Complete Streets Toolkit

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Contents

Glossary of Acronyms

ADA – Americans with Disabilities Act

ADT – Average Daily Traffic

AMATS – Akron Metropolitan Area Transportation Study

APA – American Planning Association

AARP – American Association of Retired Persons

AASHTO – American Association of State Highway and Transportation Officials

BART – Bay Area Rapid Transit

BRT – Bus Rapid Transit

CCDPW – Cuyahoga County Department of Public Works

CDBG – Community Development Block Grants

CDC – Community Development Corporation

CGP – Concrete Grid Pavers

CSA – Complete Streets Audits

CMAQ – Congestion Mitigation and Air Quality Funding

CSO – Combined Sewer Overflow

CSTP – County Surface Transportation Program

CVNP – Cuyahoga Valley National Park

EPA – United States Environmental Protection Agency

FHWA – U.S. Federal Highway Authority

FTA – U.S. Federal Transit Administration

FSC – First Suburbs Consortium

HIA – Health Impact Assessment

HUD – U.S. Department of Housing and Urban Development

L&D Manual – ODOT Location and Design Manual

LOS – Level of Service of Streets

MAP-21 – Moving Ahead for Progress in the 21st Century Act (Transportation Bill enacted July 6, 2012)

MORPC – Mid-Ohio Regional Planning Commission

MPO – Metropolitan Planning Organization

MS4 – Municipal Separate Storm Sewer System

MUTCD – Manual on Uniform Traffic Control Devices

NACTO – National Association of City Transportation Officials

NCSC – National Complete Streets Coalition

NEORSD – Northeast Ohio Regional Sewer District

NHTSA – National Highway Traffic Safety Administration

NOACA – Northeast Ohio Area-Wide Coordinating Agency

NPDES – National Pollutant Discharge Elimination System

NPO – Nonprofit Organization

NPPA – National Prevention Partnership Awards

NPS – Nonpoint Source Pollution

OASH – Office of the Assistant Secretary for Health

ODH – Ohio Department of Health

ODOT – Ohio Department of Transportation

ODNR – Ohio Department of Natural Resources

ODPS – Ohio Department of Public Safety

OEPA – Ohio Environmental Protection Agency

OPWC – Ohio Public Works Commission

ORC – Ohio Revised Code

PICP – Permeable Interlocking Concrete Pavements

PTRG – Plastic Turf Reinforcing Grids

ROW – Public Right-of-Way

RTA– Greater Cleveland Regional Transit Authority

SGA – Smart Growth America

SRTS – Safe Routes to School

STP – Surface Transportation Program

TA – Transportation Alternatives Program

TIMS - Transportation Information Mapping System

TLCI – Transportation for Livable Communities Initiative

TOD – Transit Oriented Development

TWE – Transit Waiting Environment

UBDG – Urban Bikeway Design Guide

ULI – Urban Land Institute

USDG – Urban Street Design Guide

Introduction

Every day thousands of people travel from place to place within, between, and through communities in Cuyahoga County. As such, Cuyahoga County and its communities have invested vast sums of money into the regional transportation system in an effort to make it safer, more efficient, and easier to navigate. However, the majority of these investments have been focused on safe and convenient travel *for vehicles*. Yet, streets can and should serve as more than a conduit for cars, especially with the excess capacity we have from a system designed to accommodate a much larger population and with the increasing number of citizens who are looking for transportation alternatives in their daily lives.

As local governments wrestle with issues of an aging population, public health, climate change, community revitalization, economic competitiveness and tightening revenue sources, a growing number of communities are embracing the concept of ***complete streets,*** recognizing that planning and designing for ***all modes of transportation*** within the public street right-of-way (ROW) helps to maximize investments in public infrastructure. The term "complete streets" comes from a national movement to create integrated road networks that use the entire right-of-way to serve multiple purposes and provide accessible transportation options for all citizens. When properly designed, complete streets have been shown to be safer for all users, easier to maintain, more environmentally friendly and positive contributors to neighborhood vitality.

In a nutshell, complete streets are…

> ***… roadways designed and operated to safely and comfortably accommodate multiple users of all ages and abilities, including cyclists, pedestrians, transit riders, elderly, delivery and service personnel, and emergency responders; and to accommodate and slow stormwater runoff as part of a comprehensive stormwater management system.***

The complete streets movement began in 2003; by 2006 the National Complete Streets Coalition (NCSC) was founded by a number of national organizations including American Association of Retired Persons (AARP), the Institute of Transportation Engineers, the American Planning Association (APA), and the Association of Pedestrian and Bicycle Professionals (APBP). A few years ago, the federal government recognized the importance of complete streets and in partnership with Smart Growth American (SGA) began to encourage the adoption of complete streets policies at the local level through its program "Building Blocks for Sustainable Communities." By 2014, nearly 610 complete streets policies had been adopted nationwide at all levels of government.

Studies conducted by NCSC and others have confirmed the many benefits that well-designed complete streets provide. With this in mind, Cuyahoga County embarked on a complete streets initiative to encourage local infrastructure investments that improve health and contribute to a more sustainable environment. In November 2012, Cuyahoga County was one of twenty-two communities selected by SGA to receive technical assistance regarding the advancement of complete streets concepts. In May 2013, Cuyahoga County hosted a two-day workshop with representatives from SGA that brought

together county officials, regional stakeholders, community representatives and local residents to explore the concept of establishing a complete streets policy on a county level.

Since the SGA workshop, an inter-agency County Work Team was established, led by the directors of the Cuyahoga County Planning Commission (County Planning), the Cuyahoga County Department of Public Works (CCDPW) and consisting of staff from these two agencies along with the Office of the Cuyahoga County Executive. The Work Team, with input from Bike Cleveland, developed this Complete Streets Toolkit (Toolkit).

Streets and the places they serve come in all shapes and sizes and there is no one solution that meets the needs of every community in the county. The purpose of this Toolkit is to describe the elements of complete streets and demonstrate how different strategies for different types of streets can be used by communities throughout the county to transform our current roadways. Moreover, the Toolkit provides guidance on how communities can adopt complete streets policies of their own.

How to Use the Toolkit

The Toolkit is intended as a "how to" manual for engineers, planners, and local elected officials. It is comprised of five (5) chapters structured as follows:

Chapter 1 gives an overview of the benefits and perceived challenges of complete streets.

Chapter 2 outlines the factors to consider when planning road projects, such as the local transportation context and existing street network, and helps communities identify opportunities for complete streets treatments from road maintenance to new construction.

Chapter 3 showcases section drawings for different types of streets and highlights how components of complete streets designs and amenities can be included in specific projects.

Chapter 4 goes into more depth on each of the amenities discussed in Chapter 3. A short description of each amenity is provided in order to create a unified language for complete streets planning that will facilitate and foster conversations between engineers, planners, elected officials, and citizens throughout the county.

Chapter 5 provides a strategic framework for implementing complete streets policies and projects. From involving city/village departments, through building expertise and support, to changing procedures and financing projects, Chapter 5 provides a "How to Manual" on getting complete streets projects built.

The Toolkit relies heavily on material available from the NCSC, and references are provided throughout the Toolkit for additional resources. For further questions, training, and inquiries about the toolkit, please contact the County Planning and CCDPW.

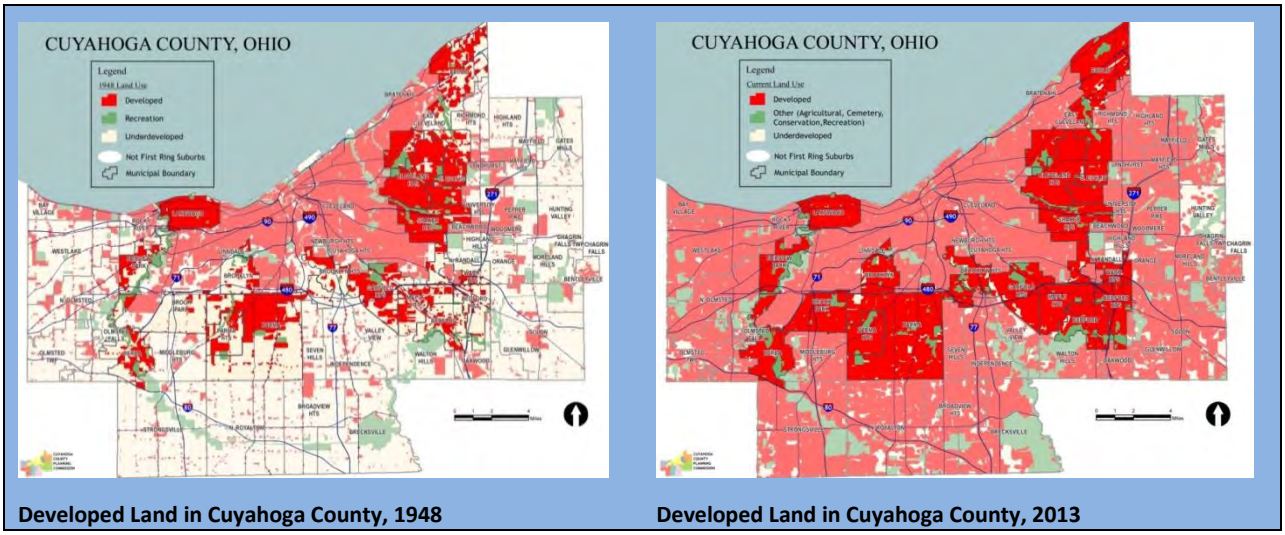
Chapter 1: Background

1.1 History of Transportation Planning in Cuyahoga County

Cuyahoga County covers 458 square miles of land area and encompasses 59 cities, villages and townships. Since the County's establishment in the early 1800s, transportation has played an important role in its development. Europeans settled along the shores of Lake Erie at the mouth of the Cuyahoga River because of the benefits of water access. With the construction of the Ohio and Erie Canal and the railroad system, greater Cleveland became a major industrial region by the early 20th century. By 1920, Cleveland was the fifth largest city in the nation, with over 943,000 people living in Cuyahoga County.

As new forms of transportation evolved, the transportation network in the county adapted: sixteen-foot wide sidewalks were constructed along Superior Avenue in 1832, horse-drawn street railways were built in the 1850s, and accommodations were made for electric street cars and bicycles in the late 1800s.[1] Yet, it was the introduction of the automobile in the 20th century that has had the most profound and lasting effect on the development patterns in our communities.

Transportation planning for the regional highway system began in the 1930s at a time when the population of Cleveland (and Cuyahoga County) was growing rapidly. Over the years, spurred on by federal funding, we continued to plan for and construct a county roadway network built primarily for automobiles, with the expectation that the population in the county would continue to expand. By 1970, the outward migration of residents from Cleveland to the suburbs and from Cuyahoga County to surrounding counties was well underway, and the highway system provided easy vehicular access throughout the region.



Developed Land in Cuyahoga County, 1948 **Developed Land in Cuyahoga County, 2013**

Figure 1: Developed Land in Cuyahoga County

[1] *Willis E. Sibley, Cleveland State University"* The Encyclopedia of Cleveland History- Streets

However, in recent years there has been an increasing awareness of the need to make changes to our roadway network. In fact, a number of local initiatives have already been undertaken to create a more robust multi-modal transportation system. For example:

- Northern Ohio Areawide Coordinating Agency (NOACA), the area's Metropolitan Planning Organization (MPO), has adopted a Regional Bike Plan that identifies a Regional Priority Bikeway Network, and its long range transportation plan states that the agency "works to make all roads safe for all modes of transportation".
- The Greater Cleveland Regional Transit Authority (RTA) adopted a Transit 2025 Long-Range Plan that envisions a sustainable, balanced transportation system for Greater Cleveland, with public transit playing a vital role in that system.
- The Cleveland Metroparks (Metroparks), which started as an organization to preserve natural areas and oversee park areas has, over time, built an extensive all-purpose trail system within and connecting various reservations. As part of its strategic planning, the Metroparks has identified the extension of its trail network into communities as one of its priorities so that cyclists and pedestrians can access the trail system without needing a car, not only for recreational purposes but also for commuting to other destinations beyond the Metroparks.
- The City of Broadview Heights passed a Bike Path ordinance in October 2008, providing that bike paths be installed on various streets in the City.

The City of Cleveland passed a Complete and Green Streets ordinance in September 2011 which requires implementation of sustainable policies and guidelines in all construction projects within the public right-of-way. Likewise, individual communities in Cuyahoga County have begun to incorporate various elements of complete streets in their transportation plans. The following list highlights some of the recent studies that relate to complete streets concerns:

Multi-Modal Connectivity Studies:

- Downtown Euclid Transportation for Livable Communities Initiative (TLCI) – Transportation and Redevelopment Plan *(Euclid)*
- Great Northern Multi-Modal Transportation Plan *(North Olmsted)*
- Citywide Bike Plan *(Westlake)*
- University-Circle-Cleveland Heights Missing Links Study *(Cleveland Heights)*

Greenway and Connection Plans:

- Warner Road/ Garfield Boulevard Connector and Trailhead Study (*Garfield Heights)*
- Big Creek – Greenway Trail Alignment and Neighborhood Connector Plan *(Parma and Brooklyn)*
- Lakewood Bicycling Priorities Report 2014

East Side Greenway (East Cleveland, Cleveland Heights, Shaker Heights, Beachwood, Pepper Pike, University Heights, Richmond Heights, Highland Heights, Mayfield Heights, Mayfield Village, Euclid,

South Euclid, Lyndhurst, Bratenahl, Orange Village and Warrensville Heights and eastern portions of Cleveland.) **Streetscape Plans:**

- Cedar-Fairmount Transportation and Streetscape Plan (Cleveland Heights)
- Lorain Road Streetscape Improvements (Fairview Park)
- Strategic Plan Report – Richmond Road Corridor Transportation Study (Warrensville Heights)
- Lee Road Traffic Study and Corridor Plan (Shaker Heights)

Transit-Oriented Development studies:

- RTA Transit-Oriented Development (TOD) Best Practices
- Warrensville/ Van Aken - Intermodal Transit Center Program Plan (Shaker Heights)

1.2 Defining Complete Streets

Over the years, there have been some efforts to improve safety for all users of the road, such as traffic calming, livable streets and routine accommodation policies. Since the 1990s, large-scale multi-modal transportation planning has been undertaken to provide a more complete network for transit, trails, and paths. The concept of complete streets is the next logical step: it advances the goals for complete networks by providing a framework for communities to develop more detailed, context sensitive solutions for streets at the local and even neighborhood level.

Planning and building complete streets encourages rethinking street designs so that the entire public street right-of-way is utilized. From a user standpoint, this means improving conditions for pedestrians, cyclists, and transit riders as well as for vehicular drivers. At the same time, many elements of complete streets can help improve environmental sustainability because they also function as stormwater management techniques. A comprehensive, more complete view of the potential of the space within the right-of-way encourages planners and engineers to rethink the public right-of-way as public space.

Complete streets incorporate a wide range of options to consider including:

- Landscape enhancements,
- Sidewalk and pedestrian-scaled streetscape enhancements,
- Bicycle infrastructure improvements,
- Crosswalk improvements,
- Improved signage and lighting, and
- Bus circulation options.

In other words, complete streets are roadways that are designed and operated with two primary goals*:*

- ***To safely and comfortably accommodate multiple users of all ages and abilities, including cyclists, pedestrians, transit riders, elderly, delivery and service personnel, and emergency responders; and***

- ***To accommodate and slow stormwater runoff as part of a comprehensive stormwater management system.***

Cuyahoga County is a very diverse region with several different types of communities that offer residents a wide array of choices in terms of community character. As complete streets are not a one-size fits all solution, there is ample opportunity for each community to define what a complete street means to them. Some communities might want to invest in their pedestrian network while others might want to be the next gold-level bicycle friendly community, or a transit hub. No matter what emphasis or focus a community decides to pursue, there are a variety of strategies to choose from to create a vibrant and bustling environment for citizens.

National organizations providing expertise on complete streets:

The Pedestrian and Bicycle Information Center provides free webinars on transportation and livable communities related topics. Free webinars are available online: http://www.pedbikeinfo.org/training/webinars.cfm

Smart Growth America and National Complete Streets Coalition provide extensive information and best practices from throughout the U.S. on complete streets benefits, policies and implementation issues. See http://www.smartgrowthamerica.org/complete-streets/

The American Planning Association *Complete Streets: Best Policy and Implementation Practices.* APA Report Number 559, Mc Cann, B., & Rynne, S. (2010). The report descibes policy and implementation strategies using case studies. Available online: http://www.planning.org/pas/brochure/pdf/report.pdf

American Association of Pedestrian and Bicycle Professionals conducts regular webinars on pedestrian and bicycle design issues. Some of them are available free online: http://www.apbp.org/events/

The Federal Highway Administration – Pedestrian and Bicycle Safety Section makes available a variety of guidelines and tools regarding pedestrian and cyclists safety: http://safety.fhwa.dot.gov/ped_bike/

1.2.1 Designing Complete Streets

Embracing complete streets concepts means that planning for roadway improvements will naturally be more comprehensive in scope, taking into consideration ways to maximize the use of the public right-of-way. This section highlights some of the factors to consider when designing multi-functional roads.

Designing for Pedestrians – Walking is the most basic mode of transportation. Every trip starts and ends by walking. Walking is also a great form of exercise. Yet, pedestrians are the most vulnerable users of the streets. For instance, "40% of pedestrian fatalities occur where there is no available crosswalk"[2].

[2]Ernst, Michelle and Lilly Shoup.(2009). Dangerous by Design.Transportation for America and the Surface Transportation Policy Partnership.

Complete streets provide an approach to design roadways with the safety of all users in mind. Pedestrian islands, curb extensions, and pedestrian traffic light signalization can greatly enhance the safety of pedestrians, including elderly, and disabled. Designing for pedestrians means that roadways have adequate and safe sidewalks and crosswalks within interesting and pleasant environments that encourage people to choose to walk between destinations rather than drive.

Designing for Cyclists – Cycling is an environmentally friendly, low-cost mode of transportation and can be a great activity for all ages if roads are designed for bicycle safety and there is a regional network of bike-friendly streets. Bike lanes and all-purpose trails that connect homes to destinations such as parks or libraries as well as job centers have the potential to greatly improve the quality of life and recreational opportunities within the region.

Designing for Transit Riders – Elements of complete streets become very important in connecting residential neighborhoods to transit stops and job centers. Complete streets include transit improvements that enhance the rider's experience such as adding bus shelters, increasing safety and security at stops and on vehicles, as well as improving intersection timing to decrease bus travel times.

Designing for Hydrology – Streets not only move people and vehicles, but are also conduits for stormwater runoff. Rain water moves quickly along smooth, paved surfaces, which can contribute to negative environmental impacts like polluted runoff, sedimentation, and bank erosion. Landscaping and other natural features that are used to provide screening and buffering for pedestrians and cyclists can be designed as cost-effective green infrastructure that retains and treats – or even eliminates – runoff at the source.

Designing for Sustainability and the Environment – Reducing pavement width and introducing additional landscaping can have positive impacts on air quality as trees function as carbon sinks, as well as on stormwater management as more water can be kept and filtered on-site. Designed in the correct way, bioswales reduce the footprint of intersections, protect the pedestrian and bicycle realm and provide habitat for neighborhood wildlife.

1.3 Benefits of Complete Streets

There are numerous documented benefits of designing multi-functional streets that meet the needs of all users and many of them reach far beyond mere improvements to the transportation system. For example, providing a well-connected, safe roadway network that helps reduce our reliance on cars can have economic, social and environmental benefits. Indeed, maximizing our use of the existing public right-of-way also makes good financial sense in that it helps leverage scarce public resources.

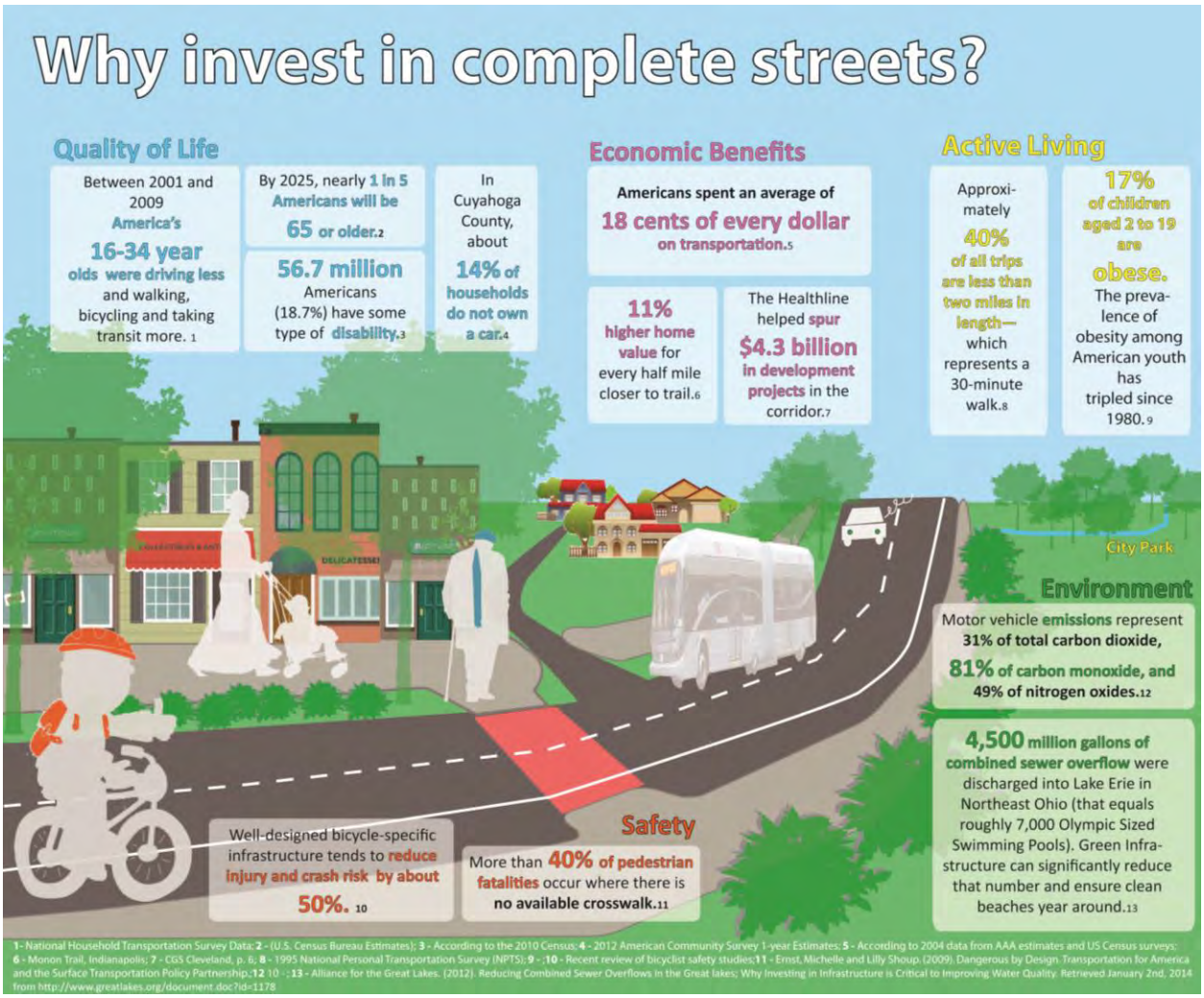


Figure 2: Benefits of Complete Streets

1.3.1 Economic Benefit

Studies conducted by the Urban Land Institute (ULI) indicate a growing trend among 'Generation Y', 'Millennials', and 'Baby Boomers' to move to more walkable and urbanized areas,[3] and the desire for more transportation options is one of the four top reasons cited. Recent development trends in Downtown Cleveland and University Circle and the continued strength of inner-ring suburbs such as Cleveland Heights, Lakewood and Shaker Heights confirm the national trends on a local scale. This trend has important implications for economic development strategies of communities. As Richard Florida notes in "The Rise of the Creative Class", companies are competing globally for a talented young workforce that prefers living in a walkable setting.[4] That means companies are choosing locations based on the quality of life a place can provide for their workforce.

[3] (Ewing & Bartholomew, 2013)
[4] (Florida, 2002)

Investing in alternative modes of transportation can have a positive impact on the local economy. On average a typical household spends nearly 20% of its income on transportation expenses[5]. If households were able to reduce their transportation costs by opting for lower cost options such as walking, biking and taking transit, they would have more disposable income to spend locally. Studies show that adding pedestrian and bicycle amenities along local streets typically leads to increased pedestrian and bicycle traffic, which can result in increased sales at local businesses. For instance, a 2013 report by New York City's DOT found that in Brooklyn, "tax receipts show that retail sales in stores adjacent to a new plaza increased 172% in the three years after the plaza was implemented, over twice the growth seen in other parts of the same area."[6]

1.3.2 Active Living

As obesity, heart disease, and diabetes rates are increasing throughout the nation, the health community increasingly advocates for a shift to more active lifestyles to prevent certain diseases[7]. Looking at Cuyahoga County, the numbers are alarming. The 2013 County Health Rankings ranked Cuyahoga County 67 out of 88 Ohio counties for health outcomes[8]:

- As of 2011, according to the Centers for Disease Control and Prevention (CDC), 38.9% of adults in Cuyahoga County were overweight and 25.7% were obese (CDC, 2011).
- As of 2011, 31.7% of adults in the county have been told they have high cholesterol.
- Cuyahoga County is experiencing a trend where chronic diseases and heart disease, cancer, chronic lower respiratory disease, stroke, unintentional injuries and Alzheimer's disease are the leading causes of death in the county (Ohio Department of Health (ODH), 2010).

The built environment typically does not foster an active lifestyle. Investing in complete streets can help to combat these trends. Studies show that in countries where people are more likely to walk, bike, or take transit on a regular basis there are lower incidences of obesity.

[5] (National Complete Streets Coalition, 2013a)
[6] (City of New York Department of Transportation, 2013, p. 125)
[7] (Safe Routes to School National Partnership, 2012)
[8] http://wellness.cuyahogacounty.us/en-US/HealthStat.aspx

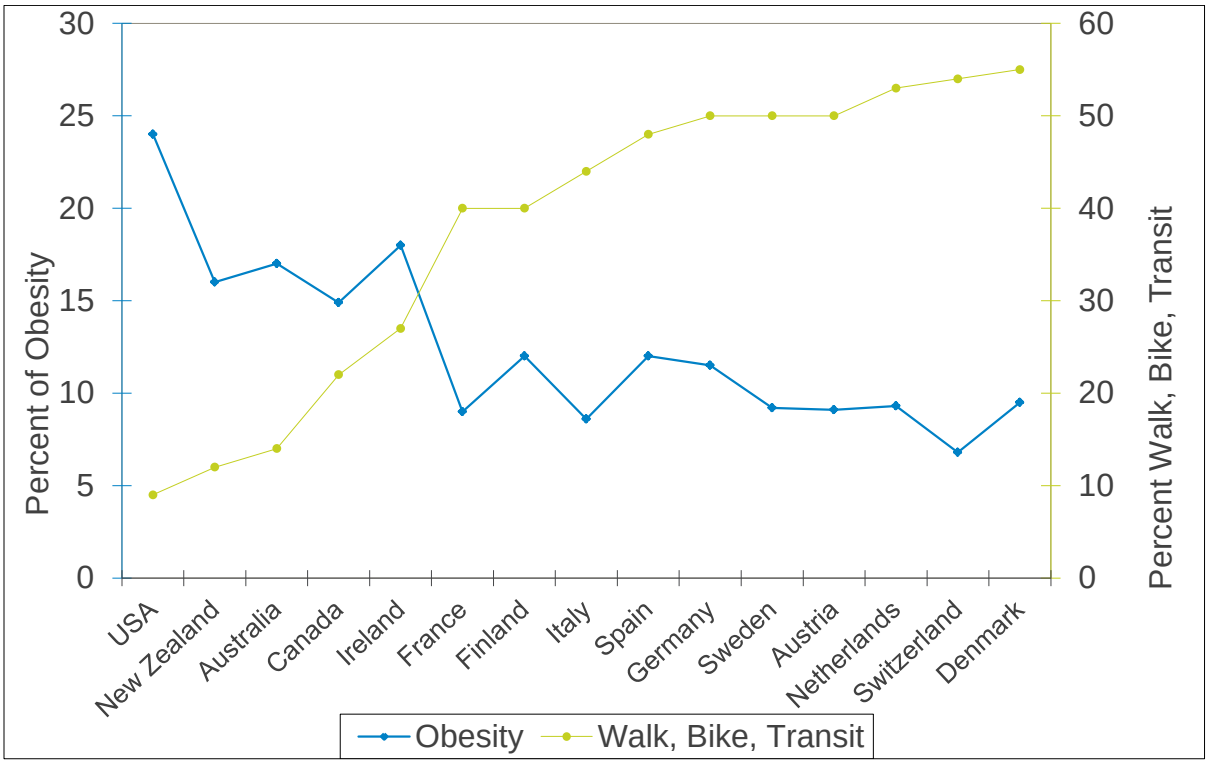


Figure 3: Obesity rates related to percent of people walking, biking and taking transit[9]

One of the key concepts of complete streets is improving the roadway environment in ways that make it easy for people to choose to walk or bike as part of their daily routine. This does not seem to be a far-fetched idea when one considers that 40% of all trips are less than two miles which is equal to a 40 minute walk or 10 minute bike ride.

In fact, over 800,000 residents of Cuyahoga County live within a half mile (about a 10 minute walk) to two types of frequent destinations: parks and/or local retail districts, as illustrated in figures 4 and 5. This data highlights potential opportunities within those half mile radii to incorporate more complete streets elements.

[9] Countries where people are more likely to walk, bike, or take transit have significantly lower rates of obesity than countries where people are less likely to use these modes. (Pucher, 2009)

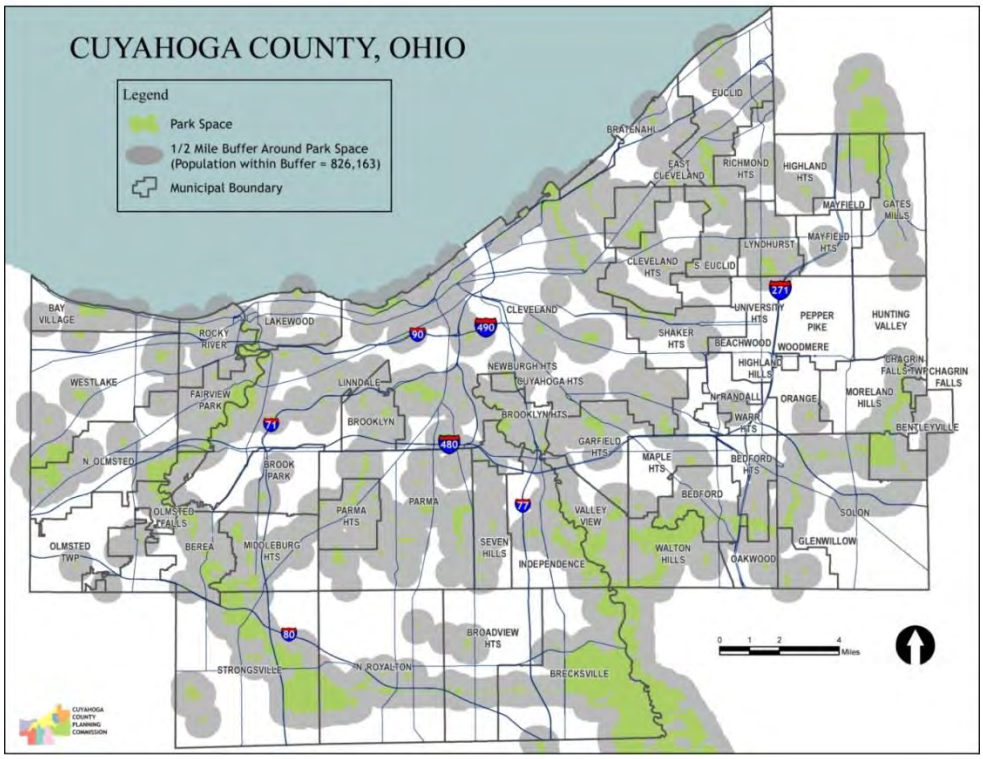


Figure 4: People living within a half-mile (10 minute walk) of a park

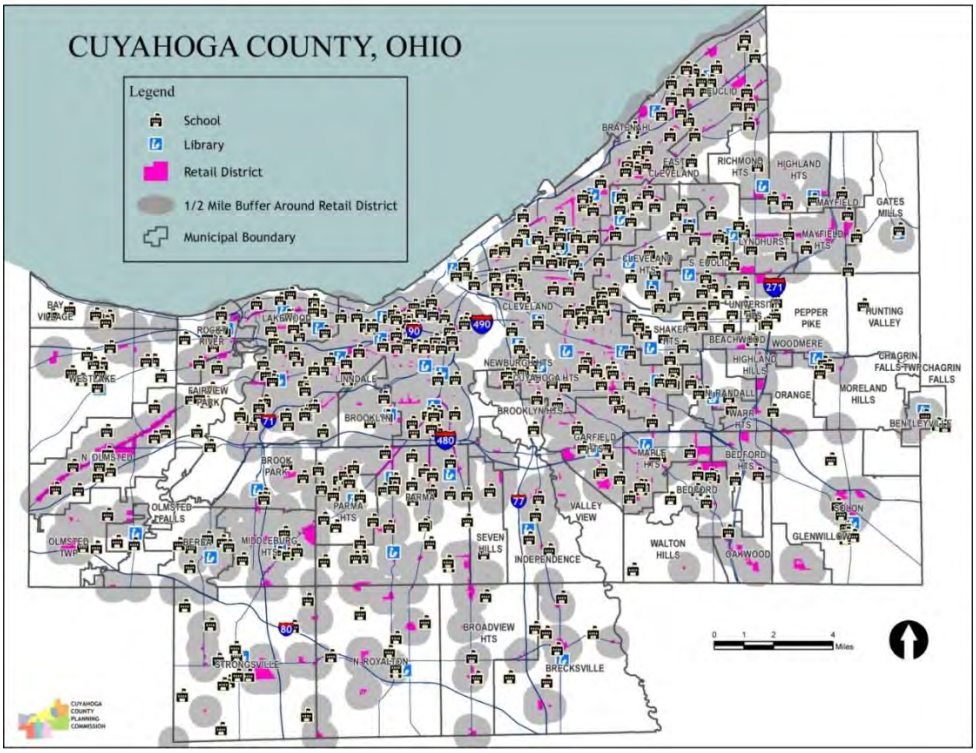


Figure 5: People living within a half-mile (10 minute walk) of a retail district

1.3.3 Safety

Safety is one of the primary reasons people chose to drive for short trips (less than two miles). As noted earlier, many pedestrian fatalities occur where there is no crosswalk. As complete streets are designed with the safety of all users in mind, enhancements can greatly enhance the safety of pedestrians, including elderly and the disabled, as well as cyclists and transit riders.

An article published in the Journal of Physical Activity and Health identified a strong correlation between bikeway miles added and a reduction in crash and fatality rates in Portland[10]. Between 1991 and 2006 crash rates dropped roughly 50% as more bike lanes were added[11]. Another study for Orlando, Florida, found that "restriping Edgewater Drive from 4 lanes to 2 travel lanes, a center turn lane, and bicycle lanes reduced the frequency of crashes involving injuries from every nine days to once every 30 days while the number of people walking and bicycling rose 23% and 30% respectively."[12] This study shows that injuries have been reduced by investment in infrastructure.

1.3.4 Environment and Sustainability

As more and more people choose to walk, bike and take transit instead of driving, there will be a measurable positive impact on the environment. Indeed, water and air quality are impacted by the travel decisions of individuals.

Air quality is a special concern in Cuyahoga County. In 2008, United States Environmental Protection Agency (EPA) designated Cuyahoga County as a marginal nonattainment area for the 8-hour ozone standard[13]. Motor vehicle emissions directly impact the air quality in the region[14]. Shorter car trips pollute more per mile because 60% of the pollution created by automobile emissions happens in the first few minutes of operation, before pollution control devices can work effectively[15]. Therefore, reducing the number of short trips taken by car will have a great effect on reducing air pollution.

Access to clean water is critical for human health, biodiversity and environmental health. Complete streets provide opportunities to include bioswales that slow and store stormwater while serving as a buffer for pedestrians or cyclists. Including stormwater and landscaping features can enhance water quality on a regional scale. Better stormwater management means less combined-sewer overflow (CSO) which may result in better water quality in Lake Erie which would enhance the lake's recreational value as a tourist attraction.

