph.

Variations: Avenues are constructed of asphalt, concrete, pavers or other durable, all weather surfaces. They can be colorized or patterned.

Drainage: Consider valley gutters to create clean, crisp lines. Standard curb and gutter sections are also common. Curb extensions are very helpful to design and operations.

Widths: Widths vary, but generally 2-lane avenues without medians can be as narrow as 32 feet and operated as two-way facilities. When a third lane is added, consider lane widths of 10-11 feet. Bike lanes add another 5 to 6 feet per side. When medians are used consider holding travel lanes to 11 feet, with added width up to 7 feet in the bike lanes. Allow extra width for parking, when provided.

Gateway Avenues are often asked to serve as attractive entries into either small communities or neighborhoods. In these cases using combinations of treatments that slow traffic becomes essential. Tree canopies, medians, on-street parking and midblock pedestrian crossings are used. In short blocks or other interior neighborhood conditions where speeds are well under control (at or below 25 mph), bike lanes are sometimes omitted. This style of avenue is very popular in new urban towns. It works well when the roadway is not required to move more than 3-5,000 vehicles per day. Avenues should also contain speeds around curves. An excellent way to do this is to include a median island. When using medians it is best to use significant tree and canopy treatments. Added foliage helps motorists see and detect the tighter road configuration from a greater distance.

Other Avenue Speed Controls

Use of appropriate lane widths, paver stones, asphalt and concrete combinations and even omitting center lines, where appropriate, can assist with speed controls.

The Orlando, Florida avenue above (Livingston Avenue) saw speed reductions from the high 30's and 40's to at and below 30 mph post construction.

Paver materials are also a worthy investment in historic neighborhoods and other locations where traditional homes are being constructed. Brick and other pavers are more expensive than other pavements, but, when constructed properly this surface can provide 70-100 years of service life.

The brick road to the right is a state road in Ionia, Michigan. The previous brick street lasted 75 years. The new street was constructed of better materials and an exceptionally talented work force and is expected to last 100 years.

The bottom photo is a former four lane avenue on the University of Toronto campus, now moving the same traffic as before (18,000 vehicles per day) in just two lanes. Inset parking, wider sidewalks and bike lanes were used to take up the excess avenue space. Speeds have been reduced and the road is safer than when it had four lanes.

Grandview Drive in University Place, Washington

Avenues are likely to change profiles even in short roadway sections. As evidence, the photos to the right are all of a newly reconstructed Avenue in University Place, Washington (near Tacoma).

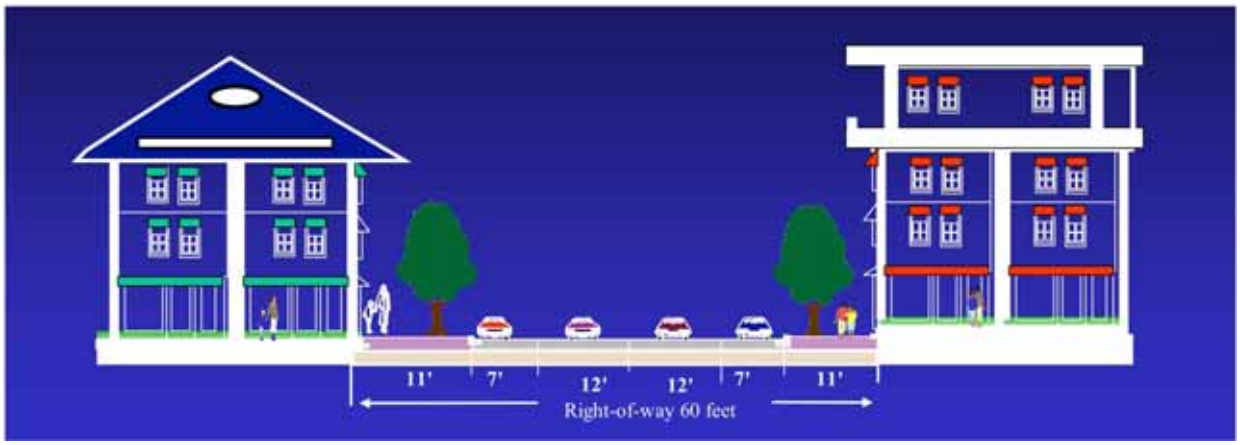
Throughout the project travel lanes were kept to 10 foot width in order to hold down speeds. Meanwhile, bike lanes or paved shoulders were used throughout.

When possible sidewalks were installed with a 6 foot planter strip. Medians were dropped where there were many residential driveways. In a more rural section of the 2.5 mile avenue paved shoulders were used in lieu of sidewalks.

Refuge islands were used to keep motorists from attempting to pass in the third lane. This roadway was built as three separate projects within a three year period. Five roundabouts were included.

Avenues should control speeds naturally. This 2.5 mile section of road curtails speeding through design. Average speeds through the corridor are 30-35 mph, despite a low to moderate intensity of mostly residential land uses. Before being rebuilt, average speeds here were in the high forties and low fifties. Design does influence behavior.

