CHAPTER 19

TRADITIONAL NEIGHBORHOOD DEVELOPMENT

TABLES

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CHAPTER 19

TRADITIONAL NEIGHBORHOOD DEVELOPMENT

A INTRODUCTION

Florida is a national leader in planning, design and construction of Traditional Neighborhood Development (TND) communities' and in the renovation of downtown neighborhoods and business districts. These represent patterns of development aligned with the state's growth management, smart growth and sprawl containment goals. This approach with its greater focus on pedestrian, bicycle and transit mobility is distinct from Conventional Suburban Development (CSD), comprised largely of subdivision and commercial strip development. The treatment of land use, development patterns, and transportation network necessary for successful TND communities is a major departure from those same elements currently utilized in other Greenbook chapters, which generally apply to CSD communities.

This chapter is intended to provide best practices to facilitate proper design of TND communities. Consequently, the emphasis varies from the rest of the Greenbook where the focus is on establishing minimum standards. To provide a design that accomplishes the goals set out in this chapter, designers will be guided by the context of the built environment established or desired for a portion of the communities, as TND communities rely on a stronger integration of land use and transportation than seen in CSD communities. TND has clearly defined characteristics and design features necessary to achieve the goals for compact and livable development patterns reinforced by a context-sensitive transportation network.

This chapter provides guidance for planning and designing Greenfield (new), Brownfield or urban infill, and redevelopment projects. It also clearly differentiates between CSD and TND communities to maximize the possibility that proper design criteria is used to create well executed TND communities. This is important, as the street geometry, adjacent land use, and other elements must support a higher level of transit, pedestrian and bicycle activity than seen in a CSD.

Differences between Conventional and Traditional Neighborhood Development:

The characteristics of CSD typically include separated land uses, where housing, retail, office and industrial uses are isolated from one another in separate buildings, areas of a development or areas of a community. Housing is usually further separated into neighborhoods, such that apartments, condominiums and other higher density housing are separate from single family housing. Parks, schools, post offices, health facilities, and other community resources are at such a large scale and separated from other

uses to the degree that they can only be reached by motor vehicle.

In CSD, the scale of big box retail, office parks and other commerce can only be sustained in an auto dominant environment since they must have a regional market to succeed. Their site design includes land parcels so large that walking to a given building from the adjacent thoroughfare or other buildings is not practical.

Finally, the roadway system is hierarchal and very much like a plumbing system, where "local" streets with lower traffic volumes feed into "collector" streets with higher levels of traffic, then finally onto the "arterial", where speeds and volumes are typically much higher. Block sizes are large to minimize the number of intersections. This type of roadway network puts essentially all trips onto the arterial with little to no alternate routes for travelers.

Design speeds for roadways outside subdivisions are rarely less than 35 mph and may be as high as 50 mph. Thus, longer distance through traffic is mixed with shorter trip traffic accessing local services. Higher volume, high speed streets fronted by the walls of subdivisions or surface parking lots of commercial developments result in a built environment that is uncomfortable for and impedes pedestrian, transit and bicycle modes of transportation. See the top of Figure 19-1 below for an illustration of Conventional Suburban Development.

Figure 19-1 Comparison of CSD and TND Communities

(Source: DPZ and Treasure Coast Regional Planning Council)

TND which is illustrated in the bottom of Figure 19-1, in contrast, is very supportive of pedestrian, bicycle and transit modes. Land uses are mixed, with retail, office, civic buildings and residential interwoven throughout the community, and often located in the same buildings. Block sizes are a smaller scale to improve walkability and to create a fine network of streets that accommodate bicyclists and pedestrians, providing a variety of routes for all users.

Multi-family and single family housing are located in close proximity or adjacent to each other and housing of various sizes and prices are mixed into neighborhoods. On-street

parking is favored over surface parking, lots and one way streets are rarely used. Travel speeds for motor vehicles ideally are kept in the range of 20-35 mph. This creates an environment that is safer and more comfortable for pedestrians, bicyclists, and transit users.

Due to the differences in the desired character of the community and the desired goal to create appropriate speeds for pedestrian and bicyclists, there are differences in the design philosophy for TND streets and CSD streets. Ideally, street speeds are kept low through the design of the street, curb extensions, use of on street parking, the creation of enclosure through building and tree placement.

This approach to street design with narrow streets and compact intersections requires designers to pay close attention to the operational needs of transit, fire and rescue, waste collection and delivery trucks. For this reason, early coordination with transit, fire and rescue, waste collection and other stakeholder groups is essential.

More regular encroachment of turning vehicles into opposing lanes will occur at intersections. Therefore, frequency of transit service, traffic volumes and the speeds at those intersections must be considered when designing intersections. For fire and rescue, determination of the importance of that corridor for community access should be determined, e.g. primary or secondary access.

When designing features and streets for TND communities in an infill or redevelopment site, designers needs to understand that they will have to “do the best they can.” In other words flexibility in the approach to design in what is a constrained environment is required. Creativity and careful attention to safety for pedestrians and bicyclists must be balanced with the operational needs for motor vehicles.

Likewise, designers should recognize that where TND streets transition into CSD streets, the design criteria such as intersection sight distance, use of on street parking, and other features should be evaluated to ensure that safety for users is provided. This is due to the higher speeds on most CSD streets.

Finally, it is very important when designing TND communities to ensure that a continuous network is created for pedestrians, bicyclists and transit throughout the community to create higher levels of mobility, that are less dependent on automobile travel.

B PLANNING CRITERIA

Planning for TND communities occurs at several levels, including the region, the city/town, the community, the block, and, finally, the street and building. Planning should be holistic, looking carefully at the relationship between land use, buildings and transportation in an integrated fashion. This approach and the use of form based codes can create development patterns that balance pedestrian, transit and bicycling with motor vehicle modes of transportation. The following sections help to define considerations for developing communities at different scales in order to increase the potential for creating TND patterns.

Planners should determine the applicable regional plans that guide their area. Plans can be generated for or coordinated with the Metropolitan Planning Organization planning process for urbanized areas. Sector planning and comprehensive planning at the city, county and regional level, i.e., any level above that of the individual community, also yield documented regional plans. Regional planning practice varies by jurisdiction; however most plans designate undeveloped land areas as either open space or areas for future growth.

Clear definitions of regional sectors or districts will identify where development is encouraged and discouraged by local and state policy. Only then can regional sectors guide the development and location of community types. Existing comprehensive plans should be reviewed to determine areas for planned future growth.

One example of regional sector definitions can be found in the SmartCode, a model form based code available for use in any region. SmartCode documents define the following regional sectors; also shown in the center of **Figure 19-2.**

O-1 Preserved Open Sector - Permanently set-aside open space, such as park or wilderness area, or lands set aside via easements or land grants. Communities do not occur in O-1.

O-2 Reserved Open Sector - Comprised of lands that are currently open but may be expected to develop at some point in the future, such as land for agriculture or silviculture. Communities do not occur in O-2. O-2 is a temporary designation

G-1 Restricted Growth Sector and **G2 Controlled Growth Sector** - These are undeveloped areas with little existing development at the beginning of the planning period, thus, any development will be new development. The less-intensive G1 Sector is intended for hamlets only and the more-intensive G2 sector, anticipates heavier development. These Sectors might be farmland, forests, or fields at the edge of existing urban development.

G-3 Intended Growth Sector and **G-4 Infill Growth Sector** - G-4 is developed, G-3 is not. Locations for G-1, G-2, and G-3 depend on terrain, thoroughfares and rail lines.

Regardless of the regional comprehensive plan terms and definitions, once the regional sectors/areas are mapped then refined planning is possible at the community level with the designation of community types.

