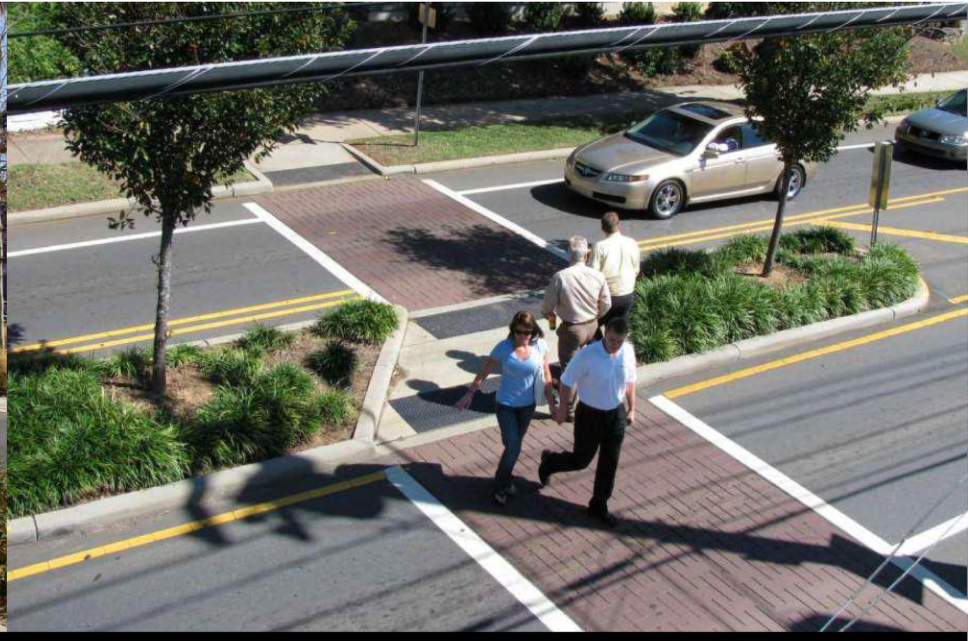
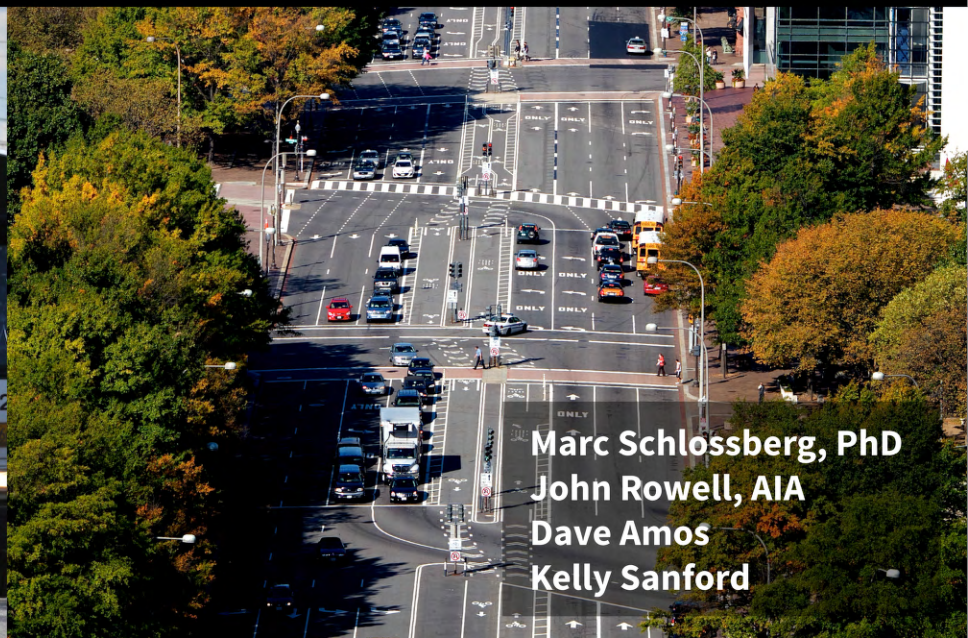


RETHINKING STREETS

An Evidence-Based Guide to 25 Complete Street Transformations



Marc Schlossberg, PhD
John Rowell, AIA
Dave Amos
Kelly Sanford

For more information, visit: rethinkingstreets.com

Rethinking Streets

An Evidence-Based Guide to 25 Complete Street Transformations

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The University of Oregon's Sustainable Cities Initiative (SCI) works to leverage the resources, expertise, energy and capacity embedded within universities to make good sustainable places through research, teaching, training and policy/advocacy. SCI's award winning Sustainable City Year Program (SCYP) has developed a new "catalytic learning" pedagogical model that has been described as "perhaps the most comprehensive effort by a U.S. university to infuse sustainability into its curricula and community outreach" (NY Times) and "one of higher education's most successful and comprehensive service-learning programs" (Chronicle of Higher Education). SCI's applied research focuses on sustainability and the built environment, sustainable urban design, active transportation, transit, triple bottom line analysis and more. SCI also actively works with policy makers and practitioners internationally, providing advising, training and consultation in a variety of sustainability areas related to cities, livability and quality of life. More information can be found at sci.uoregon.edu.

COVER PHOTO CREDITS: top left: Greg Konar, top right: City of Charlotte, bottom left: Jonathan Maus, Bike Portland, bottom right: Rob Shenk

SCI
Sustainable Cities Initiative
University of Oregon

NITC
NATIONAL INSTITUTE
for TRANSPORTATION
and COMMUNITIES

ACKNOWLEDGEMENTS

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CULTURAL
TRAIL

Table of Contents

Left: The Indianapolis Cultural Trail
photo courtesy of Rundell Ernstberger Associates

Foreword from the Authors

It's time to rethink the street. For too long we've been building streets as though they have one function–to move cars quickly. The reality is that streets can do more than just move cars. They can move people on foot, on bikes, and on transit, often without hurting vehicular throughput and improving safety. They can also be more than a way to get somewhere else. Good streets are good places, too–public places where people meet, sit and socialize, conduct business, wander about, play, and more.

Many communities across the country are re-thinking their streets and re-designing them to meet changing preferences and future needs. Americans are driving less. Many want to live where they aren't as dependent on cars for their daily routines. They want to be more connected, for physical and mental health. Some communities seek a wider range of transportation choices for social equity or to protect against climate change. And for others, the sheer cost of fixing potholes is pushing them to look for ways that create less wear and tear on the road network.

Yet, making changes to street design–like re-allocating travel lanes or on-street parking for dedicated bus lanes, bike lanes, or wider sidewalks–is often met with community controversy and divisive processes that take much too long to get from idea to implementation. Often it can be hard to imagine a street differently than how it currently exists. Streets, and the buildings that are adjacent, seem like fixed, unmovable, unchangeable conditions. We accept the way things are, even if they are less than ideal. Change can be hard, especially when it is difficult to picture how an alternative will look or function.

That is why we produced this book–to use evidence from completed street projects from around the United States in order to help communities imagine alternative futures for their streets. We are not showing hypothetical street re-designs, but actual examples from typical communities to show how they did what they did and see what resulted from the change. We have included a variety of

Photo: Jonathan Maus / Bike Portland

Community members and residents of the Albina Neighborhood in Portland, Oregon meet to develop a vision for North Williams Avenue. For more information, see page 93.

types of information relevant to traffic engineers, transportation planners, elected officials, businesses and community stakeholders at large. It is presented to be easily accessible and understandable to all.

Most of our examples are ordinary, everyday streets that exist somewhere in most cities big or small. In some cases, a specific street featured in this book may be directly relevant to a proposed project in your community. In other cases the collection of examples in this book may provide the foundation for creative street re-purposing.

This book is designed to communicate how communities of all kinds are making these changes all the time. It is our hope that this will make it easier for new projects to get built and that the examples will make it possible for a "new normal" to take hold, where all streets are re-visited and assessed to see whether they can be doing more. This is similar to a post-occupancy analysis–do our streets perform the way we want given all of the needs and uses we have of them? If not, then this book provides many examples on how to move forward and 'remodel' our streets.

A few of the street examples go beyond the ordinary and represent the transformative potential of streets in remaking a city. The Indianapolis Cultural Trail and Lancaster Boulevard examples, for example, show how deliberate investment in re-thinking a street can also help to re-think the community.

Thank you for your interest – now go and get to work!

Photo: United States EPA

The redesign of Lancaster Boulevard was a big undertaking, but resulted in major improvements to the area, including 48 new locally owned businesses, $130 million in private investment, and an 85% drop in injury-related collisions. *See page 75 for more information.*

Introduction

No public space works harder than the street. Streets provide vital links to homes and business, and serve as public spaces. As auto ownership in the United States increased, this balance shifted to favor streets as auto thoroughfares instead of places for living. Lately, the “Complete Streets” movement has challenged this paradigm, emphasizing transportation choices for users beyond cars and streets as places instead of mere transportation links.

Efforts to transform streets into Complete Streets (or from mobility-based to accessibility-based designs) face resistance at times, from both professional communities of traffic engineers and planners, and often from policy makers and the general public who feel new designs do nothing more than reduce automobile access. Complete Streets advocates, in some cases, counter that while their designs often create pedestrian and cycling space from areas that were previously occupied by automobiles, throughput is often not impacted and that automobile flow can actually improve.

One example of this conflict is the “road diet”, where a four-lane road (two lanes in each direction) with no median or bike lanes is turned into a five-lane road, with one auto lane in each direction, a center turn median and two bike lanes. Removing two automobile travel lanes seems like it would reduce automobile throughput, but studies of road diets often show that the improved flow achieved with left turning vehicles using the center median actually maintains or improves upon previous throughput numbers.

In some cases, a reduction in vehicle flow is unavoidable to introduce other modes. Some improvements to the street environment will reduce traffic flow but improve the quality of the place. This is a tradeoff that can have significant benefits for the businesses and residents along the street. Adding elements like on-street parking, street trees, and mid-block crossings can reduce auto speeds and potentially reduce throughput, but such designs make the street more inviting to people.

Photo: City of Myrtle Beach

A road diet changed the character of Ocean Boulevard in Myrtle Beach, SC. The street is now safer to cross and gives bikes dedicated lanes, all while moving the same number of vehicles.

This book documents the redesign of 25 streets across the United States and some of the effects the redesign had on traffic, safety, and economic measures. Each of the streets treats the balance between transportation modes and the balance between thoroughfare and place differently, and the results differ accordingly. Some streets added facilities for other modes with a goal of maintaining auto throughput. Others consciously reduced auto throughput and tipped the balance in favor of creating a place.

Each street shifts this balance in its own way. For example, in the case of South Carrollton Avenue in New Orleans, Louisiana, traffic engineers simply added bike lanes. In the case of Ocean Boulevard, in Myrtle Beach, South Carolina, the street received a complete redesign and looks nothing like it did before.

The goal of this book is to use already finished projects to help communities better visualize new ways to use their commercial streets to serve multiple purposes and multiple modes of transportation. Because commercial streets are frequented by both local neighbors and visiting shoppers, they serve people with diverse backgrounds and needs. Additionally, sales tax receipts, surveys with business owners and building permits can all serve as economic indicators–providing more evidence of change brought on by street design.

The collection of finished projects provides the evidence and inspiration for more communities to rethink and retrofit their streets for the next generation of use.

Photo: Google

South Carrollton Avenue was under water after Hurricane Katrina. The City of New Orleans rebuilt the road and added a bicycle lane where there was only an extra-wide auto lane before. Cycling on the street increased 325%.

Transportation Concepts

Like any discipline, transportation engineering, planning, or design rely on specific concepts, measurements, nomenclature, and techniques that may not be obvious to the general public. This guide is designed to be understandable to everyone. The following street design concepts will help everyone from traffic engineers to local residents speak the same language when talking about streets.

Average Daily Traffic

Average Daily Traffic (ADT) is a common way to measure automobile use on a street. ADT is the number of cars passing a specific measurement point on a street in a 24-hour period. Busier streets have higher ADT numbers, while lower-volume streets have lower ADT numbers.

It is important to note that ADT does not factor in the difference between a bus full of people and a single occupancy car, and does not measure the number of people using the street. While streets with the same ADT share some characteristics, there are multiple street design alternatives that can accommodate the same demand, as shown in the examples on the right. The relationship between ADT and street design can be complex, but recent research suggests that streets with ADT numbers between 10,000 and 16,000 seem to be better suited for pedestrian-oriented retail than streets with lower or higher ADT.[1] Streets with four lanes of car traffic and an ADT lower than 20,000 are often candidates for road diets.[2]

W. Lancaster Boulevard, Lancaster, CA. Photo: City of Lancaster

ADT: 19,800

When this photo was taken, W. Lancaster Boulevard had 5 lanes of traffic and averaged 19,800 vehicles per day, but did not serve the community to its full potential.

Euclid Avenue, Cleveland, OH. Photo: Sam Bobko

ADT: 20,000

Euclid Avenue's two lanes of auto traffic still accommodate 20,000 vehicles per day, while also providing a rich pedestrian experience and Bus Rapid Transit facilities.

East Boulevard, Charlotte, NC. Photo: City of Charlotte

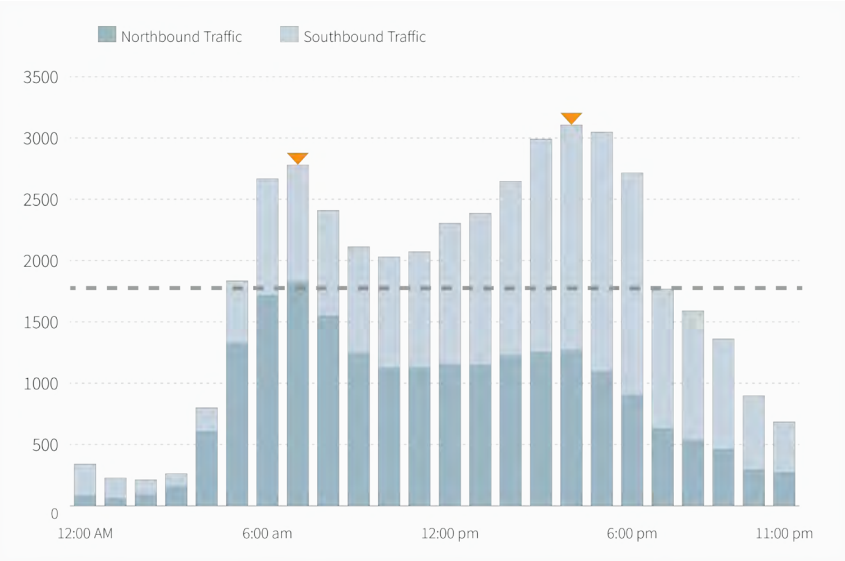
ADT: 18,900

In Charlotte, a center turn lane allows a place for left-turning vehicles to wait, improving flow of the two auto lanes. The street now features better pedestrian and bicycles facilities in addition to moving 18,900 automobiles per day.

Peak Hour Traffic

While ADT gives one indication of a street's usage, it does not address fluctuations of traffic throughout the day. On most streets, traffic increases during the morning and evening rush hours and drops off to almost nothing in the middle of the night (see chart at right). Typically, one lane on a city street can accommodate 1,000-1,600 cars per hour. To avoid traffic jams during peak periods, streets are often designed to be wide enough to handle rush hour traffic with only small delays. For most of the day, however, the street is wider than necessary to accommodate car traffic. Street redesigns that reduce car throughput often only reduce service during the peak hour but continue to serve the needs of car traffic for most of the day and night.

Traffic Fluctuations and Peak Hour



This sample data set demonstrates how traffic fluctuates throughout the day. In this scenario, peak hours occur at 7 am and 4 pm, during the morning and evening commute. Though traffic peaks around 3,000 cars per hour, the average traffic per hour is closer to 1,800. Average daily traffic on this street would likely be around 40,000.

Posted Speed

When determining a speed limit, traffic engineers consider the street width, context along the street, intersection frequency, and the street geometry, such as curves and elevation changes. Based on these characteristics, the traffic engineer will first consider how fast a typical motorist would go without a posted speed limit. The actual speed limit is then set to 85% of this speed. This technique assumes many drivers will go faster than posted speeds.

Design Speed

Street speeds can also be determined by street design rather than posted speed limit signs. Wide lanes and streets without trees and other streetscape elements encourage higher speeds. Increased distances between crosswalks or signals also encourage higher speeds. As speeds increase, businesses tend to locate further back from the street edge, and employ higher signs that can be read at a distance. This style of development is common in suburban commercial corridors that often feature fast food restaurants and strip malls.

When speeds need to be consistent with adjacent pedestrian and bicycle activity, narrower lanes, parked cars, street trees, regular crossings, benches, bike racks, lamp posts, and other street furniture all give drivers visual cues to slow down and be alert. This type of street design encourages safe driving, encourages pedestrian-oriented shopping and dining, and reduces injury in case of accident.

Usually it is more effective to design a street for a given design speed to encourage safe driving rather than relying on the posted speed alone to enforce driver behavior.

Grant Avenue, San Francisco, CA. Photo: Renee S. Swen

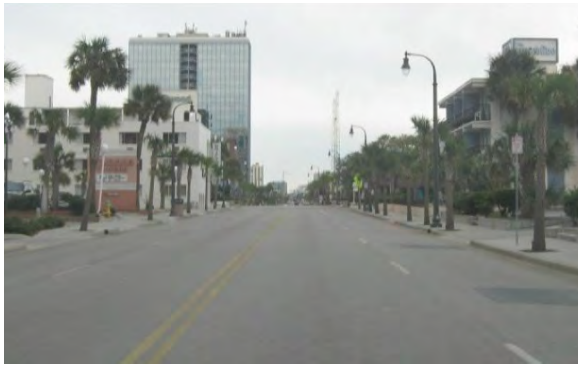
25 mph

Grant Avenue in San Francisco runs through China Town. This narrow street is typically bustling with shops and street activity - keeping drivers alert and cautious.

Second Street, Long Beach, CA. Photo: Dave Amos

25 mph

With street trees, parallel parking, and frequent crossings, it feels natural to drive 25 miles per hour or less on Second Street in Long Beach, CA.



Ocean Boulevard, Myrtle Beach, SC. Photo: Google

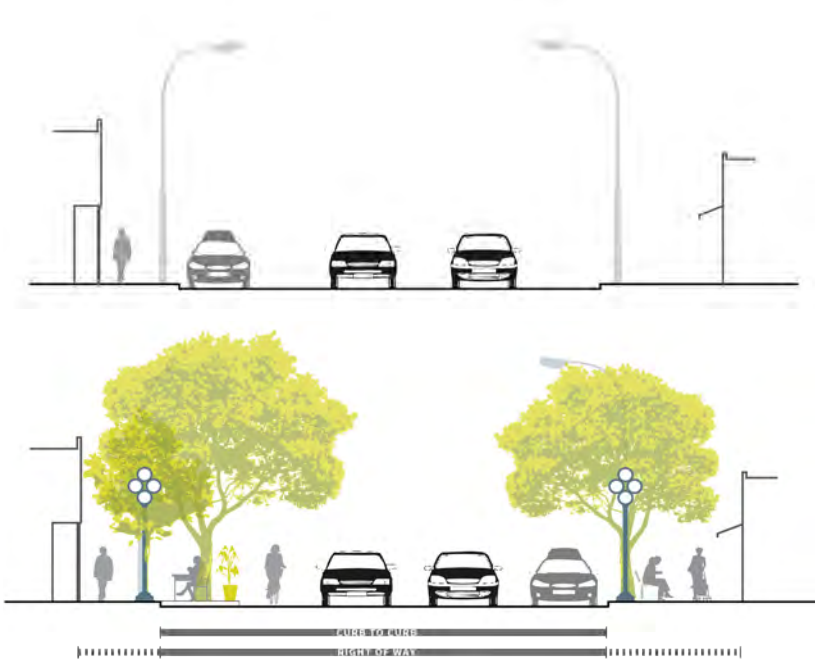
25 mph

With wide lanes, Ocean Boulevard once resembled an expressway more than an urban street, encouraging speeds much greater than the posted 25 mph speed limit.

Right of Way and Curb-to-Curb

Streets, sidewalks, planter strips, and all elements of a public street exist within a space called the right of way. This is the area of the street that is publicly owned and maintained. In an urban area, this may be the entire space between facing buildings. On a residential street, this may be the space from sidewalk to sidewalk, with a few extra feet on either side. In the right of way, the public owner (city, state, etc.) can design and implement improvements like streets, sidewalks, storm drains, and street trees. Changes to a street must occur within existing rights of way. Changes that extend beyond the right of way are typically complex, more costly and can be politically unpopular.

On existing streets, the right of way isn't the only important measurement. Moving curbs to widen or narrow streets can be very expensive, especially if utilities and storm drains need to be moved as well. This cost may be worth it in some cases, but often engineers and planners make changes without moving the curbs. Instead, they will add or remove travel lanes, bike lanes, and parking lanes, adjust the width of lanes, or use painted buffers while keeping the existing curb-to-curb width intact.



Streetscape elements like street trees and parked cars increase the "friction" a driver feels. This friction slows down traffic, making the street more pleasant as a place. The streets in the above image are the same width.

Bicycle Facilities

Many of the streets in this book have new infrastructure to accomodate cyclists. Depending on the size of the street and the context within the community, there are multiple potential strategies that help cycling be safe, comfortable, and direct.

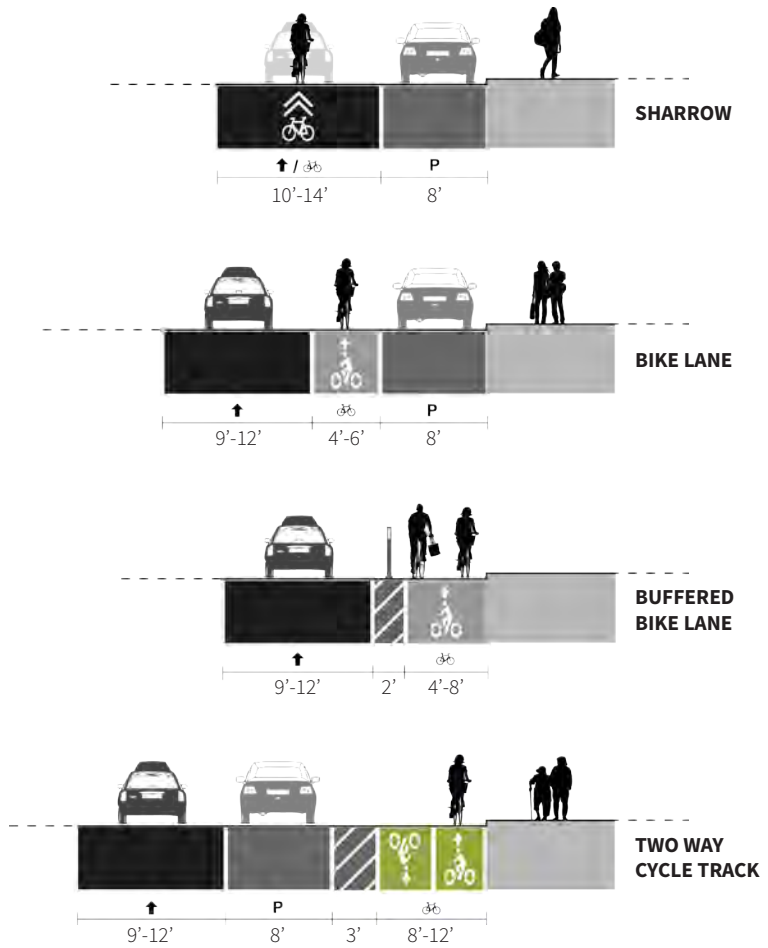
Sharrows are symbols painted in the lane indicating that drivers and bicyclists share the travel lane. Existing law generally already allows for shared use, and sharrows simply reinforce that reality in particular locations. In narrow lanes, sharrows may be installed in the center of the lane, whereas on wider lanes they tend to be toward the right. In either case, the sharrow symbol often indicates the preferred location for cyclists to ride.

Bike lanes typically range in size from 4 feet to 8 feet, and are lanes specifically dedicated to cyclists, though they may occasionally share space with cars for right turns at intersections. They usually exist on busier streets and demarcate bicycle space from motorized vehicle space with a line of white paint.

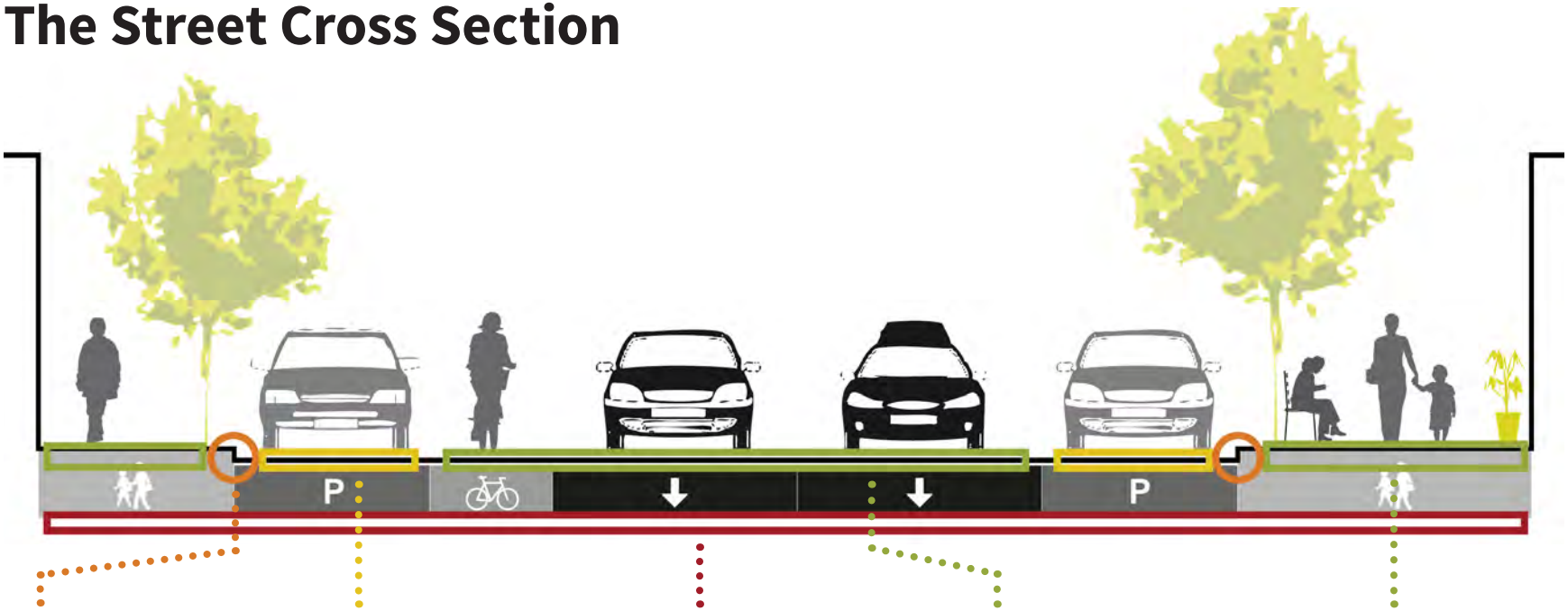
Cycle tracks are like bike lanes, but are physically separated from the motorized traffic. The barrier further protects cyclists from cars and dooring (collisions between cyclists and the open doors of parked cars). Cycle tracks may be one way or two way, and are sometimes lined with posts or painted green for added visibility. Advanced cycle tracks may be raised above the roadway between the asphalt and the sidewalk, or separated with larger physical barriers like planters.

Buffered bike lanes are a hybrid design that widens the strip of paint between a bike lane and motorized vehicle lanes. This extra buffer, often 2-3 feet, provides extra space and comfort to a wider range of people on bikes. Like bike lanes, buffered lanes and cycle tracks are generally located on busier streets that have destinations where people want to go.

For a more detailed explanation of bicycle facilities and design guidance, see the NACTO Urban Bikeway Design Guide.



The Street Cross Section



Curbs

$$$

The curb provides a clear distinction between the sidewalk and the street, but is also important for the street's function. Changing the curb line impacts the drainage system on the street, and requires re-engineering the street system, which can become costly. Construction may be lengthy and result in partial closure of the street. Thus, street designs that include moving curbs often require a greater investment of time and resources.

Parking

$

Although changes to parking may only require restriping or painting the curb, changing parking is often the most controversial and discussed aspect of redesigning streets. On-street parking typically is located next to the curb, although in some cases bike lanes are located between curb and parking to give cyclists protection from moving vehicles. In addition to cars, parking strips can contain bike parking (12 bikes = 1 car), leaving sidewalks to pedestrians.

Right of Way

$$$$$

The right of way is the strip of land that accommodates all the elements of the street, including lanes and sidewalks. Expanding the right of way can be a complicated, lengthy and expensive process. In order to expand the right of way, the City typically must purchase the land along the roadway from individual citizens and businesses. In many cases, structures and other obstacles may exist in this area.

Travel Lanes

$

Though re-striping lanes may require a traffic study, the cost to grind off old paint and repaint the lines is generally very low. Additionally, there is minimal disruption to traffic because the construction process is simple and can be done in phases. Cities can also test out new street designs with temporary restriping because of its low cost. Auto travel lanes can range from 9-12' in commercial areas. Current standards recommend minimum 6' bike lanes.

Streetscape Elements

$$

Streetscape elements include benches, bike parking, trees, and other furnishings on the sidewalk. Though the city may have standards to maintain a clear walking zone, there are a variety of ways to improve the streetscape. Installing streetscape elements can improve the sense of place of a street and create pleasant pedestrian environments.

How to Use This Guide

Location and Population (2010 U.S. Census)

After

Before

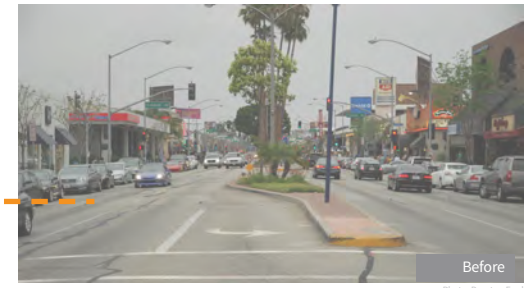


Photo: Royston Ford

Wide green stripes and sharrows give bicyclists a more comfortable travel lane on a busy street.

- Outer lanes in both directions were painted with a stripe of bright green to call attention to the mix of bicycles and cars in the lane.
- White sharrows were painted over the green paint. These are symbols indicating that bicycles share the travel lane with cars, and should travel in the flow of traffic.

