

# Urban Water

SEEKING CULTURAL, ECONOMIC, AND ENVIRONMENTAL CONNECTIONS

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## Problem Statement:

How can our design with urban stormwater incorporate the three pillars of sustainability; economy, environment and society?

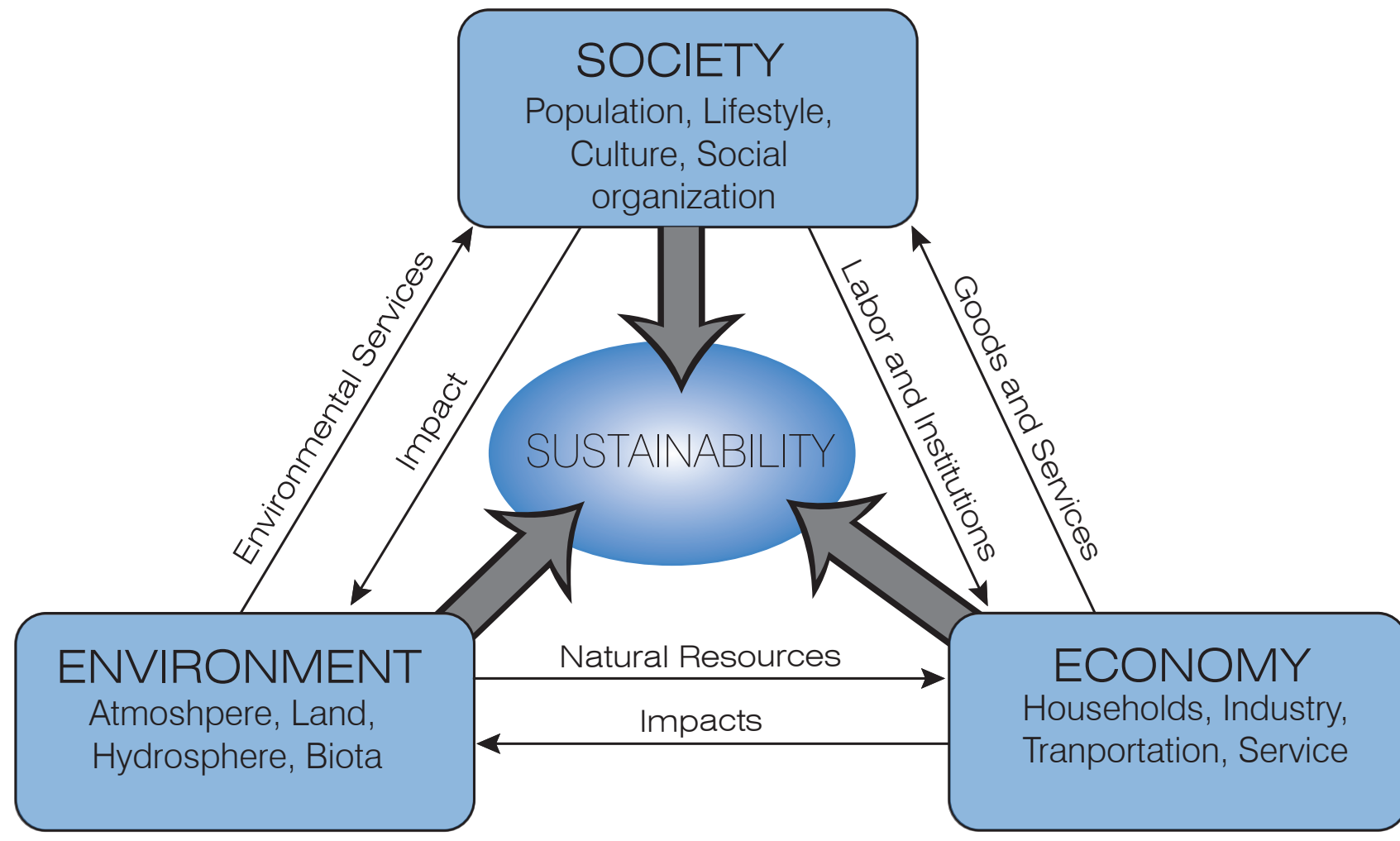
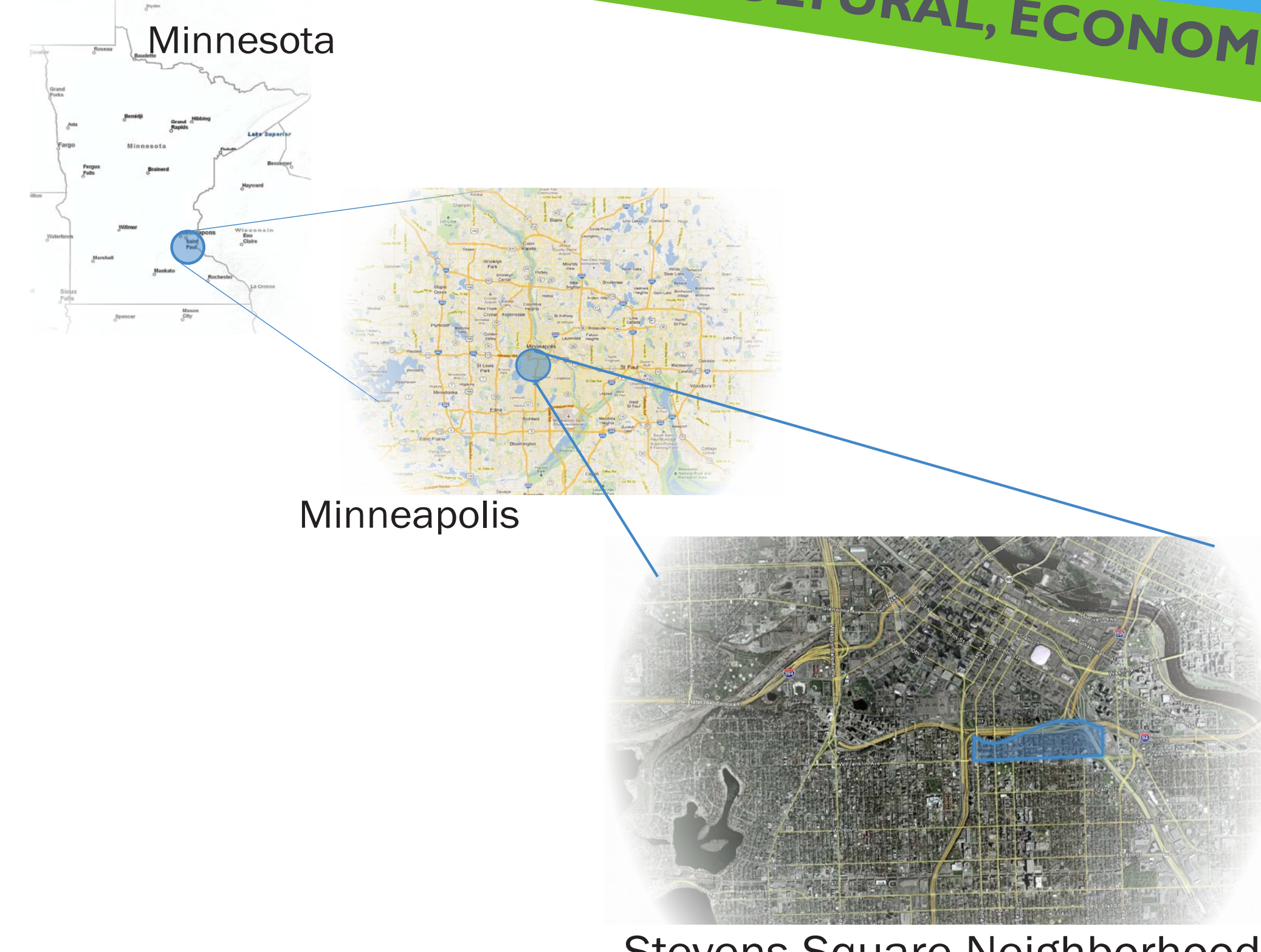