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[10] (Gotschi, 2011)
[11] http://www.railstotrails.org/resources/images/whatwedo/trailadvocacy/atfa/28.gif
Used "*Parameters for the HEAT for Cycling calculation.* The Health Economic Assessment Tool for Cycling can be downloaded here: www.euro.who.int/ HEAT." (p. S. 56)
[12] (Rosales, 2013)
[13] (NOACA, 2013b)
[14] (Pedestrian and Bicycle Information Center)
[15] (Pedestrian and Bicycle Information Center, 2013)

1.3.5 Quality of life

As we travel about our communities, we may overlook the need for easier access until we experience an injury or have to travel with someone who uses a wheel-chair or has vision loss. For some people the simple act of getting to a destination often becomes an obstacle course. Many people have reduced abilities through birth, accident, or aging. In fact, in 2012, 14% of residents in Cuyahoga County were disabled, and 15.9% were over the age of 65.[16] As our population ages, many may begin to experience mobility problems. In addition, 13% of households in Cuyahoga County do not own a car.[17] Thus there are a considerable number of people living in Cuyahoga County who might not have the choice to drive a car.

At the same time, there is a growing trend away from driving among the millennial generation, which includes people born between 1982 and 2004. According to the National Household Travel Survey, from 2001 to 2009, the annual number of vehicle-miles traveled by young people (16 to 34-year-olds) decreased from 10,300 miles to 7,900 miles per capita—a drop of 23 %.[18] Increasingly young people are choosing not to drive, and instead have increased their use of public transit, biking, and walking.

Complete streets increase independence and mobility for elderly, people with disabilities, and people who prefer alternative modes of transportation. Designing complete streets can improve the quality of life for a number of residents in a community.

For further information on benefits of complete streets:

The Pedestrian and Bicycle Information Center:
Provides informational fact sheets on the various benefits of a complete streets network, including health, economic, environmental, and social benefits. Also available are factsheets on safe practices for pedestrians and cyclists as well as crash statistics. All are available at: http://www.pedbikeinfo.org/data/factsheet.cfm

Smart Growth America and National Complete Streets Coalition:
http://www.smartgrowthamerica.org/complete-streets/complete-streets-fundamentals/benefits-of-complete-streets/

US Department of Transportation, Safer People, Safer Streets:
Summary of U.S. Department of Transportation Action Plan to Increase Walking and Biking and Reduce Pedestrian and Bicyclist Fatalities (September 2014)
http://www.dot.gov/sites/dot.gov/files/docs/safer_people_safer_streets_summary_doc_acc_v1-11-9.pdf

[16] 2012 American Community Survey 1-Year Estimates
[17] U.S. Census, 2008-2012 American Community Survey 5-Year Estimates, Selected Housing Characteristics (DP-04).
[18] (Frontier Group, 2012)

1.4 Challenges of Complete Streets Planning

As the communities in Cuyahoga County are very diverse the challenges to implement complete streets may vary. The following concerns may apply more to some communities than others.

1.4.1 Right-of-way Concerns

A common concern in built-out communities relates to the available right-of-way. For the most part, bicycle and pedestrian infrastructure is currently treated as an addendum to existing facilities leading many to believe that complete streets require purchasing additional right-of way. However, complete streets elements often can be accommodated within the existing right-of-way. A complete streets approach encourages decision makers, planners, and engineers to re-examine the use of the public right-of-way by addressing transportation issues through either demand-side or supply-side strategies. While demand-side strategies focus on reducing the demand for car use through land use and zoning, supply-side strategies focus on increasing the capacity of the transportation system by encouraging different modes of transportation. Figure 6 shows that moving 40 people in a car need significantly more space than moving 40 people on one bus or on bikes: therefore, replacing car trips with bicycle or transit trips can have a tremendous positive impact on congestion, use of space, and money. In fact, NOACA's Connection 2035+ Long Range Plan recommends implementing bicycle, transit, and pedestrian improvements as one strategy for congestion management[19]. As the road network in the Cuyahoga County was built for thousands of more people than we currently have, many streets currently operate under capacity. For instance, a four lane road with 15,000 Average Daily Traffic (ADT) would be a candidate for a road diet.

With this in mind, a complete streets approach emphasizes redesign of the existing corridor and its ROW rather than purchasing additional ROW. This Toolkit explores a wide range of tools that communities can use to refurbish existing streets and their right-of-ways to accommodate various modes of travel. Complete streets policies do not recommend a one-size fits all approach but rather allow communities to create a transportation network tailored to their residents' needs. Every community will make different decisions on which modes to prioritize on certain corridors. An example of several different configurations for an 80-foot wide corridor can be found in Chapter 2.2, with further detailed section drawings for street types and design features found in Chapters 3 and 4.

[19] (NOACA, 2013a, p. 33ff)

Figure 6: Road Capacities need for 40 vehicles, 40 transit riders and 40 cyclists.[20]

1.4.2 Connectivity

Most residents cross municipal boundaries every day as they travel for work, shopping, and entertainment. For the most part, people drive along major roadway corridors, such as Euclid, Detroit, Mayfield, Warrensville Center, Brook Park, Richmond, State, Ridge, Pleasant Valley, and Royalton Roads, to move seamlessly from one community to another without even realizing it because our street network is well connected. However, this is not always true for cyclists, and to some extent pedestrians and transit riders.

The concept of complete streets promotes connectivity in terms of a completed network for all major pedestrian, bicycle, and transit routes. A complete streets approach recommends that gaps for each travel mode be closed to make it easier to choose these alternative travel options. For example, there are instances where bike lanes begin in one community, but disappear at the border of an adjacent community, only to resume again in the following one. This gap in the bicycle network could be reasonably addressed through various complete streets treatments, but would not necessarily need to be addressed in the same way for each segment of the corridor. Not every community has to use the same treatment. If one community is committed to becoming a gold level bicycle friendly community, it might want to install protected bike lanes, whereas a community with other priorities might opt to install shared lane markings, commonly called sharrows, instead. Although the type of treatment might vary, the presence of a seamless network should not.

Connectivity also has to do with prioritization of transportation corridors for various travel modes. Communities might want to collaborate in the identification of these priority corridors that lead to destinations of regional significance (regional shopping centers, Metroparks, hospitals, office clusters, etc…). Several resources exist to help communities in this prioritization. NOACA's Regional Bike Plan provides detailed information on a per-corridor basis, including locations with high crash rates, and identifies a regional priority bikeway network for Cuyahoga County.[21] The Cleveland Metroparks

[20] (Bennett, 2010)
[21] (NOACA, 2013a, pp. 35-39, and 56-65)

Reservation Concept Plans[22] provide a valuable resource for communities with regards to needed neighborhood connections to access the Metroparks extensive trail system. Additionally, RTA's Transit 2025 Plan provides maps that illustrate locations where several "key long-term transportation projects" such as future transit centers, park-ride lots and transit system expansions are targeted.[23]

1.4.3 Cost Concerns

A common concern is that adding infrastructure for pedestrians, bicycles, or transit riders would be very costly. In past years, projects aimed at improving multi-modal transportation at the street level have focused on pedestrian and cyclist amenities *separately* from the rest of the street, which has contributed to the perception that improvements are very costly or difficult to fund. However, if pedestrians, cyclists and transit riders are routinely and strategically accommodated in all street projects, communities can actually save costs by both reducing infrastructure and stress on infrastructures and in externalities such as improved community health.[24]

Comparing Costs for Pedestrian, Bicycle and Transit Facilities

There are different ways of measuring costs and benefits of complete streets. A variety of examples illustrate that the needed investment in car traffic and infrastructure is much larger than the investment in other modes of transportation.

What will $30 million buy you in 2013?[25]

- One mile of street widening
- 600 miles of striped bike lanes
- 300 miles of buffered bike lanes
- 100 miles of sidewalk
- 20 miles of physically separated bicycle tracks
- 1.5 miles of bus rapid transit (RTA)

Comparing one mile of street widening to 600 miles of bike lane or 100 miles of sidewalk illustrates the much higher impact of investing in complete streets amenities.

[22] (Cleveland Metroparks, 2012)
[23] (Greater Cleveland Transit Authority, 2004, pp. 73-76)
[24] (National Complete Streets Coalition, 2013f)
[25] (Flusche, Sullivan, Wyatt, & Nuttle, 2013)

Health Care Savings

"Research examining the health benefits of bicycling and walking point to the same conclusion: investments in active transportation pay enormous dividends. The literature suggests the largest share of benefits comes from the well-being and health outcomes associated with being physically active."[26]

- Lincoln, Nebraska: Every $1 spent on bicycle and pedestrian trails (including construction, maintenance, equipment, and travel) yields $2.94 in direct medical benefits.[27]
- Portland, Oregon: Every $1 invested in bicycling yields $3.40 in health care cost savings. When the statistical value of lives is considered, as is done for the evaluation of highway safety improvement projects, every $1 invested yields nearly $100 in benefits.[28]
- Kansas City: Every dollar invested in bicycle and pedestrian projects yields $11.80 in benefits, the greatest portion of which is the perceived health and recreation value of those biking and walking.[29]
- A summary of several studies in the U.S. and Europe found that every dollar invested in bicycle networks yields at least $4 to $5 in benefits, mostly related to health and safety.[30]

For further details on costs of complete streets:

Victoria Transport Policy Institute assigns values to various categories of transportation costs and benefits in: *Transportation Cost and Benefit Analysis - Techniques, Estimates and Implications.* http://www.vtpi.org/tca/ (2011, March).

Prepared for Federal Highway Administration by Bushell, M. A., Poole, B. W., Zegeer, C. V., & Rodriguez, D. A. (n.d.). list detailed cost information on design elements in their publication *Costs for Pedestrian and Bicyclist Infrastructure Improvements. A Resource for Researchers, Engineers, Planners, and the General Public.* http://katana.hsrc.unc.edu/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf

National Complete Streets Coalition.

Complete Streets Costs Factsheet. http://www.smartgrowthamerica.org/complete-streets/implementation/factsheets/costs

Costs of Complete Streets. What are we learning from state and local governments? http://www.smartgrowthamerica.org/documents/cs/factsheets/cs-costs-2.pdf

The Pedestrian and Bicycle Information Center: *Webinar – Countermeasure Costs: Putting prices on pedestrian and bicycle infrastructure.* http://www.pedbikeinfo.org/training/webinars_PBIC_LC_012214.cfm

[26] (American Planning Association California Chapter; Walk San Diego, 2012)
[27] (Wang, Macera, Scudder-Soucie, Schmid, Pratt, & Buchner, 2005)
[28] (Gotschi, 2011)
[29] (Mid-America Regional Council, 2009)
[30] (Salensminde, 2004)

As shown in the figure 7, complete streets projects do not necessarily need to be more expensive but can in fact save money and leverage funds more efficiently. New pavement is comparably more expansive than pedestrian features. See Chapter 5.5 for more detailed recommendations for funding.

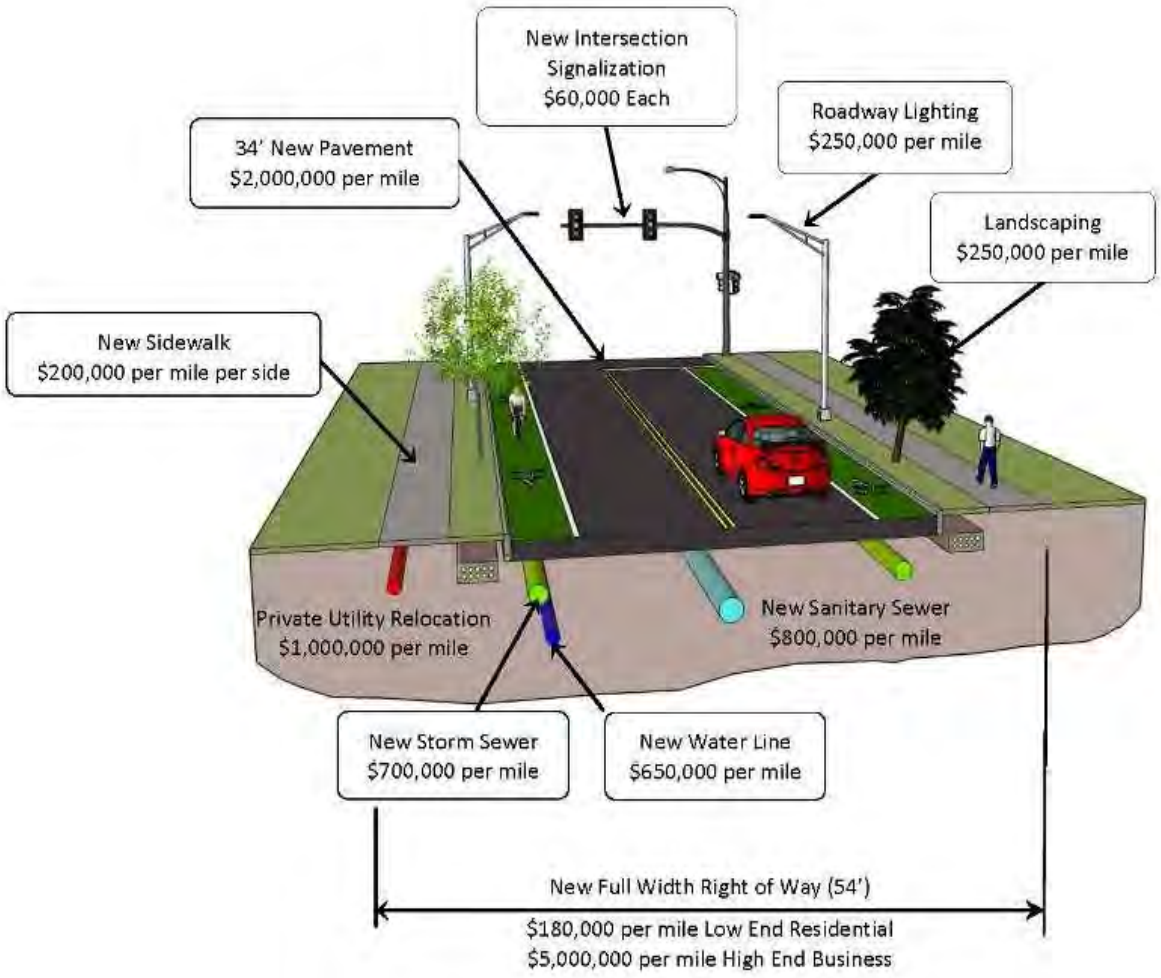


Figure 7: 2013 Cost Estimates on Complete Street Elements

1.4.4 Projects that are "too far down the road"

Complete streets features can be considered a disruption or costly addition rather than a beneficial component for all residents. Choosing a complete streets approach can prevent the exclusion of a bike lane, sidewalk or better transit facilities because the project is already "too far down the road". As illustrated in figure 8, by the time projects are in the final engineering and design phase, engineers and planners have been working on the project many years.

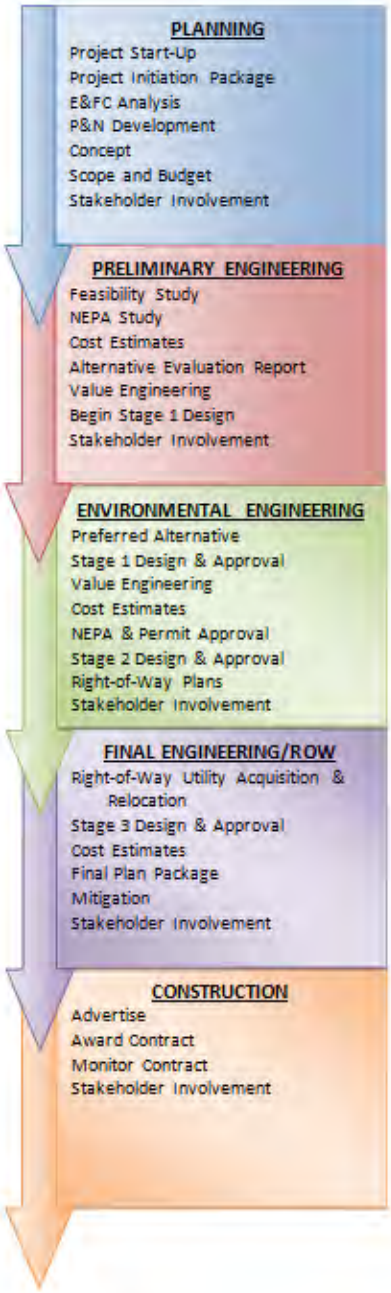


Figure 8: Phases of a road project

Projects that are currently in the preliminary engineering phase will most likely not turn into a last minute complete streets project. However, there are opportunities to include complete streets elements on every project, including ones already in the design phase. Additions like bike lanes, crosswalks, modified signal timing, and pedestrian signage can improve a street for all users with little cost and minor design change. For future road projects, starting to include complete streets in the planning phase can help reduce change order costs and prevent frustrations for everyone involved in the project.[31] "Complete streets policies frequently do not trigger any additional spending: they require more careful planning of existing transportation projects. This means safety improvements can be incorporated into existing projects instead of seeking separate funding sources."[32] In fact, there may even be opportunities for project cost savings. For instance, Lee County, FL, re-examined its 2035 Long Range Transportation plan and determined potential savings of $58.5 million for five road widening projects by using a complete streets approach.

Adopting a complete streets policy can be a first step for a community to start rethinking its transportation network. Even if some recent projects are already "too far down the road", communities may want to consider how complete streets aspects can be included in street projects. Considering complete streets elements early on in the planning process opens up a broader variety of funding options, and can help to create stronger communities as well as better connections in the region.

[31] (National Complete Streets Coalition, 2013f)
[32] (National Complete Streets Coalition, 2013g)

Chapter 2: Planning and Scoping a Complete Streets Project

Planning a road project is a complex process that requires consideration of several components. This chapter helps engineers, planners and elected officials to identify the gaps and opportunities in road projects that are currently in the planning or design phase. The flow chart in figure 9 summarizes the suggested steps of complete streets projects.

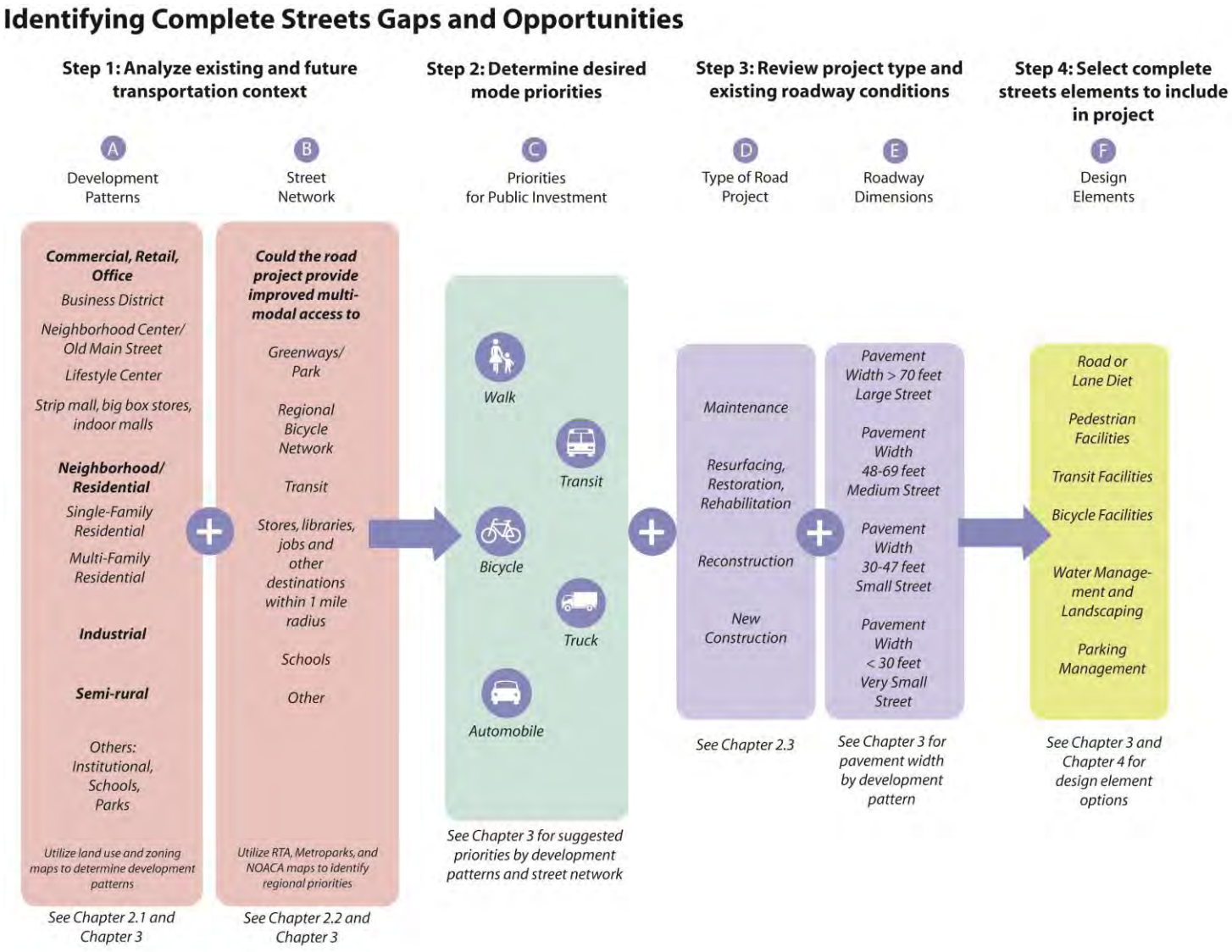


Figure 9: Identifying Complete Streets Gaps and Opportunities

Step 1: Analyze transportation context

Every road corridor is embedded in a larger system of land use (including local and regional destinations), as well as in a regional street network. When developing a road design, communities are encouraged to consider land use and connectivity to destinations to determine mode priorities. Furthermore, opportunities may arise dependent on the type of road project being considered. The Cuyahoga County complete streets typology presented in Chapter 3 will be based upon the categories outlined in Chapter 2.1.

Step 2: Determine mode priorities

Based on the development patterns and network considerations communities will be able to determine mode priorities for their specific corridor. Figure 10 illustrates examples for an 80 foot ROW with different mode priorities.

Step 3: Review project and existing roadway conditions

The selection of specific design features will be impacted by the type of road project a community is pursuing. Chapter 2.3 highlights the differences between maintenance, resurfacing, and reconstruction projects.

Step 4: Select complete streets elements to include in project

Chapter 3 and 4 together offer complete streets design elements and guidelines planners and engineers may choose to include in their specific road project. Chapter 3 outlines a street typology based upon development patterns and network aspects. For each street type; design elements will be listed in Chapter 3 and definitions of those elements can be found in Chapter 4.

For further details on planning complete streets:

Congress for the New Urbanism. (2012). *Sustainable Street Network Principles.* http://www.cnu.org/cnu-news/2012/01/cnus-sustainable-street-network-principles

Maricopa Association of Governments. (2011). *Complete Streets Guide.* Defines road project development process (complete streets planning process) very well. http://www.azmag.gov/Documents/BaP_2011-01-25_MAG-Complete-Streets-Guide-December-2010.pdf

Federal Highway Administration – Pedestrian and Bicycle Safety: Provides different tools to conduct pedestrian and bicycle crash analysis, safety audits and countermeasures selection assistance: http://safety.fhwa.dot.gov/ped_bike/tools_solve/

The North Carolina *Complete Streets - Planning and Design Guidelines* (2012, July) provide great details on the relation of land uses, street types and functional street classifications. http://www.completestreetsnc.org/wp-content/themes/CompleteStreets_Custom/pdfs/NCDOT-Complete-Streets-Planning-Design-Guidelines.pdf

2.1 Transportation Context

Many of Cuyahoga County's main commuter streets transect commercial as well as residential areas of varying density. Different adjacent land uses and densities may require different complete streets treatments along the same corridor. For instance, if a street runs through a neighborhood center, communities may want to prioritize pedestrian mobility and safety in this area.

2.1.1 Development Patterns

Communities are encouraged to determine the land use along specific road corridors and to choose the appropriate complete streets facilities based on the suggestions in Chapter 3. To identify development patterns along a corridor, communities will want to look at zoning and land use maps as well as taking walks along the corridor (which gives first hand user experience). The general development patterns recommended to prioritize users of the street are the following:

- Commercial, retail, and office uses (See Chapter 3.1)
- Neighborhood/ residential (See Chapter 3.5)
- Industrial uses (See Chapter 3.3)
- Semi-rural residential areas (See Chapter 3.7)

2.1.2 Street Network Considerations

In addition to analyzing development patterns, communities may want to assess their multi-modal networks that connect pedestrians, cyclists, and transit riders to local and regional destinations.[33] Analyzing regional networks might alter priorities for any specific corridor.

In terms of regional connectivity between communities, planning departments and departments of public works are encouraged to consult NOACA's regional bike plan as well as RTA's Transit 2025 System Map. Both plans are shown in Appendix B.[34] Additionally, communities might want to consider looking at the Cleveland Metropark's Reservation Concept Plans to identify opportunities to better connect both regionally and locally. Specific design ideas can be found in Chapter 3 for:

- Commuter streets (Chapter 3.2),
- Boulevards (Chapter 3.4),
- Transit spines (Chapter 3.6),and
- Bridges (Chapter 3.8).

When it comes to local connectivity for pedestrians, several cul-de-sac subdivisions impose special challenges. Figure 9 illustrates the differences in block size and connectivity of different grids compared on the same scale. Looking at the different grids, it becomes apparent that cul-de-sac developments do not provide direct pedestrian connection. People might choose to drive to a location (restaurant) that is

[33] (Congress for the New Urbanism, 2012, p. 5)
[34] (Greater Cleveland Transit Authority, 2004) AND (Cleveland Metroparks, 2012) AND (NOACA, 2013c)

only 1/2 mile away as the crow flies, but 2 miles away in actual street distance. Therefore the goal of complete streets development should be to create "a finely woven fabric of streets and blocks that offer direct, varied pedestrian routes made interesting through careful design.[35]

Communities should consider their street grid from a network and destination perspective and identify priority bicycle routes, streets that urgently need pedestrian facilities (in absence of sidewalks), and possible pedestrian connections between cul-de-sacs or through parks. Communities are encouraged to identify nodes of activity and most suitable pedestrian and bicycle priority connections between those nodes. Once those priorities are identified, specific street reconfigurations and design elements become relevant.

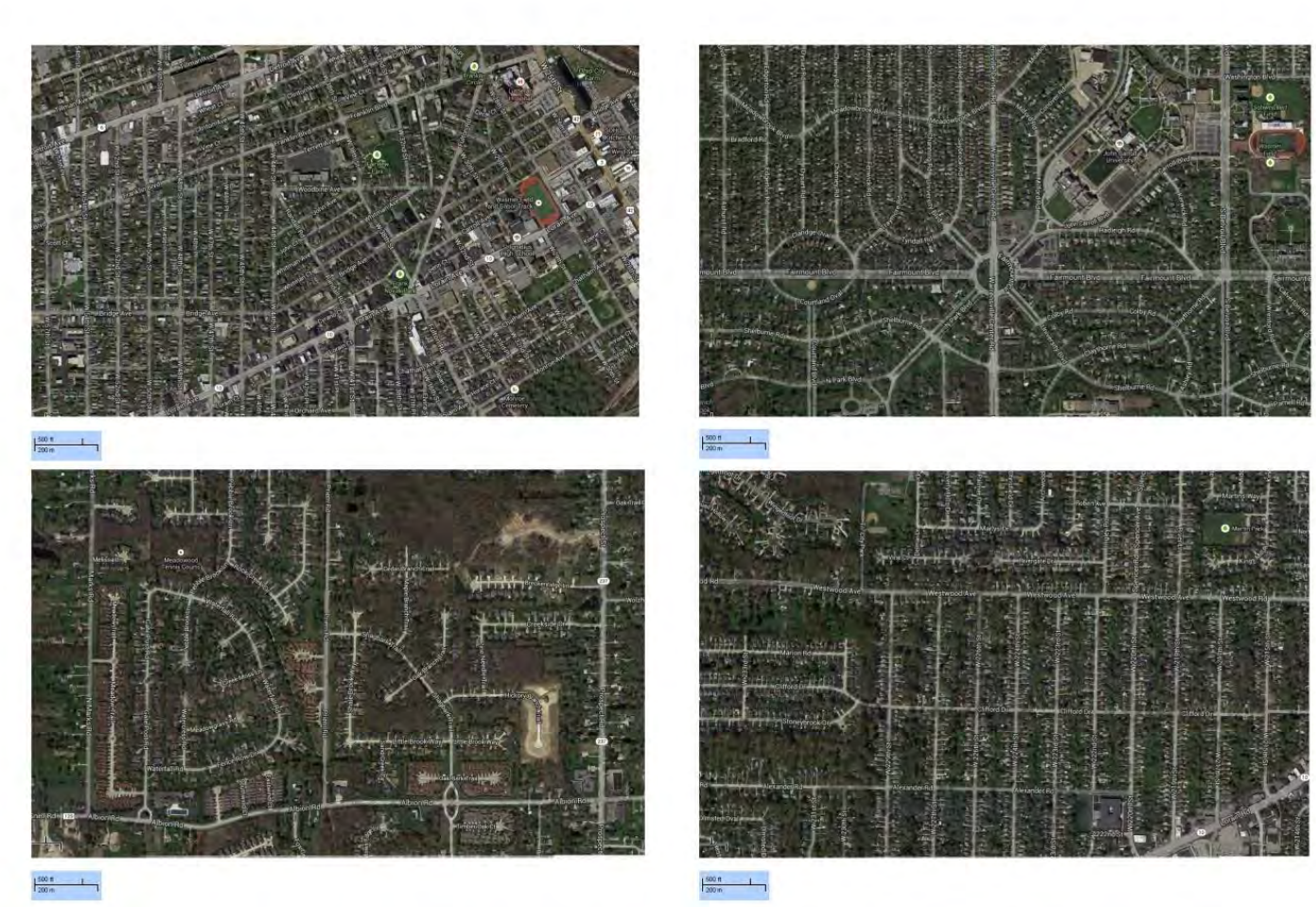


Figure 10: Street Networks in Cuyahoga County:
Varying connectivity, block size and density levels (Source: google maps)

[35] (Congress for the New Urbanism, 2012, p. 14)

Urban Design Reclaimed – Analysis of Connections in Streetgrid[36]

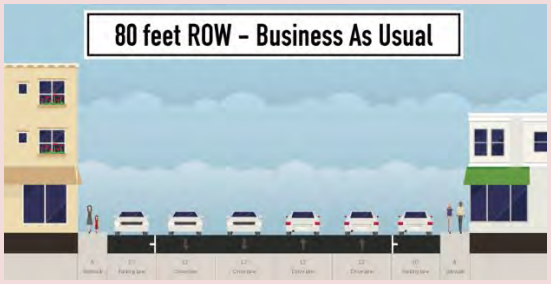
- Find the regional systems – roads, greenways, transit lines – that intersect the neighborhood
- Identify areas likely to have connectivity problems (cul-de-sacs, housing areas built after 1960, large blocks and parcels)
- Delineate the 5 minute walking radius around each neighborhood center (identified pedestrian sheds)
- Identify smaller clusters of activity as neighborhood focal points (schools, churches, public institutions)
- Examine in detail the routes within neighborhood center pedestrian sheds and within proximity of neighborhood focal points
- Identify improvements to pedestrian connectivity. Might include:
    - Emphasizing additional/ alternative routes to bypass the busiest streets
    - Include alleys
    - Mid-block crossings and crosswalks

2.2 Impact of Mode Priorities on Design Choices

Road projects often times face a variety of decisions made by engineers such as the number of travel lanes, the width of each lane, and what additional amenities and facilities to include. In commercial areas and residential streets leading up to commercial areas, especially, there is an increased opportunity to get the highest reward for dollars spent on bicycle, pedestrian, and transit facilities. As stated earlier, most trips people take are less than 2 miles which is within easy bicycling distance. During the past decades the idea of the purpose of streets was to move commuters to their destination as fast as possible. Figure 11 illustrates how 80 feet of ROW on a commuter street can be reconfigured based on different community priorities. The short text under each picture explains the decisions made for each configuration.

[36] (Talen, 2009)

Example of different design for a 80 feet right-of-way based on mode priorities

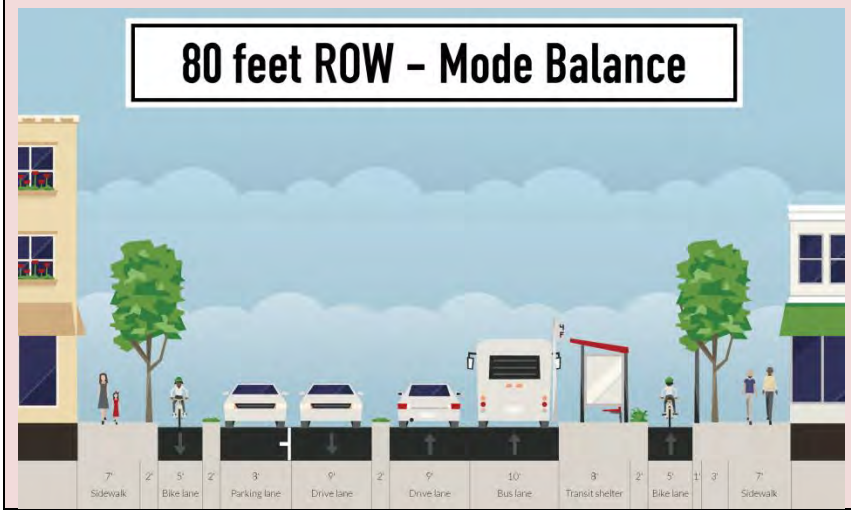


"80 feet ROW - Business As Usual": Many streets are designed with 12 foot travel lanes and 10 foot temporary parking lanes. The sidewalks are often times very narrow and do not provide much protection for pedestrians.

"80 feet ROW – Pedestrian Priority": Especially in Commercial Districts (Suburban Business Districts), communities might want to consider making pedestrians a priority as it can support park-once solutions. By reducing travel lane width from 12 feet to 10 feet and by reducing parking lanes to 8 feet, communities can add trees and benches to the sidewalk to provide a sufficient buffer from moving traffic. In the picture the planting strip on the left hand side of the street is meant to illustrate a chicane that can enable mid-block crossings for pedestrians and structured on-street parking.

"80 feet ROW – Pedestrian and Bicycle Priority": Especially communities with a sizable residential community around their commercial districts (Neighborhood Centers and Old Main Streets) might want to consider making pedestrians and bicycles a priority on their commercial streets as people can easily bike 2 miles within 10 minutes to get to stores. This street configuration can be achieved by taking out one parking lane and one travel lane. The idea is that by putting in a bike lane, more people living in the neighborhood will bike to the stores rather than take their car, which means less on-street parking would be needed.

"80 feet ROW – Transit Priority": As Cleveland is becoming a national leader in Bus Rapid Transit; connecting inner-ring suburbs through BRT might become more and more interesting. Making transit a priority might mean to take out travel lanes. The above example is an extreme case where the car travel lanes are reduced to 2 and where there is no on-street parking. On a real corridor, the transit shelters might be caddy-corner from each other which means that one of the transit shelters shown above (8 feet) could be a turning lane or a parking lane.



"80 feet ROW – Mode Balance": The example shown above will be more likely to be found in Suburban Business Districts, Neighborhood Centers or streets leading to Lifestyle Centers. There would be a strong commitment by the community to enable residents to shift modes – workers could travel more conveniently by Bus Rapid Transit to work or people living closer could take their bikes on a protected bike lane. This configuration needs to be part of a broader network that connects protected bike lanes and priority bus lanes through towns and ideally several communities.

Figure 11: Eighty feet of ROW on a commuter street

2.3 Types of Road Projects

There are four main categories of roadway projects that are constructed throughout Cuyahoga County. Each type of road project offers different complete streets opportunities.

2.3.1 Maintenance

The purpose of a maintenance project is to extend the life of the existing pavement and improve public safety by re-establishing the roadway surface. These projects are very quick and little, if any, design is involved. Multiple roads can be included in a single project and be completed within one construction season. Maintenance projects can include crack sealing, striping, filling potholes, signal upgrades or reprogramming, and other small corrections. Often, city forces will perform this type of project without the use of an outside contractor. Municipalities pay for these types of projects from their own funding sources, either gas tax or general funds money.

While these projects are small, there are still complete street elements that are able to be incorporated. Whenever a street is being restriped it should be looked at for the addition of bicycle lanes, sharrow markers, or painted pedestrian islands. Signal reprogramming can include longer pedestrian phases or "scramble" phases at pedestrian heavy intersections. Sign upgrades for reflectivity and installation of "Share the Road" signs are able to be done on these minor projects as well.

2.3.2 Resurfacing, Restoration, and Rehabilitation (3R)

The purpose of a 3R project is to preserve and extend the life of an existing highway while improving safety and enhancing its operation. These projects retain the existing line, grade and geometrics of the facility. These projects include:

- Resurfacing,
- Pavement structural and joint repair,
- Minor lane (less than a full lane) and shoulder widening,
- Minor alterations to vertical grades and horizontal curves,
- Bridge repair,
- Removal or protection of roadside obstacles, and
- Spot safety improvements.

