City of ALBANY

COMPLETE STREETS

Policy & Design Manual

A Guidance Document for City Streets

December 2016

CDTC Capital District Transportation Committee

ALBANY 2030 your city. your future.

Mayor's Office of Energy & Sustainability City of Albany, NY

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Acknowledgements

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The City of Albany Complete Streets Policy and Design Manual is intended to support the City of Albany's efforts to comply with its Complete Streets Ordinance found at Section 323-89 of the City of Albany general code and adopted in June of 2013. The Complete Streets Policy and Design Manual does not commit the City of Albany, CDTC, CDTA, NYSDOT, or Albany County to funding any improvements. Undertaking additional engineering or other follow up work will be based upon funding availability.

The Albany Complete Streets Policy and Design Manual represents a consensus-based document supported by the PAC members. PAC member input, insight and expertise was critical to its development. While there is a wide range of organizations represented by PAC members, content herein has consensus support of the individual PAC members, not necessarily their affiliations.

Project Team

This manual was developed with support from the following Project Team:

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What are Complete Streets?

Complete streets design is defined as roadway design features that accommodate and facilitate convenient access and mobility by all users, including current and projected users, particularly pedestrians, bicyclists, transit users, and individuals of all ages and abilities. Complete streets may also play a role in making a community healthier, reducing environmental impact, and leading to private investment in a corridor.

Initiative

The City of Albany (City) recognizes the desire and need for active lifestyles and reduced vehicle-dependence. Developing walkable streets that connect districts and stimulate economic opportunity is an important component of the complete streets initiative. In addition, the City understands the role aesthetics play in instituting pride, attracting visitors, and supporting local business.

In June 2013, the Albany Common Council adopted a Complete Streets Ordinance, which aims to create roadways that accommodate the many demands for access, safety, and use by people of all ages and abilities. This ordinance can be located in Section 323-89 of the City of Albany general code.

The ordinance states that for all street construction, reconstruction, or resurfacing projects that are undertaken by the City and not covered under the New York State Complete Streets Law contained in section 331 of the Highway Law, the City should consider the convenient access and mobility on the street by all users of all ages. This includes planning for motorists, pedestrians, bicyclists, and public transportation users through the use of complete street design features during all stages of design and implementation.

This initiative also supports the Albany 2030 Comprehensive Plan, adopted in April 2012. Several Albany 2030 vision components relate directly to complete streets or can be supported through benefits provided by complete streets including safe, livable neighborhoods; a vibrant urban center; a multi-modal transportation hub; a green city; and a prosperous economy.

Engagement

In addition to evaluating existing conditions about the City, input from a Project Advisory Committee (PAC) and the public was gathered. The PAC consists of a variety of stakeholders including the City of Albany, the Capital District Transportation Committee (CDTC), the Capital District Transportation Authority (CDTA), the Capital District Regional Planning Commission (CDRPC), Albany Fire Department, Independent Living Center of the Hudson Valley, Northeastern Association of the Blind, and the New York Bicycling Coalition (NYBC). The PAC met seven (7) times and two (2) public meetings were conducted to provide information and receive feedback on the project. This input assisted in developing a tangible vision aligned with both the Complete Streets Ordinance and the Albany 2030 Comprehensive Plan.

Guiding Principles

The input gathered from the PAC and the public assisted in developing the following four (4) guiding principles that support the vision for complete streets within the City:

- Accessibility
- Connectivity
- Safety
- Placemaking

These principles were critical to establishing guidelines for construction, reconstruction, and resurfacing projects for all public and private projects throughout the City. The design guidelines have been developed to ensure that streets are treated based on land use context and the ability to accommodate the needs of all users. Street treatments are aimed toward providing functional, aesthetically pleasing streetscapes that accommodate and encourage a diverse mix of activities within the community and respect the existing culture of the City.

Design Guidelines

A series of six (6) land use/street typologies were developed to create a baseline for understanding the diverse areas and neighborhoods within the City. Each land use/street typology is representative of characteristics of existing streets within the City.

The following six (6) land use/street typologies were developed:

- Downtown
- Neighborhood Mixed Use
- Neighborhood Residential
- Community Mixed Use
- Community Commercial
- Industrial

Land use/street typologies were utilized to categorize areas and provide concise guidelines based on the existing characteristics, neighborhood identity, land use, and opportunities for improvement. Based on existing conditions, City goals and input from the PAC and public, guidelines related to trending considerations, streets, sidewalks, streetscapes, and intersections were developed for each typology.

Implementation

The City of Albany Complete Streets Policy and Design Manual (Manual) is intended to serve as a usable tool for the implementation of complete streets. Design guidelines are intended to allow implementation to occur during routine maintenance, reconstruction, or new construction and to contribute positively to the overall transportation network within the City. Parameters set forth for each typology will be followed, as feasible, to develop designs for future street work. The Manual appendices contain additional resources to assist planners, engineers, and others to incorporate complete street elements.

Coordination

The City of Albany, with the support from CDTC and other local agencies, looks forward to ensuring that projects within the City incorporate safe and effective complete street design. The guidelines and supportive tools provided within this document are intended to assist the City, local partners, and developers in contributing to a more complete transportation network and connected community. In order to have successful implementation, early and frequent coordination with multiple departments and agencies is crucial. Chapter 3 of this Manual provides more detailed information regarding the coordination required throughout the process.

CHAPTER 1

Introduction

1. Introduction

Purpose

The purpose of the Complete Streets Policy and Design Manual (Manual) is to implement the City of Albany Common Council Ordinance for Complete Streets. The ordinance requires that the needs of all users be considered in any future street construction, reconstruction, or resurfacing project. The ordinance supports roadway design features that accommodate and facilitate convenient access and mobility by all users, including current and projected users. The City-wide Policy and Design Manual guides street rehabilitation, construction, and design for all public and private projects throughout the City to ensure that complete street elements are incorporated. This Manual establishes treatment criteria for different streets and intersections throughout the City based on existing physical constraints, street/intersection type, land use context, and neighborhood character.

The City's goal was to develop a tool that could be utilized on a regular basis, could be easily applied, and would provide assistance during planning and implementation of routine maintenance, reconstruction, and new construction projects.

This Manual was developed to guide public and private projects that impact City Right-of-Way (ROW). The guidelines aim to ensure appropriate street treatments are used to accommodate the needs of all users and create an enjoyable streetscape that invites a mix of activities and supports a robust community.

The Manual can provide assistance by creating a place for bicyclists, pedestrians, transit users, and people with disabilities to feel welcome. Design guidelines raise awareness and also make reference to the need for a streetscape or street to serve multiple purposes.

Lastly, the Manual promotes awareness of complete streets as the City continues to develop a connected transportation network that accommodates all modes. Education and awareness will assist the community and its leaders to further understand the importance of complete streets and its impact on the daily life and overall success of the City.

Evolution of a Transportation Network

The City of Albany was established as a walking city that also accommodated private and commercial horse carriages. In 1862, tracks were laid for horse drawn trolleys. Soon after, as technology advanced, the horse drawn trolleys were replaced with electric-powered trolleys. The electric trolleys were an integral part of the City's transportation system and were even used to attract tourists. The electric trolleys played a large role in the development of the Pine Hills Neighborhood and Delaware Avenue.

Residents working in the City no longer needed to live downtown nearby their places of work. Instead, City workers had the option of commuting to work by electric trolley and living in a residential neighborhood. In 1946, trolley service ended after increasingly being replaced by buses and cars. As City development changed to accommodate the popularity of private vehicles, accommodations

for pedestrians and other modes of travel diminished or were no longer considered.

The history of transportation in the City of Albany illustrates that choices and policies related to transportation can directly impact growth and access within a city.

As is common with many communities within the United States, City growth in the recent past has been focused in a way that provides primary access to motorists. However, the City is comprised of a complex transportation network which includes passenger vehicles, buses, commercial vehicles, bicyclists, and pedestrians. According to the Capital District Transportation Authority (CDTA), CDTA ridership within the City has greatly increased since 2009. CDTA experienced a 2.5 million person increase in ridership from 2010 to 2014. Data collected as part of a biannual bicycle count by the Mayor's Office of Energy and Sustainability shows a 14.7% increase in cyclists between the spring of 2012 and the spring of 2013.

Growth of these modes of transportation further emphasizes the need for roadways to be designed or reconstructed with complete streets in mind. In addition to cars and pedestrians, today's City streets and sidewalks must also safely accommodate bicyclists, buses, delivery vehicles, and people of all abilities.

Progress

The benefit of creating and implementing a Complete Streets Policy and Design Manual is that it allows the City transportation network to connect people and places. Through routine use of this Manual, projects impacting City streets will build upon one another in a cohesive and guided manner. Complete Street goals are not anticipated to be realized through a city-wide street overhaul, but rather through a series of changes implemented over time. Each of these changes will help to enhance a cohesive and multi-modal transportation network.

Compliance

The purpose of the Manual is to establish a course of action to accomplish goals related to transportation and transit as set forth by the City of Albany Bicycle Master Plan (2009), the Albany 2030 Comprehensive Plan (2012) and the Complete Streets Ordinance (2013).

Goals include improving access and mobility within both the City and region for people of all ages and abilities. Meeting these goals will help create a quality transit and transportation network that improves community connectivity, safety, and sense of place.

The Manual aims to create roadways that accommodate the many demands for access and safety, as required in the Complete Streets Ordinance, Section 323-89 of Albany's Code. The Complete Streets Policy and Design Manual establishes treatment criteria for different streets and intersections throughout the City based on existing physical constraints, the street/intersection type, context, and use.

The Manual is intended to assist in establishing and extending a safe and efficient transportation network, while contributing to the image and identity of the City and supporting neighborhood character and economic activity.

Understanding Existing Conditions

The existing neighborhood, land use, and transportation network within the City of Albany was evaluated by completing the following:

- Review of adopted City and community plans;
- Walking audits;
- Mobile LIDAR mapping; and
- Review of City standard details for streets and sidewalks.

By evaluating a diverse array of resources related to existing conditions and future plans, information was gathered and examined to develop land use/street typologies and design guidelines. See Appendix A for the Existing Conditions Analysis which contains detailed information that aided in the development of the Manual. See Appendix B for existing City standard details, a sample of statewide standard details, and resources such as green infrastructure standard details.

City and Community Plans

To understand the City of Albany's vision for complete streets, existing plans and land use regulations related to the development of complete streets within the City were reviewed. The review included public input and future expectations regarding complete streets and transportation.

The existing plans and land use regulations were used to develop a framework for individual street treatments and design elements. City plans, regulations and projects examined to assist in the development of the Manual include:

- The Albany 2030 Comprehensive Plan;
- City of Albany Bicycle Master Plan;
- Albany Education District enhancement Study;
- Madison Avenue Road Diet;
- City of Albany Zoning;
- Complete Streets Ordinance; and
- Standard Details.

Walking Audits

A complete streets walking audit was conducted to gather first-hand knowledge of the complete street elements in the City of Albany. Three planning areas within the City of Albany were identified by the Planning Advisory Committee (PAC) as focus areas for the complete streets walking audit. A block by block visual inspection of accessibility, connectivity, safety, and placemaking elements was completed to gather data.

Mobile Mapping

The PAC also identified six (6) planning areas for which to compile an existing roadway inventory using mobile LIDAR mapping. Mobile LIDAR mapping technology utilizes a 3D laser scanner mounted to a moving platform, such as a vehicle, to collect field measurements of objects within line-of-sight of the platform. Maps and a digital inventory of complete street elements such as sidewalks, crosswalks, and bike lanes were created from the mobile mapping effort.

By examining the physical and community/demographic features of the City, transportation data provided by the City and other local partners, as well as data collected through walking audits and

mobile mapping, opportunities for improvement were identified. These opportunities would allow the neighborhood, land use and transportation network to work together in a manner that would support the vision of the City.

Engagement

The existing visions set forth in various adopted planning documents and policies were reviewed and supplemented by gathering valuable input from the PAC and members of the public at public workshops.

PAC

Early in the development of this Manual, the PAC expressed their vision and goals for complete streets within the City. Main goals expressed by the PAC included the following:

- Sufficient inventory and mapping of the existing street infrastructure;
- Development of practical and effective guidelines;
- Funding opportunities and coordination with local organizations and initiatives;
- Accommodating and welcoming all users such as bicyclists and people with disabilities; and
- Promoting awareness of the importance of complete streets.

The PAC placed an emphasis on the importance of developing a realistic and usable process to incorporate complete streets. It was recognized that the guidelines must be developed with consideration of the City's existing infrastructure and constraints.

Taking advantage of available funding sources provides the opportunity to accomplish goals without solely depending on City funds. It will be important for the City to continue coordinating with local partners and organizations, such as the Capital District Transportation Committee (CDTC) and Capital District Transportation Authority (CDTA).

Public

Two (2) public interactive workshops took place during the development of this Manual. Public workshop participants reviewed project display boards and provided written and verbal comments to project team members. The major concerns expressed by the public, during public meetings and through comments for this project, were in relation to safety, access, and placemaking. With regard to sense of place, the public expressed concerns related to neighborhood aesthetics. With regard to safety and access, the public comments focused on the following:

- Safe routes to public amenities;
- Availability and condition of crossings and sidewalks;
- Lighting and visibility;
- Reducing bicycle and vehicle conflicts; and
- Snow clearing and storage.

The public also expressed a desire for connections to bike trails, and an enhanced streetscape with amenities such as benches, bike racks and bus shelters. Additionally, the public discussed the widening of sidewalks, car free streets as well as dual-purpose street paint to slow traffic, promote public art, and support neighborhood branding.

Guiding Principles

The input received from the public and the PAC, as well as an understanding of existing policies and plans, assisted in developing guiding principles for this Manual. The guiding principles developed are: Accessibility, Connectivity, Safety, and Placemaking. Each guiding principle is defined below and can be associated with its own representative icon. These icons appear in Chapters 4 and 5 to help identify complete street elements that support the guiding principle.

Accessibility includes the ability to move from one location to another with ease regardless of age or ability. Accessibility is enhanced with the presence of pedestrian, bicycle and transit facilities.

Connectivity is the ability to connect modes of transportation as well as neighborhoods, major destinations and nodes of activity.

Safety includes providing a safer environment for all users regardless of transportation mode.

Placemaking involves creating a livable, walkable, and vibrant community by incorporating elements that enhance the quality of life and assist neighborhoods in developing a sense of place.

Roles and Responsibilities

The goal of this Manual is to provide guidelines for future public and private projects within the City. This Manual is intended to act as a tool for the City to utilize as projects are planned. The guidelines are intended to consider the needs of all users as well as support a sense of place that increases safety, aesthetic appeal, and neighborhood identity within the City. Additionally, the guidelines are intended to assist with the long term goal of creating a connected network of streets for multiple modes. The guidelines strive to encourage increased safety, connectivity, accessibility, and placemaking and assist in each of these principles joining together to create a cohesive and functional street. As the guiding principles are considered on a consistent basis, each principle is intended to continue to build upon another, further strengthening these principles.

The Manual is intended to be used primarily by municipal departments. The Manual is particularly useful for collaboration with New York State Department of Transportation (NYSDOT), Albany County and other agencies when instituting City street construction, reconstruction, resurfacing, maintenance projects and public developments. This Manual can also be used as part of the City's development review process for private development projects that impact City streets.

The policies and procedures included in this Manual focus on creating compact and safe roadways. The policies and procedures provide guidelines related to intersection design as well.

Manual Organization

The Manual is organized into the following chapters:

Chapter 2: Land Use/Street Typologies

Chapter 2 is representative of existing conditions. It describes six (6) distinct land use/street typologies developed by categorizing areas within the City. The typologies are based on roadway function, the surrounding context (right-of-way width, building type, and land use) and primary transportation mode. The descriptions are further supported by photographs and examples of each land use/street typology. The land use/street typologies represent a continuum of streets working together to create a city-wide transportation network.

Chapter 3: Process and Implementation

A description of the complete streets implementation process is provided in this chapter. The chapter walks through the steps required to be taken during project development and review to ensure complete street elements are considered and integrated into project design to the extent feasible. This section offers details on steps to be taken for City sponsored projects and privately sponsored projects. Additionally, this chapter describes the use of an internal complete streets review checklist by City departments.

Chapter 4: Trending City-wide Design Considerations

Chapter 4 includes descriptions of complete street elements that are applicable to the City as a whole. The chapter addresses additional components of complete streets, their related factors and presents information on progressive complete street ideas and trends.

Chapter 5: Guidelines for Streetscapes, Sidewalks, and Streets

Chapter 5 includes a discussion of complete street elements that are applicable to streetscapes, sidewalks, and streets. The elements described in this chapter illustrate the type of transportation network that the City envisions. The sample cross sections and illustrations provided show treatment options for each land use/street typology with variations based on wide and narrow right-of-way widths. This chapter also discusses the importance of modal hierarchy and provides a table prioritizing zones for each land use/street typology.

Chapter 6: Guidelines for Intersections

Chapter 6 provides design guidelines specific to the unique nature of intersections. Sample illustrations showing intersection treatment options for specific modes are provided to offer a visual depiction of various intersection alternatives and illustrate the future transportation network envisioned by the City.

A **Glossary of Terms**, **List of References**, and **Appendices** are included at the end of this Manual. Appendices include technical documentation used for the development of the Manual itself as well as resources that may be referenced by the Manual user.

See below for a list of appendices:

- Appendix A: Existing Conditions Analysis
- Appendix B: Standard Details
- Appendix C: Referenced Mapping
- Appendix D: Environmental Justice
- Appendix E: Sample Complete Streets Review Checklist

Application of the Manual

Use of the Manual will vary based on project type and sponsor.

Upon project initiation, a project sponsor will identify the most applicable land use/street typology or typologies of the project area based on information provided in Chapter 2. Chapter 2 provides a snapshot of the City by examining typologies based on the existing transportation network, land use and neighborhood character, which is useful for identification.

As a project progresses, Chapter 3 will be utilized to determine steps for evaluation based on the specific project type. The chapter references the use of internal complete street review checklists by City departments. The checklists, to be developed internally by the City, aid in determining incorporation of complete street elements. Process flow charts for both City sponsored and privately sponsored projects are included within the chapter.

Specific street treatments and technical guidance are included in Chapters 4, 5 and 6.

While the Manual provides extensive information regarding the evaluation of existing conditions, the review process, and design guidelines, coordination remains a critical component for successful project implementation. Another critical component of successful implementation includes updating and maintaining current resources and records such as completed and ongoing projects, checklists, and current mapping.

Legal Resources

The guidelines provided within the Manual were developed based upon best practices, guidelines and requirements found in a variety of resources including, but not limited to, NYSDOT, the American Association of State Highway and Transportation Officials (AASHTO), National Association of City Transportation Officials (NACTO), the Federal Highway Administration (FHWA), and the Manual on Uniform Traffic Control Devices (MUTCD). References to specific resources are identified throughout the Manual.

CHAPTER 2

Land Use/Street Typologies

2. Land Use/Street Typologies

Overview

Implementation of complete streets begins with an understanding of existing street characteristics within the City of Albany. Through a mobile mapping effort and a walking audit of several corridors throughout the City, existing land use/street typologies were developed for the purposes of this Manual and are described within this chapter. The land use/street typologies were created through use of a framework. This framework incorporated land use context, modal hierarchy, and other transportation characteristics.

Six (6) land use/street typologies were developed to incorporate a wide range of existing conditions related to roadway, land use, and neighborhood characteristics. Project designers are encouraged to not only identify the existing land use/street typology, but consider what the future land use/street typology may be. Design guidelines for complete street implementation can be found in Chapters 4, 5, and 6.

Descriptions

A description for each land use/street typology used in this Manual follows. The land use/street typologies represent a continuum of streets working together to create a city-wide transportation network. The descriptions begin with the highest density land use, represented by the Downtown land use/street typology, to the lowest density, represented by the Industrial land use/street typology. Not all streets will fit within a single land use/street typology and can change in character along a corridor. For such streets, select the most appropriate land use/street typology.

Downtown

The Downtown land use/street typology is characteristic of a downtown core. The streets contain high density commercial, office, civic, and multi-family residential uses. Modes of transportation typically found downtown include vehicular, transit, bicycling, and walking. However, walking, bicycling, and transit are the most common modes of transportation. Elements that support the pedestrian experience include sidewalks, crosswalks, curb ramps, curb extensions, and pedestrian-scaled lighting. Bicycle related elements include bike racks, bike lanes, and shared lane markings. Elements that aid transit users include bus shelters and bus lanes. There are streets located within the Downtown that are not characterized as a Downtown land use/street typology.

Downtown: Broadway looking south at the intersection of Columbia Street and Broadway

Downtown: Intersection of Columbia Street and Broadway looking west

Neighborhood Mixed Use

The Neighborhood Mixed Use land use/street typology includes streets serving moderate density residential and community-supported commercial areas and often functions as a transition between Downtown and Neighborhood Residential land use/street typologies. This typology supports multiple modes of transportation including walking, bicycling, vehicular, and transit. Elements supporting pedestrians include sidewalks and benches. Elements that support bicycling within this land use/street typology include bike racks, bike lanes, and signage. Vehicular or motorist elements include clearly marked lanes and accessible on-street parking. Elements considered for transit within this land use/street typology include bus shelters, bus lanes, and bus bulbs.

Neighborhood Mixed Use: South Pearl Street looking south at the intersection of South Pearl Street and Westerlo Street

Neighborhood Mixed Use: Madison Avenue looking northwest between South Allen Street and West Lawrence Street

Neighborhood Mixed Use: Madison Avenue looking southeast between Ontario Street and Quail Street

Neighborhood Residential

The Neighborhood Residential land use/street typology is often found on streets adjacent to the Neighborhood Mixed Use land use/street typology and the Community Commercial land use/street typology. This land use/street typology tends to serve lower vehicle volumes. The typical transportation modes included within this land use/street typology are walking and bicycling with vehicular traffic serving the residential uses. Neighborhood Residential streets contribute to a high quality of life for residents, creating a sense of place and connecting neighborhoods. Elements that support walking within this land use/street typology include pedestrian-scaled lighting and sidewalks. Bicycling elements found in this land use/street typology may include "Share the Road" signage and design features that minimize view obstructions.

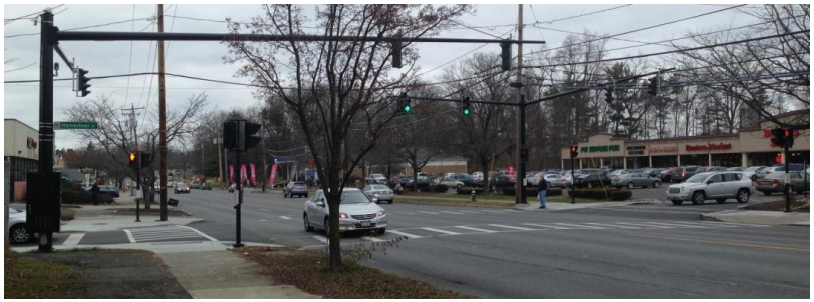
Neighborhood Residential: On Winnie Street looking northeast between Twitchell Street and Cliff Street

Neighborhood Residential: On South Manning Boulevard looking southwest between Freeman Road and Greenway South

Community Mixed Use

The Community Mixed Use land use/street typology is characteristic of streets that serve as a transition between Neighborhood Mixed Use or Neighborhood Residential land use/street typology and the lower density Community Commercial land use/street typology. This typology may include a mix of standalone commercial or office buildings, smaller scale commercial plazas, single family housing and multi-family housing. Generally, the mix of uses occurs within blocks instead of within a building. This typology primarily serves vehicular, transit, and bicycle transportation modes, but also supports pedestrian traffic flows. Elements that support these modal options within this land use/street typology include designated turning lanes, on-street parking, and bicycle racks.

Community Mixed Use: Western Avenue south of Homestead Street



Community Mixed Use: Intersection of Western Avenue and Homestead Street looking north

Community Commercial

The Community Commercial land use/street typology includes moderate to low density commercial uses of a larger scale. These corridors are located beyond the Downtown land use/street typology and are located within, or in close proximity to, existing residential neighborhoods. Community Commercial streets provide easy access to necessary commercial establishments and services. Community Commercial transportation methods include vehicular, transit, bicycling, and pedestrian traffic flows, with vehicular and transit traffic being the most common modes. Elements that help support these modes of transportation include timed signals and bus shelters.

