NORTH TRENTON
BATTLE MONUMENT
IMAGINING A NEIGHBORHOOD OF CHOICE

Trenton Donnelly Homes Activity Action Final Proposal

October 29, 2021

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Project Description

The North Trenton/ Battle Monument Home Improvement Program (HIP) is intended to improve the physical appearance of a highly visible section of the main corridor running through the target neighborhood by addressing residential disrepair and blight. This program will leverage multiple programs, both new and existing, and target the owners of residential properties to enable them to undertake rehabilitation projects that will enhance the physical appearance of their homes, and improve health, safety, bolster property values and encourage additional investment in the community. This Action Activity supports the North Trenton/Battle Monument Choice Neighborhood Plan Neighborhood / Housing Goal 2.B: Establish a program to assist homeowners with necessary repairs.

Many homes in the Choice Neighborhood have substantial deferred maintenance and can be obstacles to resident and visitor perceptions of the neighborhood and can stymie redevelopment efforts. To address this, we have identified three key blocks in the neighborhood where facade and other improvements will serve as a model for home-by-home redevelopment on the block level. The program will use Choice Neighborhoods and City of Trenton funding to complete facade repairs on owner-occupied homes. If the property is rented, facade repairs may be completed using funds from the Choice Neighborhood Grant and the Trenton Neighborhood Initiative (a unique partnership between Trenton Health Team and Capital Health). Trenton Neighborhood Initiative focus is on community-wide improvement in the North Trenton/Battle Monument neighborhood. There are many vacant and abandon properties within this neighborhood. The City of Trenton will invest funds to demolish the unsafe, inhabitable properties and assemble vacant properties to sell for redevelopment. In addition, there is an indoor batting cage located in the same target area along the 600 block of MLK Boulevard that is owned by the City of Trenton and operated by the North Trenton Little League. The City will invest funds to rehabilitate the batting cage and community space within that property.

Participating properties that require accessibility-related and urgent repairs, like the repair or replacement of roofs, heaters, plumbing or electrical, etc. will be addressed via the Trenton Urgent Rehabilitation Program (TURP). TURP provides up to $5,000 per home, for homeowners making no more than 80% of area median income.

In addition, all participating properties will receive a Healthy Homes Assessment from planning partner, Isles. This assessment examines the health and safety, energy efficiency, and lead conditions of a home, and identifies the most cost-effective remedies to address dangerous and inefficient conditions. Depending on the conditions identified, lead remediation, weatherization, and health and safety improvements will be completed with funding from the City of Trenton, Isles and the Trenton Neighborhood Initiative.

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The unique ability to braid together multiple funding streams--Choice, Trenton Neighborhood Initiative, Isles grants, and the City of Trenton's funding --will allow residents to improve the conditions of their homes at little to no cost and will create a continuous stretch of Martin Luther King Jr. Boulevard to be a catalyst for additional investment and improvement in the neighborhood.

The HIP will target the 600 and 700 blocks of Martin Luther King Jr. Blvd, from Southard Street south to New Rose/Middle Rose Street. Once complete, homeowners and residents will benefit from safer, healthier homes. The program will renew residents' pride in MLK Blvd, a major corridor in the neighborhood that will once again strive to honor its namesake.

Target Area (Donnelly Homes is immediately north of Southard Street)

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Administration

Trenton Housing Authority will provide overall project management, interagency coordination, and conduct community outreach. Trenton Housing Authority will also assess participant eligibility; coordinate funding; and oversee construction and contractor relationships. Isles will conduct Healthy Homes Assessments and coordinate lead remediation and weatherproofing work. Trenton Neighborhood Initiative and the City of Trenton will support both THA and Isles in these coordination efforts as necessary.

Project Budget

Sources	**CNI**	**Isles**	**City**	**Trenton Neighborhood Initiative**	**Total**
Staffing		$30,000		$30,000	$60,000
Facade Repairs	$500,000			Up to $175,000	$675,000
Urgent Repairs-Funding source?			$100,000		$100,000
Healthy Homes Assessments		$2,000			$2,000
Weatherization			$150,000		$150,000
Remediation/ Weatherproofing		$365,000		$100,000 for lead remediation only	$465,000
Demolition-HMFA (18)			$720,000		$720,000
Demolition-CDBG (2)			$72,000		$72,000
Batting Cage			$500,000		$500,000
	$500,000	$397,000	$1,542,000	$305,000	$2,744,000

*Note – funds have not been committed

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Project Schedule

Milestones	Date Start	Date Finish
Community Outreach	January 2022	June 2022
First six participants identified, and contracts signed	June 2022	August 2022
First round of construction begins	August 2022	November 2022
Second round of participants identified, and contracts signed	November 2022	January 2023
Second round of construction begins	January 2023	May 2023
Third round of participants identified, and contracts signed	April 2023	May 2023
Third round of construction begins	May 2023	September 2023

Measurable Outcomes

40 Completed residential facades

40 Healthy Homes Assessments

40 City owned properties demolished

40 City owned properties sold for redevelopment

Neighborhood / Housing 2.B goal: Establish a program to assist homeowners with necessary repairs.

- At least 40 homes will receive necessary repairs and façade improvements

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FACT SHEET

WHAT IS THE HIP PROJECT?

The North Trenton / Battle Monument Home Improvement Program (HIP) is intended to improve the physical appearance of the targeted neighborhood (in the Choice Neighborhood) by addressing residential disrepair and blight.

WHAT SERVICES DOES HIP PROVIDE?

Choice Martin Luther King Jr Blvd Façade Program — ***Up to $20,000***

- Porches, Steps, Windows, Railings, Brick repair, Exterior lighting, etc.

Trenton Urgent Rehabilitation Program (TURP) — ***Up to $5,000***

- Heaters, Water Heaters, Plumbing, Electrical, Sewer, severely leaking rook, Wheelchair ramps, Grab bars in showers, Accessible toilets

Healthy Homes Assessment - Weatherization Assistance and Lead Safe Program

- Free structural & home health assessment, lead paint and water testing. ***$50 Value***
- Replacement or repair for roofs, gutters, windows, and doors. Free lead paint removal. Up to ***$12,000*** of free repairs
- Insulation and air sealing, furnace or hot water heater repair or replacement and other energy saving measures. ***$7,000*** of free repairs

WHO QUALIFIES FOR THESE SERVICES?

Choice MLK Façade: This program is targeted to owners of residential properties in the 600 and 700 blocks of Martin Luther King Jr. Blvd, from Southard Street south to New Rose/Middle Rose Street, who meet the income guidelines below are eligible.

TURP: ALL Trenton Home owners, who meet the income guidelines below are eligible.

Lead and Healthy Home Assessments: All Mercer County residents are eligible. Renters do not need landlord approval to receive health and safety assessments.

Lead Safe Repairs: ALL Trenton homeowners or renters, who meet the income guidelines below are eligible. Landlord approval is needed for any work performed, but the income of the renter is used to determine eligibility.

Weatherization: All Mercer County homeowners or renter who meet income guidelines below are eligible. Landlord approval is needed for any work performed.

Choice Façade program income cap by household size:
1: $89,740 2: $102,560 3 :$115,380 4: $128,200 5: $138,450 6: $148,750

TURP and Lead Services income cap by household size: 1: $54,950 2: $62, 800 3: $70, 650 4: $78,500 5: $84,800 6: $91,100

Weatherization income cap by household size: 1: $25,520 2: $34,480 3: $43,440 4: $52,400 5: $61,360 6: $70,320

HOW MUCH WILL IT COST?

There is no cost to the renter or owners who live in their homes. Landlords may be asked for a contribution toward services.

HOW CAN I PARTICIPATE?

Please complete an interest form and someone will contact you.

CONTACT US:
CHRYSTI HUFF (609) 278-5004
OR EMAIL: CHUFF@THA-NJ.ORG

TRENTON HOUSING AUTHORITY

isles Trenton Neighborhood Initiative

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Martin Luther King Jr. (MLK) Complete Streetscape Project

Project Description:

Martin Luther King Jr. (MLK) Boulevard runs through the heart of the North Trenton/Battle Monument Choice Neighborhood, forming a prominent gateway to the City from the north that leads directly downtown. The Boulevard runs along the Donnelly Homes site, which is about a 20-minute walk to downtown. With a light mix of uses, this tree-lined and pedestrian-scaled boulevard has all of the building blocks of a true main street.

This Action Activity aims to make a series of targeted improvements to enhance the appearance, safety, character, and sense of place of MLK Boulevard in response to residents' desire for the street to "live up to its name" and become a beautiful, vibrant corridor of which residents can be proud. Improvements are intended to run the length of MLK Boulevard in the Choice Neighborhood from Battle Monument to Calhoun Street. These aspirations align with many goals of the North Trenton/Battle Monument Choice Neighborhood Plan and the City's Trenton250 Comprehensive Plan.

Improved Safety & Connectivity

The North Trenton/Battle Monument Choice neighborhood is inviting in part because of the pedestrian-scaled blocks that make it very walkable—if residents feel safe. Safety is a top concern for Donnelly Homes and neighborhood residents. By implementing the City's first Complete Streets project, this activity will improve safety, walkability, bikability and public transit access.

A system of "Complete Streets" across the city is proposed in the City's Trenton250 Comprehensive Plan, and a Complete Streets Handbook was just drafted, although no immediate plans or funds have been identified to implement the city-wide network. This Action Activity will jumpstart the Complete Streets effort and serve as a pilot / demonstration project for the entire city, illustrating how streets can be safe, clean, and convenient for all users by integrating a multi-modal transit network for pedestrians, bicyclists, motorists and transit riders of all ages and abilities. Complete Streets promotes healthy lifestyles and walkability; reduces traffic congestion and carbon emissions; and incorporates the needs of multiple users.

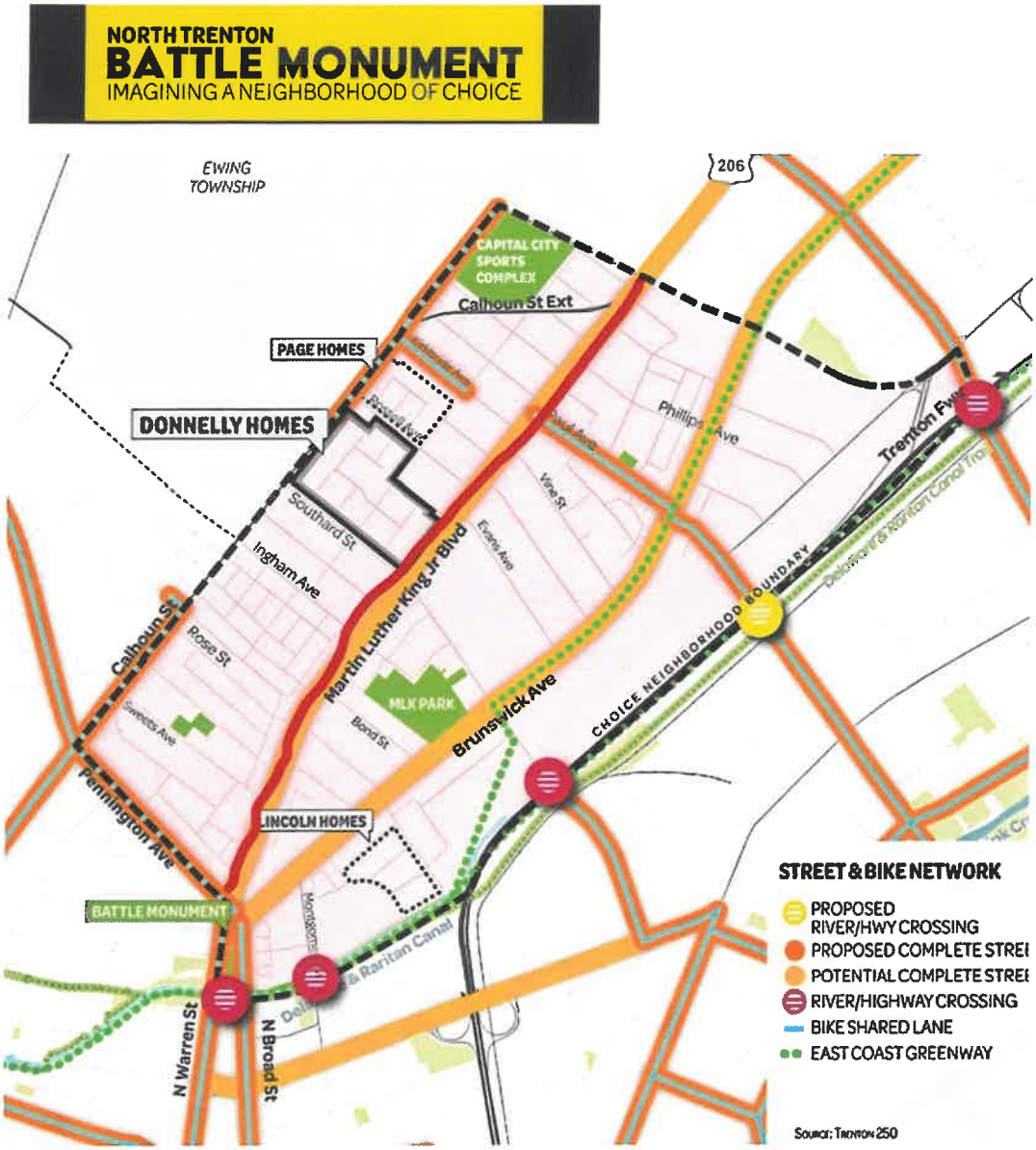
In North Trenton along MLK Boulevard, a complete street transformation would increase safety for pedestrians and bus riders and cyclists along the central corridor and help create more of a "main street" for the neighborhood. It would also improve connections to the neighborhood's major assets such as MLK Boulevard, the schools, and parks, as well as connections to center city and adjacent neighborhoods. In doing so, it would provide alternative connections to employment, education, recreation including the 70-mile Delaware & Raritan Canal Trail, retail, public facilities, and the Trenton Train Station, which offers service to New York City, Philadelphia and the larger region.

Placemaking

In addition to improving safety and mobility for all users, this project will enhance the sense of place along MLK Boulevard to create an active commercial corridor and central gathering place that is inviting for nearby residents as well as folks beyond the neighborhood. A coordinated design for these improvements still needs to be developed with input from the community but the vision includes street furniture such as benches, planters and trash cans, interpretive signage to celebrate the area's history, landscaping, decorative lighting, and public art by local artists.

Martin Luther King Boulevard has not only a meaningful name but a historical past. The "Battle Monument" aspect of this neighborhood's identity comes courtesy of the 1776 Battle of Trenton that gave Washington his first victory in the American Revolutionary War. It was later commemorated in 1896 with the monument that marks the gateway to the neighborhood from Downtown Trenton. This stretch of MLK also formed the backdrop of the 1968 riots in reaction to Martin Luther King's death, forming another layer in the city's tradition of civic activism and fight for equality.

We would like the neighborhood to celebrate this distinctive identity and character in remembrance of the past by displaying interpretive signage along the MLK Boulevard corridor. In addition, we are proposing painting intersections and installing artistic murals along the MLK Boulevard to reflect this rich historical heritage and civic legacy. In workshops with residents during the planning process, we explored opportunities to reimagine MLK Boulevard and there was great interest in reflecting this history through features such as decorative elements such as historic-inspired lampposts and street furniture, which this project also strives to integrate.



Redline represents the Martin Luther King Jr. Blvd corridor

Administration: Staff of the City of Trenton, Department of Public Works, Public Service Electric & Gas, and Trenton Housing Authority would work together to administer the project. The City of Trenton (COT), would administer contracts for professional services and construction work for this part of Trenton, will oversee project design, engineering and the bidding process. COT will take the lead on sidewalk, streets/ roadway, and lighting. The Trenton Housing Authority will work with other partners like Isles, Smith Family Foundations and THT to oversee the beautification, artistic and historical enhancements. The City of Trenton will be the responsible entity to maintain and manage the street furniture and improvements.

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Project Budget

Sources	CNI	Isles	City	Smith Family Foundation	Trenton Health Team	Total
Public Works Improvements (Streets / Sidewalks)			$700,000			$700,000
Historic Decorative Lighting	$50,000		$50,000			$100,000
Gardens	$20,000	$10,000			$10,000	$40,000
Trees			$300,000			$300,000
Benches / Bistro seating	$21,000			$10,000		$31,000
Decorative Crosswalks	$75,000			$30,000		$105,000
Interpretive Signage	$55,000			$10,000		$65,000
	$221,000	$10,000	$1,050,000	$50,000	$10,000	$1,341,000

Project Schedule

Milestones	Date Start	Date Finish
Planning	January 2022	June 2022
Implementation	July 2022	December 2023

Measurable Outcomes

Complete Street improvements installed along MLK Boulevard running the length of the Choice Neighborhood boundary from Battle Monument to Calhoun Street.

Number of interpretive signs installed

Number of decorative historic lampposts installed

Number of murals/public art installed

Number of enhanced crosswalks

MLK Jr. Blvd Version

NOVEMBER 2020

Trenton
[COMPLETE STREETS DESIGN]
Handbook

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

TRENTON 250 1792-2042

Overview

Eleven typologies were developed to help guide Complete Streets design decisions for streets in Trenton. These Complete Streets typologies serve a similar purpose to functional classification by divvying roads into logical categories, but rather than focus on the road's function within just the motorized transportation network as the functional classification does, these typologies take a holistic view of roads in Trenton and consider the wide variety of roles and functions that streets can play in urban life.

The eleven typologies developed for this guide are listed in the table below. These typologies are based on several key factors, including the adjacent land use, the density of surrounding development, the estimated traffic volume on the road, and whether or not the road is located downtown. A full methodology is provided in the following section, "Typology Development."

The typologies are mapped together in Figure 1. Limited access facilities are also mapped in Figure 1, but these are not considered a Complete Streets typology since, by definition, they are open exclusively to motorized vehicles. Maps of subsections of the city, including all the street names, are provided in the appendix.

This chapter provides details on each of the Complete Streets

Typology	Land Use	Density	Approx. Avg. Daily Vehicle Traffic	Downtown
Dense Residential	**Residential**	**Above Average**	**1,500**	**No**
Single-Family Residential	**Residential**	**Below Average**	**1,000**	**No**
Commercial Corridor	**Commercial**	**Variable**	**7,000**	**No**
Connector Corridor	**Variable**	**Variable**	**5,000**	**No**
Downtown Commercial Corridor	**Commercial**	**Above Average**	**4,700**	**Yes**
Downtown Connector Corridor	**Variable**	**Above Average**	**4,500**	**Yes**
Downtown Minor	**Office, Commercial**	**Above Average**	**2,500**	**Yes**
Neighborhood Mixed Use	**Variable**	**Variable**	**3,000**	**No**
Industrial Access	**Industrial**	**Variable**	**2,300**	**No**
Park	**Park**	**Below Average**	**Very Low**	**No**
Alley	**Residential**	**Variable**	**Very Low**	**No**

typologies, including an overview of how an ideal street in this typology could be designed. For each typology, a cross-section of a possible street configuration is provided. In addition, a table of design elements indicates what features should be included to ensure the design is compliant with Complete Streets principles. The guidelines developed here take into account issues like the types of people that this typology is likely to primarily serve – whether they're motorists, pedestrians, children, office workers, etc. They also provide guidance on the types of amenities that are most relevant and the types of traffic calming strategies that are likely to be appropriate in locations where speeding or other hazardous driving behaviors are present. They also point out unique considerations that should be at the front of mind when designing a road in each typology.

Not every road will be able to incorporate every recommendation listed under their typology. This guide provides a starting point, however, for making context-sensitive design choices that further Trenton's Complete Streets implementation goals.

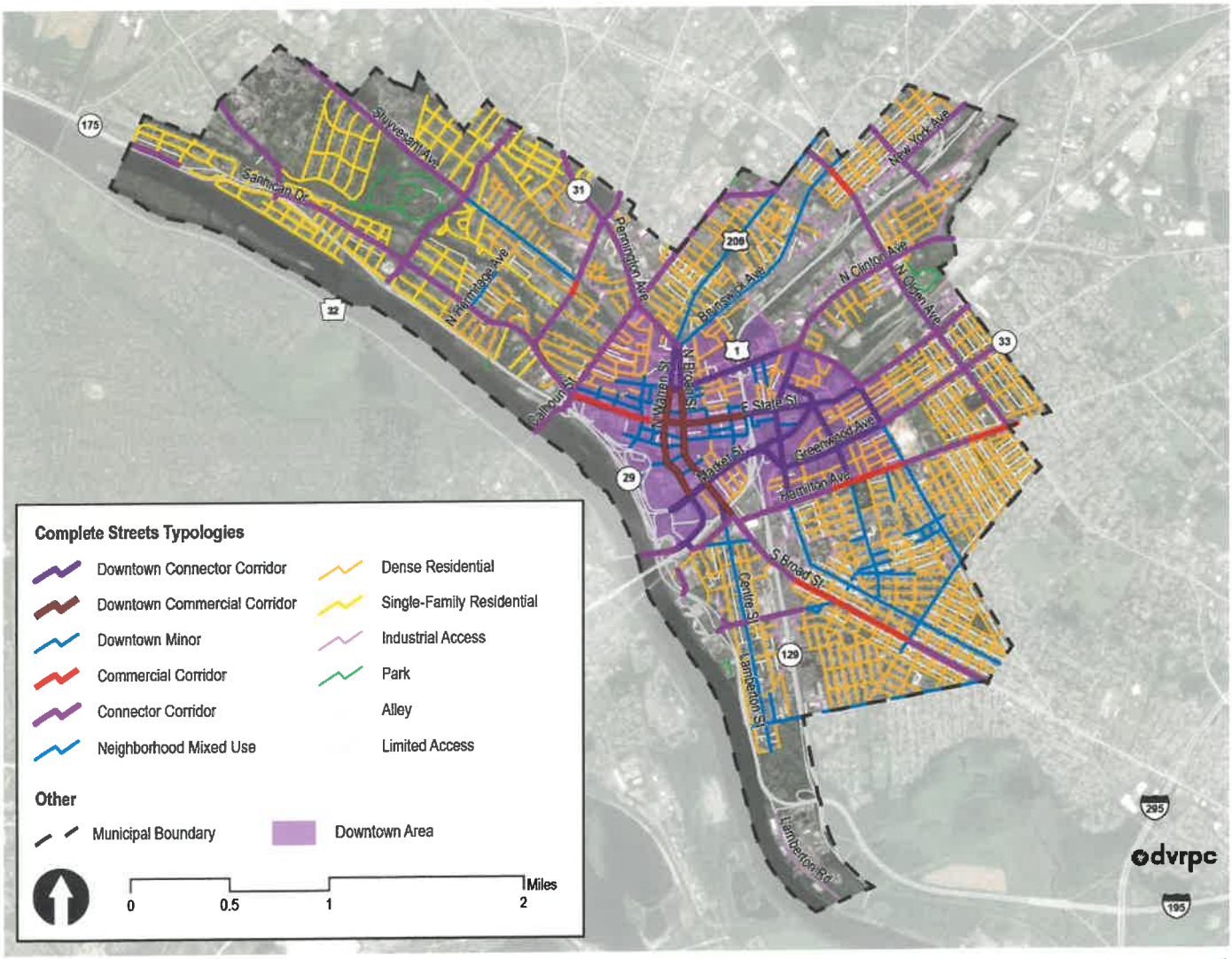

Figure 1 *Trenton Complete Streets typologies*

Source: DVRPC, 2019

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Typology Development

To make appropriate recommendations, street typologies needed to be developed and applied to each street segment in Trenton. Typologies are a standard element of many Complete Streets guides. Typologies are useful because they can be tailored to the unique characteristics of Trenton and used to group similar streets across the city into categories that can communicate the best design guidelines to ensure compliance with the Complete Streets policy.

Typology development and assignment was done by analyzing the characteristics of the city that impact street activity: modes of transportation, land use, density of uses, the downtown area, daily vehicle traffic volumes, and bus routes.

Land use is reflective of the types of activities in an area, which in turn indicates the way that a street is used. For example, commercial streets with stores benefit from a frontage zone in the sidewalk, which serves as a buffer between shop entrances and the pedestrian zone that should always be clear from obstructions. Figure 2 maps the land use categories used to determine the Complete Streets Typologies.

People Density is determined by the number of people living and working by Census block. It indicates if the population density is higher or lower than the citywide average. This metric provides a sense of how many people are living and working along a given street. This is important to understand

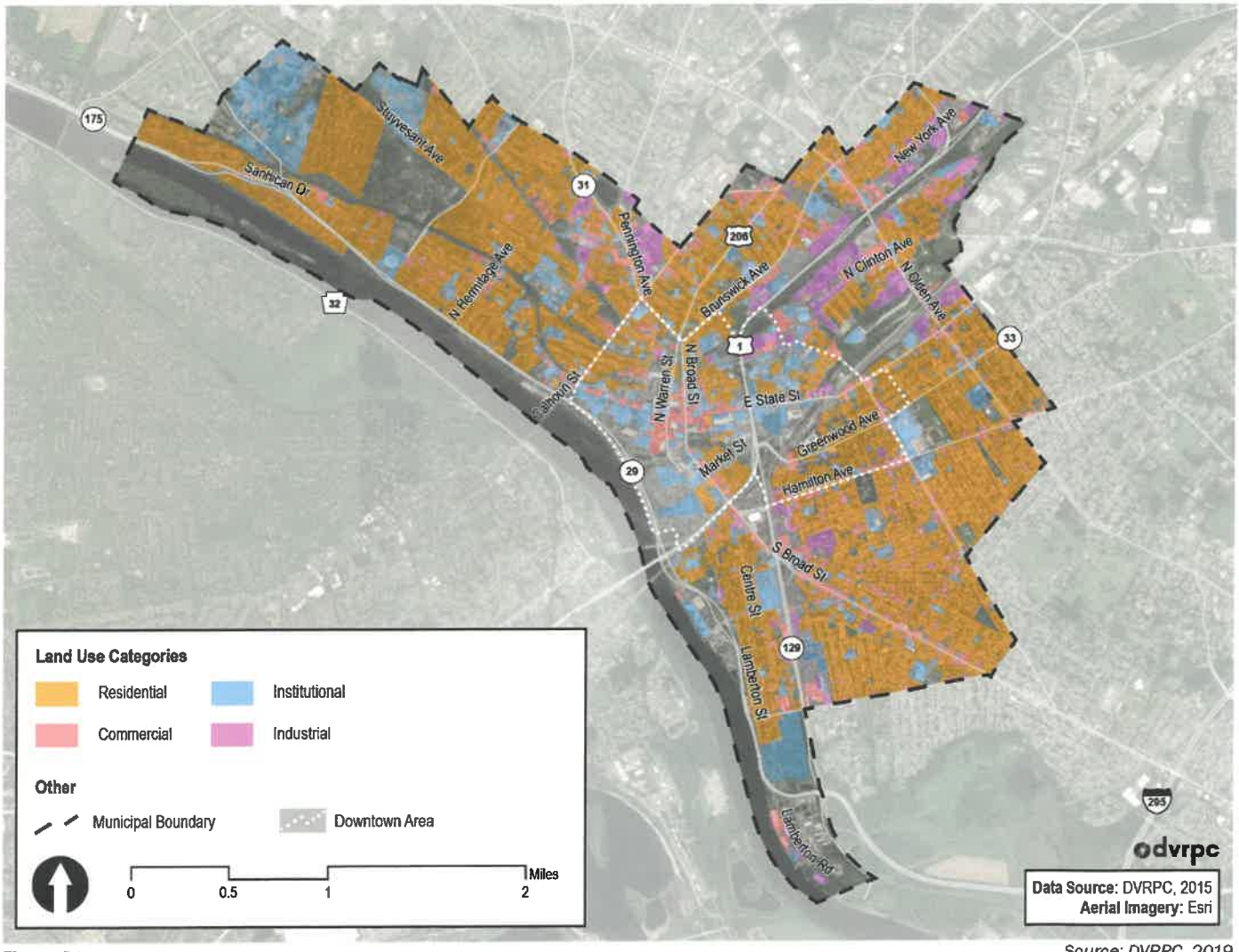

Figure 2 *Land Use*

Source: DVRPC, 2019

so that appropriate capacity is provided for different modes. For example, if a street is densely populated with residents and workers, then extra consideration for how they travel should be made, including accommodations for people that drive, bike or take public transit. Figure 3 maps the people density across Trenton used to determine the Complete Streets Typologies.

The downtown boundary identifies streets that are in the active central business district of Trenton. These streets are generally high density, with a diverse group of workers and residents who use a wide range of transportation options. Each mode generally needs to be able to handle high capacity in this area, with more people using transit and more people walking.

Downtown Trenton also has unique aesthetic considerations. The main arterial streets should have elements like paired streetlights, brick accents on the sidewalks, and granite curbs that highlight their importance as the most traveled streets in the city and where people from across the city and area convene.

Estimated annual average daily traffic (AADT) reveals the number of cars traveling on a street segment each day. This informs recommendations that accommodate higher traffic volumes while also creating a safe environment. For example,

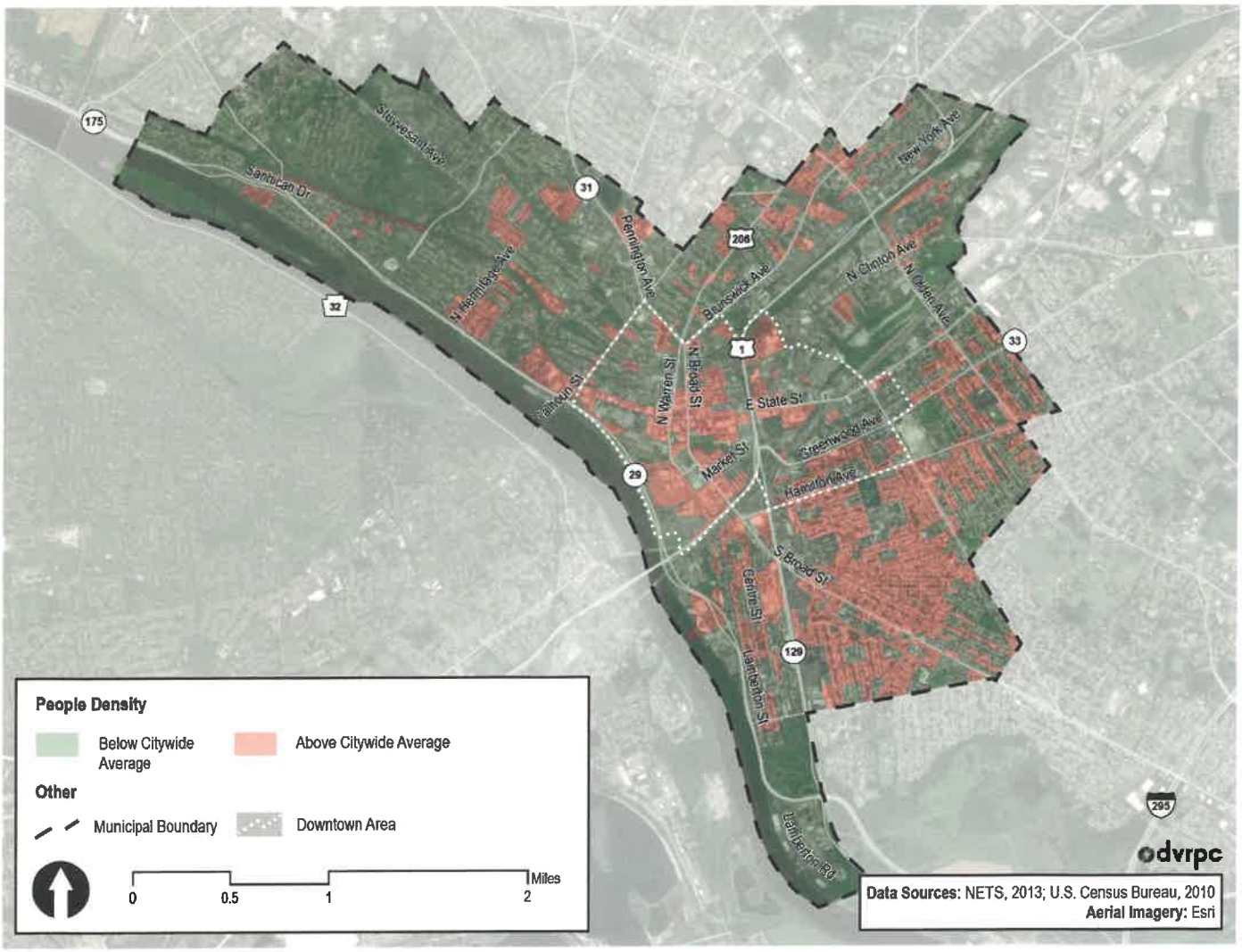

Figure 3 *People Density*

Source: DVRPC, 2019

many traffic calming strategies are limited to roads with lower AADT to avoid having a detrimental effect on throughput on key arterial roads. Figure 4 maps the AADT estimates across Trenton's road network that were used to determine the Complete Streets Typologies.

Bus routes reflect the streets that need capacity for surface transit vehicles and people boarding and departing vehicles. For example, bus bulbs allow buses to stay in the travel lane during boarding and avoid the need to merge back into traffic. At the same time, bus bulbs keep the sidewalk clear and enable pedestrians to walk easily through the bus station area. Safety is addressed by improving sight lines between the travel lane and the bus stop where people are boarding and alighting. Figure 5 maps the bus routes in Trenton used to determine the Complete Streets Typologies.

These data points were used to create typologies. For instance, primarily residential streets in lower density sections of Trenton became the Single-Family Residential typology. Streets outside of the Downtown Zone with more than 3,500 estimated AADT that were not primarily commercial were assigned the Connector Corridor typology. Streets that were identified by the *Trenton250 Plan* and by the *Downtown Trenton Bicycle and Pedestrian Plan* were given special consideration to ensure consistency across the recent planning efforts.