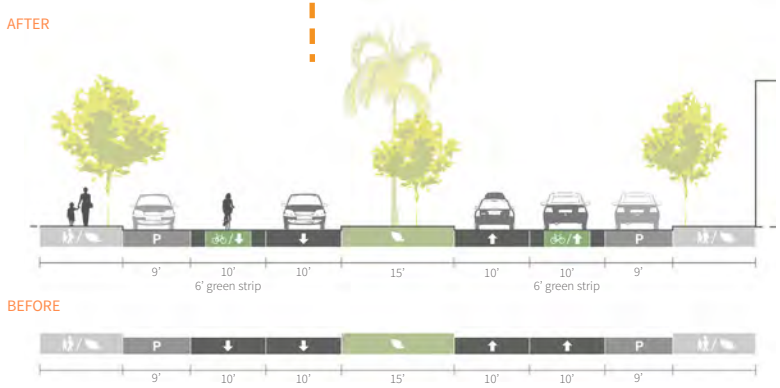
53 URBAN, MIXED-USE STREET

Key Interventions

Street Section Before and After

Facts and Figures

Urban, Mixed-Use Street



STREET CLASSIFICATION

Major Arterial

RIGHT OF WAY

76'–80'

LENGTH

0.75 miles

SPEED

SPEED LIMIT 25 BEFORE	SPEED LIMIT 25 AFTER

AVERAGE DAILY TRAFFIC

29,800* BEFORE	29,300* AFTER

PROCESS

3 days Construction

* Please note that these figures represent traffic counts taken on the same calendar day several years apart, and were not calculated as an average.

KEY OUTCOMES

Bikes Are Good for Business
In interviews with 27 businesses along the corridor, Bike Long Beach found that about 15% of shoppers come by bike, and 80% of businesses observed an increase in business from cyclists after the implementation of the green stripes.[22]

Increase in Bicyclists
Cycling rates nearly doubled after the green stripes were added in place of more typical sharrows. Cyclist counts over a three day period showed an increase from 1,320 cyclists to 2,428 cyclists a year later.[23]

A Safer Street for Everyone
Nearly four years after the paint was added, the total number of crashes has declined roughly 25%.[24]

Drivers and Cyclists are More Harmonious
The green lane was installed in part to coax cyclists away from the "door zone" and encourage them to take the lane. After an adjustment period, a majority of cyclists began riding in the center of the green paint. With the green paint, drivers understand that bikes belong, and have been more respectful of cyclists taking the lane since the change.[25]

Evidence of Change

How to Use This Guide

Location and Median Income (2010 U.S. Census)

Additional information on the street and its context

Second Street

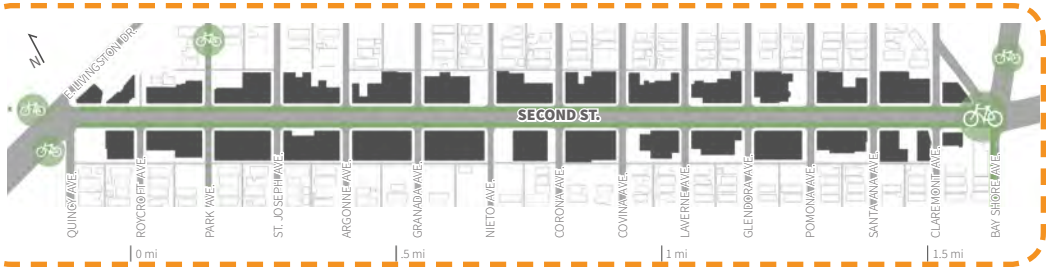
Long Beach, CA
City Median Household Income: $52,945

SECOND STREET CONTEXT

- Second Street serves as the main street for the Belmont Shore area of Long Beach. This area is characterized by a sandy beach, many beach cottages, and Second Street's many restaurants and retail stores catering to the beach crowd. The pace of the street is slow, with stoplights at nearly every block.
- Prior to the addition of the green stripes (also known as "super sharrows"), Second Street was already a popular destination for cyclists, in part because of the flat terrain, limited car parking and nice weather.
- In addition to the green stripes, signage educating cyclists and drivers on the lanes were added. Decorative bicycle parking further encouraged cyclists to use the corridor.
- The City of Long Beach's Bike Long Beach project has been forceful about increasing bicycle facilities throughout the city, as well as promoting bicycle use and bicycle awareness. This project did not happen in isolation, but is part of a strong and growing network of good bicycle infrastructure around Long Beach.

A BEACH NEARBY

Second Street is five blocks from the Belmont Shore and much of its liveliness stems from its proximity to the beach.



55 URBAN, MIXED-USE STREET

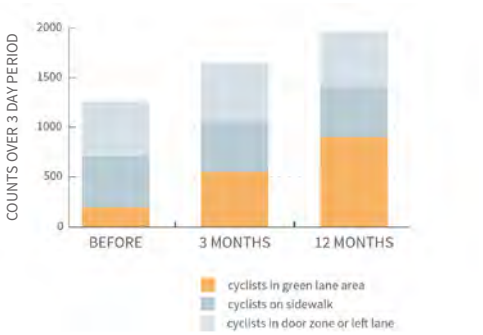
Map of the street and the surrounding area

BUSY, MULTI-MODAL CORRIDOR

Photo: Dave Amos

Second Street sees cars, bikes, buses, and pedestrians in high numbers. The street always feels bustling and full of energy.

CYCLING RATES BEFORE AND AFTER



Cycling increased after the green stripes were added, and continued to increase a year after installation.[23]

SECOND STREET DETAILS

"Bikes in Lane" signs remind drivers to be alert.

Painting the lane was a 3-day process.

Photos: Dave Amos

Decorative bike racks adorn the sidewalks.

Road Diet

Balancing the needs of all road users can be a challenge. Rebalancing a street to include improvements for pedestrians and cyclists can be even more challenging. A road diet, or a four to five lane conversion, manages to successfully rebalance streets by re-allocating two auto lanes for two bike lanes and a center turn lane. By doing so, car throughput remains high and the street becomes a much better place for people.

Photo: Ocean Boulevard, Myrtle Beach, SC, photo by City of Myrtle Beach

25th Avenue

San Francisco, CA

Metro Population: 4,335,391 | City Population: 805,235

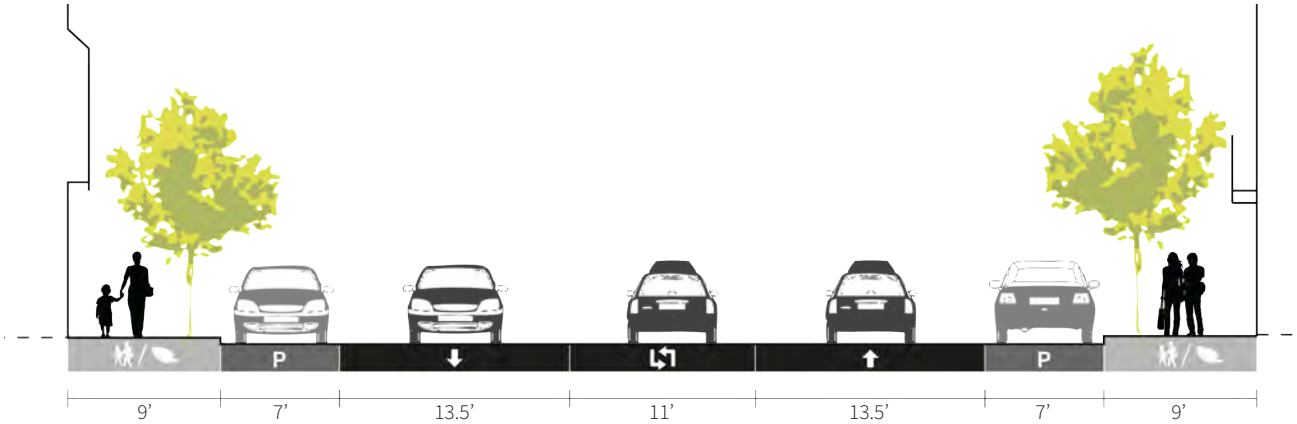
Photo: Kelly Sanford

Photo: City of San Francisco

Restriping the road was all it took to improve vehicle travel times and boost pedestrian activity along 25th Avenue.

- Four lanes of traffic were converted to two wide travel lanes and a two-way center turn lane.
- Trees were planted where cars once parked illegally on the sidewalk.
- Curbside bus loading zones were added and extended.

AFTER



BEFORE

KEY OUTCOMES

Non-Car Modes Increased
Bike and pedestrian activity increased during the PM peak hour. Bus boardings increased by 35% along the stretch of 25th Avenue that was redesigned.[3]

Improved Travel Times for Buses
Bus travel times through the entire length of the corridor were reduced by 6% and bus arrivals were more predictable and evenly spaced. The left turn lanes and dedicated bus zones allow traffic to flow more smoothly, resulting in improved travel times despite slower speeds.[3]

Left Turns More Comfortable
Prior to the road diet, left turns were often rushed and intimidated pedestrians. Since the redesign, drivers have reported that they felt more comfortable making turns in the dedicated turning lane, and pedestrians felt more visible in the crosswalks.[4]

Positive Public Response
City officials gave people the chance to offer feedback on the project. “It has been a great improvement,” says one resident, “Traffic moves a lot slower and the street is more livable. There seem to be fewer accidents.”[3]

STREET CLASSIFICATION
Major Arterial

RIGHT OF WAY
70’

LENGTH
.9 miles

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

13,000	11,500*
BEFORE	AFTER

PROCESS
3 years

* Please note that the City has not received any complaints about spillover traffic onto surrounding streets.

25th Avenue

San Francisco, CA
City Median Household Income: $72,947

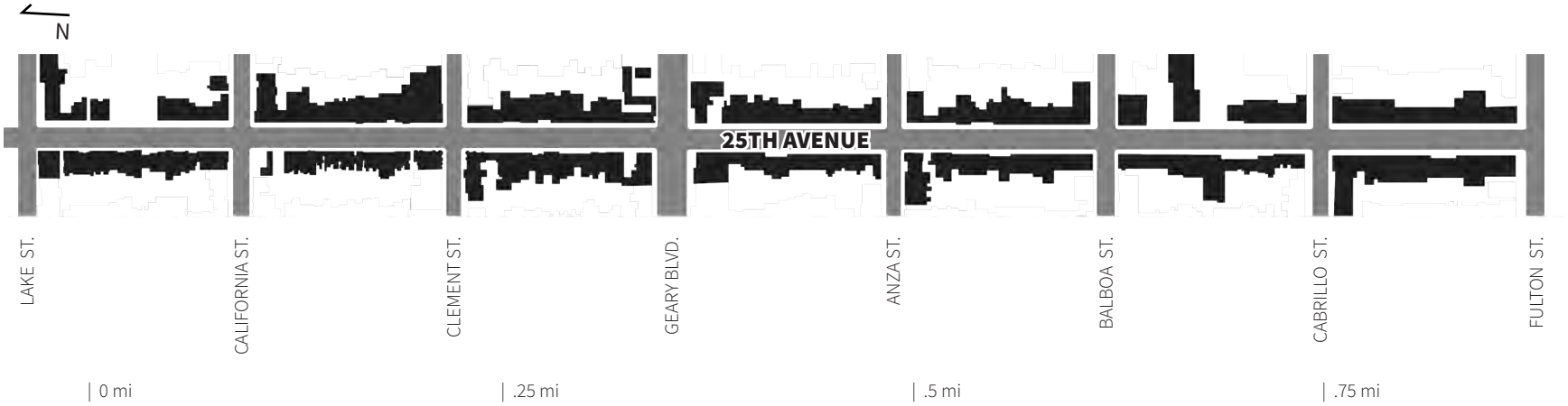
25TH AVENUE CONTEXT

- 25th Avenue runs through the Outer Richmond District and runs from Golden Gate Park to the Presidio and the San Francisco Bay. Much of the avenue is lined by rowhouses, and commercial activity on the avenue is clustered around Geary Boulevard, Clement Street and California Street.
- It was a group of residents on 25th Avenue that sought out the help of the San Francisco Municipal Transportation Agency to improve the dangerous and uncomfortable conditions on the street. The project was made possible due to the support of the district supervisor and a local air quality grant.[3]
- Before the change, buses had to travel in between the two narrow lanes to avoid sideswiping vehicles. The wider lanes allow the buses to stay in one lane, and new passenger boarding zones along the sidewalk preserve the ability for cars to pass while the bus is loading. In addition to reducing travel times, the buses experience fewer delays.[3]
- Although there are no dedicated bicycle facilities on this stretch of the street, 25th Avenue provides a direct link between cycling paths in Golden Gate Park and the Presidio, and is the preferred route for some cyclists. The wider lanes provide some accomodation.

NEW PASSENGER LOADING AREAS

Photo: Kelly Sanford

Several new designated bus loading areas allow buses to pick up passengers without blocking the flow of traffic.



BEFORE: PARKING ON SIDEWALKS

Photo: City of San Francisco

Concerned about being clipped by passing cars and trucks, motorists used to park on the sidewalk, obstructing the pedestrian path.

AFTER: SPACE FOR TREES AND WALKING

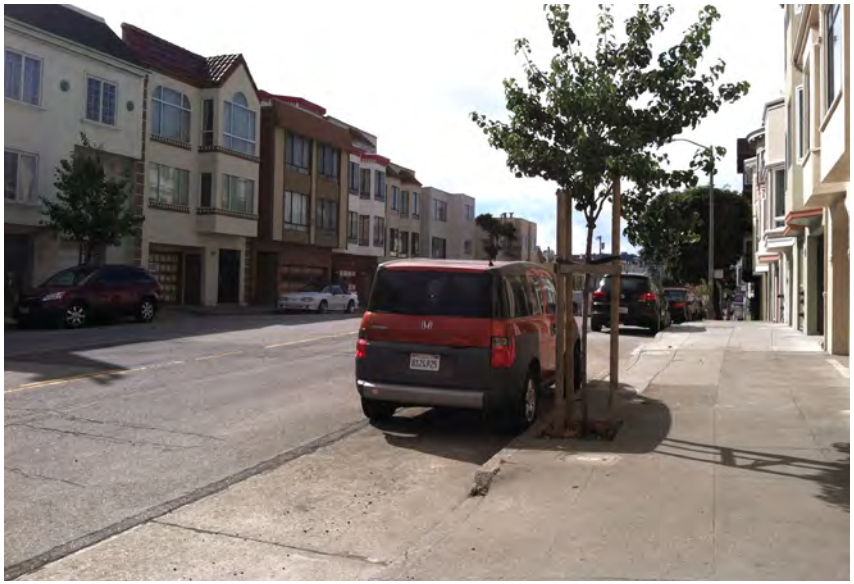
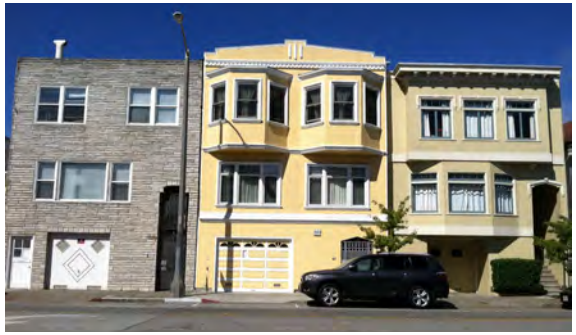


Photo: Kelly Sanford

Wider travel lanes gave motorists confidence to park in the road again, opening up space on the sidewalk for street trees.

The turning lane doubles as a place for truck loading.

The Presidio, once a military base, is a national park.



Photos: Kelly Sanford

Rowhouses are typical in the area.

Stone Way N.

Seattle, WA

Metro Population: 3,905,026 | City Population: 608,660

After

Photo: City of Seattle

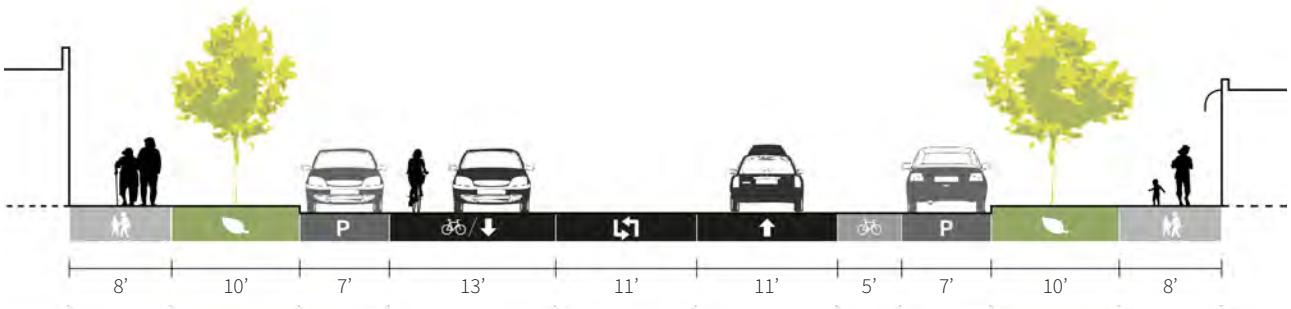
Before

Photo: City of Seattle

Seattle improved safety and cycling rates without sacrificing car traffic capacity.

- Four lanes were converted to two lanes plus a center turn lane.
- A bicycle lane was added to the uphill side of the street and sharrows were added to a wider travel lane on the downhill side.

AFTER



BEFORE

KEY OUTCOMES

Pedestrians Are Safer
Pedestrian collisions at crossings were reduced 80 percent thanks to improved crosswalks compliant with federal and city guidelines. Total collisions have also declined 14%. [5]

Speed Declined
Drivers now drive closer to the posted speed limit and top speeders—those traveling over 40 mph—declined more than 80%. [5]

More Cyclists
Between 2007 and 2010, the volume of cyclists increased 35%. Bicycles now represent almost 15% of peak traffic volume on the street. [5]

Traffic Capacity Remained Steady
Peak hour volumes are higher south of N. 45th Street, but congestion is not a problem. This indicates the capacity is still there to handle the same number of vehicles with fewer lanes. [5]

STREET CLASSIFICATION
Minor Arterial

RIGHT OF WAY
90’

LENGTH
1.2 miles

SPEED

SPEED LIMIT 30	SPEED LIMIT 30
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

13,000	12,000*
BEFORE	AFTER

PROCESS
1 year

* Please note that traffic declined on many of Seattle’s arterials from 2006-2008. Traffic was not diverted onto neighboring streets.[5]

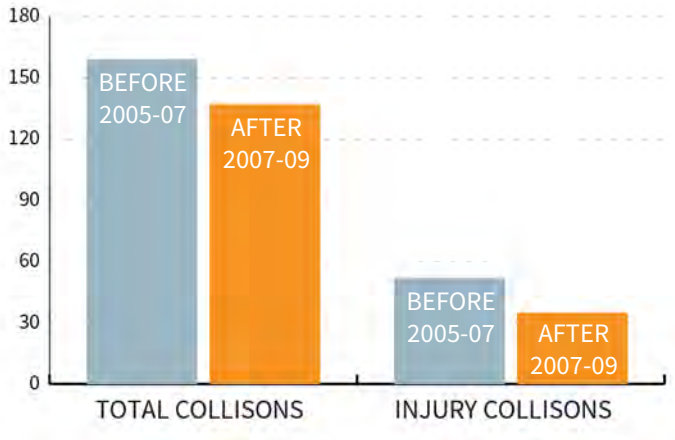
Stone Way N.

Seattle, WA
City Median Household Income: $61,856

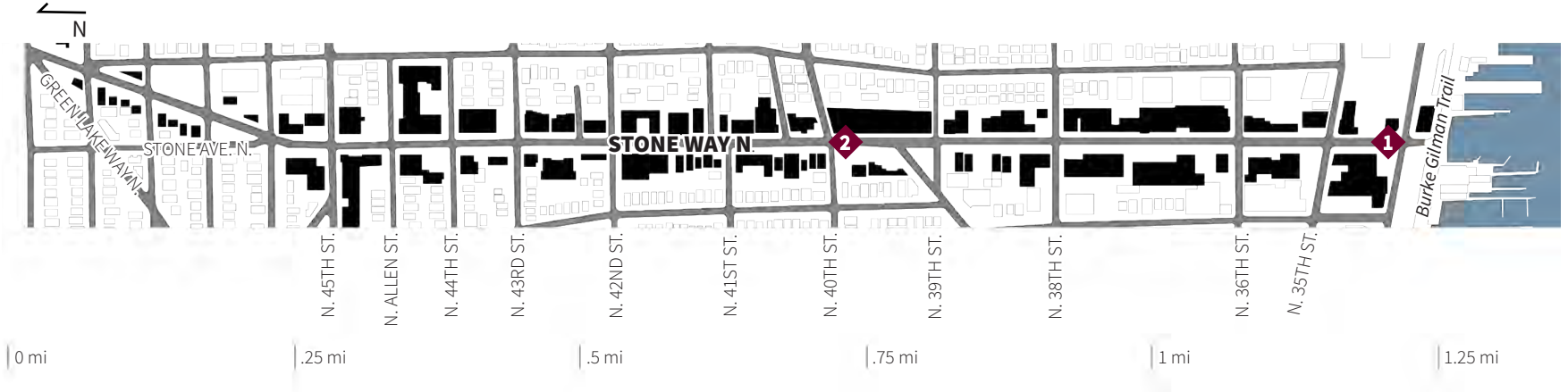
STONE WAY N. CONTEXT

- As of July 2013, Seattle has implemented 35 road diets across the city. The City of Seattle has been measuring and documenting the effectiveness of the road diet program and has found that it is a useful tool for maintaining car capacity while improving safety and adding bike lanes.[6]
- Stone Way N. connects the Wallingford and Fremont neighborhoods and supports a mix of residential, commercial and retail development. Eight schools, two public libraries and five parks exist within five blocks of the corridor. Several Metro bus routes travel along Stone Way, supporting significant bus traffic.
- This corridor was chosen for improvements because it was identified in the 2007 Bicycle Master Plan, the crosswalks were out of date, and the street was scheduled for repaving.
- The City of Seattle studied the before and after conditions of Stone Way N. The before measurement period occurred between April 2005 and August 2007, and the after measurement period occurred between August 2007 and December 2009.[5]

TOTAL COLLISIONS BY TYPE 2005-2009



All collisions between cars, pedestrians and bikes, and collisions that resulted in injury dropped after the road diet was implemented.[5]



BEFORE

Photo: City of Seattle

Previously, there were no dedicated left-turn lanes or explicit markings to demarcate the parking or cycling lanes.

AFTER

Photo: City of Seattle

Now, parking and bike lanes are demarcated, and the center two-way left-turn lane transforms into a dedicated left-turn lane at intersections. The parking lane gives way to a right turn lane.

VIEWS OF STONE WAY N.

Photo: Flickr user carfreedays

Cyclists take advantage of improved markings.

Photo: Jordan Dawe

This bus stop once faced an empty lot.

Photo: Google

The same stop now serves a mixed-use building.

Nebraska Avenue

Tampa, FL

Metro Population: 2,824,724 | City Population: 335,709

After

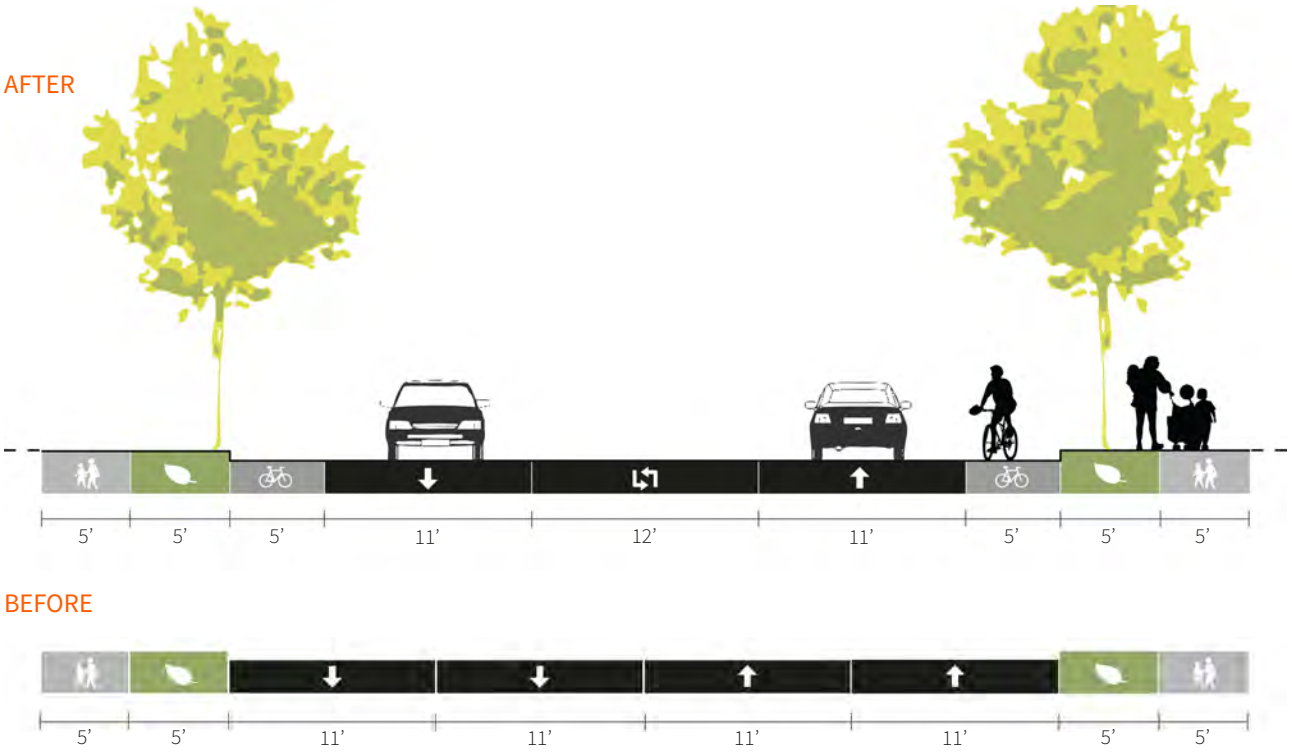
Photo: Florida Department of Transportation

Before

Photo: Florida Department of Transportation

A transformed corridor improved safety and efficiency for everyone.

- Four auto lanes were converted to two auto lanes, a center turn lane and two bike lanes.
- Dedicated bus loading zones were installed.
- Sidewalks were updated for ADA compliance.
- Medians and crosswalks received special paving treatments.



KEY OUTCOMES

Crashes Dropped Significantly
Collisions along the corridor decreased by 68 percent after the redesign. Before 2007, Nebraska Avenue saw 174 crashes per year on average. After, the street saw only 56 crashes. Crashes in all categories, including those involving pedestrians and bicyclists, dropped. The decrease in crashes occurred despite the increase in pedestrians and bicyclists, who were attracted by improvements.[7]

Car Traffic Declined Slightly
After the redesign, fewer cars travel along Nebraska Avenue. This small drop may be due to the recent improvements to Interstate 275, a highway that was improved at the same time as Nebraska Avenue. Through traffic may have migrated there. Other side streets near Nebraska Avenue did not see an increase in traffic.[7]

STREET CLASSIFICATION
Minor Arterial

RIGHT OF WAY
50’–64’

LENGTH
3.2 miles

SPEED

SPEED LIMIT	SPEED LIMIT
35	35
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

17,900	14,600
BEFORE	AFTER

PROCESS
16 months Construction

Nebraska Avenue

Tampa, FL
City Median Household Income: $43,957

NEBRASKA AVENUE CONTEXT

- Nebraska Avenue hosts residential and commercial uses along its route. The street begins in downtown Tampa and extends north for miles into suburban Tampa. The street parallels Interstate 275 for much of its length in Tampa, and is part of State Route 45, which was the primary route to Tampa before I-275 was constructed in the 1960's and 70's.
- Due to the high rate of collisions along the corridor, the Florida Department of Transportation (FDOT) redesigned over three miles of Nebraska Avenue. FDOT consulted with the City of Tampa, Hillsborough Area Regional Transit, the Chamber of Commerce and local community groups throughout the process.[8]
- The project cost $11.1 million to complete, and paid for improvements beyond simply restriping the roadway. FDOT improved traffic and pedestrian signals, added midblock pedestrian crossings and fixed some sidewalks and drainage facilities.[8]
- Hillsborough County's new bus rapid transit system, MetroRapid, now runs down Nebraska Avenue from Telecom Park to Downtown Tampa.

LANDSCAPED HIGHWAY UNDERPASS

Photo: Florida Department of Environmental Protection, US Geological Data, via Google

The stretch of the avenue passing under the highway received a special treatment: newly planted trees now line a decorative brick sidewalk.

BUS RAPID TRANSIT

Photo: Florida Department of Transportation

The project included designated bus loading areas, which have since been updated to accommodate the county's bus rapid transit system, MetroRapid.

UNION STATION

Photo: City of Tampa

Union Station is at the southern end of the avenue, and is Tampa's primary station for Amtrak.

BICYCLING MORE COMFORTABLE

Photo: Florida Department of Transportation

After the lanes were installed bicyclists reported feeling safer on the street.[9]

PEDESTRIAN CROSSINGS

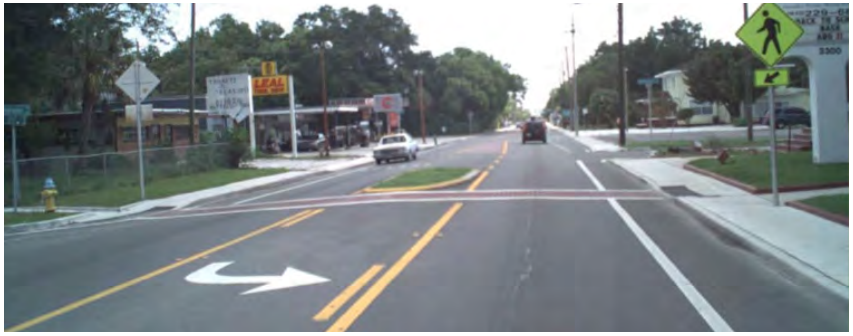


Photo: Florida Department of Transportation

Medians, signage and paving are designed to make crossing comfortable.