Main Streets

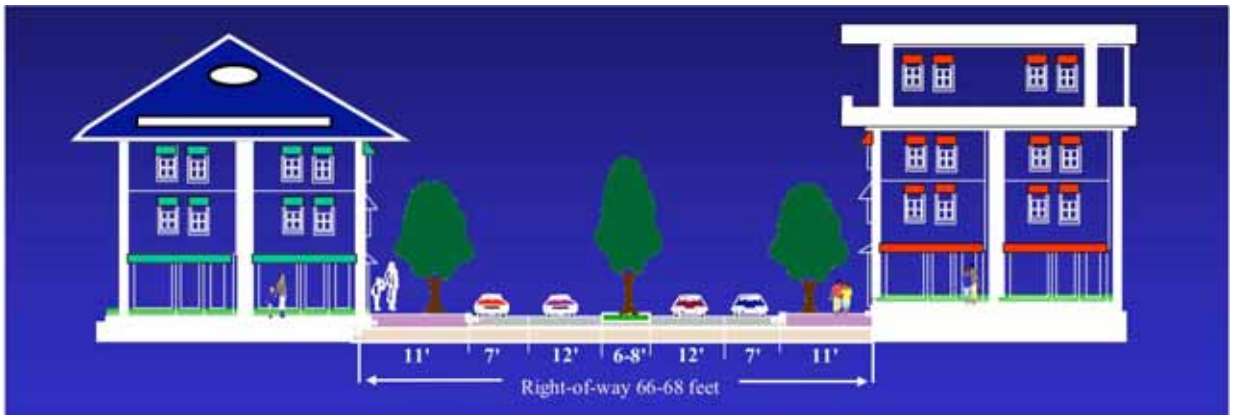


Main Streets

Main streets provide access to town center services, as well as places for neighborhood commercial and mixed-use buildings. Main streets are two-way streets. In many cases main streets use two lanes, but when significant traffic must be moved, 4 lanes, and in some cases even six lanes are provided.

On-street parking is very desirable. Due to the 15-25 mph, low-speed environment, bike lanes are optional. As speeds reach the top end of the range bike lanes are preferred.

Main streets usually do not have medians, but medians with low shrubs are acceptable if they do not detract from terminating vistas and attractive storefronts. As more lanes are added medians also become a useful tool, creating separation between traffic directions.



Description: Main Streets are the commercial and activity heart of communities. Main Streets vary widely in the amount of traffic carried, and are designed for the broadest possible range of human and vehicular activity.

Other Uses: Main Streets operate almost universally as two-way roads, and in some rare cases as one way roads. Main Streets create significant width for walking, outdoor cafes and other commercial activities. Main Streets are used for commercial deliveries, and often support convenience parking.

General Rules: As a general rule, Main Streets have parking on both sides. If exceptionally long blocks are used consider providing mid-block crossings every 300 feet. If street width is tight, angled parking can be introduced on one side then alternated with parallel parking at a mid-block location creating convenient crossings, outdoor cafes, or community gathering spots in these mid portions. This helps lower speeds. Parking should be inset with curb extensions, creating clean, crisp lines and attractive travel ways.

Design Speed: Main Streets are designed so that motorists are not comfortable driving more than 25 mph.

Variations: Main Streets are constructed of asphalt, concrete, pavers or other durable, all weather surfaces. They can be colorized or patterned.

Drainage: Consider valley gutters to create clean, crisp lines. Standard curb and gutter sections are also common. Curb extension are very helpful to design and operations.

Widths: Widths vary, but generally 2-lane Main Streets without parking can be as narrow as 24-30 feet and operated as two-way facilities. Multi-laned Main Streets are common. In these cases allow for 11 feet per lane. Allow extra width for parking and bike lanes, when provided.

Main Street Details

To help pedestrians cross the street and calm traffic, "bulbouts" — wider sidewalks that extend into the roadway — should be provided at intersections and, if blocks are long, at mid-block crossings. As a general rule pedestrians will walk up to 150 feet out of their way to get to a well designed crossing point.

Thus on block lengths of more than four hundred feet, and especially 500 feet or longer it becomes desirable to organize midblock crossings. Often this is done at alleys or passageways, or other logical crossing points.

Main streets call for high levels of detail, especially in buildings and streetscaping detail. For this reason we devote nearly a full chapter to pedestrian street design details (see Chapter Three).

Main streets need to be well lit, deliveries and trash pickup must be planned for, landscaping must be carefully arranged, and a myriad of other issues must be addressed.

Park Avenue, Winter Park, Florida. One of Florida's premier shopping and neighborhood streets. This street was modernized in 2000. Lanes were kept narrow and parking fully retained, despite pressure for more capacity.

Design Smart, Not Wide

To help control speed, lane width, valley style gutters and parking use precision measurements. When traffic volumes are light (2-4,000 ADT) travel lanes are kept to 10 feet, and parking bays are 6 feet. The width works especially well when 2 foot wide valley gutters separate the two street uses. These measures would not work as well at moderate volumes, and not at all at high volumes.

On side streets parking can be increased by 40-100% through angled, straight-in or back-in angled parking.

Main streets can be made all the more attractive through close attention to selection of contrasting materials. Note in the second photo from the top that the roadway appears narrower by using concrete for the parking bays, and insetting these with curb extensions.

University Avenue in Palo Alto, California (below) a two lane road with diagonal parking on one side and parallel on the other moves 14,500 cars daily (at 15-20 mph). The use of 30 year old tree wells to bring the canopy more fully over the street, and alternating diagonal parking from side to side every other block creates visual effects that keep traffic moving slowly.