Each community type is made up of transect zones to further define its character. The jurisdiction's existing comprehensive plan should again be reviewed to identify available community type definitions. If none are adopted, the SmartCode offers a set of definitions. As an example, **Figure 19-3,** describes the community types, in order from least to most intensive:

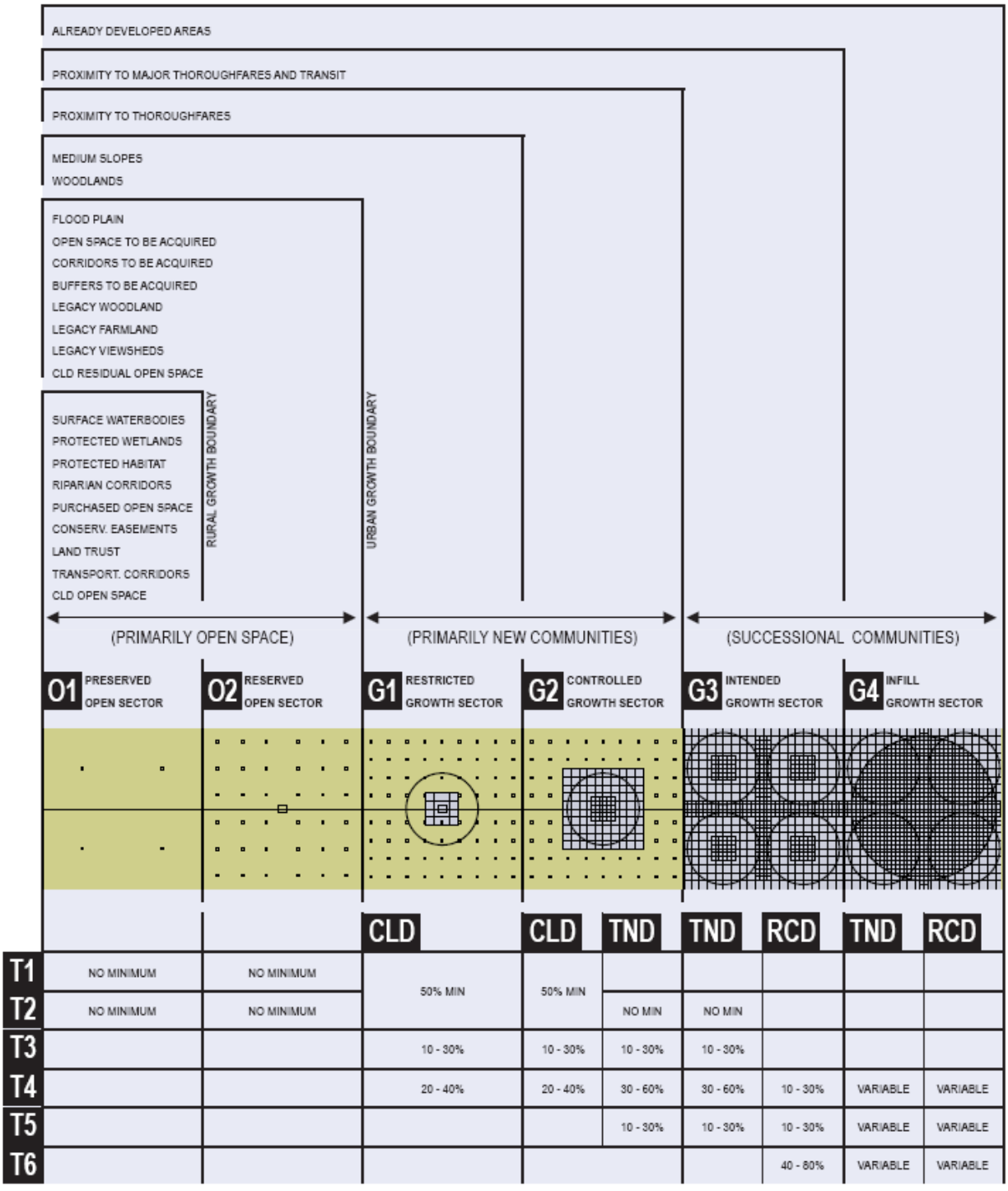
CLD – Clustered Land Development – an incomplete neighborhood standing alone in the countryside. (Syn: hamlet)

TND – Traditional Neighborhood Development –a village or small town composed of one or more neighborhoods (Infill TND occurs in the G-4 Sector)

RCD – Regional Center Development – a large town or part of a city with regionally significant development. (Infill RCD occurs in the G-4 Sector.)

Figure 19-2 Transect Zone Descriptions

(Source SmartCode 9.2)



As noted in the following Community Guiding Principles section, planning for a specific community type focuses the scale of land pattern and the transportation facilities.

The principles for defining or creating the context should be considered based on the scale of the area that is being evaluated, developed, or redeveloped. Regional scale considerations yield the recommended locations of cities and towns in areas where growth is encouraged. Then cities and towns can be planned.

The City/Town – Guiding Principles

- The city should retain its natural infrastructure and visual character derived from its location and climate, including topography, landscape and coastline.
- Growth strategies should encourage infill and redevelopment.
- New development should be structured to reinforce a pattern of neighborhoods and urban centers, with growth and higher density focused at transit nodes rather than along corridors.
- Transportation corridors should be planned and reserved in coordination with land use.
- Green corridors should be encouraged to enhance and connect the urbanized areas.
- The city should include a framework of transit, pedestrian, and bicycle systems that provide alternatives to automobile use.
- A diversity of land use should be distributed throughout the city to enable a variety of economic activity, workplace, residence, recreation and civic activity.
- Affordable and workforce housing should be distributed throughout the city to match job opportunities and to avoid concentrations of poverty.

The Community - Guiding Principles

- Neighborhoods and urban centers with a mix of uses should be the preferred pattern of development; single-use area should be the exception.
- Neighborhoods and urban centers should be compact, bicycle and pedestrian-oriented and mixed-use. Density and intensity of use should relate to the degree of existing or planned transit service.
- The ordinary activities of daily living should occur within walking or bicycling distance within a half mile of most dwellings, allowing independence to those who do not drive.
- Interconnected networks of thoroughfares should be designed to disperse and reduce the length of automobile trips and to encourage transit use, walking and bicycling. A range of open space, including parks, squares and playgrounds, should be distributed within neighborhoods and urban centers.

- Appropriate building densities and land uses should occur within walking or bicycling distance of transit stops.
- Civic, institutional and commercial activity should be embedded in mixed-use urban centers, not isolated in remote single-use complexes.
- Schools should be located to enable children to walk or bicycle to them. Programs such as Florida's Safe Routes to Schools may be referenced for additional information. Note that this program is intended for retrofitting CSD communities and many of the recommendations may not apply to properly designed TND communities.
- Within neighborhoods, a range of housing types and price levels should accommodate diverse ages and incomes.

The Block and the Building - Guiding Principles

- Buildings and landscaping should contribute to the physical definition of thoroughfares as civic places.
- Development should adequately accommodate automobiles, while respecting the pedestrian, bicyclist and transit user in the spatial form of public space.
- The design of streets and buildings should reinforce safe environments, while ensuring access is provided in a way that walking and bicycling are encouraged and that neighborhoods have multiple access points either through streets or pathways.
- Architecture and landscape design should grow from local climate, topography, history, culture and building practice.
- Civic buildings and public gathering places should be located to reinforce community identity and support self-government.

The following principles are intended to offer guidance on the most appropriate setting for the design principles of this chapter. The principles are not intended to be criteria, but it is recommended that at least the first seven of the principles or their intent be reflected in a project or community plan for it to be considered a TND.

- Has a compact, pedestrian-oriented scale that can be traversed in a five to ten-minute walk from center to edge.
- Is designed with low speed, low volume, interconnected streets with short block lengths that are between 150 to 500 feet and cul-de-sacs only where no alternative exists. Cul-de-sacs, if necessary should have walkway or bicycle connections to other sidewalks and streets to provide connectivity within and to adjacent neighborhoods.
- Orients buildings at the back of sidewalk or close to the street with off-street parking located to the side or back of buildings as not to interfere with pedestrian activity.

- Has building designs that emphasize higher intensities, narrow street frontages, connectivity of sidewalks and paths, and transit stops to promote pedestrian activity and accessibility.
- Incorporates a continuous bike and pedestrian network with wider sidewalks in commercial, civic and core areas, but at a minimum has sidewalks of at least five feet that are on both sides of a street. Accommodates pedestrians with short street crossings, which may include mid-block crossings, bulb-outs, raised crosswalks, specialty pavers, or pavement markings.
- Uses on-street parking adjacent to the sidewalk, to calm traffic, and offer diverse parking options but planned so that it does not obstruct transit operations.
- Varies residential densities, lot sizes, and housing types, while maintaining an average gross density of at least eight dwellings per acre and higher density in the center.
- Integrate in the plan at least ten percent of the developed area for nonresidential uses, civic uses and open spaces.
- Has only the minimum rights of way necessary for the street, median, planting strips, sidewalks, utilities, and maintenance and which are appropriate to adjacent land uses and building types.
- Locates arterial highways, major collector roads, and other high-volume corridors at the edge of the TND, not through the TND.

C CONTEXT

Context is the environment in which the roadway is built and includes the placement and frontage of buildings, adjacent land uses and open space, historic, cultural, and other characteristics that form the built and natural environments of a given place. The "Draft" ITE Recommended Practice: Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities is one of the documents included in the listing of reference material at the end of this chapter. While that document refers to the Transect Zones used in this document as "Context Zones" the zones are in fact the same.

It is essential to describe the urban context in a way that sufficiently informs transportation design. Transportation planners and designers should know the form and scale of urban development to best serve its traveling population. As noted above in the Planning Criteria section, a broader perspective is needed to move beyond the planning and zoning classification of land by use and the transportation classification of travel mode as motor vehicle dominant.

