



9.0

ECO STREET

INTENT

Discovery during the Master Planning process identified the great need to deal with storm water in Peoria. The existing system during peak times at maximum capacity relies on untreated overflow to the Illinois River. The renovation of Peoria's downtown streets at their surface level also provides an opportunity to retrofit the streets below ground so that they can manage rainfall right where it lands. In short, since the streets will already be demolished for curb, paving, earthwork and planting renovations, it will be a small additional cost to install very low-tech stormwater cleansing and infiltration infrastructure at the same time. This type of stormwater infrastructure is often referred to as Green Stormwater Infrastructure (GSI). Currently two alignments have been anticipated as pilot projects.

9.1

ECO-STREET

WATER QUALITY

“Stormwater from urban areas delivers many pollutants to our streams, lakes, and beaches - including pathogens, nutrients, sediment, and heavy metals. In cities with combined sewer systems, high stormwater flows can also send untreated sewage into our waters. By retaining rainfall from small storms, green infrastructure reduces stormwater discharges. Lower discharge volumes translate into reduced combined sewer overflows and lower pollutant loads.”

United State Environmental Protection Agency, Why Green Infrastructure? water.epa.gov/infrastructure

THE BENEFIT OF GETTING THE STREETS OFF THE GRID

Most of the downtown streets currently drain to a “combined sewer” wherein rainfall runoff is combined with building sanitary sewage in a single pipe under the street. This combined flow is conveyed many blocks to the city’s wastewater treatment plants. When a rain storm creates more runoff than can safely be treated at the plant, the combined sewer overflows to Illinois River. This occurs with as little as 3 inches of rain. The city of Peoria plans to implement a number of GSI projects around the city to reduce combined sewer overflows with the intent of ultimately achieving a no overflow situation for all storms up to the 10-year storm (4.32 inches of rain). The streetscape renovations present an excellent opportunity to render the street network self-sufficient relative to rainfall runoff by leveraging the new planting and underlying soil materials to first cleanse runoff and then direct it into the ground rather than into the combined sewer. The street network could be “off the grid” for all storms up to the 10-year storm goal of the city, and would be consequently no longer a part of the city’s Combined Sewer Overflow (CSO) problem. A network of “Eco-Streets” that take care of themselves.

AN ECO-STREET PILOT

Creating a demonstration of the above-described Eco-Street could be very simple, with the Green Stormwater Infrastructure elements surgically inserted into the existing right-of-way fabric of the city. A single block pilot would accomplish a variety of goals including:

- Allow the city to show the EPA that Peoria is serious about installing Green Stormwater Infrastructure to reduce CSOs.
- Show the public how Green Stormwater Infrastructure and Eco-Streets work.
- Showcase all the other master planned elements of a Complete Street.
- Refine the means and methods for inserting Green Stormwater Infrastructure elements.
- Inform cost models for a wider roll-out of Complete Streets and Eco-Streets.
- Inform how Eco-Streets could be created in more suburban parts of the city; if you can fit Green Stormwater Infrastructure into downtown streets then you can fit it anywhere.

HOW WOULD IT WORK?

Like most urban street networks, Peoria’s utilizes the street intersections as the collection point for flow travelling along the street curb line. Consequently a pilot area centered on an intersection would allow the most seamless conversion of the existing drainage collection method to the new Eco-Street method. In addition, this would allow study and showcasing of how main streets, side streets and the intersection itself would be renovated.

What is an **ECO-STREET**?

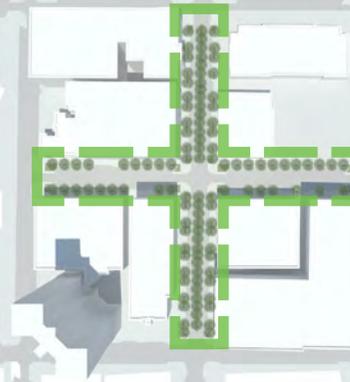
An Eco-Street involves utilizing plants and underlying soils and gravels to manage street runoff where it lands.

Why do **WE NEED** it?

Eco-Streets will eliminate Peoria's street contribution to the city's combined sewer overflow problem.

How will it benefit the **PEORIA COMMUNITY**?

Not only will Eco-Streets solve a serious public health issue, they will convert street ecology to function more like Mother Nature where plant uptake, evaporation and infiltration dispose of rainfall while creating a healthy ecosystem on every block.