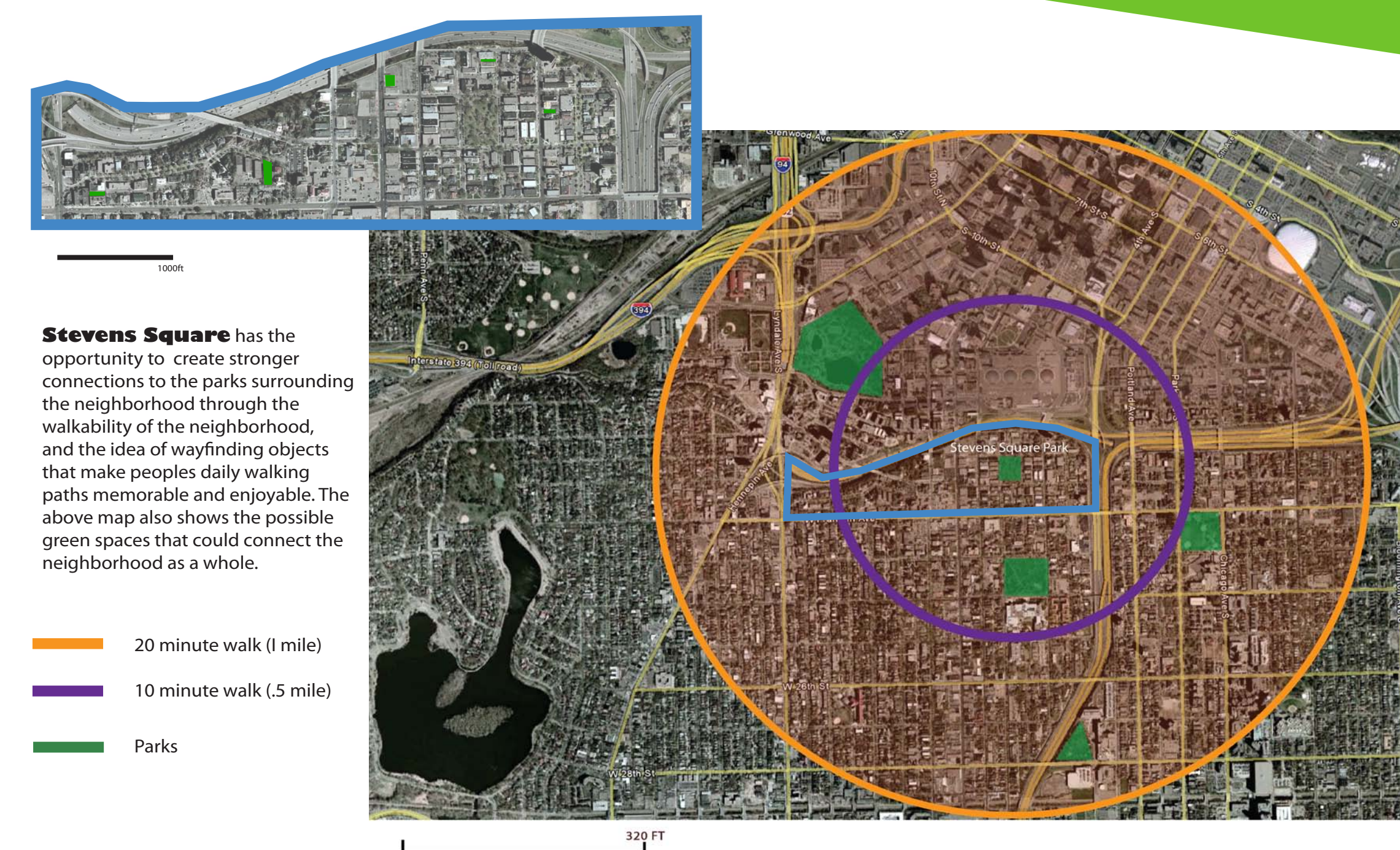
Figure 1. The trinity of factors and impacts determining sustainability. Adapted from Brundtland (1987), Novotny (2003) and Allan (2005).

