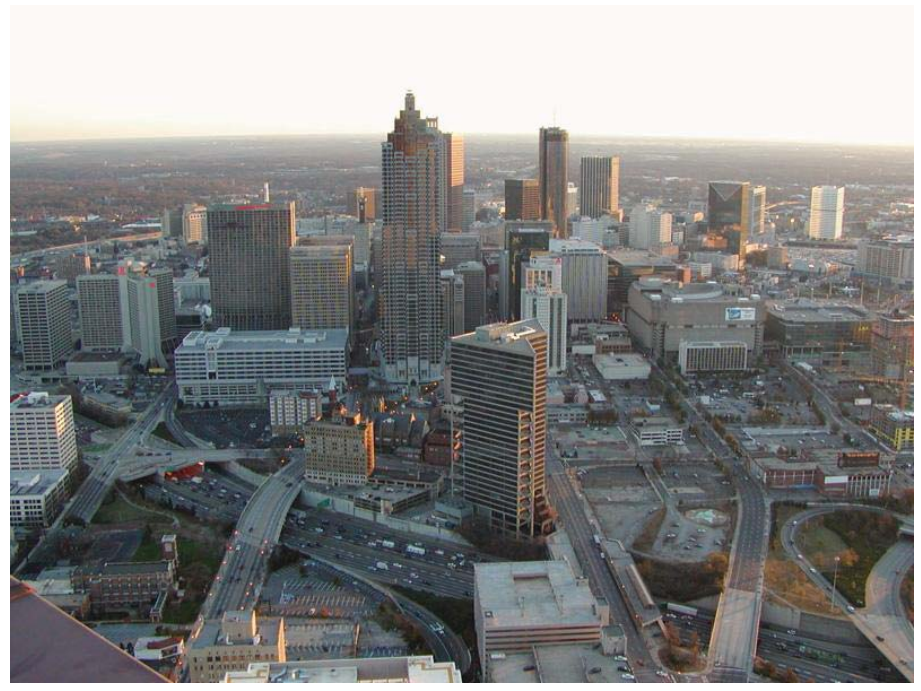
Connect Atlanta Plan



STREET DESIGN GUIDE

connect atlanta plan

OVERVIEW AND TABLE OF CONTENTS

The street sections of the SDG are organized around two different views: a left-hand page based on an understanding of the implications that context may have on street design needs, and a right-hand page that details the typical section design elements. The figures to the right display this layout organization in greater detail.

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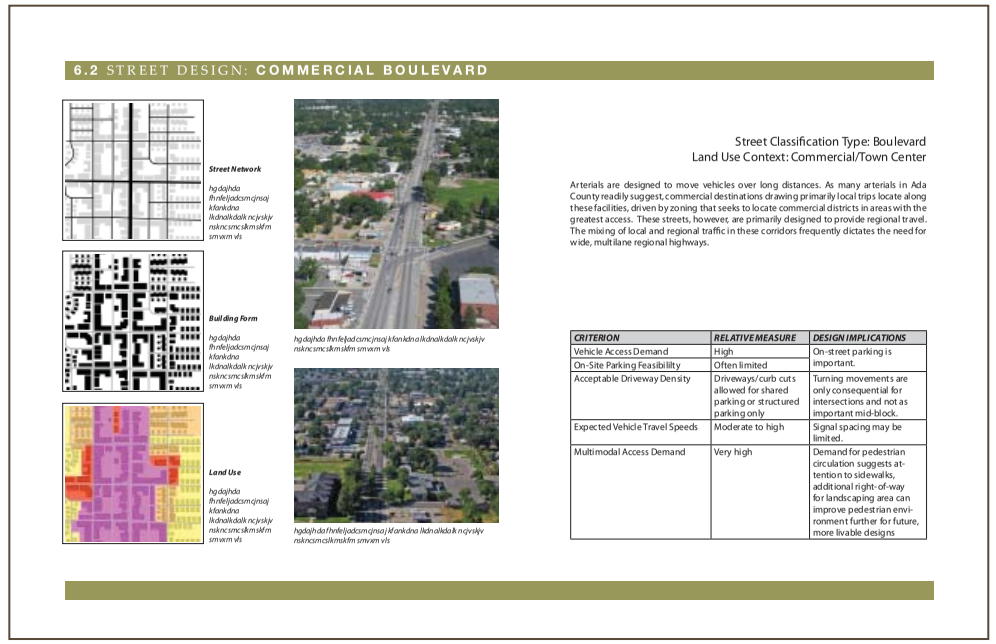
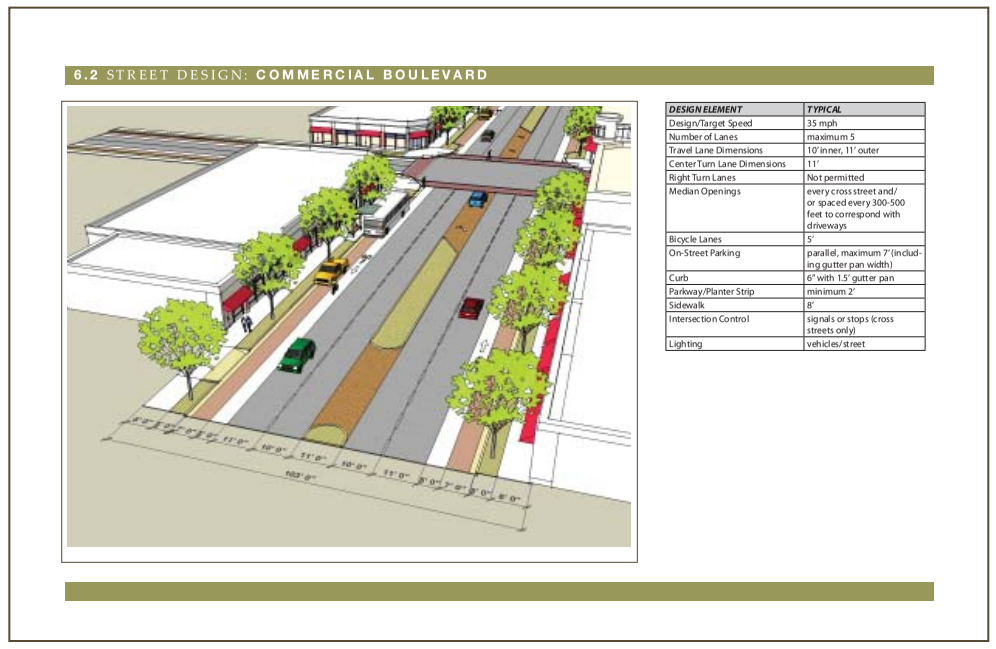


Left Page: Context and Design Needs for the Street

On this page, planners and design engineers alike can better understand the context in which the street is expected to be found. On the left, diagrams demonstrate how the context can be understood in terms of typical street network, built form and land use patterns— emphasizing that context is multi-dimensional and not necessarily tied exclusively to one indicator of the street's surroundings. Picture examples illustrate the general look and feel of the street in its environment, and the table on the right outlines typical needs of the users of a street with the consequences these needs may be expected to have on the street design.



Right Page: Cross Section and Recommended Street Design Dimensions

This page details the recommended street design dimensions for meeting the needs of the context and provides a perspective illustration of how this suggested design would fit into its surroundings. On sections with complex treatments outside of the moving way of the street, particular attention is given to these design elements, including clear zones, amenity zones and pedestrian zones.

GENERAL DESIGN PARAMETERS OF THE STREET DESIGN GUIDE

The following are basic principles used consistently in the cross sections presented on the following pages:

1. Street dimensions are given from face of curb to face of curb.

2. Curb-and-gutter sections are illustrated with 6-inch curb widths and 18-inch gutter widths, though it is not the intent of this Street Design Guide to replace the City's existing design standards for curbs. If a header curb is used instead of a curb and gutter, the overall width of a cross section may be adjusted accordingly.

3. The width of any on-street parking areas includes through to the face of curb to avoid confusion between those parts of the section in the street and those parts outside of it. This is likely only to be relevant when curb-and-gutter drainage is used. In header curb sections, the parking area will be composed of the roadway surface material.

4. For all typologies the minimum pedestrian zone dimensions vary, as illustrated in the diagrams to the right. Safety is the underlying design principle in all cases.

FLEXIBILITY OF RECOMMENDATIONS

In addition, in applying the recommendations in this guide to actual street design, the street section typologies of the SDG are presented in the context of the following general provisions.

1. Some typologies will require internal discussion within the city for example, coordination with their fire service and parks requirements.
2. Private alleys can be an option to minimize access to boulevard streets; these have not been addressed here as they are generally identified, located and designed through the development application process.
3. Dimensions, number of lanes, medians, speeds etc. shown are "Typical" or "General" and may vary once project specific conditions are determined.

FUNCTIONAL CLASSIFICATION AND STREET DESIGN GUIDE TYPOLOGIES

The guide makes reference to three types of streets: boulevards, avenues and streets. These generally correspond with the Federal Highway Administration's functional classification types, but this choice of terminology has been made so that the Street Design Guide is consistent with the design recommendations of the Atlanta BeltLine subarea planning studies.

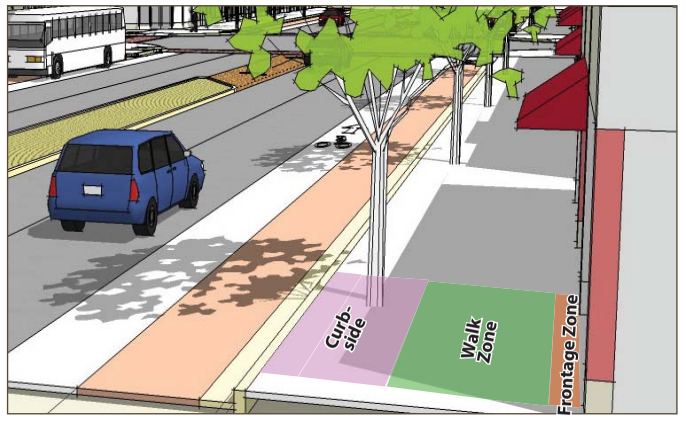
For purposes of this guide, street types should correspond to FHWA definitions per the table below:

FHWA Classification	Corresponding Connect Atlanta SDG Classification
Arterial	Boulevard
Collector	Avenue
Local	Street

THE PEDESTRIAN ZONE

Throughout the Connect Atlanta Plan, emphasis has been made on the importance of a strong pedestrian realm. With this it is important to understand basic fundamentals of the streetside area, or pedestrian zone, and where each is critical to a well-designed street.

1. The **curb zone** is the portion of the street cross section that accommodates street trees, light posts and, as needed, other utility structures and facilities. In general, a minimum of 1.5 feet of this zone should be reserved for horizontal clearance from the back of curb. Widths should be provided so that pedestrians are also not immediately in contact with tree trunks and other vertical elements, especially when constrained widths mean that walk zones (see next numbered item in this list) may be narrow. Trees should generally be planted in the center of this zone's width.
2. The **walk zone** is the primary passing and circulating area for pedestrians. Widths are suggested in specific cross sections, with particular regard to surrounding land use context and the needs that that land use may suggest for pedestrian activity.
3. The **frontage zone** is useful as a buffer from buildings in more densely developed urban areas, though should be considered part of the right-of-way. In the case of land development regulations where setback are required to accomplish this same function, the frontage zone may be assumed to be part of the walk zone. It should be noted that landscaping against the right of way may impede the true width of the walk zone; if a frontage zone is not to be used landscaping standards for private development should seek to address any encroachment into the sidewalk area.



Pedestrian Zone

This is an illustrative legend to explain how the pedestrian zone is broken down: the colors do ***NOT*** indicate color-based surface treatments.

- Curbside Zone
- Walk Zone
- Frontage Zone: generally 1', provides buffer from buildings

Transit

The SDG street typologies are ready-made for bus transit, providing for optimum operations without special rights-of-way or unique street design considerations. Certainly there must be careful consideration in the placements of bus stops by optimizing rider convenience and considering vehicular, pedestrian and bicycle traffic along the boulevard and at major intersections.

Depending on the boulevard street typology, bus operations are likely to retain operational right-of-way within the boulevard as it stops to unload and load passengers. Where bike lanes separate the outside travel lane from the curb, buses will stop within the outside travel lane and bike lane, and cyclists and motorists will either yield to the stopped bus or swing around the stopped bus (on multi-lane boulevards). For those selective typologies with on-street parking, special curb extensions can be placed at major bus stops to extend the pedestrian access to the bus stopped in the outside lane.

In general, special bus pull-out lanes are not are not recommended here as they are both expensive (additional ROW costs) and inefficient for bus operations.

The street-side pedestrian space and features contained in the SDG typologies provide sufficient space to appropriately accommodate the minimum dimensions required for bus stops and their amenities.

BUS TRANSIT ILLUSTRATION. *The street typologies in the SDG reflect the needs of transit vehicles for efficient operations.*

Traffic calming programs are being used to re-create safe, slow neighborhood and commercial streets without limiting mobility. Traffic calming influences driver behavior through physical or psychological means, resulting in lower vehicle speeds or through traffic volumes. Many traffic calming techniques physically alter the width or alignment of the cart way. Physical techniques can generally fall into three categories: narrowing the street, deflecting the vehicle path vertically, or deflecting the vehicle path horizontally. By changing the direction of travel or interrupting a driver's sight line, physical techniques encourage drivers to slow down and widen their vision field thereby making them more aware of pedestrians, bicyclists, and other vehicles. In addition to physical changes to the cart way, visual friction elements can be used to create a sense of enclosure or break up views.

Traffic calming techniques, especially physical means, are most suited for avenue and local streets, but can also be used on low-volume arterials. Physical treatments on arterial streets are best used up to a design speed of approximately 40 mph. Above that speed, calming should be limited to visual friction and mild horizontal shifts. A common tool on arterials is narrowed roadways or narrowed travel lanes.

The type of treatment used is dependent on the context: land use, traffic volumes, desired travel speed, et cetera. Concerns about emergency vehicle response time and safety for cyclists need to be addressed when developing a traffic calming scheme. While traffic calming is most commonly used in residential neighborhoods, certain techniques can also be applied effectively in commercial areas or other locations that have high levels of pedestrian activity. Traffic calming techniques have the greatest impact when they are employed in districts through coordinated efforts rather than in isolated locations. In fact, installation of a single device may divert traffic to neighboring streets, shifting the problem rather than resolving it. Some calming techniques are incorporated into the SDG, notably landscaping, narrow streets, and pavement treatments, but additional calming schemes can be applied on a case-by-case basis.

In addition to the descriptions provided here, several resources are available to guide development of traffic calming programs. Additional resources include Georgia Department of Transportation's Pedestrian and Streetscape Guide and the City of Decatur's Community Transportation Plan.

Visual Techniques

Visual elements include surface striping or colorization (top), landscaping (middle), building placement, and other changes to the visual field. These tools visually narrow the cartway, which usually makes drivers more aware of their surroundings and drive more slowly. Visual tools, particularly striping and landscaping, are often combined with physical measures to maximize traffic calming.

Simply requiring development to place buildings and landscaping next to the street can be effective traffic calming by raising driver awareness to an active environment.

Physical Techniques – Narrowed Street

Street narrowing can be used both at intersections (curb extensions) and mid-block (chokers). Intersection narrowing helps to reduce pedestrian crossing times and distances and to meet ADA requirements. They are therefore useful near school zones or in areas with high elderly and disabled populations. Mid-block narrowing is used primarily to slow down traffic. Many narrowing techniques require landscaping to give motorists advance warning and to intensify the calming effect.

Medians or Center Islands slow traffic in three ways: visually tightening the road, slowing turn speeds, and creating narrow channels. They are very pedestrian-friendly, especially when combined with crosswalks and divided to provide a crossing entirely at street level (also called Refuge Islands). The minimum preferred width is 8 feet and they should include full width ADA ramps installed at grade or with a light crown. Medians represent one of the most affordable and least intrusive tools.

Median islands can be used to narrow travel lanes. Lanes remain passable but prompt drivers to move more slowly around the median.

Curb Extensions (Bulb-outs) are great tools for slowing speeds at intersections and midblock locations. They can be used mid-block to create chokers or chicanes and to inset on-street parking without disrupting emergency responder access to critical streets. However, without proper treatment they may be dangerous for bicyclists.

Chokers (Neckdowns) reduce traffic speeds by narrowing passageways (10′ width is highly effective) to a one-way entry or exit point, and can be very attractive when properly landscaped.

Physical Techniques – Vertical Deflection

Speed Humps are both inexpensive and effective (a 14′ parabolic hump can slow traffic to about 22 mph), but can also be noisy, devalue a neighborhood, and affect emergency response times.

Speed Tables are a special form of speed hump that feature flat tops. They are the best tool for pedestrian and bicyclist crossings, and are typically used on local streets. They are more suitable for avenues than traditional speed humps, but should not be used where volumes exceed 10,000 vehicles per day, on bus routes, or on prime emergency response routes. Speed tables can be placed mid-block (used as raised cross-walks) or at intersections (see "Raised Intersections"). A popular design of the 22′ speed table, developed by Gwinnett County, features 6′ straight ramps and a 10′ table.

