



# Transforming Gray Space to Green Space:

Integrating Stormwater Management With Urban Design

March 25, 2015



California Stormwater  
Quality Association

Kevin Robert Perry, ASLA

Urban Rain | Design

**Why Retrofit?**

George Kessler  
1900's



*“Very little thought is given to [cities] qualitative characters. But there comes a time when development must be subject to control, when further growth must be planned such that urbanization will no longer proceed at the expense of devastating ‘nature’.”*



**1960's Urbanization**



**1960's Urbanization**



Truth or Cartoon?



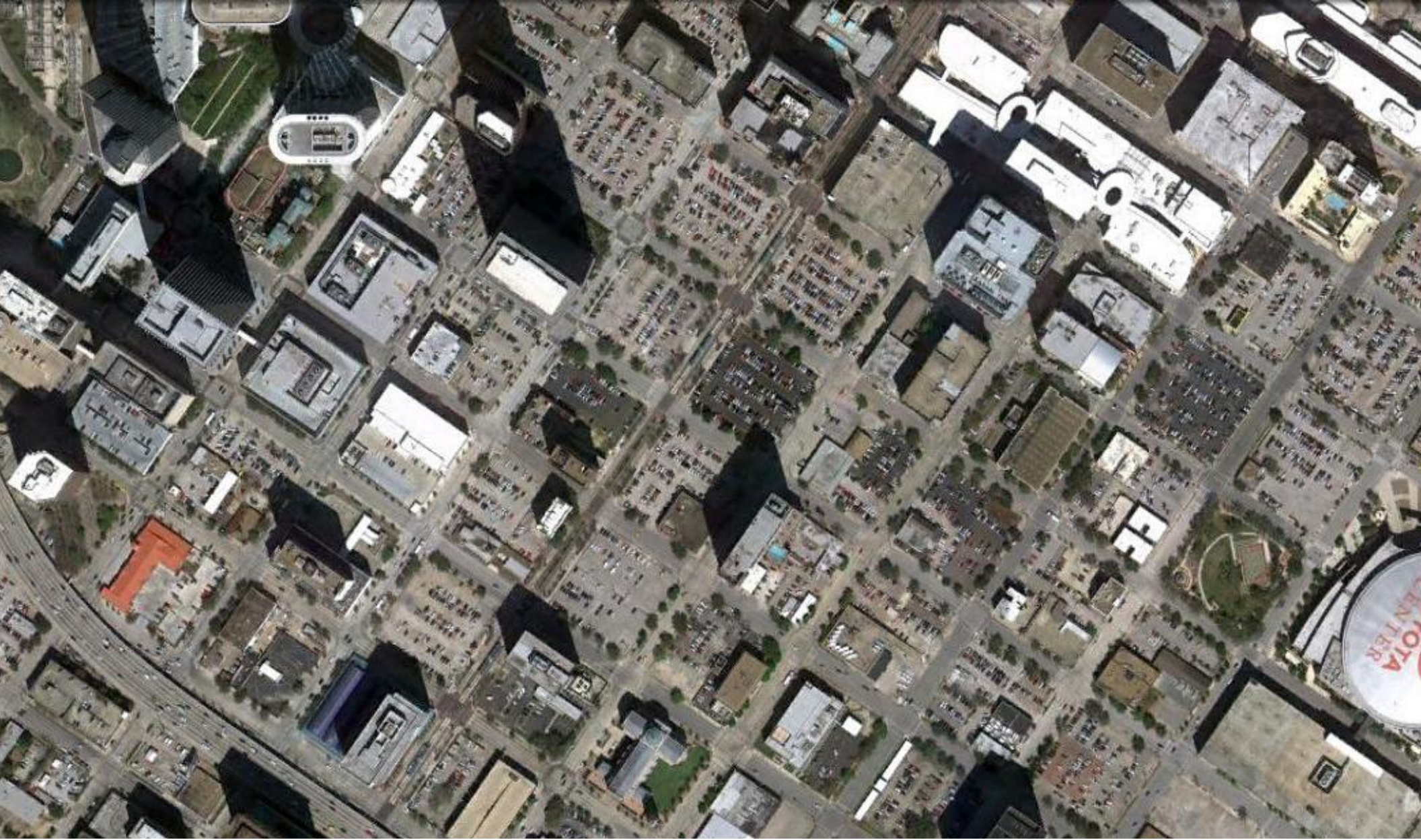
**Urbanization Today**



*Photo: Google Earth*

# Natural Landscape





*Photo: Google Earth*

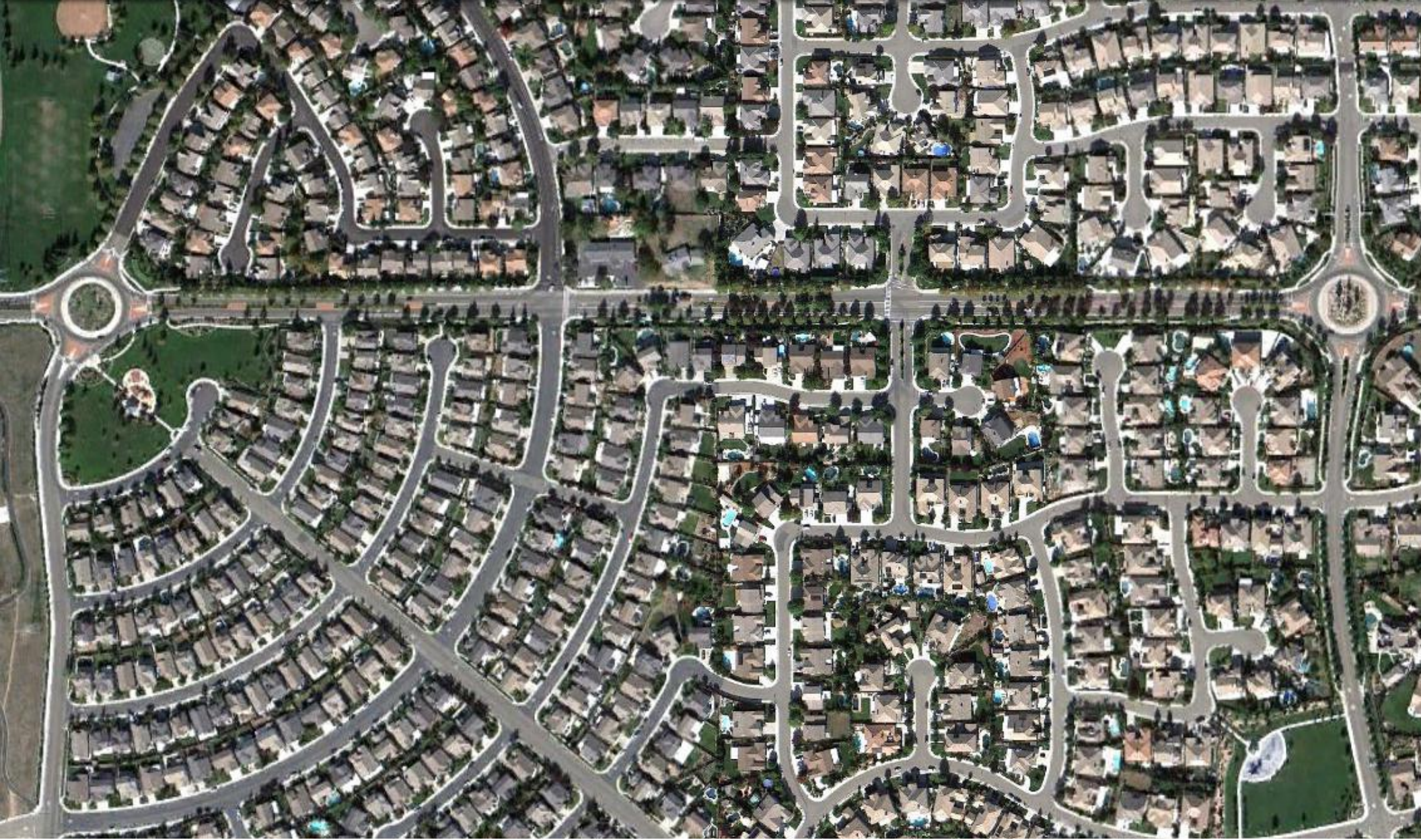
# Urbanization

Houston, Texas



*Photo: Google Earth*

# Natural Landscape



*Photo: Google Earth*

# **Sub-Urbanization**

California



Desert



Redwoods



Riparian



Oaks





**Moving Towards An Unhealthy Watershed**

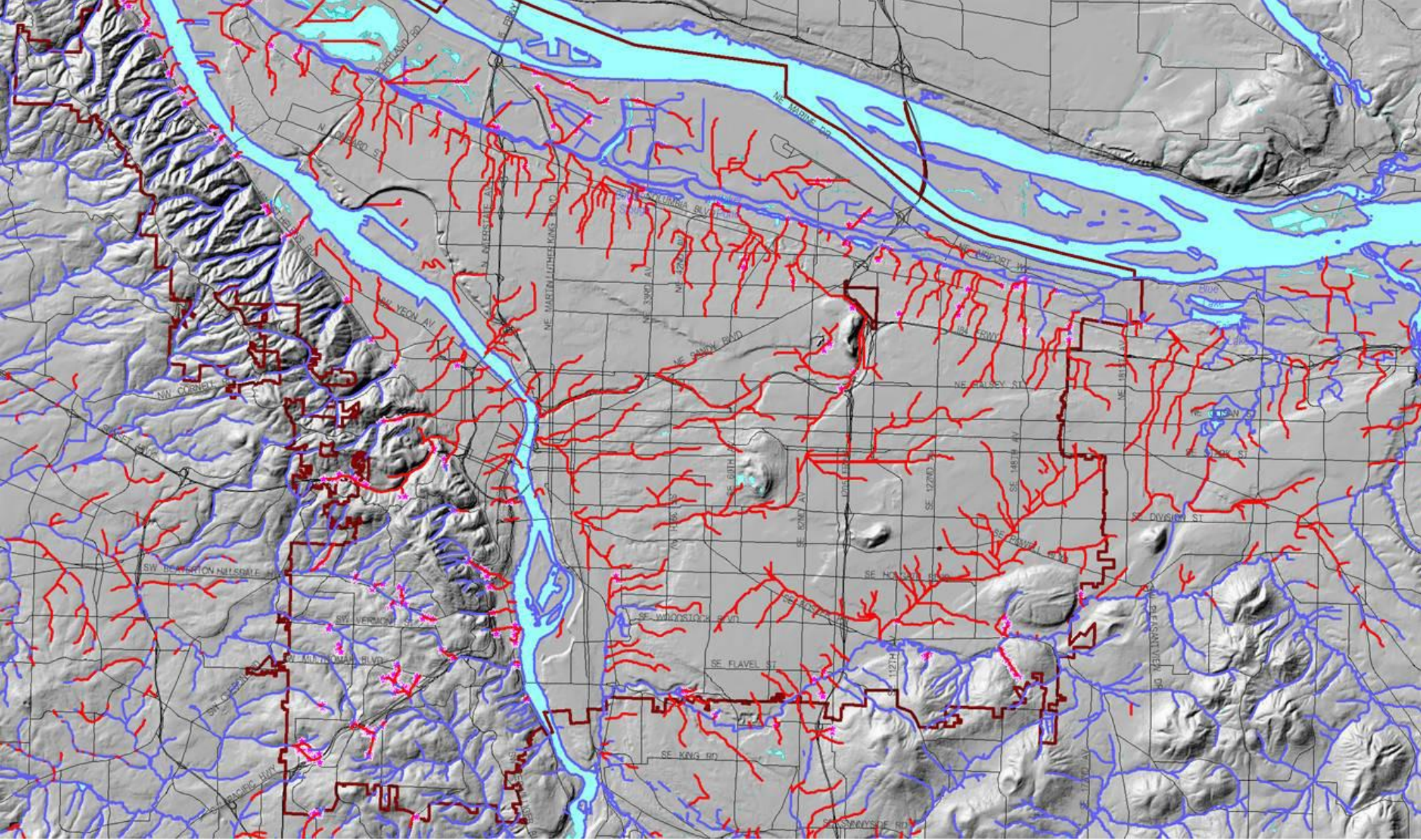
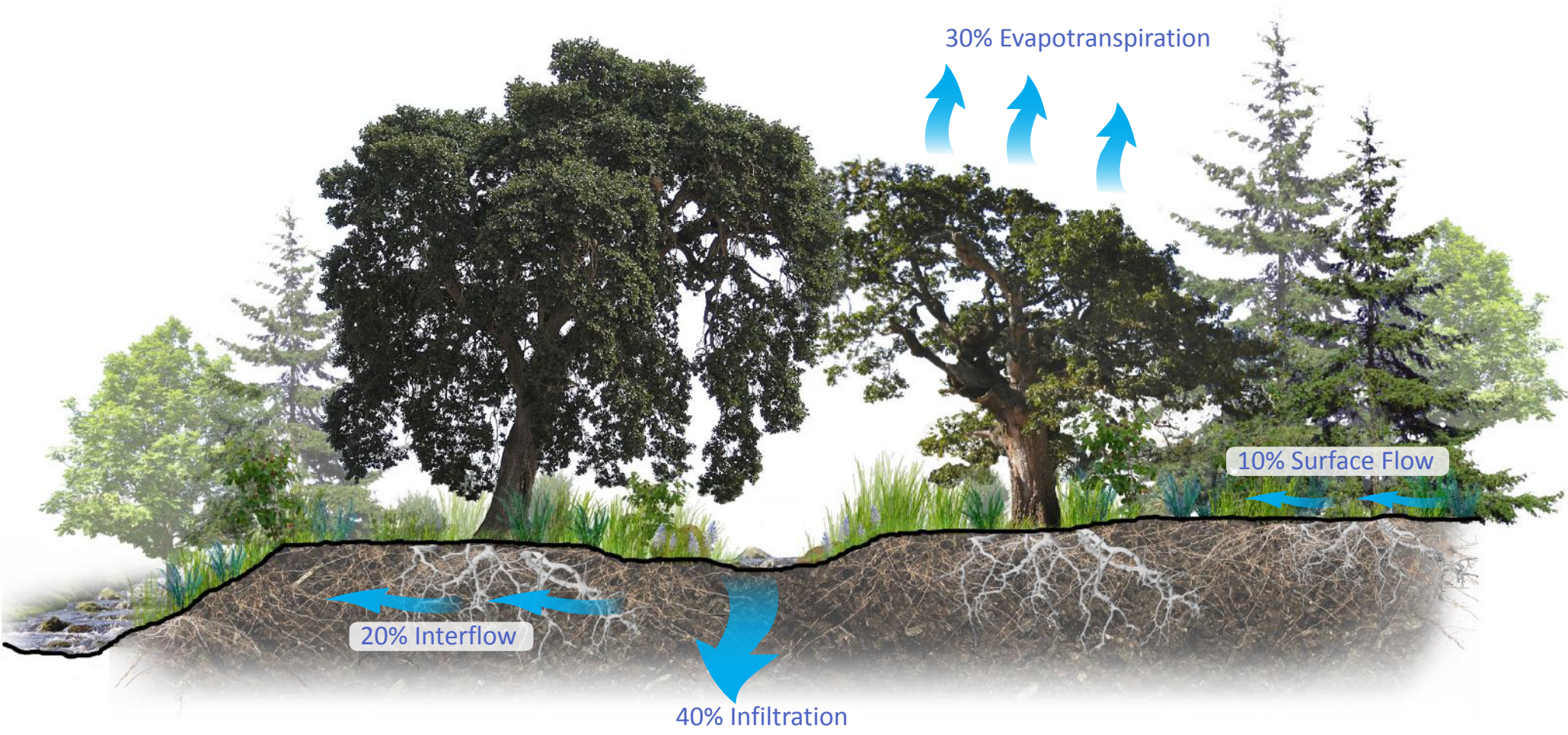


