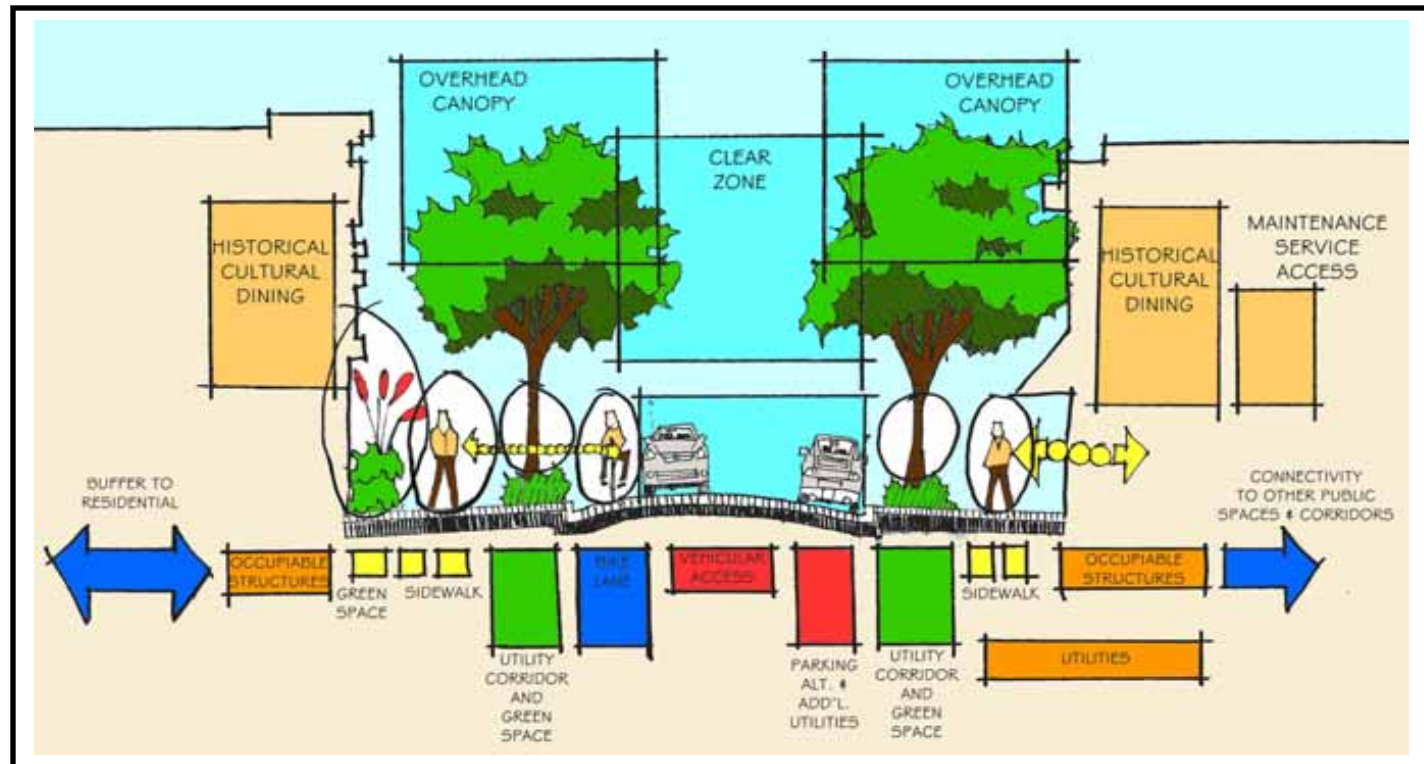


Livable Roadways Guidelines



August 1, 2006

HILLSBOROUGH COUNTY METROPOLITAN PLANNING ORGANIZATION

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Background

This document is an update and consolidation of two documents: *Livable Roadways: Proposals for Roadway Appearance and Function* and *Guidelines for Landscaping Hillsborough County Roadways*. In the late 1980's the Planning Commission included policies and guidelines for establishing and protecting a system of scenic corridors in the comprehensive plans for Hillsborough County and the City of Tampa. In response to this framework the Tampa Urban Area Metropolitan Planning Organization, currently the Hillsborough County MPO, included the landscaping and improvement of roadways as one of its ten strategic goals. In 1989, the MPO established a Livable Roadways Committee, to propose ways to improve roadway appearance and function.

The MPO Livable Roadways Committee partnered with the Planning Commission in the creation of *Livable Roadways: Proposals for Roadway Appearance and Function*, which was completed in 1990. It established the need for change in the thinking about roadways. The document emphasized roadways as an expression and function of quality of life, the need for improved facilities for bicyclists and pedestrians, the need to improve the appearance of auto-oriented commercial corridors, and the need to better landscape and maintain public rights-of-way.

Subsequent to the development of *Livable Roadways*, the Planning Commission organized the Hillsborough County Livable Roadways Task Force to develop *Guidelines for Landscaping Hillsborough County Roadways*. These were completed in 1992 and included specific details on how to incorporate landscape into the public right-of-way.

Both *Livable Roadways: Proposals for Roadway Appearance and Function* and *Guidelines for Landscaping Hillsborough County Roadways* are currently adopted by reference in the Hillsborough County Comprehensive Plan. The *Guidelines for Landscaping* are also referred

to in the Hillsborough County Land Development Code. Given the many changes to regulations and design standards that have taken place subsequent to their original publication, there was a need to improve and update these documents.

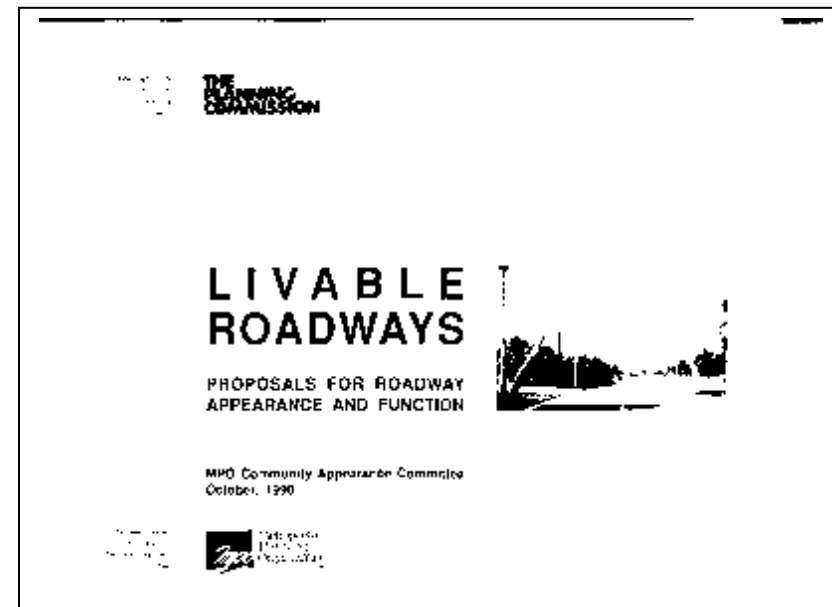


Figure 1.1: Original Livable Roadways document cover

Purpose

The purpose of this document is to provide guidance on features and variables that contribute toward enhancing the experience of people using various transportation modes typically within the roadway corridor. It is the intention of this document to set forth guidelines consistent with local codes and ordinances. However, codes and design standards sometimes conflict. This document highlights best practices and attempts to resolve some of those conflicts. The intent of this document is to inspire a new approach to roadway design, emphasizing that our communities' streets are significant public spaces for all modes of transportation; embracing the concept of moving people, not just cars, to enhance the 'livability' of roadways throughout Hillsborough County.

It is the intent of these guidelines to add flexibility and context sensitivity to the roadway design process by:

- Creating a more appropriate balance among all modes of transportation
- Increasing the perceived level of safety of roadway users and functionality of roadways
- Accounting for differences in roadway types and adjacent land use conditions
- Providing guidelines and standards that are sensitive to the economics, aesthetics, safety and environmental impacts of roadways

Need

Roadway design and implementation must address a variety of factors, including the desired overall character of the roadway, the “balancing” of the road right-of-way to accommodate users equitably, and the use of design elements in a context that adequately supports and connects adjacent land uses. Roadway design throughout Florida has focused on safe and efficient travel for motorists.

Factors such as visual quality of the roadway environment and use of the right-of-way for non-motorized and public forms of travel have not received as much attention. This has resulted in a network of roads throughout Hillsborough County with inadequate functional amenities for multi-modal transportation. A fundamental rebalancing of the roadways in Hillsborough County will improve overall circulation of users traveling by a diversity of means.

The visual character of a community's major roads has a strong impact on the perceived character of the entire community. Throughout Hillsborough County, strip commercial development has eroded community character, and in older areas has created blight and deterioration. There is a need for guidance that promotes cohesive redevelopment in these areas. In part, this document addresses this need by providing guidelines for community, site and building design.

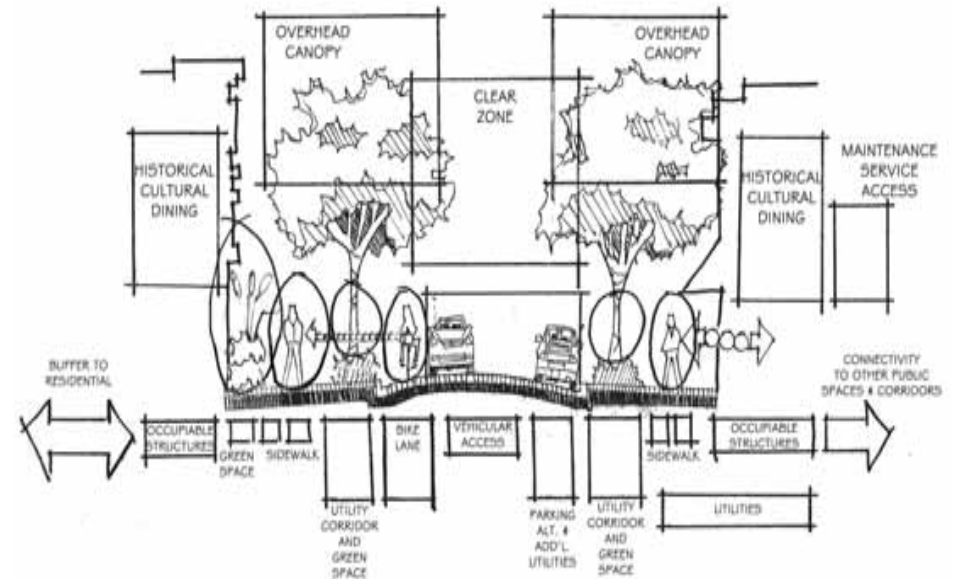


Figure 1.2: Conceptual balanced roadway

Areas of Applicability

The creation and establishment of *Livable Roadways* involves the integration of transportation and safety functions of all modes of transportation with aesthetic considerations. It promotes user-friendly facilities for pedestrians, bicycles, and transit patrons. It emphasizes the use of landscaped medians and rights-of-way for non-vehicular modes of travel. It considers the impact of roadway construction on the surrounding communities and environmental areas, and seeks to provide solutions that contribute to the overall livability of adjacent neighborhoods and the community at large. The principles outlined here should apply to all publicly designed and built roadways, as well as collectors and arterials provided as parts of private developments. In addition, the principles should also be used as a guide when undertaking roadway widening, resurfacing, enhancement and maintenance projects as well as construction of pedestrian, bicycle and transit facilities. Guidelines are recommendations advocated by the MPO in the effort to identify principles of successful *Livable Roadways*.

Throughout this document, a guideline may be referred to as a “**KEY CONCEPT**.” Guidelines designated in this manner are recommendations that are fundamental toward achieving more *Livable Roadways*. Guidelines that are not designated as such are best practices that might be practicable in a given situation.

The guidelines address two distinct areas: public rights-of-way, and land development. *Chapter 2: Livable Roadways and the Public Rights-of-Way* provides guidance for a comprehensive approach to the design elements of public rights-of-way: pedestrian uses and amenities, street furnishings, bicycle facilities, transit facilities, traffic calming, parking, landscaping as well as street design types.

Recognizing that the visual character and livability of spaces is not limited to the design of the public rights-of-way, this document is written to address issues of land development adjacent to rights-of-way. *Chapter 3: Livable Roadways and Land Development* provides guidance on land development issues that affect street function and appearance. Issues that may confront developers, or agencies reviewing development applications, are largely covered within this chapter.

Areas of Applicability (Continued)

This document is designed to address the conditions of developed and developing urban and suburban areas. Guidelines and standards for roadway design should be sensitive to differences in development patterns and demographics. However, these guidelines are designed to apply to the Urban Service Area as defined in the Hillsborough County Comprehensive Plan unless otherwise noted.

While some of the guidelines included in this document are appropriate for rural areas outside of the Urban Service Area, the roadway facilities that serve them have needs that are unique from urban and suburban areas. Specific guidance on designing roadways in rural areas is included in Chapter 2 Section 2.6 Roadway Design Types.

*Figure 1.3:
The Urban
Service Area
includes
activity
centers*



*Figure 1.4:
Suburban
densities are
appropriate
in the Urban
Service Area*



Areas of Applicability (Continued)

In addition to the distinction between areas inside and outside the Urban Service Area, two supplementary designations are made in this document concerning particular types of roadways in urban areas that may require special considerations within the guidelines. They are as follows:

Main Streets are meant to have a safe, functional and attractive pedestrian-oriented environment while balancing the needs of vehicle users.

Signature Corridors are four to six lane roadways that move high volumes of traffic, but need to provide a safe environment for pedestrians, a high aesthetic quality and a flexible pattern of development. These corridors serve to uniquely identify and define the areas they are placed within, providing economic development and neighborhood center functions.

All standards set forth by this document pertain to Main Streets and Signature Corridors unless specifically stated. This document does not designate which of the roadways in Hillsborough County should fall into one of these categories. The standards should be employed as needed and desired.

*Figure 1.5:
Retail land
use with an
outdoor
Café along a
Main Street*



*Figure 1.6:
This 4-lane
divided
roadway is
an example
of a
Signature
Corridor*



Livable Roadways Questionnaire

The Hillsborough County Metropolitan Planning Organization is in the process of developing new Livable Roadways Guidelines. In an effort to better understand public preferences on Livable Roadways issues, a questionnaire was developed and distributed with the Winter 2006 edition of *The Mobility Focus* and *Bike Ped NEWS*, the MPO's quarterly newsletters. The circulation of *The Mobility Focus* is over 2000. A summary of the results follows, documenting the 26 responses. Here are some observations on the results:

- Many respondents could not come up with a livable roadway in Hillsborough County or do not believe our roads are living up to the ideal;
- There were many more examples given of the least livable roadways in Hillsborough than the most livable roadways;
- The most common suggested remedies to the identified least livable roadways were the addition of sidewalks, safe crosswalks and traffic calming;
- Many of the respondents indicated congestion made roadways unlivable;
- All of the respondents thought people drive too fast;
- Almost all of the respondents thought that bicycle and pedestrian safety is a big problem here, and most of them said they would walk and bicycle more if the roadways were more livable;
- Most of the respondents thought attractive roadways are important to the community, and over half thought our major roads were "ugly";
- About half of the respondents said they would take the bus to work if it were more accessible.

The Winter 2006 newsletter in which the questionnaire was published included a cover story on ADA accessibility and the following livable roadways article:

Your MPO Livable Roadways Committee is currently updating Hillsborough's Livable Roadways Guidelines. The guidelines show best practices for designing pleasant, safe, and functional highways and by-ways. Other goals include promoting economic growth and enhanced aesthetics; minimizing impact on the environment; and addressing how roads relate to each other and the homes, businesses and other land uses that surround them. How many times have been driving or walking on a major road in the heat of the summer and wondered why there aren't any shade trees? Or noticed a sidewalk that abruptly ends or runs into a utility pole? Or visited other communities that have a pleasant "Main Street" with shops and restaurants, and wondered where ours are? Please give us your thoughts by returning the brief survey card on the back cover of this newsletter. Your opinion on livable roadways counts.



The questionnaire was structured as follows:

What do you think? Please fill in the blanks or circle the responses below that best reflect your views on Livable Roadways (see article on page 3), and fax to 813/301-7172. Or respond via business reply mail by folding the page in half and taping the edges so this survey is on the inside. Drop it in the mail – no postage required. Thank you!

1. Would you like more information about the Livable Roadways Committee? If so, please supply your email address:

2. List some good examples of the most livable major roads in Hillsborough County.

3. List some examples of the least livable major roads in Hillsborough County.

4. What would fix the least livable roadways or is most needed to improve the roadways listed in number 3 above?

5. What features are most important in a livable roadway?

	Not Important <----->Very Important				
Complete sidewalk network	1	2	3	4	5
Safe crosswalks at intersections	1	2	3	4	5
ADA accessibility	1	2	3	4	5
Comfortable bus stops	1	2	3	4	5
Well lit streets	1	2	3	4	5
Bike lanes	1	2	3	4	5
Attractive landscaping	1	2	3	4	5
Directional signage	1	2	3	4	5
Shade trees	1	2	3	4	5
Traffic calming design	1	2	3	4	5

6. Write yes, maybe, no, or don't know next to each statement:

_____ Attractive roadways are important to my community.

_____ People drive too fast.

_____ Roads are built for vehicles, not people.

_____ Our major roadways are ugly.

_____ Bicycle and pedestrian safety is a big problem here.

_____ I would walk more if our roadways were more livable.

_____ I'd bike more often if I felt safer on the roadways.

_____ Roads should be functional, who cares what they look like.

_____ I would take the bus to work if it were more accessible.

Livable Roadways in Hillsborough County

Respondents were asked to list what they thought were the least livable and most livable major roadways. The **most livable roadways** (including the number of times the particular road was mentioned) identified were:

- Bayshore Boulevard (2)
- Veterans Expressway (2)
- Hillsborough Avenue (2)
- Countryway Boulevard in Westchase (2)
- Sheldon Road (2)
- Sun Coast Parkway
- Channelside Drive
- Busch Boulevard
- Himes Avenue
- S. Dale Mabry
- Orange Grove in Carrollwood
- Bruce B. Downs
- Westchase Community
- Kennedy Boulevard
- Kings Avenue south of SR 60



Other comments about the most livable roadways:

- Not sure
- Don't know of any
- I haven't found one
- I can't think of a single one
- There are none that I travel on
- None that I know of, most major roads are ugly
- There are no livable roads left in Florida



The **least livable roadways** (including the number of times the road was mentioned) identified were:

- Dale Mabry (7)
- Nebraska Avenue (5)
- Florida Avenue (3)
- SR 60 (3)
- US 41 (3)
- I-75 (2)
- Hillsborough Avenue (2)
- Busch Boulevard (2)
- I-4 (2)
- Bruce B. Downs (2)
- SR 39 (2)
- Causeway Boulevard
- State Route 674
- 33rd near 674
- Gunn Highway
- Veterans Expressway
- US 301
- 78th Street South
- Progress Boulevard
- Kennedy from Westshore to Downtown
- N. Orleans
- Rome Avenue
- N. Boulevard
- Sligh Avenue
- Lowry Park area
- Kirby Street and Patterson Street
- Crawley Road
- Tarpon Road
- Race Track Road
- Waters Avenue
- Trapnell Road



- Bearss Avenue
- Henderson Road
- MLK east of 22nd
- 22nd Street
- 15th Street
- 124th Avenue
- Fletcher Avenue
- 30th Street
- Hutchinson Road
- North Mobley Road

Other comments about the most livable roadways:

- Not sure

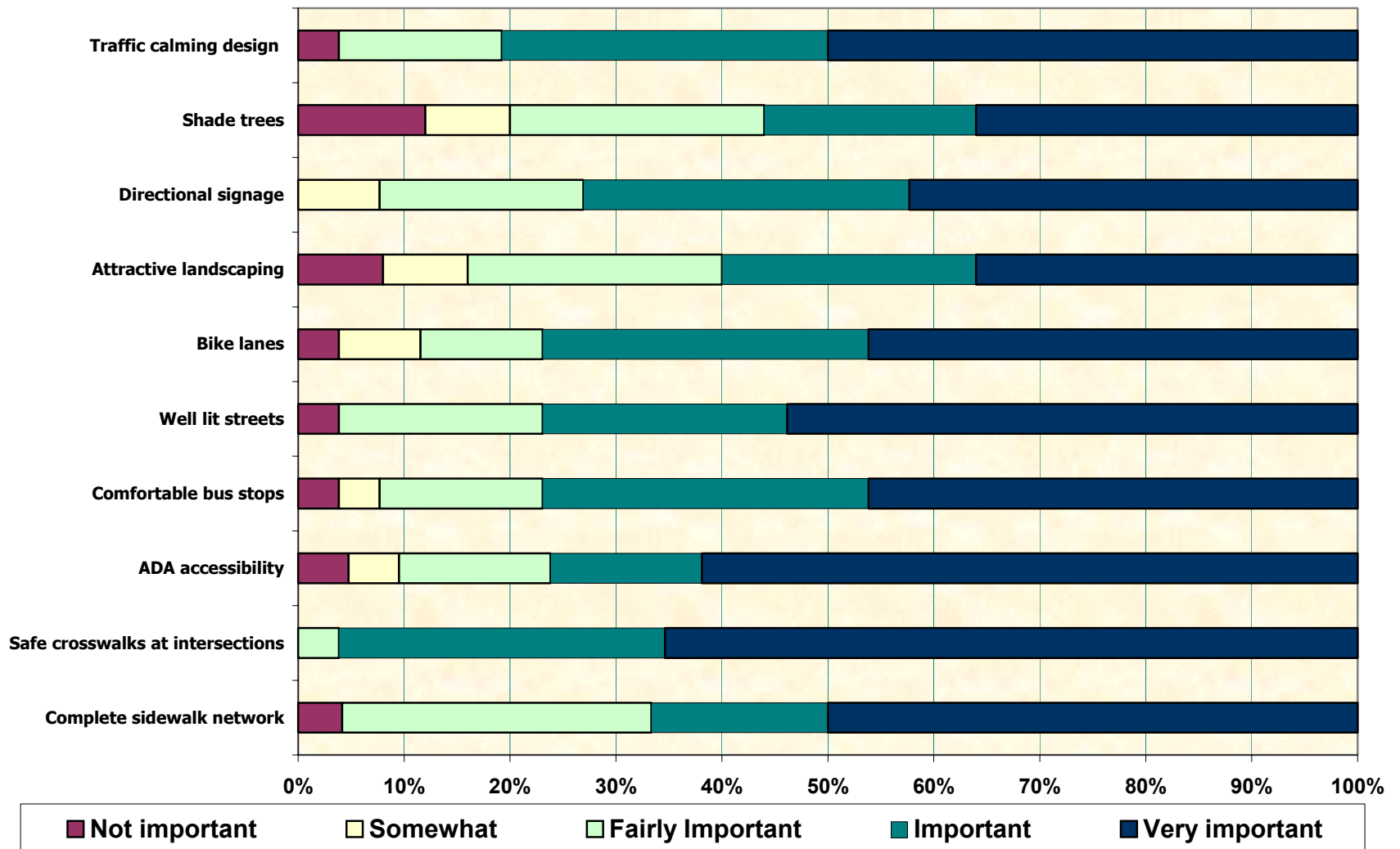


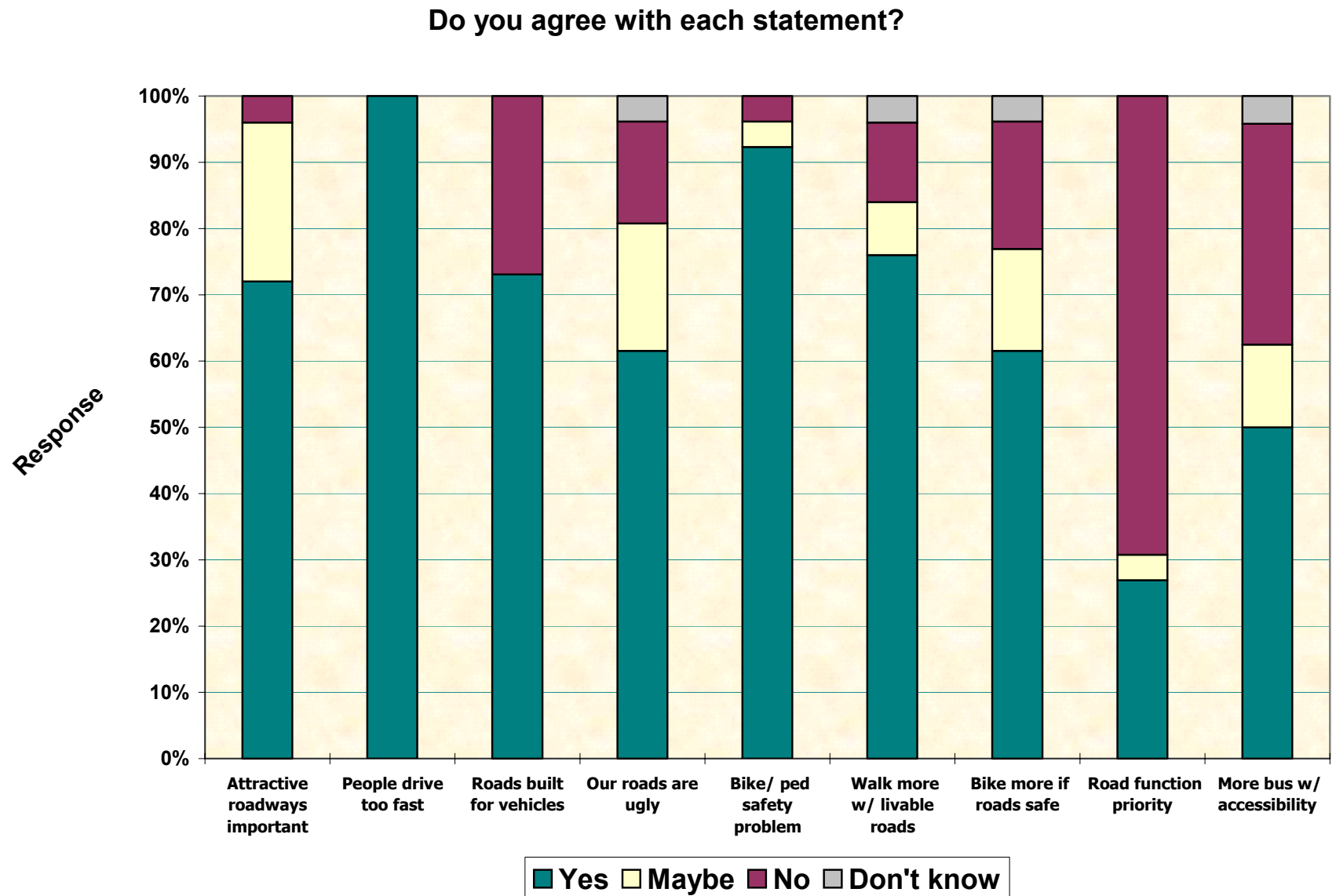
Other major roadways that escaped mention as most *or* least livable:

- I-275
- Crosstown Expressway
- Gandy Boulevard
- Tampa Street
- Westshore Boulevard
- Courtney Campbell Causeway
- Linebaugh Avenue
- Fowler Avenue
- 56th Street
- 40th Street
- US 92
- Lithia Pinecrest
- Lumsden Road
- Bloomingdale Avenue
- CR 579
- Brandon Parkway



What features are most important in a livable roadway?





General Guidelines

The overall goal of designing environments for pedestrians is to create a safe walking network that is pleasant for users and provides direct connections between locations. Well designed pedestrian networks can contribute to the creation of vital public spaces, which promote walkable communities. Other potential desirable benefits linked with increased pedestrian travel are a reduction in the following: traffic congestion, air and noise pollution, maintenance needs of roadways, costly road widening and vehicular parking areas, and fuel consumption. General guidelines are listed below, while subsequent sections outline more specific issues as they relate to facilitating pedestrian travel.

GENERAL PEDESTRIAN GUIDELINES

1. Provide continuous sidewalks, free of obstruction, buffered from traffic by landscape or setbacks, and shaded by awnings or trees or at intervals specified in local Land Development Codes. **“KEY CONCEPT”**
2. Provide direct routes between destinations, minimizing potential conflicts between pedestrians and automobiles. **“KEY CONCEPT”**
3. Provide adequate roadway crossings, signalized and unsignalized, at appropriate intervals. Clearly mark crosswalks at intersections, with high visibility striping and/or paving patterns. Include features to assist the visually impaired. **“KEY CONCEPT”**

*Figure 2.1:
Sidewalk shaded
by mature trees,
building overhangs
and awnings*



GENERAL PEDESTRIAN GUIDELINES CONTINUED

4. Provide ADA accessible connections between the sidewalk system and transit stops, including between the sidewalk and the curb in stop locations. **"KEY CONCEPT"**
5. Provide adequate crossing times for pedestrian movement at intersection crossings. **"KEY CONCEPT"**
6. **Main Streets and Signature Corridors:** Provide lighting and street furnishings, including benches, trash receptacles, as appropriate to surroundings. **"KEY CONCEPT"**
7. Provide continuous and direct connections between sidewalks and building entrances. **"KEY CONCEPT"**

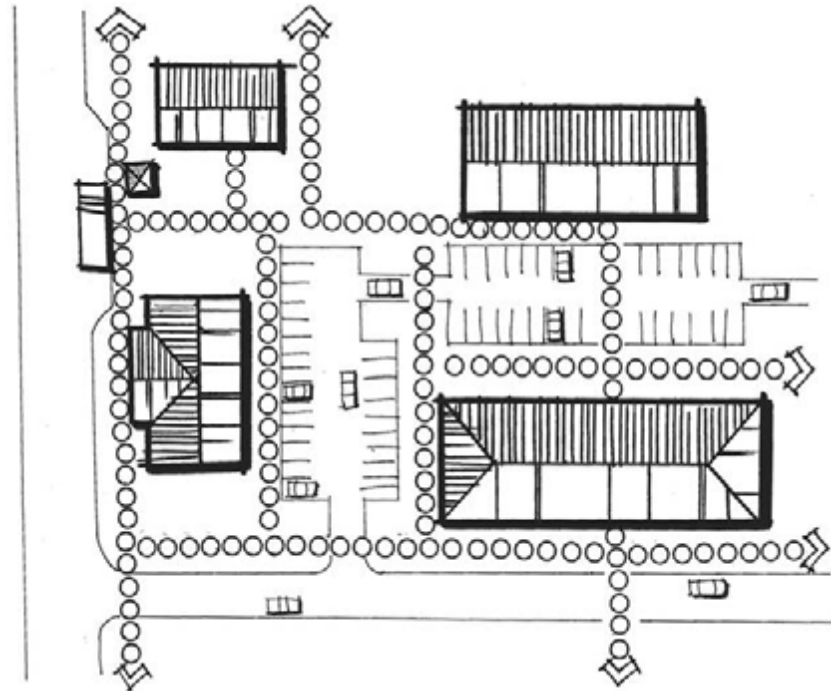


Figure 2.2: Pedestrian routes should be direct and convenient for users

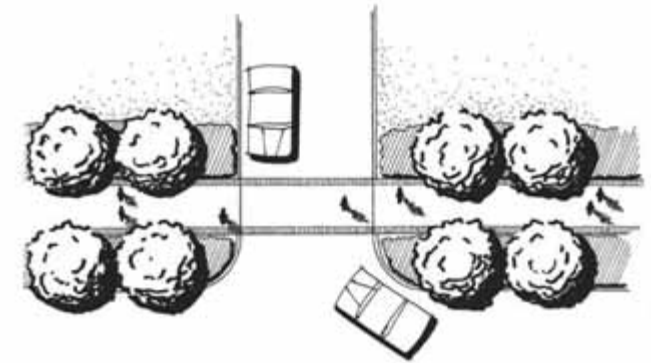
Sidewalks

As an essential component of the **Livable Roadway**, sidewalks are areas separate from vehicular areas that provide visual, as well as physical, access to adjacent land uses. In order to increase pedestrian use of corridors, guidelines and standards to ensure the provision of adequate sidewalks must be set. The following statements address proper location and design of sidewalks.

SIDEWALK GUIDELINES

1. Sidewalks shall be located along both sides of all public streets except collectors in residential areas and local streets. **"KEY CONCEPT"**
2. Sidewalk width shall be a minimum of 5 feet with 6 feet minimum preferred. **"KEY CONCEPT"**
3. **Main Streets:** Sidewalk width shall be 12 feet but may be reduced to 8 feet if existing conditions preclude this width. **"KEY CONCEPT"**
4. **Signature Corridors:** Sidewalk width shall be 6 feet minimum. **"KEY CONCEPT"**
5. Sidewalk paths, including sidewalk material, shall be continued across the entire length of all driveway aprons and should match the adjacent sidewalk materials. **"KEY CONCEPT"**
6. Provide a 5 foot minimum buffer between the sidewalk and edge of pavement or have outside edge of sidewalk a minimum of 10 feet from back of curb.
7. **Main Streets and Signature Corridors:** Sidewalks should include art, creative design, cultural and historical markers and other similar enhancements.