Speed tables are usually preferable to speed humps in that they are more accommodating to delivery and emergency vehicles, yet they also provide a cue to use lower speeds.

Raised Intersections are flat, raised areas covering an entire intersection, with ramps on all approaches and often with brick or other textured materials on the flat section. They slow traffic in three ways: creating a distinct shape that draws a motorist's attention, creating a vertical deflection that forces a low-speed approach, and highlighting the area as a pedestrian space. Raised intersections can be used with very tight and narrow intersections in commercial areas, but are relatively costly.

Physical – Horizontal Deflection

Chicanes are a mid-block treatment that use curb extensions, striping, islands, or even on-street parking to divert traffic from its intended course (and may narrow the roadway). Also called "slow points", chicanes hold speeds to 15 to 20 mph and may result in a volume reduction. On low volume streets no treatments are needed for bicycles, but on higher volume avenues, it may be appropriate to channel bikes along the side of the chicane.

Chicanes create one-lane yield conditions. They can be used on both sides to deflect driver paths and further reduce speeds, though streets that are naturally narrow may not need this treatment.

Roundabouts and mini-roundabouts act as both traffic calming devices on higher order streets and as intersection control devices in place of four-way stops or traffic signals. These tools lower speeds to 15-20 mph, shorten pedestrian crossings to 12-14 feet at a time, decrease injury crashes significantly, reduce noise and pollution, and increase area property values. Features like mountable curbs and corner cut-outs can improve navigability by large vehicles (trucks, emergency vehicles). However, roundabouts can create challenging or dangerous conditions on streets with high volumes of both motor vehicle and bicycle traffic and should be carefully evaluated with regard to multimodal users.

Roundabouts (above) and mini-roundabouts (below). Mini-roundabouts do not have the same traffic operations concerns as a larger roundabout, but given their smaller footprint are appropriate primarily on local, low-volume streets only.

OVERVIEW

The on-street bicycle route network recommended in the Connect Atlanta Plan is envisioned as a combination of striped bicycle lanes and shared-use streets with visual pavement markings. Because Atlanta's streets vary in width and many serve multiple purposes, the construction of bicycle routes may need to use a variety of design features to fit within existing constraints.

This section of the SDG details bicycle facilities and provides the City of Atlanta with a broader design framework for constructing formalized bicycle routes. It is intended to be used as a toolkit, allowing a project designer to select facilities that are appropriate to the street's other uses and design elements, to the type of route being constructed, and to the surrounding land uses and community characteristics. These are specified in order of preference, with the most desirable design options listed first. Though more preferential design options should be used before less preferential options, each lists conditions that would restrict its use.

This guide will refer to the Manual on Uniform Traffic Control Devices (MUTCD) for pavement markings. Many designated bike routes in Atlanta and other cities around the nation have relied solely on vertical signs for route indication. The MUTCD has specified this as a standard, though in practice this system of route indication presents a variety of maintenance challenges: ensuring that signs are visible and not obscured by landscaping or other streetside objects, timely replacement of lost signs, and appropriate frequency of placement to guide users along the length of a route. Each of the facilities is described next to an illustrative diagram showing proper placement of pavement markings relative to street edge and on-street parking.

One design option that these guidelines introduce to Atlanta is the shared-use arrow, commonly referred to as a 'sharrow' and used primarily in cities in the Western United States. Sharrows provide an advantage to unmarked shared bicycle streets in that they offer both visual cues to motorists that cyclists will be using a street and positioning guidance to cyclists on a safe riding distance from curbs and parked cars. Many of Atlanta's streets have multiple uses, not least of which are vehicle movement and parking, and the use of a pavement marking on streets intended for bicycles helps to establish continuity along a route and indicate all of the users for whom the street is intended.

It is important to establish that bicycle lanes are well-branded and easily understood; for that reason they are recommended as a preferred design option. However, they are not always easy to apply to a street: in the vast majority of all cases, the existing street is simply not wide enough to accommodate its current uses and the added width of bicycle lanes. In these cases the shared street approach, complete with appropriate signage and pavement markings, can 'carry' a route along its alignment in places where the addition of bicycle lanes is not practical.

FOLLOWING THE CONNECT ATLANTA PLAN

The guiding principle of the bicycle network in the Connect Atlanta Plan is providing connections between neighborhoods and recreational and community facilities that are often short trips. Connect Atlanta's intent is for the bicycle network to be a fundamental part of Atlanta's transportation system, and this means ensuring that routes are continuous and connect to other routes inside the City or to key locations along the City boundaries.

Connect Atlanta's proposed bicycle network follows two basic types of routes: Core Connections which provide longer-distance connectivity across the City, and Secondary Connections that bring these Core Connections into neighborhoods.

The Core Connections are envisioned as the bicycle thoroughfares of Atlanta and span the extent of the City. In many cases they have been selected on commercial corridors as these are seen as the principal 'challenges' to cycling as a more attractive mode choice. Cyclists and people interested in cycling perceive that many of these streets are unsafe or generally undesirable bicycle environments. For that reason, these streets are recommended to carry on-street bicycle lanes in the long-term. Core connections are the major bicycle thoroughfares of Atlanta's transportation system, and bicycles should be provided a formalized, dedicated space along these routes.

Secondary Connections allow the bicycle network to reach neighborhood destinations more closely and have primarily been selected along lower-speed, lower volume roads where flexibility in bicycle design is more appropriate. These routes may use on-street bicycle lanes or designate the street as shared between vehicles and bicycles with special signs and pavement markings.

General dos and don'ts:

DO:

Construct **bicycle lanes where they fit before selecting shared-use arrows**. Shared-use arrows are a useful tool but they should not be viewed as a substitute for bicycle lanes.

Continue **both** recommended **vertical signage and pavement markings** for the length of a designated route.

Consider alternative streets where they exist and when they provide generally superior cycling conditions. Look in particular at the grade of a street, daily traffic volume and observed vehicle travel speeds.

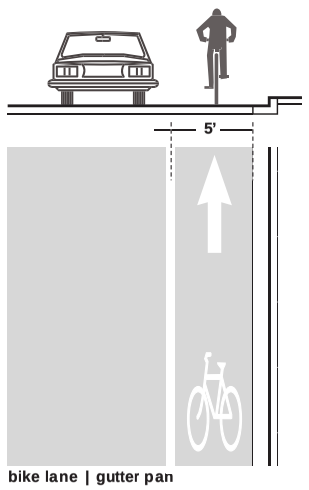
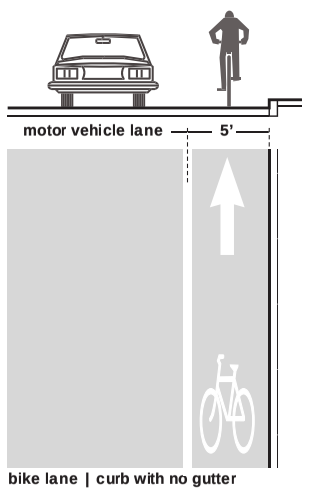
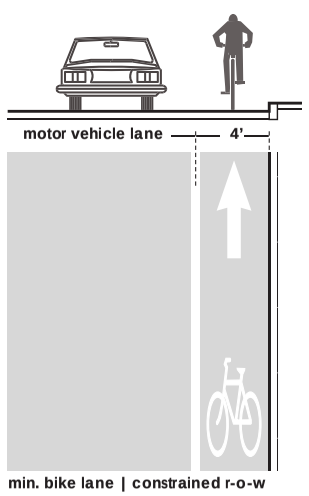
DON'T:

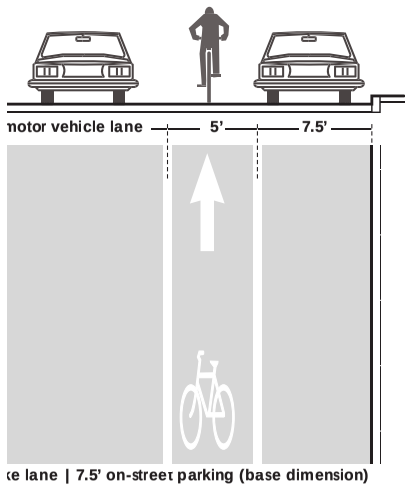
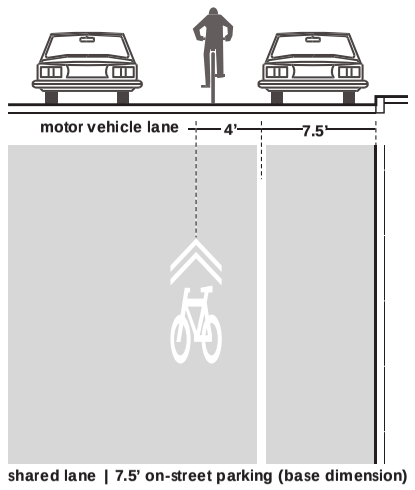
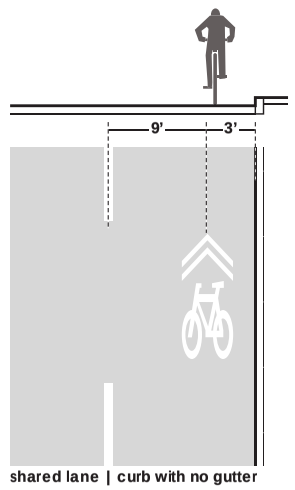
Remove or disallow on-street parking in order to add an on-street bicycle lane, especially in residential areas, without first having a discussion with neighborhood residents and businesses to determine if it is acceptable for a bicycle lane to replace parking.

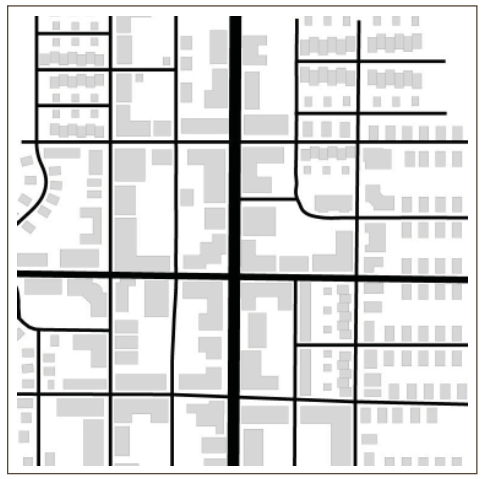
Use the diamond symbol in place of a bicycle lane or shared use arrow facility.

Place bicycle lanes between the curb and a dedicated right-turn lane. Chapter 9C, Section 4 of the MUTCD provides guidance on proper placement of bicycle lanes when right turn lanes are used at intersections.

Provide a bicycle lane or shared-use marking **for only one direction of travel** unless the street is one-way traffic.

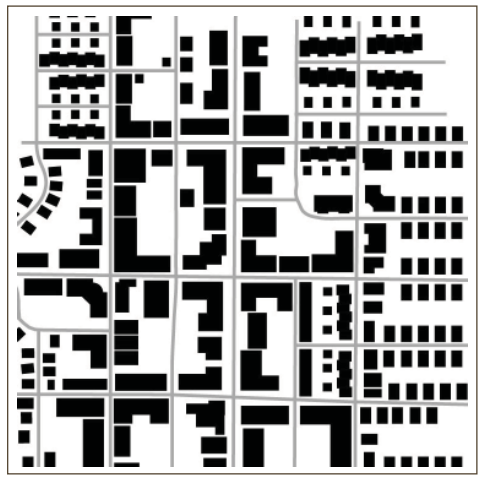
		Where these should be used	Where they should NOT be used	Guidelines for placement
Design Option 1: Standard 5' Bicycle Lane (Curb and Gutter)	 bike lane | gutter pan	• Used on curb-and-gutter street sections without on-street parking. • Can be striped when existing curb dimensions will allow five (5) feet of smooth surface for the bicycle lane and at least ten (10) feet of width remaining for the adjacent travel lane. • This (or Design Option 2, depending on curb construction) should be used as the base design for any reconstructed streets or roads where bicycle lanes are to be added and on-street parking will not be included. Five (5) feet should always be used as the base dimension for bicycle lane width when adjacent to a travel lane.	• Do not apply if this bicycle lane will replace permitted on-street parking without the Department of Public Works first working with neighborhood residents to determine if this is an acceptable design option. • Do not apply if existing curb-to-curb dimensions will not allow five (5) feet of bike lane in paved surface AND at least ten (10) feet of width in adjacent travel lane.	• Place one marking (bicycle symbol and arrow) immediately after a signalized intersection and at least one per 500 feet. • Refer to MUTCD (2003 edition) Chapter 9C, Figure 9C-6 for appropriate design and spacing of the bicycle symbol and arrow. • At intersections with dedicated right turn lanes, bicycle lanes should always be placed between the turn lane and the right-most through travel lane.
Design Option 2: Standard 5' Bicycle Lane (Header Curb)	 bike lane | curb with no gutter	• Used on header curb sections without on-street parking. • Can be striped when existing curb dimensions will allow five (5) feet of smooth surface for the bicycle lane and at least ten (10) feet of width remaining for the adjacent travel lane. • This (or Design Option 1, depending on curb construction) should be used as the base design for any reconstructed streets or roads where bicycle lanes are to be added and on-street parking will not be added. Five (5) feet should always be used as the base dimension for bicycle lane width when adjacent to parking.	• Do not apply if this bicycle lane will replace permitted on-street parking without the Department of Public Works first working with neighborhood residents to determine if this is an acceptable design option. • Do not apply if existing curb-to-curb dimensions will not allow five (5) feet of bike lane in paved surface AND at least ten (10) feet of width in adjacent travel lane.	• Place one marking (bicycle symbol and arrow) immediately after a signalized intersection and at least one per 500 feet. • Refer to MUTCD (2003 edition) Chapter 9C, Figure 9C-6 for appropriate design and spacing of the bicycle symbol and arrow. • At intersections with dedicated right turn lanes, bicycle lanes should always be placed between the turn lane and the right-most through travel lane.
Design Option 3: 4' Bicycle Lane (For Constrained Street Sections)	 min. bike lane | constrained r-o-w	• Used on header curb sections without on-street parking. • Should only be used when existing curb dimensions will allow only four (4) feet of smooth surface for the bicycle lane and at least ten (10) feet of width remaining for the adjacent travel lane (i.e. total width from centerline to curb is 14 feet). • May be used when centerline-to-curb width is up to 16 feet if travel lane widths up to 12 feet need to be preserved. If centerline-to-curb width is greater than 16 feet, a five (5) foot bicycle lane should be used. • When streets are reconstructed and bicycle lanes will be added, a five-foot width should always be used unless there are physical limitations or cost-related reasons that would make that width impractical.	• Do not apply if this bicycle lane will replace permitted on-street parking without the Department of Public Works first working with neighborhood residents to determine if this is an acceptable design option. • Do not apply if existing curb-to-curb dimensions will not allow four (4) feet of bike lane in paved surface AND at least ten (10) feet of width in adjacent travel lane.	• Place one marking (bicycle symbol and arrow) immediately after a signalized intersection and at least one per 500 feet. • Refer to MUTCD (2003 edition) Chapter 9C, Figure 9C-6 for appropriate design and spacing of the bicycle symbol and arrow.

	Where these should be used	Where they should NOT be used	Guidelines for placement
Design Option 4: Bicycle Lane with Parking 	• Used on Core Connection and Secondary Connection street sections with on-street parking. • Can be striped when existing centerline-to-curb dimensions will allow five (5) feet for the bicycle lane, 7.5 feet for on-street parking and at least ten (10) feet of width remaining for the adjacent travel lane. • This should be used as the base design for any reoncstructed streets or roads where bicycle lanes are to be added and on-street parking is desired. Five (5) feet should be used as the base dimension for bicycle lane width when adjacent to parking.	• Do not apply if this bicycle lane will replace permitted on-street parking or cause parking dimensions to be less than seven feet (7') in width. • Do not apply if existing curb-to-curb dimensions will not allow five (5) feet of bike lane in paved surface AND at least ten (10) feet of width in adjacent travel lane and 7.5 feet for on-street parking.	• Place one marking (bicycle symbol and arrow) immediately after a signalized intersection. • Refer to MUTCD (2003 edition) Chapter 9C, Figure 9C-6 for appropriate design and spacing of the bicycle symbol and arrow.
Design Option 5: Shared Street with Parking (Pavement Markings) 	• Used on Secondary Connection street sections with on-street parking. • Can be striped when existing curb dimensions will allow five (5) feet of smooth surface for the bicycle lane and at least ten (10) feet of width remaining for the adjacent travel lane.	• Shared-use arrows should not be used unless Design Options 1-4 for bicycle lanes have been evaluated and are not practical. • Do not apply if posted speed on a roadway is 40 miles per hour or greater. • Do not apply on one-way streets if parking is permitted on the right side of the street only. In these cases, use design options 4 or 5.	• Place one marking (bicycle symbol and chevrons) immediately after a signalized intersection and repeat them along the length of a street. They should be 200 feet apart at most. • The centerline of the marking should be 11.5' from the curb, or four feet from the edge of a delineated parking area, whichever is greater. • Do not place the shared-use arrow marking within 100 feet of a signalized intersection.
Design Option 6: Shared Street without Parking (Pavement Markings) 	• Used on Secondary Connection constrained street sections without on-street parking. • Used on Secondary Connection routes when the centerline-to-curb dimension is too narrow to accommodate both a minimum width of four feet (4') for a striped bicycle lane and a minimum width of ten feet (10') for adjacent travel lane. • These can be used on both one-way and two-way streets, but in the case of one-way streets should only be used if the street has a 'partner' street that carries traffic in the opposite direction.	• Shared-use arrows should not be used unless Design Options 1-5 for bicycle lanes have been evaluated and are not practical. • Do not apply if posted speed on a roadway is 40 miles per hour or greater. • Do not apply on one-way streets if parking is permitted on the right side of the street only. In these cases, use design option 5.	• Place one marking (bicycle symbol and chevrons) immediately after a signalized intersection and repeat them along the length of a street. They should be 200 feet apart at most. • The centerline of the marking should be 11.5' from the curb, or four feet from the edge of a delineated parking area, whichever is greater. • Do not place the shared-use arrow marking in intersection approaches (within 100 feet behind a signalized intersection).



