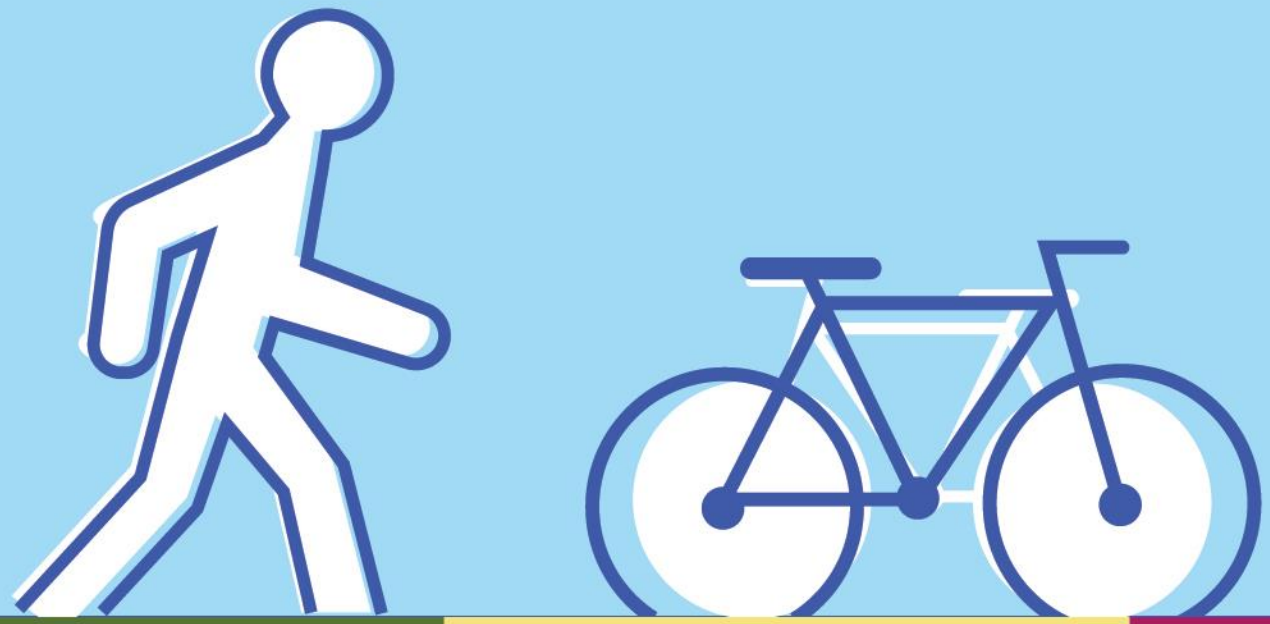


Maintaining Pedestrian and Bicyclist Facilities

Monday, December 13, 2021

U.S. Department of Transportation
Federal Highway Administration

ZERO IS OUR GOAL
A SAFE SYSTEM IS HOW WE GET THERE

Webinar Logistics

- Please post questions at any time
- We will be saving time at the end of the session for questions and discussion
- Certificates of Attendance can be requested through an emailed questionnaire that you will receive following this webinar.

Agenda

- Tamara Redmon, FHWA Office of Safety
- Agency Case Studies:
  - Michael Hintze - Toole Design Group
  - Trent Rondot - Houston Parks Board
  - Nicole Losch, PTP - City of Burlington, Vermont
  - John Leonard - Virginia DOT (VDOT)
- Discussion

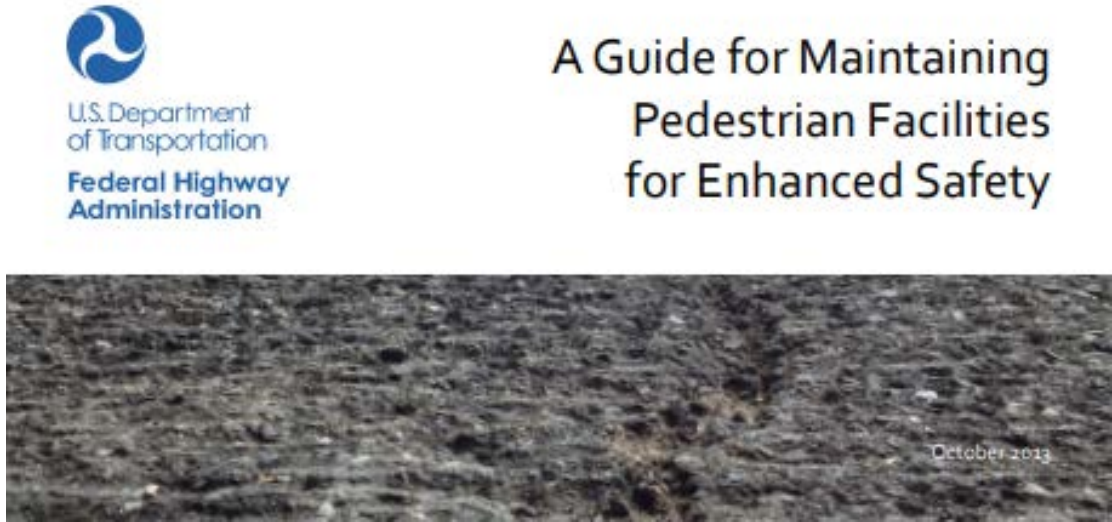
Webinar Objectives

- Understand future initiatives by FHWA to help agencies understand how to maintain pedestrian, bicyclist, and micromobility facilities for enhanced safety
- Explore how agencies are maintaining their pedestrian and bicyclist facilities, particularly in light of climate change and the expansion of temporary or quick build facilities
- Identify strategies for maintaining pedestrian and bicyclist facilities
- Learn more about challenges agencies face and lessons learned regarding pedestrian and bicyclist facility maintenance

Michael Hintze
Toole Design Group

A Guide for Maintaining Pedestrian Facilities For Enhanced Safety

A webinar to discuss updates to the Guide



U.S. Department of Transportation
Federal Highway Administration

TOOLE DESIGN

vhb

Purpose and Background

Purpose

- *A Guide for Maintaining Pedestrian Facilities for Enhanced Safety* provides guidance for maintaining pedestrian facilities with the primary goal of increasing safety and mobility

Purpose and Background

Audience

- This guide is intended for any agency or organization that builds and maintains pedestrian facilities.
  - Government bodies (State, County or Local level)
  - Homeowner’s associations,
  - Private land management organizations
  - and Other groups

Purpose and Background

In this guide, maintenance is defined as **inspecting, preserving, repairing, and restoring a pedestrian facility and keeping it in condition for safe, convenient, and accessible use**.

The guide focuses on the following facility categories:

- Sidewalks, walkways and curb ramps
- Shared use paths
- Crosswalks, signals and other treatments of facilities for crossing streets
- Signs

The Case for Pedestrian Facility Maintenance

Pedestrian facility maintenance is important for:

- Safety
- Accessibility
- Mobility
- Asset Management
- Liability

The Case for Pedestrian Facility Maintenance – Safety

Improved safety through proper maintenance can be considered in two ways:

- Reduction of crashes with motorists and
- The reduction in trips, slips, and falls.

The Case for Pedestrian Facility Maintenance – Accessibility

Maintaining an “accessible path.”

- Proper and routine maintenance of walkways allow access between intersections.
- The maintenance of transition points – curb ramps, medians, crosswalks, etc. – ensures access at intersections.

The Case for Pedestrian Facility Maintenance – Mobility

Access and mobility are inextricably linked. Access to pedestrian facilities is key to pedestrian mobility.

Any break in the pedestrian network or disrepair can potentially eliminate a walking or transit option for people.

The Case for Pedestrian Facility Maintenance – Asset Management

The maintenance of pedestrian facilities is no different than other components of the transportation system.

Better decision-making occurs based on the quality of information and the defined objectives.

The Case for Pedestrian Facility Maintenance – Liability

Liability varies from state to state and community to community.

A sound maintenance program can significantly reduce an agency's exposure to liability.

A written policy is better than having an informal, unwritten policy.

Common Maintenance Issues

Surface material is a determinant of how and how often maintenance is performed.

Common Maintenance Issues – Seasonal Concerns

Seasonal conditions are the cause of problems people most associate with maintenance or lack thereof.

The removal of snow and ice for many U.S. communities presents the most significant maintenance challenge they confront.

Inspection and Accessibility

At what point does a sidewalk, path, or curb ramp become a hazard, inaccessible, or impassable?

Inspection criteria establish a quantifiable answer to when facilities become a hazard or inaccessible for pedestrians.

Compliance

Maintenance, and often repair of sidewalks, is a cooperative effort between the community and its residents.

Important to ensure that responsibilities are clearly defined for all parties.

This usually involves inspection regiments and administrative and enforcement actions to ensure compliance.

Policies and Ordinances

A community's written maintenance policies should outline:

- inspection procedures and criteria, and
- responsibilities of property owners and the community.

Plans

Maintenance plan key elements:

- **Prioritization and funding**
- **Communication**
- **Documentation**
- **Equipment**

Maintenance Measures

Repair methods for:

- Sidewalks/paths
- Maintenance of Crosswalks
- Maintenance of Pedestrian Signals
- Maintenance of Pedestrian Signage

Maintenance Measures

Seasonal Maintenance

- Vegetation
- Snow and ice

Construction Techniques

Subgrade

Pavement Thickness

Drainage

Control Joints

Construction Techniques

Curb Ramps and Detectable Warning Fields

Street Trees

Funding

Methods for Funding Inspection/Maintenance Programs

- Local government general fund
- State-Aid funds
- Bond referendums
- Federal transportation funds which usually require matching funds from the funding sources above.

Appendices

The guide has several appendices such as:

- Model sidewalk inspection policy
- Protruding objects summary sheet
- Risk management information
- Example policies and programs (City of St. Michael, Eau Claire, WI, Des Moines, IA)

Known Updates.

Improve readibility

- Less wordy with more diagrams and pictures

Updating case studies/examples

- The examples and research cited in 2013 will potentially be out of date now.

New topics

- Climate related issues
- New funding sources and funding processes
- Quick Build project maintenance.

Expanding Guide to Include Bicycle Facility Maintenance

Seasonal maintenance

Pavement markings, vertical elements

Techniques

Equipment

Funding and programming

What else should be included?