Rebuilt Town Center
Main Streets

Brick or other pavers can also be used on main streets to create a warm color and a low level auto rumble. Speeds in this new roadway section in the Arena District of Columbus, Ohio are kept below 30 mph through use of the color and pavers. The median effect is created using a grey brick paver. This entire town center district is the former site of the Ohio State Penitentiary.

In the bottom three photos, downtown West Palm Beach, Florida has been resurrected from near oblivion in the past eight years, largely by narrowing every street in the downtown area, while making significant investments in walkability and civic activities. These and other incentives were offered so that developers would create many new shopping, entertainment, and public space needs of the community.

The investment is paying off in major ways. The third photo is Clematis Avenue, a former three-lane one-way couplet system through the downtown. Under the new traffic circulation plan virtually all one ways are eliminated and speeds are greatly controlled. The new downtown is a haven for living, working, shopping and walking. The new philosophy that downtowns are for people, not speed, has proven popular. Today West Palm Beach is a major laboratory of modern traffic circulation and main street speed control.

The bottom photo is Rosemary Street, which connects the new City Place area in West Palm Beach with the older more historic town center. This several block long connector street is not required to carry heavy traffic. Colorful pavers, a center drained street, tree wells and woonerf style sidewalks (level with street, separated with bollards and parking meters) make this an interesting study in low speed design.

Passageways and Paseos

Passageways, Paseos and Commercial Alleys

Passageways, paseos and commercial alleys provide access between main streets and other shopping areas and parking lots or garages.

Passageways, paseos and alleys are usually narrow corridors. They range in width from a mere 10 feet to 30 feet. Some grand paseos may be 100 feet wide or more, but these are exceptions.

Other functions of these passageways and paseos are the provision of fire breaks, lighting into buildings, social gathering spaces, as well as added access for emergencies of all types.

In commercial alleys, trucks and cars are often permitted. In this case speeds are quite low, typically 5-10 mph.

Utilities in alleys are common. As a general rule utilities are underground, inserted into building walls, or otherwise organized and made attractive.

Lighting is essential. Close attention is paid to a combination of wall, ground or overhead lighting, or some combination. In historic areas the sides of buildings are often lit to bring out the warmth and character of these buildings. In all cases many active "eyes on the corridor" are essential. This is arranged by having many stores face into passageways from street level, a basement level, and more frequently through mixed use buildings. Passageways, paseos and alleys are often conveniently located at midblock locations, or otherwise used to break up long blocks. In such cases organized midblock crossings are often arranged.

The three scenes to the right are in a newly made town center in downtown San Luis Obispo. To one side is the blank wall of a movie theatre, to the other double walls of shops. Although this corridor could have had shops facing out on one side, exceptional design was used to house utilities, bikes and provide an attractive, clean, respectful, well-lit space.

Bay Walk in St Petersburg, Florida provides a midblock set of stores and open public space, connected by several passageways. One passage is through a building, made all the more interesting with a display of significant headlines of local, state and national history. The walk continues through one plaza, across the main street and into a second plaza of stores, a theatre and other entertainment.

Security

Security in paseos, passageways and alleys is accomplished through a combination of treatments.

First is the provision of eyes on the passageway through appropriate mixed use development.

Doors and other areas are not permitted to be inset more than 4 inches, to avoid creating hiding places. Walls are covered or otherwise provided with plant materials or other fabric making acts of graffiti difficult.

Shops can often face into the physical space. When this is done it is best to have at least one shop, such as an ice cream shop, that will be open during evening hours.

If the passageway is wide enough this is the perfect place for a small community center, police station, public rest room and related services and facilities. Walt Disney's magic kingdom orchestrates one of its restroom facilities in just such an area.

Most important is to have the passageway flow into and out of courts and plazas likely to be alive with people and activities many hours of the day.

Commercial Alleys

Description: Commercial alleys are narrow ways providing vital access for downtowns and village centers. Effective placement of commercial alleys provides essential access for utilities, deliveries, added setup for emergency response, and in some cases added pedestrian access.
Other Uses: Commercial alleys are used primarily for utilities (above or below grade), drainage, added fire and rescue operations. Use of commercial alleys allows streets fronting stores or mixed use development to be clear of utility wires, driveways and other challenges to quality street making and pleasant walking conditions.
General Rules: As a general rule, commercial alleys must have many "eyes" overseeing the physical space. This is achieved through design. Parking is generally not permitted in the alleyway. Alleys must be well-lit, and sunlight to them must be maximized.
Design Speed: Commercial alleys are designed so that motorists are not comfortable driving more than 5-10 mph.
Variations: Commercial alleys are constructed of durable long lasting all weather materials. In some cases alleys are highly decorated, turned into popular pedestrian ways, or even created as major pedestrian routes through downtowns (e.g.. Victoria, British Columbia).
Drainage: Often toward the center, or to one side.
Widths: Widths vary, but generally should be kept to 10-30 feet of carriage space, and operated as either one or two-way facilities.

Before and After: One of Victoria, British Columbia's oldest alleys was saved by replenishing its old hardwood brick deck. The city simply hung flowers, and mounted lamps to bring life to a unique alley circulation system. Victoria has converted dozens of alleys into spaces housing hundreds of new shops, cafes and other urban village experiences.