*Figure 2.3:
Sidewalk
continued
across
driveway
apron*



*Figure 2.4:
Sidewalks can
be further
delineated from
vehicular use
areas with
unique paving
patterns*



SIDEWALK GUIDELINES CONTINUED

8. Sidewalks should be located on both sides of the street in all residential areas that are within walking distance to schools and adjacent to parks or recreational facilities, office buildings, local businesses and other similar locations that attract high amounts of pedestrian activity.

9. **Main Streets:** Roadside elements, such as fire hydrants, parking meters, landscaping, signs, and street furniture, should be placed between the sidewalk and the roadway to create a buffer for pedestrians in a manner that does not impair visibility by motorists. Horizontal clearance should be maintained as described in the FDOT Plans Preparation Manual Volume I Chapter 21 Transportation Design for Livable Communities.

10. Movable obstructions such as chairs and tables should also provide a clear passage zone equal to the required minimum sidewalk width. Permanent or movable benches should not obstruct sidewalk and should be placed on a separate pad behind the outside edge of sidewalk or between the sidewalk and the street.

11. The potential for moving the sidewalk to the edge of the right-of-way should be explored for roadways with high design speeds. A buffer consisting of swales, planting strips, road shoulders, and/or bike lanes should be considered when feasible.

*Figure 2.5:
Sidewalk
located along
a high-volume
road. The
addition of
landscape
buffers would
improve it
aesthetically*



*Figure 2.6: Sidewalk
buffered from roadway
by vehicular parking,
pedestrian lighting,
and landscaped areas.
Although the clear
passage width is the
same as the above
example, the sidewalk
placement and buffers
create a more
pedestrian friendly
environment*



Multi-Use Trails

Multi use trails (paths) are facilities within rights of-ways with minimal cross flow by motor vehicles. Multi-use trails may be used by bicyclists, pedestrians, joggers, wheelchair users, in-line skaters and equestrians (in designated areas). Multi-use trails serve a variety of purposes including: recreation; connectivity to public spaces and neighborhoods, natural resource protection through the conservation/preservation of open spaces; as well as alternative transportation corridors. Because of the differing needs of travelers, specific guidelines are necessary to minimize the potential for conflicts.

MULTI-USE TRAIL GUIDELINES

1. Multi-use trails should not substitute for a good system of on-street pedestrian/bicycle/vehicular facilities. **“KEY CONCEPT”**
2. New development should connect or accommodate a future connection to planned and existing trails. **“KEY CONCEPT”**
3. The number of at-grade crossings with roadways or driveways should be minimized as much as possible along trails. Where crossings occur, denote with high visibility crosswalks. **“KEY CONCEPT”**
4. Trails should not be located directly adjacent to roadways, except in urban situations where no other feasible alternative exists. The preferred horizontal separation from the roadway is 5 feet, however greater distances are desirable.
5. Vehicular access to trails shall be prohibited. Bollards should be placed in a line across trail pavement no greater than 5 feet apart with removable center bollards. Bollards should be inset a minimum of 10 feet from the roadway edge. Consider using also using short curb radii in addition to standard multi-use path signage to deter vehicular use.

*Figure 2.7:
Minimize the
number of
times trails
must cross
roadways or
driveways*



*Figure 2.8:
Bollards
should be
used to
deter
vehicular
use of
multi-use
trails*



MULTI-USE TRAIL GUIDELINES CONTINUED

6. A 2 foot width of graded area should be maintained adjacent to both sides of the trail pavement.
7. Neighboring jurisdictions should coordinate trail planning to match and link elements when a trail crosses neighborhood or other similar jurisdictional boundaries to enhance trail connectivity.
8. Provide vehicle stop bars, stop signs, and/or trail crossing warning signs at all driveway exits.
9. Where bicycle travel is prevalent consider the following treatments:
 - Use delineation treatment such as: colored paving, signing, slip resistant pavement marking/stripping and/or pavement
 - Post bicycle speed limits
 - Use directional signage
10. See Appendix F for appropriate width and location of trails and pathways.

*Figure 2.9:
This multi-use
trail connects
to an area of
new
development*



*Figure 2.10: The
markings on the
pavement give
directional
information
and separate
bicyclists from
pedestrians*



Crosswalks

In order to establish a safe pedestrian network throughout Hillsborough County, convenient roadway crossings that are easily identifiable by pedestrians and motorists and allow quick routes between destinations are critical. Crosswalks are intended to provide guidance for pedestrians crossing roadways with definition and delineation of paths on approaches to and within signalized intersections, and on approaches to and within other unsignalized intersections. The following guidelines relate to design of crosswalks.

CROSSWALK GUIDELINES

1. Pedestrian signals at intersection crosswalks shall be timed so they do not impede bicyclists or pedestrians with insufficient crossing times, based on intersection width. **“KEY CONCEPT”**
2. High visibility (ladder or triple-four style), marked crosswalks and pedestrian signals should be located at all approaches of signalized intersections where significant pedestrian traffic is present. **“KEY CONCEPT”**
3. Pedestrian actuated signals shall be installed where they are warranted. Adequate sight distance and warning signals for vehicles is required with the installation of these signals. **“KEY CONCEPT”**
4. Where refuges do not exist, pedestrians should not be required to cross at grade where there are more than 10 through and turn lanes at the intersection.
5. **Main Streets:** Consider the use of raised crosswalks along streets with high pedestrian use or regular use by children, seniors, or persons with reduced mobility.

*Figure 2.11:
Ladder style
crosswalk
markings*



*Figure 2.12:
Triple-Four
crosswalk
markings*



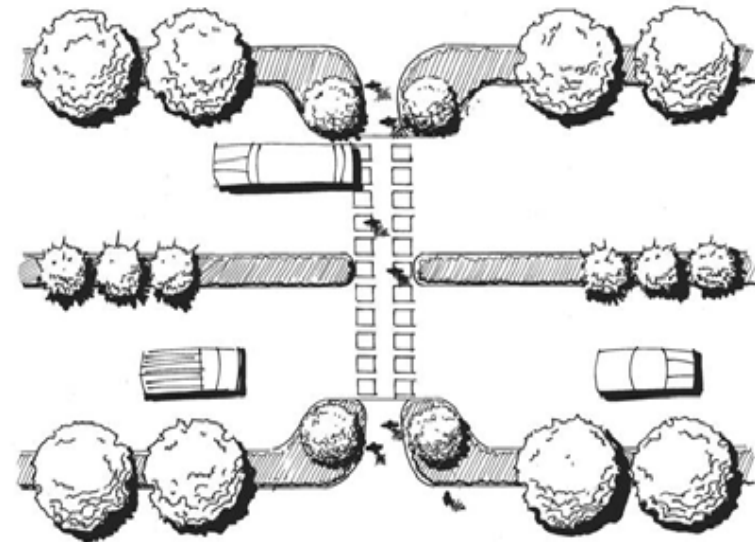
CROSSWALK GUIDELINES CONTINUED

6. Marked mid-block crossings should be installed as recommended in Appendix G.
7. Unsignalized pedestrian crossings should be installed with warning signs and adequate visibility for motorists and crosswalk users. Other elements should include raised pavement, offset median refuges protected by railings, and pedestrian-actuated flashing yellow signals.
8. Countdown signals with audible warnings should be considered at all signalized crossings.
9. Pedestrian activated lights should be installed in the pavement at all crosswalks with high pedestrian use (more than 24 pedestrians per hour during peak periods) or regular use by children, seniors, or persons with reduced mobility.

Figure 2.13: The paving treatment of this crosswalk helps differentiate pedestrian and vehicular use areas



Figure 2.14: Mid-block crossings should be considered in areas where long blocks might otherwise limit pedestrian access



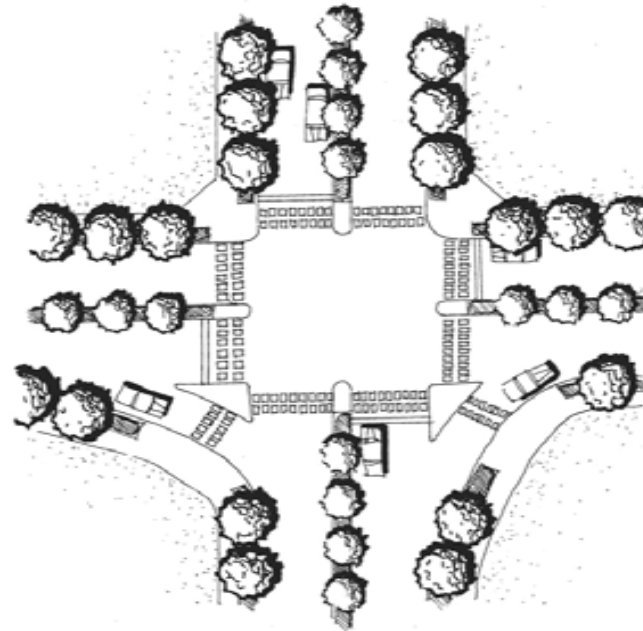
Intersection Treatments

Intersections allow for changes in travel direction of roadway users. Conflicts among different modes of travel frequently occur at these locations. Proper design of intersections needs to take into account a variety of factors such as the design speed of the roadway, the balance of travel modes along the corridor, as well as the type and pattern of adjacent land uses.

INTERSECTION TREATMENTS GUIDELINES

1. Pedestrian refuges should be provided within intersections that require pedestrians to cross over more than 8 lanes of traffic. **"KEY CONCEPT"**
2. The intersection curb radii should be designed to accommodate vehicular, bus, and truck turning movements, but should use the smallest appropriate radius given the situation.
3. Median nose extensions should be provided to allow for refuge islands with a 5 foot minimum width. Widths from 6 to 8 feet are preferred.
4. Curb extensions should be provided at intersections where on-street parking is provided and where there is a high volume of pedestrian traffic at certain times of the day.

*Figure 2.15:
Refuge islands
and median nose
extensions make
intersections of
major roads
easier for
pedestrians to
cross*



*Figure 2.16:
Pedestrians
using a
refuge
island*



Lighting

Lighting of roadways, sidewalks, and bike paths increases safety and security of users. Pedestrian and roadway lighting can also be used to aesthetically improve the area in which they are placed. Location, type and style of lighting fixtures should be chosen taking into account the following guidelines.

LIGHTING GUIDELINES

1. **Urban Areas:** Pedestrian scale lighting, with frangible bases, should be located between the curb and sidewalk.
2. In addition to pedestrian and street lighting, lighting may be necessary at pedestrian crossings, intersections, and entrances to buildings.
3. To consolidate the number of fixtures placed within the right-of-way, consider placing a tall pole with varying luminaire heights and other streetscape elements, such as street banners, on a single pole.
4. **Urban Areas:** Decorative bases, posts, luminaries, and bollards should be used in place of standard wood or concrete poles along in Main Street Districts and along Signature Corridors.
5. Lighting levels and lighting design for the right-of-way should meet Crime Prevention Through Environmental Design standards.

*Figure 2.17:
Pedestrian
lighting can
enhance
nighttime life
of an urban
corridor*



*Figure 2.18 and Figure 2.19: Hanging plants on
lighting fixtures adds additional daytime aesthetics
to the streetscape*

Designing for Persons with Disabilities

Guidelines under this category are focused on improving pedestrian conditions for people with disabilities. The following guidelines were created with the intention of supplementing existing codes and standards relating to accessibility in order to make the environment more pedestrian friendly for all users.

DESIGNING FOR PERSONS WITH DISABILITIES

1. All pedestrian walkways shall meet or exceed ADA (American with Disabilities Act) requirements. **"KEY CONCEPT"**
2. All pedestrian signal push calls shall be designed and constructed to be accessible to persons with disabilities, signals with audible warnings and countdowns are preferred. **"KEY CONCEPT"**
3. Clear passage: Clear paths shall be a minimum width of 48 inches. A 5 foot x 5 foot passing area is required at intervals not exceeding 200 feet. **"KEY CONCEPT"**
4. Obstructions: Sidewalks shall be clear of obstructions such as sign posts, utility and signal poles, parking meters, fire hydrants, trees, and street furniture within the clear passage zone. Movable obstructions, such as tables, chairs and benches must also be placed outside this area and it is preferred that grates not be allowed within walkways. **"KEY CONCEPT"**

Figure 2.20: Protruding objects can be particularly hazardous to blind individuals

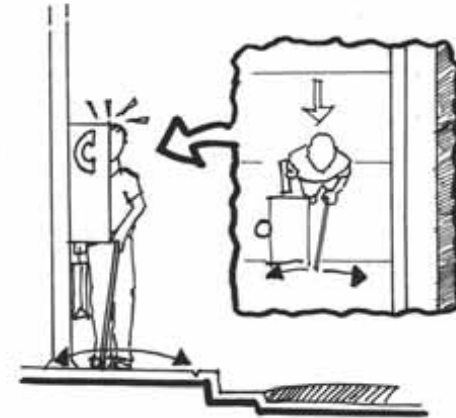


Figure 2.21: A wider sidewalk eliminates the need for passing areas



**DESIGNING FOR PERSONS WITH DISABILITIES
GUIDELINES CONTINUED**

5. Slope of Walkway: Slopes greater than 5% are considered ramps. Ramps shall not exceed 8.33% for distances greater than 30 feet. **"KEY CONCEPT"**

6. Cross slope of Walkway: Cross slopes on paths and ramps shall not exceed 2% in developed areas, and 3% in natural areas. **"KEY CONCEPT"**

7. Curb ramps are required for access between the sidewalk and street for individuals with mobility related disabilities and are required by the ADA. A variety of types exist that vary in position relative to curb as well as structural design. The selection of a specific curb ramp depends largely on site conditions. Direction of curb ramp should be the same as the crossing and not at 45 degrees. **"KEY CONCEPT"**

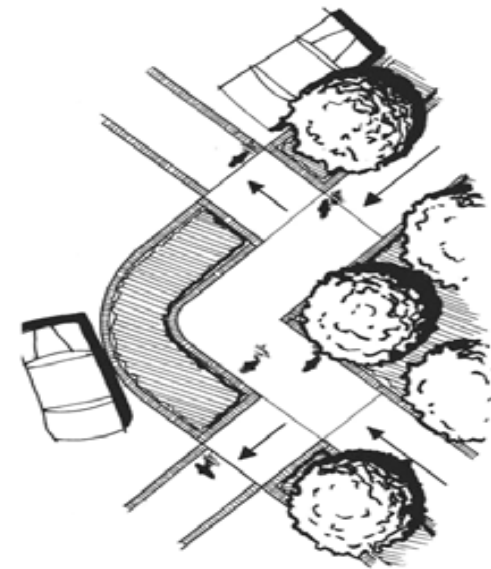
8. Tactile Warning Strips: Textural and color contrasts should be used on surfaces of walkways to warn pedestrians of abrupt grade changes, potentially dangerous exits and vehicular areas. A 2 foot strip (minimum) of tactile warnings should be placed at all curb ramps to identify the crosswalk locations.

9. Protrusions: Objects mounted on the wall, post, or side of building, should not protrude more than 4 inches onto the sidewalk corridor.

Figure 2.22: Typical tactile warning strip, its contrasting color and raised indentions warn pedestrians they are about to enter a vehicular zone



Figure 2.23: Typical crosswalk configuration



General Guidelines

In recent years, bike lanes have become common elements in the design of roadways. They can be found on collector and arterial roads as well as Main Street typical sections countywide. The following general guidelines should be considered when designing for bicycles. Following subsections relate to specifics with regard to facility design, intersection with roadways, and parking.

GENERAL BICYCLE GUIDELINES

1. Bike facilities are required to meet or exceed standards established by FDOT, AASHTO (American Association of State Highway and Transportation Officials), and local regulating agencies. **"KEY CONCEPT"**
2. Although bicyclists are permitted to use sidewalks provided they yield to pedestrians, sidewalks shall not be designated for bicycle travel. **"KEY CONCEPT"**
3. Bike lanes should be included along arterials, major collectors, and minor collectors with high average traffic speeds or high traffic volumes. Shared roadways are appropriate for low speed, low traffic minor collectors and local streets. In order to enhance bicycle and pedestrian travel in urban areas, a multi-use side path may be considered, in particular where abandoned railroads or other open spaces provide a corridor free of obstacles.
4. Travel lane width reductions should be considered in order to provide expanded paved shoulders, wide outside lanes or bike lanes.
5. Paved shoulders for use by bicyclists should be included along roadways without designated bike lanes. Paved shoulders between 3 and 5 feet are useful.

*Figure 2.24:
There is a
greater
tendency for
crashes to
occur when
bicyclists
and
pedestrians
share
sidewalks*



*Figure 2.25: Where
bicyclists and
motorists share
roadway, signs
should be posted
alerting motorists*



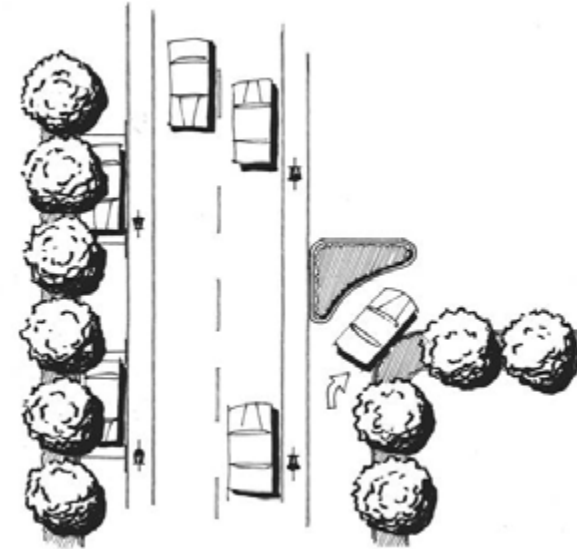
Facility Design

Bike facility types cited within this document include bike lanes, paved shoulders, shared roadways and multi-use trails. The appropriate location for each is discussed under general guidelines. Specific design parameters for facility design are as follows:

BICYCLE FACILITY DESIGN GUIDELINES

1. Bike lanes shall be a minimum of 4 feet wide when typical section has bicycle lanes located next to a curb and gutter. **"KEY CONCEPT"**
2. Bike lanes shall be a minimum of 5 feet wide when typical section has bicycle lanes located adjacent to on-street parking. **"KEY CONCEPT"**
3. If right turn lanes for vehicles are provided on a corridor with bike lanes, locate bike lanes to the left of the right turn lane. **"KEY CONCEPT"**
4. Where bike lanes are not currently part of the road, it is recommended that bike lanes or paved shoulders be constructed during road resurfacing or restriping.

*Figure 2.26:
Placement of bike
lanes to the left of
right turn lanes
reduces potential
conflicts between
bicyclists and
motorists*



*Figure 2.27:
Typical 5' wide
bike lane adjacent
to on-street
parking*



Intersections with Roadways

As with the case of pedestrian crossings, intersections can be dangerous locations for bicyclists. Motorists do not always look for or see bicycle riders. Different treatments should be explored in order to minimize potential conflicts among the various modes of travel.

INTERSECTIONS WITH ROADWAYS GUIDELINES

1. If intersections with roadways occur at-grade, types of traffic control devices (such as stop or yield signs) and locations should be provided in accordance with the MUTCD standards. **“KEY CONCEPT”**
2. Where bicyclists must cross a multi-lane highway in a location where there is not enough traffic volume to justify a signal, the provision of a median refuge island should be considered. **“KEY CONCEPT”**
3. If bike paths are to cross freeways or other high-speed, high volume arterials, a grade separated structure may be necessary.

Figure 2.28: Bollards and specialty paving are used to define this pedestrian crossing



Figure 2.29: Pedestrians and bicycles are routed above this high volume road near Raymond James Stadium in Tampa



Parking

In order to properly design for bicycles on *Livable Roadways* sufficient bicycle parking in convenient locations must be included in the design of spaces.

BICYCLE PARKING GUIDELINES

1. Bicycle parking shall be located close to main entrances of buildings in highly visible, high trafficked, easy to access locations. **“KEY CONCEPT”**
2. Bicycle parking shall be required for all commercial and office uses at a minimum ratio of one space per twenty motor vehicle spaces. **“KEY CONCEPT”**
3. Bicycle parking provided in a covered location is preferred. Where parking garages exist, provide parking for bicycles within the structure at the ratio specified above. Parking in decks should include bike lockers or other facilities with enhanced security and comfort facilities with showers and restrooms.
4. Inverted “U” racks are preferred for general use parking.

Figure 2.30: While many buses are equipped to store bicycles on the front, transit riders may prefer to leave bikes at stops.



Figure 2.31: Covered parking helps protect bikes from inclement weather. At this mall, bike racks with lids are provided.



General Guidelines

An important consideration when designing for transit facilities is creating an experience that can compete with the convenience of the automobile. The guidelines featured on this page apply to the general topic of designing for transit and are meant to supplement criteria established by the “Transit Friendly Planning and Design Handbook and Technical Manual” published by the Hillsborough Area Regional Transit Authority (HART).

GENERAL TRANSIT FACILITY GUIDELINES

1. Transit pull-off areas and transit stops shall be provided where on-street bus stops on 2-lane roadways would create potentially hazardous traffic congestion resulting from illegal passing or intersection back-ups at heavily trafficked intersections. **“KEY CONCEPT”**

2. Transit stops shall be easily accessible to pedestrians, bicyclists, and all persons with disabilities. Provide access to transit stops by providing sidewalks and ADA improvements as standard part of roadway projects. **“KEY CONCEPT”**

3. Bicycle parking shall be placed near sheltered transit stops. Providing two spaces at stops is preferable. Transit centers should provide ample bike parking facilities, including bike lockers or other facilities with enhanced security. **“KEY CONCEPT”**

Figure 2.32: This transit stop in downtown Tampa is easily accessible to pedestrians and bicyclists



Figure 2.33: Unfortunately, many transit facilities are not - this stop is not located directly adjacent to a sidewalk and the existing curb does not have curb cuts.



GENERAL TRANSIT FACILITY GUIDELINES CONTINUED

4. Standards and incentives for transit facilities upgrades, such as a reduction in the amount of parking required for development, should be made available to private developers.
5. Provide breaks in parking spaces on-street that would allow a transit interface not in conflict with parked cars. Breaks at intersections could provide for “bulb-outs” to facilitate a transit zone. Such treatments could minimize impacts to reduced parking space usage compared to a bus pull-in bay. Intersection transit zones would also reduce the number of lanes that a pedestrian would need to cross a busy intersection.

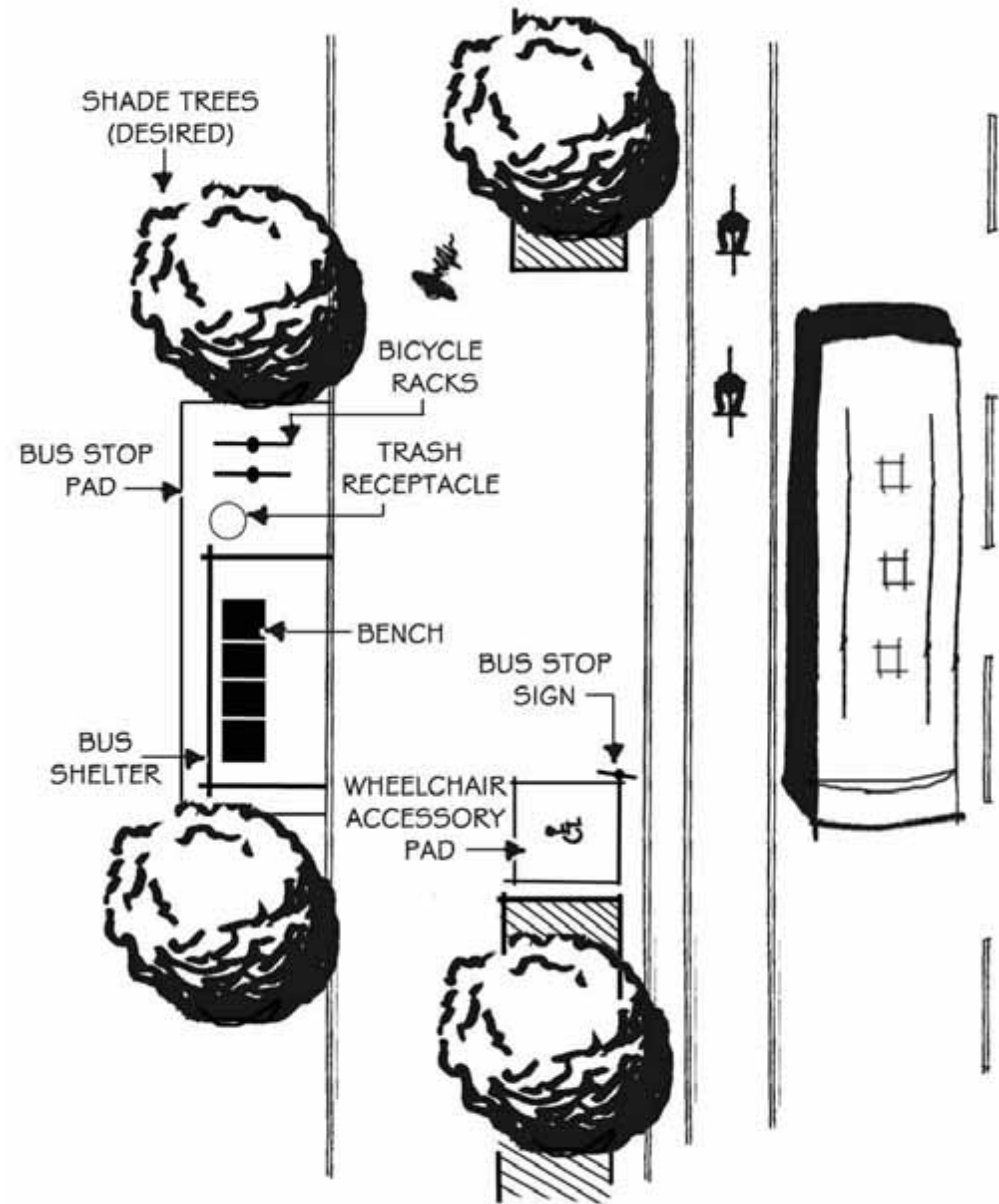


Figure 2.34: Ideal transit stop design

Transit Stop Location and Frequency

The use of transit facilities should be a comfortable, convenient and safe experience. To help ensure this, and the predictability of transit ridership overall, appropriate locations and frequencies of stops are critical.

TRANSIT STOP LOCATION AND FREQUENCY GUIDELINES

1. Transit stops shall be provided on all sites that meet threshold development intensity requirements and are located on public transit corridors. Frequency and location of stops shall follow criteria established by HART. Development thresholds are listed within the “Development Threshold Matrix” found on the following page. **“KEY CONCEPT”**

2. Far side stops (stops located immediately past an intersection) are the preferred standard for bus stop location. Near side (stops located immediately before an intersection in the direction of bus travel) and mid-block locations should only be used by exception where specific conditions make them necessary.

3. Transit stop spacing should be considered given the Bus Stop Spacing Guidelines for Local Routes and Circulators.

Operating Environment	Minimum Spacing (in feet)	Maximum Spacing (in feet)	Typical Spacing (in feet)
Central Business District	400	800	600
Urban	500	1000	750
Suburban	600	1200	900
Rural	800	As needed based on development & activities	As needed based on development & activities

Figure 2.35: Bus stop spacing guidelines

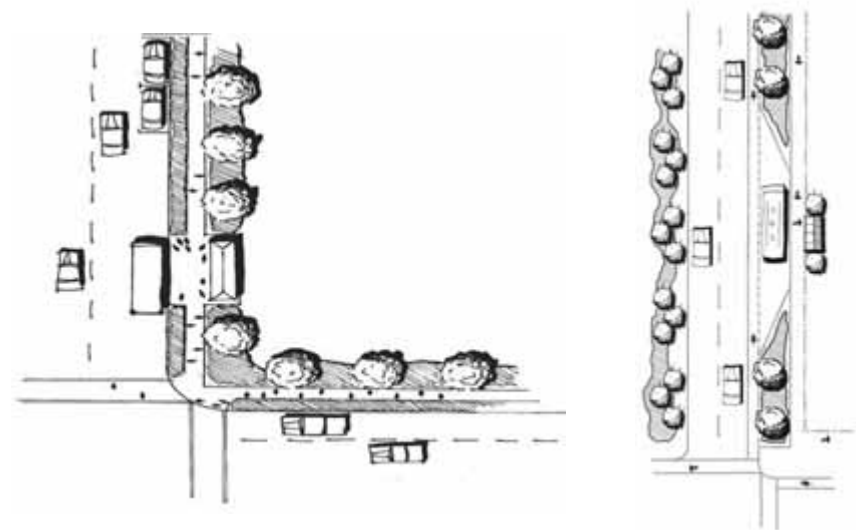


Figure 2.36: Far-side transit stops are the preferred location. Pull-outs are preferred for bus loading

TRANSIT STOP LOCATION AND FREQUENCY GUIDELINES

4. Many suburban residential densities are too low to yield significant concentrations of transit-trip origins; however suburban activity centers (town centers) could be potential destinations for transit trips.

5. Alternate forms of public transportation services, such as bike to bus, park-and-ride facilities, van/carpools should be considered in areas that do not have sufficient densities to sustain traditional bus service.

Development Thresholds	Pedestrian & Bicycle Facilities	Transit pad with seating, trash receptacle, and bicycle rack	Sheltered transit pad	Bus loading/unloading area	Bus staging area
Developments > 1,000 residential units	●	●	●	●	●
Developments: 500-1,000 residential units, non-residential and mixed-use developments 200,000- 500,000 sq. ft.	●	●	●		
Non-residential developments: 100,000-200,000 sq. ft.	●	●	●		
Non-residential developments: 50,000-100,000 sq. ft.	●	●			
Non-residential development, single- or multi-tenant office buildings < 50,000 square feet	●				

Figure 2.37: Recommended transit facilities for different thresholds

Sheltered Transit Stop Design

In locations where transit stops occur, a sheltered area is preferred to protect passengers from sun and rain.

SHELTERED TRANSIT STOP DESIGN GUIDELINES

1. In urban areas where curb and gutter is provided, the shelter supports may be as close to the curb as 4-feet per regulations with the roof overhang a minimum of 4 feet; however, preferred placement of shelter supports is a minimum of 8 feet behind the curb to allow for adequate 5 x 8 foot landing pad. Locations may dictate various approaches to provide for the best transit infrastructure interface within this range of possibilities. The minimum vertical clearance between the underside of the roof and sidewalk is seven feet (7'). **"KEY CONCEPT"**
2. A firm stable surface 5x8 feet should be placed either in front of the bus shelter (preferred) or adjacent to shelter if space does not allow. **"KEY CONCEPT"**
3. Placement of benches at bus stops should not impede the use of sidewalks or trails. A minimum setback of 3 feet, 4 feet preferred, from edge of pavement is required. **"KEY CONCEPT"**
4. The overhead canopy of transit stops should be a minimum of 48 square feet. The canopy shall be waterproof with provisions for drainage away from transit passengers in the bus loading area. **"KEY CONCEPT"**
5. Bus Route maps and bus information shall be posted at all high volume stops and at transfer points. **"KEY CONCEPT"**



Figure 2.38 and Figure 2.39: Design of bus stops should take cues from surrounding community development



SHELTERED TRANSIT STOP DESIGN GUIDELINES CONTINUED

6. Well-lit access ways to transit stops and shelters are preferred. Lighting level and uniformity shall be in accordance with applicable local standards and the Illuminating Engineering Society of North America recommendations.
7. Design of transit stop should reflect the character and history of the surrounding community.
8. Materials used in construction should not obstruct views into or out of shelters.
9. Local, recycled, or renewable materials and green building techniques should be used in the design of bus shelters.
10. Materials, coating and surfaces should be graffiti and vandal resistant. Furniture should be durable and readily replaceable. It should be easy to clean shelter materials and paving beneath and around shelters.

Figure 2.40: An example of a bus stop incorporating "green building" design standards

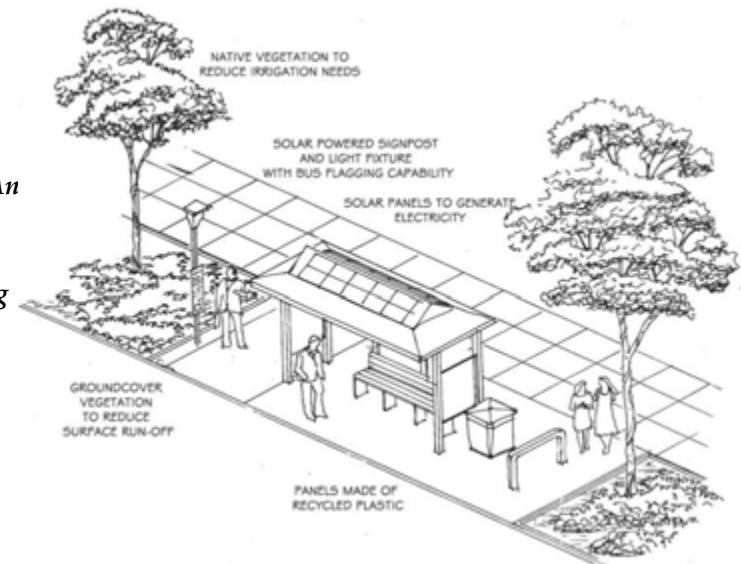


Figure 2.41: Bus stops maps and information help transit users navigate their routes



Landscape

Transit stops, in addition to being convenient and safe, should be aesthetically-pleasing and comfortable locations for riders to wait for the bus. Landscape materials should be used to provide shade, seasonal interest and enhance the appearance of the transit facility.