U.S. Department of Transportation
Federal Highway Administration

TOOLE DESIGN

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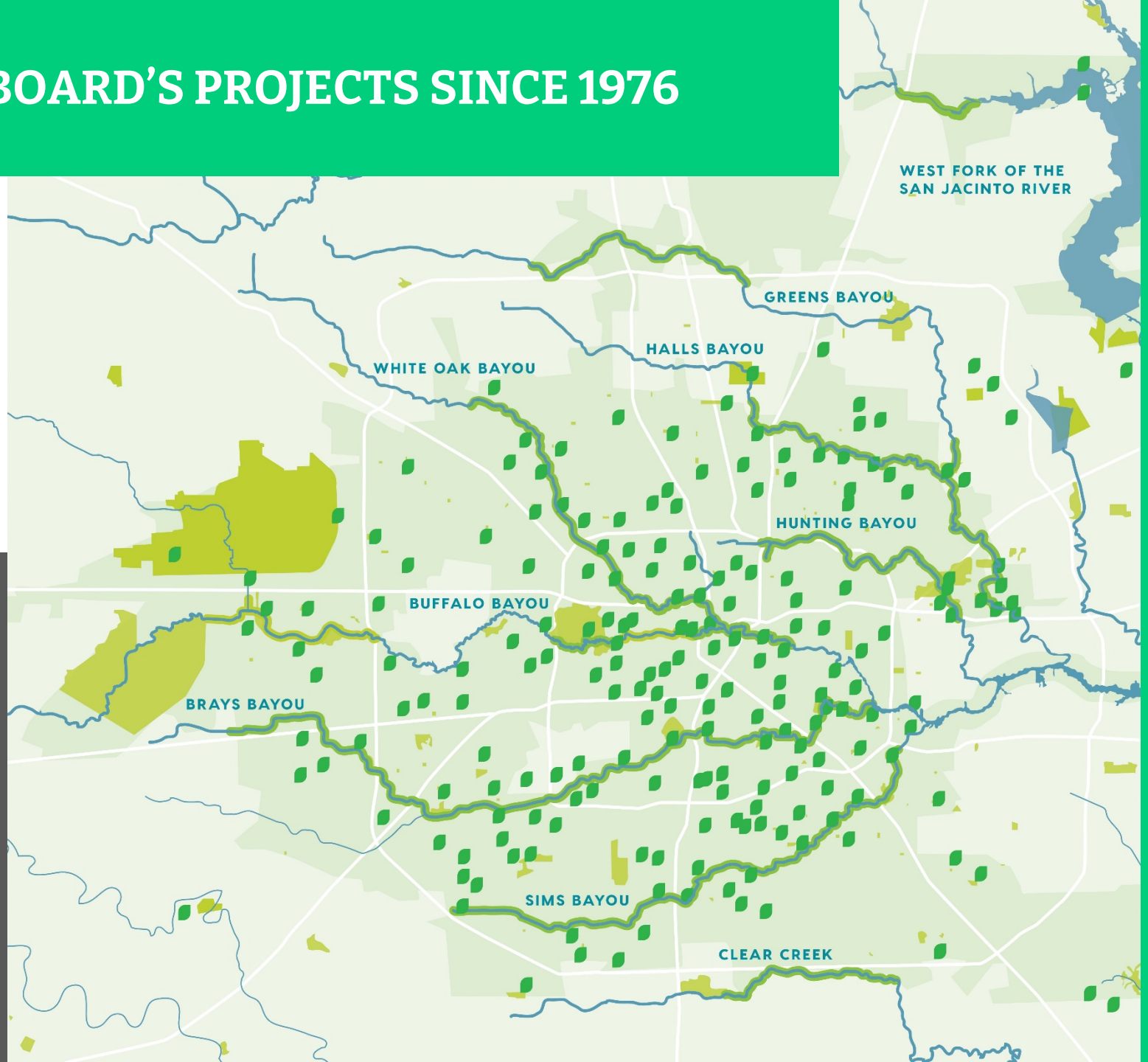
Trent Rondot
Houston Parks Board


HOUSTON
PARKS BOARD
HOUSTON PARKS BOARD + YOU!
FHWA Pedestrian Facilities Maintenance Guide Update
Flood Impact and Maintenance Presentation

HOUSTON PARKS BOARD'S PROJECTS SINCE 1976

- **Projects in more than 250 parks**
- **14,000 acres of new parkland and greenspace**
- **Raised and leveraged more than $300 million for Houston's parks**



With the completion of Bayou Greenways, our bayous will become a network of linear parks and trails that make our lives happier, healthier and more connected.

3,000
Acres of new Green Space

150
Miles of trails

9
Bayous

Mayor Sylvester Turner

HARRIS COUNTY FLOOD CONTROL DISTRICT

HOUSTON PARKS BOARD

HPARD HOUSTON PARKS AND RECREATION DEPARTMENT
A CAPRA Accredited Agency

CAPITAL CAMPAIGN $220 MILLION

= $20 MILLION

$100 million Public Funding
(2012 city bond)

Houston Parks Board committed to raise $120 million

$120+ million raised

HOUSTON PARKS BOARD

BAYOU GREENWAY DEVELOPMENT

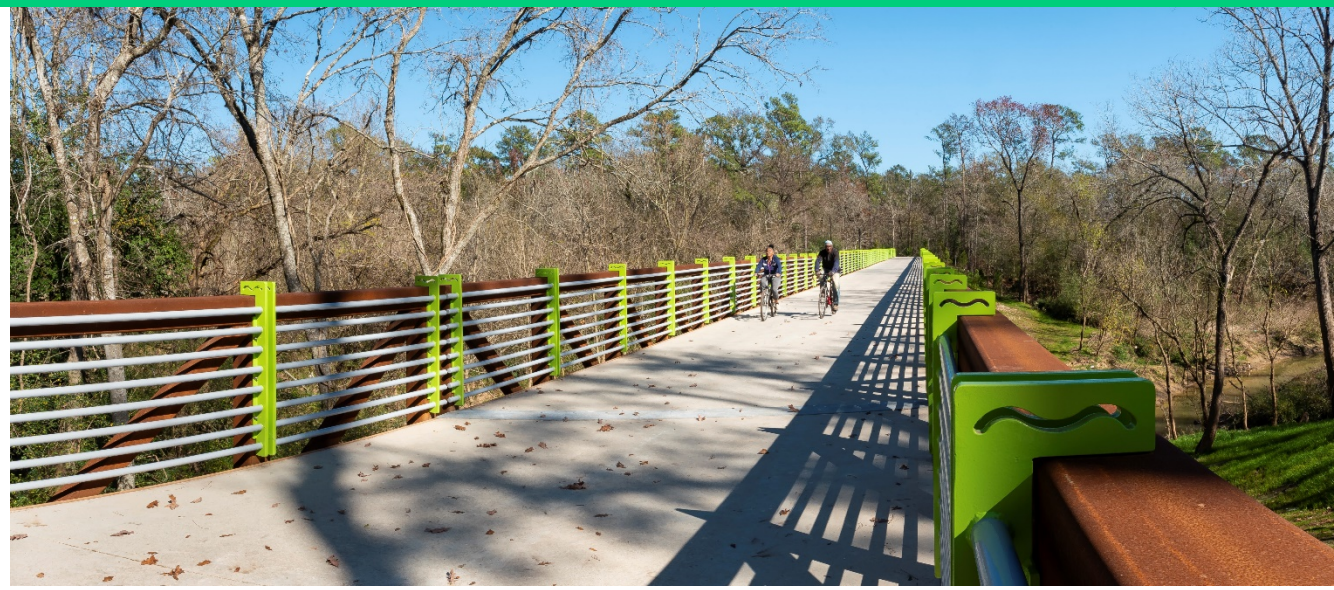
White Oak Bayou Greenway

HOUSTON PARKS BOARD

BAYOU GREENWAY DEVELOPMENT

Greens Bayou Greenway

Halls Bayou Greenway



HOUSTON PARKS BOARD

BAYOU GREENWAY DEVELOPMENT

Brays Bayou Greenway

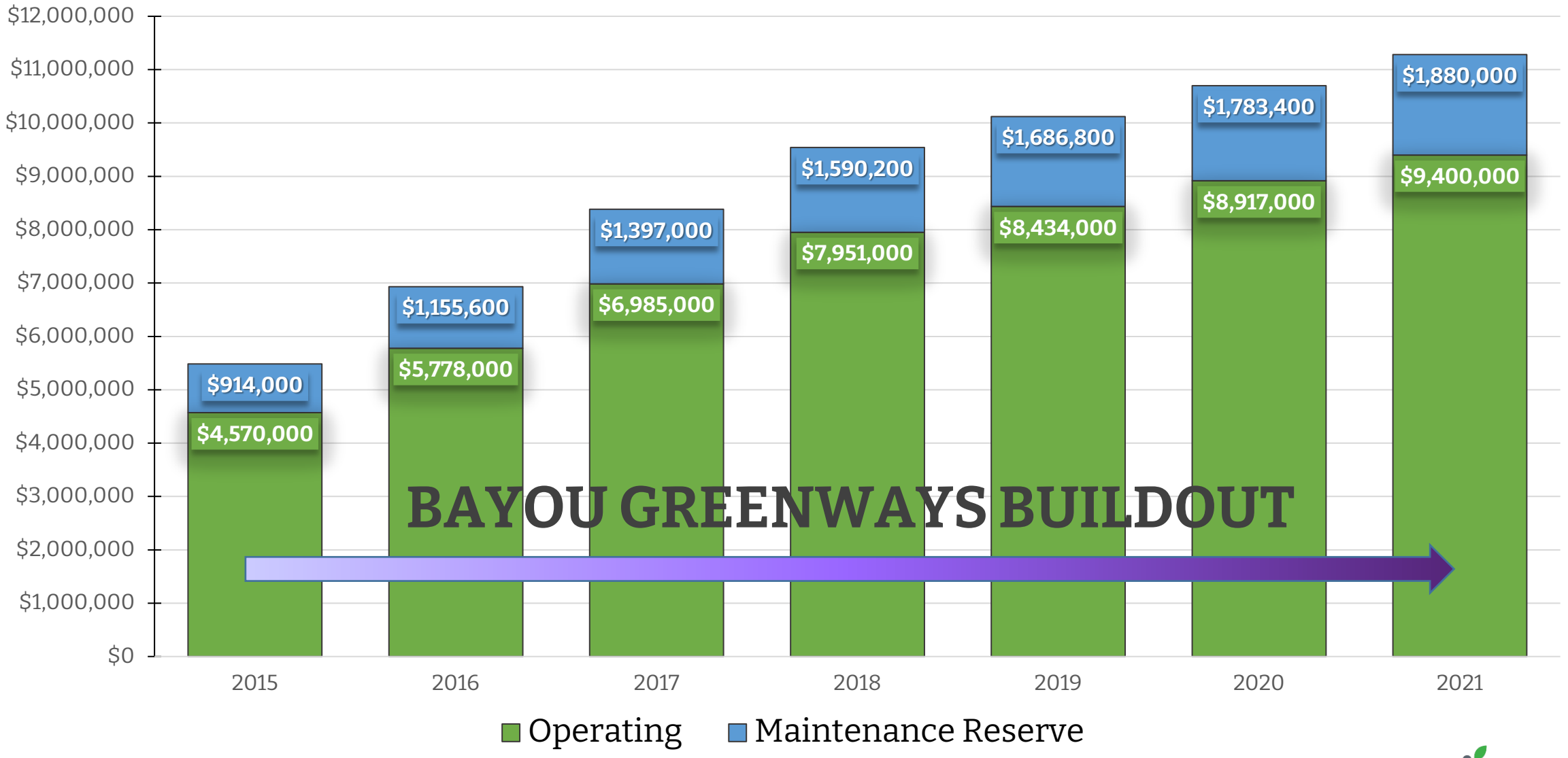
HOUSTON PARKS BOARD

COMMITMENT TO MAINTENANCE

- 80-Year Agreement
- Committed funding
- Coordination with multiple entities
- Assurance, especially to donors, that the improvements would be maintained at a high level

