5 ARTICLE FIVE – CIRCULATION SYSTEM DESIGN

5-1 Purpose

The purpose of this Article is to assure the development of functional and safe circulation patterns within new subdivisions, in order to encourage economical and effective movement of motor vehicles, bicycles, and pedestrians; provide access for public safety vehicles; and encourage the development of circulation systems that enhance the quality of life within new and existing neighborhoods in the City of Storm Lake and its planning jurisdiction.

5-2 General Standards

The design of circulation systems should conform to the following general standards and requirements:

a. Roadway System Design

1. The road system shall be designed to permit safe and orderly movement of traffic, to meet but not exceed needs of the present and future served population; to be simple and logical; to respect natural features, topography, and landscape; and to present an attractive streetscape.

2. The system shall conform to the City's Comprehensive Plan. For streets not shown on the Comprehensive Plan, the arrangement of streets shall provide for the logical extension of existing streets and maintain a high degree of connectivity.

3. The street network of a subdivision should provide for logical, continuous extensions of streets to subsequent later developments. Such extensions shall make provision when necessary with a turnaround with a diameter of at least 180 feet.

4. The system shall provide adequate traffic flow through a subdivision and provide at least two routes from each lot within the subdivision to the rest of the City, except as explicitly permitted by the approving authorities. Additionally, the system should be designed to encourage through traffic to be routed to collector or arterial streets.

5. The system shall promote a safe and comfortable street system through the implementation of traffic calming measures that ensure safe speeds and minimize unintended traffic patterns.

b. Pedestrian and Bicycle Systems

1. A continuous pedestrian system shall be provided within each subdivision, designed to conduct pedestrians between every point in the subdivision in a safe manner.

2. In new subdivisions, the pedestrian system will ordinarily be provided by sidewalks placed parallel to and on both sides of each street, with exceptions permitted on cul-de-sac streets, to preserve natural features, to create visual interest, or maintain greenways and pedestrian ways proposed in the Storm Lake Comprehensive Plan.

3. All aspects of the pedestrian system, including sidewalks and intersection crossings, must be designed to comply with the Americans with Disabilities Act.

4. Bikeways or recreational trails shall be required when specifically indicated by the Comprehensive Plan. Any land dedicated for trail development shall be credited toward the satisfaction of pedestrian system and open space standards set forth by this ordinance.

5-3 Street Hierarchy and Design

a. Characteristics of the Hierarchy

1. Streets shall be classified according to a street hierarchy with design tailored to function.

2. The street hierarchy shall be defined by road function and projected average daily traffic (ADT), as calculated by trip generation rates using standards approved by the City Infrastructure and Public Facilities Director.

3. Each residential street shall be classified and designed to meet appropriate standards for its entire length.

4. The applicant shall demonstrate to the satisfaction of the approving agencies that the distribution of traffic created by the subdivision will not exceed the design capacity of the proposed street system and its individual segments.

5. The categories, functions, and projected traffic loads of the street hierarchy are set forth in Table 5-1.

b. Roadway Width

1. Roadway width for each street classification is determined by parking and curbing requirements based on form or intensity of adjacent development.

2. To promote economical and environmentally responsible development of streets, minimum roadway width should generally be used. Minimum roadway widths are set forth in Table 5-2.

c. Curbs Gutters, and Shoulders

1. Curbing shall be required for the purposes of safety, drainage, and protection of the pavement edge, as set forth in Table 5-3.

2. Requirements for curbs vary according to street function and the nature of adjacent development. Adjacent development is defined as urban or rural as follows:

   (a) Rural: Residential or predominately agricultural land use where average lot frontage exceeds 150 feet.

   (b) Urban: Residential land use where average lot frontage is less than or equal to 150 feet; or adjacent land uses include commercial, office, industrial, or civic use types and are served by municipal utilities.

3. Where curbing is not required, edge definition and stabilization shall be provided.

4. Where curbing is required, shoulders and drainage swales may be used only if soils or topography make the provision of shoulders preferable to curbs; or where the character of an area is preserved by the use of shoulders and drainage swales.

5. Shoulders, when developed, shall be at least eight feet in width on each side for all streets; and located within right-of-way. Swale width is site-specific. Shoulders shall consist of stabilized turf or other acceptable material.

6. All curbs shall provide ramps for accessibility by handicapped people consistent with the requirements of the Americans with Disabilities Act.

7. Curb construction shall follow standards established by the City of Storm Lake.

8. The design and installation of curbs, gutters, and shoulders shall be consistent with an approved Storm Water Management Plan for the subdivision.

d. Sidewalks

1. Sidewalk requirements are determined by road classification and intensity of development, as set forth in Table 5-3.

2. Where sidewalks are not otherwise required by Table 5-3, the City may require their installation if necessary to provide access to generators of pedestrian traffic or major community features; to continue a walk on an adjacent street; to link parts of the city; or to accommodate future development.

3. Unless otherwise approved, sidewalks shall be placed generally parallel to streets within right-of-way. Exceptions are possible on cul-de-sacs, to preserve important natural features or to accommodate topography or vegetation; when applicant shows an alternative for a safe and convenient pedestrian system.

4. In commercial areas with on-street parking or traffic speeds below 30 mph, sidewalks may abut curb.

5. Pedestrian easements at least 12 feet in width may be required through the center of blocks over 600 feet in length if deemed necessary by the approving authorities to provide access to schools or community facilities; or to maintain a continuous pedestrian network within and between subdivisions and districts of the City of Storm Lake and its jurisdiction.

6. All sidewalks shall be constructed according to current standards in use by the City of Storm Lake and shall comply with standards of the Americans with Disabilities Act.

7. All sidewalks, crossings, and other segments of a continuous pedestrian system must comply with standards of the Americans with Disabilities Act.

e. Bikeways and Recreational Trails

1. Bikeways and recreational trails shall be required in subdivisions when specified as part of the Comprehensive Plan.

2. All off-street recreational trails shall be a minimum of ten feet in width for two-way traffic and comply with the Americans with Disabilities Act. Surfacing of trails shall be acceptable to the City of Storm Lake. Gradients for bikeways and recreational trails should not exceed five percent, except for short distances.

3. Recreational trails may satisfy part of the requirements of this ordinance for sidewalks or open space.

4. All residential streets shall utilize bicycle safe drainage grates at storm sewer inlets and shall be consistent with an approved Storm Water Management Plan for the subdivision.

f. Right-of-Way

1. Measurement: The right-of-way of a street shall be measured from lot line to lot line, and shall be wide enough to contain the roadway, curbs or shoulder, sidewalks and sidewalk setbacks, other necessary graded areas, and utilities.

2. Any right-of-way that continues an existing street shall be no less than that of existing street.

3. The requirements for right-of-ways for functional categories of roads are set forth in Table 5-3.

4. Dedications: Dedications of right-of-way for collector, sub collector, community, or arterial streets shall be made consistent with the Comprehensive Plan.

g. Street Design Standards

1. Street Design Standards shall follow the Statewide Urban Design and Specifications (SUDAS) Manual where practical.

2. All streets shall be paved to current standards as established in City Specifications and consistent with the SUDAS manual.

3. Continuity of Arterial or Collector Streets- No subdivision shall prevent the extension of arterial or collector streets through and beyond the subdivision. The subdivider may plan and design collector streets not designated in the

Comprehensive Plan subject to the approval of the City Council.

4. Cul-de-sacs

   (a) Cul-de-sac streets designed to have one end permanently closed shall not exceed 300 feet in length and shall be designed so that vision from entrance to end is not restricted.

   (b) The closed end of a cul-de-sac shall have a turnaround with a street property line diameter of at least 114 feet in residential subdivisions. In commercial or industrial areas, the diameter shall be designed to accommodate commercial vehicle maneuvers appropriate to the type of uses planned for the subdivision.