For application in walkable communities, the context through which the thoroughfare passes must be identified. For this document, context can defined at three levels as defined in the Planning Criteria section:

- The Region – by Sector
- The Community – by Community Types
- The Block – by Transect Zones

Rural-Urban Transect

The transect zones within each community type define the human habitats ranging from the very rural to the very urban. All T-Zones allow some mix of uses, from home occupations and civic spaces/buildings allowed in otherwise residential T-3, to the most intense mixed use in T-5 and T-6. The mix of T-zones in a community offers a greater diversity of building types, thoroughfare types, and civic space types than conventional zoning allows, thus, greater walkability follows.

In the least-intensive transect zones of a community, T1 and T2, a rural road or highway is appropriate. Open space outside the community types, whether preserved or reserved, is guided by its regional sector designation, not by a transect zone. All T-Zone designations occur inside community units.

By definition, the urban transect zones T3 through T6 do not exist as standalone zones, but rather are organized in relation to each other within a community. Each transect zone is highly walkable and assumes the pedestrian mode as a viable and often

preferred travel mode, especially for the ¼ mile, five minute walk.

The T-3 Sub-urban zone defines the urban to rural edge. It is therefore potentially misunderstood. Of all the transect zones, T-3 appears most like conventional sprawl. It has single-family dwellings, a limited mix of uses and housing types, and tends to be more automobile-oriented than T4, T5 or T6. To earn its place as a walkable transect zone, it must be located within the same pedestrian shed as T4, T5 and/or T6. The 5 minute test of walkable distance (¼ mile radius) limits the overall size, of a T-3 transect zone. The T3 zone often defines the edge of the more developed urban condition, so is sometimes called neighborhood edge.

Transect zones, T-4 through T-6, are relatively simple to recognize and assign properly.

Knowing that a particular area is a T-5, Town Center, immediately provides known thoroughfare design elements that are appropriate (and ones that are not). Buildings to the sidewalk with parking on street and behind, for instance, are appropriate in T-5 and T-6. Referring to a set of tables and design recommendations correlated to the transect helps the designer determine how a thoroughfare should function in each transect zone.

To further define the transect zones used throughout the document, the transect zones and their related characteristics are listed in Figure 2 below.

Figure 19-3 Transect Zone Descriptions

(Source SmartCode 9.2)

T1

T-1 NATURAL

T-1 Natural Zone consists of lands approximating or reverting to a wilderness condition, including lands unsuitable for settlement due to topography, hydrology or vegetation.

General Character:	Natural landscape with some agricultural use
Building Placement:	Not applicable
Frontage Types:	Not applicable
Typical Building Height:	Not applicable
Type of Civic Space:	Parks, Greenways

T2

T-2 RURAL

T-2 Rural Zone consists of sparsely settled lands in open or cultivated states. These include woodland, agricultural land, grassland, and irrigable desert. Typical buildings are farmhouses, agricultural buildings, cabins, and villas.

General Character:	Primarily agricultural with woodland & wetland and scattered buildings
Building Placement:	Variable Setbacks
Frontage Types:	Not applicable
Typical Building Height:	1- to 2-Story
Type of Civic Space:	Parks, Greenways

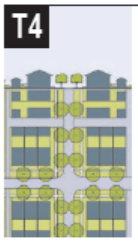
T3

T-3 SUB-URBAN

T-3 Sub-Urban Zone consists of low density residential areas, adjacent to higher zones that some mixed use. Home occupations and outbuildings are allowed. Planting is naturalistic and setbacks are relatively deep. Blocks may be large and the roads irregular to accommodate natural conditions.

General Character:	Lawns, and landscaped yards surrounding detached single-family houses; pedestrians occasionally
Building Placement:	Large and variable front and side yard Setbacks
Frontage Types:	Porches, fences, naturalistic tree planting
Typical Building Height:	1- to 2-Story with some 3-Story
Type of Civic Space:	Parks, Greenways

T4

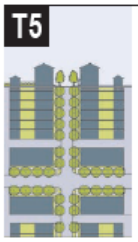


T-4 GENERAL URBAN

T-4 General Urban Zone consists of a mixed use but primarily residential urban fabric. It may have a wide range of building types: single, sideyard, and rowhouses. Setbacks and landscaping are variable. Streets with curbs and sidewalks define medium-sized blocks.

General Character:	Mix of Houses, Townhouses & small Apartment buildings, with scattered Commercial activity; balance between landscape and buildings; presence of pedestrians
Building Placement:	Shallow to medium front and side yard Setbacks
Frontage Types:	Porches, fences, Dooryards
Typical Building Height:	2- to 3-Story with a few taller Mixed Use buildings
Type of Civic Space:	Squares, Greens

T5

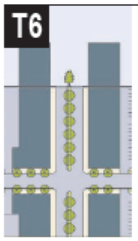


T-5 URBAN CENTER

T-5 Urban Center Zone consists of higher density mixed use building that accommodate etail, offices, rowhouses and apartments. It has a tight network of streets, with wide sidewalks, steady street tree planting and buildings set close to the sidewalks.

General Character:	Shops mixed with Townhouses, larger Apartment houses, Offices, workplace, and Civic buildings; predominantly attached buildings; trees within the public right-of-way; substantial pedestrian activit
Building Placement:	Shallow Setbacks or none; buildings oriented to street defining a street wall
Frontage Types:	Stoops, Shopfronts, Galleries
Typical Building Height:	3- to 5-Story with some variation
Type of Civic Space:	Parks, Plazas and Squares, median landscaping

T6



T-6 URBAN CORE

T-6 Urban Core Zone consists of the highest density and height, with the greatest variety of uses, and civic buildings of regional importance. It may have larger blocks; streets have steady street tree planting and buildings are set close to wide sidewalks. Typically only large towns and cities have an Urban Core Zone.

General Character:	Medium to high-Density Mixed Use buildings, entertainment, Civic and cultural uses. Attached buildings forming a continuous street wall; trees within the public right-of-way; highest pedestrian and transit activity
Building Placement:	Shallow Setbacks or none; buildings oriented to street, defining a street wall
Frontage Types:	Stoops, Dooryards, Forecourts, Shopfronts, Galleries, and Arcades
Typical Building Height:	4-plus Story with a few shorter buildings
Type of Civic Space:	Parks, Plazas and Squares; median landscaping

D DEFINITIONS

- **Allee** - A walkway, path or street lined with trees or tall shrubs.

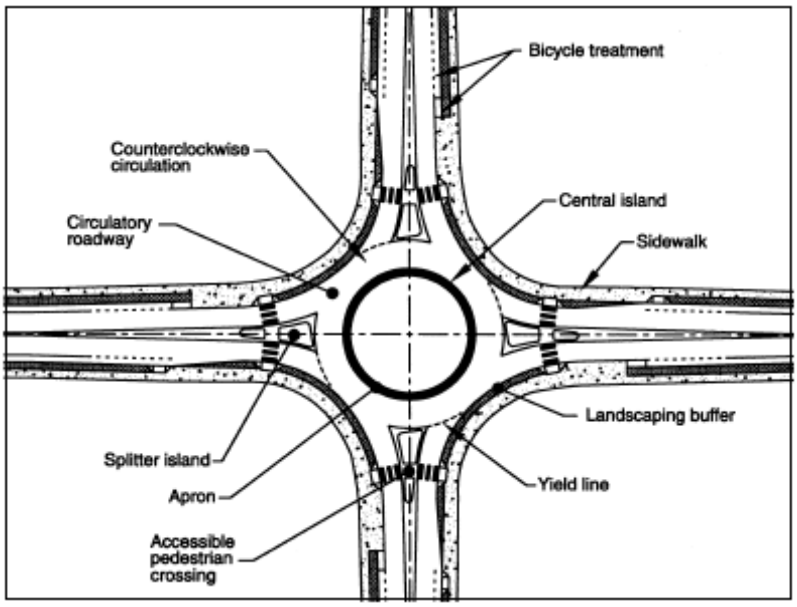
Allee, Davis, CA
(Source: Billy Hattaway)

- **Alley** - a narrow street, especially one through the middle of a block giving access to the rear of lots or buildings.
- **Avenue** (AV) – an avenue is a thoroughfare of high vehicular capacity and low to moderate speed, acting as a short distance connector between urban centers, and usually equipped with a landscaped median.

  It is important to note that many municipalities use the terms, “avenue” and “street” in combination with the thoroughfare name as a way to differentiate streets running north and south from those running east and west. (e.g. 1st Street, 1st Avenue). These are street names, however, not to be confused with thoroughfare types.
- **Boulevard** – a boulevard is a thoroughfare designed for high vehicular capacity and moderate speed, traversing an urbanized area. Boulevards are usually equipped with slip roads buffering sidewalks and buildings.
- **Context** – the financial, environmental, historical, cultural, land use types, activities and built environment which help to establish the configuration of thoroughfares.
- **Context sensitive solutions** (CSS) - a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total

context within which a transportation improvement project will exist.