HOUSTON PARKS BOARD

ESTIMATED COST OF MAINTENANCE



HOUSTON PARKS BOARD

FUNDING STRUCTURE

Operating

- **Routine maintenance**
  - ***mowing***
  - ***litter/debris removal***
  - ***graffiti***
  - ***forestry and bed maintenance***
  - ***flood cleanup***
- **Conservation program**
  - ***prairies***
  - ***wildlife habitat***
  - ***invasive vegetation removal***
- Staffing and support
- Equipment and supplies

Maintenance Reserve (20% Contingency)

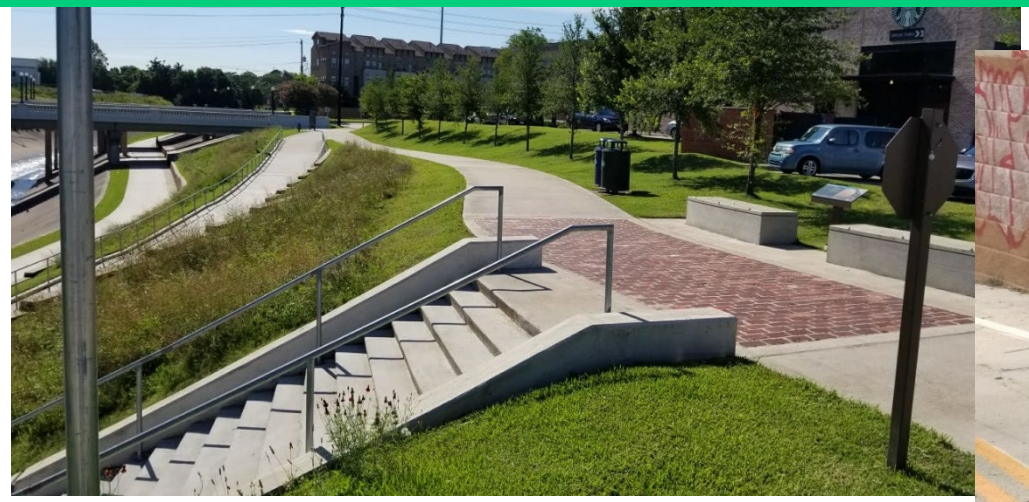
- **Major flood clean up**
- Unexpected repair/replacement of capital assets

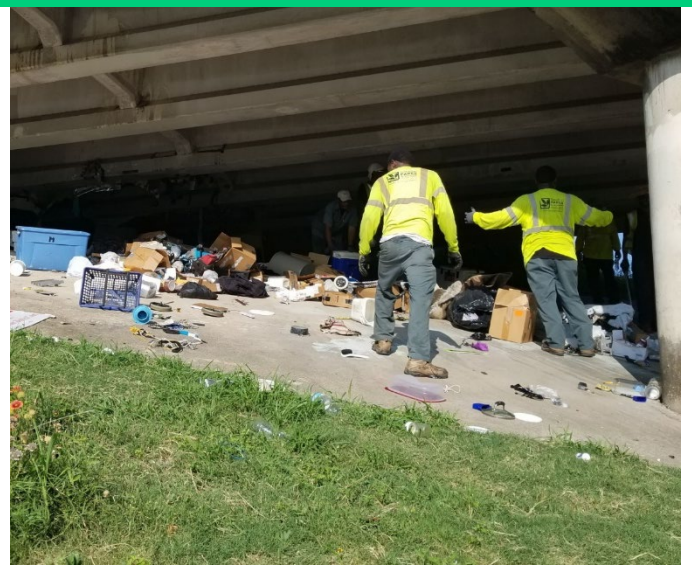
Capital Replacement Reserve

- **"Life Cycle" replacement**
  - ***Trails***
  - ***Bridges***
  - ***Retaining Walls***
  - ***Railings***
  - ***Lights***
  - ***Benches***
  - ***Trash receptacles***
  - ***Drinking fountains***
  - ***Signs***
  - ***Parking areas***

HOUSTON PARKS BOARD

OPERATING ACCOUNT





ROUTINE MAINTENANCE

HOUSTON PARKS BOARD

RELEVANT HABITAT CONSERVATION

The Bayou Greenways system encompasses portions of nine major bayous within and immediately beyond the city of Houston limits; and can be classified by the ecosystems or habitats of interest within its riparian boundaries where our native flora and fauna reside.

Prairies
White Oak Greenway

Wetlands
Greens Bayou Greenway

Forests
Coolgreen Park

HOUSTON PARKS BOARD

STEWARDSHIP PARTNERSHIPS

- Student Conservation Association
- Texas Conservation Corps
- Houston Parks and Recreation
- Houston Audubon
- Garden Club of Houston
- Trees for Houston
- Houston Zoo