Commercial Alley Vehicular Access

Alleys are used for deliveries, utilities, sanitation, fire breaks, a source for light for mixed use buildings, cafes and other land uses. Although alleys can be used to a limited extent for area traffic circulation, all other uses come first.

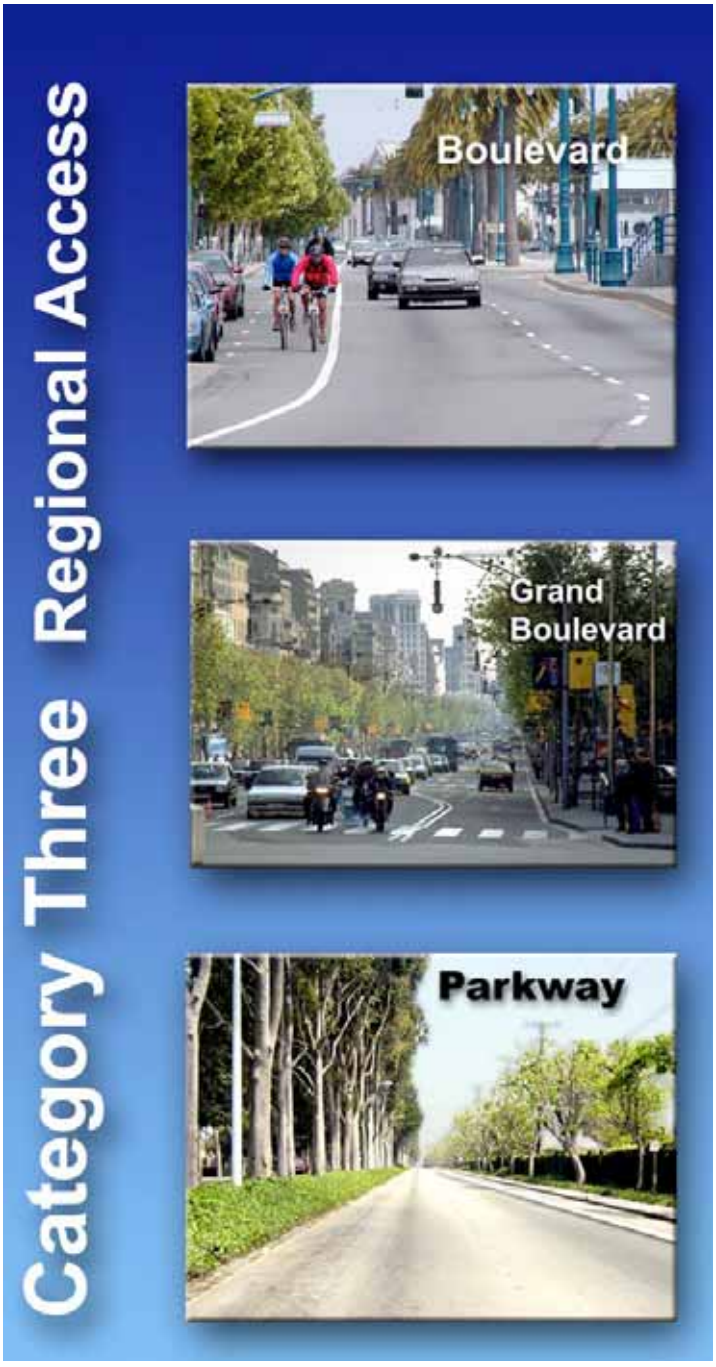
Special care should be taken where alleys cross pedestrian ways. These areas should be well lit, and make use of contrasting materials to identify to the driver that they are intruding on pedestrian space.

Curb extensions are sometimes used at alley junctions, aiding drivers in getting a good view of traffic before entering, and eliminating the possibility of vehicles being parked too close to the alley.

Alleys are not always faced on both sides with buildings. This Newport, RI alley faces into a town square. Again, building articulation and "eyes on the alley and public space" is what makes this a pleasant place to stroll in or visit.

Category Three — Regional Access: Boulevards, Grand Boulevards, and Parkways

Category Three boulevards, grand boulevards, and parkways connect town centers to the greater region. Each of these roadways has multiple lanes in each direction. Four lanes are most common. However six lanes and even eight lanes are possible. As more lanes are added more extraordinary care is required to retain friendly features for pedestrians and bicyclists and people living, working, shopping and playing along these powerful community development engines.