TRANSIT FACILITY LANDSCAPE GUIDELINES

1. The provision of landscaping near the transit stop in the form of shade or ornamental/palm trees is encouraged to maximize passenger comfort.
2. If trees are provided, they should be placed to provide the best shading for bus patrons during afternoon hours year round.
3. All landscaping should be located so as not to obstruct the shelter canopy (if present) or bus stop visibility.
4. Appendix B of this document should be used as a guide for selecting trees for use near transit stops. Trees with thorns should be excluded from use in these locations. The use of native and/or drought tolerant plant species is encouraged.

Figure 2.42: The appearance of a transit stop enhanced by the addition of landscape materials



Figure 2.43: Landscaping must be maintained in order for there to be visibility in and out of sheltered stops



General Guidelines

Designing for vehicles provides guidance for design of roadways within Hillsborough County with consideration for the way vehicular needs shape the Livable Roadway environment. The guidelines featured on this page apply to the general topic of designing for vehicles, while subsequent subsections provide guidelines for various situations as they relate to vehicular travel.

GENERAL VEHICLE GUIDELINES

1. Provide design elements that contribute to a safe driving experience. Maintain asphalt and roadway striping. Maintain visibility, especially at intersections, by providing lighting, well maintained signals and signage, and appropriately spaced and maintained landscape. **“KEY CONCEPT”**
2. Provide visual cues to drivers that alert them to the presence of pedestrians and bicyclists. **“KEY CONCEPT”**
3. Roadways with more than 8 through lanes and turn lanes at intersections are not **Livable Roadways**. **“KEY CONCEPT”**

*Figure 2.44:
Multiple
pedestrian
crossing signs
may be
necessary in
areas of high
pedestrian
traffic, such as
near schools*



GENERAL VEHICLE GUIDELINES

4. Roadway design speed and posted speed limit should be appropriate to the area the road serves. Roads that facilitate speeds over 45 mph are not appropriate for developed parts of the Urban Service Area.
5. Utilize innovative design techniques to improve the safety and function of roadways including roundabouts and traffic circles in both residential and commercial areas.
6. Medians with turn lanes are preferred to continuous center turn lanes. Medians should not be utilized if numerous median breaks are required to accommodate existing curb cuts.

Figure 2.45: Signs can be used to alert drivers when they must yield to other forms of travel



Parking and Access

In order to reduce the presence of large parking areas, on-street parking and the use of parking garages is encouraged. It is also recommended that local jurisdictions maximum acceptable parking limits. Additional parking standards are provided in Section 3.2 Site Design (Parking) and Section 3.3 Building Design (Parking Structures).

VEHICLE PARKING GUIDELINES

1. **Main Streets:** Parking shall only be permitted at the sides or rear of buildings. **Other Areas:** Parking between building and street should be limited. **“KEY CONCEPT”**

2. **Main Streets:** Side yard parking may occupy no more than 50% of the principal frontage line and should be screened from the sidewalk with trees, shrubs and walls. In redevelopment areas, Main Street provisions should allow for side yard parking. In new development, Main Streets can be achieved with little or no side yard parking. **“KEY CONCEPT”**

3. Interconnect parking areas and sidewalks on separate properties to accommodate potential cross traffic of people and cars. **“KEY CONCEPT”**

*Figure 2.46:
Metered
parking is
appropriate in
urban
locations*



*Figure 2.47:
This rear
parking area
is accessed
from side
streets*



VEHICLE PARKING GUIDELINES CONTINUED

4. On street parking is encouraged on streets with speed limits less than 40 mph. Individual on-street parking spaces, not located in residential areas, shall be delineated with striping and metered wherever feasible.

5. Structured parking is preferred in order to encourage more compact development. Shared parking and parking credits should be utilized to support mixed use development, infill development, use of non-motorized travel, use of transit, the provision of transit infrastructure and service, and other transportation demand management strategies. When adjacent to the street, ground floor retail and active uses should be incorporated into the structure.

Figure 2.48: On-street parking can also be used in residential areas



Traffic Calming

Traffic calming can greatly increase the level of comfort and feeling of safety of motorists, pedestrians and bicyclists. Traffic calming guidelines and standards are in place for local roads, minor arterials, collector and neighborhood roads, within the County's "Neighborhood Traffic Calming Manual" and the "Residential Traffic Calming Handbook." In addition to being used in residential areas, traffic calming can also be effective in urban areas.

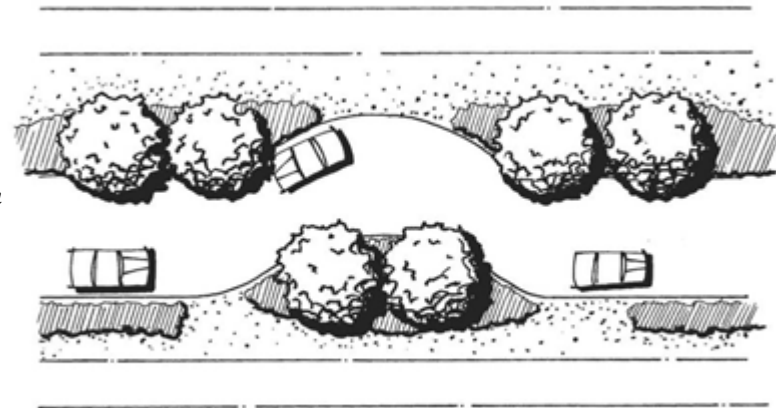
TRAFFIC CALMING GUIDELINES

1. Roads should be designed with traffic calming features emphasizing horizontal deflection rather than retrofitted with punitive devices that rely on vertical deflection to calm traffic. **"KEY CONCEPT"**
2. **Main Streets and Signature Corridors:** Traffic calming measures such as the following should be used: on-street parking, reduced lane widths, curb extensions and crosswalk enhancements.
3. Traffic calming measures such as the following are appropriate: speed tables or humps, chicanes, intersection throats, half closures of street and crosswalk enhancements. Roundabouts, traffic circles, painted lane narrowing, speed indication signs and reduction in the number of through lanes may also be considered.
4. Roadside plantings, such as trees lining both sides of roadways provide a traffic calming effect and are encouraged.

*Figure 2.40:
Roundabout
in Downtown
Tampa near
Channelside
has a traffic
calming effect*



*Figure 2.50:
Typical plan
of a chicane in
a roadway*



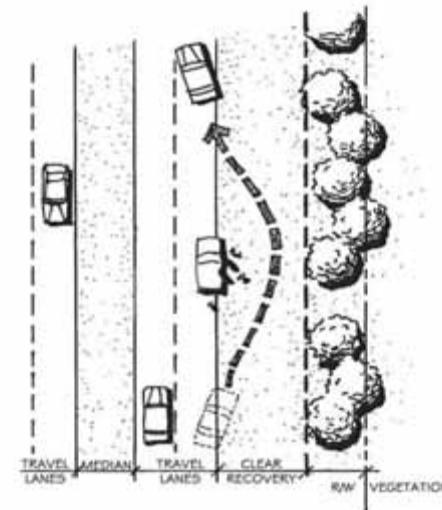
Intersection Clear Recovery Zones

In order to enhance safety among various forms of travel, minimum horizontal clearances and clear sight distance must be followed. These standards prohibit the placement of vertical elements in locations that might block views of intersection users. Horizontal clearance requirements and clear recovery zones additionally reduce the number of obstacles in the path of a vehicle, should the motorist lose control and hit the object. For additional information regarding clear recovery zones reference the most current version of the *Plans Preparation Manual, Volume 1*.

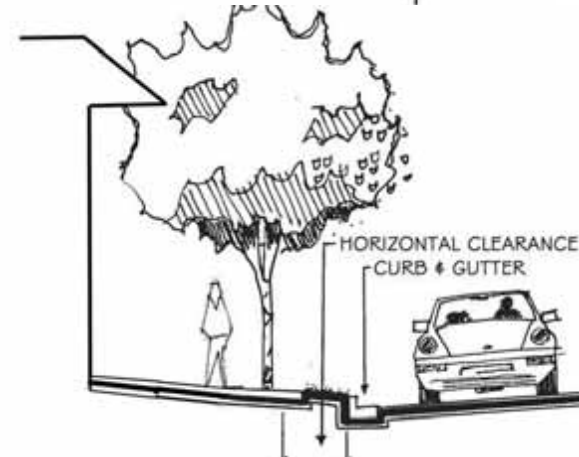
INTERSECTION CLEAR RECOVERY ZONES GUIDELINES

1. Along roadways with curb and gutter, horizontal clearance from the face of curb to roadside elements and landscape should be provided.
2. In rural areas, where shoulders are flush, swales should be a minimum of 60 feet from travel lanes for design speeds greater than 50 mph, 50 feet where design speeds are less than 50 mph.
3. The Florida Department of Transportation Plans Preparation Manual Volume 1 Chapter 21 Transportation Design for Livable Communities provides additional guidance.

*Figure 2.51:
Recovery
zones are
important for
motorist
safety*



*Figure 2.52:
Horizontal
clearance*



General Guidelines

Landscaping along roadways provides numerous benefits including improving the visual quality of the environment as well as providing a sense of identity to the area. General guidance for appropriate landscape design for new roadways and roadway modifications is included in the following:

GENERAL ROADWAY LANDSCAPE GUIDELINES

1. All trees along public roadways shall be planted so that when they reach mature height they remain outside minimum clear sight limits at intersections, as outlined in FDOT Index Number 546 "Sight Distances at Intersections." **"KEY CONCEPT"**
2. Planting areas shall preserve existing vegetation, where feasible. **"KEY CONCEPT"**
3. Plantings shall be self-sustaining, and shall include low cost plant materials that require minimal maintenance.
4. Where narrow rights-of-way exist, opportunities for planting easements should be considered through agreements with adjacent property owners.
5. Roadway landscape in and adjacent to the right-of-way should allow for clear visibility between 2 feet and 7 feet above grade.

*Figure 2.53:
Existing trees
can provide a
shade canopy
to roads and
nearby
walkways*



*Figure 2.54:
Native and/or
drought-
tolerant
vegetation
should be used
to reduce
irrigation and
maintenance
requirements*



Roadway Plantings

Roadway plantings are important on all types of roadways. In general, selection of plant material must take into account irrigation needs, maintenance costs, and community preferences for landscaping. In general, low maintenance, native vegetation is preferred for roadway planting areas.

ROADWAY PLANTINGS

1. All plants shall be Florida Number 1 or better as designated in the most recent publication of "Grades and Standards for Nursery Plants." **"KEY CONCEPT"**
2. Hardy, readily available, low maintenance plant species are preferred; refer to the list of Recommended Plant Species in Appendix C. **"KEY CONCEPT"**
3. Roadway designs should incorporate single theme trees along with one or two secondary themes to promote a distinct character for the roadway corridor in which they are placed. **"KEY CONCEPT"**
4. Within medians, shrubs and groundcover should be provided in addition to trees along Main Streets and Signature Corridors. **"KEY CONCEPT"**
5. Trees should be planted on both sides of all public roadways and in medians, where feasible.
6. Intersections, community gateways and development entries should have special planting treatments. Ornamental trees with color should be considered for placement in these locations.
7. Trees should not be placed directly under overhead electrical lines unless they are specified in Appendix E as a species that is appropriate for placement in that location.



Figure 2.55: Trees lining a roadway on both sides can provide pleasant views as well as a sense of visual enclosure that slows motorists

ROADWAY PLANTINGS GUIDELINES CONTINUED

8. Grass areas should be minimized, but where between or along trees and planting beds should be designed for ease of mowing. The outside radius of the grass area should not be smaller than 5 feet. And the width of the grass areas should be in multiples of 4 feet.

9. Where feasible, the tree planting hole should be three to five times the diameter of the root ball.

10. Planting soil should be composed of topsoil from the area, fertilizer, and other appropriate amendments.

11. At least 3 inches of mulch should be placed in all planting beds and at the base of all trees. Mulch should not be Cypress and should be treated with a pre-emergent herbicide.

12. Root barriers should be installed where trees are planted close to paving or underground utilities.

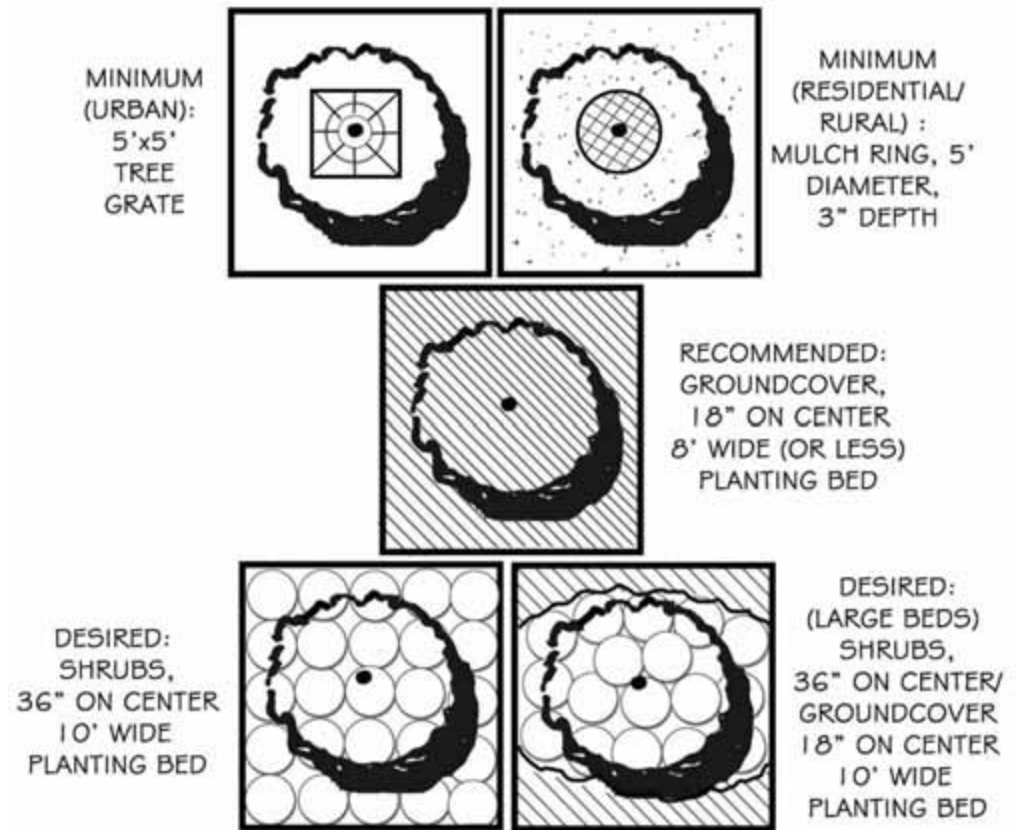
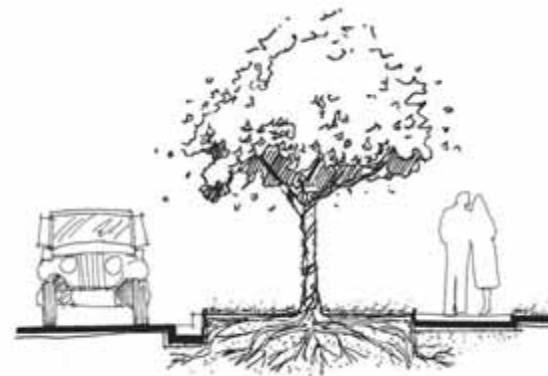


Figure 2.56: Landscape beds should be sized to accommodate long term growth and planted to minimize maintenance issues. Root barriers for trees help protect adjacent paving and underground utilities



Plant Maintenance

While low-maintenance vegetation is preferred along roadways in general, the continued care of plant material is fundamental toward establishing a more pleasurable environment surrounding roadways. When proposing the addition of plant material to a “Livable Roadway” the following guidelines should be taken into account.

PLANT MAINTENANCE

1. If individuals, groups, or organizations are permitted to plant within the road right-of-way, they must agree to also maintain or pay to maintain the planting area.

“KEY CONCEPT”

2. Maintenance plans should be submitted at the same time as planting plans for plants proposed within right-of-way of roadways.

3. Pruning of trees within the right-of-way should be completed in a manner that is in accordance with the Tree Care Industry Association Standards.

*Figure 2.57:
Following
establishment,
plants should
continue to be
maintained*



*Figure 2.58: Local
groups and
organizations may
adopt roadways
and provide
services such as
litter removal,
plantings, and
maintenance*



Roadway Design Types

The following typical sections were derived from and are consistent with criteria set forth in the Hillsborough County Transportation Technical Manual. Minimum rights of way depicted in this document are given to show what is detailed in each cross section. The Transportation Technical Manual, or the jurisdiction appropriate document or policy, should be used to determine right of way requirements for reservation, planning, preliminary design, acquisition, etc.

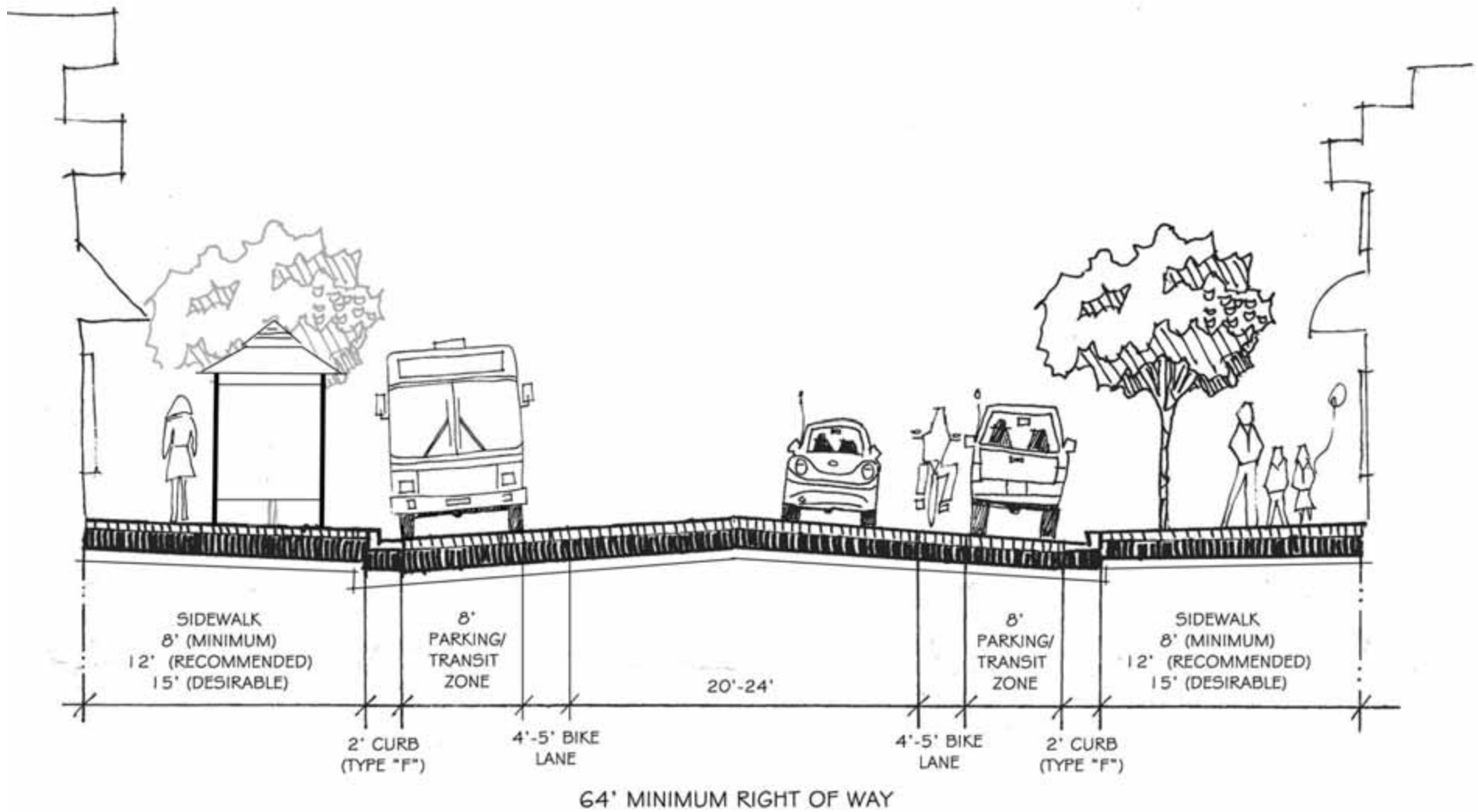
These standard sections are meant as a guide for assisting in the development of new roadways, as well as the redesign or retrofit of existing roadways. Please be advised that all roadways classified as collectors and higher shall be designed in accordance with criteria established by the Hillsborough County Public Works Department and Plans Preparation Manual. It is intended that livable roadways should meet the roadway dimension standards and include the streetscape elements as illustrated in order to promote more livable roadways. Throughout this section, tree spacing widths are proposed. While actual spacing may need to change based on individual design speeds, existing roadway conditions and/or presence and preservation of existing vegetation, the spacing proposed should be used as a general guide for use whenever feasible.

Transit facilities have been shown on all of the plans and cross sections that follow. The purpose is not to show what is specifically required, rather how transit infrastructure can and should be accommodated within each of the roadway types. Roadway conditions and the type of transit service provided will guide decisions about bus stop design.

Consideration of stormwater issues is needed as specific design decisions are made. Issues of topography, existing runoff drainage patterns need to be addressed. Stormwater system standards need to be met to avoid local and system level problems such as standing water and flooding.

For existing and new roads, the transportation infrastructure to serve different modes of transportation needs to be designed in light of the need for other features to be located in the right of way including ditches, culverts, utility poles, sign posts, trees, fire hydrants, etc.

Figure 2.59: Two-Lane Main Street with On-Street Parking



ROADWAY DESIGN GUIDELINES

1. If ornamental trees or palms are mixed with shade trees, all trees should be spaced an average of 30 feet on center, with shade trees no more than 90 feet apart. If only shade trees are to be used they should be planted no more than 40 feet on center. **“KEY CONCEPT”**
2. Where tree grates are not used, low shrubs and/or groundcover should be placed around tree base. **“KEY CONCEPT”**
3. Sidewalks should be a minimum of 12 feet in width (15 foot preferred), with 5 foot clear passage area.
4. Bike lanes should be 5 feet in width and placed to the left of parking lanes on both sides of the roadway.
5. A transit zone should be provided for patrons to wait for a bus so as to avoid conflicts with pedestrians, bicycles and parked cars. Where traffic volumes are high, pull-in bus stops should be used to reduce congestion behind stopped busses.

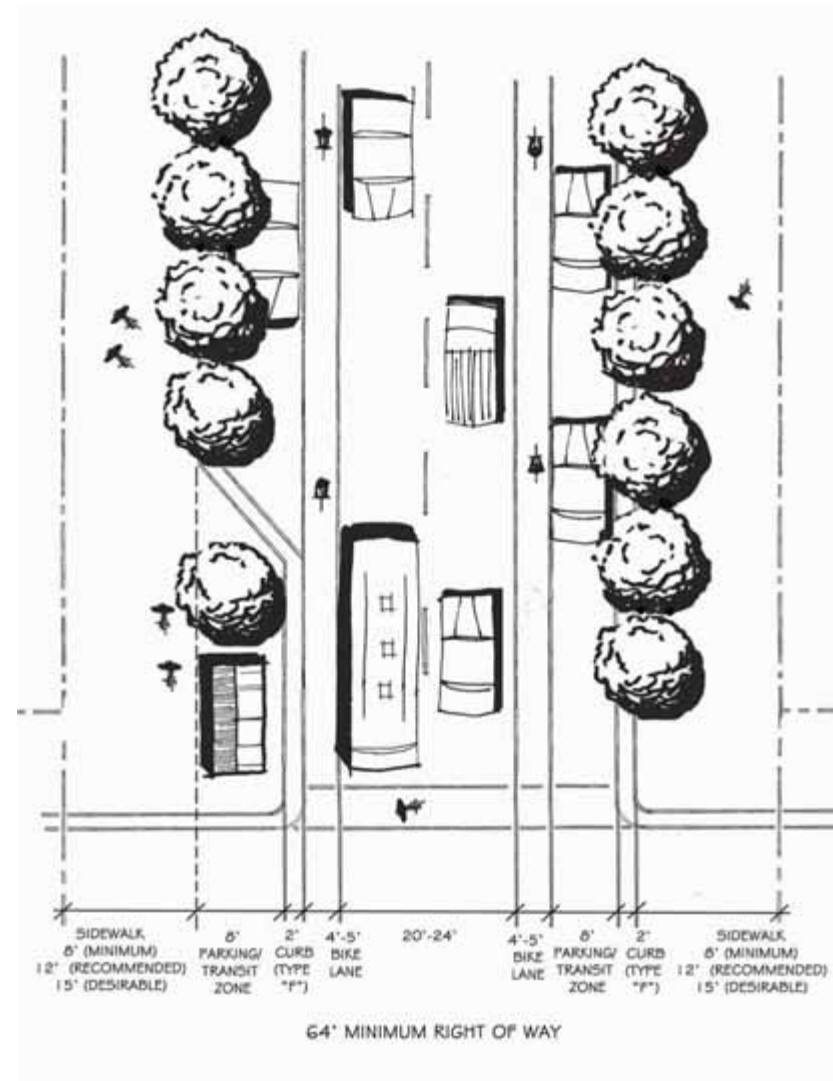
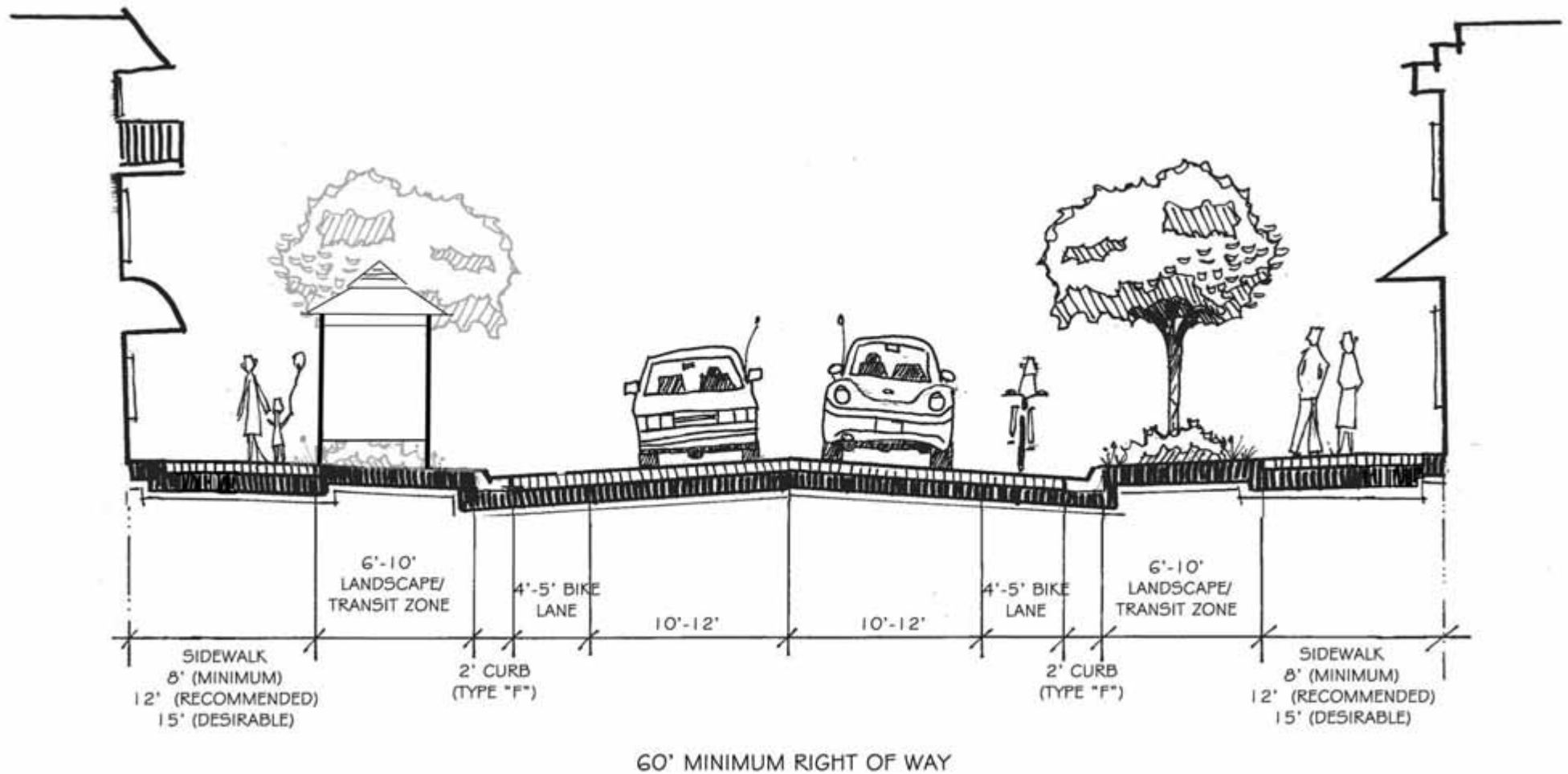


Figure 2.60: Two-Lane Main Street with On-Street Parking. Transit stop can be a pull-out as depicted in Figure 2.59 or a curb extension as show in this figure.

Figure 2.61: Two-Lane Undivided Urban Corridor



ROADWAY DESIGN GUIDELINES

1. If ornamental trees or palms are mixed with shade trees, all trees should be spaced an average maximum of 30 feet on center, with shade trees no more than 90 feet apart. If only shade trees are to be used they should be planted no more than 40 feet on center. **"KEY CONCEPT"**
2. Where tree grates are not used, low shrubs and/or groundcover should be placed around tree base. **"KEY CONCEPT"**
3. Sidewalks should be a minimum of 12 feet in width (15 foot preferred), with 5 foot clear passage area.
4. Bike lanes should be 4 feet in width (5 foot preferred) and located on both sides of roadway.
5. A transit zone should be provided for patrons to wait for a bus so as to avoid conflicts with pedestrians, bicycles and parked cars. Where traffic volumes are high, pull-in bus stops should be used to reduce congestion behind stopped busses.