Community Commercial: Central Avenue looking northwest between Austain Avenue and Colvin Avenue

Community Commercial: Central Avenue between Colvin Avenue and Everett Road Extension

Industrial

The Industrial land use/street typology is characteristic of areas supporting industrial, commercial, wholesale, construction, and service uses. Industrial land use/street typology transportation methods are characteristic of heavy vehicular traffic flows, specifically truck traffic. Bicycle traffic is also present along some industrial corridors. Elements that support vehicular and bicycle traffic include paved shoulders for potential emergencies, designated turn lanes and sharrows.

Industrial: Church Street looking south between Broadway and Boat Street

Industrial: Church Street looking south between Broadway and Boat Street

Industrial: On Broadway looking north between Church Street and Vine Street

The table below outlines *existing* land use/street typology characteristics. Among these characteristics are modal hierarchy and a set of example elements that may support the transportation modes listed. Modal hierarchy refers to the primary mode type found within each land use/street typology. The modal hierarchies identified in the table are based on existing conditions and are not exhaustive as user type varies by street frequently throughout the City. The mode most commonly represented in the use/typology is listed first. This mode is then followed, in order, by the modes that are less commonly represented. The example elements listed are representative of what may currently be found within each land use/street typology. As noted previously in this chapter, designers, upon project initiation, are encouraged not only to identify the existing land use/street typology, but to also identify what the future land use/street typology may be.

Table 2.1: Existing Land Use/Street Typology Characteristics

Land Use/Street Typology	Functional Classification	Modal Hierarchy	Example Elements	Existing Building Setback Range (feet)[a]	Existing ROW Width Range (feet)[b]	Existing Pavement Width Range (feet)[c]
Downtown	Principal Arterial Minor Arterial Local Road	Pedestrian Bicyclist Transit User Motorist	Sidewalks, Crosswalks, Curb Ramps Bike Racks, Shared Lanes Bus Shelters, Bus Bulbs Marked Lanes, On-Street Parking	0	48 - 152	23 - 90
Neighborhood Mixed Use	Principal Arterial Minor Arterial Major Collector	Pedestrian Bicyclist Motorist Transit User	Pedestrian Crossing Signals, Sidewalks, Benches Bike Racks, Bike Lanes, Signage Marked Lanes, On-Street Parking Bus Shelters, Bus Bulbs	0 - 20	76 - 102	45 - 59
Neighborhood Residential	Minor Arterial Major Collector Local Road	Pedestrian Bicyclist Motorist	Pedestrian-scaled Lighting, Sidewalks, Curb Ramps Share the Road Signage Minimal Obstructions, On-street Parking	20 - 25	37 - 50	18 - 28
Community Mixed Use	Principal Arterial Minor Arterial Major Collector	Motorist Transit User Pedestrian Bicyclist	Designated Turning Lanes, On-Street Parking Bus Shelters, Bus Bulbs Sidewalks, Crosswalks, Curb Ramps Bike Racks	0 - 20	98 - 103	52 - 58
Community Commercial	Principal Arterial Minor Arterial Major Collector	Motorist Transit User Pedestrian Bicyclist	Designated Turning Lanes Bus Shelters, Curb Extensions Pedestrian-scaled Lighting, Sidewalks, Curb Ramps Shared Lanes, Bike Racks	0 - 40	98 - 104	60 - 70
Industrial	Major Collector Local Road	Motorist Transit User Bicyclist Pedestrian	Dedicated Turn Lanes Bus Shelters Shared Lanes Sidewalks, Crosswalks, Curb Ramps	0 - 20	41 - 85	23 - 34

[a] *The building setback ranges are front setback minimums. These ranges are estimates and do not reflect specific requirements of the City of Albany zoning ordinance.*
[b] *The ROW width ranges reflect estimated field observations from roadways.*
[c] *The pavement width ranges reflect estimated field observations from roadways.*

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CHAPTER 3

Process and Implementation

3. Process and Implementation

Overview

Complete street implementation is a multifaceted process that includes planning, design, construction, and maintenance. It incorporates engineering practices and judgment, while engaging appropriate stakeholders. This process is used to consider and understand how a project will accommodate the needs of facility users in order to improve accessibility, connectivity, safety, and placemaking within the City.

The implementation process is critical for integrating complete street elements of streetscapes, sidewalks, streets, and intersections across changing land use/street typologies. It is also understood that not all recommended elements can be implemented in all projects, but that a balance must be met where road widths and other constraints may be present. It will be the responsibility of the project designers, in coordination with project sponsors and involved partners, to prioritize the design features that are most applicable based on existing physical conditions, desired conditions, modal preferences, long-term maintenance, and availability of funding.

Coordination

Implementation of complete streets involves many steps and many partners, often creating an environment where responsibilities overlap. Therefore, coordination among City departments and applicable agencies is required to ensure that opportunities for project implementation are achieved. City of Albany departments and offices recommended to be involved in project coordination include, but may not be limited to: the Department of General Services, Traffic Engineering Services, the Department of Planning and Development (Planning Department) and the Department of Water and Water Supply. Coordination is also recommended among CDTA, NYSDOT, Albany County, and other local organizations directly involved with a specific project area. Depending on the project, coordination with local service providers, such as National Grid, may be necessary. The City is encouraged to pursue opportunities that combine capital street improvement projects as well as coordinate with local service provider upgrades and maintenance schedules to more efficiently implement complete streets.

Funding

Funding is an important component for complete street implementation. In order to efficiently implement the proposed design guidelines for complete street elements throughout the City, funding opportunities should be pursued both within the City's capital budget and through other resources.

Currently, funding for projects within the City primarily comes from capital bonds or the Consolidated Local Street and Highway Improvement Program (CHIPS). CHIPS is a funding program managed by the State, which provides municipalities financial support for the construction and repair of highways, bridges, and other facilities that are not a part of the State highway system. CHIPS, and other funding sources, have unique funding requirements which must be met in order for funding to be

allocated for a specific project. At times, this may limit what can be completed for a given project.

Roadway and corridor improvements within the City are identified on an annual basis as part of a larger capital budget effort. It is recommended that the City plan its road projects utilizing a two (2) year planning horizon to allow sufficient coordination among City departments as well as design time for adjustments and identification of supplemental funding sources. It is also recommended that location be considered with respect to other complementary projects that are underway at any given time in order to disperse resources appropriately and efficiently.

In addition to the established funding sources, the City is encouraged to pursue State and federal grant opportunities for projects. Other funding sources may include bond measures, public/private partnerships, and project improvements or funding required as part of new development projects. More efficient coordination of capital street improvement projects between City departments and with local service providers will also streamline project costs going forward.

The City may also explore non-traditional funding sources for complete street projects as well. These funding sources may include New York State Department of Environmental Conservation (NYSDEC) green infrastructure grants and New York State Energy Research and Development Authority (NYSERDA) grants. Complete street projects have been known to revitalize corridors and promote private investment.

Internal Complete Streets Review Checklist

An internal complete streets review checklist is intended to provide a formalized method for the City to plan for, design, and track the implementation of complete street efforts within the City and its right-of-way boundaries. Use of an internal review checklist to evaluate the possibility of incorporating complete street elements into a project allows for the implementation process to remain consistent and transparent. Using guided tools, such as a checklist, encourages project sponsors to explore opportunities to incorporate complete street elements not previously considered during the early stages of project planning. The City of Albany's Department of General Services' Engineering Division includes the departments of Development and Planning, Traffic Engineering, Traffic Safety, Building and Codes, Water and Water Supply, and Recreation. Each of these departments is encouraged to develop the checklist jointly. A sample checklist has been provided in Appendix E.

The internal review checklist is encouraged to request a range of information about the proposed project. This information should include existing and proposed conditions, project location, quantitative details, and to what extent the project will be contributing to the guiding principles of accessibility, connectivity, safety, and placemaking. Additionally, the internal review checklist allows the City to provide information about how project components add to or improve safety, green infrastructure, and facilities for all modes of transportation and people of all ages and abilities within the City. The checklist is recommended to provide the opportunity to explain whether certain complete street elements are feasible or not for a specific project. Similarly, the

checklist may require modification once applied to several projects. Therefore, the City is encouraged to revisit the contents of the checklist and make adjustments, as appropriate.

Completing the checklist provides several advantages. This allows the City to document the project information, recognize existing and potential complete street elements, and gain insight from other City departments and local agencies. The process formalizes coordination between City departments and agencies, and provides an opportunity for the City to better document and track patterns of development.

As set forth by the City of Albany Complete Streets Ordinance, complete street design shall not apply if it has been determined and set forth in publicly available documents that one of the following applies:

- Use by bicyclists and pedestrians is prohibited by law, such as within interstate highway corridors;
- The cost would be disproportionate to the need as determined by factors including, but not limited to, the following: land use context, current and projected traffic volumes, and population density;
- Demonstrated lack of need as determined by factors including, but not limited to, land use, current and projected traffic volumes, including population density, or demonstrated lack of community support; or
- Use of the design features would have an adverse impact on, or be contrary to, public safety.

Evaluation Process

The following sections describe the implementation processes for City-sponsored and Privately-sponsored projects. The processes complement and support the utilization of design guidelines outlined within this Manual. The steps for each process may not always be linear and should be fluid as a project moves from planning to preliminary design to final design. It is likely that some steps may occur concurrently, while other steps may need to be revisited as the project evolves and as input is gathered during continued project coordination. The steps apply to all construction, reconstruction, and repaving/restriping/resurfacing projects, capturing ongoing and overlay projects in order to further implement complete streets throughout the City. The review process varies depending on whether the project is City-sponsored or privately-sponsored. Emergency projects are not required to complete the evaluation process. Process flow charts have been developed identifying steps for each project type. These process flow charts may be found at the end of this chapter.

City Sponsored Projects

City sponsored projects can be categorized into small-scale or large-scale. Small-scale projects are less than one (1) City block, while large-scale projects are greater than or equal to one (1) City block. Repaving/restriping/resurfacing projects have the potential to vary greatly. It is possible that not all steps will be required for every project, but in some instances, it may be necessary for steps to be revisited based on design changes.

If a project scope does not include work within the City right-of-way, complete streets evaluation is not required. Emergency work is exempt from complete street evaluation.

It is understood that small-scale projects may offer fewer opportunities for the implementation of complete street elements. Additionally, small-scale and repaving/restriping/resurfacing project schedules are typically condensed, and therefore, may require an accelerated review process. However, it is encouraged that all City sponsored projects consider complete street elements during project planning. As noted previously within this chapter, and to aid in the further incorporation of complete street elements, it is recommended that the City utilize a two (2) year planning horizon for its roadway and/or corridor projects, including repaving/restriping/resurfacing projects. Operating in this planning horizon would provide City departments sufficient time to identify pipeline projects. In addition, this planning horizon allows the City to cross-reference pipeline projects within individual departments, thereby creating a more efficient approach to project prioritization, funding, and implementation.

City Sponsored Complete Streets Review Process

Step 1: Project Initiation

Project initiation includes establishing a project sponsor, identifying the project, identifying whether the project is small-scale or large-scale, and determining the project location. At this stage, a basic idea of the project has been developed.

Step 2: Project Planning

During this step, the project becomes more defined. Project expectations and goals are set and coordination with other City departments, local partners and funding agencies is initiated. Project limits are further established and may increase or decrease based on coordination with City departments and local partners.

Step 3: Checklist Documentation (City)

Checklist documentation will begin upon initiation of this step in the project development and review process. The documentation will occur by City staff and include identifying the applicable land use/street typology(ies), applicable adopted plans, existing conditions, and proposed complete street elements.

The selected land use/street typology(ies) should match the character and function of the project area. It is important to note that more than one land use/street typology may be applicable, particularly if the project area includes intersections. An evaluation of existing conditions will be necessary to understand and consider the physical, environmental, and social constraints of the project area. Checklist documentation is recommended to include an existing conditions evaluation. This evaluation should include identification of the right-of-way width, pavement conditions, existing complete street elements, and more. The project sponsor will also identify plans adopted by the City that are applicable to the project. Upon completion of an existing conditions evaluation, complete street elements that are most appropriate for the project area are identified. Modal hierarchy within the project area may serve as another tool for prioritizing design elements. The project sponsor will provide documentation of complete street elements to be incorporated, as well as elements that are not appropriate. It is necessary for the project sponsor to consult with other City departments and local partners throughout this step. This will ensure accurate and thoughtful documentation.

Step 4: Preliminary Design

The preliminary design process should incorporate the elements identified during Step 3. It should be understood that design elements included may change as the preliminary design process advances. This is a typical part of the design process and coordination with project partners will ensure transparency. Throughout the preliminary design stage, the project sponsor should coordinate with other City departments and local partners. Additionally, the project sponsor is expected to follow applicable federal, State, local and funding agency requirements.

Step 5: Coordination

Coordination is critical throughout the whole project development and review process. At this point in the design process, the project sponsor is to coordinate with other City departments and local partners about checklist documentation and the preliminary design for the project. The City departments and local partners may provide comments and/or concerns about the documentation completed to date. Upon completion of review by City departments and local agencies, the internal review checklist is returned to the project sponsor for verification and re-evaluation.

Step 6: Re-evaluation

Once the internal review checklist is returned to the project sponsor, the project design should be re-evaluated based on the internal checklist review. The project sponsor will verify that complete street elements are being incorporated, as feasible, or indicate that additional complete street elements need to be incorporated, as feasible. The project sponsor will either adjust the project design based on feedback, or will determine that adding new complete streets elements is not feasible. If incorporation of new complete street elements is not feasible, supporting documentation will be included with the internal checklist in order to support this determination. There are many questions that can assist the project sponsor during re-evaluation. A sample list of questions has been provided below.

- Are there creative approaches to incorporate additional complete street elements and still meet budget requirements?
- Is the appropriate modal hierarchy achieved by the design?
- Have the priority elements been incorporated to the greatest extent possible?

The project sponsor should coordinate with City departments and local agencies during re-evaluation as necessary.

Step 7: Final Project Design

During Step 7, the project sponsor will finalize the project design based on Step 5 and 6 coordination and re-evaluation. After confirming that applicable federal, State, local and funding agency requirements have been addressed, the internal review checklist will be finalized and filed.

Privately Sponsored Projects

Similar to city sponsored projects, privately sponsored projects may be categorized into small-scale or large-scale projects. Small-scale projects are defined as less than one (1) City block, while large-scale projects are defined as greater than or equal to one (1) City block. For privately sponsored projects that impact the City's right-of-way, City staff may require the completion of an internal complete streets review checklist as part of the site plan application review.

The Planning Board will utilize the checklist completed by the City to assist in the review of site plan applications. This will include answering specific questions within the required State Environmental Quality Review Act (SEQRA) Environmental Assessment Form. The checklist questions capture existing traffic and transportation information in the project area and the expected impact of the project on the right-of-way.

Most of the complete street elements and considerations described in this Manual have been incorporated into the City's zoning code and permitting processes. Therefore, these elements and considerations should be automatically integrated into the review of private development projects. Additionally, regulations within the code ensure that private development projects meet standards of design and construction that align with complete street guidelines provided in this Manual. The City's zoning code is intended to encourage complete streets that contribute to walkable, bikeable, and accessible neighborhoods. The following bulleted items are short descriptions of relevant complete streets-related standards found within Section 375 of the City's code.

- **Stormwater Runoff and Green Infrastructure** – The maximum amount of impervious surface area on a lot is regulated for each zoning district. Maximum amounts are included within a table found in Section 375.

- **Low Impact Development** – This form of development is encouraged within the zoning code through reduced building setbacks and increased maximum building heights. A number of incentives accompany the low impact development description found within the zoning code.

- **Lighting** – In order to ensure that sufficient and appropriate lighting is provided for new development, requirements and standards have been described within the code. These standards promote pedestrian-scaled lighting for sidewalks, walkways, and bicycle paths.

- **Landscaping** – Standards relating to landscaping, screening, and buffering encourage the promotion of healthy environments by providing shade, air purification, oxygen regeneration, groundwater recharge, stormwater runoff management, erosion control, and noise, glare and heat abatement. These standards generally enhance the quality and appearance of the City.

- **Parking and Loading** – This section contains the requirements for off-street parking and bicycle parking for both new development and building expansion projects. Information about parking alternatives and adjustments can also be found within this section. Information about reduced parking requirements pertaining to new development, shared parking with another property, and whether there is sufficient proximity to transit is also discussed. Bicycle parking standards and business loading access through off-street loading are also stipulated within this section.

- **Building Entrances** – Within the Form-Based Code special districts, the primary entrance of every building must face a street or a public space.

- **Access, Circulation, and Connectivity** – This piece of the code contains development standards that aim to reduce the number and length of automobile trips and greenhouse gas emissions. Additionally, this section encourages walking and bicycling by integrating sidewalks and bicycle routes in new development and redevelopment. The goal is to provide shorter and more direct routes between multiple destinations. Maximum driveway widths for each zoning district are discussed within this section.

Privately Sponsored Complete Streets Review Process

The complete streets project development and review process has been established to ensure complete street elements are incorporated into projects within the City, as appropriate. If the project is anticipated to impact the City right-of-way, including sidewalks, streets, and/or buffer zones, the following process is recommended.

Step 1: Coordination with City (Applicant)

Step 1 includes identifying the appropriate land use/street typology(ies) and the applicable adopted plans. Upon meeting with the City, the applicant will discuss existing conditions and the site plan application noting the possible incorporation of complete street elements.

Step 2: Application/Submission (Applicant)

The Applicant will submit the completed site plan application and continue coordination with the City to refine the project scope and/or design. During this step, the City may request additional documentation from the Applicant. It is the responsibility of the Applicant to provide the City with this additional information.

Step 3: Complete Checklist (City)

Step 3 includes having City staff complete the internal checklist review of the project application, then provide it to the Planning Board and Applicant.

Step 4: Final Project Design/Approval

Step 4 includes considering additional opportunities to incorporate complete street elements and finalizing the project design based on Step 3 checklist evaluation. The Applicant is to confirm that the project meets City requirements as well as federal, State, and other local requirements. Upon confirmation, the internal review checklist will be finalized and filed.

Measuring Success

The success of complete street implementation should be measured and monitored in order to understand the progress and future direction of complete streets within the City. The City's Complete Streets legislation requires biennial reports showing how the City has complied with the legislation and improvements made to City roadways. Items that may be specifically tracked include the length of sidewalks, length of bicycle lanes and facilities, mode share information, transit and bicycle ridership, adherence to posted traffic speed, reduced stormwater runoff, increased business activity, and increased safety and comfort among community members. Additional tracking may take place in the form of economic development, including increased private investment, new housing and businesses, and tax revenue generation.

Much of the quantitative information can be tracked and mapped through the City's geographic information system (GIS) by incorporating information provided in the project checklists.

Additional methods to obtain qualitative information may include hosting an annual public meeting to update the public on complete street implementation progress or creating an annual survey to be placed on the City's website in order to gather feedback on completed projects. This may also help to prioritize streets to target for future improvements.

Complete Streets Process Flow Chart | City Sponsored Projects

The complete streets project development and review process has been established to ensure that complete streets elements are incorporated into projects within the City of Albany, as appropriate. City sponsored projects can be categorized into small-scale and large-scale. Small-scale projects are defined as less than one (1) City block, while large-scale projects are defined as greater than or equal to (1) City block. More detail for small- and large-scale projects may be found on earlier pages within this chapter.

The steps outlined below are intended to allow for a smooth transition from project planning and design to construction for small-scale and large-scale projects. As part of the project planning and design process, the City will complete an internal complete streets review checklist. Upon completion, the review checklist will be provided to other City departments and local agencies for review and input, prior to and during design. Please note that not all steps may required for every project. In some instances, it may be necessary for steps to be revisited based on design changes.

Step 1
Project Initiation

- Establish project sponsor
- Identify project
- Identify whether project is small-scale or large-scale
- Determine project location(s)

Step 2
Project Planning

- Set expectations and goals
- Coordinate with other City departments and local partners
- Establish project limits

Step 3
Checklist Documentation (City)

- Identify land use/street typology(ies)
- Identify applicable adopted plans
- Identify existing conditions
- Identify proposed complete street elements

Step 4
Preliminary Design

- Incorporate elements identified during Step 3
- Follow applicable federal, State, local and funding agency requirements

Step 5
Coordination

- Coordinate with other City departments and local partners about checklist documentation and preliminary design

Step 6
Re-evaluation

- Re-evaluate project design based on checklist findings and feedback
- Consider additional opportunities to incorporate complete street elements
- Verify that applicable federal, State, local and funding agency requirements have been addressed

Step 7
Final Project Design

- Finalize project design based on Step 6 re-evaluation
- Confirm that applicable federal, State, local and funding agency requirements have been met
- Finalize and file checklist

Complete Streets Process Flow Chart | Privately Sponsored Projects

The complete streets project development and review process has been established to ensure complete street elements are incorporated into projects within the City of Albany, as appropriate. Privately sponsored projects may be categorized into small-scale or large-scale projects. Small-scale projects are defined as less than one (1) City block, while large-scale projects are defined as greater than or equal to one (1) City block. For privately sponsored projects that impact the City's right-of-way, City staff may require the completion of an internal complete streets review checklist as part of its site plan application review. The Planning Board will utilize the checklist completed by the City to assist in the review of site plan applications. Please note that not all steps may be required for every project, and in some instances, it may be necessary for steps to be revisited based on design changes.

If the project is anticipated to impact a City right-of-way including sidewalks, streets and/or buffer zones, please follow the process outlined below. It is encouraged that all developers and applicants consider complete street elements in each project and coordinate with the Department of Planning and Development prior to submittal of a site plan review application.

Step 1
Coordinate with City (Applicant)

- Identify land use/street typology(ies)
- Identify applicable adopted plans
- Discuss existing conditions and provide site plan application
- Discuss possible complete street elements

Step 2
Application/Submission (Applicant)

- Applicant to submit site plan application to City
- Continue coordination with City on project refinement
- Provide additional documentation as requested

Step 3
Complete Checklist (City)

- City staff to review application, complete checklist, and provide to Planning Board and Applicant

Step 4
Final Project Design/Approval

- Consider additional opportunities to incorporate complete street elements
- Finalize project design based on Step 3 re-evaluation
- Confirm that project meets City requirements
- Follow applicable federal, State, and local requirements

Note: All necessary local approvals and permits will be required prior to project construction.

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CHAPTER 4

Trending City-wide Design Considerations

4. Trending City-wide Design Considerations

Overview

Trending city-wide design considerations have the ability to accommodate and facilitate convenient access and mobility by all roadway users. These considerations represent general concepts, policies, or programs that may be applicable city-wide. General concepts, policies, and programs are organized into the following categories: bicycling, transit, fundamental, and future. The information provided within this chapter should be reviewed for applicability during any planning, design, construction, reconstruction and/or resurfacing projects. It is important that these considerations be integrated with design guidelines and elements presented in Chapters 5 and 6. The guiding principles have been applied to each element description to show which principle is being achieved.

Bicycling

Bike Share Programs

Bike share programs provide bicycle access to residents and visitors who may not own a bicycle or have access to a bicycle at a particular location where they would like to use one.

As noted in the City of Albany Bicycle Master Plan 2009, there are generally two programs that may be implemented for a bike share program. The first includes a program operated by a public agency which allows access to bicycles located throughout a city through hubs or docking stations upon a small payment of a fee. The second program includes community or membership-based bike lending programs administered by community organizations. A bike share program has the potential to promote accessible and connected streets.

It is recommended that the City coordinate with CDTA, CDTC and other local organizations to fully understand the requirements and needs of implementing a bike share program. Other factors to consider about bike share program implementation include whether to develop on a local or regional scale, the location of potential docking stations, the management of thoroughfares, and the potential use of parking spaces for the program.