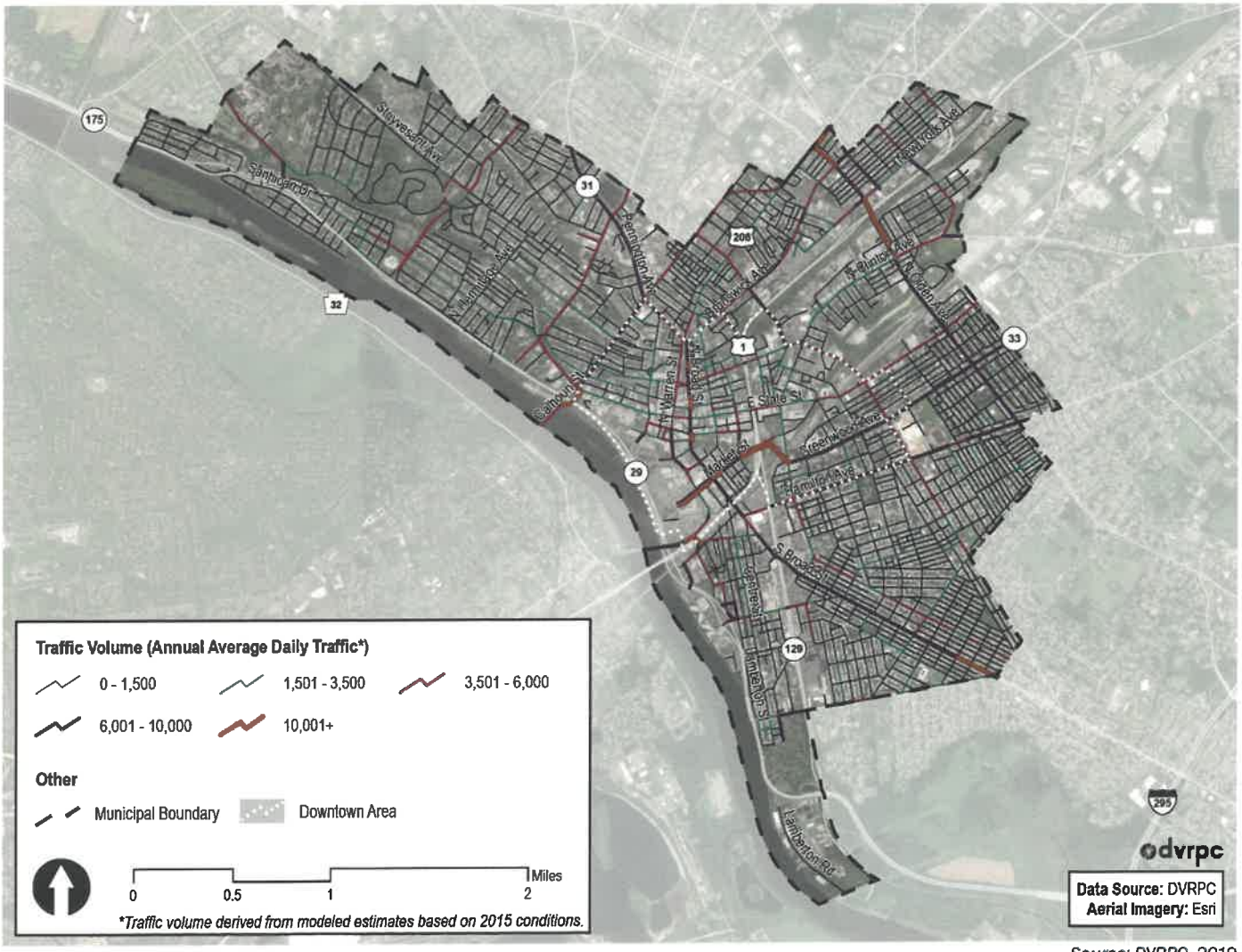

Figure 4 *Estimated Daily Traffic Volumes*

Source: DVRPC, 2019

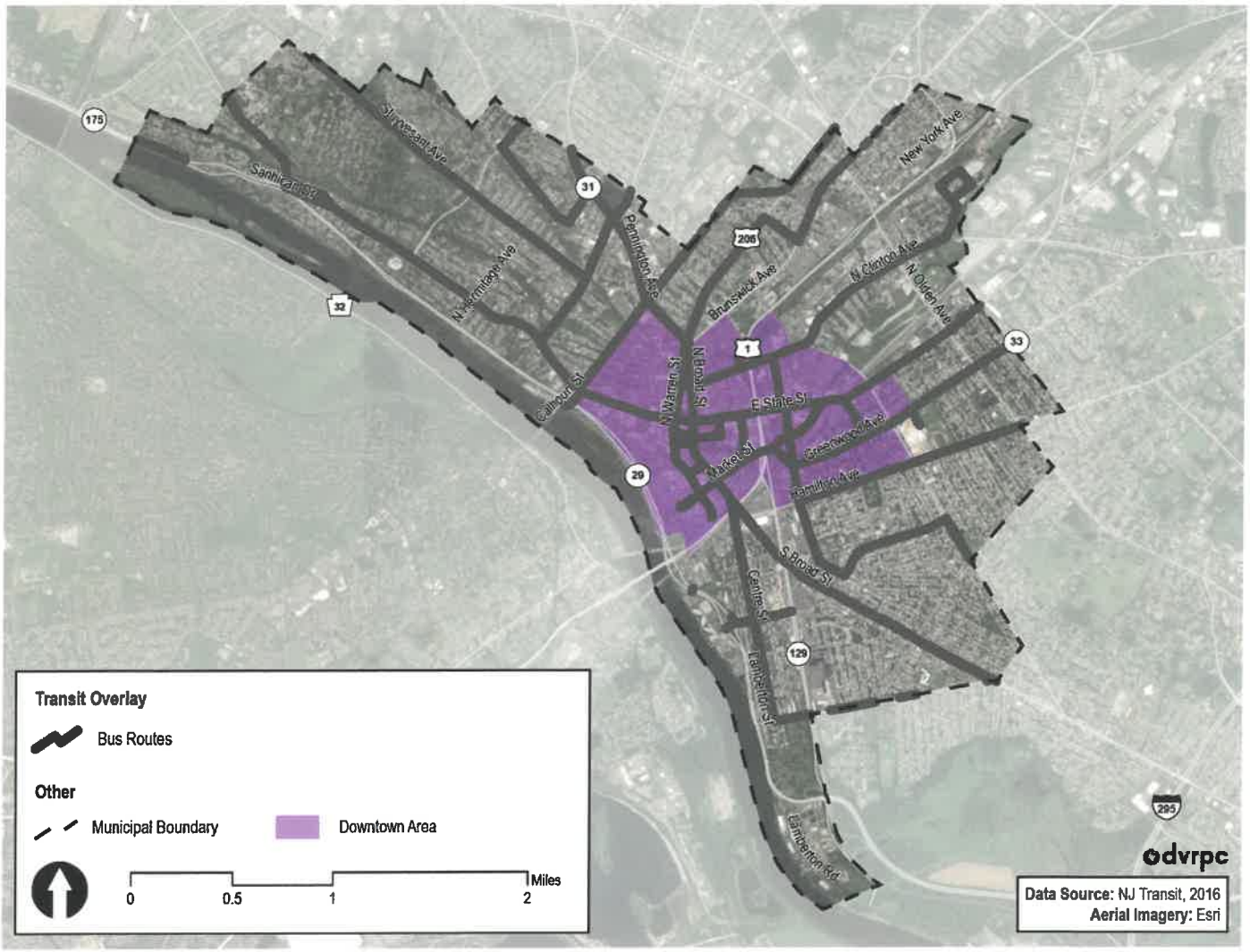

Figure 5 *Bus Routes*

Source: DVRPC, 2019

The remainder of this chapter will address each typology in detail, including a description, goal, ideal cross-section, and design considerations for each.

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Example Typology Spread

For each typology, a cross-section of a ideal street configuration is provided. In addition, a table of design elements indicates what features should be included to ensure the design is compliant with Complete Streets guidance. Green boxes below are provided to explain the purpose of each graphic and section that will be included for each typology. Each design element is defined and explained in the design elements chapter (see page 75). Note that required elements are shown in the table, but do not necessarily appear in graphics. For example, intersections are not shown in graphics, but there are required elements at intersections.

Goal: The purpose of the typology

Primary Land Use: The most common land use

Density: Typical population density

Average Estimated Traffic Volume: #,### vehicles/day

Miles: Total miles of roadway with the typology

Examples: Example streets

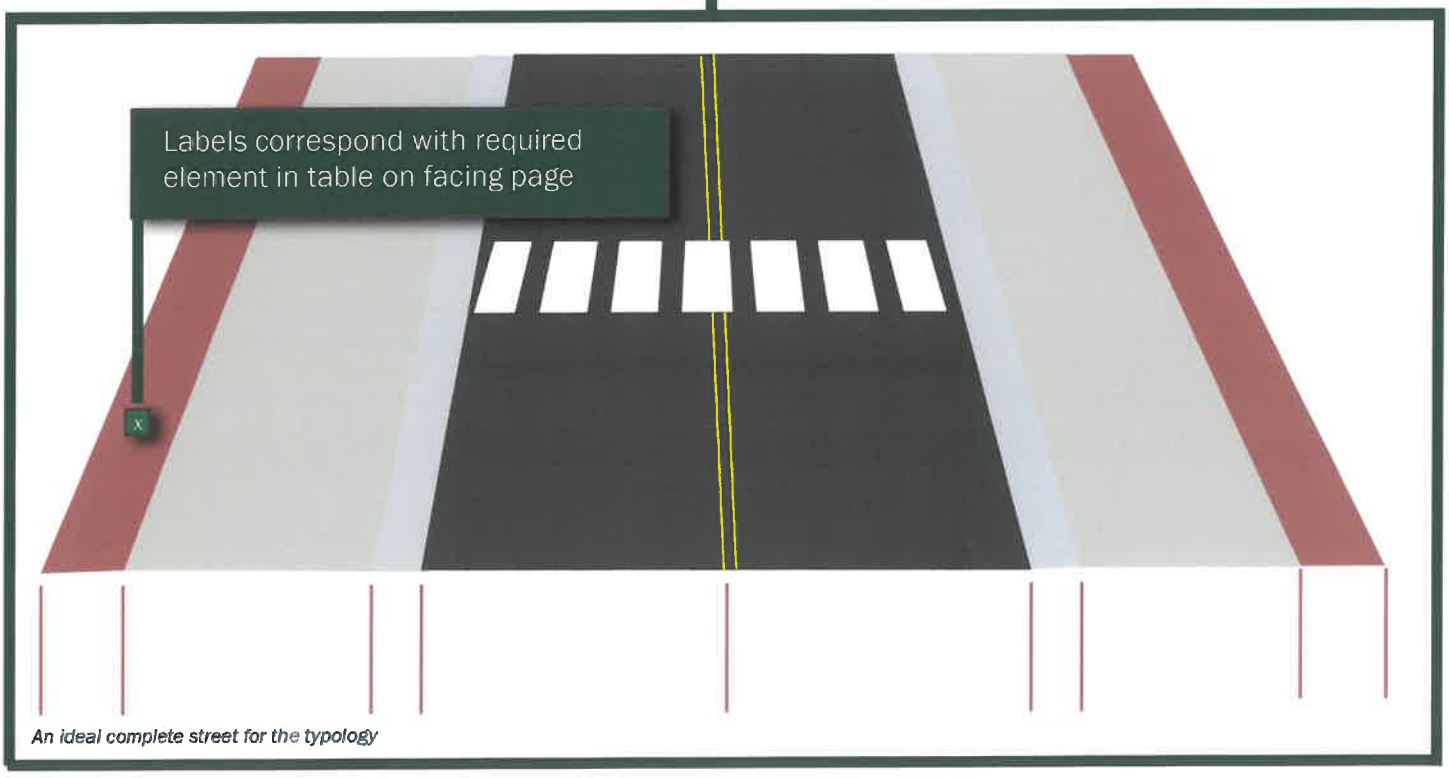
The existing conditions box describes the characteristic of the typology

Overview

These streets are primarily residential, but may include some small commercial or institutional land uses such as corner stores, churches, and schools....

The overview section is used to gain a basic understanding for the context of the street typology.

The cross section shows an ideal street configuration, including required and recommended design elements.



An ideal complete street for the typology

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The typology element table shows if an element is required and any stipulations regarding implementation.

This column is used to determine if a design element is required, recommended, should be used only as needed, or not recommended.

The stipulations column details specifications relevant for a design element by typology.

These design elements are detailed in the design elements chapter. Not every design element is included; the focus is on elements with typology-specific guidance.

Each category is hyperlinked to the associated design elements page

Below the elements, special considerations provide additional guidance beyond what is included in the table. These items are indicated with a numbered footnote (1).

		ELEMENT	✓	STIPULATIONS
K	Sidewalk Zones	Frontage Zone		
		Pedestrian Zone	x	5' - 6', sidewalk should be s
		Greenscape-Furnishing Zone		2'-6" - 4'
		rastructure		stormwater planters, tree t
				small stature, spaced at least 25' apart
				alternating across street, 75'-120' spacing
		Bike Parking		
CURB	Sidewalk Facing	Driveways / Entrances		10'-12' wide, at least 20' from signalized intersections
		Curb Extensions		use if visibility and/or speeding are issues
		Bus Loading Curb Extensions		
	Road F ce	On-street		
		Parklets		
		Loading		
ROADWAY		Lane Nar		10', painted centerline not required
	Traffic Calming Strategies[2]	Vertical De		use speed cushions if road used by buses or heavy vehicles
		Chicanes		use where speeding is a problem
		Neckdowns		use in areas with high pedestrian volume, mid-block crossings
	Transit	Dedicated Bus Lane		
	Bikes	Bicycle Facilitie [3]		consider sharrows and creating Neighborhood Greenways
INTERSECTION	Pedestrian Safety and Priority	Crosswalks		continental style at all controlled intersections
		Pedestrian Signals and Warning Signs		install countdown tim
		Pedestrian Refuge Island		
	Bicycle Safety and Priority	Bike Boxes		
		Two-stage Turning Boxes		use where there is hi
	Traffic Calming	Vertical Deflection and Turn Calming		use at intersecti s w

Required | Recommended | As Needed | Not Recommended or N/A

[1] **Lighting:** Pedestrian scale lighting is not necessary on single-family residential streets. In addition, lighting fixtures may be more spread out at up to 120' spacing.

[3] **Bicycle Facilities**: Vertical and horizontal deflection, signage and other tools can be used to keep speeds and volumes low and create Neighborhood Greenways.

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Neighborhood Mixed Use

Goal: Safely balance the needs of different road users accessing neighborhood destinations

Primary Land Use: Mixed Commercial/Residential

Density: Varies

Average Estimated Traffic Volume: 3,000 vehicles/day

Miles: 23.6 miles

Examples: South Clinton Avenue, Liberty Street

Overview

Neighborhood Mixed Use streets are characterized by a relatively even mix between residential and non-residential land uses. Unlike Commercial Corridors, these streets are relatively low-volume as they primarily serve local residents. Like Commercial Corridors, the goal of these streets is to balance the needs of different users, but the lower vehicle volumes and fewer destinations demand a different approach. Opportunities should be taken to brand these walkable streets with elements that reflect neighborhood identity.

*Note that intersection elements are not included in the graphic, but may still be required.

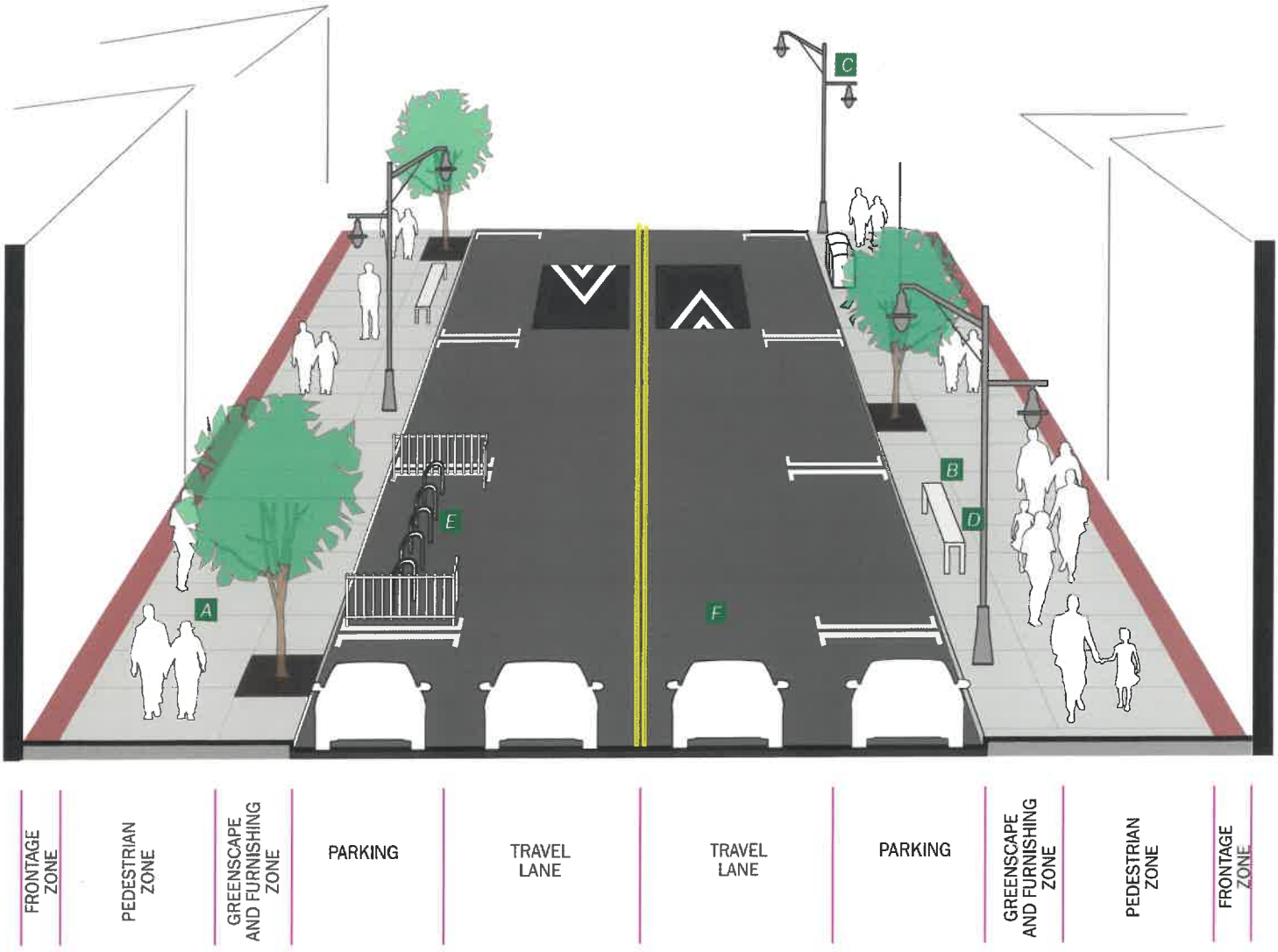

Figure 13 *Model cross-section of a Neighborhood Mixed Use street*

Source: DVRPC, 2019

Design Considerations

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone		2' - 6'
		Pedestrian Zone	A	5' - 12', sidewalk should be standard cast-in-place concrete
		Greenscape-Furnishing Zone		2'-6" - 8'
	Sidewalk Elements[1]	Drainage / Green Stormwater Infrastructure		stormwater planters, tree trenches, rain gardens
		Sidewalk Cafes and Plazas		
		Street Trees		small or medium stature, spaced at least 20' apart
		Street Furniture	B	provide seating, waste receptacles at regular intervals
		Lighting[2]	C	alternating across street, 75'-120' spacing
		Bus Stop Amenities	D	provide seating, add shelter if possible
		Bike Parking	E	if sidewalk space is limited, consider bike corral in a parking space
CURB	Sidewalk Facing	Driveways / Entrances		20'-24' wide, 100' from signalized intersections
		Curb Extensions		as needed, only in high pedestrian traffic areas
		Bus Loading Curb Extensions		
	Road Facing	On-street Parking[3]		may be used as a flex lane for other curb uses, like parklets
		Parklets		Consider in areas with high pedestrian activity
		Loading Zones		30' long, use as needed
ROADWAY	Traffic Calming Strategies[4]	Lane Narrowing	F	11' for lanes with bus traffic, maximum 10' for all other lanes
		Vertical Deflection		use speed cushions if road used by buses or heavy vehicles
		Chicanes		
		Neckdowns		use in high pedestrian traffic areas
	Transit	Dedicated Bus Lane		if space is available, place on the right side of the road
	Bikes	Bicycle Facilities		consider sharrows or parallel routes with high quality facilities
INTERSECTION	Pedestrian Safety and Priority	Crosswalks	*	continental style with ADA ramps at all controlled intersections
		Pedestrian Signals and Warning Signs	*	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island		
	Bicycle Safety and Priority	Bike Boxes		install at signalized intersections with bike facilities
		Two-stage Turning Boxes		use where there is high bike turning volumes and/or cycle tracks
	Traffic Calming	Vertical Deflection and Turn Calming		use at intersections with Corridors and where speeding is a problem

Required | Recommended | As Needed | Not Recommended or N/A | * Not shown in graphic but required

[1] **Sidewalk Elements:** Public art can be placed in the Greenscape-Furnishing Zone. Consider using neighborhood identity and local artists.

[2] **Lighting:** Lighting fixtures should be more concentrated at 75' spacing. Pedestrian scale lighting fixtures should be provided.

[3] **On-street Parking:** Spaces dedicated to short-term parking and drop-off zones may be used near some land uses like apartment buildings, churches, stores, or schools.

[4] **Traffic Calming Strategies:** Traffic calming treatments should be carefully evaluated where speeding and speeding-related crashes are a concern. Devices like raised crosswalks or intersections may be appropriate in locations with high volumes of pedestrians, while speed cushions can calm traffic at midblock locations.

[5] **Bicycle Facilities**: Because the cartway is often constrained and there are many uses competing for space, creating high-quality bicycle facilities on parallel routes is recommended.

Overlays

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What Are Overlays and Why Were They Developed for the Plan?

In addition to the typologies, there are areas of the city that have needs or users that would benefit from additional treatments or types of infrastructure, no matter what the underlying typology is. The overlays specify recommended treatments above and beyond the typology requirements, acknowledging that it is especially important to provide safe access for pedestrians, people on bicycles, and children in these places. Overlays were defined to delineate the access routes and streets adjacent to particular uses. Figure 17 shows a map of all seven types of overlays. Detailed maps with overlays identified by street are available in the appendix.

Figure 17 *Map of all overlays*

Source: DVRPC, 2019

Lyndale Avenue, next to Villa Park *Source: DVRPC, 2018*

E. State Street, a hub of bus activity *Source: DVRPC, 2018*

The seven overlay types are:

- Transit
- Trail Access
- Park Access
- School Access
- Station Area
- Limited Access Transitions
- Combined Sewer

Each of the overlays was defined individually based on assumptions made about how and how far a person walking or biking might go to access each of features included in the overlay or if transit vehicles are present. For example, the catchment area for the Trenton Transportation Center Station overlay is likely different than that of a neighborhood park. These differences are reflected in what is covered by each overlay.

The following section describes how each overlay was defined and maps where each overlay is applicable. Next a description of each overlay's design goals and tools is described and illustrated, ending with a table of required, recommended, and as needed elements for these streets.

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Overlay Development Methodologies

The following are the methodologies used to develop each overlay and their most common underlying typology:

Transit

Streets identified in the transit overlay serve as bus routes in NJ TRANSIT's network. These streets have an array of underlying typologies, but the most common underlying typologies are Connector Corridors, Downtown Connector Corridors, and Neighborhood Mixed-Use streets. The source data used was NJ TRANSIT 2015 bus routes.

Multimodal street in Seattle, WA *Source: Dan Burden, PBIC*

Figure 18 *Transit overlay*

Source: DVRPC, 2019

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Transit

Overview

The Transit Overlay triggers additional considerations to ensure the smooth operation of transit vehicles and safe, easy access for transit riders at transit stops. Streets identified in the transit overlay serve as bus routes in NJ TRANSIT's network.

Considerations

The roadway must accommodate buses to the greatest extent possible, ideally with a dedicated bus lane. At a minimum, the outer lanes of the road must have an 11' width.

A If vertical traffic calming treatments are needed on the roadway, speed cushions should be selected because they will allow the bus to pass unimpeded.

B At the curb, priority should be given to bus boarding and alighting through loading bumpouts and the minimization of obstacles that can interfere with bus operations like driveways. This guidance applies whether near-side or far-side (as shown below) bus stops are used.

Where the bike network interacts with bus stops, special care should be made to minimize conflicts between bicyclists, buses and transit riders. This may include raising the bike lane to the level of the sidewalk and allowing bicyclists to pass between the sidewalk and the loading bumpout.

C On the sidewalk, space should be allocated for transit riders with shelters, seating areas, and other amenities.

D Accommodation should be made for safe access to bus stops including high visibility crosswalks with ADA ramps and bicycle parking for multimodal trips. Bus stops should be outfitted with amenities for transit riders, including shelters, seating, transit maps and timetables, and trash receptacles.

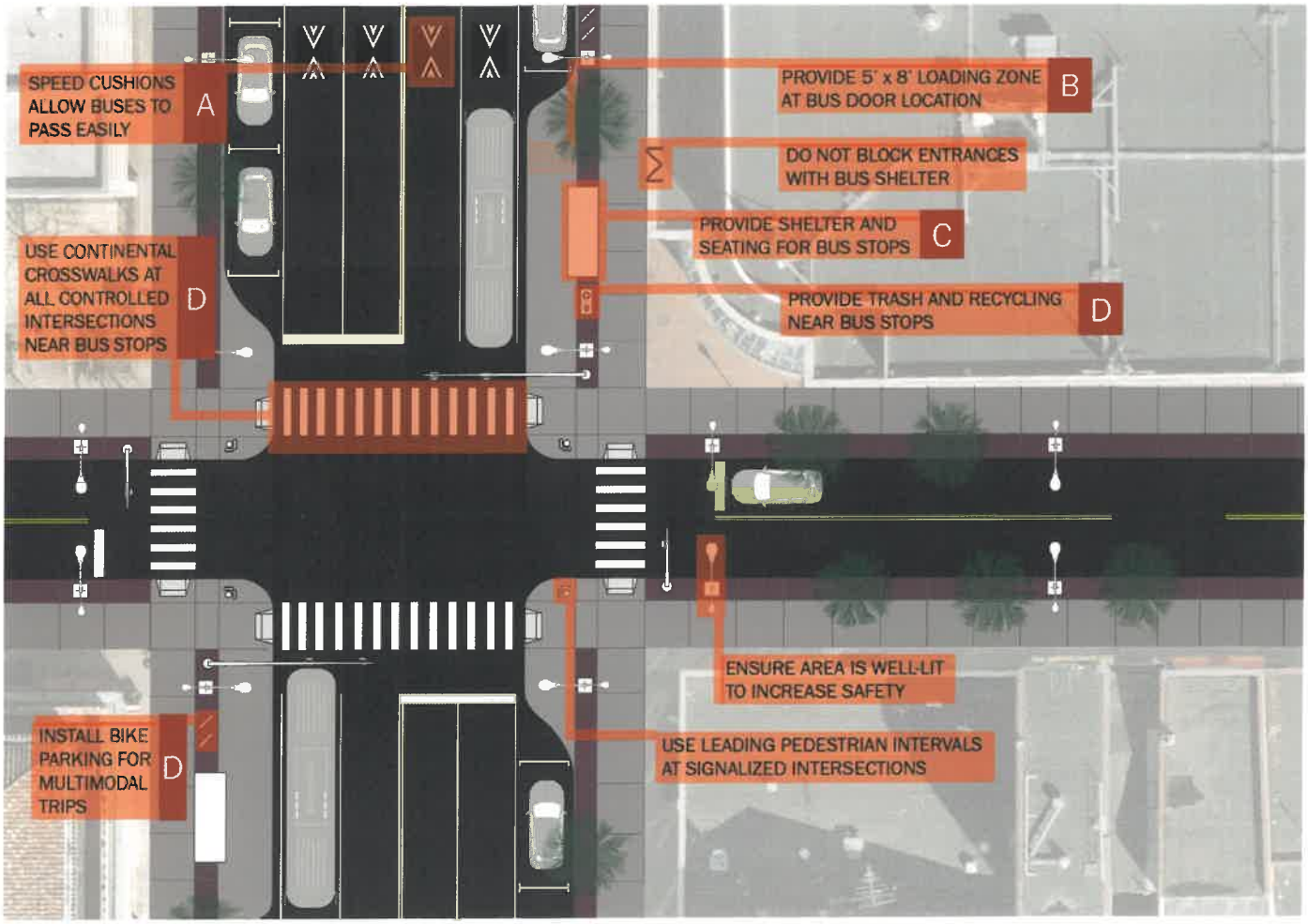

Figure 25 *Design considerations for streets within the Transit overlay*

Source: DVRPC, 2019

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*Overlay stipulations supersede underlying typology stipulations except where otherwise noted.

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone		*refer to underlying typology*
		Pedestrian Zone		8' - 12'
		Greenscape-Furnishing Zone		8' at bus stops
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure		special attention to grade/pooling if loading bumpout is built
		Sidewalk Cafes and Plazas		*refer to underlying typology*
		Street Trees		site trees to not block view of approaching buses
		Street Furniture		provide seating
		Lighting		50' spacing
		Bus Stop Amenities		add shelter if possible
		Bike Parking		if space limited, consider installing a bike corral in a parking space
CURB	Sidewalk Facing	Driveways / Entrances		restricted use
		Curb Extensions		use with bus stop
		Bus Loading Curb Extensions		as needed with bus stops and limited sidewalk space
	Road Facing	On-street Parking		assess need, minimize in proximity to bus loading
		Parklets		use caution around bus stops to avoid interfering with operations
		Loading Zones		assess need, minimize when possible
ROADWAY	Traffic Calming Strategies	Lane Narrowing		11' for lanes with bus traffic
		Vertical Deflection		use speed cushions if road used by buses or heavy vehicles
		Chicanes		
		Neckdowns		*refer to underlying typology*
	Transit	Dedicated Bus Lane		if space is available, place on the right side of the road
	Bikes	Bicycle Facilities		use most protection possible, consider parallel routes
INTERSECTION	Pedestrian Safety and Priority	Crosswalks		continental style with ADA ramps at signalized intersections
		Pedestrian Signals and Warning Signs		install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island		assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes		*refer to underlying typology*
		Two-stage Turning Boxes		*refer to underlying typology*
	Traffic Calming	Vertical Deflection and Turn Calming		design to not impede bus operations

Required | Recommended | As Needed | Not Recommended/Not Applicable

Park Access

Streets identified in the Park access overlay are within 100 feet of a park, and include segments up to the nearest major intersection. These streets have an array of underlying typologies, but the most common underlying typologies are Dense Residential streets, Single-Family Residential streets, and Alleys. The input data was DVRPC open space information from 2011.

Neighborhood park in Boston, Massachusetts *Source: Laura Sandt, PBIC*

Figure 20 *Park Access overlay*

Source: DVRPC, 2019

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Park Access

Overview

The Park Access Overlay identifies locations where extra consideration is needed to ensure safe access to parks. Neighborhood parks are community assets that attract users of all ages and abilities. As such, streets under the Park Access Overlay should be locations where traffic moves as slowly as possible. The presence of the park elevates the need to slow traffic and ensure that everyone can easily and safely access the park.

Considerations

A In the roadway, all pedestrian crossings must be designed and maintained for high visibility, including the use of continental crosswalks and in-road signage. On streets with long distances between intersections or high demand midblock attractions, a midblock crossing should be considered. All crosswalks should be outfitted with ADA ramps and detectable warning surface.

B At the curb, a buffer should be provided between the Pedestrian Zone and the travel lane(s) to increase comfort and safety for pedestrians. This can be accomplished in two ways - a Greenscape-Furnishing Zone or on-street parking. Ideally both are used.

C On the sidewalk, facilities should be provided that encourage people to travel to the park without a car. This includes providing seating and a shelter at any bus stops and providing sufficient bike parking. Trash and recycling containers should be provided to minimized litter on the sidewalk, in the road, and in the park.

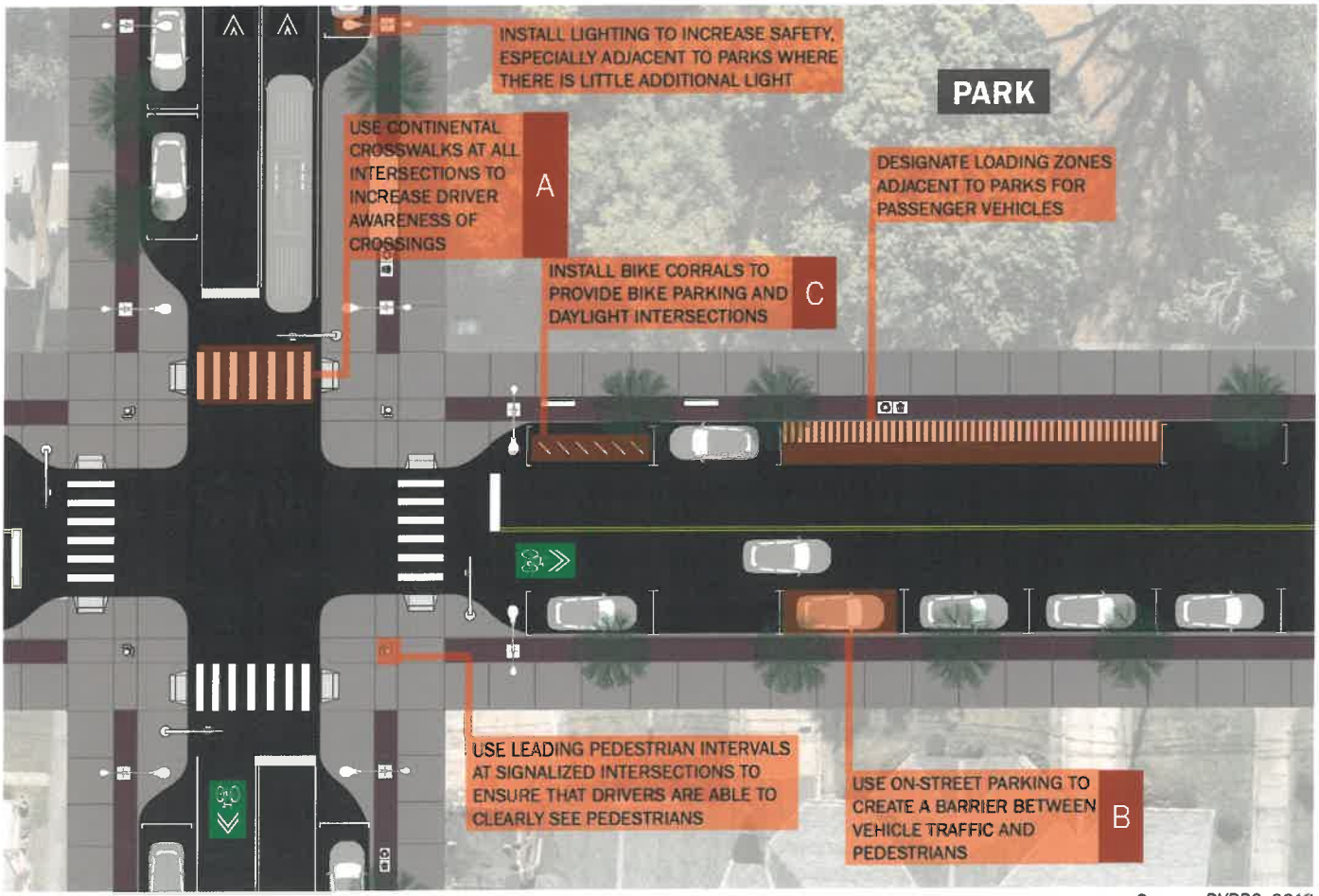

Figure 27 *Design considerations for streets within the Park Access overlay*

Source: DVRPC, 2019

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*Overlay stipulations supersede underlying typology stipulations except where otherwise noted.