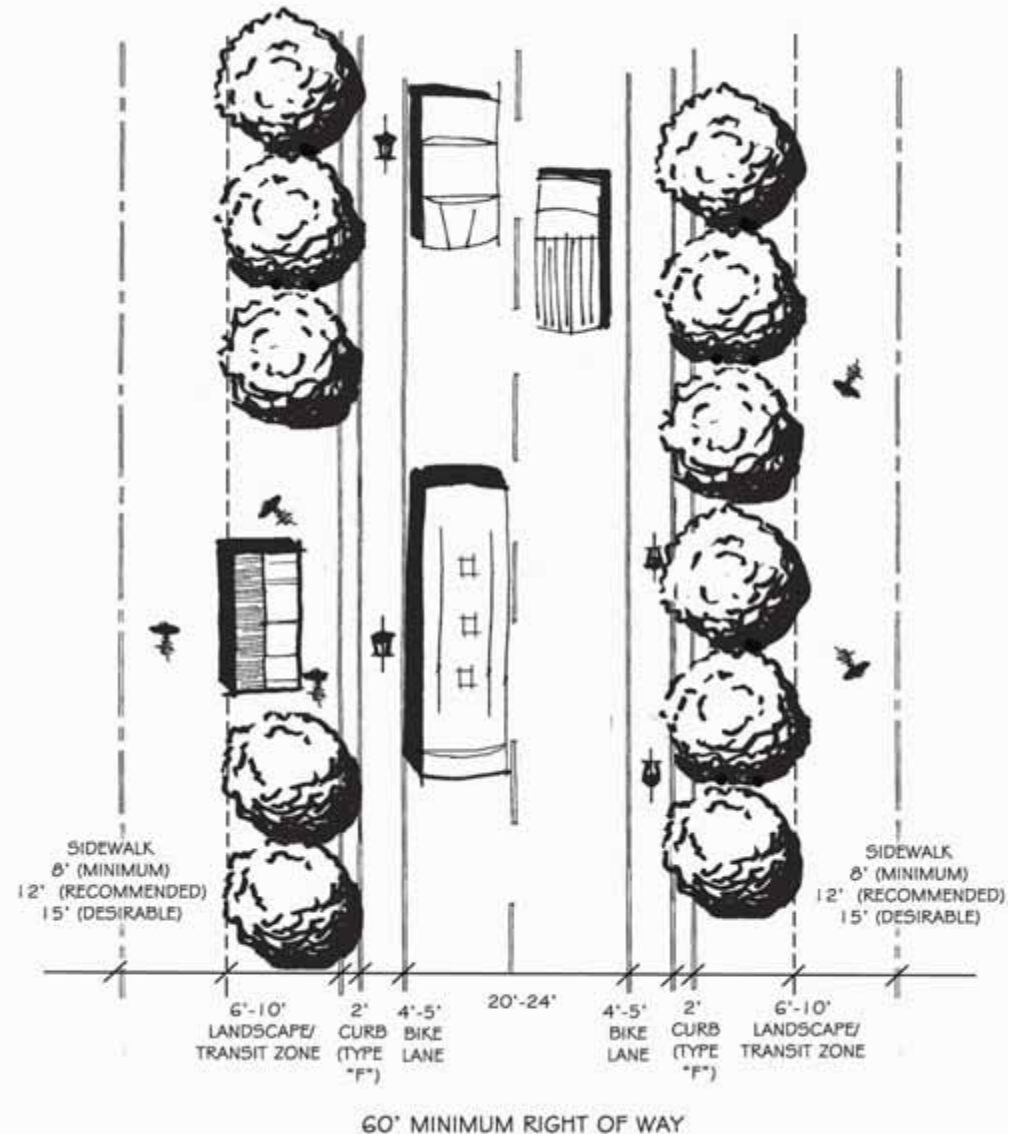
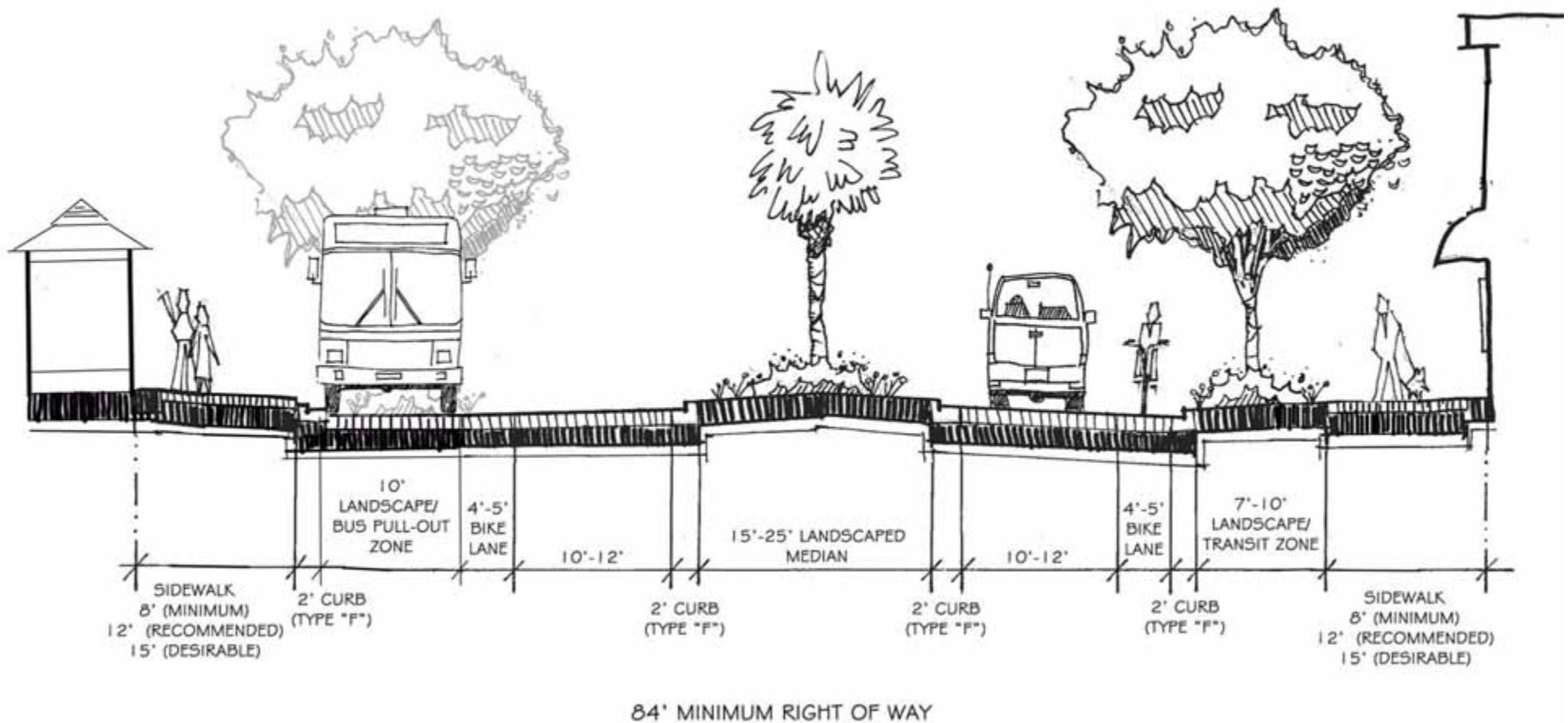


Figure 2.62: Two-Lane Undivided Urban Corridor

Figure 2.63: Two-Lane Divided Urban Corridor



ROADWAY DESIGN GUIDELINES

1. **Along Sidewalks:** If ornamental trees or palms are mixed with shade trees, all trees should be spaced an average of 30 feet on center, with shade trees spaced no more than 90 feet apart. If strictly shade trees are used they should be planted no more than 40 feet on center. Where tree grates are not used, low shrubs and/or groundcover should be placed around tree base. **"KEY CONCEPT"**
2. Sidewalks should be a minimum of 12 feet in width (15 foot preferred), with 5 foot clear passage area. **"KEY CONCEPT"**
3. **In Medians:** Trees may be planted in formal rows, alternating rows, or informal clusters. If only shade trees are used, they should be planted an average maximum of 60 feet on center. If ornamental trees or palms are used or mixed with shade trees, trees should be planted an average maximum of 40 feet on center. Shrubs and groundcover should be incorporated as part of the design. **"KEY CONCEPT"**
4. Bike lanes should be 4 feet in width (5 foot preferred) and located on both sides of roadway.
5. A transit zone should be provided for patrons to wait for a bus so as to avoid conflicts with pedestrians, bicycles and parked cars. Where traffic volumes are high, pull-in bus stops should be used to reduce congestion behind stopped busses.

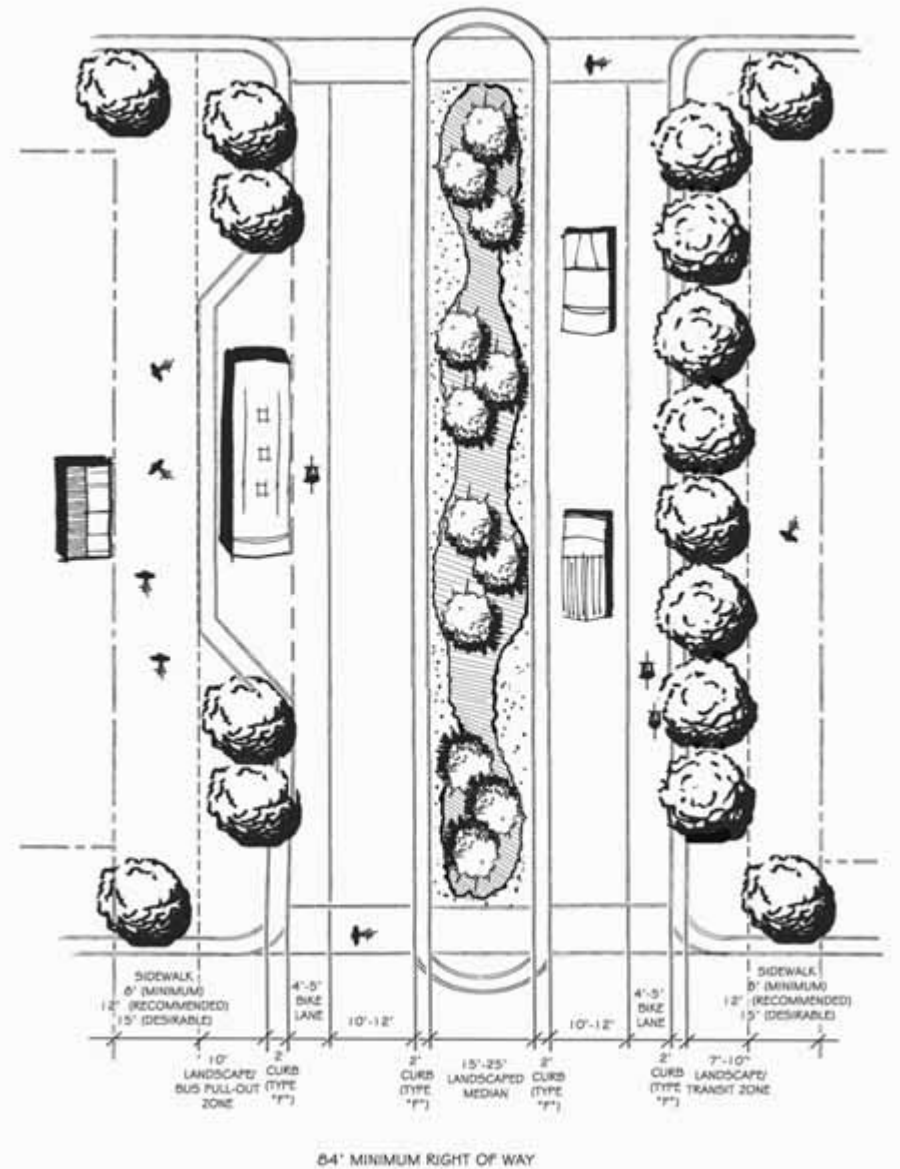
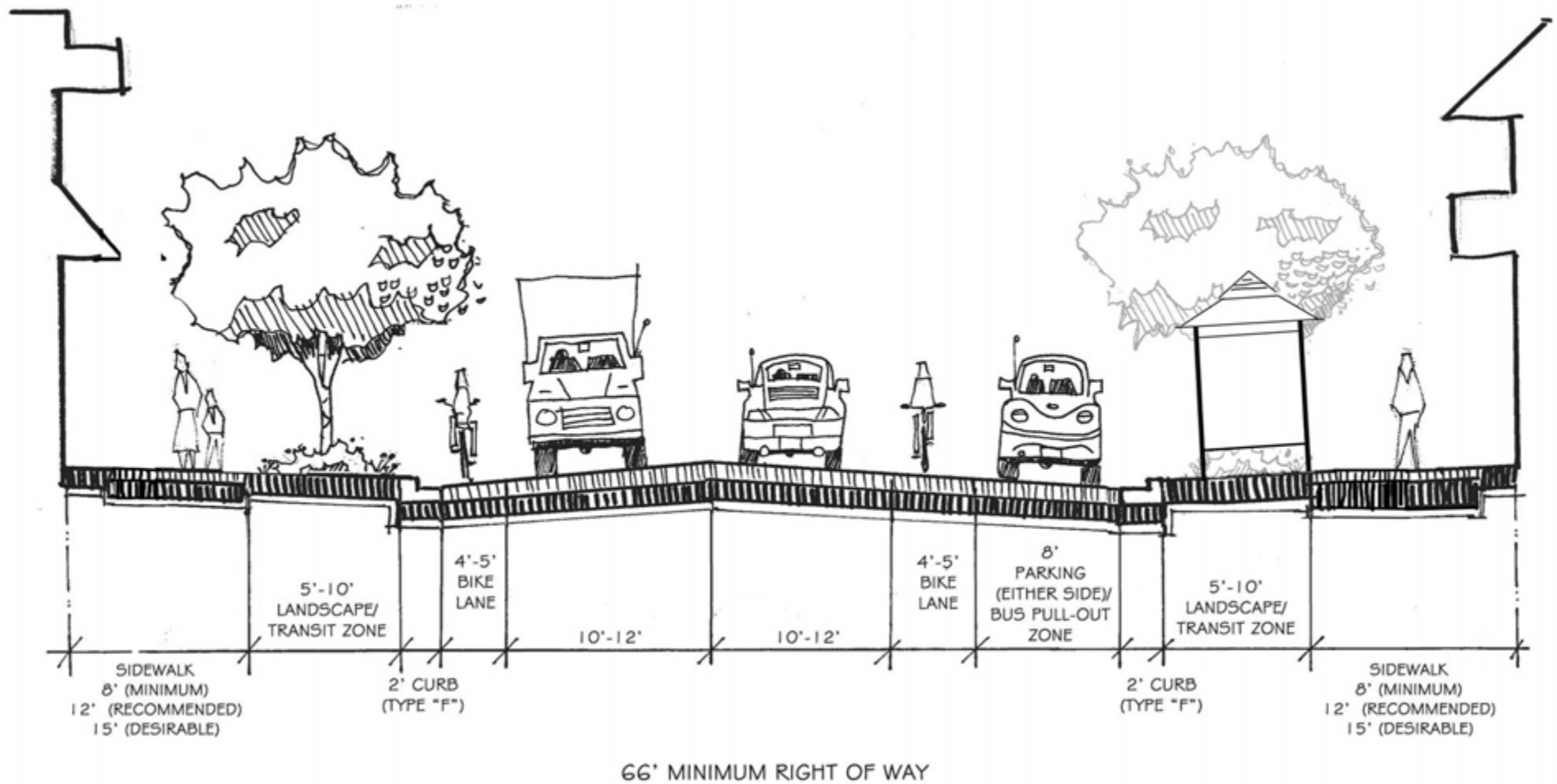


Figure 2.64: Two-Lane Divided Urban Corridor

Figure 2.65: Two-Lane Undivided Urban Corridor with On-Street Parking



ROADWAY DESIGN GUIDELINES

1. If ornamental trees or palms are mixed with shade trees, all trees should be spaced an average maximum of 30 feet on center, with shade trees no more than 90 feet apart. If only shade trees are to be used they should be planted no more than 40 feet on center.
“KEY CONCEPT”
2. Where tree grates are not used, low shrubs and/or groundcover should be placed around tree base. “KEY CONCEPT”
3. Sidewalks should be a minimum of 12 feet in width (15 foot preferred), with 5 foot clear passage area.
4. Bike lanes should be 4 feet in width (5 foot preferred) and located on both sides of roadway, to the left of parking.
5. A transit zone should be provided for patrons to wait for a bus so as to avoid conflicts with pedestrians, bicycles and parked cars. Where traffic volumes are high, pull-in bus stops should be used to reduce congestion behind stopped busses.

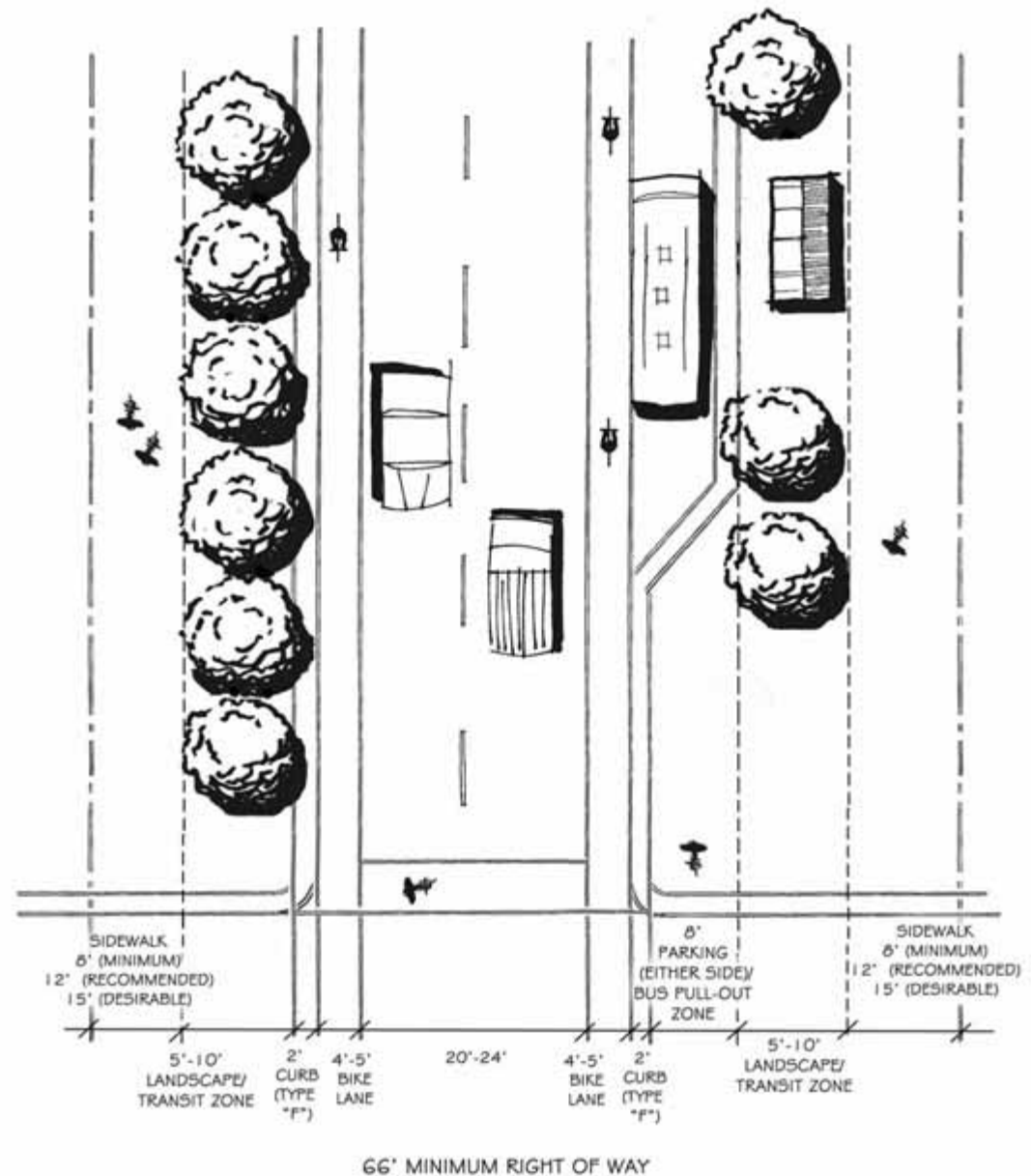
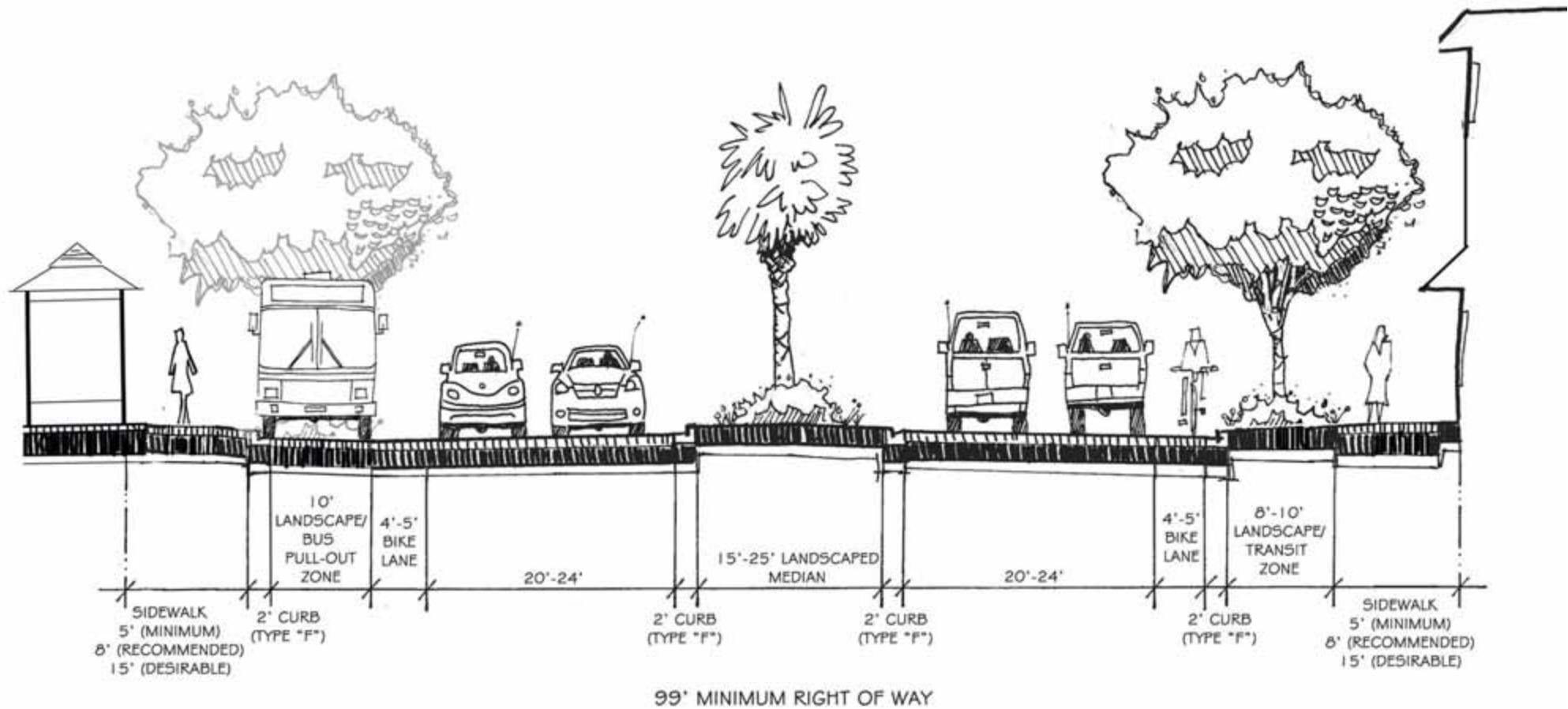


Figure 2.66: Two-Lane Undivided Urban Corridor with On-Street Parking

Figure 2.67: Four-Lane Divided Urban Corridor



ROADWAY DESIGN GUIDELINES

1. **Along Sidewalks:** If ornamental trees or palms are mixed with shade trees, all trees should be spaced an average of 30 feet on center, with shade trees spaced no more than 90 feet apart. If strictly shade trees are used they should be planted no more than 40 feet on center. Where tree grates are not used, low shrubs and/or groundcover should be placed around tree base. **"KEY CONCEPT"**
2. Sidewalks should be a minimum of 12 feet in width (15 foot preferred), with 5 foot clear passage area.
3. **In Medians:** Trees may be planted in formal rows, alternating rows, or informal clusters. If only shade trees are used, they should be planted an average maximum of 60 feet on center. If ornamental trees or palms are used or mixed with shade trees, trees should be planted an average maximum of 40 feet on center. Shrubs and groundcover should be incorporated as part of the design.
4. Bike lanes should be 4 feet in width (5 foot preferred) and located on both sides of roadway.
5. A transit zone should be provided for patrons to wait for a bus so as to avoid conflicts with pedestrians, bicycles and parked cars. Where traffic volumes are high, pull-in bus stops should be used to reduce congestion behind stopped busses.

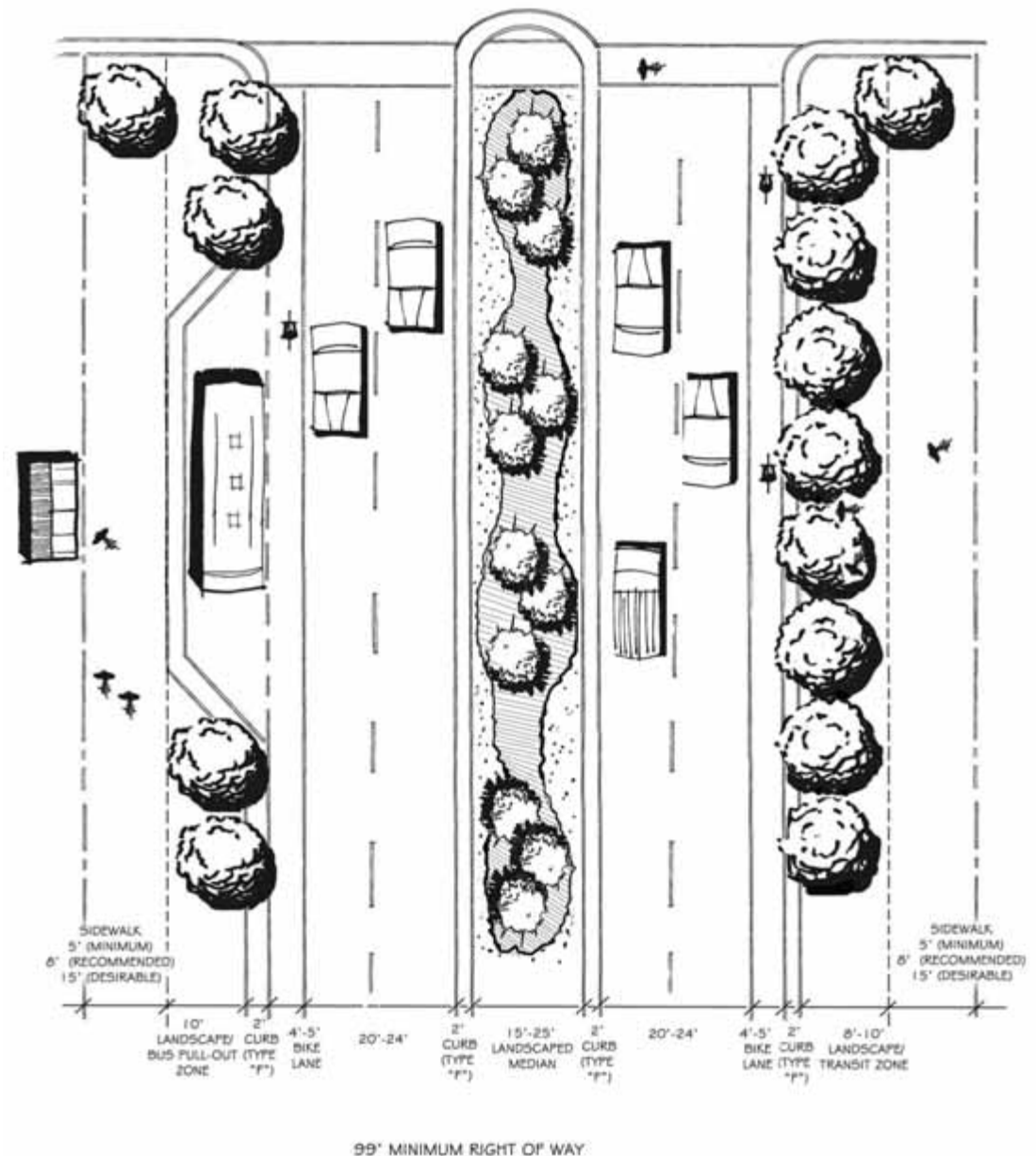
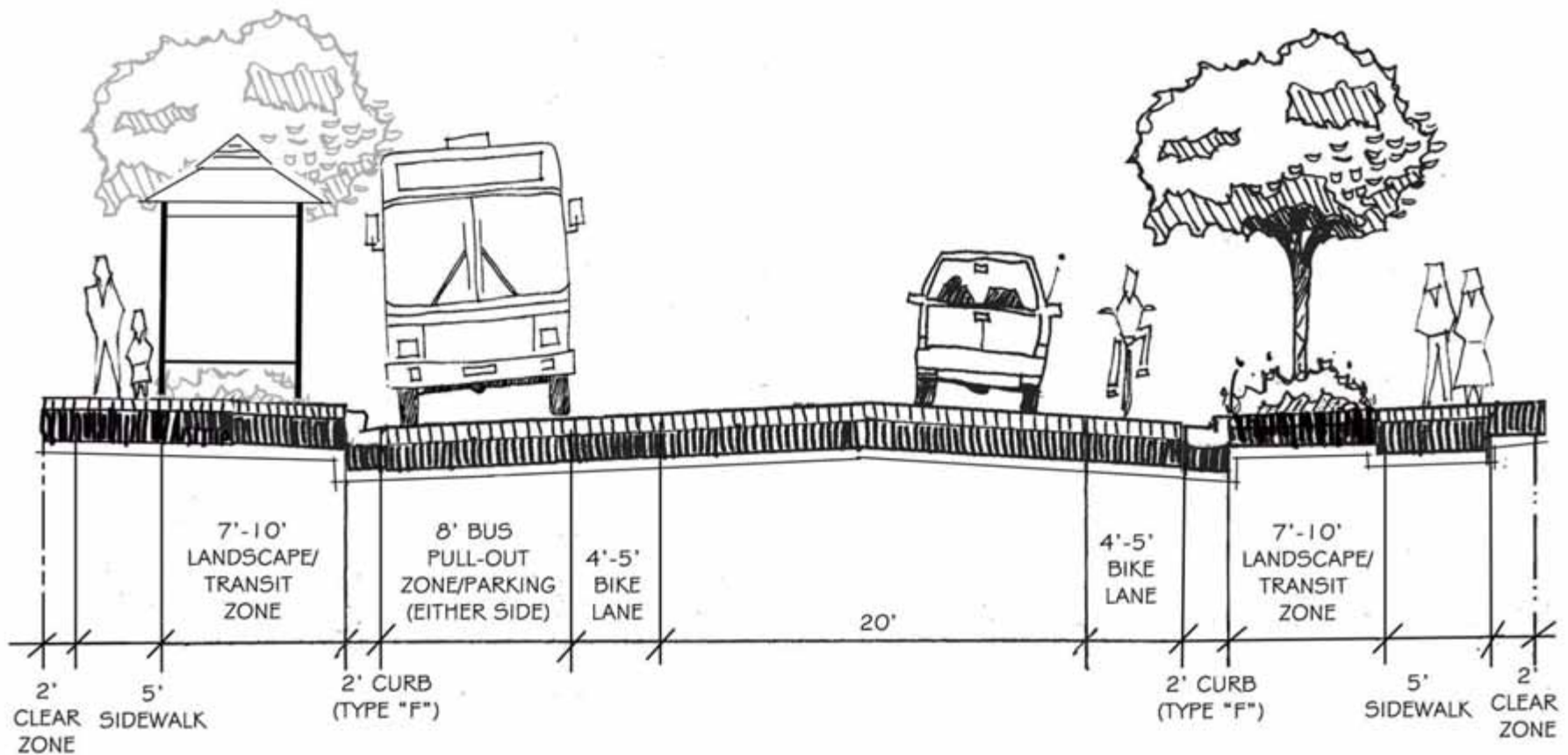


Figure 2.68: Four-Lane Divided Urban Corridor

Figure 2.69: Two-Lane Undivided Residential Corridor



68' MINIMUM RIGHT OF WAY

ROADWAY DESIGN GUIDELINES

1. Shade trees and/or ornamental trees shall be spaced a maximum average of 40 feet apart.

"KEY CONCEPT"

2. Bike lanes should be 4 feet in width (5 foot preferred) and located on both sides of roadway, to the left of parking. **"KEY CONCEPT"**

3. Sidewalks should be a minimum of 5 feet in width.

4. Bus stops and landing pads should be provided where ridership and bus stop spacing warrants. Where transit stops are needed in residential areas, infrastructure should fit the character of the neighborhood. Placement of stops or amenities should be at fenced or open areas, not in the front of residential land uses or blocking driveways.

