

# Implementation & Equity 201:

The Path Forward to Complete Streets

## Greening the Streetscape: Complete Streets & Stormwater Management

Webinar begins at 1PM EDT



**Smart Growth America**  
Improving lives by improving communities



National Complete  
Streets Coalition

# Greening the Streetscape: Complete Streets & Stormwater Management

July 10, 2017



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**National Association of  
City Transportation Officials**



**DENVER**  
THE MILE HIGH CITY





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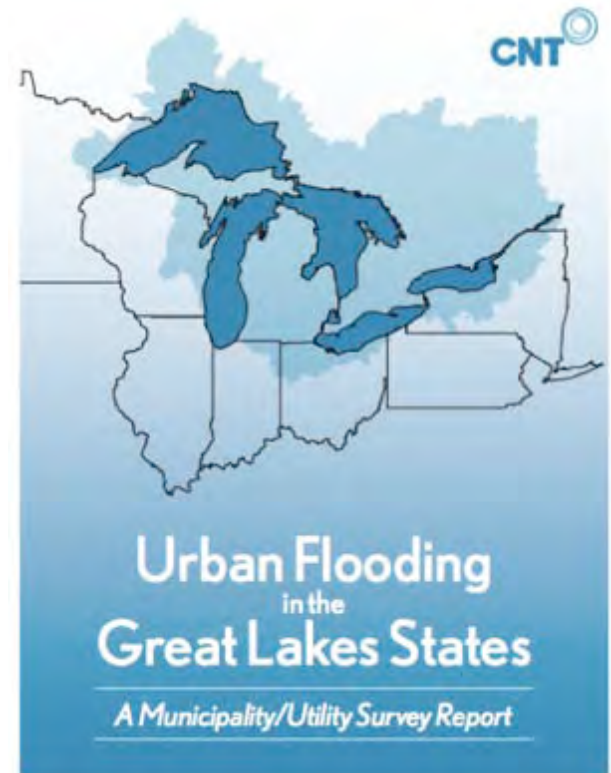
# Emiko Atherton

Director

@CompleteStreets

# Urban Flooding

- Nationally, floods cause **\$7.82 Billion** in damage per year
- Common flooding complaints:
  - Street, parking lot, & backyard flooding **(90%)**
  - Sewer backups into buildings **(83%)**
  - Overbank flooding from rivers, lakes, streams **(40%)**



# Economic Impact

**Aging infrastructure** + increased rainfall = more **urban flooding** outside of floodplains

Much of this damage is **not** covered by insurance

Source: Center for Neighborhood Technology, RainReady Midlothian (IL)

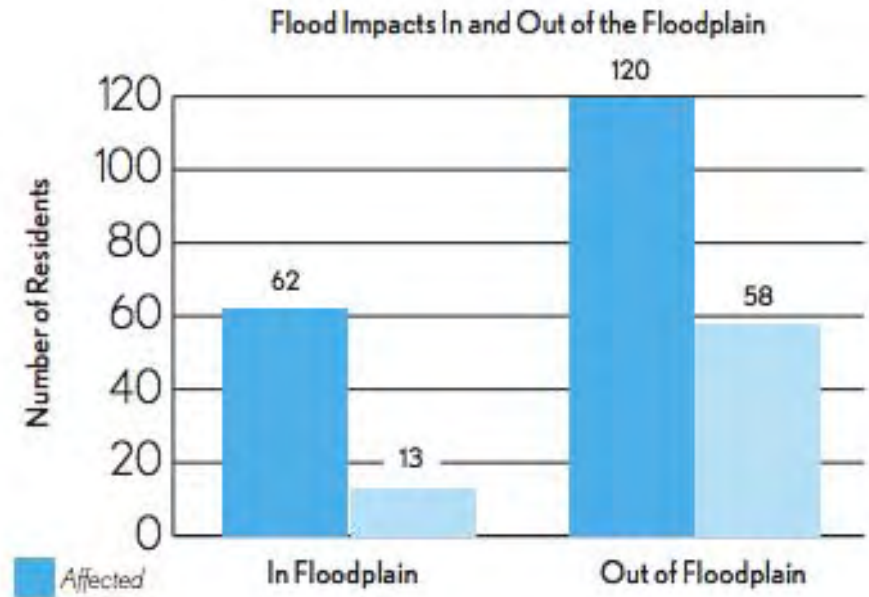


FIGURE 12: FLOOD IMPACTS IN AND OUT OF THE FLOODPLAIN

“The water problem is the worst; our neighbors are going to put their house for sale in the spring but we can't afford to move.”



National Association of  
City Transportation Officials



# Aaron Villere

Program Associate  
@NACTO

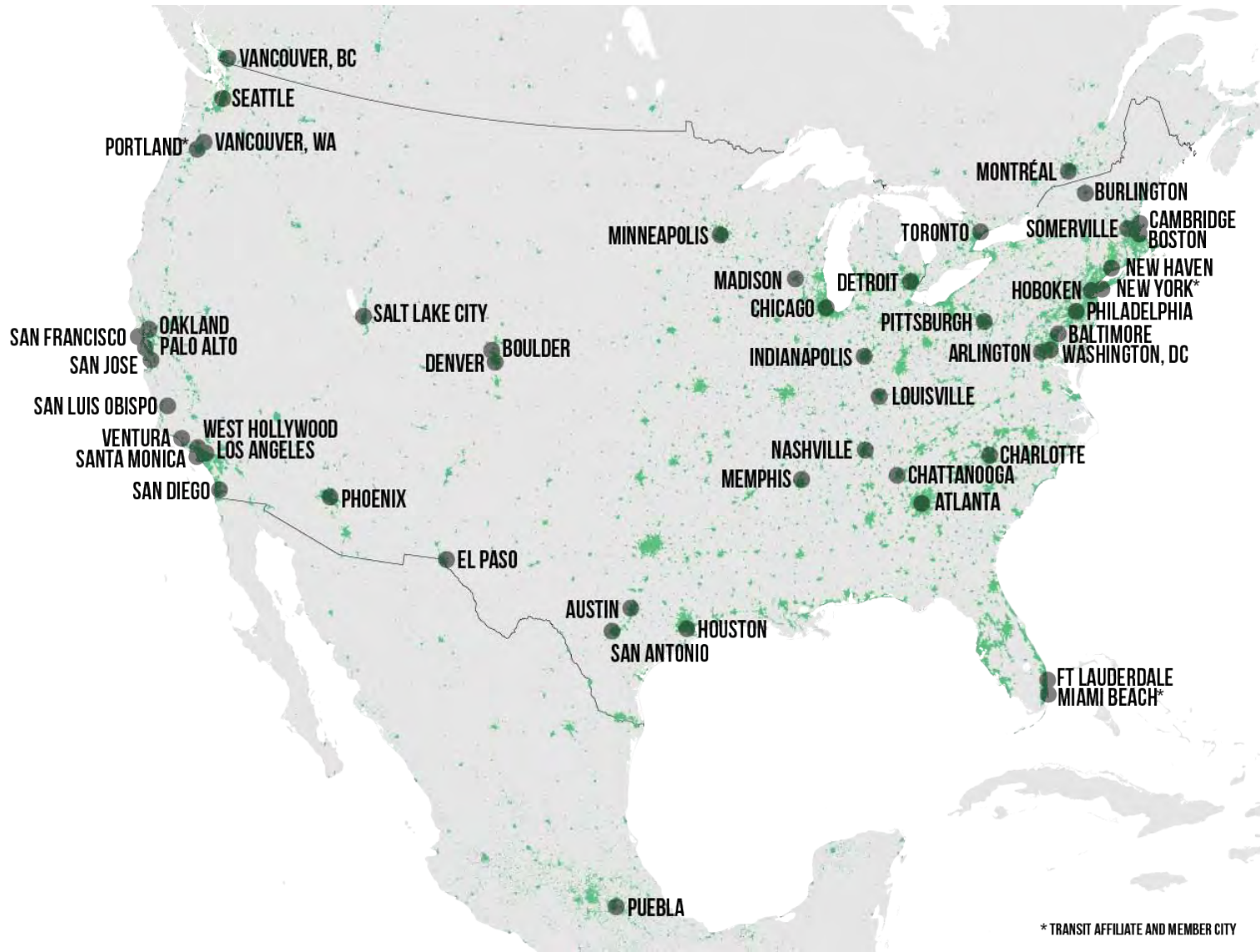
# NACTO's *Urban Street Stormwater Guide*



Aaron Villere  
Program Associate,  
*Designing Cities Initiative*  
NACTO  
[aaron@nacto.org](mailto:aaron@nacto.org)

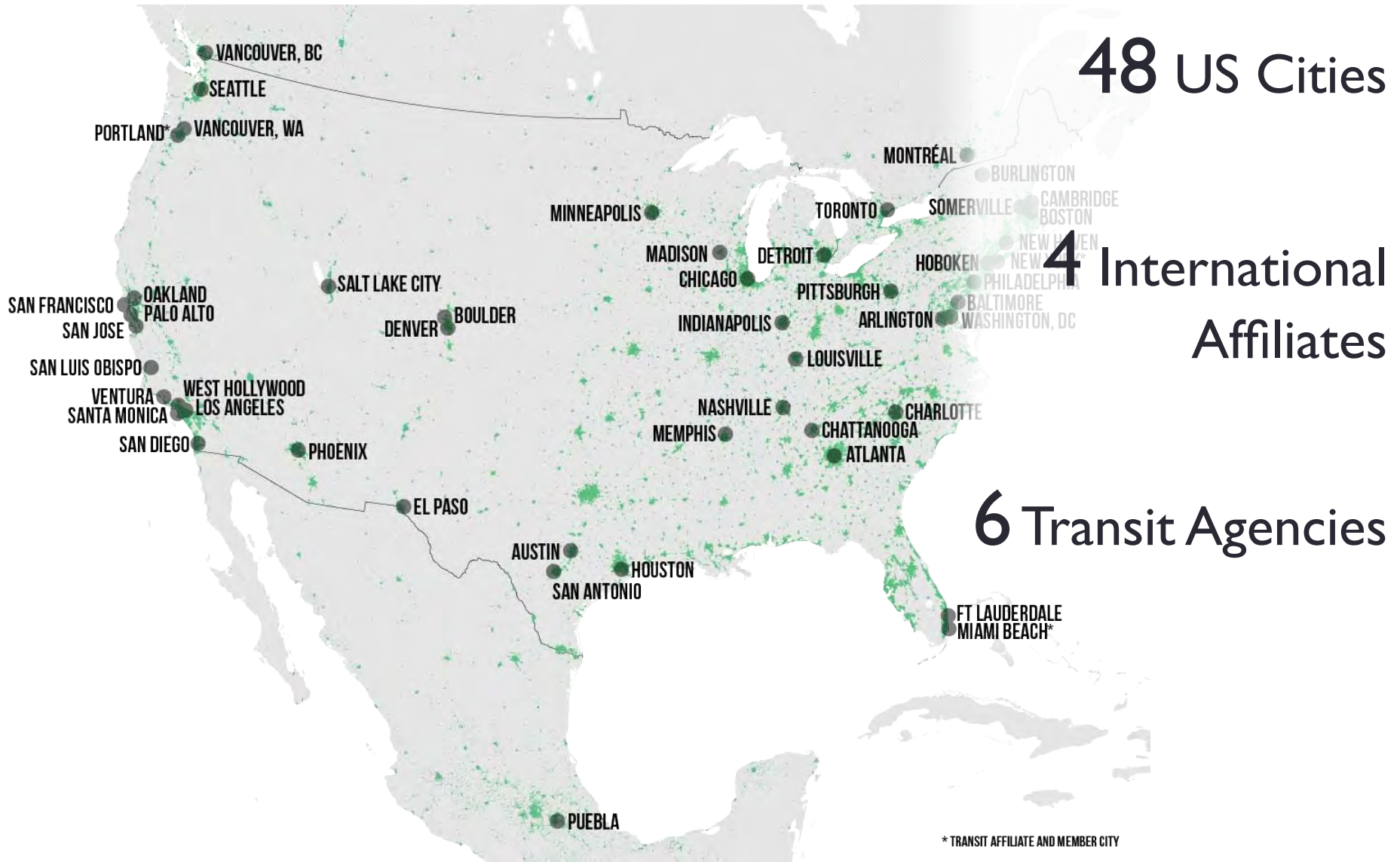


# NACTO

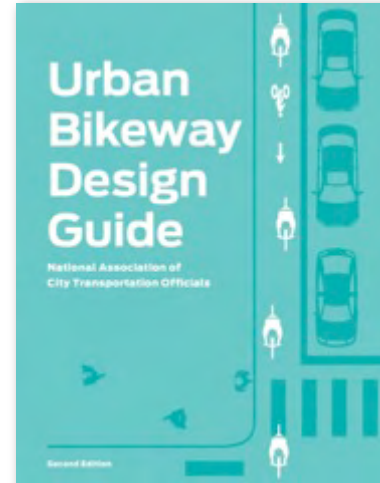




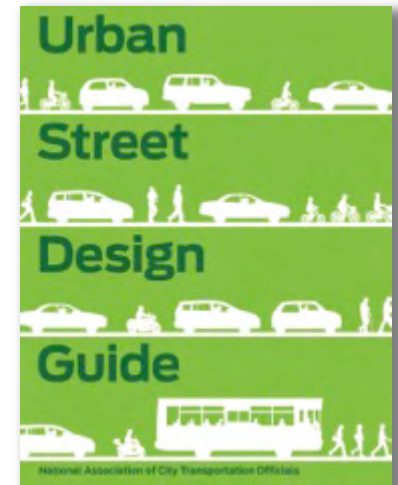
# NACTO



# Giving Cities a Permission Slip to Innovate



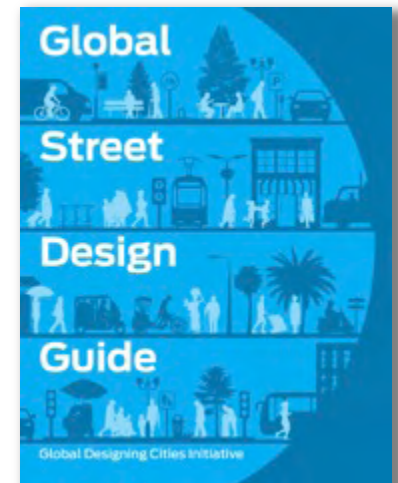
*Spring 2011*



*Fall 2013*



*Spring 2016*



*Fall 2016*



# A street for cars ...





# A street for people ...





# A street for water ...





A flooded street is not a complete street.