From concept to construction, these projects typically take about one year for project design with construction then taking about one season. Small design and safety improvements are included with maintenance resurfacing projects. Minor shoulder widening for pavement width, American with Disabilities Act (ADA) curb ramps, and drainage structure adjustments are also usually included in maintenance projects. Minor resurfacing projects can often be completed with local (municipal or

County funds) funding. Projects that are larger in cost or scope often require assistance with State funding.

Safety and comfort are goals of these types of projects. Within that framework, there are many opportunities to incorporate complete streets elements. Bicycle lanes, “sharrows,” and crosswalks are all striping modifications that can be included. Minor lane widening to allow for wide shoulders and sidewalk construction can improve both bicycle and pedestrian safety. For transit facilities, these projects provide the opportunity to construct concrete bus pads and install bus shelters (with green roofs!).

2.3.3 Reconstruction

The purpose of a reconstruction project is to upgrade an existing facility to meet new design standards or new capacity requirements. These projects often require the acquisition of additional ROW for either temporary or permanent uses. Minor projects can be completed with local (municipal or County funds) funding. Projects that are larger in cost or scope often require assistance with State funding.

These projects often take longer than 2 years from concept to construction, but can take much longer depending on the scope of the project. Reconstruction projects typically follow the Ohio Department of Transportation (ODOT) design requirements and submittal schedule with multiple reviews during the design phase. Because of the scope of reconstruction projects, and the long time line, there are ample opportunities for complete streets to be incorporated in to these projects. Many of the elements provided in this manual are able to be included in reconstruction projects. Stormwater analysis should include alternative styles of management such as bio-retention cells, permeable pavement for pedestrian areas, and native landscaping. Bicycle facilities can include bike lanes, bike parking, or possibly cycle tracks. Pedestrian improvements can include widened sidewalk, furniture, and enhanced intersections. Each reconstruction project should be reviewed for the addition of complete streets elements.

2.3.4 New Construction

The purpose of new construction is to provide access to locations where access was not previously available. These projects always involve new right-of-way acquisitions, environmental impact studies, and significant public involvement. Projects that are larger in cost or scope often require assistance with State funding. New constructions are also part of new residential developments which communities can guide through their subdivision regulations.

New construction projects can take many years to be completed from concept to construction. They also provide the best opportunity to create a truly complete street. On these projects, complete streets elements should be included from the very beginning. Depending on the classification and use of the street being constructed, different elements are applicable.

Chapter 3: Complete Streets Typology

There are many excellent resources for design guidance related to complete streets. Many municipalities and transportation agencies have developed their own design guidance for what elements are applicable to streets in their unique region. The National Association of City Transportation Officials (NACTO) published the Urban Streets Design Guide (USDG) in 2013. This design guide provides information relating to key principles, design elements, interim and permanent solutions, intersections, and general design control. The NACTO USDG can be used in conjunction with this Toolkit to provide more in depth design descriptions and guidance.

The information provided in this chapter is to be used as suggestions for what elements can be applied to the different types of streets. Streets throughout Cuyahoga County can be categorized in to one of the following types.

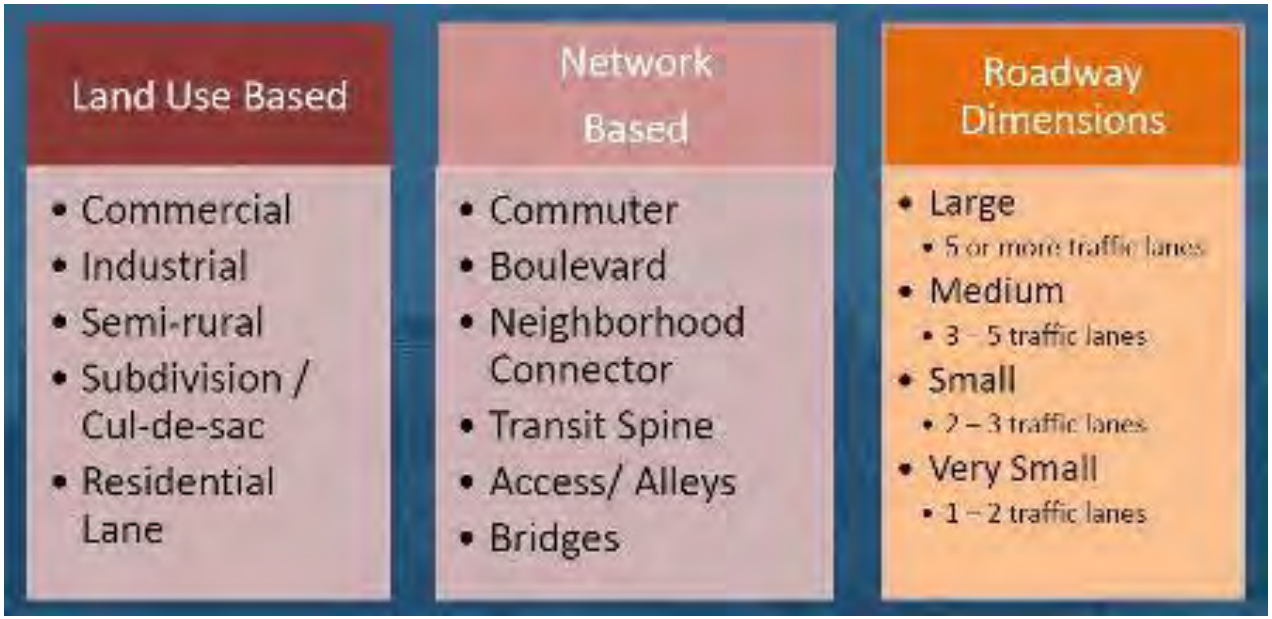


Figure 12: Review road context

It is up to each municipality to determine which typology their streets fit. Each of the 59 municipalities in Cuyahoga County is unique and has special desires to address the needs of its residents.

Street Typology for Cuyahoga County	
3.1 Commercial	3.5 Neighborhood Residential
3.2 Commuter	3.6 Transit Spine
3.3 Industrial	3.7 Semi -rural
3.4 Boulevard	3.8 Bridge

3.1 Commercial

Commercial areas provide opportunities to shop, dine, and work. Commercial streets attract visitors with different purposes, thus has implications for parking demands, intersection configurations, and pedestrian connectivity. Roads are characterized by multiple lanes, substantial traffic volume, transit stops, pedestrians, and bicycles. These streets have a significant transportation connectivity function and serve as a destination. Generally, pedestrians, cyclists and vehicular traffic should be prioritized in commercial areas. The following section highlights some of the more general considerations when designing streets in commercial areas. The second table details more specific considerations for different types of commercial districts. Trucks traffic should be reduced and rerouted to access locations. A complete commercial street should encourage consumers to spend time in the area.

Primary Users 

Secondary Users 

General considerations to prioritize transit, pedestrians and cyclists in all commercial areas:

- Is there potential to improve transit waiting environments to make taking transit more pleasant?
- Can people reach the district conveniently by foot or bike from adjacent residential units (within 1 or 2 mile radius)?
- Are there options to reconfigure intersections and traffic signals to make pedestrians a priority (e.g. no turn on red or 30 second pedestrian-only traffic light phase)?
- Is there bike parking and bike access to encourage residents that live within a 2 mile radius to bike to stores for minor trips?

Innovative considerations:

- Do some employees have electric cars and expressed the desire to charge their car while at work? Would it be worth-while to install electric car charging stations and equipment?
- Are there options for shared-parking solutions? Can parking be shared at night with other users (e.g. residential parking needs vs. office parking needs)?
- Are there options to provide a few parking spots for bike or car sharing stations?

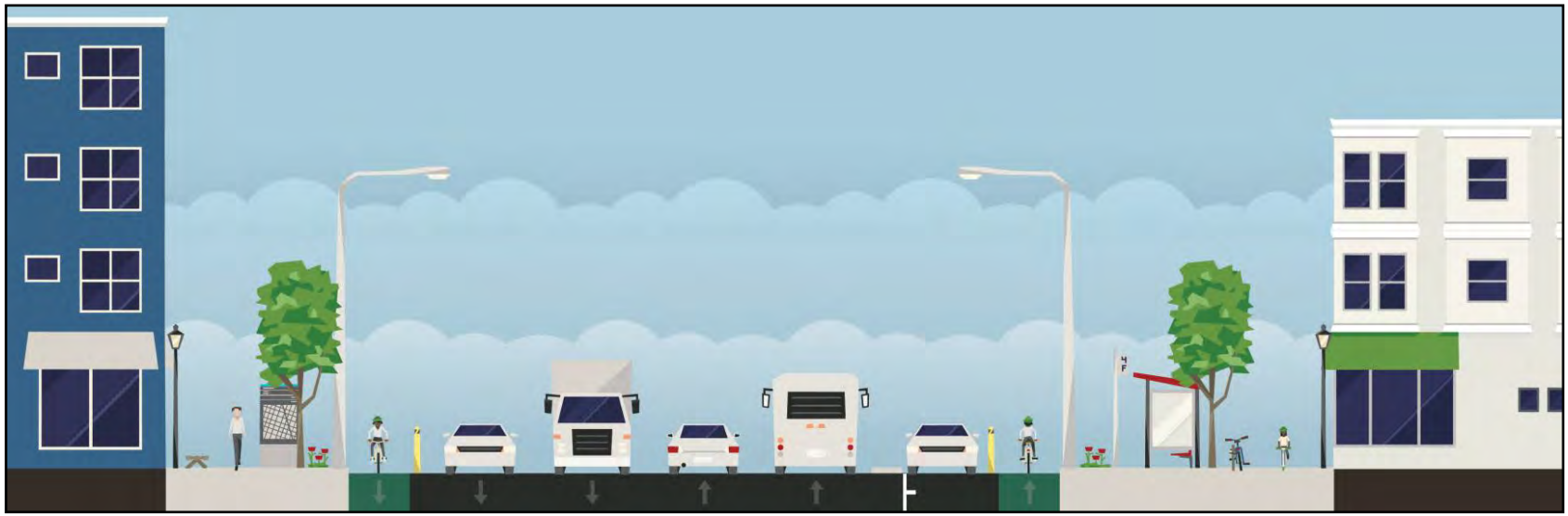
Figure 13: Bedford Town Center (Broadway Ave)

Figure 11: Specific considerations in different types of commercial areas			
Business District	**Neighborhood Center and Old Main Street**	**Lifestyle Centers**	**Strip Malls, Big Box Stores, and Indoor Malls**
Significant numbers of people travel to and from the suburban business district on a daily basis, primarily for work purposes. Restaurants and stores provide lunch and after-work happy hour options. The large number of people imposes a special challenge on finding the right ratio of pedestrian priorities, vehicular accessibility of parking lots as well as providing bicycle and transit access. Business districts are the primary candidate and most challenging designs for complete streets that prioritize pedestrians, transit and bike riders while allowing vehicular access to parking lots. Basic transportation considerations include: • Can workers walk to lunch places? Are there sidewalks, and connections between developments? • Do employers provide bike parking options in good visible spots? Would it be feasible to connect to a regional bike network? Land use considerations include: • Are there options to increase the number of surrounding multi-residential family buildings? Are there any additional land-uses to increase evening activities (e.g. theater, restaurants)?	As a lot of older commercial areas were developed along old streetcar right-of-ways, the character most likely includes two to three story buildings without setback from the sidewalk. Often times these districts have adjacent residential areas which creates a great pedestrian environment. These commercial areas are prime candidates for premium complete streets treatments connecting residential development within a 2 mile radius to shopping and dining facilities. Basic considerations include: • Are there opportunities to improve the streetscape and give the area a distinct character (lighting, benches, bike racks, planters, outdoor seating)? • Have you explored park-once options? Are there opportunities for potential regional visitors to park in a parking garage behind buildings? • How do stores handle truck delivery traffic? Are there special safety needs for pedestrians? Innovative considerations include: • Are some restaurants interested in parklets that would provide out-door seating and extend the sidewalk?	More recently the region has seen a few "lifestyle centers" developed by one developer (such as Crocker Park). Lifestyle centers try to re-create a denser urban setting that provides people with regional shopping, dining and living opportunities (featuring national retailers). Compared to indoor malls, the primary difference is the pedestrian-oriented streetscape. As lifestyle centers are oftentimes a drive-to-destination, one of the challenges for communities is to connect residents to and from the lifestyle center: Basic considerations include: • Are transit waiting environment pleasant, appealing and big enough to handle potential customers that visit the lifestyle center by bus or train? • Would the developer be willing to preserve land through building a parking garage rather than surface-level parking? Are there sustainable parking standards in place (landscaping, stormwater management)? • Do sidewalks and bikeways connect adjacent neighborhoods to the development? Are there non-car pedestrian connections between neighborhoods and the development? • Can transit enter the development? • How is stormwater run-off handled? Are there options for landscaping and permeable pavers? • Are there opportunities to retrofit existing developments?	Most communities have developed national food chains and commodity stores located along main corridors in big box stores, strip malls, or big indoor malls. A major traffic concern is vehicular traffic turning into and out of parking lots. The frequency of parking lot entrances imposes a special challenge to provide bicycle access but also the frequent interruption of sidewalks makes for an unpleasant environment for pedestrians. Some strip malls have main entrances to their parking lots from a side street. Basic considerations include: • How do pedestrians get through the parking lot? Are there safe ways to walk to stores from parking spot? • Are there options to enhance the pedestrian realm to encourage people to only park once and walk from store to store? • Are there restaurants, fast food chains, or coffee shops that might be interested in small outdoor seating areas? • How is stormwater run-off handled? Are there options for landscaping and permeable pavers? Land use and zoning considerations include: • What are parking and landscaping requirements in the zoning code? • Could parking requirements per square foot of retail be reduced through shared parking solutions?

3.1.1 Large Commercial Street

Suggested Design Elements for **Large Commercial Street**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Road diet • Lane diet • Traffic calming • One-way traffic • Weekend driving restrictions • Street lighting	• Sidewalks • Sidewalk furniture • Signalized crosswalks • Pedestrian signals • Chicanes • Scramble phase • Winter maintenance • Mid-block crossings • Pedestrian scaled lighting	• Transit center • Furniture at stops • Real-time information • Smart-pay systems • ADA access	• Bike lanes • Painted bike boxes • Bicycle parking • Floating bike lanes • Bike signals • Cycle track	• Bioretention cells • Permeable pavers • Tree boxes • Vegetated biofilter • Vegetated roofs • Stormwater planters to structure on-street parking • Street furniture	• Metered on-street • Valet parking • Idle engine restrictions • Parallel parking • Driver's side door buffer • Green parking

Example Section for **Large Commercial Section:** 115 feet ROW & 70 feet Curb to Curb Width



Example Three-Dimensional View for **Large Commercial Section**:
Illustrates bus pull-out, parking lane, and bike lane on intersection, as well as pedestrian mid-block crossing

Example Three-Dimensional View for **Large Commercial Section**:
Illustrates street view for bus pull-out, parking lane, and bike lane on intersection, as well as pedestrian mid-block crossing

3.1.2 Medium Commercial Street

Suggested Design Elements for **Medium Commercial Street**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Road diet • Lane diet • Traffic calming • One-way traffic • Weekend driving restrictions • Street lighting • Speed reduction	• Sidewalks • Sidewalk furniture • Signalized crosswalks • Pedestrian signals • Chicanes • Scramble phase • Winter maintenance • Intersection treatments: narrow and raised crosswalks at intersections • Pedestrian scaled lighting	• Transit center • Furniture at stops • Real-time information • Smart-pay systems • ADA access	• Bike lanes • Painted bike boxes • Bicycle parking • Floating bike lanes • Bike signals • Cycle track	• Bioretention cells • Permeable pavers • Tree boxes • Vegetated biofilter • Green parking • Vegetated roofs • Stormwater planters to structure on-street parking • Rain gardens • Street furniture	• Metered on-street • Valet parking • Idle engine restrictions • Parallel parking • Driver's sidedoor buffer

Example Section for **Medium Commercial Section:** 48 – 69 feet curb to curb width and/or 3 to 5 traffic lanes

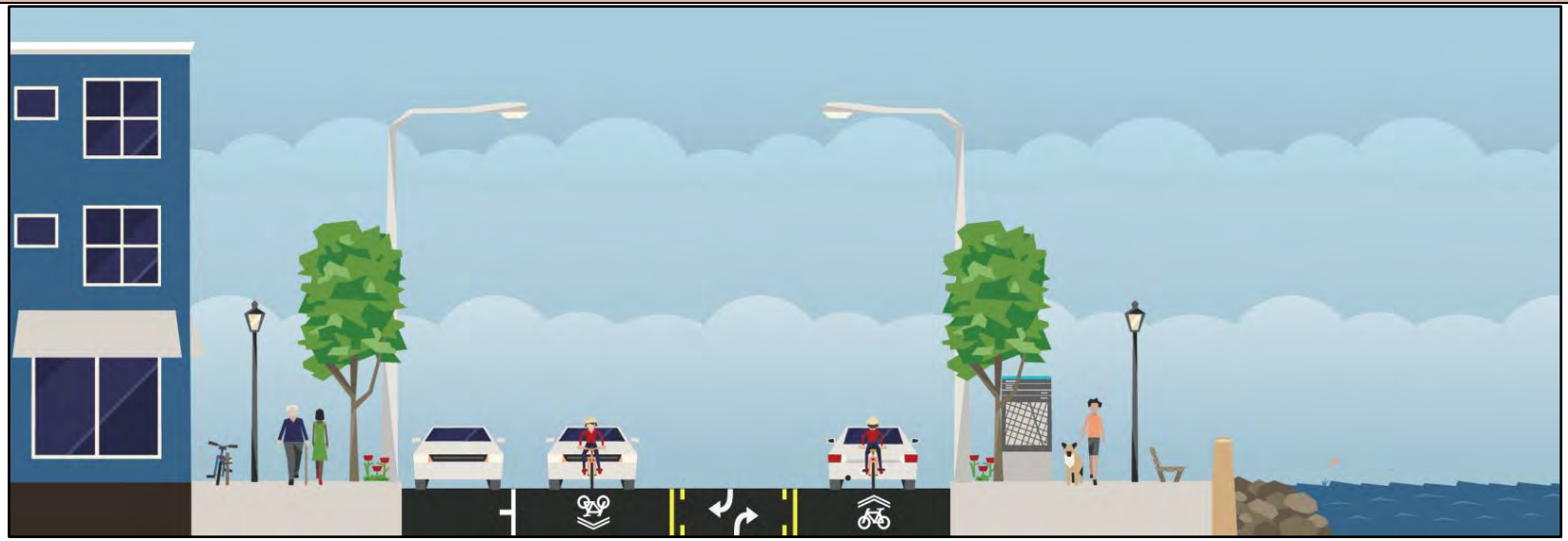
Example Three-Dimensional View for **Medium Commercial Section**:
Illustrates contra-flow bike lane on intersections, screening of parking lot and sidewalk furniture, and on-street parking with bus-stop

Example Three-Dimensional View for **Medium Commercial Section**:
Illustrates street view for pedestrians crossing contra-flow bike lane on intersections

3.1.3 Small Commercial Street

Suggested Design Elements for **Small Commercial Street**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Road diet • Lane diet • Traffic calming	• Sidewalks • Sidewalk furniture • Crosswalks • Pedestrian signals • Chicanes • Street furniture • Pedestrian scaled lighting	• Transit center • Furniture at stops • Real-time information • Smart-pay systems • ADA access	• Bike lanes • Painted bike boxes • Bicycle parking • Floating bike lanes • Bike signals	• Bioretention cells • Permeable pavers • Tree boxes • Vegetated biofilter • Green parking • Vegetated roofs • Stormwater planters to structure on-street parking	• Metered on-street

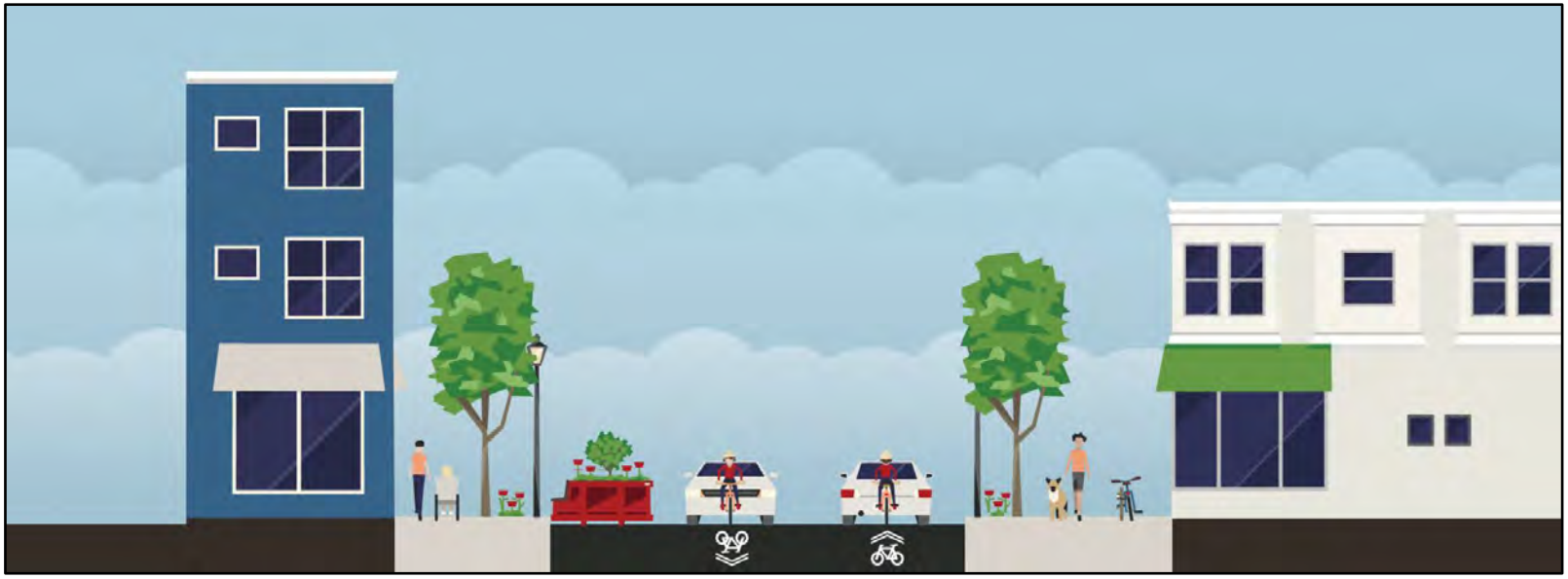
Example Section for **Small Commercial Section:** 30 – 47 feet curb to curb width and/or 2 to 3 traffic lanes



3.1.4 Very Small Commercial Street

Suggested Design Elements for **Very Small Commercial Street**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Road diet • Lane diet • Traffic calming • One-way traffic • Weekend driving restrictions	• Sidewalks • Sidewalk furniture • Lighted crosswalks • Pedestrian signals • Chicanes • Scramble phase • Street furniture • Pedestrian scaled lighting	• Transit center • Furniture at stops • Real-time information • Smart-pay systems • ADA access	• Bike lanes • Bicycle parking • Floating bike lanes • Bike signals	• Bioretention cells • Permeable pavers • Planters • Vegetated roofs • Stormwater planters to structure on-street parking	• Metered on-street • Valet parking

Example Section for **Very Small Commercial Section:** < 30 feet curb to curb width and/or 1 to 2 traffic lanes



3.1.5 Access and Alleys

These roadways have a local access function serving commercial and industrial areas. These streets should ensure safe use for non-motorized vehicles. Access can be restricted to certain vehicles.

Primary Users 

Secondary Users 

Suggested Design Elements for **Access and Alleys**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Visibility (absence of obstructions and proper lighting)	• Lighting • Windows facing street • Safety call boxes	• N/A	• N/A	• Bioretention cells • Permeable pavers • Tree boxes • Furniture • Green parking • Vegetated roofs	• Restricted parking • Idle engine restrictions

Example Section for **Access and Alleys:** < 30 feet curb to curb width and/or 1 to 2 traffic lanes

3.2 Commuter Street

Commuter streets are characterized by multiple lanes, high traffic volume, transit stops, pedestrian traffic and bicycles. The primary function of these roadways is the efficient movement of motor vehicles. Commuter streets should provide its users with a pleasant, safe, and quick method of transportation, whether it is via personal vehicle, public transit, or bicycle. A key component to this street type is providing sufficient lane width for cars and trucks while also providing proper design for bicycle commuters. Access to public transit should be frequent and safe, but not impede vehicular flow patterns.

Primary Users 

Secondary Users 

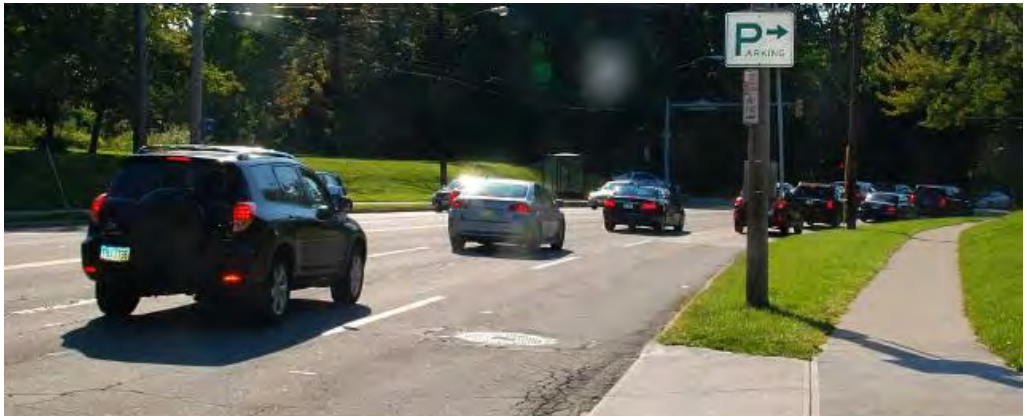
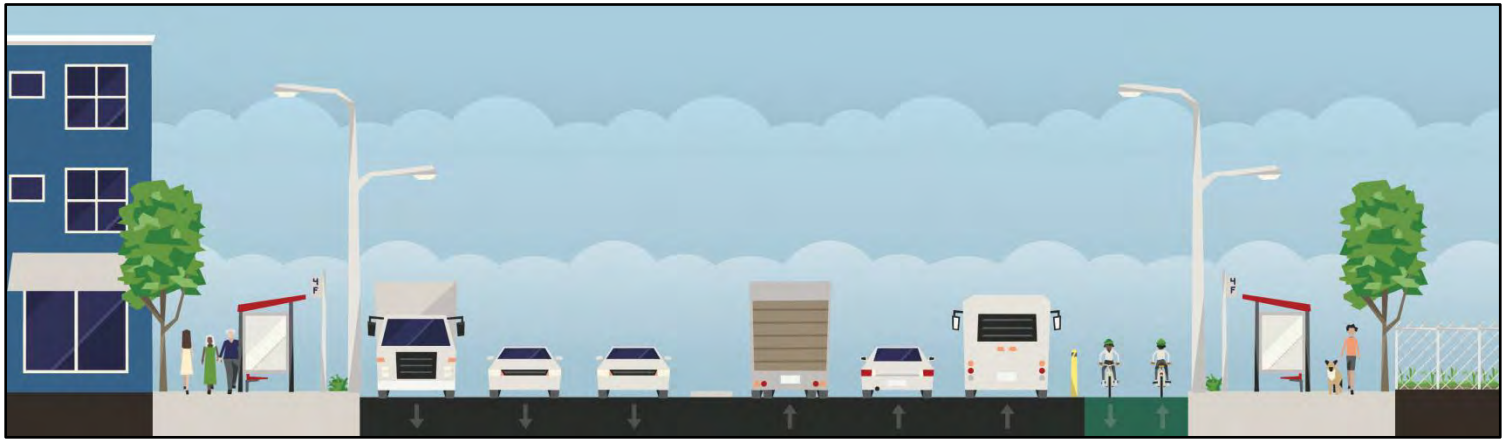


Figure 14: Cedar Road, Cleveland Heights

3.2.1 Large Commuter Street

Suggested Design Elements for **Large Commuter Street**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Alternate routes • Road diet • Lane diet • Traffic calming • Street lighting	• Sidewalk width • Buffer zone • "Goat paths" to real paths • Winter maintenance • Mid-block crossings • Refuge island	• Transit center • Furniture at stops • Real-time information • Smart-pay systems • ADA access • Transit pull-outs	• Bike route signage • Multi-use path • Cycle track • Bike signals • Two-way bike lanes • Painted Bike boxes	• Vegetated biofilter • Manufactured system • Use landscaping as buffer for pedestrian and bicycle realm	• Restricted parking • Idle engine restrictions

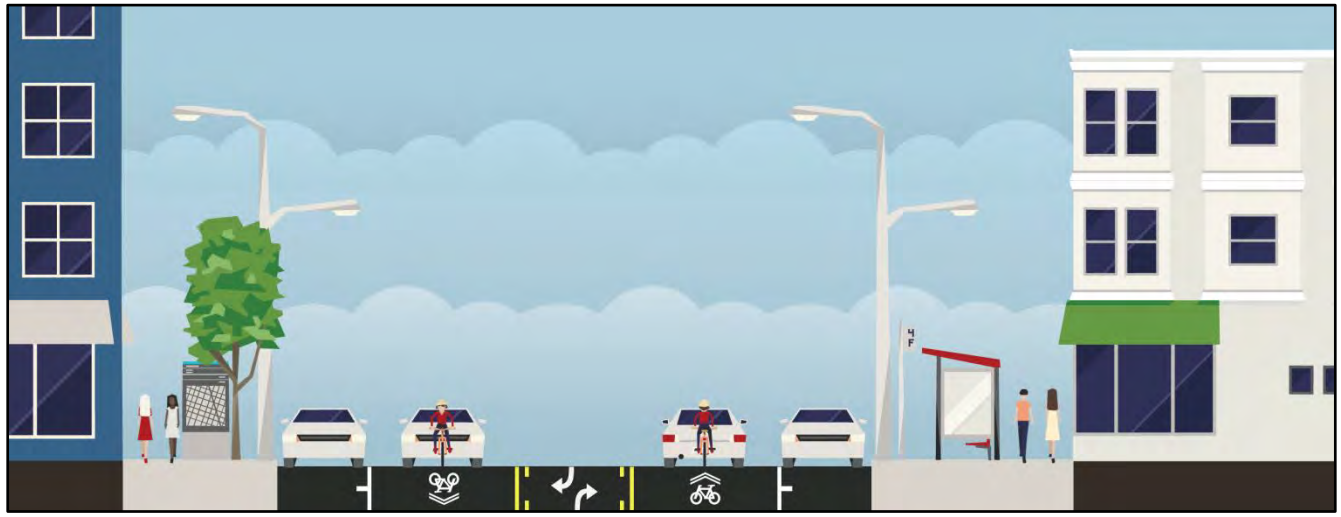
Example Section for **Large Commuter Street:** > 70 feet curb to curb width and/or 5 or more traffic lanes



3.2.2 Medium Commuter Street

Suggested Design Elements for **Medium Commuter Street**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Alternate routes • Road diet • Lane diet • Traffic calming • Street lighting	• Sidewalk width • Buffer zone • "Goat paths" to real paths • Winter maintenance • Mid-block crossings • Refuge island	• Furniture at stops • Real-time information • Smart-pay systems • ADA access • Transit pull-outs	• Bike route signage • Multi-use path • Bike signals • Painted bike boxes	• Vegetated biofilter • Manufactured system • Use landscaping as buffer for pedestrian and bicycle realm	• Restricted parking • Idle engine restrictions

Example Section for **Medium Commuter Street:** 48 – 69 feet curb to curb width and/or 3 to 5 traffic lanes



3.3 Industrial

Industrial areas have their own set of regulations and requirements. Industrial streets primarily handle truck traffic that delivers to or picks up at facilities within these districts. Many older industrial areas are located close to residential properties. Also, some workers might rely on public transit or others might walk to their lunch destinations. Therefore, streets in industrial districts need to accommodate truck traffic that requires wider turn-radii and streets, as well as less obstructions (like trees), while at the same time accommodating pedestrian safety. Wide tree lawns could be used to separate pedestrians from truck traffic, additionally on smaller streets, planters might be viable to protect pedestrians. Bicycle traffic would ideally be re-routed by utilizing signage. General aspects to consider are:

- How can pedestrians be protected from trucks without obstructing truck turn-radii?
- Are there suitable locations for bus stops that provide protected shelter? (Survey employers to estimate need for transit services)
- How do workers connect to lunch-time places?

Primary Users 

Secondary Users 

Figure 15: East 49th Street near the Canalway Visitor Center

3.3.1 Large Industrial Street: >70 feet curb to curb width and/or 5 or more traffic lanes

Suggested Design Elements for **Large Industrial Street**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Alternate routes • Visibility (absence of obstructions and proper lighting)	• Sidewalks • Crosswalk with signage • Sidewalk width • Refuge island	• Frequency of transit stops • Furniture at stops • ADA access	• Bike route signage • Shared lane marking	• Manufactured systems • Underground storage • Inlet protection • Riparian buffers • Vegetated biofilter	• Idle engine restrictions • Truck parking needs

Example Section for **Large Industrial Street:** >70 feet curb to curb width and/or 5 or more traffic lanes

3.3.2 Medium Industrial Street: 48 feet – 69 feet curb to curb width and/or 3 to 5 traffic lanes

Suggested Design Elements for **Medium Industrial Street**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Alternate routes • Visibility (absence of obstructions and proper lighting	• Sidewalks • Crosswalk with signage • Sidewalk width	• Frequency of transit stops • Real-time information • Smart-pay systems • Furniture at stops • ADA access	• Bike route signage • Shared lane marking	• Vegetated biofilter • Manufactured system	• Restricted parking • Idle engine restrictions • Truck parking needs

Example Section for **Medium Industrial Street:** 48 – 69 feet curb to curb width and/or 3 to 5 traffic lanes

3.3.3 Small Industrial Street

Suggested Design Elements for **Small Industrial Street**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Visibility (absence of obstructions and proper lighting)	• Sidewalks • Crosswalks	• Frequency of transit stops • ADA access	• Bike route signage • Shared lane marking	• Vegetated biofilter	• Truck parking needs • Permeable parking lots

Example Section for **Small Industrial Street:** 30 – 47 feet curb to curb width and/or 2 to 3 traffic lanes

3.3.4 Very Small Industrial Street (including alleys and access)

Suggested Design Elements for **Very Small Industrial Street**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Alternate routes • One-way designation • Time/day restrictions on all traffic	• Sidewalks • Crosswalks	• Frequency of transit stops • ADA access	• Bike route signage • Shared lane marking	• Vegetated biofilter	• Truck parking needs • permeable parking lots

Example Section for **Very Small Industrial Street:** < 30 feet curb to curb width and/or 1 to 2 traffic lanes

3.4 Boulevard

Boulevards are typically characterized by multiple lanes and a street median, connecting residential and business areas. These roads should be pleasant and enjoyable for all users. Speeds on these streets should be moderate but allow for efficient movement of vehicular traffic. Boulevards provide an excellent opportunity for landscaping and bicycle enhancements. Boulevards tend to have medians, which lend themselves wonderfully to pedestrian refuges, landscaping, and art.