Photo: City of Portland Bureau of Environmental Services

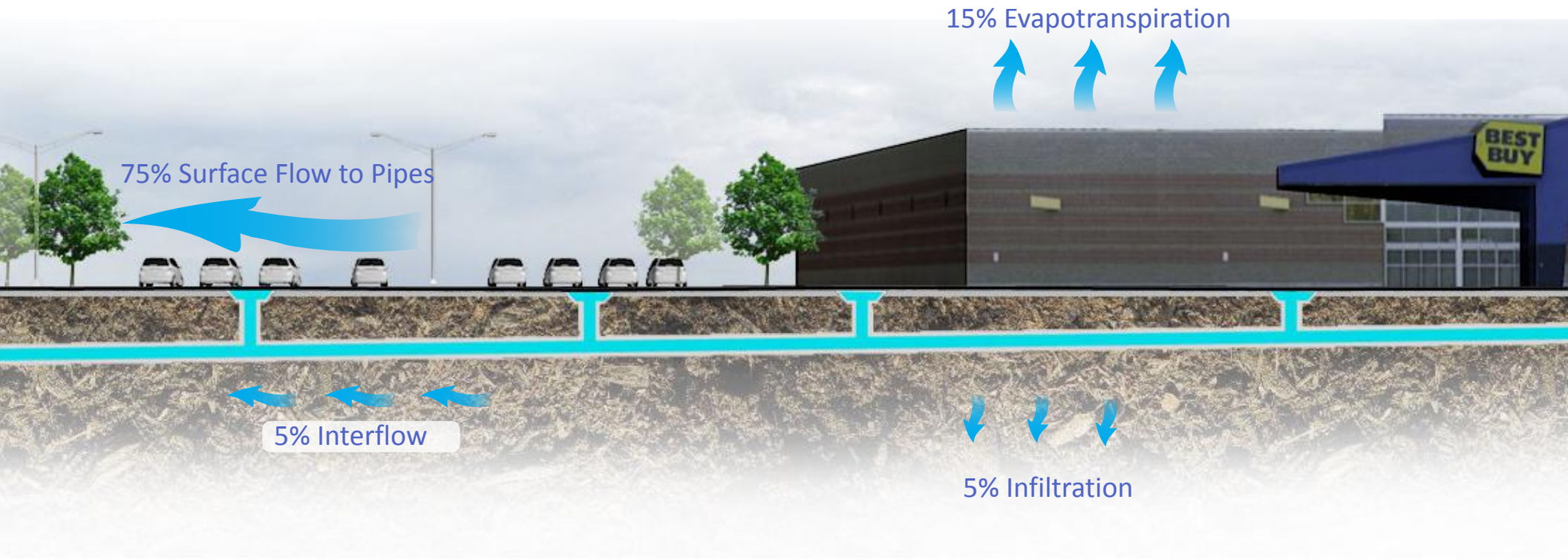
# The **Red** Lines Used To Be Streams



# Pre-Urban Development

The Healthy Landscape





# The Urbanized Landscape

Moving Towards Watershed Destruction



## The Green Infrastructure “Toolbox”

# Retrofit Projects



2003

*Photo: Kevin Robert Perry, City of Portland*

**NE Siskiyou Green Street**  
Portland, Oregon



*Photo: Kevin Robert Perry, City of Portland*

**NE Siskiyou Green Street**  
Portland, Oregon



*Photo: Kevin Robert Perry, City of Portland*

# **NE Siskiyou Green Street**

**Portland, Oregon**



*Photo: Kevin Robert Perry, City of Portland*

# **NE Siskiyou Green Street**

**Portland, Oregon**



*Photo: Kevin Robert Perry, City of Portland*

# **NE Siskiyou Green Street**

**Portland, Oregon**





2011

*Photo: Kevin Robert Perry, Nevue Ngan Associates*

**SE Clinton and 18th Green Street**  
Portland, Oregon



*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# **SE Clinton and 18th Green Street**