ECO-STREET

PILOT STUDY

Intersection-Focused Stormwater Micro-Shed

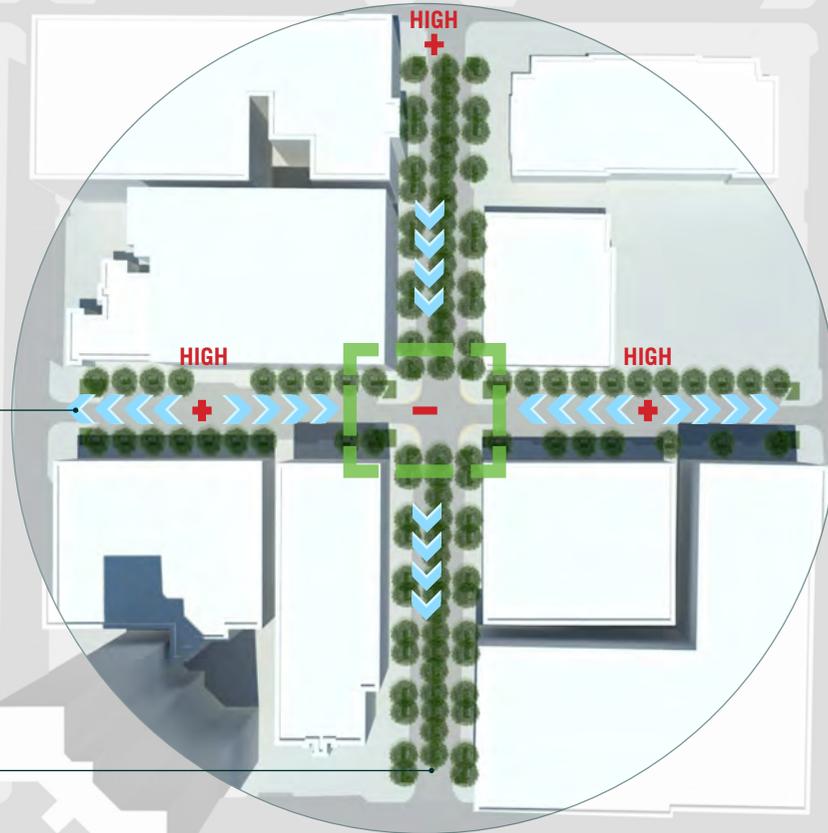
Like most urban street networks, Peoria's utilizes the intersections as the collection point for flow traveling along the curb lines.

EAST & WEST

East & west streets have a high point at mid-block with half-street length collection at intersections.

NORTH & SOUTH

North & south streets flow south with one full street length collection at intersections.



FULTON ST.

MAIN ST.

HAMILTON BLVD.

MONROE ST.

MADISON ST.

JEFFERSON ST.

ECO-STREET

PILOT STUDY

Intersection-Focused Stormwater Microshed

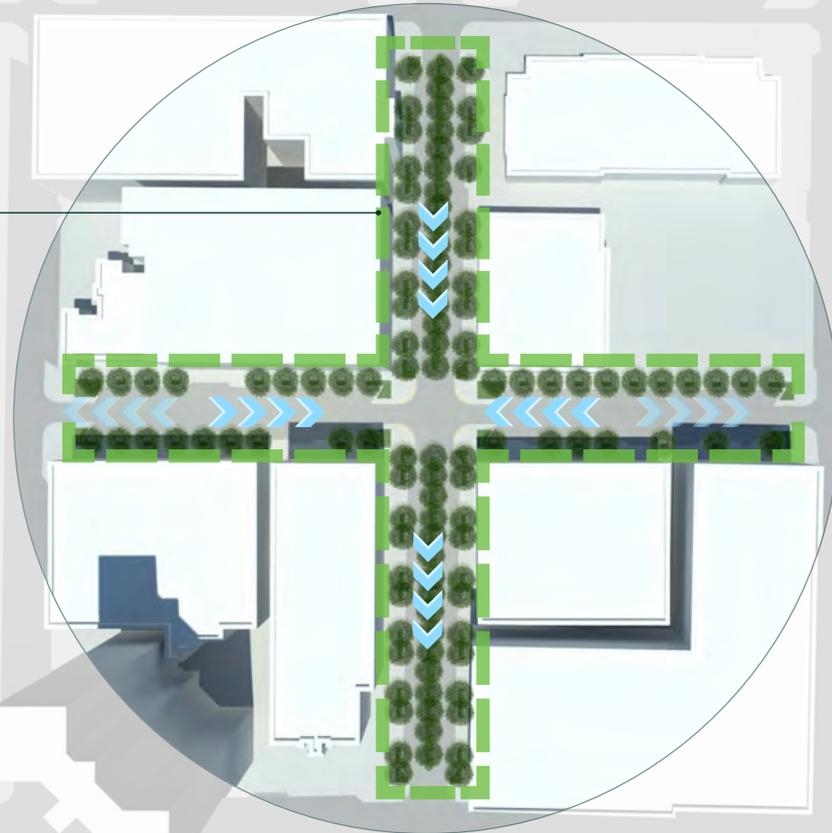
This collection paradigm defines a stormwater microshed that is intersection-focused.