Ocean Boulevard

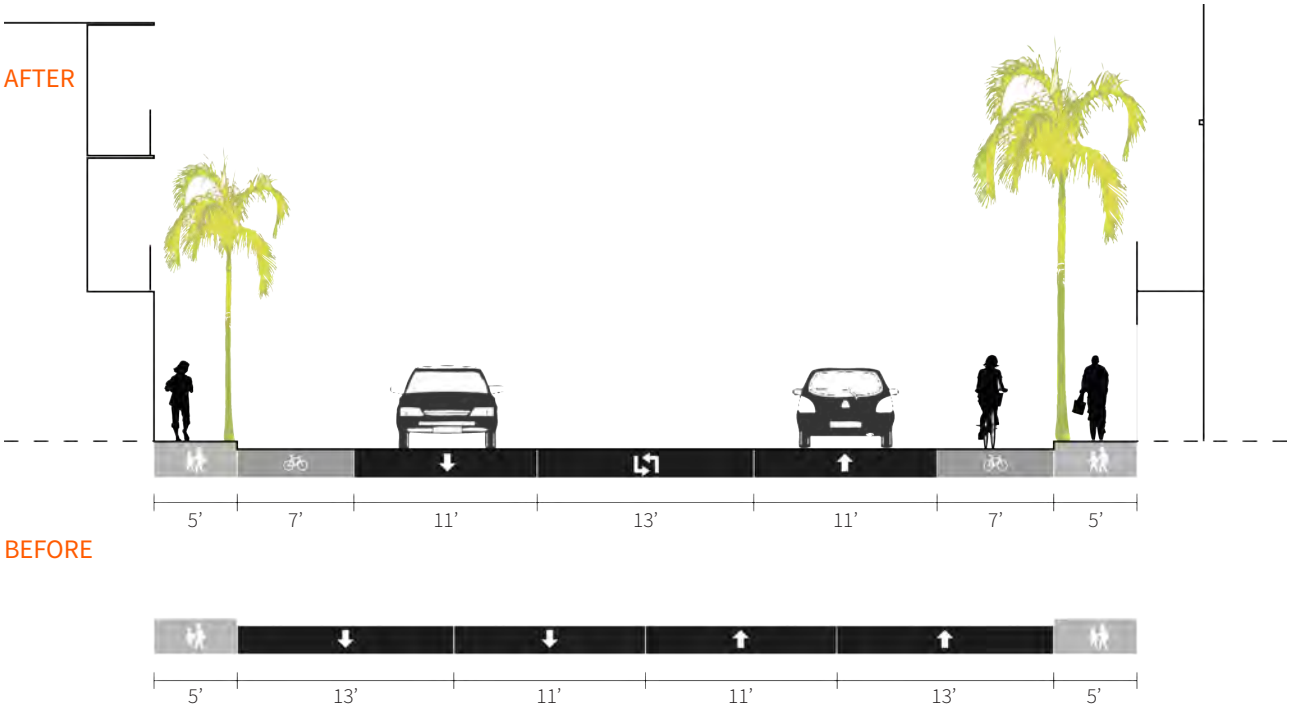
Myrtle Beach, SC
Metro Population: 329,449 | City Population: 27,109

Photo: City of Myrtle Beach

Photo: Google

Myrtle Beach's main street now fits the needs of a hospitality district.

- A Four to Five Lane Conversion: four lanes of traffic were reconfigured to two auto lanes, two bike lanes and a two-way center turn lane.
- Landscaped medians, improved sidewalks, and safer pedestrian crossings were installed.



STREET CLASSIFICATION

County Paved

RIGHT OF WAY

58’

LENGTH

4.1 miles

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

15,000	13,000
BEFORE	AFTER

PROCESS

Ongoing since 2008

KEY OUTCOMES

Improved Street Life
The street redesign led to a safer, more pleasant environment. It added frequent protected median crossings so people now feel comfortable walking from one side of the street to the other.

Lower Speeds
Though the speed limit didn’t change, drivers on the street now tend to travel at 15 mph, which has led to less noise and vibrations for hotel guests along the corridor. At the same time, bicycle, transit and walking counts increased.[10]

Decline in Crashes
Collisions along the corridor dropped 400 percent after the redesign. Car to car crashes resulting from lane changes and rear ending were quite high before, as were car to pedestrian collisions. After the redesign, car crashes dropped significantly and accidents were less severe. Pedestrian-related crashes vanished. Bicycle collisions, virtually non-existent before the redesign, did increase modestly, though this is likely due to the significant increase in cyclists using the street.[10]

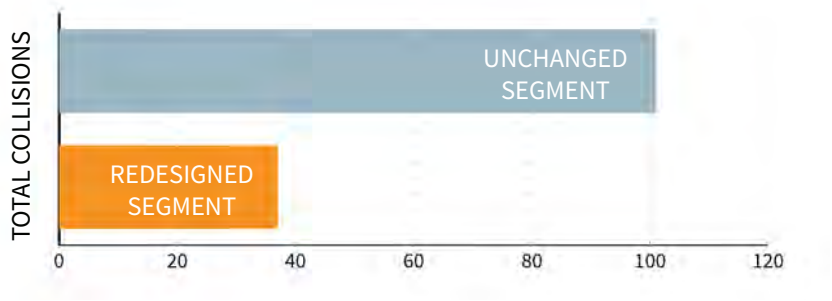
Ocean Boulevard

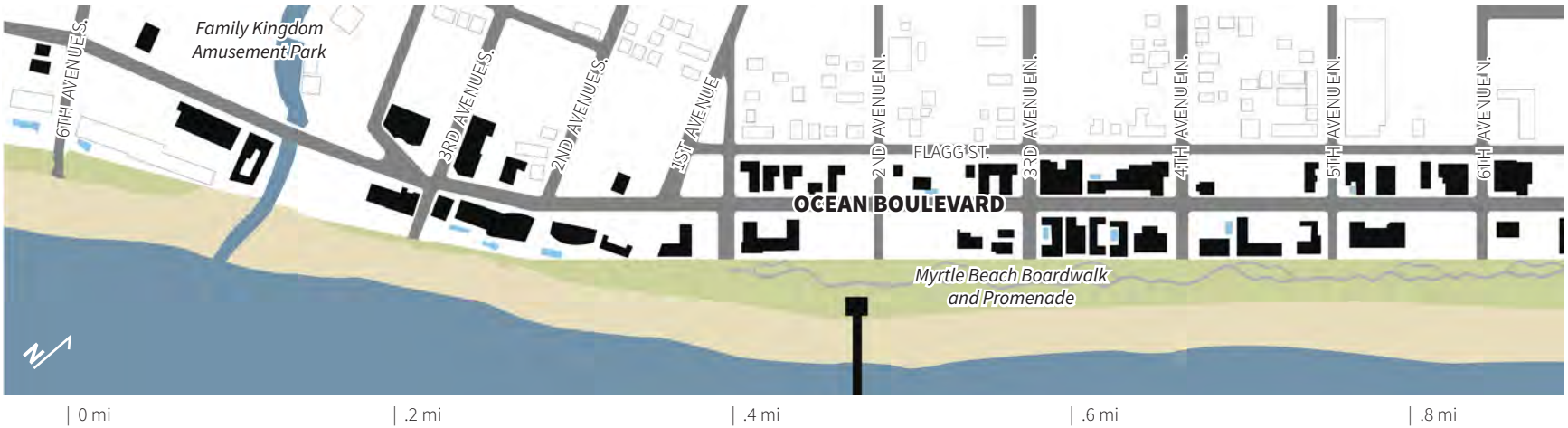
Myrtle Beach, SC
City Median Household Income: $36,963

OCEAN BOULEVARD CONTEXT

- Ocean Boulevard serves as Myrtle Beach's main artery and runs through a large hospitality district. The street runs parallel to the Atlantic Ocean and serves numerous hotels, restaurants, gift shops, and other tourist destinations and attractions.
- New bike lanes offer an amenity to visitors as well as another transportation option to employees of establishments along Ocean Boulevard.
- The project was a public-private partnership between the City and hoteliers who contributed 20% of the project budget and actively participated in the process. [10]

FEWER COLLISIONS OVER 6 MONTHS





MID-BLOCK CROSSINGS

Photo: City of Myrtle Beach

Landscape refuge islands reduce the crossing distance and create a safe, inviting space for people to wait between lanes.

AN AMUSEMENT PARK

Photo: James Willamor

Attractions along the boulevard include the Family Kingdom Amusement Park, which opened in 1966 and has been operating for over 45 years.

BICYCLE LANES

Photo: City of Myrtle Beach

One of the car lanes was repurposed to become two bicycle lanes.

PARALLEL TO THE OCEAN

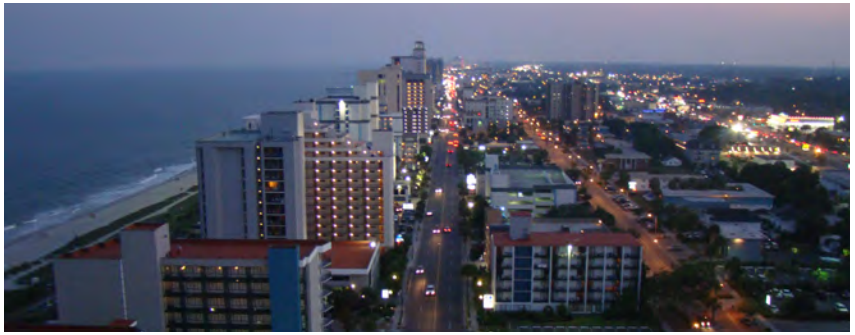


Photo: Michael Underwood

Ocean Boulevard's proximity to the beach makes it attractive for hotels.

East Boulevard

Charlotte, NC

Metro Population: 2,296,569 | City Population: 731,424

After (Phase 1)

Photo: City of Charlotte

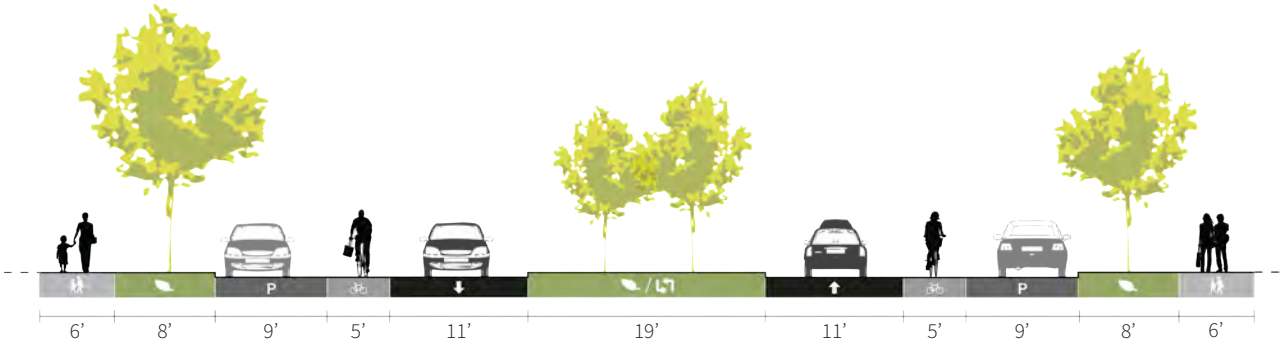
Before (Phase 1)

Photo: City of Charlotte

This commuter corridor's redesign surprised early critics and now supports a café culture without significantly disrupting car traffic.

- Four auto lanes were converted to two auto lanes, two bicycle lanes and a center turn lane.
- Crosswalks were marked with a distinct paving pattern, and planted pedestrian refuge islands reduced the crossing distance.

AFTER (PHASE 2)



BEFORE (PHASE 2)

KEY OUTCOMES

Street Now Supports Outdoor Dining
Residents and business owners wanted more sidewalk cafés and outdoor dining options, and after the redesign those options significantly increased. Reduced traffic noise and a greater separation between diners and moving traffic facilitated that change.[11]

Changes Popular with the Public
After the first two phases were complete, 77 percent of those surveyed indicated they supported the same changes along phase three.[12]

Speeds Dropped, Travel Times Remained Constant
The posted speed on the street is 35 miles per hour, but some drivers would speed in excess of 50 miles per hour. The 85th percentile speed declined from 43 to 40 miles per hour. Despite this speed decline, travel times did not change except for a slight increase during peak periods. [11]

Minimal Impact to Car Traffic
Daily traffic counts along East Boulevard showed that traffic slightly increased in one section and slightly decreased in another.[12]

STREET CLASSIFICATION
Arterial

RIGHT OF WAY
60-100’

LENGTH
1.6 miles

SPEED

SPEED LIMIT	SPEED LIMIT
35	35
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

20,600	18,900
BEFORE	AFTER

PROCESS
5 years

East Boulevard

Charlotte, NC
City Median Household Income: $53,146

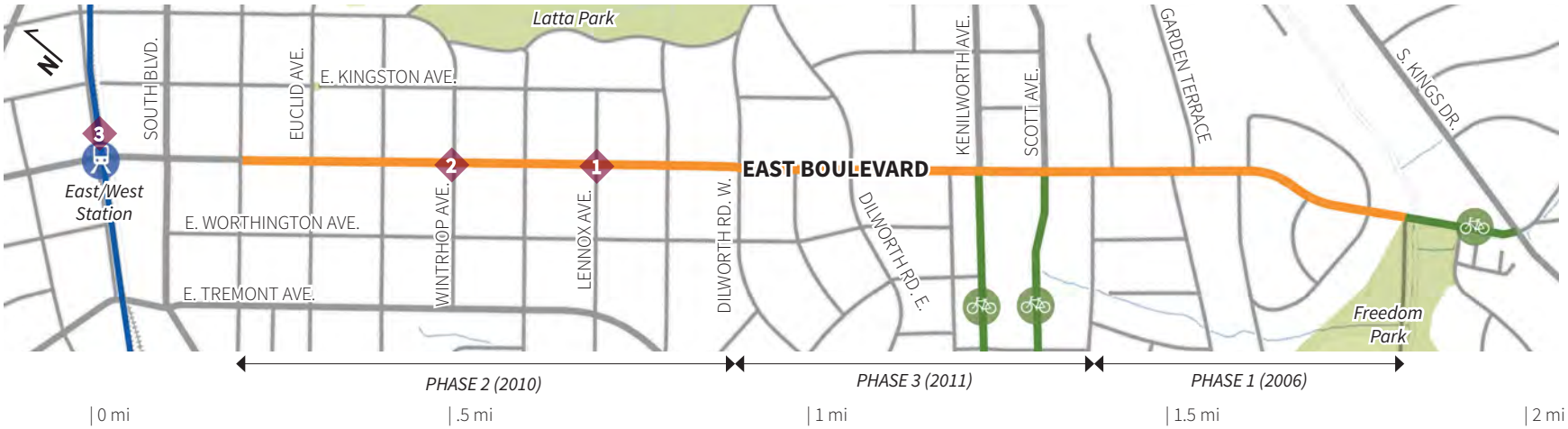
EAST BOULEVARD CONTEXT

- Land uses vary along the 1.5 mile stretch of East Boulevard. A regional park, grocery store, hospital, shops, fast food restaurants, cafés, offices and condominiums line the street.
- In 2002, the City of Charlotte adopted the East Boulevard Pedscape Plan. The plan laid out the guidelines for future public and private sector investment on and along the roadway. This document created the framework for a street redesign along the corridor.[13]
- The redesign connected and balanced all transportation networks. The new and improved bicycle and pedestrian infrastructure now better connects with bus routes and light rail.
- Initial public outcry about the proposed redesign was intense. From a letter to the editor in the *Charlotte Observer* in 2006: "If the goal is to bring pedestrians to the streets, that may actually work—since they can no longer drive on East."[11]
- After the redesign, City engineers received praise. From a resident's email to City staff: "If the goal was to slow down traffic, improve pedestrian safety and quality of life, while allowing traffic to flow smoothly, you've succeeded!"[11]

PEDESTRIAN CONNECTIVITY (PHASE 1)

Photo: City of Charlotte

Protected islands give pedestrians a comfortable way to cross, connecting businesses on both sides of East Boulevard.



MULTIPLE TREATMENTS ALONG THE SAME CORRIDOR (PHASE 2)

Photo: City of Charlotte

Here at the intersection of Lennox Avenue, the wider right of way allows room for street parking, bike lanes and a wide planted median.

Photo: City of Charlotte

The median narrows to provide a left turn pocket at the intersection of Winthrop Avenue, while still providing a refuge for pedestrians.

BUSINESSES EMBRACE THE STREET

Photo: City of Charlotte

Outdoor dining became more popular with the new road configuration.

TRANSIT CONNECTIONS

Photo: Doug Letterman

The Blue Line Lightrail connects to East Boulevard at Camden Road.


EUROPEAN
MOTORS

Arterial Rehab

Busy, multi-lane streets, often referred to as arterials, crisscross the landscape of our cities and suburbs. Alongside these wide thoroughfares, fast food restaurants, strip malls and grocery stores take advantage of the high volume of vehicle traffic they help facilitate. The next three street profiles demonstrate how arterials can be rehabilitated to accommodate other types of road users while improving the aesthetics of the area.

Photo: Aurora Avenue North, Shoreline, WA, photo by City of Shoreline

E. Washington Avenue

Madison, WI
Metro Population: 568,593 | City Population: 233,209

After

Photo: Flickr User Digital_Third_Eye

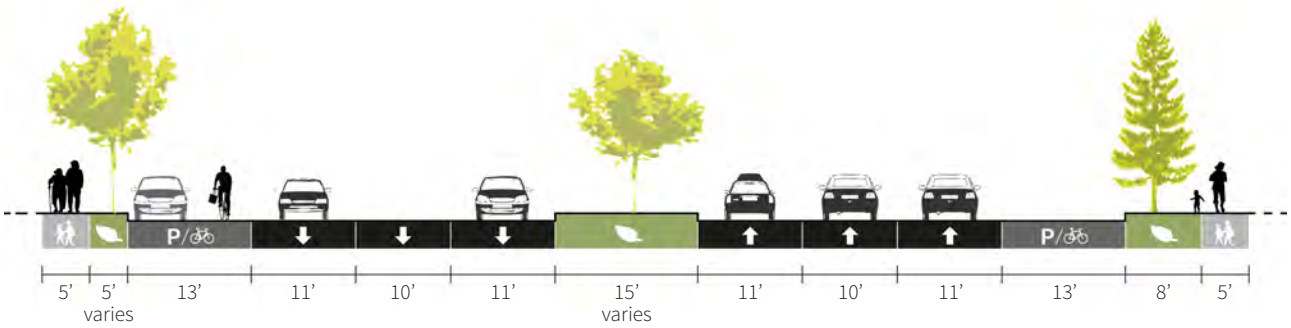
Before

Photo: City of Madison

Landscaping, parking, and bicycle connections breathe new life into a critical corridor.

- New landscaping, street furniture and crossings were installed, including a new bike and pedestrian overpass.
- A parking lane was widened to accommodate cycling and parking.

AFTER



BEFORE

KEY OUTCOMES

New Development
After E. Washington Avenue received its facelift, new development began to emerge in an area with little momentum before. A $39 million mixed-use building with 32,500 square feet of commercial space and 220 apartments opened in August of 2013.

More Amenities for Pedestrians
Enhanced crosswalks, wider resting places in the median, countdown timers and bump outs at intersections all serve to improve the experience of walking along E. Washington Avenue.

New Connections for Bicycles
The City of Madison took the opportunity to improve its bicycle network on the street and throughout the corridor. Bike paths run along the Yahara River and under E. Washington Avenue’s new bridge. Additionally, there is a new bike and pedestrian overpass crossing the avenue at Starkweather Creek.

STREET CLASSIFICATION

Major Arterial

RIGHT OF WAY

132’

LENGTH

5.5 miles

SPEED

SPEED LIMIT 35	SPEED LIMIT 35
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

53,000	53,000
BEFORE	AFTER

PROCESS

5 years planning

6 years construction

E. Washington Avenue

Madison, WI
City Median Household Income: $54,093

E. WASHINGTON AVENUE CONTEXT

- E. Washington Avenue forms the spine of the eastern half of Madison. Between the interstate highway and the State Capitol, it passes by schools, a mall, residences, a stadium and countless businesses and industrial enterprises.
- City leaders have been trying to reinvigorate the Capitol East district, roughly the part of the isthmus between the state capitol and the Yahara River. Previously, manufacturing and light industry populated the district, but now the area has a high vacancy rate. The redesign of E. Washington Avenue is part of the City's efforts to invest in the district with the hope of attracting new businesses and development.[14]
- Engineers divided the project into five segments to reduce construction impacts on businesses and residents along the corridor. Construction halted in 2008 to provide a break for road users between segment construction.
- Major changes to the corridor include new lighting, enhanced landscaping, bike lanes along the whole corridor and new on-street parking. The goal of the project was to create a gateway feel and provide consistency in streetscape elements along the entire corridor. The project cost $100 million and was paid for by local, state and federal funds.[16]

A GREENER CORRIDOR

Photo: City of Madison

The medians along the route received attention; the City implemented a landscape design plan to add some color and shade.

NEW BIKE UNDERPASS AND OVERPASS

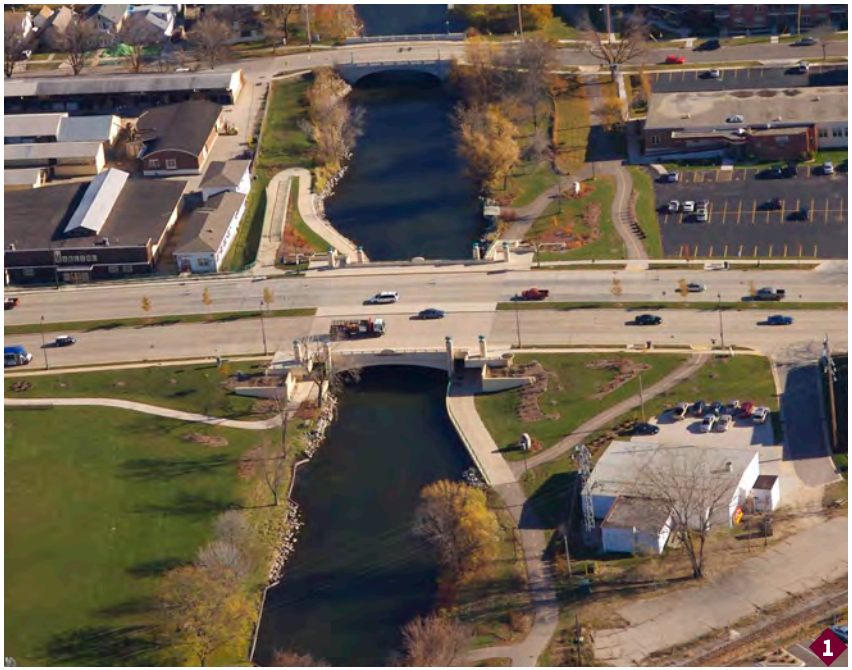


Photo: City of Madison

Photo: Peter Patau

Yahara River Bridge (above) and Starkweather Creek overpass (below).

CAPITOL CONNECTION

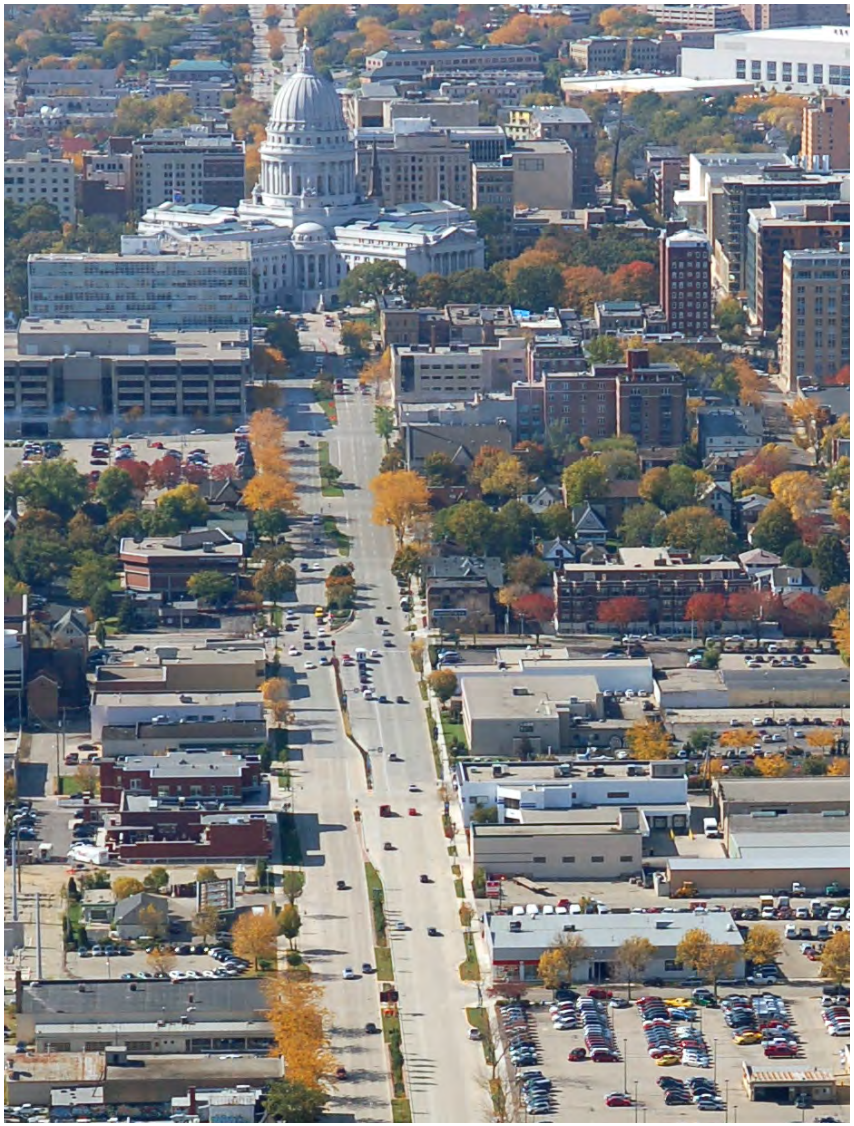


Photo: City of Madison

E. Washington Avenue links downtown and the capitol to east Madison.

28th Street (US 36)

Boulder, CO
Metro Population: 294,567 | City Population: 97,385

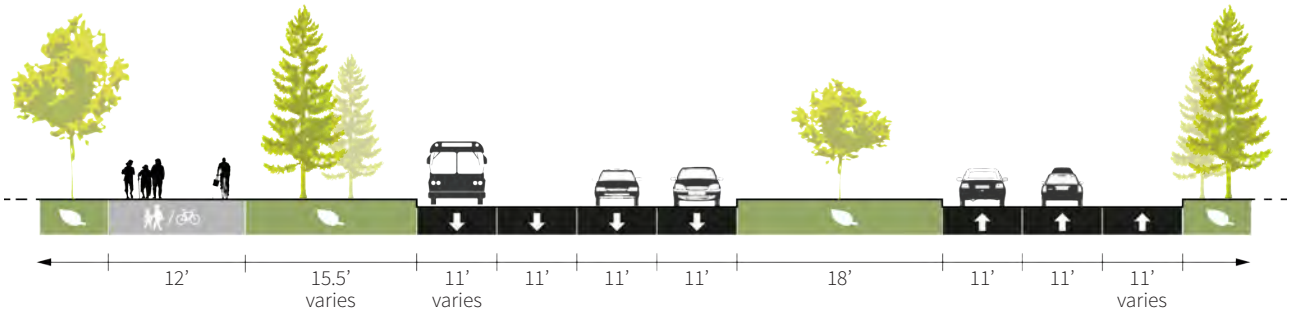
Photo: Google

Photo: City of Boulder

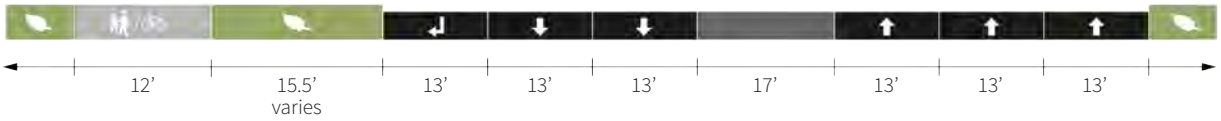
The City of Boulder transformed a state highway into a corridor for people and art.

- Bus stops, a retaining wall and an underpass all received artistic treatments in addition to improved landscaping throughout the corridor.
- Travel lanes were narrowed and bus pull out areas were added.

AFTER



BEFORE



KEY OUTCOMES

More People Biking and Walking
Pedestrian and bicyclist activity in the area has increased since the first two phases of the project have been completed. [17]

An Attractive, Functional and Progressive Corridor
The project received an award for encouraging non-motorized transportation from the Federal Highways Administration by enhancing the human environment. Functional art was concentrated around transit stops, a pedestrian underpass and a retaining wall.

New Development
Five new multi-family housing developments catering to the elderly and students are under construction next to 28th Street. [17]

More Capacity to Develop
As a result of the improvements to transit, pedestrian and bike facilities, the planning board and city council approved new zoning for the area that increased allowable housing density. [17]

STREET CLASSIFICATION
Major Arterial

RIGHT OF WAY
90’

LENGTH
1 mile

SPEED

SPEED LIMIT 35	SPEED LIMIT 35
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

50,000	44,000
BEFORE	AFTER

PROCESS
6 years

28th Street (US 36)

Boulder, CO
City Median Household Income: $54,051

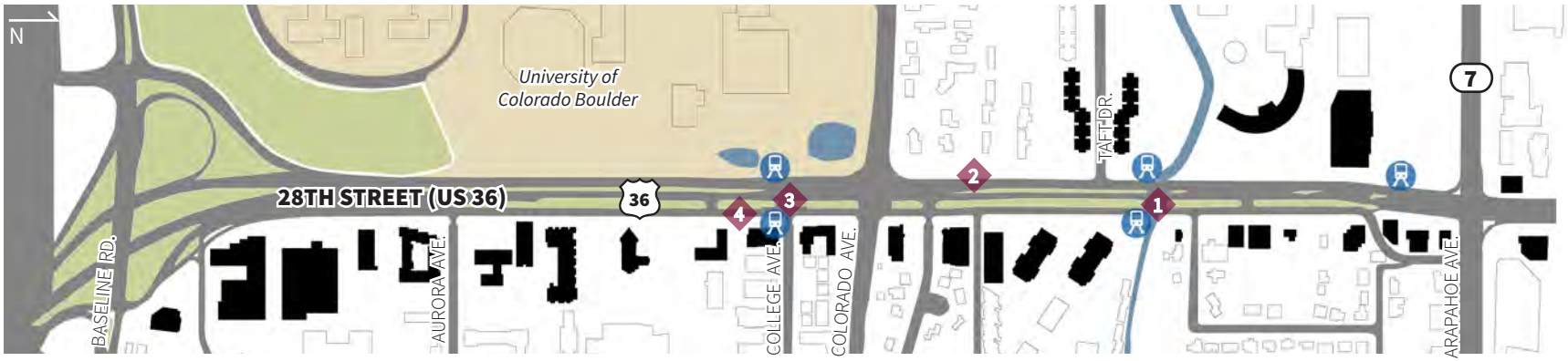
28TH STREET CONTEXT

- 28th Street connects Central Boulder to the University of Colorado and continues on to Denver and Rocky Mountain National Park. A major goal of the project is to make the 28th Street–Denver/Boulder Turnpike better act as a gateway to Boulder. Previously, the corridor looked nondescript and did not draw attention to the University. [17]
- The project consists of three phases. The first is titled "Hello Boulder!" and consists of the southern segment, profiled here. This segment cost $10 million, with 37 percent paid from federal sources. The mix of funding sources included city and state transportation funds.[17]
- To create that sense of arrival, functional art was deployed to make the corridor more memorable. A retaining wall colloquially known as "The Great Wall of Boulder" adds to the visual appeal, as does a beautified pedestrian underpass. The City created an entire 28th Street Corridor Arts and Aesthetics plan to guide the implementation of the art pieces.[18]
- Further improvements to the multi-use path and on-street bike facilities are now in the planning stages and slated for construction in the fall of 2014.[19]

TRANSIT STOP ARTWORK

Photo: City of Boulder

Every surface of the transit "superstop" on 28th Street is richly detailed and adorned with art.



| 0 mi | .25 mi | .5 mi | .75 mi | 1 mi

ARTISTIC RETAINING WALL

Photo: George Peters

Artists Ken Bernstein, George Peters and Melanie Walker created this piece that is inspired by geology of the surrounding landscape.