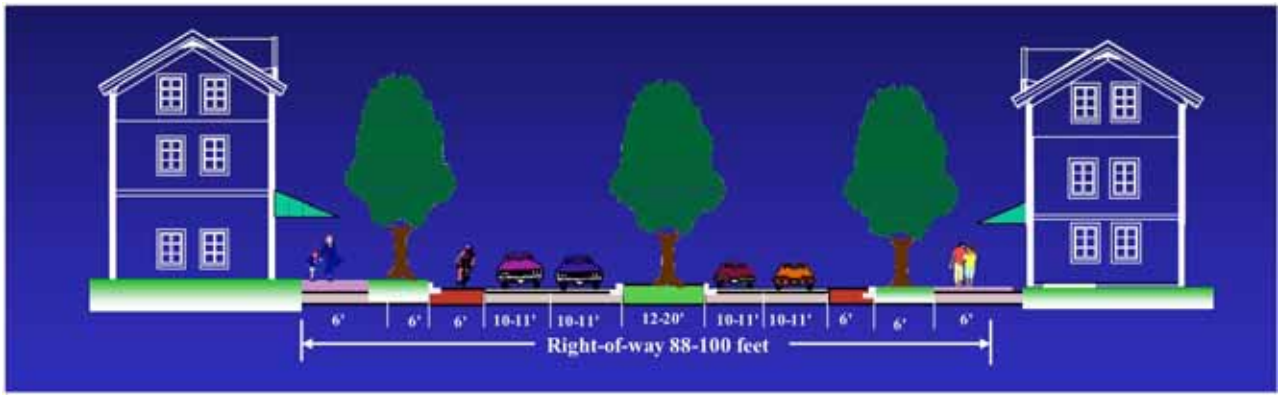
Boulevards, grand boulevards and parkways are essential for combining motorized and non-motorized traffic in safe, efficient, welcoming environments. Since the success of commerce and traffic circulation depends on effective street design, much attention has to be paid to the orderly and balanced movement of all trans-portation modes on boulevards, grand boulevards and parkways.

On these streets, car traffic, delivery trucks, emergency responders, and transit must operate with high levels of efficiency. Steady but safe speeds (30-45 mph) are common on these roadway types. Generally speeds of 30-35 mph are most common, except when going through areas with significant high intensity development, numerous intersections and driveways. In these settings speeds may be lower. Parkways have very limited access (few driveways and intersections), so speeds tend to be higher (35-45 mph).

Travel volumes are also much higher on each of these roadway types. Typical boulevards, grand boulevards and parkways move from 20,000 to 60,000 vehicles per day, and a few move up to 80,000 vehicles per day.

Pedestrians and bicyclists must also be welcomed. Indeed, pedestrians and bicyclists have even greater need of support on these streets through bike lanes and sidewalks, due to the higher speeds and amount of traffic.

Boulevards



Boulevards

Boulevards provide multi-lane access to commercial and mixed-use buildings, and they carry regional traffic. For these reasons, speeds on these streets are higher (30-35 mph). Boulevards have bike lanes and sidewalks on both sides of the roadway, and they may have sections of parking to support commerce, parks, schools, museums, churches, hospitals and other attractors along their routes.

There may be some exceptions to sidewalks on both sides, such as when there is a canal, lake, railroad or other feature preventing land development. In this case multi-use trails are often substituted in design.

In conventional neighborhoods, boulevards are classified as "arterial" roadways. Under such conventional conditions many of these roadways have been built with five-lanes, with the fifth lane providing turns in each direction. However, in this manual five-lane road sections are seen as problematic, unsafe, inefficient, and are generally recommended for conversion to higher performance, safer, more aesthetic boulevard style travelways supporting higher capacity and supportive of walking, bicycling and transit.

Boulevards generally perform much better for pedestrians and bicyclists (reducing crossing exposures to one-half), allowing better tree canopies, and reducing turning conflicts. Trees and other landscaping treatments also reduce starkness and have a tendency to reduce speeding through otherwise stark or blighted areas.

Boulevards

Description: Boulevards provide the greatest horsepower for moving traffic. Boulevards vary widely in the amount of traffic carried, but generally handle 20-45,000 vehicles with 4-lanes (or 6-lanes when numbers exceed 38-50,000 vpd).
Other Uses: Boulevards operate as two-way roads, and by definition, have median islands, helping these facilities maintain peak efficiencies, utility and safety. Boulevards are used in most parts of a community, and are often used for commercial or Main Streets.
General Rules: As a general rule, Boulevards have bike lanes, and can have parking on one or both sides with curb extensions. When land uses do not call for parking, it is omitted. If exceptionally long blocks are used, or if signals are widely spaced, pedestrian crossings are arranged each 600 feet. If parking is in short supply, and speeds can be managed, angled parking may be considered on one or both sides. Parking helps hold speed down. Parking should be inset with curb extensions, creating clean, crisp lines and attractive travel ways. Boulevards need to be efficient. Maintain the lowest possible number of driveways in order to maximize safety and efficient movement. Bike lanes are essential in most cases. On-street parking is provided in commercial and many multi-family zones.
Design Speed: Boulevards are designed so that motorists are not comfortable driving more than 30-35 mph in central parts of towns, villages and cities, and 40-45 mph once urban and suburban villages are left behind.
Variations: Boulevards are constructed of asphalt, concrete, pavers or other durable, all weather surfaces. They can have spots that are colorized or patterned.
Drainage: Valley gutters are used to create clean, crisp lines. Standard curb and gutter sections are also common. Curb extension are very helpful to design and operations.
Widths: Widths vary, but generally 4-lane Boulevards are kept to 22-24 feet per side, with medians of 12-20 feet. Turning pockets are inserted into medians, typically every 600 feet. Bike lanes add another 5-6 feet per side. When medians are used consider holding travel lanes to 11 feet, with added width of up to 7 feet in the bike lanes. Allow extra width for parking, when provided.