- **Design speed** - A selected rate of travel used to determine the various geometric features of the roadway.
- **Drive -** A drive is located along the boundary between an urbanized and a natural condition, usually along a waterfront or park. One side has the urban character of a thoroughfare, with sidewalk and buildings, while the other has the qualities of a road or parkway, with naturalistic planting and rural details.
- **Human scale** - describes buildings, block structure and other aspects of the built environment which are designed in consideration for pedestrians and bicyclists, their rate of travel and other physical needs
- **Liner building** - a building specifically designed to mask a parking lot or a parking garage from the frontage.
- **Live-work** - a dwelling unit that contains a commercial component in the unit.
- **Mixed use development** - the practice of allowing more than one type of use in a building or set of buildings. This can mean some combination of residential, commercial, industrial, office, institutional, or other land uses.
- **Modern roundabout** - a circular intersection with specific design and traffic control features. These features include yield control of all entering traffic, channelized approaches, and appropriate geometric curvature to ensure that travel speeds on the circulatory roadway are typically less than 30 mph.



Modern Roundabout
(Source: FHWA Roundabouts: An Informational Guide)

- **Neighborhood** - an urbanized area at least 40 acres that is primarily residential. A neighborhood shall be based upon a partial or entire standard pedestrian shed.
- **New Urbanism** - a development philosophy based on the principles of traditional neighborhood development designed for the pedestrian, bicyclist and transit, as well as the car; cities and towns should be shaped by physically defined and universally accessible public spaces and community institutions; urban places should be framed by architecture and landscape design that celebrate local history, climate, ecology, and building practice. See the Charter of the New Urbanism for more information. http://www.cnu.org/charter
- **Passage** - a pedestrian connector passing between buildings, providing shortcuts through long blocks and connecting rear parking areas to frontages.
- **Path** - a pedestrian way traversing a park or rural area.
- **Pedestrian shed** - an area, approximately circular, that is centered on a common destination. A pedestrian shed is applied to determine the approximate size of a neighborhood. A standard pedestrian shed is 1/4 mile radius or 1320 feet, about the distance of a five-minute walk at a leisurely pace.

Pedestrian Shed
(Source: Glatting Jackson, Project: Viera)

- **Private frontage** - the privately held area between the right of way line and the building facade.
- **Public frontage** - the area between the curb of the thoroughfare and the right of way line. Elements of the public frontage include the type of curb, sidewalk, planter, street tree and streetlights.
- **Rear alley/Lane** - a vehicular way located to the rear of lots providing access to service areas, parking, and outbuildings and containing utility easements. Rear Lanes may be paved lightly to driveway standards. The streetscape consists of gravel or landscaped edges, has no raised curb, and is drained by percolation.

- **Retail** - premises available for the sale of merchandise and food service.
- **Smart Growth** - an urban planning and transportation theory that concentrates growth in the center of a city to avoid urban sprawl and advocates compact, transit-oriented, walkable, bicycle friendly land use, including mixed use development with a range of housing choices.
- **Road** - a local, slow-movement thoroughfare suitable for more rural transect zones. Roads provide frontage for low-density buildings with a substantial setback. Roads have narrow pavement and open swales drained by percolation, with or without sidewalks. The landscaping may be informal with multiple species arrayed in naturalistic clusters.
- **Setback** - the area of a lot measured from the right of way line to a building facade or elevation.
- **Street** – a local, multi-movement thoroughfare suitable for all urbanized transect zones and all frontages and uses. A street is urban in character, with raised curbs, drainage inlets, wide sidewalks, parallel parking, and trees in individual or continuous planters aligned in an allee. Character may vary somewhat, however, responding to the commercial or residential uses lining the street.

  It is important to note that many municipalities use the terms, “avenue” and “street” in combination with the thoroughfare name as a way to differentiate streets running north and south from those running east and west (e.g. 1st Street, 1st Avenue). These are street names, however, not to be confused with thoroughfare types.
- **Terminated vista** - a building or feature located at the end of a thoroughfare in a position of prominence.

Terminated Vista, Monticello, FL
(Source: Billy Hattaway)

- **Thoroughfare** - a corridor incorporating sidewalks, travel lanes and parking lanes within a right of way.
- **Traditional Neighborhood Development** (TND)- a community unit type structured by a standard Pedestrian Shed oriented towards a common destination consisting of a mixed use center or corridor.
- **Transit-Oriented Development** (TOD)- a regional center development with transit available or proposed. TODs are developments that are moderate to high density, mixed-use, and walkable development designed to facilitate transit and accommodate multiple modes of transportation. TODs generally encompass a radius of ¼ or ½ miles of a transit station, a distance most pedestrians are willing to walk. It incorporates features such as interconnected street networks, bicycle and pedestrian facilities, and street-oriented site design, to encourage transit ridership. This form of development optimizes use of the transit network and maximizes pedestrian accessibility. Successful TOD provides a mix of land uses and densities that create a convenient, interesting and vibrant community.
- **Town center** - the mixed-use center or main commercial corridor of a community. A Town Center in a hamlet or small TND may consist of little more than a meeting hall, corner store, and main civic space.
- **Transect** - a system of ordering human habitats in a range from the most natural to the most urban. The SmartCode is based upon six Transect Zones which describe the physical character of place at any scale, according to the density and intensity of land use and urbanism.
- **Transect Zone (T-Zone)** - Transect Zones are administratively similar to the land use zones in conventional codes, except that in addition to the usual building use, density, height, and setback requirements, other elements of the intended habitat are integrated, including those of the private lot and building and the adjacent public streetscape. The elements are determined by their location on the Transect scale. The T-Zones are: T1 Natural, T2 Rural, T3 Sub-Urban, T4 General Urban, T5 Urban Center, and T6 Urban Core.
- **Yield street -** a thoroughfare that has two-way traffic but only one effective travel lane because of parked cars, necessitating slow movement and driver negotiation.

E LAND USE

In addition to its importance in calculating trip generation, ITE recognizes land use as fundamental to establishing context, design criteria, cross-section elements, and right of way allocation. The pedestrian travel generated by the land uses also is important to the design process for various facilities.

Land use considerations for TNDs are outlined in the Planning Criteria section and are applied at a variety of scales. A well-integrated or “fine grained” land use mix within buildings and blocks is essential. These buildings and blocks aggregate into neighborhoods, which should be designed with a mix of uses to form a comprehensive planning unit that aggregates into larger villages, towns, and regions. Except at the regional scale, each of these scales requires land uses to be designed at a pedestrian scale and to be served by “complete streets” that safely and attractively accommodate many modes of travel.

The proposed land uses, residential densities, building size and placement, proposed parking (on-street and off-street) and circulation, the location and use of open space, and the development phasing are all considerations in facility design for TNDs. ITE recommends a high level of connectivity, short blocks that provide many choices of routes to destinations, and a fine-grained urban land use and lot pattern. Higher residential density and nonresidential intensity, as measured by floor area ratios of building area to site area, are required for well-designed TNDs.

F NETWORKS

Urban network types are frequently characterized as either traditional or conventional. Traditional networks are typically characterized by a relatively non-hierarchical pattern of short blocks and straight streets with a high density of intersections that support all modes of travel in a balanced fashion.

Paris **Savannah, GA**

Traditional Network

(Source: Great Streets – Alan Jacobs)

The typical conventional street network, in contrast, often includes a framework of widely-spaced arterial roads with limited connectivity provided by a system of large blocks, curving streets and a branching hierarchical pattern, often terminating in cul-de-sacs.

Irvine, CA

Conventional Network

(Source: Great Streets – Alan Jacobs)

Traditional and conventional networks differ in three easily measurable respects: (1) block size, (2) degree of connectivity and (3) degree of curvature. While the last does not significantly impact network performance, block size and connectivity create very different performance characteristics.

Advantages of traditional networks include:

- Distribution of traffic over a network of streets, reducing the need to widen roads;
- A highly interconnected network providing a choice of multiple routes for travel for all modes, including emergency services;
- More direct routes between origin and destination points, which generate fewer vehicle miles of travel (VMT) than conventional suburban networks;
- Smaller block sizes in a network that is highly supportive to pedestrian, bicycle and transit modes of travel;
- A block structure that provides greater flexibility for land use to evolve over time.

It is important in TND networks to have a highly interconnected network of streets with smaller block sizes than in conventional networks. There are several ways to ensure that these goals are achieved. Two of those methods are illustrated here.

One method is based on the physical dimensions used to layout streets and blocks. The following list identifies those parameters:

- Limit block size to an average perimeter of approximately 1,320 feet.
- Encourage average intersection spacing for local streets to be 300-400 feet.
- Limits maximum intersection spacing for local streets to about 600 feet.
- Limits maximum spacing between pedestrian/bicycle connections to about 300 feet (that is, it creates mid-block paths and pedestrian shortcuts).