[Stormwater Micro-Shed]

The area contributing runoff to a single intersection - **154,000** sf

[Water Collection Comparison]

10 Year Storm: **4.32** in/ 24 hr.
404,000 gallons
54,000 cubic feet
25 swimming pools



MONROE ST.

MADISON ST.

JEFFERSON ST.

FULTON ST.

MAIN ST.

HAMILTON BLVD.

ECO-STREET

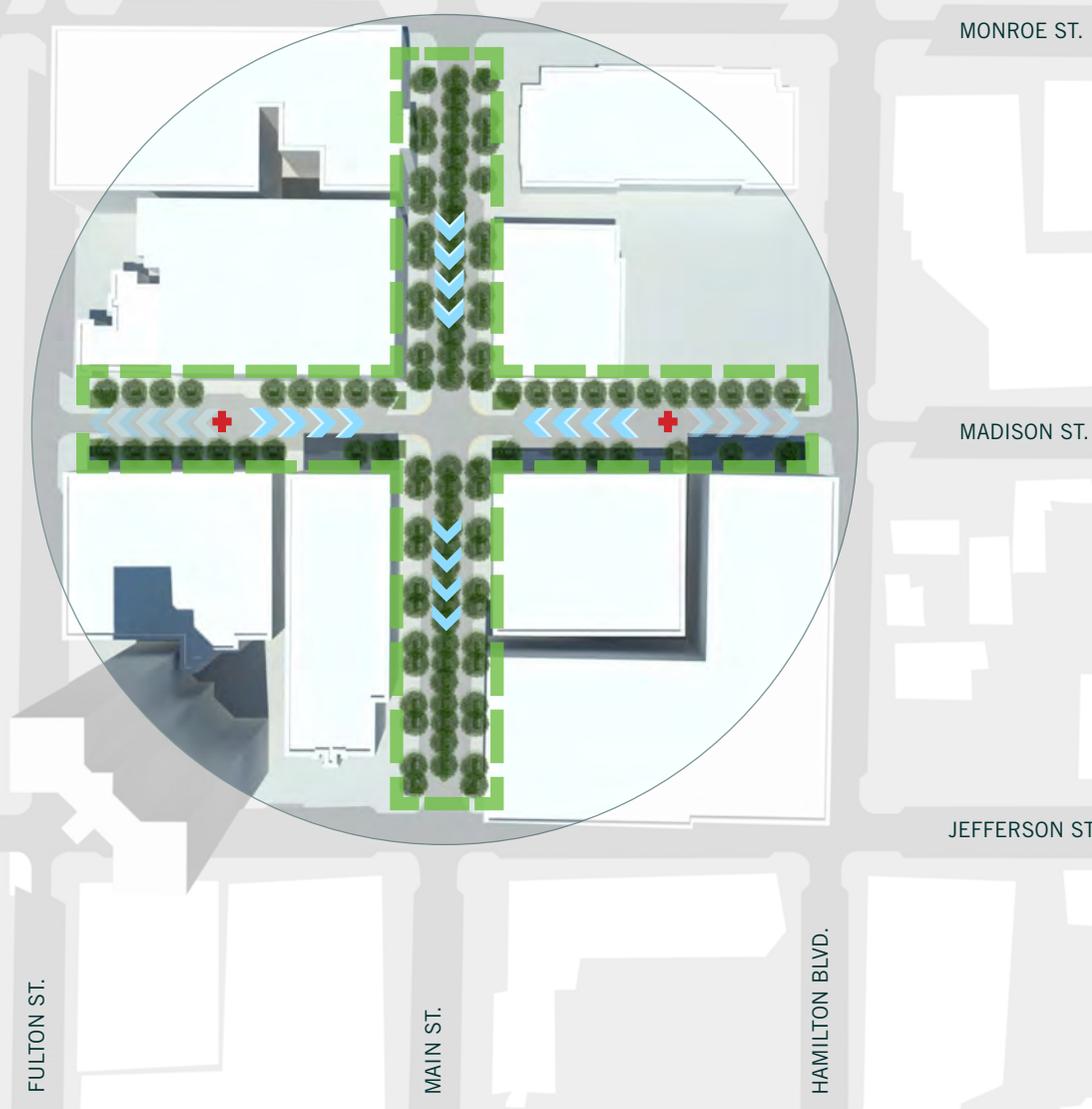
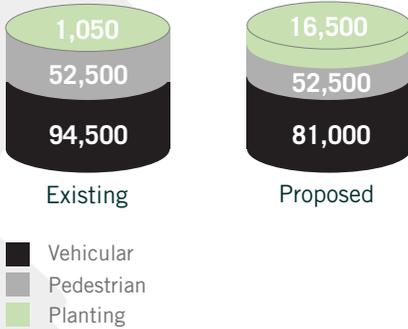
PILOT STUDY