5. Street Grades - Required street grades are set forth in Table 5-2.

6. Street Intersections

   (a) Streets shall intersect as nearly at right angles as possible, unless limited by topography, existing street alignments, or other clearly defined constraints.

   (b) In most cases, no more than two streets should intersect at a single intersection.

   (c) Local streets shall not provide intersections with major arterials.

   (d) New intersections along one side of an existing or proposed street shall, if possible, align with intersections on the other side of the street. Offsets between adjacent intersections shall measure at least 150 feet between centerlines. The use of traffic calming strategies is encouraged where local streets intersect with collector streets.

   (e) Intersection design standards are set forth in Table 5-2.

7. Block Size

   (a) The length, widths, and shapes of blocks shall be suited to the proposed land use and design of the proposed subdivision. Blocks within urban subdivisions shall not exceed 600 feet in length, unless necessitated by exceptional topography or other demonstrable constraints. Blocks within conservation design subdivisions shall not exceed 1,320 feet.

5-4 Lighting and Wiring

a. Underground Wiring

1. All electric, telephone, television, cable TV, and other communication lines shall be provided by underground wiring within easements or public right-of-way, except where in the opinion of the approving authorities, such location is not feasible. Poles

for permitted overhead lines shall be placed in rear lot line easements; or in other locations designed to lessen their visual impact.

2. New lots adjacent to existing overhead service may utilize that service; however, new local service connections shall be underground.

TABLE 5-1: Street Hierarchy

Street Type	*Function*	*Guideline Maximum ADT*
Lane, Court, or Cul-de-sac	Street providing private or controlled access to no more than twelve housing units.	120-150
Local	Provides frontage to lots and carries traffic with origin or destination on street itself. Carries least traffic at lowest speed. East-west orientation provides best solar access. Local residential streets usually do not interconnect with adjoining neighborhoods or subdivisions. Bike Boulevards can be accommodated on local streets that do connect to adjoining neighborhoods or subdivisions.	250-1,000
Collector	Conducts and distributes traffic between local streets and major streets in the community. Carries larger volume of traffic. Residential collectors interconnect and provide through access between residential neighborhoods. Collector streets should preserve one through traffic lane in each direction, without encroachment by parking. Collectors may be included in the city's Surface Transportation Program system for federal aid. Bike Boulevards can be accommodated on collector streets.	1,000-2,000
Minor Arterials	Provides community wide access between residential neighborhoods and to other activity centers in Storm Lake, including downtown and major commercial facilities. Direct access may be provided to other arterial streets. Parking should generally be prohibited on other arterials. Other arterials should be excluded from residential areas. These streets are part of the Surface Transportation Program system for federal aid. Bike accommodations on minor arterials should be designed as bike lanes.	2,000-6,000

TABLE 5-2: Street Right-of-Way, Widths, and Grades

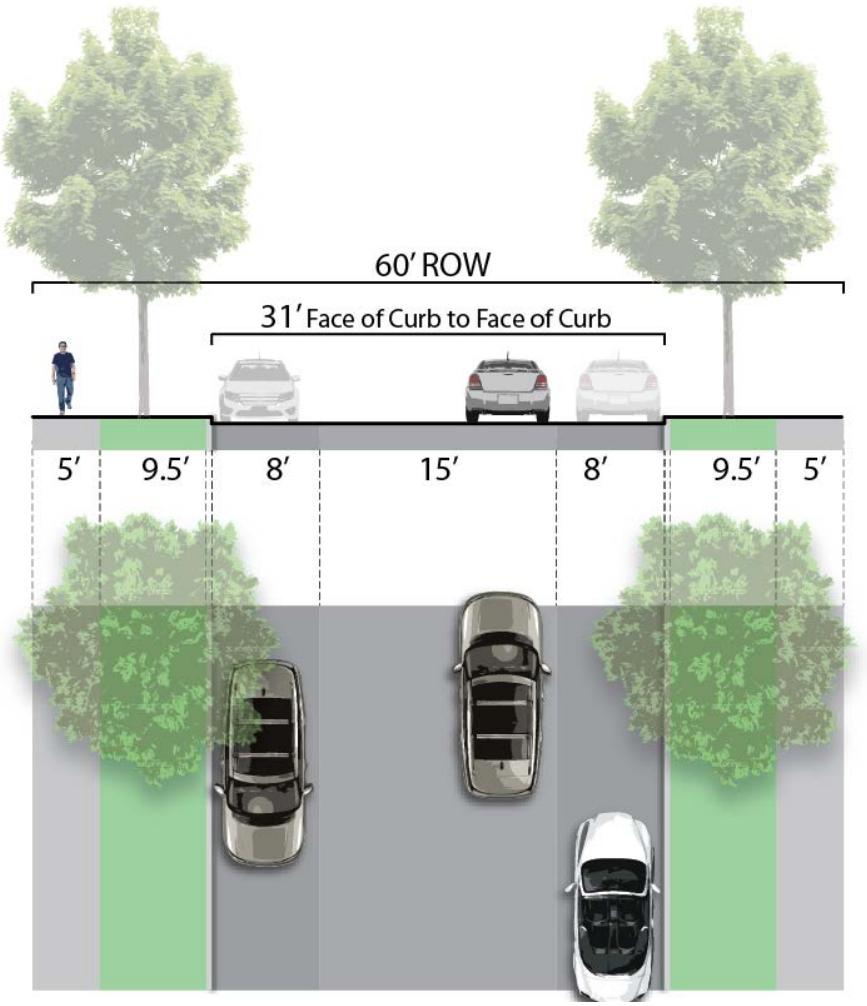
Street Right-of-Way and Widths. Minimum rights of way shall be provided as follows:

1. Thoroughfares – 80 feet
2. Collector streets – 80 feet
3. Residential or minor streets – 60 feet
4. Cul-de-sac – 130 feet in diameter
5. Alleys – 20 feet

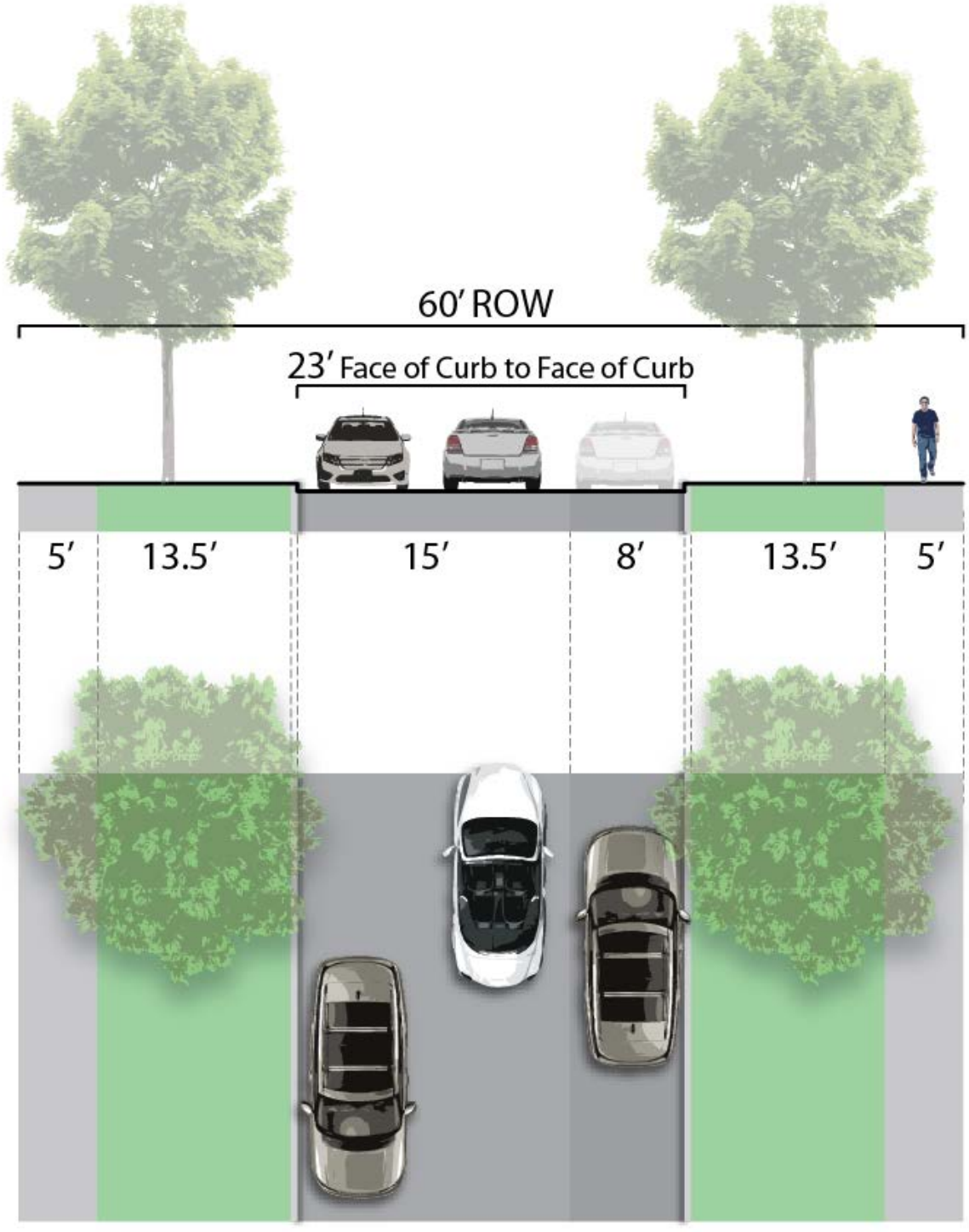
Street Widths. Streets shall have a width and cross section that matches the street type appropriate to the subdivision using the following street types as guidelines:

1. Local Street (Residential and Commercial)

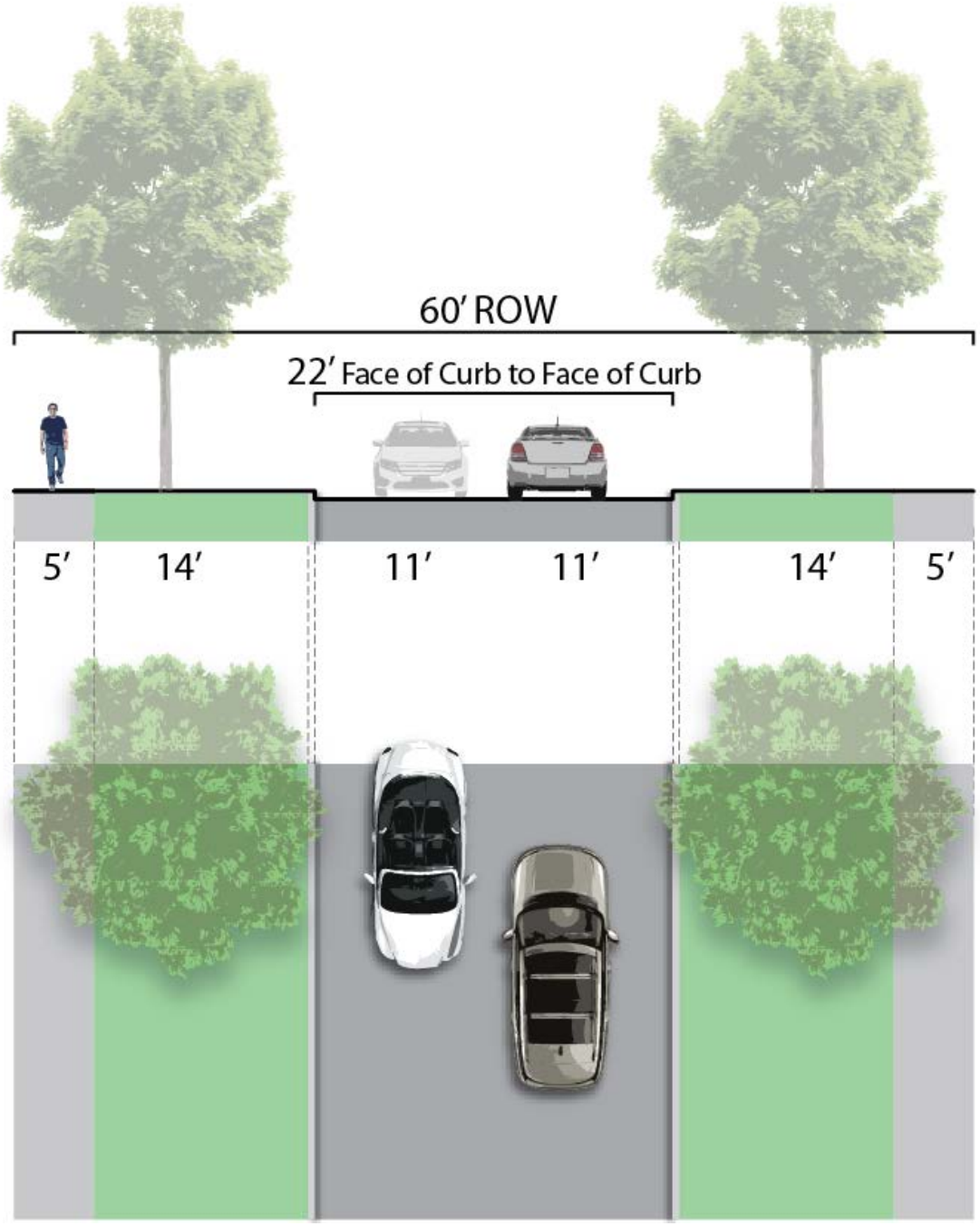
   Street Type A Local Street with parking on both sides – to be applied where parking is developed to minimum required off-street parking thresholds.



Street Type B Local Street with parking on one side – to be applied to subdivisions where adequate off street parking is provided