The Connectivity Index (Reid Ewing, 1996) can be used to quantify how well a roadway network connects destinations. Links are the segments between intersections and intersections are considered to be nodes. Cul-de-sac heads are treated as a node. A higher index means that travelers have increased route choice, providing more connections available for travel between any two locations. The Connectivity Index is calculated by dividing the number of links by the number of nodes. A score of 1.4 is the minimum needed for a walkable community.

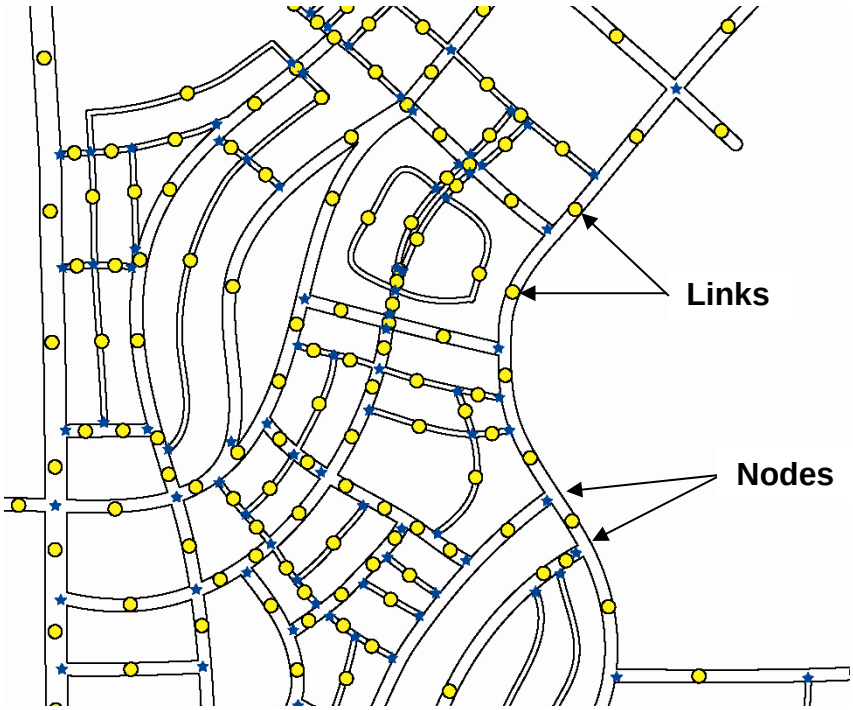
An example illustration on how to calculate a Connectivity Index is included below:

To establish a Connectivity Index, using a map of the network under consideration, first

establish the area to be evaluated. Identify and count the number of intersections, cul-de-sacs and street segments between intersections/cul-de-sacs within the study area.

The Starkey Ranch project, a portion of which is shown below, illustrates the identification of nodes and links. For the entire community, there were a total of 242 road segments, or links, and 146 intersections/cul-de-sacs or nodes identified. The calculation for this community yielded a Connectivity Index of 1.66, which is greater than 1.4, therefore, based on the Connectifity Index, the Starkey Ranch should be considered walkable.

Connectivity Index = 242 Links/146 Nodes = 1.66



Connectivity Index, Odessa, FL
(Source: Glatting Jackson Project: Starkey Ranch)

G THOROUGHFARE TYPES

Section C, Highway Function and Classification in Planning Chapter 1 contains the conventional classification system that is commonly accepted to define the function and operational requirements for roadways. These classifications are also used as the primary basis for geometric design criteria.

Traffic volume, trip characteristics, speed and level of service, and other factors in the functional classification system relate to the mobility of motor vehicles, not bicyclists or pedestrians, and do not consider the context or land use of the surrounding environment. This approach, while appropriate for high speed rural and suburban roadways, does not provide designers with guidance on how to design for a Traditional Neighborhood Development or in a context sensitive manner.

The thoroughfare types described here provide mobility for all modes of transportation with a greater focus on the pedestrian. The functional classification system can be generally applied to the thoroughfare types in this chapter. What designers should recognize is the need for greater flexibility in applying design criteria based more heavily on context and the need to create a safe environment for pedestrians, rather than strictly following the conventional application of functional classification in determining geometric criteria.

General Principles

- The thoroughfares are intended for use by vehicular, transit, bicycle, and pedestrian traffic and to provide access to lots and open spaces.
- The thoroughfares consist of vehicular lanes and public frontages. The lanes provide the traffic and parking capacity. Thoroughfares consist of vehicular lanes in a variety of widths for parked and for moving vehicles. The public frontages contribute to the character of the transect zone. They may include swales, sidewalks, curbing, planters, bicycle paths and street trees.
- Thoroughfares should be designed in context with the urban form and desired design speed of the transect zones through which they pass. The public frontages that pass from one transect zone to another should be adjusted accordingly.

The terms for thoroughfare types that are used in Traditional Neighborhood Development include:

RD-Road

A road is a local, slow-movement thoroughfare suitable for more rural transect zones. Roads provide frontage for low-density buildings with a substantial setback. Roads have narrow pavement and open swales drained by percolation, with or without sidewalks. The landscaping may be informal with multiple species arrayed in naturalistic clusters.

Road, Santa Rosa Beach, FL

(Source: Cooper, Robertson & Partners Project: Watercolor, Photo - Billy Hattaway)

Since roads are located in more rural transect zones where larger setbacks are created, on street parking is not provided for. Lot size and driveways should be provided to allow for parking on site and should allow for unobstructed sidewalks to allow for pedestrian activity.

ST-Street

A street is a local, multi-movement thoroughfare suitable for all urbanized transect zones and all frontages and uses. A street is urban in character, with raised curbs, drainage inlets, wide sidewalks, parallel parking, and trees in individual or continuous planters aligned in an allee. Character may vary somewhat, however, responding to the commercial or residential uses lining the street.

It is important to note that many municipalities use the terms, “avenue” and “street” in combination with the thoroughfare name as a way to differentiate streets running north and south from those running east and west. (e.g. 1st Street, 1st Avenue)

Street, Sanford, FL

(Source: Glatting Jackson Project, Photo - Billy Hattaway)

DR-Drive

A drive is located along the boundary between an urbanized and a natural condition, usually along a waterfront or park. One side has the urban character of a thoroughfare, with sidewalk and buildings, while the other has the qualities of a road or parkway, with naturalistic planting and rural details.

Drive, Franklin, TN

(Source: DPZ Project: Westhaven, Photo - Billy Hattaway)

AV-Avenue

An avenue is a thoroughfare of high vehicular capacity and low to moderate speed, acting as a short distance connector between urban centers, and usually equipped with a landscaped median.

It is important to note that many municipalities use the terms, “avenue” and “street” in combination with the thoroughfare name as a way to differentiate streets running north and south from those running east and west. (e.g. 1st Street, 1st Avenue)

Avenue, Albany, NY
(Source: Photo – Dan Burden)

BV-Boulevard

A boulevard is a thoroughfare designed for high vehicular capacity and moderate speed, traversing an urbanized area. Boulevards are usually equipped with side access lanes buffering sidewalks and buildings.

Octavia Boulevard, San Francisco, CA

(Source: Alan Jacobs & Elizabeth McDonald Project, Photo – sfcityscape)

PP-Pedestrian Passage

A pedestrian passage is a narrow connector restricted to pedestrian use and limited vehicular use that passes between buildings or between a building and a public open space. Passages provide shortcuts through long blocks and connect rear parking areas with frontages. In T3, Pedestrian Passages may be unpaved and informally landscaped. In T4, T5 and T6, they should be paved and landscaped and may provide limited vehicular access. When in civic zones, passages should correspond with their context and abutting transect zones.

Pedestrian Passage, Rosemary Beach, FL

(Source: DPZ Project: Rosemary Beach, Photo – Billy Hattaway)

Pedestrian Passage, Franklin, TN

(Source: DPZ Project: Westhaven, Photo – Billy Hattaway)

AL-Alley

An Alley is a narrow vehicular access-way at the rear or side of buildings providing service and parking access, and utility easements. Alleys have no sidewalks, landscaping, or building frontage requirements. They accommodate trucks and dumpsters and may be paved from building face to building face, with drainage by an inverted crown using impervious or pervious pavement. In older residential neighborhoods alleys may be unpaved.

Alley, Franklin, TN

(Source: DPZ Project: Westhaven, Photo – Billy Hattaway)

H DESIGN PRINCIPLES

H.1 Introduction

The principles for designing streets in TND communities are similar in many respects to designing streets for conventional transportation.