Source: City of Ukiah



Source: Blair County Water



Source: Auburn University



Source: WBAL

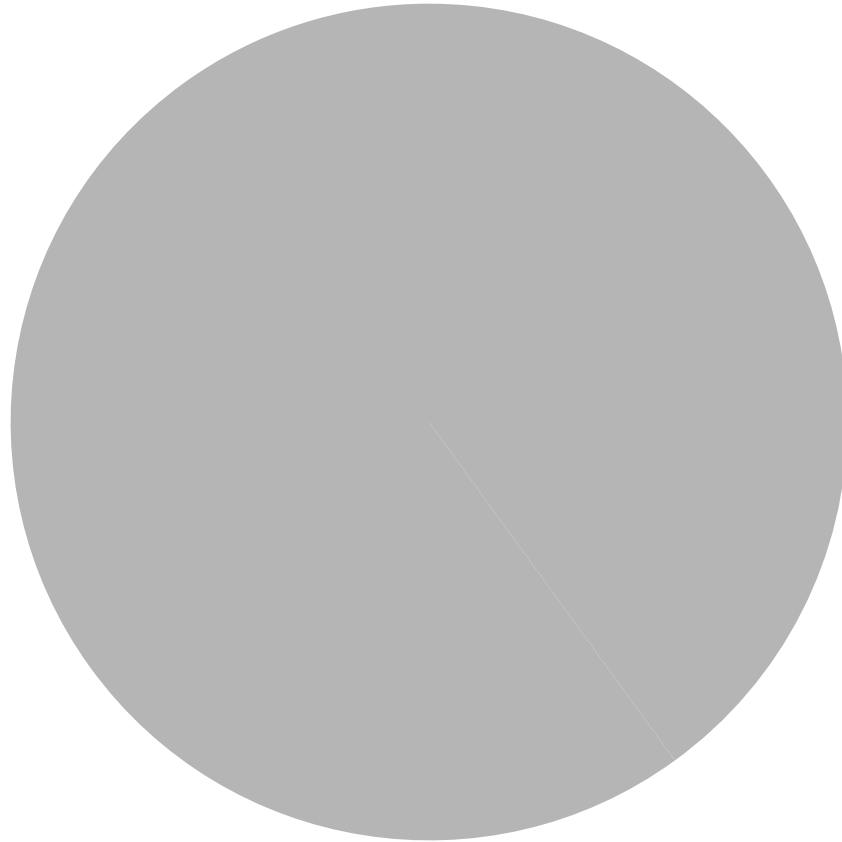


Cities are 60 – 90% impervious.



Source: National Geographic

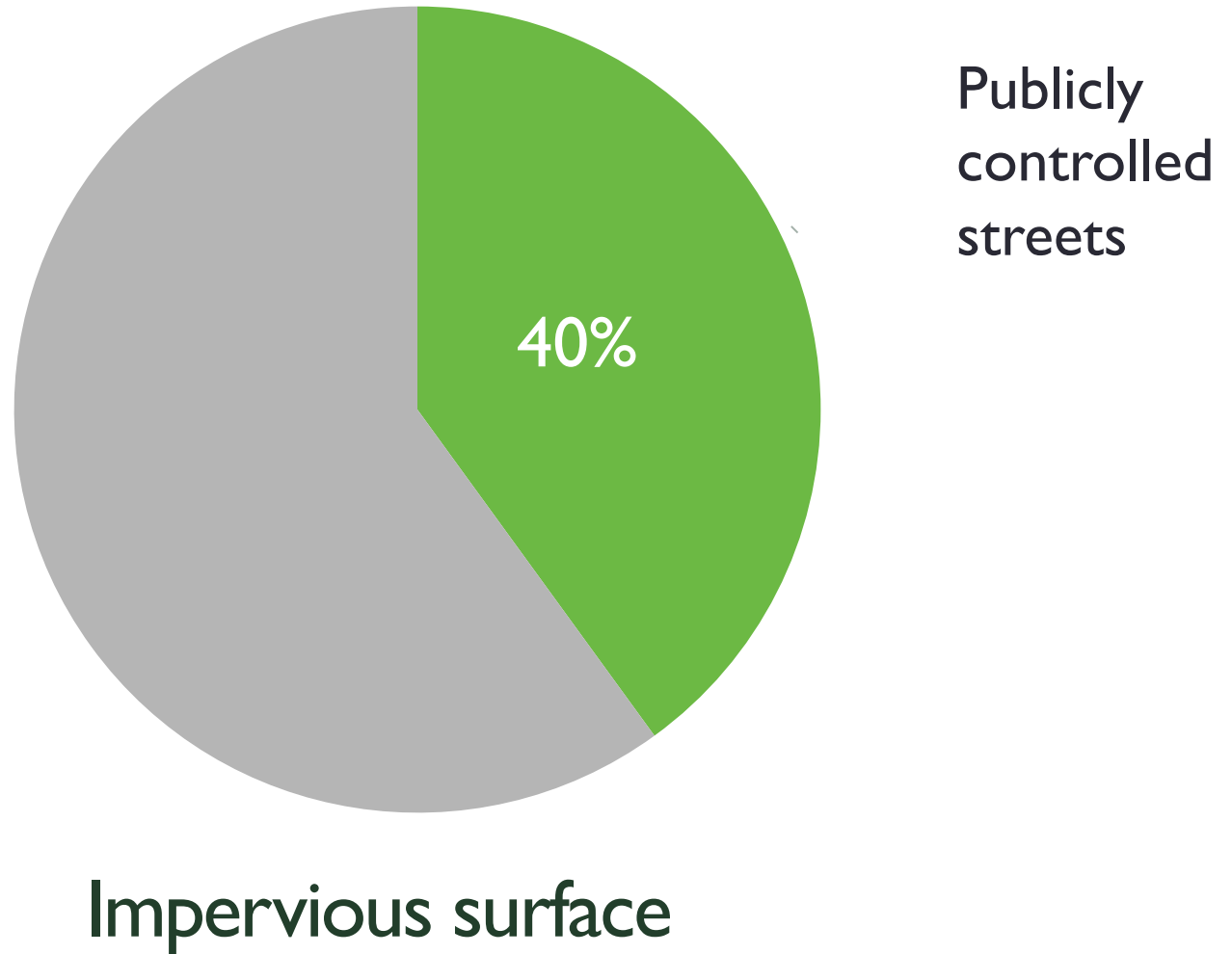
# Streets are an opportunity.



Impervious surface

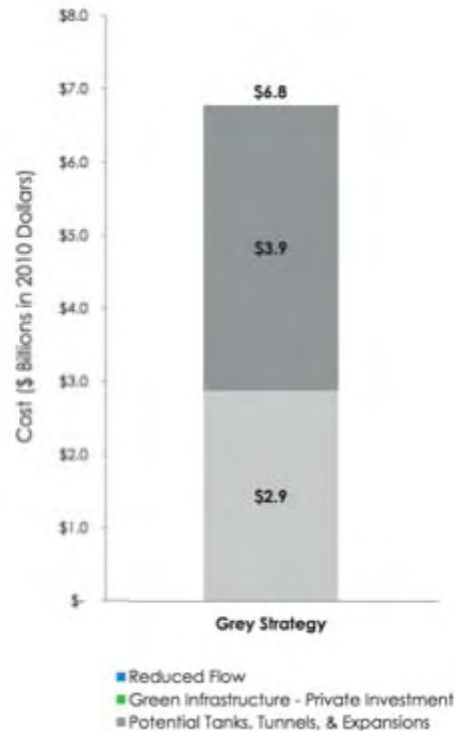


# Streets are an opportunity.



# Don't build more infrastructure ...

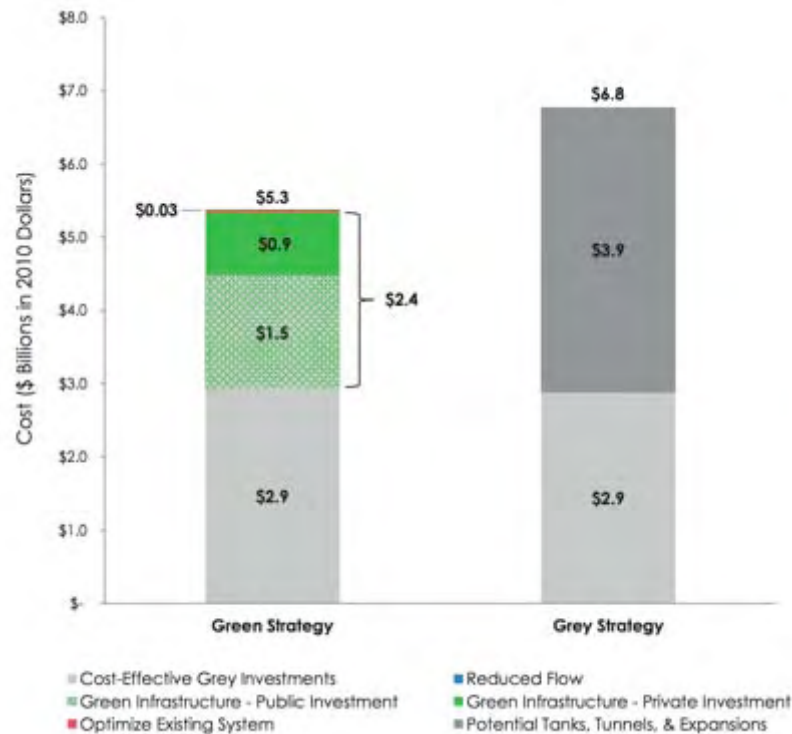
New York City:  
*Cost of CSO Control Scenarios*