Primary Users

Secondary Users

Figure 16: Big Creek Parkway in Parma Heights

3.4.1 Large Boulevard

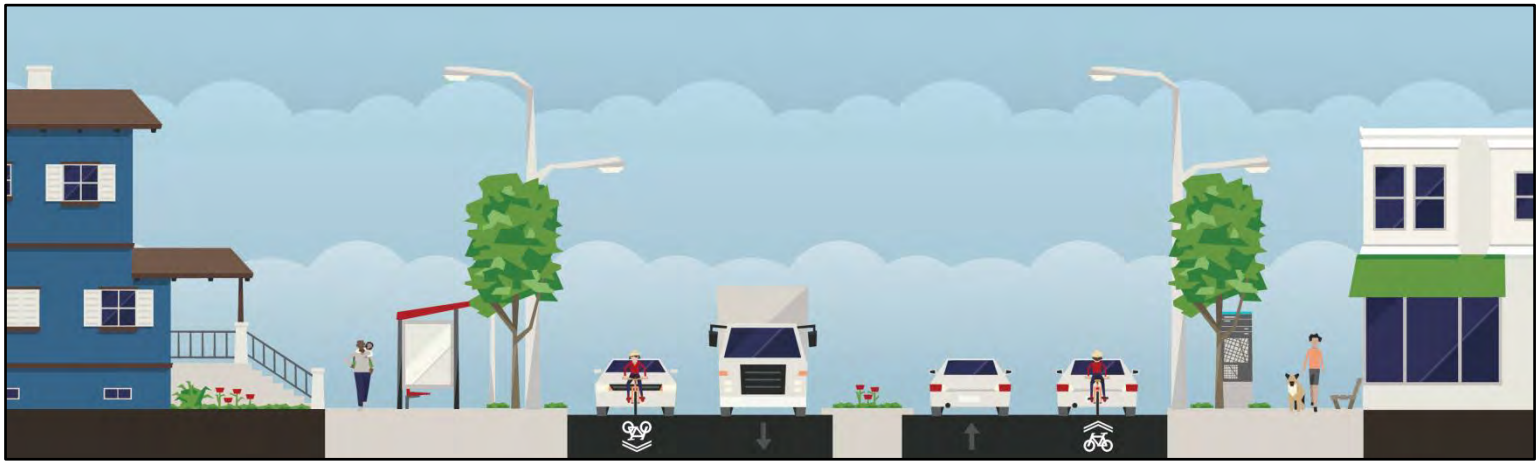
Suggested Design Elements for **Large Boulevard**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Speed reduction • Traffic calming	• Sidewalks • Sidewalk furniture • Pedestrian signals • Chicanes • Winter maintenance • Signalized crosswalks • Refuge island	• Furniture at stops • Real-time information • Smart-pay systems • Transit pull-outs	• Floating bike lanes • Bike route signage • Multi-use path • Cycle track • Bike signals • Painted bike boxes	• Bioretention cells • Permeable pavers • Tree boxes • Furniture • Vegetated biofilter • Green parking • Vegetated roofs	• Time restrictions • Weather restrictions

Example Section for **Large Boulevard:** > 70 feet curb to curb width and/or 5 or more traffic lanes

3.4.2 Medium Boulevard

Suggested Design Elements for **Medium Boulevard**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Speed reduction • Traffic calming	• Sidewalks • Sidewalk furniture • Pedestrian signals • Chicanes • Winter maintenance • Signalized crosswalks • Refuge island	• Furniture at stops • Real-time information • Smart-pay systems • Transit pull-outs	• Floating bike lanes • Bike route signage • Multi-use path • Cycle track • Bike signals • Painted bike boxes	• Bioretention cells • Permeable pavers • Tree boxes • Furniture • Vegetated biofilter • Green parking • Vegetated roofs	• Time restrictions • Weather restrictions

Example Section for **Large Boulevard:** 48 - 69 feet curb to curb width and/or 3 to 5 traffic lanes



3.5 Neighborhood and Residential Streets

Throughout the 59 communities in the County, residents have a broad array of choices of neighborhoods with different densities, lot sizes, and building ages, ranging from mansions to modest single-family houses and townhouses to multi-family apartment buildings.

Regardless of the unique character of each neighborhood, residential areas share important commonalities: residents want their children to be safe when playing, visiting friends, or traveling to school. They want convenient places to walk their dogs or to take a jog. Many people also value the opportunity to walk to various neighborhood amenities such as libraries or parks. This section highlights some of the most common types of streets found in residential areas. Some residential roads function as neighborhood connectors that connect local residential areas to business districts. These roads have high volumes of pedestrian and bicycle traffic. The speeds tend to be slower as these streets are not main thoroughfares. These are an ideal location for transit stops, bicycle facilities, sidewalk furniture, and landscaping as a way to transition from commercial to neighborhood use.

Primary Users 

Secondary Users 

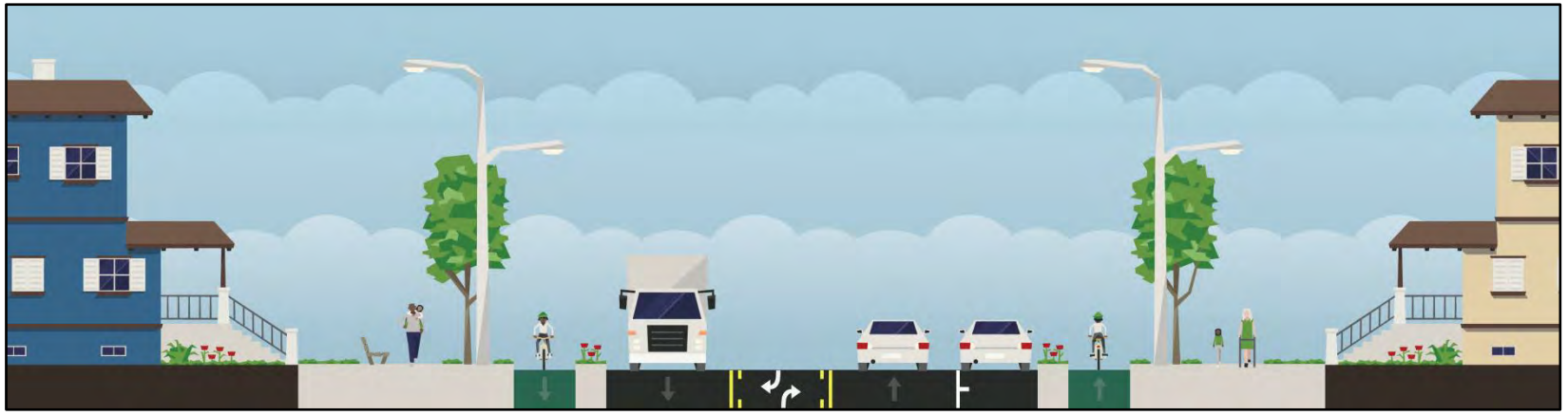
Figure 17: South Woodland Road

Figure 12: Specific considerations in different types of residential areas	
Single-family Residential Neighborhoods	***Multi-family Residential***
Most residential single-family neighborhoods have low traffic volumes but with morning and evening peak flows for commuters. The challenges for walkability in residential neighborhoods relate to the connectivity of the street network due to cul-de-sac-developments. Another challenge is that several communities lack sidewalks along major streets that connect subdivisions. Sometimes the frequency of driveways along major streets makes it more difficult to install protected bicycle facilities. Since most residential streets are fairly quiet in character, sharrows and bike boulevards may be appropriate options for these streets. Basic considerations include: • Do streets connect to destinations? Are there opportunities to create additional pedestrian-only connections between cul-de-sacs? • What are the regulations for sidewalk shoveling during the winter? How well are they enforced? • Are sidewalks a requirement in subdivision regulations?	Some communities have multi-family housing intermixed with single-family units, other communities have separate multi-family housing clusters. The primary characteristic of multi-family housing is higher density and increased need for shared spaces, residents can use such as open space outside of the building, parking lots, and small dog parks. Typically multi-family units are located close to commercial areas; the challenge is to make better connections to the districts for pedestrians and cyclists. Basic considerations include: • Are sidewalks and curb cuts well maintained? • Can residents connect to transit stops easily, and is there sufficient shelter? • What are the regulations for sidewalk shoveling during the winter? How well are they enforced? • How pleasant is it for pedestrians and cyclists to connect to commercial areas or recreational facilities? • Where can people store their bikes in apartment units? Do owners of buildings provide sufficient bicycle parking opportunities?

3.5.1 Medium Neighborhood Connector

Suggested Design Elements for **Medium Neighborhood Connector**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Alternate routes • Visibility (absence of obstructions and proper lighting) • Reduce speed limit	• Sidewalks • Signalized crosswalks • Pedestrian signals • Chicanes • Winter maintenance	• Frequency of bus stops • Alternate routes • Real-time information • Smart-pay systems	• Shared lane marking • Sharrows • Priority shared lane	• Vegetated biofilter • Tree boxes • Rain gardens	• Time restrictions • Weather restrictions

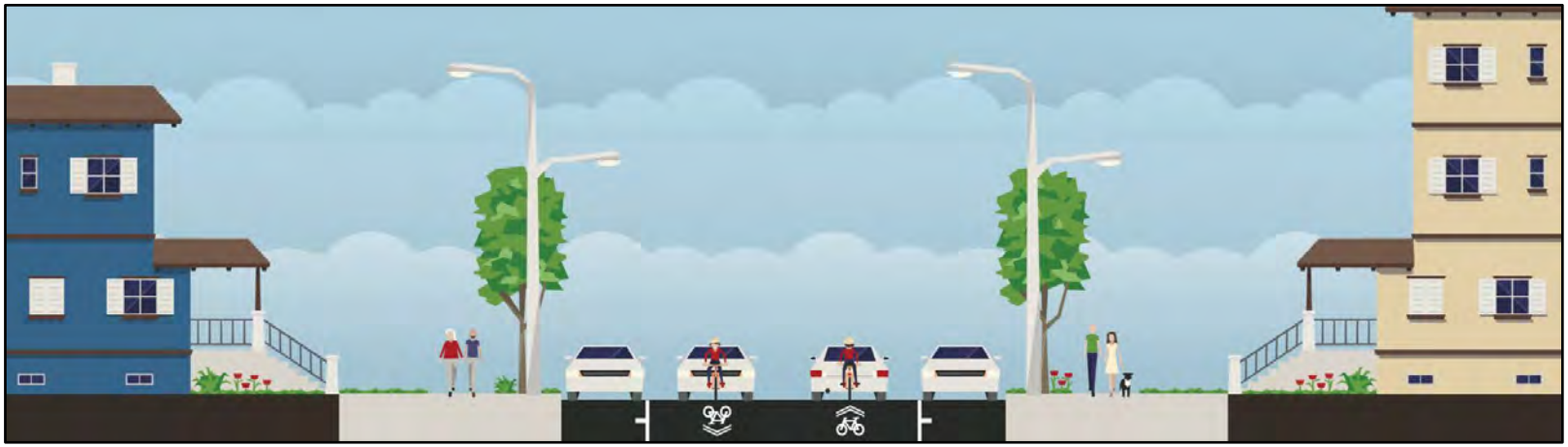
Example Section for **Medium Neighborhood Connector:** 48 - 69 feet curb to curb width and/or 3 to 5 traffic lanes



3.5.2 Small Neighborhood Connector

Suggested Design Elements for **Small Neighborhood Connector**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Visibility (absence of obstructions and proper lighting) • Reduce speed limit	• Sidewalks • Pedestrian level lighting	• Limited transit	• Bike route signage • Bike parking (at recreation sites) • Sharrows	• Street trees • Vegetated biofilter • Rain gardens	• Time restrictions • Weather restrictions

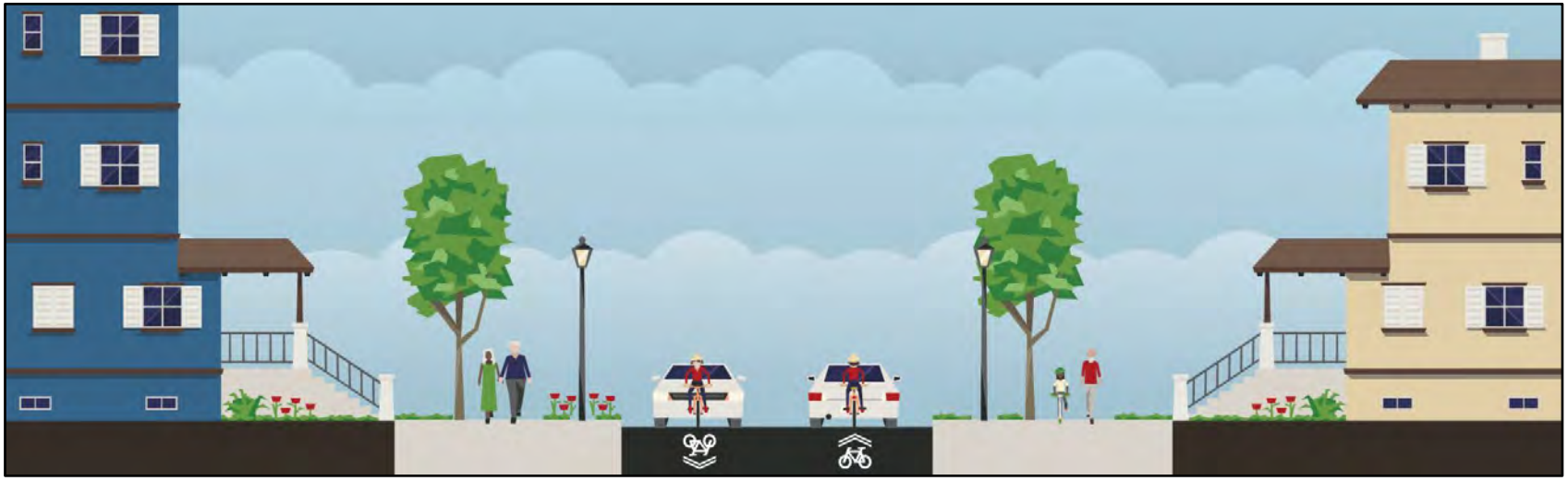
Example Section for **Small Neighborhood Connector:** 30 - 47 feet curb to curb width and/or 2 to 3 traffic lanes



3.5.3 Very Small Neighborhood Connector

Suggested Design Elements for **Very Small Neighborhood Connector**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Visibility (absence of obstructions and proper lighting) • Restricted access • Reduce speed limit	• Sidewalks	• Limited transit	• Bike route signage • Bike parking (at recreation sites)	• Street trees • Vegetated biofilter • Rain gardens	• Restricted parking

Example Section for **Very Small Neighborhood Connector:** < 30 feet curb to curb width and/or 1 to 2 traffic lanes



3.5.4 Subdivision

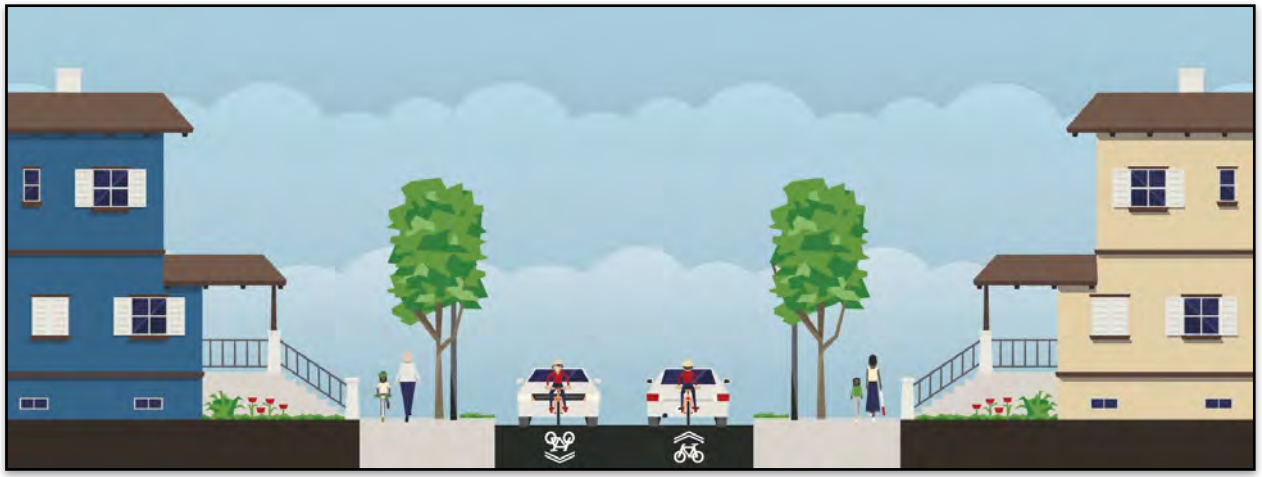
Local and/or subdivision streets limit through-traffic in residential areas. These streets are characterized by low speeds, low vehicular traffic volume, high pedestrian and bicycle traffic. Subdivision streets also typically have a higher volume of children, particularly in areas near schools and parks. To ensure safe and enjoyable travel for all users, subdivision streets provide opportunities to use chicanes, traffic islands, and other landscaping options.

Primary Users 

Secondary Users 

Suggested Design Elements for **Subdivision Street**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Lighting	• Sidewalks • Signage for target users • Pedestrian connections between cul-de-sac's	• Location at access points	• Sharrows • Bicycle signage	• Raingardens/bioswales • Vegetated biofilter • Recessed curbs	• Time restrictions

Example Section for **Subdivision Street:** < 30 feet curb to curb width and/or 1 to 2 traffic lanes

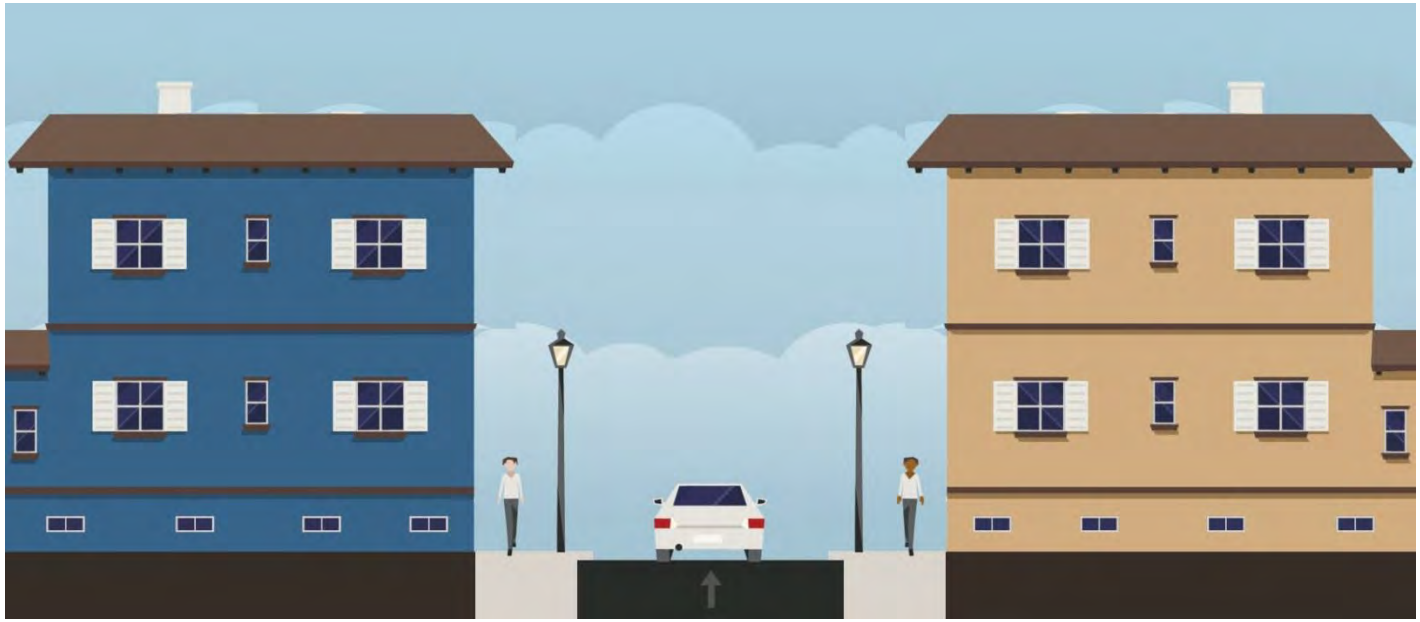


3.5.5 Residential Lane

A residential lane is a very small residential street designed to provide limited access to homes. These streets can be private or public streets. They are often narrow and only provide one-way traffic movement. Sometimes, they are referred to as alleys, but not in every case.

Suggested Design Elements for **Residential Lane**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Traffic calming • Lighting • Alternative routes	• Separated sidewalks/ wider sidewalks • Visibility	• N/A	• N/A	• Planter buffers • Alternate deicing materials	• Limited access • Restrictions for access

Example Section for **Residential Lane**



3.6 Transit Spine

These are roadways that have been identified as current or future express bus or Bus Rapid Transit (BRT) corridors by RTA. These roads focus on efficient movement of non-personal vehicular traffic. They encourage alternate methods of transportation, such as bicycle or public transit.

Primary Users 

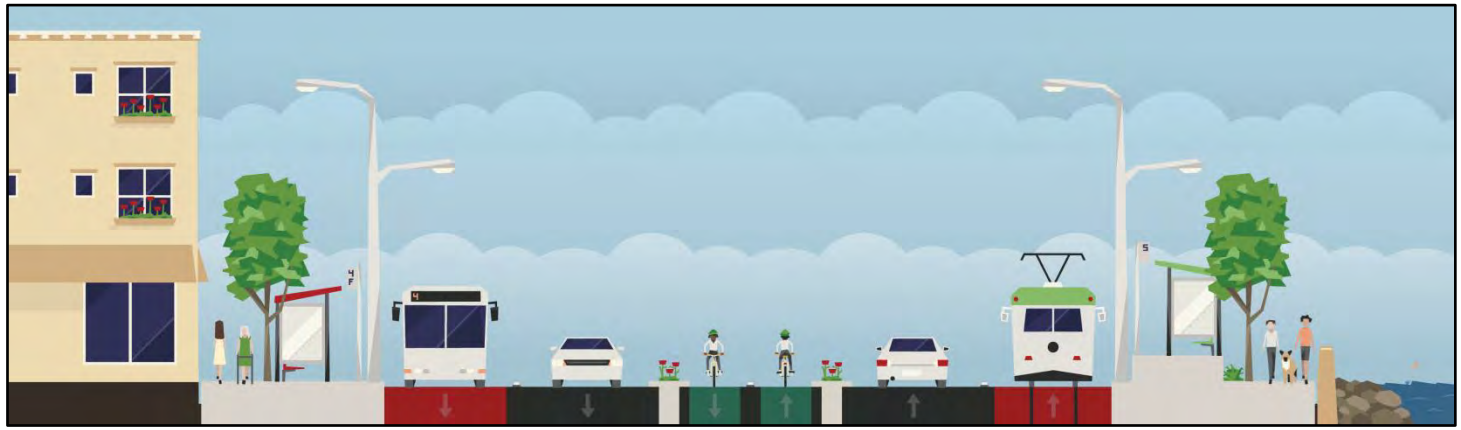
Secondary Users 

Figure 18: Euclid Avenue

3.6.1 Large Transit Spine

Suggested Design Elements for **Large Transit Spine**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Road diet • Lane diet • Traffic calming • One-way traffic • Street lighting	• Sidewalks • Signalized crosswalks • Pedestrian signals • Chicanes • Scramble phase • Winter maintenance • Mid-block crossings • Refuge island	• Transit center • Furniture at stops • Real-time information • Smart-pay systems • ADA access • Bus/ train priority signalization • Protected bus-way	• Bike route signage • Cycle track • Bike signals • Contra-flow bike lanes • Two-way bike lanes	• Bioretention cells • Permeable pavers • Tree boxes • Furniture • Vegetated roof	• Restricted parking

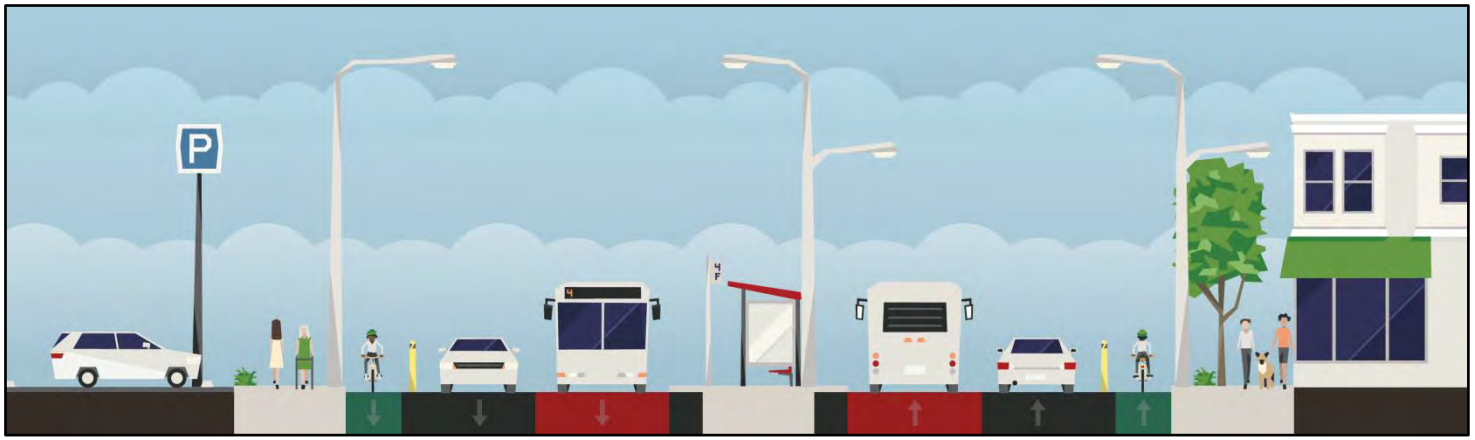
Example Section for **Large Transit Spine:** >70 feet curb to curb width and/or 5 or more traffic lanes



3.6.2 Medium Transit Spine

Suggested Design Elements for **Medium Transit Spine**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Alternate routes • Traffic calming	• Sidewalks • Signalized crosswalks • Pedestrian signals • Chicanes • Scramble phase • Winter maintenance • Mid-block crossings • Refuge island	• Frequency of bus stops • Alternate routes • Real-time information • Smart-pay systems • Bus/ train priority signalization • Protected bus-way	• Bike route signage • Cycle track • Bike Signals • Contra-flow bike lanes • Two-way bike lanes	• Bioretention cells • Vegetated biofilter • Permeable pavers • Tree boxes • Furniture • Vegetated roof	• Restricted parking

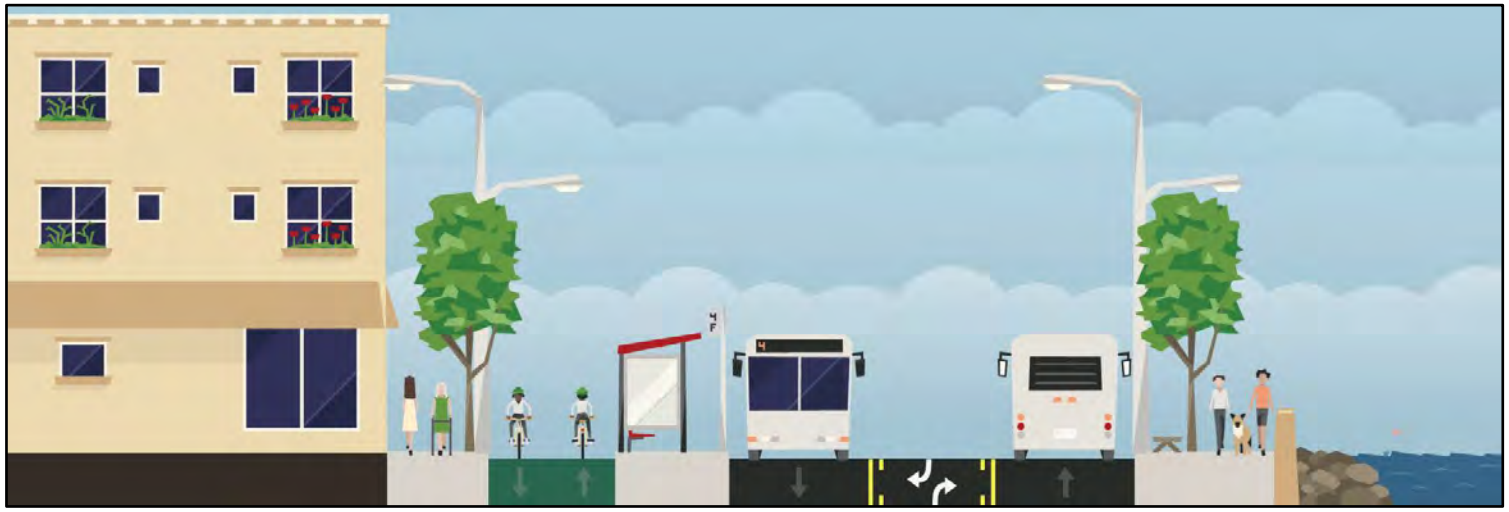
Example Section for **Medium Transit Spine:** 48 - 69 feet curb to curb width and/or 3 to 5 traffic lanes



3.6.3 Small Transit Spine

Suggested Design Elements for **Small Transit Spine**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Alternate routes • Traffic calming	• Sidewalks • Signalized crosswalks • Pedestrian signals • Chicanes • Scramble phase • Winter maintenance • Mid-block crossings • Refuge island	• Frequency of bus stops • Alternate routes • Real-time information • Smart-pay systems • Bus/ train priority signalization • Protected bus-way	• Bike lanes • Contra-flow bike lanes • Two-way bike lanes • Bike boxes • Cycle track • Bike signals	• Bioretention cells • Vegetated biofilter • Permeable pavers • Tree boxes • Furniture • Vegetated roof	• No parking • Alternate access locations

Example Section for **Small Transit Spine:** 30 - 47 feet curb to curb width and/or 2 to 3 traffic lanes



3.7 Semi-rural

As the county is mostly built out, only a few communities still have semi-rural and large-lot zoning. As semi-rural areas are characterized by houses and farms being spread far apart from each other, complete streets considerations only have limited application.

Things to consider include wider shoulders in areas with no sidewalks where people might bike, jog or walk in areas that are close to parks, commercial areas, and recreational facilities. Ditches should also be considered to determine what extent they impose safety hazards for vehicular drivers. If ditches are converted into sewer lines, there might be opportunities for multi-use trails that could provide access to parks or commercial areas (if desired by the community). Another alternative is utilizing native plants in these roadside ditches to make them more visible and less hazardous while simultaneously storing and/or slowing stormwater.

Primary Users 

Secondary Users 

Figure 19: Rural Residential in North Royalton

3.7.1 Semi-rural Road

Suggested Design Elements for **Semi-rural Road**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Reduce speed limit	• Widened shoulders	• Transit shelters • Frequency of bus stops	• Bike lanes • Widened shoulders	• Vegetated biofilter	• Widened shoulders • Designated locations

Example Section for **Semi-rural Road**

3.8 Bridge

Bridges are constructed to span a physical obstacle such as a body of water, valley, train tracks, or road. The purpose is to provide safe passage over the obstacle. Bridges present unique considerations when being constructed or replaced. Due to the high expense of constructing a bridge, complete streets must be included from the beginning; it cannot be added easily once a project is complete and constructed due to limited space on the structure.

Suggested Design Elements for **Bridge**					
Right-of-way Considerations (Section 4.1)	Pedestrian Facilities (Section 4.2)	Transit Facilities (Section 4.3)	Bicycle Facilities (Section 4.4)	Landscaping and Stormwater (Section 4.5)	Parking Management (Section 4.6)
• Traffic calming • Lighting	• Separated sidewalks/ wider sidewalks • Visibility • Safety barriers	• N/A	• Bike lanes • Shared lanes	• Planter buffers • Alternate deicing materials	• N/A

Example Section for **Bridge**

Examples of other typologies and design guidelines:

Boston (2013) *Boston Complete Streets Design Guidelines*
Very detailed three dimensional street sections; considers integration of smart technologies
http://bostoncompletestreets.org/pdf/2013/BCS_Guidelines_LowRes.pdf

Chicago (2012) *Complete Streets Chicago - Design Guidelines*
Strong in terms of defining mode hierarchies and defining project delivery process
http://www.cityofchicago.org/content/dam/city/depts/cdot/Complete%20Streets/CompleteStreetsGuidelines.pdf

Cleveland (2013) *Cleveland Complete and Green Streets*
Relates design elements to specific street types and applies street typology to specific streets
http://www.sustainablecleveland.org/celebration-topics/2016-sustainable-mobility/complete-and-green-streets/

Los Angeles County (2011) *Model for Living Streets Design Manual*
Extensive discriptions of design features by mode of transportation, including emergency vehicles and traffic calming measures
http://www.modelstreetdesignmanual.com/

New York City (2009) *Street Design Manual*
Very detailled on geometries, materials, lighting and furniture
http://www.nyc.gov/html/dot/downloads/pdf/sdm_lores.pdf

New York City (2013) *Sustainable Streets: 2013 and Beyond*
Showcasts implemented examples of complete streets designs and measured safety and mobility improvements
http://www.nyc.gov/html/dot/downloads/pdf/2013-dot-sustainable-streets-lowres.pdf

North Carolina. (2012) *Complete Streets - Planning and Design Guidelines*
Very comprehensive in terms of relating land uses to street types, providing geometries for intersections
http://www.completestreetsnc.org/wp-content/themes/CompleteStreets_Custom/pdfs/NCDOT-Complete-Streets-Planning-Design-Guidelines.pdf

For Case Studies:

The Project for Public Spaces provide several projects from cities and suburbs throughout the U.S. that right-sized their streets in recent years
http://www.pps.org/reference/rightsizing/

Tools to draw quick and easy sections:

Streetmix is an easy to use online tool that provides pre-built design blocks for street sections.
http://streetmix.net/

Chapter 4: Design Elements

The following section of the Toolkit provides decision makers and designers, with information they need to make decisions about what complete streets elements can be included in their projects. Chapter 2 addressed the different land use or context throughout municipalities, mode priorities for the contest, and construction project types. Chapter 3 presented the different street typology category of roads that can be found throughout Cuyahoga County along with a menu of possible elements that can be considered for complete street projects. This chapter goes further in depth to provide descriptions of the various design elements, and in some cases references to design standards for the elements. This chapter serves as a reference for picking and choosing elements to include in your project, but should not be considered absolute. There are hundreds of complete street elements available and these are just a few that are recommended.

Volume One of the ODOT Location and Design (L&D) Manual, except as modified herein, is considered applicable to all Cuyahoga County sponsored Highway/Bridge improvements. Where references are made to the State, Bureau/Engineer of Location and Design, or any other term designating any representative or employee of the State, or the Department of Transportation, as found in Volume One of the ODOT L&D Manual, such references shall mean Cuyahoga County, CCDPW, the Cuyahoga County Engineer, the Cuyahoga County Chief Highway Design Engineer and the Cuyahoga County Chief Bridge Design Engineer.

For the purposes of applying design standards, the CCDPW complete street elements shall be split in to the following categories:

- Right-of-way Considerations,
- Pedestrian Facilities,
- Transit Facilities,
- Bicycle Facilities,
- Stormwater and Landscaping, and
- Parking Management.

For further information on design elements:

NACTO. (2013). *Urban Street Design Guide.* Retrieved November 21, 2013, from http://nacto.org/usdg/

Mid-Ohio Regional Planning Commission. (2012). *Complete Streets Toolkit - A Guide for Central Ohio Communities.* Detailled explanations of design elements, chapter on parking management highlights supply side and demand side strategies; http://www.morpc.org/trans/CS_Toolkit_Web_Lo_Res.pdf

Cape Cod Commission. (2012, October). *Complete Streets/ Living Streets - A Design Manual for Cape Cod.* http://archives.lib.state.ma.us/bitstream/handle/2452/205612/ocn851096305.pdf?sequence=1

North Carolina. (2012, July). *Complete Streets - Planning and Design Guidelines.* (pages 94ff.) for details on intersections and design standards as well as measurements; http://www.completestreetsnc.org/wp-content/themes/CompleteStreets_Custom/pdfs/NCDOT-Complete-Streets-Planning-Design-Guidelines.pdf

Prepared for Federal Highway Administration by Bushell, M. A., Poole, B. W., Zegeer, C. V., & Rodriguez, D. A. (n.d.). list detailed cost information on design elements in their publication *Costs for Pedestrian and Bicyclist Infrastructure Improvements. A Resource for Researchers, Engineers, Planners, and the General Public.* http://katana.hsrc.unc.edu/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf

4.1 Right-of-way (ROW) Considerations

The public right-of-way should promote flexibility as well as transportation choices. The ROW does not need to accommodate all users at all times but should by designed such that users and transportation modes are accommodated in a safe, balanced and effective manner taking into account the surrounding community context and land uses.

Alternate Routes – Removing or recommending alternative routes for bicycle, truck, or other vehicular traffic from routes where that vehicle is not the main user is important for allowing the intended users to safely use the system.

Road Diet – Lane reduction or channelization technique used to slow vehicular traffic and improve traffic flow. Often in an urban or suburban area, the existing ROW is already completely used. The goal of this method is to reduce traffic lanes and speeds while staying within the existing ROW. There are many options available that can improve access for pedestrians and cyclists, while not having a negative impact on vehicular traffic for the intended use of the road. Some options for a road diet include:

- Wider sidewalks >6 feet,
- Planting strips >3 feet,
- Landscaped median with breaks and turn lanes at key locations,
- Visual stormwater treatments such as bioretention cells,
- Bicycle lanes, or
- Chicanes.

Traffic Calming – A combination of physical and traffic related (signal) measures installed to reduce the negative effects of motor vehicles, alter driver behavior, and improve conditions for other roadway users. The goals of traffic calming can be to increase quality of life, create safe and attractive streets, reduce speeds of motor vehicles, and promote pedestrian, bicycle, and transit use. Some methods of traffic calming include:

- Reduce the road width by narrowing lanes, widening sidewalks, creating pedestrian refuges, or converting from one to two way streets.
- Install vertical modifications like speed bumps, speed tables, or raised pedestrian crossings.
- Install horizontal modifications like chicanes, pedestrian refuges, parklets, or intersection islands.
- Restrict access by either removing left turn options, put in a cul-de-sac, or create pedestrian or bicycle only zones.