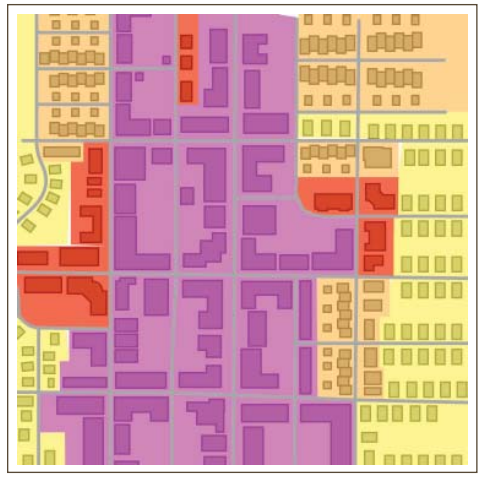
Street Network

Downtowns typically have the most thoroughly connected street networks of a community.



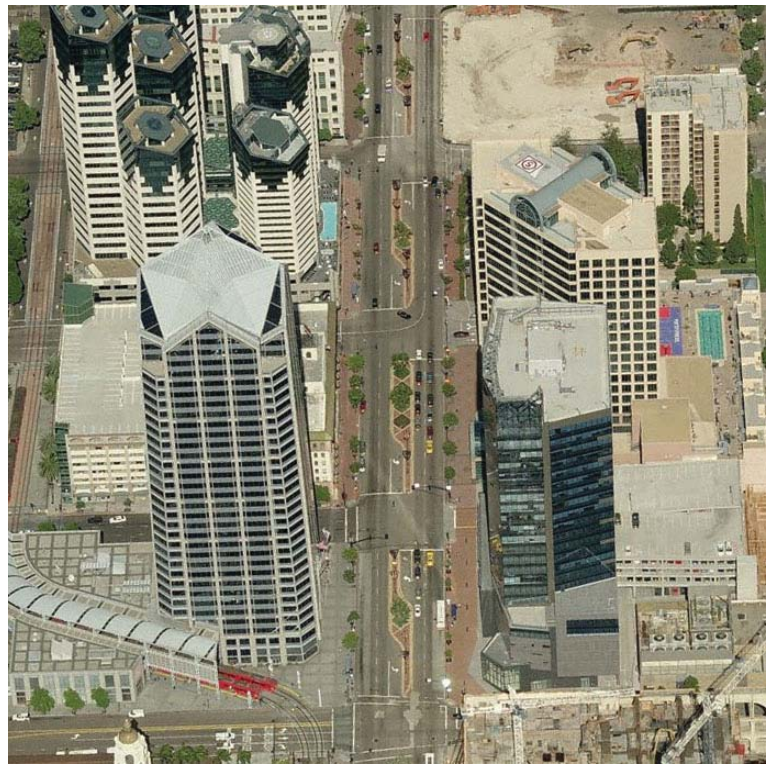
Building Form

Likewise, building form is often directly oriented to streets: these areas are usually the traditional downtowns and business districts of their communities; buildings were placed in a way to maximize pedestrian access.



Land Use

Though land use patterns may be similar to commercial districts, the overall development patterns tend to be more intense and combine many uses in a small area (especially office, retail, dining and entertainment and sometimes residential).



Existing Classification Type: Boulevard
Land Use Context: Downtown/Town Center

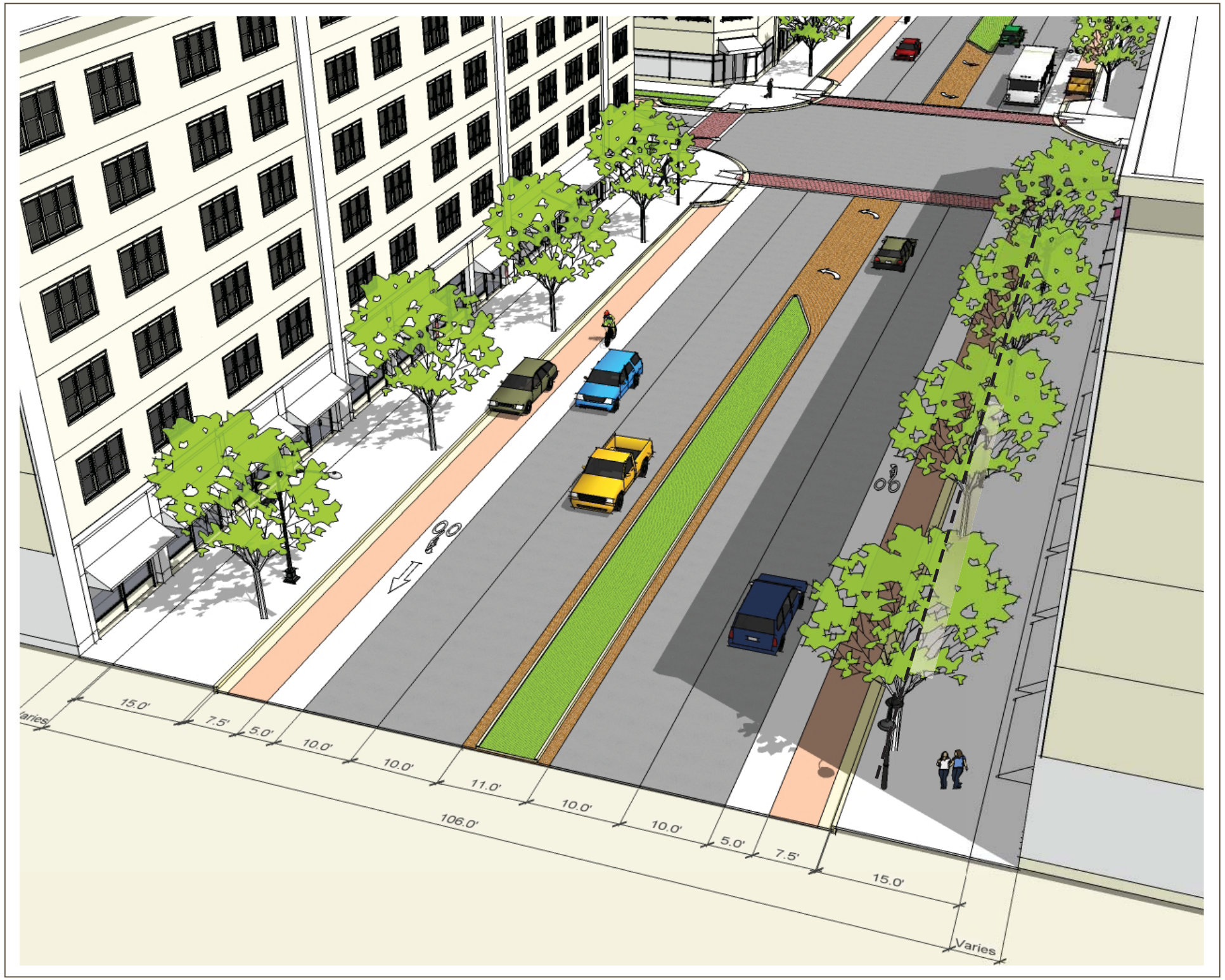
Downtown streets, perhaps more than any other streets in the regional system, play all at once the roles of vehicle thoroughfare, bike route, pedestrian zone, convenient parking area and, most importantly, public space.

The needs of downtown businesses and establishments have led to the creation of streets that provide ample sidewalk space for short pedestrian trips; loading/unloading and general service areas for deliveries and functional needs, and on-street parking for immediate access to customers and users arriving by motor vehicle. However, the draw of downtown as an employment center has created a legacy of traffic engineering that favors large systems of one-way operations designed to move traffic in and out.

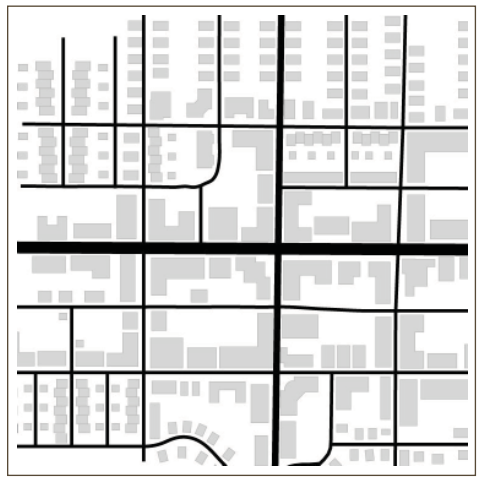
The focus of downtown streets is meeting the multiple needs of the centers of cities. In this particular classification, the street design recognizes that downtown is a destination for drivers and that consequently, vehicle capacity is important. It also acknowledges that pedestrians and cyclists use the streets and need both ample sidewalk space and dedicated bicycle lanes with a safe and comfortable separation from vehicle travel lanes.

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Vehicle Access Demand	High	On-street parking is important.
On-Site Parking Feasibility	Very limited	
Acceptable Driveway Density	Driveways/curb cuts allowed for shared parking or structured parking only	Turning movements are only consequential for intersections and not as important mid-block, though mid-block curb cuts are allowed.
Expected Vehicle Travel Speeds	Low to moderate, though congestion is often expected	Frequent signal spacing and mid-block pedestrian crossings are acceptable.
Multimodal Access Demand	Very high	Sidewalks in particular should be addressed to allow sufficient room for circulation.

2.1 STREET DESIGN: HIGH DENSITY MIXED USE / CBD BOULEVARD

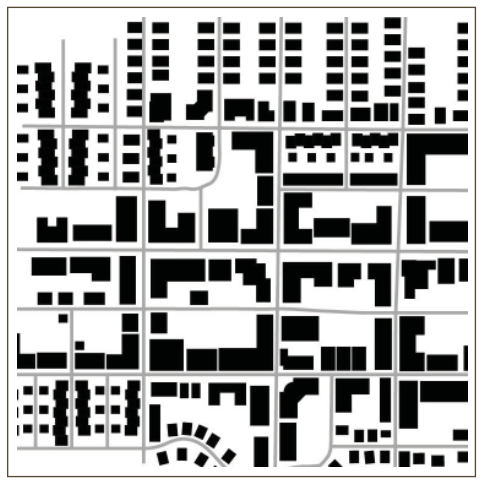


Design Element	Typical
Right-of-Way	**106'**
Design & Posted Speed	30 mph
Number of Travel Lanes (per direction)	maximum 2
Lane Dimensions	10'
Right Turn Lanes	not Allowed
Bicycle Lanes	5'
Median	yes, 11'
On-Street Parking	optional, 7.5' parallel when used (includes gutter pan width)
Curb	6" with 1.5' gutter pan
Sidewalk	15' sidewalk with a minimum 8' walk zone
Frontage Zone	see page 4
Intersection Control	signals or stops (cross streets only)
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance from back of curb should be 1.5'.
Block Length	250'-400'



Street Network

Downtowns typically have the most thoroughly connected street networks of a community.

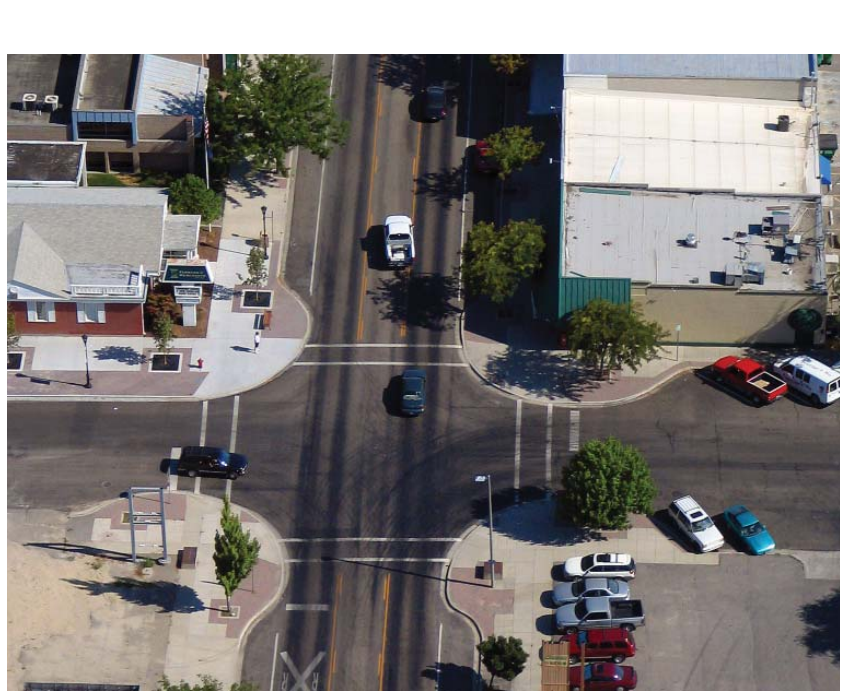


Building Form

Likewise, building form is often directly oriented to streets: these areas are usually the traditional downtowns and business districts of their communities; buildings were placed in a way to maximize pedestrian access.

Land Use

Though land use patterns may be similar to commercial districts, the overall development patterns tend to be more intense and combine many uses in a small area (especially office, retail, dining and entertainment and sometimes residential).



Existing Classification Type: Avenue
Land Use Context: Downtown/Town Center

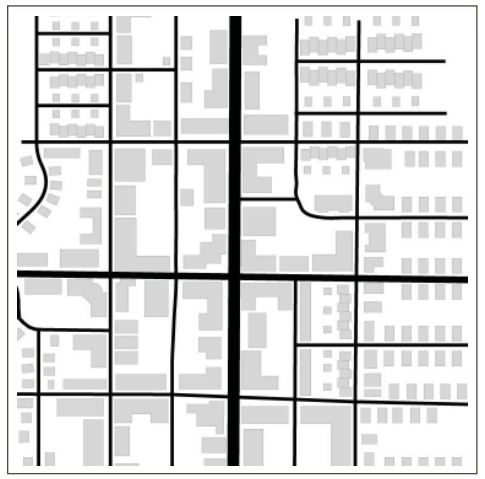
As land uses and building configurations tend to have the same ground-floor retail and commercial on these streets as on the previously illustrated Downtown/CBD Boulevard, vehicle access demand is accordingly high, meaning that in spite of possibly more frequent driveway cuts on these streets, space for on-street parking may be seen as important. Likewise, the viability of a commercial street serving pedestrians making short trips depends on longer stretches of 'protected zones' for pedestrians, meaning curb cuts and driveways should be limited.

It is not common for the intensity of land use in these places to generate transportation impacts that justify one-way traffic operations. With this, flexibility in design for different parking configurations should be applied (e.g. angled or parallel) depending on the limitations of the right-of-way.

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Vehicle Access Demand	High	Due to high demand for accessing land uses and limited parking on-site, on-street parking is especially important.
On-Site Parking Feasibililty	Limited	
Acceptable Driveway Density	Should not be frequent	Relatively frequent driveway spacing may require two-way left turn lane.
Expected Vehicle Travel Speeds	Low - congestion generally expected in town center contexts	Narrower lanes are acceptable, as well as more frequent signal spacing and smaller intersection curb radii.
Multimodal Access Demand	High (especially pedestrian demand)	Sidewalks should be provided, and special treatments such as mid-block crossings on long blocks (600 feet or longer) are important.