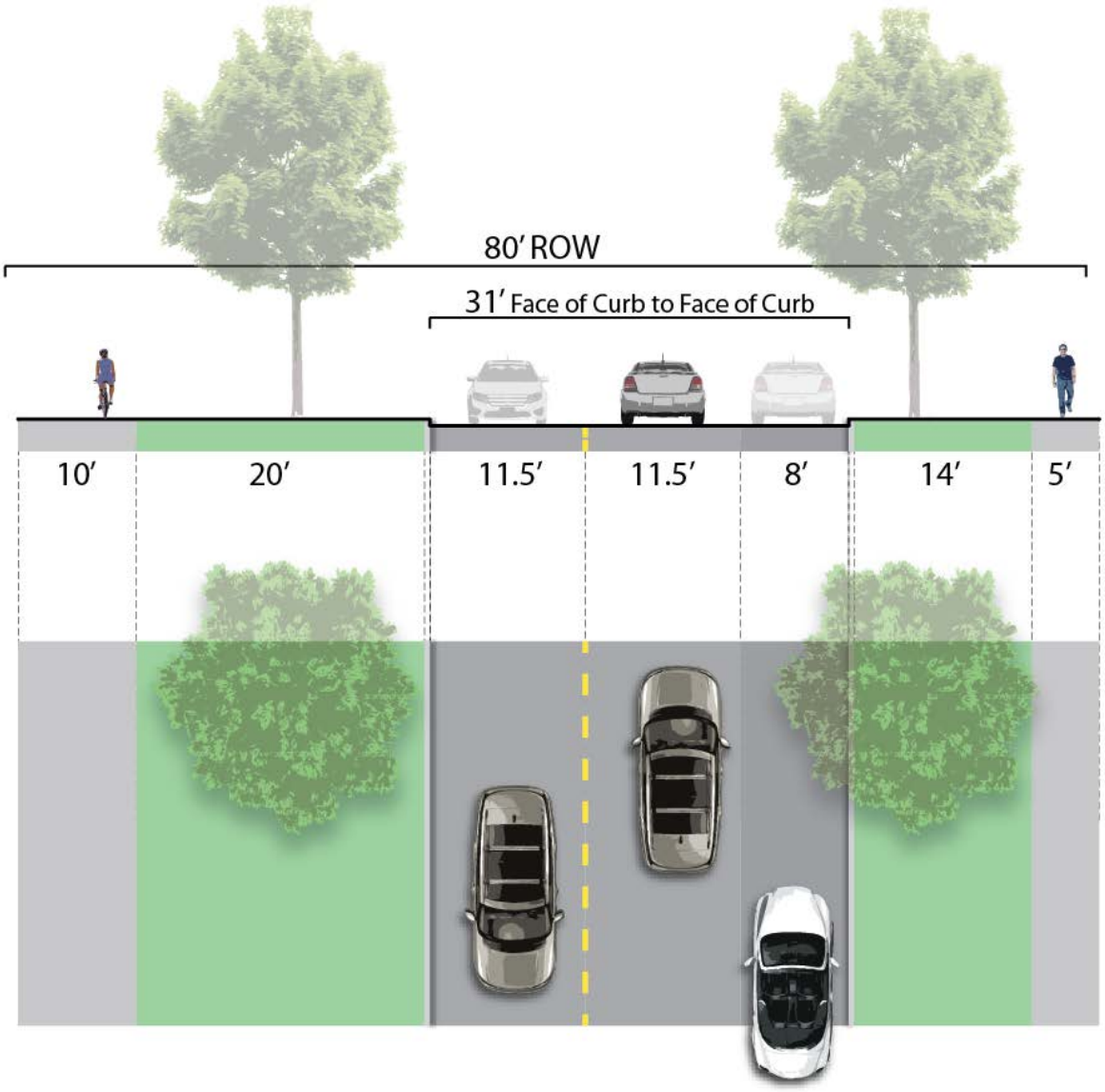


Street Type C — Local street with no parking – to be applied to subdivisions where development type/pattern includes ample off street parking accommodations including parking areas for visitors/guests typically maintained through a homeowner association or other private entity.