Adding medians to a five-lane road converts it to a boulevard. Taking away the scramble lane can cut injury-producing crashes by 50% in most cases, increase roadway capacity up to 30%, and improve conditions for pedestrians and bicyclists. Building boulevards out of 5-lane roads is one of the best uses of limited transportation dollars. Conversions are a win for all modes. The middle and bottom photos are of the same roadway, taken from the same angle one year after the conversion.

Boulevards and People

Boulevards owe their efficiency to long stretches of uninterrupted flow. Meanwhile distances between signals often run many hundreds or thousands of feet — far too great a distance for pedestrians. Either full medians, or refuge islands provide simplified crossings for many people needing to get from one side of the street to the other.

Full medians and short refuge islands each break a crossing from 20 second exposure to as little as 8 seconds. In traffic, people are not able to predict many critical events that are out 10-12 seconds, so getting distances down is vital to pedestrian and traffic safety.

Special Medians

There are times and locations where boulevard streets need to be partly or fully open in the median location. The nation's Main Street, Pennsylvania Avenue has flat medians in order to allow for the presidential inaugural parade every four years.

Below are several added examples showing how the use of color, textures and other materials creates a buffer between moving lanes, acts as storage when needed, and otherwise helps dress up an otherwise all-grey roadway.

Although full medians have the most positive effects, partial or intermittent medians are far superior to nothing at all.

Proper selection of flat median materials will keep motorists from using them to pass another vehicle. Since pedestrians will need to cross streets in a variety of locations the surfaces must be foot friendly.

Trees provide much of the magic of boulevards. Through combinations of vertical height, crowning canopies that can evolve in as few as 10-20 years, and the strong presence of greenery, most motorists moderate their speed. Trees in medians have been shown to reduce the potential for crashes.

Meanwhile proper trimming and undercutting of trees, and ensuring that large caliper trees are not placed near intersections is important to reduced risk and enhanced safety.

Boulevard Streets should have bike lanes whenever right-of-way permits. Bike lanes provide many benefits to all roadway users, and do not need to be justified on the numbers of bicyclists that will make use of them alone.

Bike lanes add to the border width of a roadway, create effective buffers between motorists and pedestrians, add to the effective turn radii at corners and driveways, allow motorists to view traffic when they are about to enter the roadway, and provide many other benefits.

When curb extensions are provided, these should be trimmed to allow the full width of a bike lane (see bottom two photos).

From Five Lanes to Boulevards

U.S. A-1-A in Ft Lauderdale Beach was once a five lane (see top photo), with highly dysfunctional traffic. The roadway would congest fully each night and almost all day during weekends (photo #2).

In 1994 the roadway was converted to a four lane boulevard with a center median. At first wide curb lanes (see photo #3) were used.

These 14 foot wide curb lanes did not meet the needs of most bicyclists, who continued to use adjacent sidewalks. The travel lanes were narrowed to insert bike lanes 3.5 feet wide.

These substandard bike lanes were too narrow, and so eventually the roadway was narrowed to 10 foot lanes to allow the proper width for the bike lanes (see bottom photo.

Converting this roadway to a boulevard has been a key factor in returning economic prosperity to the corridor and region. Today nearly $1 billion in new economic development has arrived.

Keeping Wide Boulevards Pedestrian Friendly

Brea Boulevard is six lanes wide in midblock locations and up to 12 lanes as it intersects Orange County, California's Imperial Highway. Despite intense traffic use of medians, appropriate building locations and other features allow pedestrians reasonable access along and across this major roadway. A number of design and operations features keep traffic speeds manageable. Below: A former Mesa, Arizona main street was narrowed from seven-lanes to four, without any loss of capacity.

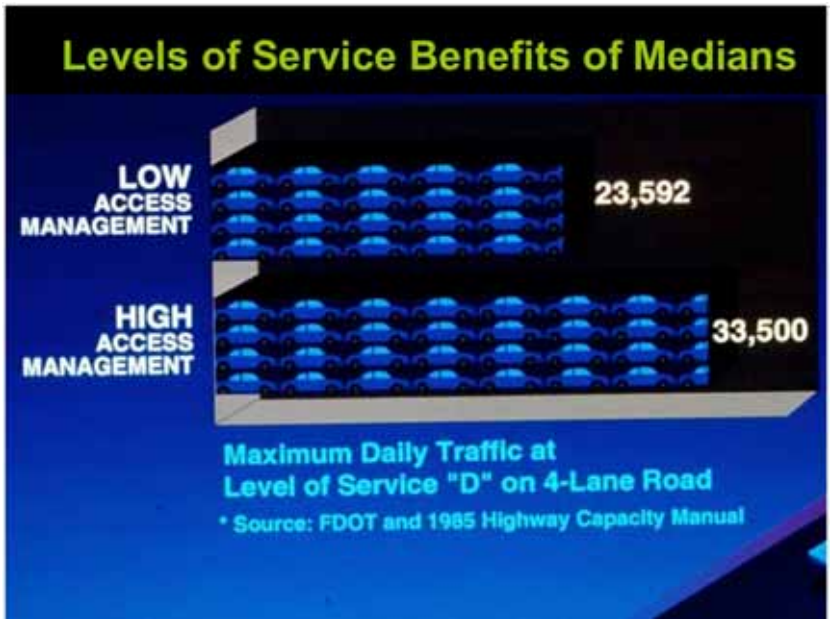
Parking Issues on Boulevards

Boulevards in commercial or mixed use districts can benefit from on-street parking in a number of ways. Parking creates a buffer to walkways. Parking provides convenient auto storage where it matters most. Most important, on-street parking helps slow traffic.