On-Street Bicycle Parking

On-street bicycle parking is often necessary in areas where there is a higher demand for bicycle parking. Implementation of on-street bicycle parking includes considering location preference, sufficient bicycle demand, and maintenance agreements. A number of shared benefits may be achieved upon addressing these components. On-street bicycle parking keeps sidewalks clear for pedestrians and sidewalk activity. The on-street bicycle parking may also have an impact on vehicle speeds, thus serving as a traffic-calming measure. Bicyclists benefit from improved accessibility, parking availability, and visibility.

Transit

Enhanced Transit

Regular fixed route transit is provided by CDTA. CDTA also provides regional transportation services along what are known as designated transit priority corridors for Bus Rapid Transit (BRT) corridors. These corridors are considered enhanced transit.

Three (3) BRT routes, also known as BusPlus routes are currently located within the City as follows:

- New York Route 5 Corridor
- Washington/Western Corridor
- River Corridor

BRT routes provide limited stop service along the busiest travel corridors in the City and the surrounding Capital Region. BRT is an alternative transit service within communities without the level of density and customer volume needed for light rail. BRT routes provide clear connections to economic development in areas where it has been introduced. Systems put in place to aid transit such as BRT include signal prioritization and queue jumps.

Enhanced transit supports transit safety, convenience, and comfort. This leads to increased safety for community members while creating more connected corridors and neighborhoods. Streets that are well designed for transit can encourage ridership thereby decreasing individual travel expenses, congestion, and air pollution. Complete streets provide accessible bus stops while allowing buses to move through traffic with greater ease, further encouraging ridership while reducing dependence on private transportation services.

Consideration should be given to placement of facilities or amenities that support the use of multiple modes of transportation, such as placing bicycle racks and benches at or near bus shelters. By accommodating additional modes of transportation within the City, stronger connections are formed between major nodes and the surrounding neighborhoods.

While transit element placement may rely on land use/street typology, some placement cases may rely on whether or not the project location is within a BRT corridor. It is recommended that coordination with CDTA continue to occur during future planning and design of routes and facilities.

Shared Transit-Bicycle Lanes

Shared transit-bicycle lanes are designated for use by public transit buses, bicycles, and generally for right turning vehicles. The primary purpose of these lanes is to provide a time advantage to public transit by taking the buses out of the general traffic flow and into a designated lane. Where a bicycle lane and transit lane are appropriate elements, but a constrained right-of-way prevents a separate bicycle lane, the intent is to allow bicycles to use the designated bus lane. Implementing this type of lane would establish a more simplified route for transit, while providing a greater service to bicyclists. A greater separation between general traffic, transit, and bicyclists creates a greater sense of safety, comfort, and accessibility. More information about shared transit-bicycle lane design guidelines and considerations can be found in Chapter 5 under the travelway elements section.

Fundamental

Catch Basins

Catch basins are curbside drains used to collect and transport stormwater away from adjacent roadways and properties to local waterways. Catch basins serve as inlets to a storm drain system that typically include grates used for capturing sediment, debris, and associated pollutants. Several factors contribute to the performance and efficiency of catch basins. These factors include catch basin placement, catch basin design, maintenance frequency, flow rate, pollutant loading and particle size. Catch basins should be designed in a way that safely accommodates pedestrians and bicyclists, while optimally assisting in stormwater management.

Curb Returns

Curb returns are the curved connection of curbs at the corner of intersections. A curb return guides vehicles turning at corners, while separating vehicles from pedestrians at intersections. Larger curb radii facilitate the turning of large trucks and buses, increase vehicular turning speeds, and increase the length of crosswalks. Depending on the location of the curb return, there may be a need for a greater or smaller return radius.

Curb returns designed and placed within Downtown or Mixed Use land use/street typologies are recommended to be designed with the smallest practical curb return radii that will accommodate the largest frequently turning vehicle. An area with a high frequency of straight moving buses and/or trucks does not necessarily indicate a need for a large turning radius. Design elements such as on-street parking and bicycle lanes contribute to the widening of the effective turning radius. Therefore, these elements as well as other alternatives are encouraged before considering implementation of a larger curb return radius.

Design Vehicles

Design vehicles are vehicles that must be regularly accommodated without encroachment into opposing travel lanes. Design vehicles should be chosen carefully to avoid unnecessarily large pedestrian crossing distances or high speeds of turning traffic. Examples of design vehicles include a standard transit vehicle on a regularly scheduled bus route, or a semi-tractor trailer on a primary freight route. This allows corridors to be designed appropriately for vehicles frequenting a particular area of the City, not for vehicles occasionally traveling within these areas.

Emergency Vehicles

Emergency responders utilize the shortest and fastest routes to a destination. Responders may be traveling in fire trucks, ambulances, and/or police vehicles. Many of the streets in Albany are organized in a grid-like fashion, creating an efficient road system for emergency vehicles due to the redundancy of the road network. Emergency vehicles, such as fire trucks, may range in lengths, widths, and heights. Fire trucks found within the Albany Fire Department fleet have length ranges of 32-feet to 57-feet, width ranges of 9-feet to 10-feet, and height ranges of 10-feet to 12-feet. Implementation of complete streets and any roadway changes should be coordinated with the Albany Fire Department and medical institutions. This coordination is recommended in order to alleviate potential access issues for emergency responders.

Green Alleys

An alley is a narrow passageway between or behind buildings. Alleys may be found in any land use/street typology discussed within this manual. Revitalizing urban alleys into green alleys allows for several potential benefits to the City. Green alleys typically use sustainable materials, pervious pavements, and effective drainage to help create a welcoming public space. Benefits for implementing green alleys may include stormwater management, heat reduction, material recycling, and energy conservation. Additional benefits may include economic benefits associated with pedestrian and bike paths, and improved safe and accessible gateways between neighborhoods. These elements combined allow for better accessibility, safety, connectivity and placemaking.

Characteristics such as vehicle speed and visibility at intersection crossings should be considered for green alleys. In areas of the City where a narrow right-of-way is desired, green alleyways may be appropriate. The design of these alleyways may address the need to provide access to adjacent businesses and residences. Although there are few alleys present within the City, it is encouraged that green alleyway design be considered, where appropriate.

Institutions

The City of Albany is home to many institutions including a number of NYS offices, State University of New York (SUNY) at Albany, Russell Sage, The College of Saint Rose, Albany Medical Center, St. Peter's Hospital, neighborhood schools and more. Each institution is accessible through use of multiple modes of transportation. Complete streets support these institutions by creating a more accessible, connected, and safer network of streets. It is recommended that coordination take place between the City and the various institutions where roadwork is conducted.

Lane Widths

Lane widths are an important design component for any corridor within the City. Generally, lane widths of 10-feet are preferred. On high-frequency transit routes, lane widths of 11-feet are preferred. On Designated Access Highways, lane widths are required to be a minimum of 10-feet. Lane widths are recommended to account for pedestrian and bicycle activity as well. In areas where pedestrian activity is high, 10-foot lane widths are preferred in order to allow for a more comfortable pedestrian crossing experience. Similarly, wide lane widths are not a preferred bicycle accommodation.

Level of Service

Level of Service (LOS) is a qualitative assessment of operating conditions for roadways. More specifically, it refers to a standard measurement used by transportation officials which reflects the relative ease of traffic flow on a scale of A to F. An assessment of LOS-A indicates free-flowing traffic, while LOS-F indicates congested conditions. While LOS is important to understand for any roadway project, it is important to recognize that design guidelines provided within this manual integrate many qualitative and quantitative factors and that this factor may not necessarily be a primary design consideration.

Loading Zones and Delivery Vehicles

Loading zones allow traffic flow to continue as normal, without creating any roadway obstructions, thereby improving accessibility. These zones impact the functionality of a corridor and the economic

vitality of a neighborhood. In areas where freight and other deliveries are frequently taking place, it is recommended that loading zones only be available during specific times in order to maximize limited space found on some streets within the City. This may be accomplished through use of clear loading zone signage and/or pavement markings. Coordination with CDTA is recommended in order to avoid potential transit stop conflicts.

National Highway System

The National Highway System (NHS) includes the Interstate Highway System as well as other roads important to the nation's economy, defense, and mobility. The NHS was developed by the United States Department of Transportation in cooperation with the states, local officials, and metropolitan planning organizations (MPOs), such as CDTC. The presence of the NHS has the ability to influence significant economic benefits within the City through access to interstates and movement of goods and products. Knowing which roadways within the City boundaries are a part of the NHS may contribute to project reorganization in order to better accommodate all roadway users as well as economic endeavors. It is recommended that FHWA NHS design standards be reviewed for roadways designated as or near NHS roads. NHS mapping can be found in Appendix C.

Non-Standard Street Widths

Non-standard street widths are found throughout this historic City and are likely to be found frequently. Non-standard widths may create difficulties when applying complete street elements and therefore require special attention during complete street design and implementation. Primary project considerations include which land use/street typology the street is located within and what the modal hierarchy is. Streets with non-standard widths are recommended to be handled on a case by case basis. To aid in project development, designers are encouraged to reference the modal hierarchy table found in Chapter 5.

Road Diets

Generally, a road diet includes removing travel lanes from a roadway. The space gained from removing travel lanes is utilized for other uses and travel modes. Road diets may include converting an existing four-lane undivided roadway segment to a three-lane segment consisting of two through lanes and a center two-way left turn lane. Chapter 5 includes design guidelines for preferred travel lane widths. This type of roadway configuration may reduce vehicle speed differential, improve mobility and access by all road users, and be integrated into surrounding uses resulting in improved quality of life. According the FHWA's Road Diet Informational Guide, a road diet is recommended to be considered on roadways with 20,000 Average Daily Traffic (ADT) or lower.

Smart Technology

Smart technology may include the incorporation of interactive traffic controls, transit signage, kiosks, parking, wayfinding, or other information devices. These smart technologies allow users to obtain real-time information on transportation and community related information, or allow traffic control devices and transportation to adjust to demand and changes in user behavior. CDTA has implemented real-time signage at BusPlus stations on Central Avenue. It is recommended, where feasible, that smart technology

be considered for implementation as a means to increase accessibility, connectivity, and safety within the City.

Stormwater and Green Infrastructure

Stormwater management in urbanized areas is challenging, but may be addressed through the use of green infrastructure where impervious surfaces prevent precipitation from naturally infiltrating into the ground. This creates problems such as flooding, combined sewer overflows, infrastructure damage, and/or contaminated streams. Green infrastructure is a method used to allow water to slowly permeate into the ground and may be incorporated into streetscapes via rain gardens, vegetated swales, porous pavements, and other natural processes to create healthier urban environments.

The City of Albany has combined sewer systems that carry stormwater, domestic sewage and industrial wastewater. These systems can be overwhelmed by rainwater and melting snow, thereby sending untreated waste into nearby water bodies. Utilizing stormwater management practices has the potential to reduce stormwater runoff in local water bodies, while helping keep streets from flooding. It is recommended that coordination occur with the Albany Pool Combine Sewer Overflow (CSO) Communities Corporation upon project initiation. The Corporation developed a Combined Sewer Overflows (CSO) Long Term Control Plan which identifies programs and projects that are anticipated to aid in the clean-up of the Hudson River, which can be impacted by combined sewer system overflows during flood events. Coordination should also take place with the City of Albany Water and Water Supply Department and the New York State Department of Environmental Conservation (NYSDEC).

Streets Meeting Public Places

There are two primary ways in which streets meet public places, active plazas or squares. Streets may travel through public places, such as through Washington Park and Lincoln Park, or may end at or abut a public place such as a plaza, square, a bikeway trailhead, or a waterfront, such as the Corning Riverfront Park. Both of these roadway types serve a significant purpose, allowing residents and visitors alike to navigate city streets while being exposed to cultural community assets. Community assets may include parks, trailheads, multi-use trails, historical landmarks, museums, or public squares.

There are several ways in which the City may approach promoting and encouraging accessibility, safety, and placemaking along streets traveling through or adjoining public places. Streets contiguous with public places that include sidewalks or separated walking and bicycle paths may eliminate roadway obstructions for motorists. This may increase accessibility and safety for all users. For example, all roadway users on park streets are typically in close proximity to each other. It is recommended that raised crosswalks, sidewalks, and other traffic-calming measures be considered for these streets to create a more accessible, safer and connected street network to public places in the City and other areas within and outside of the City.

Target Speed

Target speed is the speed at which a project designer intends drivers to travel. On most City streets, there is a mix of motorized and unprotected street users, such as pedestrians and bicyclists. Therefore, target speeds and project design need to take an approach that aims to minimize injuries. Target speeds are recommended to be based on land use/street typology.

Traffic Calming

Traffic calming refers to the physical design and other measures put in place on streets to slow or reduce motor-vehicle traffic and improve safety for pedestrians and bicyclists. There are a variety of traffic calming measures that may be utilized on streets currently designed to accommodate high operating speeds. Traffic calming measures may include setting signal timing for moderate speeds, creating narrower travel lanes, using physical measures such as curb extensions and center islands to narrow a street, providing on-street parking to create a narrowing affect, utilizing smaller curb radii, eliminating right turn lanes, utilizing textured paving materials, and installing speed humps or bumps.

Truck Routes

Truck routes are found throughout the City of Albany and are necessary as they support many commercial and industrial businesses. These routes are managed by the NYSDOT. Notable changes to road networks are recommended to be coordinated with NYSDOT. According to the New York State Highway Design Manual Section 2-12, roadways listed as qualifying access highways and not owned by the City require minimum travel and turn lane widths of 12 feet. Additionally, if a roadway is within one (1) mile of a qualifying highway, the minimum travel and turn lane width is 10 feet. According to the Official Description of Designated Highways in New York State, **Access Highways** are highways designated for use by Surface Transportation Assistance Act (STAA) vehicles and 53-foot trailers. These vehicles may not travel off the access highway for any distance. **Qualifying Highways** are highways designated for STAA vehicles and 53-foot trailers to use that highway and any other highway within one (1) linear mile of the Qualifying Highway. Any design requirements for these designations should be integrated. NYSDOT Access and Qualifying Highways mapping can be found in Appendix C.

Roadways with Multiple Jurisdictions

Roadways with multiple jurisdictions in the City include US Route 9, US Route 9W, US Route 20, NYS Route 32, NYS Route 85, NYS Route 443, Interstate 87, Interstate 90, and Interstate 787. See Appendix C for a City roadway map. The City currently coordinates with NYSDOT and Albany County to handle any required maintenance, proposed projects or procedures. In the event that a State road enters the City, NYSDOT is coordinated with and is required to approve the project. It is recommended that coordination continue to occur between the City of Albany and other involved agencies in order for the successful implementation of complete streets in all projects.

Two-Way Left Turn Lanes

Two-way left turn lanes are found in various locations throughout the City. These lanes are located at the center of the roadway and are used by vehicles making left turns in both directions. Lane widths range in size from 10-feet to 16-feet and are dependent on roadway classification. It is recommended that roadway

classifications and truck traffic percentages be taken into consideration for any new two-way left turn lane implementation.

Vertical Clearance

Vertical clearance is important for any location where there are bridges or overpasses in the City. The preferred vertical clearance over pedestrian facilities is 7-feet, which includes signage, building awnings, or any other elements that may be installed over the pedestrian facility. Guy wires and utility tie-downs should not be located in or across sidewalks at heights below 8-feet. More information about vertical clearance over pedestrian facilities may be found in the AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities, Section 3.2.12 and Chapter 3 Section 307.4 Protruding Objects of the Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG).

Vertical clearance over bicycle facilities is recommended to be 10-feet, with a minimum clearance of 8-feet. Information about vertical clearance for bicycle facilities is from the AASHTO Guide for the Development of Bicycle Facilities, Section 5.2.1. Per the NYSDOT Bridge Manual, Section 2.4.1 indicates that the preferred vertical clearance is 16.5-feet with a minimum of 16-feet over roadways a part of the National Highway System (NHS). For all roadways not a part of or exempt from the NHS requirements, the preferred vertical clearance is 14.5-feet with a minimum of 14 feet. The minimum vertical clearance for all pedestrian bridges and overhead sign structures is one (1) foot over the minimum vertical clearance determined using Table 2-2 in the NYSDOT Bridge Manual.

Future

Autonomous Vehicles

Autonomous vehicles or driverless vehicles continue to be researched and developed. These vehicles have the potential to improve safety, reduce congestion, lower emissions, and reduce costs associated with wasted time and fuel. Anticipated benefits of this technology include a reduction in parking needs and an increase in infill development. As technology advances for autonomous vehicles, it is recommended that the City monitor this trend for potential future design guidelines and milestones as this technology is developed. Additionally, consideration for audible signals is encouraged regarding autonomous vehicles and their potential impact on the blind community.

Electric Bicycles

Electric bicycles refer to any bicycle or tricycle with a low-powered electric motor weighing less than 100 pounds, with a top motor-powered speed not in excess of 20 mph. While not currently legal in New York State, discussions about including electric bicycles as a means of transportation within cities have been taking place across the country. It will be important to consider bike speeds, charging ability, and user friendliness for all electric bicycles should they be permitted in the future. All factors will contribute largely to accessibility, connectivity, safety, and placemaking. Additionally, consideration for audible signals is encouraged regarding electric bicycles and their potential impact on the blind community.

Electric Vehicle Charging Stations

Electric vehicles use electricity for fuel rather than gasoline. There are a variety of electric vehicles, including Hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and all-electric vehicles (EVs). As the City continues to encourage and promote the use of alternative-fueled vehicles, electric vehicles could play a significant role in the future of complete streets by making city streets more sustainable and environmentally friendly. The Albany 2030 Comprehensive Plan states that facilities for plug-in vehicles should be considered for on-street and other parking facilities. The United States Department of Energy provides information about all electric vehicle types and their associated deployment, maintenance, and safety.

Maintenance

Maintenance is essential as infrastructure ages and is used more frequently. Roadway and complete street infrastructure conditions have the potential to vary greatly, but are critical to providing a safer, more accessible and connected roadway network within the City. Utilizing a maintenance schedule has the ability to improve the life and sustainability of roadways and complete street elements throughout the City. During the design of a project, it is critical to incorporate an operations and maintenance plan in order to address all aspects of maintenance including those taking place on a daily, weekly or seasonal schedule.

The City experiences a number of snowfalls each year that impact all modes of transportation. Accessibility, connectivity, and safety are all impacted if snow removal does not take place in a timely manner. Street design is encouraged to facilitate snow clearance and storage for all modes, with pedestrians, bicyclists, and transit users given the same attention as motorists. In an effort to increase safety within the City, hydrants, catch basins, crossing islands, medians, and building entrances should also be accessible and kept free of snow, or other obstructions.

CHAPTER 5

Streetscapes, Sidewalks, and Streets

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5. Streetscapes, Sidewalks, and Streets

Overview

This chapter serves as a toolbox for complete streets, providing design guidelines for streetscapes, sidewalks, and streets. Guidelines found within this chapter allow designers to choose the complete street elements that best fit a given land use/street typology within the confines of the available pavement width and right-of-way. Information shared in Chapter 2 is based upon existing conditions, while guidelines shared within this chapter are based upon complete street aspirations.

Streetscapes and Sidewalks

This section includes design guidelines for streetscape and sidewalk elements. Streetscapes refer to all elements contributing to the appearance and function of a given street or corridor. Descriptions for streetscape and sidewalk elements have been included. Design guidelines for streetscapes and sidewalks are organized into four zones representing the space from a private property line to a curb line or edge of a roadway. The four zones include a Building Use Zone, Pedestrian Zone, Buffer Zone, and Curb Zone. Each zone has preferred measurements or widths which may be applied for each land use/street typology.

Design Guidelines

Upon determining which land use/street typology a project is located within, as described in Chapter 2, design guidelines for streetscape and sidewalk zones can then be determined. Table 5.1 identifies preferred zone range measurements for each land use/street typology. While considering these design guidelines, it is imperative to recognize that each complete street project is unique. Right-of-way widths, supporting land use, modal hierarchy, and functional classification can greatly impact the implementation of complete street elements. When and where feasible, the guidelines presented should be implemented.

The **Building Use Zone** includes the area between the building front or private property line and the pedestrian zone. This zone is intended to buffer pedestrians from doorways and appurtenances. Private signage, merchandise displays, private street furniture, or outdoor cafes are often located within the building use zone. The **Pedestrian Zone** is the area primarily utilized for pedestrian travel. This zone should be free of obstacles, protruding objects, and vertical obstructions for pedestrians. The pedestrian zone width ranges will vary by land use/street typology. The **Buffer Zone** is typically utilized for utilities, landscaping, public signage, snow storage, transit stops, public street furniture and other public streetscape amenities keeping the pedestrian zone free of obstacles. The number of amenities present typically depends on the street typology/land use and pedestrian volume. The **Curb Zone** is the area located immediately adjacent to the roadway and serves as a safety feature, discouraging motor vehicles from driving onto the sidewalk. It also serves as an integral part of the drainage system and is an essential cue for the visually impaired, allowing them to identify where the sidewalk corridor and the roadway meet.

Table 5.1: Preferred Design Guidelines for Streetscapes and Sidewalks

PLEASE NOTE THAT THIS GRAPHIC IS FOR ILLUSTRATIVE PURPOSES ONLY.

Street Typology	Building Use Zone (ft) [a]	Pedestrian Zone (ft) [b]	Buffer Zone (ft) [c]	Total Width (ft) [d]
Downtown	4 – 8	8 – 12	4 – 6	16 – 26
Neighborhood Mixed Use	2 – 6	6 – 10	4 – 6	12 – 22
Neighborhood Residential	2 – 6	5 – 6	2 – 6	9 – 18
Community Mixed Use	2 – 6	6 – 10	4 – 6	12 – 22
Community Commercial	2 – 6	6 – 10	4 – 6	12 – 22
Industrial	0 – 10	5 – 6	4 – 6	9 – 12

[a] *The industry standard width of 2 ft has been adopted as the preferred minimum between the effective sidewalk width and the face of buildings or other obstacles.*

[b] *The industry standard width of 5 ft has been adopted by NYSDOT as a minimum to allow use by users of all abilities. The minimum clear width per ADAAG is 4 ft with a minimum 5 ft x 5 ft area to allow for disabled users to pass at a reasonable distance (200 ft per NYSDOT standards). In commercial areas with high pedestrian volume, widths up to 12 ft should be considered with typical widths ranging from 8 ft to 12 ft. The exact width will depend on pedestrian volumes. These standards should also be applicable where there are no buffer zones.*

[c] *The buffer zone width is calculated for required snow storage capacity and is based on the pavement width from the centerline of the roadway to the edge of the curb (L) (Snow Storage = 0.5*L). This calculation is in Chapter 5, Section 3.2.11.1 of the NYSDOT Highway Design Manual. For areas where bus shelters are provided, a width of at least 7 ft is required for a standard CDTA shelter, while BRT shelters require at least 12 ft for a 10 ft shelter.*

[d] *Curb widths must also be considered in total width calculations. Per the City of Albany Code, Section 323-18, a stone curb is to be 5 inches. Per NYSDOT, stone curbs are to be 5 inches.*

Streetscape and Sidewalk Elements

Streetscape and sidewalk elements work together to create a more accessible, connected and safer environment within the City. This section describes typical streetscape and sidewalk elements.

Benches

Benches create a place for people to stop and rest along a corridor. Strategically placing benches at transit stops and midblock locations helps create a sense of place within a particular neighborhood. Several distinct populations benefit from the placement of benches along corridors, including the elderly, the disabled, and transit riders. Benches have the ability to add to a particular streetscape character and encourage informal gathering areas enhancing social interaction.

Bicycle Racks

Bicycle racks are parking fixtures to which bicycles can be securely attached, and which can be placed at key locations along a block or corridor. Bicycle racks come in a variety of styles and can be designed to incorporate the character of the neighborhood in which they reside. This element can enhance a sense of place, while directly enhancing accessibility for bicyclists. Bicycle racks are typically found at transit stops and midblock locations near commercial facilities, providing an incentive to use an alternate mode of transportation. When bicycle racks are placed at transit stop locations, the catchment area of transit services typically increases.