**Portland, Oregon**



*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# **SE Clinton and 18th Green Street**

**Portland, Oregon**



2005

*Photo: Kevin Robert Perry, City of Portland*

**SW 12th Avenue Green Street**  
Portland, Oregon



*Photo: Kevin Robert Perry, City of Portland*

# **SW 12th Avenue Green Street**

**Portland, Oregon**



*Photo: Kevin Robert Perry, City of Portland*

**SW 12th Avenue Green Street**  
Portland, Oregon



*Photo: Kevin Robert Perry, City of Portland*

# **SW 12th Avenue Green Street**

**Portland, Oregon**

Nevue Ngan Associates recently assisted URS Engineers with the development of streetscape design plans for Sandy Boulevard between NE 14<sup>th</sup> and NE 48<sup>th</sup> Avenue. NNA was responsible for assessing existing street trees, developing and illustrating streetscape design alternatives related to landscape, and assisting with the development of construction documents.

NNA worked closely with the Portland Bureau of Environmental Services, Portland Office of Transportation, and Urban Forestry to create an innovative plan that incorporates several landscaped stormwater treatment areas into the right-of-way. Both infiltration basins and landscaped curb extensions are being utilized to achieve the dual purpose of reducing CSOs and to bring a stronger visual identity to specific intersections.

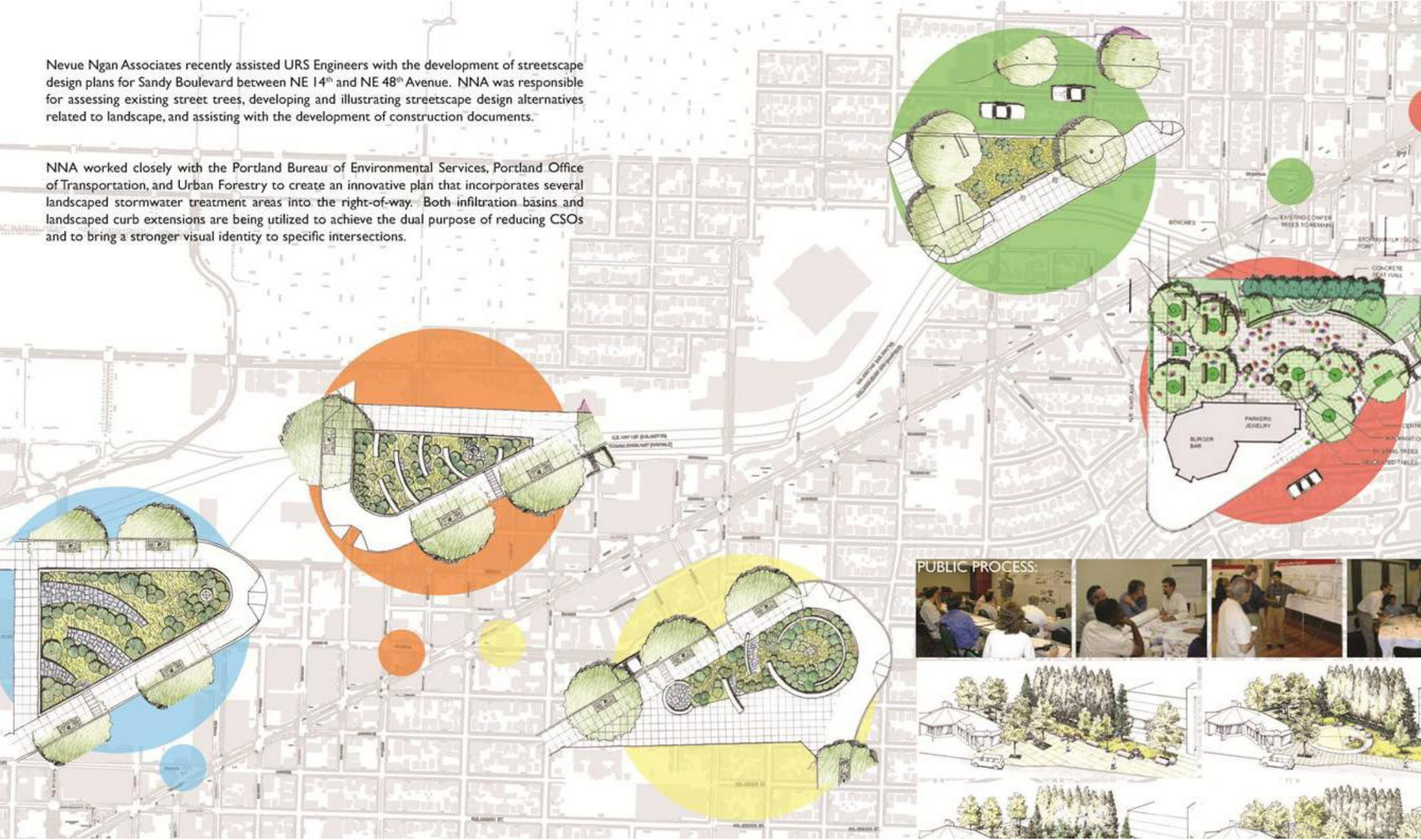


Illustration: Nevue Ngan Associates

# NE Sandy Boulevard Rain Gardens

Portland, Oregon





2006

*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# **NE Sandy Boulevard Rain Gardens**

**Portland, Oregon**



*Photo: Kevin Robert Perry, Nevue Ngan Associates*

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*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# **NE Sandy Boulevard Rain Gardens**

**Portland, Oregon**



2008

© AND ©  
Pictometry Bi

Photo: Google Earth

# Brisbane City Hall Rain Garden

Brisbane, California



*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# **Brisbane City Hall Rain Garden**

**Brisbane, California**





*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# **Brisbane City Hall Rain Garden**

**Brisbane, California**



*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# **Brisbane City Hall Rain Garden**

**Brisbane, California**



2008

*Photo: Kevin Robert Perry, Nevue Ngan Associates*

**Logus Road Green Street**  
Milwaukie, Oregon



*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# **Logus Road Green Street**

**Milwaukie, Oregon**



2008

*Photo: Kevin Robert Perry, Nevue Ngan Associates*

**Logus Road Green Street**  
Milwaukie, Oregon



*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# Logus Road Green Street

Milwaukie, Oregon

# Site Plan

## SW Montgomery Green Street

Connecting the West Hills to the Willamette River



The SW Montgomery Green Street is regarded as Portland's most innovative green street effort. The project demonstrates how, in even the most ultra-urban conditions, downtown streets can be planned and retrofitted not only to fully manage stormwater runoff but to also create, integrate, and preserve vibrant pedestrian spaces. This 9-block concept plan incorporates a variety of green infrastructure and alternative transportation strategies throughout this emerging neighborhood in downtown Portland.