HOUSTON PARKS BOARD

COMMUNITY VOLUNTEERS

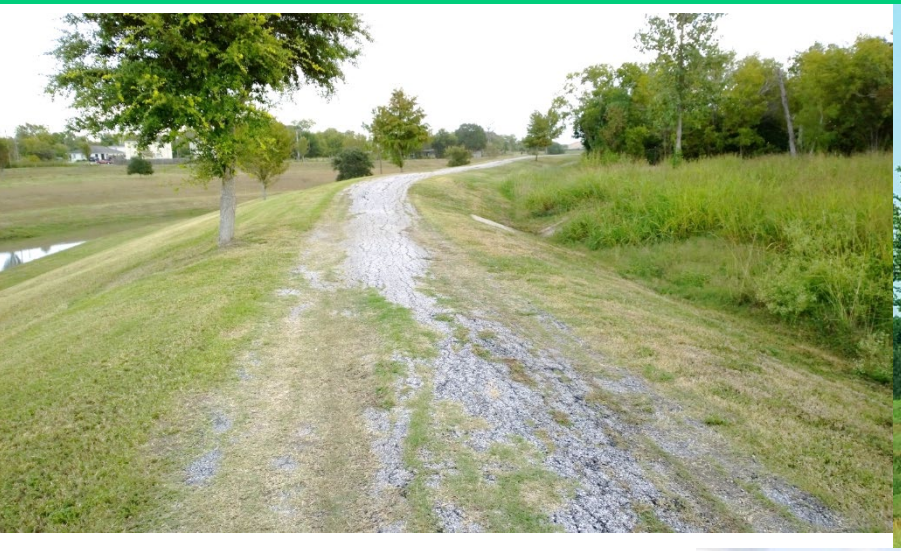
HOUSTON PARKS BOARD

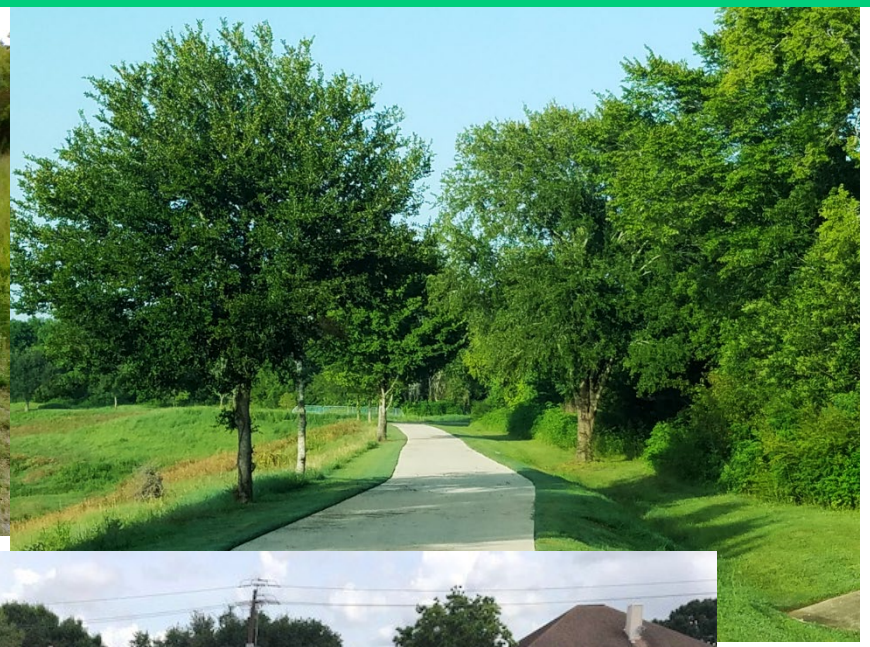
CORPORATE PARTNERSHIPS

Anthony Rathbun, courtesy of Houston Parks Board

HOUSTON PARKS BOARD

CAPITAL REPLACEMENT RESERVE

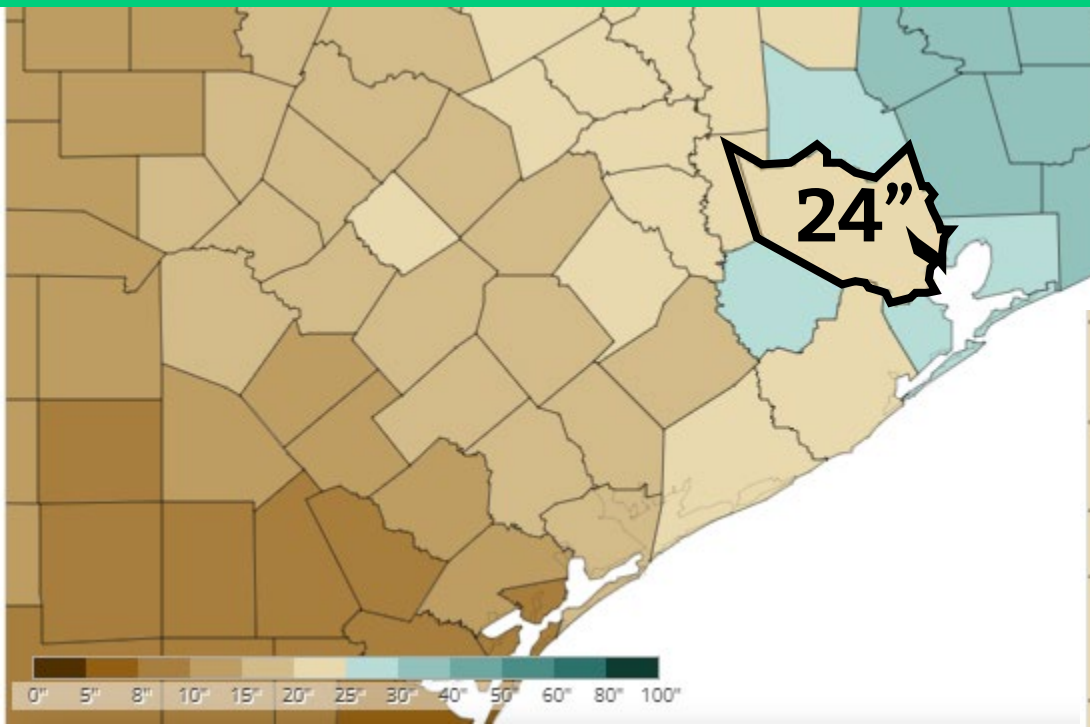




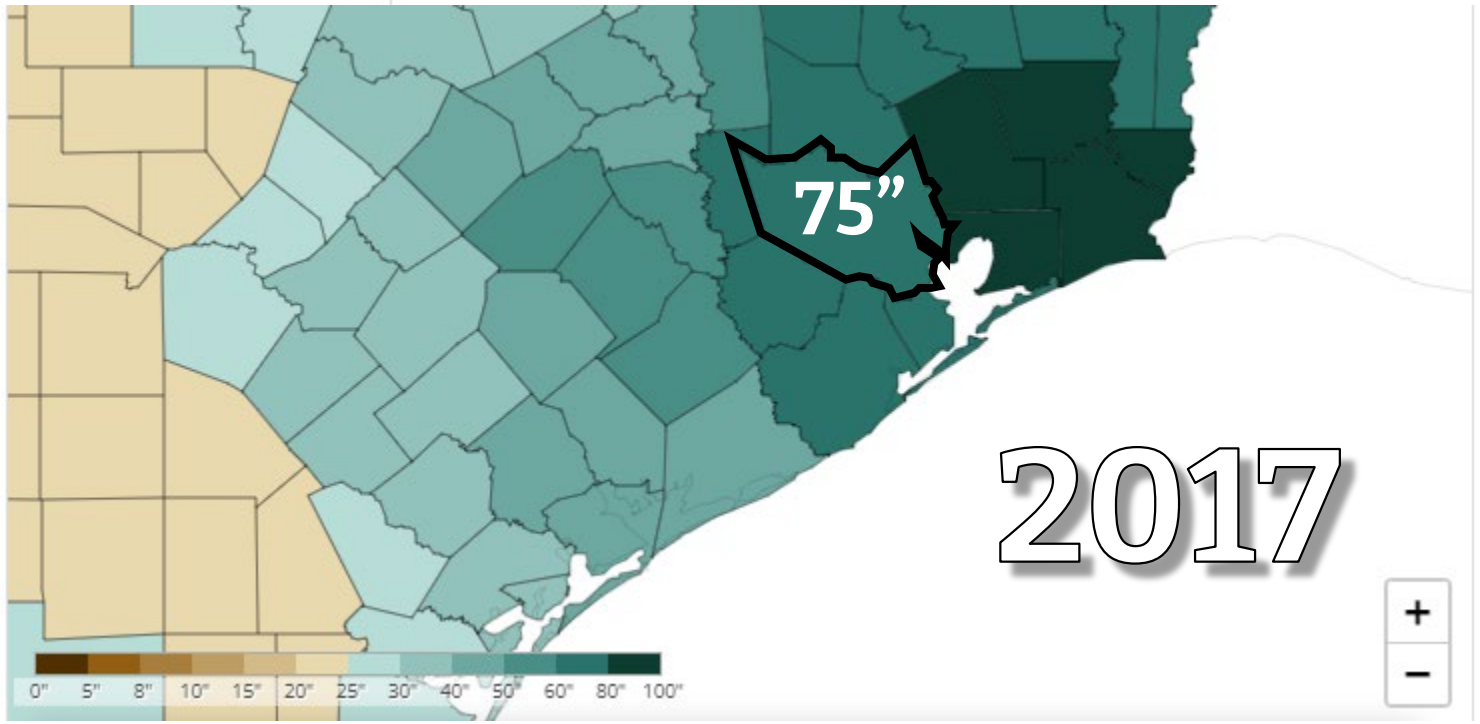
LIFE CYCLE REPLACEMENT

HOUSTON PARKS BOARD

RAINFALL EXTREMES



2011



2017

Gauge near Clear Creek
2011 - 21”
2017 - 105”

Worst single-year drought in 2011

Four of the top ten flood events in the last 40 years occurred between 2015 and 2017

RAINFALL EXTREMES

Photo courtesy of Texas Forest Service

2011

5 Million Trees Died

2017

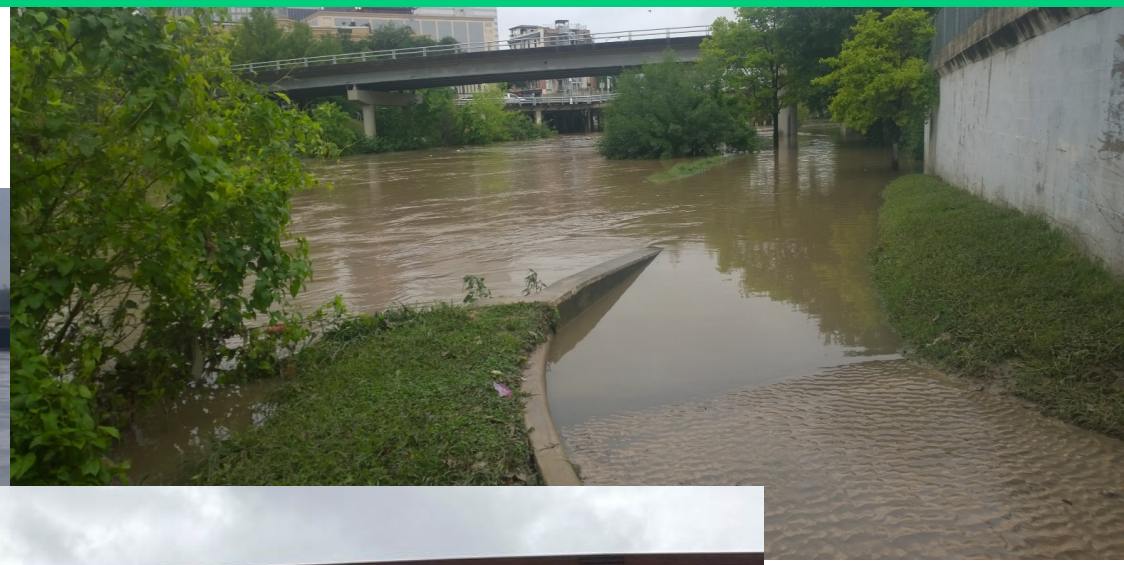
100,000 Homes Flooded

Photo courtesy of Houston Chronicle

Worst single-year drought in 2011

Four of the top ten flood events in the last 40 years occurred between 2015 and 2017