Bus Shelters

Bus shelters are designed for the protection and convenience of bus passengers. Bus shelters provide safe, accessible areas for entering and exiting buses, while providing information such as bus connections, transfers, and routes. These structures also provide convenient shelter from inclement weather.

Driveways

Driveways are roads leading from a public roadway to a private facility or parking lot. The number of driveways along a corridor may significantly impact the ability of a complete streets project to enhance the streetscape and sidewalk for pedestrians. Multiple driveways, or curb cuts, have the potential to create multiple conflict points between motorists, pedestrians, and bicyclists. However, driveways provide access to facilities for other roadway users. Therefore, driveway consideration and access management is recommended to be considered while designing a complete street project. Access management refers to the design, implementation, and management of entry and exit points between roadways and adjacent properties. In order to support access management, the project designer is encouraged to review the City's most current zoning requirements.

Green Infrastructure

Green infrastructure is a technique for managing stormwater and creating healthier urban environments. It is used to allow water to slowly permeate into the ground and may use rain gardens, bio-retention areas, vegetated swales, porous pavements, and other natural processes to create healthier urban environments. Green infrastructure benefits include cooling urbanized areas, improving

air quality, and reducing demand on combined sewer systems by incorporating such measures.

Pedestrian-scaled Lighting

Street lights create a safer environment for pedestrians, bicyclists, and motor vehicles along streets and corridors. Pedestrian-scaled lighting refers specifically to lighting at lower heights which illuminate sidewalks, crosswalks, curb ramps, and signs for pedestrians. Differences between pedestrian-scaled lighting and other lighting found along corridors are height, spacing, and style of lighting. Standard lighting is typically greater in height with greater distances between each post. Pedestrian-scaled lighting improves accessibility and safety for pedestrians, and has the ability to take on a design that enhances the character of the neighborhood.

Pedestrian Crossing Signals

Pedestrian crossing signals are used to control pedestrian traffic, according to the Manual on Uniform Traffic Control Devices (MUTCD) Chapter 4E, and are typically included with work on any signalized intersection. These signals are timed and may require pedestrian activation, such as through use of a pushbutton. Pedestrian crossing signals enhance accessibility, connectivity and safety for pedestrians crossing streets of large and small widths. The visually impaired may benefit from accessible crossing indicators which let the pedestrian know when it is safe to cross the street through a walk indication tone or vibrating button. Any time a new pedestrian crossing signal is installed, the design and installation shall comply with PROWAG's Section XO2.5.

Sidewalks

Sidewalks serve as channels for pedestrian movement and access, while enhancing connectivity and promoting walking to and from public and private spaces. Sidewalks benefit the social and economic components of communities, while promoting an accessible, connected, and safer means of transportation.

Smart Devices

Smart devices may include interactive traffic controls, kiosks, parking, wayfinding, or other informational devices. These devices allow users to obtain real-time information about transportation and community-related activities. In addition, these devices can allow traffic control devices and transportation to adjust to demand and changes in user behavior and traffic conditions.

Street Trees

Street trees are used to frame corridors and are aesthetically pleasing to pedestrians thereby enhancing placemaking. Street trees also reduce stormwater runoff and flooding potential by absorbing approximately 30% of most precipitation through their leaf system before evaporating back into the atmosphere. Up to an additional 30% of precipitation is absorbed back into the ground and taken in and held onto by the root structure of the street trees. Street trees also help reduce the urban heat island effect, which contributes to increased temperatures, air pollution, demands on cooling systems, and health-related problems. Street trees may also serve as traffic-calming measures by creating a narrowing effect along a corridor.

Traffic-Calming Measures

Traffic-calming measures may involve changes to street alignment or installation of barriers such as curb extensions that slow traffic on roadways in which they are implemented. Other traffic-calming measures include raised crosswalks, speed bumps and humps, curbed medians, and raised intersections (speed tables). Implementation of these measures can create a narrowing effect, thereby slowing traffic flow and establishing an accessible and safer pedestrian- and bicycle-friendly environment.

Trash Receptacles and Recycling

Trash receptacles and recycling bins help keep neighborhoods clean. Trash receptacle and recycling bin placement along heavily used corridors and near transit stops help discourage littering while encouraging recycling. Trash receptacles may be standard or come in the form of a solar-powered trash compactor which can be found in core Albany neighborhoods. The latter uses solar energy to compact trash, which increases capacity and reduces the possibility for trash overflow.

Wayfinding

Wayfinding informs pedestrians, bicyclists, motorists, and transit users while guiding them to a desired destination. Wayfinding benefits roadway users by creating an accessible and connected community through an informative, on-the-go means of communication. Wayfinding often takes on the character of a given neighborhood, while sharing details about shops, restaurants, and other features along city corridors.

Streetscape and Sidewalk Sample Cross Sections

The following streetscape and sidewalk sample cross sections illustrate zone widths falling within preferred design guideline zone width ranges shown in Table 5.1. A sample cross section has been provided for each of the land use/street typologies and each cross section is supported by zone descriptions specific to that particular land use/street typology.

Figure 5.1: Downtown Streetscape and Sidewalk Sample

Downtown Building Use Zone

Creating an active and vital street starts with creating an active building use zone. Downtown streets are therefore encouraged to contain enough space beyond the pedestrian zone to allow for active uses associated with buildings fronting a street. These active uses may include outdoor patios, retail stands, and displays.

Active Building Use Zone

Downtown Pedestrian Zone

Downtown streets typically handle larger volumes of pedestrian traffic, thus sidewalk widths are recommended to go above the minimum widths. This allows pedestrians of all ages and abilities to navigate Downtown streets with ease.

Downtown Buffer Zone

Buffer zones found along Downtown streets are typically comprised of pockets of landscaping or street tree planters. These features may be interwoven with seating, transit shelters, bicycle parking, pedestrian access between buildings and on-street parking, street lighting, and other amenities. The buffer zone may contain planters providing an alternate means for capturing and treating stormwater and snow melt.

Key Applications

In areas where space for building use zones is limited, patio seating may still be considered, but spillover into on-street parking spaces. In areas popular for bicyclists, bicycle parking may be provided through use of an on-street parking space. This idea of using on-street parking spaces as an extension of the building use zone or buffer zone is becoming more widely accepted within dense urban areas. Ultimately, these concepts can help make Downtown streets more active and vital.

On-Street Patio Seating

Figure 5.2 Neighborhood Mixed Use Streetscape and Sidewalk Sample

Neighborhood Mixed Use Building Use Zone

Similar to the Downtown land use/street typology, establishing an active street begins with creating an active building use zone. The building use zone allows the pedestrian zone to be free of obstructions, while supporting a variety of active uses such as outdoor patios, retail stands, and displays.

Mixed Use Active Building Use Zone

Neighborhood Mixed Use Pedestrian Zone

Neighborhood Mixed Use streets, similar to Downtown streets, are known to handle larger volumes of pedestrian traffic. However, Neighborhood Mixed Use streets often have constrained right-of-ways, potentially creating a design challenge. Careful consideration of existing right-of-way and complete street elements will be necessary.

Neighborhood Mixed Use Buffer Zone

The buffer zone of a Neighborhood Mixed Use street may contain strips of landscaping or planters interwoven with seating, transit shelters, bicycle parking, pedestrian access between buildings and on-street parking, street lighting, and other amenities. These zones often contain planters that provide alternative means for capturing and treating stormwater and snow melt.

Key Applications

Building use zones of a Neighborhood Mixed Use street, similar to Downtown streets, are increasingly being extended into on-street parking spaces. Similarly, in areas popular for bicyclists, bicycle parking may be provided through use of an on-street parking space. Ultimately, these concepts can help make Neighborhood Mixed Use streets more dynamic and essential.

On-Street Bicycle Parking

Figure 5.3 Neighborhood Residential Streetscape and Sidewalk Sample

Neighborhood Residential Building Use Zone

Neighborhood Residential building use zones tend to serve as extensions of the adjacent residences. The extensions may appear in the form of front lawns or porches, allowing for green infrastructure opportunities.

Neighborhood Residential Pedestrian Zone

Pedestrian zones found along Neighborhood Residential streets typically handle less pedestrian traffic than that of Downtown or Neighborhood Mixed Use streets. However, the pedestrian zone should remain clear of any obstacles in order to allow users of all ages and abilities to utilize these streets.

Welcoming Pedestrian Zone

Neighborhood Residential Buffer Zone

The buffer zone of a Neighborhood Residential street may contain a strip of landscaping or street tree planters broken up by driveways. Due to the nature of Neighborhood Residential streets having less pedestrian traffic, fewer buffer zone amenities are found in comparison to Downtown or Neighborhood Mixed Use streets.

Sample Buffer Zone Landscaping

Key Applications

Neighborhood Residential streets may have the potential to be transformed into a bicycle boulevard. Bicycle boulevards allow for traffic-calming measures, green infrastructure practices, and enhanced pedestrian and bicycle opportunities along a street.

Figure 5.4 Community Mixed Use Streetscape and Sidewalk Sample

Community Mixed Use Building Use Zone

Building use zones found along Community Mixed Use streets often face design challenges due to the variation in building setbacks and orientations. This zone may support multiple active uses.

Community Mixed Use Pedestrian Zone

Pedestrian zones found along Community Mixed Use corridors should be clearly defined. These zones, typically serving larger pedestrian volumes, provide connections between abutting Neighborhood Residential areas and smaller scale commercial services. It is important to recognize that these corridors also serve a larger volume of vehicular traffic, often resulting in a greater number of driveways leading to commercial parking lots. This has the potential to create conflicts between motorists, bicyclists, and pedestrians utilizing these corridors. Therefore, pedestrian zones should be clearly defined and free of obstructions.

Accessible and Connected Pedestrian Zone

Community Mixed Use Buffer Zone

Buffer zones found along Community Mixed Use corridors are recommended to include a variety of amenities for pedestrians and other roadway users. Amenities may include street tree planters, benches, transit shelters for transit users, bicycle parking, pedestrian access between buildings and on-street parking, and pedestrian-scaled lighting. Buffer zones within this land use/street typology may also serve a critical role in providing a place for snow storage. As noted within the pedestrian zone description, these corridors serve a larger volume of vehicular and pedestrian travel. Buffer zones typically aid in keeping pedestrian zones free of obstructions and clearly defined by placing amenities in strategic locations.

Key Applications

Community Mixed Use corridors are unique and often challenging to design. It is necessary to define clear user space in order to eliminate the greater chance for roadway conflicts. Ultimately, this may lead to greater community support of local, small-scale commercial activities, in turn making the surrounding neighborhoods more viable.

Figure 5.5 Community Commercial Streetscape and Sidewalk Sample

Community Commercial Building Use Zone

Community Commercial corridors differ significantly from other land use/street typology corridors. These corridors are characteristic of large setbacks that serve big box retail businesses. Due to the nature of these corridors, building use zone guideline application may vary greatly. However, despite this variation, the application of building use zone guidelines should occur where applicable and feasible, allowing for a variety of active uses.

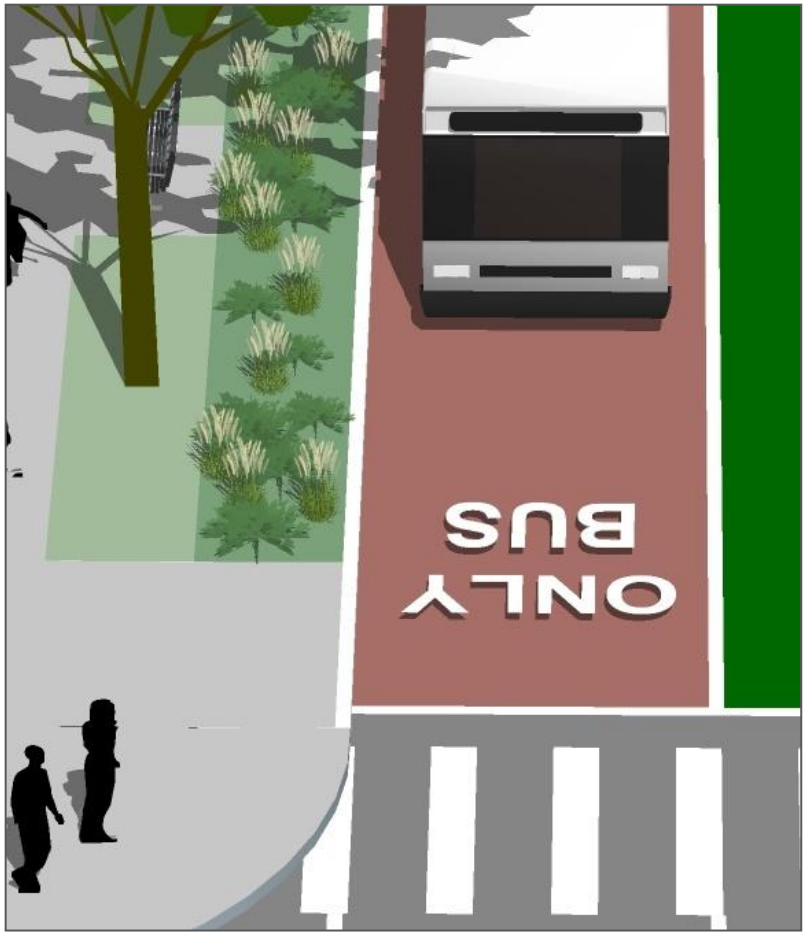
Community Commercial Pedestrian Zone

Pedestrian zones found along Community Commercial corridors may not be characteristic of high pedestrian traffic. However, as implementation of complete street elements occurs throughout the City, connectivity will remain an important guiding principle. This includes allowing appropriate pedestrian access especially within areas with a limited right-of-way.

Bicycle Racks

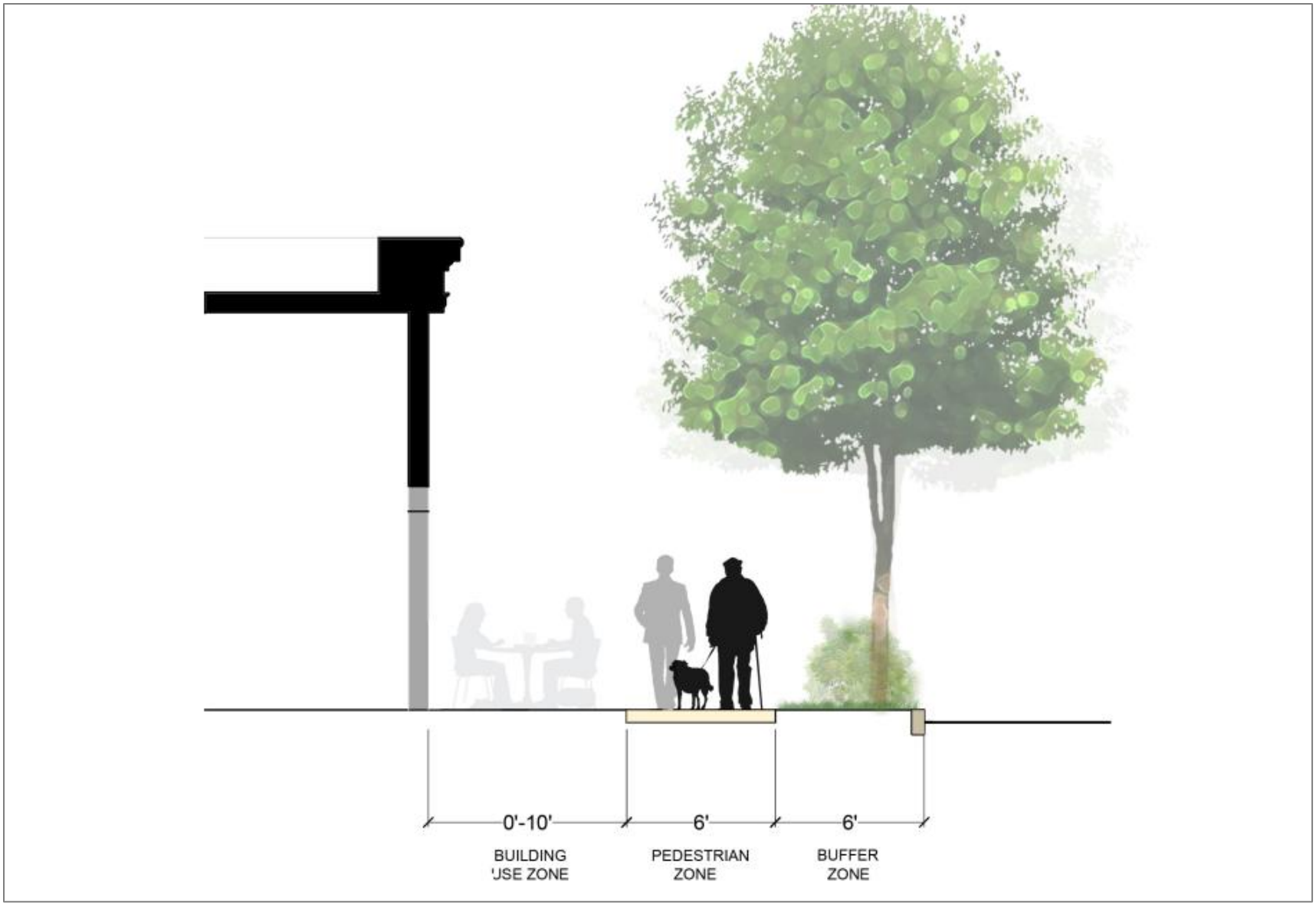
Community Commercial Buffer Zone

Buffer zones located along a Community Commercial corridor are essential. Adjacent roadways found along these corridors typically handle larger volumes of traffic moving at higher speeds in comparison to Neighborhood Mixed Use streets. Depending on the corridor, a variety of amenities such as benches, bicycle racks, and transit shelters may be placed in the buffer zone.



Buffer Strip along Commercial Corridor

Figure 5.6 Industrial Streetscape and Sidewalk Sample



Building Use Zone

Industrial corridors, similar to Community Commercial corridors, greatly differ from other land use/street typologies. Industrial corridors have evolved over time from serving traditional heavy and large manufacturing facilities to lighter and smaller manufacturing facilities. While active industry still exists, another evolution of Albany's industrial areas is occurring. Some corridors are strictly industrial, while others function as light commercial, such as restaurants, or act as connections to local residential neighborhoods. This is pertinent to the building use zone because these zones are typically meant for the handling of goods and delivery vehicles, thereby contributing to space design challenges. It is recommended that building use zone design consider the surrounding land use/street typologies and the potential needs of community members.

Pedestrian Zone

Pedestrian zones along an Industrial corridor typically handle less pedestrian traffic. However, as explained within the building use zone description, Industrial zones may include or abut other land use/street typology characteristics that have higher pedestrian traffic. Providing a wider pedestrian zone, as appropriate, can support and encourage additional pedestrian traffic. Although pedestrians are not typically the primary user of these corridors, complete streets encourage safe and accessible use for all community members. Clearly defining a space will also make roadway navigation and travel along these corridors easier for industrial vehicular traffic.

Buffer Zone

The buffer zone along an Industrial corridor may contain any number of amenities depending on its location within the City. As discussed in the building use zone description, these corridors may vary greatly. This causes a challenge for buffer zone design and it is therefore recommended that the surrounding land use/street typologies be taken into consideration. In industrial areas where light commercial facilities are present, such as restaurants, it is recommended that the buffer zone go above the minimum recommended width. Buffer zones may include street tree planters or trees, outdoor patios, and/or bicycle racks.

Streets

This section includes design guidelines for streets. Streets refer to all elements within or contributing to the travelway. Descriptions for street elements have been included. Design guidelines are organized into five lane types, occupying the space between curbs. The lane types are Transit Lane, Turn Lane, Travel Lane, Bicycle Lane, and Parking Lane. Each lane has preferred measurements or widths which may be applied for each land use/street typology. This section also discusses modal hierarchy and the importance of determining the priority of each transportation mode upon project initiation.

Design Guidelines

Design guidelines for streets can be found in Table 5.2. This illustrative table provides preferred zone width ranges for each land use/street typology. Definitions for the Transit Lane, Turn Lane, Travel Lane, Bicycle Lane, and Parking Lane follow and correspond to a column within the table.

As previously noted within the streetscape and sidewalk section, it is imperative to recognize that each complete street project is unique. Right-of-way widths, supporting land use, and functional classification can greatly impact the implementation of complete street elements. The guidelines presented within this chapter should be implemented as feasible. There will be instances in which lane types described herein are not applicable or feasible for implementation on all roadways.

A **Transit Lane** is for public transit. This dedicated lane has the potential to enhance the frequency, efficiency and reliability of transit service along corridors throughout the City.

A **Turn Lane** is designated for turning movements. The intent of this lane is to control traffic and reduce conflicts.

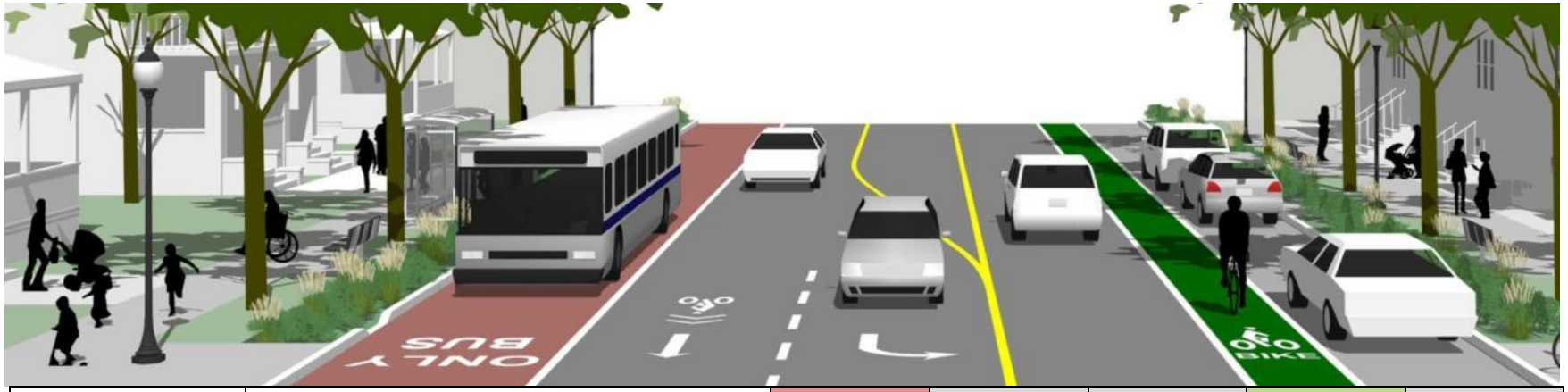
A **Travel Lane** is dedicated for traffic flow, which may include bicycles and transit as well as other vehicles.

A **Bicycle Lane** is utilized for bicycles. Bicycle lanes may appear as fully separated striped lanes or as buffered lanes dedicated specifically for bicycle use.

A **Parking Lane** is a lane for parking vehicles.

Table 5.2: Preferred Design Guidelines for Streets

PLEASE NOTE THAT THIS GRAPHIC IS FOR ILLUSTRATIVE PURPOSES ONLY.