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone		*refer to underlying typology*
		Pedestrian Zone	■	6' minimum, 8' preferred
		Greenscape-Furnishing Zone	■	2'-6" - 8'
	Sidewalk Elements	Drainage / Green Stormwater Infrastructure	■	
		Sidewalk Cafes and Plazas		*refer to underlying typology*
		Street Trees	■	
		Street Furniture	■	
		Lighting[1]	■	50' spacing
		Bus Stop Amenities	■	provide seating, add shelter if possible
		Bike Parking	■	consider a bike corral in an on-street parking space, if needed
CURB	Sidewalk Facing	Driveways / Entrances		*refer to underlying typology*
		Curb Extensions	■	if space allows
		Bus Loading Curb Extensions		*refer to underlying typology*
	Road Facing	On-street Parking	■	
		Parklets		*refer to underlying typology*
		Loading Zones	■	30' long, near park entrance for passenger vehicles
ROADWAY	Traffic Calming Strategies	Lane Narrowing		*refer to underlying typology*
		Vertical Deflection	■	consider raising midblock crossings
		Chicanes		*refer to underlying typology*
		Neckdowns		*refer to underlying typology*
	Transit	Dedicated Bus Lane		*refer to underlying typology*
	Bikes	Bicycle Facilities	■	use most protection possible
INTERSECTION	Pedestrian Safety and Priority	Crosswalks[3]	■	continental style at signalized intersections or park entrances
		Pedestrian Signals and Warning Signs[4]	■	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	■	assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes		*refer to underlying typology*
		Two-stage Turning Boxes		*refer to underlying typology*
	Traffic Calming	Vertical Deflection and Turn Calming	■	

■ Required ■ Recommended ■ As Needed ■ Not Recommended / Not Applicable

[1]**Lighting:** Lighting should be spaced every 50' to ensure that people feel safe near parks at night. This is particularly important immediately adjacent to parks, where there are fewer light sources in general.

[2]**Pedestrian Safety and Priority:** "No Right Turn on Red" prohibitions and accompanying signage should be implemented at signalized intersections in this overlay due to the high number of children and other vulnerable pedestrians crossing the street.

[3]**Crosswalks:** All crosswalks should be outfitted with ADA ramps and detectable warning surface (DWS). Raised midblock crossings at locations of high pedestrian activity should be considered. Crossings should be paired with Rectangular Rapid Flashing Beacons (RRFBs) to alert drivers when pedestrians are crossing.

[4]**Pedestrian Signals and Warning Signs:** Countdown timers should be set at 3.5 feet per second to allow both children and elderly park visitors a slightly longer crossing time than usual.

Schools

Streets identified in the Schools overlay are adjacent to school parcel boundaries, and include segments up to Safe Passage intersections. Safe Passage intersections have been identified by the Trenton Public Schools district and the data is available on their website. Where there is not a Safe Passage defined, the nearest major intersection was used. These streets have an array of underlying typologies, but the most common underlying typologies are Dense Residential streets, Connector Corridors, and Neighborhood Mixed Use streets. Schools were identified using information from the National Center for Education Statistics from 2015 to 2019 and include all schools, kindergarten through high school (K-12), including public, private, and charter schools.

Crossing guard ensuring that children cross safely on their route to school. *Source: Rachel Bowden , PBIC*

Figure 21 *School overlay*

Source: DVRPC, 2019

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Schools

Overview

Roads surrounding schools are often subject to existing regulations to slow traffic and ensure that students can safely get to school on foot or by bike, including regulations that are part of Safe Routes to Schools and School Zone programs. The Schools Overlay is intended to build on these with additional considerations for Complete Streets elements that facilitate the heightened awareness demanded of drivers in proximity to schools.

Considerations

A In the roadway, all pedestrian crossings must be designed and maintained for high visibility, including the use of continental crosswalks with ADA curb ramps and in-road signage. Major pedestrian trip generators like the

B entrances to school buildings should be paired with midblock crossings, if appropriate.

C At the curb, a buffer should be provided between the Pedestrian Zone and the travel lane(s) to increase comfort and safety for pedestrians. This can be accomplished in two ways - a Greenscape-Furnishing Zone or on-street parking. Ideally both are used. Care should be given to creating loading (drop-off) zones that ensure safety for both students leaving vehicles and for non-motorized road users that may conflict with these operations, particularly bicyclists.

On the sidewalk, facilities should be provided that encourage students to travel to the school without a car. This includes providing seating and a shelter at any bus stops and providing sufficient bike parking. Trash and recycling containers should be provided to minimized litter around the school.

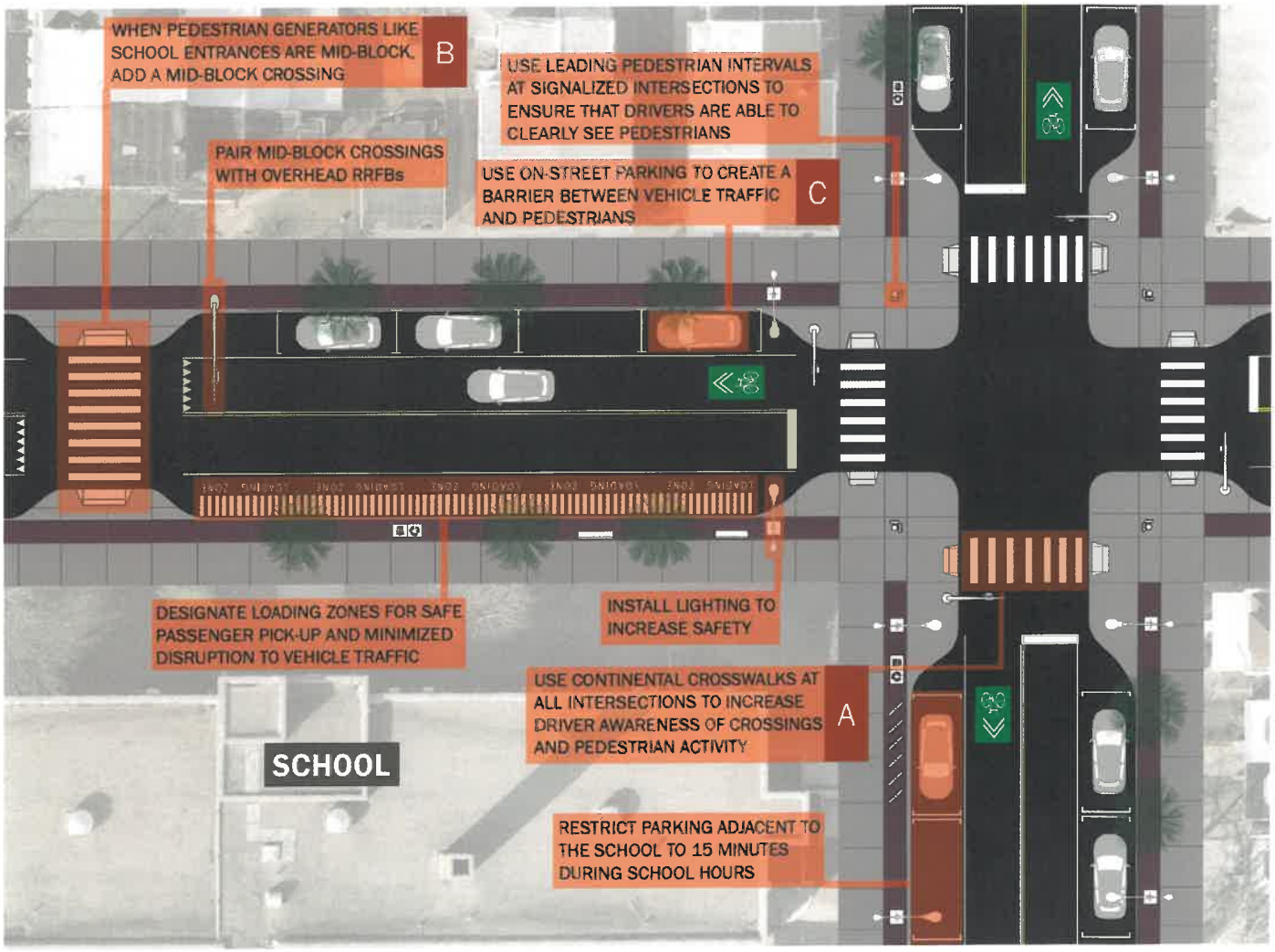

Figure 28 *Design considerations for streets within the Schools overlay*

Source: DVRPC, 2019

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*Overlay stipulations supersede underlying typology stipulations except where otherwise noted.

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone		*refer to underlying typology*
		Pedestrian Zone		*refer to underlying typology*
		Greenscape-Furnishing Zone	■	2'-6" - 8
	Sidewalk Elements	Drainage / Green Stormwater Infrastructure	■	
		Sidewalk Cafes and Plazas		*refer to underlying typology*
		Street Trees	■	
		Street Furniture	■	
		Lighting	■	50' spacing
		Bus Stop Amenities	■	provide seating, add shelter if possible
		Bike Parking	■	consider a bike corral in an on-street parking space, if needed
CURB	Sidewalk Facing	Driveways / Entrances		*refer to underlying typology*
		Curb Extensions	■	if possible
		Bus Loading Curb Extensions		*refer to underlying typology*
	Road Facing	On-street Parking	■	
		Parklets		*refer to underlying typology*
		Loading Zones	■	30' long, near school entrance for passenger vehicles
ROADWAY	Traffic Calming Strategies	Lane Narrowing		*refer to underlying typology*
		Vertical Deflection	■	consider raising midblock crossings at school entrance
		Chicanes		*refer to underlying typology*
		Neckdowns		*refer to underlying typology*
	Transit	Dedicated Bus Lane		*refer to underlying typology*
	Bikes	Bicycle Facilities	■	use most protection possible
INTERSECTION	Pedestrian Safety and Priority	Crosswalks[2]	■	continental style with ADA ramps at all signalized intersections
		Pedestrian Signals and Warning Signs	■	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	■	assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes		*refer to underlying typology*
		Two-stage Turning Boxes		*refer to underlying typology*
	Traffic Calming	Vertical Deflection and Turn Calming	■	

■ Required ■ Recommended ■ As Needed ■ Not Recommended / Not Applicable

[1]**Pedestrian Safety and Priority:** "No Right Turn on Red" prohibitions and accompanying signage should be implemented at signalized intersections in this overlay due to the high number of children and other vulnerable pedestrians crossing the street.

[2]**Crosswalks:** All crosswalks should be outfitted with ADA ramps and detectable warning surface (DWS). Raised midblock crossings at locations of high pedestrian activity (e.g. school entrances) should be considered. Crossings should be paired with Rectangular Rapid Flashing Beacons (RRFBs) to alert drivers when pedestrians are crossing.

School Zone: Design standards relevant to schools zones should be consulted to ensure maximum safety benefits in proximity to the school entrances. For instance, "School Zone" signage should be installed at the nearest controlled intersections to alert drivers.

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Complete Streets Design Elements Guide

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Complete Streets Design Elements Guide

Overview

The design elements in this chapter are organized into four sections: sidewalk, curb, roadway, and intersection. This organization helps to identify project components, but it also highlights how different design elements are connected. For example, bumpouts are part of the curb zone, but they also serve as a traffic calming device in the roadway.

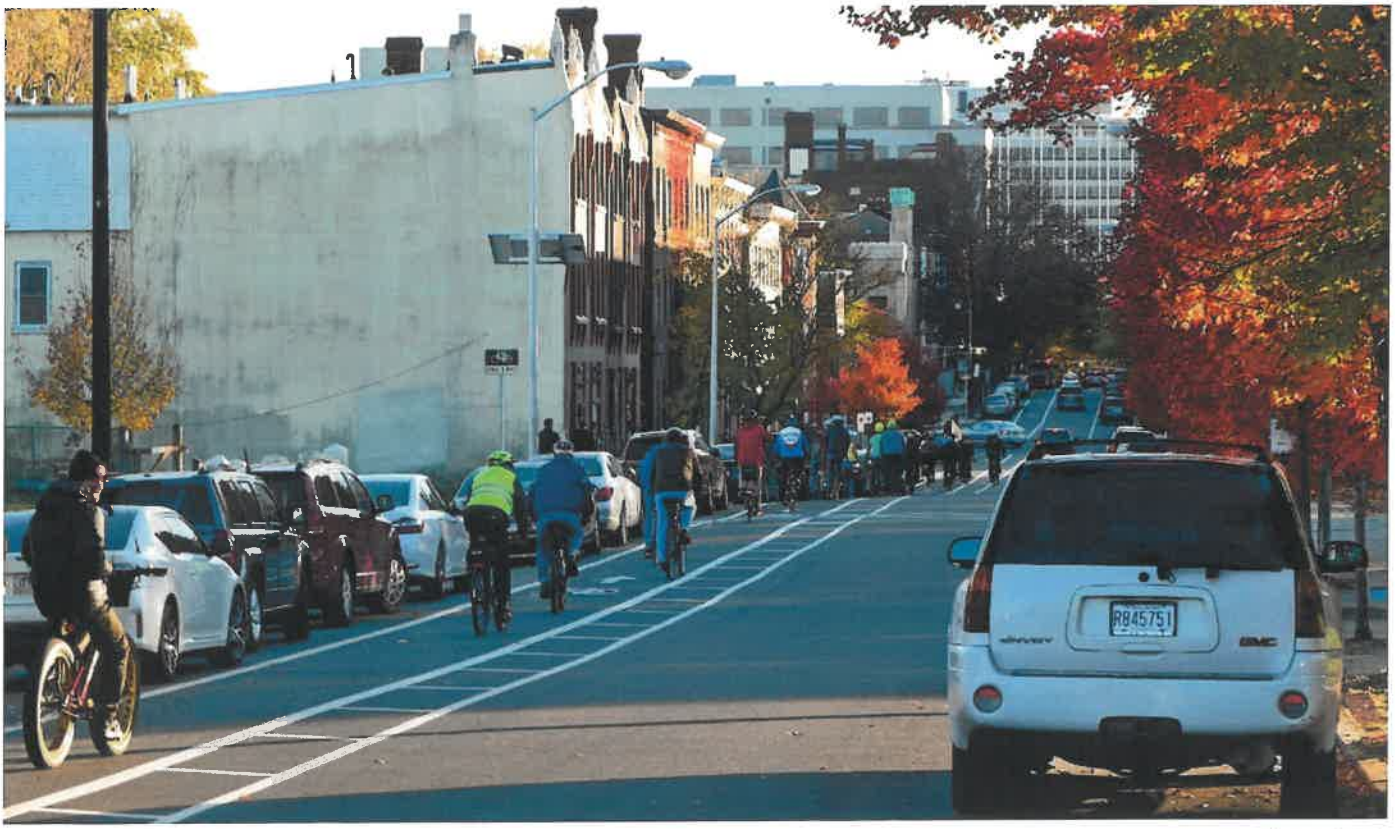
A full list of treatments are listed on the next page and explored in depth throughout this chapter. Some design elements can be built quickly with low-cost materials. These interim strategies typically utilize easy-to-install elements like planters or delineator posts and can be used to test designs or build public support before replacing with concrete. Treatments that may utilize interim strategies are indicated by a green icon (see "Key" below). Many elements have benefits to safety, including crash reduction. Orange icons indicate where an element has been included in Federal Highway Administration's (FHWA) Proven Safety Countermeasures, and the crash reduction benefit is listed. Most elements include technical specifications to ensure that concerns like minimum clearances or sight lines are addressed. The guidance in this document is not exhaustive, however, and is tailored to focus on specifications that support Complete Streets implementation. Additional guidance documents are referenced for many design elements.

A Complete Street should unify each of the four sections by providing facilities that work with other elements of the street. Bicycle lanes are incomplete without bicycle storage. Bus lanes are incomplete without dignified shelters and stops. Each element works together with others to unify the streetscape, providing amenities for all street users.

Key

Interim Design Strategy

FHWA Proven Safety Countermeasure



One-way street, Trenton, NJ

Source: Jay Watson

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Design Treatment List

Sidewalk *(pp. 76-87)*

Sidewalk Zones

Sidewalk Elements

- Drainage & Green Stormwater Infrastructure
- Sidewalk Cafes & Plazas
- Street Trees
- Street Furniture
- Lighting
- Bus Stop Amenities
- Bike Parking

Curb *(pp. 88-95)*

Sidewalk Facing Elements

- Driveways & Entrances
- Curb Extensions
- Bus Loading Curb Extensions

Roadway Facing Elements

- On-street Parking
- Loading Zones
- Parklets
- Drainage & Green Stormwater Infrastructure

Roadway *(pp. 96-103)*

Traffic Calming Strategies

- Lane Narrowing
- Lane Reductions
- Vertical Deflection
  - Speed Humps
  - Speed Tables
  - Speed Cushions
- Chicane
- Neckdown

Prioritizing Transit

- Dedicated Bus Lane

Bicycle Facilities

Intersection *(pp. 104-116)*

Pedestrian Safety and Priority Elements

- Crosswalks
  - Pedestrian Signals and Warning Signs
    - Countdown Timers and LPIs
    - In-Street Crossing Signage
    - RRFBs and Pedestrian Hybrid Beacon
- Pedestrian Refuge Islands

Bicycle Safety and Priority Elements

- Bike Signals
- Bike Boxes
- Two-Stage Turning Boxes
- Intersection Crossing Markings

Traffic Calming Strategies

- Vertical Deflection
  - Raised Intersections
  - Raised Crosswalks
- Roundabouts
- Right-turn Traffic Calming
- Left-turn Traffic Calming
- Diverters

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Sidewalk

Sidewalks serve many purposes in achieving Complete Streets, not least providing an exclusive right-of-way to pedestrians where they can safely travel without encroachment from vehicles. Sidewalks, however, can provide space and amenities that serve many other purposes of a Complete Street, including relief for pedestrians through seating and shade; delivery of municipal services like lighting and waste and excess stormwater management; entertainment and recreation through programmed pedestrian plazas; and multimodal mobility support through bike storage and bus shelters. The design elements that correspond to each of these uses are covered in this section.

Considerations

All sidewalks consist of three zones: Frontage, Pedestrian, and Greenscape-Furnishing; they are discussed in detail in the section of this chapter on "Sidewalk Zones." Sometimes the boundaries between zones can be blurred, and in some cases not all zones are present, but each of them serves a purpose and contributes to Complete Streets.

In addition to the three sidewalk zones, sidewalks also have a "street wall," the point where the sidewalk ends and a building begins. Activating this space is critical to create lively and interesting spaces for street users. On commercial corridors, street walls are effective when they house retail and restaurant spaces at the street level. The street wall can be enhanced with plantings, lighting, signage, and awnings. Windows provide opportunities for businesses to display goods. Walls provide space for public art, signage, and informational displays.

The materials used to construct a sidewalk are of critical importance to its successful functioning. Materials used must be safe in different weather conditions and remain in a state of good repair for an optimal period of time. Materials should be selected that reflect the architectural style of the surrounding buildings. Materials can be used to demarcate different zones of the sidewalk or to give character to a commercial district. Whatever materials are selected, they should remain consistent on similar roadways within the district. The most successful sidewalk materials will improve public space while assisting in other efforts like stormwater management.

Sidewalks are also a prime location for the installation of public art. Public art strengthens the connection between a community and its streets by engaging people. Creating space for artistic expression can also create a sense of place and community ownership. Creative expression of functional street elements like lights and benches can make interesting and unique street elements. Transit stops and other visible, high use locations such as trail entrances, are good locations for art.

Brick and bluestone are common in downtown Trenton *Source: DVRPC*

Street wall with large transparent windows *Source: Russ Roca, PBIC*

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Best Practices

- **Ensure Accessibility.** To ensure accessibility for all users, sidewalks must have:
  - smooth, stable, slip resistant surfaces,
  - a cross-slope of less than 2% and ideally 1.5%,
  - ramps at all intersections,
  - minimize pooling which can lead to ice,
  - remain continuous across driveways, and
  - have joints of less than 3/8".
- **Promote Traction.** Permeable materials increase traction for pedestrians by reducing water pooling and minimizing slippery surfaces and can assist with stormwater management.
- **Deploy Brick Strategically.** Brick and other materials like cobblestone or slate can lead to tripping hazards and pose challenges to people in wheelchairs when they are not well-maintained. This is especially important near trees, where insufficient space for root growth can result in bricks being lifted and becoming a tripping hazard. However, brick creates a unique aesthetic appropriate for some areas (like historic downtown districts) when properly installed and maintained. Downtown Trenton has a history of using brick sidewalks and bluestone curbs, so this should be considered when repairing or replacing sidewalks in that area. On streets in Downtown Trenton, brick is recommended for the Greenscape-Furnishing Zone and concrete for the remainder of the sidewalk.
- **Signage Guidance.** Signage should be deployed in the Greenscape-Furnishing Zone. Different categories of signage have different considerations. These include:
  - Wayfinding signage, or signs that direct people to and through areas, should be well maintained, visible, and consistent. It should define distances by the time it takes to reach a destination rather than by miles or kilometers alone. "You are here" labels should be used to orient users. For more information on wayfinding signage, see the wayfinding chapter of the *New Jersey Complete Streets Guide*.
  - Pedestrian specific signage should include tactile signage (braille) to accommodate vision impaired users of the street, and multilingual signage should be installed where appropriate.
  - Signs for bicyclists should direct them to bicycle routes while providing directional information, distances, and timing information to local destinations.
  - Signs for motorists should include traffic control signs, warning signs, and wayfinding signs.

Street art next to a cafe *Source: Laura Sandt, PBIC*

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Sidewalk Zones

Overview

There are three zones of the sidewalk and each has a unique role. See Figure 32 for an illustration of each of the sidewalk zones.

The Frontage Zone is most important in downtown, commercial, and dense areas in which there is a lot of movement in and out of buildings along the sidewalk. It serves as a buffer that achieves several goals. The Frontage Zone protects pedestrians from doors opening outward, while also allowing for foliage, signage, and other street wall elements. In areas with high pedestrian traffic, a wider Frontage Zone can support sidewalk cafes and plazas that contribute to an active sidewalk environment. This is especially valuable in downtown and mixed use areas.

The Pedestrian Zone is the area of the sidewalk that is kept clear for pedestrian movement. It is the most important part of the sidewalk. Although zone widths vary by typology, a 5' wide Pedestrian Zone is required for every sidewalk to ensure accessibility for all people and compliance with the Americans with Disabilities Act (ADA). The other zones allow for improvements and amenities, but the Pedestrian Zone is essential.

The Greenscape-Furnishing Zone stretches from the front edge of the Pedestrian Zone to the roadway curb face. It provides a buffer between pedestrians and the roadway. This zone is where landscape elements, street furniture, signage and utilities are located. Therefore the minimum width and required amount of space vary depending upon the street typology and the contextual circumstances. Street trees, stormwater planters and GSI, lighting, benches, bus shelters, fire hydrants, street light boxes, wayfinding signage, and bike parking are all found in this zone.

Best Practices

- **Use Appropriate Materials.** Sidewalks need to be smooth, stable, and slip resistant to increase access and minimize injuries.
    - Frontage Zone materials are somewhat flexible and contribute to defining or blurring boundaries with other zones. When traversal of the Frontage Zone is expected, as with a building entrance, paving should

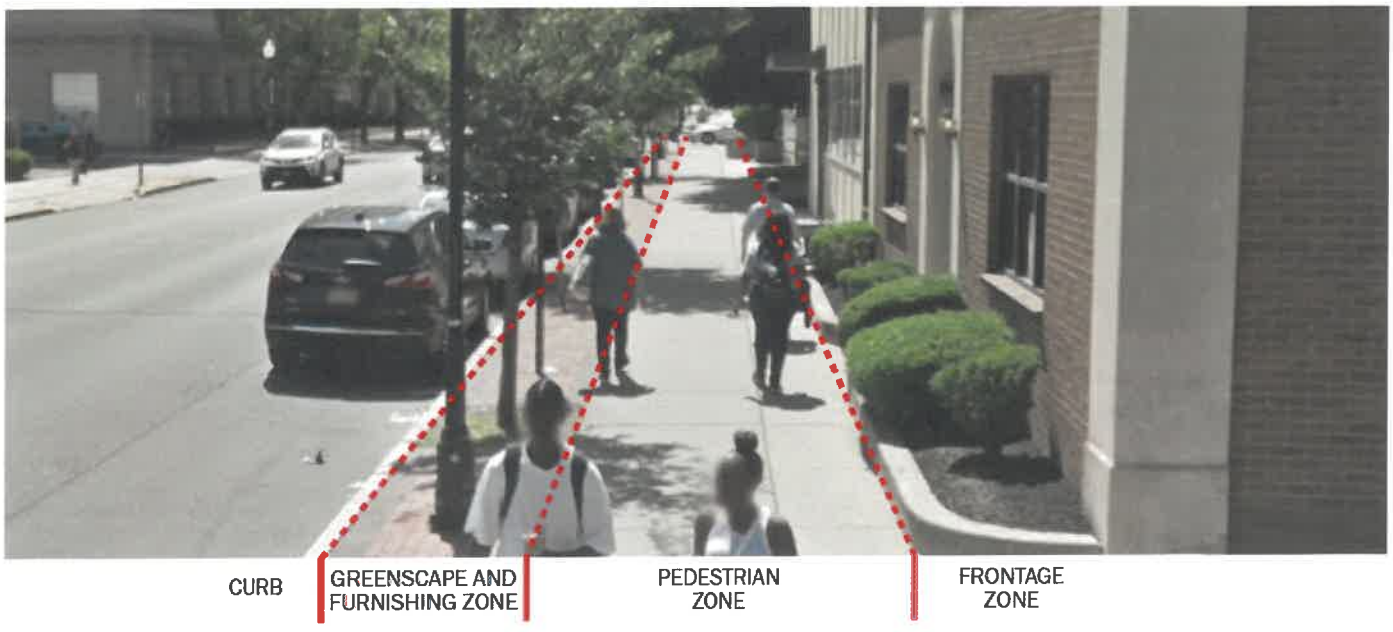

Figure 32 *Zone elements of the sidewalk, plus the curb zone.*

Source: DVRPC

match the Pedestrian Zone materials to signal that it's an area intended for passage. Otherwise the materials should match the Greenscape-Furnishing Zone.

- **Account for Pedestrian Volume.** The width of the Pedestrian Zone should vary based on the anticipated pedestrian volume on the sidewalk.
  - The Pedestrian Zone is required to be at least 5' wide and maintained as a clear zone.
  - It is recommended that the Pedestrian Zone be at least 8' wide on Corridor streets, at least 12' wide on Downtown streets, and at least 6' wide on all other streets.
  - For Downtown and Corridor typologies, a wider Pedestrian Zone is recommended to allow for higher pedestrian volumes and chaotic movement by people who are entering and exiting businesses and transit stops.
  - An 8' minimum width should be implemented when the Pedestrian Zone is immediately adjacent to moving traffic, without a Greenscape-Furnishing Zone or on-street parking.
- **Maintain Access Across Driveways.** When driveways and entrances cross sidewalks, the Pedestrian Zone must continue at the same width and cross-slope (see "Driveways and Entrances" for more information).
- **Consider Loading Drop-off Space.** On streets with transit, schools, or parks, where pick-ups and drop-offs are facilitated, space needs to be made for passenger loading zones and waiting areas in the Greenscape-Furnishing Zone. See "Overlays" for more information on where these elements should be considered.
- **Account for Clearances.** Many of the elements in the Greenscape-Furnishing Zone have minimum horizontal clearance requirements. It is important to consider each of these when laying out this part of a sidewalk, especially in the most complex areas like downtown. Clearances are addressed by sidewalk element in the remainder of this chapter.

Lively sidewalk in Pittsford, NY

Source: Dan Burden, Pedestrian and Bicycle Information Center, PBIC

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Sidewalk Elements

Drainage and Green Stormwater Infrastructure on the Sidewalk

Overview

Sidewalk space can be used to house green stormwater infrastructure (GSI), such as retention basins or rain gardens. GSI allows water to infiltrate into the ground and slowly release into the water table rather than through pipes and into rivers. GSI can provide habitat for native flora and fauna, increase tree cover, and reduce the heat island effect by providing shade and the cooling effect of evapotranspiration. GSI is most commonly installed in the Greenscape-Furnishing Zone, although some elements may be appropriate for the Frontage Zone.

Small sidewalk rain garden in Philadelphia, PA *Source: Philadelphia Water Department*

Best Practices

- **Choose GSI Sites that Accomplish Multiple Goals.** GSI should be sited and sized based on not only drainage requirements, but also on how to avoid or benefit adjacent utilities and how to direct pedestrian traffic. GSI like rain gardens provide both stormwater management benefits and added green space for public use and can be scaled according to context.
- **Create Permeable Surfaces.** Permeable pavement can be used to assist with infiltration. If permeable is not an option, stormwater from sidewalks can be conveyed into underground infiltration basins. Street trees and other plants can reduce runoff by adding permeable surfaces and providing evapotranspiration.
- **Use Retention Basins to Hold Stormwater.** Retention basins are underground basins used to hold and slowly release water to infiltrate groundwater, as shown in Figure 34. Basins should be located to avoid underground utilities.
- **Use Biofiltration to Avoid Water Damage.** Biofiltration planters should be used instead of other infiltration measures in areas where basements, transit tunnels, or underground utilities could be damaged by water. See NACTO's *Green Street Design Guide* for more information.

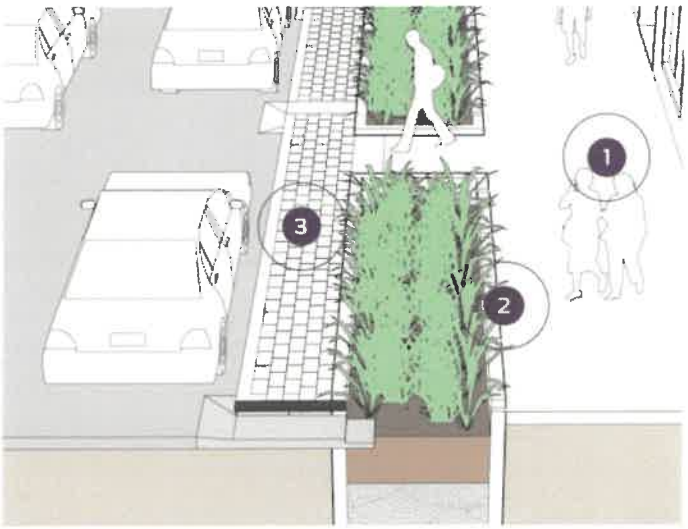

Figure 33 *Bioretention planter in Sidewalk Zone* *Source: NACTO*

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Sidewalk Elements

Sidewalk Cafes and Plazas

Overview

Sidewalk cafes and plazas offer outdoor space for dining and public gathering. They animate the street and can help create a sense of place to busy streets like commercial corridors. Both increase activity on the street, calming traffic and providing safer access for all users. These elements are not specific to a sidewalk zone and may be present in the Frontage Zone, Greenscape-Furnishing Zone, and even in the curb space (see "Parklets").

Best Practices

- **Go Where the People Are.** Pedestrian plazas should be located near pedestrian generators such as transit stops or schools.
- **Design for Future Programming.** Plazas should be located with consideration for lighting, water, and electricity. Plazas should accommodate vendors where possible, to provide space for commerce and increase pedestrian activity.
- **Support Mobility.** Plazas can house infrastructure that increases mobility such as bike share docking stations.
- **Interim Design Strategy.** Plazas can be built using low-cost, quick-build methods like street paint, planters, flex-post delineators, and plastic curbing. This interim strategy allows for testing and refinement, and builds public support before any concrete is poured. Plazas can be built by repurposing parking or by taking extraneous space from the street.
- **Sidewalk Café Guidance.** Sidewalk café seating must meet certain criteria to ensure they function properly. These criteria apply whether the sidewalk seating is located in the Frontage Zone of the sidewalk or in a parklet (see Figure 33). Criteria include:
    - Seating zone should be a minimum of 6' deep
    - A 5' clearance path should be maintained for ingress and egress to the seating zone
    - The seating zone must not overlap with the Pedestrian Zone

A pop-up plaza in University City, Philadelphia *Source: NACTO*

Figure 34 *Sidewalk Zone with cafe outside of the Pedestrian Zone* *Source: NACTO*

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Sidewalk Elements
Street Trees

Overview

Street trees provide a wide range of benefits. Environmental benefits include reducing greenhouse gases, airborne particulates, and the urban heat island effect. Street trees improve groundwater discharge capacity and reduce pressure on stormwater infrastructure. They support ecological diversity. They reduce exposure to harmful ultraviolet rays and keep pedestrians cool in the summer. They generally improve the aesthetics of the street and can increase the appeal of retail districts and property values overall. Street trees have also been shown to have economic and safety benefits. Street trees should be consistent with Trenton's Zoning and Land Development code. Street trees belong in the Greenscape-Funishing Zone.