PEDESTRIAN UNDERPASS

Photo: George Peters

This pedestrian underpass once felt cramped and dark. Engineers and artists redesigned the entrances to reduce collisions and improve safety perception.

FRONTAGE ROAD – BEFORE

Before the improvements, the dark underpass receded into its surroundings.

FRONTAGE ROAD – AFTER

Photos: City of Boulder

Today, the more inviting underpass offers a seamless way to cross 28th Street.

Aurora Avenue N. (WA 99)

Shoreline, WA
Metro Population: 3,905,026 | City Population: 53,007

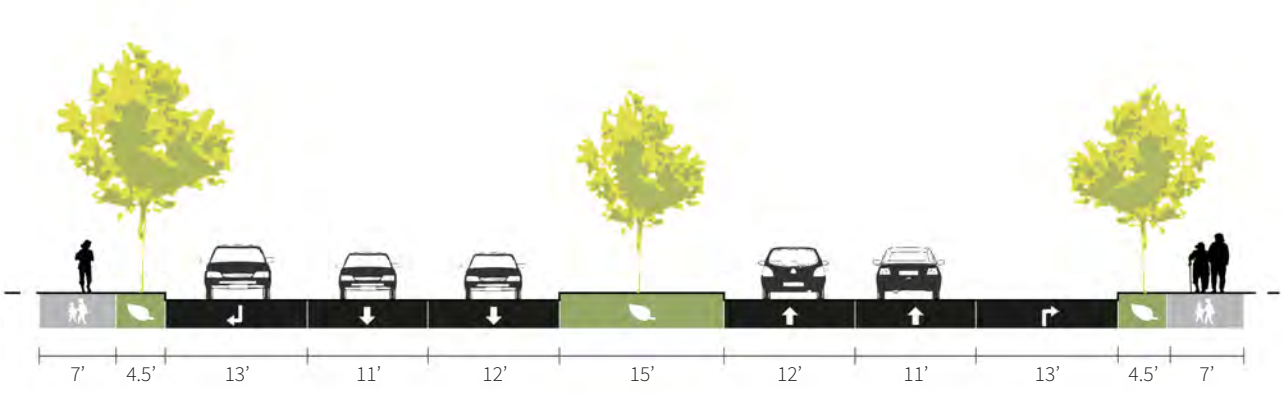
Photo: City of Shoreline

Photo: City of Shoreline

City leaders in Shoreline, WA created a new main street for a new city.

- The city widened the right of way 20 feet by acquiring land from local businesses.
- Planted median strips were installed, pedestrian crossings were improved and a dedicated lane for buses and right turns was added.
- Urban design elements like new bus shelters, landscaping and pedestrian crossings helped establish a new identity for the city.

AFTER



BEFORE

STREET CLASSIFICATION

Major Arterial

RIGHT OF WAY

90’

LENGTH

1 mile

SPEED

SPEED LIMIT 45	SPEED LIMIT 40
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

38,000	35,000
BEFORE	AFTER

PROCESS

2 years construction

KEY OUTCOMES

Economic Development
Construction on the first mile and planning for the remaining two miles has stimulated redevelopment projects, created jobs and offered more retail choices in the area.[20]

Accidents Decline
Before the redesign, Aurora Avenue N. saw nearly one accident per day on average. Forty-two pedestrians were struck by vehicles between 1992 and 1996. After the redesign, accidents dropped 60%.[20]

Sales Increased during Construction
Merchants along the corridor were concerned about losing business during the construction process. City officials kept track of sales tax receipts along the corridor during the two years of construction and found a 2.9% dip in sales in the first year and a 9.1% increase in the second year.[20]

Aurora Avenue N. (WA 99)

Shoreline, WA
City Median Household Income: $66,774

AURORA AVENUE N. CONTEXT

- For much of its history, Shoreline existed as an unincorporated community near Seattle, WA. In 1995, Shoreline incorporated and began to define itself as a city. With no formal main street or downtown, city officials decided to redesign busy Aurora Avenue (State Route 99) to serve as a main street and center of retail and civic life. The city worked hard to create a pleasant urban environment while meeting state highway standards.[20]
- This project is linked to other civic projects in Shoreline, including the Interurban trail, a civic center/city hall project, Heritage Park and Fire adminstration offices. All projects help establish Shoreline as a new city.
- The design arose out of an extensive public participation and review process with businesses along the street and the greater community. Though the city contributed $2.4 million of its own funds, the project was primarily funded by grants, which made up $21 million of the budget.[21]
- The redesign did not happen without significant conflict within the community. The project required the City to acquire 20 feet of right of way from neighboring businesses. Business owners against the project went to court to stop it, but lost and the project moved forward.

NEW BUS STOPS

Photo: City of Shoreline

This photo shows one of the enhanced bus stops with the two Interurban Trail bridges in the distance.

INTERURBAN TRAIL CONNECTION

Photo: Curtis Cronn

The Interurban Trail, a 15 mile bike and pedestrian off-street trail, runs roughly parallel to Aurora Avenue N. The project included two new crossings.

BUSINESS-ACCESS TRANSIT LANES

Photo: City of Shoreline

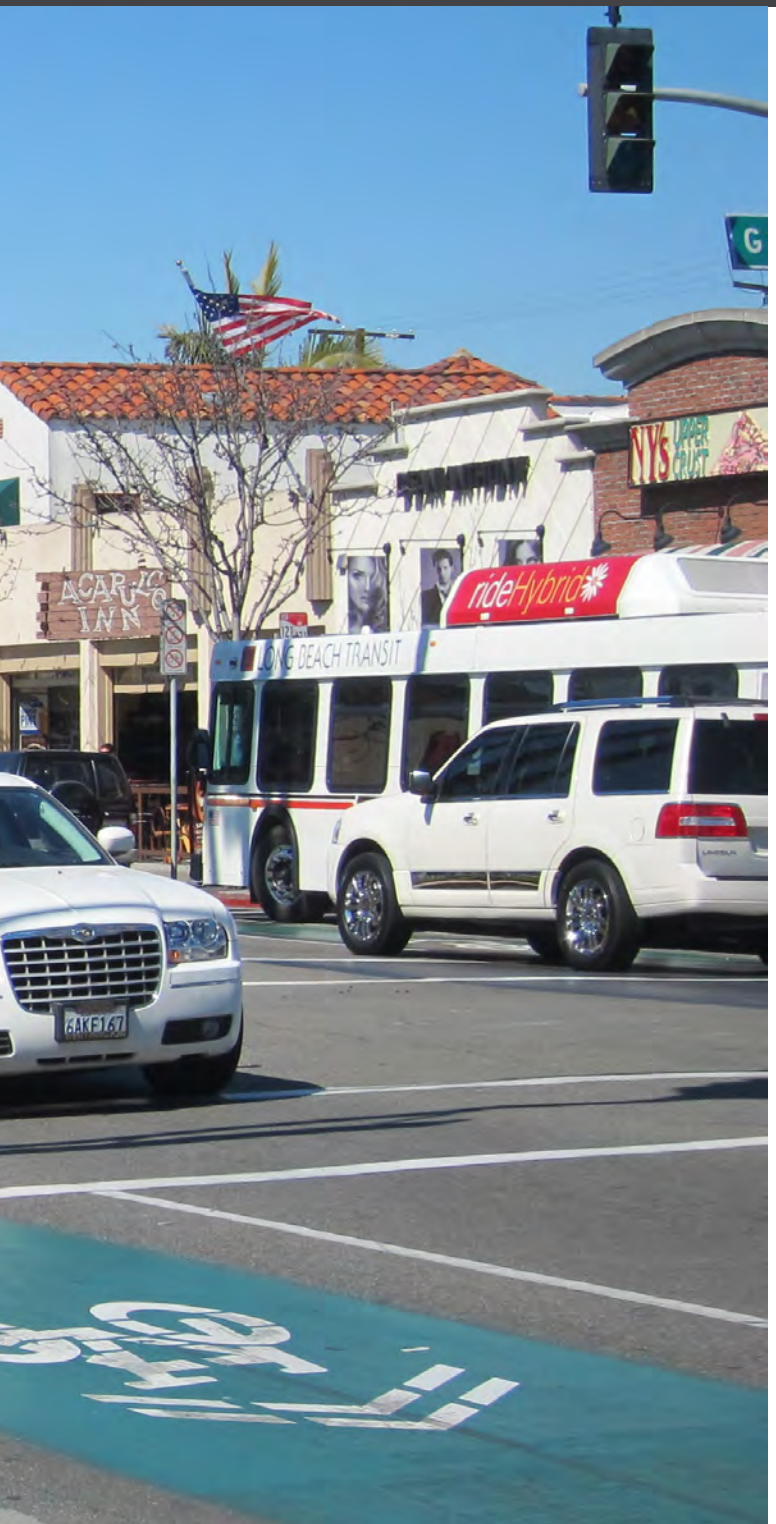
Buses now have their own lanes; cars may only use them to turn right.

IMPROVED PEDESTRIAN ZONES

Photo: Google

The corridor now has a consistent, continuous sidewalk on both sides.


ONE WAY
La Verne Av
TOYOTA
GRAND PRIX
of Long Beach
APRIL 19-21
Belmont Shore
Parking



Urban, Mixed-Use

Streets in this category play host to a diverse mix of uses. These uses can change along the length of the street, with each block having a different character. The uses may also be different from building to building, or within the same building. These streets demonstrate how improvements to the public right of way can further grow and support that diversity and energy.

Photo: Second Street, Long Beach, CA by Dave Amos

Second Street

Long Beach, CA

Metro Population: 12,828,837 | City Population: 462,257

After

Photo: Dave Amos

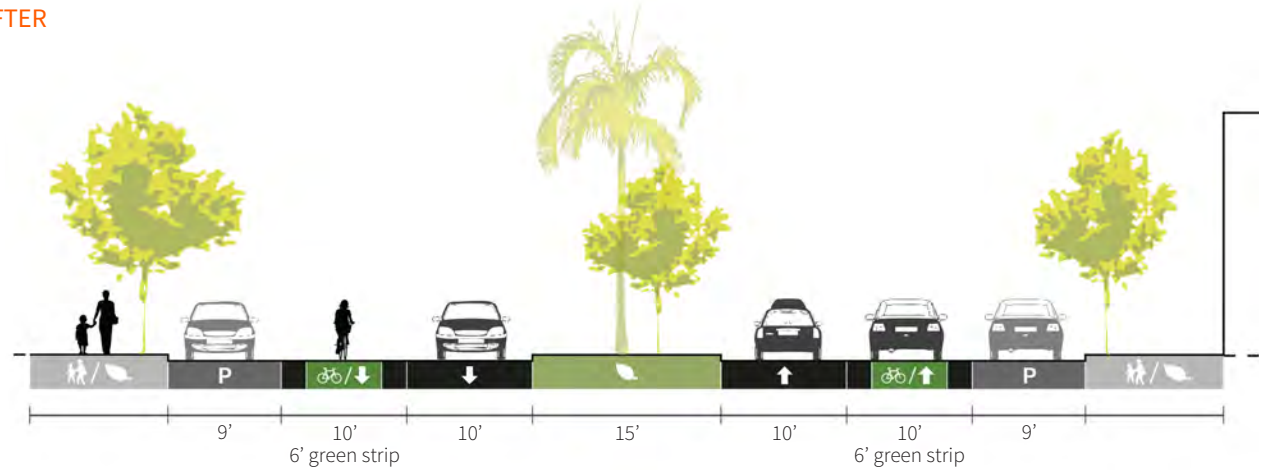
Before

Photo: Royston Ford

Wide green stripes and sharrows give bicyclists a more comfortable travel lane on a busy street.

- Outer lanes in both directions were painted with a stripe of bright green to call attention to the mix of bicycles and cars in the lane.
- White sharrows were painted over the green paint. These are symbols indicating that bicycles share the travel lane with cars, and should travel in the flow of traffic.

AFTER



BEFORE

STREET CLASSIFICATION

Major Arterial

RIGHT OF WAY

76’–80’

LENGTH

0.75 miles

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

29,800*	29,300*
BEFORE	AFTER

PROCESS

3 days Construction

KEY OUTCOMES

Bikes Are Good for Business
In interviews with 27 businesses along the corridor, Bike Long Beach found that about 15% of shoppers come by bike, and 80% of businesses observed an increase in business from cyclists after the implementation of the green stripes.[22]

Increase in Bicyclists
Cycling rates nearly doubled after the green stripes were added in place of more typical sharrows. Cyclist counts over a three day period showed an increase from 1,320 cyclists to 2,428 cyclists a year later.[23]

A Safer Street for Everyone
Nearly four years after the paint was added, the total number of crashes has declined roughly 25%.[24]

Drivers and Cyclists are More Harmonious
The green lane was installed in part to coax cyclists away from the “door zone” and encourage them to take the lane. After an adjustment period, a majority of cyclists began riding in the center of the green paint. With the green paint, drivers understand that bikes belong, and have been more respectful of cyclists taking the lane since the change.[25]

* Please note that these figures represent traffic counts taken on the same calendar day several years apart, and were not calculated as an average.

Second Street

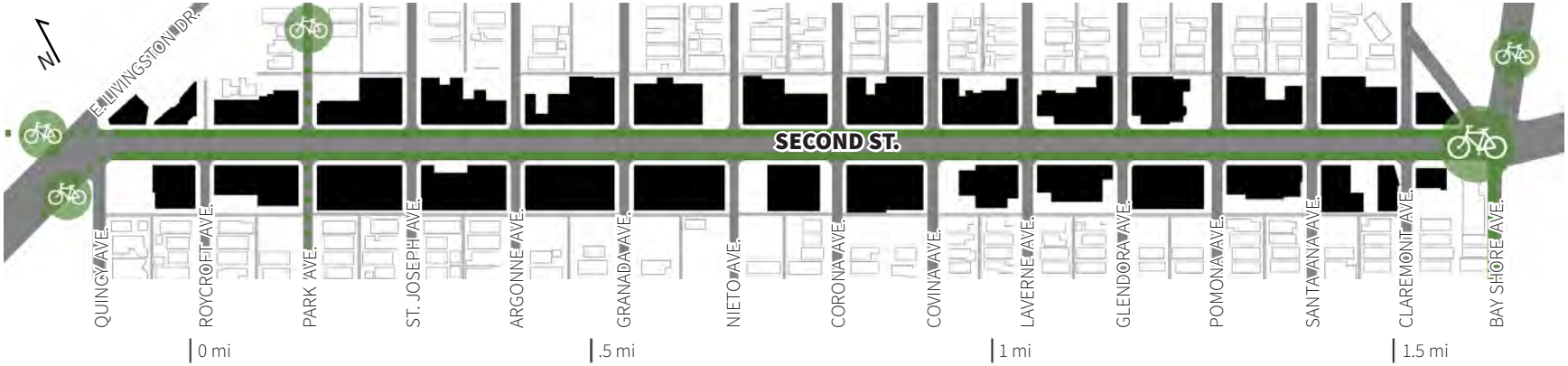
Long Beach, CA
City Median Household Income: $52,945

SECOND STREET CONTEXT

- Second Street serves as the main street for the Belmont Shore area of Long Beach. This area is characterized by a sandy beach, many beach cottages, and Second Street's many restaurants and retail stores catering to the beach crowd. The pace of the street is slow, with stoplights at nearly every block.
- Prior to the addition of the green stripes (also known as "super sharrows"), Second Street was already a popular destination for cyclists, in part because of the flat terrain, limited car parking and nice weather.
- In addition to the green stripes, signage educating cyclists and drivers on the lanes were added. Decorative bicycle parking further encouraged cyclists to use the corridor.
- The City of Long Beach's Bike Long Beach project has been forceful about increasing bicycle facilities throughout the city, as well as promoting bicycle use and bicycle awareness. This project did not happen in isolation, but is part of a strong and growing network of good bicycle infrastructure around Long Beach.

A BEACH NEARBY

Second Street is five blocks from the Belmont Shore and much of its liveliness stems from its proximity to the beach.

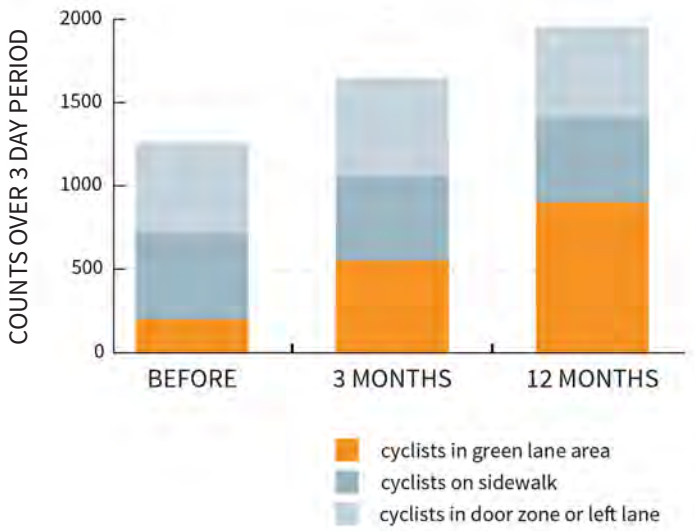


BUSY, MULTI-MODAL CORRIDOR

Photo: Dave Amos

Second Street sees cars, bikes, buses, and pedestrians in high numbers. The street always feels bustling and full of energy.

CYCLING RATES BEFORE AND AFTER



Cycling increased after the green stripes were added, and continued to increase a year after installation.[23]

SECOND STREET DETAILS

"Bikes in Lane" signs remind drivers to be alert.

Painting the lane was a 3-day process.

Photos: Dave Amos

Decorative bike racks adorn the sidewalks.

Pine & Spruce Streets

Philadelphia, PA

Metro Population: 5,826,742 | City Population: 1,526,006

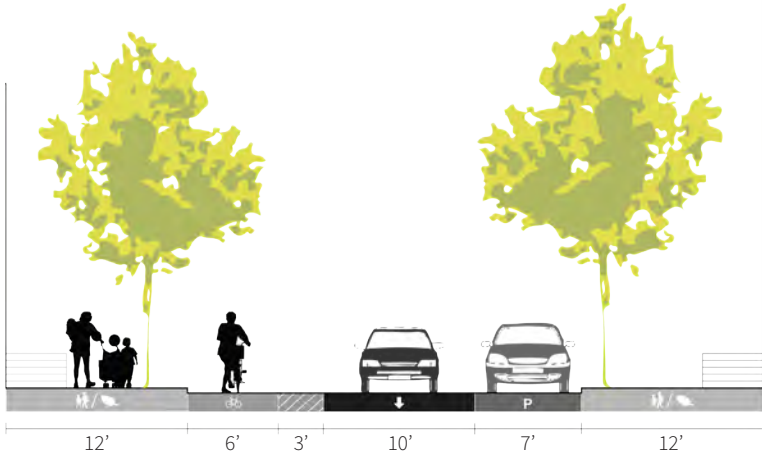
Photo: Kyle Gradinger

Photo: Google

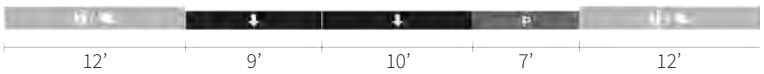
This one-way couplet provides cyclists with a safe, calm link between the Schuykill and Delaware Rivers.

- One travel lane was converted into a buffered bicycle lane.
- Parking for religious services is permitted in the bicycle lane on Sundays.

AFTER



BEFORE



STREET CLASSIFICATION

City Neighborhood

RIGHT OF WAY

50’

LENGTH

2 miles

SPEED

SPEED LIMIT 25 BEFORE	SPEED LIMIT 20 (ADVISORY) AFTER

AVERAGE DAILY TRAFFIC

6,000 BEFORE	6,000 AFTER

PROCESS

6 months

KEY OUTCOMES

Traffic Volumes Did Not Change
Despite removing one car lane, traffic volumes remained constant along both streets. Peak hour volumes were measured in two places along each street and only small increases and decreases in peak hour volume were observed.[26]

Crashes Declined
3 years since the streets were reconfigured with bike lanes, the decline in crashes remains nearly 30%.

Auto Speeds Remained the Same
Prior to the change, car speeds averaged between 17 and 20 miles per hour. After the redesign, the range of average speeds in the study locations was identical.[26]

Public Reaction Positive
Nearly 70% of residents surveyed after the redesign had positive comments. Most drivers felt more comfortable, although some felt the streets were too slow.[26]

Pine & Spruce Streets

Philadelphia, PA
City Median Household Income: $36,957

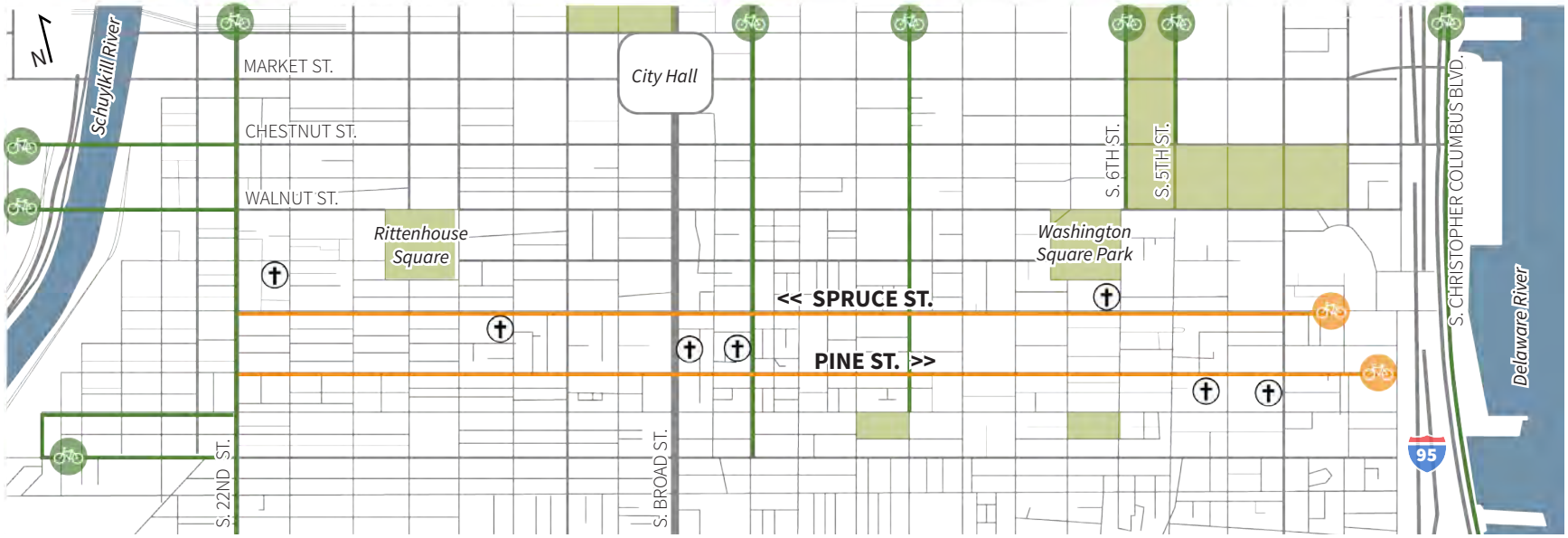
PINE & SPRUCE STREETS CONTEXT

- The new bicycle lanes provide a critical east-west route through Center City, connecting trails that exist or are being constructed along the Schuylkill River and Delaware River.
- Residents of the Society Hill neighborhood were initially divided about adding bike lanes, with some residents strongly supporting the concept, and others opposed. The civic association was very engaged in the planning and evaluation of the trial bike lanes. Following implementation, a substantial majority of residents endorsed the plan.
- The new lanes were implemented on a trial basis with striping for six months and made permanent when the city resurfaced both streets.
- The streets now feature a green wave–a motorist or bicyclist traveling at 18-20 mph will seldom encounter a red light.

ROWHOUSES, RETAIL AND RESTAURANTS

Photo: Joseph Readdy

This mixed-use neighborhood features rowhouses mid-block, with retail and restaurants clustered at intersections.



NEGOTIATING PARKING AND BIKE LANES

In this mixed-use neighborhood, parking is scarce. Philadelphia had previously allowed residents, building contractors and delivery vehicles to stop for short periods of time in the travel lanes. When the lane was converted to a bike lane, the streets were posted with "No Parking" signs, which allow vehicles to stand in the bike lane while making deliveries. Stopped vehicles that block the lanes are a recurring obstacle for cyclists along each street, although most of the curb space remains available for bicyclists.[27]

More problematic has been the parking at religious institutions. Philadelphia has traditionally allowed members of religious institutions to park their cars in travel lanes against the curb while attending services. Several years prior to creating the bicycle lanes, the City started regulating this parking. Specific block faces are assigned to specific religious institutions for defined hours, and members are allowed to park in the no parking zones only if they display a current permit on their dashboards.[27]

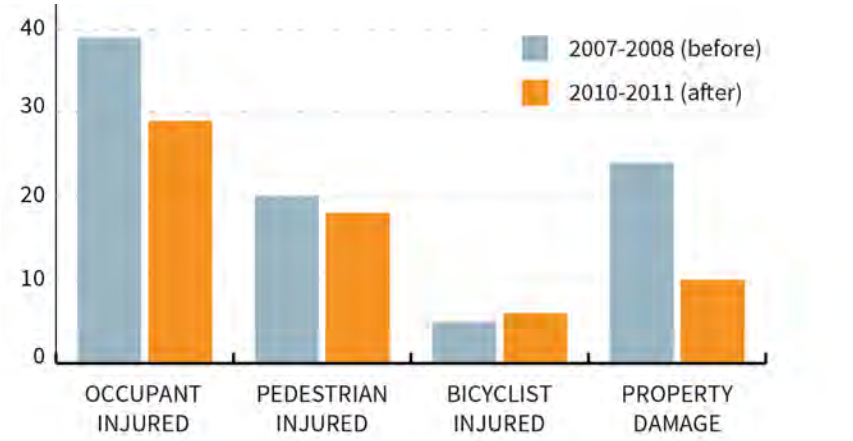
Fifteen religious institutions were identified along the couplet, and many of those institutions have been in place for 200 years or more. The City agreed to continue to allow drivers to park in the bike lanes if they displayed permits. Elimination of the religious parking would likely have resulted in the rejection of the bike lanes.[27]

Observations indicate that drivers so far have been considerate about sharing the remaining vehicle lane when the bike lane is obstructed, whether for religious parking or for residential deliveries. In a dense, urban neighborhood, flexibility goes a long way to making streets work for everyone at all times.[27]

FLEXIBLE USE OF BIKE LANE

Photo: Kyle Gradinger

CHANGES IN CRASHES BY TYPE



Data: "Cycling in Philadelphia: Safety of Paint Buffered Bike Lanes"

S. Carrollton Avenue

New Orleans, LA
Metro Population: 1,167,764 | City Population: 343,829

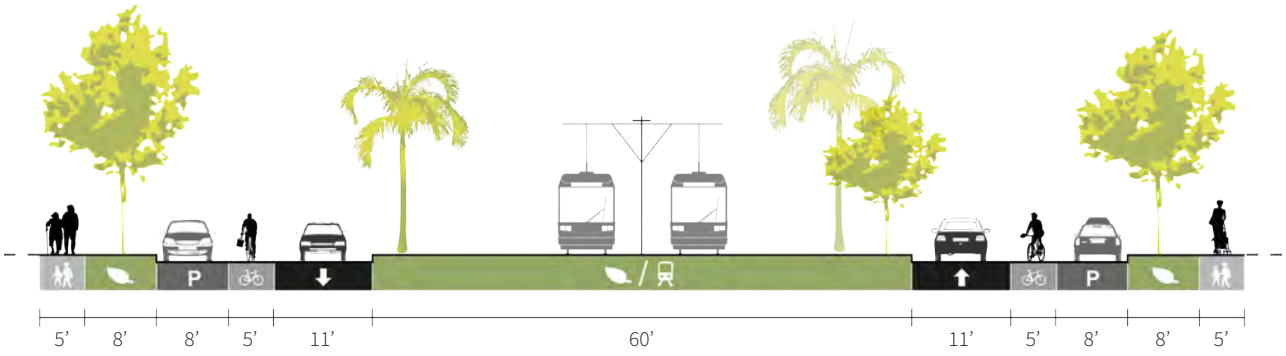
Photo: Google

Photo: Charles B. Porter, H. George Friedman Collection

S. Carrollton Avenue demonstrates the big impact that small changes to the street can have on non-motorized modes.

- Sidewalks were repaired and curb ramps were installed at intersections.
- Bicycle lanes were added by narrowing the travel lane.