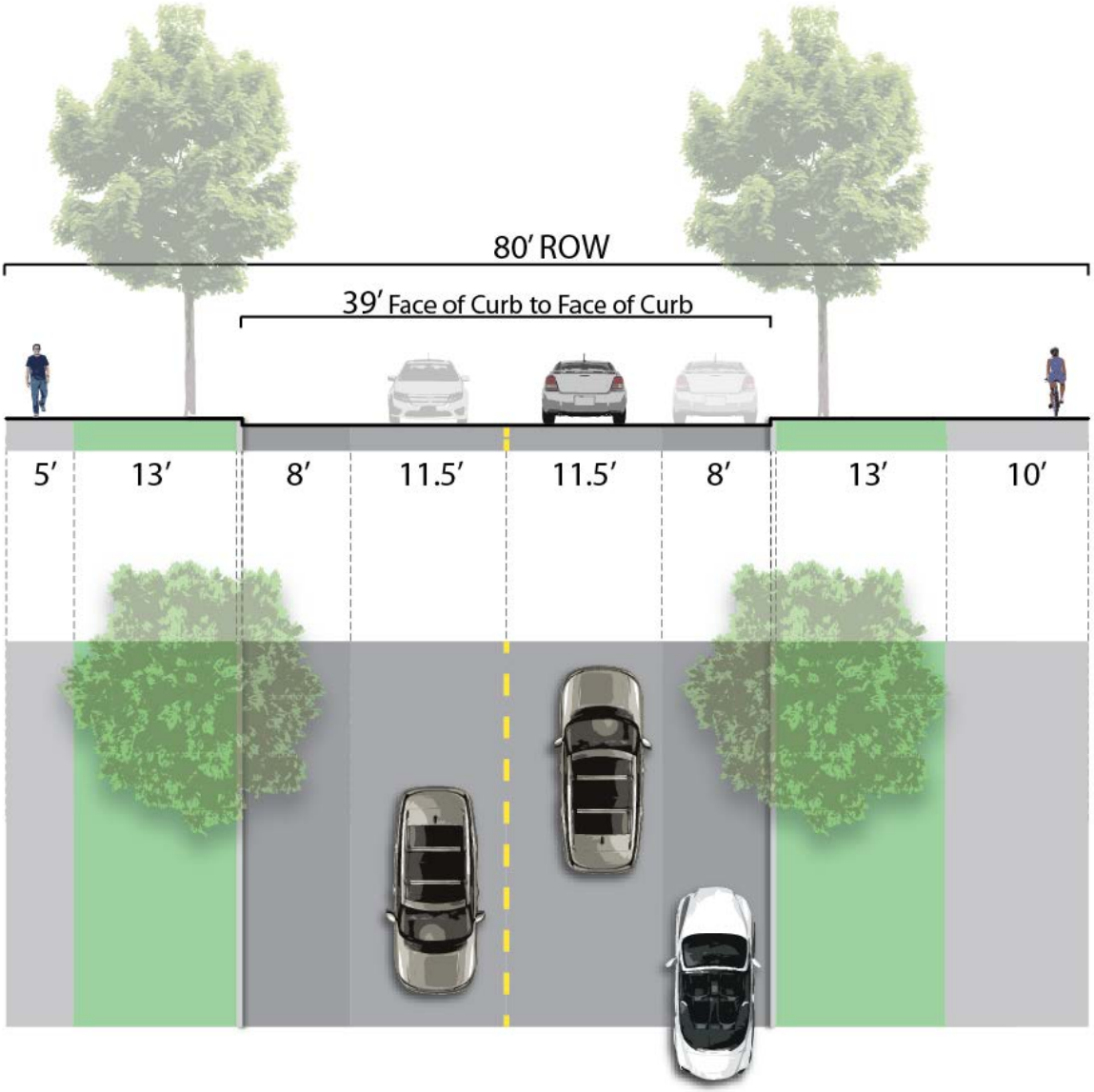


2. Collector/Arterial Street

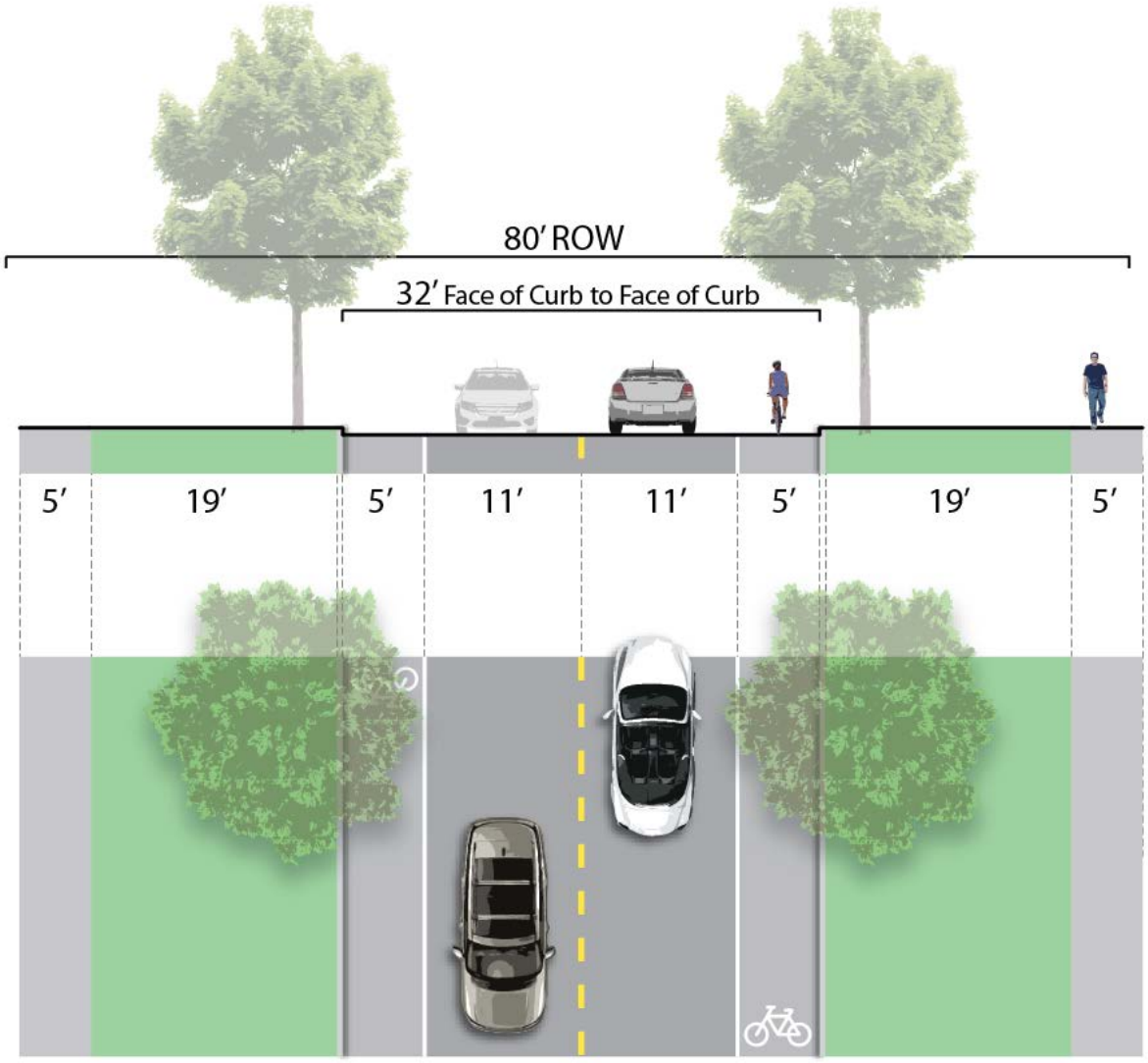
Street Type D — Collector Street through residential neighborhood with parking on one side



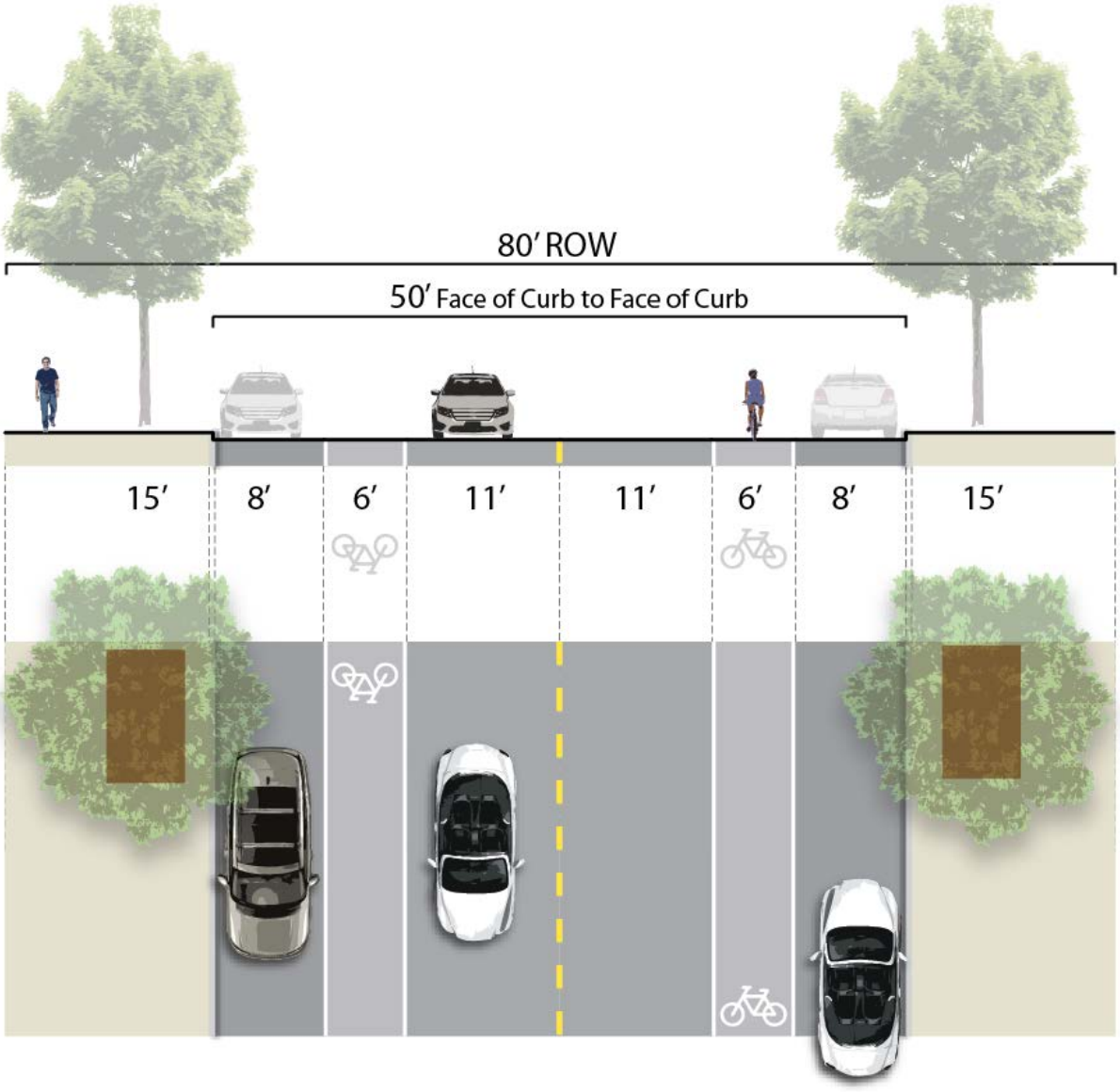
Street Type E Collector Street in residential neighborhood with parking on both sides