Best Practices

- **Provide Adequately Sized Tree Pits.** To succeed, street trees require properly sized pits to grow in. These come in different forms, which may fit better in one context versus another.
    - Tree pits are most typical. They should be 4' x 10' x 3' deep, with a minimum width of 4'-6".
    - Open tree trenches connect a row of trees and capture and filter stormwater. They should be 2'6" wide. They are not conducive to high turnover on-street parking.
    - Covered tree trenches should be 5' wide, 3' deep. They are effective for high pedestrian traffic areas, but it is important to note that the grate does not count towards minimum pedestrian zone. They are easier to install when the sidewalk is being replaced.
    - Raised tree beds are a good solution for locations with underground utilities or other barriers. The constrained soil is only suitable for smaller trees. They can provide seating if the bed wall is 16"-24" tall (ideal is 20").
- **Consider Soil Type.** Soil type is an important consideration for street trees and green stormwater infrastructure (GSI). Consult with the city's public works department on soil type considerations.
- **Design Sidewalks to Anticipate Tree Growth.** Pitching the sidewalk toward trees provides natural irrigation. Flexible pavement like asphalt should be considered around tree pits. Flexible porous paving helps maintain level surfaces; it bends but does not crack, thereby accommodating root growth. It is three-to-five times more expensive, but costs can be saved long-term due to easier maintenance. It also provides a smooth, accessible surface to pedestrians.

S. Broad Street *Source: DVRPC*

Sidewalk Elements
Street Furniture

Overview

Street furniture supports the uses and aesthetics of a sidewalk by making it more comfortable and convenient. Benches are a common type of street furniture, but other types of seating like raised planter boxes or trees beds should be considered as well. Creative seating can also be a form of public art. Street furniture is most commonly installed in the Greenscape-Furnishing Zone, although it may be appropriate for the Frontage Zone as well, where space allows.

Best Practices

- **Ensure Accessibility.** To ensure accessibility for all people, consider providing traditional benches both with and without arms. Arms make it difficult for those using wheelchairs to slide onto a bench, but they make it easier for people who have difficulty sitting down or standing up.
- **Avoid Creating Obstructions.** Seating must not interfere with loading zones, building entrances, and access to fire hydrants. See Figure 35 for minimum clearance distances according to ADA guidelines.
- **Plan for Future Maintenance.** Ensure that maintenance and cleaning are easy by maintaining a 1' clearance around the back and 3' clearance on the front and sides of a bench.

Traditional benches in Portland, ME *Source: Dan Burden, PBIC*

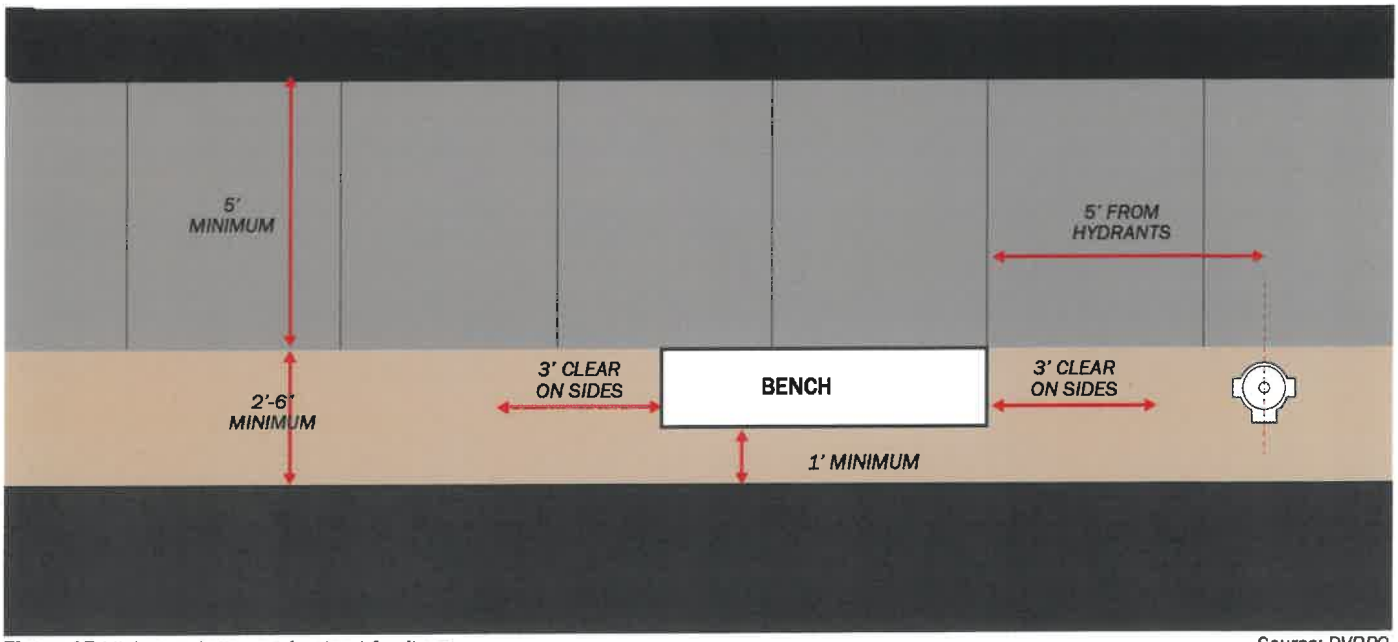

Figure 35 *Minimum clearances for street furniture*

Source: DVRPC

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Sidewalk Elements
Lighting

Overview

Lighting should be consistent with Trenton's Zoning and Land Development code, specifically Section 315-208 (Lighting Guidelines) and Section 315-209 (Lighting Design Standards).

Context-sensitive street lighting is key to a successful Complete Street and should be tailored to the Complete Street Typology. Lighting should not create a hazard or nuisance and should be consistent with the architectural style of buildings in the area, avoid light spillage beyond property lines, and be located along streets and at intersections in order to light roadways, sidewalks and at locations where circulation systems merge. Lighting should face downward to minimize light pollution, be spaced evenly, and reflect the neighborhood character. When done well, lighting can make a street welcoming at all hours and encourage the intended use of the street. Street lights belong in the Greenscape-Funishing Zone, but pedestrian-scale lighting and property-specific lighting fixtures may be installed in the Frontage Zone. Lighting illumination levels should follow recommendations from the Illumination Engineering Society RP-9-00 and from the FHWA standards, as these sources detail approproiate illumination levels for varying use, street size, and pedestrian activity.

Best Practices

- **Avoid Creating Obstructions.** Light poles need minimum clearances from other street features. Figure 36 and Figure 37 illustrate many of these considerations, including minimum clearances for street features like traffic poles, curb ramps, streets trees, and hydrants.
- **Select Bulbs that Fit Lighting and Energy Needs.** Types of lights include (1) LED – white light (10-25 year lifetime, use when compatible fixtures are available), (2) High Pressure Sodium - warm yellow light (4-5 year lifetime, use for lower nighttime activity), and (3) Metal Halide – cool white (4-5 year lifetime, use for heavy nighttime activity). Light-emitting diode (LED) lights on a network can be controlled for color.
- **Consider Pedestrian-scale Lighting.** Pedestrian-scale lighting is intended to light walkways and typically must be paired with street lights, if adjacent to the roadway.

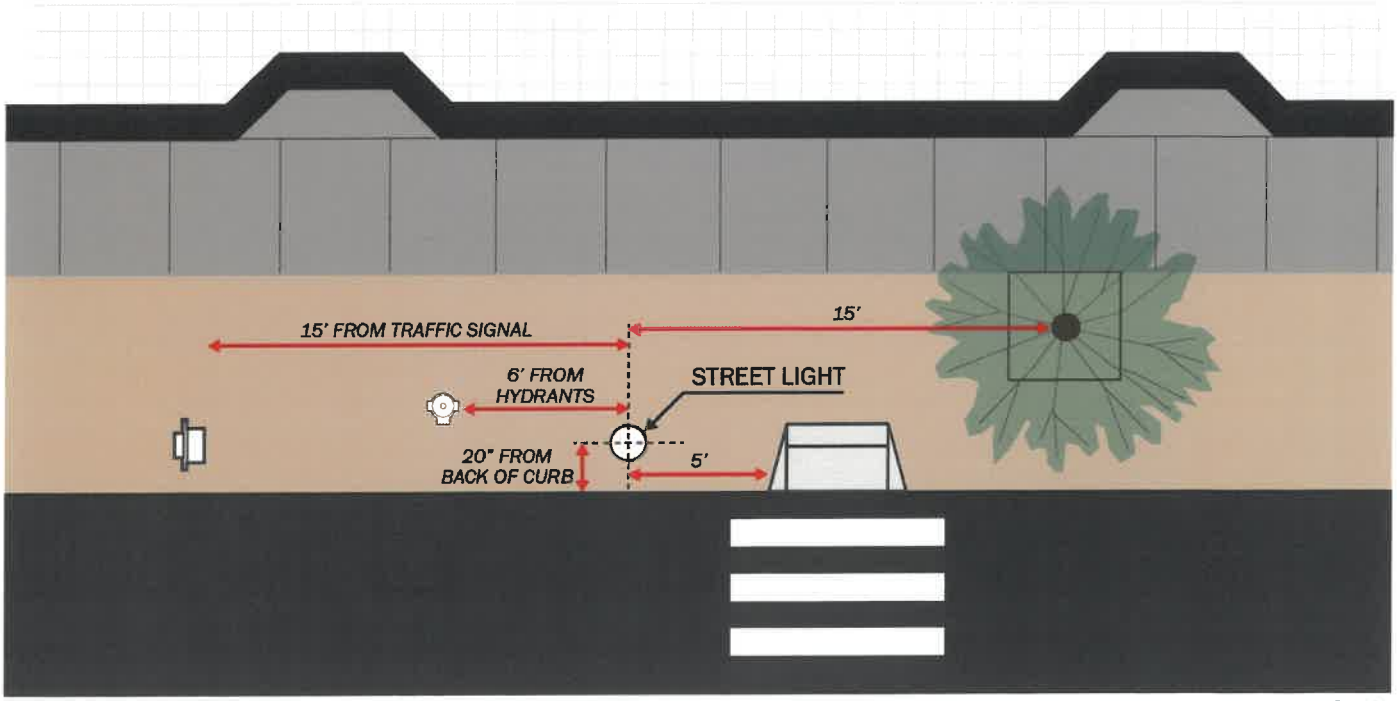


Figure 36 *Street light clearance diagram*

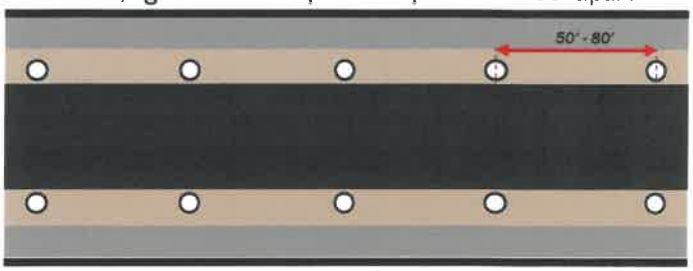
Source: DVRPC

Pedestrian-scale lighting should be provided near transit stops and high pedestrian crossings.

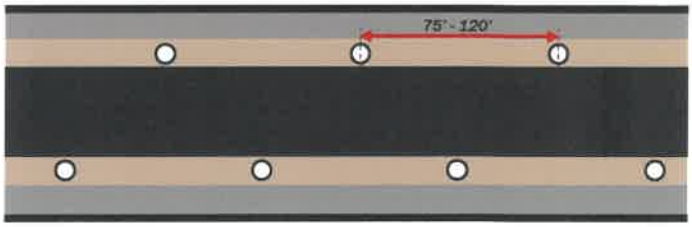
- **Space Poles to Reflect the Context.** Lights paired across the street provide a formal look (this should be used downtown). Lights staggered across the street provide more uniform lighting for a lower cost (best in residential areas). Spacing can be 50'-120' depending upon the illumination of the fixture. See "Spacing" inset for additional information.
- **Consider Unique Fixtures.** Unique lighting fixture designs can be used to identify historic areas or other spaces of significance.

Spacing

Downtown, lights should be placed in pairs 50' - 80' apart



For other typologies, lights should alternate 75' - 120' apart



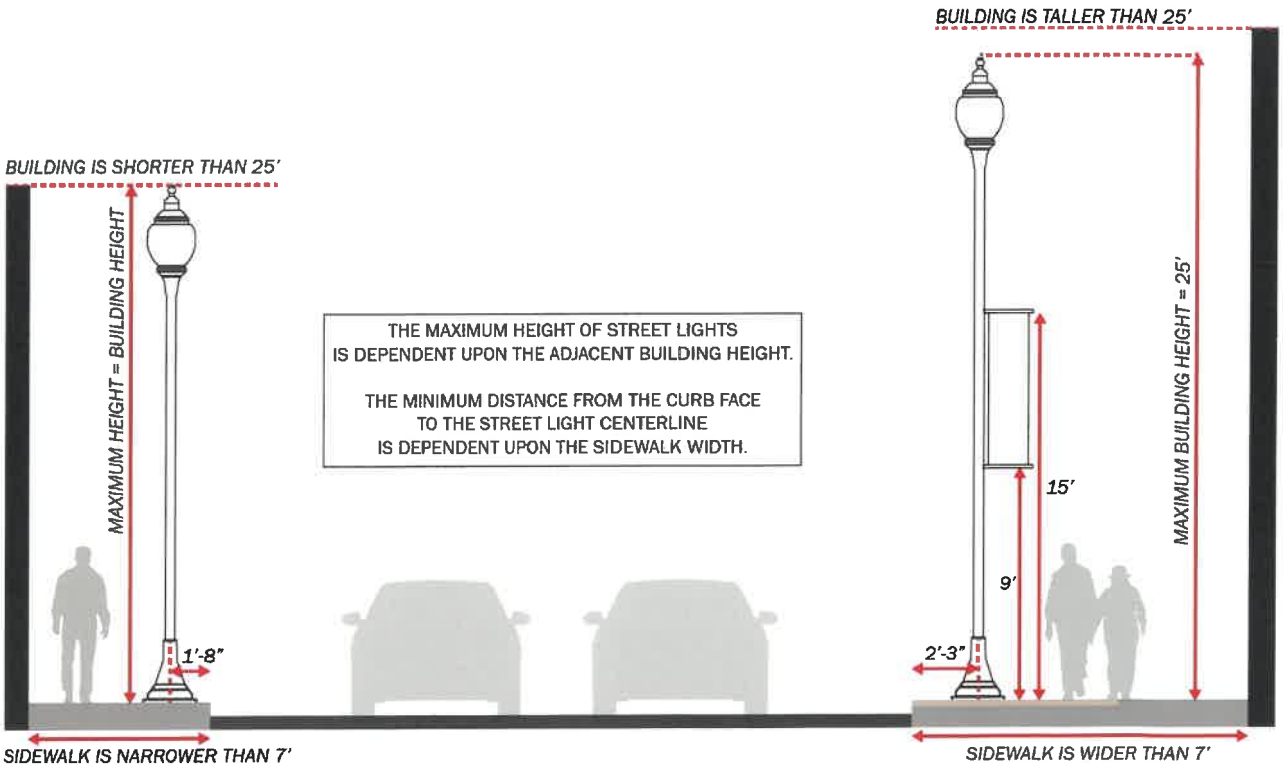


Figure 37 *Street light specifications*

Source: DVRPC

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Sidewalk Elements
Bus Stop Amenities

Overview

Bus stop amenities make travel more comfortable and efficient by providing amenities and information to transit users waiting for the bus to arrive. At a minimum, seating and route information should be provided at every stop. Shelters should be constructed when space permits. Bus shelters belong in the Greenscape-Funishing Zone, unless they are installed on a curb extension (see "Bus Loading Curb Extensions").

Shelters provide protection from the elements along with information regarding transit and wayfinding. Shelter roofs are an opportunity to add solar power or green roofs, and the side panels can be used to display public art or passenger information.

Bus shelter with amenities *Source: Oran Viriyincy, NACTO*

Best Practices

- **Ensure Accessibility.** Bus shelters and all bus stops must be ADA accessible with a 5'-wide opening to the sidewalk. If located on a curb extension or island, ADA-compliant curb ramps must be used.
- **Provide Space for Passengers to Alight.** Landing zones (where passengers alight) should ideally be 10' wide by 8' deep at all bus doors for new construction, and should be at minimum 5' wide by 8' deep.
- **Use Durable Materials Where Bus Stops.** Bus pads (where the bus stops along the curb) should be concrete to avoid warping asphalt.
- **Ensure Clearances.** Bus shelters need minimum clearances surrounding them from other sidewalk amenities. See Figure 38 for minimum clearance distances.

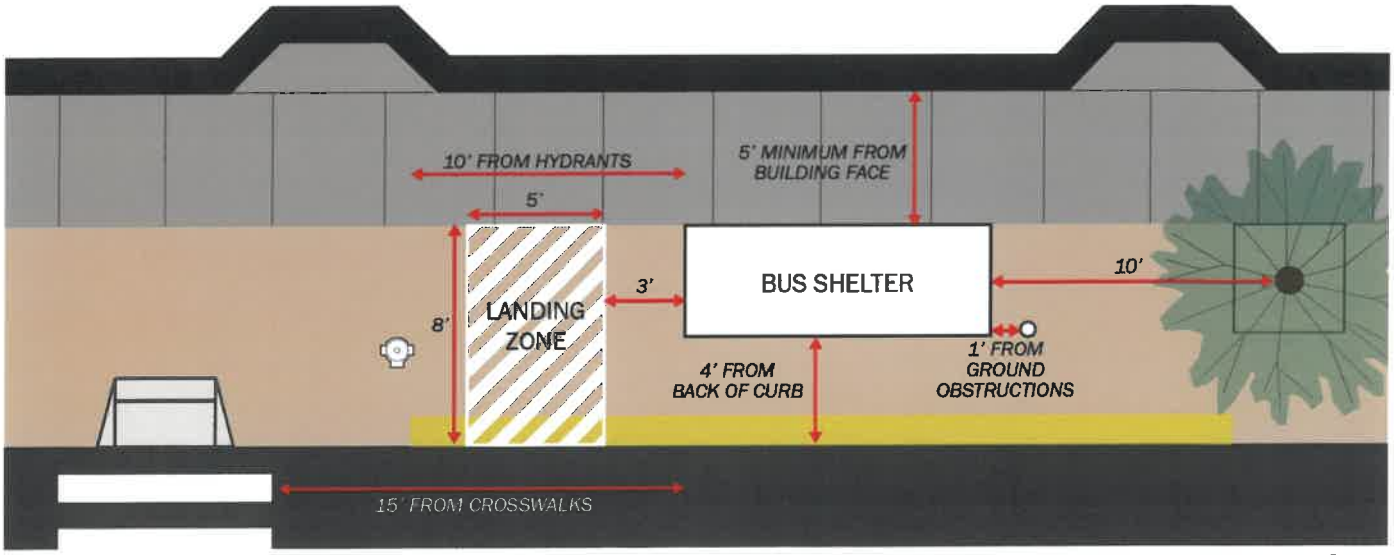

Figure 38 *Bus shelter clearances* *Source: DVRPC*

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Sidewalk Elements
Bike Parking

Overview

Bike parking is a crucial part of bike infrastructure and encouraging people to cycle. Parking makes cycling more convenient, and certain bike rack designs are effective at discouraging bicycle theft. There are three types of bike parking: bike racks, bike corrals, and bike lockers. Bike parking is most commonly installed in the Greenscape-Furnishing Zone, but may be appropriate for the Frontage Zone as well.

Two recommended styles of bike racks are shown in Figure 39. Bike corrals (shown in Figure 40) allow 10 bikes to fit in one on-street parking space. Bike lockers should be considered near transit stations. Lockers allow bicyclists to store their bike safely while commuting by train.

Figure 39 *Inverted (left) and post & ring (right) bicycle parking* *Source: DVRPC*

Best Practices

- **Bike Rack Guidance.** Racks should be allotted a 2' x 6' unobstructed space to park out of people's way. Racks must allow bikes to be secured at both the frame and the wheel for security.
    - Recommended types of bike racks: Inverted "U", Post-and-Ring (see Figure 39).
    - Not recommended types of bike racks: Wave, Schoolyard, Wheelwell, Secured Wheelwell, Coathanger, Bollard
- **Bike Corral Guidance.** Figure 40 shows the layout for a bike corral. Consider placing corrals in the end-most parking space on a street, adjacent to an intersection. This increases visibility for drivers as they approach the intersection. If multiple racks are placed together, they should be 3' apart to allow easy access, as illustrated in Figure 40.
- **Provide Lighting.** Bike parking should be well lit to ensure safety at night.

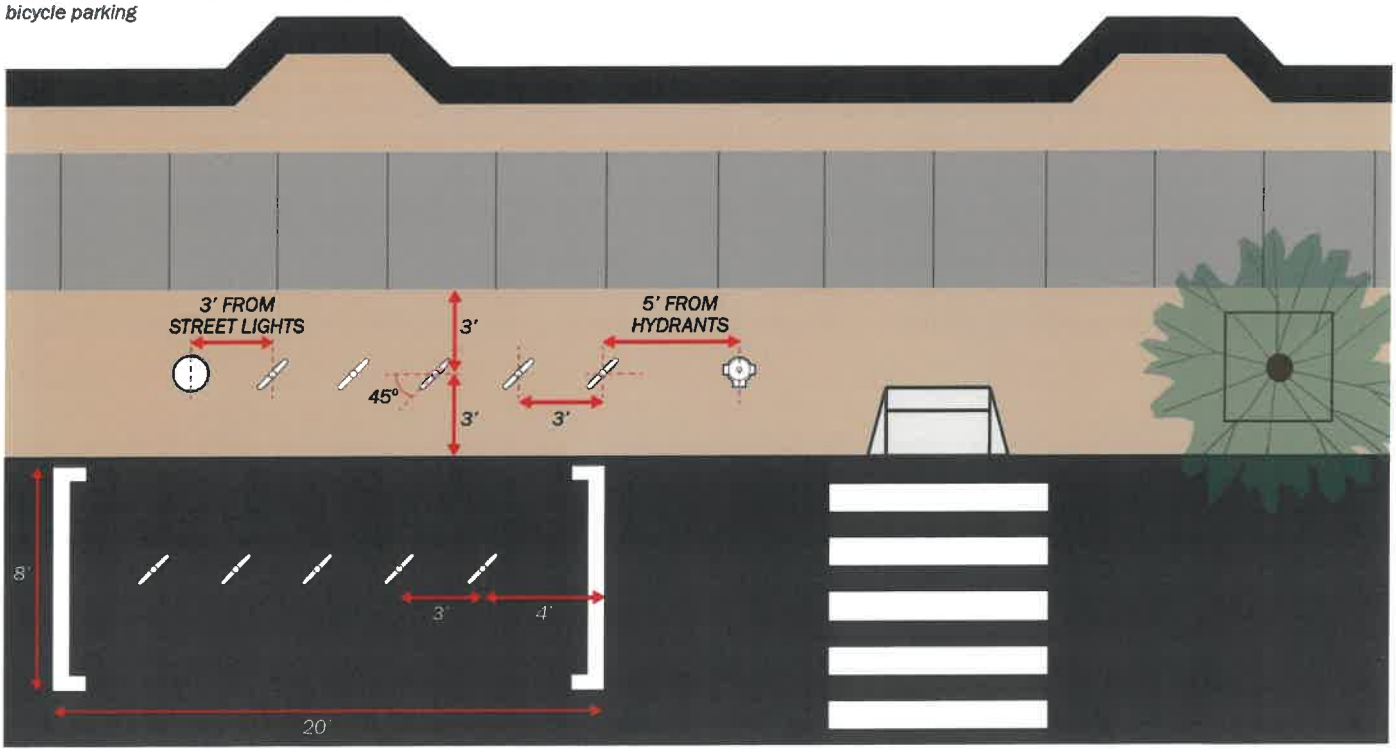

Figure 40 *Bicycle parking clearances* *Source: DVRPC*

Curb

The curb is an area of special interest in Complete Streets implementation. The curb is the threshold between the sidewalk—where vehicles are not permitted—and the roadway—where vehicular movement is often prioritized. As a result, it plays many key roles in negotiating the interaction and competition for space between these two travel zones. For purposes of this guidebook, the curb includes the curbstone itself and the roadway space directly adjacent to it that is critical for drainage and non-travel lane uses. This space can serve many purposes of a Complete Street, including vehicle storage; vehicle access to adjacent land uses; extensions of the sidewalk for pedestrian safety and recreation; and stormwater. The design elements that correspond to each of these uses are covered in this section. They are divided into two categories: elements that extend from the sidewalk toward the roadway ("Sidewalk Facing") and elements that are exclusively in the roadway along the curb ("Roadway Facing").

Considerations

The design of all curbs should pay special attention to the radius of the curb at corners. Curb radii influence the speed at which a vehicle can turn at an intersection: smaller radii require slower speeds to navigate a turn while larger radii can be taken at higher speeds and by large vehicles. Curb design should use the smallest possible curb radius. A smaller curb radius not only slows vehicles, but provides greater sidewalk area and less roadway area for pedestrians.

The curb is also a key area for storm drains and other above- and below-ground utilities. Curbs need to be cut or left open to allow for road and/or sidewalk runoff to feed into GSI infrastructure. Where utilities must take up real estate on the street (like hydrants), they must be placed in the Greenspace-Furnishing Zone, without encroaching upon the Pedestrian Zone (see Figure 41). These utilities should maintain clearances from trees, lighting, bus shelters, and other utilities.

Best Practices

- **Curb Radius Guidance.** Curb radius should be less than 10', except on Industrial Access streets. Larger curb radii are necessary on Industrial Access streets to accommodate truck turning radii. The effective turning radius (the curvature that turning vehicles follow) on all other streets should be less than 35' and as little as 15'. The designed turning speed should be less than 15 miles per hour. See Figure 42 for a diagram of a typical curb radius.

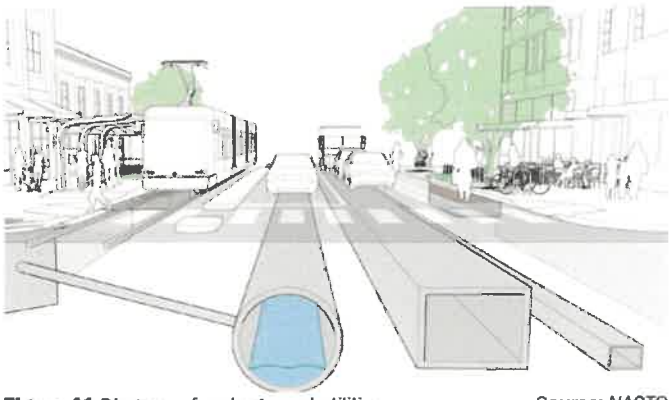

Figure 41 *Diagram of underground utilities* *Source: NACTO*

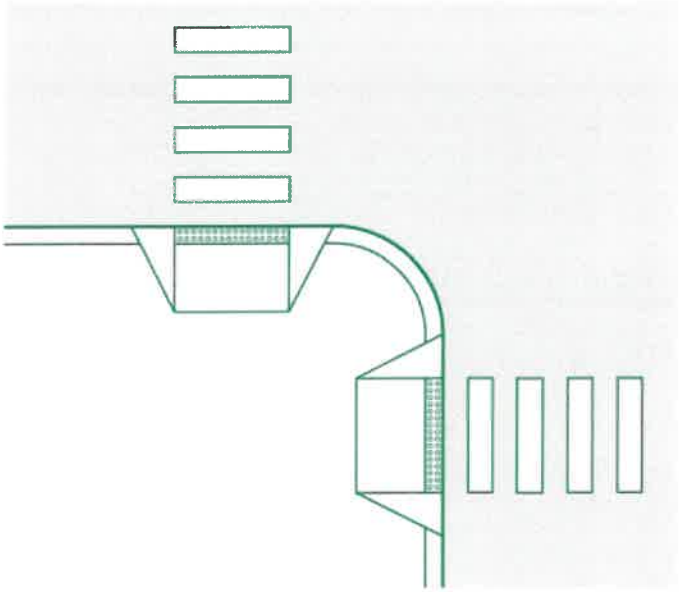

Figure 42 *Curb radius diagram* *Source: NACTO*

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Sidewalk-Facing Elements

Driveways and Entrances

Overview

Driveways connect off-street parking to the road network and, in most urban contexts, must do this by crossing the sidewalk. This creates conflicts between vehicles and pedestrians. In addition, driveways create conflicts between vehicles and bicyclists in the travel lanes. It is important that driveways are designed to minimize all of these conflicts to the greatest extent possible.

Best Practices

- **Minimize Conflicts.** Driveways should be avoided on major roads whenever possible to minimize conflict areas. Instead, place driveways on side streets and smaller roads.
- **Maintain Pedestrian Right-of-Way.** Driveways must give priority to pedestrians by prioritizing the visible and physical continuity of the sidewalk through conflict zones. Clear identification of the Pedestrian Zone is required to help drivers see pedestrians and be aware of where pedestrians might be.
    - The cross slope should not exceed 2% and the slope of driveway flare should not exceed 10%.
- **Provide Clearance to Intersections.** Residential driveways should be 10'-12' wide; 40' from a signalized intersection or 20' from an unsignalized intersection. Commercial driveways should be 20'-24' wide and 100' from any intersection. See Figure 43, Figure 44, and Figure 45 for more information.

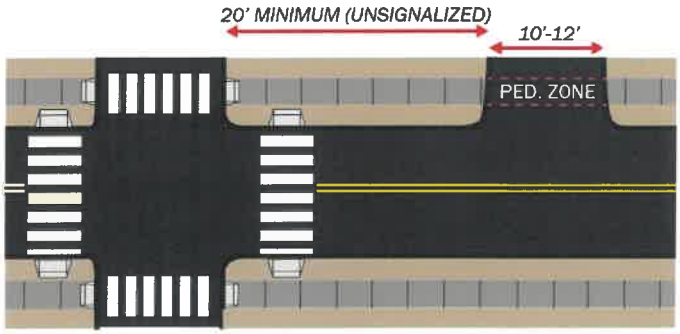

Figure 43 *Driveway clearance for unsignalized intersection* *Source: DVRPC*

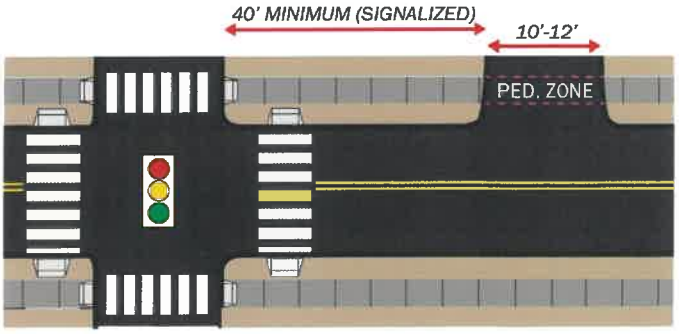

Figure 44 *Driveway clearance for signalized intersection* *Source: DVRPC*

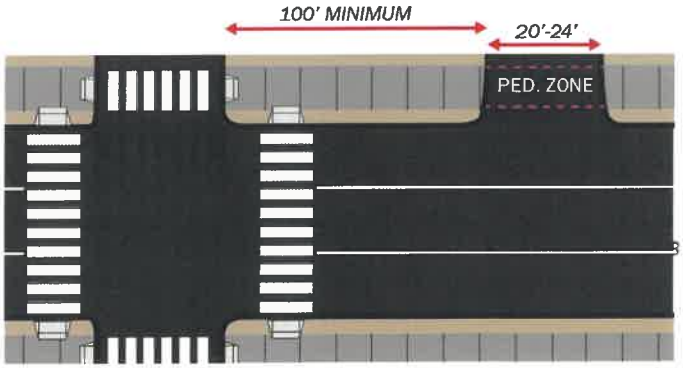

Figure 45 *Driveway clearance for commercial driveways* *Source: DVRPC*

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Sidewalk-Facing Elements
Curb Extensions

Overview

Curb extensions (also called bumpouts) provide expanded pedestrian space while slowing vehicle turning movements and shortening pedestrian crossing distances. Curb extensions can be built with curbing and concrete, or interim bumpouts can be built quickly using paint, delineators, and/or planters. An interim strategy provides benefits more quickly while allowing for testing and refinement, and also acclimates street users to changes. Curb extensions can also incorporate green stormwater infrastructure (GSI), as shown in Figure 46.

Best Practices

- **Curb Extension Dimensions.** Curb extension length must be at least equal to the width of the adjacent crosswalk. They should be 1'-2' narrower than the parking lane; they are often 6' wide. Curb extensions should extend to the stop bar.
- **Avoid Interfering with Bus Operations.** Planters should be placed as to ensure buses can still perform turns. Flexible posts can be used instead during the interim phase to solidify the best design before full construction.

Figure 46 *Curb extension with GSI*

Source: NACTO

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Sidewalk-Facing Elements

Bus Loading Curb Extensions

Overview

Bus loading curb extensions, or bus bulbouts/bumpouts, provide additional space for transit users waiting for the bus by extending the bus landing area onto a curb extension. This also frees up space on the sidewalk for passing pedestrians. Bus bumpouts speed up transit service by allowing the bus to load passengers in the travel lane. Bus loading bumpouts also have the possibility for interim implementation, using modular plastic platforms.

Best Practices

- **Provide Sufficient Space.** Loading bumpouts should occupy at least the width of the parking lane. They should be at least the length of the transit vehicles servicing the stop (typically 40').
- **Reduce Conflicts Between Modes.** When used on corridors with bicycle facilities, bike lanes can be routed behind loading bumpouts to further separate cyclists from vehicular traffic and passenger boarding and alighting.
- **Outfit with Amenities.** Wayfinding signage, transit information, and shelters are all beneficial amenities that should be considered for bus bumpouts. For more information, see NACTO's Transit Street Design Guide.
- **Ensure Accessibility.** Bus loading bumpouts must be designed to enable access for all users. They can either be built at-grade or use ADA ramps to ensure access.