Area Conversion

The proposed design reduces vehicular area and converts it to planting, leaving pedestrian areas more or less unchanged.

Area of Use Comparison

for **150,000** sf Stormwater Microshed



ECO-STREET

PILOT STUDY

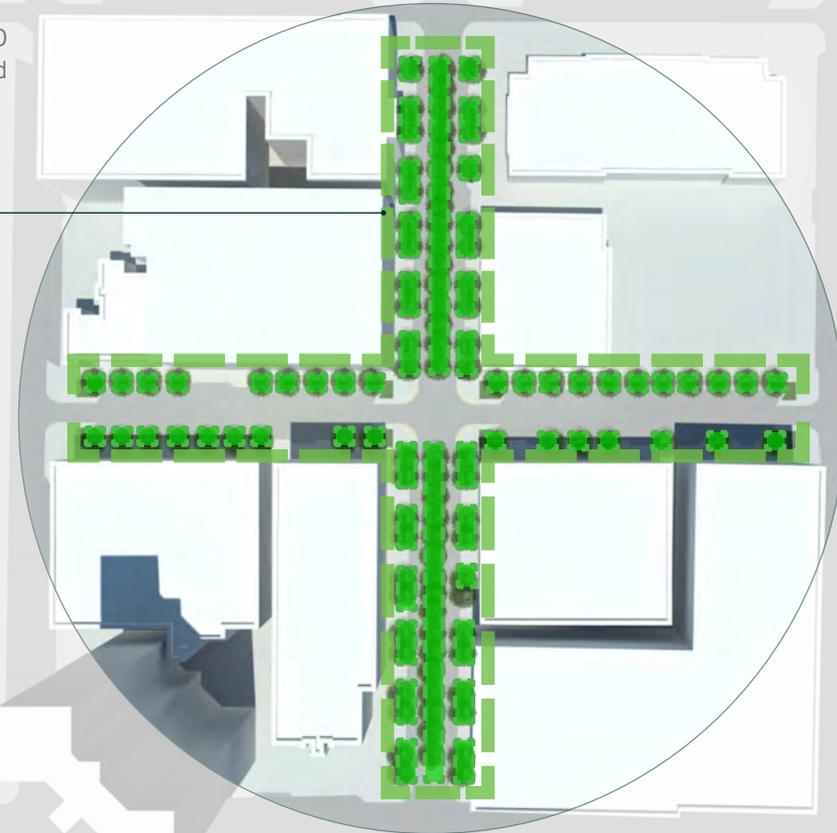
Intersection-Focused Stormwater Microshed

[Zero-Discharge Streets]

The proposed design allows for full infiltration of the CSO design storm (the 10 year storm) which can be accomplished in a number of alternative ways.

[Bio-Retention System]

Infiltrate entire microshed at all landscape elements; gravel layer = 2.5 feet deep over area of all landscape elements.



MONROE ST.

MADISON ST.

JEFFERSON ST.

FULTON ST.

MAIN ST.

HAMILTON BLVD.