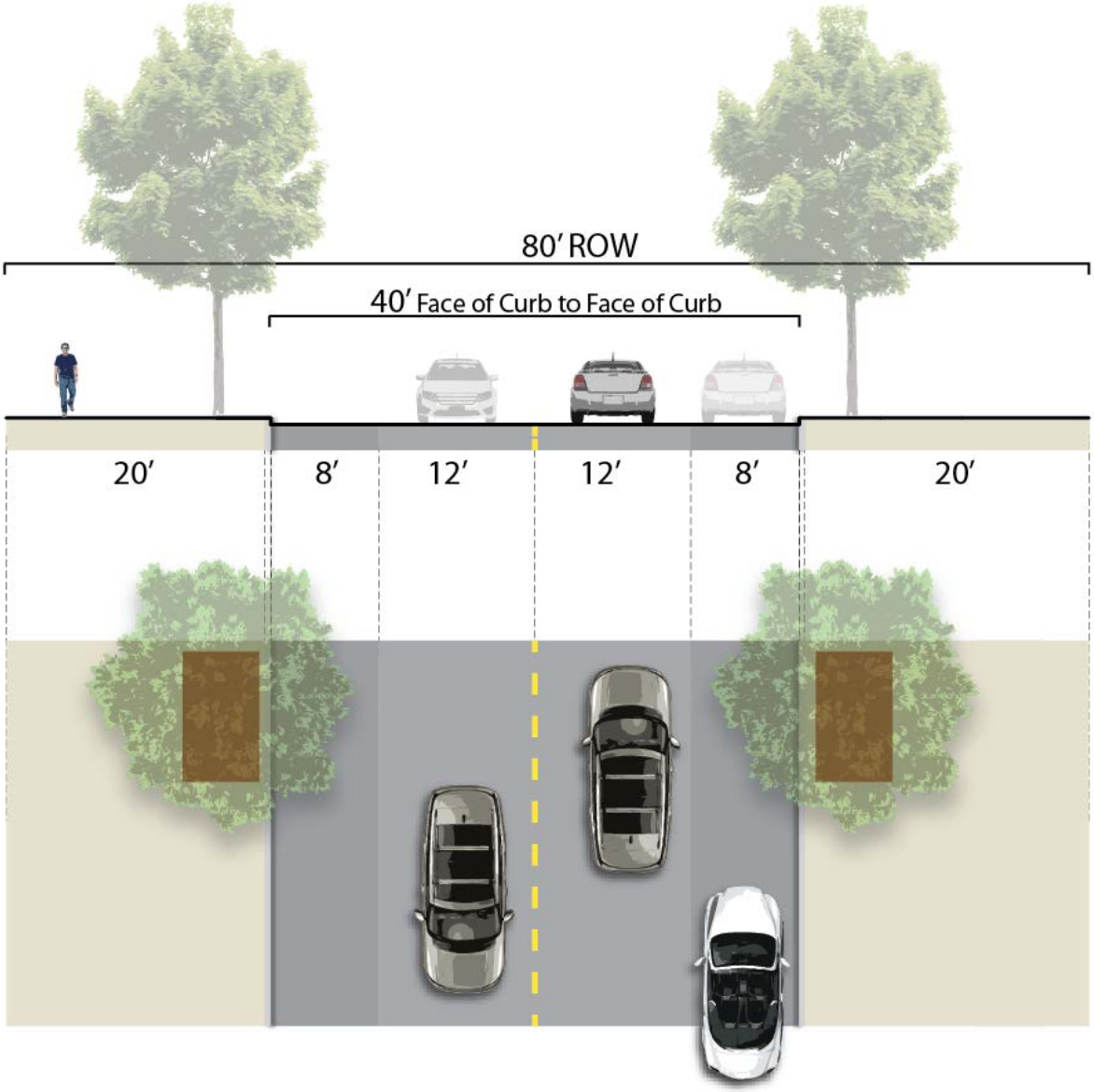
Street Type F Collector Street in residential neighborhood with no street parking and bike lanes on street



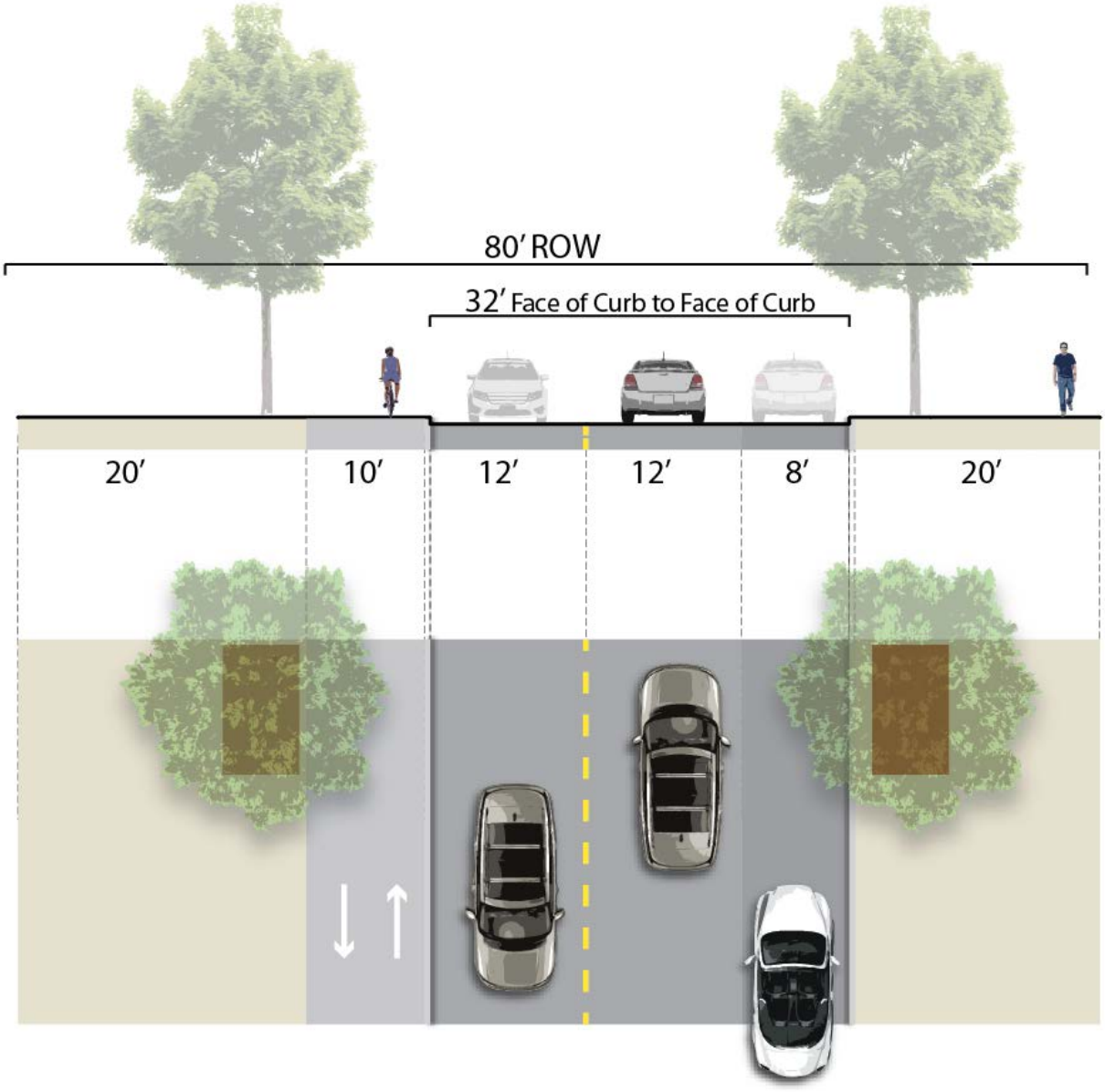
Street Type G Collector Street in commercial neighborhood with on street parking and bike lanes on street