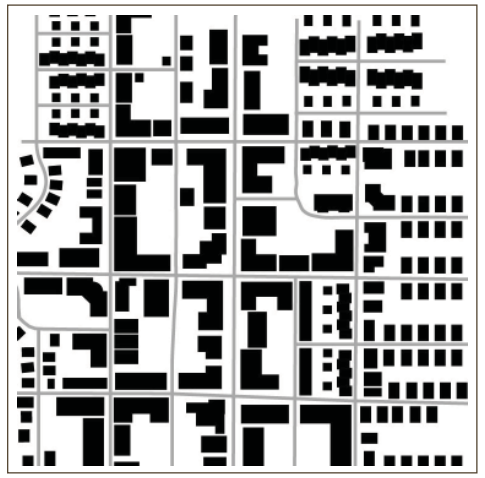
2.2 STREET DESIGN: **HIGH DENSITY MIXED USE / CBD AVENUE**

Design Element	Typical
Right-of-Way	**86'**
Design & Posted Speed	30 mph
Number of Travel Lanes (per direction)	maximum 2
Lane Dimensions	10'
Right Turn Lanes	not allowed
Median	yes, 11'
Bicycle Lanes	5'
On-Street Parking	optional, 7.5' parallel when used (includes gutter pan width)
Curb	6" with 1.5' gutter pan
Sidewalk	15' sidewalk with a minimum 8' walk zone
Frontage Zone	see page 4
Intersection Control	signals or stops (cross streets only)
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance from back of curb should be 1.5'.
Block Length	250'-400'



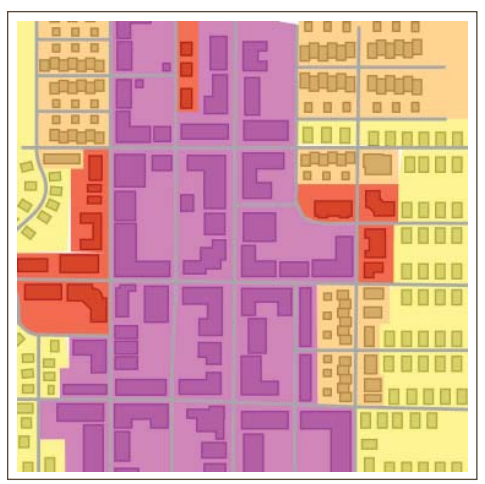
Street Network

Downtowns typically have the most thoroughly connected street networks of a community.



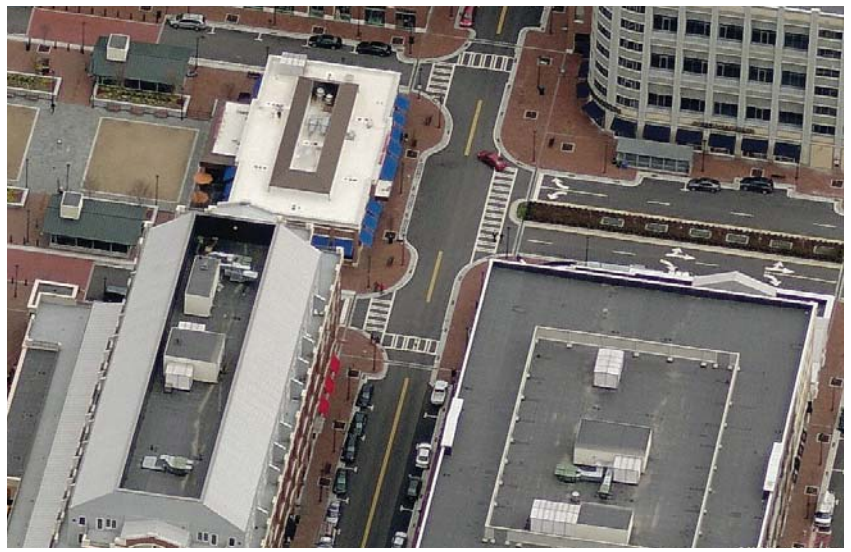
Building Form

Building form is often directly oriented to streets, though sometimes local streets carry more of a service and access role and development patterns have used these streets to access parking and rear building entrances.



Land Use

The overall development patterns tend to be more intense and combine many uses in a small area (especially office, retail, dining and entertainment and sometimes residential).

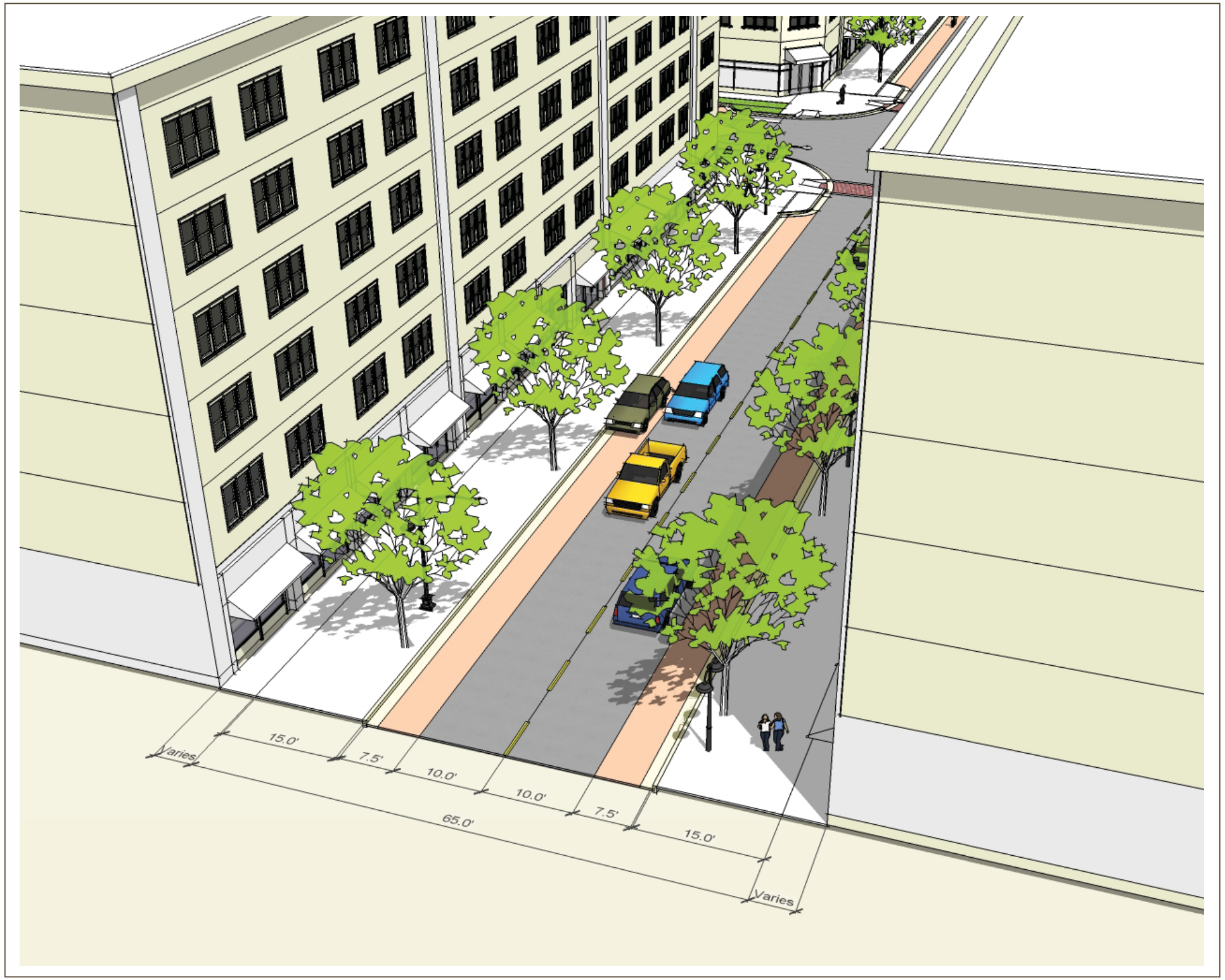


Existing Classification Type: Street
Land Use Context: Downtown/Town Center

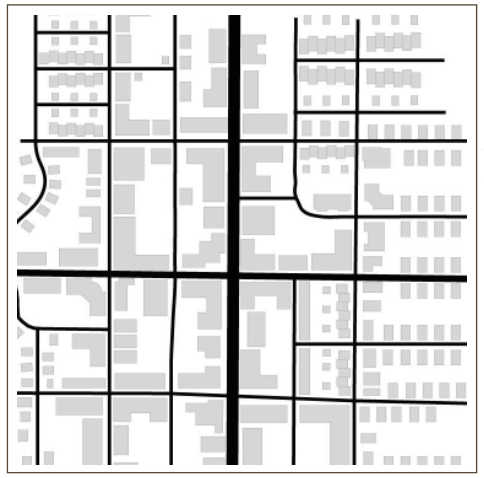
Similar in function to the local streets in more purely commercial contexts, the local streets of downtowns and town centers provide the most prominent access function, giving access to driveways when they are needed and allowing a level of circulation in the roadway network that frees boulevard roadways from needing to accommodate service trips and related turning movements.

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Vehicle Access Demand	High	On-street parking is important.
On-Site Parking Feasibilility	Limited	
Acceptable Driveway Density	Driveways/curb cuts allowed for shared parking or structured parking only	Turning movements are only consequential for intersections and not as important mid-block.
Expected Vehicle Travel Speeds	Moderately low	Frequent signal spacing and mid-block pedestrian crossings are acceptable.
Multimodal Access Demand	Very high	Sidewalks in particular should be addressed to allow sufficient room for circulation.

2.3 STREET DESIGN: **HIGH DENSITY MIXED USE / CBD STREET**

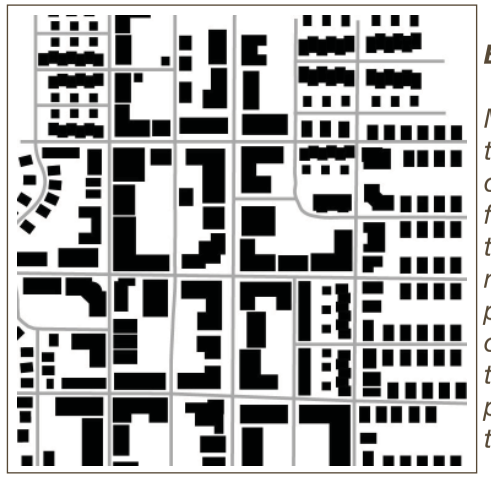


Design Element	Typical
Right-of-Way	**65'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	maximum 1
Lane Dimensions	10'
Right Turn Lanes	not allowed
Median	no
Bicycle Lanes	5' if used, otherwise shared vehicle/bicycle lane per guidelines in Section 1.5
On-Street Parking	optional, 7.5' parallel when used (includes gutter pan width)
Curb	6" with 1.5' gutter pan
Sidewalk	15' sidewalk with a minimum 8' walk zone
Frontage Zone	see page 4
Intersection Control	signals or stops (cross streets only)
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance from back of curb should be 1.5'.
Block Length	250'-400'



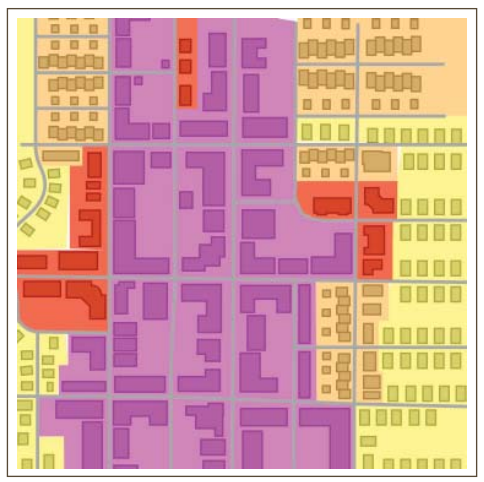
Street Network

The boulevard is the primary street in the area, with most principal commercial streets oriented to it.



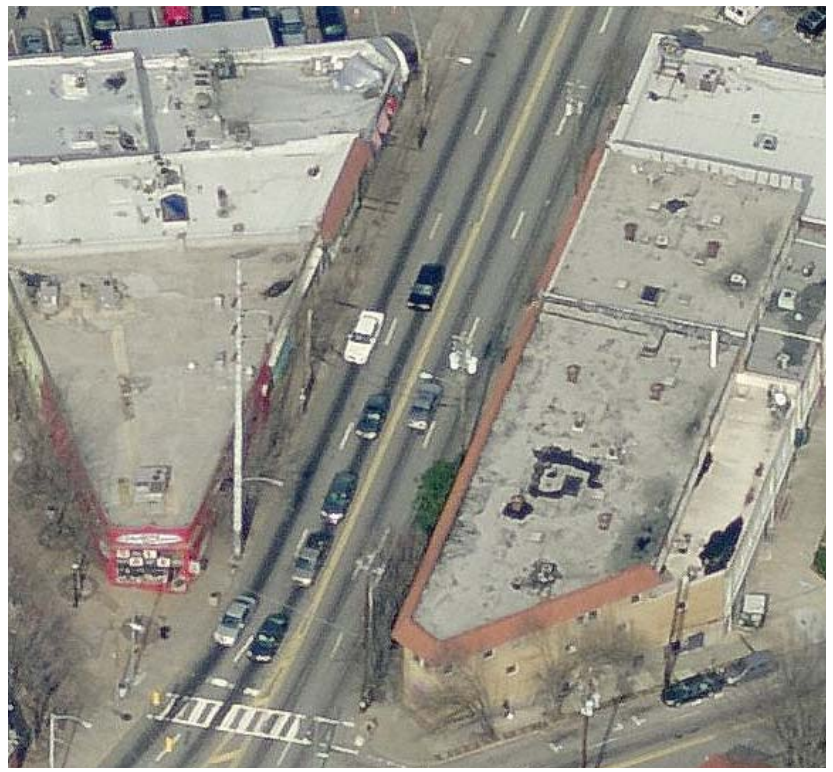
Building Form

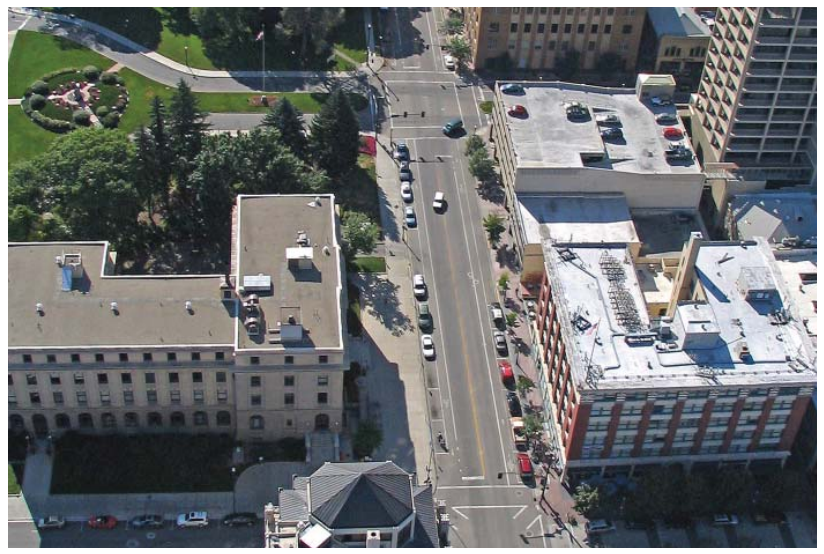
Many buildings in typical commercial context are not fully oriented to the street: they may face it, but parking demand often influences their form and placement relative to the street.



Land Use

It is often the case in these contexts that commercial land use is just along the main street, though the nature of this land use will have implications on the design of the street.





Existing Classification Type: Boulevard
Land Use Context: Conventional Commercial Area

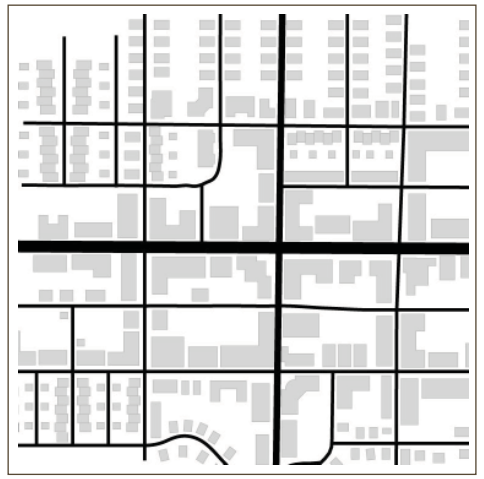
Boulevards are designed to move vehicles over long distances. As many such streets in Atlanta readily suggest, commercial destinations drawing primarily local trips locate along these facilities, driven by zoning that seeks to locate commercial districts in areas with the greatest access. These streets, however, are primarily designed to provide regional travel. The mixing of local and regional traffic in these corridors frequently dictates the need for wide, multilane regional highways.

Commercial boulevards can be modified within existing right-of-way dimensions to provide a more livable streetscape. This kind of transition represents first steps that can be taken in transforming streets that bear a double burden of mobility and access (which is contrary to their intended purpose as mobility streets) into livable streets that still provide a mobility function.

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Vehicle Access Demand	High	On-street parking is important.
On-Site Parking Feasibililty	Typical	
Acceptable Driveway Density	Should not be frequent	Turning movements are only consequential for intersections and not as important mid-block.
Expected Vehicle Travel Speeds	Moderately high, though congestion is often expected	Frequent signal spacing and mid-block pedestrian crossings are acceptable.
Multimodal Access Demand	Very high	Sidewalks in particular should be addressed to allow sufficient room for circulation.