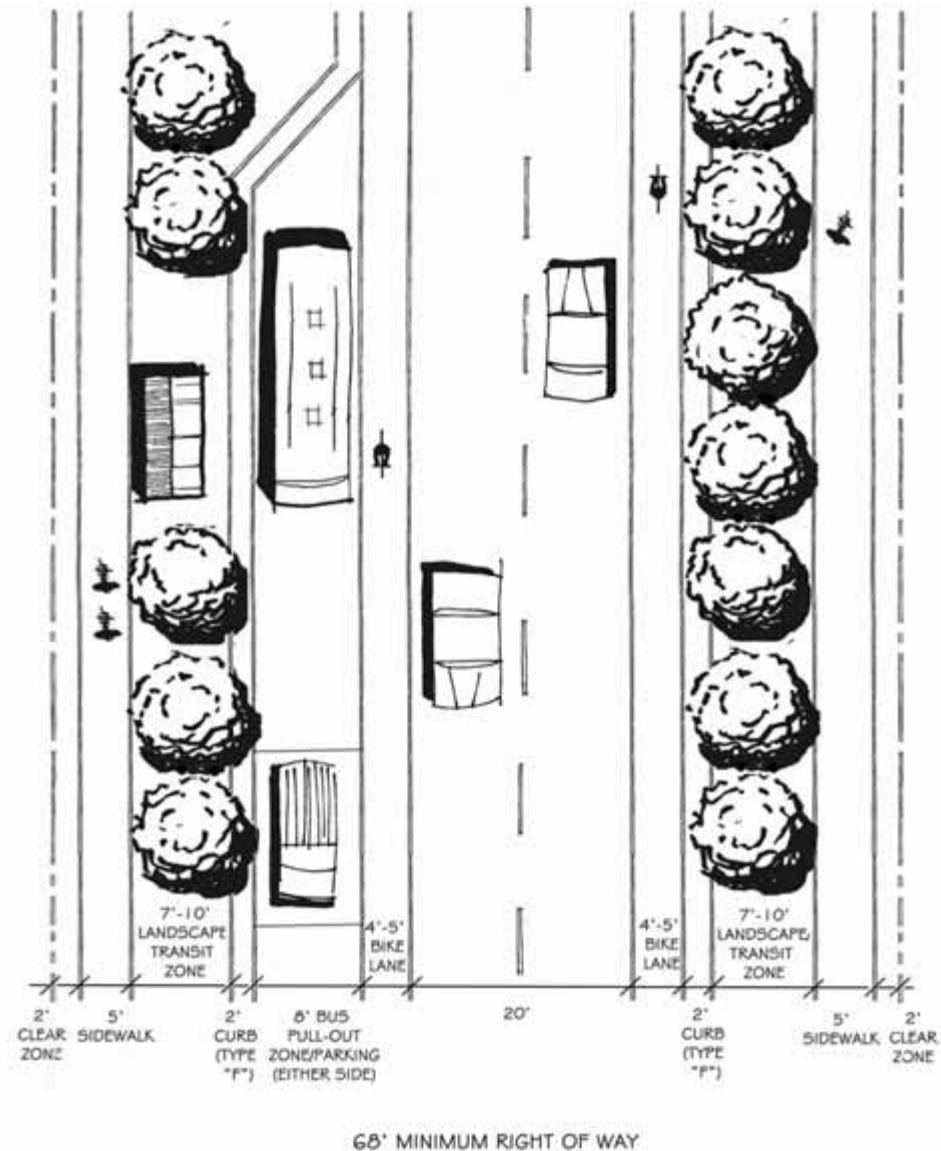
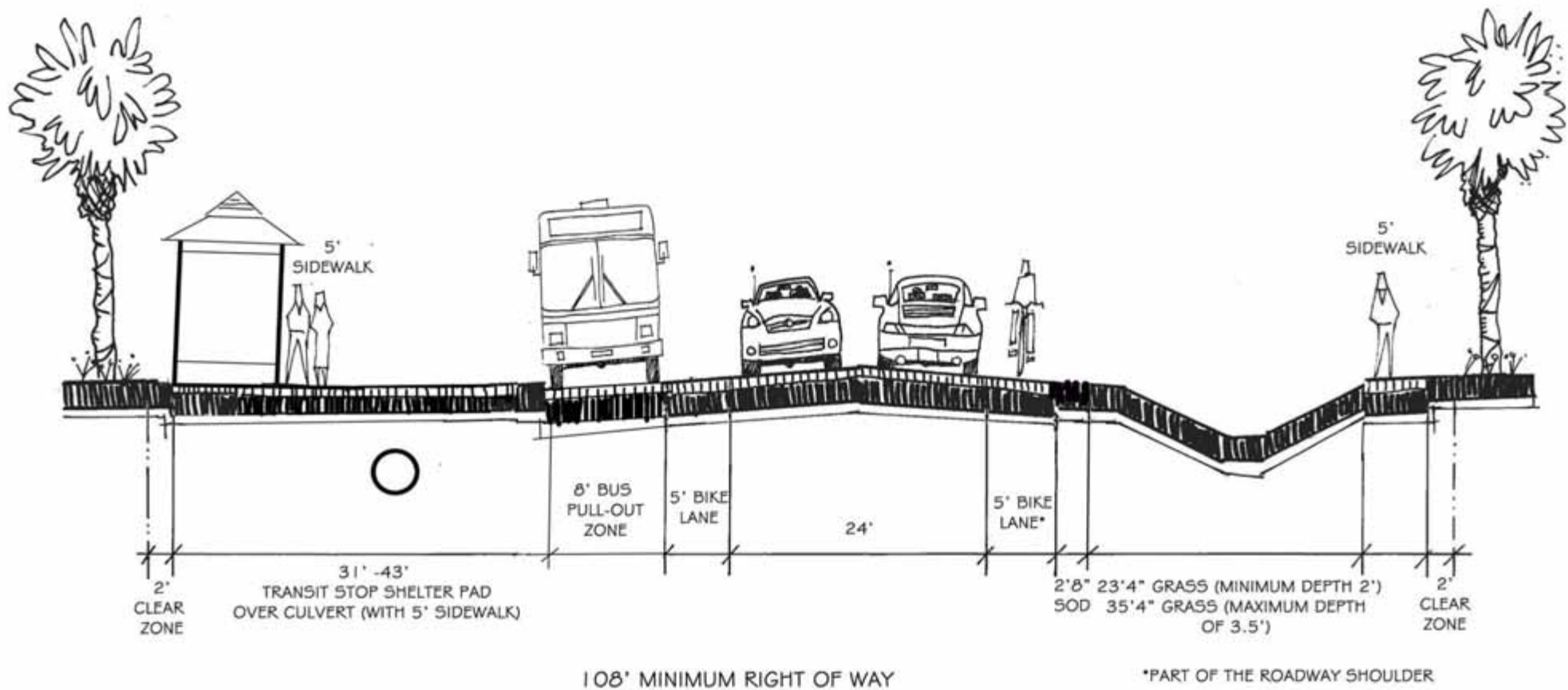


Figure 2.70: Two-Lane Undivided Residential Corridor

Figure 2.71: Two-Lane Undivided Rural Corridor



ROADWAY DESIGN GUIDELINES

1. Due to line of sight and drainage requirements, no tree or shrubs should be planted within the right-of-way.
2. Bike lanes should be 5 feet in width and located on both sides of roadway.
3. Sidewalks should be a minimum of 5 feet in width. In general they should only be incorporated near uses that generate pedestrian travel, such as schools and parks, but are not a standard part of the rural roadway.
4. At intersections and appropriate mid-block locations, a culvert should be extended to provide a 14' x 25' firm stable surface to allow for existing or future transit zone with access connections to sidewalks.

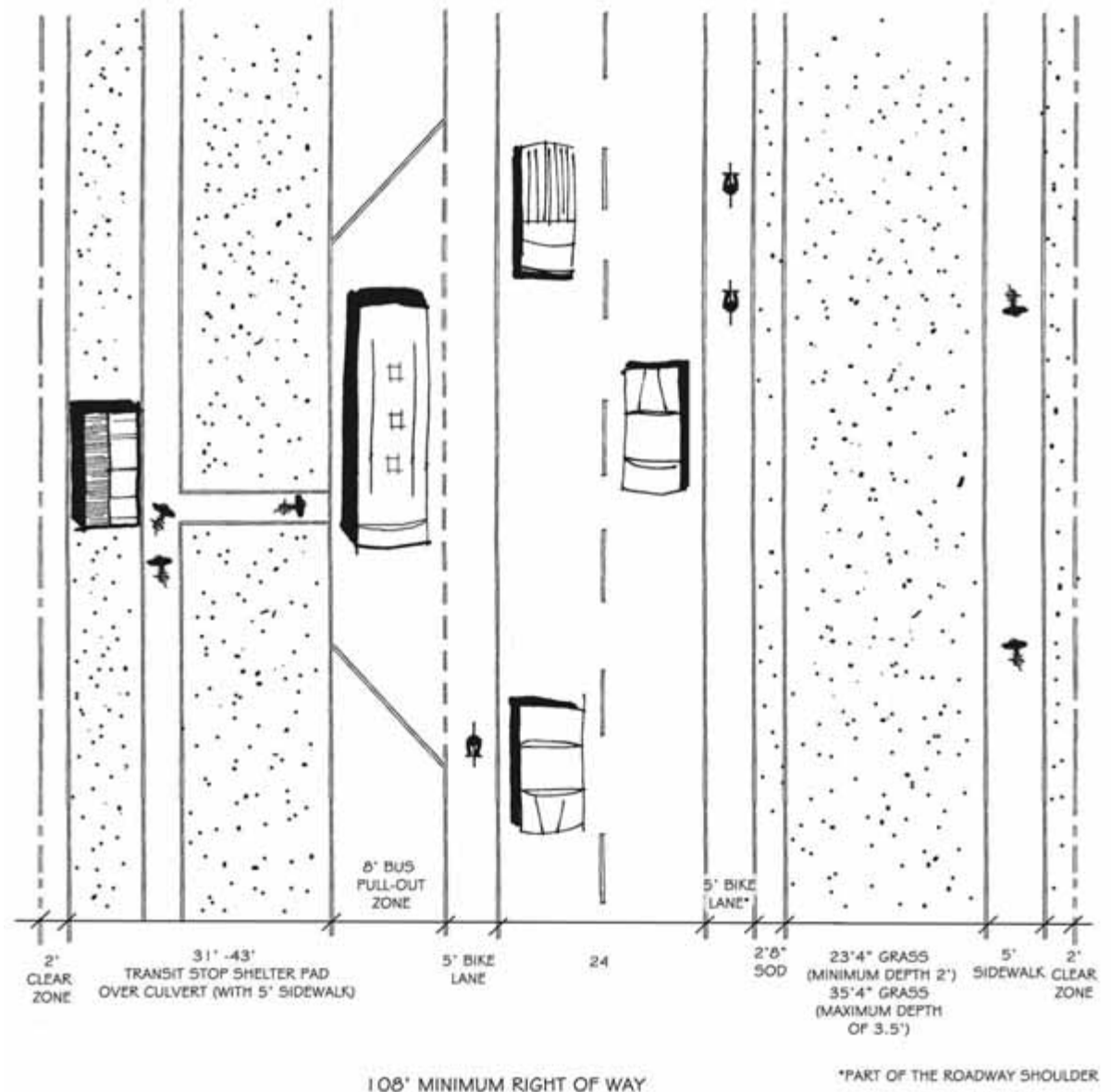
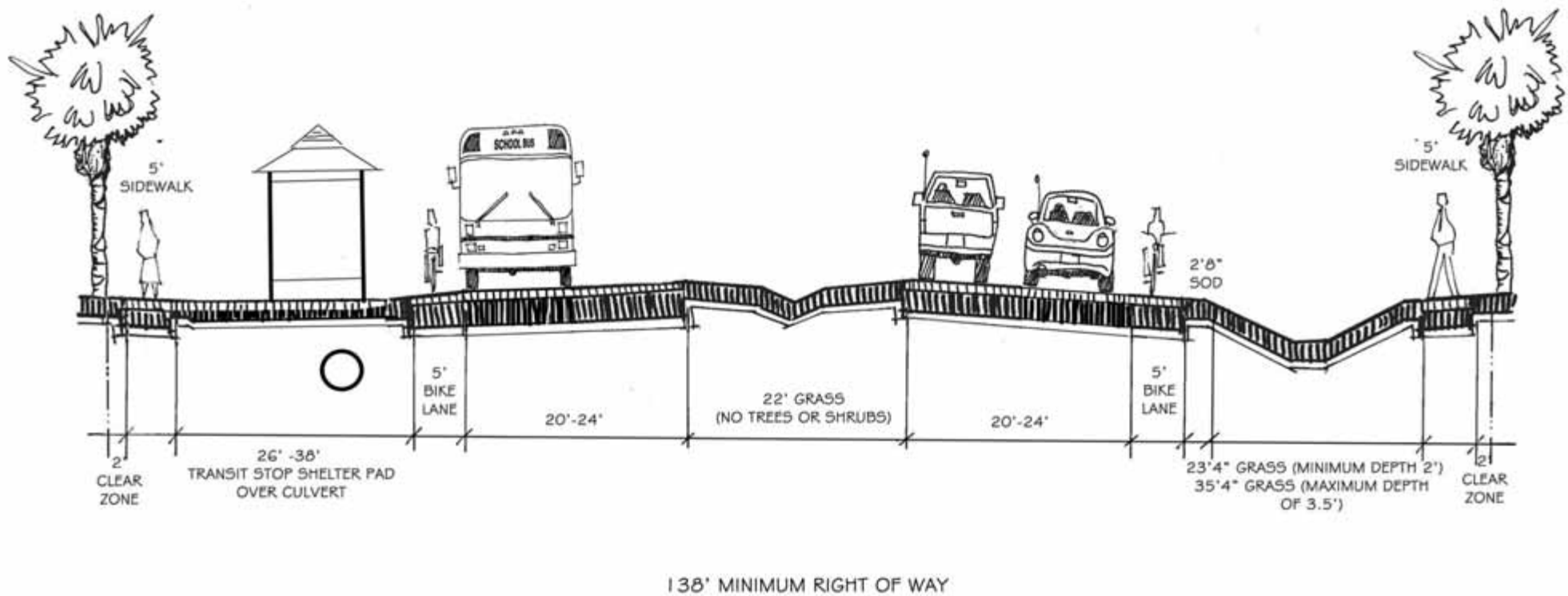


Figure 2.72: Two-Lane Undivided Rural Corridor

Figure 2.73: Four-Lane Divided Rural Corridor



ROADWAY DESIGN GUIDELINES

1. Due to line of sight and drainage requirements, no tree or shrubs should be planted within the right-of-way.
2. Bike lanes should be 5 feet in width and located on both sides of roadway.
3. Sidewalks should be a minimum of 5 feet in width. In general they should only be incorporated near uses that generate pedestrian travel, such as schools and parks, but are not a standard part of the rural roadway.
4. At intersections and appropriate mid-block locations, a culvert should be extended to provide a 14' x 25' firm stable surface to allow for existing or future transit zone with access connections to sidewalks.

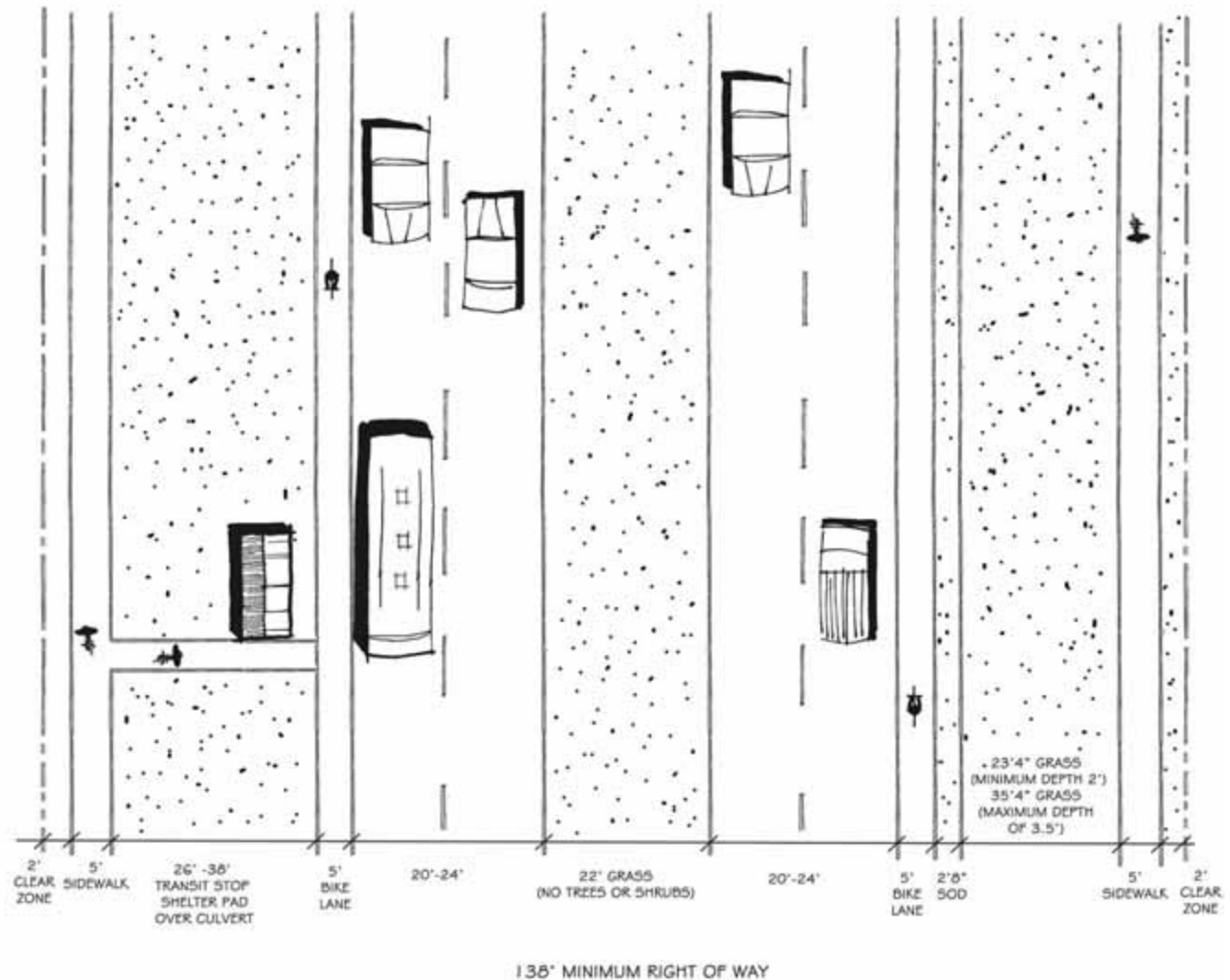


Figure 2.74: Four-Lane Divided Rural Corridor

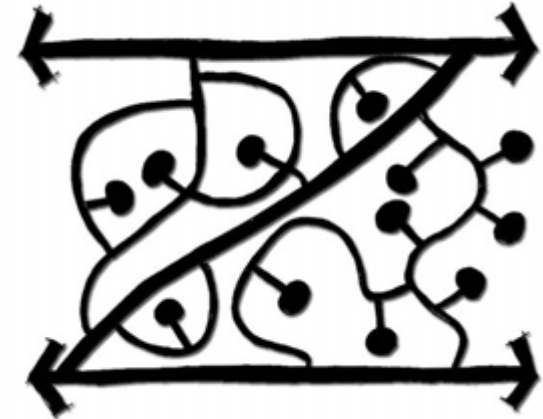
Street Network

Discontinuous or confusing curvilinear street networks can deter use by pedestrians, bicyclists, and motorists. Direct routes must be made available as an option for users in order to maximize the use of the roadway network at the community level.

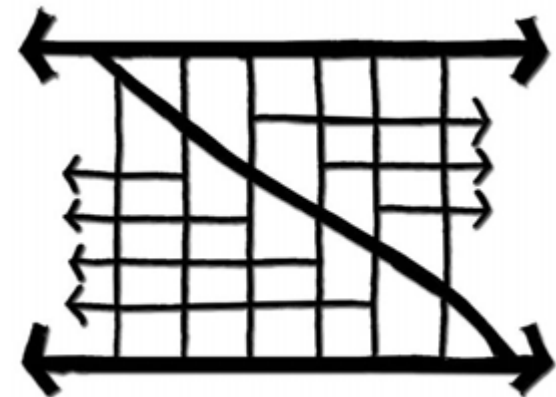
STREET NETWORK GUIDELINES

1. Neighborhood roadways shall be connected to form a more cohesive community grid. **"KEY CONCEPT"**
2. Local roads and collectors should be connected and continuous routes that provide alternates to arterials and limited access facilities. **"KEY CONCEPT"**
3. The street network should provide all residents with direct links to community focal points, social services and major roads in the region.
4. Walkways through parking lots should be delineated.
5. Cul-de-sacs and dead ends should be avoided. As a general rule, a minimum of fifty (50) percent of all roadways internal to new subdivisions should be constructed so that both ends of a given roadway terminate with another roadway.

*Figure 3.1:
Meandering
curvilinear
streets that
terminate with
cul-de-sacs and
dead ends are
inefficient and
can be confusing
and difficult for
way-finding*



*Figure 3.2: A
street network
on a grid
system is less
confusing and
provides more
direct routes
for all users*



Setbacks

In Urban and Suburban areas small setbacks are generally desirable. Buildings can provide a comfortable sense of enclosure for pedestrians. Interesting views should be provided for the pedestrian, in form of windows on buildings with retail use, or outdoor seating areas. Buffers to the roadway, such as landscaping and other pedestrian amenities should be considered. Future right of way needs should always be considered when requiring building setbacks.

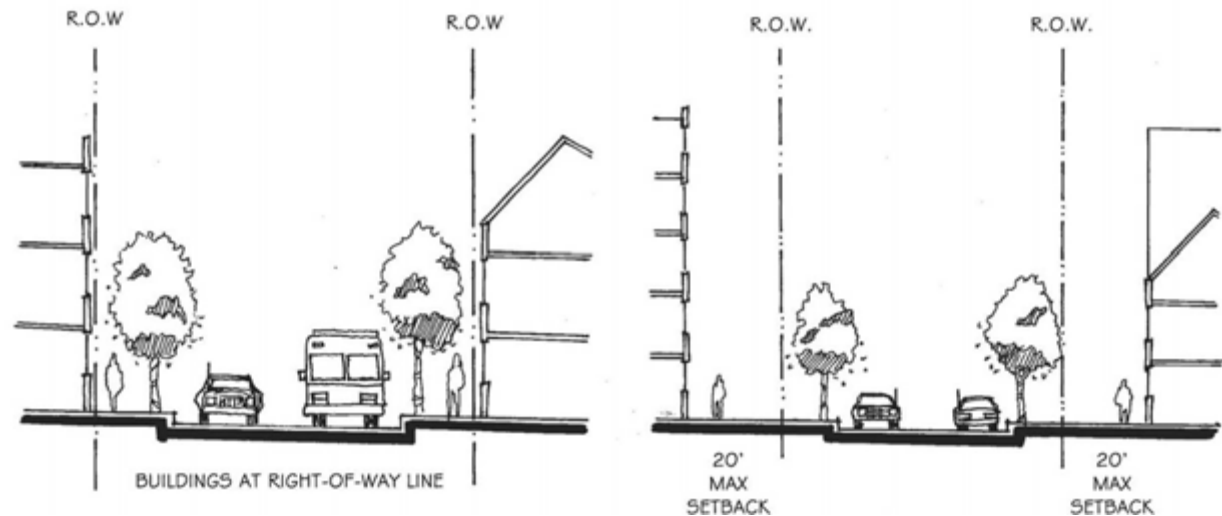
SETBACK GUIDELINES

1. A sense of vertical enclosure shall be provided by relatively similar building heights, building recesses, and/or street trees along Main Streets. **“KEY CONCEPT”**
2. **Main Streets:** Buildings should be located close to sidewalk with a maximum setback of 20 feet unless unique urban design strategies dictate a larger setback.
3. **Signature Corridors:** Driveways and parking should not be located between the building and the street.

*Figure 3.3:
Even large
retail spaces
can be
accommodated
with small
setbacks*



Figure 3.4: In both examples buildings are located near the road, providing a comfortable sense of enclosure for pedestrians. In the example on the right buildings are set back further due to the increased adjacent building heights



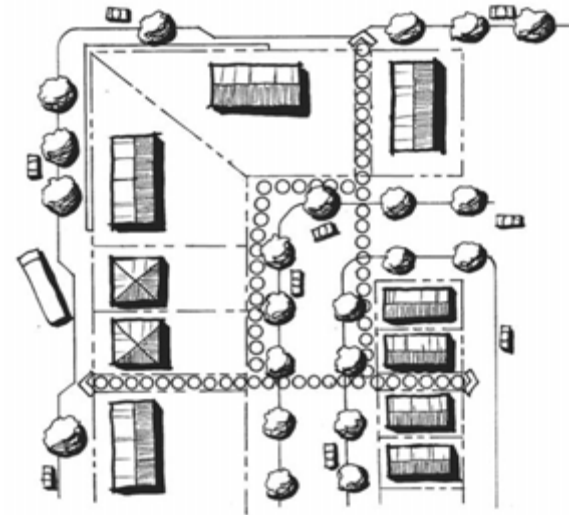
Site Access

Many existing strip commercial developments within the County are characterized by a focus on efficiency of vehicular circulation. Multiple curb cuts confuse the boundary between the roadway and the adjoining property and make the travel lanes more dangerous. Good site design prescribes easy access for pedestrians in order to promote a safe, convenient, and comfortable experience for the pedestrian.

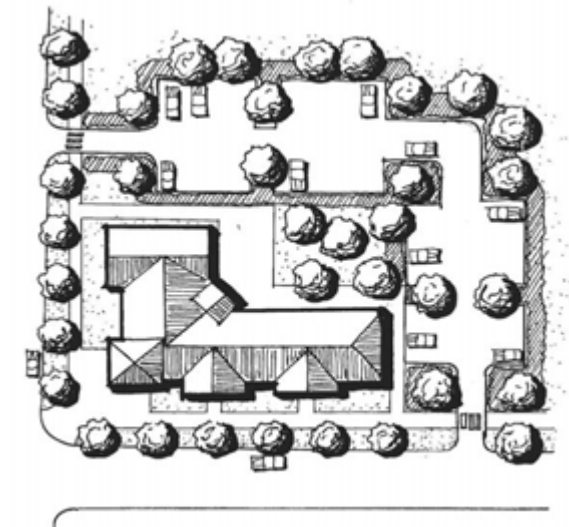
SITE ACCESS MANAGEMENT GUIDELINES

1. Walls or other permanent barriers that preclude the movement of people and cars between properties and the street are prohibited along Main Streets. In other areas, placement of walls and other permanent barriers in these areas should also be avoided. Access points should be provided as needed to allow for pedestrian passage where barriers currently exist. **"KEY CONCEPT"**
2. Interconnect parking areas and sidewalks on separate properties to accommodate potential cross traffic of people and cars. **"KEY CONCEPT"**
3. Provide transit interface with pedestrian circulation patterns to place bus patrons close to destinations.
4. Require adjacent properties to share entrances wherever possible, reducing the need for additional curb cuts. In instances where the configuration of property lines does not permit joint access, allow a single curb cut per property.
5. Restrict the use of curb cuts near intersections of major streets. Wherever possible, site entrances should be off arterials and collectors and on side streets.
6. Curb cuts should be aligned with breaks in medians.

*Figure 3.5:
Barriers such as walls or hedges should not be placed in areas that will block pedestrian access to destinations such as transit stops*



*Figure 3.6:
Where feasible, parking areas should be connected*



**SITE ACCESS MANAGEMENT GUIDELINES,
CONTINUED**

7. Provide landscaped medians (preferred when there is a maintenance commitment) or raised concrete barriers to control vehicular turning movements from the street.

8. Mid-block and rear alleys should be utilized where feasible for access to parking, utilities, service and unloading areas in order to minimize the number of required curb cuts along primary access routes.

9. Access to parking areas should be provided primarily from side streets.

10. Avoid placing a “wall of right-turn lanes” along frontage of commercial developments as this precludes transit stops on-street.

11. Provide continuous and direct connections between sidewalks and building entrances and between sidewalks and parking areas.

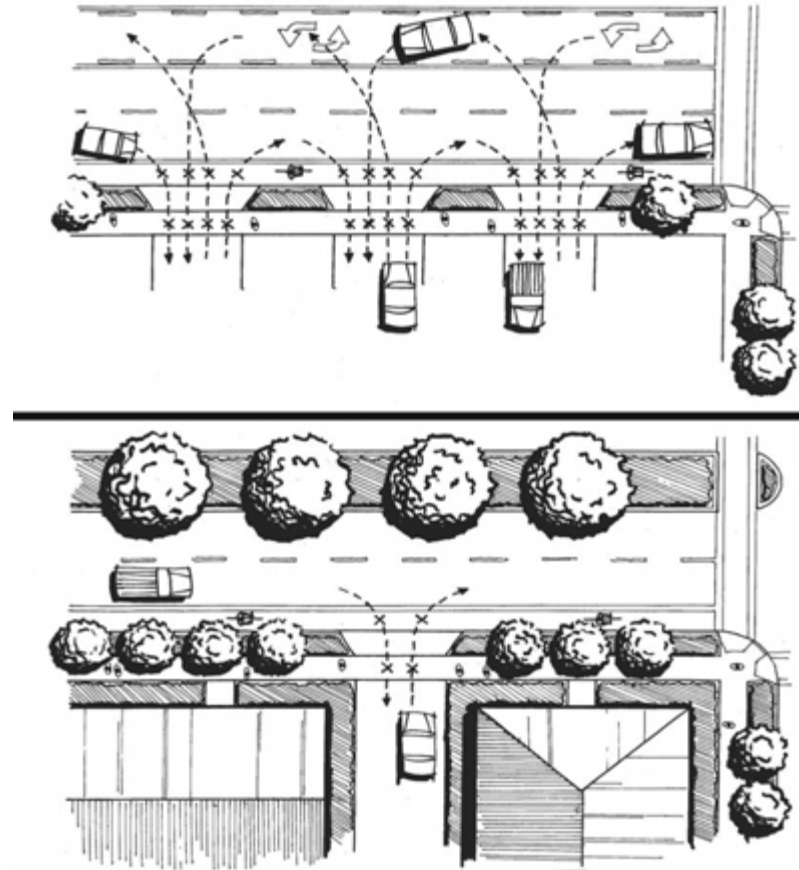


Figure 3.7: Medians can reduce potential conflicts between motorists and non-motorists by restricting vehicular turns

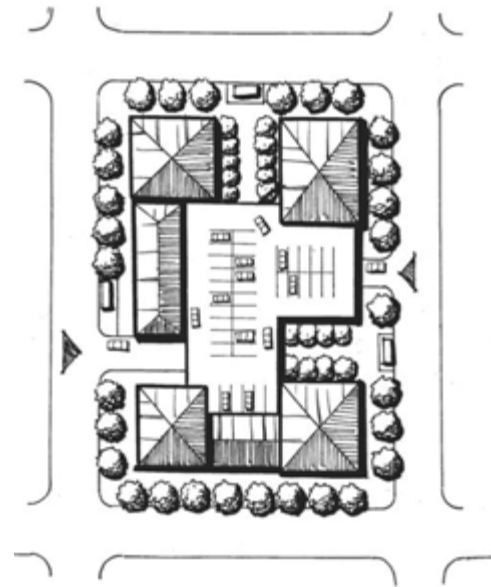
Parking

Parking lots can greatly visually detract from an area. To the greatest extent possible parking should be located at the rear or side and hidden from view and situated in a manner that allows multiple trips without repositioning of vehicles.

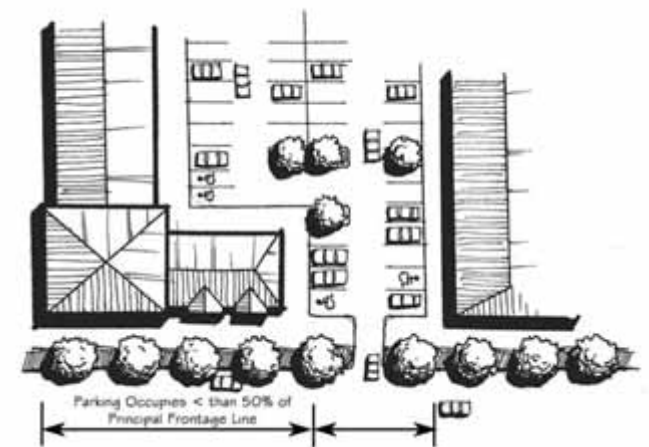
PARKING GUIDELINES

1. **Main Streets:** Parking shall only be permitted at the rear or sides of buildings. **"KEY CONCEPT"**
2. **Main Streets:** Side yard parking may occupy no more than 50% of the principal frontage line. **"KEY CONCEPT"**
3. Parking lots shall be designed to facilitate cross access between properties. **"KEY CONCEPT"**
4. Bicycle racks should be located close to main entrances of buildings.
5. **Main Streets:** Allow off-site parking to be used as credit for required parking where appropriate.
6. Allow a reduction in the number of required parking spaces for a development if transit facilities are placed on site.
7. Allow a reduction in the number of required parking spaces for a development where a parking garage is placed on site.

*Figure 3.8:
Cross access of
businesses is
easy for
pedestrians if
parking areas
are designed
properly. In
this example a
parking garage
is shared by
businesses*



*Figure 3.9:
Appropriate
ratio of
parking to
building
frontage*



Pedestrian Facilities

The following guidelines directly address the facilities that connect pedestrians with land use. Generally, they are designed to maximize user convenience and comfort.

PEDESTRIAN FACILITIES GUIDELINES

1. On site pedestrian facilities shall be a minimum of 5 feet wide. **“KEY CONCEPT”**
2. Pedestrian facilities shall connect the sidewalk adjacent to the roadway with the main entrances to the property’s buildings on the site with a clear, delineated path. **“KEY CONCEPT”**
3. Ensure that pedestrian facilities interconnect with existing or future sidewalks on adjacent properties and on the public rights-of-way. **“KEY CONCEPT”**
4. Provide sufficient width to provide for minimum 5 foot wide x 8 foot deep landing pad at bus stops. **“KEY CONCEPT”** Where no alternative to weather protection is available (roof overhangs, awnings, shade trees) provide a shelter pad that measures a minimum of 18 feet deep (for roadways <45mph) up to 24 feet deep (for roadways up to 50mph) x 25 foot long.
5. Shade should be provided for pedestrian facilities across the front property line and along the front edge of the buildings along Main Streets. **“KEY CONCEPT”**
6. **Main Streets:** Provide pedestrian amenities, such as seating and other street furniture. **“KEY CONCEPT”**



Figure 3.10: The provision of shade awnings the front edge of these buildings promotes a more enjoyable pedestrian experience

PEDESTRIAN FACILITIES GUIDELINES CONTINUED

7. Encourage the development of a streetscape with pedestrian amenities as well as safe and pleasant means to access the adjacent commercial development and neighborhoods.
8. On-site pedestrian facilities shall be a minimum of 5 feet wide, if sidewalk is separated from curb, 6 feet if flush to curb.
9. Pedestrian facilities in the public right of way shall connect to the buildings on the site with a clear, delineated path that is ADA accessible.
10. To further distinguish pedestrian from vehicular areas, color or texturize pedestrian facilities.