AFTER



BEFORE

KEY OUTCOMES

Cycling Increased Overall
After the bike lanes were installed, cycling along S. Carrollton increased 325%. Cycling counts decreased along side streets, indicating a preference to ride on S. Carrollton once adequate facilities were in place. The area saw a net gain in cyclists, and the number of women cyclists increased 475%.[28]

Cycling Behavior Changed
Before the lanes, cyclists often rode on the sidewalks or rode the wrong direction in traffic. This behavior reduces the safety of cyclists and other road users. After the lanes were installed, 16% fewer cyclists were observed riding on the sidewalk on S. Carrollton and 3% fewer cyclists rode against the flow of traffic.[28]

STREET CLASSIFICATION
Major Arterial

RIGHT OF WAY
108’

LENGTH
1.2 miles

SPEED

SPEED LIMIT 35	SPEED LIMIT 35
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

17,400	28,600
BEFORE	AFTER

PROCESS
Striped in June 2010

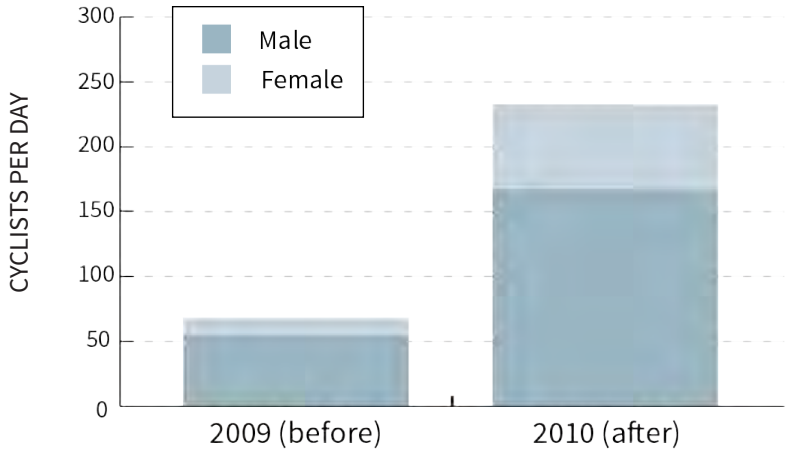
S. Carrollton Avenue

New Orleans, LA
City Median Household Income: $37,325

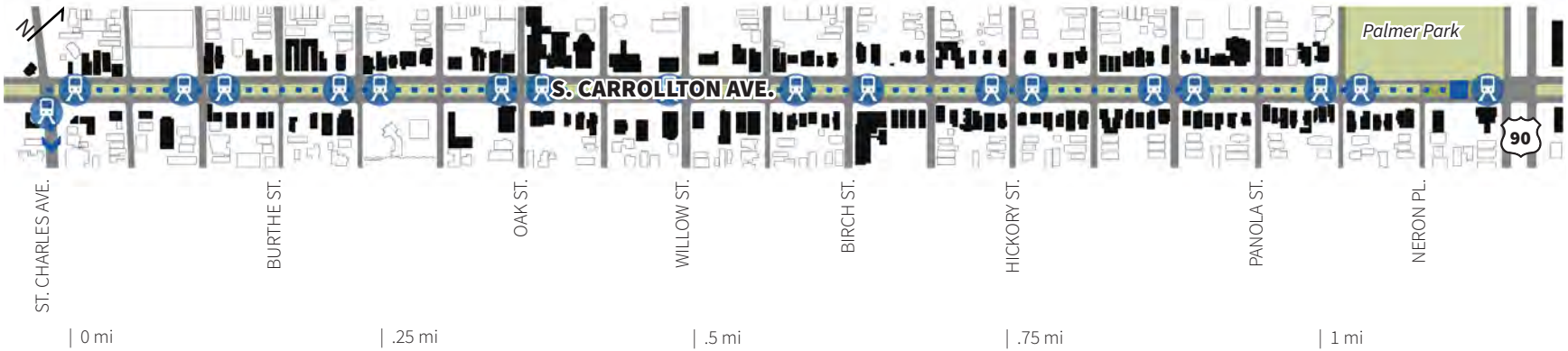
S. CARROLLTON AVENUE CONTEXT

- The Carrollton neighborhood was once an independent city, but was annexed by New Orleans in 1874. Carrollton Avenue was originally the city's main street, and is now host to a mix of residential and commercial buildings.
- The total cost for road resurfacing was $3.4 million. The bike lanes and additional bike signage cost $11,320.[28]
- All of the funds for the road resurfacing came from the South Louisiana Submerged Roads Program, a program of the Federal Highway Administration. The program funded 56 road improvements on arterial streets that were damaged in 2005 by Hurricanes Katrina and Rita. The program began in 2007 and ended in 2012.[29]
- For some streets funded by the program, including Carrollton Avenue, the damage from the hurricanes not only came from the storm or flooding itself, but from the trucks and heavy equipment used during the rescue and recovery efforts.

CYCLING RATES INCREASED



Daily cycling rates increased dramatically after the bike lanes were added to the street. Prior to the lanes, there were almost no women cyclists. [28]



FLOODED BY HURRICANE KATRINA

Photo: Flickr user Tidewater Muse

The street was flooded in 2005 during Hurricane Katrina, damaging businesses and homes in the neighborhood.

BUSINESSES RETURNING

Photo: Marie Carianna

People lined up outside of a popular gelato shop, Angelo Brocato, when the business reopened after recovering from Hurricane Katrina.

HISTORIC STREET RAIL LINE

Photo: Wikimedia user Infrogmation

The Saint Charles Line is the oldest continually operating street rail line in the world and has been transporting passengers on Carrollton since 1835.

WOMEN CYCLING

Photo: Michael Corson, GNO Cyclery

One year after the dedicated bike lanes were installed, more than 4 times as many women and 3 times as many men were counted cycling on the avenue.[28]

Mill Avenue

Tempe, AZ

Metro Population: 4,192,887 | City Population: 161,719

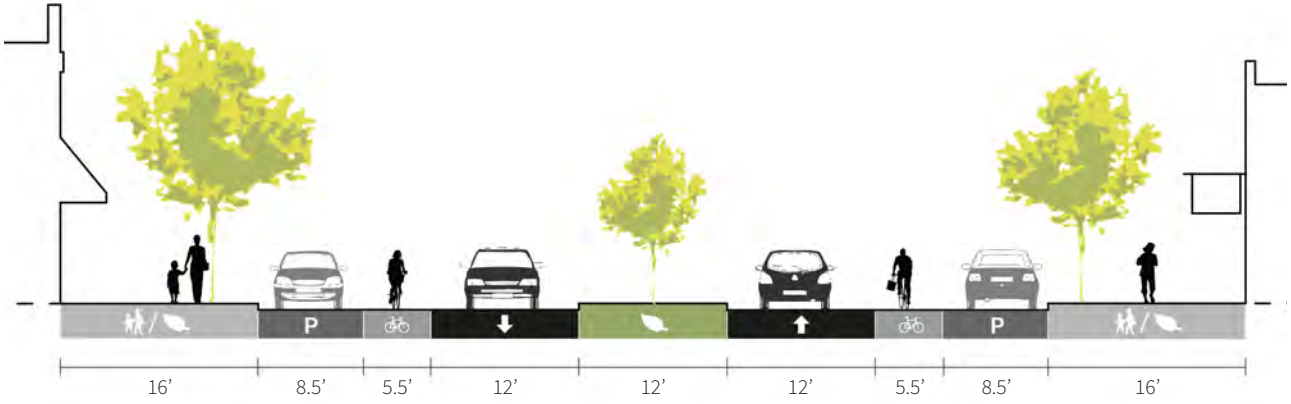
Photo: Google

Photo: City of Tempe

Mill Avenue serves as the interface between Downtown Tempe and nearby Arizona State University.

- Two lanes of traffic were replaced with on street parallel parking.
- Bike lanes were widened and sidewalks redesigned.

AFTER



BEFORE

STREET CLASSIFICATION

Major Arterial

RIGHT OF WAY

98’-100’

LENGTH

0.5 miles

SPEED

SPEED LIMIT 30	SPEED LIMIT 30
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

19,000	16,000
BEFORE	AFTER

PROCESS

Ongoing since 1987

KEY OUTCOMES

Pedestrian Benefits
Redesigned sidewalks with well-defined amenity, pedestrian and transition zones created a popular pedestrian environment. Mill Avenue averages 18,000 pedestrians mid-week, and nearly 25,000 on weekends.[33]

Healthy Retail Environment
Between 1993 and 2002, taxable sales downtown more than doubled-an increase of $89.2 million-signifying a healthier street for retail and restaurant activity.[31]

Less Through Traffic
Reducing the number of auto lanes almost eliminated through traffic on Mill Ave. Prior to the redevelopment 16% of traffic was destination-oriented, and after the redesign the number jumped to 60%.[32]

Slower Speeds = Less Noise
Average speeds declined from 27-28 m.p.h. to 16-18 m.p.h. This change, coupled with a small reduction in traffic volume, reduced traffic noise volume 20-30 decibels.[32]

Mill Avenue

Tempe, AZ
City Median Household Income: $48,618

MILL AVENUE CONTEXT

- In the early 1990's, commuters used the street as a way to get through town quickly. City planners and engineers tried widening the sidewalks in 1987, but the change didn't solve the traffic problem. In 2004, they removed an auto lane in each direction and added street parking. They divided the wide sidewalk into different functional zones to encourage street life.
- The Mill Avenue District serves as the heart of Tempe, located downtown and near the ASU campus. Tempe City Hall sits a half block away.
- In addition to the new street design, the City of Tempe offered incentives for development and subsidized projects to give the area a boost.
- Mill Avenue hosts a number of events and celebrations. An annual Fantasy of Lights event typically draws over 50,000 attendees and a boat parade attracts 40,000. Twice a year the street closes to traffic for the Festivals of the Arts in the Spring and Fall, which have been taking place since 1968. Attendance for these festivals is now around 225,000.[34]

PROXIMITY TO CAMPUS

Mill Avenue in relation to Arizona State University and its 65,000 students

PEDESTRIAN-FIRST DESIGN

Photo: City of Tempe

Parked cars replaced a travel lane in Mill Avenue's redesign. As a result, traffic noise dropped and pedestrian activity increased and remains strong today.[33]

COLLEGE TOWN NIGHT LIFE

Photo: Michael J. Barber

Mill Ave. draws 4 million visitors annually and regularly attracts many of the 65,000 Arizona State University students to enjoy a vibrant retail and night life environment.[30]

LIGHT RAIL CONNECTION

Photo: Nick Bastian

Light rail service began in 2008 and serves about 1,200 passenger trips on a typical weekday.

DOWNTOWN TEMPE COMMUNITY

The work of creating and sustaining momentum around a street doesn't often happen without some dedicated support. In the case of Mill Ave., Downtown Tempe Community (DTC), a nonprofit business group, fills that role. DTC employs 15 staff to market, organize events, maintain the street and engage in business development. Funding for DTC comes from fees, grants and district assessments.

Barracks Row (8th Street SE)

Washington, DC
Metro Population: 5,860,342 | City Population: 601,723

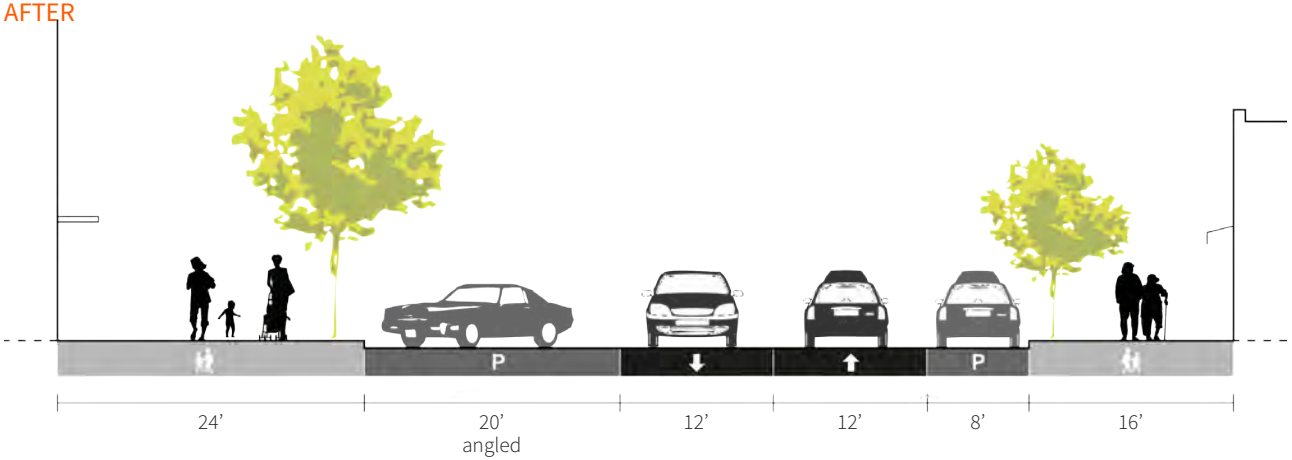
Photo: Peter Fitzgerald

Photo: Barracks Row Main Street

Rebranded as "Barracks Row" and rehabilitated to be an attractive street, 8th Avenue SE was brought back to life after decades of decline.

- The dilapidated streetscape was replaced with wider brick sidewalks, American Elm trees, landscape planters, bike racks and new street lighting.
- Parallel parking was switched to angled parking on several blocks, adding 55 parking spaces.
- Two blocks of one-way street were returned to two-way.
- Paving patterns and cobblestones were installed to slow traffic.

AFTER



BEFORE

STREET CLASSIFICATION

Minor Arterial

RIGHT OF WAY

98’

LENGTH

0.75 miles

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

11,500	11,500
BEFORE	AFTER

PROCESS

15 months of construction

KEY OUTCOMES

Café Culture Blossomed
Within two years of the redesign, Barracks Row went from two cafés on the street to more than a dozen. Barracks Row is now a highly-regarded restaurant and café row for residents of Capitol Hill.[35]

More Foot Traffic and Bicycle Amenities
The number of pedestrians has increased dramatically and street events are well attended. Bicycle parking was part of the streetscape improvement and two Capital Bike Share stations serve the street.[37]

Business Transition and Expansion
Although four businesses on Barracks Row closed during the 15 months of construction, more than 30 new businesses opened when the construction was complete. According to the Barracks Row Main Street organization, the businesses that closed were struggling before construction.[35]

National Recognition
The street won the The National Trust for Historic Preservation’s “Great American Main Street Award” in 2005.

Barracks Row (8th Street SE)

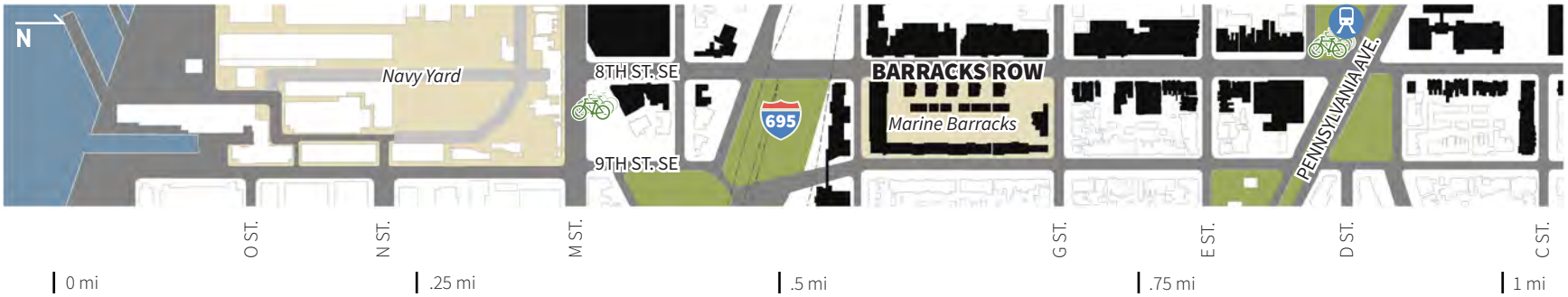
Washington, DC
City Median Household Income: $61,835

BARRACKS ROW CONTEXT

- Located 8 blocks east of the Capitol, Barracks Row is a historic commercial street in the Capitol Hill Neighborhood. Capitol Hill is the largest residential historic district in DC, and is also one of the most densely populated.
- Barracks Row saw significant disinvestment in the 1960's. The Washington Navy Yard laid off workers after World War II, and a freeway bisected the street in 1962. Civil unrest in the 1960's further scared businesses out of central Washington. Until the 1990's, many storefronts were boarded up or were home to businesses barely hanging on.
- The Barracks Row name comes from Marine Barracks Washington, an active military facility still located on the street. In the 1990's the Barracks Row Main Street association rebranded 8th Street SE as Barracks Row and the name change has largely been adopted by Washingtonians.
- Barracks Row Main Street worked hard to keep businesses afloat during the construction period. They scheduled events to bring people to the area; some worked and some did not. The organization now regularly schedules events on the street to promote the district to shoppers and diners.[35]

HOST TO EVENTS AND FESTIVALS

People take over the street during the 2011 Fall Festival, one of the many events hosted on Barracks Row.



LOCAL BUSINESSES INSPIRED BY CHANGE

Photo: Elvert Barnes

The cafés along Barracks Row offer attractive outdoor seating and often add beauty to the streetscape by setting out planters.[36]

Photo: Elvert Barnes

Local businesses, like this bike shop, take advantage of the new sidewalks to showcase their merchandise and draw customers in.

STREETSCAPE, BEFORE

Photo: Barracks Row Main Street

The shabby streetscape received a facelift during the redesign.

STREETSCAPE, AFTER

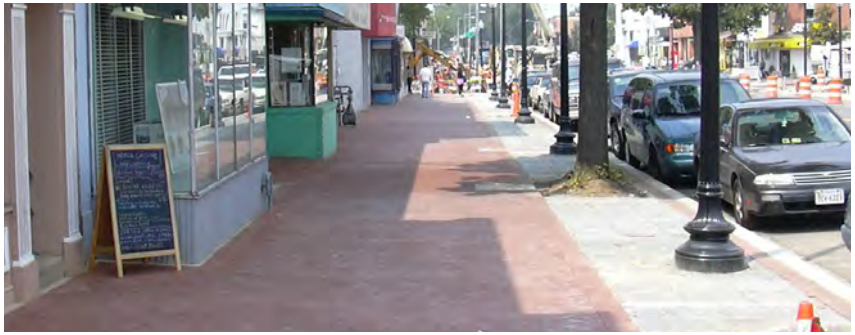


Photo: Barracks Row Main Street

New sidewalks and crosswalks signaled public reinvestment in the area.


LANCASTER
HOMETOWN
HERO
lancaster

Main Street

Main streets serve as important symbols in communities. The streets in this category have historically served as the center of town, the place people went to shop, meet friends, and attend community events. Prior to the redesigns documented in this book, each of these streets went through periods where they no longer served as that community hub. Fortunately, these communities did something about it and now serve as excellent examples of how to change the trajectory of a main street.

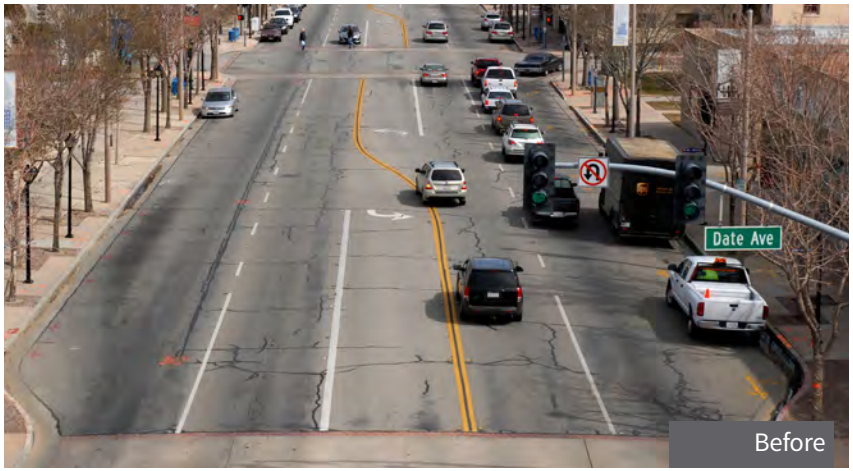
Photo: Lancaster Boulevard, Lancaster, CA. Photo by Greg Konar.

W. Lancaster Boulevard

Lancaster, CA
Metro Population: 158,000 | City Population: 156,633

After

Photo: Greg Konar



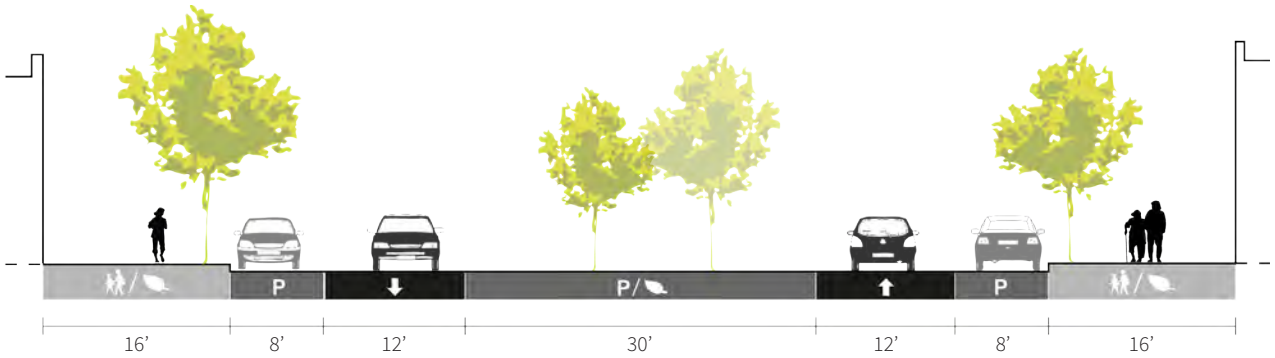
Before

Photo: City of Lancaster

W. Lancaster Boulevard's successful redesign led to $130 million in private investment .

- 2 travel lanes and a center turn lane were converted to diagonal parking and plaza space in the center of the street.
- Street trees, benches, and landscaping were added along sidewalks and in the new median.

AFTER



BEFORE

KEY OUTCOMES

Economic Development
The project resulted in $273 million in economic output and $130 million in private investment. The redesign attracted 49 new locally owned businesses and added 800 permanent jobs and 1,100 construction-related jobs.[39]

Revitalized Buildings
Over 116,000 square feet of commercial space was constructed or rehabilitated, making the streetscape feel more vibrant.[39]

Safety Improved
During the two years after the project’s completion the overall number of traffic collisions has been cut in half, while injury-related collisions have decreased 85% as a result of the new streetscape and traffic pattern.[39]

New Housing Downtown
The project attracted private developers who built 800 units of low- to moderate-income condos and apartments on the corridor.[39]

STREET CLASSIFICATION
Major Arterial

RIGHT OF WAY
102’

LENGTH
0.6 miles

SPEED

SPEED LIMIT 35	SPEED LIMIT 15
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

19,800	[no data]
BEFORE	AFTER

PROCESS
8 Months Construction

W. Lancaster Boulevard

Lancaster, CA
City Median Household Income: $52,290

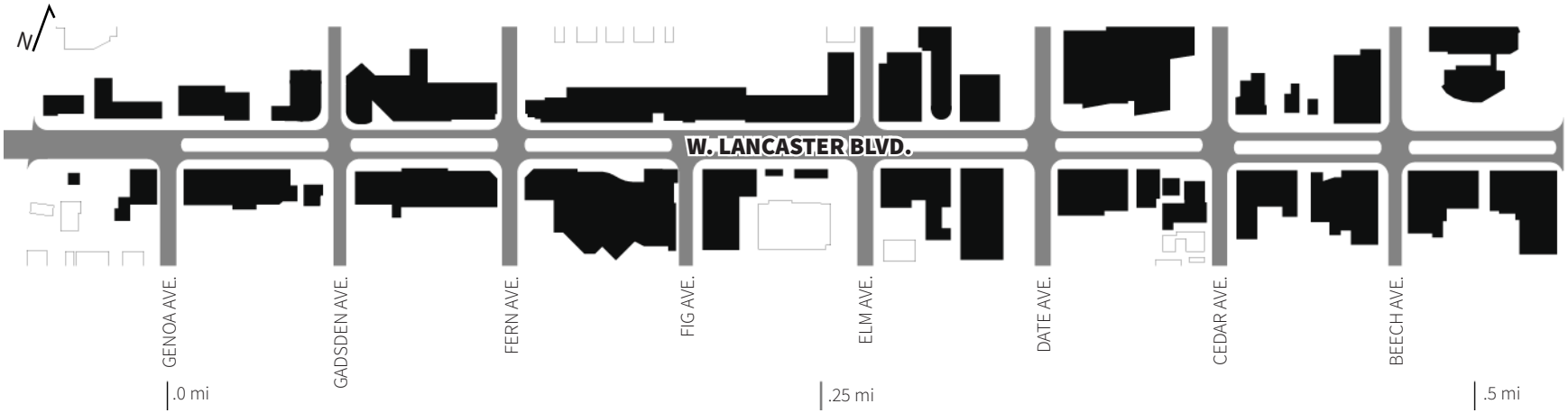
LANCASTER BOULEVARD CONTEXT

- The streetscape project cost $11.5 million, and was led by the City of Lancaster and The BLVD, a business organization.[39]
- W. Lancaster Boulevard used to run through a downtown area that had increasingly more and more vacant storefronts due to the economic recession and high unemployment in the late 2000's.
- The project also included nine new housing complexes, rehabilitation or construction of 116,000 square feet of new commercial space and the construction of a park and a museum. [39]
- All 190 businesses in the project area remained open through construction. The construction was phased so no business was severely impacted for more than three months. [39]
- New developments include a former furniture store converted into a nightclub and an underground bowling alley. These establishments, along with the addition of a movie theater, added activity to the street at night.

NEW BUSINESSES

Photo: City of Lancaster

The redesign led to over 40 new businesses along the corridor, including a new three-screen movie theater, shown above.



PARKING

Photo: Greg Konar

On most days, a well-designed center median defined by landscaping and distinct paving provides additional parking to downtown businesses.

MARKET

Photo: City of Lancaster

On farmers market days and holidays, the central parking turns into a space for vendors, while pedestrians replace cars in the auto lanes, demonstrating how a street can be a place as well as a transportation corridor.

A COMPLETE REDESIGN

Photos: City of Lancaster

The City of Lancaster completely rebuilt Lancaster Boulevard in eight months.

Clematis Street

West Palm Beach, FL
Metro Population: 5,564,635 | City Population: 99,919

After

Photo: Google

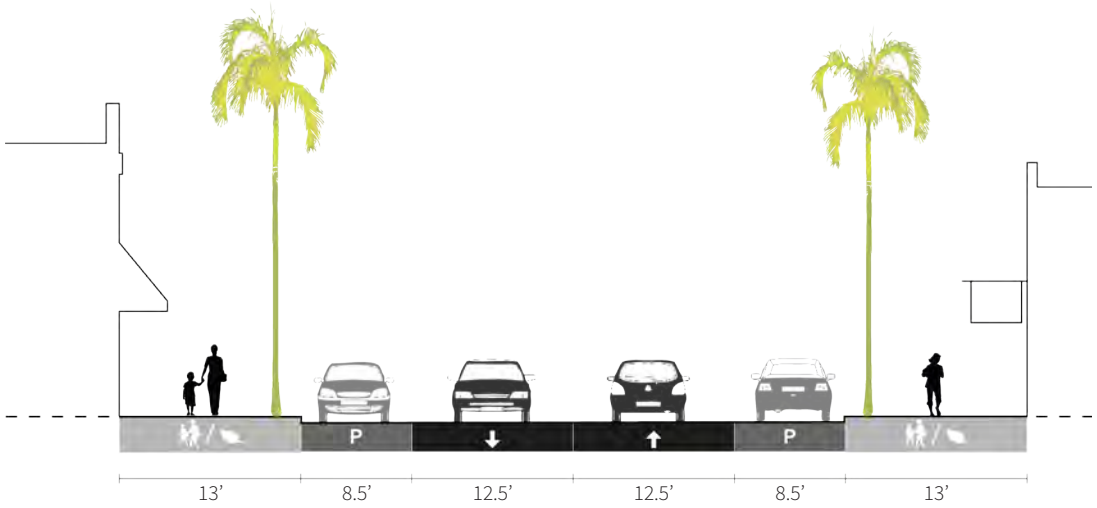
Before

Photo: Ian Lockwood

Downtown West Palm Beach was once only for commuters, but now attracts shoppers, families, and tourists.

- Widened sidewalks, landscaping, trees and street furniture all contributed to an improved pedestrian realm.
- Three lanes were reduced to two as the street was converted from one way to two way.

AFTER



BEFORE

STREET CLASSIFICATION

Minor Arterial

RIGHT OF WAY

68 ft

LENGTH

0.5 miles

SPEED

SPEED LIMIT	SPEED LIMIT
30	30*
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

[no data]

KEY OUTCOMES

Major Private Reinvestment Followed
The City’s $10 million dollar investment in Clematis Street encouraged $300 million in private investment along the street. [40]

Retail Vacancies Disappeared
Many storefronts stood empty in the early 1990’s due to crime and blight. At its worst, nearly 80% of storefronts were empty. After the redesign, stores and restaurants came back. The street now has 80% occupancy. Where rents were once $6 per square foot per year, now they are five times that. [40]

Crime Declined
Prior to the City’s revitalization efforts, Clematis Street was a destination for illegal activities like drug dealing and prostitution. After public investment, those activities disappeared and a more welcoming atmosphere emerged. Families with children began frequenting the street, and a weekly block party, “Clematis by Night” has been drawing people downtown since 1995. [40]

* Please note that the operating speed is lower than the unposted, default, speed limit and estimated at 20-25 mph.

Clematis Street

West Palm Beach, FL
City Median Household Income: $44,806

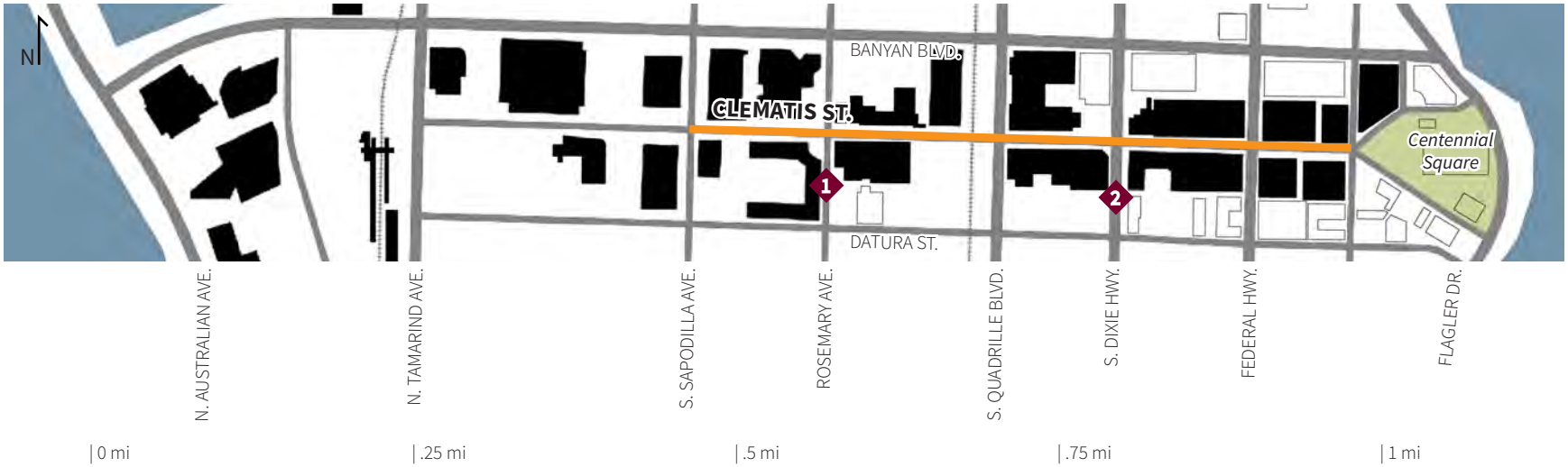
CLEMATIS STREET CONTEXT

- Downtown West Palm Beach is home to approximately 25% of Palm Beach County's employment base and sees a large amount of commuter traffic in and out every day. [40]
- The City of West Palm Beach developed a downtown master plan in 1995 that set design standards, simplified the permitting process, and made traffic calming projects the new normal for streets downtown. These policies led to the conversion of Clematis Street from a one-way street to a two-way street with new streetscape elements. [40]
- In 2000, CityPlace, an upscale shopping center, opened downtown. Rosemary Avenue, the connection between Clematis Street and CityPlace, received a facelift that emphasized people over cars.
- The overall investment in the project amounted to $10,000,000. This included the streetscape improvements on Clematis, a redesigned plaza, and a facelift for the library situated on the plaza. [40]

CENTENNIAL SQUARE REVITALIZED

Photo: Gregory Moine

The City rehabilitated Centennial Square with Clematis Street. The park sits at the east end of Clematis Street and once again serves as the center of civic life.