FLOODING



HOUSTON
PARKS BOARD

FLOODING


Friday

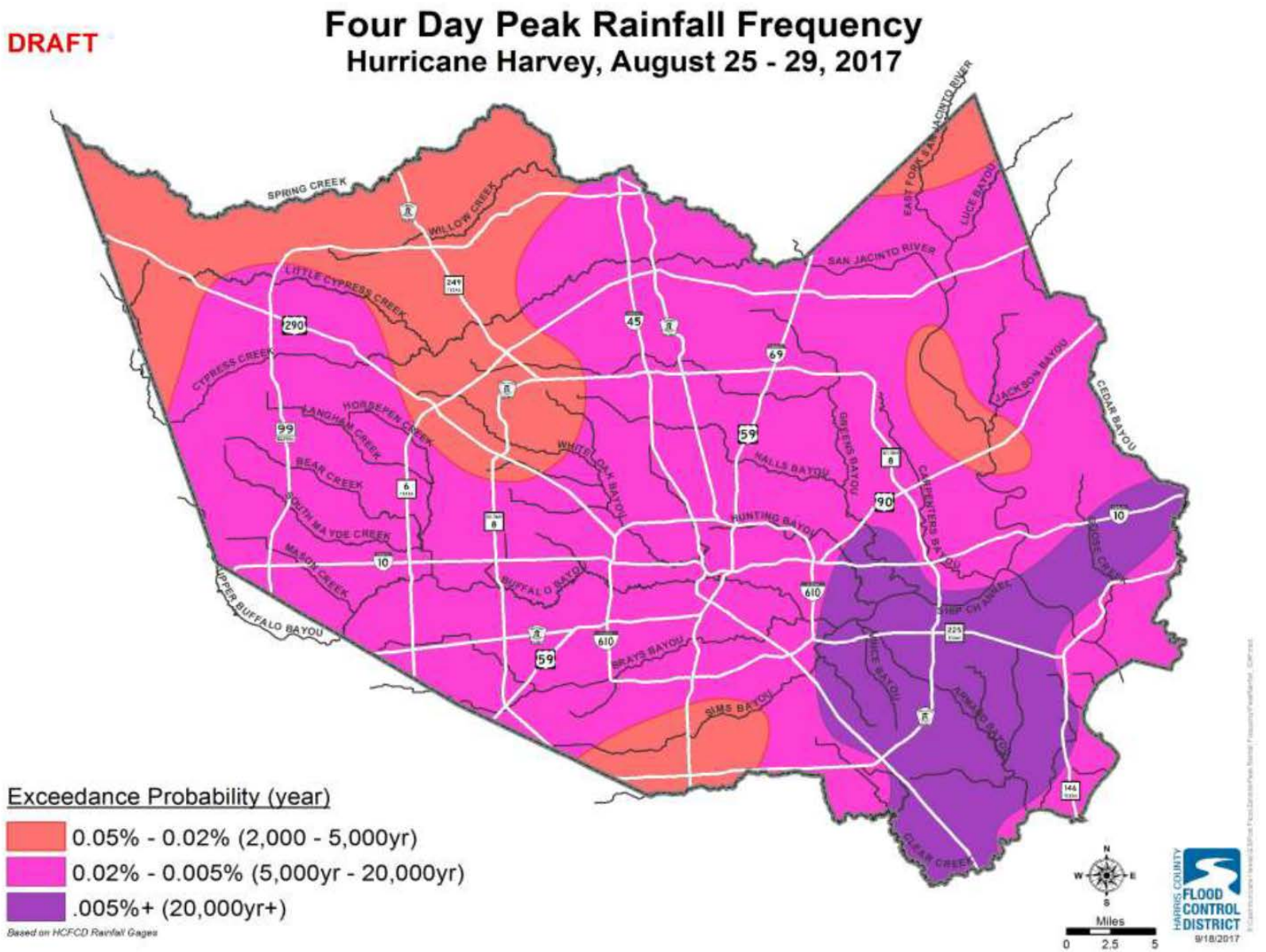

Saturday


Sunday


8/25/2017 11:54a


8/27/2017 8:30a
Photo Grid

HURRICANE HARVEY



FLOODING IMPACT - WASHOUTS

HOUSTON PARKS BOARD

FLOODING IMPACT - DEBRIS

HOUSTON PARKS BOARD

FLOODING IMPACT – DOWNED TREES

HOUSTON PARKS BOARD

FLOODING IMPACT - SILT

HOUSTON
PARKS BOARD

CLEAN UP

HOUSTON PARKS BOARD

CLEAN UP

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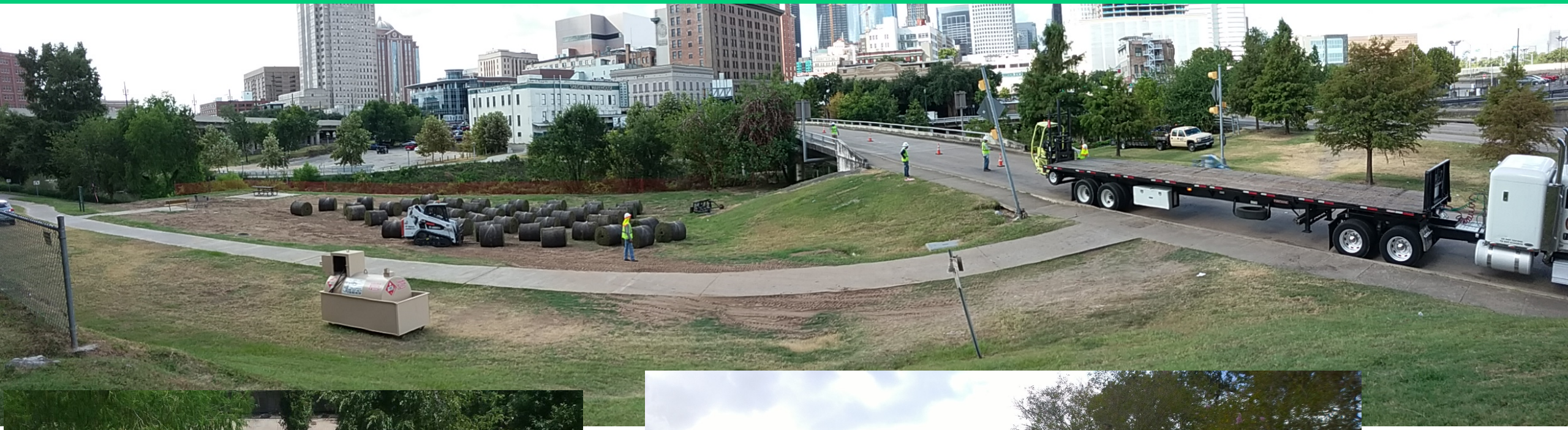
CLEAN UP

HOUSTON
PARKS BOARD

CLEAN UP



HOUSTON PARKS BOARD

CLEAN UP

Flooded 6 days before the Grand Opening event

HOUSTON PARKS BOARD

CLEAN UP SINCE JULY 2014

60

Flood Events

Major

6

Flood Events

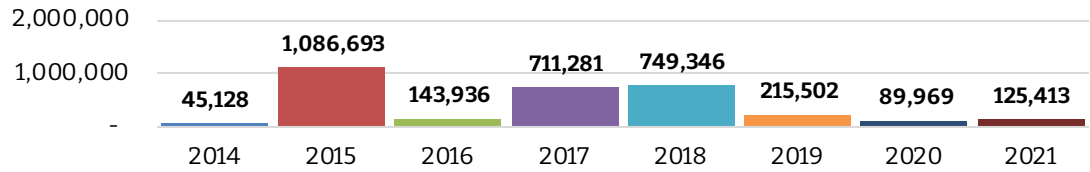
2015 (May)	**Memorial Day - 10" rainfall**
2015 (October)	**Hurricane Patricia (remnants) - 11"**
2016 (April)	**Tax Day - 10"**
2017 (August)	**Hurricane Harvey - 37"**
2019 (September)	**Tropical Storm Imelda - 15"**
2020 (September)	**Tropical Storm Beta - 16"**

Silt and Debris Removed

3,000

Dump Truck Loads

Clean Up Costs ($)

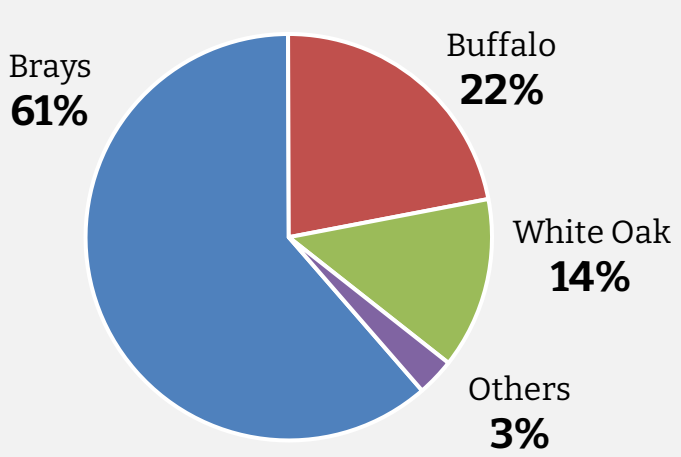


Silt and Debris Removed

44,994

Cubic Yards

Clean Up Cost by Bayou



Acres

2,792

Maintained

Clean Up

$3,167,267

Total Spent

Miles of Trails

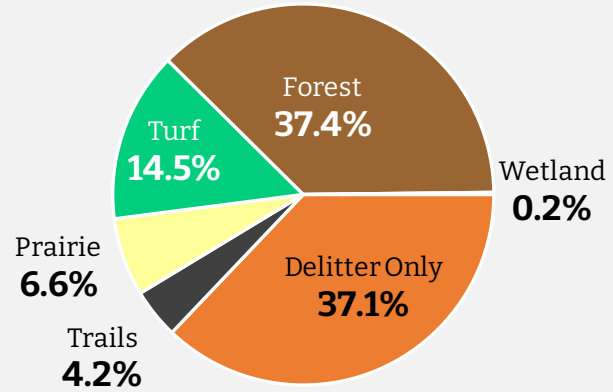
102

Maintained

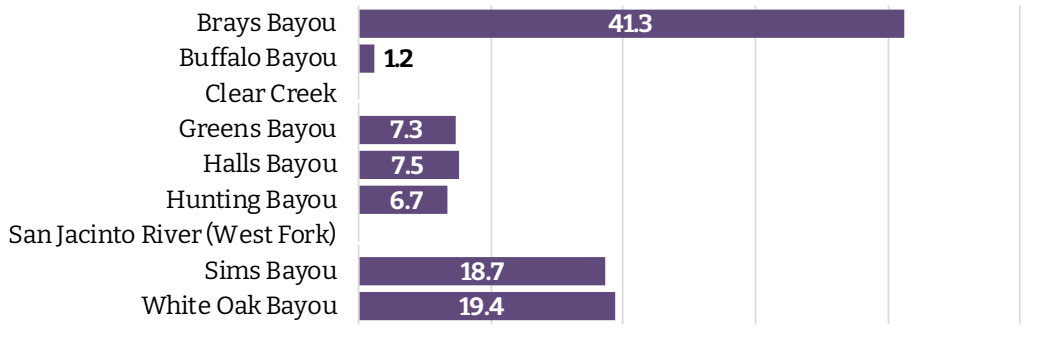
HOUSTON PARKS BOARD

CONSERVATION and MAINTENANCE METRICS

2,792 Acres Maintained



102 Miles of Trails Maintained



Flood Events
60

Major
6
Flood Events

Flood Cleanup
$3,167,267
Total Spent

Litter and Debris Clean Up
2,023
Dump Truck Loads

Trees
25,201
Inventoried

Operating and Maintenance Reserve
$11,280,000
Current Annual Budget

Flood Related Silt and Debris Removed
3,000
Dump Truck Loads

Prairie Areas
12.2
Aces Rebuilt

Conservation
1,400
Volunteer Hours

Trees
5,000 +
Planted

Graffiti Sites
10,109
Abated

Graffiti Abatement
$312,987
Total Spent

Bridges
7
Repaired

Trails
5
Miles Rebuilt

Pedestrian
53
Bridges

Drinking
12
Fountains

Trash and Recycling
305
Receptacles

Benches and
286
Picnic Tables

Bicycle
13
Fixit Stations

Capital Replacement Projects
$8,805,202
Total Spent

QUESTIONS?

Trent Rondot
Conservation and Maintenance Director
Trent@houstonparksboard.org

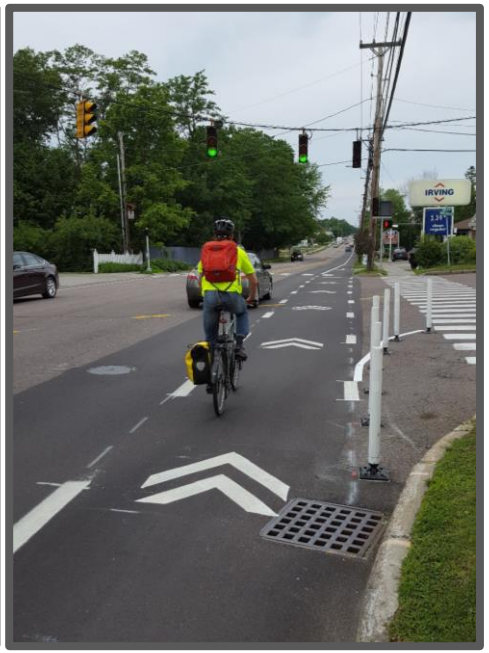
Nicole Losch
City of Burlington, Vermont

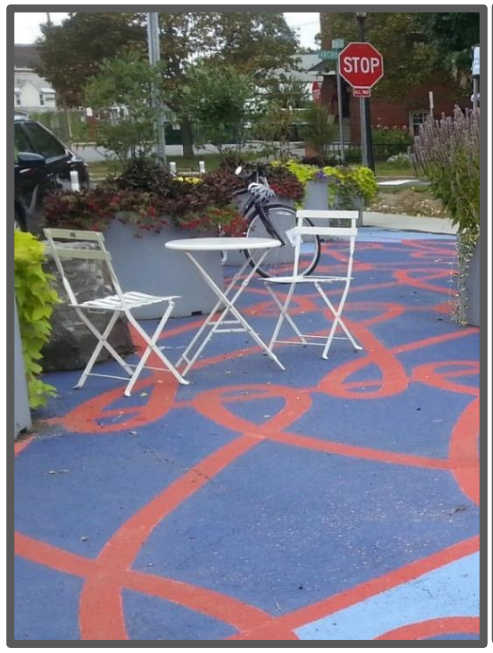
Quick-Builds in Burlington, VT

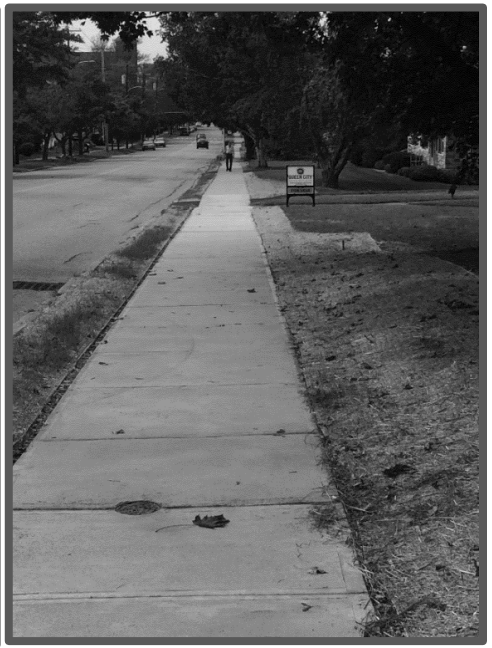
Why Quick-Builds?

Invest in public safety.
Build many projects at once.
Build momentum.
Adapt before construction.