Street Typology	FHWA Functional Classification [a]	Transit Lane (ft) [b]	Travel Lane (ft) [c]	Turn Lane (ft) [d]	Bicycle Lane (ft) [e]	Parking Lane (ft) [f]
Downtown	Principal Arterial / Minor Arterial / Major Collector / Local Road	11 – 14	10 – 12	10 – 12	5 – 7	7 – 8
Neighborhood Mixed Use	Principal Arterial / Minor Arterial / Major Collector	11 – 14	10 – 12	10 – 12	5 – 7	7 – 8
Neighborhood Residential	Minor Arterial / Major Collector / Local Road	N / A	9 – 12	9 – 12	5 – 7	7 – 8
Community Mixed Use	Principal Arterial / Minor Arterial / Major Collector	11 – 14	10 – 12	10 – 12	5 – 7	7 – 8
Community Commercial	Principal Arterial / Minor Arterial / Major Collector	11 – 14	10 – 12	10 – 12	5 – 7	7 – 8
Industrial	Major Collector / Local Road	11 – 14	9 – 12	9 – 12	5 – 7	7 – 8

[a] *Principal Arterials serve major centers of metropolitan areas, provide a high degree of mobility, providing access to abutting land uses. Minor Arterials serve geographic areas that are smaller than Principal Arterials, while offering connectivity to the higher Arterial system. Major Collectors serve a critical role in the roadway network by gathering traffic from Local Roads and funneling them to the Arterial network. Local Roads provide direct access to adjacent land, while providing access to higher systems and carrying no through traffic.*

[b] *A minimum lane width of 11 feet is required on signed CDTA bus routes. However, lane width may be as wide as 14 feet to accommodate bicycles where it is not possible to create a bicycle facility at minimum widths for travel, turning, and bicycle lanes and where it is not possible to create a shoulder for bicycle use. (See AASHTO Guide for the Development of Bicycle Facilities section 4.3.1/document incorporated into NYSDOT HDM 17.4.3. Also FHWA Incorporating On-Road Bicycle Networks into Resurfacing Projects pg 19.)*

[c] *Travel lane widths may vary due to traffic speed, traffic type, pavement constraints and/or right-of-way constraints. Projects located on NYSDOT Designated Qualifying Highways require a minimum lane width of 12 feet. Projects located on Designated Access Highways require a minimum lane width of 10 feet. All routes located within one mile of Qualifying Highways require a minimum travel lane width of 10 feet.*

[d] *Turn lane widths may vary due to traffic speed, traffic type, pavement constraints and/or right-of-way constraints. Projects located on NYSDOT Designated Qualifying Highways require a minimum lane width of 12 feet. Projects located on Designated Access Highways require a minimum lane width of 10 feet. All routes located within one mile of Qualifying Highways require a minimum travel lane width of 10 feet.*

[e] *Bicycle lane widths, as recommended by the AASHTO's 2012 Guide for Development of Bicycle Facilities 4th Edition and the City of Albany Bicycle Master Plan, should be at least 5 feet. AASHTO guidelines also recommend that a bicycle lane should be 7 feet wide when adjacent to an 8 foot wide or less parking lane typical of high rates of turnover. In areas with high bicycle volumes, no on-street parking, and high vehicle speeds and volumes, lane widths are recommended to be between 6 feet and 8 feet. The wider lane creates more room for potential avoidance maneuvers.*

[f] *Parking lane widths may vary due to potential future uses, such as becoming a travel or turn lane. According to Chapter 2 of the NYSDOT Highway Design Manual, the minimum parking lane width is 7 feet which is typically seen along residential corridors.*

Street Elements

Street elements enable accessible and safe connections between the streetscape and sidewalk portion of a corridor and the adjacent street.

Crosswalks

Crosswalk markings are used to define the pedestrian path of travel across a roadway and alert drivers to the area where pedestrians can be expected. Crosswalks may be signed or marked. This may be achieved through public artwork in the walkway, signage, and varied pavement materials and colors. Crosswalk design is recommended to take into consideration adequate lighting, proper placement of curb ramps, attention to location of bus stops and crosswalks, and smaller curb radii. Depending on the installation area, such as at mid-block locations, crosswalks may need to take into consideration the number of travel lanes, inclusion of a raised median, pedestrian crossing islands, advanced stop lines and associated signing, and parking restrictions. Crosswalks increase pedestrian visibility and safety. Crosswalk design has the ability to make a significant difference on wider roadways. Inclusion of pedestrian refuges or raised medians may provide an additional level of safety for pedestrians while contributing to placemaking within a corridor. Signalized and non-signalized mid-block crosswalks may also be applied, where feasible.

Curb Ramps

Curb ramps providing ADA compliant access between a sidewalk and a street are found in many locations along a corridor. Locations may include intersections, loading zones, bus stops, and midblock crossings. Curb ramp design may be flexible in order to achieve accessibility and safety for users of all abilities. Curb ramp implementation should meet all applicable ADA requirements.

Driveways (Access Management)

Driveways are roads leading from a public roadway to a private residence, facility or parking lot. The number of driveways along a corridor may significantly impact the accessibility and safety for roadway users to reach destinations. Therefore, access management and the number of driveways should be reviewed while designing a complete street project.

Lane Striping

Lane striping and pavement markings convey messages to roadway users. Use of lane striping and pavement markings can indicate which part of the road is designated for which user to create a safer, more accessible roadway network for all users.

Paved Shoulders

The installation and widening of paved shoulders can provide a stable surface for use by pedestrians or bicyclists. Pedestrians may use a paved shoulder when sidewalks cannot be provided. Bicyclists may also use a paved shoulder to ride separated from motor vehicle traffic (since bicycles are prohibited on sidewalks according to the City code, Section 359-4 unless the bicyclist is 10 years of age or under). Paved shoulders may increase pedestrian and bicyclist safety and visibility, and therefore reduce the number of conflicts that occur between motorists, bicyclists, and pedestrians. Paved shoulders may also provide an emergency stopping area for breakdowns or emergency vehicles. These areas may serve limited uses, but are encouraged to remain clear of obstructions or litter for its users.

Signage

Signage is a critical design component for navigating any street or roadway within a City. It has the ability to keep motorist, bicyclist, and transit traffic moving while allowing destinations to be identified. Signage has increasingly shifted toward the use of symbols rather than words to convey a message. Symbols can provide instant communication to all roadway users, typically overcoming language barriers, while continuing to become a standard for traffic control devices worldwide.

Travelway Elements

Travelway elements enhance opportunities for multi-modal travel, while improving accessibility for multiple users and connecting various destinations within the City. These elements contribute to a safer commuting environment, while creating a sense of place both along a single corridor and throughout the City. The following descriptions provide the purpose, benefit, and the preferred design guidelines for implementing travelway elements. The travelway elements are also the foundation for Table 5.3. This table identifies which travelway elements are most appropriate for which land use/street typologies depending on the presence of a wide or narrow right-of-way.

Bicycle Boulevards

Bicycle boulevards are typically found along streets with lower traffic volumes and speeds. In general, this may include streets of residential character or streets providing access to schools, parks, or other public places. The design gives bicycle travel significant priority. Successful bicycle boulevards incorporate signage, pavement markings, and speed and volume management measures to discourage through trips by motor vehicles. These measures encourage safe, convenient bicycle crossings of more active arterial streets. It is also typical of bicycle boulevards to incorporate green infrastructure elements.

Buffered Bicycle Lanes

Buffered bicycle lanes are striped bicycle lanes that contain an additional striped buffer. This additional striped buffer further separates bicyclists from motorists and parked vehicles, typically offering an increased level of comfort for bicyclists on the street side of on-street parking. A buffered bicycle lane may be incorporated anywhere that a standard bicycle lane is being considered and is feasible. These lanes may be found along corridors with higher traffic volumes and speeds in order to improve bicyclists comfort on these streets. Bicycle lanes per the NYS Vehicle and Traffic Law require a minimum width of 5-feet, but the preferred width range is 6-feet to 7-feet.

Contra-Flow Bicycle Lanes

Contra-flow bicycle lanes are lanes that allow the movement of bicycles along a one-way street in the opposite direction of vehicular traffic. A contra-flow bicycle lane is striped with yellow lane striping. This demarcates the separation between vehicular traffic and the opposite movement of bicyclists. This method of travel may introduce additional challenges to a one-way street including the need for signal heads for the contra-flow bicycle lane. Like a standard bicycle lane, contra-flow bicycle lanes may be buffered or protected. The minimum width for a contra-flow bicycle lane is 5-feet, with a preferred width range of 6-feet to 7-feet.

Dedicated Transit Lanes

Dedicated transit lanes are lanes used by transit vehicles only along enhanced transit corridors. These lanes may be developed as short distance or long distance lanes. Short distance lanes, such as a queue jump, allow transit vehicles to bypass queued traffic at an intersection. Long distance lanes improve mobility and lower congestion throughout the City. Dedicated transit lanes should be 11-feet wide, contain "BUS ONLY" pavement markings per MUTCD Section 3D-01, and be a different pavement color in order to effectively avoid roadway misuse. Dedicated transit lanes are typically applied to corridors identified as enhanced transit corridors and corridors with multiple lanes.

Enhanced Transit Lanes

Enhanced transit lanes or corridors incorporate dedicated transit lanes and other transit amenities such as bus shelters located in buffer zones or bus bulbs. Enhanced transit lanes or corridors are currently found within the City and are known as BRT or BusPlus corridors. Enhanced transit lanes require a minimum width of 11-feet. The bus shelters serving these bus lines require a minimum of 10-feet. Enhanced transit lanes enable energy efficiency and reduce traffic congestion, while enhancing connectivity for community members in an affordable and fast manner. More information about CDTA's BusPlus and BRT corridors is available in Chapter 4.

Medians

Medians are areas between opposing lanes of traffic (not turn lanes), that can either be open (pavement markings only) or channelized (raised medians or islands) to separate various roadway users. Pedestrian crossing islands or refuge areas are raised islands placed on a street at intersections or mid-block locations to separate crossing pedestrians from motor vehicles. These refuge areas allow pedestrians a safe place to stop at the mid-point of a roadway before crossing the remaining road distance. Medians may also be referred to as center islands, refuge islands, or pedestrian islands. Medians have the ability to increase safety by enhancing the visibility of pedestrians, particularly at unsignalized crossing points, while also serving as additional space to incorporate supplemental signage on multi-lane roadways. Medians may function best in regards to stormwater collection and green infrastructure practices if the roadway in question is concave, or lowest at the middle of the street. Measures, such as bioretention, should slow the flow of water if located on a steeply sloped roadway.

Median Cycle Tracks

Median cycle tracks are another form of bicycle lane. These lanes run along the left travel lane adjacent to a median. Median cycle tracks allow bicyclists to travel long a continuous median with minimal conflict from adjacent driveways or parked cars found on the right side of a roadway. The minimum width of a median cycle track is 5-feet, with preferred widths being 6-feet to 7-feet. Similar to standard bicycle lanes, a median cycle track can be buffered or protected. These lanes should be considered along corridors with heavy transit use and/or frequent transit stops. Another application of median cycle tracks includes placement along corridors with a high number of vehicle right turning movements.

On-Street Parking

On-street parking may be found along one-way or two-way streets and is an essential component of a street for most corridors where off-street parking is limited or unavailable. It provides short-term

parking options for adjacent businesses and contributes to a more active and vital streetscape. On-street parking should not exceed 8 feet in width. Along corridors where excess pavement is available, rather than stripe a wider parking lane, the excess pavement width may be used to provide a clear door zone and offer additional safety to bicyclists and other vehicles. Applications for on-street parking include where buildings are positioned along a street line with little to no front or side setback, where accommodating short-term and high turnover parking is desirable, or along low-speed corridors where additional parking is desired. On-street parking may pose design challenges for many streets and therefore space constraints and modal hierarchy should be understood for any given corridor.

Sidepaths

Sidepaths are a specific type of shared use path that run adjacent to the roadway, where right-of-way and other physical constraints dictate. Sidepaths may be one-way or two-way. According to AASHTO's 2012 Guide to Bicycle Facilities, it is important to note that provision of a pathway adjacent to a road is not a substitute for the provision of on-road accomodation such as paved shoulders or bike lanes. However, it may be considered in some locations in addition to on-road bicycle facilities. A sidepath should satisfy the same design criteria as shared use paths in independent rights-of-way and may be implemented along short or long distances. Sidepath application along suburban and urban streets should be reviewed for potential operational conflicts.

Separated Bicycle Lanes

Separated bicycle lanes are lanes at or raised above street level that use a permanent physical barrier such as a raised curb or planting strip to provide separation from travel lanes. These lanes may be one-way or two-way depending on the user demand and space constraints. This minimum width for a one-way separated bicycle lane is 5 feet, but the preferred width is 6-feet to 7-feet. Design of separated bicycle lanes is recommended to bring heightened awareness to drivers that there is two-way traffic on a single side of the roadway. The minimum width for a two-way separated bicycle lane is 10-feet, but the preferred width is 12-feet. Two-way streets may lend themselves to two-way separated bicycle lanes being placed within a median, rather than including two one-way bicycle lanes on the outside edges of a corridor. Under this application, intersection management is critical.

Application considerations for separated bicycle lanes includes streets with few curb cuts or driveways, streets that contain higher volumes of traffic or traffic traveling at higher speeds, and streets where providing a one-way separated bicycle lane on each side of the street is not feasible due to a limited right-of-way or other constraints. Other application considerations include corridors where destinations are predominantly located on one side of a street, streets that have potential to connect with other separated bicycle lanes, and corridors with higher bicycle volumes.

Shared Transit and Bicycle Lanes

Shared transit and bicycle lanes are lanes for use by transit and bicycles only. The minimum lane width for transit is 11-feet. The preferred width for a shared transit and bicycle lane is 12-feet. This can allow sufficient width for transit as well as space for adequate pavement markings and signage. Shared transit and bicycle lanes are recommended to utilize a colored pavement in order to recognize the lanes as a lane dedicated to transit and bicycle use

only. Upon coordination with CDTA, these lanes may be implemented along corridors identified as enhanced transit, or BRT corridors, where there is not enough pavement or right-of-way width for a separate bicycle facility such as a separated bicycle lane. Speed of the potential corridor implementation is also recommended to be considered. Corridors with posted speed limited of 35 mph or less are ideal.

Shared Use Lane Markings

Shared use lane markings, also known as sharrows, promote the shared use of travel lanes by motorists and bicyclists. While all lanes where bicycles are permitted are considered shared use lanes, shared use lane markings reinforce the legitimacy of bicycle traffic on the street and may be configured to offer directional and wayfinding guidance. Incorporation of sharrows often includes the consideration of various geometric and operational factors that may impact the comfort level of bicyclists using shared lanes. Shared lane markings should only be utilized to indicate the presence of a narrow lane. According to the 2013 NYS DOT Shared Lane Marking Policy, a narrow lane is defined as being less than 14-feet wide and does not allow motorists and bicyclists to safely travel side-by-side within the lane. Shared lane markings should not be used to indicate the desired position for a bicyclist, as the optimal position can change depending on a number of factors.

The primary application consideration for shared use lane markings is where pavement width constraints do not allow for dedicated bicycle facilities. Other considerations include corridors where the speed differential between motorists and bicyclists is low, streets where traffic signals are timed for bicycle travel, bicycle boulevards, filling a gap between dedicated bicycle facilities for a short distance, or transitioning across an intersection. Information regarding bicycle hierarchy can be found later in this chapter under the Modal Hierarchy section. This information is recommended to be referenced to aid in the placement of shared use lane markings.

Striped Bicycle Lanes

Striped bicycle lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. In areas of potentially high vehicle conflict, green colored pavement can be used to heighten driver awareness that bicyclists may be present. Striped bicycle lanes enable bicyclists to ride at a preferred speed without interference from prevailing traffic conditions. The significant difference between a striped bicycle lane and protected or separated bicycle lanes is that there is no physical barrier separating the bicycle lane from other travel lanes. Striped bicycle lanes also allow bicyclists to exit the lane to pass other bicyclists, make left turns, avoid obstacles or debris, and avoid conflicts with other roadway users. The minimum bicycle lane width is 5 feet, but the preferred lane width is 6-feet to 7-feet. According to the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide, appropriate application for striped bicycle lanes is along streets with an ADT of greater than or equal to 3,000 vehicles and posted speed limits greater than or equal to 25 mph. Another appropriate application includes streets where additional protection or separation is not feasible due to pavement width or right-of-way constraints.

Travel Lanes

Travel lanes accommodate multiple traffic types. Depending on the corridor, the number of travel lanes will vary. Roadways with two travels lanes, one going in each direction, are used in areas that

have a constrained pavement width and/or right-of-way. Roadways with three or more travel lanes are used in areas with higher traffic volumes. The minimum width for a travel lane is 10-feet, unless the travel lane is to accommodate a CDTA bus. In this situation, a minimum lane width is 11-feet. References such as NYSDOT and NACTO indicate that preferred travel lane widths are 11-feet to 12-feet.

Travelway Elements Table

The travelway elements are the foundation for Table 5.3. This table identifies which travelway elements are most appropriate for which land use/street typologies depending on the presence of a wide or narrow right-of-way. The wide right-of-way represents a least-constrained sample scenario for a roadway. The narrow right-of-way represents a most-constrained scenario for a roadway.

Table 5.3: Travelway Elements by Land Use/Street Typology and Right-of-Way

This table identifies preferred travelway elements for each land use/street typology depending on the presence of a wide or narrow right-of-way. This table offers design guidance and is not intended to limit or prohibit opportunities to implement complete streets elements.

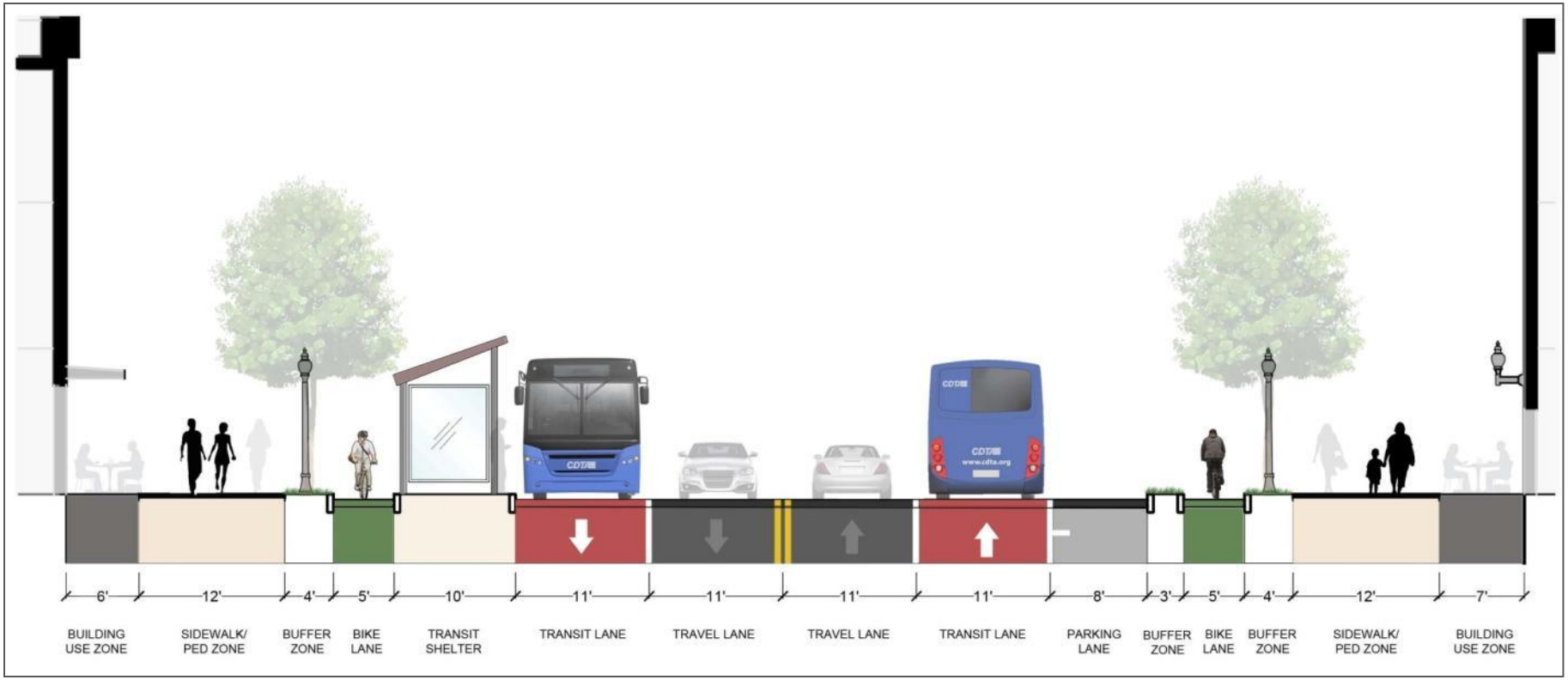
Complete Street Elements	Downtown		Neighborhood Mixed Use		Neighborhood Residential		Community Mixed Use		Community Commercial		Industrial	
	Wide	Narrow	Wide	Narrow	Wide	Narrow	Wide	Narrow	Wide	Narrow	Wide	Narrow
2-Lane Travelway	●	●	●	●	●	●	●	●	●	●	●	●
3-Lane Travelway	●	●	●	●			●	●	●	●	●	
4-Lane Travelway	●						●		●	●		
5-Lane Travelway	●								●		●	
Bicycle Boulevard		●			●	●						●
Buffered Bicycle Lane	●	●	●				●	●	●	●	●	
Contra-Flow Bicycle Lanes	●	●				●						
Dedicated Transit Lane	●						●		●			
Enhanced Transit Lane[a]	●						●		●			
Median	●		●		●				●		●	
One-Way Separated Bicycle Lane	●						●		●		●	
One-Way Street	●	●		●		●						
On-Street Parking (1-Way Street)	●	●		●		●						
On-Street Parking (2-Way Street)	●	●	●	●	●	●	●	●	●	●	●	
Shared Transit/Bicycle Lane	●	●					●	●		●		
Shared Use Lane Markings		●	●	●				●			●	●
Striped Bicycle Lane	●	●	●	●				●		●	●	●
Two-Way Separated Bicycle Lane	●						●		●			
Two-Way Side Path							●		●		●	

[a] *As BRT routes continue to be developed throughout the City, opportunities may arise for enhanced transit to appear in land use/street typologies not selected within this table.*

Streets Sample Cross Sections

For each land use/street typology, two sample complete street cross sections have been provided. The first cross section depicts complete street elements within a wide right-of-way, and the second cross section depicts complete street elements within a narrow right-of-way. Unlike the streetscape and sidewalk sample cross sections, these sample cross sections illustrate streetscape, sidewalk, and street elements in order to demonstrate the use of space across a whole sample corridor within a specific land use/street typology. The travelway elements vary within each of the sample cross sections to demonstrate the variety of design options available based on existing constraints. Please note these represent sample design options.