**\$6.8 billion** to  
replace only gray  
infrastructure

# ... Build more resilient infrastructure

New York City:  
*Cost of CSO Control Scenarios*



**\$5.3 billion** to blend  
gray and green  
stormwater strategies

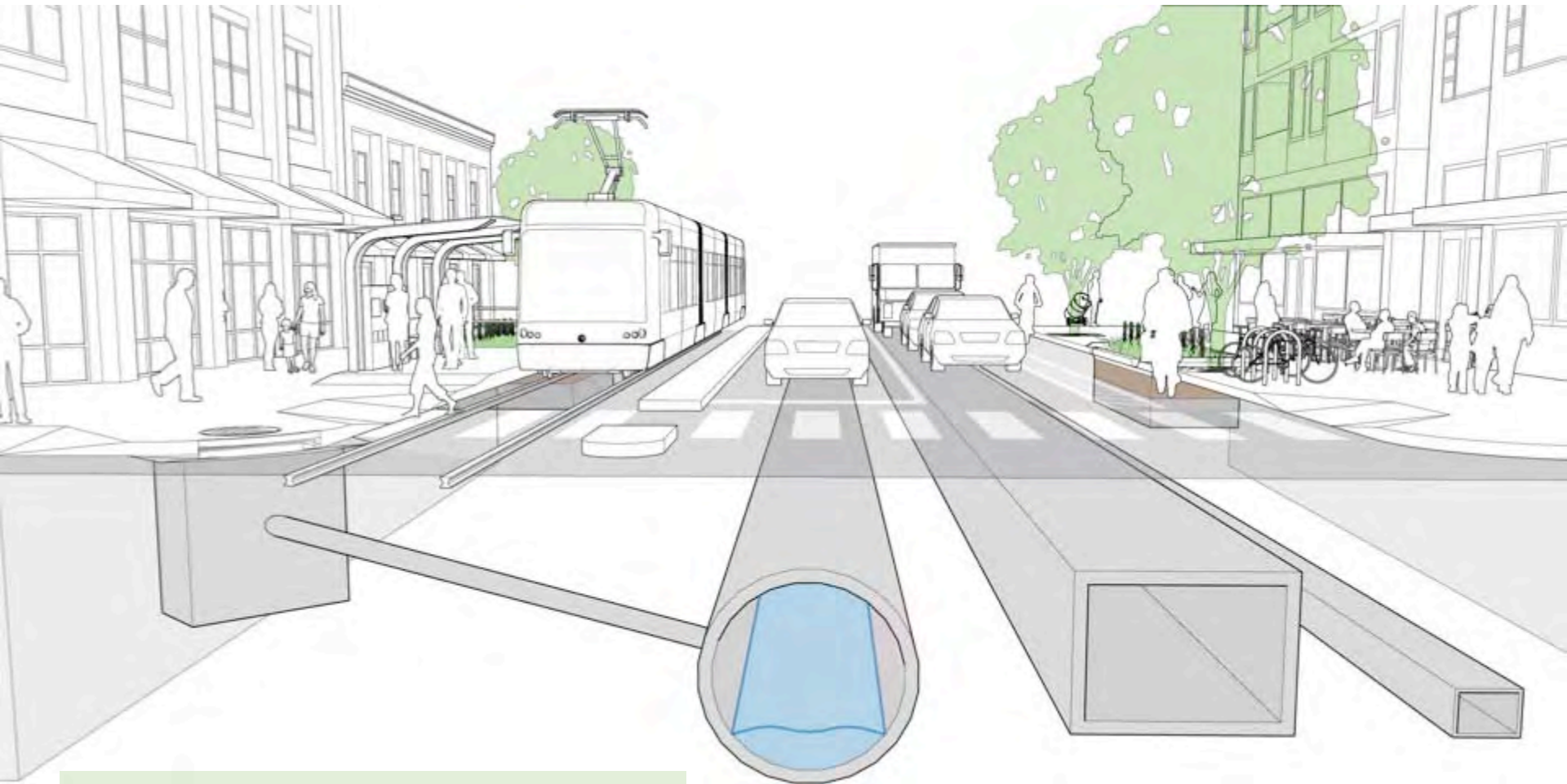


# Who is responsible for the street?

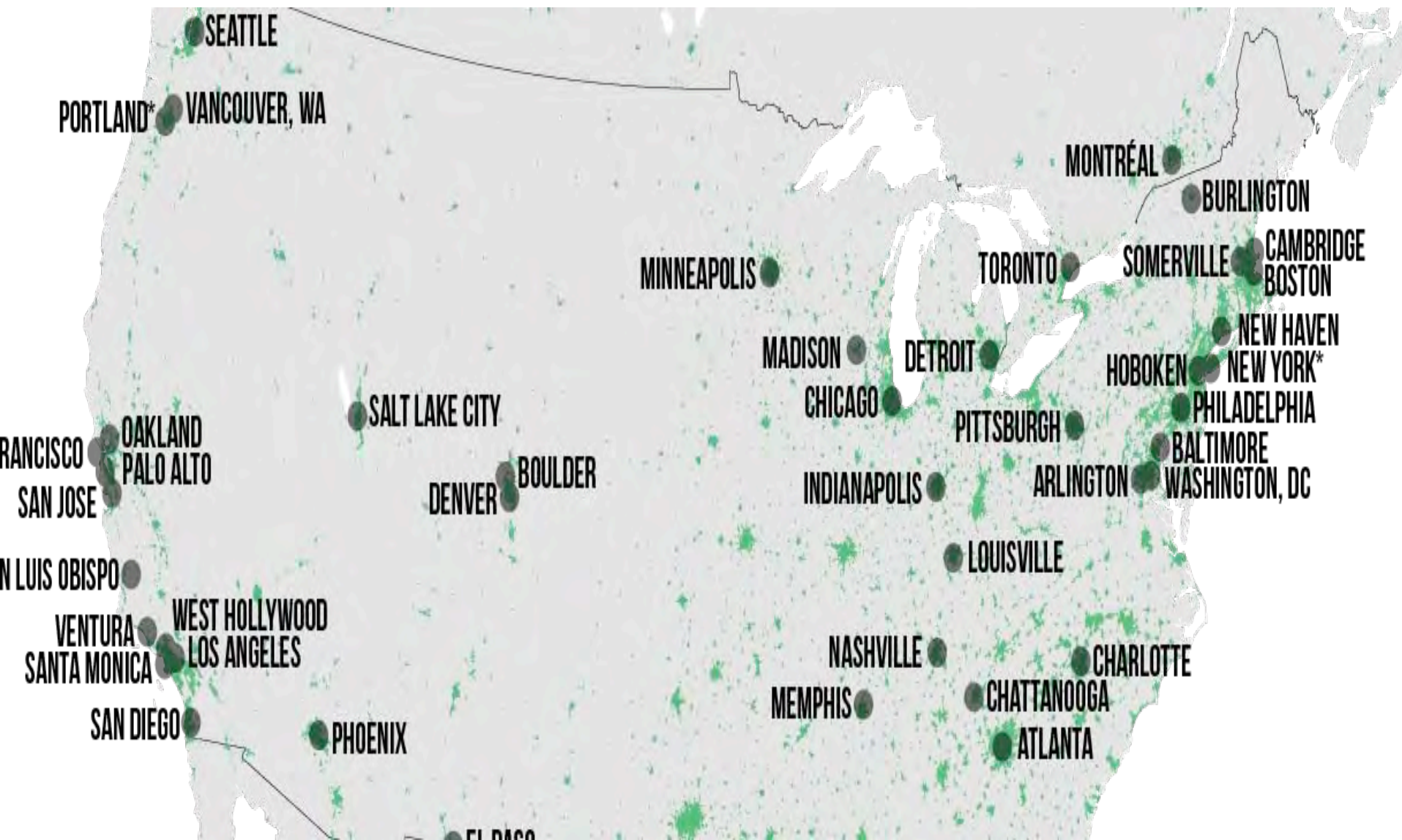
## Transportation Departments



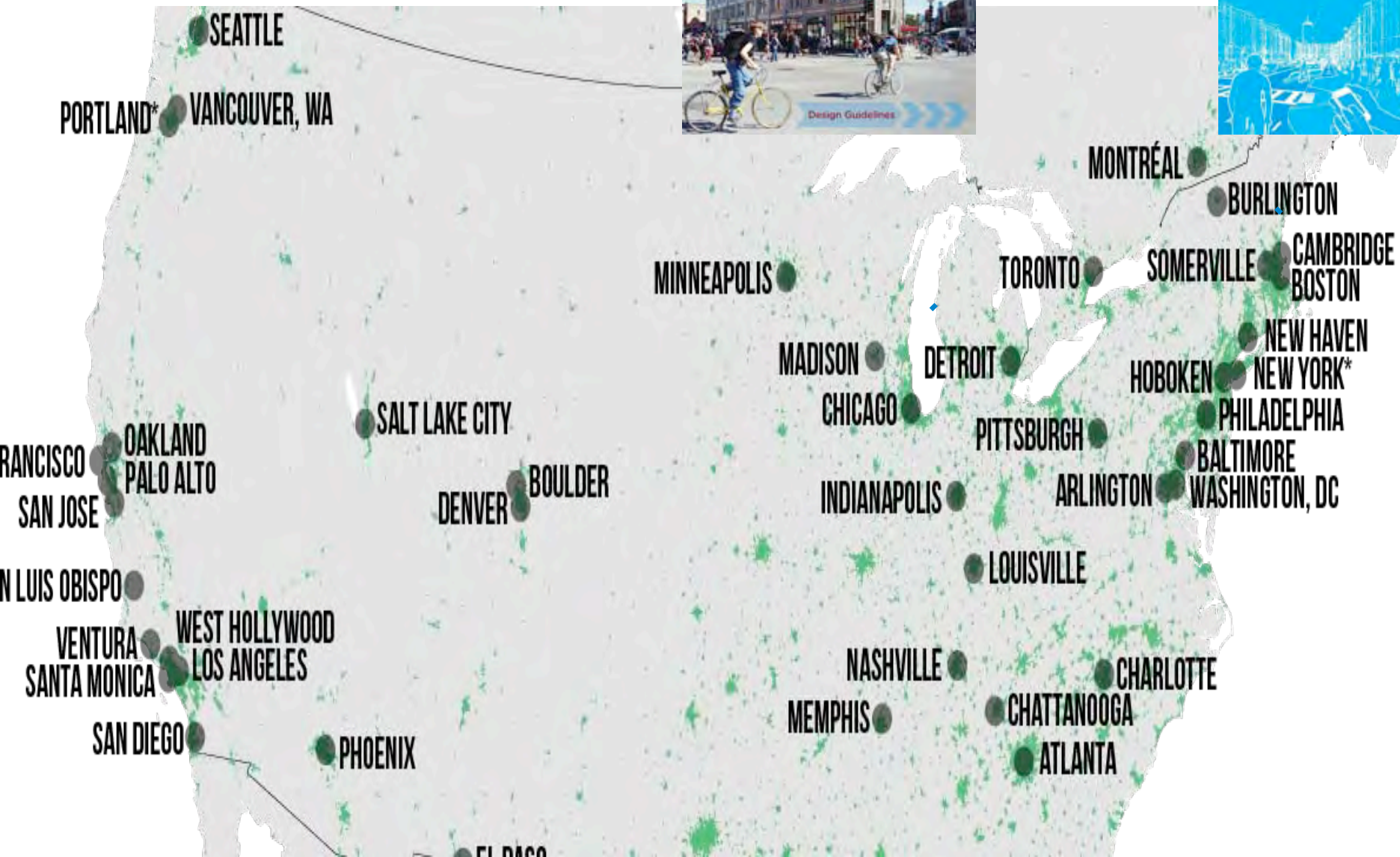
# Who is responsible for the street?