2009

*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# Smith Memorial Student Union Plaza

Portland, Oregon





2009

*Photo: Kevin Robert Perry, Nevue Ngan Associates*

**Smith Memorial Student Union Plaza**  
Portland, Oregon



*Photo: Kevin Robert Perry, Nevue Ngan Associates*

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*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# **Smith Memorial Student Union Plaza**

**Portland, Oregon**



2010

*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# Urban Center Plaza Stormwater Retrofit

Portland, Oregon



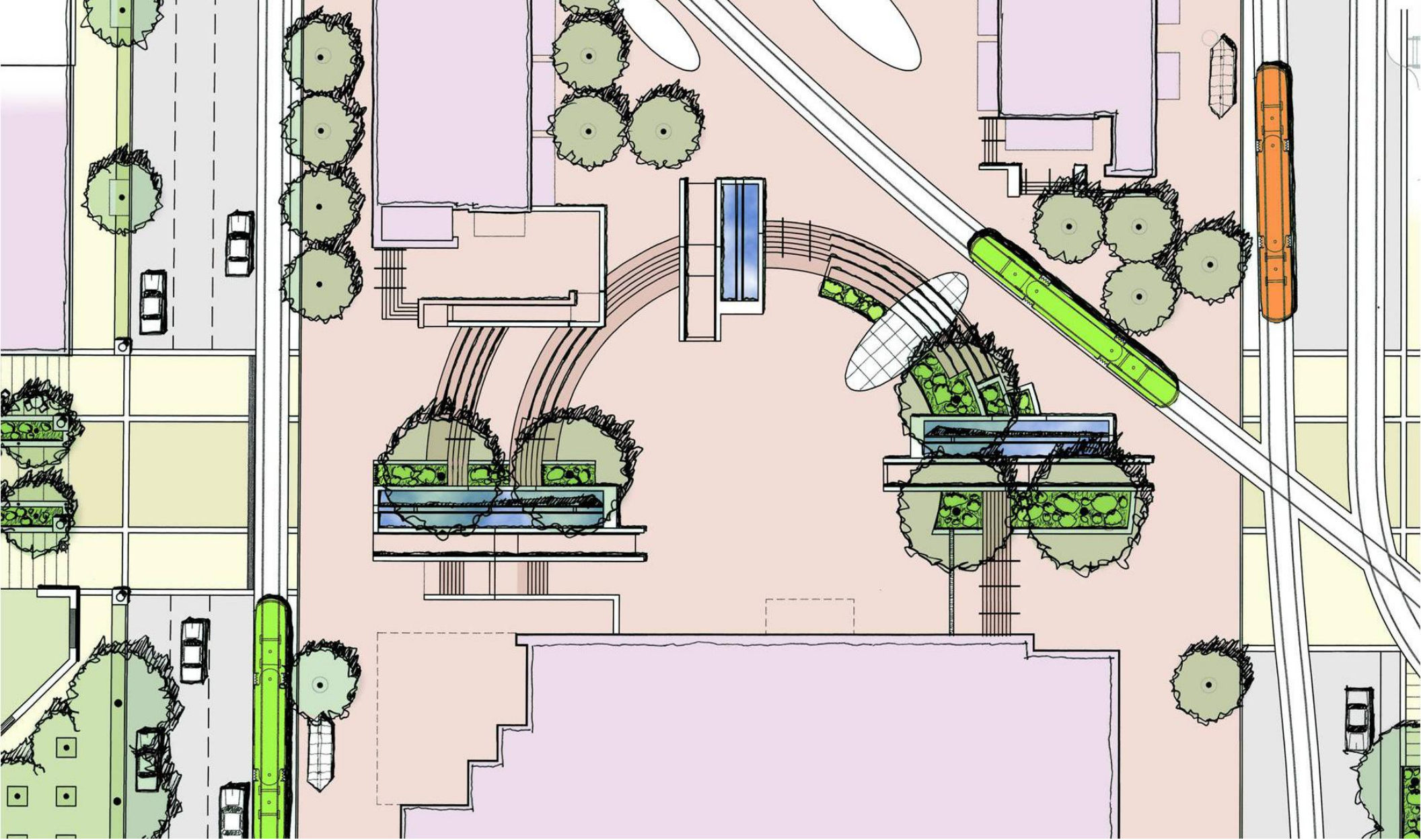


2010

*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# Urban Center Plaza Stormwater Retrofit