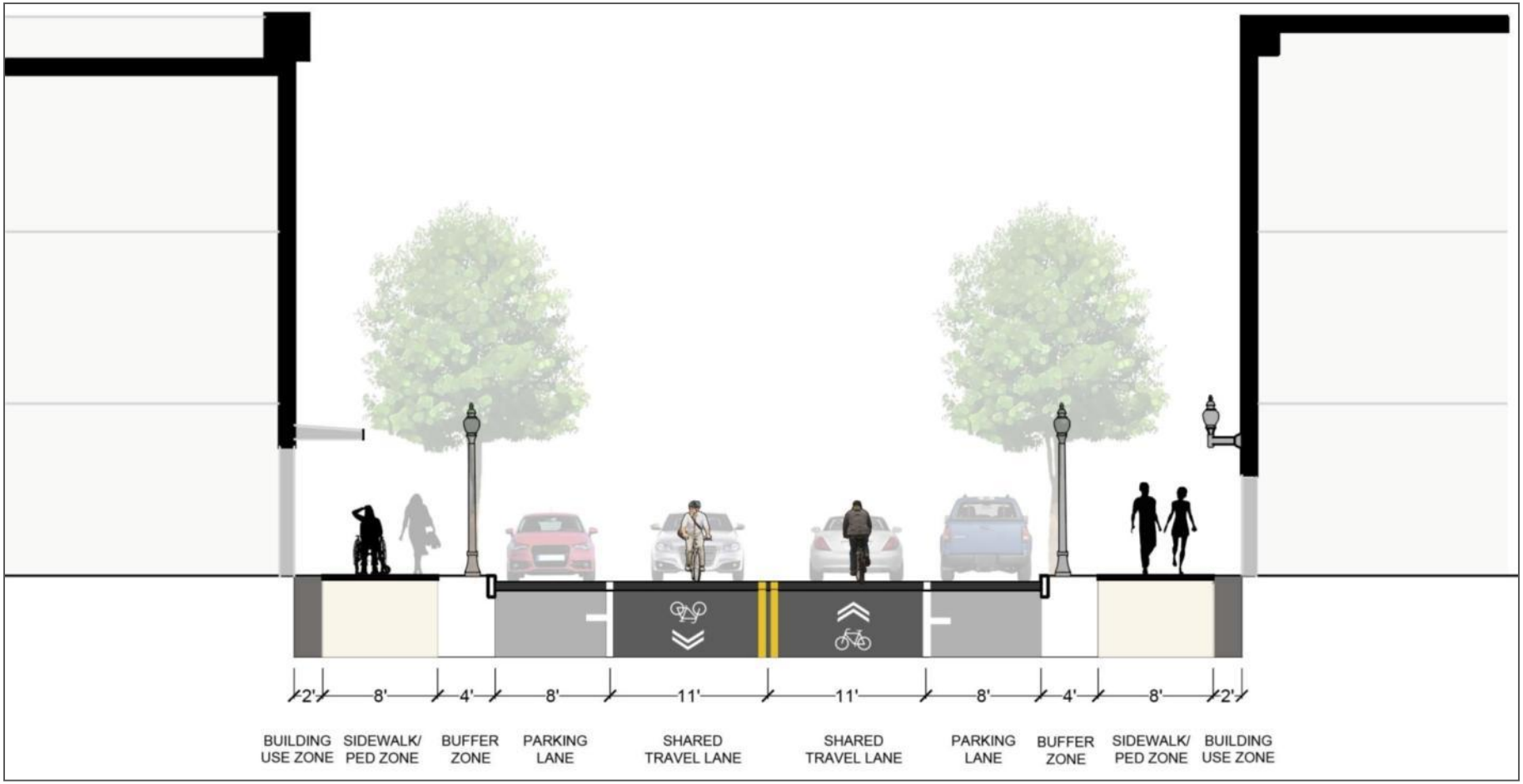
Figure 5.7 Downtown Sample: Wide Right-of-Way Street



Potential Downtown Wide ROW Travelway Elements per Table 5.3:

- 2-Lane Travelway
- 3-Lane Travelway
- 4-Lane Travelway
- 5-Lane Travelway
- Buffered Bicycle Lane
- Contra-Flow Bicycle Lane
- Dedicated Transit Lane
- Enhanced Transit Lane
- Median
- One-way Separated Bicycle Path
- One-Way Street
- On-Street Parking (1-way street)
- On-Street Parking (2-way street)
- Shared Transit/Bicycle Lane
- Striped Bicycle Lane
- Two-Way Side Path

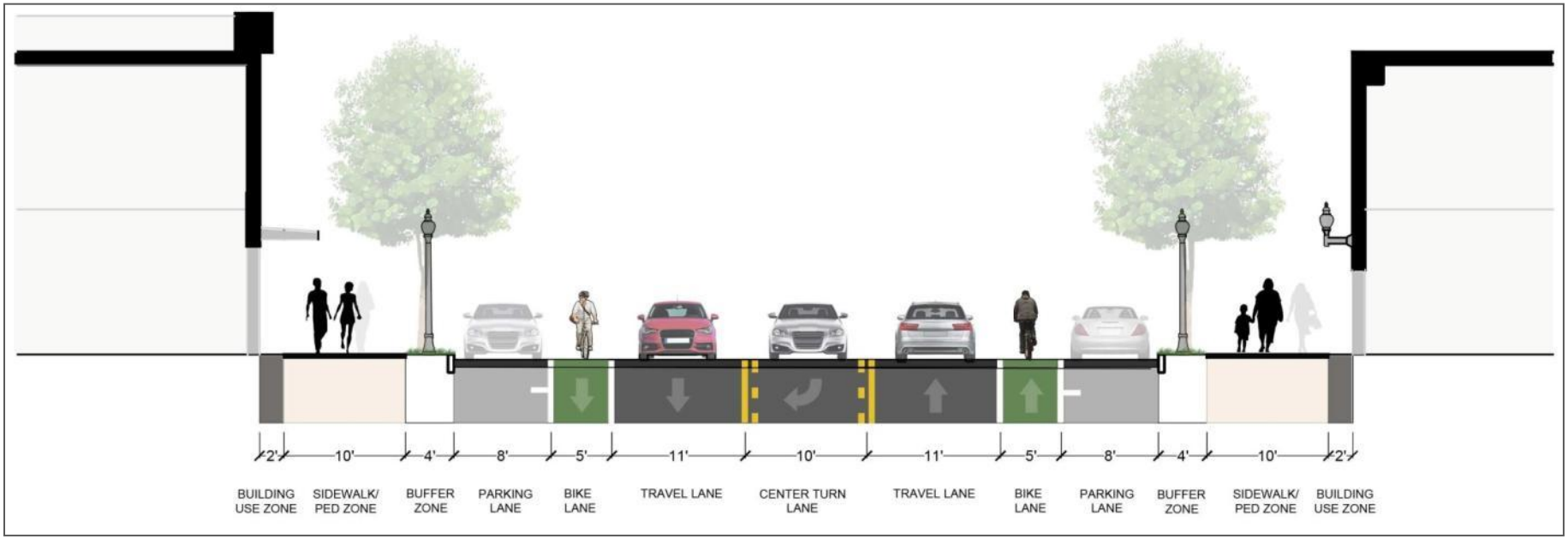
Figure 5.8 Downtown Sample: Narrow Right-of-Way Street



Potential Downtown Narrow ROW Travelway Elements per Table 5.3:

- 2-Lane Travelway
- 3-Lane Travelway
- Bicycle Boulevard
- Buffered Bicycle Lane
- Contra-Flow Bicycle Lane
- One-Way Street
- On-Street Parking (1-way street)
- On-Street Parking (2-way street)
- Shared Transit/Bicycle Lane
- Shared Use Lane Markings
- Striped Bicycle Lane

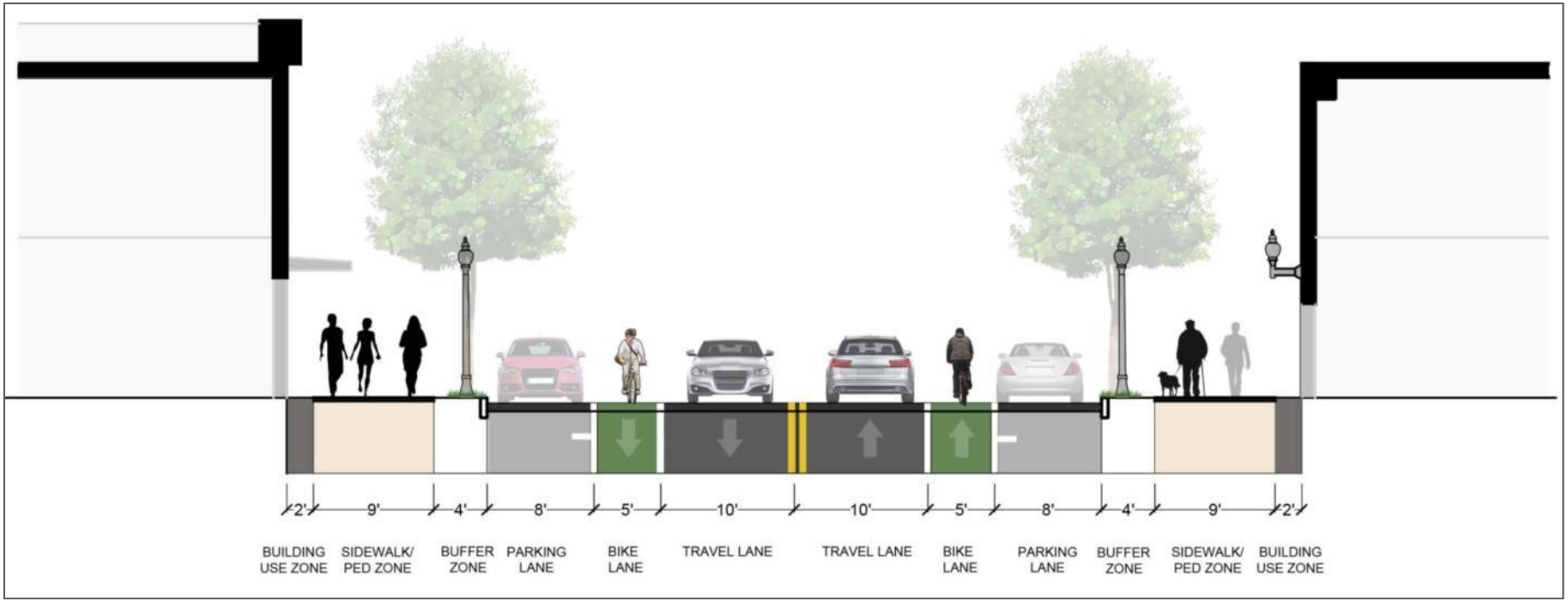
Figure 5.9 Neighborhood Mixed Use Sample: Wide Right-of-Way Street



Potential Neighborhood Mixed Use Wide ROW Travelway Elements per Table 5.3:

- 2-Lane Travelway
- 3-Lane Travelway
- Buffered Bicycle Lane
- Median
- On-Street Parking (2-Way Street)
- Shared Use Lane Markings
- Striped Bicycle Lane

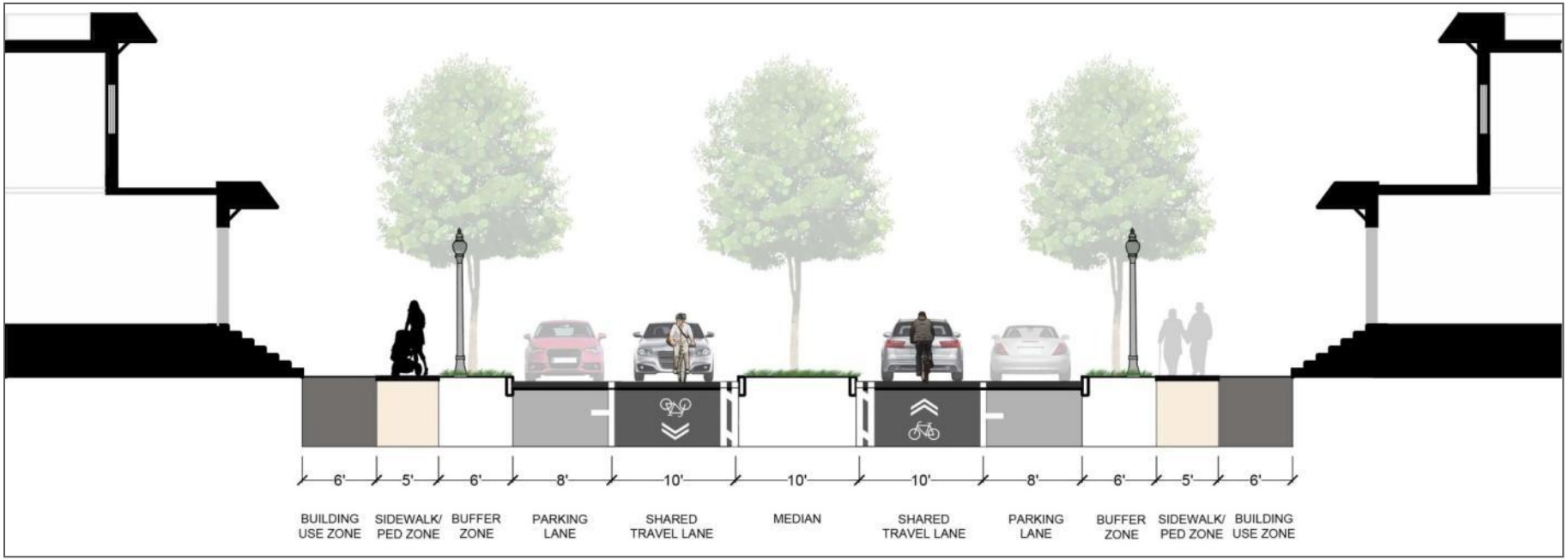
Figure 5.10 Neighborhood Mixed Use Sample: Narrow Right-of-Way Street



Potential Neighborhood Mixed Use Narrow ROW Travelway Elements per Table 5.3:

- 2-Lane Travelway
- 3-Lane Travelway
- One-Way Street
- On-Street Parking (1-Way Street)
- On-Street Parking (2-Way Street)
- Shared Use Lane Markings
- Striped Bicycle Lane

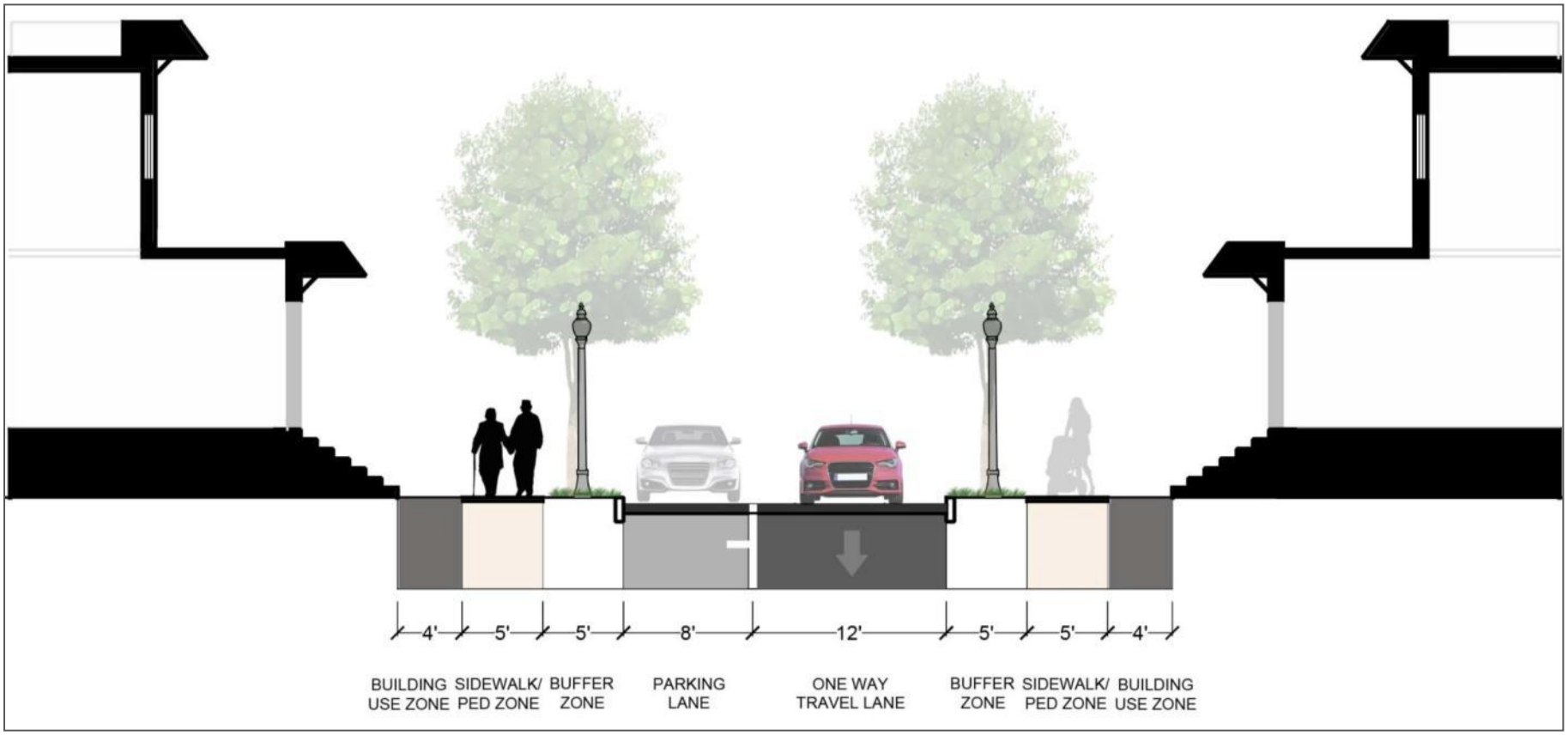
Figure 5.11 Neighborhood Residential Sample: Wide Right-of-Way Street



Potential Neighborhood Residential Wide ROW Travelway Elements per Table 5.3:

- 2-Lane Travelway
- Bicycle Boulevard
- Median
- On-Street Parking (2-Way Street)

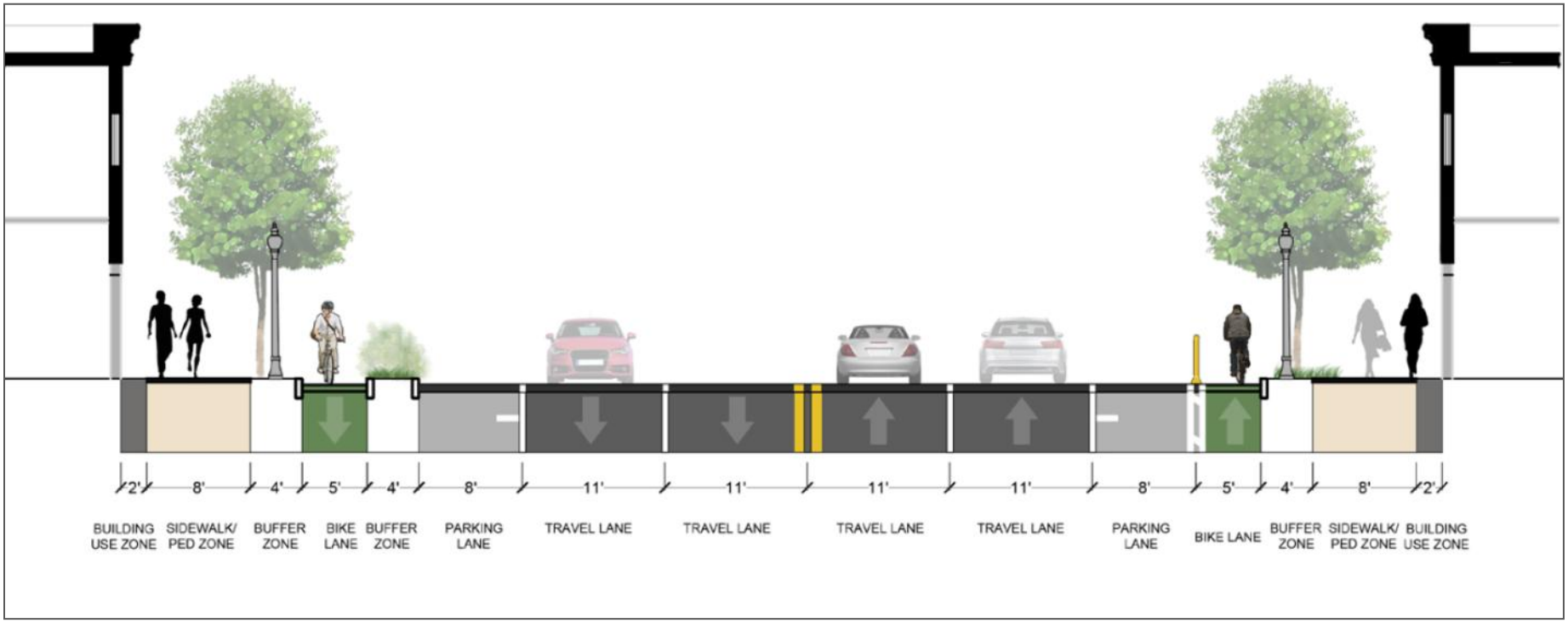
Figure 5.12 Neighborhood Residential Sample: Narrow Right-of-Way Street



Potential Neighborhood Residential Narrow ROW Travelway Elements per Table 5.3:

- 2-Lane Travelway
- Bicycle Boulevard
- Contra-Flow Bicycle Lane
- One-Way Street
- On-Street Parking (1-Way Street)
- On-Street Parking (2-Way Street)

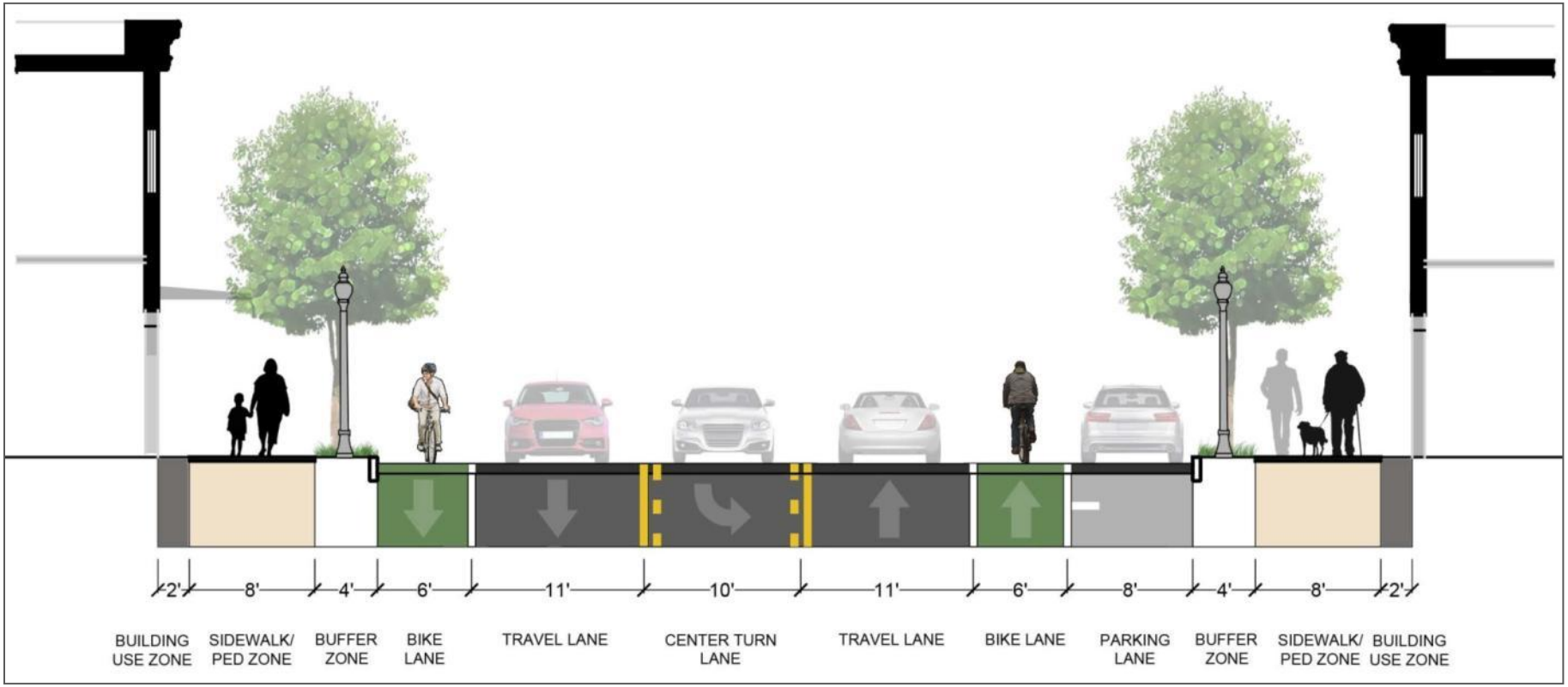
Figure 5.13 Community Mixed Use Sample: Wide Right-of-Way Street



Potential Community Mixed Use Wide ROW Travelway Elements per Table 5.3:

- 2-Lane Travelway
- 3-Lane Travelway
- 4-Lane Travelway
- Buffered Bicycle Lane
- Dedicated Transit
- Enhanced Transit
- One-Way Separated Bicycle Lane
- On-Street Parking (2-Way Street)
- Shared Transit/Bicycle Lane
- Two-Way Side Path