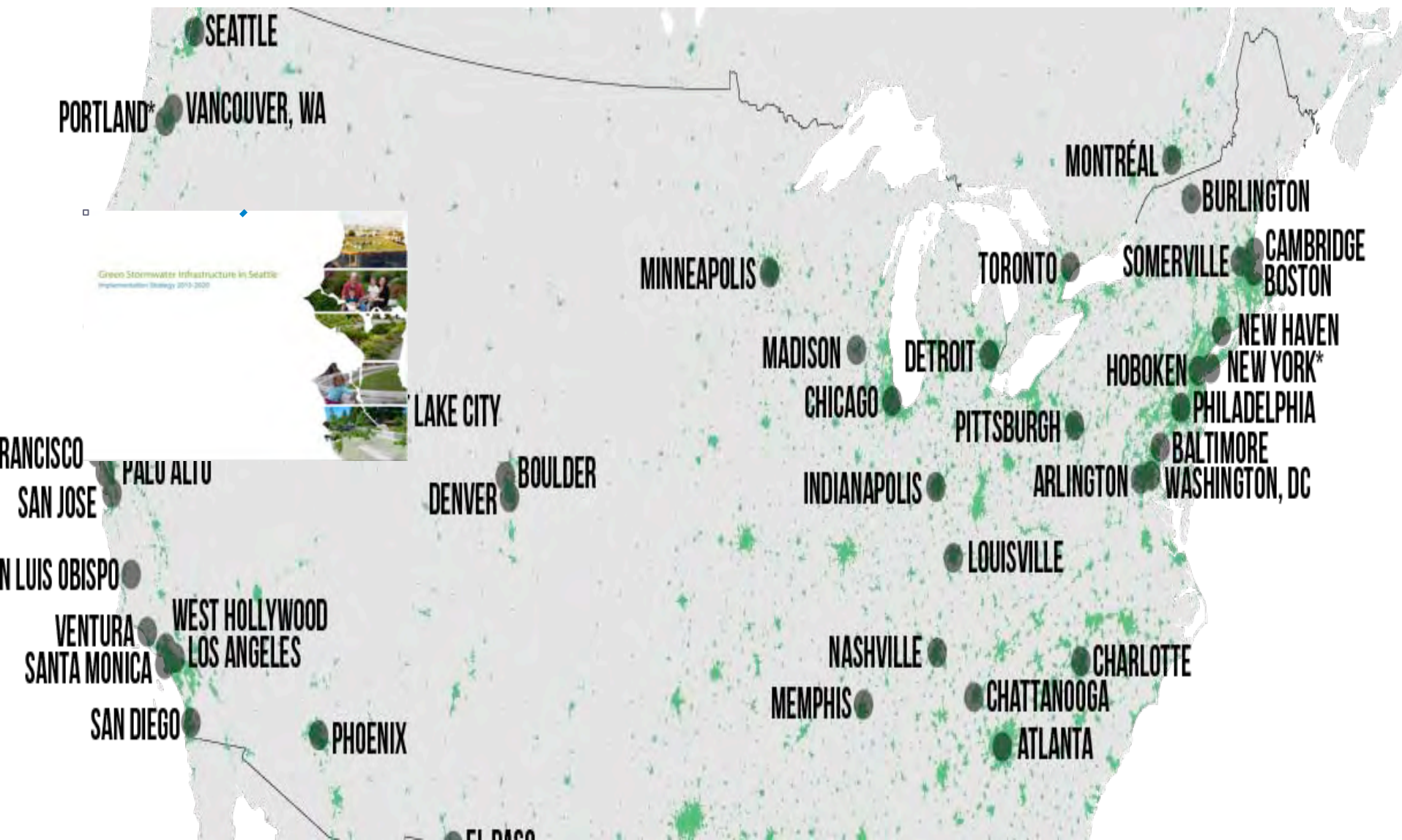


**Water & Sewer Agencies**

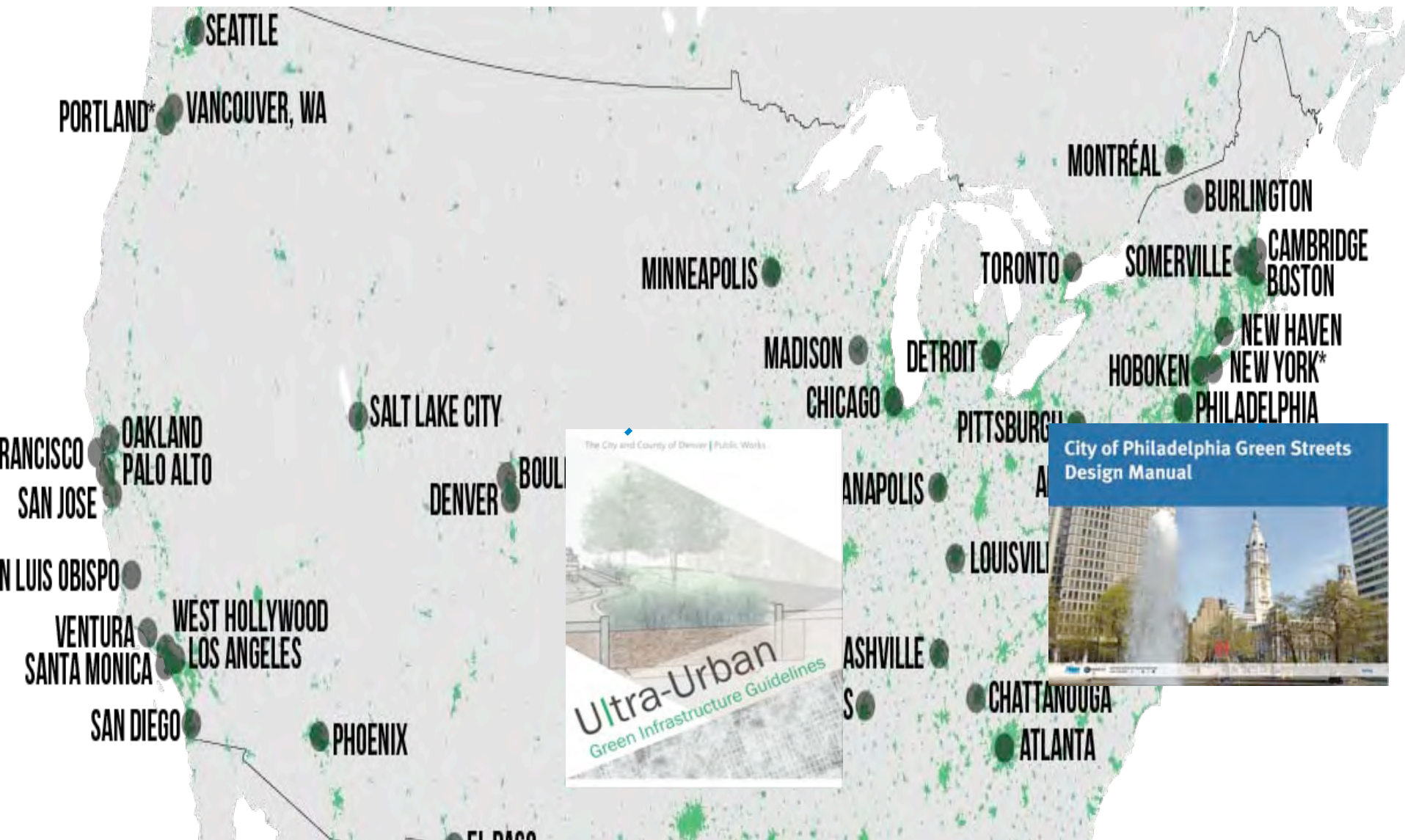






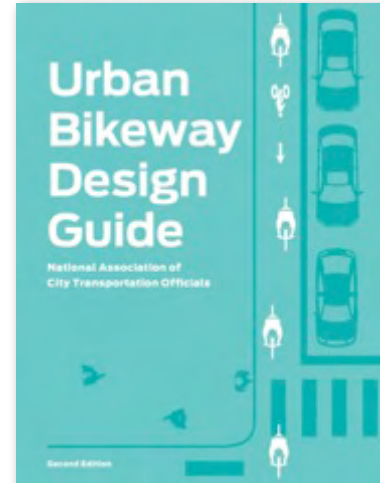




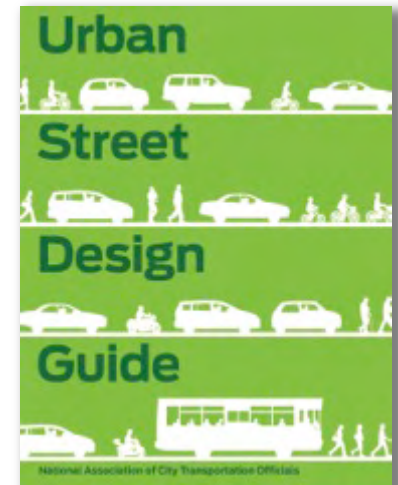




# A Permission Slip to Innovate



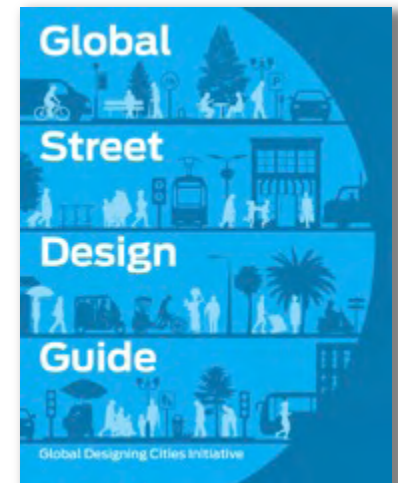
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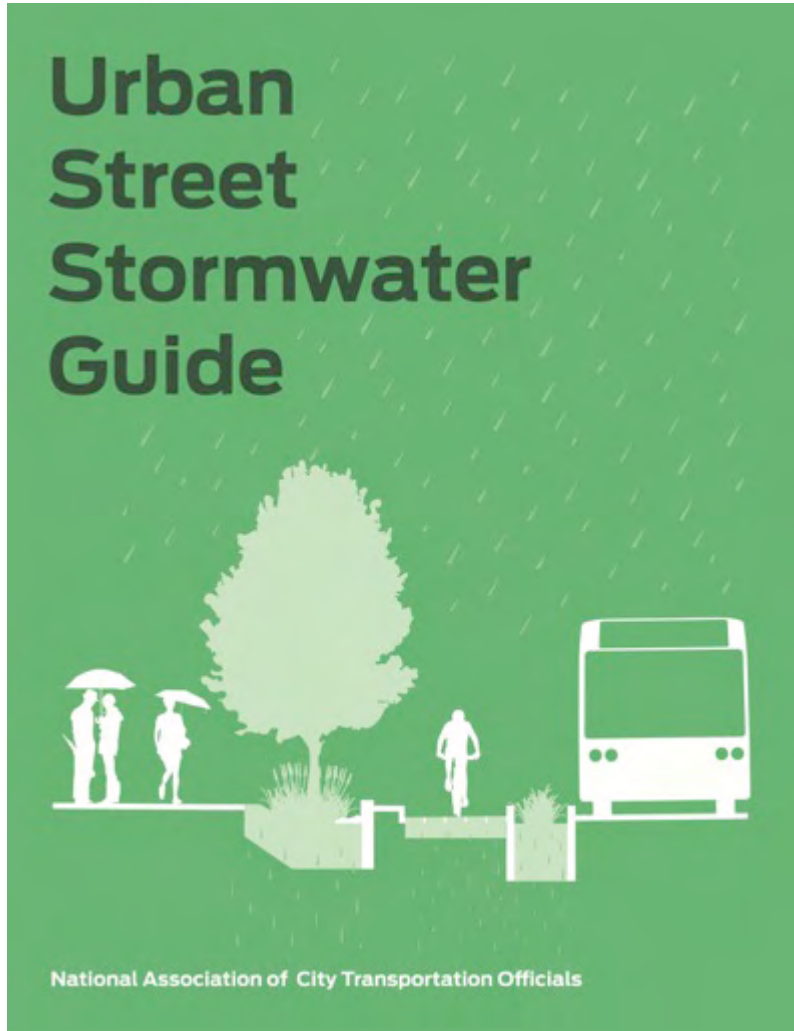


*Spring 2016*

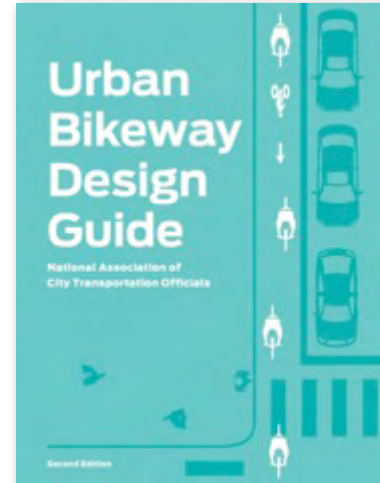


*Fall 2016*

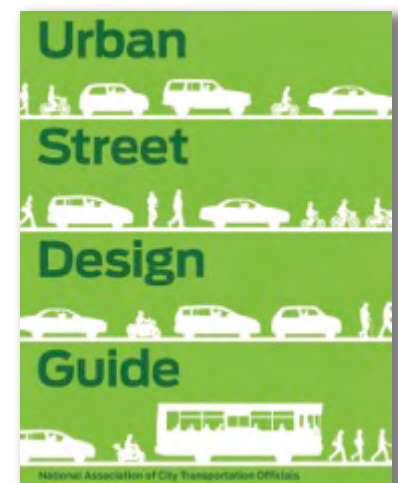
# A Vocabulary to Collaborate



*Summer 2017*



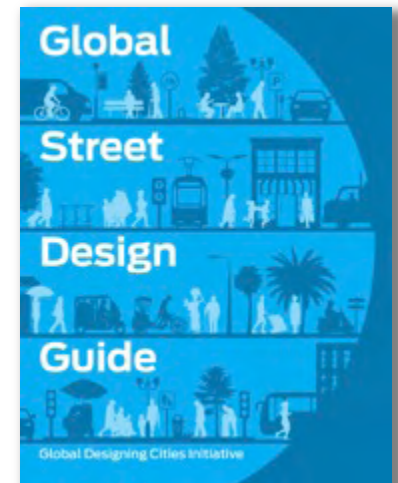
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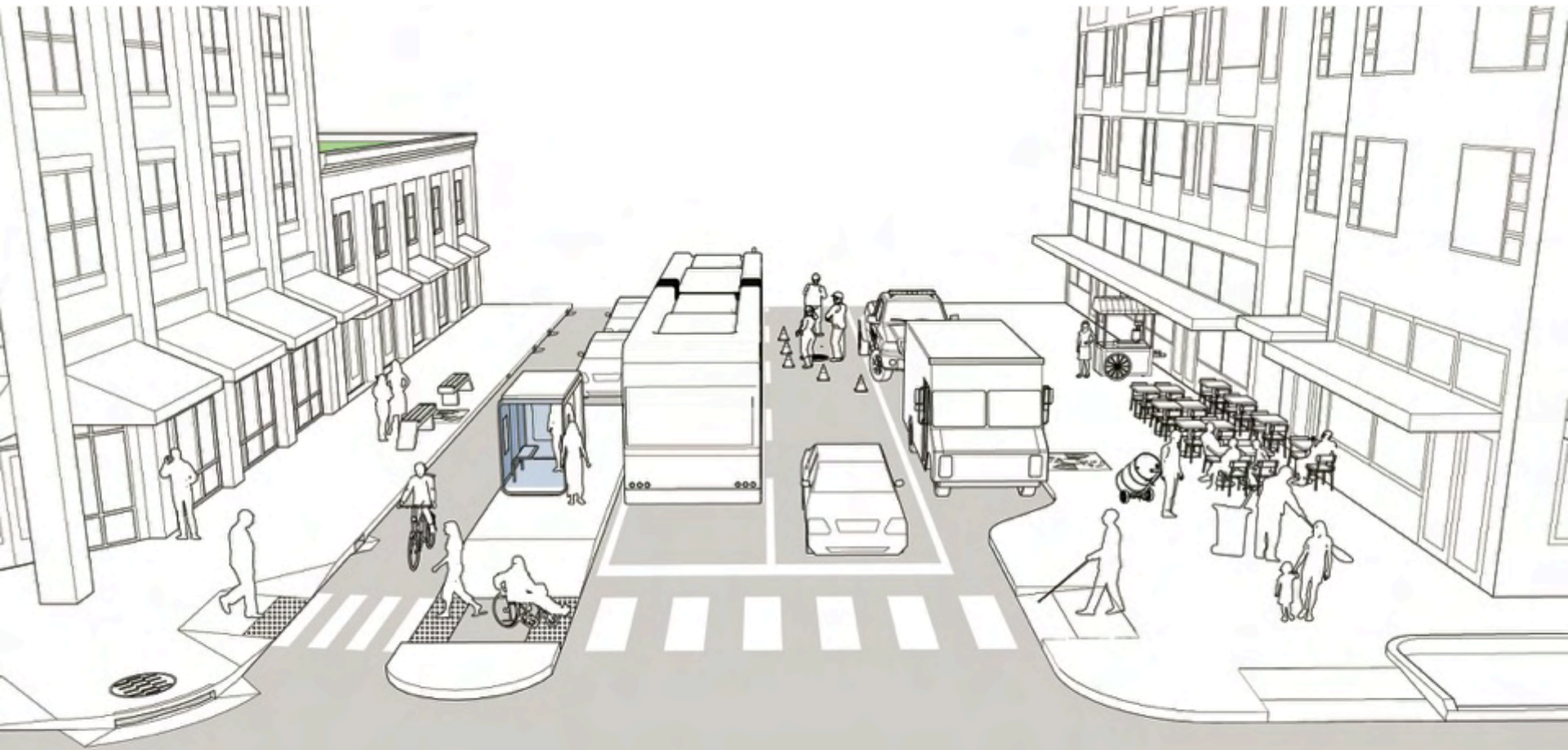
*Spring 2016*