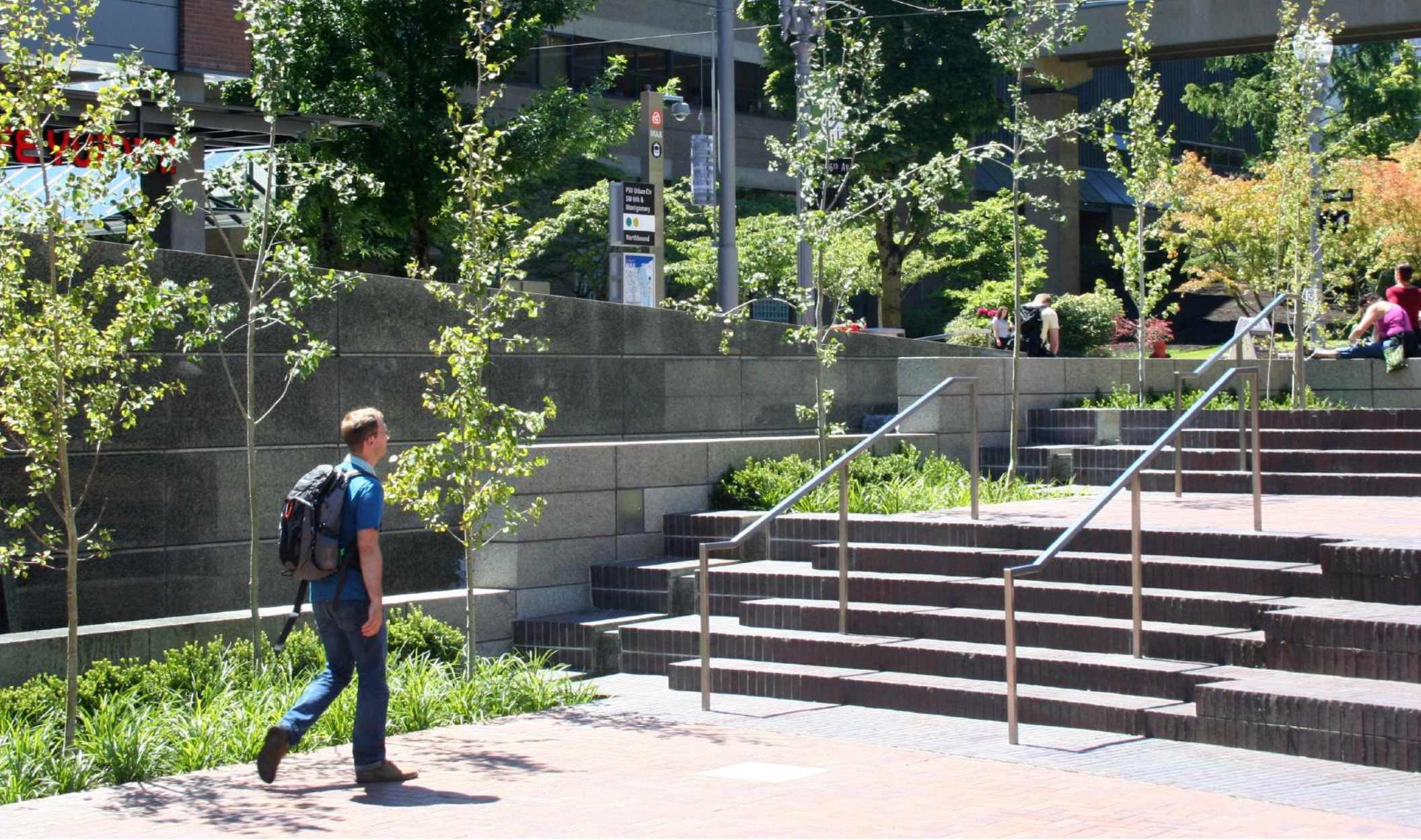
Portland, Oregon



*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# Urban Center Plaza Stormwater Retrofit

Portland, Oregon



*Photo: Kevin Robert Perry, Nevue Ngan Associates*

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*Photo: Kevin Robert Perry, Nevue Ngan Associates*

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Portland, Oregon



*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# **Urban Center Plaza Stormwater Retrofit**

**Portland, Oregon**



2010

*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# **Urban Center Plaza Stormwater Retrofit**

**Portland, Oregon**



*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# Urban Center Plaza Stormwater Retrofit

Portland, Oregon

# Visualizing Retrofits





*Photo: Kevin Robert Perry, ASLA*

# Capturing Sidewalk and Street Zones

San Francisco, California



*Photo: Kevin Robert Perry, ASLA*

# Capturing Overly Wide Streets

Hartford, Connecticut



*Photo: Kevin Robert Perry, ASLA*

# Capturing Sidewalk and Street Zones

Hartford, Connecticut



*Photo: Kevin Robert Perry, ASLA*

# Capturing Landscape Zone

Hartford, Connecticut



*Photo: Kevin Robert Perry, ASLA*

# **Capturing Sidewalk and Street Zones**

**Nashville, Tennessee**



*Photo: Kevin Robert Perry, ASLA*

# **Capturing Sidewalk Zone**

**Nashville, Tennessee**



*Photo: Kevin Robert Perry, ASLA*

# Capturing Parking Zone

Philadelphia, Pennsylvania



*Photo: Kevin Robert Perry, ASLA*

# **Capturing Sidewalk and Street Zones**

**Sacramento, California**





*Photo: Kevin Robert Perry, ASLA*

# **Capturing Overly Wide Streets**

**Sacramento, California**



Before

*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# Typical Residential Street

San Mateo County, California



*Illustration: Kevin Robert Perry/Jason Hirst, Nevue Ngan Associates*

# **Conceptual Green Street**

**San Mateo County, California**



Before

*Illustration: Kevin Robert Perry/Jason Hirst, Nevue Ngan Associates*

# Typical Residential Street

San Mateo County, California



# Conceptual Green Street

San Mateo County, California



Before

*Photo: Kevin Robert Perry, Nevue Ngan Associates*

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San Mateo County, California