ROSEMARY AVENUE, BEFORE

Photo:Ian Lockwood

After the success of Clematis Street, Rosemary Avenue was redesigned under the city's new policy, connecting the mall to downtown.

ROSEMARY AVENUE, AFTER

Photo: Ian Lockwood

A new curbless design, brick pavers, and a zone where parking and street trees mix maximized the narrow street's ability to serve pedestrians.

DIXIE HIGHWAY, BEFORE

Photo: Ian Lockwood

Many of the streets in downtown West Palm Beach served to efficiently move commuters in and out of downtown but did not serve people well.

DIXIE HIGHWAY, AFTER

Photo: Ian Lockwood

In another project on Dixie Highway, City traffic engineers reduced travel lanes, added street trees and made intersections safer for pedestrians.

Main Street (US 62)

Hamburg, NY

Metro Population: 1,135,509 | City Population: 9,409

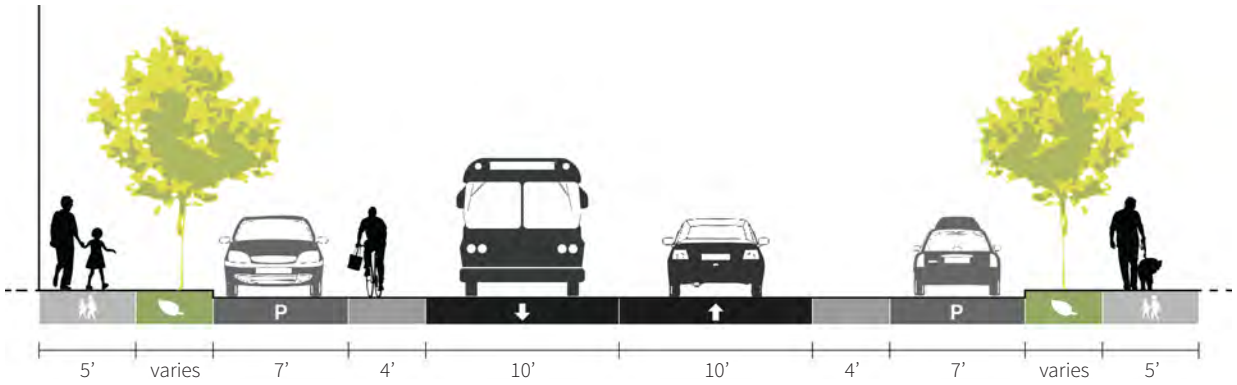
Photo: Laura Hackathorn

Photo: Laura Hackathorn

This small village revived its city center by working with the State Department of Transportation on its downtown streets.

- Pedestrian improvements included mid-block pedestrian crossings, landscaping and sidewalk extensions.
- Traffic calming strategies were employed, including narrowed lanes and roundabouts.

AFTER



BEFORE

KEY OUTCOMES

Fewer, Less Severe Accidents
Car Accidents dropped by 66% and injuries dropped by 60% two years after the changes were implemented in 2009.[41]

New Investment Downtown
$7 million dollars were spent on 33 building projects in the four years since the design was implemented. The New York Main Street Grant Program contributed $200,000 in grants which sparked $1.2 million in private investment.[41]

Local Business Blossomed
The Village Business Advisory Council (VBAC) made a concerted effort to promote local businesses during construction. No businesses were lost during construction, and more businesses were attracted to the area after the improvements. The number of building permits rose from 15 in 2005 to 96 in 2010.[42]

Boost to Property Values
Locals report that people are returning to Hamburg, and average property sales increased 169% from 2005 to 2011.[42]

STREET CLASSIFICATION
Urban Minor Arterial

RIGHT OF WAY
66 ft

LENGTH
1.9 miles

SPEED

SPEED LIMIT 30	SPEED LIMIT 30
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

12,100	15,000
BEFORE	AFTER

PROCESS
4 years Construction

Main Street (US 62)

Hamburg, NY
City Median Household Income: $63,446

MAIN STREET CONTEXT

- Hamburg is a small village located on the border of Erie County, 20 minutes south of Buffalo. The town's main street is a part of U.S. Route 62.
- The project initially rose as a reaction to a proposal by the state transportation department (NYSDOT) to remove parallel parking and add another lane to the street. Concerned citizens formed the Route 62 Committee and spearheaded the effort to come up with a better proposal. [41]
- Architectural design standards for the street now promote the preservation of historical features, and encourage buildings with shops at the street level and housing above. The street was placed on the National Register of Historic Places in 2012.[41]
- Traffic calming strategies included replacing traffic lights with roundabouts, adding more on-street parking and planting more trees in the area. Striped "safety lanes" also provide space between parked cars and moving traffic, and function as bike lanes. [41]
- Street fairs and events are popular on the street, including a movie-in-the-park night, a village garden walk and a music festival, among others. [41]

STREETSCAPE IMPROVEMENTS

Photo: Laura Hackathorn

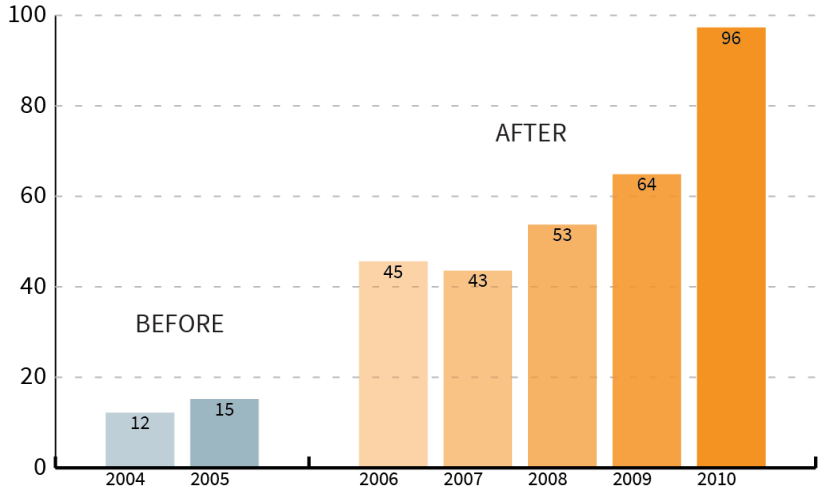
Street trees, upgraded sidewalks and improved crossings benefit pedestrians.

TRUCK ACCESS MAINTAINED

Photo: Walkable Olean

Buffalo Street is a designated truck route, and the new roundabouts were carefully designed to provide enough room for large turning vehicles.

INCREASE IN BUILDING PERMITS PER YEAR



Increased investment on the street began in 2005, at the beginning of construction, and jumped again after construction was completed in 2009.[42]

ROUNDABOUTS REPLACE INTERSECTIONS

Photo: Timothy Valentine

This roundabout transformed an ordinary intersection into a landmark.

REVITALIZED STOREFRONTS

Photos: Village of Hamburg

This exterior renovation received a $7,800 grant to help cover expenses.

Courthouse Square

Sulphur Springs, TX
Metro Population: 15,449 | City Population: 15,449

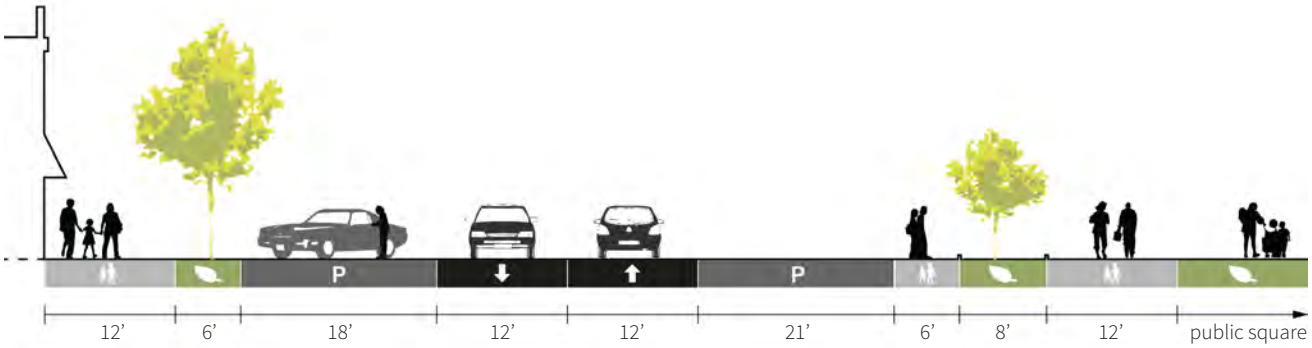
Photo: Cindy Roller

Photo: David Wilson

A multi-pronged approach in City Planning, Economic Development, and Urban Design reaped big rewards in downtown Sulphur Springs.

- What was a parking lot has become a city square, with grass, trees, benches, a splash fountain and public art.
- A new veteran's memorial was established on the square as a place of civic pride.
- The surrounding one way streets were converted to two-way streets and re-paved with vibrant red brick.

AFTER



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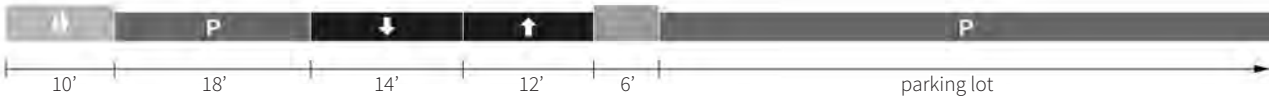


KEY OUTCOMES

Businesses Attracted to the Area
After the improvements were made, the downtown area saw $1.5 million in private investment. Fifteen new businesses have set up shop in the district, and the city reports a 15% increase in sales tax revenue.[43]

Property Values Increased Dramatically
In the two years since changes were implemented in 2011, most downtown properties have doubled in value. Additionally, a real estate broker with over 30 years experience reported he had doubled his record year for selling real estate in Sulphur Springs.[43]

500 New Jobs in Town
Local industries have expanded and new industries have moved in, producing roughly 500 new jobs in Sulphur Springs as a result of the revitalization.[43]

Regional Recognition
In 2011, during the tail end of the project, Sulphur Springs was named the “Most Improved Small Town” by County Line Magazine, a publication serving the upper east side of Texas.[44]

STREET CLASSIFICATION
N/A

RIGHT OF WAY
104’

LENGTH
.5 miles

SPEED

SPEED LIMIT	SPEED LIMIT
30	30*
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

4,000	7,500
BEFORE	AFTER

PROCESS
4 years design and construction

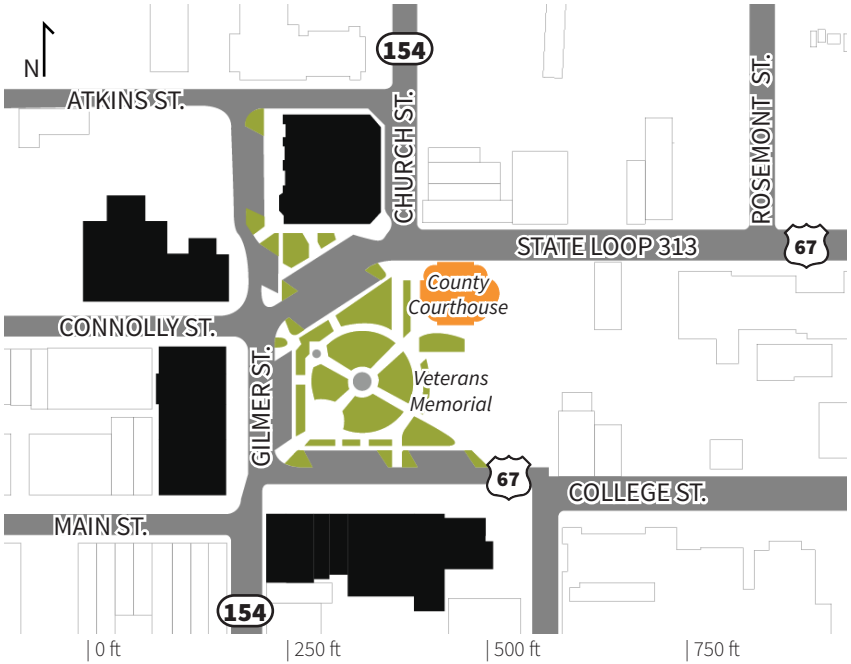
* Please note that the operating speed is lower than the unposted, default, speed limit and estimated at 5-15 mph.

Courthouse Square

Sulphur Springs, TX
City Household Median Income: $38,480

COURTHOUSE SQUARE CONTEXT

- The Downtown Revitalization was a choreographed effort, and the city worked deliberately to attract people and businesses downtown. Shane Shepard, the City Development Director, said "It is not a build it and they will come scenario.... It is a build it, program it, and recruit partners (businesses) and they will come." [43]
- The wide streets surrounding Courthouse Square were once part of a state truck route. The route was diverted and the one way streets were converted to two-way streets during the redesign.
- A number of businesses along the square and surrounding streets received grants for signage and facade improvements. The Downtown Revitalization Board has awarded $320,000 in grants as of September 2013. [43]
- The project cost $6 million dollars and was funded through Tax Increment Financing: property taxes from the increased property value will pay off the 20 year bond.[43]
- Festivals and events populate the square 44 weekends out of the year, including concerts, car shows, wine tastings and weddings.[43]



A DESTINATION FOR PUBLIC EVENTS

Photo: Jill McKeever

A popular farmers market takes place on the square and surrounding streets during the spring and summer.

SPACE TO SIT AND PLAY

Photo: Jill McKeever

The new square offers plenty of places for the public to sit, play and enjoy the downtown neighborhood. Speakers play music day and night.

FUNCTIONAL ART ON THE SQUARE

Photo: Ian Lockwood

This public restroom is reflective on the outside, but transparent on the inside! The city advertises the restrooms on a billboard along I-30 to attract tourists.

HISTORICAL SIGNIFICANCE

Photo: Ian Lockwood

Sitting prominently on the square is a veterans memorial and the county courthouse. The courthouse was constructed in 1895 and restored in 2002.

GILMER STREET BEFORE

Photo: Ian Lockwood

Before the redesign, the area was plagued with vacant store fronts and run-down buildings. A grant program gives incentives for facade improvements.

GILMER STREET AFTER

Photo: Ian Lockwood

With the revitalized streets and square, new businesses opened, like this restaurant and pub.


ONLY

Bike Street

Cycling, and the need for dedicated bicycle infrastructure, is on the rise in the United States. These streets demonstrate the variety of ways cyclists can be accommodated on all types of streets. Examples in this chapter include everything from a simple bicycle lane to an eight-mile world class urban trail.

photo: Pennsylvania Avenue, Washington, DC, photo by Rob Shenk

N. Williams Avenue

Portland, OR
Metro Population: 2,289,800 | City Population: 583,776

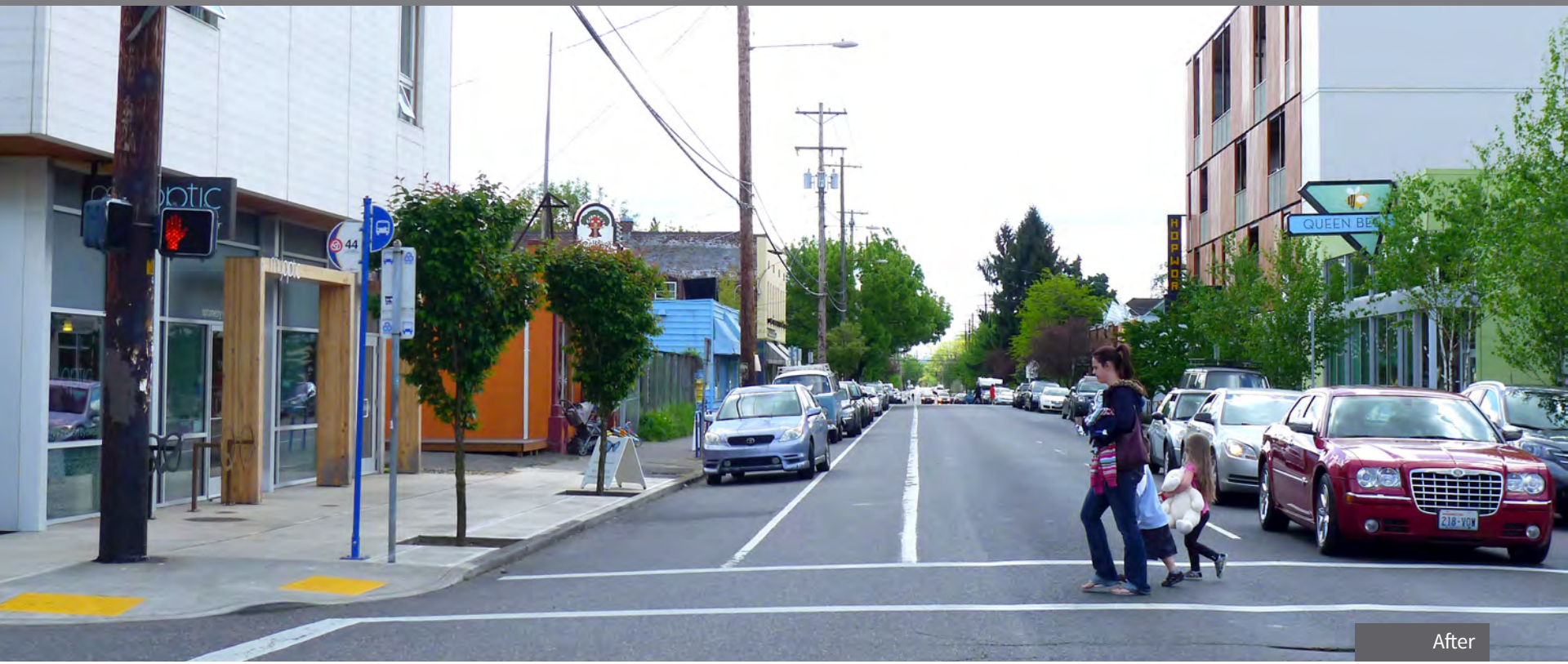
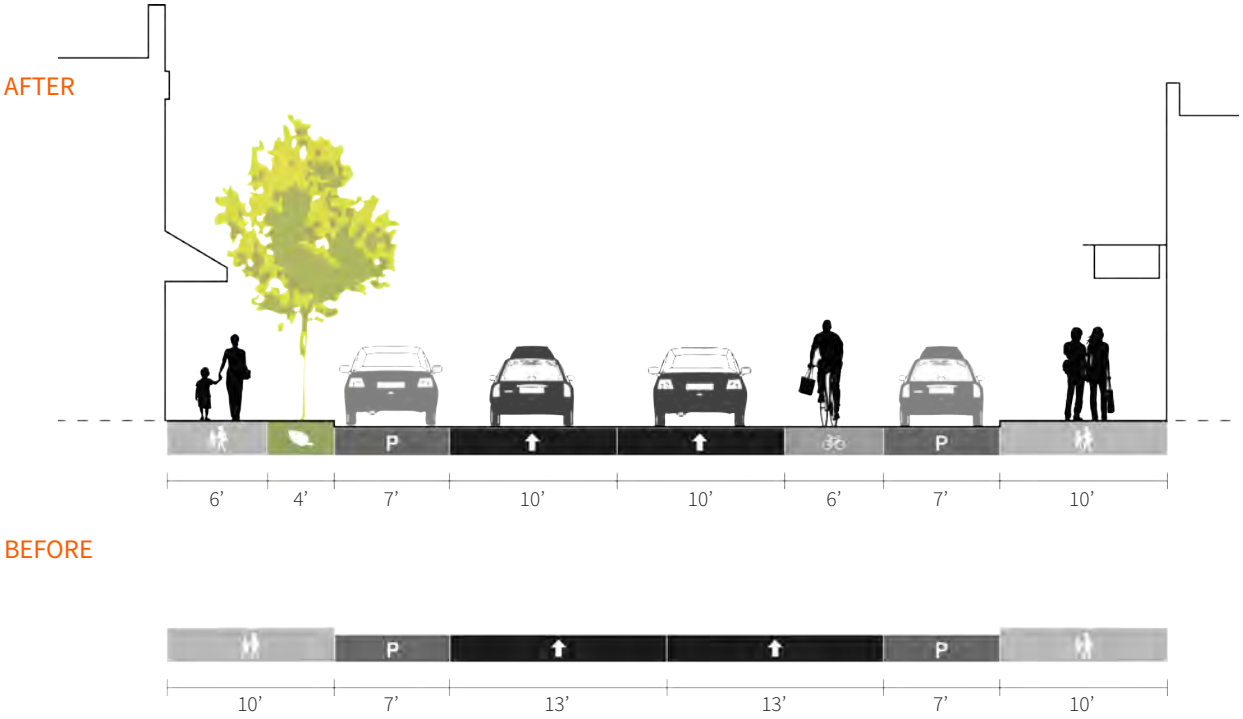


Photo: Emma Newman

Photo: City of Portland

Pedestrian and bike improvements helped bring investment to a neighborhood recovering from urban renewal projects.

- A bike lane was striped in 1999.
- Streetscape improvements were made in 2006, including improved crossings, landscaping and repaved sidewalks.



STREET CLASSIFICATION
Neighborhood Collector

RIGHT OF WAY
60’

LENGTH
1.9 miles

SPEED

SPEED LIMIT 30	SPEED LIMIT 30
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

8,000	7,700
BEFORE	AFTER

PROCESS
2 years

KEY OUTCOMES

Increase in Cyclists
Before the lanes, there were almost no bicyclists on the street, and city staff were worried that the lanes wouldn’t be used. A decade later there are so many bicyclists using the lanes that plans are in place to expand the facility.[45]

Development is Booming
New residential, mixed use and commercial buildings are quickly replacing empty lots and abandoned buildings.[46] In October of 2013, 700 new units were under construction with more on the way.[47]

Higher Property Values
Rents along N. Williams are now $5 per square foot higher than the Portland average, having doubled from $10 to $20 per square foot in the last ten years.[47]

Bicycle Friendly Businesses
A number of bicycle-friendly businesses have opened along N. Williams Avenue. In July of 2012, twenty-two businesses participated in Rider Appreciation Day–an event in which local businesses offered gifts, discounts, food, drinks and other perks to passing cyclists. [48]

N. Williams Avenue

Portland, OR
City Household Median Income: $50,177

N. WILLIAMS AVENUE CONTEXT

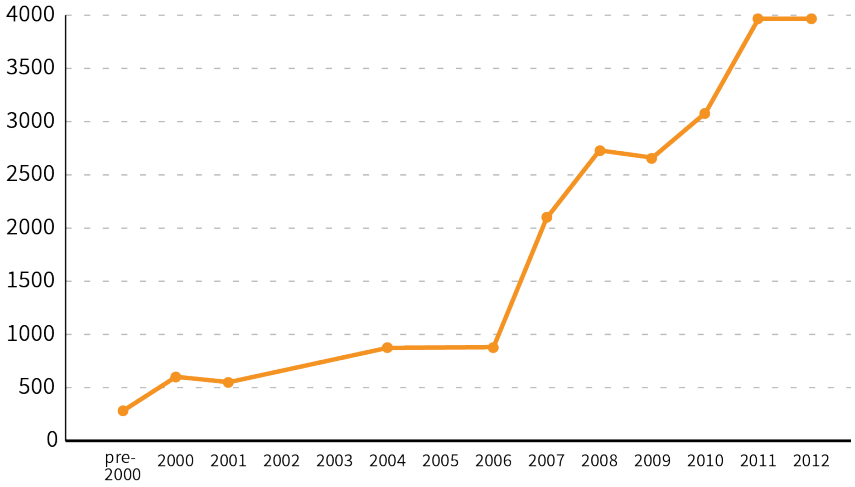
- North Williams is at the heart of Portland's Albina Neighborhood. During the 1950's, the once-thriving African American community fell victim to bulldozing in the name of urban renewal, destroying 1,100 housing units and a multitude of businesses.[48]
- Gentrification over the past 20 years has resulted in a shift from 70% African American and 21% Caucasian in 1990 to 27% African American and 54% Caucasian in 2010.[50]
- There is a high degree of heavy industrial use along the corridor, which employs 63% of the local population.[50]
- North Williams is designated a "major city bikeway" because it offers a continuous connection between the Broadway and Steel Bridge Bike Paths. In the warm months roughly 400 cyclists bike up the avenue per hour.[51]
- In 2012 a community process began to redesign the street again. Street users expressed desire for buffered bike lanes, well-marked crosswalks, better street lighting, traffic calming measures and more public gathering spaces.[52]

MORE CHANGE AHEAD

Photo: Jonathan Maus, Bike Portland

The community is in the process of redesigning the street to accommodate more cyclists while respecting the neighborhood's history and vision.

RATES OF CYCLISTS PER DAY SOARING



Data: Portland Bicycle Count Report 2012

The number of cyclists on the avenue has increased dramatically since the lanes were striped in 1999. Bicycle traffic city-wide has more than tripled since 2000.[53]

BIKE-FRIENDLY BUSINESS

Photo: Jonathan Maus, Bike Portland

Local businesses are capitalizing on the high volume of bicycle traffic by offering bike parking and embracing cycling culture.

SCENES ALONG N. WILLIAMS

Photo: Jonathan Maus, Bike Portland

With so many cyclists, bus stops can cause backups.

Photo: Laura Levenberg

New housing developments are a common sight.

Photo: Kelly Sanford

Street art peppers the corridor.

8th and 9th Avenues

New York, NY

Metro Population: 22,214,083 | City Population: 8,175,133

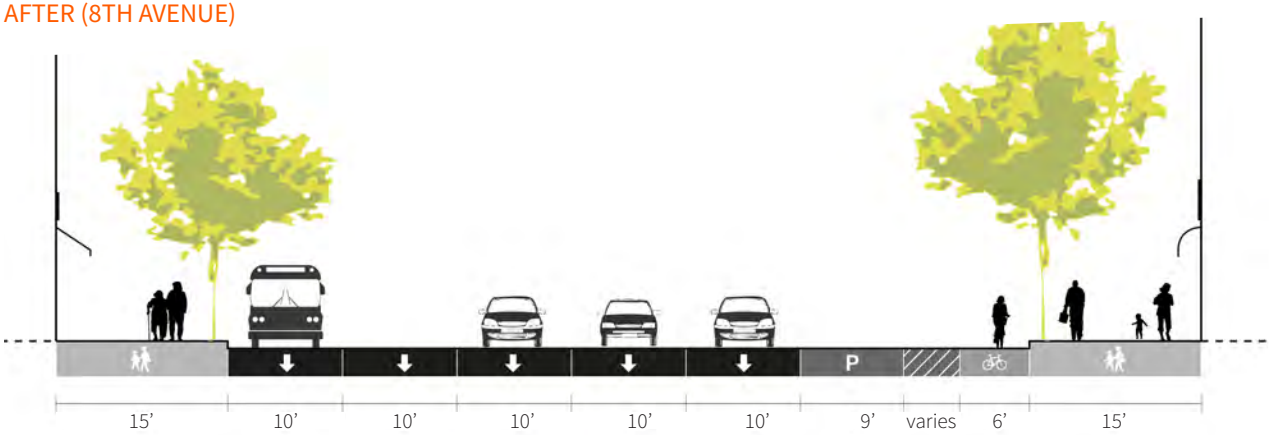
Photo: NYCDOT

Photo: NYCDOT

New cycle tracks on the west side of Manhatten improved retail sales, safety, and travel times.

- The four travel lanes on this avenue were narrowed to generate space for a cycle track- a bike lane separated from auto traffic with a row of parked cars and a buffer zone.
- Intersections were designed to regulate vehicular left turns while preventing collisions with bike lane users.