ECO-STREET

SELF-MITIGATING STREETScape SECTION



[Bio-Retention Infiltration System]

Bio-retention areas function as a soil and plant based stormwater runoff filtration device/process that remove sedimentation and contaminants through a variety of physical and chemical treatment processes. This process includes the capture or routing, collection of water and the infiltration of water back into the groundwater system. Filtration will include plant material, a treatment soil profile, geotextile fabric, pea gravel layer, and gravel infiltration facility. Overflow stacks will provide relief to the system should excessive amounts of stormwater pass through basins.

REGIONALLY-ADAPTIVE PLANTS

Natives and adapted species reduce maintenance & water needs and create habitat.

OVERFLOW STACK (24")

Provides relief to the system should excessive amounts of stormwater pass.

BIO-RETENTION SOIL (24")

Soil mix used in bio-retention systems for determining flow control and water quality treatment performance.

FILTER FABRIC (2")

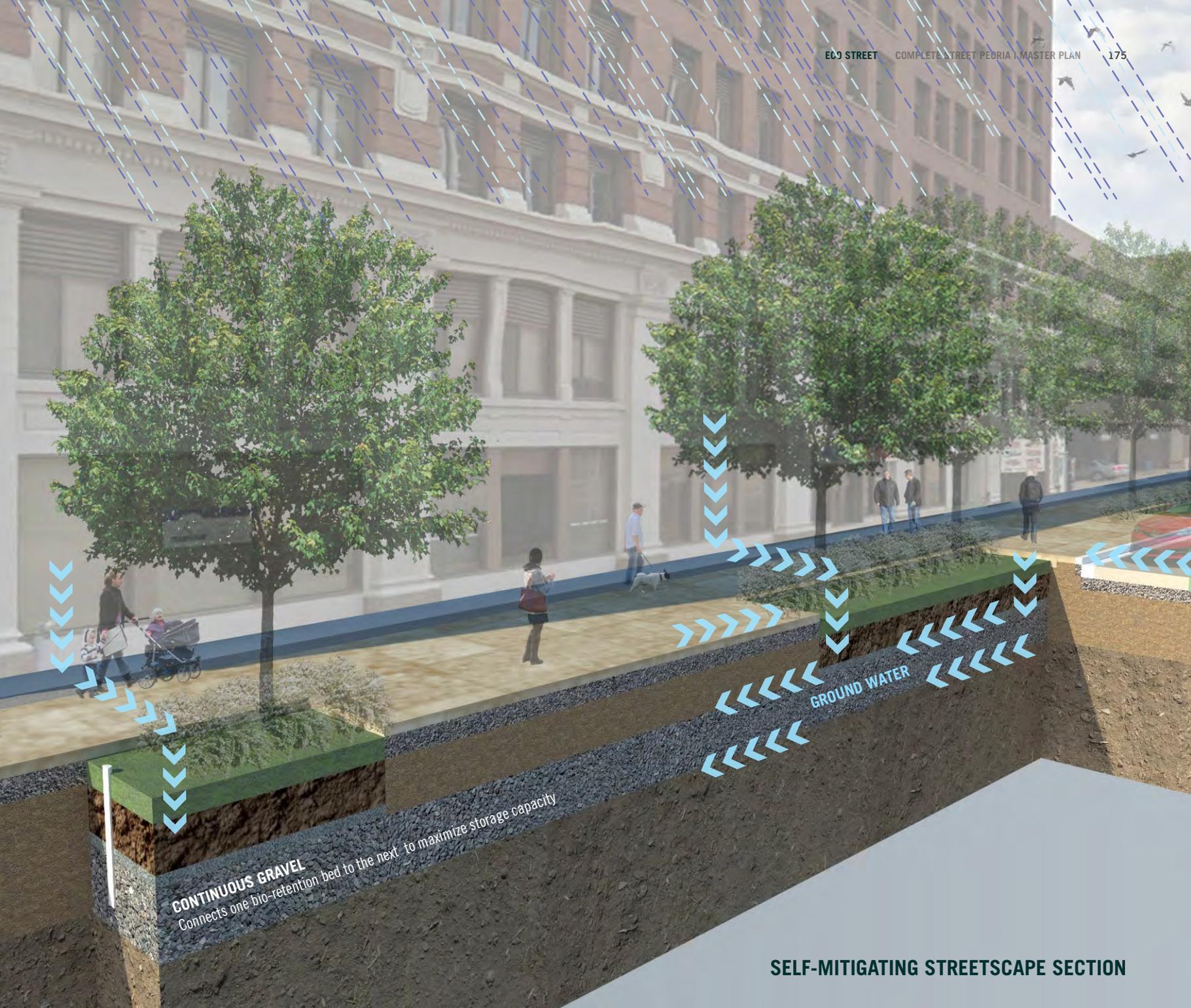
Filters and treats runoff

PEA GRAVEL (6")