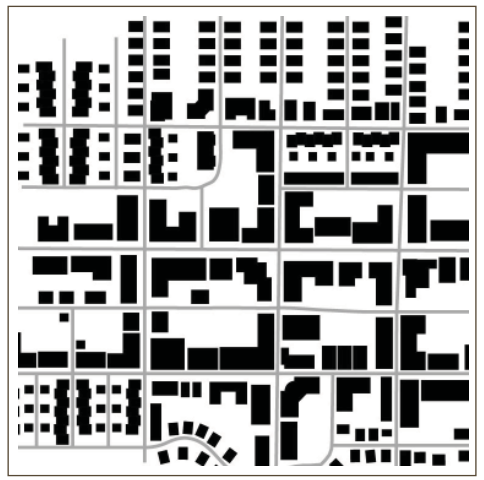
2.4 STREET DESIGN: **COMMERCIAL BOULEVARD**

Design Element	Typical
Right-of-Way	**106'**
Design & Posted Speed	35 mph
Number of Travel Lanes (per direction)	maximum 2
Travel Lane Dimensions	10'
Left Turn Lane Dimensions	11'
Right Turn Lanes	Allowed for heavy turning movements or heavy truck traffic
Medians	optional, 11' when needed
Median Openings	when medians are used, openings for cross streets only
Bicycle Lanes	5' minimum; necessary when part of Connect Atlanta Bicycle Map (5' when used). Dimensional constraints on existing streets may require shared lane design. Refer to Section 1.5 for design details and options.
On-Street Parking	7.5' maximum (includes gutter pan width)
Curb	6" with 1.5' gutter pan
Sidewalk	12' to 15' sidewalk with a minimum 8' walk zone
Mid-block crossings	when warranted by conditions (blocks longer than 600', unusually high pedestrian activity)
Frontage Zone	see page 4
Intersection Control	signal or stop (cross streets only)
Lighting Standards	Pedestrian and vehicle/street required. Minimum horizontal clearance from back of curb should be 1.5'.
Block Length	intersecting streets to be no more than 500' apart; mid-block curb cuts not permitted



Street Network

The avenue is typically a secondary street in these areas, though they may define principal intersections along a commercial corridor.

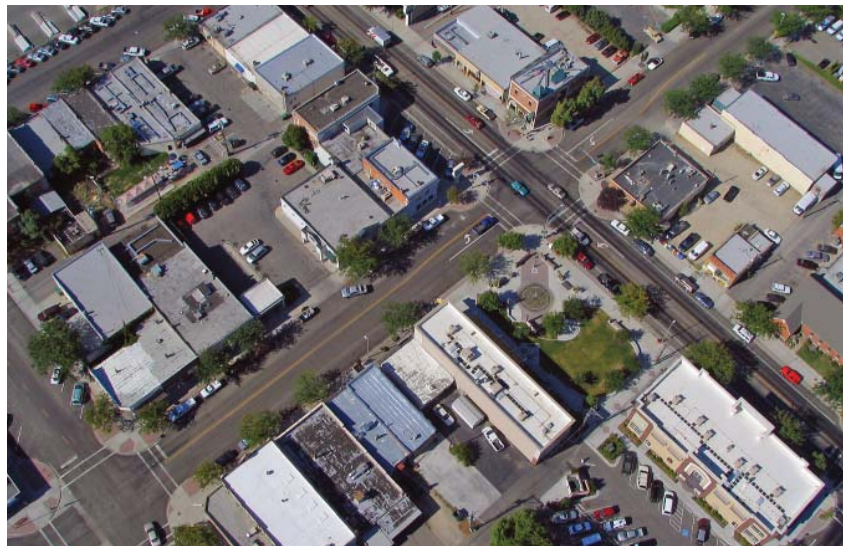


Building Form

In 'strip' commercial areas, typically intersecting avenue roadways will carry more of an access responsibility and will quickly transition to other land uses away from the commercial area.

Land Use

These avenues often move into areas of other land uses.



Existing Classification Type: Avenue
Land Use Context: Commercial Area

Serving as a 'bridge' between the mobility function of boulevards and the access function of local streets, avenues in a commercial context usually connect commercial corridors and nodes of concentration to the residential areas that surround them.

In larger commercial areas, the avenues provide an important access function and allow development to be focused away from boulevards. These types of contexts are often found in regional retail centers, usually near malls and other large-scale shopping facilities that are adjacent to commercial outparcels. When they occur in these contexts, they should be the focus streets for driveways and access to development before the boulevard streets are.

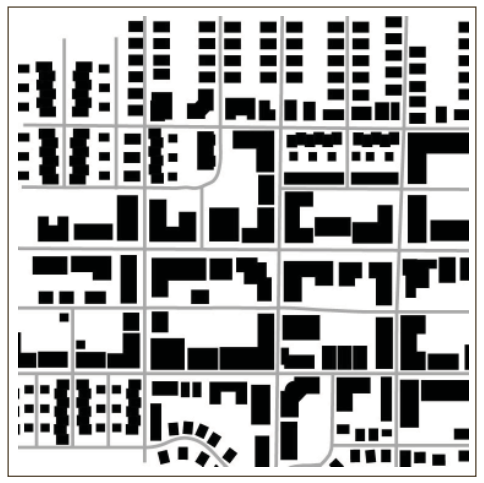
CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Vehicle Access Demand	High	Due to high demand for accessing land uses and limited parking on-site, on-street parking is especially important.
On-Site Parking Feasibililty	Limited	
Acceptable Driveway Density	Driveways/curb cuts allowed for shared parking or structured parking only	Relatively frequent driveway spacing may require two-way left turn lane.
Expected Vehicle Travel Speeds	Low - congestion generally expected in town center contexts	Narrower lanes are acceptable, as well as more frequent signal spacing and smaller intersection curb radii.
Multimodal Access Demand	High (especially pedestrian demand)	Sidewalks should be provided, and special treatments such as mid-block crossings on long blocks (600 feet or longer) are important.

2.5 STREET DESIGN: **COMMERCIAL AVENUE**

Design Element	Typical
Right-of-Way	**86'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	maximum1
Travel Lane Dimensions	10'
Center Turn Lane Dimensions	11'
Right Turn Lanes	Allowed for heavy turning movements or heavy truck traffic
Medians	optional, 11' when needed
Median Openings	cross streets only
Bicycle Lanes	Optional, necessary when part of Connect Atlanta Bicycle Map (5' when used). Dimensional constraints on existing streets may require shared lane design. Refer to Section 1.5 for design details and options.
On-Street Parking	7.5' parallel (includes gutter pan width)
Curb	6" with 1.5' gutter pan
Sidewalk	12' to 15' sidewalk with a minimum 8' walk zone
Mid-block crossings	permitted only in front of civic facilities
Frontage Zone	see page 4
Intersection Control	signals, stops, or roundabouts
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance from back of curb should be 1.5'.
Block Length	maximum 500'. Access to driveways limited by two curb cuts per block.

Street Network

Local streets in commercial areas are usually part of an established street grid, though they may be uncommon in newer commercial districts.

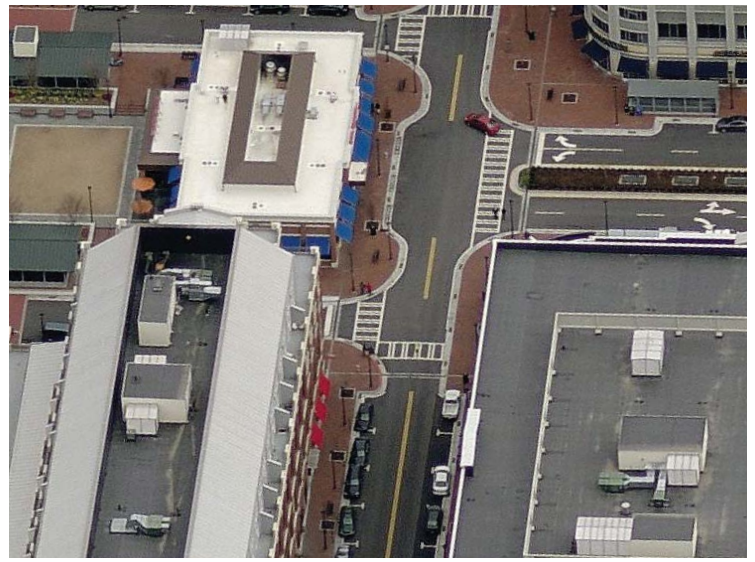


Building Form

Where buildings along main streets in commercial districts are sometimes separated from the street by parking, they do face the street: on local streets, commercial buildings are usually not oriented to the main street and provide more of a service function to rear and side entries to buildings.

Land Use

These locals often function as a transition street between commercial areas and neighboring land use types (usually residential).



Existing Classification Type: Street
Land Use Context: Commercial Area

Local streets in a commercial context assist the boulevard and, to a lesser degree, the avenue roadways in serving land uses. With this access function, driveways and entrances are expected to be more frequent. Designs should take into account the nature of the land use and what kind of 'operating contingencies' this kind of street will have to accommodate (e.g. impromptu delivery parking, turns into narrow driveways and alleys) These streets are thought of as the 'side streets' where the primary pedestrian access (and visual presentation) of commercial land uses would not be oriented.

Given that typical commercial contexts are 'strip-based' with most commercial land use directly fronting onto a major road, the local street design in this context is not likely to be commonly employed. The greatest opportunity for its use is from redevelopment, where commercial properties change their access patterns to make greater use of side streets and when redevelopment of conventional suburban land uses (especially big boxes and strip malls) into a more structured urban form occurs. In many cases, multiple ownership of these commercial centers makes full-scale redevelopment difficult, and land use change comes from development of outparcels that are closer to the major roadway. The commercial local street becomes more of an option when primary drive aisles through large parking lots are transitioned into these kinds of streets, with the side of the street that is redeveloping into a programmed land use following the roadside dimensions recommended on the opposite page.

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Vehicle Access Demand	High	On-street parking is less important.
On-Site Parking Feasibility	Usually serving parking areas of developed properties	
Acceptable Driveway Density	Driveways/curb cuts allowed as needed, typically to support parking for commercial uses built to higher-class streets	Turning movements more frequent, wider lanes can help to accommodate these movements and account for contingencies
Expected Vehicle Travel Speeds	Moderately low (20-25 mph)	Frequent signal spacing, intersection control and mid-block pedestrian crossings are acceptable.
Multimodal Access Demand	High	Sidewalks in particular should be addressed to allow sufficient room for circulation. Sidewalks needed principally for access to parking areas and side/rear entrances, width equal to that of main streets not necessary.

2.6 STREET DESIGN: **COMMERCIAL STREET**

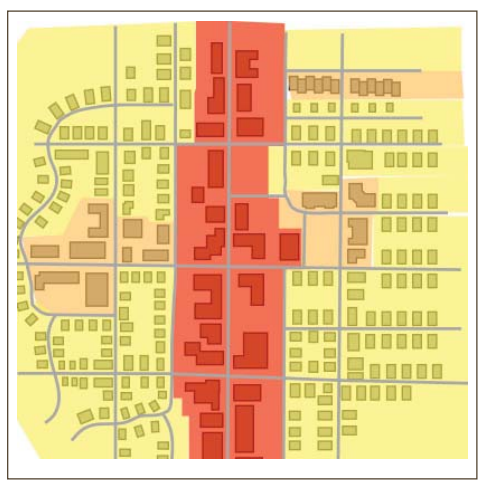
Design Element	Typical
Right-of-Way	**65'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	10
Center Turn Lane Dimensions	no center turn lane
Right Turn Lanes	Allowed for heavy turning movements or heavy truck traffic (limited to intersections)
Medians	none
Median Openings	none
Bicycle Lanes	none unless called for in Connect Atlanta Bicycle Map.
On-Street Parking	7.5' parallel (includes gutter pan width)
Curb	6" with 1.5' gutter pan
Buffer Area	6' minimum recommended (see clear zone and buffer zone dimensions below)
Sidewalk	12' to 15' sidewalk with a minimum 8' walk zone
Frontage Zone	see page 4
Mid-block crossings	not needed
Intersection Control	signals or stops
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance from back of curb should be 1.5'.
Block Length	maximum 500'

Street Network

The street network is similar to that of multi-family residential/office strips.

Building Form

Unlike multi-family/office strips, though, the placement of buildings is typically closer to the street through redevelopment.



Land Use

Land use patterns are similar to the transitioning areas: multi-family/office corridors surrounded by residential neighborhoods.

At their heart these are still commercial strips, though access management through driveway consolidation may reduce the need for left turns mid-block.

Land development standards, whether historic or a more recent effort, can improve pedestrian access to buildings by locating them adjacent to streets.

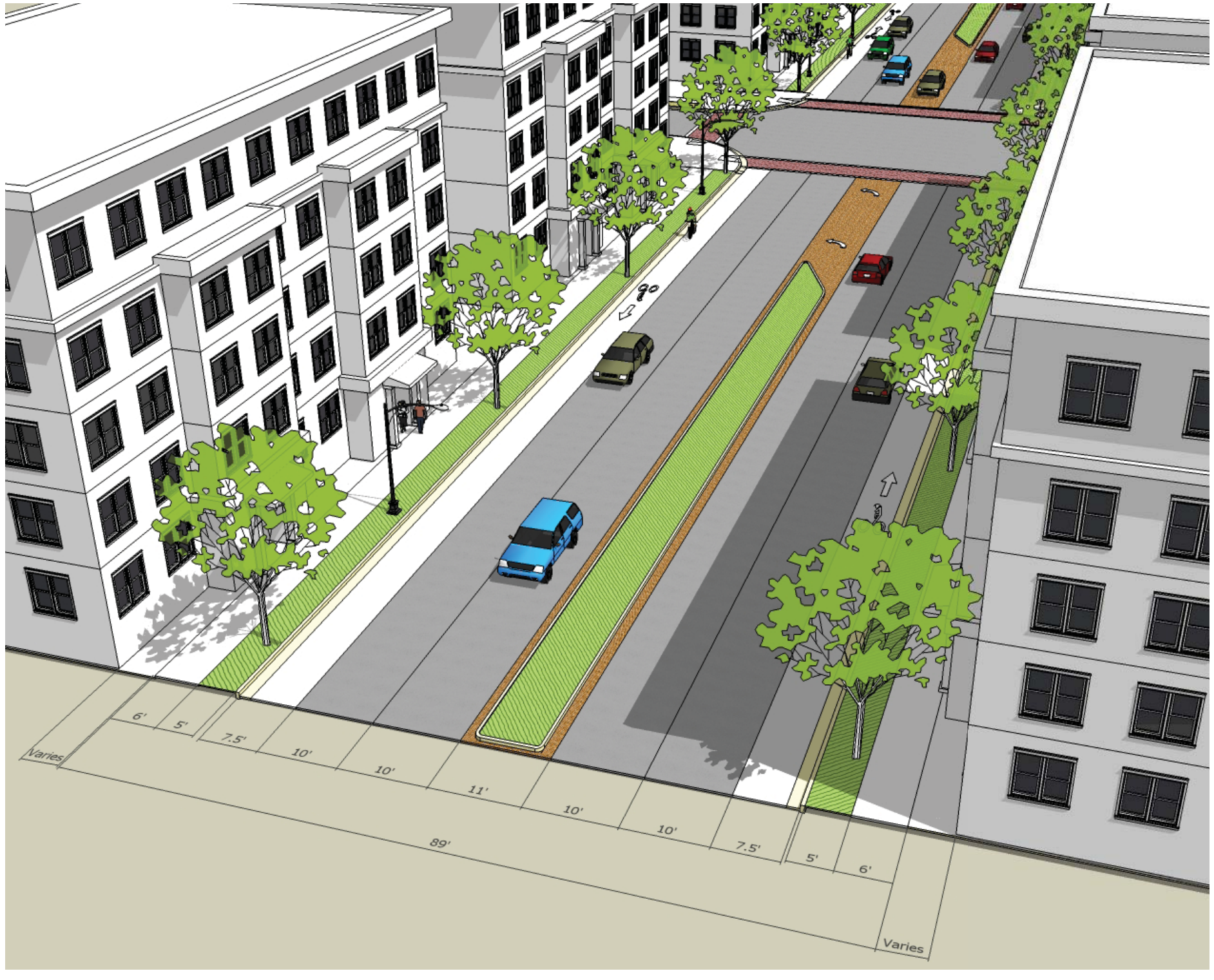
Existing Classification Type: Boulevard
Land Use Context: Multi-family Residential/Office Area

Boulevards are designed to move vehicles over long distances. As many such streets in Atlanta readily suggest, multi-family residential/office destinations drawing primarily local trips locate along these facilities, driven by zoning that seeks to locate these districts in areas with the greatest access. These streets, however, are primarily designed to provide regional travel. The mixing of local and regional traffic in these corridors frequently dictates the need for wide, multilane regional highways.