Where Quick-Builds fit into Project Delivery







Demonstration	Pilot	Interim	Permanent
1 hour to 1 week	30 days to 1 year	1 to 5 years	Varies

peopleforbikes.org
Quick Builds for Better Streets (2016)

Pilot Projects

Data-driven evaluations

Test impacts, materials, gauge community support

Quick-Build / Interim Design

Rapid implementation!

QUICK BUILD

BURLINGTON

DESIGN STANDARDS

QUICK BUILD

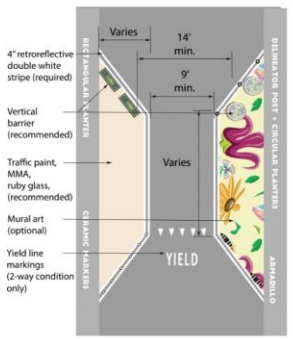
BURLINGTON

MATERIAL STANDARDS

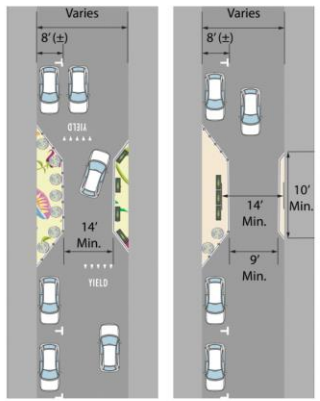
VEHICULAR PINCH POINTS

Pinch Points, sometimes called "chokers" are mid-block curb extensions that may be applied to both sides of one- or two-way streets. Pinch points are similar to neckdowns, only they do not feature pedestrian crosswalks. They help slow traffic speeds, sometimes forcing a yield condition, and often provide opportunities for placemaking enhancements such as public art, benches/planters, bus stop amenities, and other stormwater treatments (when built out with permanent materials).

DETAILS



IN CONTEXT



APPLICATION GUIDANCE

Applications

Neighborhood Greenways | Neighborhood / Downtown Slow Zones

Components

Surface Treatment

- Double 4" solid retroreflective white stripe (required)
- Ruby Lake Glass (optional)
- Acrylic traffic paint / custom murals (optional)
- Methyl methacrylate (optional)

Barrier Elements

- Ceramic markers (optional)
- Delineator posts (optional)
- Circular planter (optional)
- Rectangular planter (optional)

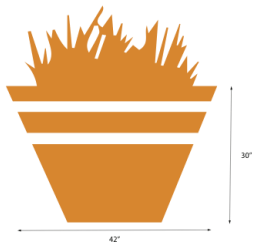
Dimensions

- Length: 10' minimum
- Width: Varies based on street design/configuration, but 8' typical
- May use 90, 60, or 45 degree curb return angle, depending on parking lane configuration and other street design considerations.

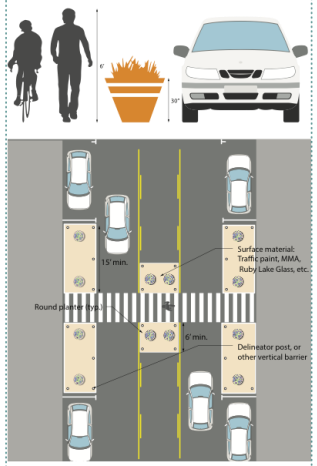
Design Guidance

- Pinch points may be installed on low-speed (25 mph or lower), low-volume (3,000 ADT or lower) streets such as neighborhood greenways and within neighorhood/downtown slow zones.
- Curb extension width is typically one foot less than the width of the parking lane, but the curb extension can also extend to the bicycle lane when one is striped.
- Placement of pinch points should not impede access to/from existing driveways, unless part of access management plan, bicycle lanes, or bus stops.
- Except for intersection approaches, consider removing the centerline from streets with pinch points.
- A 14' width between non-mountable vertical barriers should be maintained for emergency vehicle access.
- In select locations, the area defined by a pinch-point curb extension may be used for other streetscape amenities, such as bicycle parking / fix-it stations, trash receptacles, benches, bus stops, etc. but must not impede pedestrian flow, obstruct clear path, emergency operations, or sight lines.
- Pinch point curb extensions must maintain stormwater flow / drainage.
- Vertical barrier elements should be used to alert drivers and snow plow operators to presence of the pinch point area
- Pinch points may be designed in conjunction with a fire hydrant, however the length of the curb extension should be equal to/greater than the 'no parking' zone (typically 15 feet in either direction) and access to the hydrant must not be impeded by any non-mountable vertical barrier elements.
- See NACTO's Urban Street Design Guide for more details.

PLANTER - CIRCULAR, PLASTIC



IN CONTEXT



APPLICATION GUIDANCE

Applications

Bike Corral | Bicyclist / Pedestrian Refuge Island | Curb Extension| Pedestrian Plaza | Mini-Roundabout / Neighborhood Traffic Circle

Components

- Plastic Planter
- Soil and filler
- Plant matter

Dimensions

(See diagrams at left)

General Design Guidance

- Identify a maintenance/stewardship partner who will be able to water and maintain the plant matter.
- Ensure placement does no obstruct accessibility / ADA compliance.
- For all applications below, add a retroreflective strip for night-time visibility.

Specific Design Guidance

Bicycle Corral | Bicyclist Refuge Island

- Place a planter on either side of the bicycle rack(s) elements, leaving 2' clear for bicycles to be parked on the outside edge of the rack; where the corral replaces or is adjacent to parallel parking, pair with curb stop placed between the planter and the adjacent parking space(s).
- Place a planter(s) on either side of the bicyclist refuge area (see left), May be paired with vertical delineators placed at th corners of the ref uge area.

Curb Extension | Pedestrian Refuge Island | Pedestrian Plaza

- Place planters parallel along the inside edge of the double white 4" line demarcating the curb extension; place planters every 8 - 10', May be paired with other vertical barriers to enhance visibility / sense of enclosure.
- Place a planter(s) on either side of the pedestrian refuge area (see left), May be paired with vertical delineators placed at th corners of the ref uge area.
- Place planters every 8 - 10' along the edge of the plaza; Depending on size, planters may also be used as landscaping / greenery throughout the plaza area, including adjacent sidewalks with width;

Mini-Roundabout / Neighborhood Traffic Circle

- Place a single planter in the center of the painted island in conjunction with signs and other design elements; use multiple planters to demarcate round about area

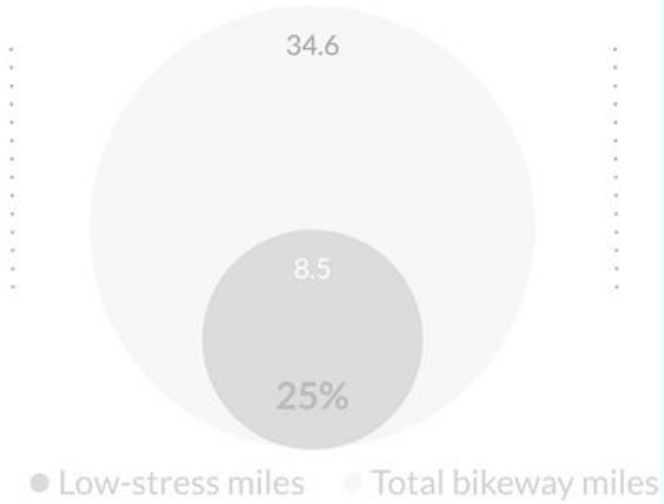
Walk Bike plan BTV

2021 PROGRESS REPORT ON 2026 GOALS

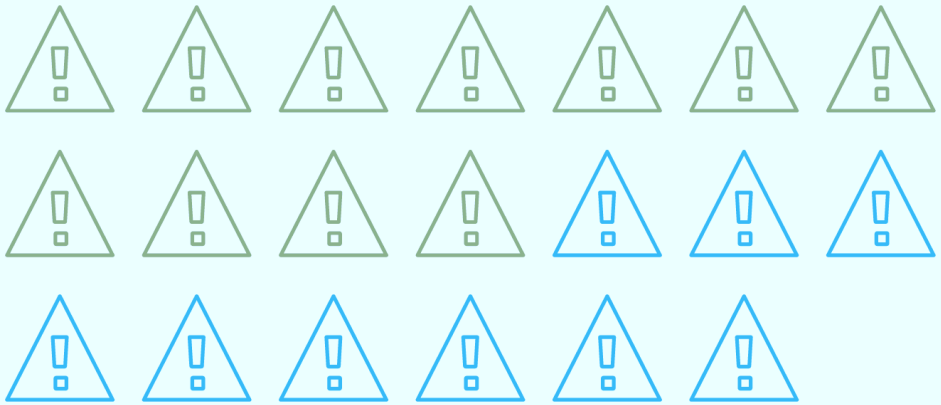
GOALS

28 miles of new bikeways

65% of bikeways are low stress



20 priority intersection safety upgrades



PROGRESS

- Greenride Bikeshare expansion underway
- 10 businesses participating in Street Seats
- Bicycle-friendly ordinance changes approved
- Standardized bus / bike conflict markings
- Updated winter cycling maintenance plan
- Updated bicycle parking zoning ordinance
- Increased staff capacity

What's next?

- More low-stress bikeways
- More intersection upgrades
- Streets redesigned for slower speeds and fewer crashes


JOBS
SOCIAL EQUITY
A CONVERSATION FOR A BETTER BURLINGTON
HOUSING
ENVIRONMENT
TRANSPORTATION


COMMUNITY-LED DEMONSTRATION PROJECT
Project Name and Description:
HOWARD CORNERS
WALK BIKE SAFETY POP-UP
Project Duration:
7/26-7/28
(Thru Friday)
Lead Contact Person and/or Organization:
JASON VAN DRIESCHE
LOCAL MOTION
BURLINGTON, VT PUBLIC WORKS

2017 Demonstration → 2018 Quick-Build → 2019 Reconstruction

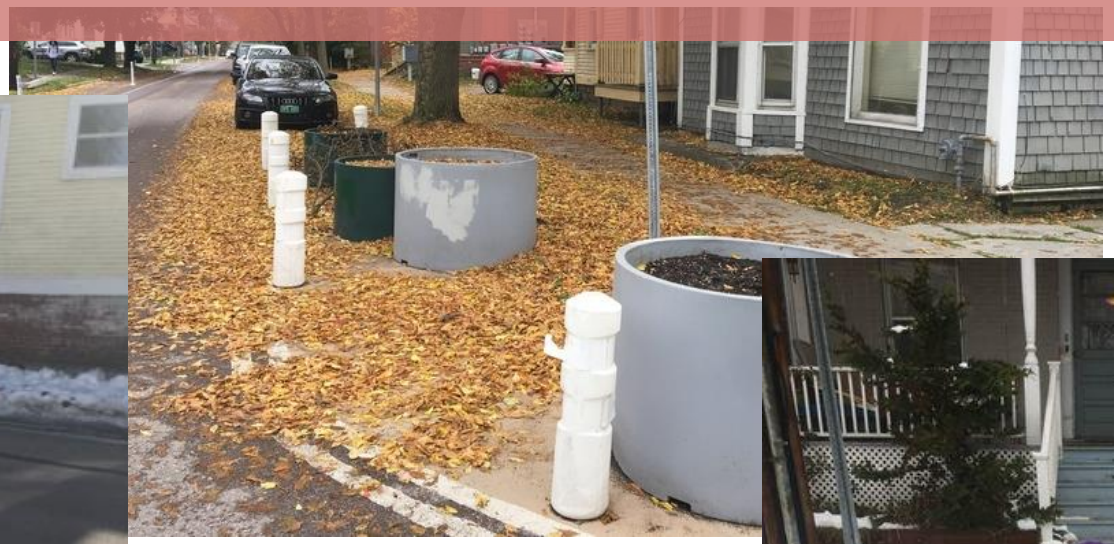
It doesn't always have to be pretty…

BURLINGTON, VT PUBLIC WORKS

BCA
BURLINGTONCITYARTS

Plans vs Reality

…and it often isn't pretty



Some Lessons Learned

- Quick-builds allow us to build ~ 4 x more
- Set a clear plan for maintenance – consider external contracts
  - Spring cleaning
  - Monthly sweeping
  - Monthly graffiti removal
  - Year-round plant maintenance
  - Winter maintenance
  - Bollard replacement / material replacement
- Set a plan to phase out of quick-builds
  - Be flexible to change in the interim
  - Internal planning, external communication