Del Mar, California provides both a bike lane and an unmarked buffer lane allowing the through lanes to remain efficient at moving traffic, and allowing the buffer lane to provide extra turn radius and storage for motorists preparing for a right hand turn. Diagonal parking can be used on lower speed boulevard roadways for volumes up to 20,000 vehicles per day.

Parallel parking is a more common treatment on boulevard streets. Note the effective use of valley gutters in this Mesa, Arizona location.

Del Mar, California



Boulevard Capacity

Boulevards provide high returns on investment in achieving vehicle capacity. A well designed 4-lane boulevard, with accompanying top performing intersection designs, can handle upwards of 45,000 vehicles per day, or 4,500 vehicles per hour.

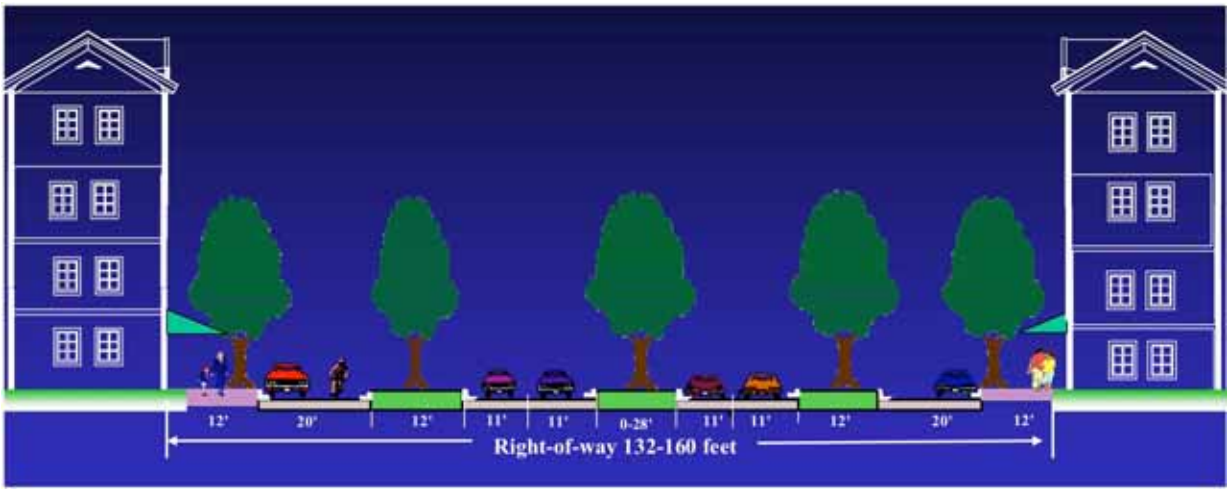
Although 11 foot lane widths are common, it is possible to narrow lanes to 10 feet, especially when bike lanes are added. A combination of a 10 foot travel lane and a 5 foot bike lane is the same as a 15 foot wide curb lane to support operational needs.

One advantage of keeping lanes to 10 feet, even if right-of-way is not an issue, is that motorists tend to drive from 3-7 mph slower when feeling the constraints of 10 foot lanes, as opposed to 11 foot and 12 foot lane widths.

Boulevards with 10 foot lanes tend to see reduced speeding, and corresponding increases in reaction time. Both are important factors in reducing the numbers of personal injuries and the severity of injuries.

Reduced speeding also dampens urban street noise. Vehicles traveling at 30-35 mph, as opposed to higher speeds, are better urban neighbors. Roadway capacity is not speed related. The same numbers of vehicles are moved through an area in one hour at 30-35 mph than at 40-45 mph due to the increased space between vehicles at higher speeds.

Grand Boulevards



Description: Grand Boulevards are the Grand Master of Urban Streets. Grand Boulevards vary widely in the amount of traffic carried, and are designed for the broadest possible range of human and vehicle activity.

Other Uses: Grand Boulevards operate as two-way roads, and in some rare cases as one way roads. Grand Boulevards are six to eight-lane facilities. Medians are used to the side of prime vehicular movements. To the sides of these medians, service roads are added, and on street parking or driveways are accessed through these side roads. Grand Boulevards are used for commercial deliveries on the sides only.

General Rules: As a general rule, Grand Boulevards have bike lanes, parking on both sides and curb extensions. When land uses do not call for parking, it is omitted. If exceptionally long blocks are used, or if signals are widely spaced, consider pedestrian crossings every 600 feet. If parking is dense, consider angled parking on one or both sides of frontage streets. This helps hold speed down. Parking should be inset with curb extensions, creating clean, crisp lines and attractive travel ways. Grand Boulevards need to be efficient. Maintain the lowest possible number of driveways in order to maximize safety and efficient movement.

Design Speed: Grand Boulevards are designed so that motorists are not comfortable driving more than 30-35 mph, or 20 mph on the frontage portions.