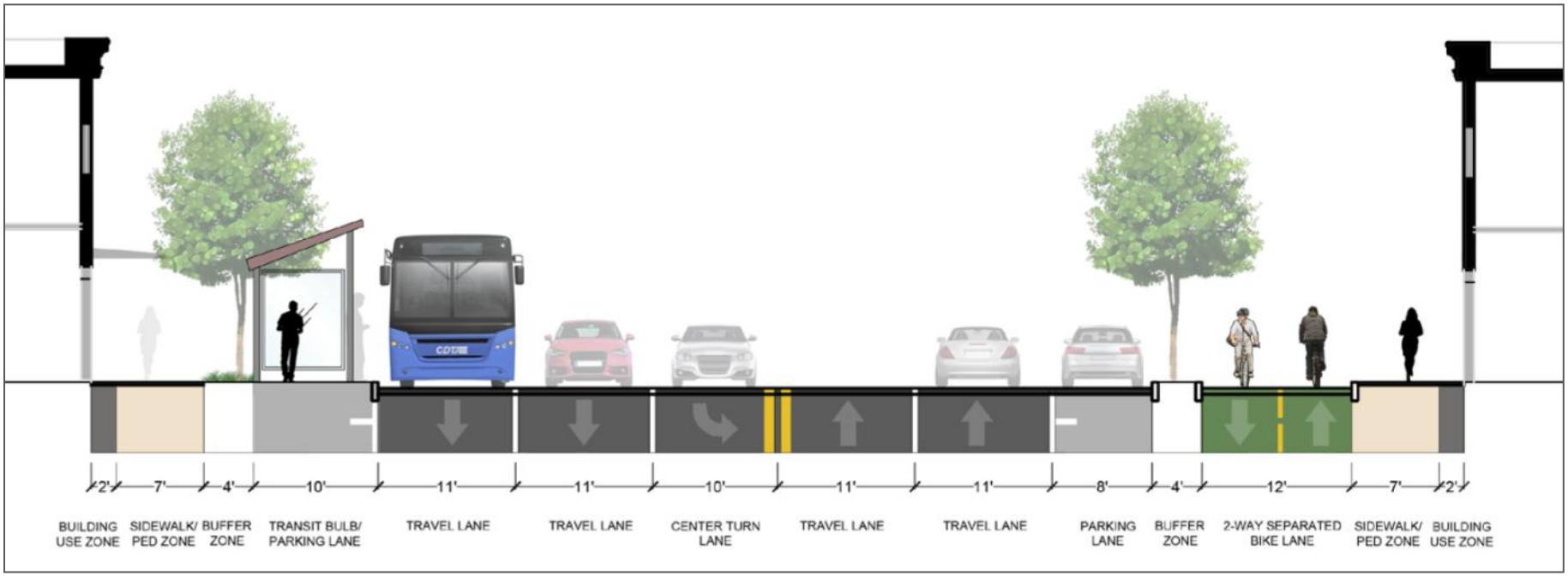
Figure 5.14 Community Mixed Use Sample: Narrow Right-of-Way Street



Potential Community Mixed Use Narrow ROW Travelway Elements per Table 5.3:

- 2-Lane Travelway
- 3-Lane Travelway
- Buffered Bicycle Lane
- On-Street Parking (2-Way Street)
- Shared Transit/Bicycle Lane
- Shared Use Lane Markings
- Striped Bicycle Lane

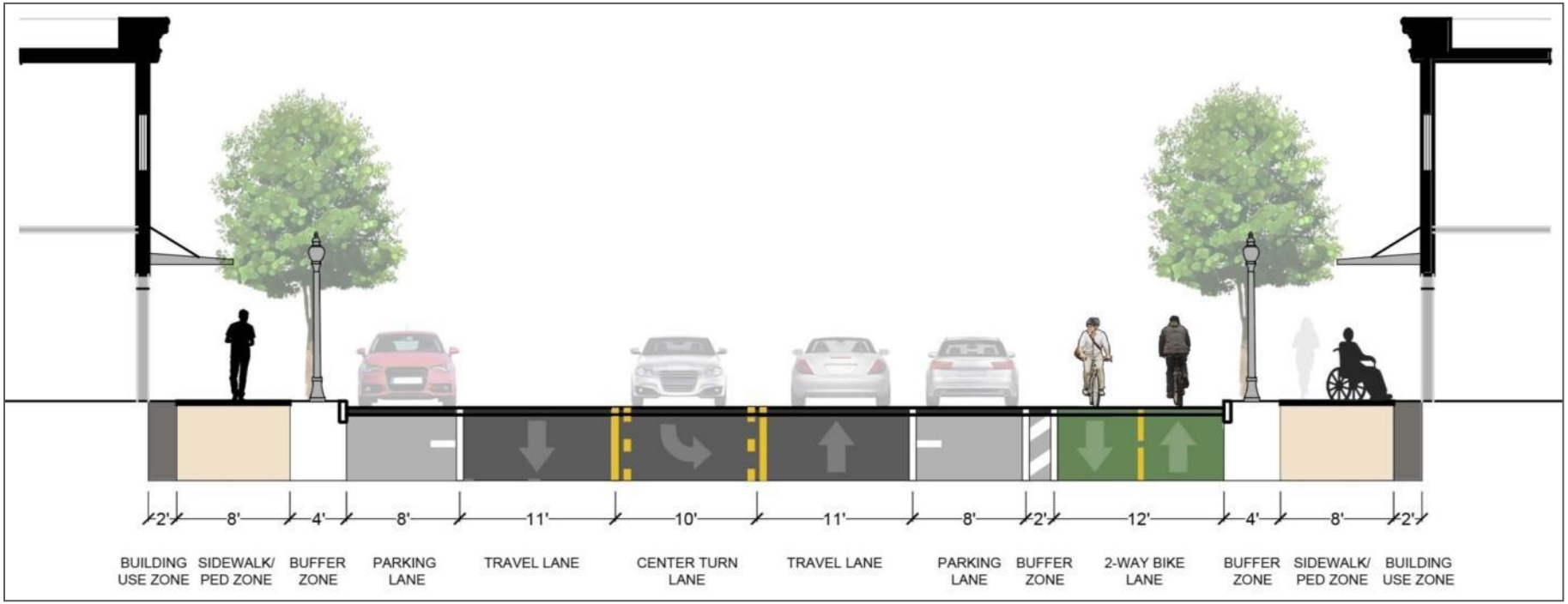
Figure 5.15 Community Commercial Sample: Wide Right-of-Way Street



Potential Community Commercial Wide ROW Travelway Elements per Table 5.3:

- 2-Lane Travelway
- 3-Lane Travelway
- 4-Lane Travelway
- 5-Lane Travelway
- Buffered Bicycle Lane
- Dedicated Transit Lane
- Enhanced Transit Lane
- Median
- One-Way Separated Bicycle Lane
- On-Street Parking (2-Way Street)
- Two-Way Separated Bicycle Lane
- Two-Way Side Path

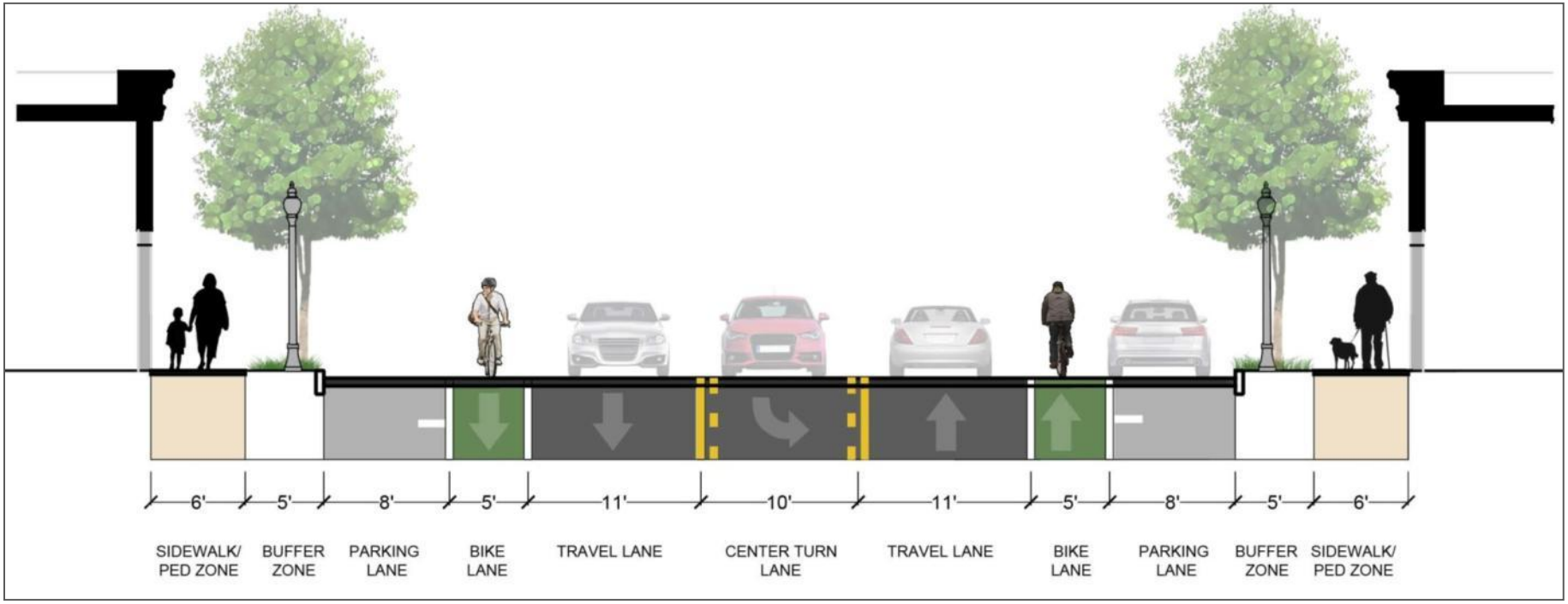
Figure 5.16 Community Commercial Sample: Narrow Right-of-Way Street



Potential Community Commercial Narrow ROW Travelway Elements per Table 5.3:

- 2-Lane Travelway
- 3-Lane Travelway
- 4-Lane Travelway
- Buffered Bicycle Lane
- On-Street Parking (2-Way Street)
- Shared Transit/Bicycle Lane
- Striped Bicycle Lane
- Two-Way Side Path

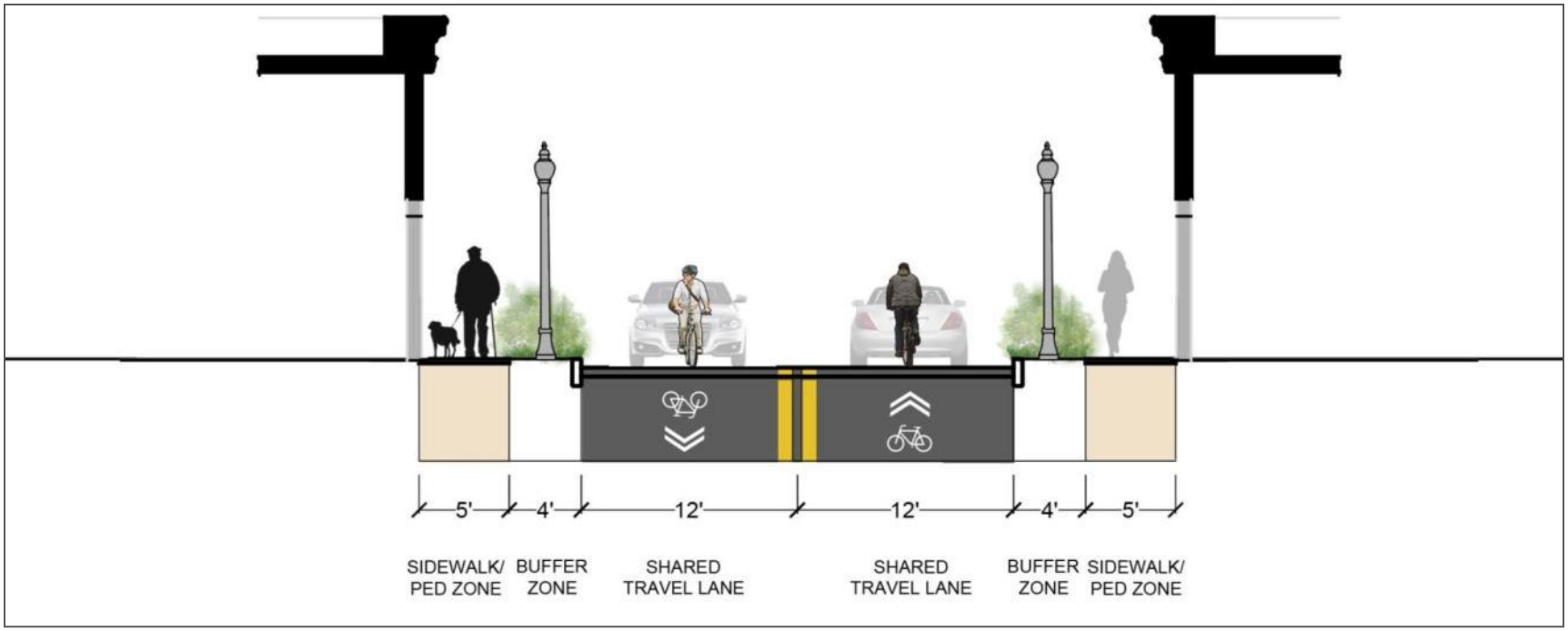
Figure 5.17 Industrial Sample: Wide Right-of-Way Street



Potential Industrial Wide ROW Travelway Elements per Table 5.3:

- 2-Lane Travelway
- 3-Lane Travelway
- 5-Lane Travelway
- Buffered Bicycle Lane
- Median
- On-Street Parking (2-Way Street)
- Shared Use Lane Markings
- Striped Bicycle Lane
- Two-Way Side Path

Figure 5.18 Industrial Sample: Narrow Right-of-Way Street



Potential Industrial Wide ROW Travelway Elements per Table 5.3:

- 2-Lane Travelway
- Bicycle Boulevard
- Shared Use Lane Markings
- Striped Bicycle Lane

Modal Hierarchy

The following sections provide descriptions of pedestrian, bicycle, transit and vehicular hierarchies. The City can use this information to make informed and prioritized design and operation decisions in the event that the physical right-of-way may not be able to accommodate all modes.

The descriptions are followed by Table 5.4, which identifies modal hierarchy rankings within a limited right-of-way for each land use/street typology and roadway functional classification. If a zone is identified as a low priority, then the width may often be sacrificed to serve another zone along a corridor. Respectively, if a zone is marked as a high priority, then the width is not recommended to be sacrificed to serve another zone.

Pedestrian Hierarchy

It is recommended that sidewalks are considered for both sides of a roadway where pedestrian traffic is present or anticipated. Sidewalks largely contribute to the ability for a pedestrian to walk to activity nodes, thereby increasing connectivity and accessibility. When considering implementation of sidewalks, it is recommended that existing plans and policies be referenced. This action will allow the project sponsor to identify where pedestrian facilities are warranted or desired.

Bicycle Hierarchy

There are several factors that contribute to the implementation of bicycle facilities. One of these factors includes comparing the volume and speed of all traffic with the volumes of bicycles. Traffic volumes can be expressed in Vehicles Per Day (VPD), Average Annual Daily Traffic (AADT), or Average Daily Traffic (ADT). Each of these generates volume averages to be used when considering implementation of bicycle facilities. Averages may vary due to time of day and length of data collection.

City streets with an AADT of less than 3,000 vehicles with posted speed limits less than or equal to 30 mph may incorporate shared bicycle lane markings. In the event that the roadway in question includes high regular truck traffic, greater than or equal to 10%, and/or high parking turnover, it is recommended that buffered bicycle lanes be considered for implementation. City streets with an AADT of greater than 3,000 vehicles with posted speed limits greater than or equal to 30 mph may incorporate dedicated bicycle lanes. In the event that the roadway in question includes high regular truck traffic, greater than or equal to 10%, and/or high parking turnover, it is recommended that separated bicycle lanes be considered for implementation.

The City of Albany Bicycle Master Plan identifies roadways for which bicycle facilities are recommended to be implemented. Facilities may include shared bicycle lane markings or physically separated bicycle lanes such as separated bicycle lanes. Separated bicycle lanes may incorporate continuous curbing or a landscaped buffer. As discussed, the facility type would vary based upon a traffic analysis.

Transit Hierarchy

City streets, where standard transit service is provided, are recommended to include transit complete street elements. Factors contributing to the implementation of transit complete street elements include whether it is a BRT corridor, is high-standard, has high speed (greater than 40 mph) multi-lane streets with limited

access, and/or has lower speed limits. Transit facilities are also recommended for short block city streets located near areas of concentrated employment or other key destinations. Bus services are the current transit option within the City limits. Ridership, or usage thresholds for CDTA bus routes, is one factor contributing to transit facility implementation. Usage thresholds are recommended to be corridor specific and locally developed in order to determine appropriate demand levels. In locations where usage thresholds are low, transit lanes or other priority measures can be rationalized using cost-benefit analyses and other area specific circumstances. Currently, CDTA routes allow for many buses per hour, but it is important to recognize that neighborhood routes tend to have 30 minute peak headways.

At locations where enhanced transit is proposed, transit priority elements can be considered. Transit priority elements may include dedicated transit lanes, queue jumps, and transit signal priority to promote efficiency and use of transit service. If the location in question cannot support these elements, elements such as bus shelters and bus bulbs may be considered.

Vehicular Hierarchy

City streets with an Arterial or Collector functional classification are recommended to be given priority. These streets are characteristic of high volumes with an ADT greater than 25,000 vehicles. City streets with low speed limits and high pedestrian and/or bicycle traffic have the potential to incorporate traffic-calming elements. These elements can help create a balance between vehicular, bicycle, and pedestrian traffic, further contributing to safety and accessibility.

Table 5.4: Modal Hierarchy in a Limited Right-of-Way

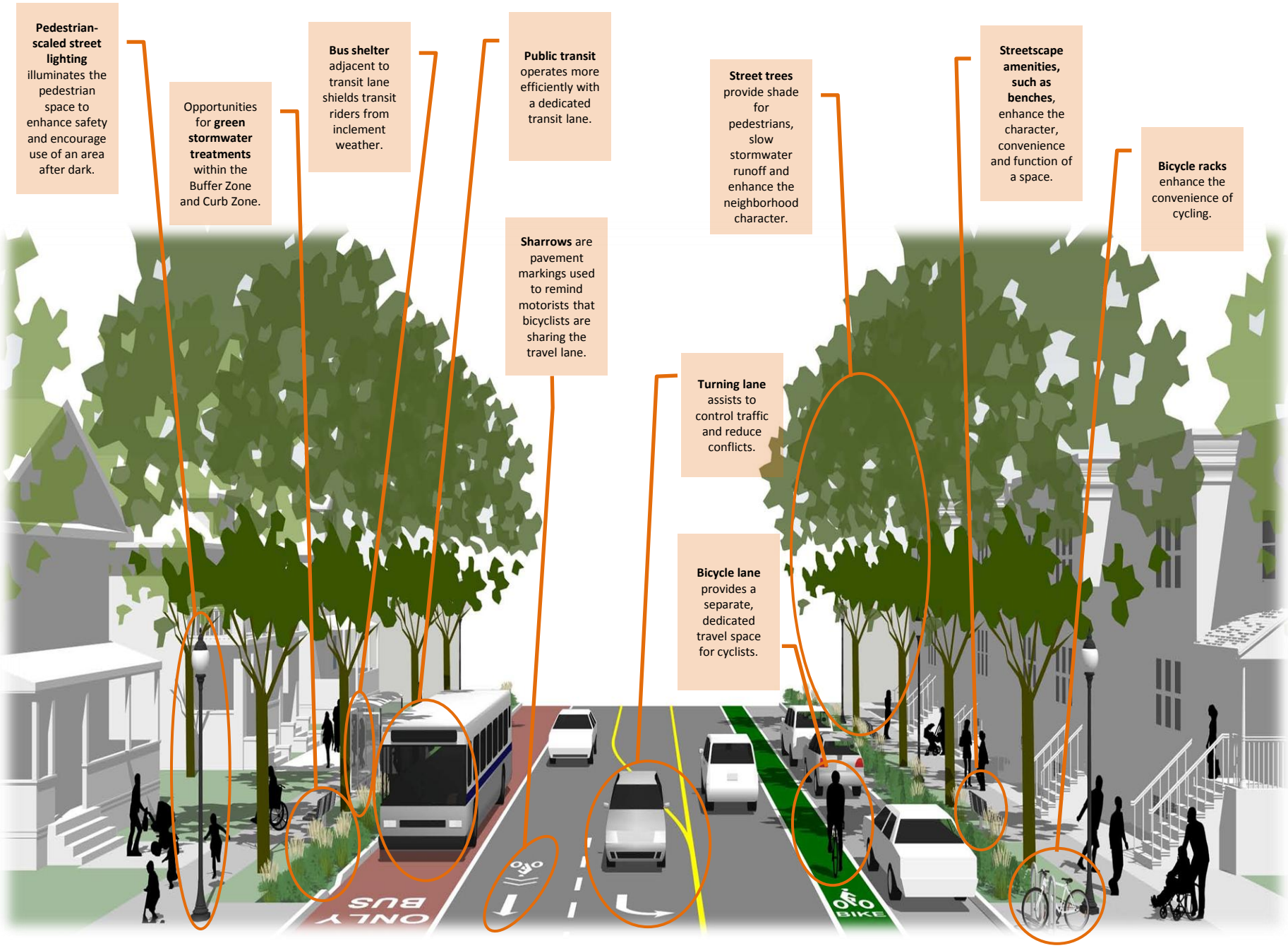
Functional Classification	Building Use Zone	Pedestrian Zone	Buffer Zone	Transit Lane	Travel/Turn Lane	Median Zone	Bicycle Zone	Parking Zone
DOWNTOWN								
Principal Arterial	Medium Priority	High Priority	Medium Priority	High Priority	High Priority	Low Priority	High Priority	High Priority
Minor Arterial	Medium Priority	High Priority	Medium Priority	Medium Priority	High Priority	Low Priority	High Priority	High Priority
Major Collector	Medium Priority	High Priority	Medium Priority	Medium Priority	High Priority	Low Priority	High Priority	High Priority
Local Road	Medium Priority	High Priority	Medium Priority	Medium Priority	High Priority	Low Priority	High Priority	High Priority
NEIGHBORHOOD MIXED USE								
Principal Arterial	Medium Priority	High Priority	Medium Priority	Medium Priority	High Priority	Low Priority	High Priority	High Priority
Minor Arterial	Medium Priority	High Priority	Medium Priority	Medium Priority	High Priority	Low Priority	High Priority	High Priority
Major Collector	Medium Priority	High Priority	Medium Priority	Medium Priority	High Priority	Low Priority	High Priority	High Priority
NEIGHBORHOOD RESIDENTIAL								
Minor Arterial	Low Priority	High Priority	High Priority	Low Priority	Medium Priority	Low Priority	Medium Priority	Medium Priority
Major Collector	Low Priority	High Priority	High Priority	Low Priority	Medium Priority	Low Priority	Medium Priority	Medium Priority
Local Road	Low Priority	High Priority	High Priority	Low Priority	Medium Priority	Low Priority	Medium Priority	Medium Priority
COMMUNITY MIXED USE								
Minor Arterial	Medium Priority	High Priority	Medium Priority	Medium Priority	High Priority	Low Priority	Medium Priority	High Priority
Major Collector	Medium Priority	High Priority	Medium Priority	Medium Priority	High Priority	Low Priority	Medium Priority	High Priority
Local Road	Medium Priority	High Priority	Medium Priority	Medium Priority	High Priority	Low Priority	Medium Priority	Medium Priority
COMMUNITY COMMERCIAL								
Principal Arterial	Low Priority	High Priority	High Priority	High Priority	High Priority	Low Priority	Medium Priority	Medium Priority
Minor Arterial	Low Priority	High Priority	High Priority	High Priority	High Priority	Low Priority	Medium Priority	Medium Priority
Major Collector	Low Priority	High Priority	High Priority	High Priority	High Priority	Low Priority	Medium Priority	Medium Priority
INDUSTRIAL								
Major Collector	Low Priority	High Priority	Low Priority	Low Priority	High Priority	Low Priority	Medium Priority	Medium Priority
Local Road	Low Priority	High Priority	Low Priority	Low Priority	High Priority	Low Priority	Medium Priority	Medium Priority

High Priority
Medium Priority
Low Priority

Streetscapes, Sidewalks and Streets in Practice

The following illustrates streetscape, sidewalk and street elements working together to create more accessible, connected, and safer corridors throughout the City. Each element has unique contributions, often benefitting and improving existing neighborhood character. Understanding the individual roles as well as connections between these elements is important to create a complete street.