Chicane – An "s" shaped diversion in the driving path. It is created by constructing curved protuberances into the vehicle travel path forcing the vehicle to maneuver though a narrowed mid-block section. They can be installed to reduce traffic to one direction, forcing the other to wait, or bi-directional. Chicanes calm traffic by both visual and physical constraints. Chicanes can be used as pedestrian "bump-outs" to reduce the traveled width for pedestrians. See figure 18

Figure 20: Residential Chicane in Lakewood

One-Way / Two-Way Conversion – Many streets in urban areas were designed to be one-way streets to create a perceived improvement on traffic flow. However, many of those streets are underutilized during off-peak hours and create hazardous conditions. Vehicles stop less on one-way streets, travel more miles due to confusion of the street network, drive at higher speeds, and discourage business due to lack of visibility. For these reasons, and many more, one-way streets across the country are being converted back to two-way streets.[37]

[37] Jaffe, Eric (2013) The Atlantic Cities Place Matters, Accesses 12/26/13 http://www.theatlanticcities.com/commute/2013/01/case-against-one-way-streets

Street Lighting – Street lights are an important safety feature for both vehicles and pedestrians. Studies have shown that properly lit roadways can reduce the number of crashes, particularly crashes involving pedestrians by up to 50%[38]. In addition to safety improvements, lighting can be used for aesthetic purposes. Lighting can improve both the safety and enjoyment of a district for users.

Weekend Driving Restrictions – Restricting traffic on some streets during non-peak hours, particularly weekends, will improve the safety of pedestrians and cyclists in areas that have high concentrations of these users. Converting a busy street to a pedestrian only commercial district can allow for festivals, outdoor cafes, street vendors, and other attractions that increase the quality of life and commercial appeal of a district. An example of this is Market Ave in the Market District in Ohio City. On weekends in the summer the street is closed to vehicular traffic to allow artists to display their wares and provide space for a pop-up market in the public space.

4.2 Pedestrian Facilities

Walking is the most basic mode of transportation, yet pedestrians tend to be the most vulnerable users of the streets. Most crashes involving pedestrians occur when a person crosses the road and a vehicle turns at an intersection. That places special challenges on re-designing intersections to improve pedestrian safety.

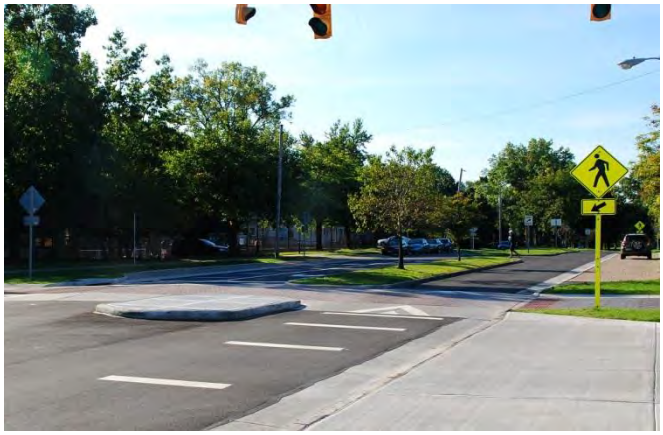


Figure 21: Pedestrian and Traffic calming enhancements on Belvoir Blvd. University Heights

Sidewalks – Sidewalks are the primary access for pedestrians in all urban and suburban areas. They should be included in every facility, unless excluded for ROW reasons. All sidewalks should be at least 4 feet wide with 5 feet width preferred. In business districts, 10 feet wide sidewalks should be included to provide enough width for large volumes of pedestrian traffic. Sidewalks should follow the ODOT and CCDPW standards. Additional standards may be in place in individual municipalities. CCDPW Supplement for further detail.

[38] Schwab, R.N., Walton, N.E., Mounce, J.M., and Rosenbaum, M.J. (1982) Synthesis of Safety Research Related to Traffic Control and Roadway Elements-Volume 2, Chapter 12: Highway Lighting. Report No. FHWA-TS-82-233. Federal Highway Administration.

Sidewalk Furniture – Benches and other furniture are desirable enhancements for commercial, commuter, neighborhood, and transit spine street types. Benches provide places for people to comfortably wait for a transit, particularly people who are older. Benches and other furniture should be installed to not encroach in traveled way for pedestrians, making sure ADA requirements are still met for all pedestrian paths (4 feet clear path). Each municipality should ensure the aesthetic and technical requirements are met with the design.

Signalized Crosswalks – Providing appropriate signalization for pedestrians at both intersection and mid-block crosswalks is an important safety feature that must be included in street design. The volume of pedestrians using the crossing, the speed of traffic on the street, and the type of signals for vehicular traffic must all be taken into account when determining is a signal is necessary. An area that has a high elderly population or an intersection that is at an off-angle might require signalization for pedestrians. The signals must take in to account all users and be accessible to all per ADA requirements. Proper installation and maintenance of signal buttons and installation of countdown timer ped-heads help pedestrians safely use the crosswalk at the correct time to provide a safe environment for all users.

Mid-block Crossing - Many designers and planners assume that pedestrians will only cross at intersections. However, pedestrians are likely to cross at mid-block locations if the closest intersection is out of the way. People take the most direct route possible. Providing a legal mid-block crossing for pedestrians makes the roads safer for all users. Some mid-block crossings may warrant a signal, and these should be considered when constructing pedestrian improvements.

Scramble Phase – At intersections that are busy with both vehicular traffic and pedestrian traffic, a scramble phase can eliminate conflict points between pedestrians and vehicles. In a scramble phase, traffic signals are programmed for a vehicle "all-red" phase while allowing pedestrians free access across the intersection. This allows pedestrians the ability to cross busy roads without worrying about right or left turning vehicles. The scramble should be initiated by pedestrian push buttons to eliminate unnecessary delay for vehicular traffic. Scramble intersections should always have "No Right Turn on Red" signs for vehicular traffic.

For more details on Pedestrian Facilities:

ODOT Location and Design Manual Volume 1, section 306 provides detailed guidance on sidewalks and buffer zones.
http://www.dot.state.oh.us/Divisions/Engineering/Roadway/DesignStandards/roadway/Location%20and%20Design%20Manual/Section_300_Jan_2014.pdf

Cuyahoga County Supplement to ODOT Location and Design Manual Volume 1 – Roadway Design
http://publicworks.cuyahogacounty.us/pdf_publicworks/en-US/DesignStandards-GeneralProvsn/DesignStandards_11-2013.pdf

Goat Path – Pedestrians tend to take the easiest route possible, avoiding extra walking when given the opportunity. The resulting path is called a "goat path." Designing sidewalk and connections should take these in to account. If pedestrians take a natural path to get to a location, sidewalks or a formal trail should be installed. Otherwise a barrier should be erected to encourage pedestrians to stay on the intended path. Areas where grass is worn away in goat paths lead to erosion and possibly unsafe entrance to facilities.

Buffer Zones – The width of non-used area between the traveled way and pedestrian traffic, sometimes known as the tree lawn or utility strip, should provide adequate width for the safety of pedestrians. This area provides the opportunity for decorative vegetation or stormwater management systems. Ideally, complete streets should include a minimum of 2 feet buffer room between the traveled way and pedestrian traffic. In a business district, 10 feet sidewalks may preclude the ability to include a buffer strip, but they should be included whenever possible.

Figure 22: Goat Path

Figure 23: Pedestrian Refuge Island

Refuge Island – An island in the middle of a large street provides an area of refuge for pedestrians while not encumbering vehicular traffic with a long signal phase. It is also a benefit at crossing where there is not a signal, but still multiple lanes of traffic. Current design standards does not provide enough time for some pedestrians to cross multiple lanes. An island gives pedestrians a place to wait for the signal to change in their favor again. It also provides a location for pedestrians to wait when they have a clear path from one direction of traffic, but not from the other.

Winter Maintenance – Maintaining pedestrian facilities is paramount to its success in the northeast Ohio winters. Pedestrians are year-round users of all facilities, and safety is their first concern. Shoveling, de-icing, and other winter maintenance must be accounted for in the design of pedestrian facilities.

4.3 Transit Facilities

Complete streets designs are an opportunity for communities to invest in transit shelters and possibly to dedicate street lanes to buses to improve the speed for transit riders. Other opportunities are connected with intersection timing, placement and frequency of transit stops, and pedestrian access. Communities are strongly encouraged to work with RTA on identifying opportunities to improve bus access in their community

RTA provides quality, economic and safe public transportation via rail, bus and paratransit throughout Cuyahoga County. The RTA transit network functions as a vital part of a balanced transportation system, one that achieves an optimal mix of automotive, transit and non-motorized transportation types. Through changes in decisions regarding transportation priorities, land use and development location, RTA aims to be the first choice for regional transportation and a one-stop source for integrated transportation information in the region. Increased interest in urban living among young people and empty nesters, higher fuel prices and reduced driving, and other factors indicate that demand for transit services will continue to steadily increase, while driving, which has now been declining for several years, is likely to continue to decline. This gives RTA the opportunity to increase its share of the transportation market, by steadily improving its quality of service, marketing and operating efficiency.

RTA's planning efforts are guided by its strategic plan titled "Re: Imagine RTA - 2010-2020 Strategic Plan". The vision of the plan is that RTA will be the preferred mode of transportation in the greater Cleveland area. The plan identifies Priority Transit Corridors that have relatively high population and employment densities.

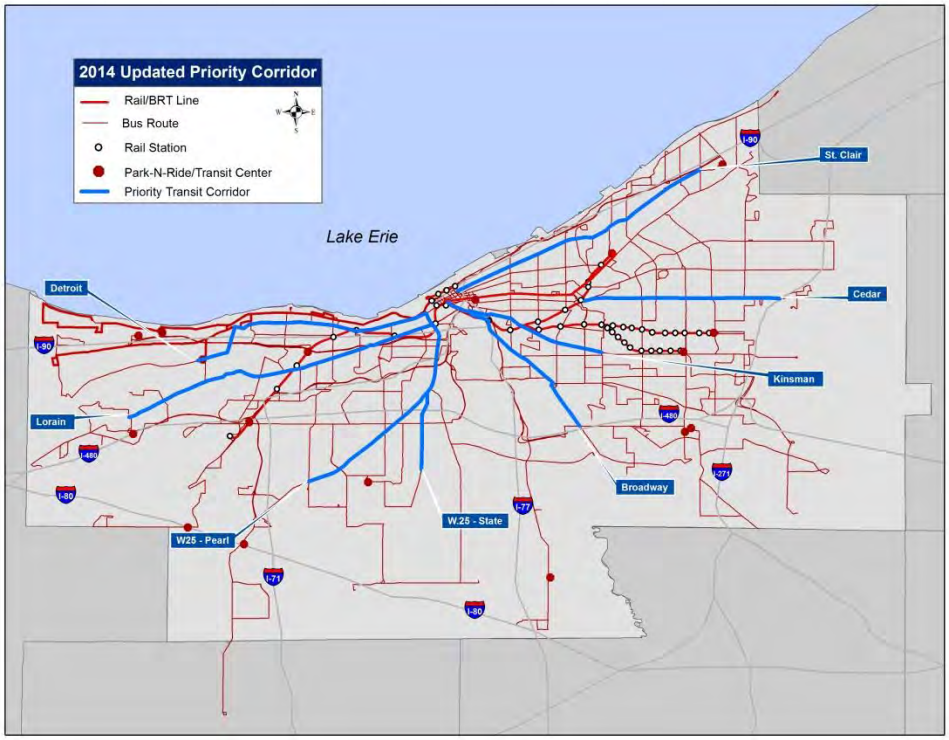


Figure 24: RTA Priority Transit Corridors

RTA will focus on these corridors for future transit improvements as funding becomes available. The goals set forth by the plan to help achieve this vision include:

- RTA will continue to put customer needs first.
- RTA will focus on ensuring access to employment and educational opportunities for regional residents.
- RTA will provide services cost effectively.
- RTA will support regional approaches to transportation and land use planning that reinforce investment in existing employment and population centers, infrastructure and services.
- RTA will improve services to suburban employment centers.
- RTA will provide special transportation service support to those who need it most.
- RTA will provide services at a sustainable level given its financial resources.
- RTA will increase its contribution to sustaining our natural environment.

Transit Center – Provides an attractive, safe, clean and comfortable environment for RTA customers while they wait to transfer between bus services. A typical transit center includes an indoor climate-controlled waiting area with real-time customer information signs.

Furniture at Stops – "RTA seeks to provide seating and shelter at bus stops and rail stations if sufficient space is available and 50 or more daily riders are expected to use the shelter. RTA installs and services waste receptacles only on RTA property. Each municipality decides whether to install and service waste receptacles in the public right-of-way." (RTA Policy adopted 12-17-13)

Real-Time Information – Real-time bus and train arrival information is available online via NextConnect (nextconnect.riderta.com) or by phone. HealthLine stations and the busier rail stations have real-time information displays. These displays are also installed at transit centers and should be considered at bus stops.

Smart-Pay Systems – RTA plans to phase in a "Smartcard" system that will allow passengers to simply tap their fare card on the "Smartcard" reader on the fare box, and the fare will be deducted from the card. No time frame has been set.

Distance Between Bus Stops – During 2014-2016, RTA will gradually implement a new guideline calling for approximately 880 feet (1/6 mile) between bus stops. However, this is only a ***guide and not a fixed distance***. The following criteria are considered when deciding on exact stop placements: safety, pedestrian access, bus routing, transfer points, land use, topography, and location of trip generators.

Figure 25: ADA Accessible Green Line Station at Warrensville Center Rd in Shaker Heights

ADA Accessibility – All bus stops and transit facilities must be designed to meet the most recent ADA standards.

Bus Bulbs – As defined in the 2012 NACTO USDG, bus bulbs "are curb extensions that align the bus stop with the parking lane, allowing buses to stop and board passengers without ever leaving the travel lane." Bus bulbs increase transit reliability as they eliminate the need for buses to pull out of and back into traffic after dropping off or picking up passengers. They also provide a shorter crossing distance for pedestrians if there is a crosswalk is at the same location as the bus stop. When used, bus bulbs should be designed to accommodate the minimum 35 feet turning radius for right-turning buses.

Transit Priority Signalization – Signal priority for transit vehicles has been implemented on Euclid for HealthLine buses, which provides travel time savings for passengers by recognizing when a bus is at the intersection and giving the bus a green light. Where appropriate, RTA is supportive of implementing this in other transit corridors throughout their system (especially on the Priority Transit Corridors identified in the RTA Strategic Plan).

Protected Bus Way – A traffic lane exclusively dedicated to buses. This can be an all-day restriction (HealthLine and Superior Avenue) or only during the peak hours (St. Clair Avenue and Clifton Boulevard). Bus lanes remove transit vehicles from the normal traffic stream and ensure that buses can move quickly without being impeded by congestion. Dedicated lanes matter most in heavily congested areas.

Bicycles on Bus – Beginning in 2001, RTA began installing bicycle racks on to buses as part of the Rack-n-Roll program. Today, 100% of RTA busses have racks that hold either two (2) or three (3) bicycles or a designated bike area on the bus (HealthLine). And, up to 50,000 people take advantage of the bike racks every year! These bike racks greatly increase the availability of multi-modal transit throughout the greater Cleveland area.

For more details on Transit Waiting Environments (TWE)

The Greater Cleveland Regional Transit Authority provides design guidance for TWE. These are actually in the process of being updated and incorporated into a larger Bus Stop Guidelines document.
Transit Waiting Environments: An Ideabook For Making Better Bus Stops
http://www.riderta.com/sites/default/files/twe/TWEIdeabook.pdf

4.4 Bicycle Facilities

Cyclists may include the weekend warriors, joy riders, or even commuters - in fact people who live within 3 to 5 miles of their work place can easily bike to work within 20 to 30 minutes. For millennials, having the choice of biking to work becomes more and more important when choosing a place to live and choosing a home. When it comes to cycling, complete streets does not mean adding a bike lane to every road, but it does mean providing a regional network of bike friendly streets that provide "protected" bike lanes that connect neighborhoods to major destinations and employment centers.

Figure 26: Bike Lane at Big Creek at Fernhurst Avenue in Parma Heights

To get more people on bicycles, cities are identifying bicycle facility treatments that provide stress-free cycling environments for people of all ages and abilities. Below are facility types that should be considered when implementing complete streets.

4.4.1 Bicycle Infrastructure

Widened Shoulders (Rural) – Paved roadway shoulders on rural roadways provide a suitable area for bicycling, with few conflicts with faster moving motor vehicle traffic. Most rural bicycle travel on the state highway system is accommodated on shoulder bikeways.

Figure 27: Protected Contra-Flow Bike Lane in N.Y.C.

Bike Lanes – Removing bicycles from shared paths with other vehicles (pedestrians or cars) is an excellent way to remove conflict and reduce accidents. A bike lane is a lane of traffic dedicated to use by bicycles. On roads where there is no curb, a 4 foot wide bike lane in each direction is sufficient. In areas where there are curbs, bike lanes should be at least 5 feet wide. Bike lanes can be used in conjunction with a road diet or installed when a street is being widened or has wide shoulders. Providing a painted buffer between the

bicycle and vehicular traffic further increases safety for both user groups. Refer to the ODOT Manual of Uniform Traffic Control Devices (MUCTD) Part 9 for design guidance for bicycle lanes.

Contra-Flow Bike Lanes – This type of bicycle lane is most efficient in a city or commercial area where one-way streets are prevalent. A bike lane is added on a one-way street, in the opposite direction from vehicular traffic. A yellow center line stripe is necessary to make this system work properly. It allows cyclists to avoid long detours and use low volume streets. Bike lane widths should be standard width and accompanied with bike lane arrows and signs indicating the direction of flow and warning cars to their presence. U.S. Federal Highway Authority (FHWA) has indicated contra-flow bike lanes can be implemented if signage and pavement markings are compliant with MUTCD.

Figure 28: Contra-flow Bike Lanes

Cycle Track (Protected Bike Lane) – These facilities physically separate the motor vehicles from bicycle traffic by a barrier. Bicycle traffic is removed from the vehicular traveled way by a physical barrier, often bollards, planters or concrete barrier, and allowed to travel in a dedicated space. Protected bike lanes can be one-way or two-way. When designing protected bike lanes it is important to utilize signage and/or dedicated bicycle signals to manage conflicts at intersections and driveways. Two-way bike lanes can be installed on either one side of the highway or in the center. Some special considerations when installed these facilities are turning movements, street crossings, and driveways. Additional signage for both cyclists and motor vehicles should be used so the intent of the path is known and movements are predictable.

Buffered Bike Lanes - Buffered bike lanes are similar to conventional bike lanes but are paired with a designated painted buffer space that further separated bicycles from motor vehicle traffic (see figure 20 for example). Guidance from NACTO suggested that the buffer be at least 18 inches wide.

**Figure 29: Buffered Bike Lane, Edgehill Road,
Collaboration of Cleveland and Cleveland Heights, Ohio**

4.4.2 Pavement Treatment, Amenities and Signage

Shared Roadway – On a shared roadway, bicyclists and motorists share the same travel lanes. A motorist will usually have to cross over into the adjacent travel lane to pass a bicyclist. Shared roadways are common on neighborhood streets and on rural roads and highways. There are two treatments that enhance shared roadways for cyclists:

- **Wide Outside Lane** – Where shoulder bikeways or bike lanes are warranted but cannot be provided due to severe physical constraints, a wide outside lane may be provided to accommodate bicycle travel. A wide lane usually allows an average size motor vehicle to pass a bicyclist without crossing over into the adjacent lane.

- **Bicycle Boulevards** – A modification of the operation of a local street to function as a through street for bicycles while maintaining local access for automobiles. Traffic calming devices control traffic speeds and discourage through trips by automobiles. Traffic controls limit conflicts between automobiles and bicycles and give priority to through bicycle movement.

Figure 30: Bicycle Boulevard, City of Columbus, Ohio

- **Shared Lanes Markings (Sharrows)** – This is the most common type of bicycle facility being used. It consists of "sharrows" and signage placed along the roadway to indicate to drivers that bicycles are on the road and in the traveled lane. It is important to note that sharrows are not a facility type; it is a pavement marking with a variety of uses to support a complete bikeway network. Sharrows should not be used as a substitute for bike lanes or protected bike lanes where space permits or these more separated types of bicycle facilities are needed for safety.

  Placement of sharrow's is very important. If lanes are less than 12 feet, they should be placed in the center of the lane to encourage cyclists to take then lane when necessary. This will encourage cars to change lanes to pass the cyclists. If the lane is 12 feet or more, the symbol may be painted offset centered at 4 feet from edge of traveled way. In areas of on street parking, sharrow symbol shall be installed 12 feet from edge of pavement to allow for an 8 feet parking lane and 4 feet door swing clearance. Sharrows should not be used on roads with posted speed limits higher than 35 mph.

Green Pavement/Paint - Green colored pavement is often used to increase the visibility of the facility especially in conflict areas (at driveways, intersections and areas where illegal on-street parking is a concern). ODOT has received interim approval for agencies to use green colored pavement in bike lanes

Bicycle Parking – There are many options for bicycle parking and the desired style varies based on use, volume, and location. When designing bicycle parking, many variables should be taken in to consideration. Many city ordinances include requirements for vehicle parking at businesses, but not bicycle parking. Including bicycle parking requirements will increase available legal parking for bicycles

and discourage bicycles from being locked to streets signs, trees, and fences. These include but are not limited to volume of bicycles, length of storage, sidewalk width, and street type. Bicycle corrals are another option for bicycle parking that should be used when sidewalk space is limited and bicycle traffic is heavy. A single vehicle parking spot is blocked off and a bicycle rack is installed. This option allows for a large number of bicycles to safely park while minimizing the impacts to other facility users. Bicycle corrals can be installed on the street, in a parking lot, or in a parking garage. In the space that was previously occupied by one or two motor vehicles, up to 20 bicycles can park, a 10 times improvement, while advertising that the area businesses and the community support cyclists.

Painted Bike Boxes – A colorized area at a signalized intersection provides a place for bicycles to safely wait for the signal to change. These boxes are used to reduce bike-car conflicts, particularly right turns made by cars across a bike lane, increase cyclist visibility, and give cyclists a head start once the light turns green. Bike boxes should be wide enough to include the entire traveled lane and the bike lane on a road and long enough to provide space for multiple bicycles. Bike boxes work best when used in conjunction with a bike lane on streets with high bicycle traffic volumes.

Bike Signals – Providing bicycles with signals at signalized intersections helps the entire intersection to move more efficiently. Using a traditional 3 lens system similar to motor vehicles, these signals provide information to bicycles and pedestrians for safe passage. They can be used to provide a protected phase for cyclists, decrease conflicts with motor vehicles and pedestrians, and discourage illegal and unsafe crossing. Signals should be installed with cycle-tracks and can be installed at all signalized intersections. There are 3 main types of signals for bicycles:

- **Active Warning Beacons** - These are similar to pedestrian crossings. They are user-activated flashing beacons typically used at mid-block crossings. These are useful where a bike path crosses a road and there is no signal or intersection.

- **Bicycle Signal Heads** - In conjunction with traditional signal heads, these bike signals are used to provide clarity and increase safety at intersections. They can be timed to allow for bicycle or car only phases to reduce the number of turning movement conflicts. These can also be used in conjunction with painted bike boxes to allow the bicycles time to clear the intersection before motor-vehicles are permitted to move.

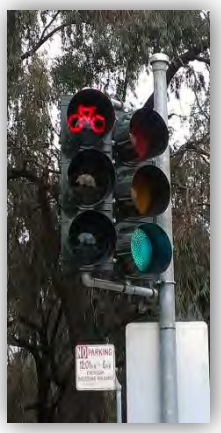


Figure 31: Bicycle Signal Head

Signal detection and actuation for traditional signal heads should be installed to improve safety for cyclists in locations without heave vehicular traffic or where bicycle signal heads are installed. Induction loops or video detection are both able to be used for this purpose. When induction loops are installed, a bicycle detector pavement marking should be installed as well to indicate to cyclist where they need to stop to properly activate the signal.

Bicycle Route Signage – A complete bicycle network should include route signage to inform bicyclists of the preferred bicycle route and upcoming destinations. Some route signage includes distance in time and miles to the destinations that the bicycle route connects.

For more details on bike infrastructure

Federal Highway Administartion Bicycle Safety Guide and Countermeasure Selection System (BIKESAFE).
This resource helps support the U.S. Department of Transportation's new pedestrian and bicycle safety initiative. BIKESAFE provides practitioners with the latest information available for improving the safety and mobility of those who bike.
http://www.pedbikesafe.org/BIKESAFE/

4.5 Stormwater Management and Landscaping

The water quantity from heavy rainfall events and snow melt in Northeast Ohio is overwhelming the area's sewer infrastructure and waterways. Since the sewer and storm water pipes in Cuyahoga County were built almost 100 years ago, there is a major need to rethink how storm water is handled on streets. Impervious surfaces such as buildings, roads, sidewalks, driveways and parking lots covered by impenetrable materials, or even soils compacted by urban development are an environmental concern because of the impact on water quality and quantity. Runoff from impervious surfaces picks up sediment and pollutants which eventually discharges into local streams and waterways. Streets and sidewalks are one of the largest categories of public impervious cover, accounting for roughly 8.2% of the land use within Cuyahoga County. Stormwater was historically drained off of paved surfaces quickly and efficiently through combined and separate storm sewer outfalls, to avoid hazardous flooding. This approach exacerbates the problem associated with stormwater runoff, such as flooding and erosion, thus polluting our streams and waterways. New stormwater management approaches use a combination of functional landscaping and engineered strategies to distribute and manage stormwater and melting snow.

4.5.1 Green Infrastructure and Landscaping for Stormwater Management

In 1972, the Federal Clean Water Act was enacted as a response to the growing concern of the quality of the nation's water supply. Part of the Act made it illegal to discharge pollutants from a point source to the waters of the United States without compliance with a National Pollutant Discharge Elimination System (NPDES) permit. An amendment in 1987 made the EPA the regulatory in charge of overseeing this program. In Ohio, it is the responsibility of each individual Municipal Separate Storm Sewer System (MS4) to obtain an NPDES permit and ensure discharge from their community meets state and federal regulations.

The following design options incorporate various green infrastructure tools and functional landscaping to reduce stormwater runoff at the source, infiltrate runoff into the soil to recharge groundwater as well as filter pollutants that otherwise end up in the Lake Erie Watershed. Not all landscaping is used as stormwater management. Communities should ensure that they are able to meet regulatory requirements for their specific project. Functional landscaping items can improve the aesthetic appeal of a project through streetscapes, as well as make the facility more enjoyable for users.

It's beneficial to slow the water down and capture it at the source. Incorporating landscaping alternatives along the roadways can improve water quality, reduce or control stormwater volume, as well as pedestrian and bicycle safety. Green infrastructure also enhances the aesthetics of the right-of-way, while alleviating urban heat islands and absorbing air pollutants and rainfall.

Alternative Post Construction BMP for Stormwater – In areas of very limited space, when no other post construction BMP (best management practice) is feasible, the use of an alternative post construction BMP may be allowed, with Ohio Environmental Protection Agency (OEPA) permission. Communities should refer to the current ODOT L&D Volume 2 manual for allowable BMPs on roadway projects.

Manufactured Systems – Large structural devices, underground, used to remove total suspended solids (TSS) from the stormwater prior to release to the main system. In order to be approved, these devices must show greater than 80% TSS removal in both field and laboratory conditions. These systems can only be used for water quality and not water quantity.

Figure 32: Permeable Pavers Columbus, Ohio

Permeable Pavement - Permeable pavement is an alternative to asphalt or concrete surfaces that allows stormwater to drain through the porous surface to a stone reservoir underneath. The reservoir temporarily stores surface runoff before infiltrating it into the subsoil. The appearance of the alternative surface is often similar to asphalt or concrete, but it is manufactured without fine materials and instead incorporates void spaces that allow for storage and infiltration. Underdrains may also be used below the stone reservoir if soil conditions are not conducive to complete infiltration of runoff. Permeable Pavement may be used as a landscaping feature in addition to other stormwater management systems. Permeable pavement is best used as part of a treatment train, but if designed properly, it can be used on its own to mitigate stormwater runoff.

Permeable pavers are an aesthetic alternative to permeable pavement which promotes groundwater recharge. Permeable interlocking concrete pavements (PICP) are concrete block pavers that create voids on the corners of the pavers (figure 29). Concrete grid paver (CGP) systems are composed of concrete blocks made porous by eliminating finer particles in the concrete which creates voids inside the blocks; additionally, the blocks are arranged to create voids between blocks. Plastic turf reinforcing grids (PTRG) are plastic grids that add structural support to the topsoil and reduce compaction to maintain permeability. Grass is encouraged to grow in PTRG, so the roots will help improve permeability due to their root channels. An additional benefit of permeable pavement is a reduction of ice on the surface. Water infiltrating through the pavement doesn't have time to sit on the surface and freeze, thus reducing the deicing materials required.

Inlet Protection – Inlet protection devices, also known as hydrodynamic separators, are flow-through structures with a settling or separation unit to remove sediments, oil and grease, trash, and other stormwater pollutants. This technology may be used as pre-treatment for other stormwater management devices. Inlet protection devices are commonly used in potential stormwater "hot spots"—areas where higher concentrations of pollutants are more likely to occur, such as gas stations.

Riparian Buffers – A riparian, or forested, buffer is an area along a shoreline, wetland, or stream where development is restricted or prohibited. The primary function of aquatic buffers is to physically protect and separate a stream, lake, or wetland from future disturbance or encroachment. If properly designed, a buffer can provide stormwater management and can act as a right-of-way during floods, sustaining the integrity of stream ecosystems and habitats.

Figure 33: Biofilter, Columbus, Ohio

Vegetated Biofilters – Filter strips are bands of dense vegetation planted downstream of a runoff source. The use of natural or engineered filter strips is limited to gently sloping areas where vegetative cover can be established and channelized flow is not likely to develop. Filter strips are well suited for treating runoff from roads and highways, roof downspouts, very small parking lots, and impervious surfaces. They are also ideal components for the fringe of a stream buffer, or as pretreatment for a structural practice. Vegetated biofilters and filter strips are typically used as part of a treatment train, but can be used on their own for water quality requirements.

Figure 34: Rain Garden

Bioretention Cells – A bioretention cell or rain garden is a depressed area with porous backfill (material used to refill an excavation) under a vegetated surface. These areas often have an underdrain to encourage filtration and infiltration, especially in clayey soils. Bioretention cells provide groundwater recharge, pollutant removal, and runoff detention. Bioretention cells are an effective solution in parking lots or urban areas where green space is limited.

Tree Boxes – Tree box filters are in-ground containers used to control runoff water quality and provide some detention capacity. Often pre-manufactured, tree box filters contain street trees, vegetation, and soil that help filter runoff before it enters a catch basin or released from the site. Tree box filters can help meet a variety of stormwater management goals, satisfy regulatory requirements for new development, protect and restore streams, control CSOs, retrofit existing urban areas, and protect reservoir watersheds. The compact size of tree box filters allows volume and water quality control to be tailored to specific site characteristics. Tree box filters provide the added value of aesthetics while making efficient use of available land for stormwater management. Typical landscape plants (for example, shrubs, ornamental grasses, trees and flowers) are an integral part of the bioretention system. Ideally, plants should be selected that can withstand alternating inundation and drought conditions and that do not have invasive root systems, which may reduce the soil's filtering capacity. The older styles of tree boxes with elevated curb should be removed and replaced with recessed trees.

Figure 35: Green Roof on Bicycle Shelter Columbus, Ohio

Vegetated Roofs – Green roofs consist of an impermeable roof membrane overlaid with a lightweight planting mix with a high infiltration rate and vegetated with plants tolerant of heat, drought, and periodic inundations. In addition to reducing runoff volume and frequency and improving runoff water quality, a green roof can reduce the effects of atmospheric pollution, reduce energy costs, and create an attractive environment. They have reduced replacement and maintenance costs and longer life cycles compared to traditional roofs. Bus stops and bicycle parking shelters are excellent candidates for vegetated roofs within the right-of-way.

Green Parking - Green parking refers to several techniques that, applied together, reduce the contribution of parking lots to total impervious cover. Green parking lot techniques include: setting maximums for the number of parking lots created; minimizing the dimensions of parking lot spaces; utilizing alternative pavers in overflow parking areas; using bioretention areas to treat stormwater; encouraging shared parking; and providing economic incentives for structured parking). Other options include solar powered parking meters and smart-park systems with real-time parking availability within a structure or district.

Bioswales – Grassed swales are shallow grass-covered hydraulic conveyance channels that help to slow runoff and facilitate infiltration. The suitability of grassed swales depends on land use, soil type, slope,

imperviousness of the contributing watershed, and dimensions and slope of the grassed swale system. In general, grassed swales can be used to manage runoff from drainage areas that are less than 4 hectares (10 acres) in size, with slopes no greater than 5 percent. Use of natural, low-lying areas is encouraged and natural drainage courses should be preserved and utilized.

Recessed Curbs – Curbs and gutters transport flow as quickly as possible to a stormwater drain without allowing for infiltration or pollutant removal. Eliminating curbs and gutters can increase sheet flow and reduce runoff volumes. Sheet flow, the form runoff takes when it is uniformly dispersed across a surface, can be established and maintained in an area that does not naturally concentrate flow, such as parking lots. Maintaining sheet flow by eliminating curbs and gutters and directing runoff into vegetated swales or bioretention basins helps to prevent erosion and more closely replicate predevelopment hydraulic conditions. A level spreader, which is an outlet designed to convert concentrated runoff to sheet flow and disperse it uniformly across a slope, may also be incorporated to prevent erosion

Alternative Deicing Materials – While many communities use plants that are accustomed to salt and help mitigate the damage caused by its use, deicing runoff is still a problem for many reasons. The use of alternate deicers can reduce polluted water going in to the lakes and rivers through runoff and stormwater systems. Some rock salt alternatives are:

Figure 36: Salt brine solution being applied as pre-treatment City of Beavercreek, Ohio

- **Acetate Deicers** – Both Potassium Acetate and Calcium Magnesium Acetate are used as deicers. Often used for runway deicing, potassium acetate is a liquid deicer that prevents the ice and snow from bonding to the pavement surface. It is effective at temperatures significantly below freezing. This solution is less toxic to plants and animal and works quickly.
- **Calcium Chloride** – This deicer is effective up to -25°F. It is less harmful to plants and animals, attracts moisture to help melt snow. It is typically combined with standard road salt to speed up the melting process. However, it can be expensive, it keeps pavement wet, and can be corrosive to metal and concrete.
- **Corn or Beet Base** – This is an all-natural agricultural based product that can be mixed with other solution based deicing methods to reduce the impacts on the environment while increasing the effectiveness of the product. The addition of naturally derived base fluids helps lower the freezing point of other salt based solutions and reduces the amount of corrosive material placed on roadways. It can be used for pre-treating roadways as well as post-precipitation treatment.
- **Magnesium Chloride** – This deicer is slightly more expensive than other options, but it performs well at low temperatures and better for roads and the environment. This chemical compound is

safe for animals and plants. It also is less corrosive than standard salt deicers, reducing long term costs of roadways. This product typically costs about $22 per lane mile.

- **Salt Brine** – Best when placed on roads prior to precipitation, salt brine is a very effective proactive deicing agent. This solution prevents ice from sticking to the roadway surface, preventing the problem before it begins. According to the City of Beavercreek, Ohio, the cost for pre-treating a road with about $2.58 per lane mile. This treatment can be up to 10 times more effective ice maintenance than post-snow treatment with rock salt. [1]
- **Sand** – This method of treatment does not melt ice. It is typically used mixed with other deicers as it only creates a friction surface on ice. Sand is less corrosive and doesn't directly harm plants and animals, but it does impact the environment by clogging drains and increasing silt in waterways.

4.5.2 Non-Stormwater Management Landscaping

Decorative Vegetation – Incorporating decorative vegetation into a streetscape is important to make the user experience enjoyable. The use of native plants is particularly important. Native plants add beauty to landscapes while providing many benefits. They require little long-term maintenance if planted properly because they naturally grow in this climate. They also have longer root systems that help reduce erosion and protect water quality. Vegetation can also play an important role in neighborhoods by reducing energy costs. Large trees that provide shade help keep energy costs down for residents.