Figure 3.11: In this residential area, a large median serves as a gathering space with pedestrian amenities, and connects residential to commercial land use



Scale and Composition

Scale and composition of buildings are important influences to *Livable Roadways*. It is recommended that buildings be a minimum of two stories in most urban locations. The use of retail and commercial use on bottom floors, with a mix of office and residential on upper floors promotes area vitality and 24 hour use of areas.

SCALE GUIDELINES

1. Maximum uninterrupted building length parallel to a roadway is 100 feet. Differing façade treatments and building setbacks constitute an adequate interruption. **“KEY CONCEPT”**
2. **Main Streets:** Buildings shall have a minimum height of 35’ and maximum height of 84’. **“KEY CONCEPT”**
3. Buildings a minimum of two stories tall are appropriate in most locations.
4. Encourage vertically mixed-use buildings.
5. Transitional height zones should be employed adjacent to all single-family residential areas.

Figure 3.12: These vertically mixed six story buildings are the maximum appropriate scale for Main Streets



Orientation

If buildings are oriented to the streets, the need for signs and other way finding instruments is reduced. Buildings oriented toward the street with interesting supporting pedestrian elements can contribute to a more enjoyable walking and driving experience.

ORIENTATION GUIDELINES

1. At least one building entrance shall be located on the street side of the building. **"KEY CONCEPT"**
2. **Main Streets:** Gasoline fuel dispenser structures shall be located along a side yard and shall not be located between the building and the street along Main Streets. **"KEY CONCEPT"**
3. **Main Streets:** Weather protection in the form of awnings or similar building elements shall be provided above pedestrians paths adjacent to buildings. **"KEY CONCEPT"**
4. **Main Streets:** Drive through windows should be located in the rear yard.
5. The design of commercial building fronts should be marked with entrances that are easy to identify.
6. Orient building entrances toward transit stops, if present.
7. To maximize street frontages of buildings, buildings should be oriented so the long side fronts the street corridor.

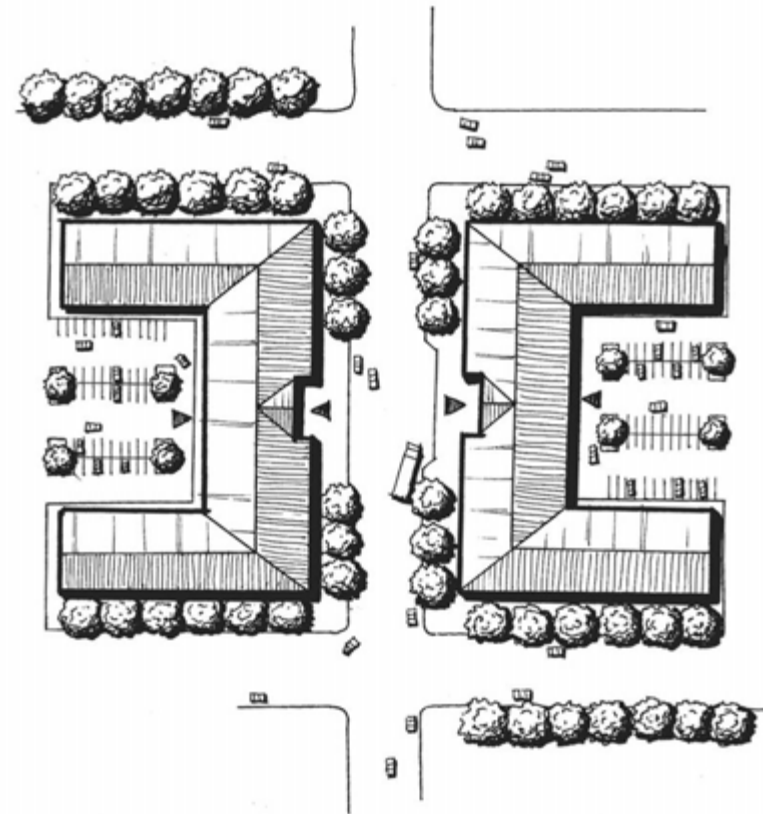


Figure 3.13: These commercial building fronts orient drivers and pedestrians with useful and attractive signs

ORIENTATION GUIDELINES CONTINUED

8. Special attention should be paid to building design at intersections, placing buildings near the street and providing entrances that are visible from the intersection.

9. The use of angled building edges where doors and other architectural features point toward intersection corners is encouraged near intersections.

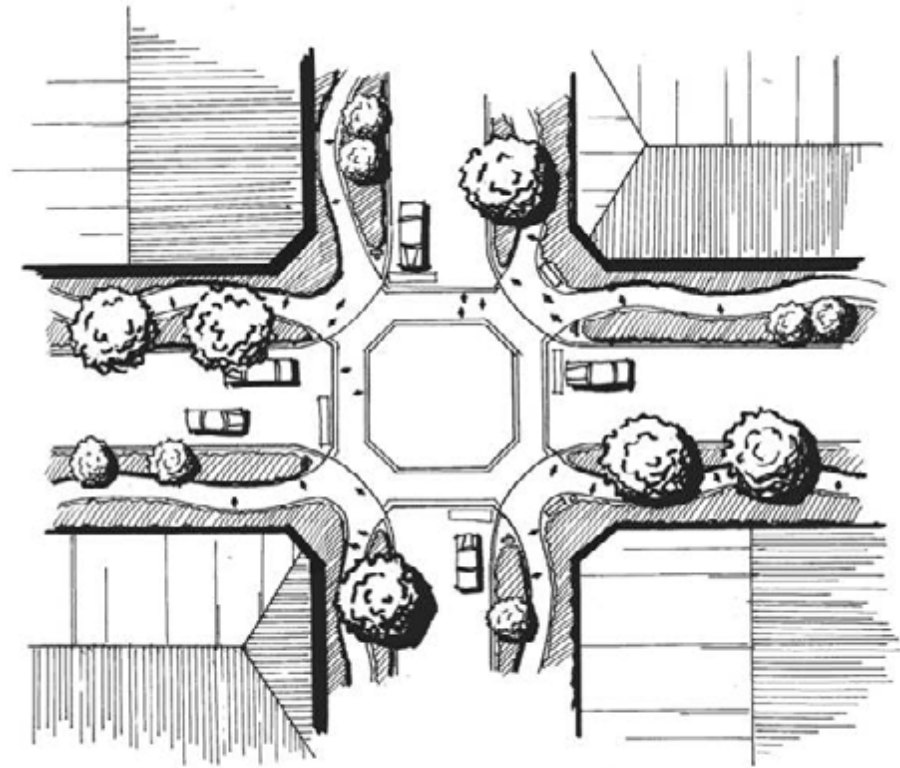


Figure 3.14: Buildings should be located near intersection

Design Coordination

Coordination of development encourages more cohesive community design. The following guidelines and standards are meant to promote this practice.

DESIGN COORDINATION GUIDELINES

1. Coordinate site planning between adjacent properties.
2. Design building patterns that create common public spaces and unified street edges, encourage the development of new plazas, seating areas, and displays that draw pedestrians toward buildings.
3. Coordinate building elements that transcend property lines. This should include facades that are aligned, similar landscape, continuous sidewalks and landscape along the building fronts, compatible scale, materials, signage and details.

Figure 3.15: Public art can provide visual interest along roadways



Figure 3.16: Fountains are one element that can be part of an overall landscape theme that transcends property lines



Facades

Building facades are an important community design element. Variation in elements and the provision of sufficient transparent facades make the pedestrian trip more interesting and inviting. The following guidelines and standards are intended to promote a higher quality of facade design, as it relates to community design.

FACADES GUIDELINES

1. Design fronts of commercial buildings with a minimum of 40% and a maximum 70% transparent façades and clearly marked entrances. **“KEY CONCEPT”**
2. **Main Streets and Signature Corridors:** Retail, civic or entertainment uses should be placed at street level. **“KEY CONCEPT”**
3. Buildings with façades greater than 100 feet in length should be broken down in scale by means of the articulation of well-proportioned and separate volumes. Strategic elements include the variation of architectural treatment and elements such as materials, heights and setbacks.
4. Exterior building lighting should be provided.
5. Building façades should reflect the character and history of the surrounding community.
6. Buildings should include at the street level elements that attract pedestrian attention, such as large display windows and signage.

*Figure 3.17:
Transparent
facades provide
visual interest
opportunities
for pedestrians*



Parking Structures

Parking Structures allow a large concentration of vehicles in a consolidated area. However, similar to parking lots, at times these structures may remain empty. Other uses that attract pedestrians, such as retail on the ground floor, should be incorporated in the design of structures in order to make the structure a supporting element to *Livable Roadways*.

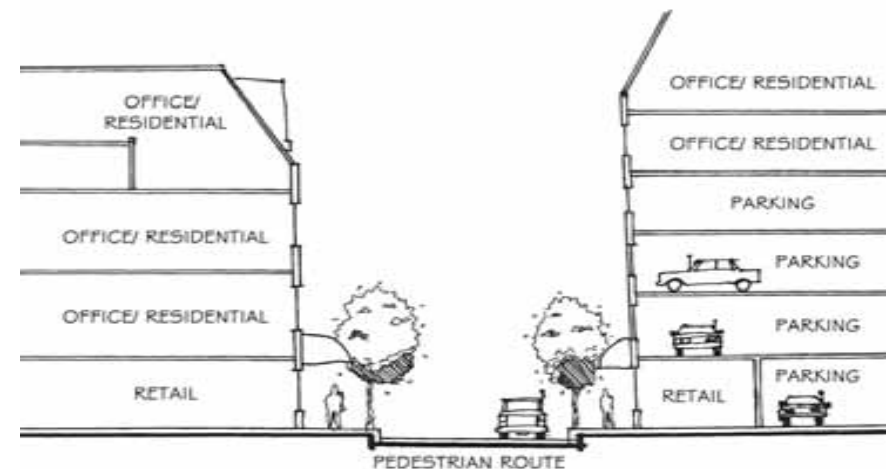
PARKING STRUCTURES GUIDELINES

1. **Main Streets:** Parking structure entrances shall only be permitted at the sides or rear of buildings. No surface parking is allowed fronting buildings between the building and street. **"KEY CONCEPT"**
2. Parking structures shall be designed to resemble adjacent buildings. **"KEY CONCEPT"**
3. **Main Streets:** Ground floor retail and other active uses shall be provided in parking structures. **"KEY CONCEPT"**
4. Allow a reduction in the number of required parking spaces for a development using a parking garage.
5. Provide vehicle stop bars, stop signs and/or pedestrian crossing warning signs at all driveway exits.
6. Provide parking for bicycles within the structure at a minimum ratio of one space per twenty motor vehicle spaces.

Figure 3.18: Parking structures can be designed to architecturally fit into surroundings



Figure 3.19: Retail can be accommodated on the ground floor of parking structures



Size and Height

Large signs are meant to alert motorists of the presence of a business. However, if good site design is practiced, and businesses are placed near and oriented toward the roadway, the need for large signs is reduced. Consequently, the overall look of the road is improved. In addition to the following guidelines, applicable County and City sign ordinance standards should be consulted.

SIZE AND HEIGHT GUIDELINES

- 1. Main Streets:** The maximum height for free standing signs shall be 6 feet from finished grade. The maximum sign square footage shall be 32 square feet for free-standing and monument signs. **"KEY CONCEPT"**
- 2. Signature Corridors:** The maximum sign height shall be 8 feet from finished grade for free-standing signs on properties with acreage greater than 40,000 and less than 120,000 square feet. The maximum sign square footage shall be 64 square feet. **"KEY CONCEPT"**
- 3. Signature Corridors:** For free-standing signs on properties with acreage greater than 120,000 square feet: The maximum height shall be 10 feet from finished grade. The maximum sign square footage shall be 72 square feet. **"KEY CONCEPT"**
- 4. Signature Corridors:** Signs with supporting members less than one-third of the width of the sign face are prohibited. **"KEY CONCEPT"**

*Figure 3.20:
Monument
signs inform
both motorists
and pedestrian
of businesses*



*Figure 3.21:
Appropriate
sign
dimensions
along
Signature
Corridors*



Location

The placement of signs can have a lasting impact on a roadway. Too many signs near the roadway can contribute to a cluttered look of the roadway and block views of businesses. The following guidelines should be consulted prior to free-standing sign placement.

LOCATION GUIDELINES

1. **Main Streets and Signature Corridors:** Free-standing signs are not permitted on properties with acreage less than 40,000 square feet. **“KEY CONCEPT”**
2. Signs should be readable under the canopy of trees on site.
3. Billboards should be prohibited on Main Streets and Signature Corridors.

Figure 3.22: The inclusions of low billboards on this roadway degrade its overall visual appearance



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Glossary of Terms and Abbreviations

AASHTO – American Association of State Highway and Transportation Officials

ADA – Americans with Disabilities Act of 1990; civil rights legislation passes in 1990 that mandated alterations in the design of buildings and transportation.

Accessibility – a measure of the ability or ease of which people may travel to and from desired locations.

Alley – Minor street type that is used primarily for vehicular service access or access to properties abutting a street.

Arterial Streets – A type of street typically used for the conveyance of high volumes of vehicular traffic.

Bicycle Facility – Any facility provided for the use and benefit of bicycle riders, including bicycle lanes and paths, as well as roadways.

Bicycle Lane – A portion of the roadway that is designated by striping or pavement markings for preferential or exclusive use by bicycle riders.

Bicycle Path – A route exclusively for the use of bicyclists and pedestrians.

Bicycle Rack – a fixed post or framework to which bicycles may be secured and locked.

Chicane – Curb extensions, landscape islands, or on-street parking that alternate from one side of the street to the other, resulting in “pinch points” where roadway width is reduced in order to slow vehicular travel.

Clear-Sight Zone – An area on the approaches to and at grade of intersections where unobstructed clear-sight windows must be provided. The length of the zone is based on the design speed of the roadway.

Collector Street – Type of street that conveys traffic from minor streets to major streets and arterials, or from local streets to local streets, and includes principal entrance streets on a residential development and streets for circulation within that development.

Corridor – a broad geographical band that follows a general directional flow or connects major trip generators.

Crosswalk – A marked or unmarked portion of the roadway designated for pedestrian crossings. Unmarked crossings are the natural extension of the shoulder, curb line or sidewalk.

Curb Extensions: Also known as “bulbs, neckdowns, flares, or chokers,” curb extensions extend the area of the curb into the intersection and reduce the distance pedestrians must cross within the roadway. Extensions are also believed to improve the visibility of pedestrians to motorists.

DOT – Department of Transportation; a municipal, county, state or federal agency responsible for transportation needs.

FDOT – Florida Department of Transportation

Median – A physical barrier which divides a street into two or more roadways.

Minor or Local Street – Type of street that is used primarily for access to abutting properties.

MPO – Metropolitan Planning Organization; the agency designated by the governor to administer the federally required transportation planning process in urban areas with population over 50,000.

Multi-Use Trail – a trail physically separated from motor vehicle traffic by an open space or barrier used by bicyclists, pedestrians, joggers, skaters, equestrians and/or other non-motorized traffic.

MUTCD – Manual on Uniform Control Devices; a national standard for placement and selection of all traffic control devices on or adjacent to all highways open to public travel.

Park-and-Ride – A mode of transportation where patrons drive individual automobiles, walk or ride bicycles to a transit station, stop, or vanpool waiting area and park vehicles or bicycles in designated areas. Patrons then take a bus or van to the desired destination. These facilities intercept and decrease vehicular traffic from peripheral areas that might otherwise directly access urban destination points.

Pedestrian – A person on foot, in a wheelchair, or escorting a bicycle.

Pedestrian Facility – An area or amenity provided for the benefit of pedestrian travel, including sidewalks, paths, crosswalks, signals, benches.

Pedestrian Refuge Island - Raised spaces that separate vehicular movement on a street. Within wide intersections, a refuge is area, often triangular in form, is placed between a through lane and a turn lane. Islands can also be placed in the middle of an intersection or roadway. Islands allow pedestrians to cross fewer lanes at a time by providing a safe haven for users at point(s) within the intersection.

Pedestrian Signal – Electronic devices used for controlling movements of pedestrians at signalized mid-blocks or intersections.

Right-of-Way – Land or property, usually in a strip, acquired for or devoted to transportation purposes.

Roadway – A paved portion of a highway.

Setback – The required or actual placement of a building a specified horizontal distance from a road or property line.

Shoulder – The paved or unpaved area between the roadway edge and the property line adjacent to vehicular travel lanes.

Sidewalk – A hard surface walkway, typically made of concrete, separated from the roadway designed for preferential or exclusive pedestrian use.

Sight Distance – The length of roadway visible to the motorist that is required for the motorist to have time to safely react upon seeing a vehicle, pedestrian or traffic control device as required by the highway design.

Stop, Far side – Transit stop located immediately past an intersection.

Stop, Mid-block – Transit stop located at a point away from intersections.

Stop, Near Side – Transit stop located immediately before an intersection in the direction of bus travel.

Structured parking – Parking provided in a building, typically at least two levels.

Traffic Calming – Transportation techniques, programs, or facilities designed or intended to slow vehicular movement.

Transit Shelter – A building or other structure constructed at a transit stop.

Traffic Signal – Any traffic control device that assigns right-of-way to vehicles and pedestrians at intersections.

Plant Species: Shade Trees

The following plant lists are meant to serve as an update to the original list provided within the *Guidelines for Landscaping Hillsborough County Roadways*. This list is meant as a guide only, and is not to be considered exhaustive. Plants are listed under the categories of Shade Trees, Ornamental Trees, Palms, Shrubs, Groundcover, and Vines. Authority for final determination of appropriate plant material for county right-of-way remains with applicable reviewing agencies.

Shade trees are defined as trees with trunks measuring a minimum of four inches diameter at six inches above ground. Clear zone setbacks apply to all shade trees.

SHADE TREE	Height	Form	Soil Requirements	Color	Florida Native	Drought Tolerant
Recommended Species						
American Elm (<i>Ulmus americana</i>)	60'-80'	Tall with vase-shaped crown	Tolerant of various soils – prefers moist soil	No variation/ No noticeable flowers	√	√
American Holly (<i>Ilex x attenuata</i>)	50'	Pyramidal	Slightly acidic, well drained	Decorative red berries, dark green leaves	√	√
Bald Cypress (<i>Taxodium distichum</i>)	40'-80'	In youth pyramidal, with age broad-topped	Tolerates range to a variety of soils, can be inundated	Fall color	√	
Florida Elm (<i>Ulmus floridana</i>)	50'-60'	Inverted conical shape	Prefers moist soil	Fall color	√	√
Florida Maple (<i>Acer saccharum</i>)	60'	Elliptical crown	Tolerates range to a variety of soils, dislikes dry, compact soil	Fall color	√	
Laurel Oak (<i>Quercus laurifolia</i>)	80'-100'	Upright, taller than broad	Tolerant of various soils	No variation/ No noticeable flowers	√	√
Live Oak (<i>Quercus virginiana</i>)	50'-60'	Spreading	Moist soil	No variation/ No noticeable flowers	√	

Plant Species: Shade Trees Continued

SHADE TREE	Height	Form	Soil Requirements	Color	Florida Native	Drought Tolerant
Recommended Species						
Longleaf Pine (<i>Pinus palustris</i>)	80'-100'	Tall with stout branches	Prefers well drained soils	Cones 6-10" long	√	√
Redbay (<i>Persea borbonia</i>)	40'-50'	Upright, dense canopy, columnar	Tolerant of swampy to dry soil	No variation/ No noticeable flowers	√	√
Red Cedar (<i>Juniperus silicicola</i>)	30'	Pyramidal when young, with age broad-topped	Sandy soils	No variation/ No noticeable flowers	√	√
Red Maple (<i>Acer rubrum</i>)	70'	Cylindrical, tall, well developed trunk	Prefers wet, but adapts to dry soil	Fall color	√	
Savannah Holly (<i>Ilex x attenuata</i> 'Savannah')	20'-30'	Narrow, open pyramidal to columnar form	Prefers fertile, well drained slightly acid soils.	Small round red berries	√	√
Shumard Oak (<i>Quercus shumardii</i>)	60'-100'	Oval when young, spreading with age	Prefers moist, well-drained to bottomland soils	Fall color	√	√
Slash Pine (<i>Pinus elliotii</i>)	100'	Tall, slender with horizontal branches	Any soil, wet or dry conditions	Cones 2-6" long	√	
Southern Magnolia (<i>Magnolia grandiflora</i>)	80'	Symmetrical upright, pyramidal shade	Prefers moist, acidic soils	7-8" diameter white flowers	√	
Sweetbay Magnolia (<i>Magnolia virginiana</i>)	40'-60'	Upright, columnar form	Prefers wet to semi-wet soil	2-3" diameter white flowers	√	
Sweetgum (<i>Liquidambar styraciflua</i>)	60'-125'	Conical shape, spreading branches	Prefers moist, acidic soil, but will adapt to drier sites	Fall color	√	
Sycamore (<i>Platanus occidentalis</i>)	75'-100'	Oval to pyramidal in form	Prefers moist, acidic soil, but adapts to most soil types	Fall color, whitish trunk	√	
Winged Elm (<i>Ulmus alata</i>)	40'-70'	Rounded crown, spreading branches	Prefers moist, acidic soil, but adapts to most soil types	Fall color	√	√

Plant Species: Shade Trees Continued

SHADE TREE	Height	Form	Soil Requirements	Color	Florida Native	Drought Tolerant
Possible Use						
Chinese Elm (<i>Ulmus parviflora</i>) – Subject to insects, drops litter	40'-50'	Rounded top, fine branches	Prefers moist, well drained soil but tolerates poor soil	Distinctive bark		√
Myrtle Oak (<i>Quercus myrtifolia</i>) – Limited availability	35'-40'	Often shrubby with an irregular or rounded crown	Prefers sandy soil	No variation/ No noticeable flowers	√	√
Pond Cypress (<i>Taxodium ascendens</i>) – Requires moist soil	40'-60'	In youth pyramidal, with age broad-topped	Prefers moist soil	Fall color	√	
River Birch (<i>Betula nigra</i>) – Requires moist soil	50'-60'	Upright, narrow	Prefers moist to wet, rich, acidic soils but tolerates drier soils	Ornamental bark	√	
Sand Live Oak (<i>Quercus geminata</i>) – Limited availability	60'-70'	Compact, shrubby	Prefers deep, sandy soils	Dark green foliage	√	√
Tulip Poplar (<i>Liriodendron tulipifera</i>)	70'-100'	Broad, columnar form	Tolerates a range of soils	Small flowers in spring	√	√

Plant Species: Not Recommended Shade Trees

Not Recommended Shade Trees		
Avocado (<i>Persea americana</i>) – Edible fruit, drops litter	Camphor (<i>Cinnamomum camphora</i>) – Roots tend to damage paving, profuse seeding	Chinese Tallow (<i>Sapium sebiferum</i>) – Florida Exotic Pest Plant Council considers a nuisance
Citrus (<i>Citrus spp.</i>) – Edible fruit, “exempted”	Floss-Silk Tree (<i>Chorisia speciosa</i>) – Has spines, Not cold tolerant	Goldenrain Tree (<i>Koelreuteria elegans</i>) – Weak wood. “exempted”
Gum Tree (<i>Eucalyptus spp.</i>) – Not cold tolerant, weak wood	Gumbo-Limbo (<i>Bursera simaruba</i>) – Not cold tolerant, weak wood	Hawthornes (<i>Crataegus spp.</i>) – Thorns, limited availability
Indian Rosewood (<i>Dalbergia sissoo</i>) – Not cold tolerant, “exempted”	Italian Cypress (<i>Cupressus sempervirens</i>) – Subject to mites	Jacaranda (<i>Jacaranda acutifolia</i>) – Not cold tolerant, “exempted”
Japanese Maple (<i>Acer palmatum</i>) – Prefers moist soil, requires winter chill	Juniper (<i>Juniperus chinensis</i>) – Subject to pests	Loblolly Bay (<i>Gordonia lasianthus</i>) – Difficult to grow
Mango (<i>Mangifera indica</i>) – Edible fruit, drops litter, not cold tolerant	Norfolk Island Pine (<i>Araucaria heterophylla</i>) – Not cold tolerant	Orchid Tree (<i>Bauhinia variegata</i>) Not cold tolerant, “Exempted”
Oriental Persimmon (<i>Diospyros kaki</i>) – Edible fruit, drops litter	Pecan (<i>Carya illinoensis</i>) – Edible fruit, drops litter	Pigeon Plum (<i>Coccoloba diversifolia</i>) – Not cold tolerant
Queen Sago (<i>Cycas circinalis</i>) – Not cold tolerant	Tamarind (<i>Tamarindus indica</i>) – Not cold tolerant	Traveler’s Tree (<i>Ravenala madagascariensis</i>) – Not cold tolerant
Poplars (<i>Populus spp.</i>) – Not tolerant of high heat, brittle, invasive roots	Weeping Willow (<i>Salix babylonica</i>) – Invasive roots, Low hanging branches	

Plant Species: Ornamental Trees

Ornamental trees are defined as trees whose trunks are anticipated to measure less than four inches at six inches above ground. This list is meant as a guide only, and is not to be considered exhaustive. Species should be considered in the context of their planted conditions and in light of their anticipated maintenance schedule.

ORNAMENTAL TREE	Height	Form	Soil Requirements	Color	Florida Native	Drought Tolerant
Recommended Use						
Chickasaw Plum (<i>Prunus angustifolia</i>)	20'	Small shrubby tree	Moist soils	½ inch fruit in summer	√	√
Dahoon Holly (<i>Ilex cassine</i>)	40'	Small tree with upward pointed branches	Wet soils	Red berries	√	
East Palatka Holly (<i>Ilex x attenuata</i> 'East Palatka')	35'	Narrow pyramidal shaped tree	Well-drained, moist soils	Red berries	√	
Fringe Tree (<i>Chionanthus virginicus</i>)	12'-20'	Spreading, open crown	Well-drained, moist soils	White fragrant flowers in spring	√	
Ligustrum (<i>Ligustrum japonicum</i>)	20'	Large, upright shrub or small tree	Tolerant of a wide-range of soils	White flowers in early summer		
Podocarpus (<i>Podocarpus macrophyllus</i>)	15'-20'	Shrubby form if unsheared	Moist soil	No variation/ Inconspicuous flowers		
Wax Myrtle (<i>Myrica cerifera</i>)	5'-20'	Multi-stemmed, densely foliated shrub or small tree	Prefers moist, acidic soils, but can adapt to most soil types	No variation/ No noticeable flowers	√	√
Yaupon Holly (<i>Ilex vomitoria</i>)	25'	Upright, irregular shrub or small tree	Can adapt to most soil types, medium drainage	No variation/ No noticeable flowers	√	√

Plant Species: Ornamental Trees Continued

ORNAMENTAL TREE	Height	Form	Soil Requirements	Color	Florida Native	Drought Tolerant
Possible Use						
Crape Myrtle (<i>Lagerstroemia indica</i>) – Subject to insects, sooty mold	15'-25'	Multistemmed; rounded crown; dense branching	Moist, well drained soil	Showy flower clusters in a variety of colors		√
Dogwood (<i>Cornus florida</i>) – Needs rich soil, appropriate for north and east part of county	15'-25'	Short trunk with a full, rounded crown	Fertile, well drained but moist soil	4" white bracts in spring; glossy red fruit in fall		
Silverbell (<i>Halesia diptera</i>) – limited availability, appropriate for north part of county	15'-30'	Rounded; open; irregular; usually multistemmed	Moist soil	1" white to pale pink, bell shaped flowers in spring		
Sparkleberry (<i>Vaccinium arboreum</i>) – Limited availability	10'-20'	Spreading shrub to small tree; crooked trunk	Dry to moist soil	Small, fragrant white flowers in spring; berries in winter		√
Upright Bottlebrush (<i>Callistemon rigidus</i>) – Not cold tolerant, limited availability	15'-20'	Oval with rounded crown	Dry to moist soil	Red flowers in a bottle shaped form		√

Plant Species: Not Recommended Ornamental Trees

Not Recommended Ornamental Trees		
Bottlebrush (<i>Callistemon citrinus</i>) – Not cold tolerant	Chaste Tree (<i>Vitex trifolia</i>) – Not hardy	Firethorn (<i>Pyracantha coccinea</i>) – Thorns
Jerusalem Thorn (<i>Parkinsonia aculeate</i>) – Thorns	Loquat (<i>Eriobotrya japonica</i>) – Edible fruit, drops litter	Schefflera (<i>Brassaia actinophylla</i>) – Not cold tolerant, Florida Exotic Pest Plant Council considers a nuisance
Weeping Bottlebrush (<i>Callistemon viminalis</i>) – Not cold tolerant		

Plant Species: Palms

All palms should be considered for clear zone setbacks similar to those required for shade trees.

PALM	Height	Form	Soil Requirements	Florida Native	Drought Tolerant
Recommended Use					
Cabbage Palm (<i>Sabal palmetto</i>) – drops litter	To 80'	Semi-fan crown atop a straight trunk	Tolerates most soil types	√	√
Pindo Palm (<i>Butia capitata</i>) - Edible fruit	To 15'	Blue-green canopies with leaves 4-6 feet long, thick trunks.	Tolerates most soil types		√
European Fan Palm (<i>Chamaerops humilis</i>)	Up to 15'	Clumping palm with triangular, fan-shaped leaves	Well drained soils		√
Washington Palm (<i>Washingtonia robusta</i>) –fast growing	70'-100'	Single trunk is typically ringed with closely set leaf scars, leaves bright green in color	Tolerates most soil types		√

Plant Species: Palm Trees Continued

PALM, CONTINUED	Height	Form	Soil Requirements	Florida Native	Drought Tolerant
Possible Use					
Canary Island Date Palm (<i>Phoenix canariensis</i>) – Thorns, high maintenance	30'-60'	Symmetrical crown with pinnate leaves and wide diameter grow on top of a massive trunk	Tolerates a variety of moist, well-drained soils		
Chinese Fan Palm (<i>Livistona chinensis</i>) – Thorns, costly	To 25'	Solitary fan palm, leaves olive-green in color	Tolerates a variety of soils		√
Date Palm (<i>Phoenix dactylifera</i>) – Limited availability	To 80'	Large, suckering, feather palm with greenish/grey leaves and slender trunk	Tolerates a variety of soils		√
Lady Palm (<i>Rhapis excelsa</i>) – Requires shade, root system must be contained by root barrier	To 10'	Dense clump forming evergreen, leaves medium green in color	Moist, fertile soil		√
Needle Palm (<i>Rhapidophyllum hystrix</i>) – Spines, Requires moist soil	3'-8'	Mostly single-stemmed, shrub like, evergreen with fanlike blades and short trunk covered with needles	Rich, moist, poorly drained soils	√	√
Paurotis Palm (<i>Acoelorrhaphe wrightii</i>) – Thorns, may freeze	20'-30'	Clump-forming, multi-stemmed palm with matted trunk and stiff, fan-shaped leaves	Occurs naturally in wet sites but can adapt to dry soil	√	√
Ribbon Palm (<i>Livistona decipiens</i>)	To 30'	Tall and slender palm with a nearly spherical crown	Tolerates most soils, except soggy, wet soil		√
Saw Palmetto (<i>Serenoa repens</i>) – Low clumps, thorns	To 10'	Sprawling, shrub, occasionally with an exposed trunk	Tolerates most soils, medium drainage	√	√
Senegal Date Palm (<i>Phoenix reclinata</i>) – Multiple trunks, thorns, may freeze	To 35'	Large clumping palm with curving trunks and slender pinnate fronds	Moist, well drained soils		
Wild Date Palm (<i>Phoenix sylvestris</i>)	35'-40'	Blue-green canopy with robust trunk	Tolerates a variety of soils		√
Windmill Palm (<i>Trachycarpus fortunei</i>) – Thorns	20'-40'	Compact palm with single trunk usually covered with a mat of fiber	Well drained fertile soils		√

Plant Species: Not Recommended Palm Trees

Not Recommended Palm Trees		
Areca Palm (<i>Chrysalidocarpus lutescens</i>) – Not cold tolerant	Bamboo Palm (<i>Chamaedorea microspadix</i>) – May freeze	Fishtail Palm (<i>Caryota mitis</i>) – Not cold tolerant
Pygmy Date Palm (<i>Phoenix roebelinii</i>) – Not cold tolerant	Queen Palm (<i>Arecastrum romanzoffianum</i>) – Not cold tolerant	

Plant Species: Recommended Shrubs

When selecting shrubs, low-maintenance, and/or native vegetation should be used whenever possible. The following list is meant as a guide only, and is not to be considered exhaustive.