These three components or "pillars" are the foundation to a sustainable environment and need to be kept in equilibrium with each other. "A change in one component affects the other two...the balance between all three is the fundamental premise of sustainability." (Novotny, Brown & Ahern, 2010) For example, a pull towards economics can lead to pollution, and impairment to the environment. These components will act as guidelines throughout my design process to create a unique, stormwater management solution.



Stevens Square Neighborhood

## Park Connections



## Design Inspiration

The Australian Aborigines are a primitive culture established in the Australian desert where water is a vital part of their daily lives and the way they keep track of where the water is through songs and dances that lead them to oases of water. The songs describe the land, and require the aborigines to use all their senses. This concept has become my design inspiration, and will be linked with the idea of way-finding and high imageability researched by Kevin A. Lynch.

Lynch described way-finding as "... the strategic link is the environmental image, the generalized mental picture of the exterior physical world that is held by an individual. This image is the product both of immediate sensation and of the memory of past experience, and it is used to interpret information and to guide action."

He then defined Imageability as, "that quality in a physical object which gives it a high probability of evoking a strong image in any given observer...where objects are not only able to be seen, but are presented sharply and intensely to the senses." Through using the aborigines wayfinding practices, I plan to seek strong imageability throughout my neighborhood.

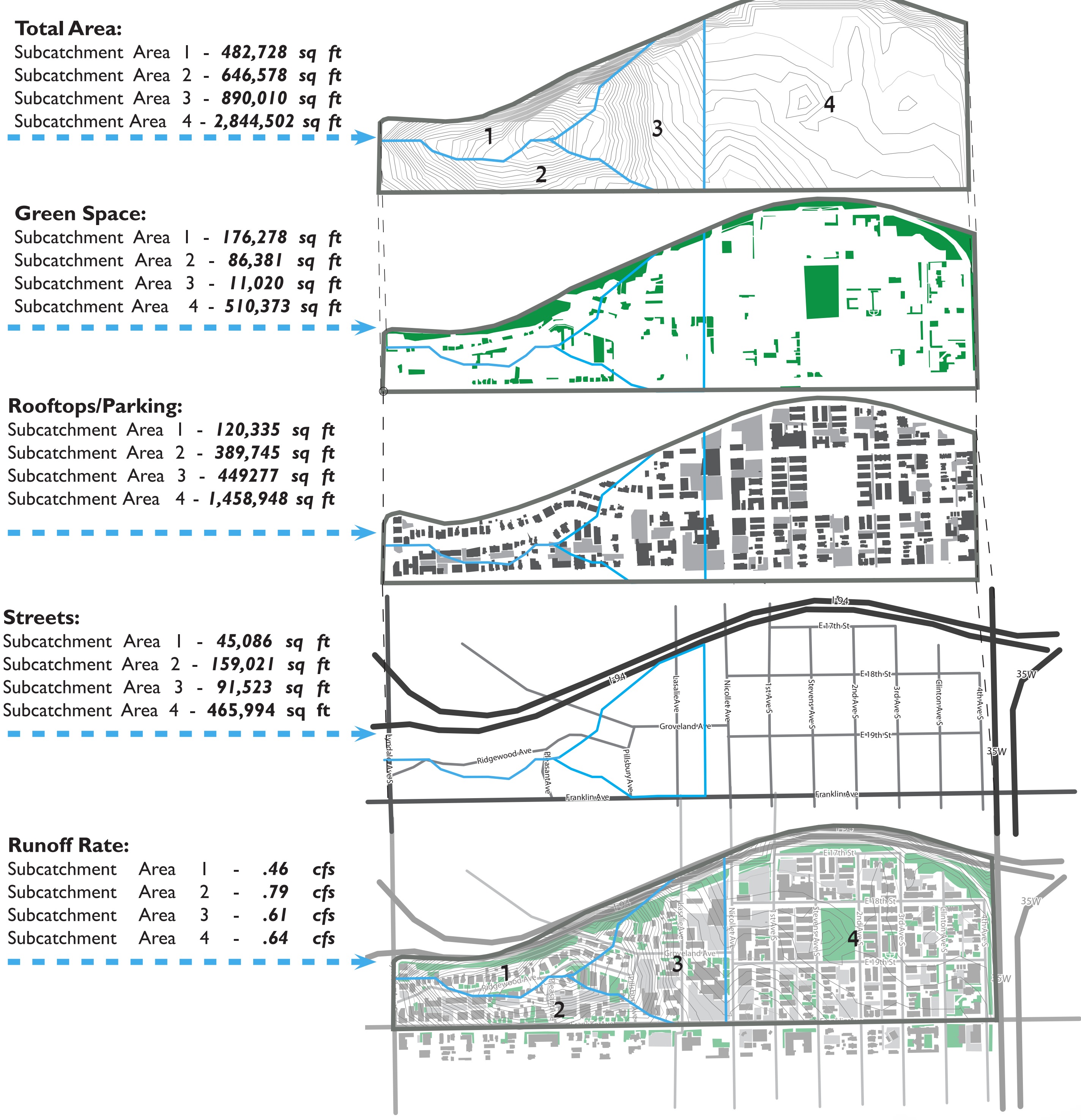
These three ideas combined will push me to design the neighborhood in a way that creates memorable areas for people to discover as they walk throughout the neighborhood.