*Fall 2016*



# Complete Streets ...



... are Green Streets





# Integrating green infrastructure ...

# Integrating green infrastructure ...



Apply at Many  
Scales



# Integrating green infrastructure ...



Apply at Many  
Scales



Align with  
Complementary  
Efforts

# Integrating green infrastructure ...



Apply at Many  
Scales



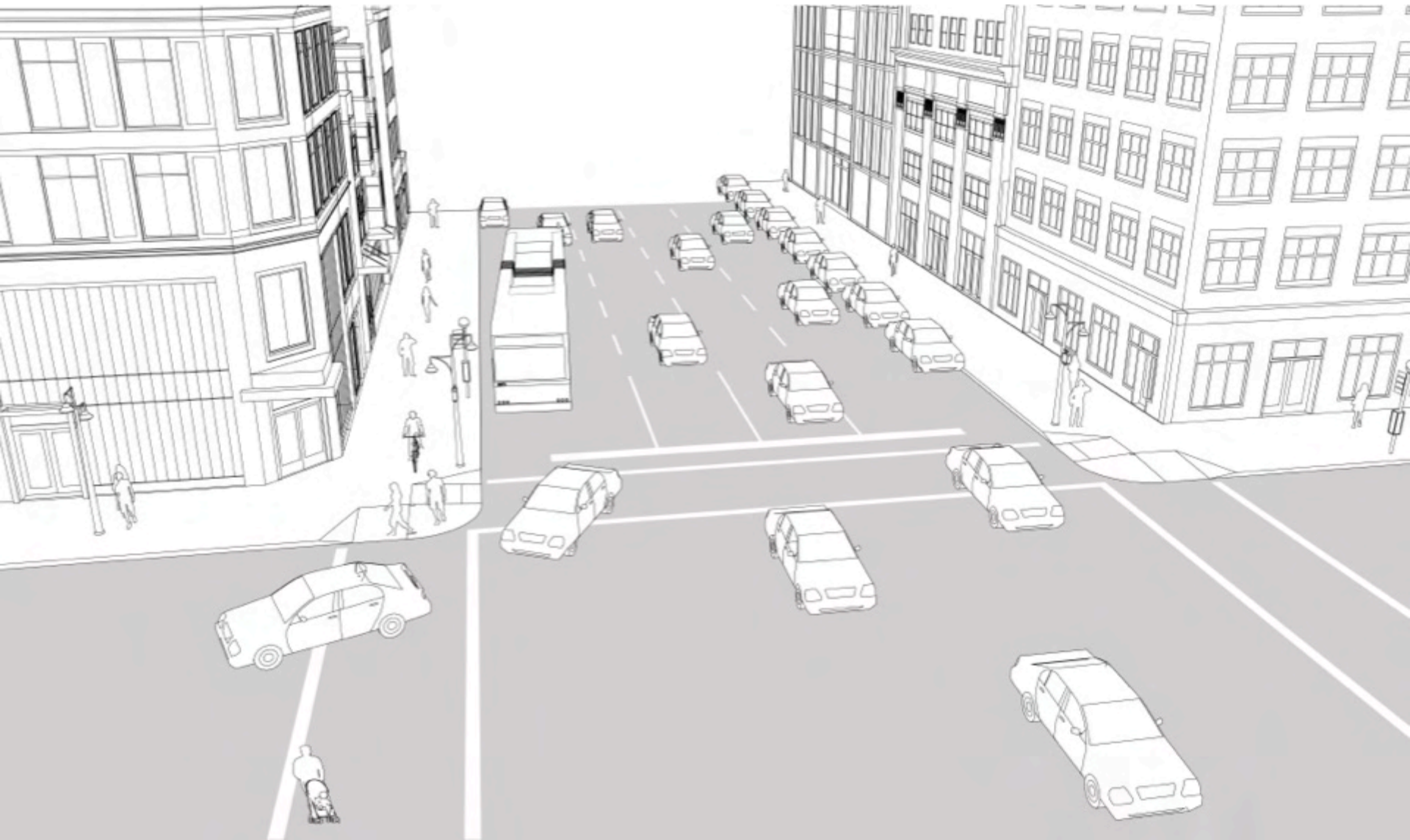
Align with  
Complementary  
Efforts



Create Safe &  
Inviting Human  
Environments



# Integrate Stormwater into Retrofits



# Integrate Stormwater into Retrofits





# Oak & Fell Streets, San Francisco



GSI is managing  
**90%** of storm-  
water runoff

**98%** of people  
bicycling feel safer

# Oak & Fell Streets, San Francisco



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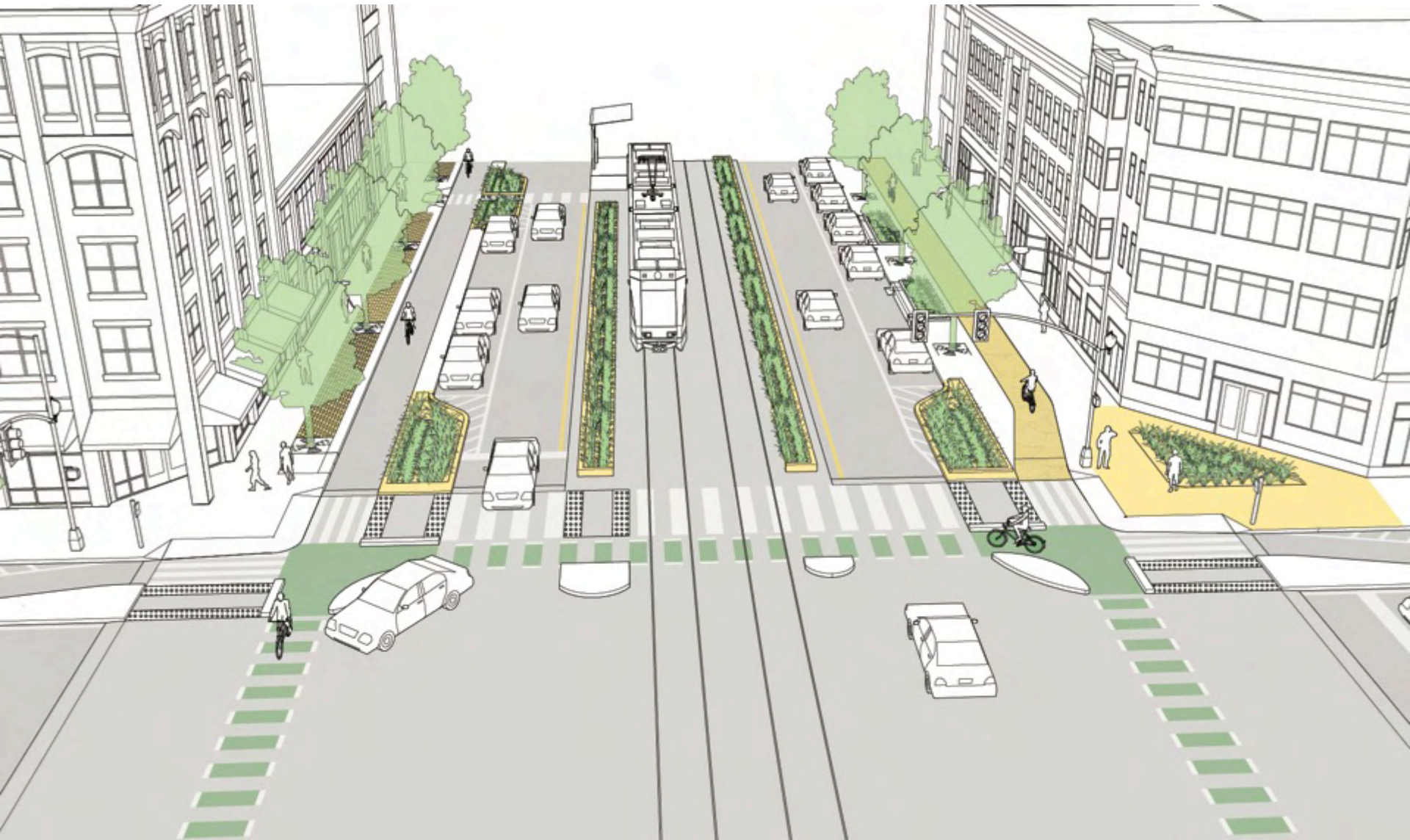
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# Seek Opportunities to Do More



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# Green Line, St. Paul/Minneapolis



**1 million riders**  
each month

**1,000 trees**  
planted

GSI is managing **50%**  
of stormwater runoff

**\$3 billion** in  
commercial/residential  
development



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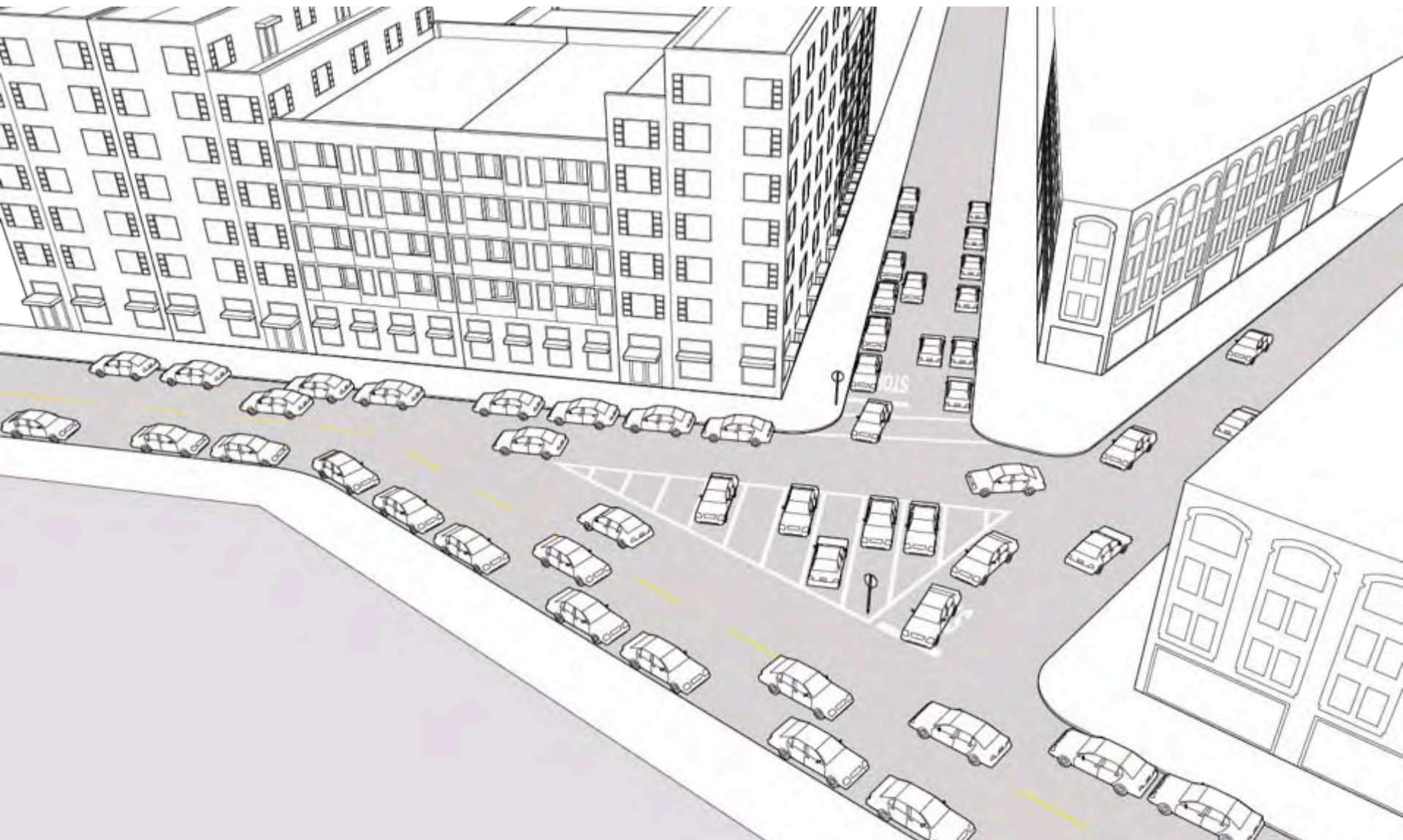
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# Recapture Public Realm



# Recapture Public Realm





# Argyle Street, Chicago



Impervious surface  
reduced **31%**

**89%** stormwater  
diverted

**Businesses**  
**enjoy** improved  
streetscape and  
pedestrian environment



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Aaron Villere  
Program Associate,  
Designing Cities Initiative  
NACTO  
[aaron@nacto.org](mailto:aaron@nacto.org)