Figure 5.19: Streetscape, Sidewalks, and Streets In Practice



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CHAPTER 6

Intersections

6. Intersections

Overview

Intersections are a challenging aspect of complete street implementation due to their range of complexity. They can range from large, multi-lane signalized intersections with multiple signal phasings to smaller stop or yield controlled intersections with few approaches. Intersections introduce conflicts between and amongst various transportation modes as well as turning vehicles and can act as pinchpoints for the efficient flow of transportation. In addition, intersections often serve as gateways for neighborhoods and as transition zones between various street typologies and complete street treatments, requiring that intersections take on a placemaking role, accounting for surrounding land uses, local neighborhood character, and acting as a node for intermodal activity.

Intersections contribute significantly to the successful implementation of complete streets. To support complete streets, intersections should act as "complete intersections". These "complete intersections" should incorporate design principles that make it compact, functional, visible, predictable, safe, connective, and accessible for all users and all modes of transportation. Intersection design must facilitate the continuation of complete street elements along a corridor through the intersection.

Intersections throughout the City vary based on character types. This section is intended to provide design guidelines and principles for the treatment of various complete street elements at intersections. The intersections shown are not intended to take on the character of a specific intersection or recommend a specific design for an intersection. Rather, the following intersection guidelines should be used to identify how specific complete street elements, when being implemented as part of a corridor, should be addressed at an intersection. These intersection treatments are meant to be interchangeable and used with appropriate land use/street typologies.

User Experience

Due to constraints presented by urban neighborhoods, such as limited right-of-way and utilities, enhancing pedestrian, bicycle, and transit accommodations along a roadway may at times include sacrificing automobile level-of-service to a degree, but can also result in a roadway that provides better multi-modal opportunities and is much more context appropriate to the surrounding neighborhood.

Pedestrians

The key to enhancing the walkability of an area is to create an environment in which pedestrians feel safe, comfortable, and accommodated. Pedestrians benefit from compact intersections that have minimal conflict and where they are highly visible to motorists, transit operators, and bicyclists. Ensuring that pedestrians of all ages and abilities are able to safely and comfortably move about an intersection is paramount. Placemaking also plays an important role in enhancing walkability of an area and

creating an environment favorable for pedestrians. Crosswalks, signage, pavement markings, signal heads, and ramps should be ADA compliant and designed to Federal and local standards. Further explanation of how pedestrians should be accommodated and how their experience can be enhanced are provided on the intersection graphics.

Bicyclists

For bicycling infrastructure to be a useful and impactful element of a transportation network, it must be perceived as being safe, comfortable, and accommodating. Further, bicycling is not just a lifestyle amenity, but a lifestyle necessity for some and therefore should be designed based upon the needs of various users, regardless of age, ability, and purpose. Bicyclist studies performed within the United States indicate that there are four (4) categories in which bicyclists may be classified.

Strong and Fearless

Strong and fearless bicyclists are active and walk, jog, ride bikes just about anywhere, anytime. This group represents less than 1% of the population.

Confident and Enthused

Confident and enthused bicyclists take advantage of improvements made to the active transportation system to walk or bike. This group represents about 5-10% of the population.

Interested but Concerned

Interested but concerned bicyclists are interested in using forms of active transportation, but are reluctant because they are concerned for their safety or are not confident enough to do so. This group represents about 60-65% of the population.

Not Interested

Not interested community members do not have an interest in active transportation and represent about 20-25% of the population.

Bicycling infrastructure should not only support the percentage of the population considered “strong and fearless” or “confident and enthused”, but also create comfortable bicycling opportunities for those that are “interested but concerned”. This group wants to bicycle, but often desires safer and more comfortable infrastructure, often protected from vehicular traffic with heightened awareness by motorists and transit operators. Likewise, motorists want bicycle travel to be predictable and visible to them.

Bicycle treatments at intersections have the potential to create the greatest apprehension when it comes to the comfort level of a bicyclist. It is therefore important to understand how bicycle treatments are carried through intersections. Further demonstration of how bicyclists should be accommodated and how the bicycling experience can be enhanced are provided on the intersection graphics that follow.

Transit Riders and Drivers

Transit conflicts at intersections often result from exposure to motorist activity, whether in the form of turning movements, vehicle queuing at intersections, or interaction in travel lanes. Transit user experience is enhanced by providing priority treatments for transit vehicles and by providing amenities that make transit use

more efficient and persuasive by offering better connectivity with pedestrians and bicyclists. Further explanation of how transit should be accommodated and how the transit experience can be enhanced are provided in the intersection graphics starting on page 6-4.

Motorists

The complexity of vehicular traffic varies greatly across various intersections throughout the City. There are a number of contributing factors to be considered for intersection design including physical, operational, and control characteristics of merging and intersecting street typologies. Crash data and traffic volumes play a significant role in determining the type of traffic control that should be implemented. Traffic control devices should be designed in accordance with MUTCD and New York State standards. Further explanation of how motorists should be accommodated and how the motorist experience can be enhanced are provided on the intersection graphics.

Design Criteria and Principles

Complete street treatments provide multi-modal opportunities for all roadway users and transportation modes, incorporate green infrastructure to reduce the impact of a roadway on the environment or a neighborhood, and consider smart technology in making the transportation system more efficient.

Intersection Alternate

Mini-roundabouts may be considered at minor intersection crossings, and may improve safety and overall intersection capacity, while reducing speed, noise, and maintenance needs. According the FHWA Mini- Roundabouts Technical Summary, locations with low truck traffic and total entering traffic of less than 15,000 vehicles are most appropriate. Please note guidelines and descriptions provided hereafter refer to more traditional intersections.

Intersection Design Criteria and Principles

To illustrate various complete street elements and their recommended treatment at intersections, three intersection graphics have been developed. These intersection graphics are not meant to represent a recommended design for a specific intersection, but rather offer guidelines on how to treat certain complete streets elements at intersections. Intersection A highlights the interaction of multimodal complete street elements. Intersection B highlights bicycle complete street elements and Intersection C highlights transit complete street elements. Numbered icons appear on specific locations on each illustration and correspond to a complete street element description. Elements with blue numbered circles represent pedestrian complete street elements. The green numbered circles represent stormwater or green infrastructure complete street elements. Elements with maroon numbered circles represent transit complete street elements.

The streets approaching the intersections depict different complete street treatments on each side of the road and are meant to be interchangeable based upon the complete street design of the corridor. For example, if a two-way corridor will incorporate a transit priority, then transit priority treatments would be designed on both sides of the street. Similarly, if bicycle treatments are to be provided along a two-way corridor, similar design would be provided on both sides of the street.

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Sample Plan View Illustrations

***Figure 6.1 - Intersection A**. The following illustration offers guidance for applying complete street elements at intersections with a bicycling and transit element focus. This is not intended to represent a recommended design for a specific intersection.*

1. ADA compliant **curb ramps** provide accessibility and safety for users of all abilities and should include detectable warning sensors to warn users that they are about to enter a roadway.

2. **Curb extensions** reduce crossing distances and give pedestrians dedicated space.

3. Using the most **minimum curb radii** feasible slows turning vehicles, making for a **safer and more comfortable** pedestrian and bicycle experience.

4. **High visibility or enhanced crosswalks** make pedestrian crossings much **more visible** to motorists.

5. **Bike lanes** provide a dedicated travel space for bicyclists.

6. **Shared travel lanes** that are striped and signed as such make motorists and bicyclists aware that the roadway is to be shared.

7. **Bicycle facilities** should be striped through intersections using pavement markings, shared lane markings, or dashed lines. **Green paint** should be used in complex, high conflict areas.

8. **Bike racks** provide parking for bicyclists and an opportunity for intermodal travel with transit.

9. **Transit only lanes** allow dedicated space for transit vehicles to operate and avoid vehicle congestion and conflict. **"BUS ONLY"** pavement markings and red pavement color should be applied to emphasize the lane and to deter drivers from using it.

10. **Signal priority** allows buses to actuate traffic signals to minimize delay and maintain headways.

11. **Shelters** at major transit stops and transfer points provide an extra level of comfort for transit users.

12. **Coordinated signal timing** helps maintain traffic flow and can help traffic progression at lower speeds.

13. **On-street parking** offers visible parking for a neighborhood, offers a buffer for pedestrians, and can help calm traffic speeds.

14. **Dedicated turn lanes** improve safety and traffic flow by removing turning vehicles from the traffic stream where turns are complex or experience heavy turning movement volumes.

15. **Pervious pavement** can be used for bike and parking lanes to **minimize stormwater runoff**.

16. **Flow through planters** and **rain gardens** treat stormwater by allowing runoff to soak through the soil and filter into an under drain.

17. **Bioswales** are **vegetated depressions** that capture, treat, and infiltrate stormwater.

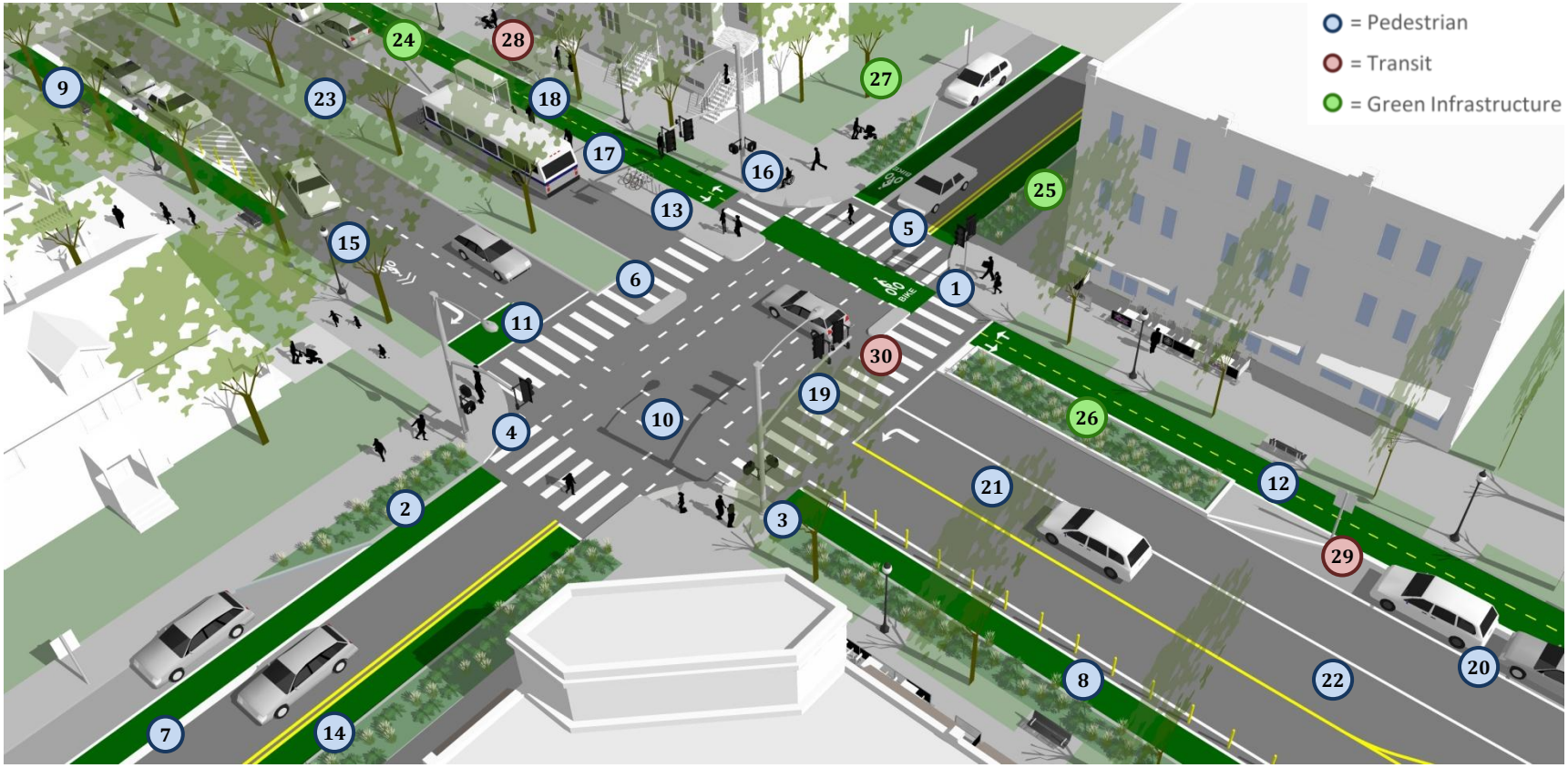
18. **Street trees** provide shade and enhance comfort and appearance of a street.

19. Transit users can access **real-time transit information** and pay fares using mobile devices.

20. Users can **find available parking** and pay for parking **using mobile devices**.

21. **Traffic control devices** that can **adjust to traffic demand**, such as adaptive signal control, **improve efficiency** of the transportation network.

Figure 6.2 - Intersection B. *The following illustration offers guidance for applying complete street elements at intersections with a bicycling element focus. This is not intended to represent a recommended design for a specific intersection.*



1. ADA compliant **curb ramps** provide accessibility and safety for users of all abilities and should include detectable warning sensors to warn users that they are about to enter a roadway.
2. **Curb extensions** reduce crossing distances and give pedestrians dedicated space.
3. **Pedestrian countdown signals** programmed to be automatic and actuated by pedestrian pushbuttons provide a level of comfort for pedestrians crossing a street. **Audible pedestrian signals** can provide extra guidance for pedestrians.
4. Using the most **minimum curb radii** feasible slows turning vehicles, making for a **safer and more comfortable** pedestrian and bicycle experience.
5. **High visibility or enhanced crosswalks** make pedestrian crossings much **more visible** to motorists.
6. **Crossing islands or curbed medians** provide a midway refuge for pedestrians crossing wider, more complex streets. Pushbuttons can be installed in medians to provide a means to extend crossing times.

7 **Buffered bicycle lanes** offer spatial protection from vehicular traffic in the form of a striped buffer space.

8 **Protected bicycle lanes** offer a greater degree of **protection from vehicular traffic** in the form of bollards, planters, curbs, or other vertical elements.

9 **Protected bicycle lanes** can use on-street parking as a buffer to offer protection from vehicular traffic.

10 **Bicycle facilities** should be striped through intersections using pavement markings, shared lane markings, or dashed lines. **Green paint** should be used in complex, high conflict areas.

11 **Bike boxes** are located between the crosswalk and vehicle stop bar to offer bicyclists a dedicated space to wait during red signal phases, **improving visibility of bicyclists** and allowing bicyclists a head start at the green phase.

12 **Two-way cycle tracks** are bicycle facilities separated from the roadway by curbing, landscaping, and/or on-street parking.

13 **Bike racks** provide parking for bicyclists and an opportunity for intermodal travel with transit.

14 **Contra-flow bicycle lanes** allow for two-way bicycle travel on a one-way street. This should be accompanied by contra-flow bicycle detection and signal head visibility at signalized intersections.

15 **One-way bike lanes** can mix with right turning vehicles in a "mixing zone"; proper shared lane markings and signage are necessary to be applied.

16 **Separate bicycle signals** can be applied where cycle tracks are separated from the roadway. Pedestrian and bicycle leading signal intervals allow pedestrians and bicyclists to clear an intersection before vehicle traffic is permitted to do so.

17 **Bus bulbs** are curb extensions at bus stops that align buses parallel to the sidewalk, allowing for improved accessibility.

18 **Shelters** at major transit stops and transfer points provide an extra level of comfort for transit users.

19 **Coordinated signal timing** helps maintain traffic flow and can help traffic progression at lower speeds.

20 **On-street parking** offers visible parking for a neighborhood, a buffer for pedestrians, and can help calm traffic speeds.

21 **Dedicated turn lanes** improve safety and traffic flow by removing turning vehicles from the traffic stream where turns are complex or experience heavy turning movement volumes.

22 A **road diet** can reduce roadway configuration from a 4-lane road to a 3-lane road with a continuous two-way center turn lane or a 2-lane road. Road diets can improve safety, increase roadway efficiency, and enhance the character and vitality of a neighborhood.

23 **Landscaped medians** provide access control, improving traffic flow along a corridor, and enhance the appearance of the corridor.

24 **Pervious pavement** can be used for bike and parking lanes to **minimize stormwater runoff**.

25 **Flow through planters** and **rain gardens** treat stormwater by allowing runoff to soak through the soil and filter into an under drain.

26 **Bioswales** are **vegetated depressions** that capture, treat, and infiltrate stormwater.

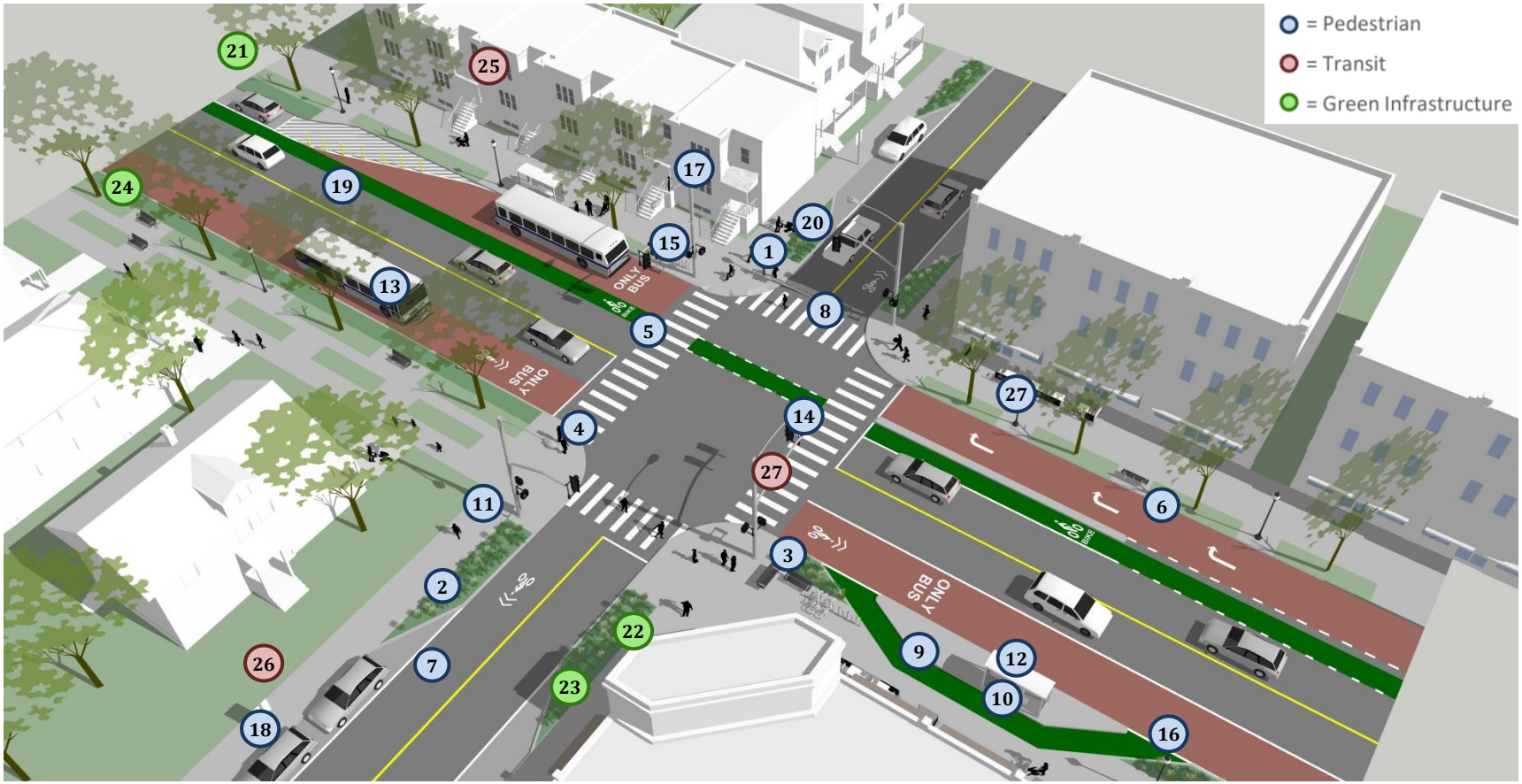
27 **Street trees** provide shade and enhance the comfort and appearance of a street.

28 Transit users can access **real-time transit information** and pay fares using mobile devices.

29 Users can **find available parking** and pay for parking **using mobile devices**.

30 **Traffic control devices** that can **adjust to traffic demand**, such as adaptive signal control, **improve efficiency** of the transportation network.

Figure 6.3 - Intersection C. *The following illustration offers guidance for applying complete street elements at intersection with a transit element focus. This is not intended to represent a recommended design for a specific intersection.*



1. ADA compliant **curb ramps** provide accessibility and safety for users of all abilities and should include detectable warning sensors to warn users that they are about to enter a roadway.

2. **Curb extensions** reduce crossing distances and give pedestrians dedicated space.

3. **Pedestrian countdown signals** programmed to be automatic and actuated by pedestrian pushbuttons provide an extra level of comfort for pedestrians crossing a street. **Audible pedestrian signals** can provide extra guidance for pedestrians.

4. Using the most **minimum curb radii** feasible slows turning vehicles, making for a **safer and more comfortable** pedestrian and bicycle experience.

5. **High visibility or enhanced crosswalks** make pedestrian crossings much **more visible** to motorists.

6. **Bike lanes** provide a dedicated travel space for bicyclists.

7. **Shared travel lanes** that are striped and signed as such make motorists and bicyclists aware that the roadway is to be shared.

8. **Bicycle facilities** should be striped through intersections using pavement markings, shared lane markings, or dashed lines. **Green paint** should be used in complex intersections or in high conflict areas.

9. **Bike racks** provide parking for bicyclists and an opportunity for intermodal travel with transit.

10. **Cycle tracks** and dedicated bike facilities should be routed around bus stops to avoid conflict with stopped buses.

11. **Separate bicycle signals** can be applied where cycle tracks are separated from the roadway. Pedestrian and bicycle leading signal interval allows pedestrians and bicyclists to clear an intersection before vehicle traffic is permitted to do so.

12. **Bus islands** allow riders to wait in a designated area away from other bicyclists and pedestrians.

13. **Shared bus and bicycle lanes** provide a dedicated space for buses and bicyclists. **"BUS AND BIKE ONLY"** pavement markings and **red paint** should be applied to emphasize the lane and to deter drivers from using it.

14. **Signal priority** allows buses to actuate traffic signals to minimize delay and maintain headways.

15. **Queue jump lanes** allow buses to bypass queued vehicles at an intersection.

16. **Shelters** at major transit stops and transfer points provide an extra level of comfort for transit users.

17. **Coordinated signal timing** helps maintain traffic flow and can help traffic progression at lower speeds.

18. **On-street parking** offers visible parking for a neighborhood, offers a buffer for pedestrians, and can help calm traffic speeds.

19. A **road diet** can be applied to reduce roadway configuration from a 4-lane road to a 3-lane road with a continuous two-way center turn lane or a 2-lane road. Road diets can improve traffic flow, improve safety, increase the roadway's efficiency, and enhance the character and vitality of a neighborhood.

20. **Pinchpoints or chokers** are used to **calm traffic** and add space for landscaping.

21. **Pervious pavement** can be used for bike and parking lanes to **minimize stormwater runoff**.

22. **Flow through planters** and **rain gardens** treat stormwater by allowing runoff to soak through the soil and filter into an under drain.

23. **Bioswales** are **vegetated depressions** that capture, treat, and infiltrate stormwater.

24. **Street trees** provide shade and enhance comfort and appearance of a street.

25. Transit users can access **real-time transit information** and pay fares using mobile devices.

26. Users can **find available parking** and pay for parking **using mobile devices**.

27. **Traffic control devices** that can **adjust to traffic demand**, such as adaptive signal control, **improve** efficiency of the transportation network.