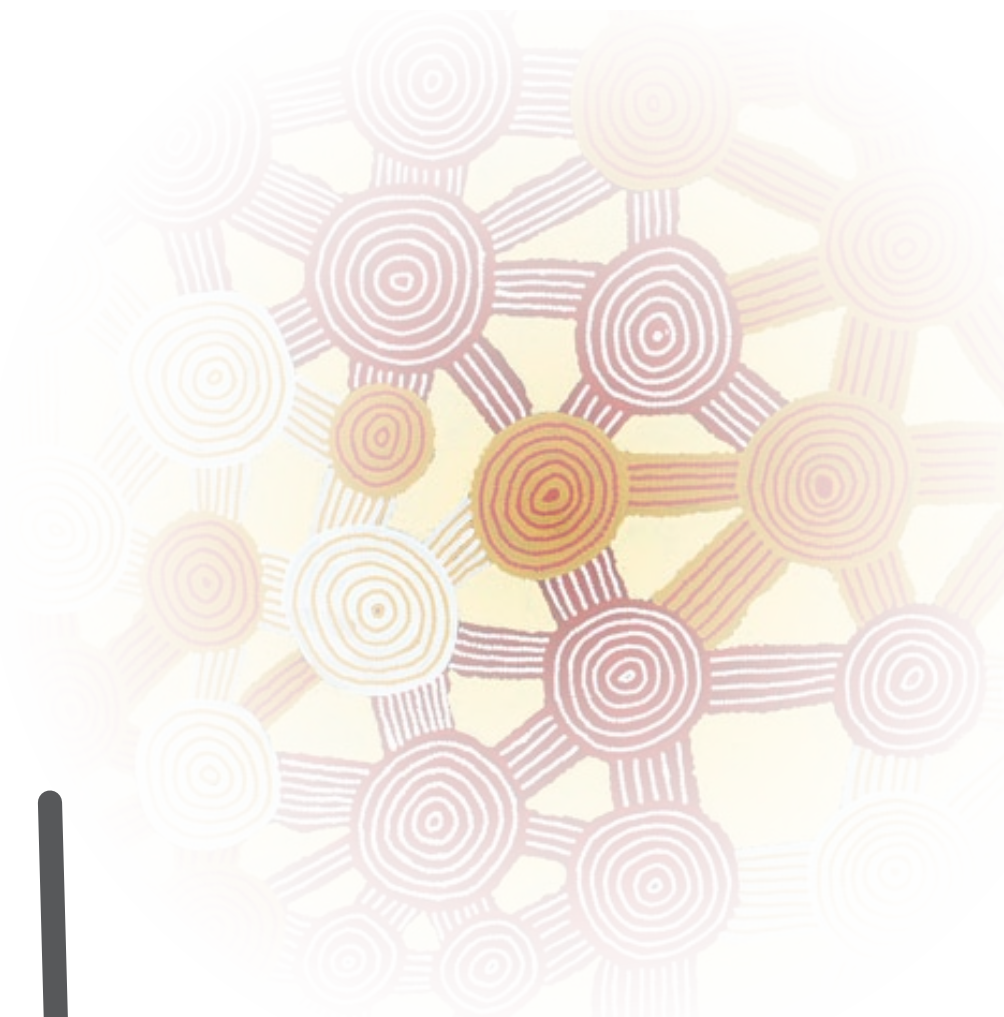
Aborigine children drinking from a stream  
Source: Elixir: A History of Water and Humankind pg 9