# Jessica Noon

Green Infrastructure Program Manager  
@PhillyH2O



# GREEN CITY, CLEAN WATERS

## Philadelphia's Green Streets Program

July 10, 2017

**PHILADELPHIA**  
**WATER**  
— EST. 1801 —



**GREEN CITY CLEAN WATERS:**  
Philadelphia's Green Approach to Stormwater Management



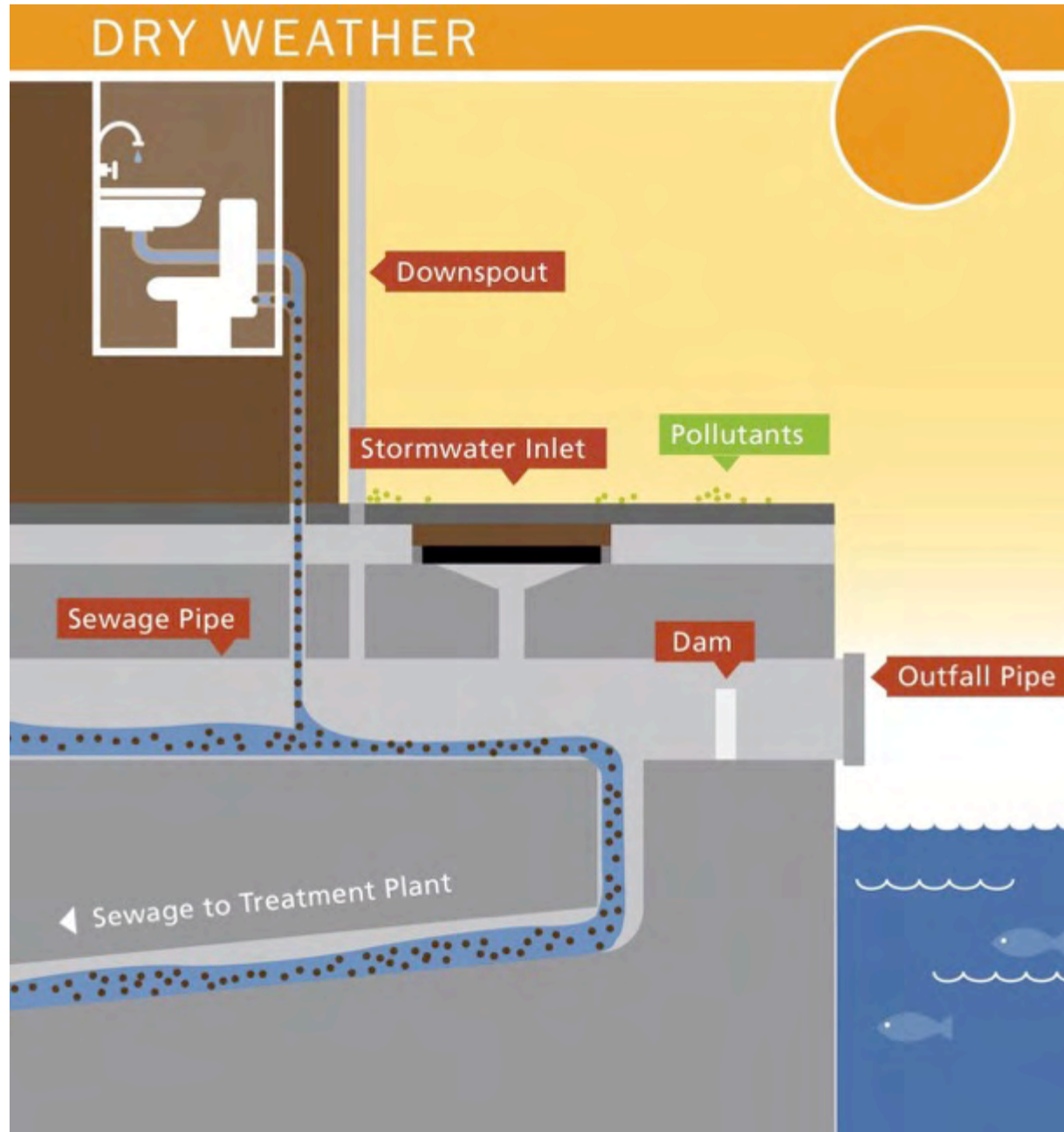
**GREEN STREETS PARTNERSHIPS**  
Philadelphia's Collaborative Green Streets Effort



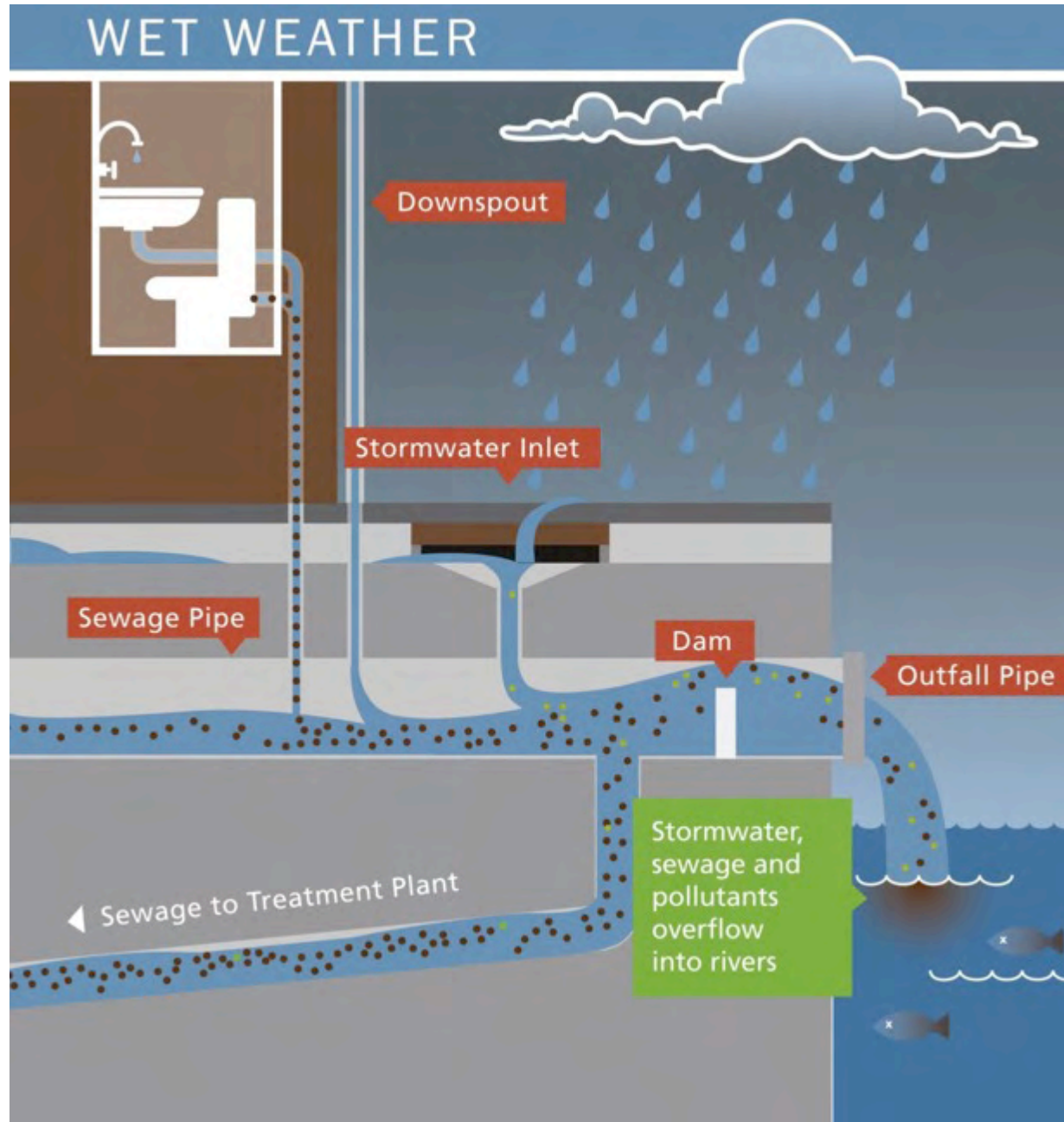
**GREEN STREETS PROJECTS**  
Retrofits, Greenways and Street Reconstruction



# HOW COMBINED SEWER SYSTEMS WORK...AND SOMETIMES DON'T



# HOW COMBINED SEWER SYSTEMS WORK...AND SOMETIMES DON'T







**\$9 Billion Tank  
and Tunnel**

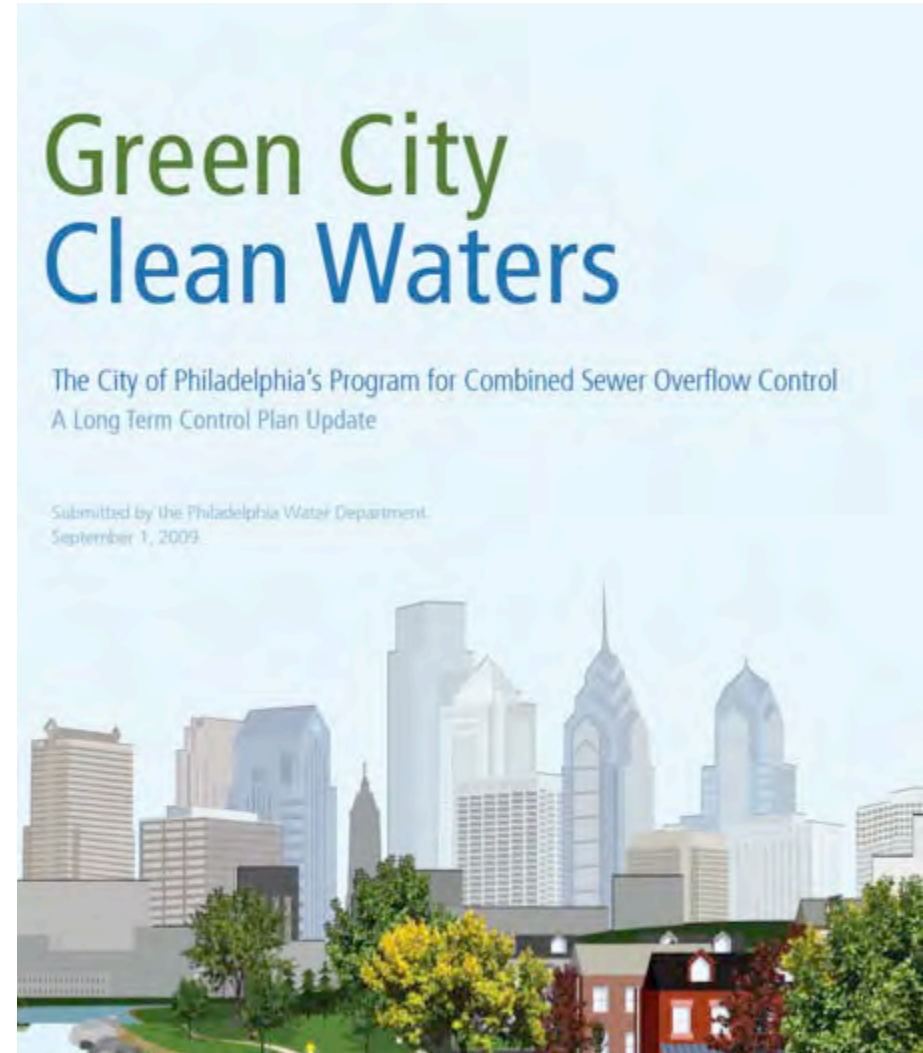


**\$2.4 Billion Green Approach**

## 2009 Long Term Control Plan Update

### 2011 Consent Order & Agreement

- Clean Water Act – EPA
- Combined Sewer Overflow Act - PA Department of Env Protection
- Reduce Combined Sewer Overflow pollution by 85%
- 25 year program, \$3 billion
- Manage stormwater from 34% of impervious surface citywide
- Enact stormwater management regulations on new development
- Recalculate stormwater fees to be based upon amount of impervious surface per parcel





PHILADELPHIA'S FIRST 5 YEARS

137 PROJECT PACKAGES

PWD PROJECTS: STREETS, PARKS, VACANT LOTS

266 PROJECTS

REGULATED PROJECTS

38 PROJECTS

GRANT-FUNDED PROJECTS

837 GREENED ACRES

GREEN CITY, CLEAN WATERS





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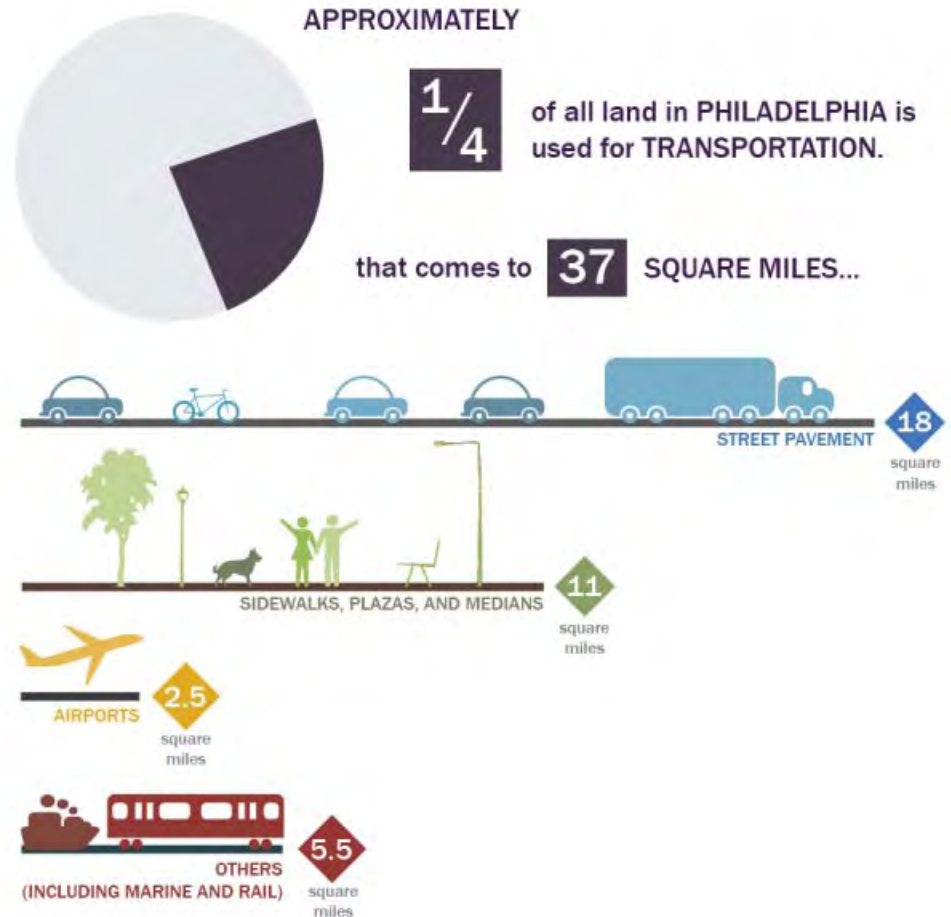
GREEN CITY, CLEAN WATERS