- Providing mobility for users
- Creating a safe roadway for users
- Movement of goods
- Providing access to emergency services, transit, waste management , delivery trucks
- Providing access to property
- TND street design principles have a different emphasis in the following manner.
- The basis for selecting criteria and features used in designing TND communities is the transect zone.
- Streets that are created in context with the desired public realm or other contextual elements
- A focus on reducing speed to create a safer and more comfortable environment for pedestrians and bicyclists

This approach to street design with narrow streets and compact intersections requires designers to pay close attention to the operational needs of transit, fire and rescue, waste collection and delivery trucks. For this reason, early coordination with transit, fire and rescue, waste collection and other stakeholder groups is essential.

More regular encroachment of turning vehicles into opposing lanes will occur at intersections. Therefore, frequency of transit service, traffic volumes and the speeds at those intersections must be considered when designing intersections. For fire and rescue, determination of the importance of that corridor for community access should be determined, e.g. primary or secondary access.

When designing features and streets for TND communities in an infill or redevelopment site, designers need to understand that they will have to “do the best they can.” In other words flexibility in the approach to design in what is a constrained environment is required. Creativity and careful attention to safety for pedestrians and bicyclists must be balanced with the operational needs for motor vehicles.

Likewise, designers should recognize that where TND streets transition into CSD streets, the design criteria such as intersection sight distance, use of on street parking, and other features should be evaluated to ensure that safety for users is provided. This is due to the higher speeds on most CSD streets

H.2 Design Process

The design process for TND communities treats streets as an important part of the public realm, which is the totality of spaces used freely on a day-to-day basis by the general public, such as streets, plazas, parks and other public infrastructure. TND balances the mobility of all users, and pays a great deal of attention to the context or transect zone in which the street is located. The process also pays attention to creating a high degree of connectivity and an extensive network of streets.

H.3 Design Speed

The application of design speed for TND communities is philosophically different than for conventional transportation and CSD communities. AASHTO language for design speed recommends that "Every effort should be made to *use as high a design speed as practical.*"

In contrast to this approach, the goal for TND communities is to establish a design speed that creates a safer and more comfortable environment for pedestrians and bicyclists, and is appropriate for the surrounding context. Consequently, if the goal is to have a street posted at 20 mph, designers should use 20 mph as the design speed.

Ideally, street speeds are kept low through the design of the street, narrow lanes, use of on street parking, the creation of enclosure through building and tree placement.

This approach to street design with more narrow streets and intersections requires designers to pay close attention to the operational needs of transit, fire and rescue, waste collection and delivery trucks. For this reason, early coordination with transit, fire and rescue, waste collection and other stakeholder groups is essential.

More regular encroachment of turning vehicles into opposing lanes will occur at intersections. Therefore, frequency of transit service, traffic volumes and the speeds at those intersections must be considered when designing intersections.

For fire and rescue, determination of the importance of that corridor for community access should be determined, e.g. primary or secondary access.

Movement Types

Movement types are used to describe the expected driver experience on a given thoroughfare and the design speed for pedestrian safety and mobility established for each of these movement types. They are also used to establish the components and criteria for design of streets in TND communities.

Yield: Drivers must proceed slowly and with extreme care and must yield in order to pass a parked car or approaching vehicle. This is the functional equivalent of traffic calming. Design speed of less than 20 mph; this type should accommodate bicycle routes through the use of shared lanes.

Slow: Drivers can proceed carefully with an occasional stop to allow a pedestrian to cross or another car to park. Drivers should feel uncomfortable exceeding design speed due to presence of parked cars, enclosure, tight turn radii, and other design elements. Design speed of 20-25 mph; this type should accommodate bicycle routes through the use of shared lanes.

Low: Drivers can expect to travel generally without delay at the design speed; street design supports safe pedestrian movement at the higher design speed. This movement type is appropriate for thoroughfares designed to traverse longer distances or that connect to higher intensity locations. Design speed of 30-35 mph; this type can accommodate bicycle routes.

Design speeds higher than 35 mph should not normally be used in TND communities due to the concerns for pedestrian and bicyclist safety and comfort. There may be locations where planned TND communities border or are divided by existing corridors with posted/design speeds higher than 35 mph. In those locations, coordination with the regulating agency for that corridor should occur with a goal to re-design the corridor to reduce the speed at or below 35 mph. The increase in motorist travel time due to the speed reduction is usually insignificant because TND communities are generally compact.

When the speed reduction cannot be achieved, measures to improve pedestrian safety for those crossing the corridor should be evaluated and installed when appropriate.

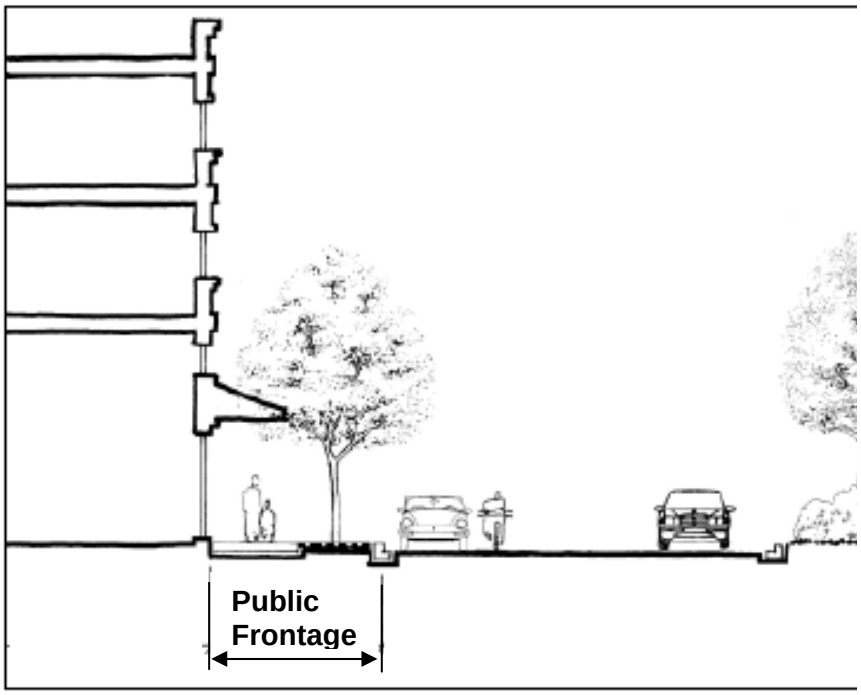
I CROSS SECTION ELEMENTS

I.1 Introduction

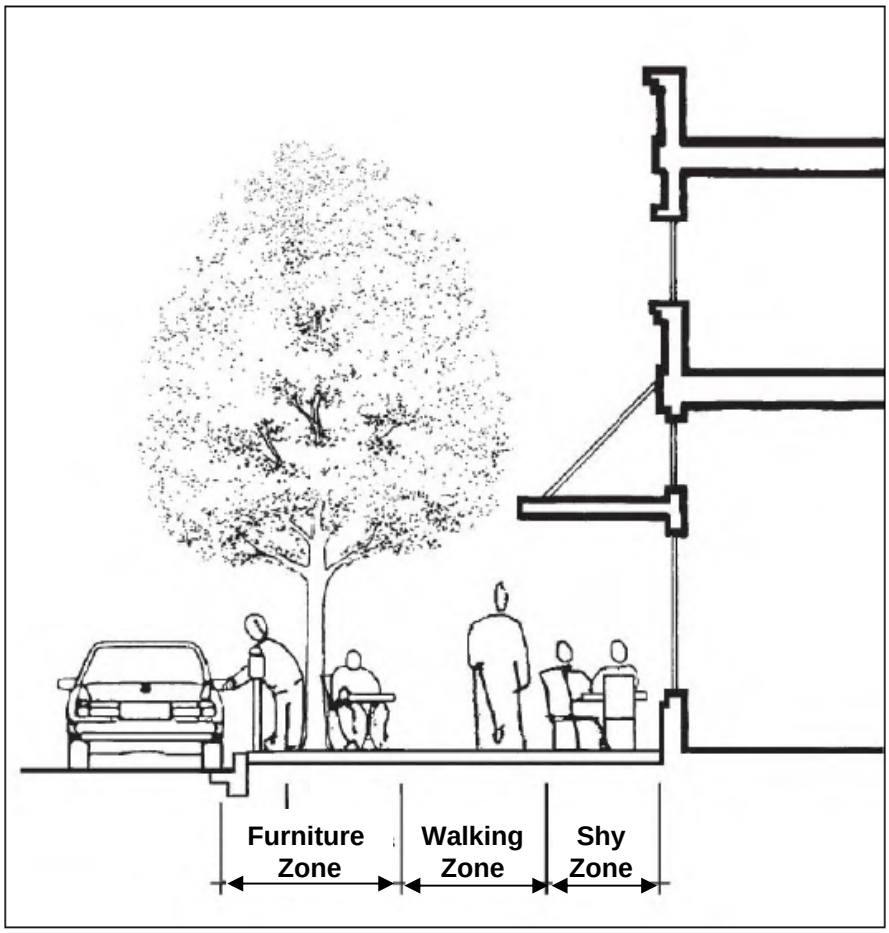
As discussed earlier in the document, TND street design places importance on how the streets are treated since they are part of the public realm. The street portion of the public realm is shaped by the features and cross section elements used in creating the street. For this reason more attention to what features are included; where they are placed and how the cross section elements are assembled is necessary.