## Stormwater Analysis of Stevens Square Neighborhood

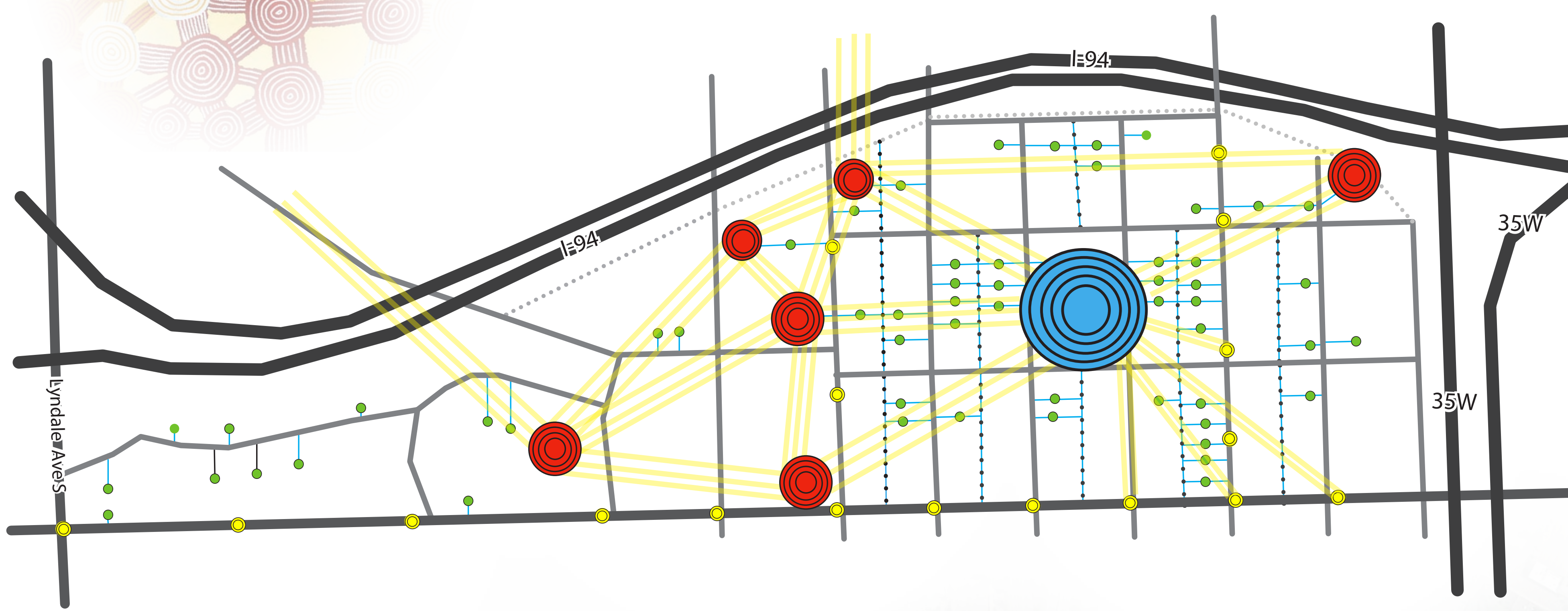
Currently within the neighborhood stormwater runoff is disposed in the storm drains and taken directly to the river. These maps show the high amount of impervious surface within the neighborhood which increases the amount of runoff going to the river. By creating small stormwater management interventions throughout the entire neighborhood they will capture and hold significant amounts of stormwater runoff which can then be reused or allowed to infiltrate the soil and revive the water tables beneath.



## Tingari Cycle

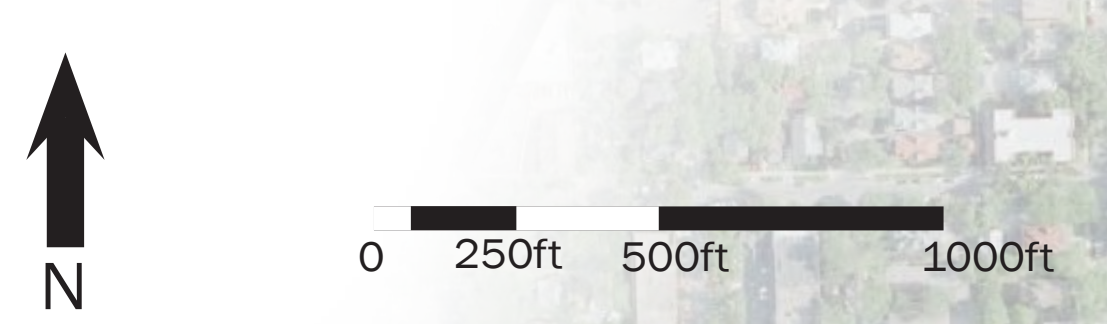


Australian Aboriginal Art inspired the connections throughout my design. The image to the left is a work of art called the "Tingari Cycle" by Warlimpirrnga Tjapaltjarri inspired by the Tingari people and depicts the Dreaming song lines connecting the aborigines to the water in the desert. The Tingari men were a respected group of ancestral leaders that voyaged throughout the dessert finding water and mapping it through song, often bringing young novices to teach and pass down their knowledge to the next generation. The circles represent gathering areas or watering holes for the tribes to come together. The lines represent the journeys, paths to each area that become the "song", that guide them to the water. My design emulates these same connections throughout the neighborhood; the parks and plazas represent the gathering areas or "watering holes" for the community and the smaller interventions, such as gutter areas, become the connection points, the places people walk through to get to the parks/plazas.