Recommended Shrubs	Native	Recommended Shrubs	Native
Beautyberry (<i>Callicarpa americana</i>)	√	Sandankwa Viburnum (<i>Viburnum suspensum</i>)	
Cordgrass (<i>Spartina bakeri</i>)	√	Simpson Stopper (<i>Myrcianthes fragrans</i>)	√
Dwarf Indian Hawthorne (<i>Raphiolepis indica 'alba'</i>)		Sweetshrub (<i>Calycanthus floridus</i>)	√
Dwarf Schillings Holly (<i>Ilex vomitoria 'Schillings Dwarf'</i>)	√	Sweet Viburnum (<i>Viburnum odoratissimum</i>)	
Fetterbush (<i>Lyonia lucida</i>)	√	Tarflower (<i>Befaria racemosa</i>)	√
Florida Privet (<i>Forestiera segregata</i>)	√	Thryallis (<i>Galphimia glauca</i>)	
Gallberry (<i>Ilex glabra</i>)	√	Walter Viburnum (<i>Viburnum obovatum</i>)	√
Parson Juniper (<i>Juniperus chinensis 'Parsonii'</i>)			
Primrose Jasmine (<i>Jasminum mesnyi</i>)			

Plant Species: Possible Use Shrubs

Possible Use Shrubs	Native	Possible Use Shrubs	Native
Azalea (<i>Rhododendron spp.</i>)		Juniper (<i>Juniperus chinensis</i>)	
Bamboo (<i>Bambusa spp.</i>)		Leatherleaf Mahonia (<i>Mahonia bealei</i>)	
Buttonbush (<i>Cephalanthus occidentalis</i>)	√	Pampass Grass (<i>Cortaderia selloana</i>)	
Cleyera (<i>Ternstroemia gymnanthera</i>)		Pineapple Guava (<i>Acca sellowiana</i>)	
Coralbean (<i>Erythrina herbacea</i>)	√	Pittosporum (<i>Pittosporum tobira</i>)	
Downy Jasmine (<i>Jasminum multiflorum</i>)		Rose-of-Sharon (<i>Hibiscus syriacus</i>)	
Dwarf Burford Holly (<i>Ilex cornuta 'Burfordii Nana'</i>)		Star Magnolia (<i>Magnolia stellata</i>)	√
Dwarf Crape Myrtle (<i>Lagerstroemia indica 'Nana'</i>)		Swamp Hibiscus (<i>Hibiscus coccineus</i>)	√
Dwarf Japanese Holly (<i>Ilex crenata 'Compacta'</i>)		Texas Sage (<i>Leucophyllum frutescens</i>)	
Fakahatchee Grass (<i>Tripsacum dactyloides</i>)	√		
Glossy Abelia (<i>Abelia x grandiflora</i>)			

Plant Species: Recommended Groundcover

Recommended Groundcover	Native	Recommended Groundcover	Native
African Iris (<i>Dietes bicolor</i>)		Japanese Garden Juniper (<i>Juniperus procumbens 'Nana'</i>)	
Algerian Ivy (<i>Hedera canariensis</i>)		Mondo Grass (<i>Ophiopogon japonicus</i>)	
Beach Sunflower (<i>Helianthus debilis</i>)	√	Periwinkle (<i>Catharanthus roseus</i>)	
Blue-eyed Grass (<i>Sisyrinchium spp.</i>)	√	Ruellia (<i>Ruellia caroliniensis</i>)	√
Border Grass (<i>Liriope muscari</i>)		Sea Oats (<i>Lineola paniculata</i>)	
Coontie (<i>Zamia pumila</i>)	√	Sea Oxeye Daisy (<i>Borrchia frutescens</i>)	√
Dwarf Confederate Jasmine (<i>Trachelospermum asiaticum</i>)		Society Garlic (<i>Tulbaghia violacea</i>)	
Evergreen Border Grass (<i>Liriope muscari 'Evergreen Giant'</i>)			

Plant Species: Possible Use Groundcover

Possible Use Groundcover	Native	Possible Use Groundcover	Native
Adam's Needle (<i>Yucca filamentosa</i>)	√	Leatherleaf Fern (<i>Rumohra adiantiformis</i>)	
Agapanthus (<i>Agapanthus africanus</i>)		Lizard's Tail (<i>Saururus cernuus</i>)	√
Amaryllis (<i>Hippeastrum</i> spp.)		Partridgeberry (<i>Mitchella repens</i>)	√
Begonia (<i>Begonia</i> spp.)		Pennyroyal (<i>Piloblephis rigida</i>)	√
Blue Flag (<i>Iris hexagona</i>)	√	Purslane (<i>Portulaca</i> spp.)	
Cast Iron Plant (<i>Aspidistra elatior</i>)		Royal Fern (<i>Osmunda regalis</i>)	√
Creeping Juniper (<i>Juniperus horizontalis</i>)		Shore Juniper (<i>Juniperus conferta</i>)	
Day Lily (<i>Heemerocallis</i> spp.)		Swamp Lily (<i>Crinum americanum</i>)	√
English Ivy (<i>Hedera helix</i>)		Yellow Canna (<i>Canna flaccida</i>)	√
Fancyleaved Caladium (<i>Caladium x hortulanum</i>)			
Holly Fern (<i>Cyrtomium falcatum</i>)			

Plant Species: Vines

Recommended	Not Recommended
Algerian Ivy (<i>Hedera canariensis</i>)	Allamanda (<i>Allamanda cathartica</i>)
Confederate Jasmine (<i>Trachelospermum jasminoides</i>)	Beach Morning Glory (<i>Ipomoea stolonifera</i>)
Coral Honeysuckle (<i>Lonicera sempervirens</i>)	Bleeding Heart Vine (<i>Clerodendrum thomsoniae</i>)
Trumpet Vine (<i>Campsis radicans</i>)	Bougainvillea (<i>Bougainvillea</i> spp.)
Possible Use	Cape Honeysuckle (<i>Tecomaria capensis</i>)
Creeping Fig (<i>Ficus pumila</i>)	Coral Vine (<i>Antigonon leptopus</i>)
English Ivy (<i>Hedera helix</i>)	Flame Vine (<i>Pyrostegia venusta</i>)
Railroad Vine (<i>Ipomoea pes-caprae</i>)	Pothos (<i>Epipremnum aureum</i>)
	Yellow Jessamine (<i>Gelsemium sempervirens</i>)

Florida Exotic Pest Plant Council's (FEPPC) 2005 List of Invasive Species

Every two years the FEPPC publishes a list of species in order to bring attention to the adverse effect, impacts, and habitat loss that result from the use of "exotic pest plants." Included within the list are plants prohibited by various regulatory entities. The following is a list of plants that are considered Category 1 Pest Plants. Plants within this designation are considered invasive exotics that alter native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives. The use of these species is discouraged along *Livable Roadways*.

List Abbreviations Used: P = Prohibited by the Florida Department of Environmental Protection, N = Noxious weed listed by the Florida Department of Agriculture, U = Noxious weed listed by the U.S. Department of Agriculture

Category 1 Invasive Exotics	List	Category 1 Invasive Exotics	List
Air Potato (<i>Dioscorea bulbifera</i>)	N	Downy Rose Myrtle (<i>Rhodomyrtus tomentosa</i>)	N
Arrowhead Vine (<i>Syngonium podophyllum</i>)		Earleaf Acacia (<i>Acacia auriculiformis</i>)	
Asian Sword Fern (<i>Nephrolepis multiflora</i>)		Glossy Privet (<i>Ligustrum lucidum</i>)	
Asparagus Fern (<i>Asparagus aethiopicus</i>)		Gold Coast Jasmine (<i>Jasminum dichotomum</i>)	
Australian Pine (<i>Casuarina equisetifolia</i>)	P	Green Hygro (<i>Hygrophila polysperma</i>)	P, U
Bichofia (<i>Bischofia javanica</i>)		Guava (<i>Psidium guajava</i>)	
Brazilian Jasmine (<i>Jasminum fluminense</i>)	P, N	Hydrilla (<i>Hydrilla verticillata</i>)	P, U
Brazilian Pepper (<i>Schinus terebinthifolius</i>)	P, N	Incised Halberd Fern (<i>Tectaria incise</i>)	
Burma Reed (<i>Neyraudia reynaudiana</i>)	N	Japanese Climbing Fern (<i>Lygodium japonicum</i>)	N
Camphor Tree (<i>Cinnamomum camphora</i>)		Japanese Honeysuckle (<i>Lonicera japonica</i>)	
Carrotwood (<i>Cupaniopsis anacardioides</i>)	N	Java Plum (<i>Syzygium cumini</i>)	
Catclaw Mimosa (<i>Mimosa pigra</i>)	P, N, U	Kudzu (<i>Pueraria montana</i> var. <i>lobata</i>)	N, U
Cat's Claw Vine (<i>Macfadyena unguis-cati</i>)		Lantana (<i>Lantana camara</i>)	
Chinese Privet (<i>Ligustrum sinense</i>)		Lather Leaf (<i>Colubrina asiatica</i>)	
Chinese Tallow Tree (<i>Sapium sebiferum</i>)	N	Laurel Fig (<i>Ficus microcarpa</i>)	
Climbing Cassia (<i>Senna pendula</i>)		Melaleuca (<i>Melaleuca quinquenervia</i>)	P, N, U
Cogon Grass (<i>Imperata cylindrical</i>)	N, U	Mexican Petunia (<i>Ruellia tweediana</i>)	
Coral Ardisia (<i>Ardisia crenata</i>)		Mimosa (<i>Albizia julibrissin</i>)	

Category 1 Invasive Exotics	List	Category 1 Invasive Exotics	List
Nadina (<i>Nandina domestica</i>)		Suckering Australian Pine (<i>Casuarina glauca</i>)	P
Napier Grass (<i>Pennisetum purpureum</i>)		Surinam Cherry (<i>Eugenia uniflora</i>)	
Natal Grass (<i>Rhynchelytrum repens</i>)		Sword Fern (<i>Nephrolepis cordifolia</i>)	
Old World Climbing Fern (<i>Lygodium microphyllum</i>)	N	Topedo Grass (<i>Panicum repens</i>)	
Orchid Tree (<i>Bauhinia variegata</i>)		Tropical Soda Apple (<i>Solanum viarum</i>)	N, U
Oyster Plant (<i>Tradescantia spathacea</i>)		Water Hyacinth (<i>Eichhornia crassipes</i>)	P
Para Grass (<i>Urochloa mutica</i>)		Waterlettuce (<i>Pistia stratiotes</i>)	P
Rosary Pea (<i>Abrus precatorius</i>)		Waterspinich (<i>Ipomoea aquatica</i>)	P, U
Seaside Mahoe (<i>Thespesia populnea</i>)		West Indian Marsh Grass (<i>Hymenachne amplexicaulis</i>)	
Santa Maria (<i>Calophyllum antillanum</i>)		Wetland Night Shade (<i>Solanum viarum</i>)	N, U
Sapodilla (<i>Manilkara zapota</i>)		White-Flowered Wondering Jew (<i>Tradescantia fluminensis</i>)	
Scaevola (<i>Scaevola taccada</i>)		Wild Taro (<i>Colocasia esculenta</i>)	
Schefflera (<i>Schefflera actinophylla</i>)		Winged Yam (<i>Dioscorea alata</i>)	N
Sewer Vine (<i>Paederia cruddasiana</i>)	N	Woman's Tounge (<i>Albizia lebbek</i>)	
Shoebutton Ardisia (<i>Ardisia elliptica</i>)			
Skunk Vine (<i>Paederia foetida</i>)	N		
Strawberry Guava (<i>Psidium cattleianum</i>)			

Recommended Tree Species near Overhead Utilities

Utility poles and overhead lines should be noted on planting plans. If trees are proposed below an overhead utility line or within 30 feet, species that will not interfere, requiring little or no trimming of branches, should be selected. Species selection should be considered according to line height, and should be coordinated with the electric company.

Under Power Lines

Crape Myrtle (*Lagerstroemia indica*)
 Chickasaw Plum (*Prunus angustifolia*)
 Dahoon Holly (*Ilex cassine*)
 European Fan Palm (*Charnaerops humilis*)
 Fringe Tree (*Chionanthus virginicus*)
 Ligustrum (*Ligustrum japonicum*)
 Pindo Palm (*Butia capitata*)
 Myrtle Oak (*Quercus myrtifolia*)
 Needle Palm (*Rhapidophyllum hystrix*)
 Sago Palm (*Cycas revolute*)
 Silverbell (*Halesia diptera*)
 Sweet Acacia (*Acacia farnesina*)
 Wax Myrtle (*Myrica cerifera*)
 Yaupon Holly (*Ilex vomitoria*)

Greater than 15' from Overhead Power Lines

Cabbage Palm (*Sabal Palmetto*)
 Dogwood (*Cornus florida*)
 East Palatka Holly (*Ilex x attenuata* 'East Palatka')
 Florida Maple (*Acer saccharum*)
 Hackberry (*Celtis laevigata*)
 Native Pine (*Pinus spp.*)

Greater than 15' from Overhead Power Lines Continued

Podocarpus (*Podocarpus macrophyllus*)
 Redbay (*Persea Borbonia*)
 Redbud (*Cercis Canadensis*)
 River Birch (*Betula nigra*)
 Washington Palm (*Washingtonia robusta*)

Greater than 30' from Overhead Power Lines

American Holly (*Ilex x attenuata*)
 Bald Cypress (*Taxodium distichum*)
 Blackgum (*Nyssa sylvatica v. bilora*)
 Canary Island Date Palm (*Phoenix canariensis*)
 Chinese Elm (*Ulmus parvifolia*)
 Live Oak (*Quercus virginiana*)
 Pignut Hickory (*Carya glabra*)
 Red Cedar (*Juniperus silicicola*)
 Senegal Date Palm (*Phoenix reclinata*)
 Shumard Oak (*Quercus shumardii*)
 Southern Magnolia (*Magnolia grandiflora*)
 Sweetbay Magnolia (*Magnolia virginiana*)
 Sweetgum (*Liquidambar styraciflua*)
 Sycamore (*Platanus occidentalis*)
 Winged Elm (*Ulmus alata*)

Typical Sections of Roadways with Multi-Use Trails

Design of multi-use trails in unincorporated Hillsborough County is guided by the *Design Standards Manual for Paved Trails in Hillsborough County*. Figures F-1 and F-2 are provided for reference.

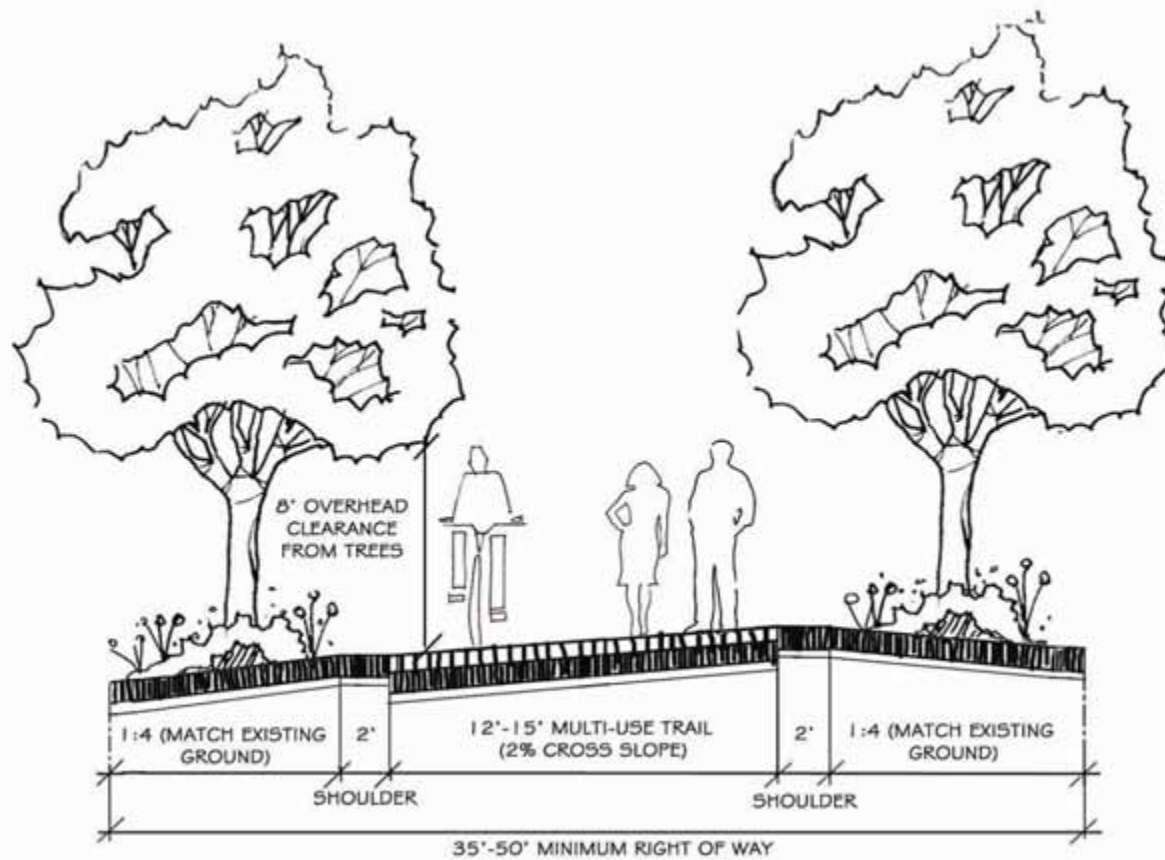


Figure F-1

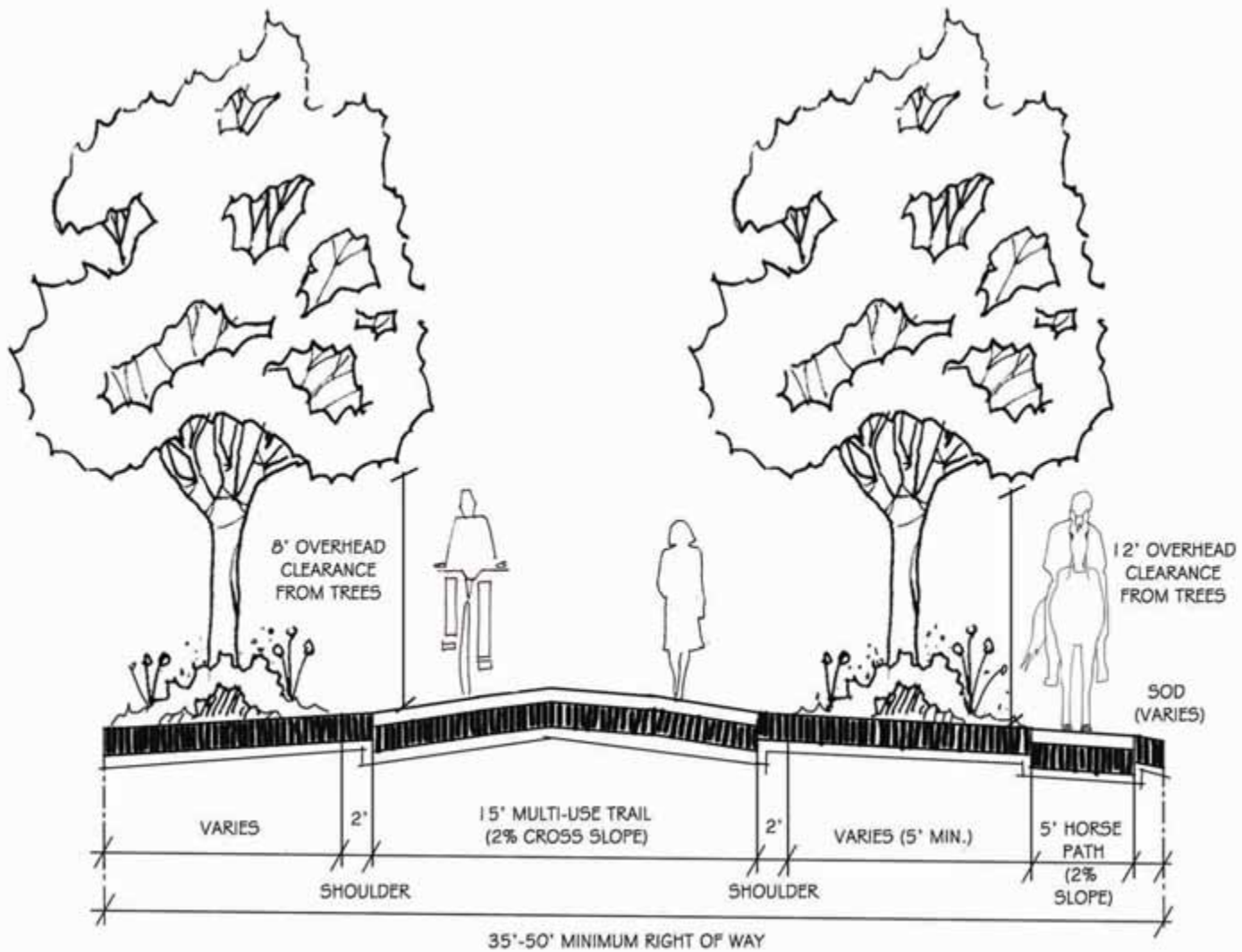
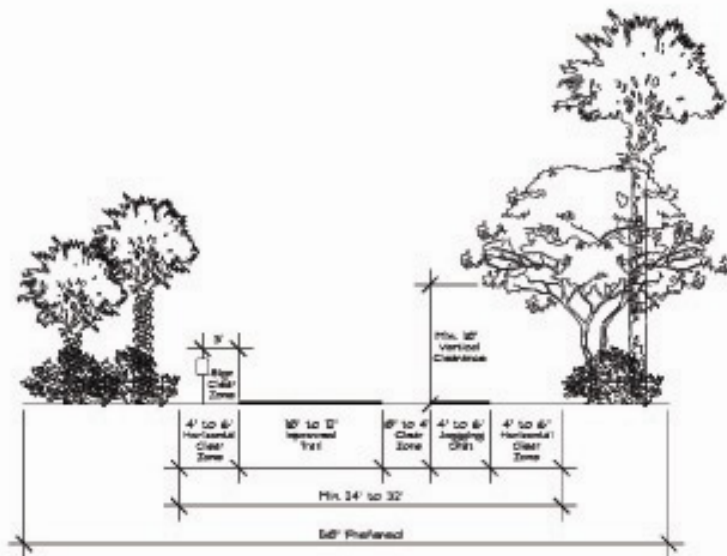


Figure F-2

Typical Sections of Roadways with Multi-Use Trails

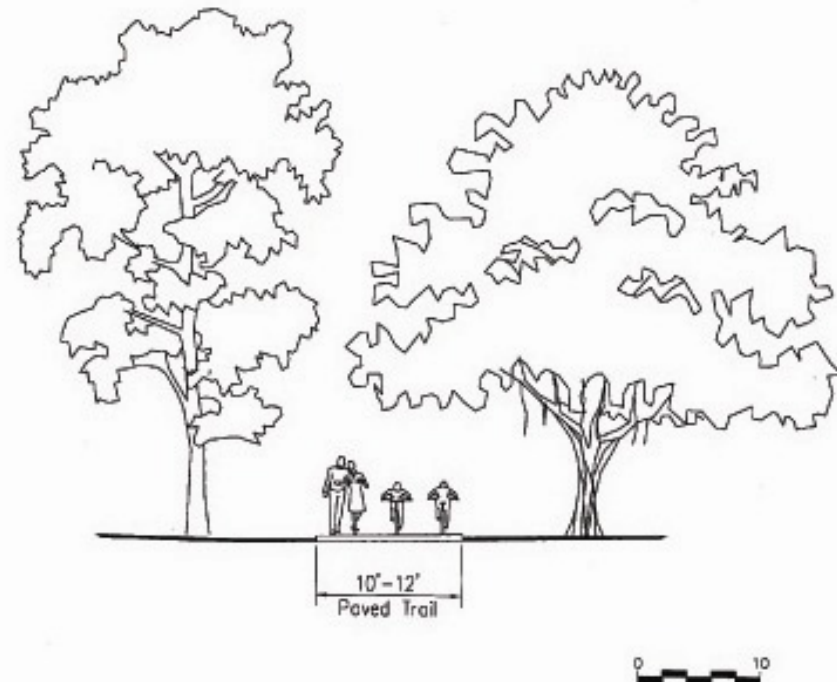
The following pages consist of typical cross-sections of roadways provided by the City of Tampa. The sections demonstrate ways in which different types of trails can be incorporated into or near road rights-of-way.

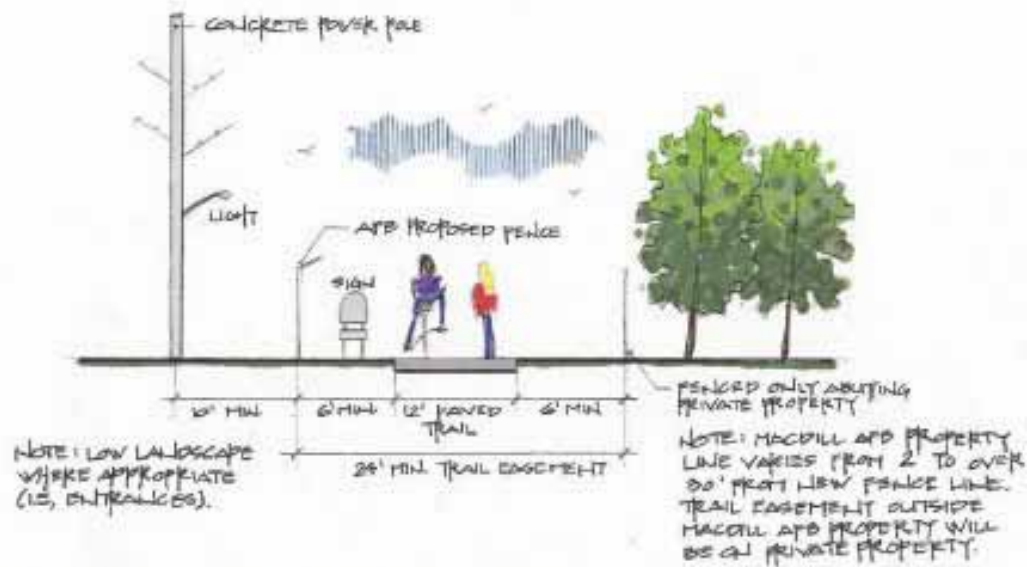


Off-Road Trail with Jogging Path (One Side)
City of Tampa Parks & Recreation Department June 2005

Scale 1/8" = 1'-0"