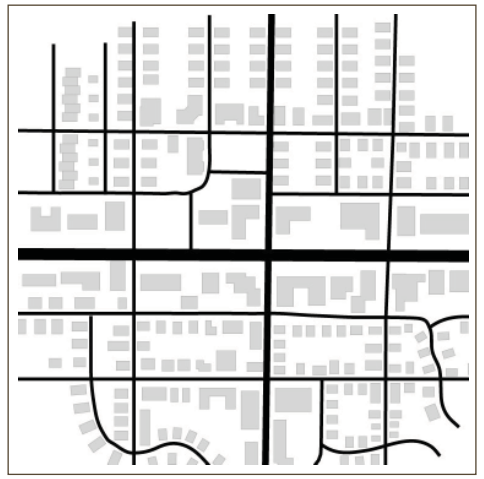
Mutli-family residential/office boulevards can be modified within existing right-of-way dimensions to provide a more livable streetscape. This kind of transition represents first steps that can be taken in transforming streets that bear a double burden of mobility and access (which is contrary to their intended purpose as mobility streets) into livable streets that still provide a mobility function.

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Vehicle Access Demand	High	On-street parking is important.
On-Site Parking Feasibility	Typical	
Acceptable Driveway Density	Should not be frequent	Turning movements are only consequential for intersections and not as important mid-block.
Expected Vehicle Travel Speeds	Low to moderate, though congestion is often expected	Frequent signal spacing and mid-block pedestrian crossings are acceptable.
Multimodal Access Demand	Very high	Sidewalks in particular should be addressed to allow sufficient room for circulation.

2.7 STREET DESIGN: **MULTI-FAMILY RESIDENTIAL / OFFICE BOULEVARD**



Design Element	Typical
Right-of-Way	**89'**
Design & Posted Speed	35 mph
Number of Travel Lanes (per direction)	maximum 2
Travel Lane Dimensions	10'
Center Turn Lane Dimensions	11'
Right Turn Lanes	Allowed for heavy turning movements or heavy truck traffic
Medians	optional, 11' when needed
Median Openings	cross streets only
Bicycle Lanes	Optional, necessary when part of Connect Atlanta Bicycle Map (5' when used). Refer to Section 1.5 for design details and options.
On-Street Parking	none
Curb	6" with 1.5' gutter pan
Buffer Area	6' minimum recommended (see clear zone and buffer zone dimensions below)
Sidewalk	6' to 8' recommended
Frontage Zone	see page 4
Mid-block crossings	permitted only in front of civic facilities
Intersection Control	signals, stops, or roundabouts
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance from back of curb should be 1.5'.
Block Length	intersecting streets to be no more than 500' apart; mid-block curb cuts not permitted



Street Network

The avenue is typically a secondary street in these areas, though they may define principal intersections along the multi-family residential/ office corridor.

Building Form

In these areas, typically intersecting avenue roadways will carry more of an access responsibility and will quickly transition to other land uses away from the office/high intensity residential area.

Land Use

These avenues often move into areas of other land uses.

Existing Classification Type: Avenue
Land Use Context: Multi-family Residential/Office Area

Serving as a 'bridge' between the mobility function of boulevards and the access function of local streets, avenues in a multi-family residential/office context usually connect these corridors and nodes of concentration to the residential areas that surround them.

In larger multi-family residential/office areas, the avenues provide an important access function and allow development to be focused away from boulevards. These types of contexts are often found in high density residential developments or in office/business parks. When they occur in these contexts, they should be the focus streets for driveways and access to development before the boulevard streets are.

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Vehicle Access Demand	High	Due to high demand for accessing land uses and limited parking on-site, on-street parking is especially important.
On-Site Parking Feasibililty	Limited	
Acceptable Driveway Density	Driveways/curb cuts allowed for shared parking or structured parking only	Relatively frequent driveway spacing may require two-way left turn lane.
Expected Vehicle Travel Speeds	Low - congestion generally expected in town center contexts	Narrower lanes are acceptable, as well as more frequent signal spacing and smaller intersection curb radii.
Multimodal Access Demand	High (especially pedestrian demand)	Sidewalks should be provided, and special treatments such as mid-block crossings on long blocks (600 feet or longer) are important.

2.8 STREET DESIGN: **MULTI-FAMILY RESIDENTIAL / OFFICE AVENUE**

Design Element	Typical
Right-of-Way	**61'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	10'
Center Turn Lane Dimensions	11'
Right Turn Lanes	Allowed for heavy turning movements or heavy truck traffic
Medians	optional, 11' when needed; no median if bike lane is not provided
Median Openings	cross streets only
Bicycle Lanes	Optional, necessary when part of Connect Atlanta Bicycle Map (5' when used). Refer to Section 1.5 for design details and options.
On-Street Parking	7.5' parallel (includes gutter pan width), 15' to be provided if back-in angled used
Curb	6" with 1.5' gutter pan
Buffer Area	6' minimum recommended (see clear zone and buffer zone dimensions below)
Sidewalk	8' recommended (see walk zone and frontage zone dimensions below)
Frontage Zone	see page 4
Mid-block crossings	permitted only in front of civic facilities
Intersection Control	signals, stops, or roundabouts
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance from back of curb should be 1.5'.
Block Length	maximum 500'. Access to driveways limited by two curb cuts per block.

Street Network

Local streets in multi-family residential/office areas are usually part of an established street grid, though they may be uncommon in newer districts.

Building Form

Where buildings along main streets in office/ high intensity residential districts are sometimes separated from the street by parking, they do face the street: on local streets, multi-family/office buildings are usually not oriented to the main street and provide more of a service function to rear and side entries to buildings.

Land Use

These locals often function as a transition street between multi-family residential/office areas and neighboring land use types (usually residential).

Existing Classification Type: Street
Land Use Context: Multi-family Residential/Office

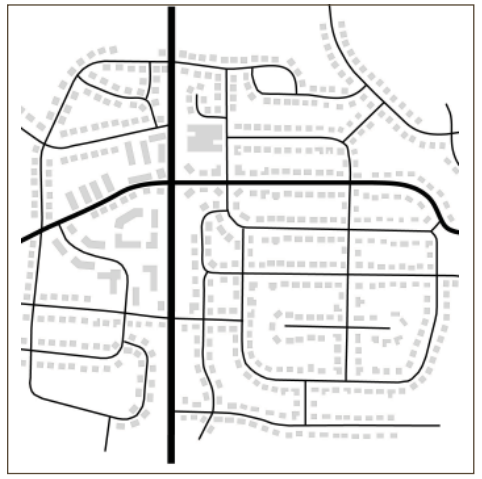
Local streets in a multi-family residential/office context assist the boulevard and, to a lesser degree, the avenue roadways in serving land uses. With this access function, driveways and entrances are expected to be more frequent. Designs should take into account the nature of the land use and what kind of 'operating contingencies' this kind of street will have to accommodate (e.g. impromptu delivery parking, turns into narrow driveways and alleys). These streets are thought of as the 'side streets' where the primary pedestrian access (and visual presentation) of multi-family residential/office land uses would not be oriented.

The greatest opportunity for multi-family residential and office use is from redevelopment, where these properties change their access patterns to make greater use of side streets and when redevelopment into a more structured urban form occurs.

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Vehicle Access Demand	High	On-street parking is less important.
On-Site Parking Feasibility	Usually serving parking areas of developed properties	
Acceptable Driveway Density	Driveways/curb cuts allowed as needed, typically to support parking for commercial uses built to higher-class streets	Turning movements more frequent, wider lanes can help to accommodate these movements and account for contingencies
Expected Vehicle Travel Speeds	Moderately low	Frequent signal spacing, intersection control and mid-block pedestrian crossings are acceptable.
Multimodal Access Demand	High	Sidewalks in particular should be addressed to allow sufficient room for circulation. Sidewalks needed principally for access to parking areas and side/ rear entrances, width equal to that of main streets not necessary.

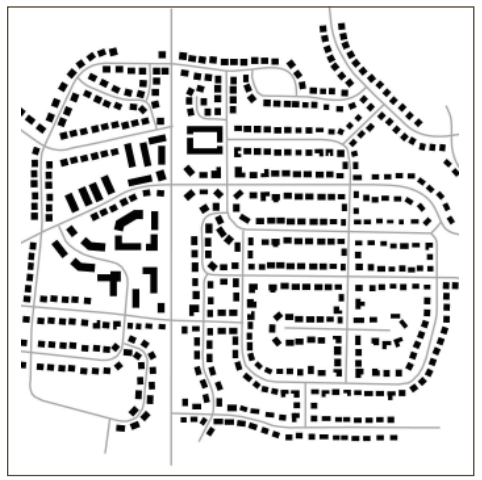
2.9 STREET DESIGN: **MULTI-FAMILY RESIDENTIAL / OFFICE STREET**

Design Element	Typical
Right-of-Way	**51'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	10'
Center Turn Lane Dimensions	11'
Right Turn Lanes	Allowed for heavy turning movements or heavy truck traffic
Medians	none
Median Openings	none
Bicycle Lanes	Optional, necessary when part of Connect Atlanta Bicycle Map (5' when used). Refer to Section 1.5 for design details and options.
On-Street Parking	7.5' parallel (includes gutter pan width), 15' to be provided if back-in angled used
Curb	6" with 1.5' gutter pan
Buffer Area	6' minimum recommended (see clear zone and buffer zone dimensions below)
Sidewalk	8' recommended (see walk zone and frontage zone dimensions below)
Frontage Zone	see page 4
Mid-block crossings	permitted only in front of civic facilities
Intersection Control	signals, stops, or roundabouts
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance from back of curb should be 1.5'.
Block Length	maximum 500'



Street Network

Street networks are often well-connected in older residential areas, where newer development patterns have favored cul-de-sacs and dead-end streets.



Building Form

Buildings are typically detached and though they face streets, there is not the same street orientation as in town center areas.

Land Use

Along regional boulevards, more recent development patterns have favored inward-facing subdivisions, often surrounded by walls to separate the rear side of residential lots from the boulevard street.

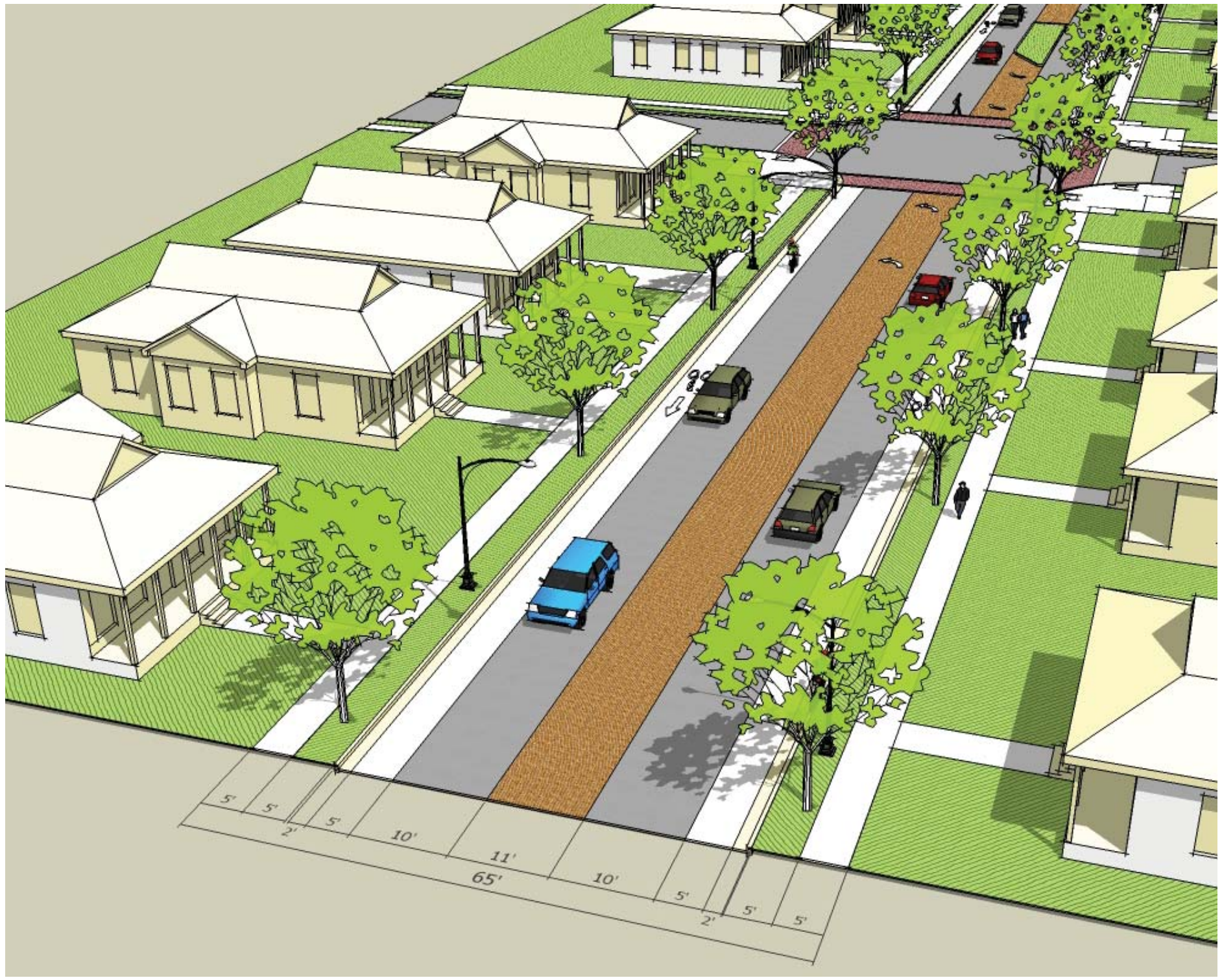
Existing Classification Type: Boulevard
Land Use Context: Residential

Many newer residential areas have been designed with orientation to the local street and do not feature direct property access from main boulevards. This is driven both by access permitting from street agencies and by a consumer preference for living on lower-speed, lower-volume local streets. The consequence has been that an internal street network has been built to accommodate all parts of new residential subdivisions and the boulevards connecting subdivisions abut rear lot lines from residential properties.

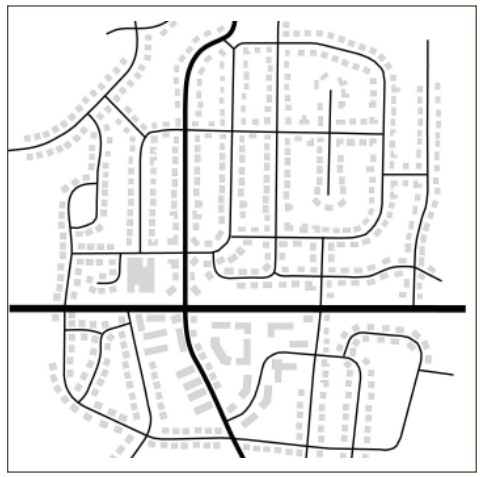
Though decisions on this form of development are the responsibility of the land use agency, these streets can be designed to serve a mobility role more clearly. As they do not face the same conditions of driveway access, left turns and access can be controlled to cross streets.

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Vehicle Access Demand	Low, most access from internal local streets	Left turn opportunities should not be limited to intersections unless block sizes are small enough to allow turns without greatly increased trip length.
On-Site Parking Feasibility	High	On-street parking is not as important as in traditional neighborhood contexts
Acceptable Driveway Density	Less frequent than in traditional neighborhood contexts	Left turn opportunities do not need to be frequent throughout a block length, depending on driveway spacing they could be limited to intersections.
Expected Vehicle Travel Speeds	Moderate	Narrower lanes are acceptable, especially in multi-lane streets.
Multimodal Access Demand	Moderate	Sidewalks and shared-use trails help to provide connectivity between different contexts; bicycle lanes are useful given the larger nature of the street.

2.10 STREET DESIGN: **RESIDENTIAL BOULEVARD**

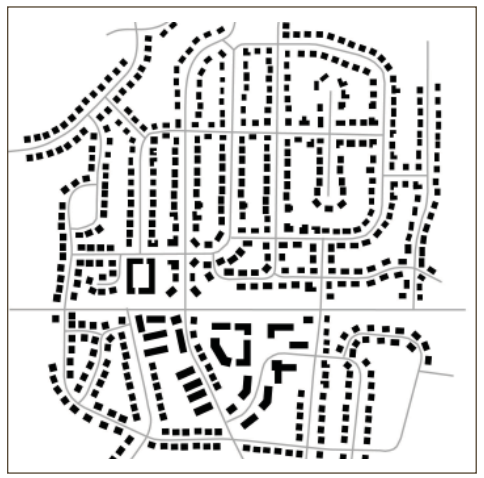


Design Element	Typical
Right-of-Way	**65'**
Design & Posted Speed	35 mph
Number of Travel Lanes (per direction)	maximum 2
Travel Lane Dimensions	10'
Center Turn Lane Dimensions	11'
Right Turn Lanes	Allowed for heavy turning movements or heavy truck traffic
Medians	11', to be substituted with turn lanes at intersections
Median Openings	for cross streets only when medians used
Bicycle Lanes	5'
On-Street Parking	optional, 7.5' parallel when used (includes gutter pan width)
Drainage	curb and gutter
Buffer Area	6' (see clear zone and buffer zone below)
Sidewalk	5' minimum recommended (see walk zone dimension below; frontage zone allows shy area from sidewalk as needed)
Frontage Zone	see page 4
Utility Zone	2' (see frontage zone below)
Intersection Control	signals or stops (stops on cross streets only)
Lighting	Vehicle/street only. Minimum horizontal clearance from back of curb should be 1.5'.
Block Length	varies



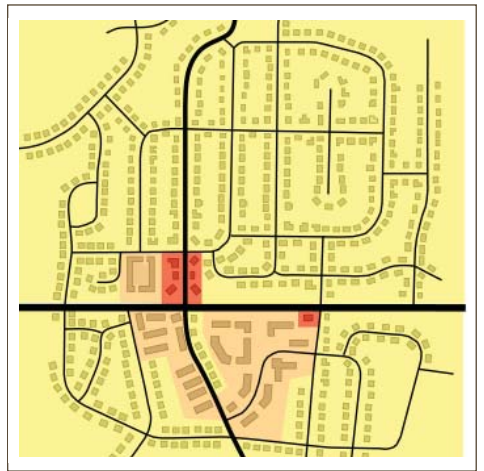
Street Network

Street networks are often well-connected in older residential areas, where newer development patterns have favored cul-de-sac and dead-end streets.