I.2 Public Frontage

The area between the face of building or right of way line and the curb face is known as the “public frontage”. This is also commonly referred to as the pedestrian realm because it is the place where pedestrian activity is provided for, including space to walk, socialize, places for street furniture, landscaping, and outdoor cafes.



Public Frontage
(Source: Image - Community, Design + Architecture)



Public Frontage Zones
(Source: Image - Community, Design + Architecture)

I.3 Furniture Zone

The furniture zone can be located adjacent to the building face but more commonly is adjacent to the curb face. The furniture zone contains parking meters, lighting, tree planters, benches, trash receptacles, magazine and newspaper racks and other street furniture. The furniture zone is provided separate from the walking/pedestrian zone to keep the walking area clear for pedestrians to walk without obstruction including proper access to transit stops.

I.4 Walking/Pedestrian Zone

Chapter 8 addresses considerations for pedestrians. It is important to keep in mind that the discussion in Chapter 8 is focused on designing for conventional

development patterns with higher design speeds. That is demonstrated by the discussion about providing separation by keeping sidewalks far away from the travel lanes. This approach is appropriate for higher speed corridors where buildings are set back from the roadway.

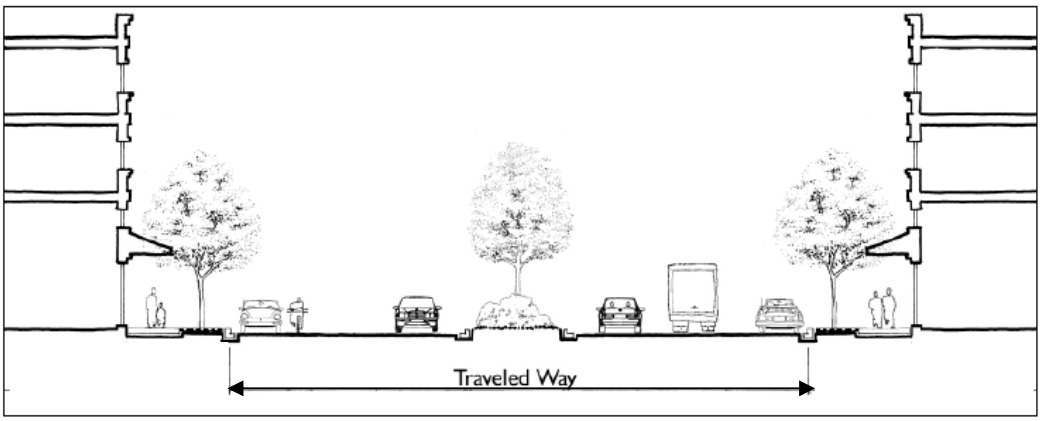
In a properly designed urban environment where buildings are at the back of sidewalk and vehicle speeds are low, the "separation" is typically provided by on street parking which also helps to calm traffic. The appropriate transect zone helps to define the width and location of sidewalks, planting strips and tree wells.

I.5 Shy Zone

The shy zone is the area adjacent to buildings and fences that pedestrians generally "shy" away from. Usually a minimum of one foot is provided as part of the sidewalk width. This space should not be included in the normal walking zone of the sidewalk.

J TRAVELED WAY

The traveled way is the central part of the thoroughfare between the curb faces where vehicle movement and on street parking occurs.



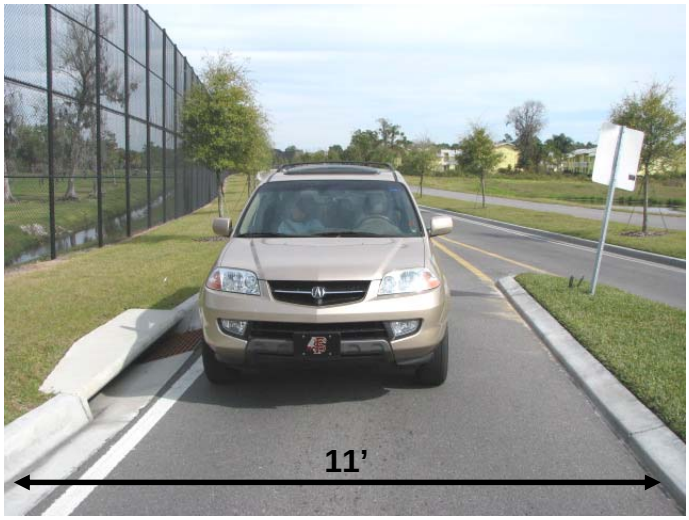
Traveled Way
(Source: Image - Community, Design + Architecture)

J.1 Introduction

Since every community has different equipment in service for transit, waste collection and emergency services, coordination with operators should occur early in the planning process to ensure that those service providers can operate their equipment on the streets. The frequency of access by these vehicles should be considered when setting lane widths. The use of narrower lane widths requires that designers recognize the impacts on turning at intersections and u-turns for multi-lane roads.

J.2 Travel Lanes

Travel lane widths should be provided based on the context and desired speed for the area that the street is located in. The table below shows lane widths and associated speeds that are appropriate. It is important to note that in low speed urban environments, lane widths are typically measured to the curb face instead of the edge of gutter pan. Consequently, when curb sections with gutter pans are used, the vehicle, bike and parking lane all include the width of the gutter pan. A typical measurement is shown below.



Lane Width, Orlando, Florida

(Source: Torti Gallas and Partners Project: Baldwin Park, Photo – Billy Hattaway)

In order for drivers to understand how fast they should drive, lane widths have to create some level of discomfort with driving too fast. The presence of on street parking is important in achieving the speeds shown in the table. When designated bike lanes or multi-lane configurations are used, there is more room for vehicles to operate in, such as buses, but car drivers will feel more comfortable driving faster than desired.

Alleys and narrow roadways that act as shared spaces can have design speeds as low as 10 mph, as noted in CHAPTER 16 – RESIDENTIAL STREET DESIGN.

Table 19-1 Recommended Lane Width

Movement Type	Design Speed	Travel Lane Width
Yield	Less than 20 mph	8 feet
Slow	20-25 mph	9-10 feet
Low	30-35 mph	10-11 feet

J.3 Medians

Medians used in low-speed urban thoroughfares provide for access management, turning traffic, safety, pedestrian refuge, landscaping, lighting and utilities. These medians are usually raised with raised curb.

Landscaped medians can enhance the street they are located within or help to create a gateway entrance into a community. Medians can be used to create tree canopies over travel lanes for multi-lane roadways contributing to a sense of enclosure.

Medians vary in width depending on available right of way and function. Because medians require a wider right of way, the designer must weigh the benefits of a median with the issues of pedestrian crossing distance, speed, context and available roadside width.

Table 19-2 Recommended Median Width

Median Type	Minimum Width	Recommended Width
Median for access control	**4 feet**	**6 feet**
Median for pedestrian refuge	**6 feet**	**8 feet**
Median for trees and lighting	**6 feet [1]**	**10 feet [2]**
Median for single left turn lane	**10 feet [3]**	**14 feet [4]**

Table Notes:
[1] Six feet measured curb face to curb face is generally considered the minimum width for proper growth of small caliper trees (less than 4 inches)
[2] Wider medians provide room for larger caliper trees and more extensive landscaping
[3] A ten foot lane provides for a turn lane without a concrete traffic separator
[4] Fourteen feet provides for a turn lane with a concrete traffic separator

J.4 On Street Parking

On street parking is important in the urban environment, both for the success of those retail businesses that line the street, but also to provide a buffer for the pedestrian and to help calm traffic speeds. When angle parking is proposed for on street parking, designers should consider the use of back in angle parking in lieu of front in angle parking. Back in angle parking has the following advantages:

- Loading and unloading of passengers naturally encourages passenger movement towards the sidewalk.
- Loading and unloading from the trunk or tailgate occurs at the sidewalk.

Back in Angle Parking, Columbus, OH
(Source: Photo - Dan Burden)

- When the vehicle leaves, the driver has a better view of oncoming traffic, therefore reducing the risk of crashes.

Back in Angle Parking, Seattle, WA
(Source: Photo - Dan Burden)

When designated bike lanes are needed in conjunction with on street parking, designers should consider increasing the bike lane to 6 feet in lieu of increasing parallel parking width from 7 to 8 feet. This helps encourage vehicles to park closer to the curb, and provides more room for door swing, potentially reducing conflict with cyclists.