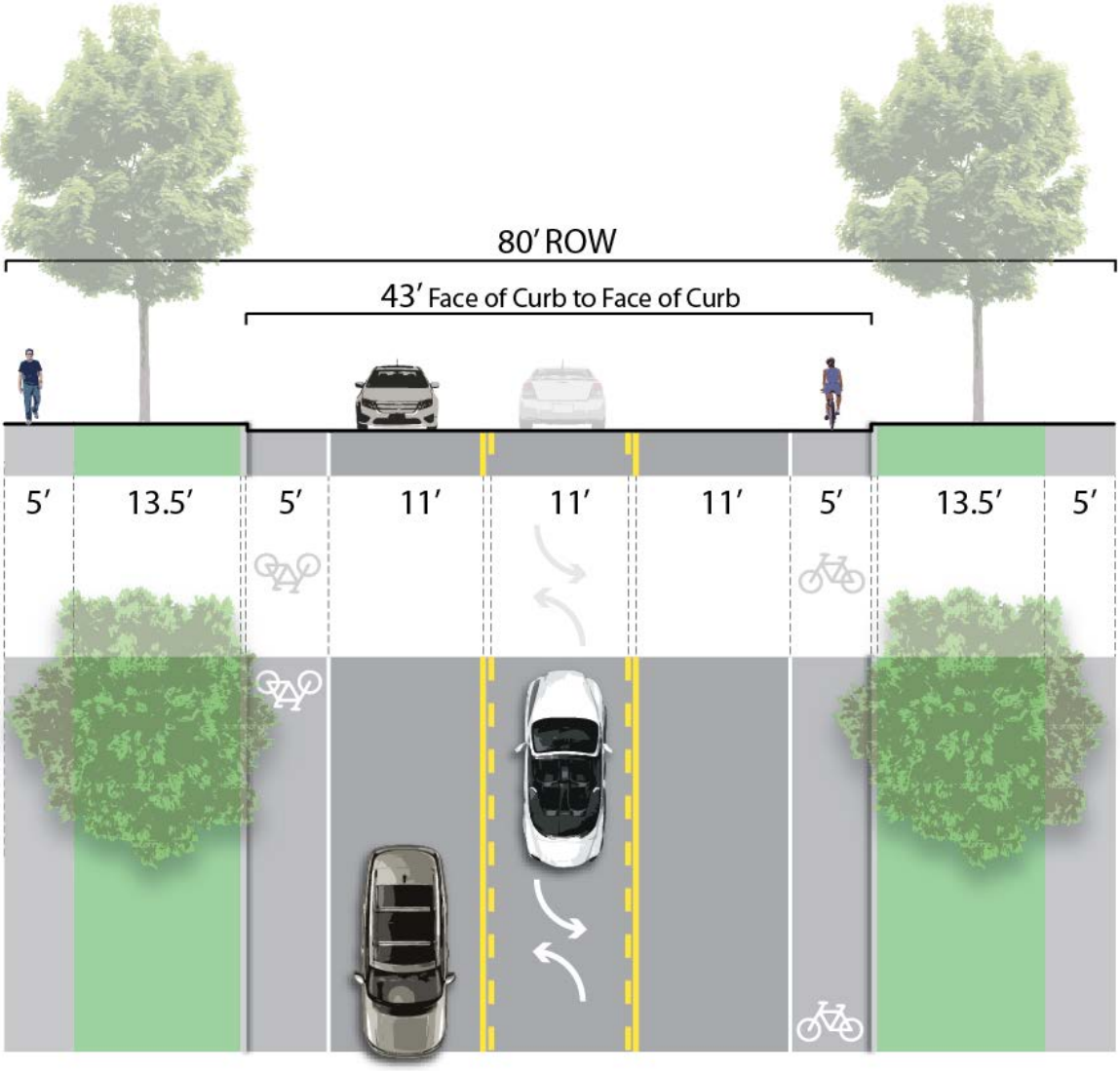
Street Type H Collector Street in commercial neighborhood with parking on both sides



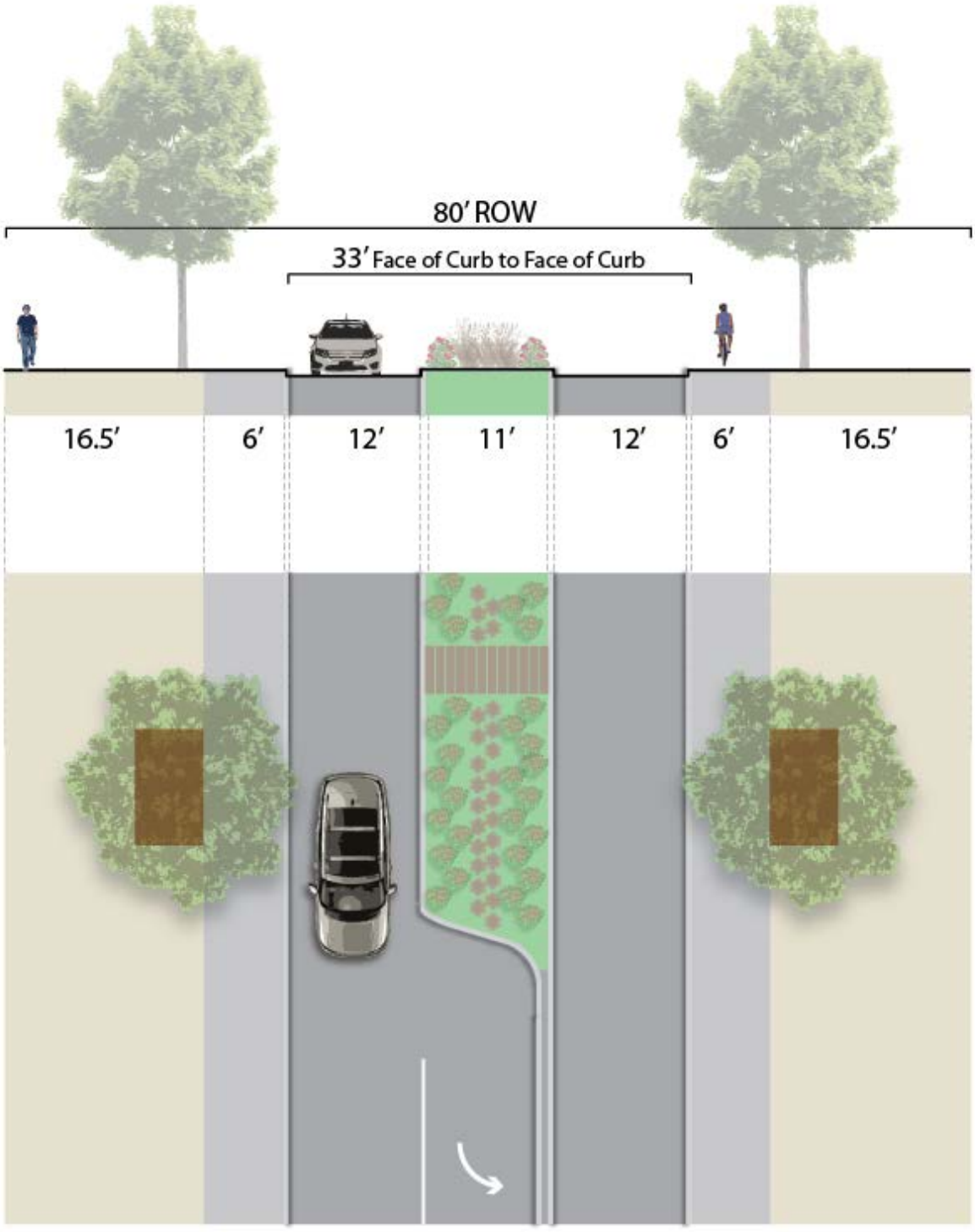
Street Type I Collector Street in commercial neighborhood with parking on one side