Building Form

Buildings are typically detached and though they face streets, there is not the same street orientation as in town center areas.



Land Use

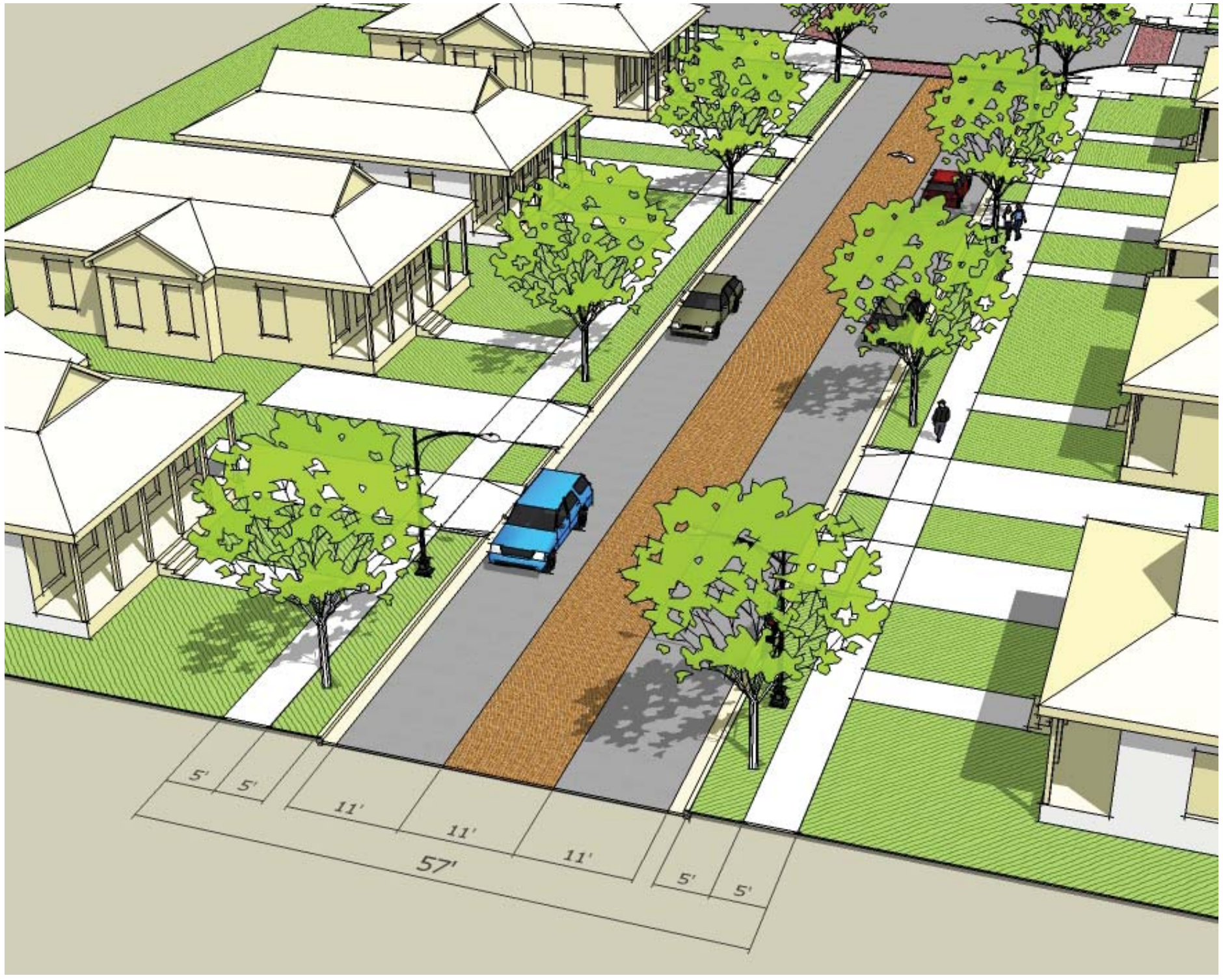
In traditional neighborhood areas, avenues may have the same land uses as local streets, though due to their historic importance (in some cases as former streetcar routes) they may support a greater variety of neighborhood-supporting land uses (especially small-scale commercial).

Existing Classification Type: Avenue
Land Use Context: Residential

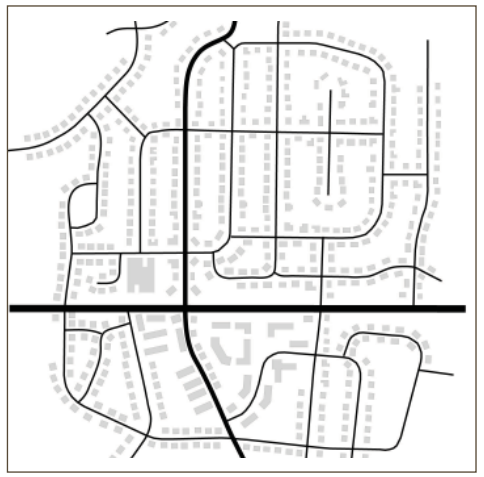
Avenues help to balance the street network in residential areas by providing the bulk of the connections to local streets and allowing boulevards to have less frequently spaced intersections. Though development patterns may orient lots not to access the avenue (especially if frequent spacing of local cross-streets orients lots to these streets alone), driveways are still acceptable on these streets.

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Vehicle Access Demand	Moderate	Not as high as commercial access; additional lanes not needed for through movements.
On-Site Parking Feasibility	High	Existing land use and development patterns of traditional neighborhoods likely have limited parking capacity on site; many houses in older neighborhoods may not even have driveways. On-street parking should be maintained on these streets, particularly in areas around community-serving facilities.
Acceptable Driveway Density	Moderate to Frequent	Regular on-street parking may be limited with frequent driveways, though in most cases of this type of street driveways are not a feature of the development.
Expected Vehicle Travel Speeds	Low	Lanes can be narrow. Curb extensions are acceptable as a traffic calming and landscaping feature, as are small curb radii at corners.
Multimodal Access Demand	Moderate to High	Sidewalks are desirable for pedestrian safety on narrower streets, slower speeds should allow safe sharing of lanes between bicycles and vehicles

2.11 STREET DESIGN: **RESIDENTIAL AVENUE**

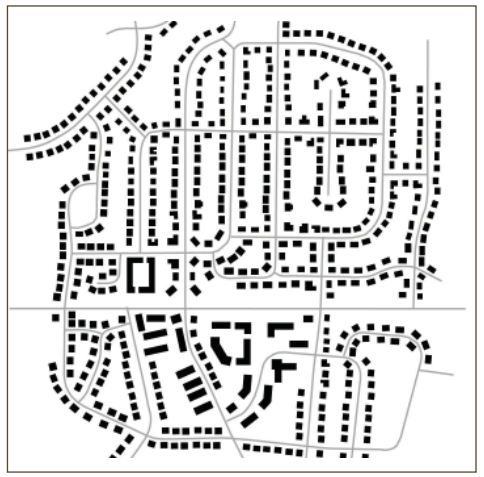


Design Element	Typical
Right-of-Way	**57'**
Design & Posted Speed	25-30 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	10'
Center Turn Lane Dimensions	11'
Right Turn Lanes	Allowed for heavy turning movements or heavy truck traffic
Medians	as right-of-way permits and when driveway spacing does not require left turns
Bicycle Lanes	5'
On-Street Parking	optional, 7.5' parallel when used (includes gutter pan width)
Curb	6" with 1.5' gutter pan
Buffer Area	6' (see clear zone and buffer zone below); this dimension can accommodate utilities
Sidewalk	5' minimum recommended (see walk zone dimension below)
Intersection Control	signals or stops (stops on cross streets only)
Lighting	Vehicle/street only. Minimum horizontal clearance from back of curb should be 1.5'.
Block Length	250'-400'



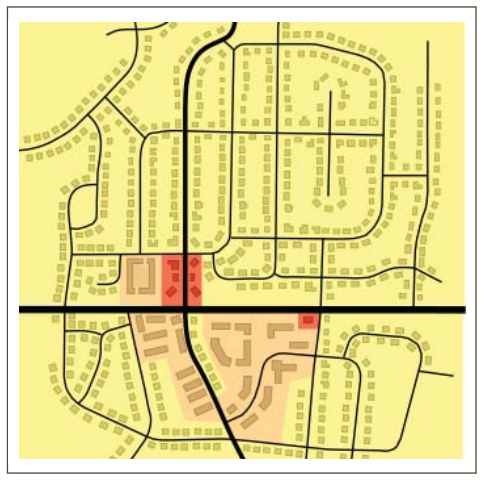
Street Network

Street networks are often well-connected in older residential areas, where newer development patterns have favored cul-de-sacs and dead-end streets.



Building Form

Buildings are typically detached and though they face streets, there is not the same street orientation as in town center areas.



Land Use

Land use patterns along residential local streets are typically exclusively residential and commonly detached, single-family structures.

Existing Classification Type: Street
Land Use Context: Residential

Local streets in residential areas are among the most access-oriented of any streets in the transportation network and travel speed expectations are usually low. While land development standards may require on-site parking, local residential streets should still have flexibility to accommodate parking on one side of the street.

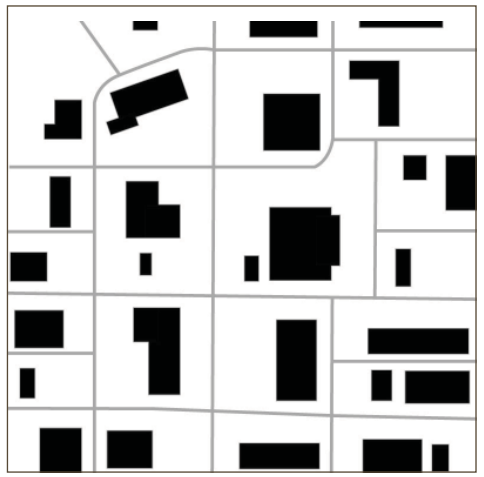
CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Vehicle Access Demand	Moderate	Not as high as commercial access; additional lanes not needed for through movements.
On-Site Parking Feasibility	High	On-street parking may not be needed in abundance and any formal designation should be limited as not to interfere with driveway access.
Acceptable Driveway Density	Frequent (typically every 50 feet)	
Expected Vehicle Travel Speeds	Low	Lanes can be narrow. Curb extensions are acceptable, as are small curb radii at corners.
Multimodal Access Demand	Moderate to High	Sidewalks are desirable for pedestrian safety on narrower streets, though dedicated bike lanes are not as important due to lower vehicular volumes.

2.12 STREET DESIGN: **RESIDENTIAL STREET**

Design Element	Typical
Right-of-Way	**44'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	10'
Center Turn Lane Dimensions	none
Right Turn Lanes	none
Medians	none
Bicycle Lanes	none
On-Street Parking	optional, 7.5' parallel when used (includes gutter pan width)
Curb	6" with 1.5' gutter pan
Buffer Area	8' (see clear zone and buffer zone below); this dimension can accommodate utilities.
Sidewalk	5' minimum recommended (see walk zone dimension below)
Intersection Control	signals or stops (stops on cross streets only)
Lighting	Vehicle/street only. Minimum horizontal clearance from back of curb should be 1.5'.
Block Length	varies

Street Network

Partly due to the size of many industrial properties, network connectivity varies in industrial areas, typically focused on main streets and cross streets providing additional access.

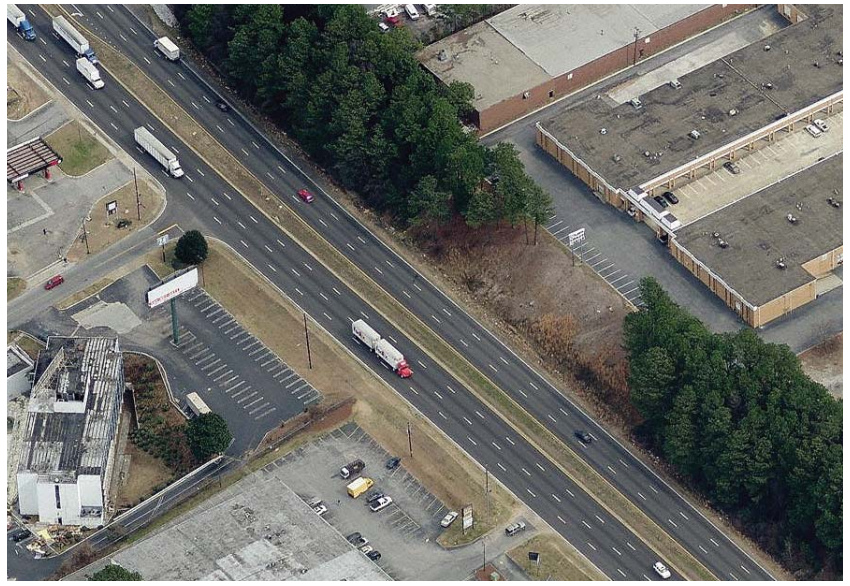


Building Form

Newer industrial areas have a service function that often requires significant vehicle circulation space in front of buildings; this leaves buildings separated from streets.

Land Use

Industrial areas tend to be larger in their extent than 'strip commercial' corridors: many have evolved from being oriented to a railstreet facility to having adjacency to principal streets as well.



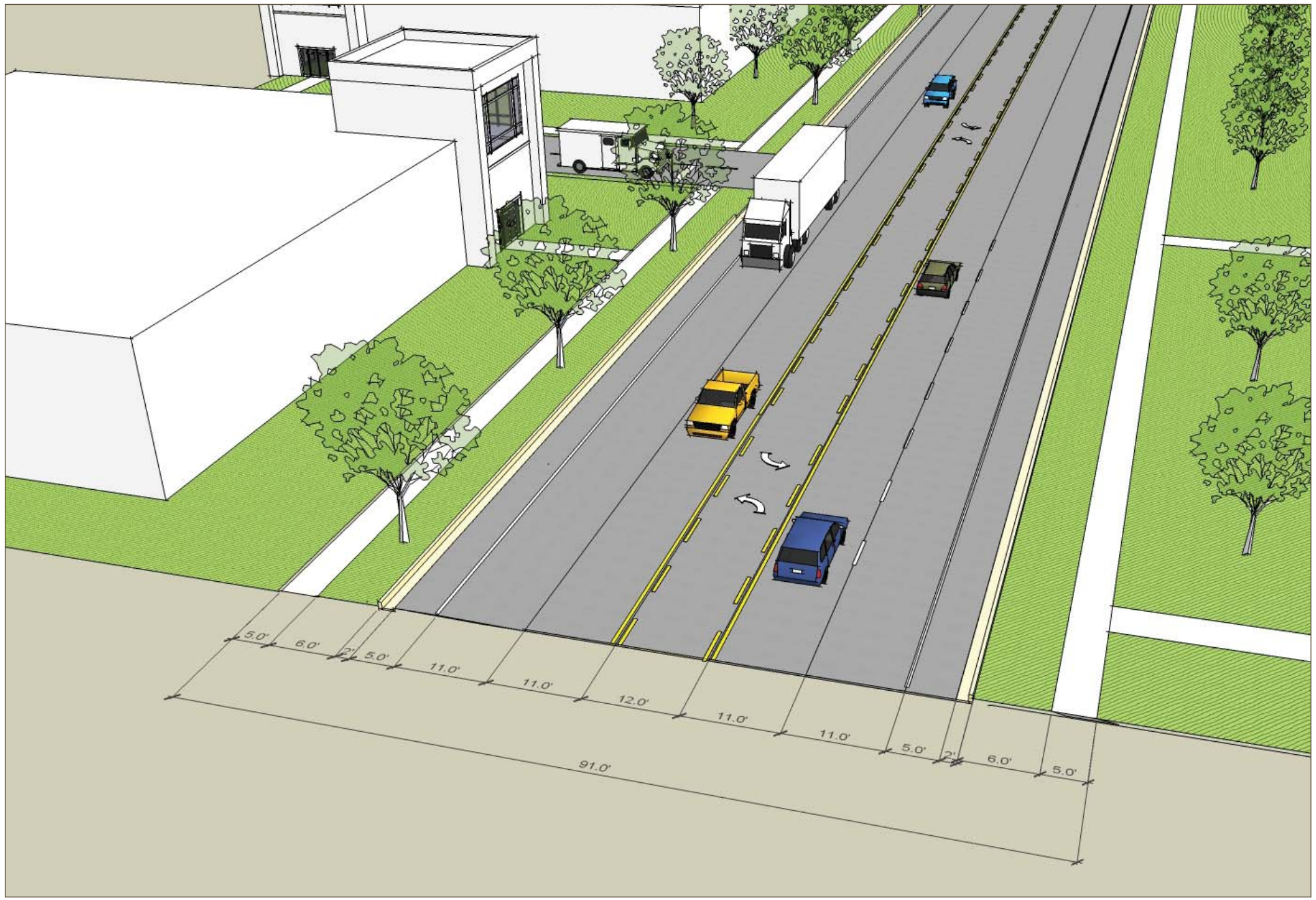
Existing Classification Type: Boulevard
Land Use Context: Industrial

Industrial areas often present a challenging situation: industrial land uses are zoned adjacent to streets that provide direct connection to other parts of the region to expedite the distribution function that industrial establishments rely on. As a result, these regional streets are burdened with higher truck volumes and turning movements than other comparable streets in different land use areas.