Bus bulbout with rear bicycle lane *Source: Adam Coppola, PBIC*

Modular plastic bus bulb in Pittsburgh, PA *Source: Zicala (CC)*

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Roadway-Facing Elements

On-Street Parking

Grand Street *Source: DVRPC*

Lyndale Street *Source: DVRPC*

Overview

On-street parking serves a number of key purposes on streets, beyond vehicle storage. It can serve as a buffer between pedestrians on the sidewalk and vehicles on the road, or even, when designed for a parking-protected bike lane, between bicyclists and vehicles. In addition, on-street parking can have traffic calming benefits by narrowing the roadway. Providing sufficient parking to meet demand is important as it reduces vehicles circling the neighborhood, but it should be weighed against other potential uses of the public right-of-way. Parking lanes provide flexible space that is often used for other purposes cited in this chapter (see "Parklets," "Curb Extensions," etc.). In general, on-street parking can be either parallel to the curb or angled (front or back) and set against the curb or at some distance from it.

Best Practices

- **Parallel Parking Dimensions.** Parallel parking should be a minimum of 7' wide, and up to 9' wide.
- **Ensure "Daylighting" at Crosswalks.** Parking stalls should be a minimum of 20' from the closest crosswalk to ensure clear sightlines of the travel lane for crossing pedestrians and vice versa ("daylighting").
- **Consider Back-in Angle Parking for Safety Benefits.** Back-in angle parking provides drivers with better sightlines of the street than parallel parking spaces. It also reduces risk of dooring bicyclists. It may take space away from the sidewalk. It is most recommended for use on low-speed streets and requires education to familiarize the public with the unusual configuration.
- **Price High Demand Parking.** Parking pricing is recommended in commercial and downtown areas, using meters and time restrictions. Restrictions are typically needed to discourage long-term parking.

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Roadway-Facing Elements
Parklets

Overview

Parklets provide gathering space and amenities for people and businesses, including seating, bicycle parking, public art, and plantings in lieu of one or more parking stalls. Parklets can be temporary, as displayed by annual (Park)ing Day demonstrations. A parklet can also be a permanent reallocation of space.

Parklets are often funded by local businesses and community groups. A 2017 University City District study in Philadelphia, PA found that parklets increased sales by 20% at nearby businesses.

Best Practices

- **Parklet Dimensions.** Parklets are recommended to be 6' deep, or one foot shallower than the parking lane, and one to two parking spaces long. To avoid visibility issues, solid elements like walls or tables should be no more than 3' high.

Parklet in Philadelphia

Source: Shiftspace (CC)

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Roadway-Facing Elements
Loading Zones

Overview

Providing dedicated space for loading and unloading prevents double-parking issues that impede other street users. Figure 47 shows a diagram of a typical loading zone.

Best Practices

- **Loading Zone Dimensions.** Loading zones need to meet minimum lengths and widths to accommodate commercial deliveries; passenger pick-up and drop-off requires less space.
    - Loading zones should utilize wider parking lanes, up to 15' wide, to support delivery trucks and industrial vehicles. For truck usage, it is recommended that loading zones be located at the beginning of a block to facilitate easy ingress and egress. If drivers must access the sides of a vehicle to unload, consider additional space to ensure safety.
    - Loading zones should be 80' long to accommodate large trucks or multiple vehicles. At minimum, loading must be at least 30' long to enable for-hire vehicles to pull in.
- **Provide Signage.** Loading zones should have signage to denote extents of the loading zone and applicable regulations and time limits.
- **Consider Flexible, Shared Zones.** Loading zones can be available for 24 hours a day to offer greater delivery flexibility, or they can use a window model where loading is only allowed during certain times. Outside of loading hours, these spaces can be used for food trucks, markets, and parklets on a temporary basis.g must be at least 30' long to enable for-hire vehicles to pull in.

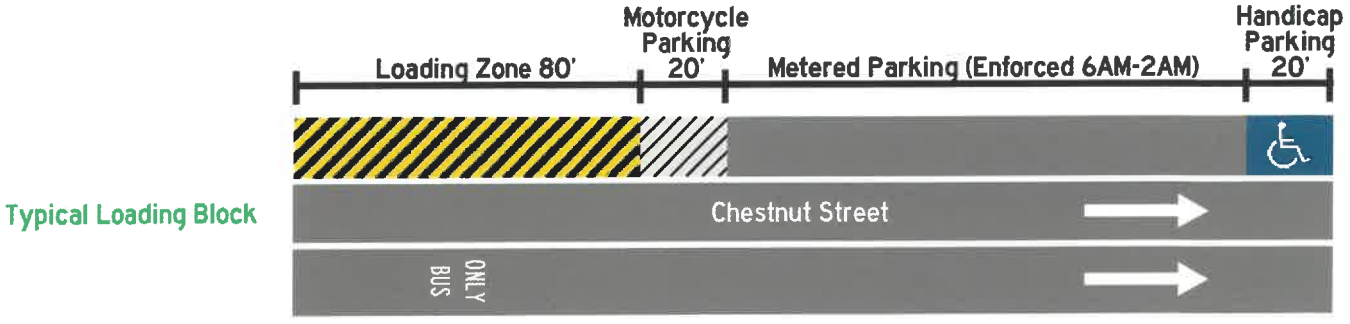

Figure 47 *Loading zone diagram*

Source: DVRPC

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Roadway-Facing Elements

Drainage and Green Stormwater Infrastructure at the Curb

Green stormwater bumpout *Source: Kristen Sandt*

GSI curb extension *Source: Laura Sandt*

Overview

Curb space can be used to house green stormwater infrastructure (GSI). GSI allows water to infiltrate into the ground and slowly release into the water table rather than through pipes and into rivers. GSI can be located in bumpouts or inlets can drain water into infiltration basins. GSI strategies include street trees, rain gardens, and permeable pavement. All of the strategies function using the same principle: hold and aborb water to replenish the water table and then slowly release it back into the sewer.

Using GSI in curb space reduces pollution runoff in rivers, decreases flooding, recharges groundwater, lowers wastewater treatment cost, and can increase property values. Additionally, GSI in public spaces can increase support for effective water management due to greater public visibility and tangible benefits. See the Boston Complete Streets Design Guide for more information on utilizing GSI in the curb.

Best Practices

- **Divert Water from Flowline.** Ideally, GSI at the curb will keep stormwater out of the combined sewer, putting less stress on the system. Strategies that can help with this include porous unit pavers that assist in stormwater infiltration. Soft paving, grass, and mulch can help to absorb and hold water. Stormwater planters can be used along a curb to decrease runoff. Rain gardens can be used to create public space with the added benefits of GSI.
- **Maintain Flowline to Sewer Inlets.** It is also critical to ensure that any infrastructure added at the curb, like curb extensions, do not interrupt the flowline. Use a grate with curb extensions to allow stormwater to reach existing inlets. Bicycle-friendly grates and sewer inlets should be used.
- **Install Signage and Educational Materials.** Signage helps to educate the public on the benefits of GSI, raising awareness that could lead to greater awareness, protection, and advocacy of GSI projects.

Roadway

The roadway is the part of the street that carries vehicular traffic. This does not just include cars, but many other types of road users as well, including bicycles, trucks, transit vehicles, motorcycles, and, increasingly, new forms of micromobility like electric scooters. Even pedestrians must use the roadway frequently, at a minimum to cross the street. The diversity of users in the roadway creates conflicts as not all vehicles can or wish to travel at the same speed and some pose a much greater safety risk to the rest than others. The roadway must be designed to weigh the safety and access concerns of all users against the need to maintain the throughput necessary to support the economic life of the city.

The design elements in this section are divided into three categories. The first category includes traffic calming elements that can be used to lower the speed that vehicles can comfortably travel along the roadway, thereby increasing safety for all road users. The second category includes design elements that prioritize transit service, making travel by bus more efficient and attractive to potential riders. The third category covers bicycle facilities that should be installed to segregate these users from faster moving and heavier automobile traffic in the roadway.

Considerations

A key factor in the design of any roadway is the design speed, or the speed that the road is designed for a driver to feel comfortable traveling at. Speed is the key factor determining the risk and severity of a traffic crash. Oftentimes, urban streets are designed according to the operating speed of vehicles using the existing facility. Streets designed to Complete Streets design standards should instead focus on the target speed of vehicles and (re-)design the street so that drivers can't exceed it.

Best Practices

- **Design Roads for Target Speed.** The target speed of non-limited access streets in built-up areas should not exceed 30 mph except in limited cases where a 35 mph target speed may be permissible on some arterials (Figure 48 shows how higher speed increases crash and severity risk). Design criteria for urban streets (including arterials) must not exceed the target speed for the facility. Design speeds can be lowered on existing facilities in order to bring the design speed in line with the target speed. See "Traffic Calming Strategies" for more information on strategies to lower design speeds.

SPEED (MPH)	STOPPING DISTANCE (FT)*	CRASH RISK (%)†	FATALITY RISK (%)†
10–15	25	5	2
20–25	40	15	5
30–35	75	55	45
40+	118	90	85

* Stopping Distance includes perception, reaction, and braking times.

† Source: Traditional Neighborhood Development: Street Design Guidelines (1999), ITE Transportation Planning Council Committee 5P-8.

Figure 48 *Design speed table*

Source: NACTO

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Traffic Calming Strategies

Overview

Traffic calming measures manipulate the roadway to slow traffic to create a safer travel environment for bicyclists and pedestrians, as well as motorists. The traffic calming strategies can generally be divided into three categories. The first includes those that alter the road configuration through striping, primarily by narrowing lane widths and reducing the number of lanes through Road Diets. The second category uses vertical deflection through strategies like speed humps, speed tables, and speed cushions that force vehicles to slow as they traverse the raised obstruction in the roadway. The third category uses curb extensions through strategies like chicanes and neckdowns to slow vehicles by interrupting an otherwise straight or wide roadway. GSI best practices can also be integrated into traffic calming projects.

Best Practices

- **Make Lanes as Narrow as Possible.** Narrowing vehicle travel lanes can reduce speeds and free roadway space for different modes. Ten-foot lanes encourage slower speeds, increasing safety for other road users. Lanes greater than 11' should not be used. Wider lanes may cause unintended speeding, accommodate error, and assume right of way at the expense of other modes
    - Commercial Corridors, Connector Corridors, and Industrial Access streets should have 11' wide lanes to accommodate wider vehicles, and all other streets should have lanes that are 10' wide.
    - Parking lanes should be between 7'-9'. Parking lanes for a loading zone can be up to 15' to accommodate trucks, 8'-9' is recommended.
    - Where there is extra room in the cartway, an edgeline, with gore stripping if necessary, can be painted to maintain proper lane widths.
- **Reduce the Number of Lanes.** A Road Diet reduces the number of travel lanes to reduce speeds, increase safety, and create room for bicycle facilities or wider sidewalks. A four-lane street could be reduced to one travel lane in each direction and a center turning lane. Road diets are a FHWA Proven Safety Countermeasure and have been shown to result in a 19-47% reduction in total crashes.

Example of a Road Diet, Vanderbilt Avenue, NYC *Source: NACTO*

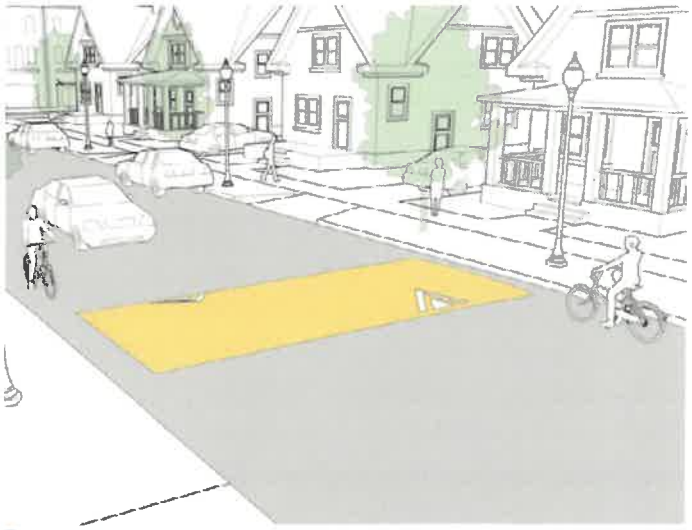

Figure 49 *Example Diagram of a Speed Hump* *Source: NACTO*

Figure 50 *Example Diagram of a Speed Table* *Source: NACTO*

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Traffic Calming (continued)

Example of a chicane *Source: NACTO*

Example of an interim speed cushion *Source: NACTO*

Example of an interim neckdown *Source: Bicycle Coalition of Greater Philadelphia*

- **Implement Vertical Deflection.** Speed humps, speed tables, and speed cushions are all types of vertical deflection. The design profile (including the slope of the ramp and length of the top) and spacing between installations influence how appropriate each element is for different types of roads. Warning signs are needed to alert drivers to vertical deflection elements. Caution should be exercised when considering vertical deflection on streets wider than 50'.
  - *Speed Humps* are the most abrupt vertical deflection design and reduce speeds to 15-20 mph (Figure 49).
  - *Speed Tables* have a flat area between the sloped edges (Figure 50). The longer traversable surface calms traffic less abruptly than speed humps; they can be crossed at up to 25-30 mph. If a speed table is needed in the same location as a crosswalk, a raised crosswalk should be installed.
  - *Speed Cushions* function similarly to speed humps, but feature wheel cutouts to allow emergency vehicles and trucks to pass easily through. Speed cushions reduce speeds to 15-20 mph.
- **Use Curb Extensions to Slow Traffic.** Chicanes and neckdowns are traffic calming strategies that use curb extensions to slow traffic. Due to the impact these elements have on the curb, drainage is a potential issue when installing them. Edge islands can provide the same benefits without impacting existing drainage channels. Warning signs should be installed to alert drivers of the traffic calming measure.
  - *Chicanes* are a traffic calming strategy that use offset curb extensions to increase public space along a roadway and force drivers to maneuver small bends, slowing speeds.
  - *Neckdowns* are curb extensions that are used to narrow the roadway. They can be utilized at the intersection as a gateway treatment or at the mid-block, often with mid-block crossings. Neckdowns create an opportunity for tree plantings or additional bicycle parking on the curb extension.

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Prioritizing Transit

Overview

Prioritizing transit in the roadway increases the reliability of surface transit schedules and can decrease travel times. Strategies to prioritize transit on the roadway include dedicating travel lanes for transit and installing priority signals for transit.

Queens, NY bus lane *Source: NYC DOT*

Best Practices

- **Dedicate Bus Lanes.** A dedicated bus lane reserves the curbside lane for bus travel (Figure 51). Dedicated bus lanes can be applied on major routes with 10-minute headways where traffic congestion could significantly affect reliability. A dedicated bus lane can increase travel speeds by 20-30%, reducing overcrowding and allowing for faster service. To benefit transit the most, the lane should be reserved exclusively for bus travel; where space is limited and depending on the adjacent land use, it may be necessary to allow right turns and business access in the dedicated bus lane as well.
    - Dedicated bus lanes should use the curbside lane with a minimum lane width of 11'. Pavement markings must indicate 'Bus Only". Red paint in the dedicated lane is recommended; it deters drivers from driving and parking in it.
    - Transit signal priority (see below) for these lanes is recommended to reduce delays.
- **Prioritize Transit at Signals.** Priority signals for transit are used to reduce delays for buses by changing the lights to green for public transit. These systems can be used intermittently, to make up time for a late vehicle, or consistently along a corridor. Priority signals are best used when signal cycle length is a significant factor to transit delay. Priority signals could also create an extended turn phase to provide room for transit to turn and maneuver slowly.

Figure 51 *Bus lane diagram* *Source: NACTO*

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Bike Facilities

Overview

Bicycle facilities in the roadway designate space for bicyclists. This increases awareness of these users for motorists and can increase safety and comfort for bicyclists. Bike facilities in the roadway cover a range of strategies, from pavement marking and signage to different types of bike lanes with varied levels of segregation and protection from car traffic.

Best Practices

- **Protect and Segregate Bicyclists from Other Vehicles.** Some types of bike lanes provide more protection from traffic than others. They can be broadly categorized as sharrows, conventional bike lanes, and protected bike lanes, in ascending order of protection and segregation. Determining the right strategy is contingent on factors like road space, operating speed of motorized vehicles, and the volume of motorized vehicles. See NACTO's *Urban Bikeway Design Guide* for more specifics on appropriate contexts for different bike lane facilities.
    - Sharrows: Sharrows are road markings that indicate that a roadway is a shared lane for both motorists and bicyclists. Can be used over green paint for "green-backed" sharrows for more visual impact. They offer no protection and no segregation and should only be utilized on very low risk roadways.
    - Conventional Bike Lanes: Conventional bike lanes designate exclusive space in the roadway for bicycle travel, usually next to the curb or parking lane. Conventional bike lanes use pavement markings and signage to designate their locations. They offer segregation, but no protection.
    - Protected Bike Lanes: Protected bike lanes function similarly to conventional bike lanes in giving bicyclists a designated space on the roadway, but separates them further with a painted buffer space or physical barriers placed in the buffer zone such as bollards, planters, and flexible delineators. These physical barriers, depending on the material, may or may not be crash resistant to provide full physical protection for bicyclists. Protected bike lanes can also be parking-protected, which places the protected bike lane to the right of the parking lane, adjacent to the curb.

Sharrow in Media, PA *Source: DVRPC*

Figure 52 *Conventional bicycle lane* *Source: NACTO*

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Green striped conflict zone *Source: DVRPC*

Protected bicycle lane in Madison, WI *Source: DVRPC*

Some type of a barrier between the parking lane and the bicycle lane, such as flexible delineators, may be necessary in a parking-protected bike lane concept if drivers are not accustomed to the design.

- **Consider Reverse and Two-Way Bicyclist Flow.** Occasionally, allowing bicyclists to travel against the typical flow of traffic is beneficial to bicycle network connectivity. There are two broad categories of these types of bike lane.
  - Contraflow Bike Lane: Contraflow bike lanes transform one-way streets for motorists to two-way streets for bicyclists by adding a bike lane traveling the opposite direction.
  - Two-Way Cycle Tracks: Two-way cycle tracks are physically separated bike lanes that allow travel in both directions on one side of the road.
- **Increase Visibility with Lane Markings and Signage.** All bike facilities need some type of pavement markings on the roadway. Green paint increases awareness of the bike lane and reinforces that the lane is not for motor traffic. It can be used in conflict areas only (driveways, intersections) or to mark the entire lane.
  - Sharrows: Sharrows should be paired with "Share the Road" signage.
  - Conventional Bike Lanes: A white solid line at least 6" wide should separate the bike lane from the vehicle travel lane. In merging areas, a dashed line should be used. Pavement markings should be placed outside of the motor vehicle tread path to minimize wear. When a bike lane is adjacent to a curb, place "no parking" signs.
  - Protected Bike Lanes: Protected bike lanes should use green paint. 'Bike Only' pavement markings and 'Bike Lane' signs could clarify these lanes as well. Pavement markings should be placed at the beginning of the lane, and in periodic intervals based on the place-specific context and engineering judgment. If a protected lane utilizes only a buffer, the buffer zone

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Bike Facilities (continued)

should be marked with solid white lines filled with diagonal cross hatching. Physical barriers between the travel lane and the bike lane are recommended to emphasize the space.

- Contraflow Bike Lane: Contraflow lanes are marked by a solid double yellow line to separate the lane, unless separated by parking. Streets with contraflow lanes should include an "Except Bikes" sign to "One Way" signs. For any "Do Not Enter Signs", an "Except Bikes" sign should be added. Bike lane pavement markings should indicate the direction of travel.
- Two-Way Cycle Tracks: Pavement markings should signal the cycle track at the beginning and at periodic intervals. On one-way streets, an "Except Bikes" sign should accompany the "One Way" sign. The cycle track should also have "Do Not Enter" and "Except Bikes" signs at every entrance to the track. Bike signals should be installed at all controlled intersections on a cycle track.

- **Provide Sufficient Roadway Width.** Adhering to minimum widths for bike facilities is critical to their success.
  - Sharrows: Sharrows do not have minimum width guidance because they share the vehicle through lane.
  - Conventional Bike Lane & Contraflow Lane: Conventional bike lanes must be at least 4' wide; but ideally 6' wide. When conventional bike lanes are placed next to a parking lane, they must be at least 5' wide. The same applies to contraflow lanes.
  - Protected Bike Lane: Protected bike lanes must be at least 5' wide, with an additional 3' buffer width. If it is a parking protected bike lane, total width for the parking lane and bike lane should be at least 11'.
  - Two-Way Cycle Tracks: Two-way cycle tracks must be at least 8' wide, though 12' wide is recommended.
- **Provide Wayfinding.** Bicycle wayfinding systems combine comprehensive signage and/or pavement markings to guide cyclists to destinations along bicycle routes while familiarizing users with the network. These systems lower

Two-way cycle track, NYC *Source: NACTO*

Contraflow bicycle lane, Chicago, IL *Source: NACTO*

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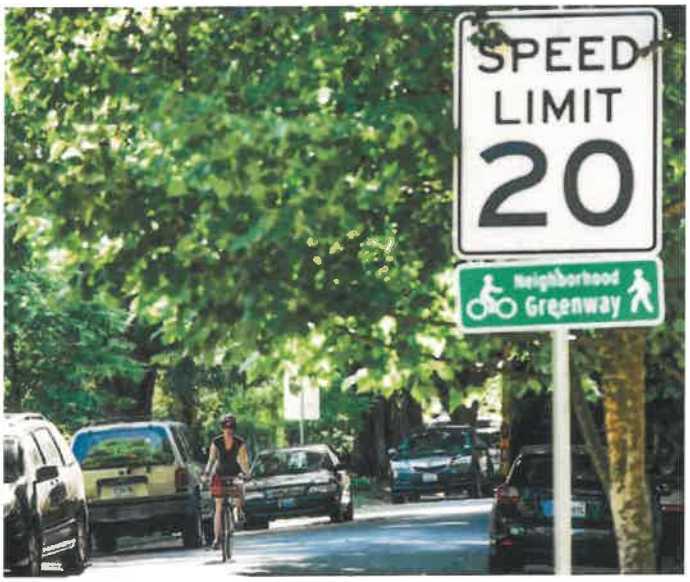
Neighborhood greenway with traffic diverter *Source: Russ Roca, PBIC*



Neighborhood greenway in Portland, Oregon *Source: Russ Roca, PBIC*

barriers to entry for infrequent cyclists by providing the best route to a popular destination. Wayfinding systems are typically applied over the entirety of the corridor or streets with the bicycle facility for continuity.

- **Manage Interactions with Transit.** At transit stops, a bumpout should be used for transit rider boarding and alighting and the bicycle lane should wrap behind it.
- **Minimize Obstructions.** Designers should minimize conflicts with drain and utility covers, and keep these elements at grade, and with bike-friendly covers.
- **Develop Neighborhood Greenways.** Neighborhood greenways are a type of bike facility that has benefits for all street users. Throughout the country these facilities have a number of names, including bicycle boulevards, neighborhood bikeways, local street bikeways and bicycle priority streets, among others. These shared roads utilize a variety of tools to decrease auto traffic volumes and speeds to provide a low-stress environment for bicyclists and pedestrians. To create a street that is comfortable for bicyclists of all ages and skill levels, traffic calming, traffic reduction, signage and pavement markings, and intersection crossing treatments are used. In Trenton, many alley streets and some dense residential streets are good candidates for this treatment.
- **Plan for Maintenance.** The most common forms of protected bicycle lanes require installing bollards, often flexible delineator posts. These pose maintenance challenges as they may create spaces too narrow for traditional street sweepers or snow plows to navigate. Bike lane maintenance is possible, however, with limited planning, including purchase of pickup truck-mounted plow blades or other small snow removal vehicles and proactive deicing efforts (see "Winter Bike Lane Maintenance: A Review of National and International Best Practices" for more information). Limiting the extent of bollard deployment to high conflict areas like intersections or curves where drivers are more likely to encroach the bicycle lane can also "right-size" a protected bike lane project and save on maintenance.

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Intersection

Overview

All road users come together at the intersection. Intersection design is of special importance to Complete Streets because it must balance the competing needs of many users and reduce the inherent conflicts created where the strands of the transportation network meet and cross. Intersections designed to Complete Streets standards bring in elements from all other parts of the street—the sidewalk, the curb, and the roadway—and adapt to them suit the heightened awareness that intersections demand. Traffic calming strategies adapt to turning vehicles, bike facilities focus on safely mixing with vehicles, and pedestrian facilities ensure that the protections of the sidewalk are not completely lost as pedestrians venture into the street.

The design elements in this section are divided into three categories. The first category includes design elements that prioritize pedestrian movements through the intersection, increasing their visibility and safety. The second category covers bicycle facilities that should be installed to maintain safety as bicycles mix with vehicles in the intersection. The third category includes traffic calming elements that can be used to slow both turning vehicles and those continuing straight, thereby increasing safety for all road users.

Considerations

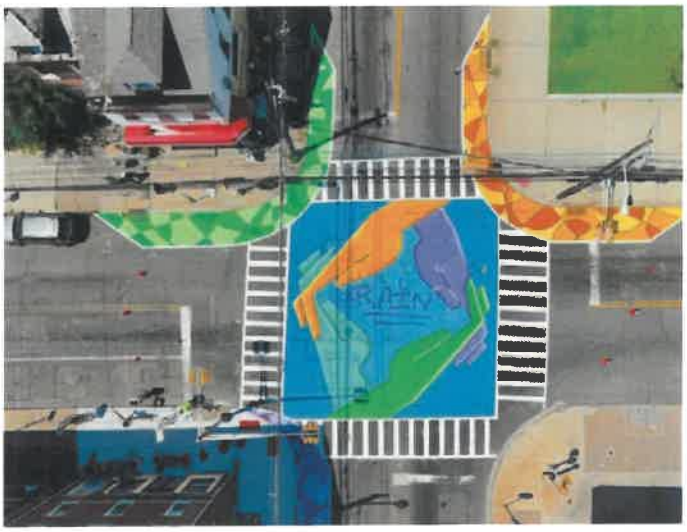
All intersections should be evaluated for line of sight concerns and designed to ensure greater visibility and safety for all road users to be able to maneuver the street. Street corners must be designed to maximize eye contact between all modes of transportation, including pedestrians, bikes, transit, and automobiles. These changes should not widen roadway corners. Though this change may increase visibility, it may also increase speed of automobiles, decreasing the driver's peripheral vision and awareness of pedestrians.

Intersections can be ideal locations to create additional public space with tactics like curb extensions. This extra space can be activated with street furniture, public art, lighting, small plazas, and parklets to create a sense of place. Areas utilizing placemaking techniques should be defined with plantings, trees, and furniture. These techniques can include wayfinding signage. Placemaking can enhance access to amenities such as transit stops, libraries, schools, government buildings, post offices, bike parking, and bike share stations.

Gateways build on these placemaking techniques with vertical elements that define the street and make pedestrians, bicyclists, and drivers more aware of their surroundings. This could be accomplished with overhead banners, or decorative signage at the entrance to neighborhoods, districts, or the city. Other vertical fixtures could be special light fixtures, overhead lighting, prominent street trees, and public art installations that make road users see the distinction of the area.

Best Practices

- **Maintain Sight Lines.** To create better lines of sight, designers should remove parking within 20' of the intersection, keep trees at least 5' from the intersection, 3' from a curb, and 5' from signage.
- **Use Texture to Enhance Placemaking and Gateway Programs.** Horizontal elements can provide placemaking and gateway benefits by defining the street to make road users more aware of their surroundings. Materials could include textured pavement, unique patterns or materiality on crosswalks, murals, raised intersections, or shared streets.



Painted intersection placemaking strategy *Source: Trenton Health Team*

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Pedestrian Safety Elements

Crosswalks

Overview

Crosswalks designate places for pedestrians to cross roadways and alert motorists to watch for pedestrians crossing. Crosswalks can create a more walkable urbanized environment.

Marked crosswalks must be installed on all legs of signalized intersections unless pedestrians are prohibited from the roadway. All new crosswalks should have a pedestrian countdown signal.

Continental-style crosswalk in Indianapolis, IN *Source: NACTO*

Best Practices

- **Prioritize Visibility.** Crosswalks must be striped in high-visibility continental crosswalk markings at least as wide as the sidewalks they connect, and align with the sidewalk as closely as possible (see Figure 53). Street lighting is required near all intersections with crosswalks to increase visibility at night.
    - Stop bars must be at least 8' before the crosswalk, perpendicular to the travel lane.
- **Ensure Accessibility.** ADA curb ramps with detectable warning surface must be installed with all crosswalks. Curb ramps should be installed perpendicular to the sidewalk, directly facing the crosswalk (not diagonal to the sidewalk, facing the middle of the intersection). Crosswalks must be at-grade unless crossing a limited access highway.
- **Minimize Crossing Distance.** Crosswalks should be as short as possible, utilizing bumpouts, pedestrian refuges, and smaller curb radii to minimize crossing time.
- **Minimize Distance Between Crossings.** Controlled crosswalks should ideally be spaced 200'-300' apart. Mid-block crossings should be considered where there are significant pedestrian generators and pedestrians must walk more than 200' to reach the nearest crosswalk. Mid-block crossings are best on streets with lower speeds and vehicle volumes. Placement and design should ensure that sight distances are sufficient and ample clear space is provided on either side. Additional treatments can be considered to ensure pedestrian safety and visibility. See FHWA's *Safe Transportation for Every Pedestrian* guide for more information.

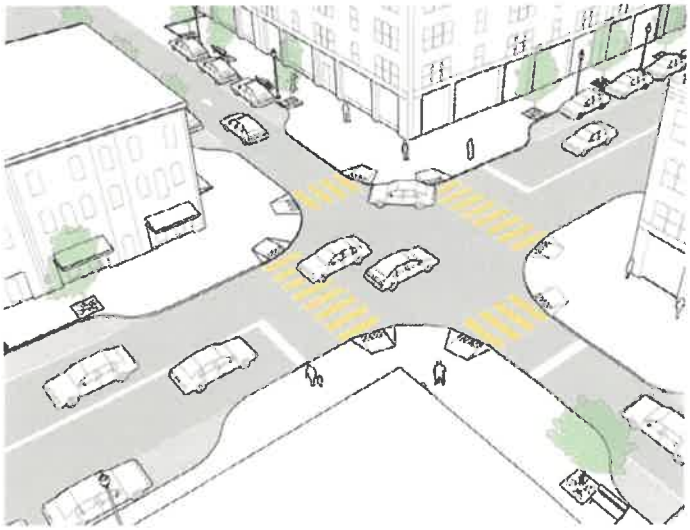

Figure 53 *Crosswalk diagram* *Source: NACTO*

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Pedestrian Safety Elements
Pedestrian Signals

Overview

Pedestrian signals are used to create a safer, more comfortable, and more predictable crossing environment for all pedestrians. These countermeasures reduce pedestrian-motorist crashes and increase motorist yielding. Safety elements include those that impact pedestrian crossing time like countdown signals, which should be installed at all new crosswalks. They also include those that increase visibility of pedestrians in the intersection, like rectangular rapid flashing beacons (RRFB), pedestrian hybrid beacons, and in-street crossing signage. Leading pedestrian intervals (LPI) accomplish both goals by extending crossing time and making pedestrians more visible in the intersection. Several of these strategies are FHWA Proven Safety Countermeasures and have been shown to result in significant pedestrian crash reductions including RRFB (47%), pedestrian hybrid beacons (55%), and LPI (60%).

Pedestrian signal *Source: AZ Magazine*

LPI signal in NYC *Source: NYC DOT*

- **Provide Sufficient Crossing Time.** Walk times must allow for a cross time of 3.5 feet per second. Crossing times should be increased near hospitals, senior centers, and other places where pedestrians may move more slowly (assume 2.5 feet per second). Two-stage crossings should be avoided.
    - Signal cycles should be no more than 60-90 seconds; shorter cycle lengths increase compliance with crossing signals. Half-cycle lengths that are below 40 seconds at signalized crosswalks and below 20 seconds at unsignalized crosswalks minimize risk-taking behavior.
- **Display Pedestrian Countdown Information.** Pedestrian signals can convey countdown information in multiple formats: visual, audible, and vibrotactile. Visual representations of countdown information include walk and hand signals. Audible representations of countdown information come from the tones to accommodate walk and don't walk. Vibrotactile representations can come from an actuator device, if one is used, which has a raised arrow in the direction of the crossing, and the button's ability to vibrate in alignment with the audible tone. Visual is the standard format. Other formats should be used as necessary in response to the needs of area users.

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Pedestrian Safety Elements

Pedestrian Signals (continued)

- **Make Actuators Accessible, If Needed.** Generally actuators or push buttons should not be used and a pedestrian cycle should be part of every signal phase. If push buttons are used, they must be accessible: placed on a level segment (<2% slope) that is 3' by 4', or 5' by 5' if the pedestrian must turn to use the actuator. Devices must be 2' to 6' from the curb, within 5' of the crosswalk, and 3'-6" from the ground, and be parallel to the direction of travel. Buttons must be large enough for those with limited hand function to operate, and easy to press.
- **Provide a Leading Pedestrian Interval.** Leading Pedestrian Intervals (LPIs) allow pedestrians to begin crossing before vehicle traffic enters the intersection. Pedestrians are given a 3-7 second "head start" before vehicles have the green light to turn or proceed, allowing pedestrians to be seen more easily in the intersection. It is an easy and inexpensive strategy with significant safety benefits. Intersections where LPIs were installed saw a 60% reduction in pedestrian-vehicle crashes, and are especially beneficial where left-turn volumes are high.
- **Increase Visibility at Key Locations.** Rectangular Rapid Flashing Beacons (RRFBs) and Pedestrian Hybrid Beacons (also known as High-Intensity Activated Crosswalks or HAWKs) can dramatically improve safety at unsignalized and other priority pedestrian crossings, including at midblock locations.
    - *Rectangular Rapid Flashing Beacons* (RRFBs) are flashing lights actuated by a crossing pedestrian that alert drivers to crosswalks and pedestrian activity; they can also be used for bike/trail crossings. RRFBs are best used for high-volume bicycle and pedestrian crossings, mid-block crossings, and low-visibility crossings. A 2009 study (Hunter, Srinivisan, Martell) showed that motorist yielding to pedestrians increased from 2% without an RFFB to 54% with a flashing RRFB. If RRFBs are intended to be used by bicyclists, the actuator button (the device to trigger the signal) should be placed in a position that does not require the cyclist to dismount.
    - *Pedestrian Hybrid Beacons* are flashing lights/signs activated by pedestrians used to enhance pedestrian and bicycle crossings of major streets at a mid-block location, or an uncontrolled intersection with high speeds. They are an FHWA Safety Countermeasure that have been shown to reduce pedestrian crashes by 55% and total crashes by 29%.
- **Use In-Street Signage to Communicate to Drivers.** In-street crossing signage can be used in order to convey information about roadway rules and warn drivers about possible pedestrian activity at unsignalized intersections and mid-block locations. "Yield to Pedestrian", and variations such as "Yield Here to Pedestrian" and "Turning Traffic Yield to Pedestrian" have been shown to increase yielding compliance.