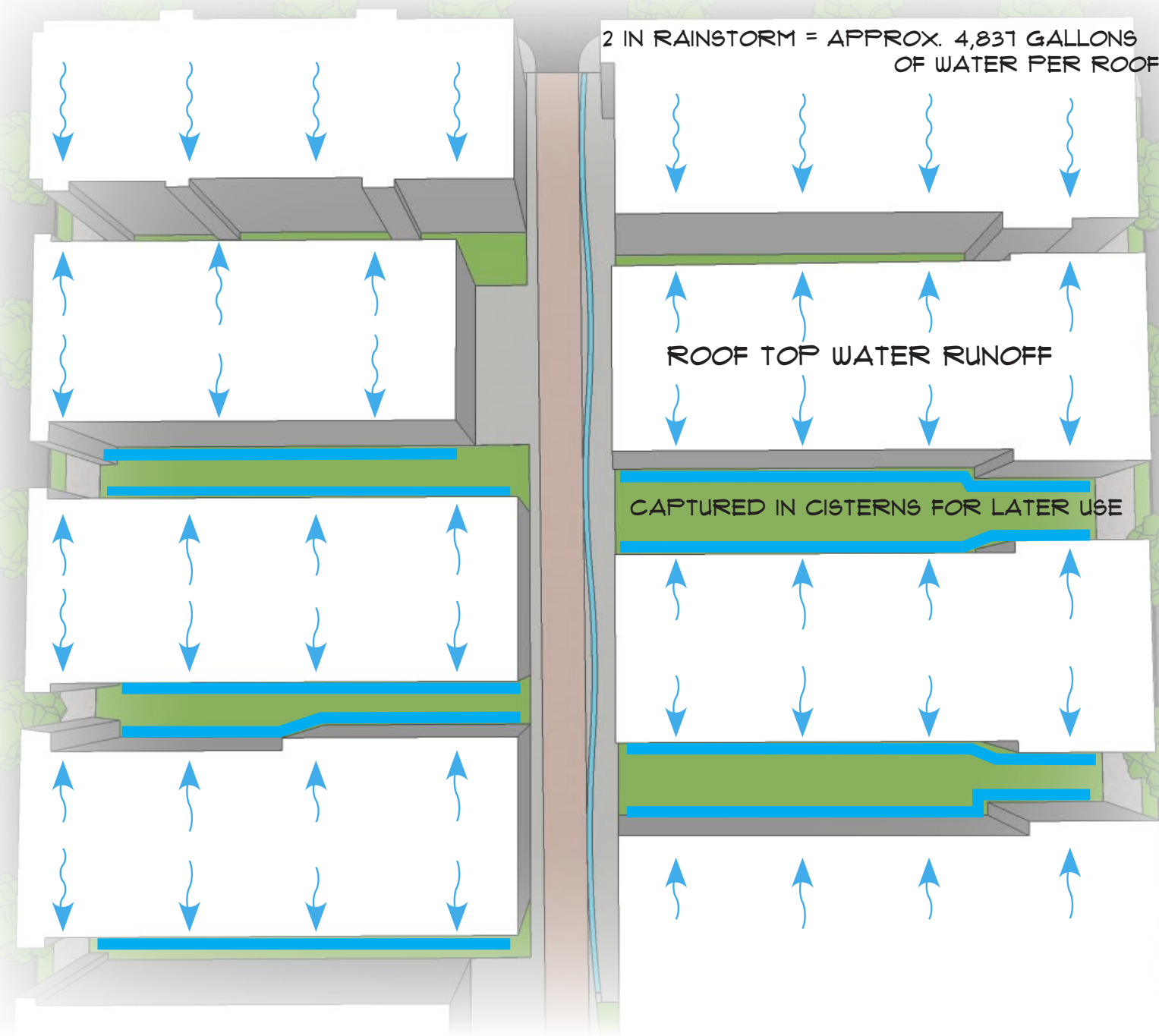
## Masterplan

- Existing Buildings
- Proposed Mixed Use Buildings
- Plazas
- Parks/Pocket Parks
- Alleyways
- Gutter Areas Between Buildings
- Bike Path