Nicole Losch, PTP

Senior Planner

Burlington VT

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https://www.burlingtonvt.gov/DPW/Quick-Build

John Leonard
Virginia DOT


VDOT
Virginia Department of Transportation

BICYCLE AND TRANSIT-ONLY LANE CONVERSIONS

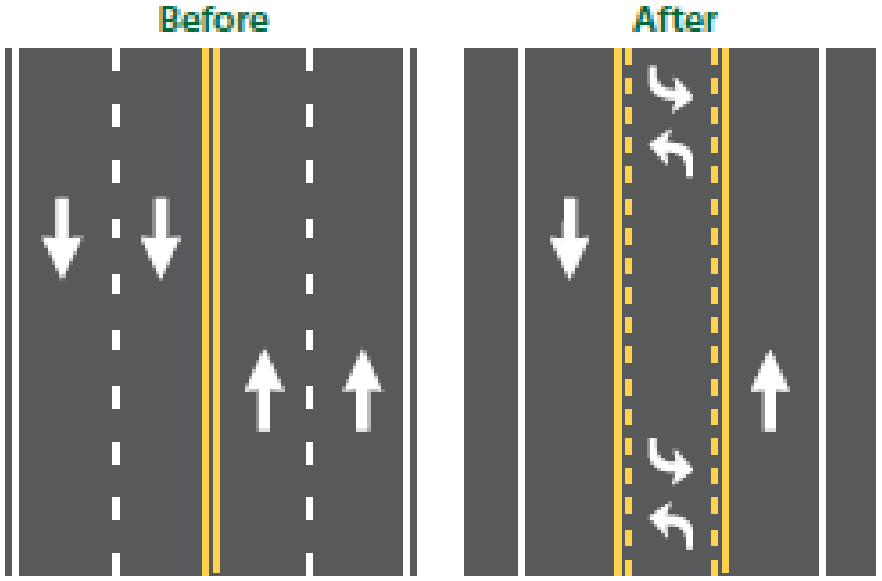


Figure 1 Typical Road Lane Reconfiguration
Source: FHWA, 2014 Road Diet Informational Guide

John Leonard, Urban Program Manager

December 13, 2021

Urban Maintenance Program Overview

Payment - General

- Payments based on moving lane miles (available to peak-hour traffic)
- CTB approves payment amounts to localities
- Localities annual growth rate is based upon the base rate of growth for VDOT's maintenance program

- ***Payment Rates:***
  - Principal and Minor Arterial Roads $22,524 per lane mile
  - Collector Roads and Local Streets $13,224 per lane mile

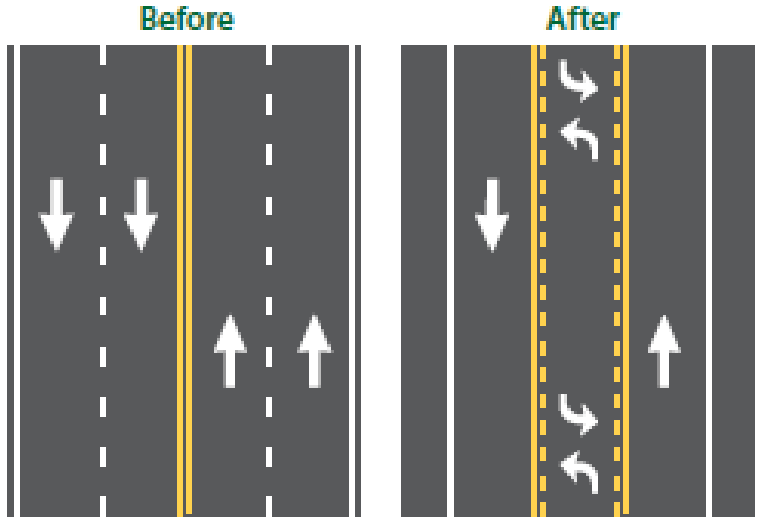


Figure 1 Typical Road Lane Reconfiguration
Source: FHWA, 2014 Road Diet Informational Guide

Bicycle and Transit-Only Lane Conversions

Bicycle and Transit-Only Lane Conversions must meet the criteria specified in Section 33.2-319 (D) of the *Code of Virginia* to remain eligible for maintenance payments

Transit only and bicycle only lanes converted after July 1, 2014

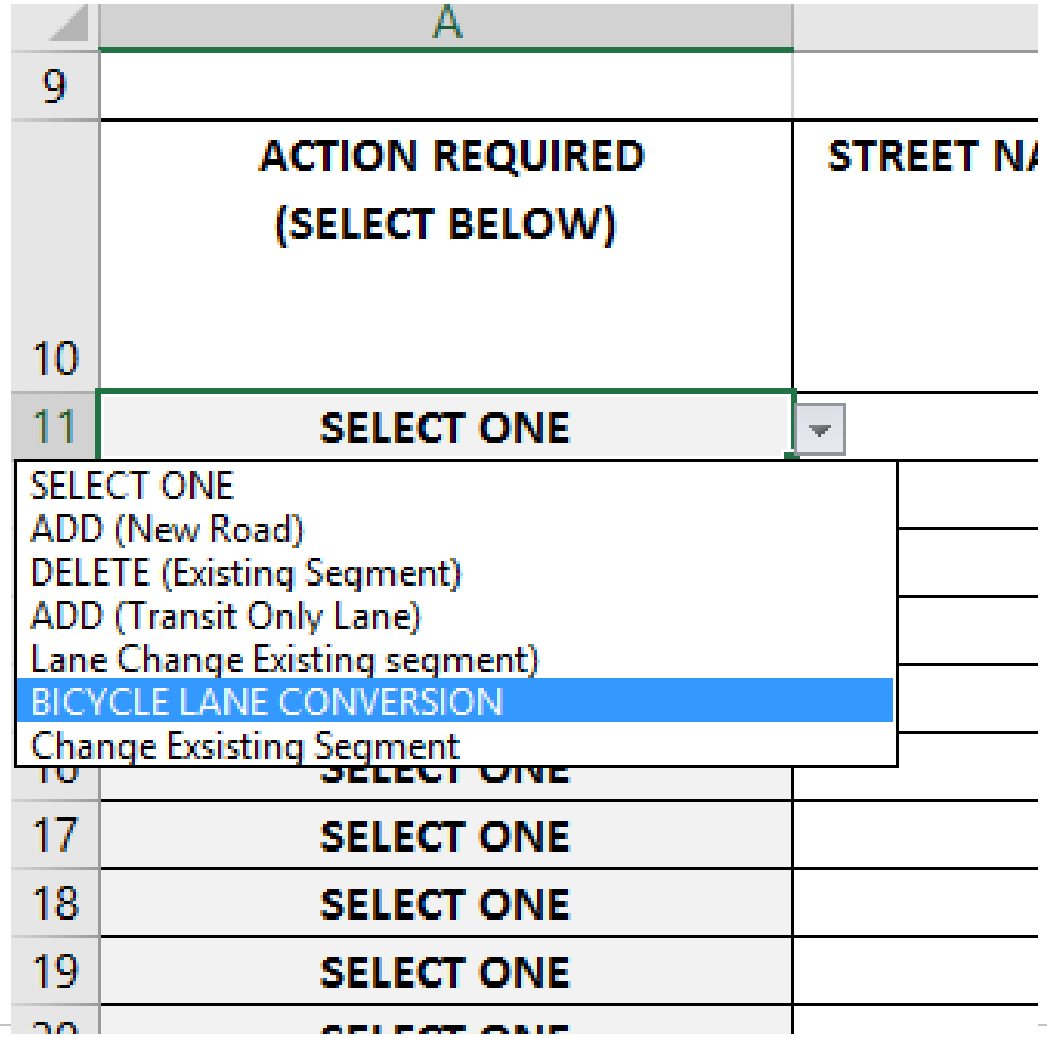
***Provided that* the number of moving-lane-miles converted is not more than 50 moving-lane-miles or three percent of the city's or town's total number of moving-lane-miles on July 1, 2014, whichever is less**

When conversion of streets meet these criteria, the municipality may request that the Department accept the conversion and update the Urban Maintenance Inventory System.

Procedures for Bicycle and Transit-Only Lane Conversions

Three items are required: U-1 Form, Resolution, Sketch. These are to be submitted to the District.

The municipality will prepare Form U-1 (Appendix U), will check the corresponding box designating the submission as moving-lane conversion.