*Illustration: Kevin Robert Perry/Jason Hirst, Nevue Ngan Associates*

# **Conceptual Green Street**

**San Mateo County, California**



Before

*Photo: Kevin Robert Perry, ASLA*

# Typical Arterial Street

Covington, Kentucky





*Illustration: Kevin Robert Perry/Jason Hirst, Nevue Ngan Associates*

# Conceptual Green Street

Covington, Kentucky



Before

*Photo: Kevin Robert Perry, ASLA*

**Typical Arterial Street**  
Covington, Kentucky



*Illustration: Kevin Robert Perry/Jason Hirst, Nevue Ngan Associates*

# Conceptual Green Street

Covington, Kentucky



Before

*Photo: Kevin Robert Perry, ASLA*

# Typical Commercial Street

San Mateo County, California



*Illustration: Kevin Robert Perry/Jason Hirst, Nevue Ngan Associates*

# Conceptual Green Street

San Mateo County, California



Before

*Photo: Kevin Robert Perry, ASLA*

# Typical Commercial Street

San Mateo County, California



*Illustration: Kevin Robert Perry/Jason Hirst, Nevue Ngan Associates*

# Conceptual Green Street

San Mateo County, California



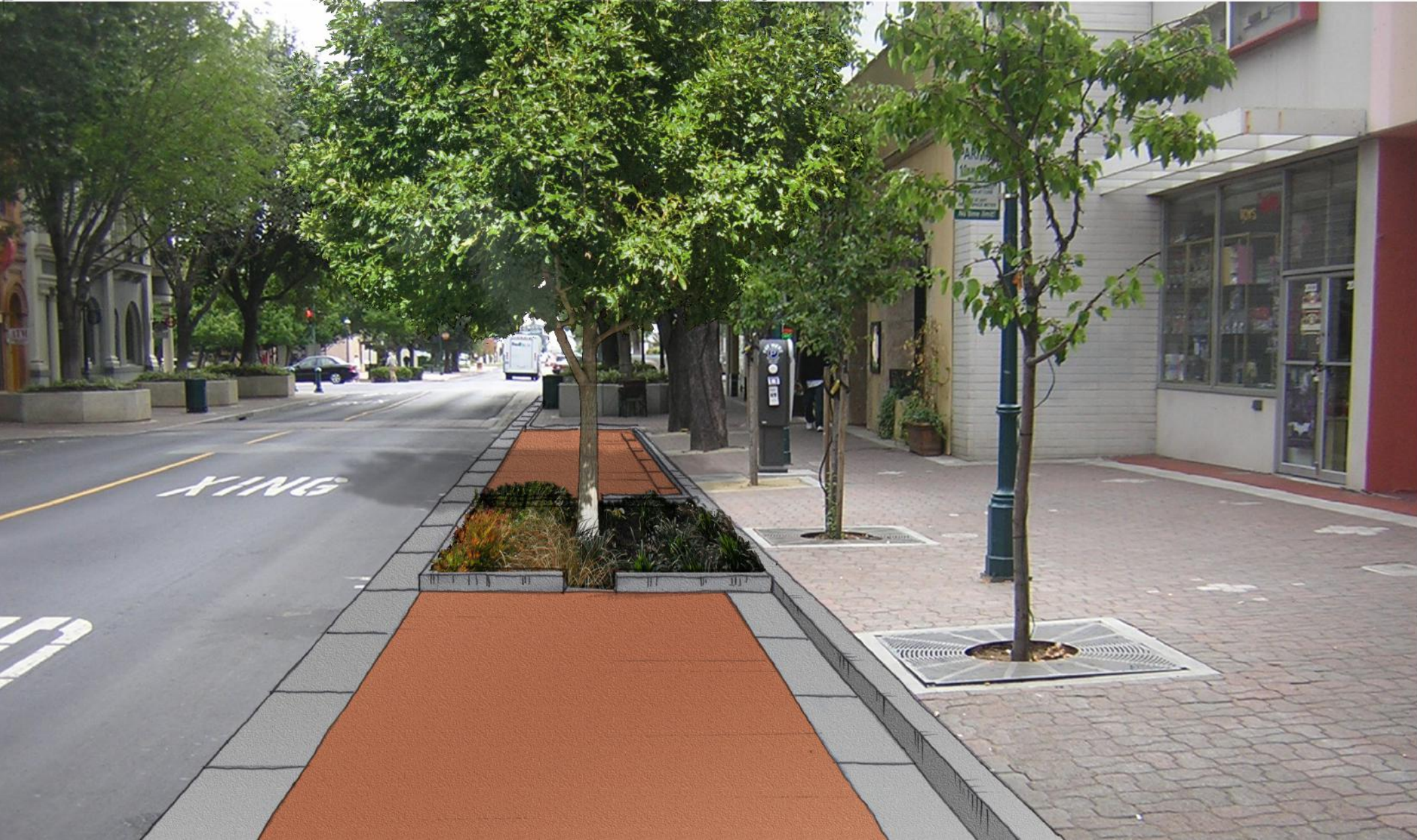
Before

*Photo: Kevin Robert Perry, ASLA*

# Typical Commercial Street

San Mateo County, California





*Illustration: Kevin Robert Perry/Jason Hirst, Nevue Ngan Associates*

# Conceptual Green Street

San Mateo County, California



Before

*Photo: Kevin Robert Perry, ASLA*

# Typical Arterial Street

San Mateo County, California



*Illustration: Kevin Robert Perry/Jason Hirst, Nevue Ngan Associates*

# Conceptual Green Street

Nashville, Tennessee



Before

*Photo: Kevin Robert Perry, ASLA*

# Typical Arterial Street

San Mateo County, California



*Illustration: Kevin Robert Perry/Jason Hirst, Nevue Ngan Associates*

# **Conceptual Green Street**

**San Mateo County, California**



Before

*Photo: Kevin Robert Perry, ASLA*

# Typical Arterial Street

San Mateo County, California



*Illustration: Kevin Robert Perry/Jason Hirst, Nevue Ngan Associates*

# Conceptual Green Street

San Mateo County, California



Before

*Photo: Kevin Robert Perry, ASLA*

# Typical Arterial Street

Indianapolis, Indiana





*Illustration: Kevin Robert Perry/Jason Hirst, Nevue Ngan Associates*

# Conceptual Green Street

Indianapolis, Indiana



Before

*Photo: Kevin Robert Perry, ASLA*

# Typical Arterial Street

San Mateo County, California



*Illustration: Kevin Robert Perry/Jason Hirst, Nevue Ngan Associates*

# Conceptual Green Street

San Mateo County, California

# **Greening Our Schools**



Photo: [www.parknpool.com](http://www.parknpool.com)