Filters and treats runoff

GRAVEL (30")

Functions as a second filter and treatment to the runoff



CONTINUOUS GRAVEL
Connects one bio-retention bed to the next, to maximize storage capacity

GROUND WATER

SELF-MITIGATING STREETScape SECTION

ECO-STREET

BIO-RETENTION INFILTRATION SYSTEM

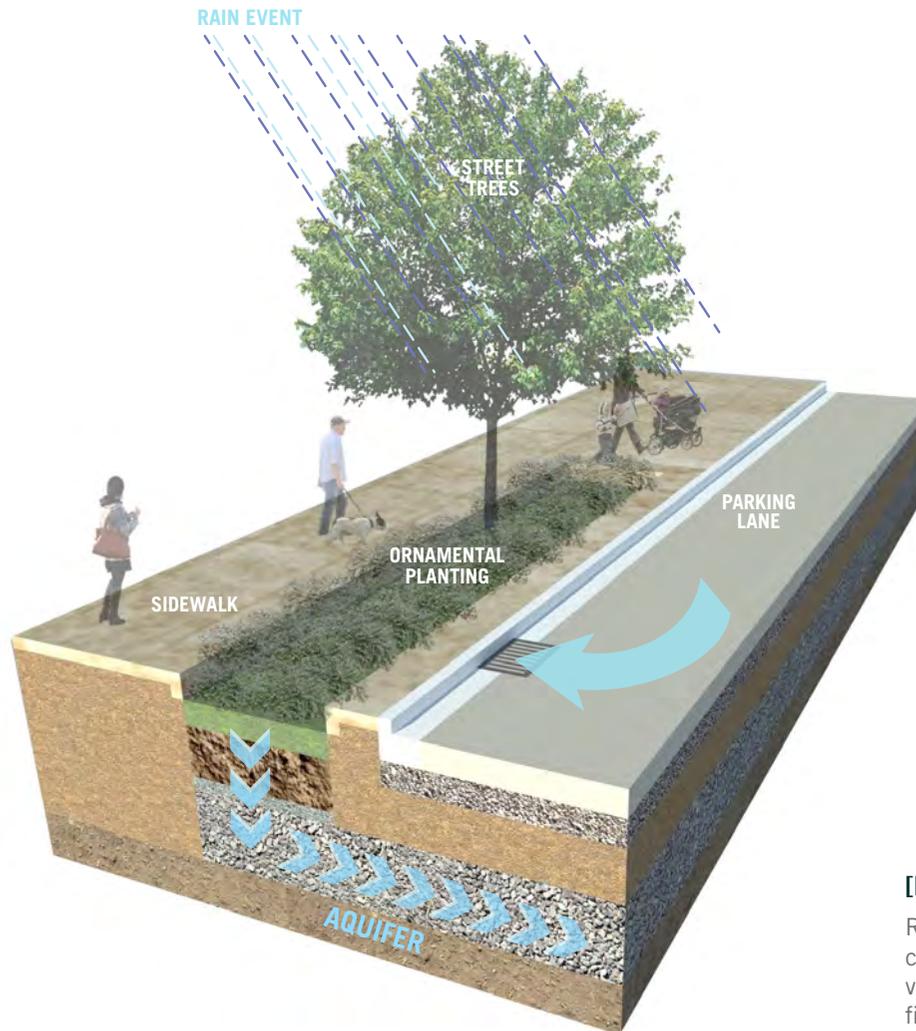


[Collection / Filtration Zone]

The bio-retention infiltration areas capture storm water for the adjacent sidewalks and potentially from building roof drain systems. Rain water is collected by sheet flow into the planting beds.