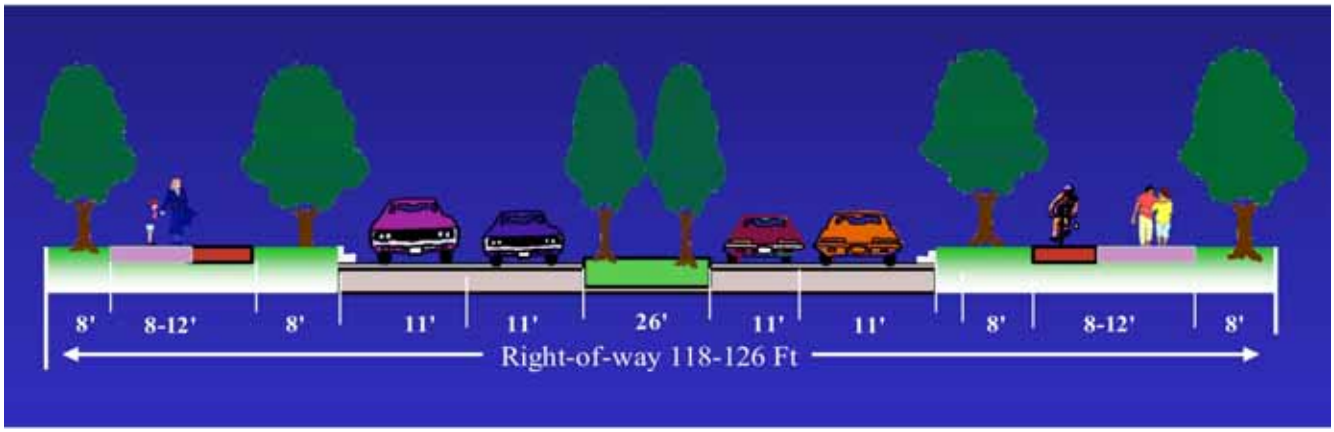
Variations: Grand Boulevards are constructed of asphalt, concrete, pavers or other durable, all weather surfaces. They can be colorized or patterned.

Drainage: Consider valley gutters to create clean, crisp lines. Standard curb and gutter sections are also common. Curb extension are very helpful to design and operations.

Widths: Widths vary, but generally 2-lane Grand Boulevards should be kept to 24-28 feet and operated as two-way facilities. When a third lane is added, consider lane widths of 10-11 feet. Bike lanes add another 5 feet per side. When medians are used consider holding travel lanes to 11 feet, with added width up to 7 feet in the bike lanes. Allow extra width for parking, when provided.

Grand Boulevard travelways are defined here as one distinct type of boulevard – a multiway boulevard designed to separate through traffic from local traffic, providing special pedestrian ways on tree lined malls. Shown on this page is one of the more famous, Passeig de Gracia in Barcelona, Spain. The corridor is 200 feet wide, and sidewalks are 36 foot each. Some better known Grand Boulevards in our country include the Esplanade in Chico, California, "K" Street in Washington, D.C., both Ocean Parkway and Eastern Parkway in Brooklyn, New York (210 feet wide). An excellent description, history, evolution and design of grand boulevards is found in Allan Jacobs newest book, "The Boulevard Book" (MIT Press).

Parkways



Description: Parkways provide higher access controls and hence greater carrying capacity than boulevards. Some parkways rival the best freeways in numbers of vehicles handled. They are superior to freeways and interstates, since many pedestrians find them to be simple and direct to use for their journeys, and crossing them is similar to boulevards.
Other Uses: Parkways are most often found in or near conservation districts. Land uses are tightly controlled.
General Rules: As a general rule, parkways connect with boulevards and traverse large areas of open space. Parkways tend to provide good, but controlled crossings. They may have some conventional intersections.
Design Speed: Parkways are designed to move traffic efficiently and at the highest urban speed. Many parkways move traffic steadily with little or no interruption at 35-45 mph, and some may move traffic at higher speeds.
Drainage: Varies. Often toward each side.
Widths: Widths vary, but generally should be kept to 44-48 feet of carriage space, and operated as two-way facilities.

Parkways

Parkways bring people into town, or they carry traffic through natural areas. Parkways are not designed to accommodate adjoining development. Roadway speeds may be 40-45 mph or higher. When parkways enter towns, they become boulevards, and speeds are reduced to 30-35 mph. Bike facilities are found on the edges of parkways, separated by distances of 10 feet to hundreds of feet. In other cases paved shoulders provide additional bicycling support. In conventional neighborhoods and town designs, parkways are classified as "arterial" roadways.

Shown to the right, a unique turning pocket before a signalized intersection allows the parkway to deny left hand turns, yet accommodate those seeking a route to their left. Previous page photo (middle) shows a low grassy median permitting emergency responders direct and immediate access into a neighborhood.

Bottom photo, Valencia, California has several roadways operating as parkways. Land uses are tightly regulated, and these roadways are capable of carrying large volumes of traffic in a limited number of lanes.

Transit Mall

Two other types of travelway are provided to show the diversity of road stock available to communities. On this page the San Diego light rail system make use of a dedicated roadway through the center of town. Pedestrians have maximum access to transit corridors, while motorized vehicles tend to be prevented entry to most. In some cases motorists are allowed to circulate in one direction only. On the next page, Wall Street in Asheville, North Carolina is one of a few true Woonerfs built in our country. The street is for any person or vehicle. However, by design, motorists are invited to enter at walking speeds only.

Asheville, North Carolina
Woonerf