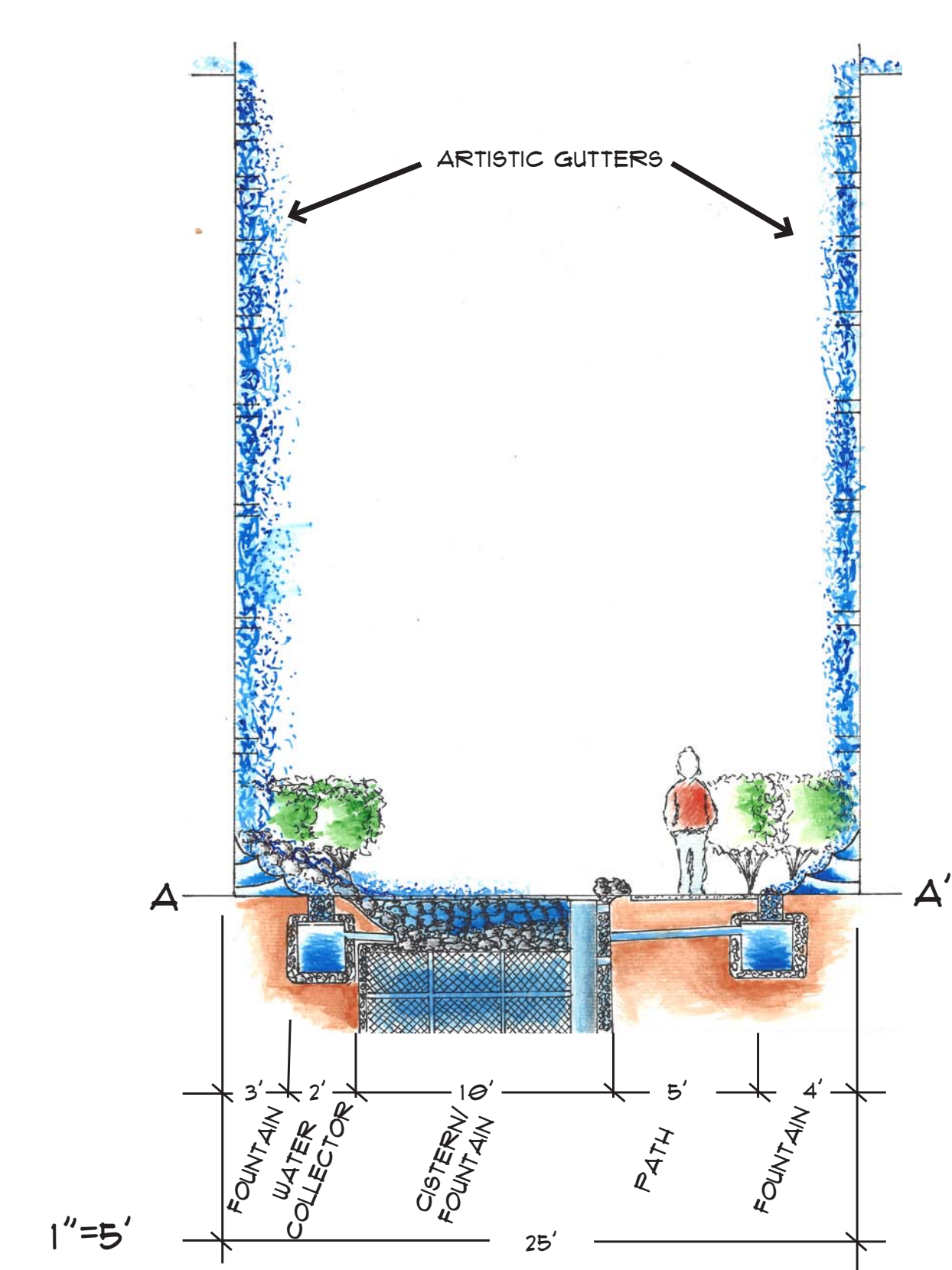
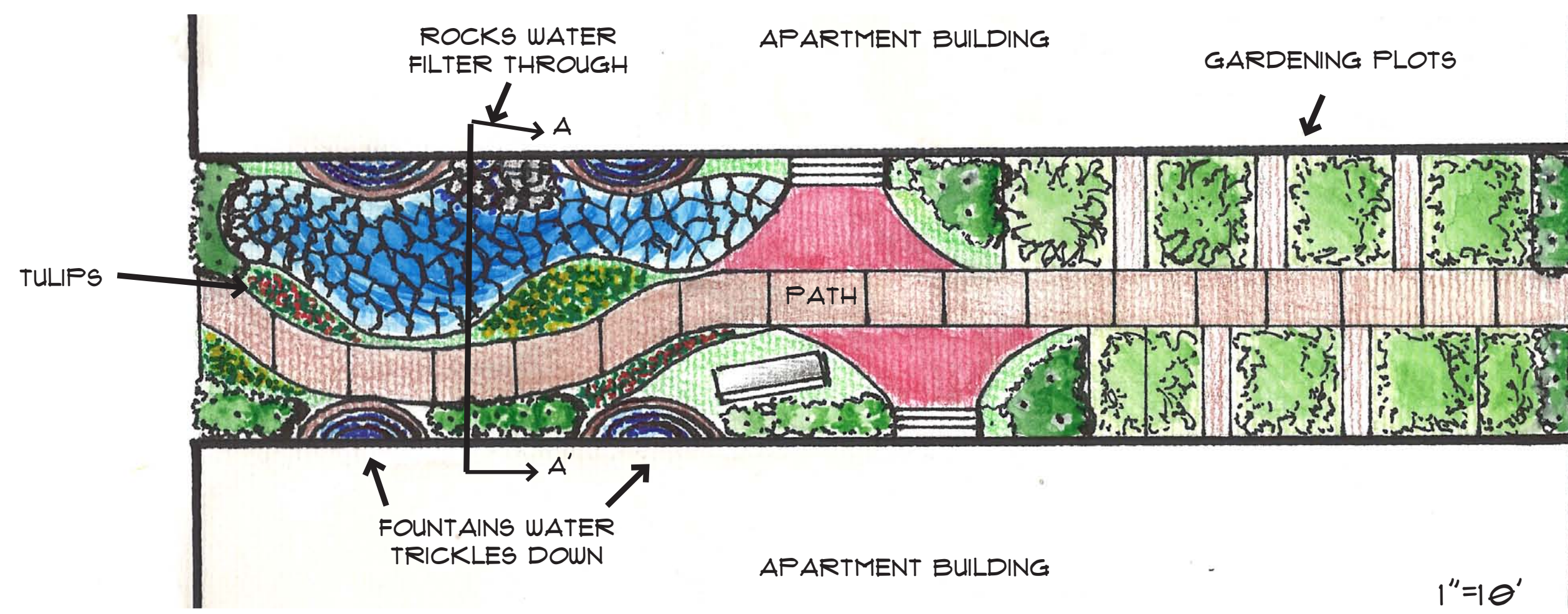