AFTER (8TH AVENUE)



BEFORE (8TH AVENUE)

KEY OUTCOMES

Crashes with Injuries Declined
Eighth Avenue saw a 20% decline in crashes that caused injuries, while Ninth Avenue saw a 52% decline. The severity of crashes has also significantly decreased.[54]

Retail Sales Increased
Sales at locally-owned businesses along the corridor jumped 49% after the addition of the cycle track. Sales only increased 3% borough-wide.[55]

Car Travel Times Decreased
The new design added left turn lanes while preserving the number of through lanes, which has led to improved travel times along the corridor. The mid-day average travel time dropped by over a minute, while peak hour trips were shortened by 22 to 28 seconds from W. 23rd Street to W. 34th Street on 8th Avenue. [54]

STREET CLASSIFICATION
Minor Arterial

RIGHT OF WAY
100’

LENGTH
2.5 miles

SPEED

SPEED LIMIT 30	SPEED LIMIT 30
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

30,000	30,000
BEFORE	AFTER

PROCESS
Multiple phases in 2007, 2008, 2009, 2010, 2012

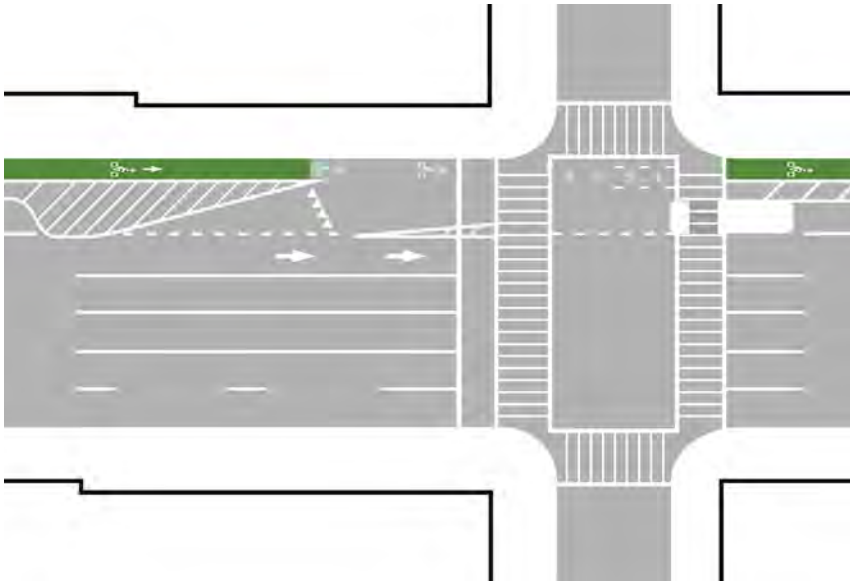
8th and 9th Avenues

New York, NY
City Household Median Income: $51,270

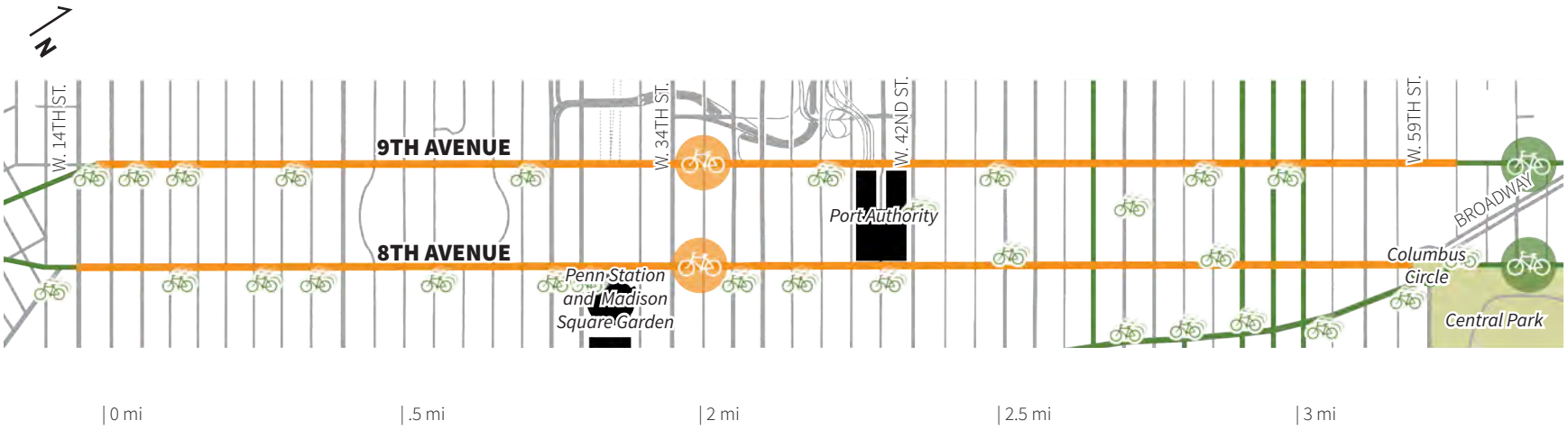
8TH AND 9TH AVENUES CONTEXT

- New York's bicycle planning efforts received a boost with the adoption of PlaNYC in 2007. The New York City Department of Transportation (NYCDOT) began implementing progressive street redesigns as a result of the plan. Between 2007 and 2010, 250 miles of bike lanes were added to New York streets, and the city saw an 87 percent increase in commuter bicycling.[56]
- NYCDOT claims that 8th and 9th Avenues are the first protected bicycle lanes in the United States.
- The lanes were implemented in a number of phases in 2007, 2008, 2009, 2010, and 2012. In 2012 the project was extended to include the stretch from 34th St. to Columbus Circle on 8th Ave. and 33rd St. to 59th St. on 9th Ave., connecting the Port Authority to Madison Square Garden and Central Park.
- Some businesses were concerned that the lanes would make deliveries too difficult and that the loss of parking would drive away customers.[57] A comprehensive study of this project and others in NYC has since shown that street improvement projects do not detract from commercial activity at the site of implementation, and may contribute positively.[58]

INTERSECTION DETAIL



The design of left turn lanes improves the visibility of cyclists and pedestrians so that all users can navigate the intersection safely.



SHORTER CROSSING DISTANCE

Photo: Flickr User thisisbossi

Refuge islands shorten the crossing distance for pedestrians while also making a clear distinction between the bike lane and travel lanes.

PROTECTED LANES

Photo: Steven Vance

Cyclists on 8th and 9th Avenues are protected by a wide buffer strip with flexible bollards as well as parked cars.

SIGHTS ALONG 8TH AND 9TH AVENUES

Photo: flickr user mtchira

Madison Square Garden sits on 8th Avenue.

Photo: NYCDOT

9th Avenue features this public plaza at 14th Street.

Photo: flickr user slgckgc

Citibike docks serve the avenues' cycle tracks.

Pennsylvania Avenue

Washington, DC
Metro Population: 5,860,342 | City Population: 601,723

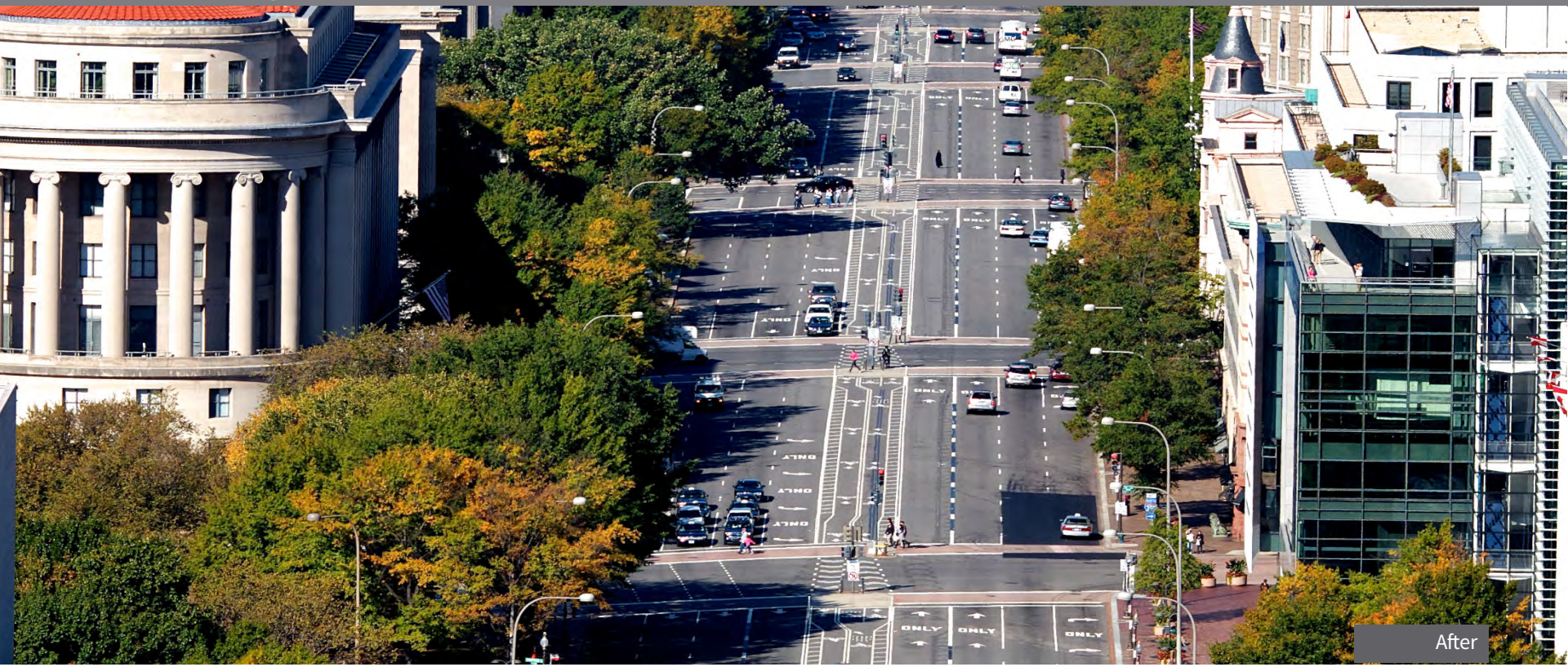


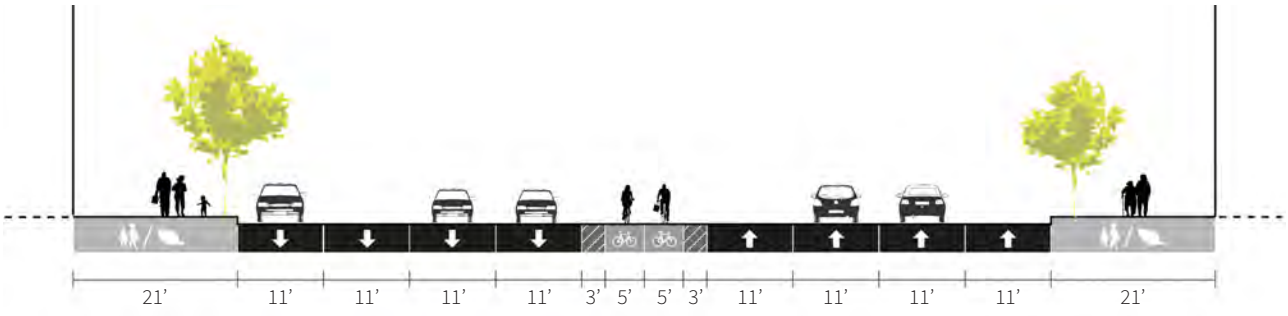
Photo: Rob Shenk

Photo: Victoria Pickering

One of the United States' iconic streets now features bike lanes at its very center.

- A center median was repurposed into a two-way buffered cycle track, with bicycle turn lanes and bicycle traffic signals.
- Left turns by motorists between the White House and the Capitol Building became restricted.

AFTER



BEFORE

STREET CLASSIFICATION

Major Arterial

RIGHT OF WAY

146’

LENGTH

1 mile

SPEED

SPEED LIMIT	SPEED LIMIT
25	25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

33,000	32,800
BEFORE	AFTER

KEY OUTCOMES

Bicycling Increased
A study of the Pennsylvania Avenue cycle track found that cycling increased over 250% during the morning and evening peak hours. All areas along the street experienced significant increases in cycling. [59]

Community Asset
When surveyed, 90% of businesses stated that they did not think the bike lanes affected their property or business, and 71% of residents agreed that the center bike lanes were a valuable asset to the neighborhood.[59]

Car Volumes Declined
After adding the cycle track, peak hour car traffic declined 21%. The reason is not clear, though turn restrictions added due to the central location of the cycle track may have played a role. [59]

Pedestrian and Auto Congestion Unaffected
Level of service is a measure of congestion on a scale from A: most free flowing, to F: most congested. The Level of service on Pennsylvania Avenue remained at A or B for pedestrians and E for motor vehicle traffic.[59]

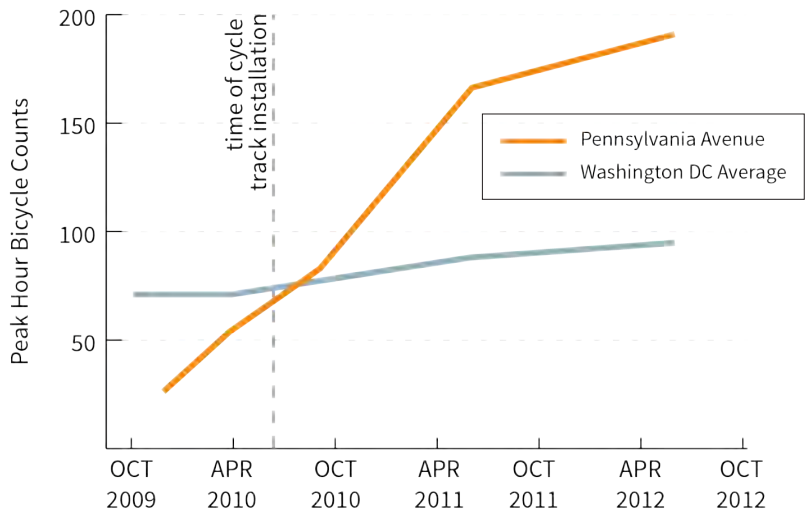
Pennsylvania Avenue

Washington, DC
City Median Household Income: $61,835

PENNSYLVANIA AVENUE CONTEXT

- Pennsylvania Avenue connects the White House with the U.S. Capitol building. This connection of executive and legislative branches of government gives the avenue heightened symbolic importance. As a result, events like parades, protests and presidential inaugurations pass through the corridor on a regular basis.
- When not in use as a ceremonial street, eight lanes of traffic carry high volumes of traffic at high speeds. The street is very wide and imposing to people at street level.
- A new bicycle master plan was adopted in 2005, charting the way to improve bicycling in the city by improving facilities, establishing bicycle-friendly policies and expanding education and outreach.
- Washington D.C.'s bike share system, Capital Bikeshare, boasts 200 bike share stations and over 1,800 bikes in the region, and is popular with both tourists and residents.
- Traffic signal timing was changed to allow cyclists to enter the intersection before cars to increase their visibility.
- The addition of the cycle track required city engineers to install many new signs to educate cyclists on how to use the new facility and to teach drivers about the changes to their experience.
- Bollards were initially installed with the lanes and interfered with the civic function of the street. They were later removed. Since being removed, illegal u-turns across the bike lanes have been a problem.

INCREASE IN BICYCLING



Data: DDOT

This graph shows the steady increase in peak hour bicycle volumes on Pennsylvania Avenue compared to the rest of the city.[59]

A NATIONAL STAGE

Photo: United States Navy Band

Pennsylvania Avenue is host to a number of national events, including the presidential inauguration.

FEATURES OF THE CYCLE TRACK

Photo: Adam Fagan

Turning lanes at intersections provide space for cyclists to wait without blocking the flow of traffic.

Photo Rendering: DDOT

Zebras, the low profile barriers pictured above, have been approved for a trial run on the avenue to discourage vehicles from making illegal u-turns.[60]

Higgins Avenue

Missoula, MT

Metro Population: 110,977 | City Population: 66,788

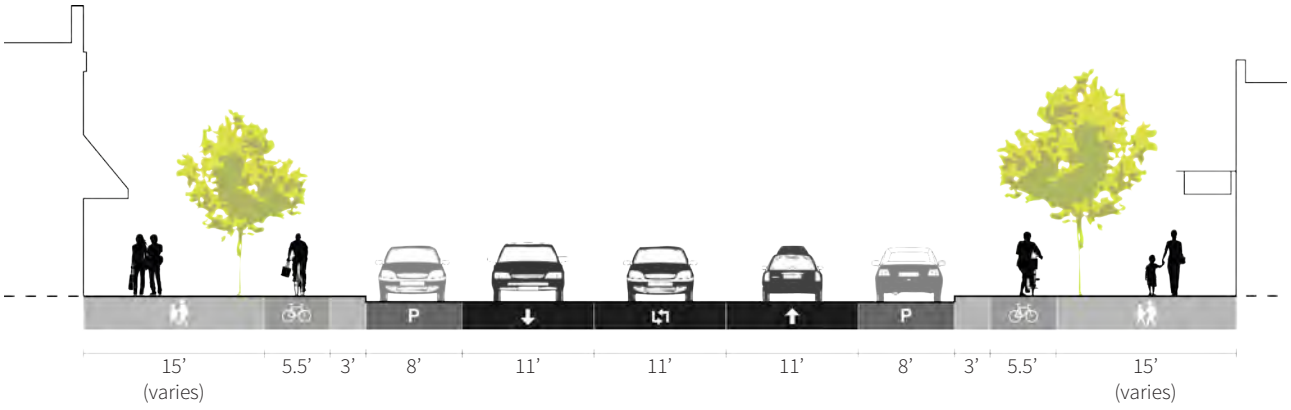
Photo: City of Missoula Bicycle/Pedestrian Office

photo: Missoula Institute for Sustainable Transportation

A road diet with a cycle track invites "interested but concerned" cyclists to Higgins Avenue.

- Four travel lanes were converted to five, including two cycle tracks, two auto lanes and a center turn lane. On-street parking remained.
- A cycle track was constructed by extending the curb to the outside of the bike lane.
- New landscaping and sidewalks were installed to enhance the pedestrian environment.

AFTER



BEFORE

KEY OUTCOMES

A More Comfortable Ride for Cyclists
In surveys conducted with people on bikes 6-10 months after the installation was complete, 75% of respondents stated that the lanes were either pretty comfortable or very comfortable and that the improvements were a good use of funds. Key benefits identified were being out of the door zone, having more room and keeping rocks out of the bike lane. [65]

Green Paint Improves Visibility
The majority of bicyclists and motorists surveyed expressed that the green paint significantly improved visibility of cyclists in the intersections. Roughly 75% of surveyed users felt that the green paint was a good use of funds, and some commented that it was essential to the project. [65]

Motorists Support Improvements
Motorists and bicyclists alike agreed that the new configuration works well and improves the safety of the street. [65]

STREET CLASSIFICATION
Major Arterial

RIGHT OF WAY
95’–96’

LENGTH
.2 miles

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

7,400	7,600
BEFORE	AFTER

PROCESS
1 year

Higgins Avenue

Missoula, MT
City Median Household Income: $37,316

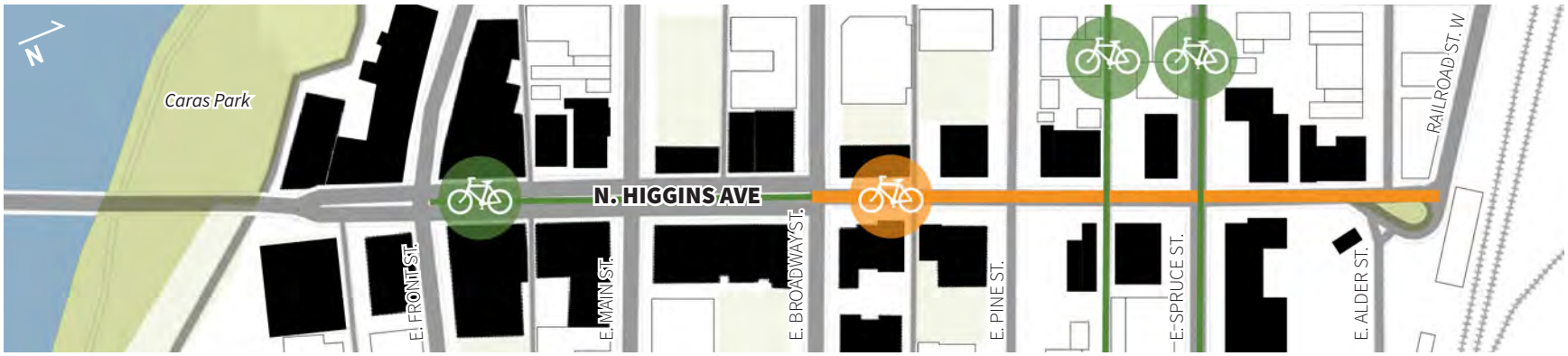
HIGGINS AVENUE CONTEXT

- Higgins is one of Missoula's historic downtown streets. It accommodated both a horse-drawn and electric streetcar system at the turn of the 20th century and it continues to be an important street in the city, starting at Missoula Central Railway Station and continuing for 3.5 miles to the south.[61]
- Surveys conducted for the City's 2008 Long-Range Transportation Plan found that 5.9% of all commuters used bicycles and 49.7% of Missoula residents thought that improving bicycle and pedestrian facilities was a higher priority than expanding road capacity for automobiles.[62]
- In response, the 2009 Downtown Master Plan identified the need for better bicycle infrastructure and Higgins St. was recommended for use as a protected bikeway. The 2010 streetscape improvements to N. Higgins St. were a demonstration project as part of the initial implementation of the Master Plan. A bike corral installed on N. Higgins is part of the project as a pilot project.[63]
- Financing for the project came from a variety of sources, including $1.2 million from the American Recovery and Reinvestment Act, $200,000 from the Montana Legislature's House Bill 645, and $50,000 from the Montana Department of Transportation.[64]

PEDESTRIAN IMPROVEMENTS

Photo: Missoula Institute for Sustainable Transportation

Bulbouts extend through the parking lane to make pedestrian crossing distances shorter, but do not conflict with the generous bike lanes.



PASSENGER UNLOADING

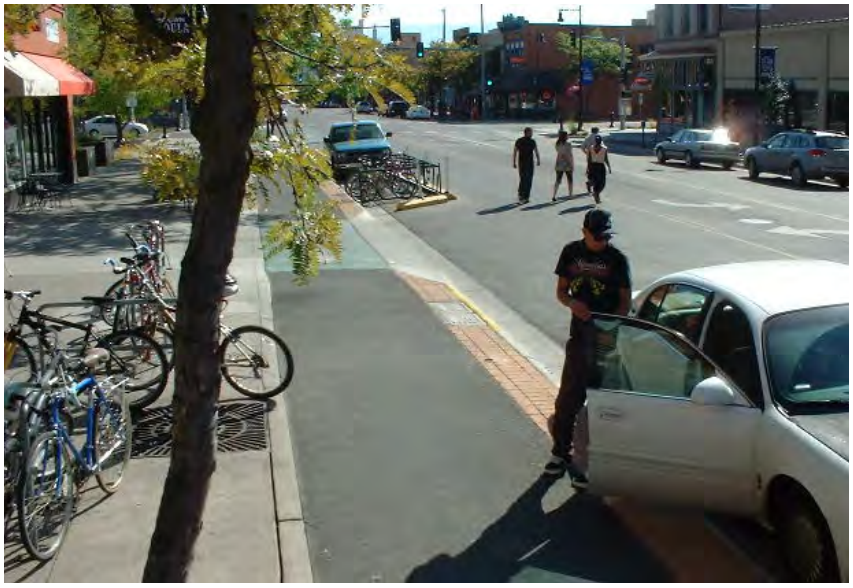


Photo: Missoula Institute for Sustainable Transportation

The cycle track includes a “door zone” or an area where car doors do not interfere with cyclists.

A TYPICAL INTERSECTION

Photo: Missoula Institute for Sustainable Transportation

The cycle track merges back into the street at intersections into lanes backed with green paint to improve visibility.

HIGGINS THROUGH THE SEASONS

Photo: Missoula Institute for Sustainable Transportation

Construction took just under 6 months.

Photo: Missoula Institute for Sustainable Transportation

The cycle track is plowed during snowy weather.

Photo: Phil Smith

On street bike parking is installed seasonally.

Indianapolis Cultural Trail

Indianapolis, IN
Metro Population: 1,778,568 | City Population: 820,445

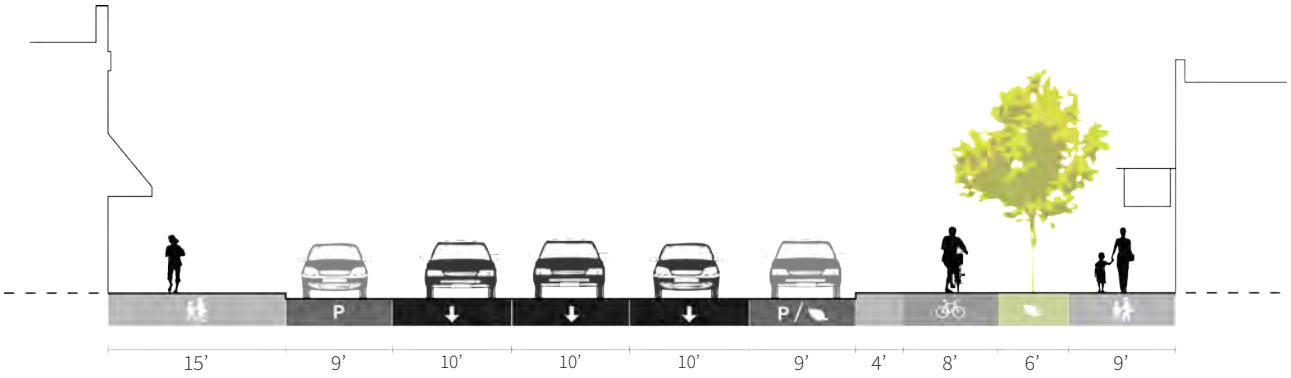
Photo: Rundell Ernstberger Associates, LLC

Photo: Rundell Ernstberger Associates, LLC

This world-class bike and pedestrian trail connects cultural attractions in Indianapolis.

- Parking and travel lanes were narrowed to create more space for plantings, benches and walking.
- A two-way bike path was installed at the level of the sidewalk and buffered from the road with stormwater planters and pavers.
- Distinct paving patterns, crosswalks and street elements strengthen the identity of the trail.

AFTER



BEFORE

STREET CLASSIFICATION

Network

RIGHT OF WAY

90’

LENGTH

8 miles

SPEED

Varies

AVERAGE DAILY TRAFFIC

Varies

PROCESS

7 years

KEY OUTCOMES

Local Businesses View the Trail as an Asset
Butler University students interviewed businesses about the trail and all expressed positive reactions to the trail. Some businesses felt their sales increased, while others appreciated the trail’s design.[66]

Car Trips Declined
49% of trail users surveyed said they make fewer trips by car thanks to the trail.[66]

Ambitious Project Draws National Attention
Newspaper and magazine articles about the trail have been published across the United States. This positive exposure will likely improve the perception of Indianapolis around the country.

Trail Users Love It
When asked their opinion of the trail, users were quick to offer their support and suggest places to expand the trail. Says one respondent, “It’s great to have someplace safe to run, ride and walk my dog.”[66]

Indianapolis Cultural Trail

Indianapolis, IN
City Median Household Income: $42,704

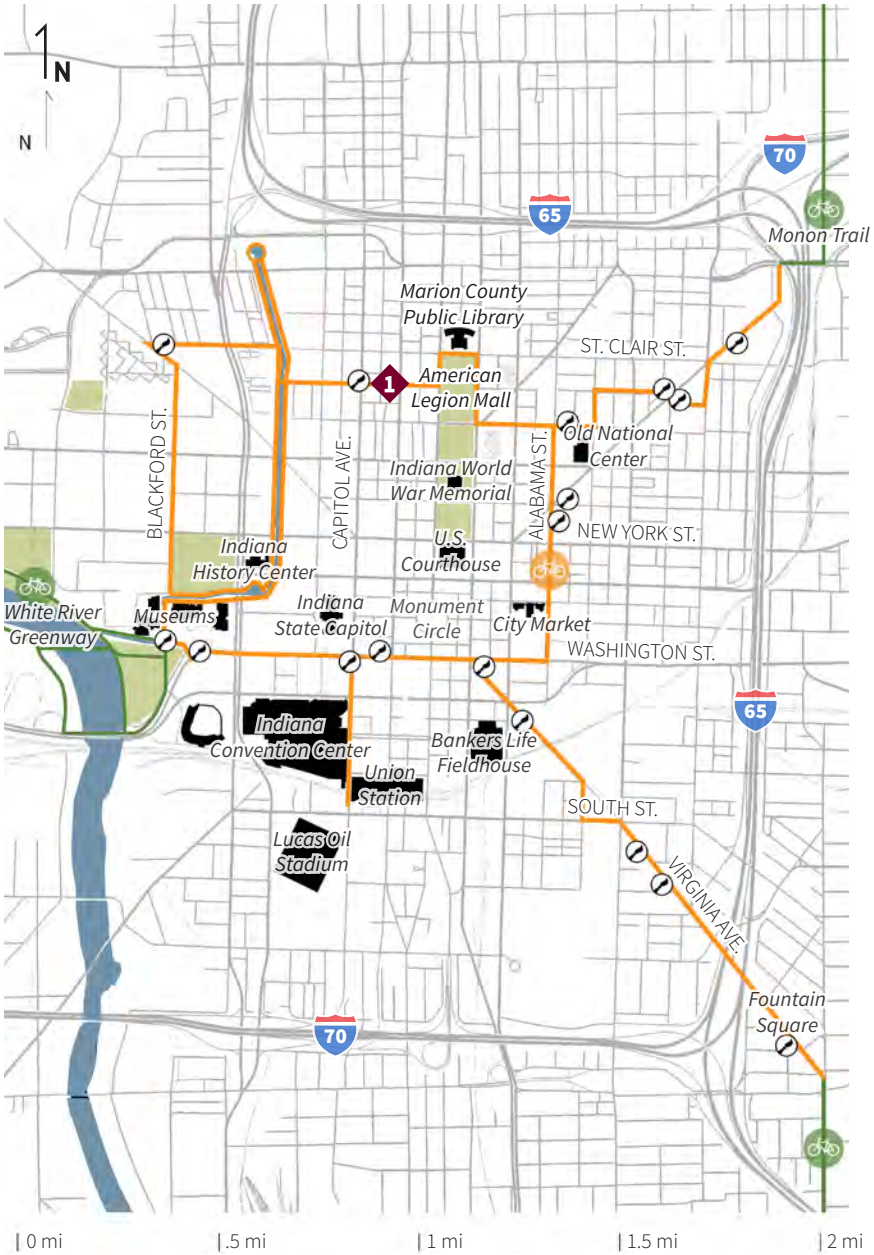
INDIANAPOLIS CULTURAL TRAIL CONTEXT

- The trail is designed to connect five downtown cultural districts: Fountain Square, Indiana Avenue, Mass Avenue, The Canal & White River State Park, and the Wholesale District.
- The Indianapolis Cultural Trail (ICT) connects to the Monon Trail, a 10.4 mile trail completed in 2003. The Monon Trail connects the Indianapolis Cultural Trail to points of interest in the north side of the city, including the state fairgrounds and a dozen neighborhoods.
- No local public money was used to build the ICT. The $63 million came from private donations and federal transportation grants. The trail is now managed by a non profit: Indianapolis Cultural Trail, Inc.[67]
- Gene and Marilyn Glick donated $15 million to the ICT and also were active in shaping the vision for the trail.[66]
- The trail includes 163,300 square feet of green space and more than 25,000 square feet of storm water planters. [66]

A BRANDED, WELL-MARKED TRAIL

Photo: Jun Wang

Distinctive paving, crosswalks, signage and logos are deployed uniformly throughout the trail. A trail user always knows where to go next.



A FLEXIBLE TRAIL FOR MANY CONTEXTS

Photo: Rundell Ernstberger Associates, LLC

In some places, bikes are separated from pedestrians, like above. Pedestrians on the left, bikes on the right.

Photo: Rundell Ernstberger Associates, LLC

Here, bicycles and pedestrians share the trail to enable the placement of a transit shelter and bicycle parking.

Photo: Rundell Ernstberger Associates, LLC

The trail includes a special sculpture garden, the Glick Peace Walk. Sculptures are dedicated to people who achieved greatness through peace.