RRFB with speed table, Philadelphia, PA *Source: DVRPC*

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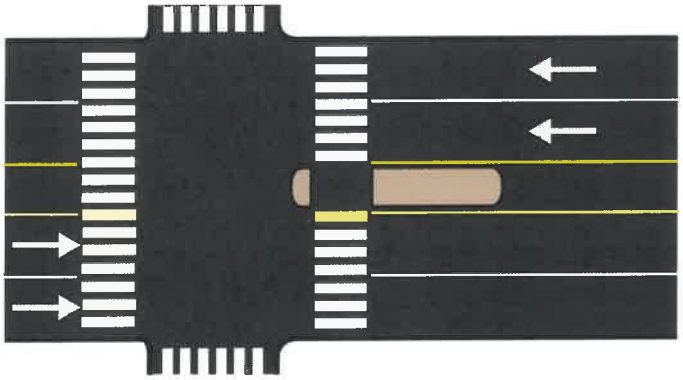
Pedestrian Safety Elements
Pedestrian Refuge Islands

Overview

Pedestrian refuge islands provide a place for people to pause while crossing the street. They can be implemented on any street, but are especially important on wider streets with at least four total lanes. They can also be used at unsignalized intersections, streets with high speeds, and crossings that are used by children and elderly people. By limiting exposure to traffic, islands keep pedestrians safe. See Figure 54 for examples of pedestrian island criteria for different roadway conditions. Pedestrian refuge islands are a FHWA Proven Safety Countermeasure and have been shown to result in a 56% reduction in pedestrian crashes.

Examples

At an intersection, extend the median past the crosswalk



At a mid-block crossing, use a staggered design

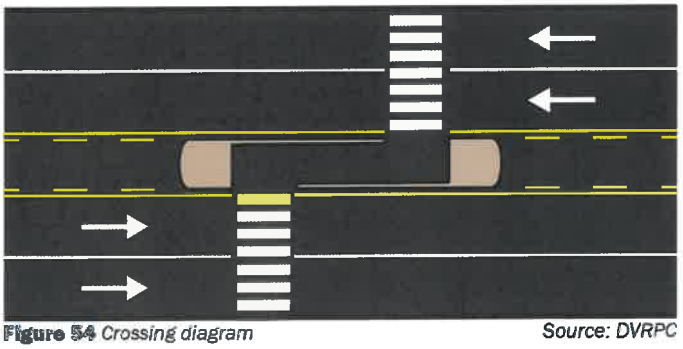


Figure 54 *Crossing diagram* *Source: DVRPC*

Best Practices

- **Shorten Long Crossings.** Implement when a pedestrian must cross four lanes of traffic or more. If the crossing uses a push-button actuator for a pedestrian crossing signal, place another at the refuge island.
- **Protect Pedestrians from Turning Vehicles.** At an intersection with a curbed median, a nose must be added to protect pedestrians from traffic. Extend the median past the crosswalk as shown in Figure 55. If a curbed median is not possible, consider using bollards to protect pedestrians.
- **Ensure Accessibility.** Islands should be at least 6' wide, to accommodate a person pushing a stroller or a bicycle, and ideally 40' long. The refuge space (where the crosswalk traverses the refuge island) should be at least as wide as the crosswalk; if this is not possible keep the crosswalk width and make the refuge as wide as possible. Place a detectable warning surface at the edges of the island to assist vision-impaired pedestrians in identifying the street.
- **Stagger Crosswalks at Mid-block Crossings.** If being used at a mid-block crossing, refuge islands should be staggered such that pedestrians are forced to face the traffic that they will be crossing.
- **Landscape Median Where Possible.** Pedestrian refuge islands are an opportunity to add landscaping elements to the street. Carefully consider visibility for all modes when selecting landscaping elements.

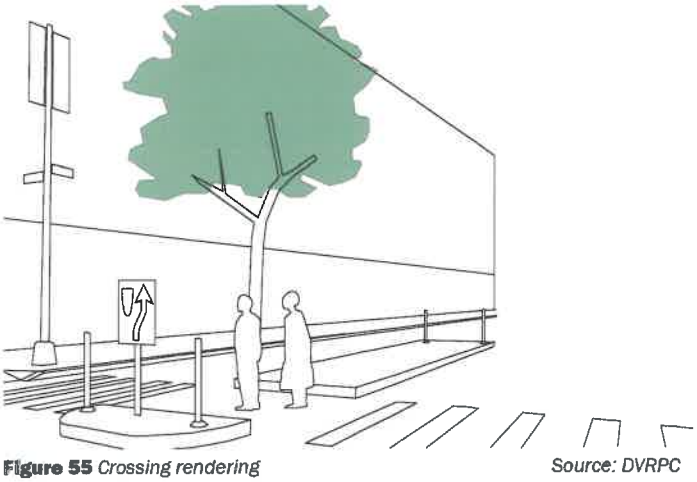


Figure 55 *Crossing rendering* *Source: DVRPC*

Bike Facilities

Overview

Bike facilities create safer environments for bicyclists to use the roadway with motorized vehicles. These strategies aim to increase the visibility of bicyclists in the intersection and to manage the interaction between turning vehicles and bicyclists traveling through the intersection.

Best Practices

- **Designate Intersection Space for Bicyclists.** Allocating pavement for bicyclists increases their visibility, even if protection is typically not possible. Pavement should be allocated for bicyclists that are waiting at a red light with a bike box and for bicyclists crossing the intersection with intersection crossing markings.
    - *Bike Boxes* designate an area at the head of a traffic lane at signalized intersections for bicyclists to stop (see Figure 56). This allows bicyclists to stop in front of queuing motorized traffic during red signal phases. Signage to communicate the Bike Box should be added, including a "Yield to Bikes" post-mounted sign indicating the egress lane, a "Stop Here on Red" post-mounted sign at the stop bar, and a "Wait Here" pavement marking at the stop bar.
    - Bike Boxes must be 10'-16' deep, and be green colored pavement with a bike symbol pavement marking. Bike Boxes should be accompanied with a 25'-50' green painted ingress lane, and an egress lane in the intersection to highlight potential conflict.
    - *Intersection crossing markings* visibly mark areas of potential conflict between bicyclists and motorists (see Figure 57). Intersection crossing markings should match the width of the leading bike lane, and may emphasize potential conflict areas.
    - Intersection crossing markings must be at least 6" wide and 2' long, spaced 2'-6', bordering the bike lane or designated cycle space. It should be painted green within conflict areas, and ideally across the entire intersection.
- **Shift the Bike Lane to Increase Visibility.** The conflict between left-turning vehicles and bicyclists traveling straight can be mitigated by shifting the bike lane as it approaches the intersection.
    - With conventional bike lanes, bike lanes must be on the "inside" of vehicle turning lanes: a through bike lane must be on the left-hand side of a right turn lane, and the right-hand side of a left turn lane. This design standard requires a "mixing zone" where turning vehicles and bicyclists can move out of each other's path before reaching the intersection.
    - With protected bike lanes, which must become unprotected in the approach to the intersection, the bike lanes should shift closer to the travel lanes to increase visibility and eye contact. Alternatively, the bike lane can shift closer to the crosswalk if a turning wedge (see "Traffic Calming" below) is included to slow right-turning traffic and ensure that the driver has a clear view of the bicyclist crossing. See NACTO's *Don't Give Up at the Intersection* (2019) for more guidance.

Figure 56 *Bike box at intersection* *Source: NACTO*

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Bike Facilities (continued)

Two stage turning boxes, Ottowa, CN *Source: NACTO*

Figure 57 *Intersection crossing markings* *Source: NACTO*

- **Provide Bike Signals.** Bike signals are separate signals for cyclists that create a safer traffic environment in the intersection for cyclists. Bike signals work alongside the traffic signals to create signal phases specific to the bike lanes. Bike signals can create a leading bike interval, allowing bikes to enter the intersection first for greater visibility for turning cars. Bike signals can also be coordinated with protected turn phases to segregate turning vehicles from conflicting cyclist through movements. See NACTO's *Don't Give Up at the Intersection* (2019) for more information.
- **Encourage Bicyclists to Take Left Turns In Phases.** Two-Stage Turning Boxes make left turns safer for cyclists by breaking the turning movement into two parts: first, crossing to the other side of the road, then turning left within the bike box and crossing the street. The two part turn requires two light signals to complete the turn. Designers can also consider a "jughandle turn" that is integrated into sidewalk space. Turning boxes could also be placed in the cross-street parking lane.
    - The boxes must be 9' long and 3' wide, painted green, have bicycle and turn arrow pavement markings, and have pavement markings through the intersection to indicate conflict areas.
- **Install No Right Turn on Red Signage.** Disallowing turning on red increases safety for all road users, especially at high use intersections. When paired with intersection bike facilities, it improves performance and keeps bicyclists using those facilities safe. Intersections with bike boxes and two-stage turning boxes must not allow right turn on red.

Traffic Calming Strategies

Overview

The goal of traffic calming at the intersection is to slow vehicles and ensure safety for all users of the intersection. There are two broad categories of vehicle movements that it may be desirable to calm: turning vehicles and vehicles traveling straight through the intersection. Raising the intersection and installing roundabouts can slow vehicles traveling straight. These strategies can also have benefits for calming turning vehicles. In addition, to calm right-turning vehicles, consider curb extensions (see "Curb Extensions"), turn wedges, and channelized right-turn lanes. To calm left-turning vehicles, consider pedestrian refuge islands (see "Pedestrian Refuge Islands") and hardened centerlines. Roundabouts are a FHWA Proven Safety Countermeasure and have been shown to result in a 78-82% reduction in severe crashes.

Raised intersection, Harrisburg, PA *Source: PennDOT*

Best Practices

- **Raise the pavement.** Raised Intersections make drivers more aware of their surroundings by bringing the roadway to the level of the sidewalk, creating a 'mixed' environment (see Figure 58). They also can have placemaking benefits when executed with unique materials. Raised Intersections should include a slight lip with an otherwise flush sidewalk to warn vision-impaired pedestrians, since curb ramps are not needed. Installation requires careful evaluation of flowlines to ensure drainage to existing sewer inlets is not disrupted. Raised crosswalks are another option for slowing traffic at the intersection.
- **Replace Controlled Intersections with Roundabouts.** Roundabouts are used to increase safety at intersections by sending all traffic around a circle in the same direction. Roundabouts keep speeds low and limit points of potential conflict in the flow of traffic. Converting a signalized intersection to a roundabout reduces crashes by 78% and converting a two-way stop to a roundabout reduces crashes by 82%. Roundabouts should be one lane on most roadways. Multi-lane roundabouts can be installed on roadways with more than 25,000 AADT. Roundabouts must be installed to current FHWA standards, which maximize their traffic calming and pedestrian safety benefits.

Figure 58 *Raised intersection diagram* *Source: NACTO*

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Traffic Calming Strategies (continued)

- **Use Mini Roundabouts at Uncontrolled and Low Volume Intersections.** Mini roundabouts are appropriate for minor, uncontrolled intersections to manage speed. If planted, mini roundabouts must be maintained to allow visibility to the other side. If bicycle facilities exist, they must clearly mark the bike route and wayfinding information. Mini Roundabouts typically span 15' from the corner curb to the center island.
- **Calm Right-Turning Travel Speeds.** Slowing vehicles taking right turns is critical to ensuring all road users can safely use the intersection.
    - *Turning wedges* are a low-cost alternative to a curb extension used to force vehicles to turn at slower speeds by creating a tighter turning radius at an intersection. They sometimes feature a modular speed bump or similar element that allows truck traffic to negotiate the turn while keeping car turning speeds slow.
    - *Channelized right turns* isolate the right turning lane, creating a separate lane with a less severe angle for vehicular traffic to complete a right turn. While they can significantly improve vehicular throughput, they tend to increase vehicular speed through the turn and decrease the propensity for turning vehicles to yield, making them a hazard to pedestrians. If a channelized right turn is needed, it should be designed to slow vehicles entering the channel and encourage visibility of pedestrians (see Figure 59). See the *New Jersey Complete Streets Design Guide* (2017) for more information. Designers should consider a right turn-only lane in lieu of a channelized right turn in order to better control speed and yielding.

Roundabout with pedestrian islands *Source: FHWA*

Mini roundabout *Source: NACTO*

Turning wedges can slow turning movements at crosswalks. *Source: NYCDOT*

Traffic Calming Strategies (continued)

- **Calm Left-Turning Travel Speeds.** Slowing left-turning traffic requires the same approach as right-turn traffic calming: the radius of the turn must be decreased as much as possible. Strategies to do this include installing a "cap" on a pedestrian median island that extends toward the path of through moving vehicles on the cross street. This prevents left-turning vehicles from making a turn with a higher turning radius. A low-cost alternative to the pedestrian refuge island cap is a hardened centerline running down the centerline of the receiving street and extending beyond the crosswalk toward the path of through moving vehicles on the cross street. The centerline can be outfitted with delineator posts up to the crosswalk and use a modular speed bump beyond the crosswalk where there is concern that turning heavy vehicles will be unable to negotiate the smaller turning radius. See NACTO's Don't Give Up at the Intersection (2019) for more information.
- **Redirect Traffic Onto Arterial Roads.** Diverters are raised islands or other vertical treatments used to limit access to an otherwise accessible vehicle lane. Diverters can be used to restrict vehicular traffic to a local road. In most cases, diverters will redirect traffic onto an arterial road.

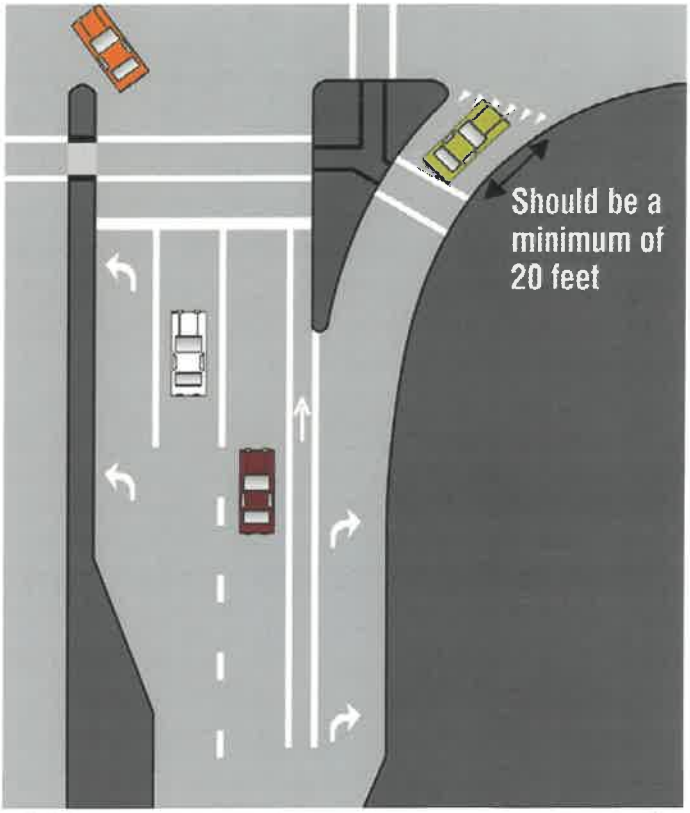

Figure 59 *Channelized right turn diagram* *Source: FHWA*

Left-turn Traffic Calming in Boston, MA *Source: DVRPC*

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Implementation

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Overview

Implementation of complete streets guidelines requires buy-in and coordination across multiple layers of city government and both for-profit and non-profit partners. This handbook overall is intended to provide a consistent framework for partners to reference in their work as it relates to Trenton's streets. This chapter provides strategies to align partners around the complete streets guidance provided throughout the handbook.

The focus of the strategies presented in this chapter is on actions that city government can take toward ensuring consistency with the guidelines of the handbook. This includes actions like incorporating the complete streets typologies into the City's Land Development Ordinance and pursuing internal education for staff on the elements of a successful complete streets project.

Ultimately, successful complete streets implementation will require a concerted effort on the part of city government and partners, including the development industry and advocates who continue to push for project elements that ensure safe and comfortable facilities for all road users.

Project Type Guidance

The Table of Design Elements by Project Type provides guidance on the types of design elements that should be considered based on project type (see Figure 60). Not every project can provide a full complete streets redesign. A repaving project, for instance, offers the opportunity to make many improvements through striping, but will not involve moving the curb or making significant changes to the sidewalk. This type of project, therefore, should focus on roadway improvements. A developer project that requires sidewalk reconstruction provides an opportunity to improve the pedestrian realm, but will not impact the roadway. This table is intended to provide guidance for how to use this handbook depending on the type of project and how it impacts the right-of-way. The project types include:

- Safety project: projects initiated due to a safety concern, can include changes anywhere within the right-of-way
- Resurfacing: minimal roadway project, focused mainly on restriping and repair of existing asphalt
- Mill and pave: removal of existing asphalt and full replacement of right-of-way from curb to curb
- Road reconstruction: extensive roadway project up to and including moving curbs
- New road: construction of new roads, such as in new developments
- Sidewalk repair: minimal sidewalk project with no impact to the curb or roadway
- Sidewalk reconstruction: extensive sidewalk project up to and including moving curbs
- New sidewalk: construction of new sidewalks, such as along facilities that were built without a sidewalk, may impact roadway

The table indicates if consideration of the design element is required or not applicable. In some cases, the design element should be considered on an as needed basis, neither required nor inapplicable. In some other cases, a permanent installation of the design element is unlikely, but the interim strategy identified in the "Complete Streets Design Elements Guide" chapter should be evaluated.

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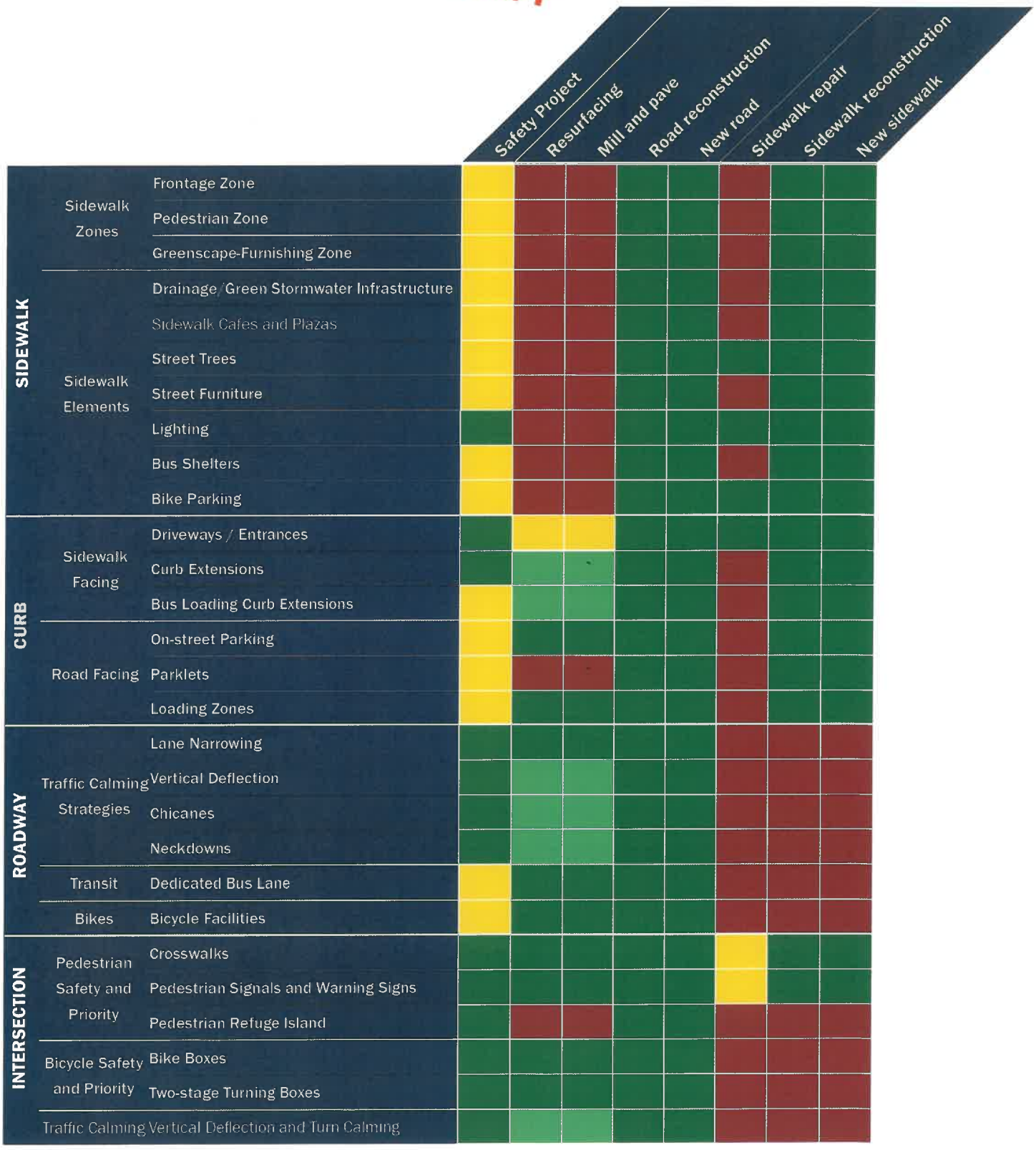

Figure 60 *Table of elements to be considered in each project type*

Source: DVRPC

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Project Development and Review Process

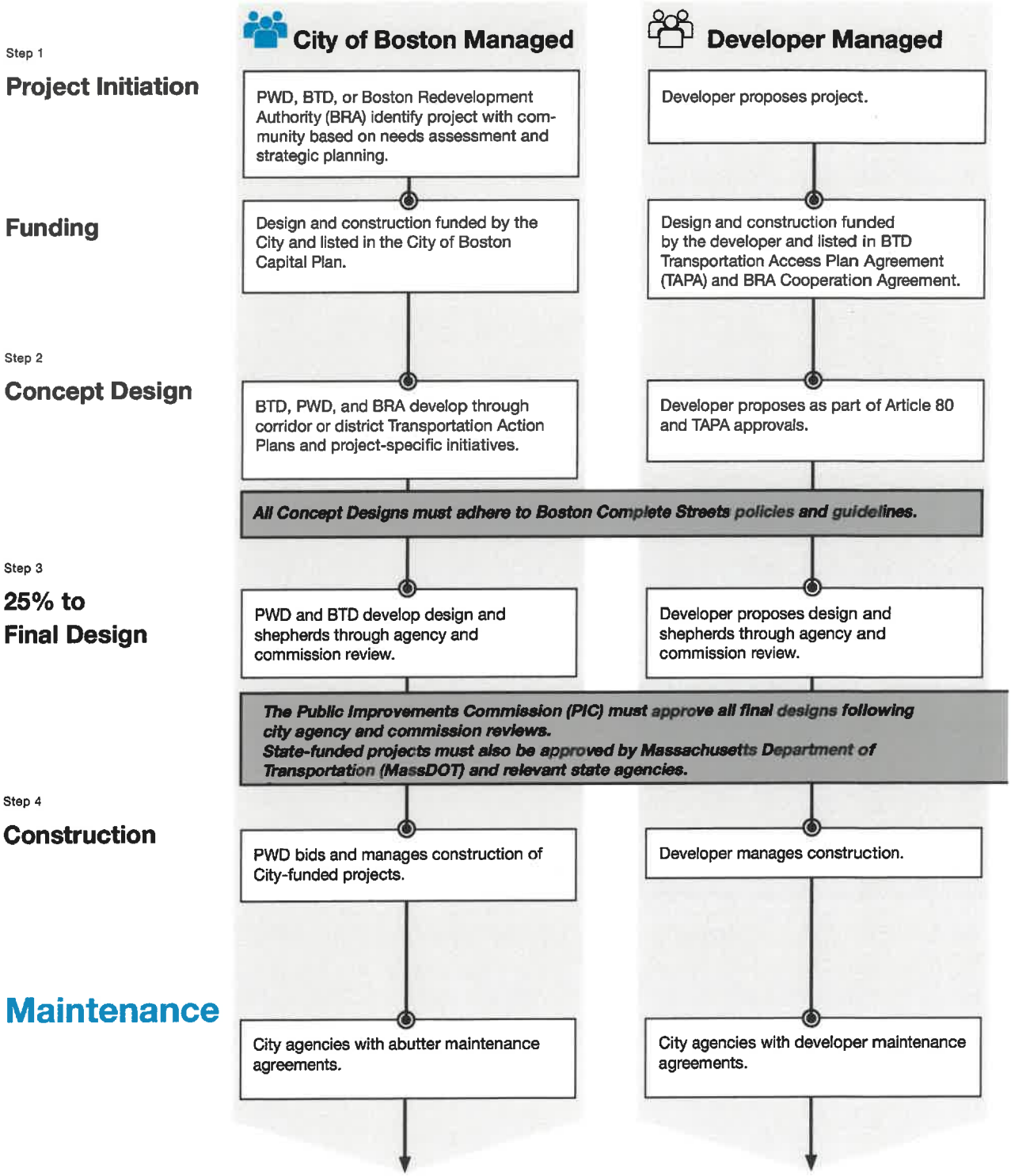

Figure 62 *Project Development and Review Process from the* Boston Complete Streets Design Guidelines

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Public Involvement

Community

Neighborhood, business and advocacy groups propose projects for consideration by the City, developers and State.

Extensive community and citizen advisory group meetings are held to inform the vision and review and select from concept design alternatives.

Community and abutter meetings are held to review design details and ROW impacts at 25% and 75%; MassDOT holds hearings for state-funded projects.

Project proponent appoints community liaison to address construction impacts.

Local residents and businesses participate in maintenance based on abutter agreements.

Source: Boston Complete Streets Design Guidelines, 2013

Formalize Process for City-Led Projects

Having a formal project development process that is individualized based on whether the project is initiated by the city, a developer or other road owner or entity, is an important part of making Complete Streets a routine and predictable part of the city's ongoing day-to-day work. An example from the *Boston Complete Streets Design Guidelines* is shown in Figure 68. Trenton should develop their own process that details the steps from project initiation, project construction and through to maintenance. Such a process is most important for major projects involving construction or reconstruction, but also helpful for smaller projects that could follow a modified or abbreviated process. Importantly, a formal process can communicate to new and existing staff what stages Complete Streets should be considered and by whom. Additionally, it makes clear who is responsible for the initiation and review of Complete Streets checklists. It also clarifies what review bodies may be involved and what their roles might be. It would outline when and how to soicit community input on the Complete Streets elements included in a project. This is helpful in ensuring that projects are site-specific and will work and perform well in the long-term. A process can also address how interim design strategies could be part of project development and at what stage they should be constructed. Finally, a process could include how to share completed checklists with the community and inform the public on how final project decisions were made.

Coordination with Other Road Owners

To ensure that this guidance is adhered to on all streets, therefore creating a true network of complete streets, the city must coordinate with other road owners, like Mercer County and NJDOT, when they undertake projects in Trenton. This make take the form of the city asking for these other entities to meet specific design standards, like ensuring that lanes are no more than 10' or 11' and that pedestrian signals with leading pedestrian intervals are included. This coordination will be ongoing and would benefit from a formalized process with the city discussing upcoming projects with other roads owners as they begin developing them.

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A-1: Complete Streets Checklists

Figure 63 *Preliminary engineering checklist 1*

Preliminary Engineering Checklist

ITEM TO BE ADDRESSED	CHECKLIST CONSIDERATION	YES	NO	N/A	REQUIRED DESCRIPTION
BICYCLIST, PEDESTRIAN, AND TRANSIT ACCOMMODATIONS	Does the proposed project design include accommodations for bicyclists described in the NJDOT Complete Streets Design Guide? **Examples include (but are not limited to):** **Bicycle facilities:** • Bicycle path/bicycle lane/ bicycle route/bicycle boulevard • Bicycle actuation at signals (loop detectors and stencil or other means) • Signs, signals and pavement markings specifically related to bicycle operation on roadways or shared-use facilities • Bicycle safe inlet grates **Bicycle amenities:** • Call boxes (for trail or bridge projects) • Drinking fountains (also for trail projects) • Secure long term bicycle parking (e.g., for commuters and residents) • Secure short-term bicycle parking				

Preliminary Engineering Checklist

ITEM TO BE ADDRESSED	CHECKLIST CONSIDERATION	YES	NO	N/A	REQUIRED DESCRIPTION
BICYCLIST, PEDESTRIAN, AND TRANSIT ACCOMMODATIONS (CONTINUED)	Does the proposed project design address accommodations for pedestrians? **Examples include (but are not limited to):** **Pedestrian facilities:** Sidewalks (preferably on both sides of the street); mid-block crosswalks; striped crosswalks; geometric modifications to reduce crossing distances such as curb extensions (bulb-outs); pedestrian-actuated traffic signals such as High Intensity Activated Crosswalk Beacons, Rapid Rectangular Flashing Beacons; dedicated pedestrian phase; pedestrian signal heads and pushbuttons; pedestrian signs for crossing and wayfinding, lead pedestrian intervals; high visibility crosswalks (e.g., ladder or zebra); pedestrian-level lighting; in-road warning lights; pedestrian safety fencing; pedestrian detection system; pedestrian overpass/ underpass; and median safety islands for roadways with (two or more traffic lanes in each direction) **Pedestrian amenities:** Shade trees; public seating; drinking fountains				

Figure 64 *Preliminary engineering checklist 2*

Preliminary Engineering Checklist

ITEM TO BE ADDRESSED	CHECKLIST CONSIDERATION	YES	NO	N/A	REQUIRED DESCRIPTION
BICYCLIST, PEDESTRIAN, AND TRANSIT ACCOMMODATIONS (CONTINUED)	Have you coordinated with the corresponding transit authority to accommodate transit users in the project design? Transit facilities: Transit shelters, bus turnouts Transit amenities: public seating, signage, maps, schedules, trash and recycling receptacles				
BICYCLIST AND PEDESTRIAN OPERATIONS	Is the proposed design consistent with the desired future bicyclist and walking plans (e.g., Master Plan/ Elements) within the project area including safety, volumes, comfort and convenience of movement, important walking and/or bicycling connections, and the quality of the walking environment and/or availability of bicycle parking?				
TRANSIT OPERATIONS	Does the proposed design address the desired/anticipated future transit conditions within the project area, including bus routes and operations and transit station access to support transit usage and users?				

Figure 65 *Preliminary engineering checklist 3*

Preliminary Engineering Checklist

ITEM TO BE ADDRESSED	CHECKLIST CONSIDERATION	YES	NO	N/A	REQUIRED DESCRIPTION
MOTOR VEHICLE OPERATIONS	Does the proposed design address the desired future motor vehicle conditions within the project area, including volumes, access, important motor vehicle connections, appropriateness of motor vehicle traffic to the particular street (e.g., local versus through traffic) and the reduction of the negative impacts of motor vehicle traffic?				
TRUCK/FREIGHT OPERATIONS	Does the proposed design address the desired future truck conditions within the project area, including truck routes, volumes, access, mobility and the reduction of the negative impacts of truck traffic?				
ACCESS AND MOBILITY	Does the proposed design address accommodations for those with access or mobility challenges such as the disabled, elderly, and children, including ADA compliance? **Examples include (but are not limited to):** Curb ramps, including detectable warning surface; accessible signal actuation; adequate sidewalk or paved path (length & width or linear feet); acceptable slope and cross-slope (particularly for driveway ramps over sidewalks, over crossings and trails); and adequate green signal crossing time				

Figure 66 *Preliminary engineering checklist 4*

Preliminary Engineering Checklist

ITEM TO BE ADDRESSED	CHECKLIST CONSIDERATION	YES	NO	N/A	REQUIRED DESCRIPTION
LAND USE	Is the proposed design compatible with the predominant land uses and densities within the project area, including any historic districts, main streets, or special zoning districts?				
MAJOR SITES	Can the proposed design support the major sites, destinations, and trip generators within or proximate to the project area, including prominent landmarks, commercial, cultural and civic institutions, and schools, public spaces?				
STREETSCAPE	Does the proposed design include landscaping, street trees, planters, buffer strips, or other environmental enhancements such as drainage swales?				
DESIGN STANDARDS OR GUIDELINES	Does the proposed design follow all applicable design standards or guidelines appropriate for bicycle and/or pedestrian facilities? **Examples include (but are not limited to):** American Association of State Highway and Transportation Officials (AASHTO) – *A Policy on Geometric Design of Highway and Streets, Guide for the Development of Bicycle Facilities, Guide for the Planning, Design, and Operation of Pedestrian Facilities; Public Right-of-Way Accessibility Guide* (PROWAG);				

Figure 67 *Preliminary engineering checklist 5*

Figure 68 *Preliminary engineering checklist 6*

Preliminary Engineering Checklist

ITEM TO BE ADDRESSED	CHECKLIST CONSIDERATION	YES	NO	N/A	REQUIRED DESCRIPTION
DESIGN STANDARDS OR GUIDELINES (CONTINUED)	*Manual on Uniform Traffic Control Devices* (MUTCD); *Americans with Disabilities Act Accessibility Guidelines* (ADAAG); National Association of City Transportation Officials (NACTO) — *Urban Bikeway Design Guide*; *Urban Streets Stormwater Guide*; New Jersey Department of Transportation (NJDOT) — *Complete Streets Design Guide*; *Roadway Design Manual*; *Smart Transportation Guidebook*. Rutgers University — *Green Infrastructure Guidance Manual*; ITE — *Designing Walkable Urban Thoroughfares*				
SAFETY	Does the proposed project design include elements from the FHWA Proven Safety Countermeasures? Examples include, but are not limited to, road diets, medians and pedestrian islands, lead pedestrian intervals, etc.				
STORMWATER MANAGEMENT	Has an impervious cover assessment been performed and have impervious surface areas been minimized while meeting engineering standards and guidelines?				