These are one context where additional right-of-way to accommodate right turn lanes may be justified to preserve mobility along the street.

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Vehicle Access Demand	Moderate to High	Comparable to commercial access; additional lanes may not be needed for through movements though heavy truck traffic should be expected.
On-Site Parking Feasibility	High	On-street parking is not needed. Truck traffic and other service vehicles are accommodated on-site as a part of development standards.
Acceptable Driveway Density	Frequent	On-street parking may be limited.
Expected Vehicle Travel Speeds	Moderate to High	Higher speeds and truck turning movements imply that full lane widths (12') may be needed.
Multimodal Access Demand	Low	Sidewalks are desirable for pedestrian safety on narrower streets, though dedicated bike lanes are not as important due to lower vehicular volumes.

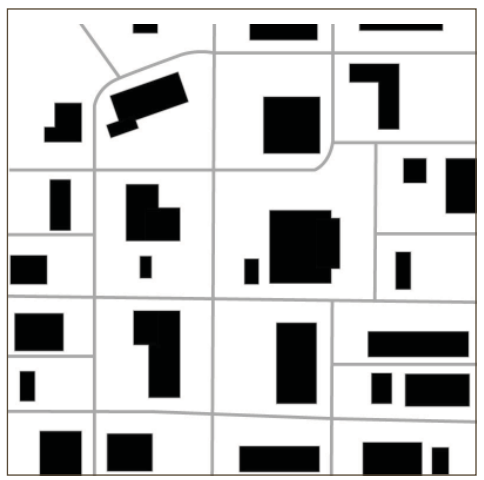
2.13 STREET DESIGN: **INDUSTRIAL BOULEVARD**



Design Element	Typical
Right-of-Way	**91'**
Design & Posted Speed	45 mph
Number of Travel Lanes (per direction)	maximum 2
Travel Lane Dimensions	11'
Paved Shoulder	6'
Center Turn Lane Dimensions	12'
Right Turn Lanes	allowed for heavy turning movements or heavy truck traffic
Medians	not typically needed, permitted to bifurcated street street before transition to center turn lane
Median Openings	medians for transition into three or five-lane sections not needed
Bicycle Lanes	if required, mark shoulder as bicycle lane
On-Street Parking	none
Curb	6" F-type with 1.5' gutter pan
Buffer Area	8' (see clear zone and buffer zone below); this dimension can accommodate utilities.
Sidewalk	5' sidewalk on at least one side of the street
Intersection Control	signals or stop
Lighting	Vehicle/street only. Minimum horizontal clearance from back of curb should be 1.5'.
Utility Zone	2'
Block Length	varies according to land use needs

Street Network

Partly due to the size of many industrial properties, network connectivity varies in industrial areas, typically focused on main streets and cross streets providing additional access.

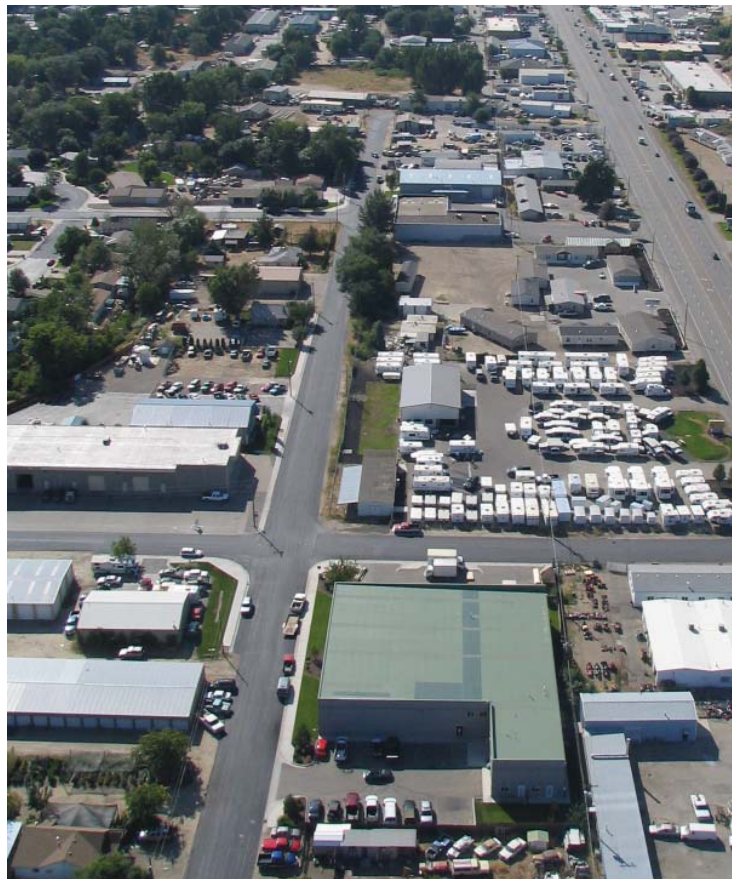


Building Form

Newer industrial areas have a service function that often requires significant vehicle circulation space in front of buildings; this leaves buildings separated from streets.

Land Use

Industrial areas tend to be larger in their extent than 'strip commercial' corridors: many have evolved from being oriented to a railstreet facility to having adjacency to principal streets as well.



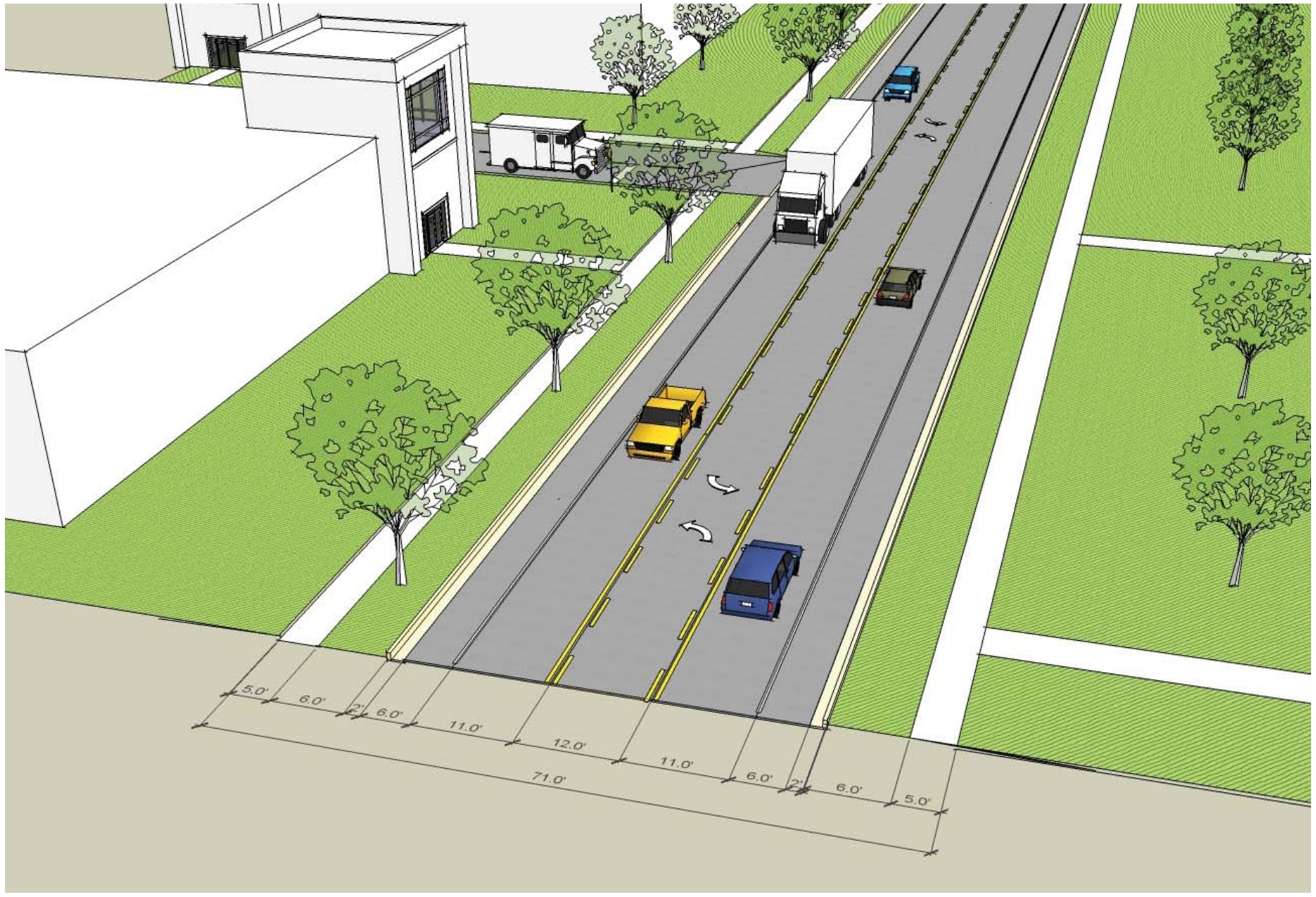
Existing Classification Type: Avenue/Street
Land Use Context: Industrial

Local streets in industrial areas are providing a clearer access function and may be designed with characteristics similar to rural streets. What is important is that street design decisions factor in heavy turning movements from trucks and that curb or corner radii are designed accordingly.

This is one context where additional right-of-way to accommodate right turn lanes may be justified to preserve mobility along the street.

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Vehicle Access Demand	Moderate to High	Comparable to commercial access; additional lanes may not be needed for through movements though heavy truck traffic should be expected.
On-Site Parking Feasibility	High	On-street parking is not needed. Truck traffic and other service vehicles are accommodated on-site as a part of development standards.
Acceptable Driveway Density	Frequent	On-street parking may be limited.
Expected Vehicle Travel Speeds	Low to moderate	Though truck turning movements and acceleration may keep overall speeds low, the nature of land use suggests full lane widths and ample turn radii at intersections.
Multimodal Access Demand	Low	Sidewalks are desirable for pedestrian safety on narrower streets, though dedicated bike lanes are not as important due to lower vehicular volumes.

2.14 STREET DESIGN: **INDUSTRIAL AVENUE/STREET**



Design Element	Typical
Right-of-Way	**71'**
Design/Target Speed	35 mph
Number of Travel Lanes (per direction)	1
Travel Lane Dimensions	12'
Shoulders	5-6'
Center Turn Lane Dimensions	12'; typically not needed on local streets
Right Turn Lanes	allowed for heavy turning movements or heavy truck traffic
Medians	none
Median Openings	N/A
Bicycle Lanes	none
On-Street Parking	none
Curb	6" F-type with 1.5' gutter pan
Utility Zone	2'
Sidewalk	5' sidewalk on at least one side of the street
Intersection Control	signal or stop
Lighting	Vehicle/street only. Minimum horizontal clearance from back of curb should be 1.5'.
Block Length	varies according to land use needs

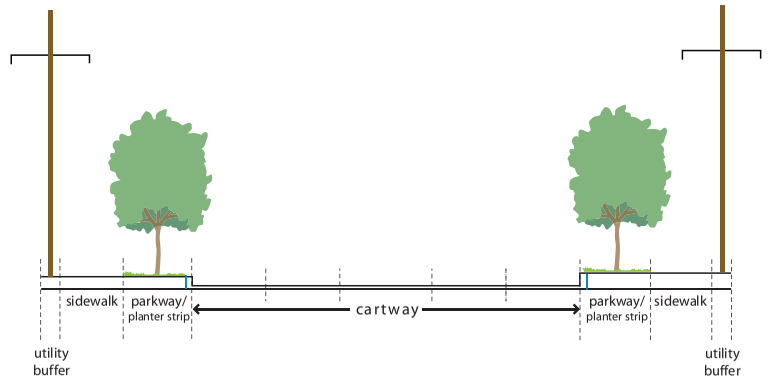
As street designs follow land use context, the placement of utilities should be considered in a way that does not impede the needs of buildings and their users or that complicates maintenance of the utility infrastructure itself. The diagram here shows a series of options that street designers can use in working with the utility providers on placement of infrastructure. These are intended to suggest ways to place utilities on streets in urban areas that allow land development patterns to bring buildings to the street without requiring additional right-of-way.

In the case of any streets using swale drainage, overhead utilities placed in the utility buffer at the right-of-way edge will generally not see change. The recommended street sections in industrial contexts in particular do not suggest contexts where building placement would be directly adjacent to the street.

DEFAULT CASE
Utilities built in buffer at edge of right-of-way

DESIGN IMPLICATIONS: *Utilities are placed at the edge of right-of-way. Individual pole placement needs to be coordinated with access points and other street design features.*

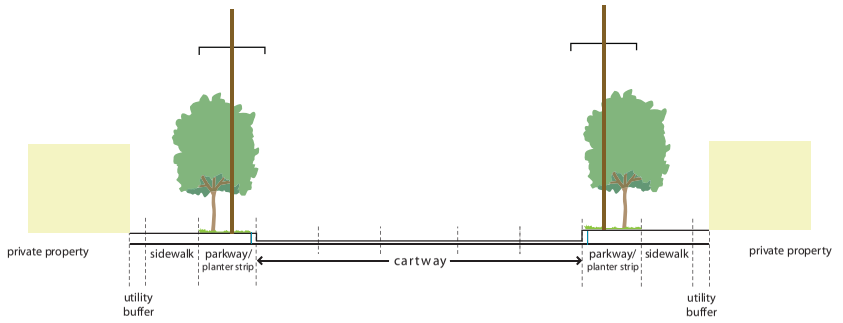
Many planning efforts so far have demonstrated the benefits of land uses that engage pedestrians along the street. As the City redefines land development standards to reflect this, transportation projects will need to reconsider utility placement.



Land development regulations change and bring building placement to right-of-way edge

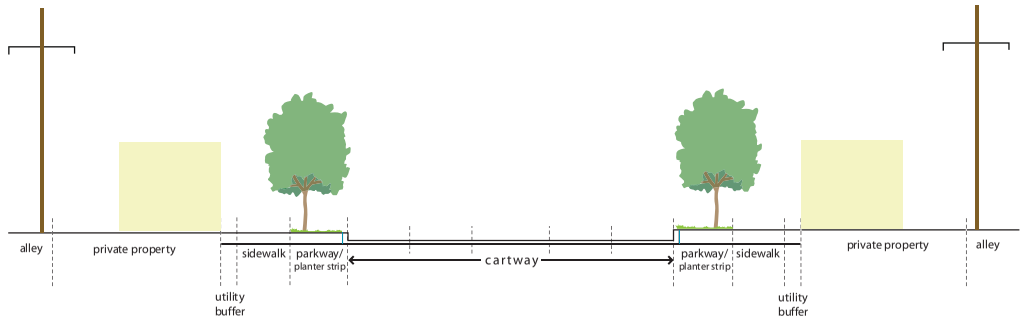
OPTION 1
Overhead utilities placed in planter strip

DESIGN IMPLICATIONS: *Tree placement and selection must keep in mind typical utility vertical clearance to avoid damage to trees from utility provider maintenance. Utility buffer can be hardscaped to add to pedestrian area as 'shy zone' against buildings (see Sections 2.5 and 2.6). Typical distance from back of curb to center of utility structure is 1.5'.*



OPTION 2
Overhead utilities placed alley behind private property

DESIGN IMPLICATIONS: *Occurs when private alleys added as part of a street design or other easements are secured for utilitiy placement behind buildings. Utility buffer can be hardscaped to add to pedestrian area as 'shy zone' against buildings (see Sections 2.5 and 2.6).*



OPTION 3
Utilities placed underground in right of way, either in planter strip or in designated utility buffer

DESIGN IMPLICATIONS: *Though hardscaping is optional, utility buffer can remain grass or ground cover if utilities are placed there.*