For more details on Stormwater:

The Ohio Environmental Protection Agency Division of Surface Water regulates stormwater to reduce the impact of pollutants.
http://epa.ohio.gov/dsw/storm/index.aspx

ODOT office of hydraulics
http://www.dot.state.oh.us/Divisions/Engineering/Hydraulics/Pages/default.aspx

Cuyahoga Soil and Water Conservation District
http://www.cuyahogaswcd.org/

Northeast Ohio Regional Sewer District
http://www.neorsd.org/stormwater-watersheds.php

Ohio Department of Natural Resources
http://soilandwater.ohiodnr.gov/

Vegetated Planters on Streets (Parklet) – This enhancement temporarily or permanently uses space within the existing ROW (parking spaces, unused bus stops) to provide space for public use. The use can include seating, landscaping, bicycle parking, and other spaces that people find enjoyable. They can also be used to assist with parking restrictions in commercial districts.

Figure 37: Parklet

Street Furniture – Street furniture is a great way to incorporate local distinction to a complete street. Benches and trash cans can be very basic and provide seating for consumers and ensure the streets are kept clean. But, they can also be a way to exhibit local artists and create a theme for a district. Working with local artists, the vision for the area can be incorporated in to the style of benches, trash cans, and street art. Street furniture must be functional, but it can also enhance the experience for all users.

4.6 Parking Management

Managing parking is one way to encourage alternative modes of travel. Throughout the county and therefore becomes a significant land use and transportation strategy. Proper management of parking can help municipalities make districts safer and traffic flow smoother throughout a region. City managers must look at the intent of a street or system of streets and determine which parking restrictions are appropriate for the determined use of a street. If a street is designated for commercial use, allowing parking at all times can encourage consumers to stop on their way home from work. Contrasting that, a commuter street should focus on quick movement of vehicles, so parking should not be allowed during peak hours. Each street must be looked at individually based on the intended use, and then assigned parking restrictions that are suitable. There are also other ways in which a community can increase quality of life and decrease impacts to the environment that can be accomplished through parking. Idle engine restrictions reduce the CO2 that enters the environment. Permeable paving and landscaped parking facilities increase the aesthetic appeal of a neighborhood while reducing the amount of stormwater entering the treatment system.

Truck Parking Considerations – Trucks must be considered for parking accessibility on most non-commuter or boulevard streets. Most transit, commercial, and even residential streets should take in to account truck access and parking in their design. Trucks can be restricted to parking during certain times of day in high-traffic areas in order to reduce the impacts to traffic flow. Removing trucks from main streets is also an option, provided there is an alternative access location, such as an alley.

Restricted Parking – There are many options for restricting parking on a street. Parking can be eliminated at certain times of day, days of the week, or limited to residents of the neighborhood. Each of these can benefit a district for different reasons. Removing parking from a commercial district on weekends, when there are more pedestrians, will make the street safer for pedestrians and cyclists. Rush hour parking restrictions can help traffic flow through a commuter district more efficiently.

Metered Parking on Streets – There are multiple ways to use metered parking to impact the street in question. A low limit on the amount of time people can park (i.e. 1 hour max limit) will increase the number of consumers that have access to the spaces and increase turnover. A higher limit (i.e. 4 hours) will encourage people to park and then wander a district allowing them time to browse, shop, and visit restaurants. In a region with ample off-street parking available, more expensive parking meters will encourage people to park in lots that are placed around a district reducing the amount of traffic traveling through a neighborhood.

Valet Parking – Valet parking is a way to restrict parking on a main street during busy hours while also providing a method for people to access the area. Strategically placing the valet station at the beginning and end of a district will minimize vehicular traffic through the area allowing for free movement of pedestrians. If valet parking is offered in addition to through traffic, pavement width must be taken in to consideration. Valet traffic can severely impede traffic flow and cause erratic movement from vehicles attempting to bypass the valet service leading to unsafe traffic patterns.

Drivers Side Buffer – Providing a driver side buffer strip on busy streets can increase the safety for drivers, vehicular traffic, and bicycles. A 2 -3 foot concrete or planted buffer strip allows the driver to exit his/her car without stepping immediately in to moving traffic. It also helps avoid bicycles being "doored" by a car door opening suddenly.

No Parking – There are some instances when a complete ban on parking is the preferred method of parking management. Streets that are designated for transit or pedestrian access only would have a complete parking ban. This will allow for safe facilities for the pedestrians and smooth traffic movement for transit. Commuter streets are another example of where full parking bans may be appropriate. In order for commuter streets to function as they are designed, parking must be restricted during peak hours but if there are no access points along a commuter street, a full parking ban could be beneficial.

Alternate Access Locations – Limiting vehicular access to a district by providing alternate access or parking locations is another way to promote safe streets for pedestrians and bicycles. With an alternate access, vehicles are removed from a main street and relocated to a side street.

Figure 38: No Parking and Alternate Access Locations, Lakewood

One-Side Parallel Parking – Limiting on-street parking to one side of a street allows for the other side of the street to be dedicated to other users without increasing the ROW or pavement width. The 8-10 feet of additional pavement width can be used for bike lanes, additional sidewalk width, or a bus lane. Many streets are under-utilized for on-street parking during most hours and can easily be converted to 1 side parking.

Widened Shoulders – In many areas of Cuyahoga County, there are streets with no curbed edges. In these locations, widened shoulders should be considered for many reasons. One reason is to allow for vehicles to park safely out of the traveled way. Many of these rural-type streets are near parks, schools, and houses all of which make use of on-street parking. A widened shoulder provides a location for vehicles to park but reduces the cost because of the reduced pavement build-up.

Idle Engine Restrictions – Only three municipalities in the State of Ohio (Maple Heights, Cleveland, and South Euclid) have restrictions on vehicle idling. When engines are allowed to idle (engine on but vehicle not moving) resources are used and pollution is emitted. Enacting an anti-idling law in your municipality can increase air quality and quality of life.

5. Steps to Implementation

Chapter 5 provides a "How to Manual" for implementing complete streets projects; from involving city departments, through building expertise and support, to changing procedures, financing projects, and measuring progress. The planning process as well as the design and construction of complete streets are critical elements for each community to improve the quality of life for their residents.

5.1 Identifying and Involving City Departments

As road projects have complex layers of funding and planning, building complete streets will require close collaboration between all city entities as well as regional partners early on. Most likely, the planning and public works department will be involved early on in the process. However, any entity can take on a leadership position in promoting complete streets. The following departments all have a role in the development of complete streets policy and implementation[39]:

- **City Council** - Can formally endorse complete streets, can authorize plans, and can direct transportation funding;
- **Mayor or City Manager** - Supervises all departments and sets the direction together with city council;
- **Engineering/ Public Works Departments** - Designs and maintains road ways, deals with specific projects;
- **Planning, Community and Building Department** - Identifies connectivity issues and provides long-term guidance, and works with private investors on-site planning issues;
- **Health** - Walking and biking can have tremendous health benefits for residents; enabling residents to pursue an active lifestyle has become more and more important to health professionals;
- **Parks** - Connecting to local recreational facilities is a challenge; planning and building complete streets can reduce on-site parking demands;
- **Chief of Police** - Regulates traffic lights and enforces speeds;
- **Schools** - Have a major stake in getting children to school safely; can assist with educating children on how to safely navigate streets;
- **Fire** - Maintaining maneuverability of emergency vehicles will be important when designing complete streets;
- **Economic Development** - Has contact to the business community and can help identify employers, employees and customers transportation needs.

[39] Depending on the internal structure of each community, some of the following departments may have different names, may be combined or may not exist.

Depending on the unique circumstances in each Cuyahoga County community, the following list of strategies provides an overview of options the leading person or agency might want to consider in order to involve all the stakeholders to start a complete streets process:

- **One-on-One Meetings** - Introduce the concept of complete streets , meet with department heads (start with engineering and planning), mayors and council members;
- **Complete Streets 101** - Arrange a presentation with CCDPW and County Planning to build expertise or support;
- **Complete Streets Policy Task Force** - Establish a task force to work on developing a policy for the community , make sure city council and all department heads are on-board and will adopt the policy;
- **Staff Working Group** - A working group can write a complete streets implementation plan and work on updating procedures within the city (see section 5.4).

A regular schedule for inter-departmental meetings and/ or a complete streets review group should be established to review upcoming road projects, measure outcomes of new policies (reduced crashes, increased public transit ridership or other measures) and keep track of success (maintenance, reconstruction and new construction). For instance, the City of Cleveland Heights established a Transportation Advisory Committee in 2013 that consists of department representatives as well as citizen advisors (a bicyclist, a transit rider, a pedestrian, a representative of the business community, and a disabled person). The Advisory Committee will be first tasked with developing a complete streets policy. In the long-run, the Advisory Committee will review upcoming road projects based on improvements that could be made for all users of the road.

5.2 Building Expertise and Support

Local complete streets leadership will need to build support among city agencies and elected officials. Cuyahoga County is happy to support local leaders with technical expertise and workshops to engage local decision-makers and staff. Upon request, a core team from Cuyahoga County will arrange visits in the communities with elected officials to introduce the Toolkit and roll-out the County-wide complete streets initiative. These meetings will provide an opportunity for an in-depth discussion of the concept of complete streets as well as initial review of priority roadways within the individual communities.

Collaboration with regional and community organizations is integral to achieving a county wide network of complete streets. In addition to strengthening relationships within and between municipalities, community stakeholders and transportation agencies; local non-profit organizations and educational institutions should be engaged as well. Additional, key partners include:

- Cuyahoga County Planning Commission,
- Cuyahoga County Department of Public Works,

- Greater Cleveland Regional Transit Authority,
- Cleveland Metroparks,
- Northern Ohio Areawide Coordinating Agency,
- Cuyahoga County Board of Health,
- Northeast Ohio Regional Sewer District,
- First Suburbs Consortium (FSC) which represents nineteen (19) cities that abut the city of Cleveland;
- Bike Cleveland, a local bike advocacy organization, working to build livable communities by promoting cycling and campaigning for the rights and equality of the cycling community including street design and safety projects;
- Cuyahoga Board of Developmental Disabilities, for ADA assistance and accessibility design suggestions within rights-of-way; and
- National Complete Streets Coalition of Smart Growth America.

As part of our efforts to inform and provide services to Cuyahoga County communities, County Planning and CCDPW will offer the following:

Technical Assistance - Complete Streets 101 workshops will be offered for local elected and appointed officials and city staff. The workshop consists of an introduction to complete streets, including the Toolkit, an overview of complete streets and procedural training so that different municipal departments learn their role in the implementation of complete streets. Communities will gain a better understanding of the implementation process from planning, to decision making, to funding, to engineering and to construction. The workshop will also cover obstacles and challenges and end with a brainstorm of potential candidate projects.

Public Outreach – As the political cycle by its very nature has a high turnover, an annual presentation can introduce the concept to newly elected officials, while highlighting progress and metrics for returning officials. County Planning staff is available to provide annual presentations to Mayors and Managers Association, FSC, County Planning Board, NOACA board, upon request.

While the County Planning staff will work to keep communities informed, a successful complete streets policy will require strengthening relationships between municipalities, community stakeholders and transportation agencies through awareness campaigns such as the examples below:

- **Bike/Pedestrian Reality Check**[40] – Experience is a powerful tool and provides an intimate and necessary correlation between the processes of actual experience and implementing a policy for complete streets. If elected officials and departmental staff join community members on a

[40] (Birk, 2010)

bike/walk along a key corridor or area they will discover the realities of the streets that they would never encounter in the course of their normal duties. Focusing only on policy content eliminates the opportunity for decision makers to develop opinions and concepts based on their interaction with the place. As each person's experience is individualized there will be a diversity of perspectives on the needs and potential for implementation that will contribute to a better developed project. A good example of this type of project development is the Bike-N-Brainstorm provided by Akron Metropolitan Area Transportation Study (AMATS).

- **Pop-up Events** (e.g. Better Block, Pop-Up Rockwell) – These proof of concept temporal installations help a community envision permanent changes in their roadways.

- **Staff a Complete Streets Table or Booth** – Provide information and activities at local festivals and events. In addition to promoting the use of new and improved infrastructure and providing information to community members about the program and benefits to their community. Staffing a table is also an opportunity to get feedback from community members or conduct attitude surveys.

- **Sponsorships –** Sponsor walking and biking activities; such as walking or running clubs and bike events.

- **Partnerships** – Partner with the local communities, municipal safety services and stakeholders to implement low cost, low commitment, small scale, temporary interventions to promote mode shift by closing key corridors to vehicles one Sunday/month in June, July and August to allow bikers, runners and walkers to enjoy a stretch of their community without having to worry about automobile traffic.

- **Education –** Partner with municipal safety services for classes on using the roads. Or Ohio City Bike Coop offers "Traffic Skills 101" workshops for people to learn the basic mechanics of bike safety and to earn a certificate.

- **Social Media Campaigns** – Utilize social media sites such as Facebook, YouTube, and Twitter, to educate and promote events, projects, or accomplishments in relation to complete streets projects in the different municipalities.

- **Economic Development Campaign** – Market to the diversity of transportation modes by differentiating and creating incentives for alternative modes of travel. For instance numerous restaurants host "Bike Nights" that include discounts and/or raffle prizes during the summer to encourage cyclists to visit their establishment. Restaurants that have consistently hosted bike nights through the summer include: Burntwood Tavern and Herbs Tavern in in Rocky River, Buckeye Beer Engine in Lakewood, Brew Kettle in Strongsville, and Stampers in Fairview Park. Nano Brew in Cleveland has a bicycle care station with tools, bike pump and tire patch kits; and they host many bicycle related events and group rides.

All in all, working with municipalities, as well as community and regional partners to implement complete streets will help create healthy communities and improve the quality of life and enable residents to pursue active lifestyles while reducing air pollution.

5.3. Developing and Adopting a Policy

By February 2014, more than 610 jurisdictions nationwide had formally committed to a complete streets approach by adopting some form of a policy.[41] There is a range of policy categories, including broad policy which articulates government-wide direction; specific policy which may be developed for a particular issue; and operational policy which may guide decisions on programs. [42] The types of policies listed below are modified from The Complete Streets Local Policy Workbook, published by SGA and NCSC and are options to consider within the context of Cuyahoga County government[43].

Legislative – Legislation requires the needs of all users be addressed in transportation projects. Changes to the city code through the creation of complete streets ordinances are typically the way in which legislation is executed. Ordinances require strong support from the community and elected officials, and are enforceable by law. Another legislative tool is a complete streets law enacted by direct ballot by the general voting public, also enforceable by law.

Resolution – Resolutions are non-binding, official statements of support. In a community, resolutions are mostly approved by Council, but do not require action and depend on community, political, and agency will to be effective. Resolutions within an agency or department are issued by the department head and usually created internally and are likely to be accompanied by changes in practice to ensure implementation.

In Ohio, Resolutions issued by a Township's Board of Trustees are binding by law, as well as official statements of support for approaching community transportation projects.

Planning Documents – Complete streets policies can be identified within community comprehensive plans or transportation plans. Listed among the community's goals for the future, a plan can provide some implementation guidance by identifying specific corridors in particular need for increased multimodal planning and design.

Design Guidelines – Communities may decide to integrate complete streets planning and design into new design guidance for their street networks. Creating new guidance is a great way to ensure that each street project's design is compliant with complete streets goals. Design guidance is an important tool for implementation.

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[41] Data from *The Best Complete Streets Policies 2013*, Smart Growth America and National Complete Streets Coalition (National Complete Streets Coalition, 2014)
[42] (Office of the Auditor General Manitoba, 2003)
[43] *The Complete Streets Local Policy Workbook*, Smart Growth America and National Complete Streets Coalition (National Complete Streets Coalition, 2012)

Tax Levy – Some communities have decided to pursue an additional tax that will fund transportation improvements. Usually approved by a general vote of residents, these levies have specific requirements and goals, which can include provisions to ensure complete streets.

Usually, policies are developed or modified because of a need that is not being met, and subsequently have numerous benefits to offer. A complete streets policy could have the following beneficial impacts on a community or governmental organization:

- **Community Benefits** – Increased safety and ease of transit for all users of a road; increased physical activity; better air and water quality; a more vibrant streetscape that encourages individual interaction and fosters a strong sense of community and increased economic resilience.

- **Distribution of Resources** – More equitable distribution of infrastructure funding such that investments in sidewalk and bike lane creation, traffic calming, and pedestrian amenities are on par with road building and widening, and congestion mitigation.

- **Public Engagement** – Better communication with the broader community, so that developers, residents, and business owners understand the community's intended patterns of growth and investment.

- **Accountability –** Establishes a framework such that an agency knows how and where to address problems should they occur.

- **Legal Protection and Enforceability –** Policies can protect a municipality from unwanted types and patterns of development, and provides the legal recourse should an entity take issue with enforcement.[44]

[44] (Griffin, no year)

Resources to develop a policy:

Complete Streets local policy workbook provided by National Complete Streets Coalition. (2012, August). http://www.smartgrowthamerica.org/documents/cs-local-policy-workbook.pdf

The Best Complete Streets Policies of 2012 provided by National Complete Streets Coalition. (2013, April). http://www.smartgrowthamerica.org/documents/cs-2012-policy-analysis.pdf

Model Policies provided in *Complete Streets Toolkit - A Guide for Central Ohio Communities.* Mid-Ohio Regional Planning Commission. (2012). http://www.morpc.org/trans/CS_Toolkit_Web_Lo_Res.pdf

For an overview of adopted policies throughout the U.S. the national complete streets coalition provides the following policy atlas: http://www.smartgrowthamerica.org/complete-streets/changing-policy/complete-streets-atlas

5.3.1. Background Research and Informational Gathering

A comprehensive understanding of current decision-making processes for transportation projects in the community, including the departments that are involved is recommended prior to developing a complete streets policy. Data on health, commuting patterns, and traffic fatalities can help determine if current plans and policies that that guide transportation decisions address multiple users in the street network. Being equipped with this background knowledge and how transportation projects are selected in the Capital Improvement Program (CIP) as well as ensuring that the right players are at the table is essential to the formation of the policy.

According to the Community Tool Box, an online resource for those working to build healthier communities, it is essential to first consider if the policy is well-timed and if it effectively will leverage community strengths. It is furthermore important that the policy ensures community flexibility and adaptability to change in future situations.[45]

5.3.2. Developing a Policy

After background research is completed and it is determined that the right elements are aligned to move forward in creating a policy, it is time to develop or draft a policy. The Community Tool Box suggests creating an action plan to carry out policy efforts. An action plan identifies a series of steps, a suggested timeframe and responsible entities for implementation, as well as funding and public outreach needs.[46]

To ensure that a policy is strong and effective, SGA has defined the following ten elements that should be taken into consideration during the policy creation process.

[45] (University of Kansas, 2013)
[46] (University of Kansas, 2013)

Vision and Intent – A strong vision can inspire a community and help direct its efforts in the realization of a complete streets policy. Being clear about the primary purposes behind policy development—such as healthy or active living or youth safety—can help guide the choices that confront most policy creation processes.

Consider All Users – A complete streets policy should call for more than just additional bicycle and pedestrian facilities: it should consider the needs of all travelers. All sectors of the population should be considered as well as their particular needs, such as a community's youth and elderly populations. Land uses should also be taken into consideration, such as schools, heavily traveled bus routes, and other factors that may influence travel mode and a person's interaction at the street level (see Chapter 1.3 for more detailed information).

Create a Network by Increasing Connectivity – The ultimate goal of a complete streets policy is to create a network for all modes of transportation, with many access points that are all connected. The connectivity of the roadway network is an especially important feature for pedestrians, who are more reluctant to take indirect routes. An interwoven network with streets that accommodate different modes is also helpful in balancing transportation needs and dispersing individual travelers to alleviate congestion and conflict (see Chapter 2.1.2 for more detailed information).

Include All Roads and Appropriate Agencies – Creating a complete streets network requires collaboration among many different agencies. Roads are built and maintained by various agencies and jurisdictions: some by state, others are controlled and maintained by county and local governmental agencies, while private developers often build new roads. Ensuring that all agencies with jurisdiction over roads is necessary.

Consider All Types of Road Projects – All transportation improvements are opportunities to improve safety, access, and mobility. A strong complete streets policy will incorporate complete streets planning into all phases of all types of projects, including new construction, reconstruction, repair, and maintenance (see Chapter 2.2 for more detailed information).

Specify Exemptions – There should be a process in place that allows for exemptions so that some roads will be exempt from accommodating all users. The FHWA provides guidance on providing exemptions for bicycle and pedestrian travel, specifying that accommodation is not necessary:

- On corridors where specific users are prohibited, such as interstate freeways or pedestrian malls;
- When the cost is excessively disproportionate to the need. No universal cost-to-need ratio has been established, and costs and needs may be difficult to quantify. A 20% cap may be appropriate in unusual circumstances, such as where natural features (e.g., steep hillsides or shorelines) make it very costly or impossible to accommodate all modes; and
- Documented absence of current and future need.

Design - Communities adopting complete streets policies should use the best and latest design standards available to them. However, design specifics are often less important at first than the political will to choose different priorities in transportation planning and allowing flexibility.

Context Sensitivity - An effective complete streets policy must be sensitive to the community and street context. The context of a street includes the surrounding land uses, density of buildings and people, the age and characteristics of buildings. A street's surroundings are the major factors that define the character of the corridor. Ensuring that a complete streets treatment is context sensitive will allay fears that a small neighborhood street will become a widened transit spine (see Chapter 2.1.1 for more detailed information).

Performance Measures - Communities with complete streets policies can measure success a number of different ways, from miles of bike lanes to percentage of the sidewalk network completed to the number of people who choose to ride public transit. In most cases, performance measures are dealt with as a later implementation step. The performance measure noted above can provide good feedback for how a complete streets policy is working but other, less concrete measures are also valuable, such as those related to health, safety, and investment. (See section 5.7 for more detailed information)

Implementation Next Steps - A formal commitment to the complete streets approach is only the beginning. SGA has identified several steps for successful implementation of a policy, including offering workshops and other training opportunities to transportation staff, community leaders and the general public to help everyone understand the importance of the complete streets vision.

A great deal can also be learned by referring to model policies that other agencies have developed or existing policies that have been adopted by other municipalities. Appendix C provides policy language based on Mid-Ohio Regional Planning Organization's (MORPC) model policy; with commentary in italics based on guidance provided in SGA's Complete Streets Work Book as well as this toolkit.

5.3.3. Steps to Formal Policy Adoption

A formally adopted policy generally takes the form of a governing principle, plan, or course of action. In the public sector, policy generation usually evolves from a prescribed process, and is adopted by an ordinance or resolution. Legislative bodies make public policy decisions; others perform the administrative task of implementing those policies.[47]

According to the Community Tool Box, developing a plan for advocacy prior to adopting a policy is important to the adoption process and overall acceptance and effectiveness. Steps included in this advocacy plan are:

- Identify precedents for the policy that have been adopted and implemented in other similar situations.

[47] (Municipal Research and Services Center of Washington, 1999)

- Describe how the policy meets the interests of potential targets, agents, and opponents.
- Describe the critical elements contained within the proposed policy.
- Gain an audience with those who can propose the policy or who will be active in forming its implementation.[48]

Ohio is a home rule state, meaning that municipal corporations (cities and villages) have certain powers which permit them to exercise authority not specifically granted in the Ohio Revised Code (ORC), provided that the Ohio Constitution has not specifically prohibited that local authority. Included in these powers is the right to local self-government. Formal adoption procedures are therefore outlined in each municipality's charter. According to Section 715.03, *Powers by Ordinance or Resolution*, in the Ohio Revised Code (ORC); all "municipal corporations…may provide by ordinance or resolution for the exercise and enforcement of such powers".

5.4 Procedural Changes

Once communities adopt a complete street policy there are steps that they can take to get more projects on the road. The information is based on recommendations provided NCSC, and various implementation plans written by communities nationwide. A key to success will be to encourage inter-departmental working groups and to revise plans, policies, and road project prioritization processes.

5.4.1 Writing an Implementation Plan

Once a policy is adopted, communities should develop an implementation plan and identify specific changes to procedures and formal documents. An implementation kick-off meeting can bring together all city departments that collaborated for the policy and extend the invitation to other agencies that are concerned with transportation. The working group's aim should be to enable all users to safely navigate community streets.

A first task for the new working group should be to review existing documents and procedures, as well as identify real and perceived barriers to the implementation of complete streets.[49] The findings should be summarized within an implementation plan (list of tasks/ documents to change) that assigns responsibilities as well as estimates a timeline for implementing the proposed changes.[50]

[48] (University of Kansas, 2013)
[49] (National Complete Streets Coalition, 2013c)
[50] (National Complete Streets Coalition, 2013b)

Resources to develop implementation action items:

Planning for Implementation provided by National Complete Streets Coalition. http://www.smartgrowthamerica.org/complete-streets/implementation

Taking Actions on Complete Streets - Implementing processes for safe, multimodal streets. Provided by National Complete Streets Coalition. (2013, July). Smart Growth America: http://www.smartgrowthamerica.org/documents/cs/impl/taking-action-on-cs.pdf

For sample zoning texts and amendments see: Ewing, R., & Bartholomew, K. (2013). *Pedestrian- & Transit-Oriented Design.*

Examples of Implementation Plans:

Cobb County. (2009, September). *Complete Streets Implementation Plan*. http://cobbcounty.org/images/documents/comm-dev/land-use/Cobb_Complete_Streets.pdf

San Francisco. (2010, January). *Better Streets Plan: Recommendations for Improved Streetscape Project Planning, Design, Review and Approval*. http://www.sfcontroller.org/ftp/uploadedfiles/controller/reports/BetterStreetsPlan.pdf

San Diego Region. (2012, June) prepared by American Planning Association California Chapter and Walk San Diego. *From Policy to Pavement - Implementing Complete Streets in the San Diego Region.* http://www.smartgrowthamerica.org/documents/cs/impl/ca-sandiego-policytopavement.pdf *Great overview on different level of service measurements and roadway performance metrics*

Once the implementation plan is in place and is being executed, it is advisable to continue the inter-departmental meetings but shift the focus toward specific road projects. The city of San Francisco established a Street Design Review Team[51] that provides guidance and review of city road projects based on their "completeness" and considering the safety of all users of the road appropriately. Part of the continuing effort will be measuring success, giving feedback and refining the procedures. The following checklist, *Steps to Implementation*, summarizes actions to consider ensuring continuous road planning with all users in mind.

[51] (City and County of San Francisco, 2010, p. 30f.)

Steps to Implementation

Kickoff

- □ Conduct an **implementation kickoff workshop** with representatives of each relevant city department (Introduce complete streets topic, learn what steps are involved in choosing, planning, and building transportation projects)
- □ Designate a **lead agency**/ person
- □ Establish a **broad-based committee** to oversee the process (departments, citizen)
- □ Write an **implementation plan**, identify barriers and challenges to complete streets, and establish a list of documents that need to be reviewed (see E.3.c for list of documents)
- □ Review and **update relevant documents** and procedures

Establish new Procedures

- □ Establish **project level checklists** of complete streets features and considerations
- □ Write new **road project development guidelines and procedures** Update **selection and prioritization process** for road maintenance
- □ Establish a **Streetscape Design Review Team**
- □ Work with **updated** plans, codes, design guidelines, and project-procedures
- □ Develop: **new organizational structures** (designate responsible entity for complete streets)
- □ Consider: project specific **design charrettes, temporary installations, pilot projects**

5.5 Financing Complete Streets Projects

As of 2014, there is no single designated source of money for funding complete streets projects thus implementation and maintenance may be accomplished by shifting of resources, leveraging new sources of funding, or both. Infrastructure and facilities that contribute to complete streets may be funded from several existing sources. As the implementation of complete streets becomes a standard procedure funding for these improvements will eventually be added to capital improvement budgets. Furthermore infrastructure projects that include complete streets components will be given additional consideration in project evaluation and selection methodology for state and federal allocation of transportation improvement funds. This section provides an overview of some federal and state funding as well as non-traditional sources of funding that can be explored.

In addition to developing the infrastructure and facilities that contribute to complete streets a series of smaller improvements and maintenance over time will also be required. This maintenance may include a variety of activities to restriping roads to maintaining the landscape for stormwater management. Depending on the nature of the project these maintenance costs can be addressed in the annual budget, a staffing plan or through potential partnerships with stakeholders and community groups.

For further information on funding of complete streets:

PBIC Webinar by Flusche, D., & Lagerwey, P. (2013, April 9). *PBIC-Webinar - Accessing Funding For Bicycle and Pedestrian Projects under MAP-21.* http://www.walkinginfo.org/training/pbic/lc_webinar_04-09-2013.cfm

Ohio Department of Transportation. (2012, February 02). Funding for Pedestrian and Bicycle Facilities in Ohio. http://www.morpc.org/trans/Feb2012_Ohio_Funding_for_Bike_and_Pedestrian_Facilities.pdf

Federal Highway Administration. (2012a). *Bicycle Road Safety Audit Guidelines and Prompt Lists.* http://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa12018/fhwasa12018.pdf

5.5.1 Sample Costs of Complete Streets Elements

The addition of complete streets elements can vary greatly within projects depending on the elements used and the right-of-way available. The least expensive option for a municipality is modification to a striping plan. In a standard roadway project, striping is eligible to be paid for at project cost.

Costs for Complete Streets Elements

An example of the cost of various complete streets elements (assuming no right-of-way is needed and in 2013 dollars) are as follows:

- 1 mile of 4" Sidewalk five feet wide - $105, 600
- Street Benches – Varies widely based on aesthetics from $250 - $1,500
- Rain Garden - $14.35 per square foot
- Permeable Pavement - $13.50 per square foot
- Green Roof - $17.00 per square foot (approximately $2,500 per bus shelter)

Other complete streets elements have virtually no cost to initiate. Changing the signal phasing at an intersection to include a scramble phase has no cost but greatly improves pedestrian safety. Vehicle restrictions, such as alternate route suggestions and weekend driving restrictions have very little cost as well. Costs can be limited to signing and striping to let users know of the restrictions.

5.5.2 Funding Sources

A project that is funded with 100% local funds has greater opportunity for innovative design. Local design standards and criteria are used for the design and construction, so local agencies have control of

design decisions and construction. These projects are able to be processed from concept to construction quickly, based on the local funds becoming available.

However, most road projects are a complex undertaking that usually involves several layers of funding and different public agencies pulling together to improve the transportation system. The funding for road projects can be provided locally, through county administered, state-wide, or federal programs:

- Regarding federal funding, with the unveiling of the transportation bill Moving Ahead from Progress in the 21st Century Act (MAP-21) in 2012, a big concern was that the funding available for transportation enhancement would be reduced.[52] A complete streets approach allows communities to leverage the more general surface transportation program (STP) dollars by including improvements for pedestrians, cyclists, and transit riders into any road project.
- NOACA announced in its Connection 2035+ long-range plan that it is working on developing a complete streets policy "to make sure that all projects that are awarded NOACA attributable funds provide safe and reasonable accommodations for all roads users, unless the project falls under one or more agreed upon exceptions."[53]
- One issue might be that state funding for road diets are not readily available. This would apply to streets that are designated state routes as well as evacuation routes. In instances where an evacuation route is concerned, communities want to make sure to involve ODOT and NOACA early on in the project to avoid problems further down the road once a multi-functional street is constructed.

The funding table in 5.4.4 first developed by ODOT has been edited to be more specific to Cuyahoga County and include private sources for funding. Information deemed reliable but not guaranteed. MAP-21 eligibility components have been incorporated into this document.

5.5.3 Example Projects

City of Painesville, Main Street Streetscape designed by Michael Baker Jr., Inc. – This project consisted of 800 feet of streetscape enhancements and roadway reconstruction in downtown Painesville. Many complete streets elements were included in this project. Some of the elements included:

- Parking Redesign – removal of angle parking and replacing it with parallel to widen pedestrian walkways.
- Streetscape Lighting – removal of existing lighting and replacing it with pedestrian level lighting along entire corridor. The electrical scope also includes the installation of conduit and stub-outs for future power pedestals that will make the corridor more conducive to special events like "Taste of Painesville" and a weekly summer farmer's market.

[52] (Flusche & Lagerwey, 2013)
[53] (NOACA, 2013a, p. 81)

- Pedestrian Bumpouts – constructing pedestrian bumpouts at intersections and key crossing locations. This shortens the crossing distance for pedestrians and creates outdoor seating plazas for businesses while also performing a traffic calming function.
- Permeable Pavement – 2,500 sf of sidewalk was replaced with permeable pavers to reduce the impermeable pavement area.
- Bioretention Cells and Tree Boxes – treats all of the required Water Quality Volume per the ODOT L&D Volume 2 manual while removing stormwater from the sewer system. Adds landscaping element for aesthetic purposes.
- The total estimated cost for this project was $1,374,975.

City of Cleveland, Detroit Avenue Bike Lanes – This project restriped 1.7 miles of an urban principal arterial from West 25th Street to Lake Ave. This segment of Detroit Ave is a primary route many vehicles and bicycles use to commute from the near west city neighborhoods and suburbs to downtown. Businesses line Detroit Ave the entire length and side streets lead to urban neighborhoods. There is a high school and a large outreach ministry along the route. At the center of this route is the developing Detroit Shoreway neighborhood with restaurants, shops, and entertainment. This route is heavy in all modes of transportation: bicycle, pedestrian, vehicular, and transit.

Initially there were two travel lanes in each direction with rush-hour restricted parking allowed in the curb lane. The restriping project reduced the through traffic to one lane in each direction, a bike lane in each direction, and maintained parking on both sides. At key intersections parking and bike lanes were removed to allow for various turning movements.