Preliminary Engineering Checklist

ITEM TO BE ADDRESSED	CHECKLIST CONSIDERATION	YES	NO	N/A	REQUIRED DESCRIPTION
STORMWATER MANAGEMENT (CONTINUED)	Has an impervious cover reduction action plan been completed for the project area, and does the project design include elements to reduce the impacts of stormwater runoff from impervious surfaces? **Examples include (but are not limited to):** • Bioretention and rain gardens • Bioswales • Stormwater planters • Tree filter boxes				

Preliminary Engineering Sign-Off

STATEMENT OF COMPLIANCE	YES	NO	If **NO**, please describe why (refer to Exemptions Clause)
The plan or roadway improvement accommodates bicyclists, pedestrians, transit users of all ages and abilities, and addresses the related public health, Priority Communities, and environmental goals as set forth in [municipality/ county] Complete Streets Policy.			

Figure 69 *Preliminary engineering checklist 7*

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LOCATION:_____

TYPOLOGY: NEIGHBORHOOD MIXED USE

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

_____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

_____

_____

_____

_____

_____

_____

_____

_____

_____

		ELEMENT		STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone		2' - 6'
		Pedestrian Zone		5' - 12', sidewalk should be standard cast-in-place concrete
		Greenscape-Furnishing Zone		2'-6" - 8'
	Sidewalk Elements[1]	Drainage / Green Stormwater Infrastructure		stormwater planters, tree trenches, rain gardens
		Sidewalk Cafes and Plazas		
		Street Trees		small or medium stature, spaced at least 20' apart
		Street Furniture		provide seating, waste receptacles at regular intervals
		Lighting[2]		alternating across street, 75'-120' spacing
		Bus Shelters		provide seating, add shelter if possible
		Bike Parking		if sidewalk space is limited, consider bike corral in a parking space
CURB	Sidewalk Facing	Driveways / Entrances		20'-24' wide, 100' from signalized intersections
		Curb Extensions		as needed, only in high pedestrian traffic areas
		Bus Loading Curb Extensions		
	Road Facing	On-street Parking[3]		shared parallel parking, 7'-9' wide
		Parklets		Consider in areas with high pedestrian activity
		Loading Zones		30' long, use as needed
ROADWAY	Traffic Calming Strategies[4]	Lane Narrowing		11' for lanes with bus traffic, maximum 10' for all other lanes
		Vertical Deflection		use speed cushions if road used by buses or heavy vehicles
		Chicanes		
		Neckdowns		use in high pedestrian traffic areas
	Transit	Dedicated Bus Lane		if space is available, place on the right side of the road
	Bikes	Bicycle Facilities		consider sharrows or parallel routes with high quality facilities
INTERSECTION	Pedestrian Safety and Priority	Crosswalks		continental style at all controlled intersections
		Pedestrian Signals and Warning Signs		install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island		
	Bicycle Safety and Priority	Bike Boxes		install at signalized intersections with bike facilities
		Two-stage Turning Boxes		use where there is high bike turning volumes and / or cycle tracks
	Traffic Calming	Vertical Deflection and Turn Calming		use at intersections with Corridors and where speeding is a problem

Figure 77 *Neighborhood mixed use typology checklist*

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A-2: Master List of Design Elements

Sidewalk

	Dense Residential	Single-Family Residential	Commercial Corridor	Connector Corridor	Downtown Commercial Corridor	Downtown Connector Corridor	Downtown Minor	Neighborhood Mixed Use	Industrial Access	Park	Alley
Frontage Zone			2' - 6'	none - 6'	2' - 6'	none - 6'	2' - 6'	2' - 6'	none - 6'		
Sidewalk Zones											
Pedestrian Zone	5' - 6' sidewalk should be standard cast-in-place concrete	5' - 6' sidewalk should be standard cast-in-place concrete	5' - 8' sidewalk should be standard cast-in-place concrete	6' - 8' sidewalk should be standard cast-in-place concrete	8' - 12'	8' - 12'	8' - 12'	5' - 12' sidewalk should be standard cast-in-place concrete	5' - 6' sidewalk should be standard cast-in-place concrete	5' - 6' sidewalk should be standard cast-in-place concrete	5' - 6'
Greenscape-Furnishing Zone	up to 6'	2'-6' - 4'	2'-6' - 6'	2'-6' - 8'	2'-6' - 8', brick is the preferred paving material Downtown	2'-6' - 8', brick is the preferred paving material Downtown	2'-6' - 8', brick is the preferred paving material Downtown	2'-6' - 8'			
Drainage/ Green Stormwater Infrastructure	stormwater planters, tree trenches, rain gardens	stormwater planters, tree trenches, rain gardens	stormwater planters, tree trenches, rain gardens	**if possible, stormwater planter, tree trenches, rain gardens**	stormwater planters, tree trenches, rain gardens	**if possible, stormwater planters, tree trenches, rain gardens**	if possible, stormwater planters, tree trenches, rain gardens	stormwater planters, tree trenches, rain gardens	**if possible, stormwater planter, tree trenches, rain gardens**	**if possible, stormwater planters, tree trenches, rain gardens**	**if possible, stormwater planters, tree trenches, rain gardens**
Sidewalk Cafes and Plazas											
Street Trees	small-medium stature, spaced at least 20' apart	small stature, spaced at least 20' apart	small-medium stature, spaced at least 20' apart	medium-large stature, spaced at least 25' apart	medium stature, spaced at least 25' apart	medium or large stature, spaced at least 25' apart	small or medium stature, spaced at least 20' apart	small or medium stature, spaced at least 20' apart	medium or large stature, spaced at least 25' apart	**provide seating**	**if possible, small stature, spaced at least 20' apart**
Sidewalk Elements											
Street Furniture	**may be placed by residents if Pedestrian Zone can be maintained**		provide seating, waste receptacles at regular intervals	provide seating, waste receptacles at regular intervals	provide seating, waste receptacles at regular intervals	provide seating, waste receptacles at regular intervals	provide seating, waste receptacles at regular intervals	provide seating, waste receptacles at regular intervals			
Lighting	intersecting across street, 75'-120' spacing	alternating across street, 75'-120' spacing	alternating across street, 75'-120' spacing	alternating across street, 75'-120' spacing	paired (not alternating) across street, 50'-80' spacing	(paired across street, 50'-80' spacing	paired across street, 50'-80' spacing	alternating across street, 75'-120' spacing	alternating across street, 75'-120' spacing	alternating across street, 50'-80' spacing	where space is available, alternating across street, 50' spacing
Bus Stop Amenities	**provide seating, add shelter if possible**		provide seating, add shelter if possible	provide seating, add shelter if possible	if sidewalk space is limited, consider bike corral in a parking space	provide seating, add shelter if possible	If sidewalk space is limited, consider bike corral in a parking space	provide seating, add shelter if possible	provide seating, add shelter if possible, especially at popular stops		
Bike Parking			assess need for number of spots	assess need for number of spots	if sidewalk space is limited, consider bike corral in a parking space	assess need for number of spots		if sidewalk space is limited, consider bike corral in a parking space		assess need for number of spots	

Required | Recommended | As Needed | Not Recommended / Not Applicable

Figure 88 *Sidewalk typology master table*

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Sidewalk

	Transit	Trail Access	Park Access	Schools	Station Area	Limited Access Transition	Combined Sewer
Frontage Zone	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	Consider permeable paving
Sidewalk Zones: Pedestrian Zone	8' - 12'	refer to underlying typology	6' minimum, 8' preferred	refer to underlying typology	minimum 8'	refer to underlying typology	Consider permeable paving
Sidewalk Zones: Greenscape-Furnishing Zone	8' at bus stops	2'-6' - 8'	2'-6' - 8'	2'-6' - 8'	2'-6' - 8'	2'-6' - 8'	2'-6' - 8', outfit with GSI projects
Drainage/ Green Stormwater Infrastructure	special attention to grade/pooling if loading bumpout is built						
Sidewalk Cafes and Plazas	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology		refer to underlying typology	refer to underlying typology
Street Trees	site trees to not block view of approaching buses					strongly recommended, pair with tree trenches	
Sidewalk Elements: Street Furniture	provide seating						
Lighting	50' spacing	50' spacing	50' spacing	50' spacing	50' spacing	50' spacing	refer to underlying typology
Bus Stop Amenities	add shelter if possible	provide seating, add shelter if possible	provide seating, add shelter if possible	provide seating, add shelter if possible	provide seating, add shelter if possible	provide seating, add shelter if possible	refer to underlying typology
Bike Parking	if space limited, consider installing a bike corral in a parking space	assess need for number of spots	consider a bike corral in an on-street parking space, if needed	consider a bike corral in an on-street parking space, if needed	assess need for number of spots	refer to underlying typology	refer to underlying typology

Required | Recommended | As Needed | Not Recommended / Not Applicable

Figure 89 *Sidewalk overlay master table*

Curb	Dense Residential	Single-Family Residential	Commercial Corridor	Connector Corridor	Downtown Commercial Corridor	Downtown Connector Corridor	Downtown Minor	Neighborhood Mixed Use	Industrial Access	Park	Alley
Driveways / Entrances	no more than 10'-12' wide, at least 20' from signalized intersections	10'-12' wide, at least 20' from signalized intersections	20'-24' wide, 100' from signalized intersections	20'-24' wide, 100' from signalized intersections	20'-24' wide, 100' from signalized intersections	20'-24' wide, 100' from signalized intersections	20'-24' wide, 100' from signalized intersections	20'-24' wide, 100' from signalized intersections	20'-24' wide, 100' from signalized intersections		
Sidewalk Facing: Curb Extensions		use if visibility and/ or speeding are issues			use in high pedestrian traffic areas	as needed, only in high pedestrian traffic areas	as needed, only in high pedestrian traffic areas	as needed, only in high pedestrian traffic areas	as needed		
Sidewalk Facing: Bus Loading Curb Extensions							as needed with bus stops and limited sidewalk space				
Sidewalk Facing: On-street Parking	parallel parking						shared parallel parking as needed	shared parallel parking, 7'-9' wide	as needed, 9'-10' minimum to accommodate trucks		as needed, 7'-9' wide
Road Facing: Loading Zones							assess need, place at the beginning of a block	30' long, use as needed	80' long and 9'-10' minimum to accommodate trucks		
Road Facing: Parklets							add in high pedestrian traffic areas	Consider in areas with high pedestrian activity			
Drainage and Green Stormwater Infrastructures	if possible	if possible	if possible	if possible	if possible	if possible	if possible	if possible	if possible	if possible	if possible

Required | Recommended | As Needed | Not Recommended/Not Applicable

Figure 90 *Curb typology master table*

Curb

	Transit	Trail Access	Park Access	Schools	Station Area	Limited Access Transition	Combined Sewer
Driveways / Entrances	**restricted use**	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
Curb Extensions (Sidewalk Facing)	**use with bus stop**	**if possible**	**if space allows**	**if possible**	**if possible**	**may be paired with gateway elements (see "Gateway," below)**	**outfit with GSI projects, where possible**
Bus Loading Curb Extensions	**as needed with bus stops and limited sidewalk space**	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
On-street Parking	**assess need, minimize in proximity to bus loading**					refer to underlying typology	**install porous asphalt in parking lane**
Loading Zones (Road Facing)	**assess need, minimize when possible**	**30' long, near trail entrance for passenger vehicles**	**30' long, near park entrance for passenger vehicles**	**30' long, near school entrance for passenger vehicles**	**30' long, near park entrance for passenger vehicles**	refer to underlying typology	refer to underlying typology
Parklets	**use caution around bus stops to avoid interfering with operations**	refer to underlying typology	refer to underlying typology	refer to underlying typology	**place away from bus stops to reduce potential conflicts**	refer to underlying typology	refer to underlying typology
Drainage & Green Stormwater Infrastructure	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology

Required | Recommended | As Needed | Not Recommended/Not Applicable

Figure 91 *Curb overlay master table*

Roadway	Dense Residential	Single-Family Residential	Commercial Corridor	Connector Corridor	Downtown Commercial Corridor	Downtown Connector Corridor	Downtown Minor	Neighborhood Mixed Use	Industrial Access	Park	Alley
Lane Narrowing	maximum of 10', unless road used by buses	10', painted centerline not required	11' lanes recommended, consider 10' if not a bus route	11' lanes recommended, consider 10' if not a bus route	11' for lanes with bus traffic, maximum 10' for all other lanes	11' for lanes with bus traffic, maximum 10' for all other lanes	11' for lanes with bus traffic, maximum 10' for all other lanes	11' for lanes with bus traffic, maximum 10' for all other lanes	maximum 11' lanes	10', painted centerline not required	no wider than 10' lanes, painted centerline not required
Lane Reductions			If possible, 4 existing lanes required		If possible, 4 existing lanes required		If possible, 4 existing lanes required	If possible, 4 existing lanes required			
Vertical Deflection	use speed cushions if road used by buses or heavy vehicles	use speed cushions if road used by buses or heavy vehicles	use speed cushions if road used by buses or heavy vehicles	use speed cushions if road used by buses or heavy vehicles	use speed cushions if road used by buses or heavy vehicles	use speed cushions if road used by buses or heavy vehicles	use speed cushions if road used by buses or heavy vehicles	use speed cushions if road used by buses or heavy vehicles	speed cushions preferred because of truck traffic	use speeds humps/ tables to slow traffic if speeding is an issue	use if speeding is an issue
Traffic Calming Strategies											
Speed Humps	use to slow traffic	use to slow traffic								use to slow traffic	
Speed Tables			use if trucks are infrequent	use if trucks are infrequent	use if trucks are infrequent	use if trucks are infrequent	use if trucks are infrequent	use if trucks are infrequent	must use speed cushions due to truck traffic		
Speed Cushions	use if trucks or buses are frequent	use if trucks or buses are frequent	use if trucks are frequent	use if trucks are frequent	use if trucks are frequent	use if trucks are frequent	use if trucks are frequent	use if trucks are frequent			
Chicanes	use where speeding is a problem	use where speeding is a problem									
Neckdowns	use in areas with high pedestrian volume, mid-block crossings	use in areas with high pedestrian volume, mid-block crossings	use in areas with high pedestrian volume, mid-block crossings	use in high pedestrian traffic areas	use in high pedestrian traffic areas, opportunity for gateways	use in high pedestrian traffic areas	use in high pedestrian traffic areas	use in high pedestrian traffic areas			
Dedicated Bus Lane											
Transit											
Bicycle Facilities	consider sharrows and creating Neighborhood Greenways	consider sharrows and creating Neighborhood Greenways	use protected bicycle lanes or consider parallel routes	use protected bike lanes or consider parallel routes	if space is available, place on the right side of the road	if space is available, place on the right side of the road	if space is available, place on the right side of the road	if space is available, place on the right side of the road	consider sharrows or parallel routes with high quality facilities	consider shared-use path	
Bikes			if space is available, place on the right side of the road		buffered or protected bike lanes or consider parallel routes	use buffered or protected bike lane or consider parallel routes	use most protection possible, but shared vehicle lanes permissible	consider for bus routes, if space is available	use if trucks are frequent	use if trucks are infrequent	strongly consider parallel routes

Required | Recommended | As Needed | Not Recommended/Not Applicable

Figure 92 *Roadway typology master table*

Roadway	Transit	Trail Access	Park Access	Schools	Station Area	Limited Access Transition	Combined Sewer
Lane Narrowing	11' for lanes with bus traffic	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
Lane Reductions	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
Vertical Deflection	use speed cushions if road used by buses or heavy vehicles	consider raising midblock crossings at trail entrance	consider raising midblock crossings	consider raising midblock crossings at school entrance	refer to underlying typology		refer to underlying typology
Speed Humps	11'	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology		
Traffic Calming Strategies							
Speed Tables		refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology		
Speed Cushions		refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology		
Chicanes	must use speed cushions due to bus traffic	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology		
Neckdowns	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology		
Transit							
Dedicated Bus Lane	if space is available, place on the right side of the road	refer to underlying typologyz	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
Bikes							
Bicycle Facilities	use most protection possible; consider parallel routes	use most protection possible	use most protection possible	use most protection possible	use most protection possible	use most protection possible	refer to underlying typology

Required | Recommended | As Needed | Not Recommended / Not Applicable

Figure 93 *Roadway overlay master table*

Intersection

	Dense Residential	Single-Family Residential	Commercial Corridor	Connector Corridor	Downtown Commercial Corridor	Downtown Connector Corridor	Downtown Minor	Neighborhood Mixed Use	Industrial Access	Park	Alley
Crosswalks											
Continental style at all controlled intersections	Continental style at all controlled intersections	Continental style at all controlled intersections	Continental style at all controlled intersections	Continental style at all controlled intersections	Continental style at all controlled intersections	Continental style at all controlled intersections	Continental style at all controlled intersections	Continental style at all controlled intersections	Continental style at all controlled intersections		
Pedestrian Signals and Warning Signs											
Install countdown timers and LPIs at all signalized intersections	Install countdown timers and LPIs at all signalized intersections	Install countdown timers and LPIs at all signalized intersections	Install countdown timers and LPIs at all signalized intersections	Install countdown timers and LPIs at all signalized intersections	Install countdown timers and LPIs at all signalized intersections	Install countdown timers and LPIs at all signalized intersections	Install countdown timers and LPIs at all signalized intersections	Install countdown timers and LPIs at all signalized intersections	Install countdown timers and LPIs at all signalized intersections		
Countdown Timers and LPIs											
all signalized intersections	all signalized intersections	all signalized intersections	all signalized intersections	all signalized intersections	all signalized intersections	all signalized intersections	all signalized intersections	all signalized intersections	all signalized intersections		
Pedestrian Safety and Priority											
In Street Crossing Signage											
use when visibility of crosswalk is limited	use when visibility of crosswalk is limited	use when visibility of crosswalk is limited	use when visibility of crosswalk is limited	use when visibility of crosswalk is limited	use when visibility of crosswalk is limited	use when visibility of crosswalk is limited	use when visibility of crosswalk is limited	use when visibility of crosswalk is limited	use when visibility of crosswalk is limited		
RRFBs and Pedestrian Hybrid Beacon											
			assess need if ped volumes are high	assess need if ped volumes are high	assess need if ped volumes are high	assess need if ped volumes are high	assess need if ped volumes are high				
Pedestrian Refuge Island											
			assess need if road is four lanes or wider	assess need if road is four lanes or wider	assess need if road is four lanes or wider	assess need if road is four lanes or wider	assess need if road is four lanes or wider		assess need if road is four lanes or wider		
Bike Signals											
use at signalized intersections when bike facility is present			use at signalized intersections when bike facility is present	use at signalized intersections when bike facility is present	use at signalized intersections when bike facility is present	use at signalized intersections when bike facility is present	use at signalized intersections when bike facility is present	use at signalized intersections when bike facility is present	use at signalized intersections when bike facility is present	use at signalized intersections when bike facility is present	
Bike Boxes											
install at signalized intersections with bike facilities			install at signalized intersections with bike facilities	install at signalized intersections with bike facilities	install at signalized intersections with bike facilities	install at signalized intersections with bike facilities	install at signalized intersections with bike facilities	install at signalized intersections with bike facilities	install at signalized intersections with bike facilities	install at signalized intersections with bike facilities	
Bicycle Safety and Priority											
Two-stage Turning Boxes											
use where there is high bike turning volumes and/or cycle tracks	use where there is high bike turning volumes and/or cycle tracks	use where there is high bike turning volumes and/or cycle tracks	use where there is high bike turning volumes and/or cycle tracks	use where there is high bike turning volumes and/or cycle tracks	use where there is high bike turning volumes and/or cycle tracks	use where there is high bike turning volumes and/or cycle tracks	use where there is high bike turning volumes and/or cycle tracks	use where there is high bike turning volumes and/or cycle tracks	use where there is high bike turning volumes and/or cycle tracks	use where there is high bike turning volumes and/or cycle tracks	
Intersection Crossing Markings											
assess needs	assess needs	use green paint and signage when bike facility is present, assess needs	use green paint and signage when bike facility is present, assess needs	use green paint and signage when bike facility is present, assess needs	use green paint and signage when bike facility is present, assess needs	use green paint and signage when bike facility is present, assess needs	use green paint and signage when bike facility is present, assess needs	use green paint and signage when bike facility is present, assess needs	use green paint and signage when bike facility is present, assess needs	especially important with truck traffic, use green paint and signage, assess needs	

Required | Recommended | As Needed | Not Recommended/Not Applicable

Figure 94 *Intersection typology master table*

Intersection

	Transit	Trail Access	Park Access	Schools	Station Area	Limited Access Transition	Combined Sewer
Pedestrian Safety and Priority							
Crosswalks	continental style at signalized intersections	continental style at signalized intersections or trail entrances	continental style at signalized intersections or park entrances	continental style at all signalized intersections	continental style at all signalized intersections	continental style at all signalized intersections	refer to underlying typology
Pedestrian Signals and Warning Signs	install countdown timers and LPIs at all signalized intersections	install countdown timers and LPIs at all signalized intersections	install countdown timers and LPIs at all signalized intersections	install countdown timers and LPIs at all signalized intersections	install countdown timers and LPIs at all signalized intersections	install countdown timers and LPIs at all signalized intersections	refer to underlying typology
Countdown timers and LPIs	all signalized intersections	all signalized intersections	all signalized intersections	all signalized intersections	all signalized intersections	refer to underlying typology	refer to underlying typology
In-Street Crossing Signage	all crossings	all crossings	all crossings	all crossings	all crossings	refer to underlying typology	refer to underlying typology
RRFBs and Pedestrian Hybrid Beacon	**if needed**	**if needed**	**if needed**	**if needed**	**if needed**	refer to underlying typology	refer to underlying typology
Pedestrian Refuge Island	**assess need if road is four lanes or wider**	**assess need if road is four lanes or wider**	**assess need if road is four lanes or wider**	**assess need if road is four lanes or wider**	**assess need if road is four lanes or wider**	**assess need if road is four lanes or wider**	**outfit with GSI projects, where possible**
Bicycle Safety and Priority							
Bike Signals	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
Bike Boxes	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
Two-stage Turning Boxes	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
Intersection Crossing Markings	use green paint and signage at bike access points	use green paint and signage at bike access points	use green paint and signage at bike access points	use green paint and signage at bike access points	use green paint and signage at bike access points		

Required | Recommended | As Needed | Not Recommended/Not Applicable

Figure 95 *Intersection overlay master table*

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Intersection (continued)	Dense Residential	Single-Family Residential	Commercial Corridor	Connector Corridor	Downtown Commercial Corridor	Downtown Connector Corridor	Downtown Minor	Neighborhood Mixed Use	Industrial Access	Park	Alley
Vertical Deflection and Turn Calming	use at intersections with Corridors and where speeding is a problem	use at intersections with Corridors and where speeding is a problem		prioritize where pedestrian volume is high		prioritize where pedestrian volume is high	use at intersections with Corridors and where speeding is a problem	use at intersections with Corridors and where speeding is a problem	design to not impede truck traffic		consider raised crosswalks if speeding is a problem
Raised Intersections			if possible		if possible		if possible	if possible			
Raised Crosswalks	Use at intersections with Corridors and midblock crossings	Use at intersections with Corridors and midblock crossings	Consider at midblock crossings		Consider at midblock crossings		Use at intersections with Corridors and midblock crossings	Use at intersections with Corridors and midblock crossings			
Traffic Calming: Roundabouts		if possible								if possible	
Traffic Calming: Right-turn traffic calming	Use at intersections with Corridors and where turning speeds are a problem	Use at intersections with Corridors and where turning speeds are a problem		Prioritize where pedestrian volume is high		Prioritize where pedestrian volume is high	Use at intersections with Corridors and where turning speeds are a problem	Use at intersections with Corridors and where speeding is a problem	[As needed] Design to not impede truck traffic		
Traffic Calming: Left-turn traffic calming	Use at intersections with Corridors and where turning speeds are a problem	Use at intersections with Corridors and where turning speeds are a problem		Prioritize where pedestrian volume is high		Prioritize where pedestrian volume is high	Use at intersections with Corridors and where turning speeds are a problem		Design to not impede truck traffic		
Diverters	Use at intersections with Corridors to limit access	Use at intersections with Corridors to limit access		Prioritize where pedestrian volume is high		Use at intersections with Corridors to limit access					

Required | Recommended | As Needed | Not Recommended/Not Applicable

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Intersection (continued)

	Transit	Trail Access	Park Access	Schools	Station Area	Limited Access Transition	Combined Sewer
Vertical Deflection and Turn Calming	**design to not impede bus operations**						
Raised Intersections	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
Raised Crosswalks							
Traffic Calming							
Roundabouts		refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
Right-turn Traffic Calming						**prioritize where pedestrian volume is high**	N/A
Left turn Traffic Calming							N/A
Diverters							N/A

Required | Recommended | As Needed | Not Recommended/ Not Applicable

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A-4: Typology and Overlay Maps

Figure 102 *Combined Typology and Overlay map 4*

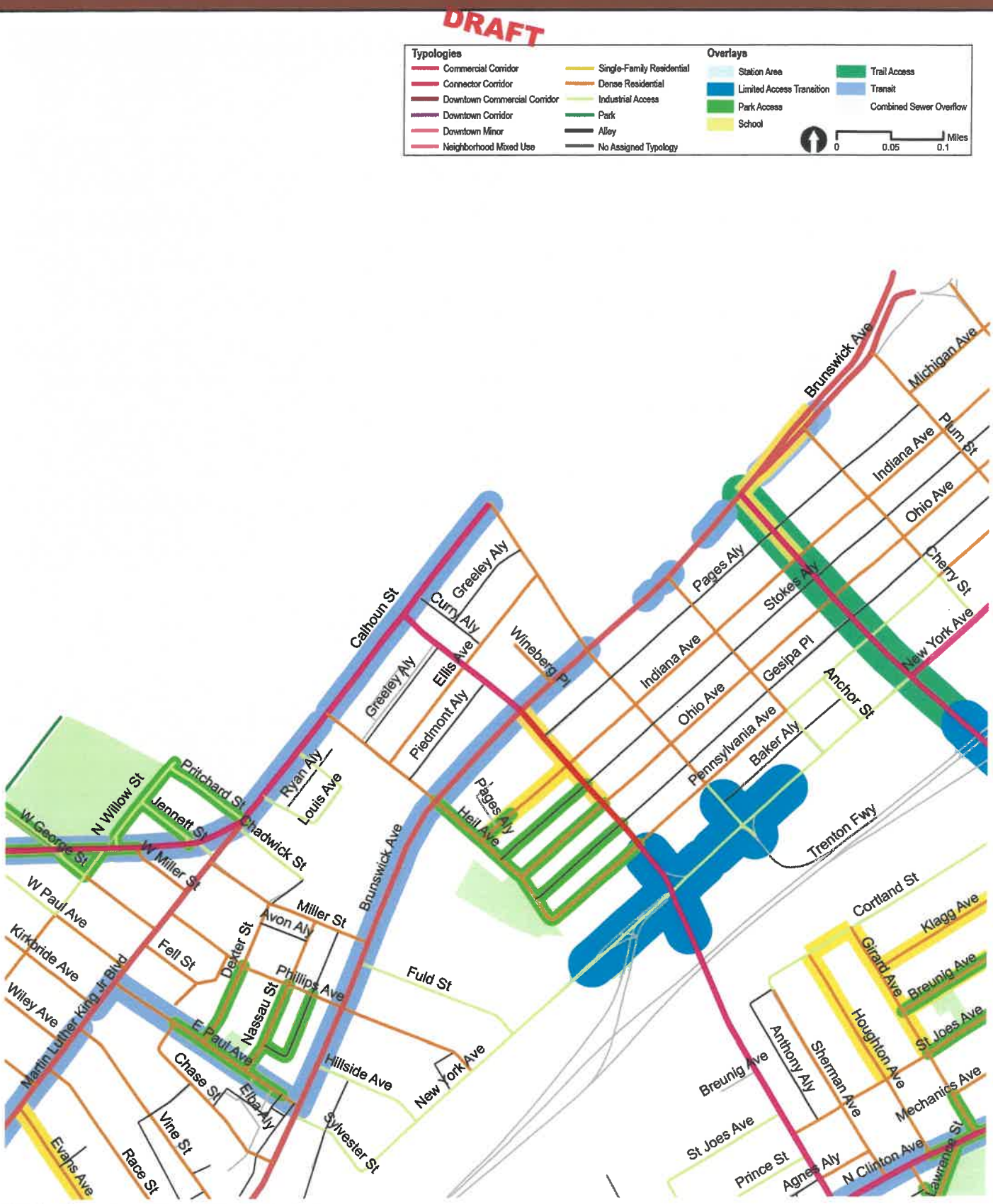

Figure 103 *Combined Typology and Overlay map 5*

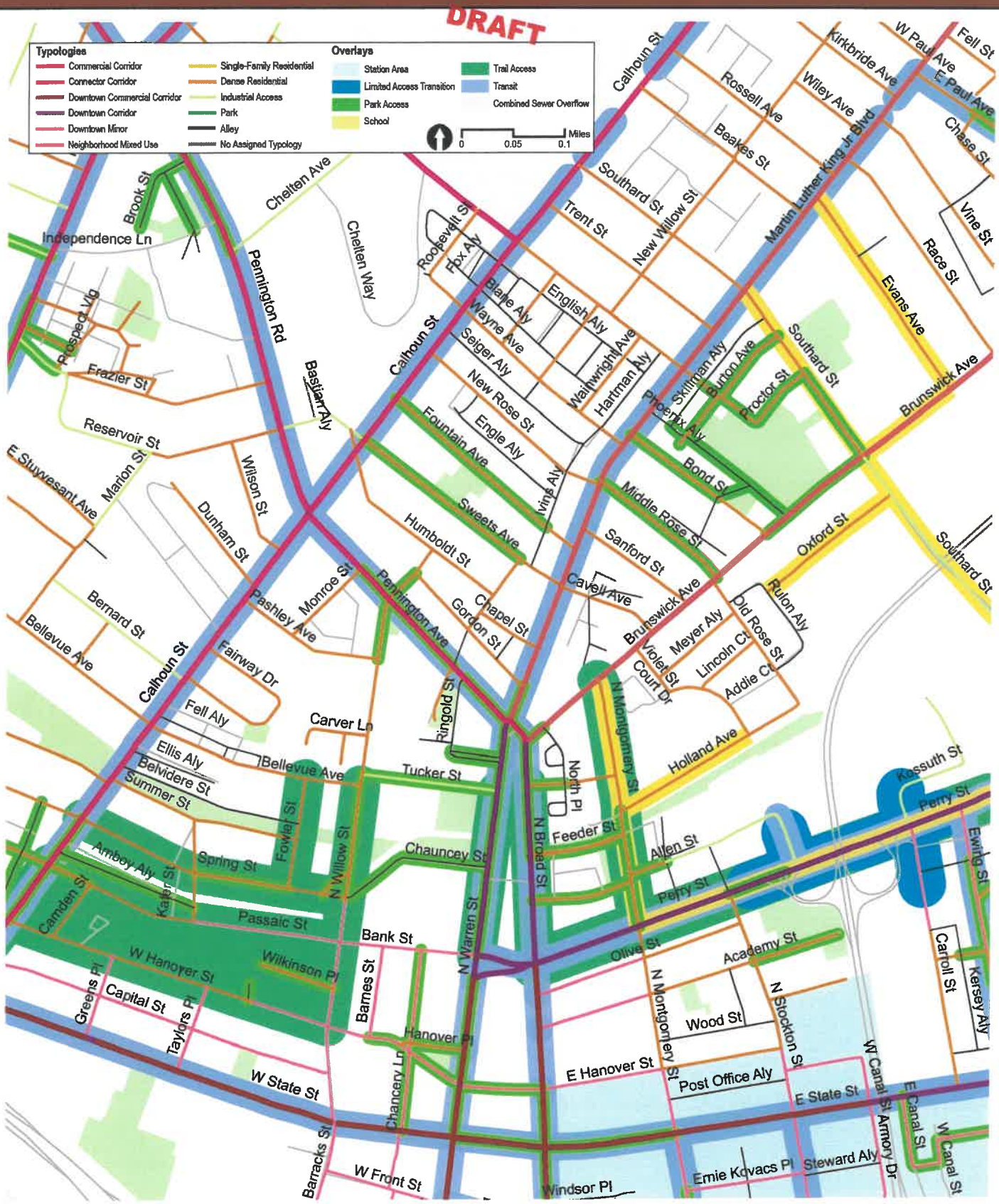

Figure 107 *Combined Typology and Overlay map 9*

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Trenton Complete Streets Handbook

DRAFT

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ABSTRACT

The Trenton Complete Streets Handbook was created by the Delaware Valley Regional Planning Commission in collaboration with a variety of partners, most notably the City of Trenton. The study proposes a series of design treatments and overlays, along with implementation steps, to implement complete streets on a variety of different street typologies.

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Connect With Us!

NORTH TRENTON
BATTLE MONUMENT
IMAGINING A NEIGHBORHOOD OF CHOICE

Athing Mu Park

The City of Trenton reached out to the Center for Community Planning, a non-profit agency that supports and trains students in city planning and community development. This summer, the youth at the Trenton Housing Authority camp, including several residents of Donnelly Homes designed a fun packed park in the North Trenton Battle Monument Neighborhood across the street from the rear of Donnelly Homes and Turner Pointe housing development. The park will be located on Rossell Avenue on City owned lots. This Park is designed with a primary focus on the needs of the neighborhood children. The design includes a small and large playground, ziplines, basketball courts, splash park, garden and pond, and many more exciting activities. The Athing Mu park is filled with many attributes that reflect their lives such as Black Lives Matter art, African art and colors. They even selected flowers to be planted the color of the African flag. At the conclusion of their planning process, the youth did a presentation to City directors in the Mayor's Office for consideration and approval. They are also scheduled to present their park design plan at the next City's Planning Board meeting.

The children decided to name the park in honor of Athing Mu, the 2021 Olympic Gold medalist that was born and raised in Trenton, New Jersey and attending Trenton Public Schools and ran in Trenton Parks.

The Trenton Youth Planning team in the Mayor's Office after presenting their plan.

NORTH TRENTON
BATTLE MONUMENT
IMAGINING A NEIGHBORHOOD OF CHOICE

Administration

The City of Trenton in collaboration with the Trenton Housing Authority and the Smith Family Foundation will provide financial and administrative support for the creation of the Athing Mu Park. The City and neighborhood residents will maintain the upkeep and appearance of the park.