# Green Routes To School



City of San Carlos and Redwood City

# URBAN GREENING PLAN

PROPOSED WORK PLAN



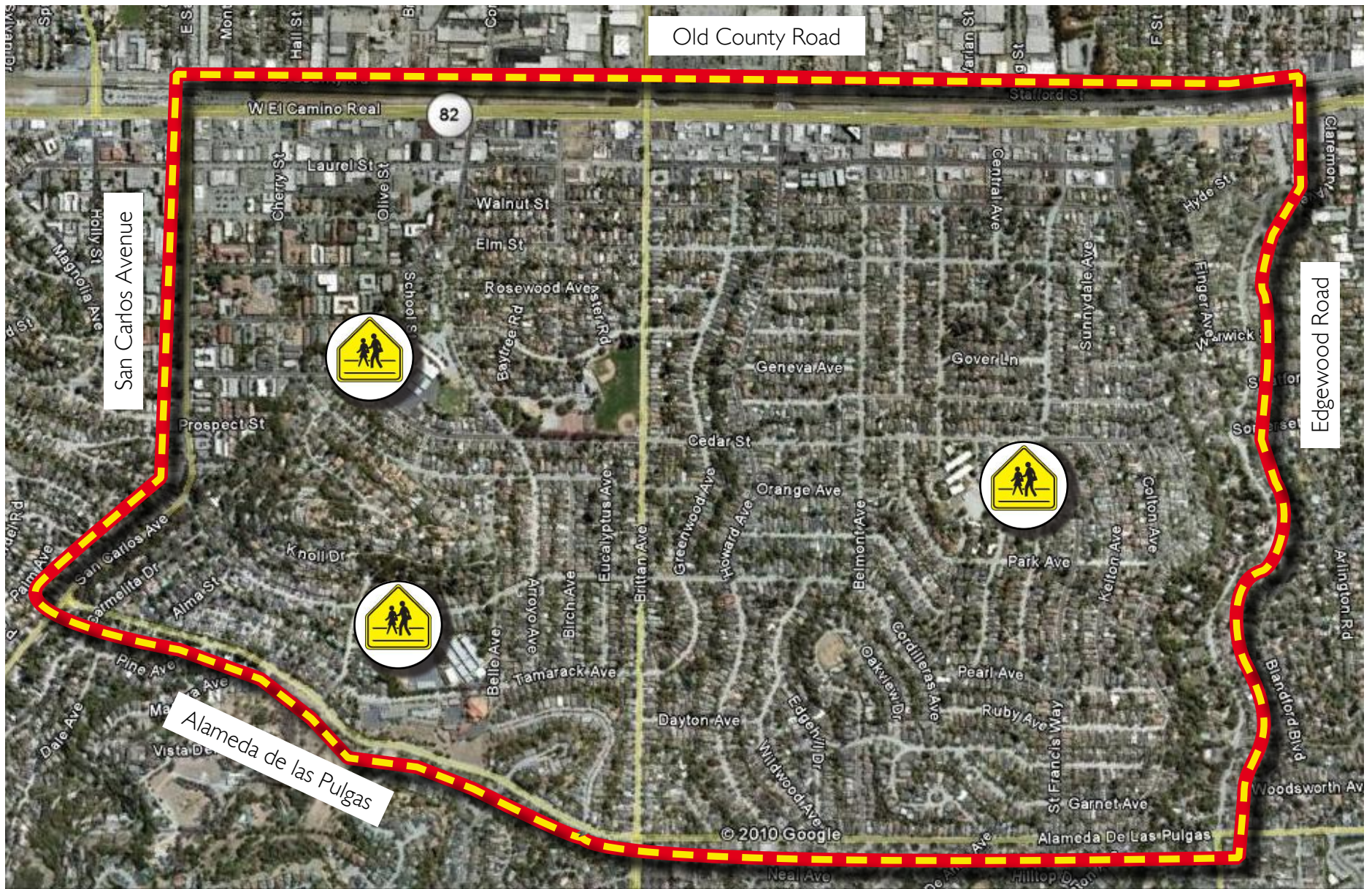


Illustration: Nevue Ngan Associates

# The Retrofit of A Neighborhood

## San Carlos Urban Greening Plan

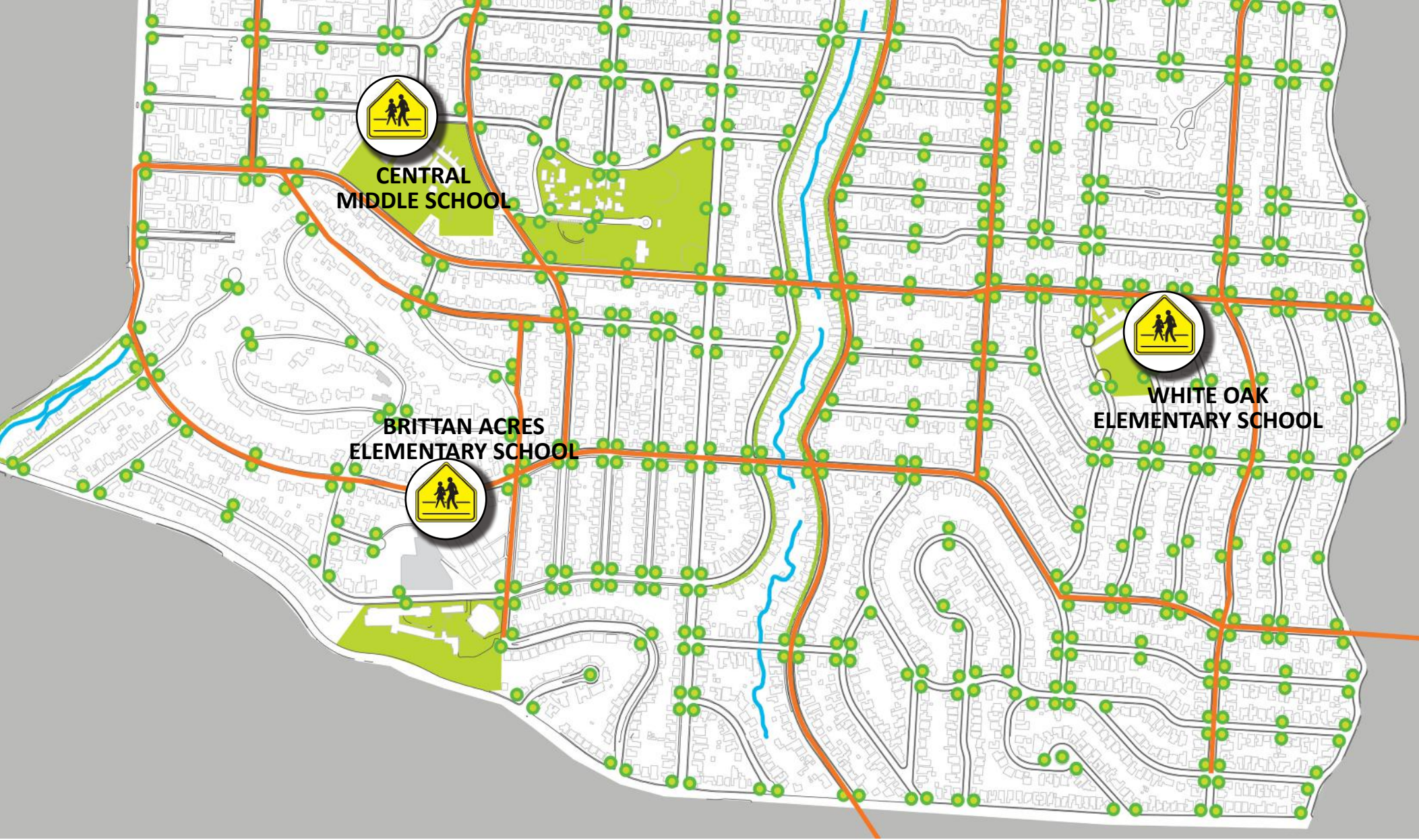


Illustration: Nevue Ngan Associates

# Conceptual Master Plan

San Carlos Urban Greening Plan





Before

*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# Typical Residential Street

San Carlos Urban Greening Plan



*Illustration: Nevue Ngan Associates/Mark Sanborn*

# **Conceptual Green Street**

## **San Carlos Urban Greening Plan**



Before

*Photo: Kevin Robert Perry, Nevue Ngan Associates*

# Typical Residential Street

San Carlos Urban Greening Plan



*Illustration: Nevue Ngan Associates/Mark Sanborn*

# **Conceptual Green Street**

## **San Carlos Urban Greening Plan**



Before

*Photo: Kevin Robert Perry, ASLA*

**Emerald Oak Drive**  
Elk Grove, California



*Illustration: Kevin Robert Perry/Ray Papa*

# **Emerald Oak Drive**

**Elk Grove, California**



# Urban Rain | Design

Kevin Robert Perry, ASLA

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