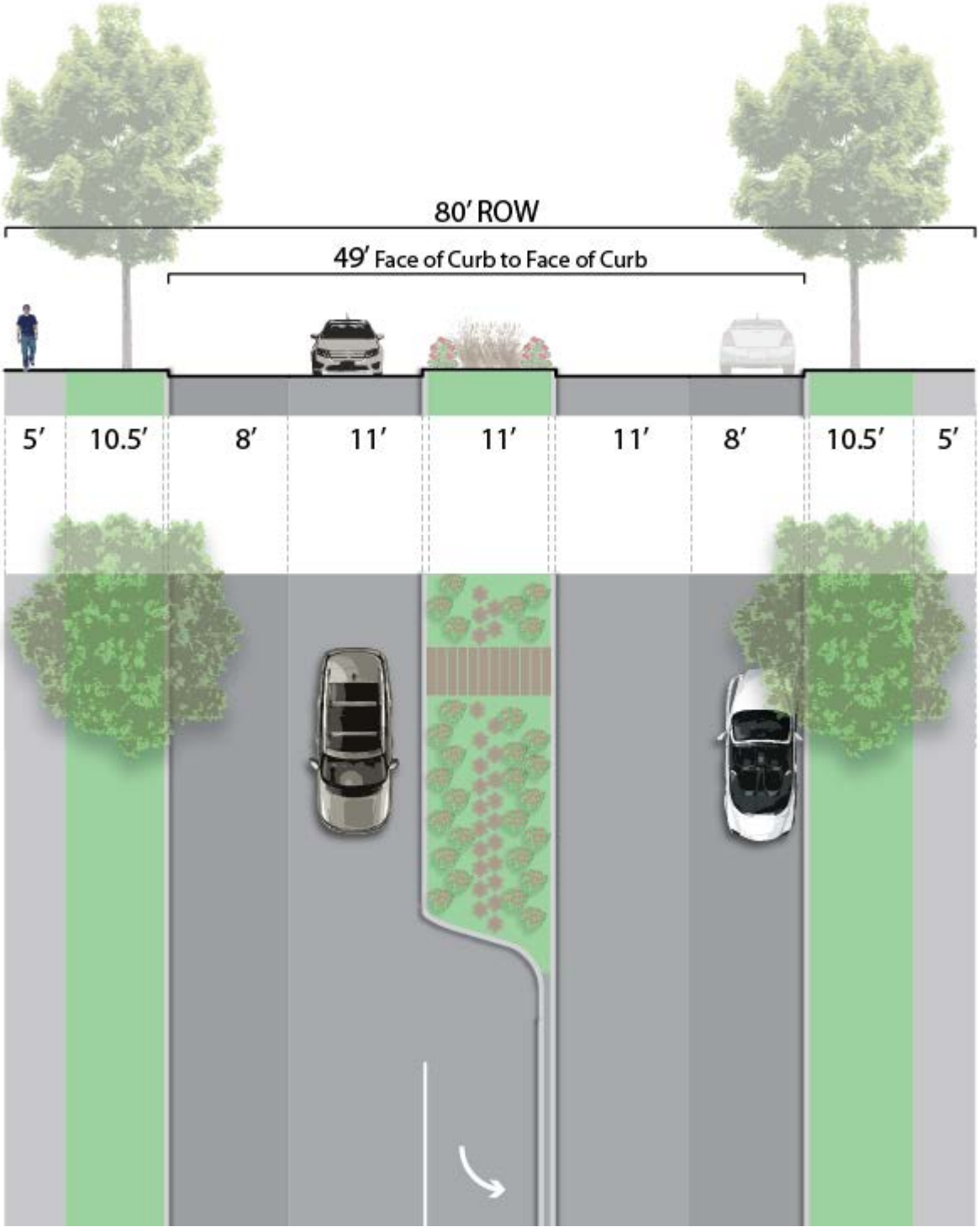
Street Type J Collector Street in commercial neighborhood 3 lane complete street configuration



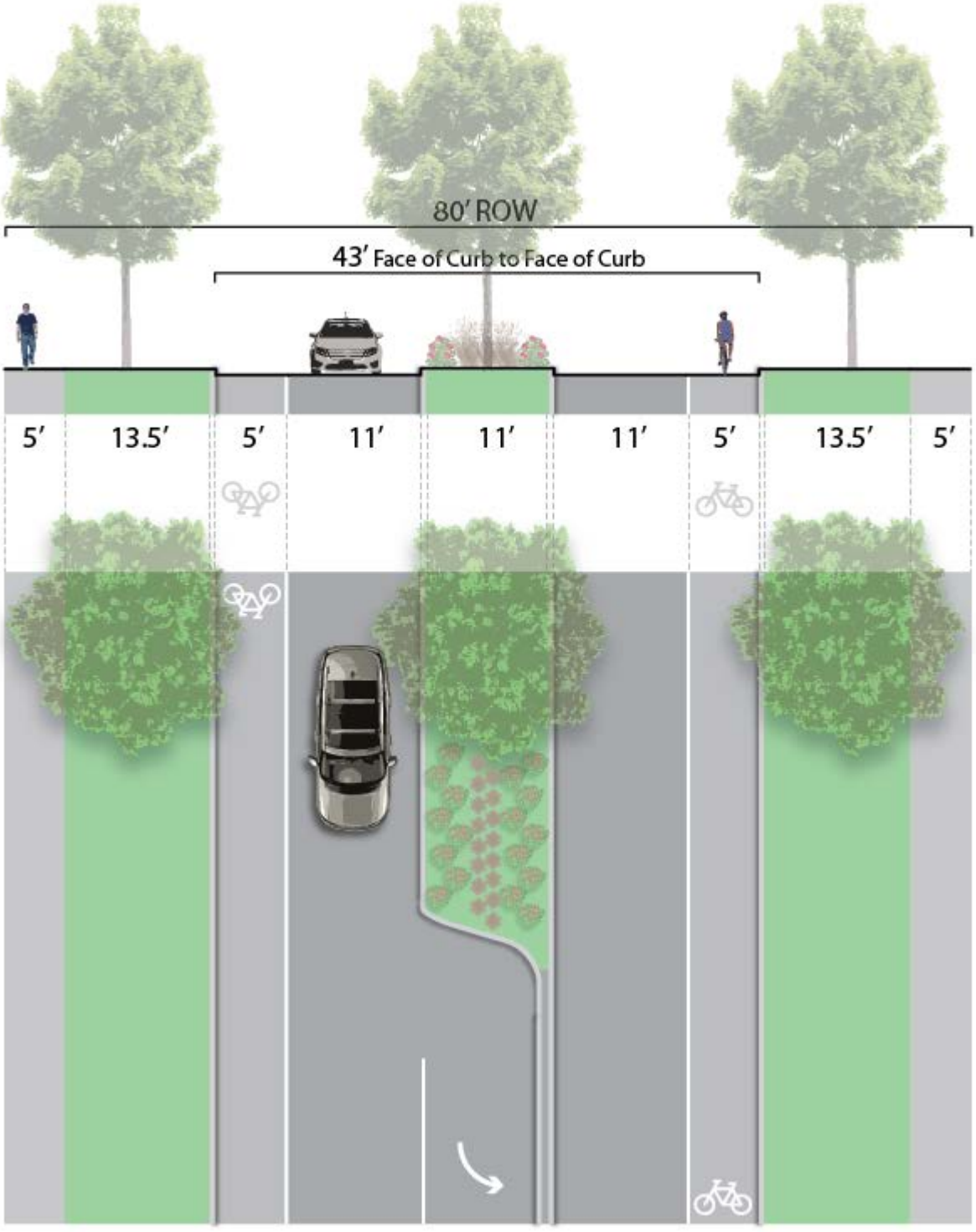
Street Type K Collector Street in Commercial neighborhood with landscaped median and no parking



Street Type L Collector Street in Residential or Commercial area neighborhood landscaped median and on street parking



Street Type M Collector Street in Residential neighborhood with landscaped median



Street Grades. Streets and alleys shall be completed to grades, which have been officially determined or be graded to the full width of the right-of-way and adjacent side slopes graded to blend with the natural ground level. The maximum grade shall not exceed six (6) percent for main and secondary thoroughfares, or ten (10) percent for main or local service streets. All changes in grades on major roads or highways shall be connected by vertical curves of a minimum length in feet equivalent to twenty (20) times the algebraic difference between the rates of grades, or greater, if deemed necessary to the City Infrastructure and Public Facilities Director; for minor streets, fifteen (15) times. The grade alignment and resultant visibility, especially at the intersections, shall be worked out in detail to meet with the approval of the City Infrastructure and Public Facilities Director.

TABLE 5-3: Curb, Sidewalk, and Trail Requirements

Street Type	*Curb/ Shoulder*	*Sidewalk*	*Bike Trail Type*
Cul-de-sac	Required	Not Required if the cul-de-sac has no pedestrian connection through the end of the cul-de-sac to a public trail, park, school or other destination	NA
Local	Curb	Both sides	Bike Boulevard
Collector	Curb	Both sides – or paired with an off street multi-purpose trail	Bike Boulevard or On Street Bike Lanes or off-street multi-purpose trail (side path)
Arterial	Curb	Both Sides – or paired with an off street multi-purpose trail	Off street multi-purpose trail (side path)
• Arterial right-of-way design and width is determined by state standards and designation of individual street or roadway segment.(See SUDAS manual) • Sidewalk and trail configurations in PUDs shall be consistent with the goals and policies outlined in the comprehensive plan and shall be subject to the approved PUD.			