5.5.4 Funding for Pedestrian and Bicycle Facilities in Ohio[54]

Funding Name	Issuing Agency	Local Match	Eligible Projects	Application Cycles	Eligible Applicants
Transportation Alternatives (TA) http://www.noaca.org/	NOACA	20%	Bicycle lanes on roadway • Bicycle parking facilities • Bicycle storage/service center • Sidewalks, new or retrofit • Crosswalks, new or retrofit • Paved Shoulders • Signed bike route • Traffic calming • Shared Use Path Construction that can include recreational trails provided they also have transportation component	Quarterly Application Period	County, City, Village, Township, and park districts
Safe Routes to School Program (SRTS) http://www.dot.state.oh.us/Divisions/Planning/LocalPrograms/Pages/TransportationAlternatives.aspx www.dot.state.oh.us/saferoutes	ODOT	0%	• Bicycle lanes on roadway • Bike racks on buses • Bicycle parking facilities • Bicycle storage/service center • Sidewalks, new or retrofit • Crosswalks, new or retrofit • Paved Shoulders • Signed bike route • Traffic calming • Shared Use Path Construction that can include recreational trails provided they also serve a transportation component • Safe Routes to School projects that are within a designated radius of a K-8 school	Application cycles vary based on fund availability.	County, City, Village, Township
Safety Program http://www.dot.state.oh.us/Divisions/Planning/SPPM/SystemsPlanning/Pages/FundingGuidelines.aspx	ODOT District Office	10-20%	• Bike and Pedestrian Facilities in Bike/Ped. High Crash Areas • Bike and Pedestrian Facilities that are appurtenances to the roadway project itself • Environment and safety education programs	Biannual Application Period: due by April 30 and September 30	County, City, Village, Township
Surface Transportation Program (STP) http://www.noaca.org/	NOACA	20%	• Bicycle lanes on roadway • Paved Shoulders • Signed bike route • Shared use path/trail • Spot improvement program • Bike racks on buses • Bicycle parking facilities • Trail/highway intersection • Bicycle storage/service center • Sidewalks, new or retrofit • Crosswalks, new or retrofit • Signal improvements • Curb cuts and ramps • Traffic calming	Applications due on a quarterly basis	County, City, Village, Township
County Surface Transportation Program (CSTP) http://publicworks.cuyahogacounty.us/en-US/Project-Planning-Funding.aspx	County Engineers Association	20%	• Bicycle lanes on roadway • Paved Shoulders • Signed bike route • Shared use path/trail • Spot improvement program • Bike racks on buses • Bicycle parking facilities • Trail/highway intersection • Bicycle storage/service center • Sidewalks, new or retrofit • Crosswalks, new or retrofit • Signal improvements • Curb cuts and ramps • Traffic calming	Annual application period	County

[54] Compiled 01/25/2013. Information deemed reliable but not guaranteed. MAP-21 eligibility components have been incorporated into this document. Heather Bowden, ODOT Bicycle and Pedestrian Planner. Revised by Cuyahoga County Planning Commission. Information deemed reliable but not guaranteed. MAP-21 eligibility components have been incorporated into this document. (Ohio Department of Transportation, 2012)

Funding Name	Issuing Agency	Local Match	Eligible Projects	Application Cycles	Eligible Applicants
Congestion Mitigation Air Quality (CMAQ) http://www.noaca.org/	NOACA designated air quality areas	20%	• Bicycle lanes on roadway • Signed bike route • Shared use path/trail • Spot improvement program • Bike racks on buses • Bicycle parking facilities • Trail/highway intersection • Bicycle storage/service center • Sidewalks, new or retrofit • Crosswalks, new or retrofit • Signal improvements • Curb cuts and ramps • Non-construction outreach related to safe bicycle use	Application Cycles To Be Determined	County, City, Village, Township
State Capital Improvement Program (SCIP) http://planning.co.cuyahoga.oh.us/dopwic/	Ohio Public Works Commission (OPWC)	10%	• Bicycle lanes on roadway • Paved Shoulders • Trail/highway intersection • Sidewalks, new or retrofit • Crosswalks, new or retrofit • Signal improvements • Curb cuts and ramps • Traffic calming • All improvements must be made in conjunction with roadway improvement project	Annual Application Period. Usually Due in the late summer for District One	County, Township, Village, or City. Sanitary Districts, and Regional Water and Sewer Districts
County Permissive License Plate Fees http://publicworks.cuyahogacounty.us/en-US/Project-Planning-Funding.aspx	County	0% - 50%	• Bicycle lanes on roadway • Paved Shoulders • Trail/highway intersection • Sidewalks, new or retrofit • Crosswalks, new or retrofit • Signal improvements • Curb cuts and ramps • Traffic calming • All improvements must be made in conjunction with roadway and is included in the original project scope	Varies	County, City, Village, Township
Local Permissive Licenses Plate Fees **http://codes.ohio.gov/orc/4504**	City or Village		• Bicycle lanes on roadway • Paved Shoulders • Trail/highway intersection • Sidewalks, new or retrofit • Crosswalks, new or retrofit • Signal improvements • Curb cuts and ramps • Traffic calming • All improvements must be made in conjunction with roadway and is included in the original project scope	Annual per Local Budget	City, Village
Recreational Trails Program http://ohiodnr.com/tabid/21369/default.aspx	FHWA & ODNR	20% [55]	• Urban trail linkages • Trail head and trailside facilities • Maintenance of existing trails • Restoration of trail areas damaged by usage • Improving access for people with disabilities • Acquisition of easements and property • Development and construction of new trails • Purchase and lease of recreational trail construction and maintenance equipment • Environment and safety education programs related to trails	Annual Application Period: Due in February	Cities, Villages, Counties, Townships, Park and Joint Recreation boards and Conservancy Districts, Jointly Sponsored Projects between Political Subdivisions, State Government Agencies, Federal Government Agencies, and Non - profit organizations
Clean Ohio Trails Fund http://clean.ohio.gov/RecreationalTrails/Default.htm	OPWC & ODNR	25% [56]	• Land acquisition for a linear trail • Trail development • Trailhead facilities • Engineering and design	Application cycles vary based on fund availability. Due in February when funding is available	Cities, Villages, Townships, Park and Joint Recreation Districts, Conservancy Districts, Soil and Water Conservation districts, and Non-profit Organizations

[55] This program can be used as a local match for the TA, SRTS, STP and CMAQ programs provided they meet both programs, however 5% of the match must be local

Funding Name	Issuing Agency	Local Match	Eligible Projects	Application Cycles	Eligible Applicants
County Bridge Program http://publicworks.cuyahogacounty.us/en-US/Project-Planning-Funding.aspx	County Engineers Association	20%	Bike and Pedestrian Facilities that are appurtenances to the bridge project itself. Funds the replacement of county bridges	Annual Application Period:	Counties
Municipal Bridge Program http://www.dot.state.oh.us/Divisions/Planning/LocalPrograms/Pages/MunicipalBridge.aspx	ODOT	20%	Bike and Pedestrian Facilities that are appurtenances to the bridge project itself. Funds the replacement of local bridges	Annual Application Period: Due in March	City, Village
Section 402 Federal, State, and Community Highway Safety Funds http://publicsafety.ohio.gov/grants.stm	ODPS	0%	• Maps • Safety/education position • Police patrol • Helmet promotion • Safety brochure/book • Training	Annual Application Period: Due in July	County, city, township, village, law enforcement agency, board of education, health department, NOACA, state agency; or non-profit organization, church, hospital, educational service center, college or university
Federal Transit Administration (FTA) http://www.fta.dot.gov/grants/12305.html	FTA/ODOT	Varies	Bike and Pedestrian Facilities that are appurtenances to the transit project itself	Varies by program	Designated recipients
Community Development Block Grant (CDBG) http://development.cuyahogacounty.us/en-US/municipal-grants.aspx	HUD	Varies by program [57]	• Public facilities •Street Surface, repair or replacement • Sidewalks, new or retrofit • Crosswalks, new or retrofit • Street Lights, repair or retrofit, Traffic/Pedestrian Signals, repair or retrofit • Barrier removal for handicap accessibility (e.g., sidewalks, curb ramps)s • Street Furniture	Annual Application Period: Due in Fall	Urban County Community areas that meet HUD Objectives, and Entitlement Communities
Cuyahoga County Sanitary District Funds **http://codes.ohio.gov/orc/6117**	County	Up to 100 % based on account Balance	Storm or Sanitary Sewer Related Components	Varies based on availabilities of funds	City, Village
Ohio EPA Surface Water Improvement Fund www.epa.ohio.gov/dsw/nps/index.aspx	Ohio EPA	0%	Implementation of projects that address nonpoint source pollution (NPS) and/or stormwater runoff and result in water quality improvements in Ohio's streams, rivers and lakes	Application cycles vary based on fund availability. Deadlines vary	Local governments, park districts, conservation organizations and others

[56] This program can be used as a local match for the TA, SRTS, STP and CMAQ programs provided they meet both.
[57] This program can be used as a local match for the TA, SRTS, STP and CMAQ programs provided they meet both program eligibility categories.

Funding Name	Issuing Agency	Local Match	Eligible Projects	Application Cycles	Eligible Applicants
Ohio EPA 319 Grants www.epa.ohio.gov/dsw/nps/index.aspx	Ohio EPA	40% [58]	Correct NPS caused water quality impairment to Ohio's surface water resources. Section 319(h) implementation grant funding is targeted to Ohio waters where NPS pollution is a significant cause of aquatic life use impairments	Annual Application Period: Usually due in May	Watershed groups and others who are implementing locally developed watershed management plans and restoring surface waters impaired by NPS pollution
The Mobilization for Health: National Prevention Partnership Awards (NPPA) Program http://www.hhs.gov/ash/index.html	Dept. of Health and Human Services, Office of the Assistant Secretary for Health (OAS)	0%	Promote and accelerate partnerships, catalyzing collaborations in improving health through access to, and use of, preventive services across the United States. The program is designed to establish integrated, collaborative local, state, regional, or tribal partnerships to increase community awareness and action on preventive health services, promote health and wellness, educate and train, and establish communication programs to all community populations, regardless of social and economic barriers, and race and ethnicity	Application cycles vary based on fund availability.	Any public or private entity located in a State
The People For Bikes Community Grant Program http://www.peopleforbikes.org/pages/grant-guidelines	People for Bikes and Bike Industry Partners		People For Bikes Community Grant Program supports bicycle infrastructure projects and targeted advocacy initiatives that make it easier and safer for people of all ages and abilities to ride	Biannual Application Period: Online Letters of Interest Due January & August	Non-profit organizations and local governments
Robert Wood Johnson Foundation Grants http://www.rwjf.org/en/grants/what-we-fund.html	Robert Wood Johnson Foundation		The Robert Wood Johnson Foundation provides grants for projects in the United States and U.S. territories that advance our mission to improve the health and health care of all Americans	RWJF awards most grants through calls for proposals (CFPs) from time to time. The Pioneer Portfolio accepts unsolicited proposals at any time and issues awards throughout the year.	Public agencies, universities, and public charities that are tax-exempt under section 501 (c)(3)

[58] A match commitment form must be completed for EACH organization that is committing any match contributions

Funding Name	Issuing Agency	Local Match	Eligible Projects	Application Cycles	Eligible Applicants
Rockefeller Foundation Grants http://www.rockefellerfoundation.org/	Rockefeller Foundation		The Rockefeller Foundation works to spread the benefits of globalization to more people in more places around the world. Funding inquiries must fit within four core issue areas: Advance Health, Revalue Ecosystems, Secure Livelihoods & Transform Cities. Within the Transform Cities issue is a focus on pushing the U.S. over the tipping point toward transportation planning and infrastructure policy that serves the needs of 21st century America	The Rockefeller Foundation will consider on line inquiries for funding projects that must fit within four core issue areas and one or more of their initiatives.	
Ohio State Infrastructure Bank (SIB) http://www.dot.state.oh.us/Divisions/Finance/Pages/StateInfrastructureBank.aspx	ODOT		THE SIB funds highway, rail, transit, intermodal, and other transportation facilities and projects which produce revenue to amortize debt while contributing to the connectivity of Ohio's transportation system and further the goals such as corridor completion, economic development, competitiveness in a global economy, and quality of life	Transportation Infrastructure Bond Fund Program and Revolving loan program	Any public entity such as political subdivisions, state agencies, boards, or commissions, regional transit boards, and port authorities

5.6 Maintaining your Complete Streets Project

Enabling year-round safe and comfortable access for all users requires seasonal maintenance of bike lanes, sidewalks and transit stops. During autumn, leaves tend to block and cover bike lanes, making it harder for cyclists to navigate streets. In winter, heavy snowfalls and a lack of maintenance result in impassable sidewalks forcing pedestrians (elderly, school children, families with strollers) to walk in the street.

Heavy snow falls tend to clog roads in Cuyahoga County every winter. More progressive snow-removal policies can help alleviate some of the traffic congestion that occurs during heavy snow falls. Cities might want to consider proactive anti-icing approaches such as applying de-icing materials to the roadway approximately two hours before the snow event. According to the North Dakota DOT, only 1/3 of the de-icing materials are needed.[59] Chapter 4.5 specifies alternate de-icing materials. As snow piles up it tends to block turning lanes and on-street parking spots. For more efficient snow storage, consider installing "No parking until snow is removed" signs for designated on-street parking spots to ensure clearance of most on-street parking spots (see city of Medicine Hat, Alberta, Canada).[60]

The following highlights some of the strategies cities throughout the U.S. and in Cuyahoga County have developed to ensure proper maintenance of roads and sidewalks year-round. The strategies to maintain complete streets include (1) allocating maintenance funds, (2) prioritizing, scheduling and enforcing maintenance, and (3) designing for easy maintenance.

5.6.1 Maintenance of Pedestrian Facilities

Snow and mud piled up on the side of the road might force pedestrians to stand in the street while waiting for traffic signals to change. On snowy days, people with disabilities are especially disadvantaged as their independence relies on being able to walk or take transit. [61] According to ADA accessibility regulations 28 CFR Paragraph 35.133 "A public agency must maintain its sidewalk in an accessible condition, with only isolated or temporary interruptions in accessibility." This includes snow removal, debris removal, and maintenance of accessible pedestrian walkways in work zones.[62]

Therefore it is important to ensure proper clearance of curb ramps at intersections as well as of sidewalks. While the accessibility of intersections is within the responsibility of the city, communities have different means of enforcing sidewalk clearance by property owners. The adjacent property owner can be fined or charged with removal of snow and ice from the sidewalk or curb ramp. In McCall, Idaho, code requires property owners to clear sidewalks and the city has authority to clear walks and assess fines on property owners.[63]

[59] (ALTA Planning and Design, 2013, p. 4)
[60] (Easter Seals Project, 2013, p. 6)
[61] (Easter Seals Project Action, 2013b, p. 7)
[62] (Easter Seals Project, 2013, p. 13) citing U.S. Department of Transportation, FHWA, Civil Rights Questions and Answers About ADA Section 504
[63] (Easter Seals Project Action, 2013b, p. 70)

Summary of action steps for communities regarding winter maintenance[64]

Allocating maintenance funds:

- Set aside funds to cover maintenance costs of pedestrian and bicycle facilities (prioritize school routes and major intersections);
- Consider purchasing a small snow plow for bike lanes and sidewalks;
- Explore collaboration with business districts regarding snow pick-up and removal (will be stored elsewhere);

Prioritizing, scheduling and enforcing maintenance:

- Develop Snow and Ice Management Plan that prioritizes essential zones that include all modes of transportation (priority should be placed on roadways connecting to medical facilities, transit facilities, businesses, and schools); Determine timelines, techniques, responsibilities, and priorities;
- Draft Snow Removal Policy that includes timely deadlines, responsible entities, and contact information for enforcement;
- Consider implementing a program to assist people who are unable to clear pathways due to physical limitations;
- Implement a reporting system of maintenance issues for sidewalks, bike lanes, and drainage ditches, including snow, leave and debris removal;

Designing for easy maintenance

- Design curb ramps, bridges, and sidewalks for accessibility by utilizing small snow plow vehicles
- Determine responsibilities of ownership and maintenance when planning a complete streets project;

5.6.2 Maintenance of Bicycle Facilities

While cycling is very popular in cold weather cities in Wisconsin and Minnesota, a pre-requirement for cycling is clear pathways that enable cyclists to be safe even in cold and snowy weather conditions. The following lists strategies for cities to ensure safe bikeways even in snowy weather:

- **Allocate Maintenance Funds*:*** The Minneapolis Bicycle Master Plan called for adding 183 miles of bikeway at a cost of $270 million with an expected maintenance cost of $1.3 million/ year.[65] Maintenance responsibilities are shared between the Minneapolis Park and Recreation Board, the City of Minneapolis Department of Public Works, the University of Minnesota, and Hennepin County on county roads. [66]
- **Prioritize, Schedule and Enforce Maintenance*:*** A Snow and Ice Management Plan should prioritize bike routes to schools and business districts. Those bike routes should be cleaned first during a snow event. Leaf pick up in fall should also be prioritized on these routes.[67]

[64] Based on actions recommended by Easter Seals Project (2013). Effective Snow Removal for Pathways and Transit Stops
[65] **Invalid source specified.**
[66] **Invalid source specified.**
[67] (ALTA Planning and Design, 2013, p. 5)

Communities might also wish to inform property owners and landscaping companies to not place leaves or pile up snow on bike lanes, sidewalks, and drainage ditches but to keep snow and leaves on the tree lawn.

- **Design for Easy Maintenance:** Bike lanes tend to be used for snow storage leaving cyclists forced into the roadway. If the bike lane is designed with a sufficiently wide (5 feet) bike lane buffer – the buffer can be used during the winter for snow storage.[68] Along priority bike routes, parking lanes could be used for snow storage. On streets that are heavily plowed, consider milling the area of pavement 3mm in depth where thermoplastic pavement markings are applied which can save maintenance costs in the long-run.[69]

5.6.3 Maintenance of Transit Facilities

People taking the bus in cold weather rely on having sufficient shelter while waiting for their bus. RTA maintains more than 1,300 shelters throughout Greater Cleveland. Through their Adopt-A-Shelter Program[70], individuals, churches, Community Development Corporations (CDC), schools, Nonprofit Organizations (NPO), merchants and anyone who wants to make their neighborhood more attractive can adopt a shelter. RTA's homepage provides more detailed information. Cities can potentially facilitate maintenance agreements between RTA and business district associations.

Further information on maintenance:

Eastern Seals Project Action. (n.d.). *Developing Effective Practices for Snow Removal: Why is it Worth all the Effort?* http://www.projectaction.org/Portals/3/Documents/Training/Snow%20Removal%20Presentation2.pdf

ALTA Planning and Design. (2013). *Winter Bike Lane Maintenance: A Review of National and International Best Practices.* http://altaplanning.com/App_Content/files/Winter%20Bike%20Riding_White%20Paper_ALTA.pdf

Federal Highway Administration. (n/a). *A Guide for Maintaining Pedestrian Facilities for Enhanced Safety.* http://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa13037/chap5.cfm

Institute for Public Administration. (2012, February). *Winter Maintenance of Pedestrian Facilities in Delaware: A Guide for Local Governments.* http://www.ipa.udel.edu/publications/SnowRemoval.pdf

[68] (ALTA Planning and Design, 2013, p. 2)
[69] (ALTA Planning and Design, 2013, p. 3)
[70] (G.C. RTA)

5.7 Performance Measurements for Evaluating Success

Performance measurements are quantitative and qualitative metrics that record preconditions (baseline data) and document post complete streets conditions at regular intervals to show progress toward reaching desired goals.

Identifying baseline data and developing performance measurements will serve to build a base of evidence for the effectiveness of the complete streets initiative and provide proof of concept for further investments in complete streets projects. Communities with complete streets policies can measure success of implementation in a number of different ways. Some communities may also want to explore and measure potential impact of complete streets on economic development and/or public health.

Performance can be measured as inputs, outputs, or outcomes:

- **Inputs** could include adoption of policies or dollars spent on complete streets projects.
- **Outputs** are the direct result of the actions above and could include the number of projects completed, the extent of the bicycle or pedestrian network, or the characteristics of that network.
- **Outcomes** reflect the impacts on the users of the system, and include counts of users, mode shares, and crashes, as well as subjective assessments such as perceived safety and user satisfaction.

Performance measures must be closely tied to planning goals: each must measure a relevant aspect of system performance. If the goal is to increase walking and bicycling or to improve safety for these modes, then performance measures should evaluate these outcomes. In developing performance measures, communities should thus take the goals of their complete streets policy as their starting points.[71]

Implementation of complete streets policies in Cuyahoga County communities advances the goals of NOACA. However each community should establish their own goals based on their own community needs, character, and infrastructure. Developing those goals should be part of developing a complete streets policy.

[71] (Mc Cann & Rynne, 2010)

NOACA Transportation 2035+ Goals

Promote and implement **ten** transportation goals, focusing on:

- Strengthening the region's economy
- Preserving the existing transportation infrastructure
- Reinvesting in the urban core
- Minimizing the impacts of adding new capacity to the system
- Improving the natural environment

1. Advance the region's economic competitiveness based upon a sustainable development approach integrating environmental, social equity and economic perspectives.
2. Enhance the natural environment and ecology of the region by improving air, land and water quality, conserving transportation energy, addressing climate change, and by identifying and preserving existing critical natural resources and environmentally sensitive areas.
3. Preserve and improve the efficiency and safety of the existing transportation system, prioritize elements of the system identified as significant and ensure the system serves homeland security.
4. Establish a more balanced transportation system which enhances modal choices by prioritizing goods movement, transit, pedestrian and bicycle travel instead of just single occupancy vehicle movement and highways.
5. Improve the transportation mobility of the transit-dependent and low-income individuals to jobs, housing and other trip purposes.
6. Provide additional transportation system capacity to move people and goods only when such capacity improvements promote the NOACA Principles, minimizing the adverse impacts of the investments on existing communities within the region.
7. Foster reinvestment in existing urban core areas throughout the region, and work to target and manage transportation investments to implement Plan goals.
8. Foster intergovernmental and private sector relationships to strengthen the regional community and assist in Plan implementation.
9. Direct the Plan and its investments toward efficient, compact land use development/redevelopment that facilitates accessibility, saves infrastructure costs, preserves and enhances farmland, forests and open space and enhances the economic viability of existing communities within the region.
10. Foster improvement in the quality of life of residents in the region through attention to aesthetics in the planning of the transportation system.

For years, information on car use has been collected and analyzed. Data collected includes traffic counts, timing counts, trip generation and other measures. In fact, ODOT has a Transportation Information Mapping System (TIMS) web-mapping portal where you can discover information about Ohio's transportation system, create maps, and share information. Other sources of data are collected at the regional level by NOACA, as well as by the County and individual municipalities.

However, there is very little standardized data collection on the other aspects of our public infrastructure. For complete streets we need to establish routine collection of data related to walking, biking, transit use, as well as green infrastructure. Bicycling and walking have only recently begun to be measured on a consistent basis. Walkscore.com is a popular website that provides a walkability index as well as bikability and transit indices. Furthermore, Walk Score can generate a commute report. This tool may be one method to consider when developing your performance measurements.

There is a new trend for engineers to develop ways of grading multimodal levels of service, and in turn planners and elected officials need to consider new methods of how to influence the shift to multi-modal transportation. As a result, transportation decision makers will have a better understanding of all kinds of traffic trends and formulate projects that will result in measurable improvements for a variety of modes of travel.

Some measurements will be ongoing and some will only be needed for a short term following the implementation of complete streets infrastructure. The table on the next few pages highlights the possible performance measures for outcomes that individual communities may want to use to evaluate their own progress based on individual goals for their road network/community. This table also highlights where and how the data may be obtained. These metrics are organized from data sets that have broad appeal such as safety and are easy to measure to less precise measurements and loose correlations:

5.7.1 Recommended Performance Measurements

PERFORMANCE MEASUREMENTS	DATA SOURCE/ LEAD AGENCY	MEASUREMENT METHOD	HOW OFTEN (suggested)
SAFETY			
Average Vehicle Speed	Municipality	Count	With master plan update
Motor Vehicle Crashes per Vehicle Trip (property damage or worse)	ODOT	Counts from: • Ohio Dept. of Public Safety • ODOT Counts	With master plan update
Pedestrian Crashes per Pedestrian Trip (property damage or worse)	ODOT ODPS Municipality	Counts from: • Ohio Dept. of Public Safety • ODOT Counts • Hand counts	With master plan update
Bicycle Crashes per Bicycle Trip (property damage or worse)		Counts from: • Ohio Dept. of Public Safety • ODOT Counts • Hand counts	With master plan update
Hotspot Locations (crash clusters)		GIS Data Analysis • Ohio Dept. of Public Safety • NOACA	With master plan update
Percentage of Crash Reductions at Crash Hotspots		GIS Data Analysis • Ohio Dept. of Public Safety • NOACA	With master plan update
PEDESTRIAN FACILITIES			
Percentage Increase of Sidewalk Mileage in Good Condition	Municipality	Measure (miles, feet)	Biennial
Number of Pedestrian Trips		Count	Post project Biennial
Miles of Pedestrian Lighting Added		Measure (miles, feet)	Post project Biennial
Sidewalk Furniture Installed		Count	Post project Biennial
Intersection Improvements Installed (i.e. scramble phase, pedestrian signal)		Count	Post project Biennial
Mid-block Crossing Improvements Installed (i.e. island refuge, bump outs, chicanes)		Count	Post project Biennial

PERFORMANCE MEASUREMENTS	DATA SOURCE/ LEAD AGENCY	MEASUREMENT METHOD	HOW OFTEN (suggested)
BIKE FACILITIES			
Number of Bicycle Trips	NOACA Bike Advocacy Groups	Counts	Biannually: Fall and Spring
Miles of Bike Lanes	NOACA Municipality Bike Advocacy Groups	Measure (miles)	Annual
Miles of Bike Exclusives Facilities (i.e. bike boulevard, cycle track)	NOACA Municipality Bike Advocacy Groups	Measure (miles)	Annual
Number of Bike Features at Intersections (i.e. bike boxes, bike signals)	Municipality Bike Advocacy Groups	Counts	Annual
Number of Spaces available for bike parking	Municipality Bike Advocacy Groups	County	Annual
TRANSIT IMPROVEMENTS			
Number of Transit Trips	RTA	Count	
Bus Shelters Installed		Count	
Days of Transit Offered		Schedules	
Hours Transit Offered		Schedules	
Average Trip Time		Count	
Average Wait Time		Count	
Multi-Modal Options installed for transit lines (i.e. park & Ride, bike racks on busses)		Count	
Lane miles with sidewalks and/or bike lanes		Count	
ENVIRONMENT			
Volume of Stormwater entering system during 20 Year Storm events	Municipality	Calculations	Pre and post project
Square Footage of Permeable Pavement	Municipality	Measure	Pre and post project
Number of Street Trees	Cuyahoga County Planning Commission	Urban Tree Canopy Study	Biennial
Miles of Roads treated with alternative deicing material	Municipality	Miles	Annual

PERFORMANCE MEASUREMENTS	DATA SOURCE/ LEAD AGENCY	MEASUREMENT METHOD	HOW OFTEN (suggested)
ECONOMIC DEVELOPMENT			
Percentage of Businesses that Promote Alternative Modes of transportation (i.e. bike parking, discounts if show bus pass or bike helmet etc…)			
Real Estate Values* (county values are every 6 years)	County Fiscal office	Tax Assessments	
Reduced Vacancies			
Percentage of businesses accessible by foot, bicycle or transit (in a certain radius?)	Walkscore.com		
Return on Investment in complete street		Cost Benefit Analysis	
PUBLIC HEALTH			
Participation in walking programs (i.e. Safe Routes to School, walking clubs)	Municipality	Counts	Annually
Participation in Bike clubs and bike events (i.e. monthly critical mass rides, membership in Ohio Bicycle Coop or Bike Cleveland, bike to school days, bike rodeo's)	Municipality Bike Advocacy Group Community Programs	Counts	Annually
Decrease In Ozone Alert Days	NOACA	Counts	Annually
PUBLIC PERCEPTION			
People Who Have Received Educational Materials Regarding Complete Streets	CCPC Municipality NOACA Advocacy Groups	Survey	Biennial
People Who Would Consider Alternative Modes Of Transportation		Survey	Biennial
Do People Feel Safer with Complete Street Improvements		Survey	Biennial
Do Parents Feel Their Children are Safer with the Improvements		Survey	Biennial

5.8 Refine Your Strategy

This Toolkit provides Cuyahoga County communities with many innovative practices to begin implementation of complete streets elements such as traffic calming, on-road bikeways, and measures to give bikes, pedestrians, people of all ages and abilities as well as transit priority on our roadways. Complete streets have been adopted as ordinances or resolutions in communities throughout the County, such as Cleveland's Complete and Green Street ordinance and Broadview Heights' bikeway ordinance. Community transportation studies in recent years have been focusing on complete streets. A periodic review of any policy is needed to determine the efficacy and to advance the concept of complete streets, as well as provide future direction for tools and practices that can work for individual communities. The following steps will help define and refine your implementation strategy:

- Identify the goals and objectives of complete streets;
- Develop performance measures based on the goals and collect baseline data so that you can measure your progress;
- Assess current projects and expected outcomes;
- Determine the tools and practices for day-to-day application, including a variety of measures for the Level of Service of Streets (LOS) for walking, cycling and transit. These would be similar in purpose to the ones now used to measure the LOS of motor vehicles to assess road congestion;
- Re-emphasize the priority of designing for vulnerable users;
- Continue to stress the need for equitable and transparent trade-offs among competing objectives when developing plans and designs for constrained corridors and intersections; and
- Plan for updates to ensure that the strategies are consistent with good planning, design standards, stormwater management and local laws.

Conclusion

Cuyahoga County aspires to create a built environment that focuses on better and more accessible transportation options for all residents, as well as address stormwater and other environmental concerns. This Toolkit describes and illustrates the concepts of complete streets, including a range of fundamentally different design standards and best practices for the County road network to incorporate.

Ultimately the Toolkit serves as a guide for communities to better understand the implementation process from planning, to decision making, to funding, to engineering and to construction, resulting in a network of complete streets Countywide. The Toolkit also provides a set of standards for developing mutual policies and procedures as well as new priorities for transportation investments that will accommodate all users of the streets. As part of our efforts to inform and provide services to the communities, County Planning and CCDPW will use the Toolkit to assist Cuyahoga County communities with complete street policy development and implementation.

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Appendix A - Data by community to support complete streets policy

Appendix A.1 Workers who work in place of residency, 2008-2012

Area	Total Workers 16 Years and Over		Worked in Place of Residence		
	Estimate	*Margin of Error*	Estimate	*Margin of Error*	Percent Estimate
Bay Village	8,095	*304*	1,293	*190*	16.0%
Beachwood	4,990	*275*	1,446	*232*	29.0%
Bedford	6,155	*341*	1,018	*191*	16.5%
Bedford Heights	4,940	*313*	225	*93*	4.6%
Bentleyville	476	*78*	44	*20*	9.2%
Berea	9,426	*426*	2,255	*284*	23.9%
Bratenahl	682	*77*	97	*28*	14.2%
Brecksville	6,392	*295*	1,057	*195*	16.5%
Broadview Heights	9,734	*394*	1,032	*203*	10.6%
Brooklyn	4,999	*319*	729	*171*	14.6%
Brooklyn Heights	778	*68*	97	*34*	12.5%
Brook Park	8,688	*339*	1,179	*196*	13.6%
Chagrin Falls village	1,881	*155*	483	*101*	25.7%
Chagrin Falls Township	25	*NA*	0	*NA*	0.0%
Cleveland	146,263	*1803*	84,601	*1721*	57.8%
Cleveland Heights	22,198	*753*	2,893	*347*	13.0%
Cuyahoga Heights	286	*66*	75	*28*	26.2%
East Cleveland	5,498	*465*	543	*159*	9.9%
Euclid	21,287	*760*	3,612	*380*	17.0%
Fairview Park	8,348	*304*	1,092	*216*	13.1%
Garfield Heights	12,905	*573*	2,156	*251*	16.7%
Gates Mills	1,037	*127*	137	*82*	13.2%
Glenwillow	332	*136*	19	*14*	5.7%
Highland Heights	4,194	*237*	590	*151*	14.1%
Highland Hills	213	*119*	18	*13*	8.5%
Hunting Valley[1]	298	*53*	46	*29*	15.4%
Independence	3,314	*219*	836	*177*	25.2%
Lakewood	28,492	*654*	4,390	*303*	15.4%
Linndale	97	*50*	13	*13*	13.4%
Lyndhurst	7,130	*317*	1,027	*215*	14.4%
Maple Heights	9,583	*518*	779	*192*	8.1%
Mayfield	1,748	*152*	252	*89*	14.4%
Mayfield Heights	9,411	*404*	1,483	*259*	15.8%
Middleburg Heights	7,604	*387*	1,552	*233*	20.4%
Moreland Hills	1,575	*110*	161	*66*	10.2%
Newburgh Heights	947	*154*	66	*46*	7.0%
North Olmsted	16,579	*435*	3,320	*351*	20.0%
North Randall	360	*64*	19	*12*	5.3%
North Royalton	15,898	*447*	2,437	*307*	15.3%
Oakwood village	1,634	*175*	113	*128*	6.9%
Olmsted Falls	4,491	*273*	380	*128*	8.5%
Olmsted Township	6,552	*307*	0	*18*	0.0%
Orange	1,535	*139*	179	*94*	11.7%
Parma	39,566	*871*	8,238	*604*	20.8%
Parma Heights	9,391	*450*	753	*204*	8.0%
Pepper Pike	2,814	*163*	436	*127*	15.5%
Richmond Heights	5,095	*358*	595	*157*	11.7%

Area	Total Workers 16 Years and Over		Worked in Place of Residence		
	Estimate	***Margin of Error***	**Estimate**	***Margin of Error***	**Percent Estimate**
Rocky River	9,555	*487*	1,684	*243*	17.6%
Seven Hills	5,202	*205*	396	*116*	7.6%
Shaker Heights	13,431	*424*	2,174	*265*	16.2%
Solon	11,137	*386*	2,876	*315*	25.8%
South Euclid	11,520	*471*	976	*212*	8.5%
Strongsville	22,545	*506*	5,518	*427*	24.5%
University Heights	6,654	*341*	913	*185*	13.7%
Valley View	1,041	*81*	127	*27*	12.2%
Walton Hills	1,160	*99*	76	*41*	6.6%
Warrensville Heights	5,689	*368*	557	*173*	9.8%
Westlake	15,583	*495*	3,812	*352*	24.5%
Woodmere	482	*67*	32	*20*	6.6%
Cuyahoga County	**567,874**	***2881***	**152,905**	***2357***	**26.9%**

[1] Hunting Valley spans two counties: Cuyahoga County and Geauga County. The data shown in the table is for the Cuyahoga County portion only.

Prepared by the Cuyahoga County Planning Commission, January 2014.

Source: U.S. Census, 2008-2012 American Community Survey 5-Year Estimates, B08008.

Appendix A.2 Occupied Housing Units with No Vehicles Available

2008-2012 American Community Survey 5-Year Estimates

Area	Occupied Housing Units (for Vehicles Available)		No Vehicles Available			
	Estimate	*Margin of Error*	Estimate	*Margin of Error*	Percent	*Margin of Error*
Bay Village	6,091	*155*	188	*71*	3.1%	*1.2*
Beachwood	5,007	*211*	471	*110*	9.4%	*2.1*
Bedford	6,095	*326*	760	*180*	12.5%	*2.7*
Bedford Heights	5,123	*234*	488	*120*	9.5%	*2.2*
Bentleyville	326	*39*	3	*4*	0.9%	*1.3*
Berea	7,272	*347*	442	*106*	6.1%	*1.4*
Bratenahl	702	*52*	30	*16*	4.3%	*2.3*
Brecksville	5,024	*154*	190	*85*	3.8%	*1.7*
Broadview Heights	7,447	*230*	194	*100*	2.6%	*1.3*
Brooklyn	4,836	*221*	484	*155*	10.0%	*3.1*
Brooklyn Heights	571	*40*	8	*7*	1.4%	*1.2*
Brook Park	7,602	*237*	508	*125*	6.7%	*1.6*
Chagrin Falls village	2,024	*96*	290	*93*	14.3%	*4.5*
Chagrin Falls Township	25	*NA*	0	*NA*	0.0%	*NA*
Cleveland	167,946	*1248*	41,723	*1073*	24.8%	*0.6*
Cleveland Heights	19,449	*435*	2,300	*296*	11.8%	*1.5*
Cuyahoga Heights	235	*37*	32	*19*	13.6%	*7.5*
East Cleveland	8,074	*329*	2,868	*280*	35.5%	*3*
Euclid	21,626	*538*	3,151	*365*	14.6%	*1.6*
Fairview Park	7,590	*199*	370	*89*	4.9%	*1.1*
Garfield Heights	11,556	*351*	1,176	*244*	10.2%	*2.1*
Gates Mills	931	*64*	17	*15*	1.8%	*1.6*
Glenwillow	270	*75*	11	*9*	4.1%	*3.5*
Highland Heights	3,185	*133*	148	*94*	4.6%	*2.9*
Highland Hills	247	*40*	72	*28*	29.1%	*9.1*
Hunting Valley[1]	255	*34*	2	*4*	0.8%	*1.6*
Independence	2,737	*127*	202	*89*	7.4%	*3.1*
Lakewood	24,686	*467*	3,349	*345*	13.6%	*1.3*
Linndale	64	*24*	4	*5*	6.3%	*7.2*
Lyndhurst	6,235	*211*	135	*57*	2.2%	*0.9*
Maple Heights	9,364	*307*	1,006	*168*	10.7%	*1.7*
Mayfield	1,401	*76*	55	*45*	3.9%	*3.3*
Mayfield Heights	9,160	*342*	765	*151*	8.4%	*1.6*
Middleburg Heights	7,009	*225*	460	*104*	6.6%	*1.5*
Moreland Hills	1,244	*63*	24	*22*	1.9%	*1.7*
Newburgh Heights	919	*76*	56	*32*	6.1%	*3.5*
North Olmsted	13,539	*284*	499	*128*	3.7%	*0.9*
North Randall	473	*55*	141	*42*	29.8%	*7.4*
North Royalton	12,368	*249*	567	*130*	4.6%	*1*
Oakwood village	1,457	*142*	131	*62*	9.0%	*4.2*
Olmsted Falls	3,362	*145*	64	*37*	1.9%	*1.1*
Olmsted Township	5,466	*217*	266	*103*	4.9%	*1.9*
Orange	1,287	*76*	23	*25*	1.8%	*1.9*
Parma	33,429	*486*	2,101	*246*	6.3%	*0.7*
Parma Heights	9,159	*280*	795	*178*	8.7%	*1.9*
Pepper Pike	2,162	*96*	19	*22*	0.9%	*1*
Richmond Heights	4,713	*238*	384	*138*	8.1%	*2.7*
Rocky River	8,682	*297*	590	*171*	6.8%	*1.9*

Area	Occupied Housing Units (for Vehicles Available)		No Vehicles Available			
	Estimate	***Margin of Error***	**Estimate**	***Margin of Error***	**Percent**	***Margin of Error***
Seven Hills	4,934	*128*	140	*52*	2.8%	*1*
Shaker Heights	11,294	*294*	906	*165*	8.0%	*1.4*
Solon	8,236	*181*	286	*111*	3.5%	*1.3*
South Euclid	8,868	*248*	330	*122*	3.7%	*1.4*
Strongsville	17,175	*269*	752	*157*	4.4%	*0.9*
University Heights	4,787	*241*	378	*122*	7.9%	*2.5*
Valley View	700	*49*	14	*12*	2.0%	*1.7*
Walton Hills	924	*47*	33	*27*	3.6%	*2.9*
Warrensville Heights	5,874	*259*	626	*155*	10.7%	*2.5*
Westlake	13,282	*321*	806	*158*	6.1%	*1.2*
Woodmere	442	*36*	37	*23*	8.4%	*5*
Cuyahoga County	534,899	*2314*	71,870	*1562*	13.4%	*0.3*

[1] Hunting Valley spans two counties: Cuyahoga County and Geauga County. The data shown in the table is for the Cuyahoga County portion only.

Prepared by the Cuyahoga County Planning Commission, January 2014.

Source: U.S. Census, 2008-2012 American Community Survey 5-Year Estimates, Selected Housing Characteristics (DP-04).