Procedures for Bicycle and Transit-Only Lane Conversions

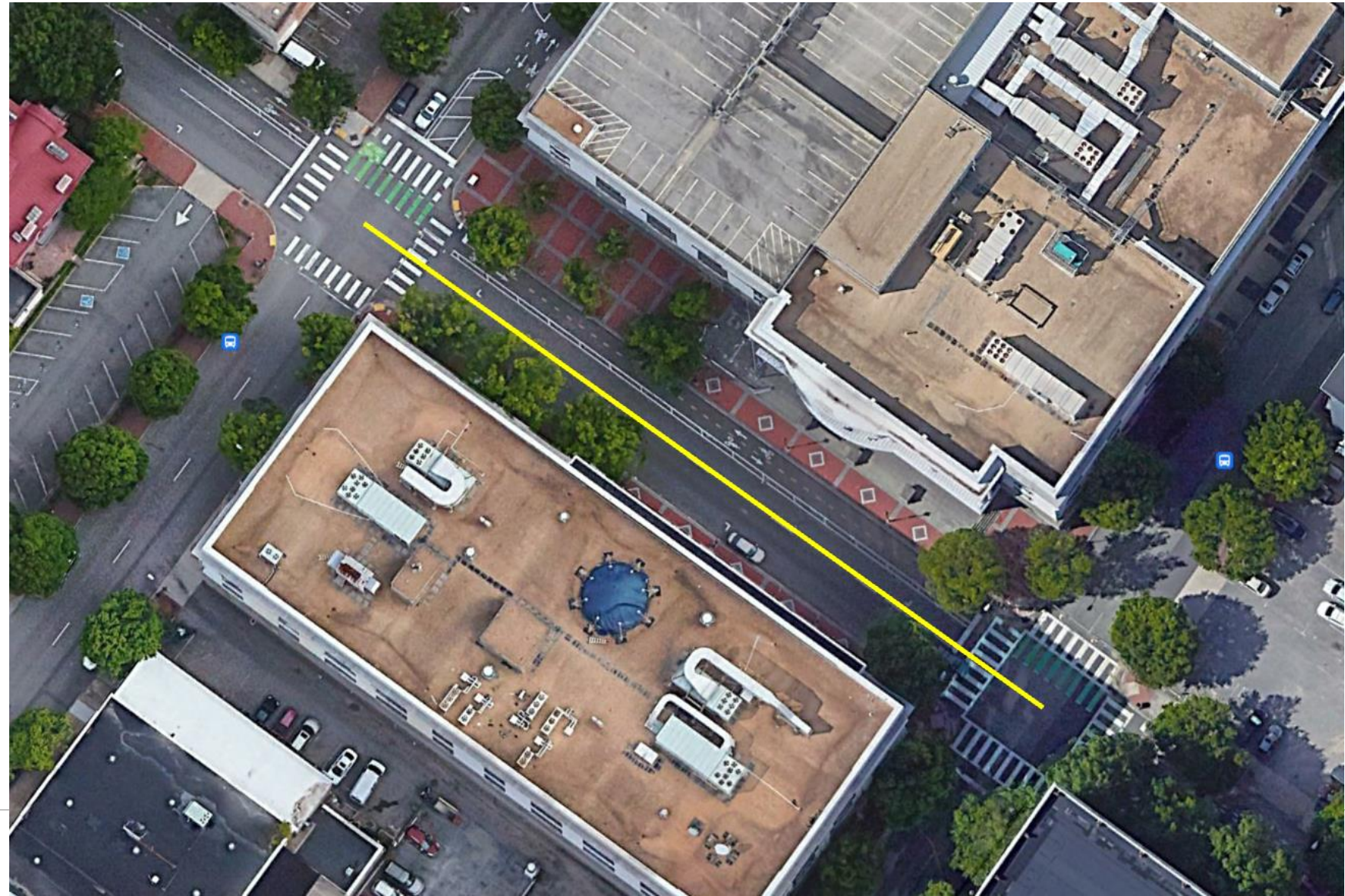
City or Town Council adopts a resolution making a formal request and includes language that certifies that the conversion design has been assessed by a professional engineer licensed in the Commonwealth pursuant to Chapter 4 (§ 54.1-400 et seq.) of Title 54.1 and that the assessment has demonstrated that :

1 - The level of service of the street to be converted will not be reduced or if it will be reduced that the associated roadway network will retain adequate capacity to meet current and future mobility needs

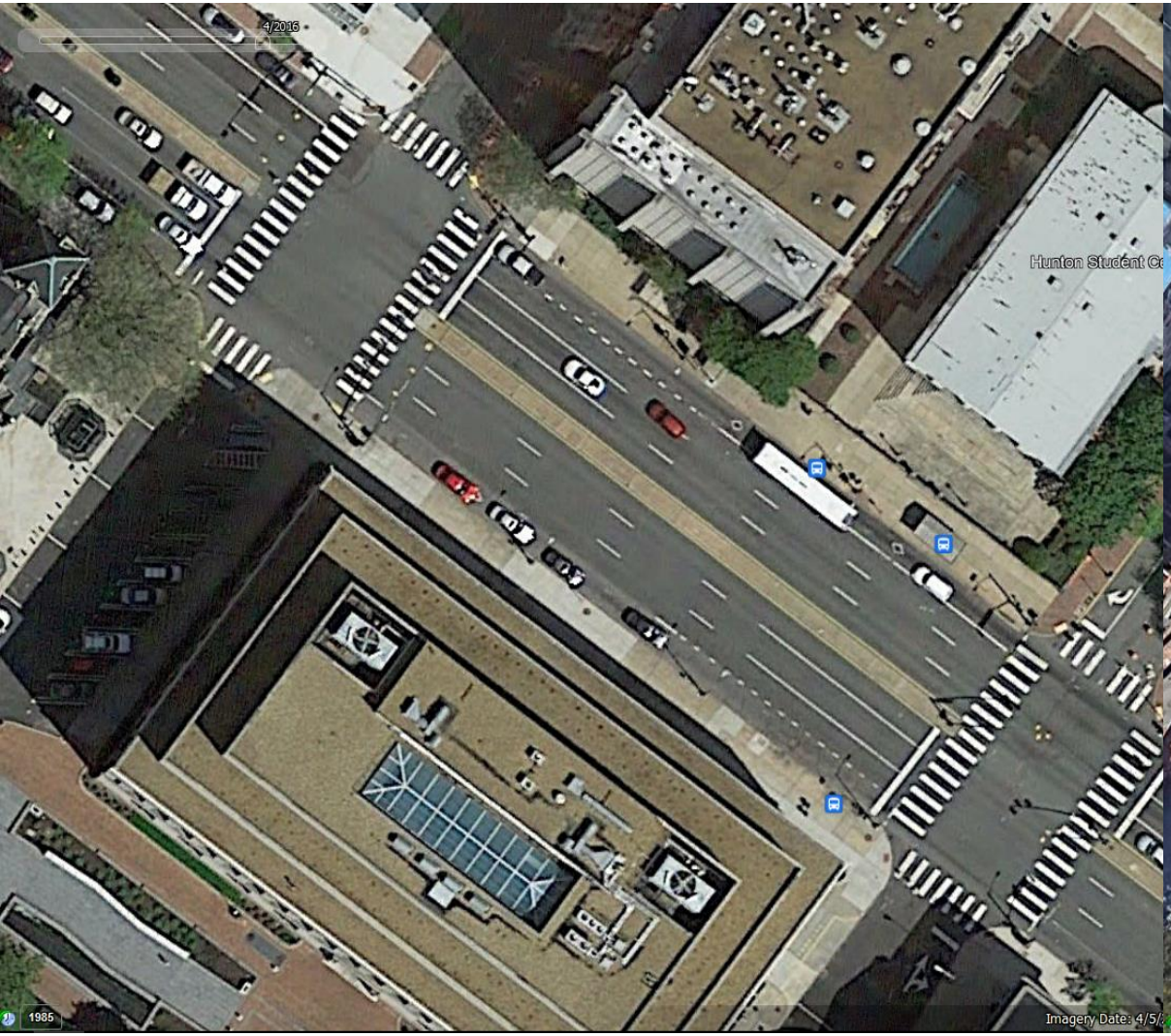
2 - (for Bicycle Conversion Lanes Only), the conversion has been designed in accordance with the National Association of City Transportation Officials' Urban Bikeway Design Guide.

Procedures for Bicycle and Transit-Only Lane Conversions

- Finally, the City or Town prepares a map showing the location and termini of the bicycle lane conversions.
- These items are submitted to the District by Feb 1 each year.



Thanks!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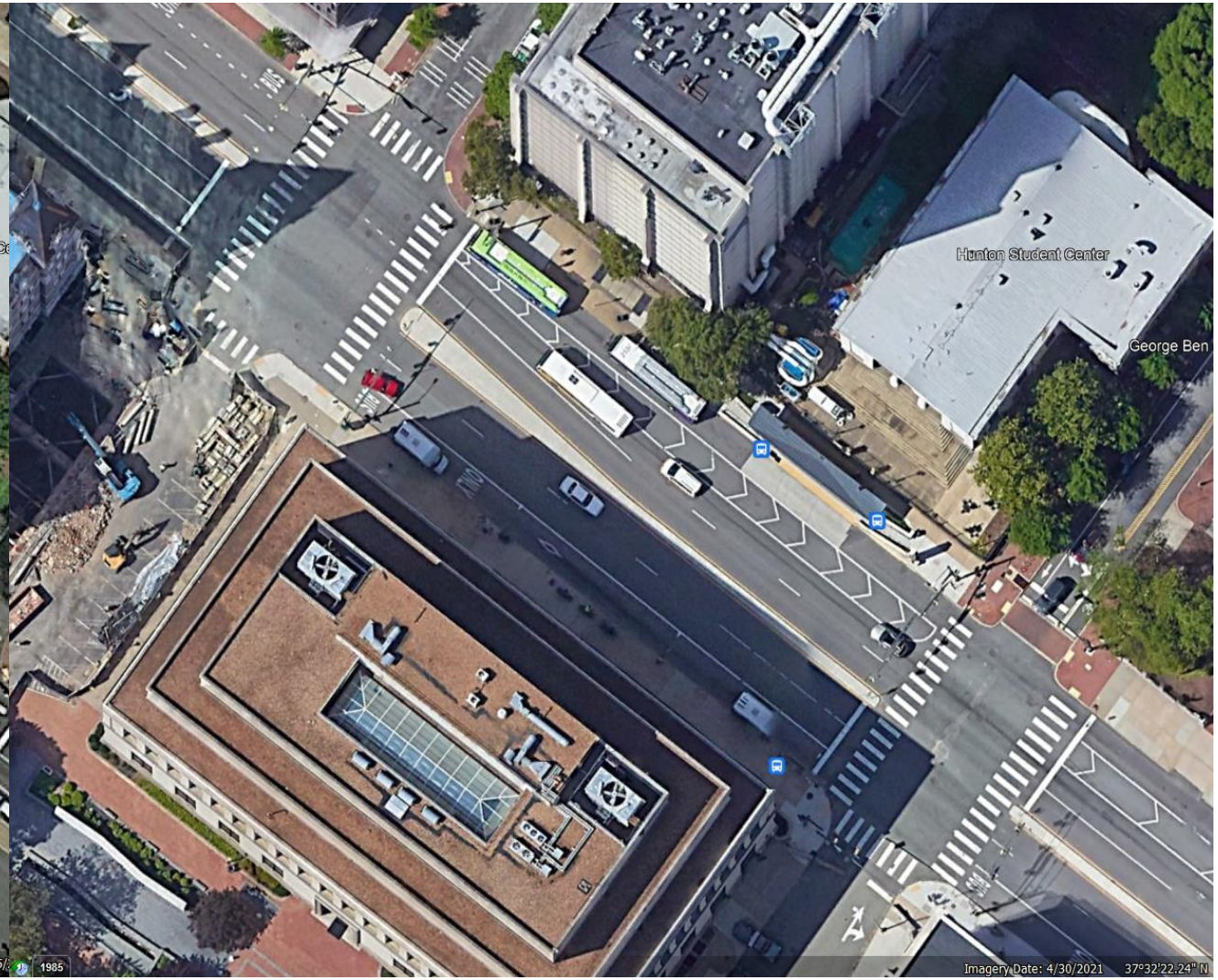
Hunton Student Center
George Ben
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Q + A

Thanks for joining!

- Be on the lookout for an email with:
  - An evaluation survey that contains a request for Continuing Education Units (CEUs) for both engineers and planners
  - Meeting materials (with contact information)

Contact Information

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