ECO-STREET

BIO-RETENTION INFILTRATION SYSTEM



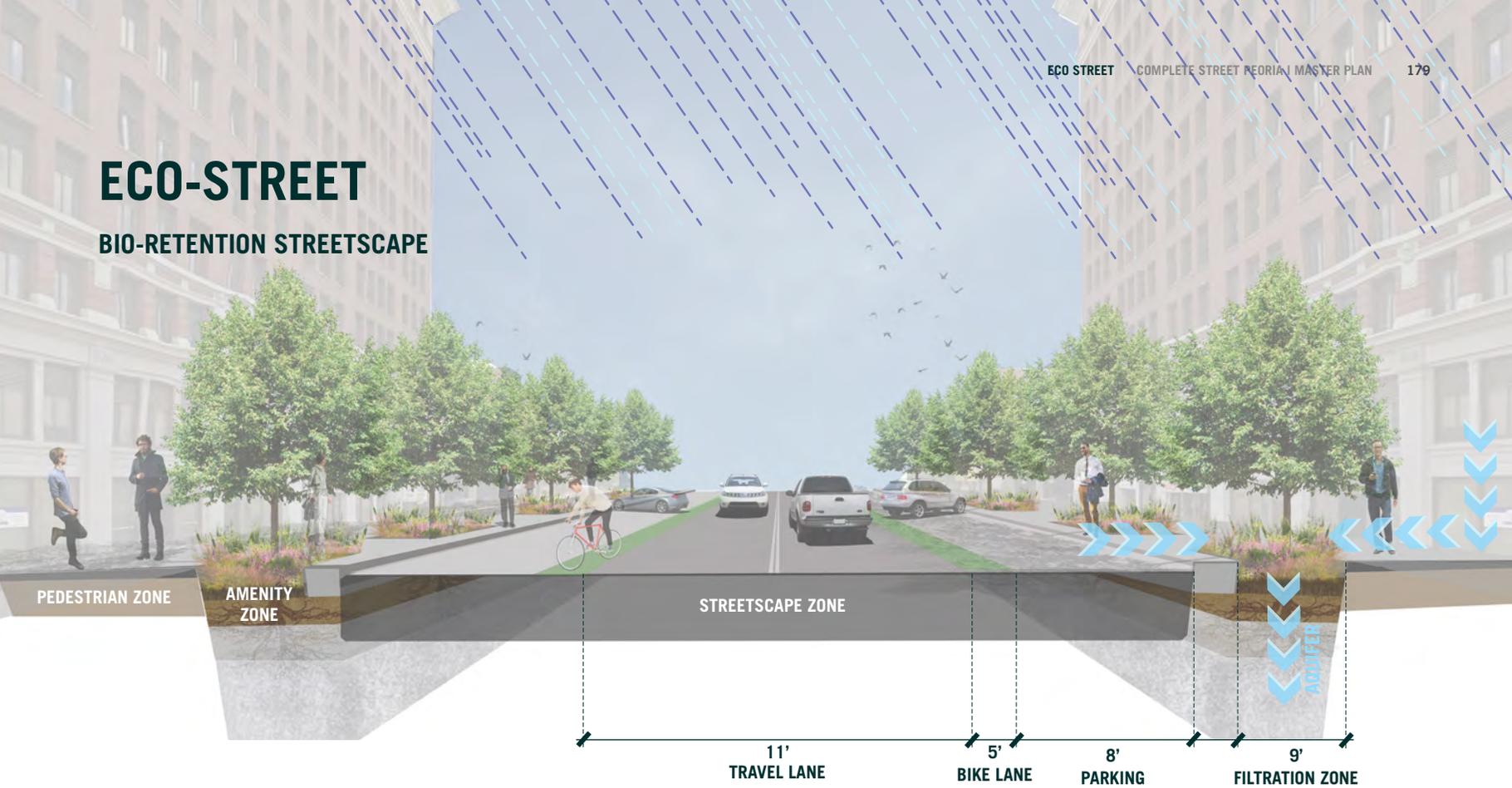
[Roadway Collection]

Road way water sheet flows to the adjacent curbs where it is channeled and captured in a storm drain box slowing water velocity. The water is then channeled via pipe to the collection filtration zone where it finds its way back into the ground water.



ECO-STREET

BIO-RETENTION STREETScape



[Eco-Street Section]

The Eco-Street Section or Green Stormwater Infrastructure will allow the City of Peoria to reduce or even eliminate the current stormwater. This shift will serve as a model for other communities who face similar water quality issues related to Combined Sewer Overflow (CSO.) With an Eco-Street Framework, Peoria will lighten the environmental footprint of the city and enhance the quality of life and Peoria Riverfront.