Appendix B: Regional Connectivity

B.1 RTA Long Range Plan

Figure 39: RTA Long Range Plan – Future Transit Centers and Park-Ride Lots

B.2 RTA Potential Corridors for Transit Expansion

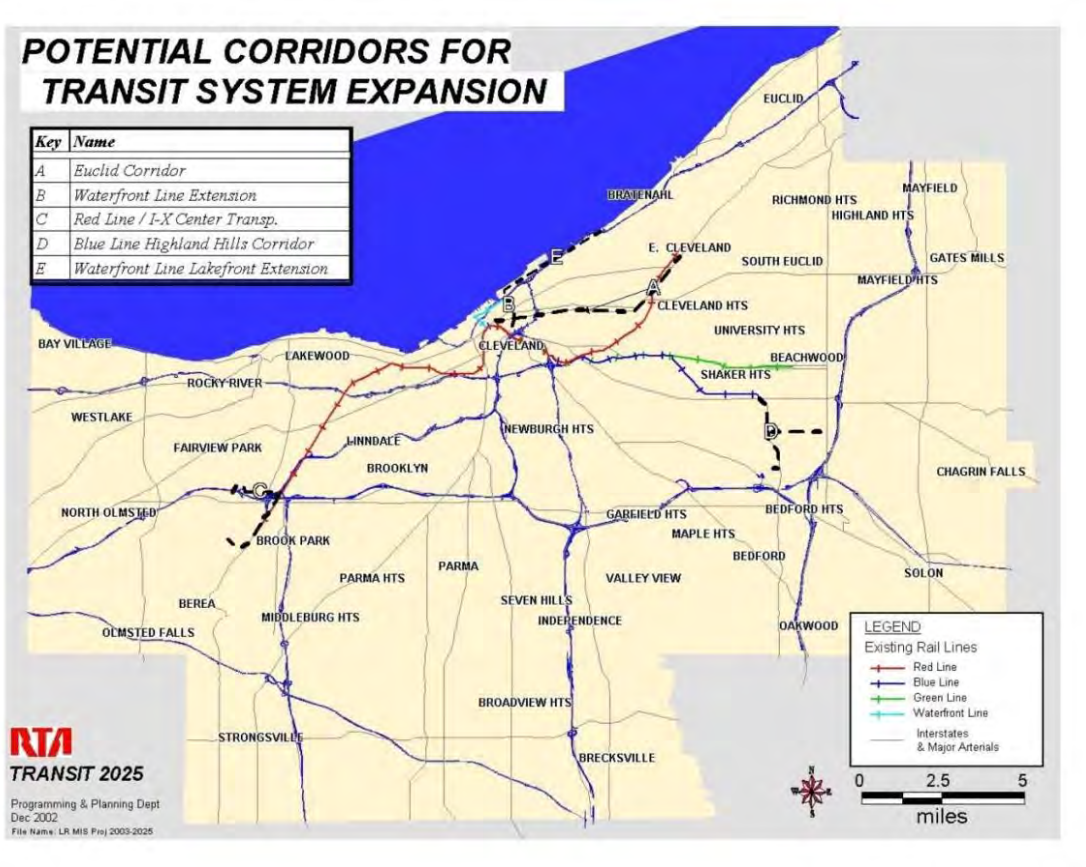


Figure 40: RTA Potential Corridors for Transit Expansion

B.3 NOACA Regional Bikeway Network

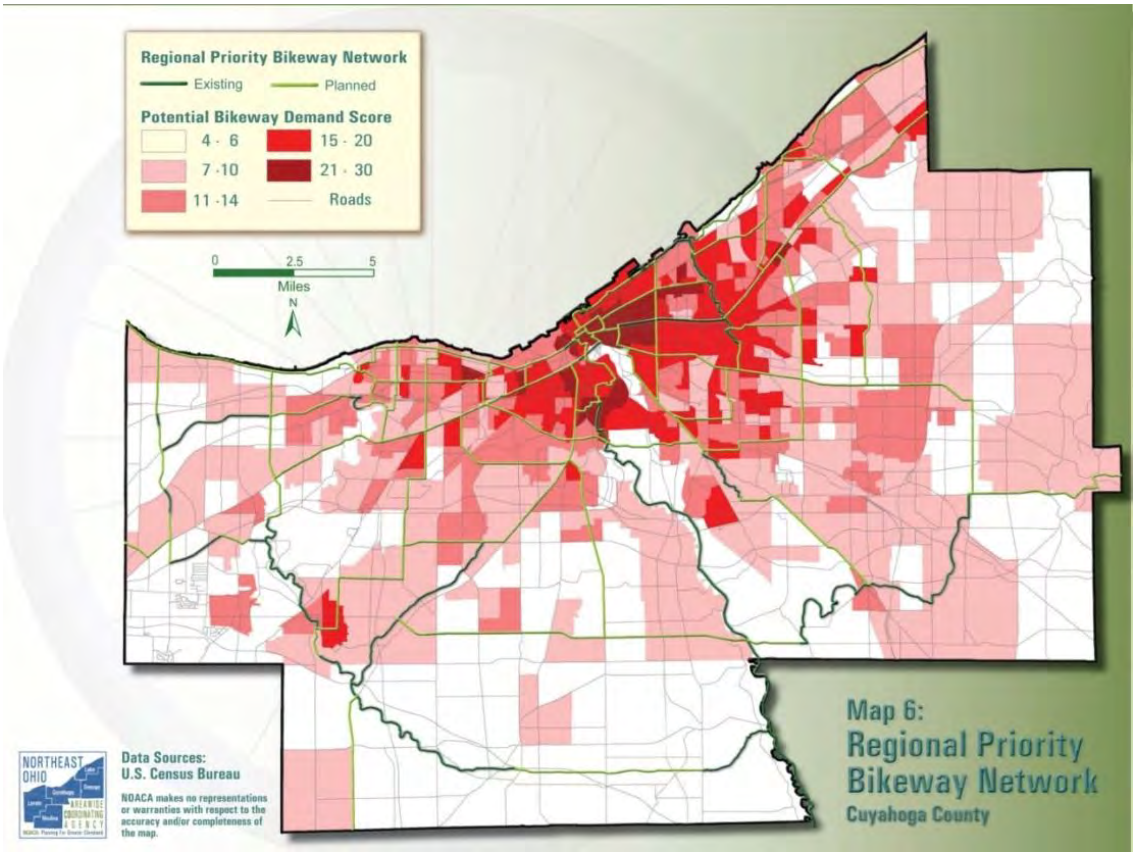


Figure 41: NOACA Regional Priority Bikeway Network

Appendix C: Sample Complete Streets Policy

SAMPLE: MORPC's COMPLETE STREETS MODEL POLICY

BACKGROUND

Some areas in *Our Community* were designed for automobile transportation and lack facilities, such as sidewalks, bus shelters, and bicycle lanes. As demand for walking, bicycling, and transit grows, safe and accessible transportation accommodations for all users become increasingly necessary. Reducing the sole reliance on the automobile can help in improving air quality and reducing greenhouse gas emissions.

About __ percent of workers residing in *Our Community* work outside the city boundaries, and a large proportion of the trips taken in *Our Community* begin or end in other communities. It is essential to provide safe and accessible transportation facilities for all users not only within *Our Community*, but also to connect to neighboring communities.

An estimated __ percent of *Our Community* residents suffer from obesity. A lack of physical activity is one of the many factors that increase the risk of obesity and diseases associated with the condition. Active transportation is an efficient, convenient way for residents to get exercise.

According to Census data, __ percent of households in *Our Community* have no access to a motor vehicle. The residents of these households should be accommodated by infrastructure that makes non-automobile transportation safe, convenient, and comfortable.

Our Community is served by __ express bus routes and __ local bus routes. Transit ridership is projected to increase in future decades, and transit service is expected to expand. However, some bus stops are in locations without sidewalks, safe street crossings, or facilities for the disabled.

Finally, from 2008 to 2010, there were __ motor vehicle crashes in *Our Community*, including __ crashes involving pedestrians, __ involving bicyclists, and a total of ___ fatalities. Improving traffic safety is a priority for the city.

Comment:

The background section of the policy provides information on:

-What are the benefits of adopting a complete streets policy in our community?

-What reason for adoption (such as health, safety, or providing transportation choice) will consistently rally support from the community, its transportation professionals, and its leaders?

- See Appendix A for Data by communities to support your background section of the policy

DEFINITION

Complete Streets are roadways designed to safely and comfortably accommodate all users, including, but not limited to motorists, cyclists, pedestrians, transit and school bus riders, delivery and service personnel, freight haulers, and emergency responders. "All users" includes people of all ages and abilities.

Comment:

The strongest policies are those that are clear in intent, saying facilities that meet the needs of multiple users "shall" or "must" be included in all transportation projects (CS policy workbook p. 19)

ALL USERS and MODES: Beyond simply the category of users is a more nuanced understanding that not all people who move by a certain mode are the same. The needs of a father bicycling with a young child are different from those of a woman in her twenties speedily riding her bicycle to work. Older adults benefit from clear markings and signage when driving. People with vision impairments need audible and tactile stimuli to travel safely and independently, and those using wheelchairs need curb ramps and standard width sidewalks. An ideal Complete Streets policy considers this range of needs and recognizes the importance of planning and designing streets for all ages and abilities. It is also important to address equity issues, taking into account potential past systemic marginalization of certain communities because of race, ethnicity, or income. (CS policy workbook p. 20)

Questions this section of the policy will answer:

-Which users and modes will our policy include?

-How will we address the needs of older adults, children, people with disabilities, minority populations, and lower income residents?

VISION

To create an equitable, balanced, and effective transportation system throughout *Our Community* that allows every roadway user to travel safely and comfortably, makes sustainable transportation options available to everyone, and provides a comprehensive, integrated network for all modes both within *Our Community* and connecting to adjacent communities.

Comment:

A strong vision can inspire a community to follow through on its complete streets policy. Just as no two policies are alike, visions are not one-size-fits-all either. Think about what can motivate your community to consistently plan and design its streets to be safe for people of all ages and abilities, regardless of how they travel. Draw from your community's history, including slogans, themes, mission statements, and past planning efforts.

POLICY STATEMENT

The Complete Streets policy of *Our Community* is developed to provide guidance for decision makers, planners, and designers to ensure that multimodal elements are incorporated into all transportation improvement projects.

- All roadway projects, including new roadways, reconstruction of existing roadways, and new developments in *Our Community* shall accommodate users of all ages and abilities, including pedestrians, bicyclists, transit users, motorists, persons with disabilities, and adjacent land users.
- Accommodation of all users should be consistent with the project context, including current or anticipated development density, roadway characteristics, transit plans, right-of-way dimensions and availability, and community plans. Since each roadway location is unique, flexibility in the appropriate type of facilities should be provided in order to allow designers to tailor the project to the unique circumstances.
- This policy shall apply to the new construction, reconstruction, rehabilitation, repair, maintenance, or planning of roadways, trails and other transportation facilities, for the entire right-of-way.
- All plans, policies, standards, guidelines, and procedures shall be reviewed, and if necessary phased in gradually, to ensure compliance with Complete Streets principles. When revising those documents, it is critical to recognize the need for flexibility in balancing user needs.
- Once those documents are revised, all roadway projects shall adhere to the most recent city-approved documents, including the following:
  - Planning documents, such as the comprehensive master plan, area plan, strategic plan, bicycle master plan, mobility plan, thoroughfare plan, or Safe Routes to School plans.
  - Zoning and subdivision regulations.
  - Project development procedures, such as design standards.
  - Operations and maintenance plans.
  - Other applicable transportation policies.
- Roadway projects shall include a project description that provides information about the city right-of-way, public support for the improvement, the potential environmental impacts of improvements, and the benefits of the project, including improved access and connectivity.
- Project boundaries shall be chosen to include connections through “pinch points,” such as overpasses, railroad crossings, and bridges.
- Street furniture, such as bike racks or benches, should be considered as part of all projects as long as they do not impede any user. Landscaping and street trees should also be considered, with careful analysis of tree, site, and design considerations.

Comments:

How will our policy address complete streets needs in scoping, planning, design, construction, operations, and maintenance?

To which types of projects will the policy apply: new construction, reconstruction, resurfacing, restoration, rehabilitation, operations, retrofits, and other maintenance work? Refer to your earlier discussions about how transportation planning and design decisions are made.

How can we ensure consultant contracts reflect our complete streets goals? How can that need be reflected in this policy?

EXEMPTION

Exemptions from this policy should be avoided. However, in cases where partial or full exemptions are necessary, they should be documented during the project development process and presented during the public involvement process. All exemptions shall be kept on record and made publicly available. The exemption of any roadway project from this policy shall be approved by a senior level department head, such as the Public Service Director.

Comments:

Determining exceptions during the writing process can reassure those who are doubtful about the policy, but if they are too broad they can make the policy meaningless.

There must be a balance achieved when specifying exceptions in policy language so that the needed flexibility for legitimate exceptions does not also create loopholes.

What exceptions will be included in the policy?

How will they be approved, and by whom?

What kind of accountability measure will we use?

PERFORMANCE STANDARDS

The success of Complete Streets projects shall be measured through a number of ways, including but not limited to:

- Miles of on-street and off-street bicycle routes created.
- New linear feet of sidewalk.
- Changes in the number of people using public transportation, bicycling, or walking (mode shift).
- Percentage of children walking or bicycling to school (mode shift).
- Number of crashes including motorists and non-motorists.
- Number of new street trees.

Comment:

Please refer to Chapter 5.6 Measuring success for additional information and measurements.

IMPLEMENTATION

Our Community will carry out these key steps in the following ways:

1. Procedures for new projects will be restructured to follow a process in which *Our Community* staff reviews all projects for its accommodation of all users.
2. Resources will be allocated for the research and development of new or revised design standards and design policies for projects within *Our Community*. Detailed design guidelines on how to build Complete Streets will be developed. *Our Community* will also acquire a library of existing design guides that serve as good examples for the design of Complete Streets.
3. *Our Community* planners and engineers will attend a certain number of workshops and other educational sessions each year relating to the design and implementation of Complete Streets.
4. *Our Community* staff will conduct ongoing research to determine performance measures. Data on all modes of traffic will be collected regularly and analyzed in order to determine trends.

Comments:

According to the NCSC, there are four key steps for successful implementation:

1. Restructure procedures to accommodate all users on every project.
2. Develop new design policies and guides.
3. Offer workshops and other training opportunities to planners and engineers.
4. Institute better ways to measure performance and collect data on how well the streets are serving all users.

Some additional steps and questions that may be useful include:

1. Establish a transportation committee/ complete streets task force
2. Select which City Department will be responsible for supervising the implementation and reporting back on the progress to city council
3. How detailed is the policy we are writing, and what parts of it will require further development during implementation planning? Who will coordinate those efforts? Should that person or group of people be named in the policy?
4. How does the policy empower implementation planners to make those decisions?
5. What other documents and procedures will need to be updated? Do we need to change our project selection criteria? Is there legislative action, such as modifying code, changing subdivision requirements, and modifying zoning, needed? Do we need to reevaluate and modify our design guidance? Consider integrating elements of the Checklists provided in Chapter 5.4 Procedural Changes; and the list included in section 5.4 Implementation and integrate documents you might want to update, including Plans, Road Projects, Design Guides, Rules, codes, procedures, Enforcement

Consider Element #4: "Include all roads and appropriate agencies" under section 5.3.4. Developing Your Policy.

- *What departments, agencies, and jurisdictions have some control or interest in our streets? At what point(s) in our process do we include outside agencies, such as the state or county? Do neighboring jurisdictions have Complete Streets policies, and how can we coordinate with them?*
- *How will we communicate our complete streets vision to them?*
- *Will our policy include private development?*

Appendix D: Tool - Complete Streets Strategies

There is a wide array of strategies that local communities can take to include complete streets in their day-to-day operations. As communities within the county are unique, there will be different paths and levels of commitment to complete streets.

Plans –The types of plans identified in the *Complete Street Strategies* info box can assist in determining networks and routes most suitable for complete streets treatment. Engaging in planning allows for a systematic perspective on integrating land uses with transportation needs. Key considerations are connecting residents to stores, schools, libraries and parks through various modes of transportation. The planning process can provide broad directions and help to set priorities on corridors. If a community just recently updated their master plan, they might want to consider writing a transportation plan, or even more specific, a bicycle and pedestrian plan as the next master plan update could still be 5 or 6 years out. The plan, eventually, can provide guidance for local engineers/ public works departments in prioritizing future projects (striping, pavement, widening). Among others, NOACA provides an opportunity to look at the transportation systems and how it can serve communities better through their TLCI studies and technical assistance program.

Project-Based Changes – Most communities are constantly working on updating and maintaining their streets through re-striping, re-paving, or widening projects. Rather than looking at the system at large, the project-focus lies on design details and challenges of a specific road corridor. Complete streets considerations can have the biggest impact at the design-stage. For example, designing a street for reduced vehicular delays will create a completely different street configuration than designing a street that is safe and comfortable for pedestrians. Including complete streets considerations in the process can be done in several different ways. Municipal engineers/ departments of public work may want to develop a checklist of design features to include in complete streets projects.

Additionally, communities might want to consider relaxing LOS on intersections in commercial areas. As the LOS focus is usually convenience for vehicle drivers (reduce delays), using relaxed vehicular LOS or multi-modal LOS for commercial areas can improve pedestrian and bicycle access as it will reduce waiting times on intersections and make walking more appealing[72] .

As pavement conditions are commonly used to prioritize road projects, communities might want to reconsider their process of prioritizing road projects. Oftentimes improvements for pedestrians or cyclists cost much less per capita than improvements for vehicular drivers. Communities might want to consider prioritizing projects based on their positive impact on the community. Aspects that could be factored into the decision of prioritizing projects are[73]:

- Can the project directly benefit multiple users (pedestrians, cyclists, transit passengers, and motorists)?

[72] (National Complete Streets Coalition, 2013d, p. 17)
[73] (City of Keller)AND (County of San Francisco Transportation Authority)

- Does the project address high-risk and high-activity pedestrian corridors or locations and/ or high bicycle collision corridors?
- Will the project improve water and air quality?
- Does the project provide change in development patterns, scale, or character of the area in the vicinity of the project?
- Could the project reduce traffic congestion by shifting modes?
- Could the project provide bicycle or pedestrian improvements?
- Could the project provide linkages to other existing transportation systems?
- Could the project improve a safety problem?

On the low-cost end of projects, communities might want to review their striping plans and explore opportunities to add pedestrian crosswalk striping or bike lanes. Additionally, planters or other barriers could be installed temporarily to "try out" various road way changes at different locations to explore potential long-term impacts.

Design Guides, Rules and Codes, and Enforcement – Updating plans and working on specific projects are only some components of complete streets implementation. Changing design guides, rules, and procedures can have additional impacts. For instance, changing subdivision requirements can ensure sidewalks and improved pedestrian and bicycle access within new projects. While complete streets are primarily focused on the public-right-of-way, the zoning code can facilitate a shift towards a more pedestrian, bicycle and transit friendly environment. As zoning codes regulate private properties, they can have an impact when it comes to parking requirements, design standards and setbacks. For a full list of actions consider the info box below.

Another issue is maintenance of sidewalks and bike lanes. Especially in the winter, unshoveled sidewalks and ice on the sidewalks can make it dangerous for pedestrians, especially, the elderly, to go outside and take walks. Additionally, in autumn, debris and leaves tend to hide bike lanes or make it impossible to use them. Those challenges need to be addressed through possible policy changes as well as enforcement or even fees for unshoveled sidewalks. The info box summarized the options that communities have and the different aspects that impact the built transportation system.

Complete Street Strategies

A: COMMUNITY PLANS (Planning Departments)

- **Master Plans:** Designate part of the master plan for circulation and transportation; consider how residents can connect to shopping, schools and recreational facilities by foot, bike, transit and car;
- **Bicycle and Pedestrian Plans:** Identify most suitable routes to be prioritized for bicycles and pedestrians that connect residential areas to destinations such as business districts, recreational facilities, and parks;
- **Corridor Plans and TLCI Studies:** Explore opportunities on specific road corridors to accommodate all users safely and conveniently;
- **Utility and sewer plans:** Coordinate with road projects;
- **SRTS Plans:** Identify routes safe for children to travel to and from school; and
- **Recreation and parks maintenance plans** for roads, sidewalks, medians etc.

For instance the City of North Royalton and Olmsted Township included recommendations for complete streets in their master plans.

B: ROAD PROJECTS (Public Works/ Engineering Departments and Police)

- Update criteria for **selecting and prioritizing road maintenance projects** (go beyond standard automobile oriented measurements like pavement conditions). Make sure to coordinate project schedules with utility and sewer projects;
- Revise **paving plans** (5 year work plan) using new selection and prioritization criteria;
- Establish a **new step-by-step project development process** that considers land uses and all users of the road as well as that gives ample opportunity to citizens to give input prior to a project being "too far down the road";
- Establish new **checklists for design elements** included in projects;
- Conduct Walk-N-Brainstorms to engage citizen;
- Consider **relaxed vehicular Level of Service** standards for business districts and shopping areas (analyze peak and off-peak-times to measure LOS);
- Review **upcoming striping projects** for opportunities to include bike lanes, sharrows, and pedestrian crosswalk striping;
- Explore **signal timing adjustment** to improve conditions for pedestrians (all pedestrian phases in business districts, adjust left-and right-turns, no turn on red);
- Update **performance measurements;**
- **Use pilot projects and temporary designs** to test alternative street configurations; and
- Work on **plan or policy for snow and ice management** (see Chapter 5.6 Maintenance).

C: DESIGN GUIDES

- Establish a street-scape design review team,
- Adopt/ Revise internal **design standards** that set forth complete streets designs,
- Adopt new design standards for specific districts (business, historic, etc.).

D: RULES/ CODES/ PROCEDURES

- Modify roadway design standards in subdivision regulations to require sidewalks and to connect streets/ cul-de-sacs at least for pedestrians; connectivity standards between subdivisions (at a minimum, bicycle and pedestrian connectivity can be required) and provide checklist for developers.

- Review zoning ordinances regarding setbacks in commercial areas (zero-lot-line building setbacks, improved pedestrian access), consider updated parking requirements (rear-parking, less parking spots by square feet, landscaping requirements, provision of bike parking) as well as connectivity between stores and offices (enable workers to walk to lunch places).
- Alter storm-water run-off standards,
- Revise regulations regarding sidewalk maintenance,
- Adopt motor vehicle and bicycle parking policy or zoning requirements.

For instance, City of Cleveland Pedestrian-Overlay District.

E: LAW ENFORCEMENT

- Increase frequency of traffic violation enforcements, such as bicycle passing distance and no parking during restricted hours or in restricted zone;
- Enforce passing distance for bicyclists;
- Establish bike police; and
- Provide education opportunities for police on bike laws.

Appendix E: Tool - Complete Streets Audit

A Complete Streets Audits (CSA) is a simple starting point for communities to briefly assess specific corridors or commercial districts. Before conducting a more detailed engineering study, a CSA is a cost-effective method to get a general idea of missing design elements along a street corridor. A CSA engages the community in examining the pedestrian, cyclist, and transit rider experience along a specific road corridor. For instance, the City of Kalamazoo, MI, used the findings of a CSA to develop the pedestrian circulation component of their downtown master plan. There are different methods available; however, all of them are fairly similar. In the Cleveland Area, Dr. Jordan Yin at Cleveland State University has been working with CSAs. This appendix gives a brief overview of how to structure and conduct a CSA.

Why use a Complete Streets Audit?

In times of tight budgets, complete streets audits are a method to easily identify transportation improvement needs on any specific corridor or intersection. CSA offers the opportunity to involve citizen in the process. For instance, Cleveland State University has collaborated with students of Villa Angela High-School for a Complete Streets Audit of E. 185th Street. As high-school students frequently use the corridor to get to and from school, they provided valuable insight on the safety of the corridor.

Whether a corridor is perceived as being safe or attractive to walk or bike can impact businesses in a commercial district as well as influence the mode choice for school children. Sometimes streets can be greatly enhanced with minor improvements such as restriping crosswalks, implementing midblock crossings, or utilizing flashing lights. CSA can help identify those opportunities. Furthermore, when examining a district, a CSA can determine most of the pressing improvements needed. Thus, it can be used to prioritize street segments over others.

How do Complete Streets Audits work?

To conduct a complete streets audit, the study area/ corridor needs to be determined. As shown in Figure41, intersections should be assigned letters, and streets should be assigned numbers on a block by block base for each street segment. Categories that should be assessed for each intersection and street segment relate to: pedestrian features, bicycle features, transit features, ADA accessibility, and general road attributes (see Table). This can be done in various ways: on paper, using technology, and using scantrons. The measurements can be adjusted and extended as needed for any specific project.

A sample of The Pedestrian Environment Data Scan (PEDS) instrument that was created by Dr. Kelly Clifton, University of Maryland; Andria Livi, University of Maryland; and Daniel Rodriguez, University of North Carolina, is provided in figure 43. Municipalities may decide to engage students and/or citizens in a Complete Streets Audit, in which case training should be provided on the meaning of the design elements that are being assessed. Small groups of people then go out into their communities and assess their assigned segments and intersections. The CSA results ultimately include the perception of specific road corridors, and can serve to prioritize investment by identifying the easiest and most necessary fixes.

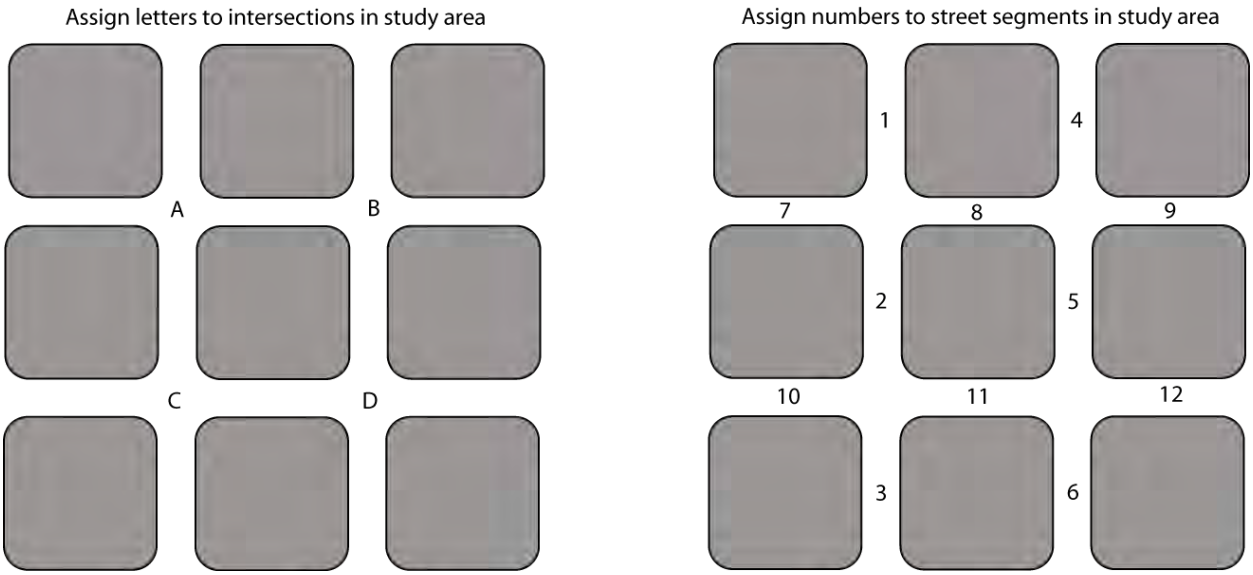
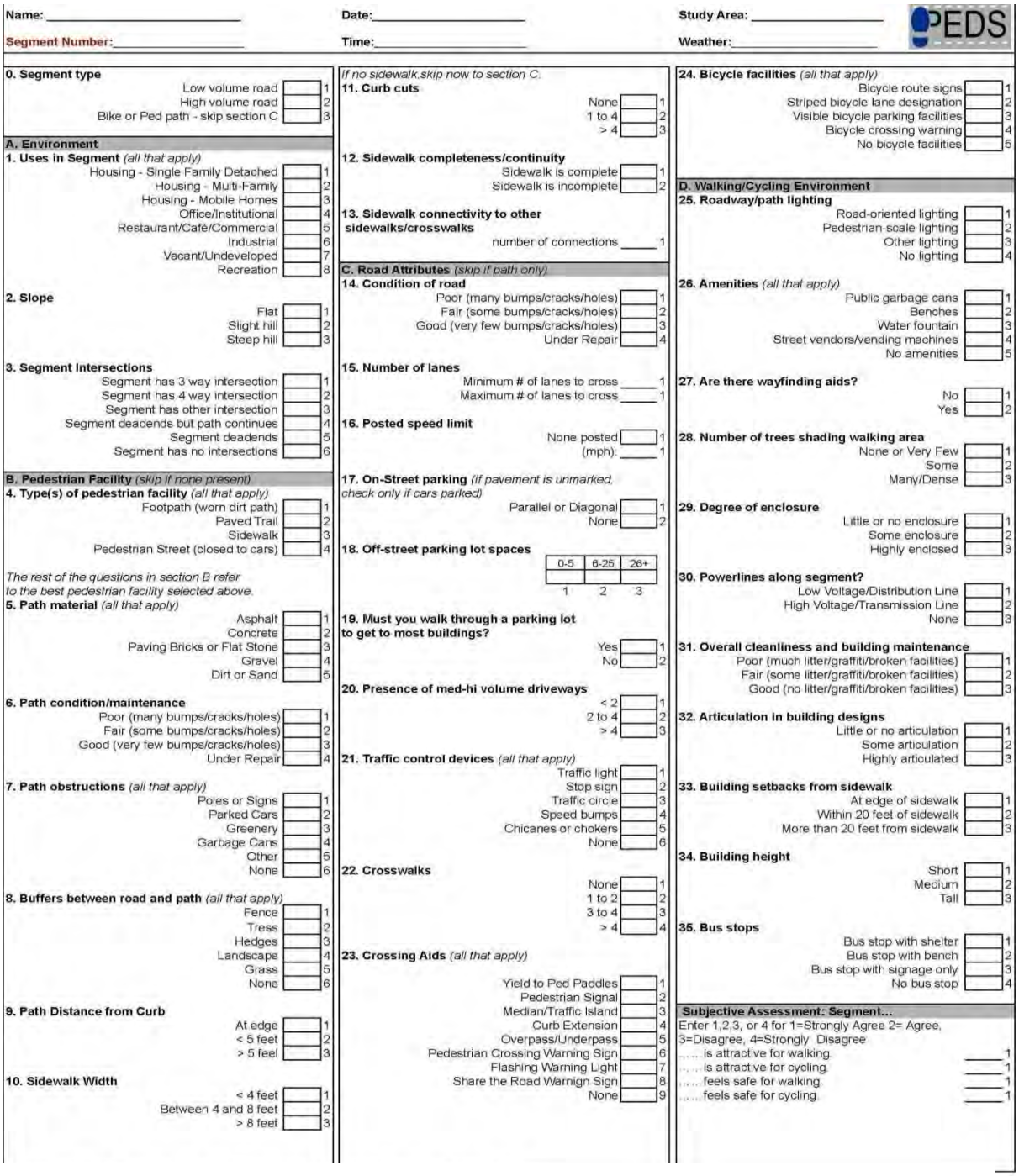


Figure 42: Labeling Street Segments for Complete Street Audit

Sample Complete Streets Audit Instrument

Pedestrian Environment Data Scan (PEDS) Audit Instrument:[i]



Name: _____ Date: _____ Study Area: _____ PEDS

Segment Number: _____ Time: _____ Weather: _____

0. Segment type
Low volume road 1
High volume road 2
Bike or Ped path - skip section C 3

A. Environment

1. Uses in Segment *(all that apply)*
Housing - Single Family Detached 1
Housing - Multi-Family 2
Housing - Mobile Homes 3
Office/Institutional 4
Restaurant/Café/Commercial 5
Industrial 6
Vacant/Undeveloped 7
Recreation 8

2. Slope
Flat 1
Slight hill 2
Steep hill 3

3. Segment Intersections
Segment has 3 way intersection 1
Segment has 4 way intersection 2
Segment has other intersection 3
Segment deadends but path continues 4
Segment deadends 5
Segment has no intersections 6

B. Pedestrian Facility *(skip if none present)*

4. Type(s) of pedestrian facility *(all that apply)*
Footpath (worn dirt path) 1
Paved Trail 2
Sidewalk 3
Pedestrian Street (closed to cars) 4

The rest of the questions in section B refer to the best pedestrian facility selected above.

5. Path material *(all that apply)*
Asphalt 1
Concrete 2
Paving Bricks or Flat Stone 3
Gravel 4
Dirt or Sand 5

6. Path condition/maintenance
Poor (many bumps/cracks/holes) 1
Fair (some bumps/cracks/holes) 2
Good (very few bumps/cracks/holes) 3
Under Repair 4

7. Path obstructions *(all that apply)*
Poles or Signs 1
Parked Cars 2
Greenery 3
Garbage Cans 4
Other 5
None 6

8. Buffers between road and path *(all that apply)*
Fence 1
Tress 2
Hedges 3
Landscape 4
Grass 5
None 6

9. Path Distance from Curb
At edge 1
< 5 feet 2
> 5 feet 3

10. Sidewalk Width
< 4 feet 1
Between 4 and 8 feet 2
> 8 feet 3

If no sidewalk,skip now to section C.

11. Curb cuts
None 1
1 to 4 2
> 4 3

12. Sidewalk completeness/continuity
Sidewalk is complete 1
Sidewalk is incomplete 2

13. Sidewalk connectivity to other sidewalks/crosswalks
number of connections _____ 1

C. Road Attributes *(skip if path only)*

14. Condition of road
Poor (many bumps/cracks/holes) 1
Fair (some bumps/cracks/holes) 2
Good (very few bumps/cracks/holes) 3
Under Repair 4

15. Number of lanes
Minimum # of lanes to cross _____ 1
Maximum # of lanes to cross _____ 1

16. Posted speed limit
None posted 1
(mph): _____ 1

17. On-Street parking *(if pavement is unmarked, check only if cars parked)*
Parallel or Diagonal 1
None 2

18. Off-street parking lot spaces

0-5	6-25	26+
1	2	3

19. Must you walk through a parking lot to get to most buildings?
Yes 1
No 2

20. Presence of med-hi volume driveways
< 2 1
2 to 4 2
> 4 3

21. Traffic control devices *(all that apply)*
Traffic light 1
Stop sign 2
Traffic circle 3
Speed bumps 4
Chicanes or chokers 5
None 6

22. Crosswalks
None 1
1 to 2 2
3 to 4 3
> 4 4

23. Crossing Aids *(all that apply)*
Yield to Ped Paddles 1
Pedestrian Signal 2
Median/Traffic Island 3
Curb Extension 4
Overpass/Underpass 5
Pedestrian Crossing Warning Sign 6
Flashing Warning Light 7
Share the Road Warnign Sign 8
None 9

24. Bicycle facilities *(all that apply)*
Bicycle route signs 1
Striped bicycle lane designation 2
Visible bicycle parking facilities 3
Bicycle crossing warning 4
No bicycle facilities 5

D. Walking/Cycling Environment

25. Roadway/path lighting
Road-oriented lighting 1
Pedestrian-scale lighting 2
Other lighting 3
No lighting 4

26. Amenities *(all that apply)*
Public garbage cans 1
Benches 2
Water fountain 3
Street vendors/vending machines 4
No amenities 5

27. Are there wayfinding aids?
No 1
Yes 2

28. Number of trees shading walking area
None or Very Few 1
Some 2
Many/Dense 3

29. Degree of enclosure
Little or no enclosure 1
Some enclosure 2
Highly enclosed 3

30. Powerlines along segment?
Low Voltage/Distribution Line 1
High Voltage/Transmission Line 2
None 3

31. Overall cleanliness and building maintenance
Poor (much litter/graffiti/broken facilities) 1
Fair (some litter/graffiti/broken facilities) 2
Good (no litter/graffiti/broken facilities) 3

32. Articulation in building designs
Little or no articulation 1
Some articulation 2
Highly articulated 3

33. Building setbacks from sidewalk
At edge of sidewalk 1
Within 20 feet of sidewalk 2
More than 20 feet from sidewalk 3

34. Building height
Short 1
Medium 2
Tall 3

35. Bus stops
Bus stop with shelter 1
Bus stop with bench 2
Bus stop with signage only 3
No bus stop 4

Subjective Assessment: Segment...
Enter 1,2,3, or 4 for 1=Strongly Agree 2= Agree, 3=Disagree, 4=Strongly Disagree
.....is attractive for walking. _____1
.....is attractive for cycling. _____1
.....feels safe for walking. _____1
.....feels safe for cycling. _____1

Figure 43: Complete Street Audit

[i] (Kelly Clifton, 2004)