## Green Streets Committee:

- Streets Department
- Commerce Department
- SEPTA (transit)
- Mayor's Office of Transportation (pedestrian/bicycle amenities)
- Planning Commission

## Focus:

- Design Standards
- Maintenance MOU
- Pilot Technologies
- Partnership Opportunities
- Joint Grant Applications



# City of Philadelphia Green Streets Design Manual

[phillywatersheds.org/GSDM](http://phillywatersheds.org/GSDM)



**GREEN STREETS PARTNERSHIP**

**PHILADELPHIA  
WATER**  
EST. 1801





# 1,045 Tree Trenches, 317 Stormwater Planters 283 Bumpouts, 12 Porous Streets











# Passayunk Avenue Lane Removal

PennDOT / Federal Transportation Funds (20% for drainage systems)  
Streets, PennDOT





# SEPTA Bus Depot

SEPTA



**GREEN STREETS PROJECTS**



# Batram's Mile Greenway

Philadelphia Parks and Recreation, Schuylkill River Development Corporation



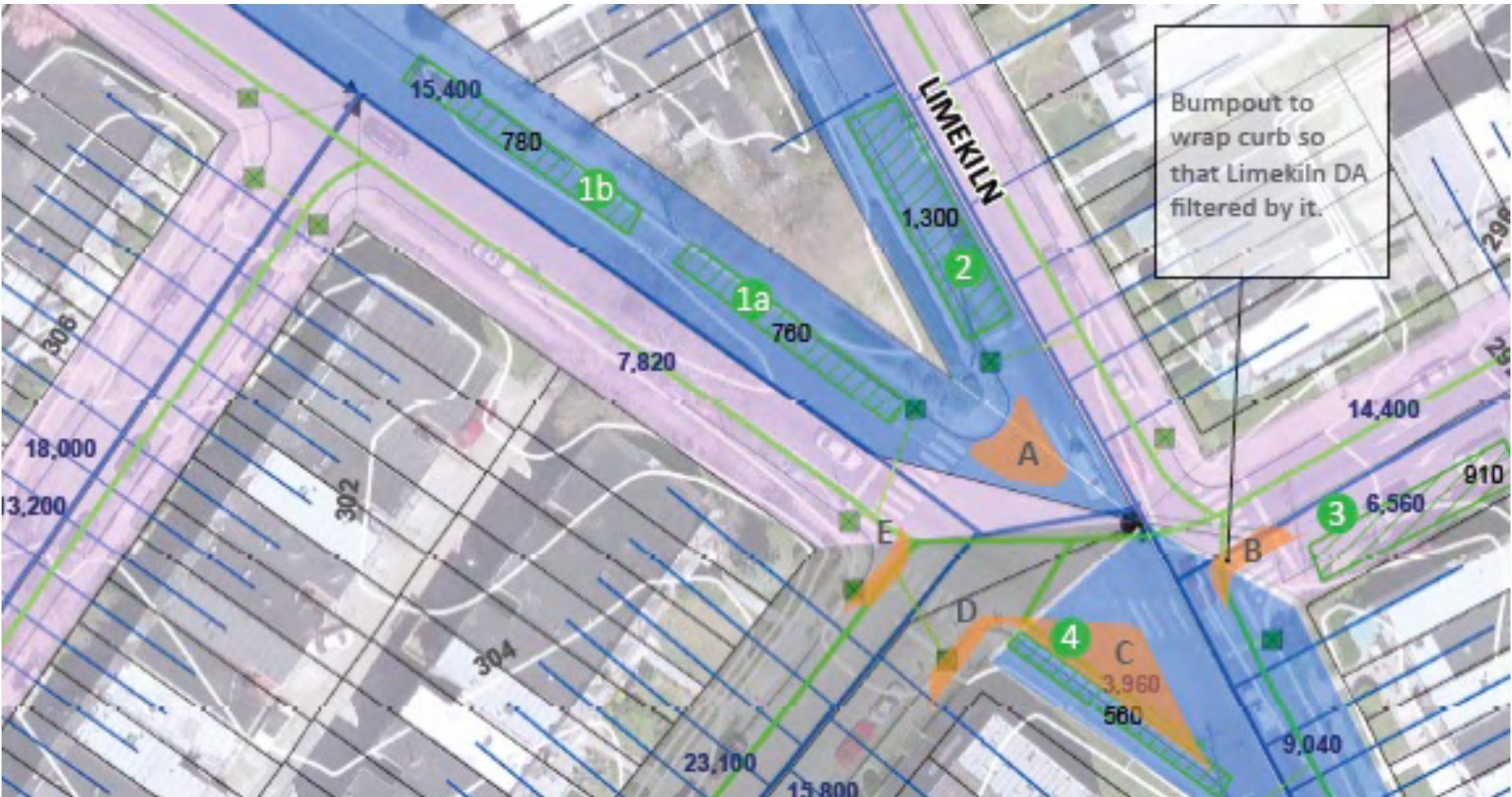
**GREEN STREETS PROJECTS**



# Safe Routes To School : 3 Schools, 12-15 Bumpouts

\$1 million Congressional Earmark Funds

Streets, School District





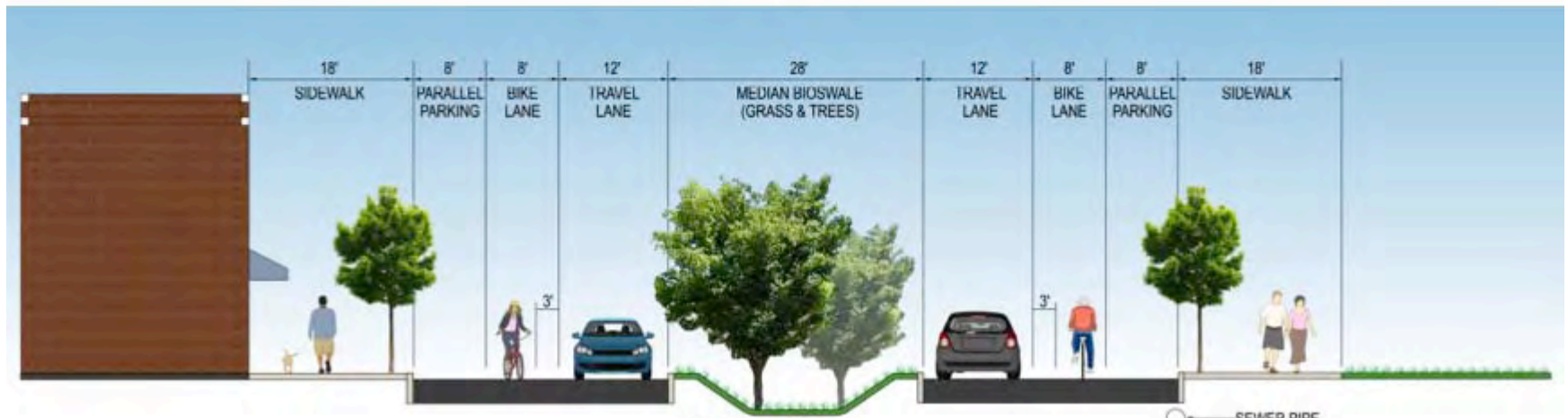
# American Street: 2 miles, 30+ Greened Acres

\$5 million TIGER Grant, \$11 Federal Transportation Funds

Streets, Commerce, PennDOT, Planning Commission



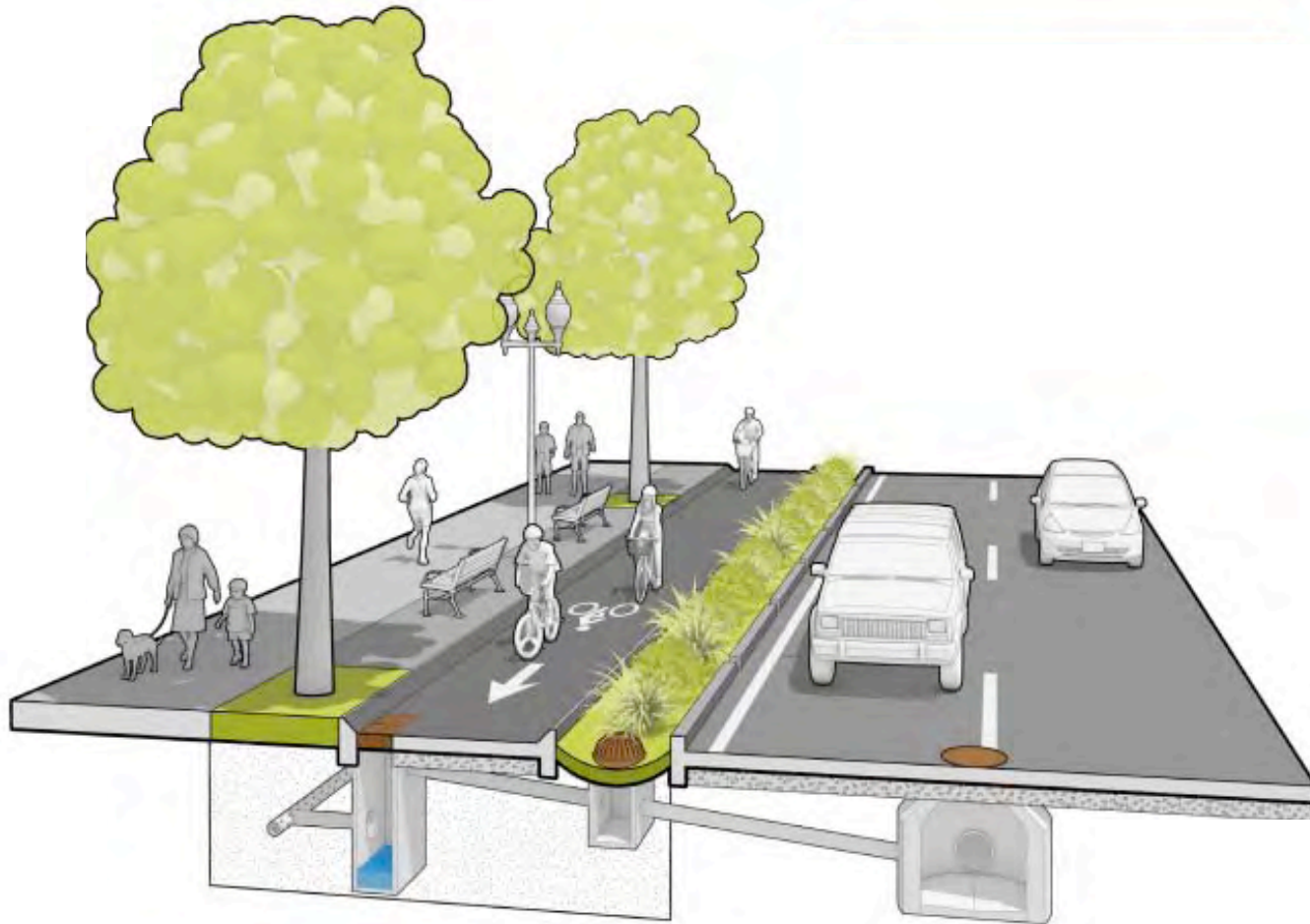
Plan View



SEWER PIPE

# What's Next:

- Green Stormwater Infrastructure for Separated Bike Lanes
- Funding for Developers to Construct Green Streets





Jessica Noon, AICP, LEED AP  
Green Stormwater Infrastructure  
Partnerships  
[jessica.noon@phila.gov](mailto:jessica.noon@phila.gov)  
215-685-6035