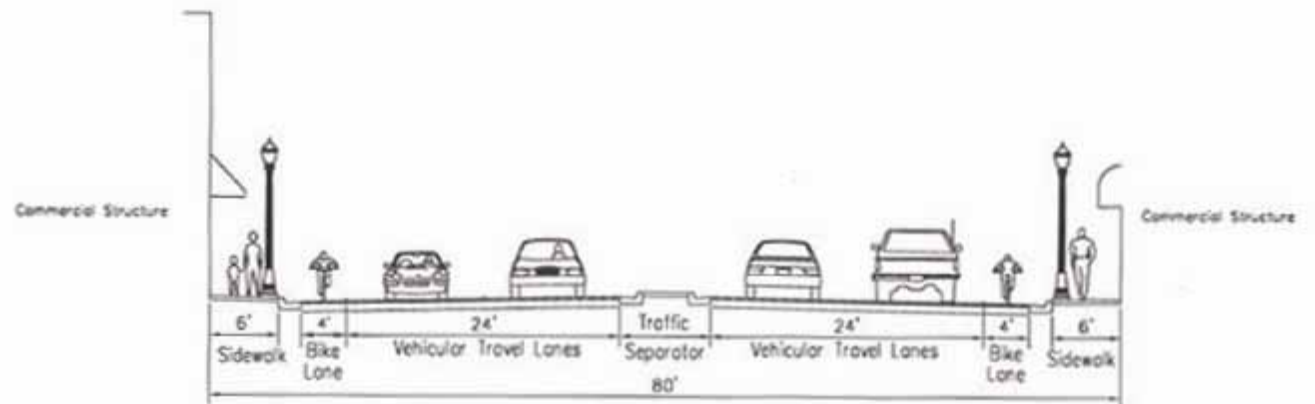
Off-Road Trail

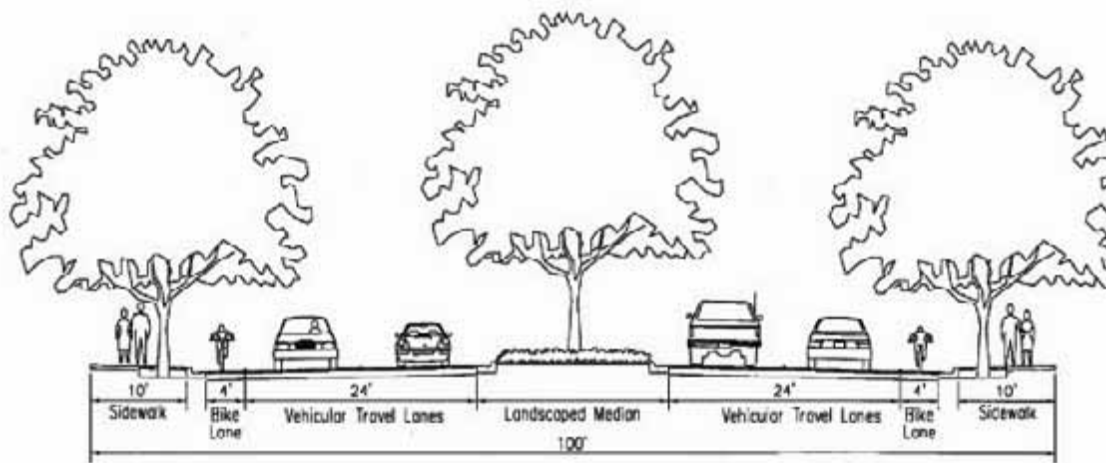




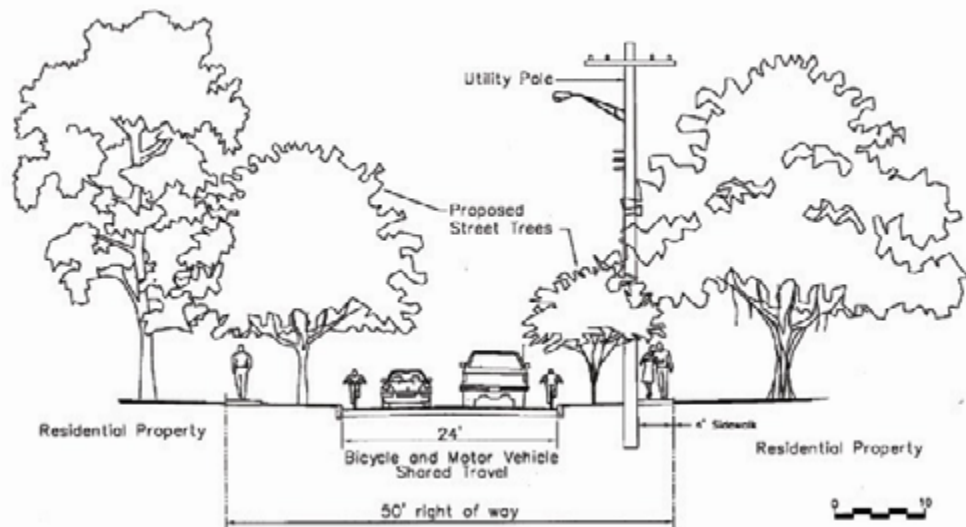
MACBILL TRAIL SECTION

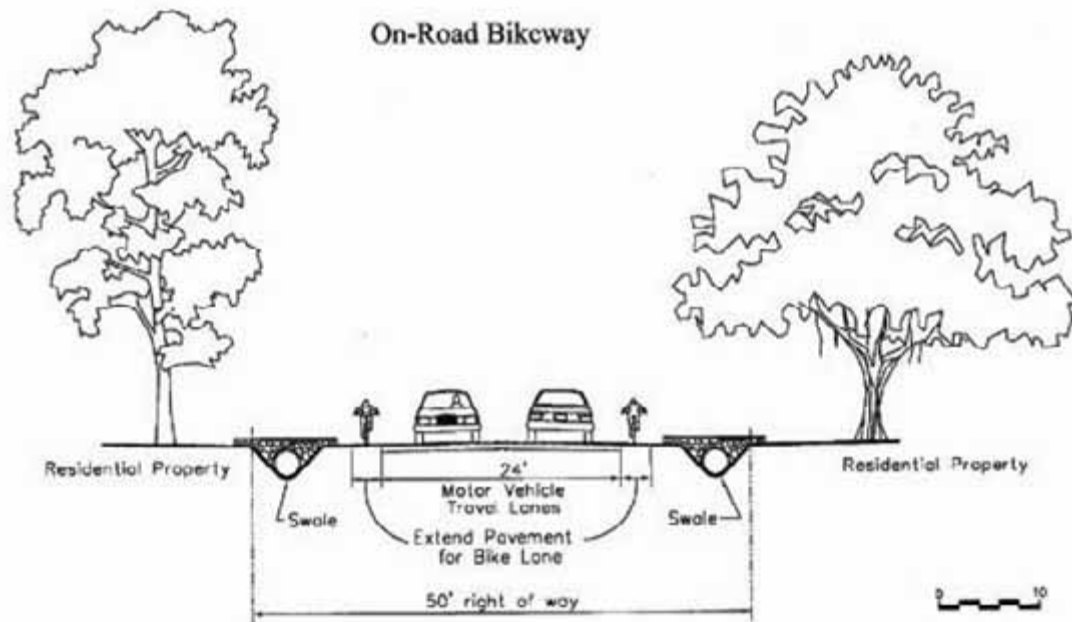
On-Road Bikeway



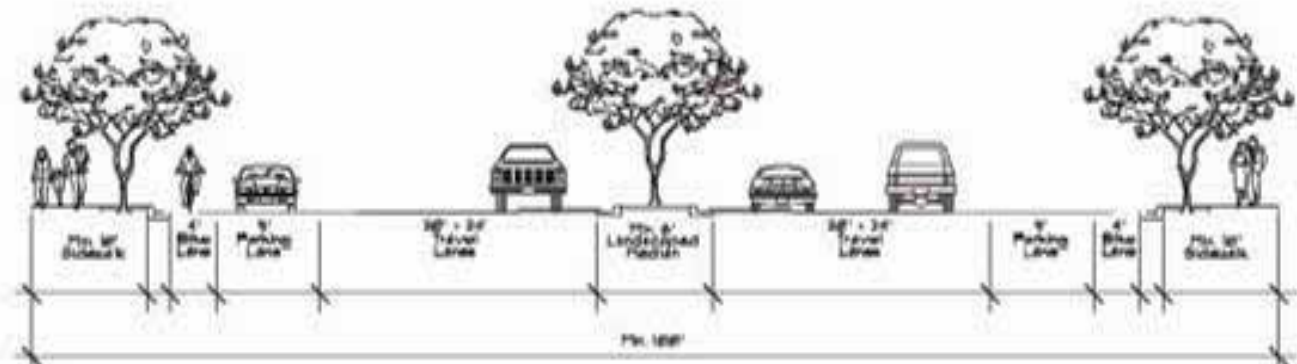


On-Road Bikeway



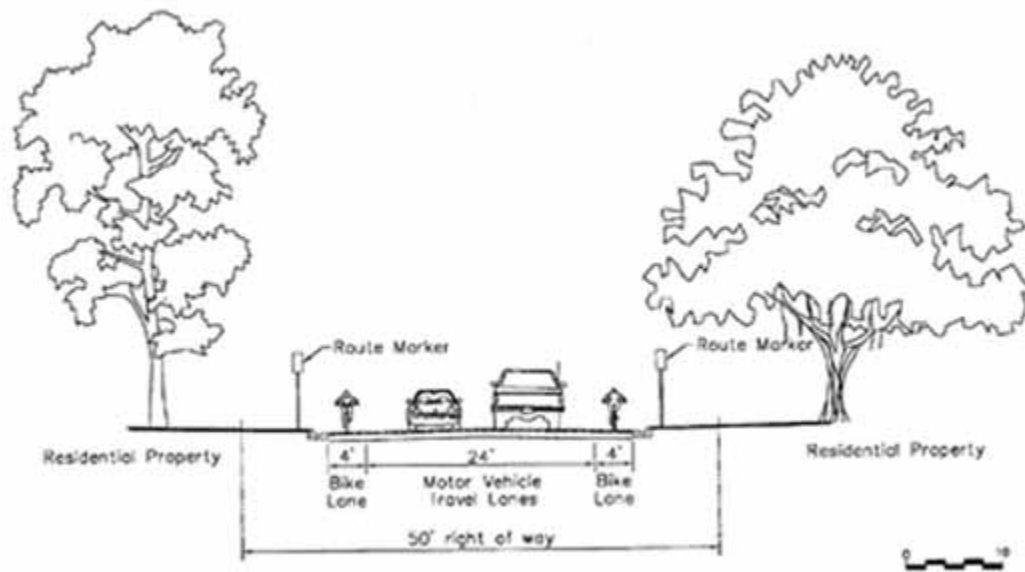


**Boulevard On-Road Bikeway with
On-street Parking**

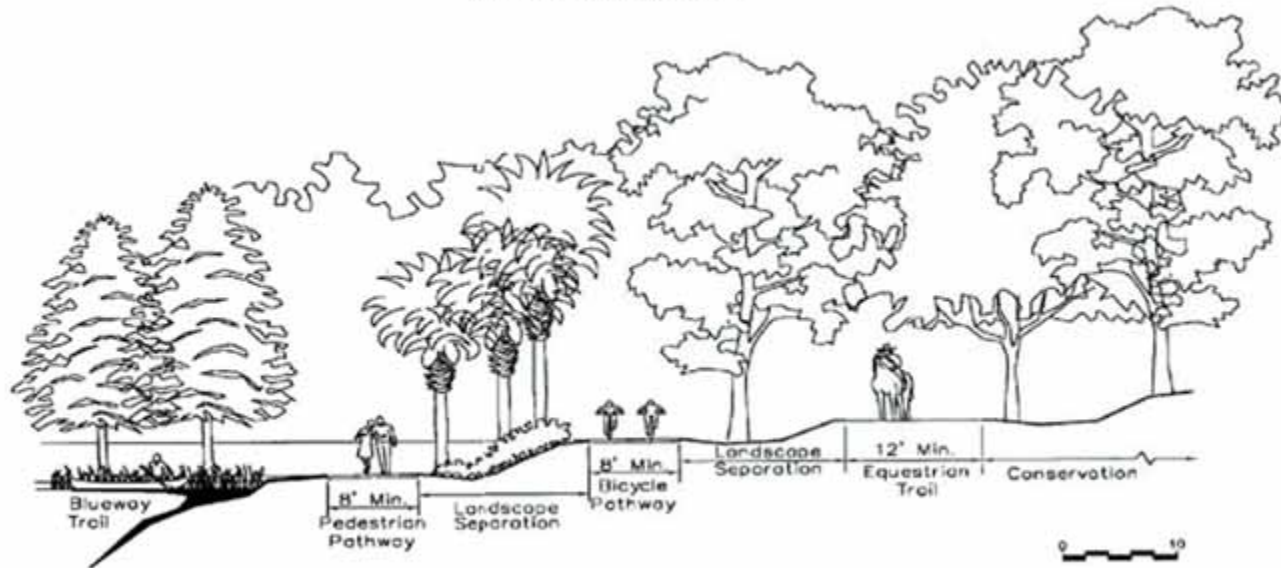




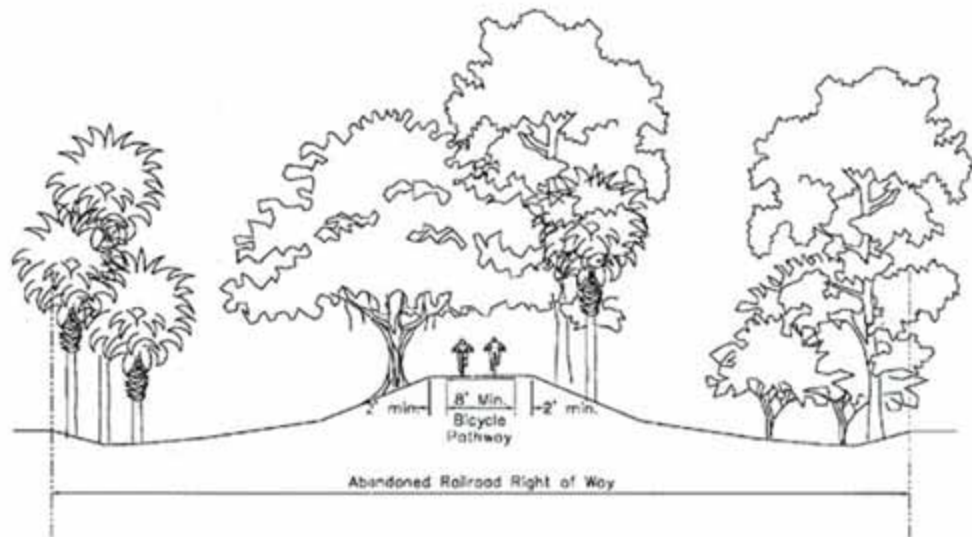
On-ROAD BIKE LANES

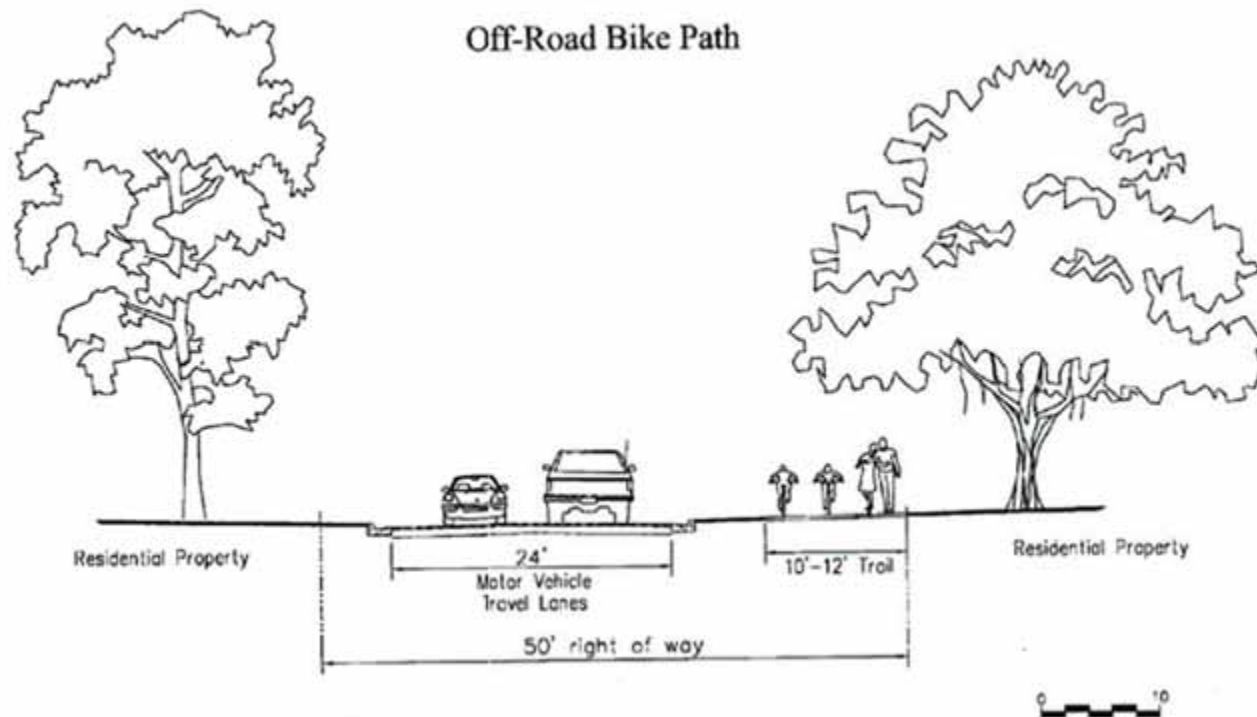


Off-Road Bike Trail



Off-Road Bike Trail





Bicycle / Pedestrian
Design Treatments & Criteria:
At Grade and Separated Pedestrian Crossings &
On-Street Bicycle Lane Configurations

Prepared for:
Hillsborough County's
Metropolitan Planning Organization (MPO)
601 E. Kennedy Boulevard
Tampa, Florida

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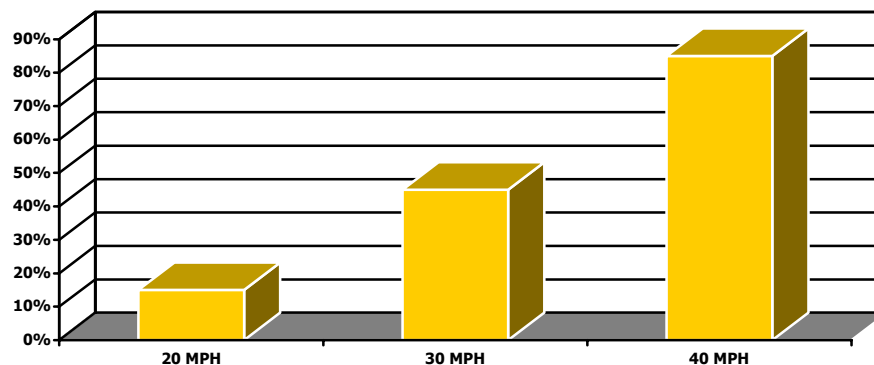
1. INTRODUCTION

The Hillsborough County Metropolitan Planning Organization (MPO) considers the safety of its citizens paramount. Figure No. 1 demonstrates how fragile this bold statement can be as pedestrians [and bicyclists] face challenging conditions when facing more and more high speed traffic.

In response to these safety concerns and the need to provide more efficient use of existing roadway rights-of-way, the MPO strives to provide an environment that encourages balance between conventional (single occupant private vehicles and other transportation modes) and non-conventional (walking, bicycling and transit patronage) modes of transportation. It should be pointed out that agencies such as the Florida Department of Transportation (FDOT) and the Hillsborough County Public Works Department have specific programs that consider and implement bicycle lanes where feasible.

The MPO has requested Volkert and Associates, Inc. (Volkert) to investigate and develop guidelines for overall safe pedestrian crossing treatments for at-grade, overpass and underpass crossings; and the development of a policy and provision of guidelines for institutionalizing the inclusion of bicycle lanes during the resurfacing planning process on local government roadways. This report details the results of these investigations and provides matrices and background documentation that should encourage transportation professionals to consider the implementation of appropriate pedestrian crossings and bicycle lanes on existing roadways.

Figure No. 1 - Probability of Pedestrian Fatality with Increasing Vehicle *SPEED*



2. METHODOLOGY

2.1 Pedestrian Crossing Guidelines:

Volkert conducted an international literature review of the various pedestrian crossing treatments currently in practice and have been tabulated in the Appendices section of the report. These treatments have been fully adopted by State and local governments or have been implemented on experimental bases requiring further review. Considering the applications of these treatments and their effectiveness in enhancing pedestrian/motorist interaction, matrices have been developed, as part of this report demonstrating suitable pedestrian treatments for various roadway configurations noting appropriate implementation methodologies.

Land use, facilities, and traffic characteristics such as speed and volume of conventional and non-conventional road users have been considered in the development of these matrices.

2.2 Bicycle Lane Restriping Guidelines:

This study includes the development of a policy that provides for the safe and efficient inclusion of bicycle lanes during the resurfacing planning process. To effectively develop guidelines suitable for transportation practitioners to use on a day-to-day basis, a thorough review of the existing national and state roadway acceptable travel lane widths was conducted.

In this regard, a series of matrices articulating minimum roadway lane widths that would provide space for designated or undesignated bicycle lanes have been developed. It should be pointed out that land use, facilities, traffic characteristics such as speed and volume of conventional and non-conventional users, and roadway configurations were also considered in the development of these matrices.

To further assist the practitioner in quantifying the costs of implementing bicycle lanes on resurfacing projects, estimated per mile costs of the various restriping configurations have been made. These cost estimates (2004 rates) include restriping by grinding and re-painting; and milling, resurfacing and re-painting methods.

These methods should be reviewed by end users and practitioners to ensure that these recommended policies and practices are appropriate and complement the existing policies and practices of the MPO. Accordingly, this report should be reviewed by the MPO's Citizen Advisory Committee (CAC), the Bicycle and Pedestrian Advisory Committee (BPAC), and the Technical Advisory Committee (TAC).

3. STUDY ANALYSIS

3.1 Pedestrian Grade Separated Crossings:

The effectiveness of grade separated crossings depends on the user's perception of accessibility and ease of crossing. Often times it is perceived to be more efficient to cross at grade than to use an overpass. Users weigh the perceived safety benefits against effort and time issues. To maximize the use of grade separated crossings, they should be located in the normal or expected path of major pedestrian movements. Guidance design (bushes, fences, medians) is sometimes needed to funnel pedestrians along a path directing them to the structure. The basic types of such crossings are noted below.

Pedestrian Overpasses/Bridges: Typically designed for non-motorized users over roadways with stairs or ramps provided. Depending on topography, the road may be depressed and the bridge is at ground level.

Elevated Walkways: Sidewalks/walkways above ground level typically parallel to traffic flow and are elevated or connected to adjacent buildings.

Skywalks/Skyways: Connecting buildings at midblock usually at the second or third level.

Pedestrian Tunnels/Underpasses: Stairs or ramps lead down to a below-grade passageway. Depending on topography, the road may be elevated and the underpass is at ground level.

Below-Grade Pedestrian Networks: These consist of extensive underground walkways usually accessible from downtown buildings and often subway stations. "Underground Cities" can be developed with shops, restaurants, offices and in limited capacities – residences.

Underpasses and overpasses normally require about a 10 and 20 feet of vertical clearance respectively. Also, underpasses may create some security problems as well as topographical or water table problems. Overpasses are very expensive to build and require side and top fencing to prevent overthrow of debris.

Deciding on the need for grade separation can be facilitated by considering the adoption of warrants or criteria for their installation. Appendix "G" provides qualitative and quantitative analysis and criteria associated with the decision requirements to install pedestrian overpasses or underpasses.

3.2 Pedestrian At Grade Crossings:

Land use plays a crucial role in the opportunities and propensity of pedestrians to cross streets at specific points. Corridors with scattered land use such as in rural locations make it difficult to predict where pedestrians will cross. Conversely, concentrated urban environments provide logical crossing points where expectation is high for pedestrians to cross (shopping areas, schools, parks, and government institutions to name a few). Transit stops in terms of locations and transfer points as well as traffic signal spacing play a role in providing a degree of comfort, appropriate walking distances, and security to pedestrians (patrons).

Our research has revealed that there are no clear industry-wide warrants or criteria for the installation of uncontrolled and midblock crossings. However, we note below some guidelines that have been developed.

- a. *Guidelines for installing crosswalks at uncontrolled and midblock crossings. (Source: C.V. Zegeer, Chapel Hill, as presented in the Institute of Transportation Engineer's compilation: "Alternative Treatments for At-Grade Pedestrian Crossings", (2001). This guideline is shown in Appendix "A"; it provides for quick analysis on an "Install / Do Not Install" approach for crosswalks based on traffic volume, pedestrian volume, speed limit, roadway configuration, and other characteristics.*
- b. *Guidelines for the installation of Marked Crosswalks Used in San Luis Obispo, California, as presented in the Institute of Transportation Engineer's compilation: "Alternative Treatments for At-Grade Pedestrian Crossings", (2001). Notwithstanding other details associated with their local design, the basic guidelines for installation are as follows.*
 - i. Pedestrian volume: 40 or more per hour during peak hour ped use, or 30 groupings of two or more pedestrians for a continuous 2-hour period twice/day; and
 - ii. The 85th percentile approach speed is below 40 mph; and
 - iii. The roadway has fewer than three travel lanes per direction; and
 - iv. The location has (or will be installed) adequate street lighting; and
 - v. There is unrestricted visibility for specific distances, for example, at a 35 mph design speed, the minimum sight distance would be 250 feet; and
 - vi. For residential streets, an ADT of 2,700 or more is required; and
 - vii. No controlled crosswalk (signal or "Stop" sign) is within 656 feet of the proposed location.

c. *Installation Criteria: Crosswalks at Uncontrolled Locations as presented in the City of St. Petersburg, Florida “CITY TRAILS Bicycle Pedestrian Master Plan”, (2003).* Crosswalks must meet the following five criteria for the installation of a marked crosswalk.

- High pedestrian locations: more than 24 pedestrians per hour during peak periods (should exceed 24 for at least two hours per day) **or** regular use by children, seniors or persons with reduced mobility). Numbers of crossing by vulnerable pedestrians should exceed 12 crossings a day.
- Two way traffic counts of over 300 vehicles per hour during times when most pedestrians are present **and /or pedestrian-motor vehicle conflicts** (*Pedestrian motor vehicle conflicts are defined as: 1. instances when the driver of a vehicle has to engage in abrupt braking, has to swerve to avoid striking a pedestrian, or if a pedestrian has to take sudden evasive action to avoid being struck. This type of conflict has been shown to be highly correlated with crash frequency (Lord, 1996). 2. The pedestrian being rapped [“trapped”] in the roadway with vehicles passing ahead and behind him/her for a period greater than 15 seconds), or a history of events at an unmarked crosswalk plotted using GIS software and analyzed using PBCAT crash typing tools).*
- Locations where the next crossing is more than 300 feet away.
- The stopping distance for vehicles traveling at mean or mode vehicle speed should be no greater than 234 feet. This distance should be calculated using the signal timing formula. This corresponds to a mean or mode speed of 40 mph with no grade. Crosswalks should not be installed at uncontrolled locations if the stopping distance for vehicles traveling at the mean or mode speed is greater than 234 ft. If the stopping distance for vehicles traveling the mode speed is greater than 234 ft, a crosswalk should not be installed unless the stopping distance for vehicles traveling at the mode speed can be reduced through traffic calming measures or speed enforcement.
- The 85th percentile speed should not exceed 45 mph.

It is clear that each jurisdiction takes a local approach to managing the installation of uncontrolled crosswalks. However, in general terms, the principles are very similar: pedestrian volumes, traffic volumes, sight distance, roadway configuration, and vehicle speeds are common elements. It appears that the San Luis Obispo, California and the City of St. Petersburg, Florida criteria are somewhat less restrictive.

3.2.1 Proposed Warrant/Criteria Model

There is a downside to using pedestrian volume as a way to measure pedestrian activity. For example when a location is near a logical demand based on land use such as the proximity of schools, places of employment, transit routes, and parks to name a few, yet the crossing is hazardous and therefore avoided.

The MPO’s *Pedestrian Demand Assessment* model predicts the greatest potential for pedestrian activity and is more realistic than using pedestrian volume for the development of pedestrian crossing warrant/criteria charts.

Taking best practices from the research and the MPO Pedestrian Plan, enhanced pedestrian at-grade crossings are recommended under these conditions:

- Latent demand score of 4 or greater or if the corridor is identified as a Pedestrian Improvement Corridor in the Comprehensive Pedestrian Plan.
- The 85th percentile approach speed should not exceed 45 mph.
- The roadway has no more than four travel lanes per direction with a median for pedestrian refuge
- The location has (or will be installed) adequate street lighting
- There is unrestricted visibility for specific distances
- Locations where the next crossing is more than 300 feet away

3.3 Innovative Pedestrian Solutions:

Several “communication” methods enhancing the crossing safety of pedestrians and bicyclists are available. These have been successfully used in other communities. A short list is noted below supplemented by a more detailed list in Appendices “D”, “E”, and “F”.

- In-Pavement Lighting
- Raised medians with staggered pedestrian approaches
- Raised intersections
- Raised crosswalks
- Curb extensions (reduced crossing exposure)
- Count-down pedestrian signals
- In-Street “Yield to Pedestrian Signs”
- “Yield” Pavement Markings w/ “Yield” Signs

3.4 Current Minimum Travel Lane Widths:

Several documents have been published by various authorities providing, among other things, standard minimum travel lane widths. Table No. 2 summarizes these features.

Table No. 2

Summary of Minimum Standards
Travel Lane Widths

Standard	Roadway Type (Minimum Lane Width in Feet) *				
	Major Arterials	Minor Arterials	Collectors	Local	Bike lanes
Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways – “Florida Greenbook”(May 2002)	11	11	11	10	4/5
Plans Preparation Manual, Volume I (Jan.2003)	11	11	11	N/A	4/5
Plans Preparation Manual, (Transportation Design for Livable Communities - 2003)	10	10	10	10	4/5
American Association of State Highway and Transportation Officials, Policy on Geometric Design of Highways and Streets (2001)	11	11	10	10	4/5
Manual of Uniform Traffic Control Devices (2003)	N/A	N/A	N/A	N/A	N/A
Hillsborough County – Transportation Technical Manual (2003)	12	12	10	10	4/5
Florida Intersection Design Guide (2002)	12	11	11	10	4/5

*Minimum from charts and respective notes such as design speeds under 40 mph, truck volume 10% or less, and interrupted flow conditions. See appendices for detailed charts.

Clearly, a variety of minimum lane widths have been adopted by these authorities. Further, it is obvious that the use and purpose of the specific bicycle lane installation (balancing the needs of through traffic) and its resultant travel lane alterations will assist the practitioner in deciding on an ultimate overall lane configuration.

3.5 Proposed Minimum Travel Lane Widths:

In determining appropriate travel lane and bicycle lane design treatments, it is generally accepted that six factors are most often cited.

Traffic Volume:

Higher motor vehicle traffic volumes represent a greater risk to bicyclists resulting in less comfortable driving experiences. Based on the typical minimum lane width in the appendices and engineering experience, the traffic volumes have been sub-divided into three groups:

- Under 2,000 (Average Annual Daily Traffic) AADT
- 2,000 to 10,000 AADT
- 10,000 to 20,000 AADT
- Over 20,000 AADT.

Speed Limit:

The posted speed limit and more importantly the roadway's operating speed, plays an important role on risk and comfort. The speed profile has been grouped as follows.

- 25 mph or lower
- 30, 35, or 40 mph
- 45 mph
- 50 mph and over.

Traffic Mix:

The degree of concentration of heavy vehicles can also increase the risk and reduce comfort level of bicyclists. Accordingly, if the quantity of large vehicles approaches and/or exceeds 10% of AADT, in most cases, minimum travel lane widths should be increased to the next level.

On-Street Parking:

The presence of on-street parallel parking increases the need for separation between the bicyclist and through traffic. Where space for bike lanes can be accommodated, the designated bike lane must be at least 5.0 feet wide. Further, it may be necessary to increase the width of a travel lane adjacent to a bike lane. This increase is particularly necessary with increasing speeds and traffic volume.

Sight Distance:

Care should be taken to ensure that adequate sight distance between the motorist and the bicyclist exists.

Number of Intersections:

Generally, the number and frequency of intersections should be taken into account when considering bike treatments. Transitional issues such as relating to right turning vehicles and congestion at signalized intersections may increase risk and discomfort levels.

Considering each of these factors and the minimum travel lane widths as noted in Table No. 2 and detailed in the appendices, tables have been developed to assist practitioners in determining the appropriate bicycle treatments. Table Nos. 3, 4, and 5 provide minimum travel lane widths and their companion Table Nos. 3a, 4a, and 5a indicate the relative remaining roadway treatments.

Table No. 3
Minimum Travel Lane Widths
Urban Section w/o On-street Parking

For Resurfacing, Restoration, and Rehabilitation (RRR) projects, a minimum of 10 feet (11 feet if trucks 10% or more) may be used for all traffic volumes and all design speeds; for multi-lane use 11 foot lane adjacent to portion in Table 3a. *Note January 1, 2004 Plans Preparation Manual, Section 25.4.5 for details.*

Table No. 3a
Remaining Roadway Treatment
Urban Section w/o On-street Parking

	Average Annual Daily Traffic Volume			
	< 2,000	2,000-10,000	10,000-20,000	>20,000
Speed Limit (mph)	Min. Travel Lane (ft)	Min. Travel Lane (ft)	Min. Travel Lane (ft)	Min. Travel Lane (ft)
25 and lower	10	10	11	11
30-40	10	11	11	12
45	11	11	12	12
50 and over	12	12	12	12

Remaining Roadway (per direction)	Treatment
0 – 1.9 feet	Paint Line at Edge of Pavement (EOP) **
2.0 – 3.9 feet	Paint Line Left of EOP
4.0 or more +	Paint/Sign Designated Bike Lane

** Optional for **traffic calming purposes**, paint a continuous white line left of EOP.

+ Not including gutter.

Note: “Bike Route” and/or “Share the Road” signs may be installed if such routes have been adopted and mapped by the local jurisdiction.

Table No. 4
Minimum Travel Lane Widths
Urban Section w/ On-street Parking

For RRR projects, a minimum of 10 feet (11 feet if trucks 10% or more) may be used for all traffic volumes and all design speeds; for multi-lane use 11 foot lane adjacent to portion in Table 4a. *Note January 1, 2004 Plans Preparation Manual, Section 25.4.5 for details.*

Table No. 4a
Remaining Roadway Treatment
Urban Section w/ On-street Parking

	Average Annual Daily Traffic Volume			
	< 2,000	2,000-10,000	10,000-20,000	>20,000
Speed Limit (mph)	Min. Travel Lane (ft)	Min. Travel Lane (ft)	Min. Travel Lane (ft)	Min. Travel Lane (ft)
25 and lower	10	10	11	12
30-40	10	11	12	12
45	11	12	12	12
50 and over	12	12	12	12

Remaining Roadway (per direction)	Treatment
0 – 1.9 feet	Do Not Paint Line (Wider outside lane results)
2.0 – 4.9 feet	Paint Line Left of Parking Stall (PS)
5.0 or more +	Paint/Sign Designated Bike Lane Lt of PS

+ Not including gutter.

Note: “Bike Route” and/or “Share the Road” signs may be installed if such routes have been adopted and mapped by the local jurisdiction.

Table No. 5
Minimum Travel Lane Widths
Rural Section

For RRR projects, please refer to *January 1, 2004 Plans Preparation Manual, Section 25.4.5 for details.*

Table No. 5a
Remaining Roadway Treatment
Rural Section

	Average Annual Daily Traffic Volume			
	< 2,000	2,000-10,000	10,000 – 20,000	>20,000
Speed Limit (mph)	Min. Travel Lane (ft)	Min. Travel Lane (ft)	Min. Travel Lane (ft)	Min. Travel Lane (ft)
25 and lower	10	10	11	11
30-40	10	11	11	12
45	11	12	12	12
50 and over	12	12	12	12

Remaining Roadway (per direction)	Treatment
0 – 1.9 feet	Paint Line at Edge of Pavement (EOP)**
2.0 – 3.9 feet	Paint Line Left of EOP
4.0 or more +	Paint/Sign Designated Bike Lane

** Optional for **traffic calming purposes**, paint a continuous white line left of EOP.

+ Not including gutter.

Note: “Bike Route” and/or “Share the Road” signs may be installed if such routes have been adopted and mapped by the local jurisdiction.

4. **CONCLUSIONS:**

The lack of specific standards associated with providing designated or undesignated bicycle lanes during resurfacing projects while maintaining minimum travel lane widths often results in designers maintaining the status quo configuration. Similarly, the lack of specific pedestrian crossing criterion often results in designers not providing for mid-block or unsignalized intersection crossings.

This report concludes that after considering the various documented standards and guidelines in the transportation industry, that it is feasible to develop guidelines and criteria to establish clear opportunities for the installation of designated/undesignated bicycle lanes and pedestrian crossings respectively. In this regard, tables have been developed to assist the practitioner in providing suitable combinations of travel and bicycle lanes depending on operating speed, traffic volume, parking, and land use characteristics. Further, criteria have been identified to also assist the practitioner in formulating clear methods to decide on the implementation of pedestrian mid-block crossings.

The Hillsborough County Metropolitan Planning Organization considers the safety of its citizens paramount. Providing additional pedestrian crossing opportunities in association with innovative crossing treatments coupled with the provision of appropriate combinations of travel and bicycle lanes will go a long way to meeting this mission.

5. **RECOMMENDATIONS**

- 5.1 That the MPO adopt criteria associated with the installation of mid-block pedestrian crossings as noted in Section 3.2.1 of this report;
- 5.2 That the MPO adopt the matrices associated with the application of designated and undesignated bicycle lanes as shown in Table Nos. 3/3a, 4/4a, and 5/5a; and

That the MPO formulate appropriate language in its comprehensive plan that encourages local governments to institutionalize these guidelines for consideration during resurfacing and reconstruction projects in Hillsborough County.

List of Appendices

- A. Pedestrian Crossing Installation Guidelines
- B. Pedestrian Treatments – Literature Review
- C. Bicycle Treatments – Literature Review
- D. Summary of Pedestrian treatments at Uncontrolled Crossings
- E. Summary of Pedestrian treatments at Signal controlled Crossings
- F. Summary of Pedestrian treatments at Signal controlled Intersection Crossings
- G. Warrants/Criteria for Overpasses and Underpasses
- H. Summary of Bicycle Treatments
- I. Minimum lane Widths for Bike Lanes (Florida Green Book – cross-section)
- J. Minimum lane Widths for Bike Lanes (Florida Green Book - table)
- K. Minimum Lane Widths (Plans Preparation Manual)
- L. Minimum Lane Widths - Special (PPM)
- M. Minimum Lane Widths – TDLC (PPM)
- N. Minimum Lane and Shoulder widths (PPM)
- O. Minimum Lane Widths - Multi-lanes (PPM)
- P. Minimum Lane Widths (Florida Intersection Design Guide)

For a copy of the appendices in the report in Appendix G contact the Hillsborough County Metropolitan Planning Organization.