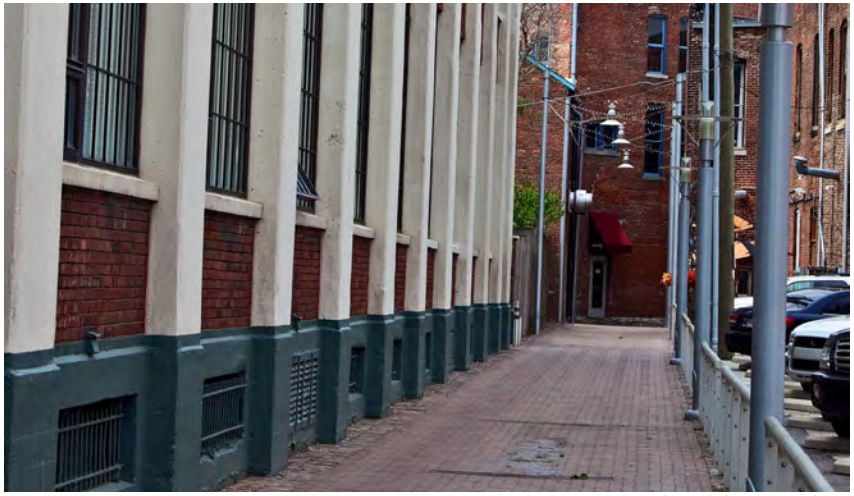


Photo: Flickr user sciondriver

Here the trail winds through an alley. It takes advantage of existing circumstances to form a complete loop.


44 MOCKS CREST
4405
2006
503-231-1548
WSE
West Side Electric
12 TO PARKROSE TC
1268

Transit Street

Transit streets emphasize buses and trains and employ designs that make it easy for people to use them. Similar to the bike streets, dedicated lanes make for excellent transit streets. The dedicated lanes remove some of the delays associated with car traffic and increase reliability for passengers. Dedicated transit lanes also signal to businesses and real estate developers that this amenity will be around for a long time. In this way, transit streets can catalyze economic development, known as transit-oriented development.

photo: Pennsylvania Avenue, Washington, DC, photo by Emma Newman

SW 5th and 6th Avenues

Portland, OR
Metro Population: 2,289,800 | City Population: 583,776

After

Photo: Emma Newman

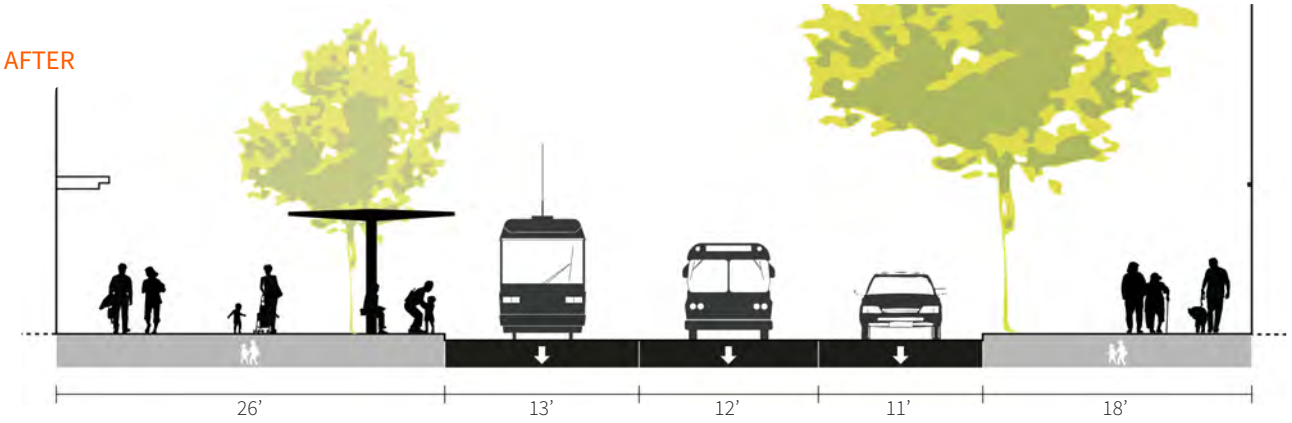
Before

Photo: ZGF Architects

A groundbreaking transit mall gets even better when it adds new transportation options.

- A light rail system was incorporated into the existing transit mall along with new transit shelters.
- A bike lane was added and previous efforts to divert automobile traffic were removed.

AFTER



BEFORE (1999)

BEFORE (1977)

KEY OUTCOMES

Transit Collisions Dropped
Between 2001 and 2006, the mall saw 68 bus-related collisions each year on average. After the redesign, the mall averaged 27 bus collisions and 13 light-rail collisions yearly.[62]

Downtown Redevelopment
The Transit Mall project led to two hotel renovations and other improvements that generated $1.5 billion in private sector investment.[69]

Block-by-Block Improvements
The Block-by-Block Program provided assistance and low-interest loans to nearby businesses. The program helped implement 40 storefront renovations and other small improvements. The program cost $1.4 million and leveraged $9.4 million in private investment.[68]

STREET CLASSIFICATION
City Neighborhood

RIGHT OF WAY
60-80’

LENGTH
1.4 miles

SPEED

SPEED LIMIT 20	SPEED LIMIT 20
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

400–12,000	[no data]
BEFORE	AFTER

PROCESS
6 years

SW 5th and 6th Avenues

Portland, OR
City Median Household Income: $50,177

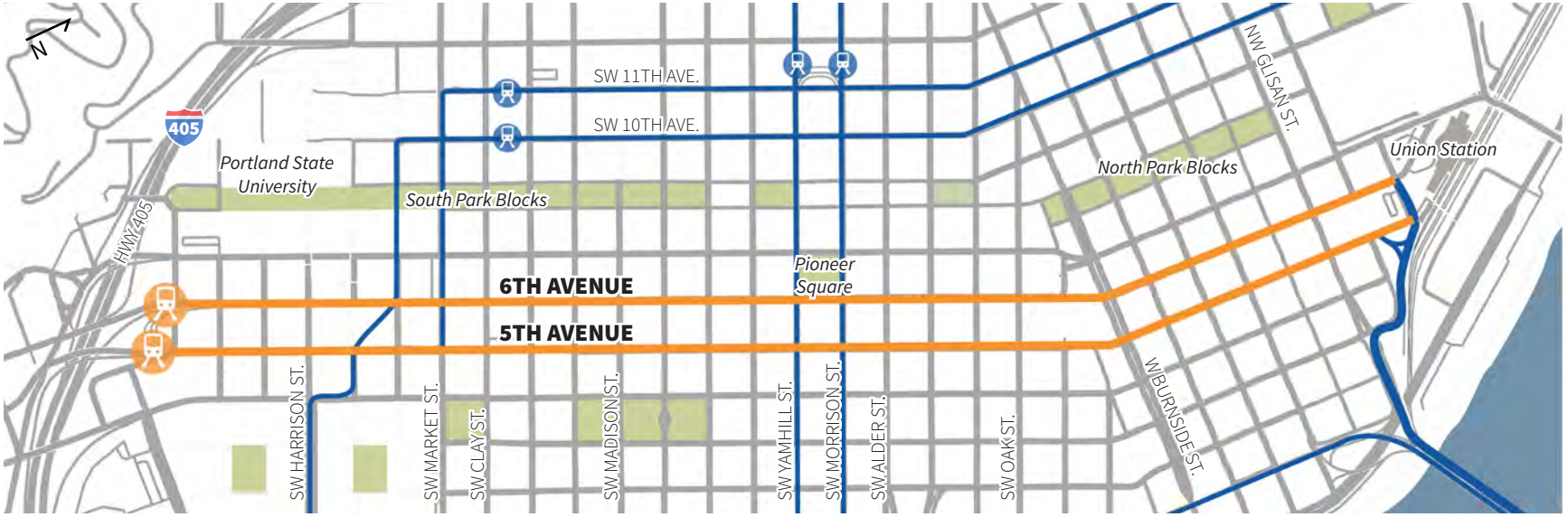
SW 5TH AND 6TH AVENUES CONTEXT

- Portland's Transit Mall was originally built in 1978 and received numerous accolades for its attempts to improve transportation and revitalize downtown.
- Thirty years later, the Transit Mall was showing its age, and plans called for adding light rail in addition to the many buses that traversed the corridor. The project, the largest public works project in city history, rebuilt 58 blocks, added 18 new blocks, replaced or added 45 new transit shelters and reconfigured the roadway for light rail, bus and through traffic for cars.
- The entire project cost $160 million.[70]
- The transit mall crosses six neighborhoods, including the central core of the city.

IMPROVED CAR ACCESS

Photo: Emma Newman

The old transit mall diverted cars every few blocks, but the new mall allows cars to drive all the way down.



OLD TRANSIT SHELTERS

Photo: ZGF Architects

The original transit shelters featured an original design, but blocked views to shops and provided shelter for illicit activities.

NEW TRANSIT SHELTERS

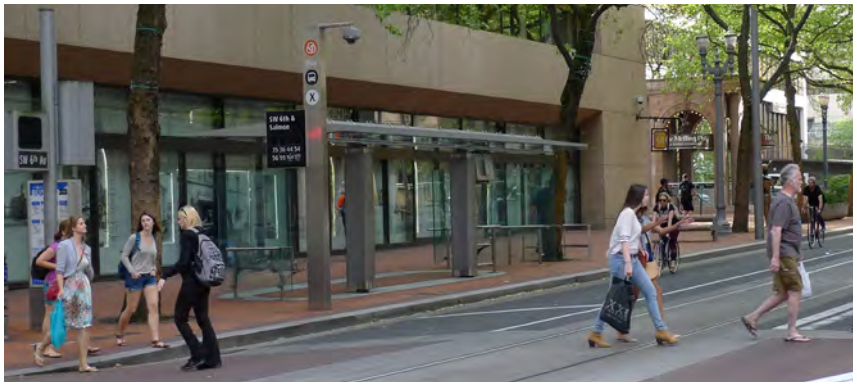


Photo: Emma Newman

New transit stops almost disappear in the daytime, allowing a better view of the storefronts behind while providing substantial protection from the rain.

PRE-TRANSIT MALL

Photo: ZGF Architects

Prior to the original transit mall, buses had to merge into traffic after boarding, slowing the process considerably.

ORIGINAL TRANSIT MALL

Photo: ZGF Architects

The original transit mall had a lane for boarding and a lane for traveling. This configuration also exists in the latest redesign, with the addition of light rail.

Euclid Avenue

Cleveland, OH

Metro Population: 2,077,240 | City Population: 396,815

After

Photo: Sam Bobko

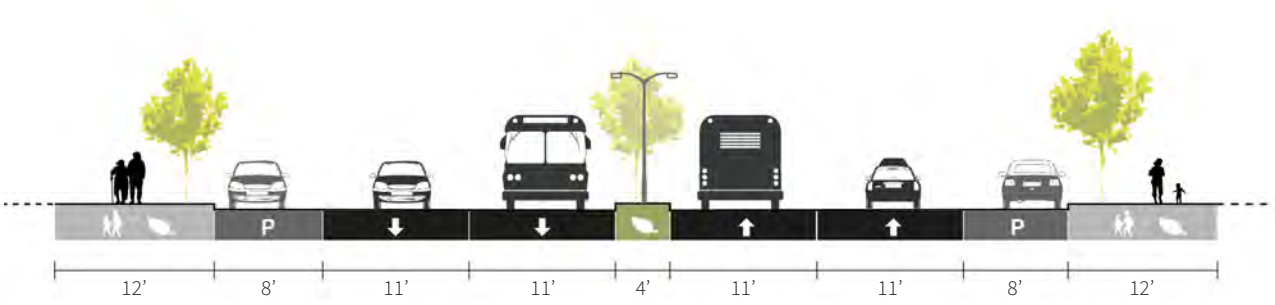
Before

Photo: David Wilson

Cleveland's signature bus rapid transit corridor spurred billions in redevelopment.

- Two travel lanes were converted into bus only lanes and transit stations were installed in the new median, creating a bus rapid transit system.
- New landscaping, public art, sidewalks, street trees and street lighting were implemented.

AFTER



BEFORE

KEY OUTCOMES

Transit Investment Spurred Private Investment
The HealthLine, Cleveland’s new bus rapid transit system, cost $200 million and attracted more than $5.5 billion in private investment along the corridor. Numerous vacant properties were redeveloped along the seven-mile route.[71]

Property Values Rose Even Before the Line Opened
Between 2003 and 2008, before the HealthLine began service, the price of an acre of land in the Midtown neighborhood went from $200,000 to $400,000.[73]

Transit Ridership Jumped
After the HealthLine opened, ridership increased 46% from the previous standard bus service. In the first year, the line moved 3.8 million passengers.[72]

Ridership Continues to Increase Year after Year
Ridership increased 62% over its first year. As of November 2013, the HealthLine’s annual ridership reached 4.8 million.

STREET CLASSIFICATION
Major Arterial

RIGHT OF WAY
88’

LENGTH
7 miles

SPEED

SPEED LIMIT 25	SPEED LIMIT 25
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

22,000	20,000
BEFORE	AFTER

PROCESS
22 years planning
3 years construction

Euclid Avenue

Cleveland, OH
City Median Household Income: $27,470

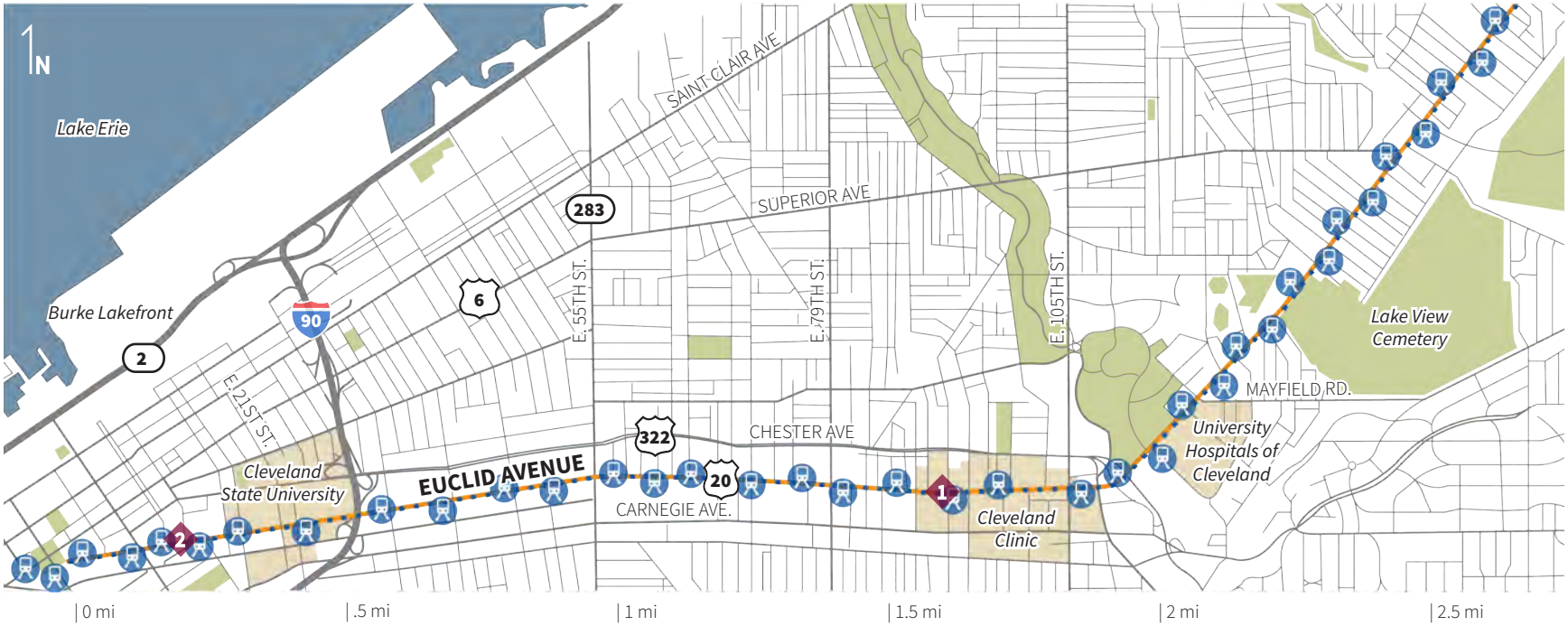
EUCLID AVENUE CONTEXT

- Between the 1860's and 1920's, Euclid Avenue was nicknamed "Millionaire's Row" for its many opulent mansions. By the 1930's, the corridor was better known as a thriving commercial avenue. As industrial disinvestment hit Cleveland hard in the 1960's, Euclid Avenue declined in stature and vitality.
- Even with Euclid Avenue's decline, in 2003, 60% of Cleveland's transit rides occurred on the corridor.[72]
- The Euclid Avenue redesign and HealthLine bus rapid transit line were funded by Federal New Starts funds, the City of Cleveland, the Greater Cleveland Regional Transit Authority, the Cleveland Clinic and University Hospitals.[71]
- Nearly 1,400 trees of 26 varieties were planted along the corridor.[75]

RTA'S HEALTHLINE

Photo: Wikimedia user Goddard Rocket

A new bus rapid transit line is the centerpiece of the project. The Cleveland Clinic and University Hospitals of Cleveland jointly bought the naming rights.



STATIONS FOR SAFETY AND SHELTER

Photo: Ian Lockwood

The HealthLine's stations are transparent to prevent illicit activities, but almost fully enclosed to shelter riders from the harsh Cleveland winters.

NEW BICYCLE INFRASTRUCTURE

Photo: Flickr usre bankbryan

Bicycle lanes were installed from East 21st Street to Chester Avenue. Counts made in 2006 and 2010 showed an increase in cyclists of more than 300%.[76]

CONNECTIONS ACROSS NEIGHBORHOODS

Photo: Kevin M. Nord

Euclid Avenue connects downtown with the Midtown neighborhood, Cleveland State University and the Cleveland Clinic (shown above).

STREETSCAPE IMPROVEMENTS

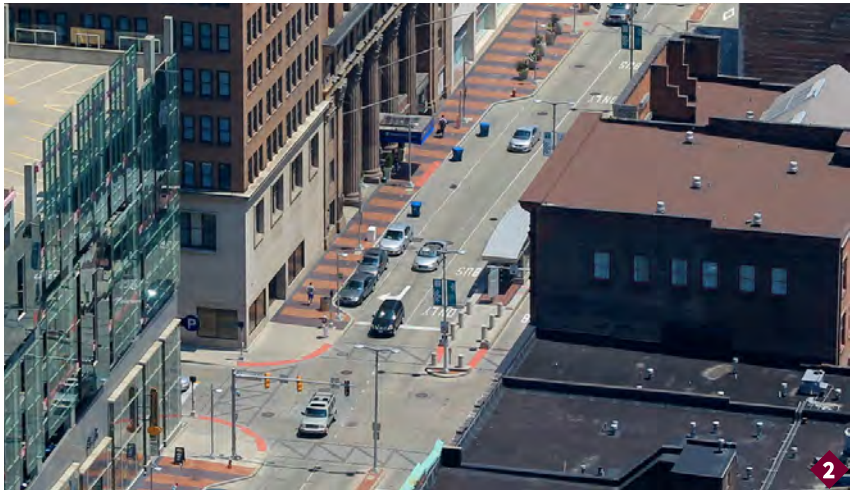


Photo: Jon Dawson

This view of a downtown segment of Euclid Avenue shows how the pedestrian realm received an upgrade along with the bus facilities.

Marquette and 2nd Avenues

Minneapolis, MN
Metro Population: 3,422,264 | City Population: 382,578

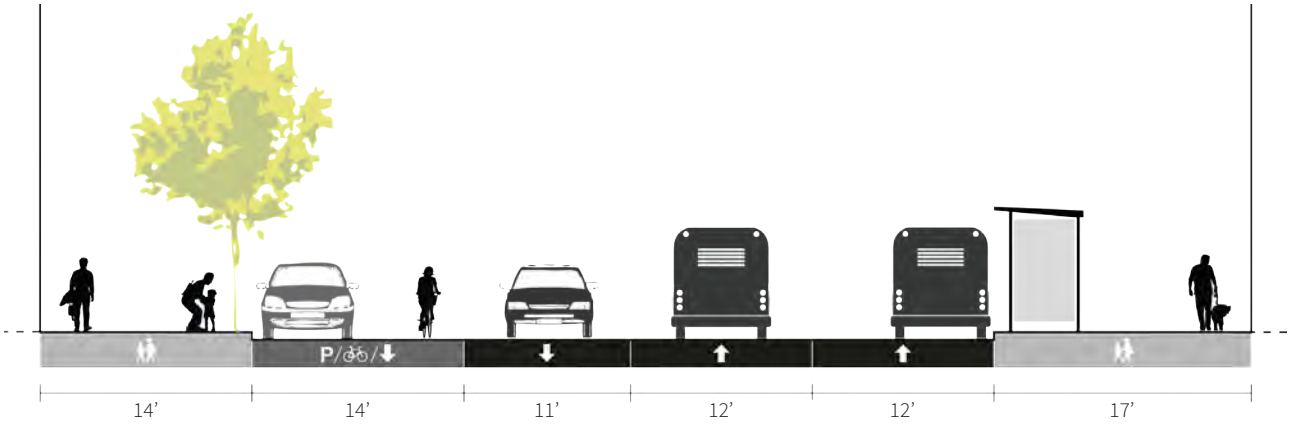
Photo: Payton Chung

Photo: Google

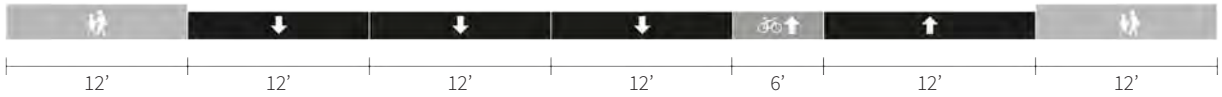
Minneapolis consolidated downtown express buses along the "Marq2" couplet and saw big benefits in reliability and speed.

- Two travel lanes were removed, making space for an additional bus lane and a flexible lane used for cycling, parking and driving during peak hours.
- The landscaping was enhanced with street trees.

AFTER



BEFORE



KEY OUTCOMES

Ridership Increased
Bus boardings increased 4% between October 2009 and October 2010. The corridor now serves over 24,000 one-way boardings each day.[77]

Bus Travel Times Decreased
The operating speeds of buses in the transit lanes increased up to 83% during the morning peak hour and 74% during the evening peak hour. The left bus lane is for traveling, while the right bus lane is only for picking up passengers, allowing for better flow of traffic.[78]

Bus Capacity Increased
Metro transit now runs 40% more buses throughout the day. During evening rush hour, the number of buses traveling along each street increased nearly 90%, from 80 to 151 per hour. Because the new configuration is designed to accommodate 180 buses per street per hour, there is still room to expand transit service during the busiest times of the day. There are two bus stops per block, and buses stop every block and a half.[78]

STREET CLASSIFICATION
Major Collector

RIGHT OF WAY
80’

LENGTH
.8 mi

SPEED

SPEED LIMIT 30	SPEED LIMIT 30
BEFORE	AFTER

AVERAGE DAILY TRAFFIC

12,000	[no data]
BEFORE	AFTER

PROCESS
2.5 years

Marquette and 2nd Avenues

Minneapolis, MN
City Median Household Income: $47,478

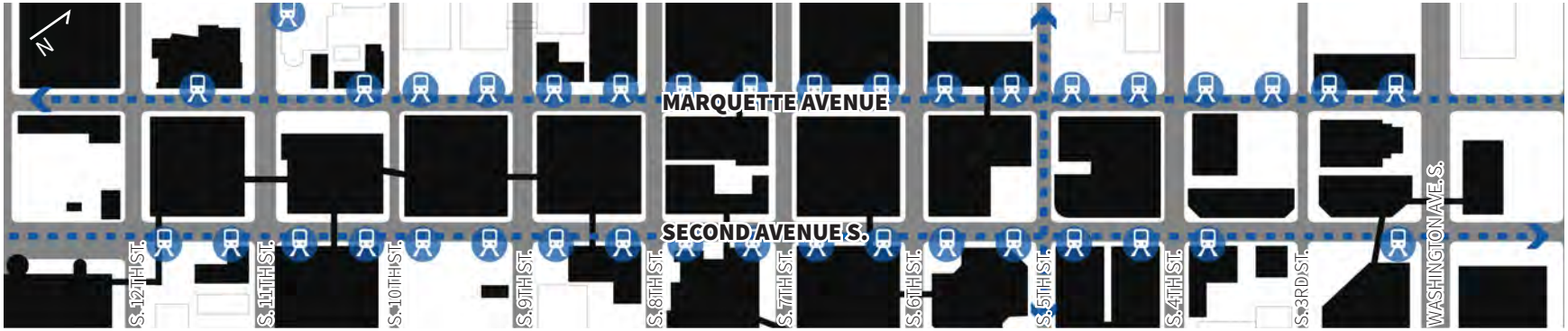
MARQ2 CONTEXT

- Prior to the project, the bus network in downtown Minneapolis was bursting at the seams. As the primary transit street, Marquette and Second Avenue were designed to accommodate 60 buses per hour and managed to operate at 80 buses per hour at peak times. During those peak times, buses moved through downtown at 2.9 miles per hour, slower than walking.[79]
- In 2000, Minneapolis adopted a "Transit First" policy and 40% of downtown commute trips were already made by transit. Downtown was growing, so a new facility was needed to meet the projected demand. The downtown transit spines could not handle that volume and Marquette and 2nd Avenues were chosen to accommodate the growth.[79]
- Inspiration for the Marq2 plan came from Portland's transit mall and their two bus lane configuration. Portland's system triples capacity and does not increase operating costs (see page 115).
- The region received $144 million of Urban Partnership funds for various improvements to relieve congestion, of that amount approximately $40 million went to rebuild Marquette and 2nd Avenue.[78]

CONTRAFLOW LANES

Photo: Payton Chung

Marquette and Second Avenues allow for buses to run opposite of car traffic. This configuration reduces the chance that cars will take the bus lane.



BUS SHELTERS ALONG BUILDINGS

Photo: Metro Transit

Some bus stops that existed before the Marq2 project were built into the sides of buildings, like this one built into the Target Center above.

BUS SHELTERS INSIDE BUILDINGS

Photo: Metro Transit

Passengers can shelter themselves from Minnesota winters in this bus stop located inside the lobby of the Wells Fargo Center.

SIDEWALK CONGESTION

Photo: Metro Transit

Waiting passengers and street furnishings can make passing through difficult.

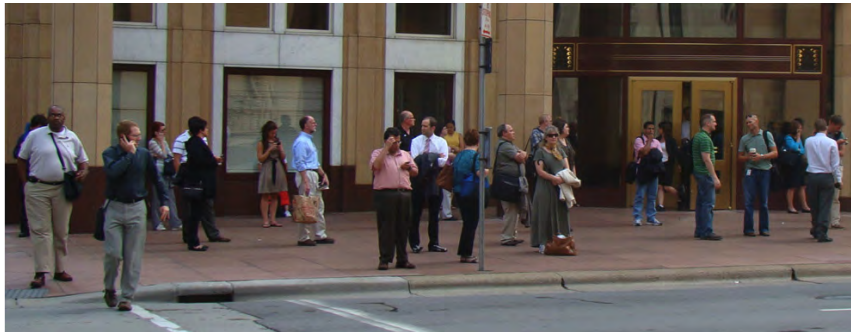


Photo: Metro Transit

Clear sidewalks provide plenty of space for those waiting and walking by.

Street Data

		RIGHT OF WAY	SPEED LIMIT AFTER	ADT BEFORE	ADT AFTER	BIKE LANES?	PAGE
ROAD DIET	25th Avenue, San Francisco, CA	70’	25	13,000	11,500		17
	Stone Way N., Seattle, WA	90’	30	13,000	12,000		21
	Nebraska Avenue, Tampa, FL	50’-64’	35	17,900	14,600		25
	Ocean Boulevard, Myrtle Beach, SC	58’	25	15,000	13,000		29
	East Boulevard, Charlotte, NC	60’-100’	35	20,600	18,900		33
ARTERIAL REHAB	E. Washington Avenue, Madison, WI	132’	35	53,000	53,000		39
	28th Street, Boulder, CO	90’	35	50,000	44,000		43
	Aurora Avenue N., Shoreline, WA	90’	40	38,000	35,000		47
URBAN, MIXED-USE	Second Street, Long Beach, CA	76’-80’	25	29,800	29,300		53
	Pine & Spruce Streets, Philadelphia, PA	50’	20	6,000	6,000		57
	S. Carrollton Avenue, New Orleans, LA	108’	35	17,400	28,600		61
	Mill Avenue, Tempe, AZ	98’-100’	30	19,000	16,000		65
	Barracks Row, Washington, D.C.	98’	25	11,500	11,500		69

		RIGHT OF WAY	SPEED LIMIT AFTER	ADT BEFORE	ADT AFTER	BIKE LANES?	PAGE
MAIN STREET	W. Lancaster Boulevard, Lancaster, CA	102’	15	19,800	-		75
	Clematis Street, West Palm Beach, FL	68’	30	-	-		79
	Route 62/Main Street, Hamburg, NY	66’	30	12,100	15,000		83
	Courthouse Square, Sulphur Springs, TX	104’	30	4,000	7,500		87
BIKE STREET	N. Williams Avenue, Portland, OR	54’	30	8,000	7,700		93
	8th and 9th Avenues, New York City, NY	100’	30	30,000	30,000		97
	Pennsylvania Avenue, Washington, D.C.	146’	25	33,000	32,800		101
	Higgins Avenue, Missoula, MT	95’-96’	25	7,400	7,600		105
	Indianapolis Cultural Trail, Indianapolis, IN	90’	-	-	-		109
TRANSIT STREET	SW 5th and 6th Avenues, Portland, OR	60’-80’	20	400-12,000	-		115
	Euclid Avenue, Cleveland, OH	88’	25	22,000	20,000		119
	Marquette and 2nd Avenues, Minneapolis, MN	80’	30	12,000	-		123

Endnotes

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For more information, visit: rethinkingstreets.com

Rethinking Streets is a tool for implementing change. The case studies within present measurable outcomes from street projects that have been executed in communities across the United States. Each case study includes information on design, community context, traffic levels and economic indicators– providing evidence readily accessible to planners, community groups, traffic engineers and merchants.

The case studies range from small rural towns to major metropolitan areas, and from light traffic loads to state highways. Several projects are as simple as re-striping the roadway while others are major capital improvement projects. Some projects focus on improving bike infrastructure, while others are more focused on improving the transit and pedestrian experience.

Most of the examples are normal, everyday streets, but they represent 25 diverse communities that have taken steps to improve transportation and public life in their own neighborhoods. Taken together, the streets within demonstrate that street redesign is not only possible, but happening in every region of the country.

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