**PHILADELPHIA**  
**WATER**  
— EST. 1801 —



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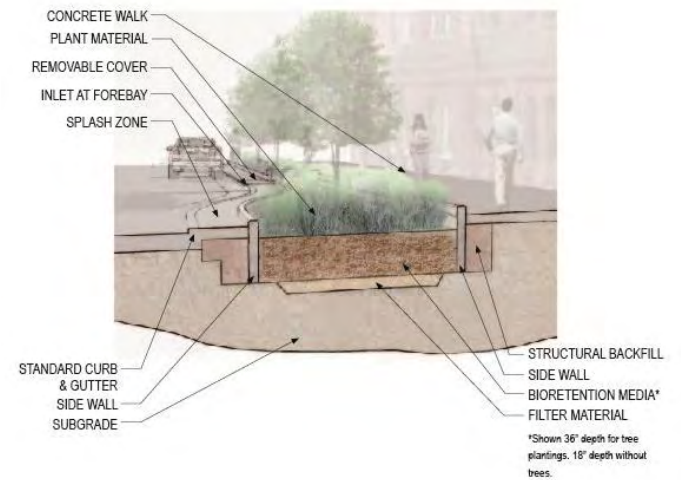
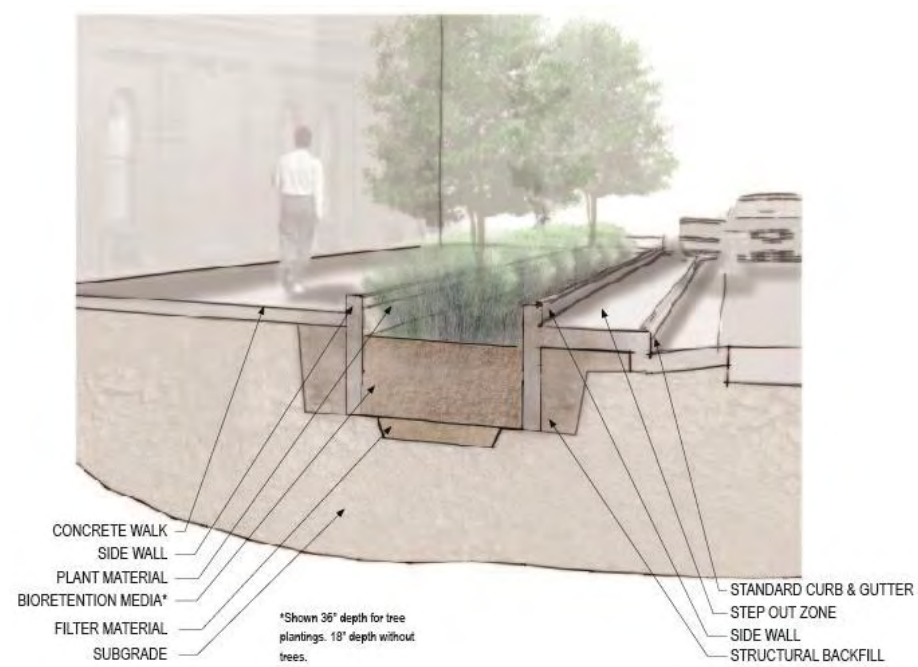
# Sarah E. Anderson

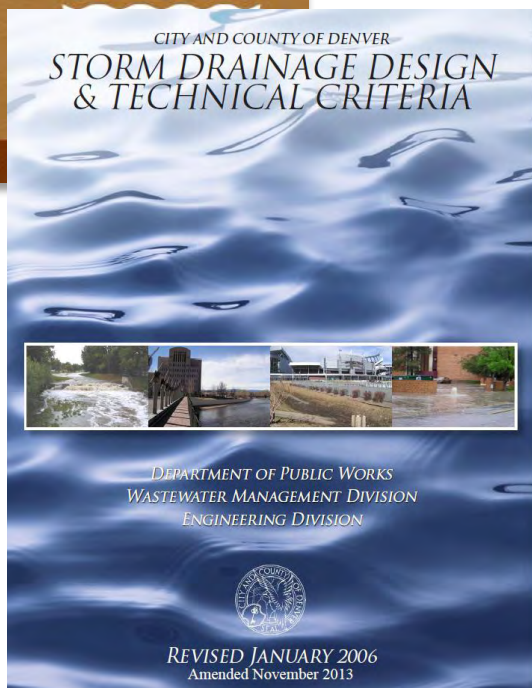
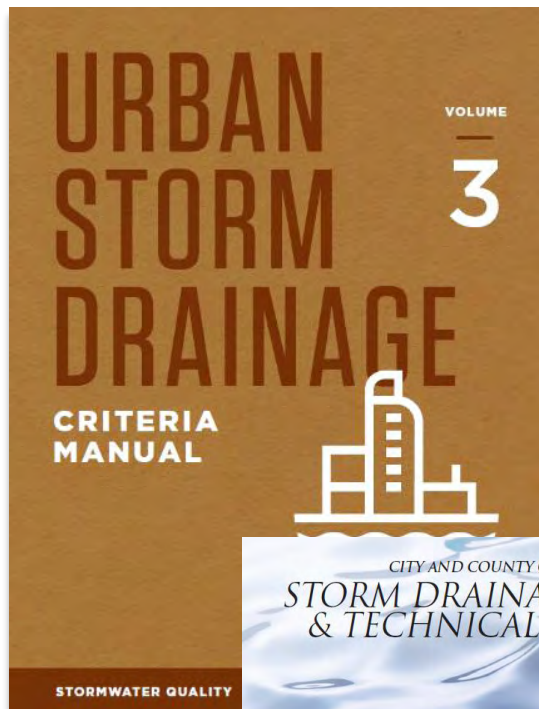
Water Quality Program Manager  
@CityofDenver



# Ultra-Urban

## Green Infrastructure Guidelines

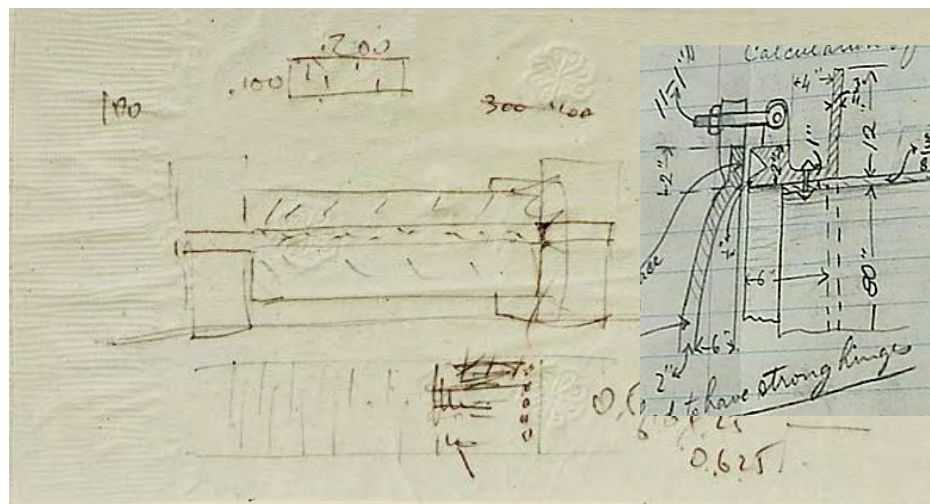




# CDPHE Pilot Program

## Current Standards

## DESKTOP Reviews







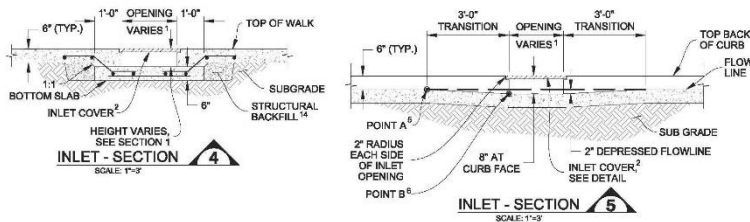
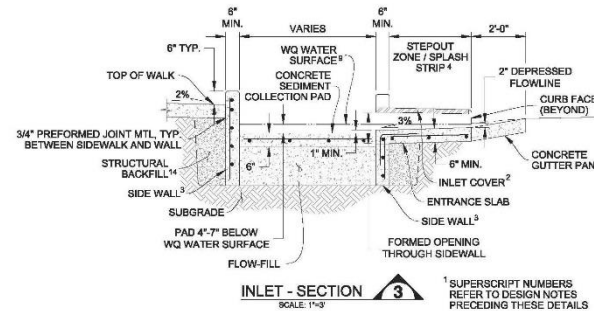
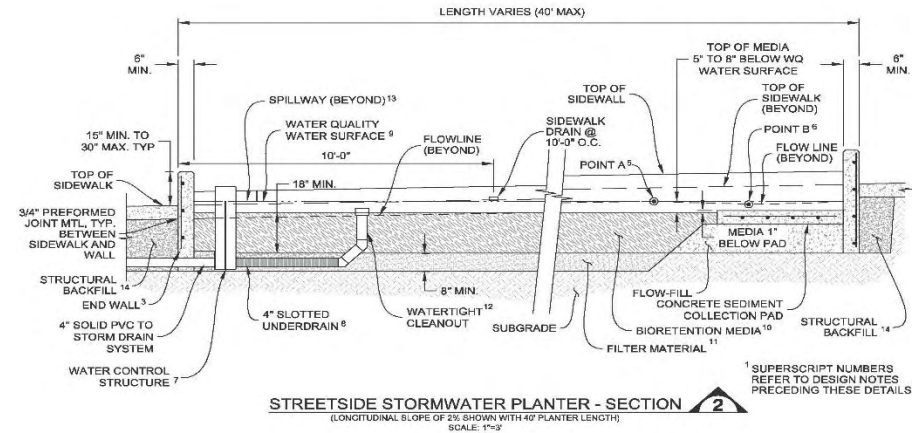
# Safety

Step out zones

Planter wall height

Depth

Access walks



# Maintenance

Inlet Sizing

Pretreatment

Planting schemes

Responsibilities



# CORRIDOR PROJECT

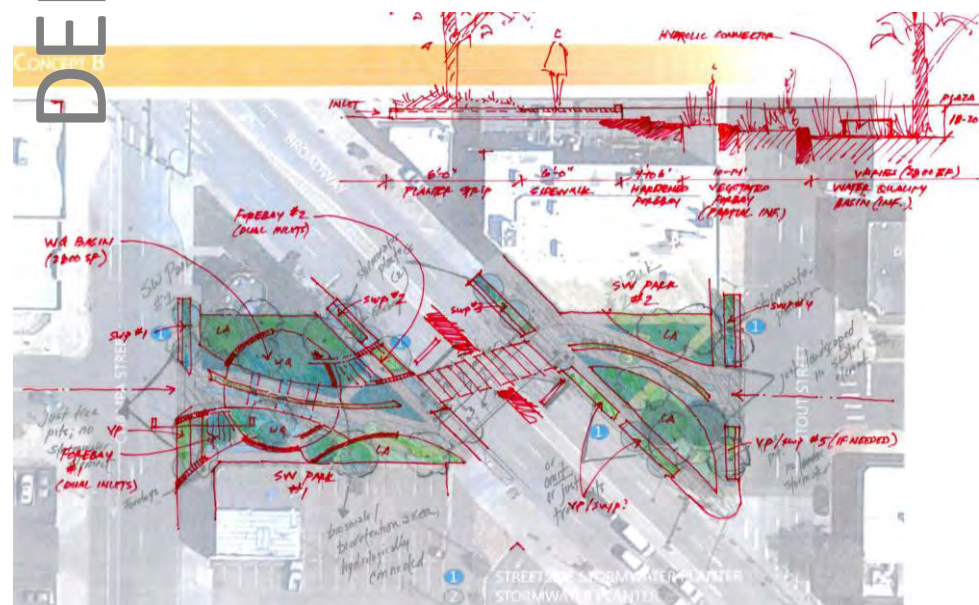
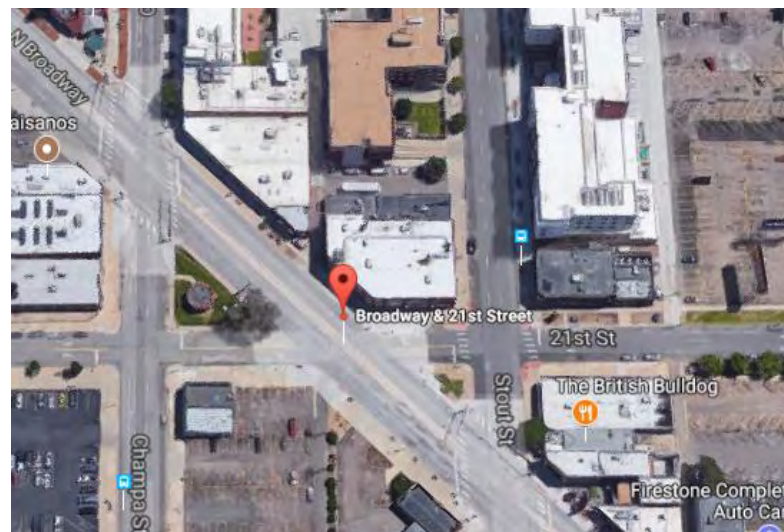
## BRIGHTON BOULEVARD REDEVELOPMENT PROJECT



- 1 Textured warning strip at edge of sidewalk
- 2 Raised Cycle Track
- 3 "Parisian" street tree grove
- 4 Streetside Stormwater Planter (SSP) treats runoff from street
- 5 Native grasses and perennials in SSP
- 6 Gabion scot wall

# DEMONSTRATION

## 21<sup>st</sup> & Broadway





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**National Complete  
Streets Coalition**

# Questions?

Type your questions in  
the ReadyTalk chat box



# Implementation & Equity 201:

The Path Forward to Complete Streets

Our webinar series will return in September

Stay tuned for more information!



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