Project Budget

Sources	**CNI**	**City**	**Smith Family Foundation**	**Total**
Playground Equipment	$50,000	$20,000	$30,000	$100,000
Lighting	$50,000		$25,000	$75,000
Cleanup & Maintenance		$60,000		$60,000
Design Development		$50,000		$50,000
Environmental	$20,000	$20,000		$40,000
Benches	$20,000		$25,000	$45,000
Landscaping	$20,000	$10,000		$30,000
Street enclosure		$75,000		$75,000
	$160,000	$235,000	$80,000	$475,000

NORTH TRENTON
BATTLE MONUMENT
IMAGINING A NEIGHBORHOOD OF CHOICE

Project Schedule

Milestones	Date Start	Date Finish
Predevelopment	January 2022	July 2022
Development	August 2022	March 2023

Measurable Outcomes

Completion of Park

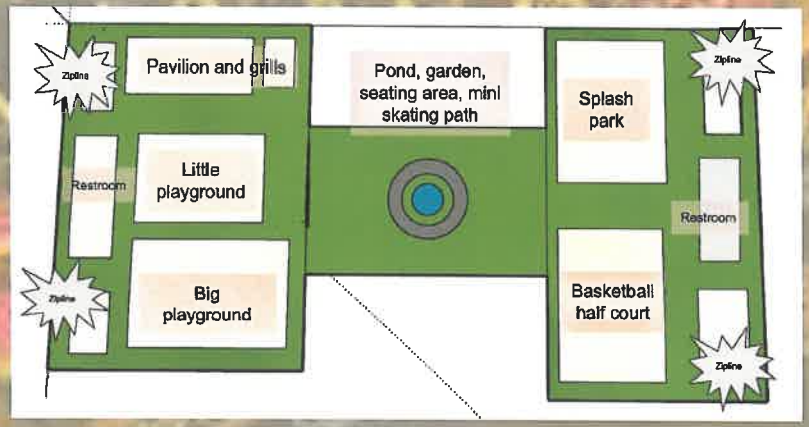
Neighborhood engagement

Number of children using the park annually

Enjoyment

The Trenton City Planning Institute Youth Planning Team presents:

ATHING MU PARK



Center for Community Planning

TRENTON HOUSING AUTHORITY

City Planning Institute

Who we are

"We are Trenton students, ages 9-13 from all different parts of the city We want this park to show little kids that they can build their dreams too."

Trenton Housing Authority campers

- Lauren
- Caila
- Malia
- Matias
- Ayden
- Jaziya
- Charles
- Musa
- Shakoi
- Nydia
- Destiny
- Ubada,
- Jonathan
- MaKenzie

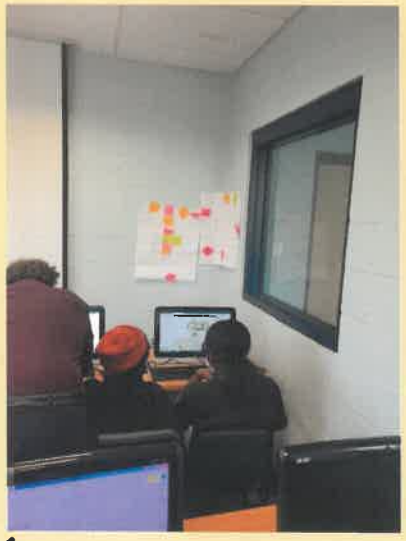
What we are doing

We are designing a park to propose to our Mayor and elected officials. Our reasons for wanting to design a park are:

- Trenton doesn't have quality parks
- People deserve good, quality parks that can keep kids occupied and give parents a break.
- A place to relax
- Athing Mu
  - Honor the Olympian gold medalist from Trenton, a young 19 year old who grew up playing in Trenton Parks herself.

How we did it

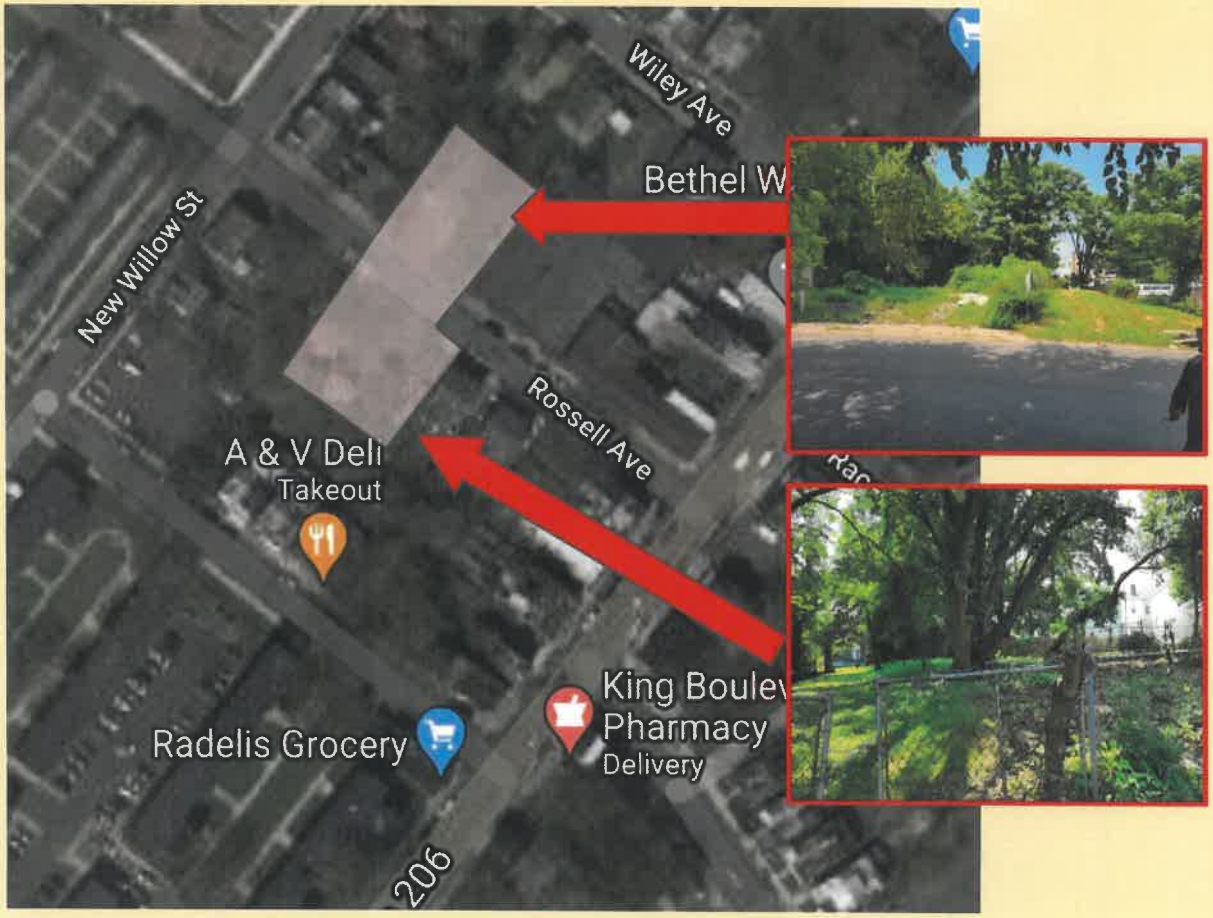
- Community walk
- Looked at city owned sites
- Spoke to residents
- Took pictures
- Thought about ways to make things work
- Researched model pictures for ideas
- Sketched things out
- Collaborated with the Housing Authority.
- We are presenting to the mayor and planning board



The Site - Rossell Avenue Neighborhood

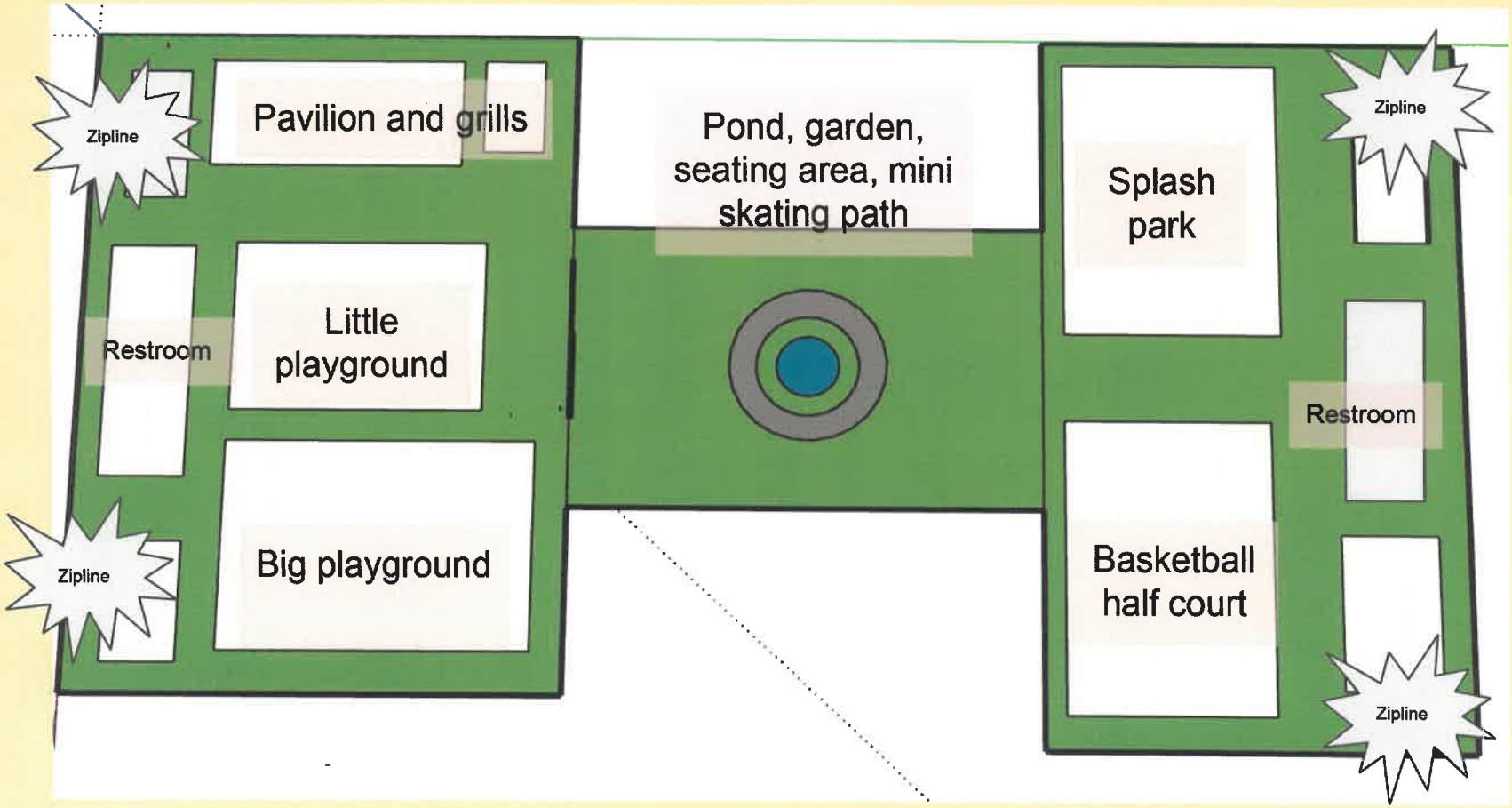
- Donnelly and Paige Homes
- Broken glass on the ground
- Broken and abandoned houses
- Trash
- Overgrown areas
- Light traffic
- Bumpy parking lot
- No streetlights
- Poorly maintained streets and sidewalks (potholes)
- Broken fences

The Site - Rossell Avenue



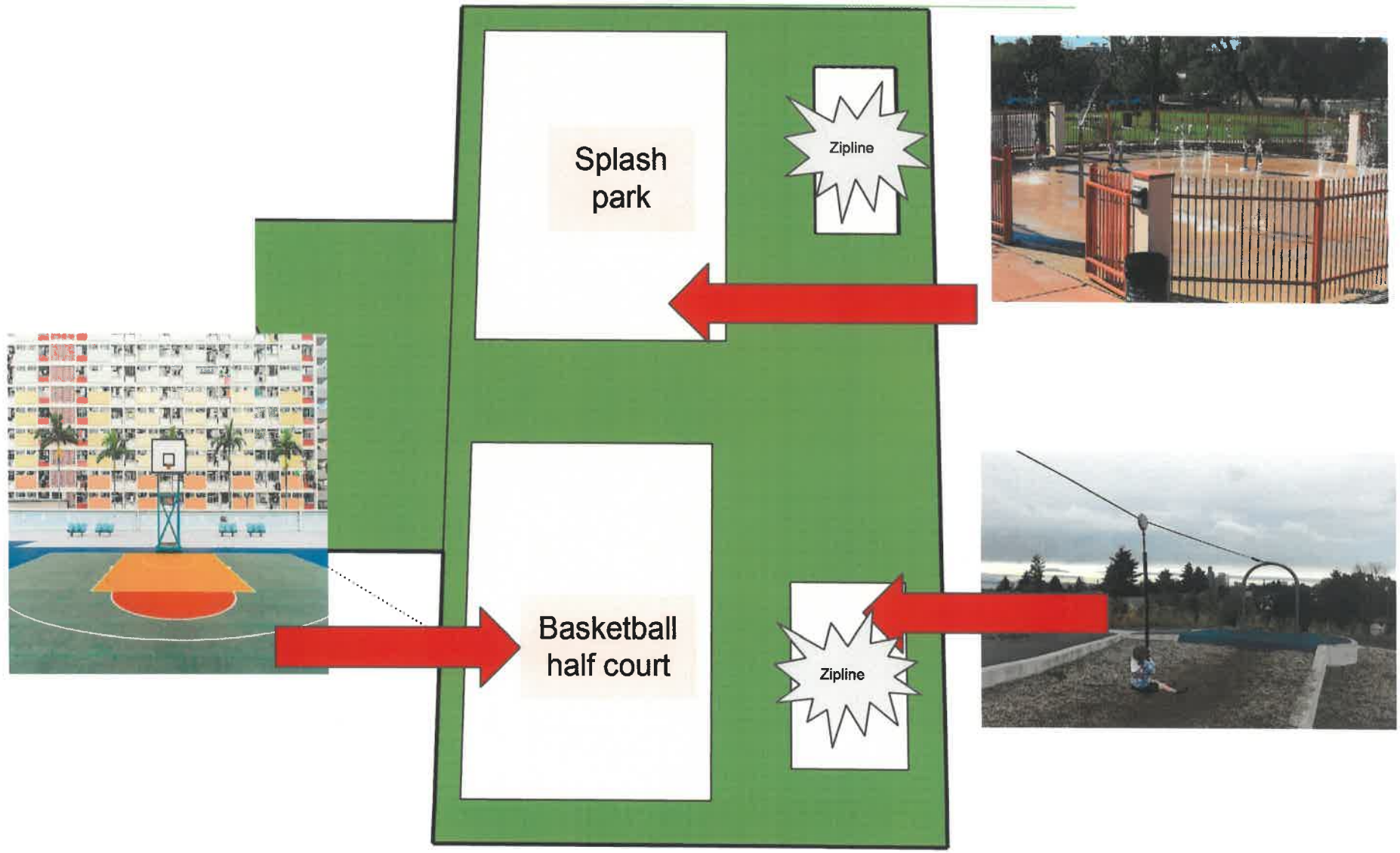
- 2 lots of open space
- Close off the street
- Close to homes (particularly Donnely Homes)
- Light traffic
- Kids want a park in their neighborhood
- People can have fun and relax close to home
- The proposal is the first of its kind (zipline) - does not exist in the city
- Community space to bring people together.

Our proposal
ATHING MU PARK



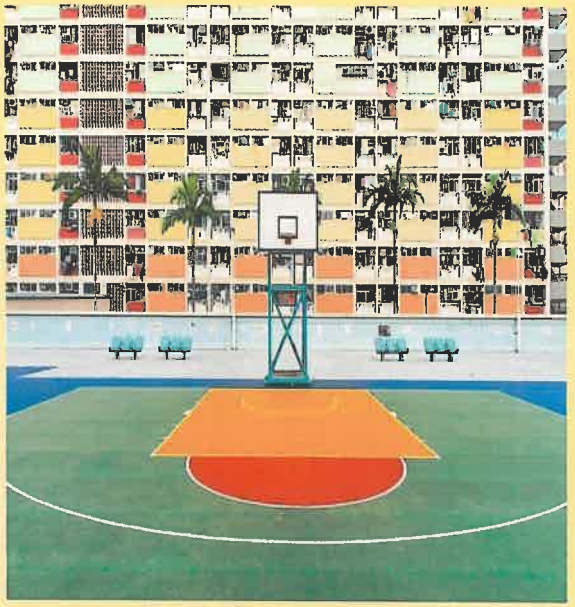
Park Highlights

- Handicap accessible equipment and seating
- BLM Theme
- Black, green, red and yellow color scheme to honor the Afican American community
- Large adult sized games throughout the park
- Chess tables
- WiFi access
- Charging stations
- Food trucks
- Parkour equipment throughout


Splash park
Zipline
Basketball half court
Zipline

Basketball courts

- Half court
- Colorful
- Unbreakable rim
- NO Double rim
- Benches
- Neon lights on rim
- Strong glass backboard

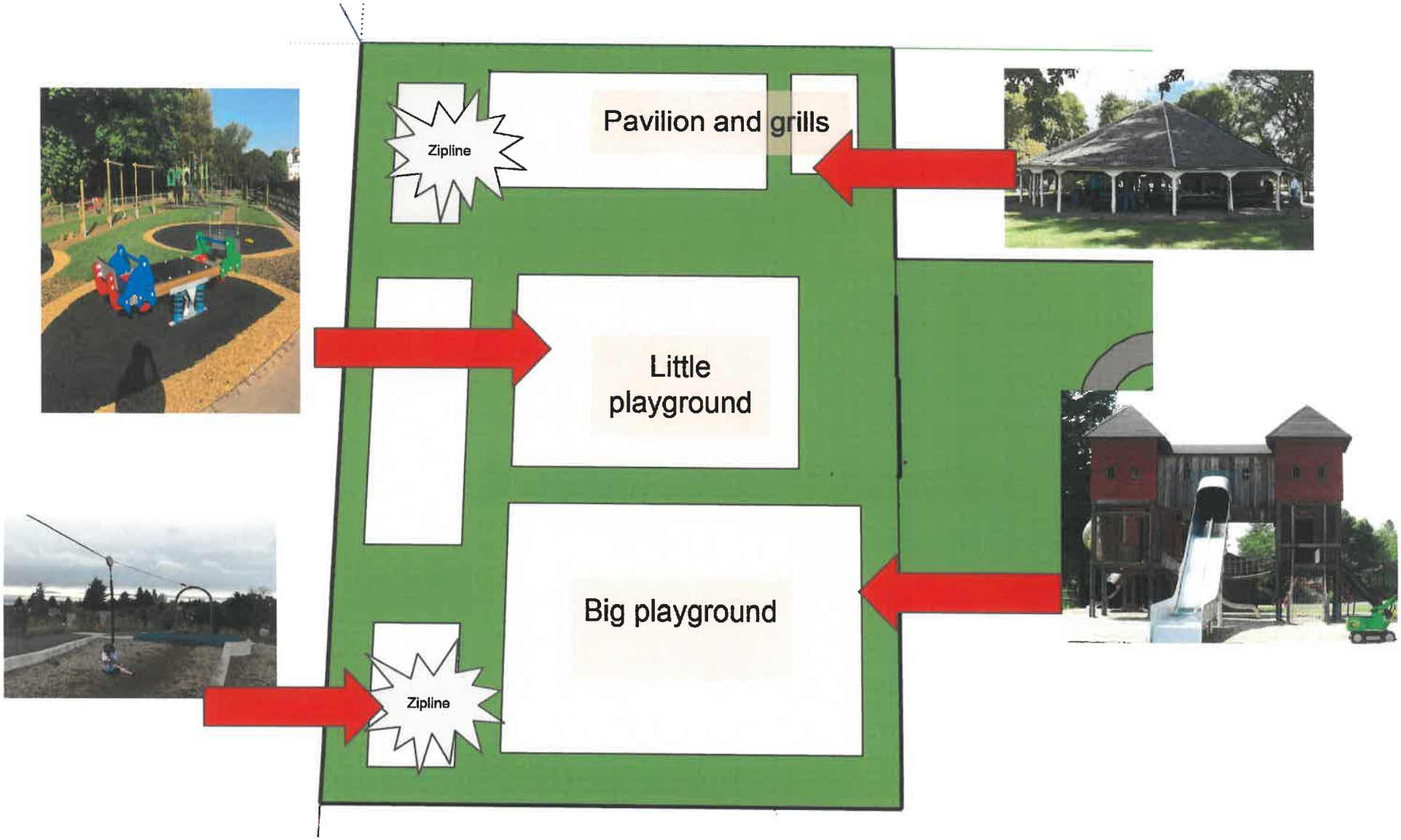


Splash park

- Sprinkler
- A waterfall
- Slip n slides
- Baby pool

Zipline

- Tall zipline (20-feet)
- Should go across the park
- Platforms with stairs
- Safety harness


Zipline
Pavilion and grills
Little playground
Big playground
Zipline

Pavilion

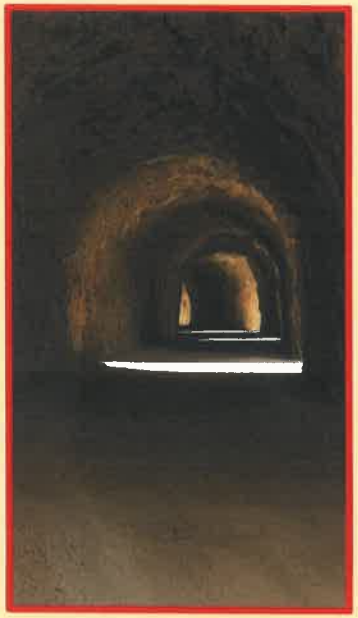
- Seating
- BBQ grills
- Wifi and charging ports
- Covered area
- Tables
- Neon lights

Small playground

- Plastic tube play area
- Swings
- Merry go round
- Seesaw
- Ladders
- Rock wall
- Spinning thing
- Rocking horse

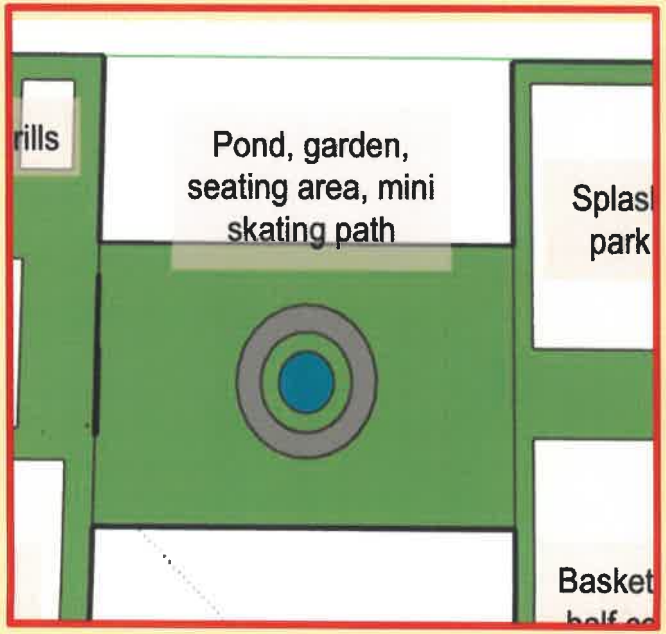
Big playground

- Big slides
- Trampolines under equipment
- Spinwheel
- Tunnels
- Tall climbing equipment
- Fortune ball
- High swings

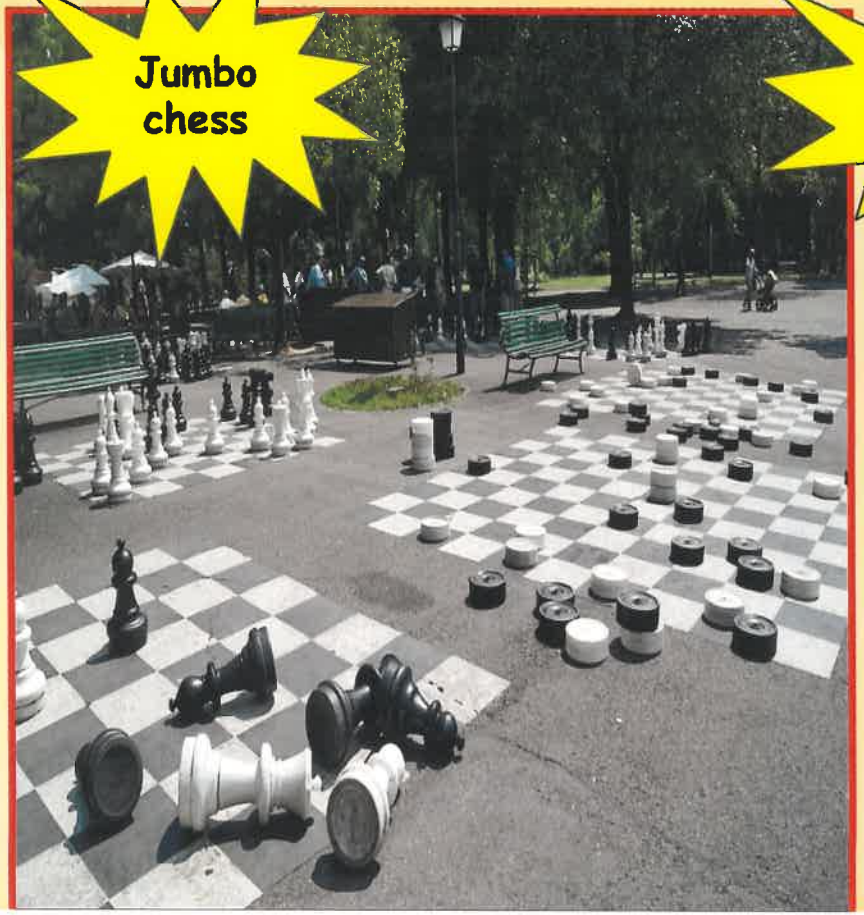


Center garden and pond

- Pond in the middle
- garden with roses and sunflowers,
- black mulch to represent Africa and Black Lives Matter
- Benches
- Skating path around it



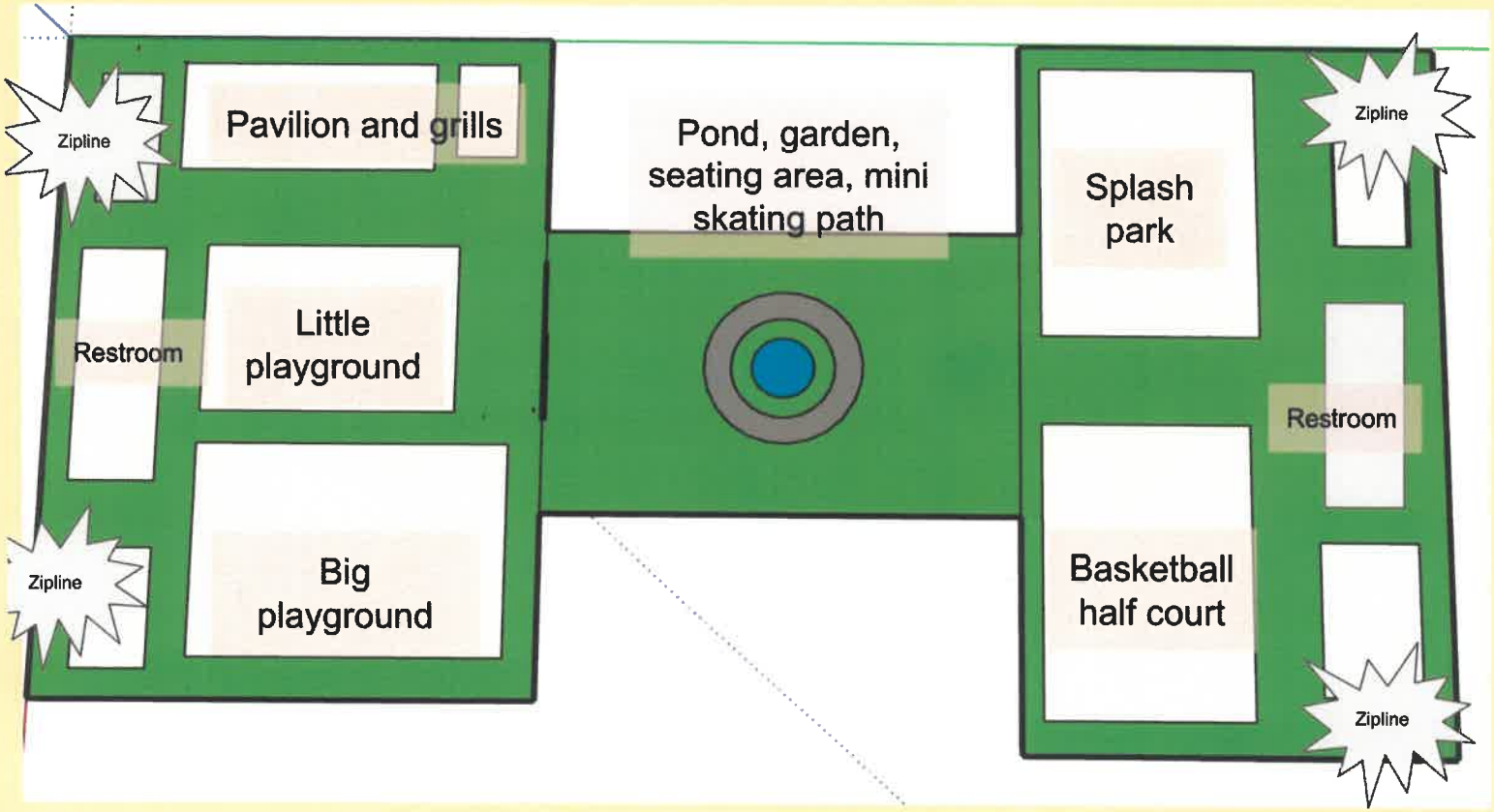
Life Sized Games



Food Trucks:

Pizza, Donuts, Cheeseburgers, Tacos

Conclusion - Athing Mu Park



NORTH TRENTON
BATTLE MONUMENT
IMAGINING A NEIGHBORHOOD OF CHOICE

Project Description

The North Trenton/Battle Monument This Lot is Loved! action activity will reverse the blight that vacant lots often attract by "cleaning and greening" at least 10 city-owned vacant lots, providing activities on at least 4 vacant lots, and providing consistent recreational activity in the neighborhood. This initiative builds on existing services provided by local organizations and leverages the momentum behind the Choice Neighborhood Initiative to transform vacant lots into community assets. This action is a direct response to two stated Neighborhood Plan goals: identifying vacant lots for the Adopt-A-Lot and Clean and Green program to demonstrate that they are watched, secured, and maintained, beginning with main corridors; and integrating a variety of safe, programmed gathering spaces—large and small—on-site at Donnelly Homes and throughout the neighborhood to encourage social interaction.

In partnership with the City of Trenton's Public Works department, Isles has operated Clean & Green initiatives in neighborhoods throughout the city. Modeled after similar successful programs in other cities, Isles hires and trains Trenton residents to perform Clean & Green work. Clean & Green cleans up and maintains vacant and abandoned lots, beautifies select lots through landscaping, art installations, and other improvements, and activates select vacant spaces through recreational programming and pop-up activities (food demonstrations, art making events, historical/cultural programming). Clean & Green improves the appearance of the neighborhood, increases foot traffic and usage of lots through productive and prosocial activities, and consequently decreases the likelihood and ease of undesirable activities. As part of the Choice Action Activities, Isles will bring Clean & Green to this neighborhood.

The North Trenton/Battle Monument neighborhood has more than 50 acres of vacant lots, made up of over 500 individual properties, with an overall vacancy rate of 20% of land in the neighborhood. Around Donnelly Homes, 240 vacant lots (about 17 acres) are city-owned, and we will identify at least 10 city-owned lots to clean and green. On at least four vacant lots in the neighborhood, Isles and other partner organizations will provide programming and services, including participatory art projects, cookouts, cultural programming, and recreational programming. In addition, Isles' T-Recs Mobile Recreation truck will reactivate these vacant lots or nearby parks with pop-up sports and games to change the perspective of the space and to provide recreational opportunities for residents. Isles mobile recreation truck is a retrofitted bread truck filled with recreation equipment that travels to underutilized parks, vacant lots, and other public open space underserved by traditional recreation. T-Recs brings low-cost activities to spaces where people are, and provides recreational opportunities—jump rope, table tennis, portable bowling, bubbles, chalk, giant Legos and connect four, bean bag toss, and much more—while creating social interaction among community members who otherwise may not have a safe, clean place to do so. With T-Recs on vacant lots, what was once a public eyesore becomes a revived space for residents to relax and enjoy themselves with pop-up sports and games for all ages.

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All lots that are part of this action activity will have a coordinated "This Lot is Loved!" branding or signage to connect the varied efforts across the neighborhood, and specific activities and amenities for lots will be based on resident and community input.

Administration

Isles, a Trenton-based non-profit with 40 years of experience working to create healthy, sustainable communities, will coordinate This Lot is Loved! activities, including hiring staff and development of plans for lot activation. With the support of Trenton Health Team's Trenton Neighborhood Initiative, Isles will hire a project coordinator, identify lots, develop activation plans, and implement these plans. Working with the City of Trenton, the Smith Family Foundation and the Trenton Housing Authority, we will coordinate which lots to improve, get residents involved, and promote activities on the lots.

Project Budget

Sources	CNI	Isles	City	Smith Family Foundation	Trenton Neighborhood Initiative	Total
Staffing		$30,000	$10,000		$30,000	$70,000
Equipment		$2,500		$10,000	$1,500	$14,000
Materials	$19,000	$1,000		$10,000	$1,000	$31,000
	$19,000	$33,500	$10,000	$20,000	$32,500	$115,000

Project Schedule

Milestones	Date Start	Date Finish
Lot identification	January 2022	March 2022
Initial clean & green	March 2022	December 2022
Lot improvement	September 2022	ongoing
Lot activation	March 2022	ongoing

Measurable Outcomes

-10 vacant lots Cleaned and Greened
-At least four lots activated
-28 events at the four locations