Since roads are located in more rural transect zones where larger setbacks are created, on street parking is not provided for. Lot size and driveways should be provided to allow for parking on site and should provide unobstructed sidewalks to allow for pedestrian activity.

Table 19-3 Parking Lane Width

Movement Type	Design Speed	Parking Lane Width
Yield	Less than 20 mph	(Parallel) 7 feet
Yield	Less than 20 mph	(Angle) 17-18 feet
Slow	20-25 mph	(Parallel) 7 feet
Low	30-35 mph	(Parallel) 7-8 feet

J.5 Mid-Block Crossings

Properly designed TND communities will not normally require mid-block crossings due to the use of shorter block size. When mid-block crossings are necessary, the use of curb extensions or bulbouts should be considered to reduce the crossing distance for pedestrians.

Mid-Block Crossing, Sanford, FL
(Source: Glatting Jackson project, Photo - Billy Hattaway)

J.6 Access Management

The philosophy of short block lengths in TND communities is intended to reduce travel speeds, increase access to property, and improve circulation for all users. This is in contrast to the use of access management in CSD which has the goal of keeping vehicles moving at higher speeds.

Since parking is usually located within blocks in mixed use blocks and in alleys in residential neighborhoods, access along streets is provided primarily through side streets and alleys. This greatly reduces driveway access along corridors, improving safety for bicyclists, pedestrians and vehicles due to the reduction in conflict points.

J.7 Design Vehicles

There is a need to understand that street design with narrow streets and compact intersections requires designers to pay close attention to the operational needs of transit, fire and rescue, waste collection and delivery trucks. For this reason, early coordination with transit, fire and rescue, waste collection and other stakeholder groups is essential.

More regular encroachment of turning vehicles into opposing lanes will occur at intersections. Therefore, frequency of transit service, traffic volumes and the speeds at those intersections must be considered when designing intersections. For fire and rescue, determination of the importance of that street for community access should be determined, e.g. primary or secondary access.

The designer should use turning templates or current software to evaluate intersections to ensure adequate operation of vehicles can occur. Treatment of on street parking around intersections should be evaluated during this analysis to identify potential conflicts between turning vehicles and on street parking.

J.8 Bike Facilities

Chapter 9 of this document contains information on Bicycle Facilities. Much of that information is appropriate so the information contained in this section is directed to designing bike facilities in TND communities. Designing for bicycles on thoroughfares in TND communities should be as follows: Bicycles and vehicles should share lanes on thoroughfares with design speeds of twenty five mph or less. It is important to recognize that the addition of bike lanes does increase roadway widths and can increase the tendency for drivers to speed.

When bicycle lanes are used in TND communities, they should be a minimum of 5 feet wide and designated as bike lanes. On curb and gutter roadways, a 4' width measured from the lip of the gutter is required. The gutter width should not be considered as part of the rideable surface area, but this width provides useable clearance to the curb face. Drainage inlets, grates and utility covers are potential problems to bicyclists. When a roadway is designed, all such grates and covers should be kept out of the bicyclists' expected path. If drainage grates are located in the expected path of bicyclists, they should be bicycle safe grates.

Where parking is present, the bike lane should be placed between the parking lane and the travel lane and have a minimum width of 5 feet. Designers should consider increasing the bike lane to 6 feet in lieu of increasing parallel parking width from 7 to 8 feet. This helps encourage vehicles to park closer to the curb, and provides more room for door swing, potentially reducing conflict with cyclists.

Shared-lane markings or "sharrows" can be used instead of bike lanes adjacent to on-street parking. The sharrow avoids placing cyclists in the "door zone" and does not affect lane width or ROW width for the thoroughfare, which also aids in speed management. Guidance for use of the sharrow is attached from the draft MUTCD. Following is a photograph of a sharrow with cyclists sharing the lane.

Sharrow, Vancouver, BC
(Source: Photo – Billy Hattaway)

Greenways, waterfront walks, and other civic spaces should include multi-use or bicycle paths and bicycle storage or parking. Bicycle storage or parking should also be included in areas near transit facilities to maximize connectivity between the modes.

J.9 Transit

See "Accessing Transit, Design Handbook for Florida Bus Passenger Facilities, 2008" for information.

http://www.dot.state.fl.us/transit/Pages/2008_Transit_Handbook.pdf

K INTERSECTIONS

K.1 Introduction

The proper design of intersections is very important to the safety of all users. Research reveals that intersections are disproportionately responsible for crashes and injuries, especially for pedestrians. This is due to the number of conflict points that occur.

The goal should be to keep intersections compact to keep vehicle speeds down, and reduce pedestrian crossing distance. The benefits of compact intersections are reduced exposure of pedestrians to vehicles and shorter cycle times for the pedestrian phase of signals.

The TND approach to street design with more narrow streets and compact intersections requires designers to pay close attention to the operational needs of transit, fire and rescue, waste collection and delivery trucks. For this reason, early coordination with transit, fire and rescue, waste collection and other stakeholder groups is essential.

More regular encroachment of turning vehicles into opposing lanes will occur at intersections. Therefore, frequency of transit service, traffic volumes and the speeds at those intersections must be considered when designing intersections. For fire and rescue, determination of the importance of that corridor for community access should be determined, e.g. primary or secondary access.

K.2 Sight Distance

Sight distance should be calculated in accordance with Chapter 3, Section C.9.b, of the Greenbook using the design speeds appropriate for the street being evaluated. When executing a crossing or turning maneuver after stopping at a stop sign, stop bar, or crosswalk as required in Section 316.123, Florida Statutes, it is assumed that the vehicle will move slowly forward to obtain sight distance (without intruding while recognizing that the guidance recognizes that a two step

movement is into the crossing travel lane) stopping a second time as necessary.

Therefore, when curb extensions are used or on street parking is in place, the vehicle can be assumed to move forward on the second step movement, stopping just shy of the travel lane, increasing the driver's potential to see further than when stopped at the stop bar. As, a result the increased sight distance provided by the two step movement allows parking to be located closer to the intersection.

K.3 Curb Return Radii

Curb return radii should be kept small to keep intersections compact. The use of on street parking and/or bike lanes increases the effective size of the curb radii, further improving the ability of design vehicles to negotiate turns without running over the curb return.

Table 19-4 Curb Return Radii

Movement Type	Design Speed	Curb Radius w/Parallel Parking
Yield	Less than 20 mph	5-10 feet
Slow	20-25 mph	10-15 feet
Low	30-35 mph	15-20 feet

*Dimensions with parking on each leg of the intersection. Both tangent sections adjacent to the curb return must be parked or else curb radii must be evaluated using "design vehicle" and AutoTurn or turning templates.

K.4 Turn Lanes

The need for turn lanes for vehicle mobility should be balanced with the need to manage vehicle speeds and the potential impact on the public frontage such as sidewalk width. Turn lanes tend to allow higher speeds to occur through intersections, since turning vehicles can move over and slow in the turn lane, allowing the through vehicles to maintain their speed.

Left turn lanes are considered to be acceptable in an urban environment since there are negative impacts to roadway capacity when left turns block the through movement of vehicles. The installation of a left turn lane can be beneficial when used to perform a road diet such as reducing a four lane section to three lanes with the center lane providing for turning movements. In urban places, no more than one left turn lane should be provided.

Right turns from through lanes do not block through movements, but do create a

reduction in speed due to the slowing of turning vehicles, so right turn lanes are used to maintain speed through intersections and to reduce the potential for rear end crashes. However, the installation of turn lanes increases the crossing distance for pedestrians and the speed of vehicles, therefore the use of exclusive right turn lanes are rarely used except at "T" intersections.

K.5 Crosswalks

See Chapter 8 for information on crosswalks.

K.6 Curb Extensions

Curb extensions are may be helpful tools for reducing the crossing distance for pedestrians, providing a location for transit stops, managing the location of parking, providing unobstructed access to fire and rescue, increasing space for landscaping and street furniture.

Designers should recognize coordinate with public works staff to ensure that street cleaning can be achieved with their equipment, and provide adequate drainage to avoid ponding at curb extensions.

L REFERENCES

The following is a list of the publications used in the preparation of this chapter or which may be helpful to use in designing Traditional Neighborhood Communities and understanding the flexibility in AASHTO design criteria:

- Draft ITE Recommended Practice: Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities, 2006 http://www.ite.org/css/
- SmartCode 9.2 http://www.smartcodecentral.org/
- A Guide for Achieving Flexibility in Highway Design, AASHTO, May, 2004
- Accessing Transit, Design Handbook for Florida Bus Passenger Facilities, 2008, FDOT Public Transit Office

  http://www.dot.state.fl.us/transit/Pages/2008_Transit_Handbook.pdf
- Safe Routes to Schools Program, FDOT Safety Office http://www.srtsfl.org/