# 1. Area Between Buildings - collecting runoff from rooftops

Because Stevens Square is such a high density neighborhood, collecting runoff from the rooftops will help decrease the amount of runoff reaching the stormwater drains. These areas are great opportunities to get the community involved in caring for the landscape around them while also teaching them about the importance of water and how it can be used in a more sustainable manner. These areas will offer gardening plots to the tenants using the water harvesting from the rooftops to water their plants. Although they will have to grow plants that require low amounts of light because of the height of the buildings.

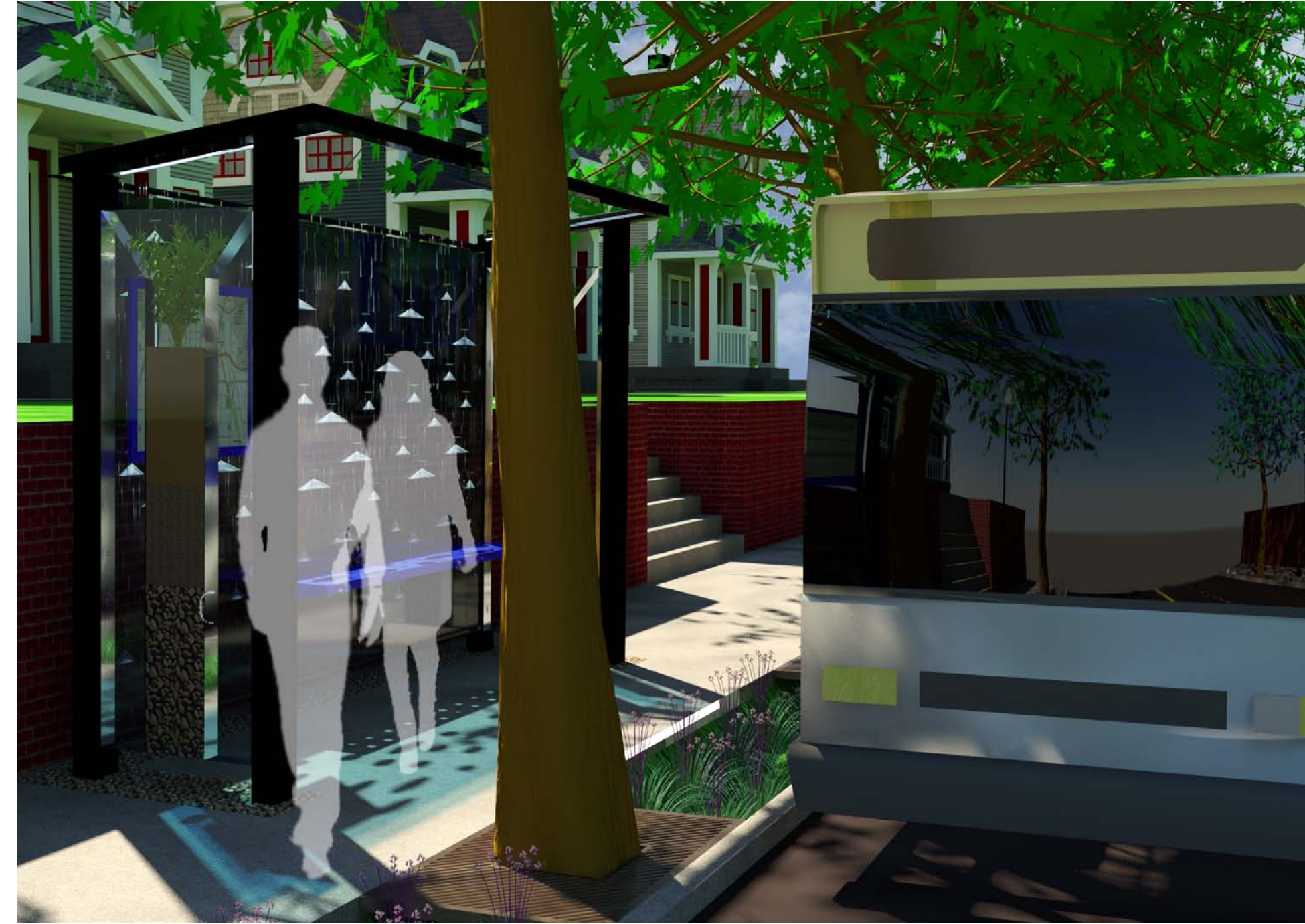
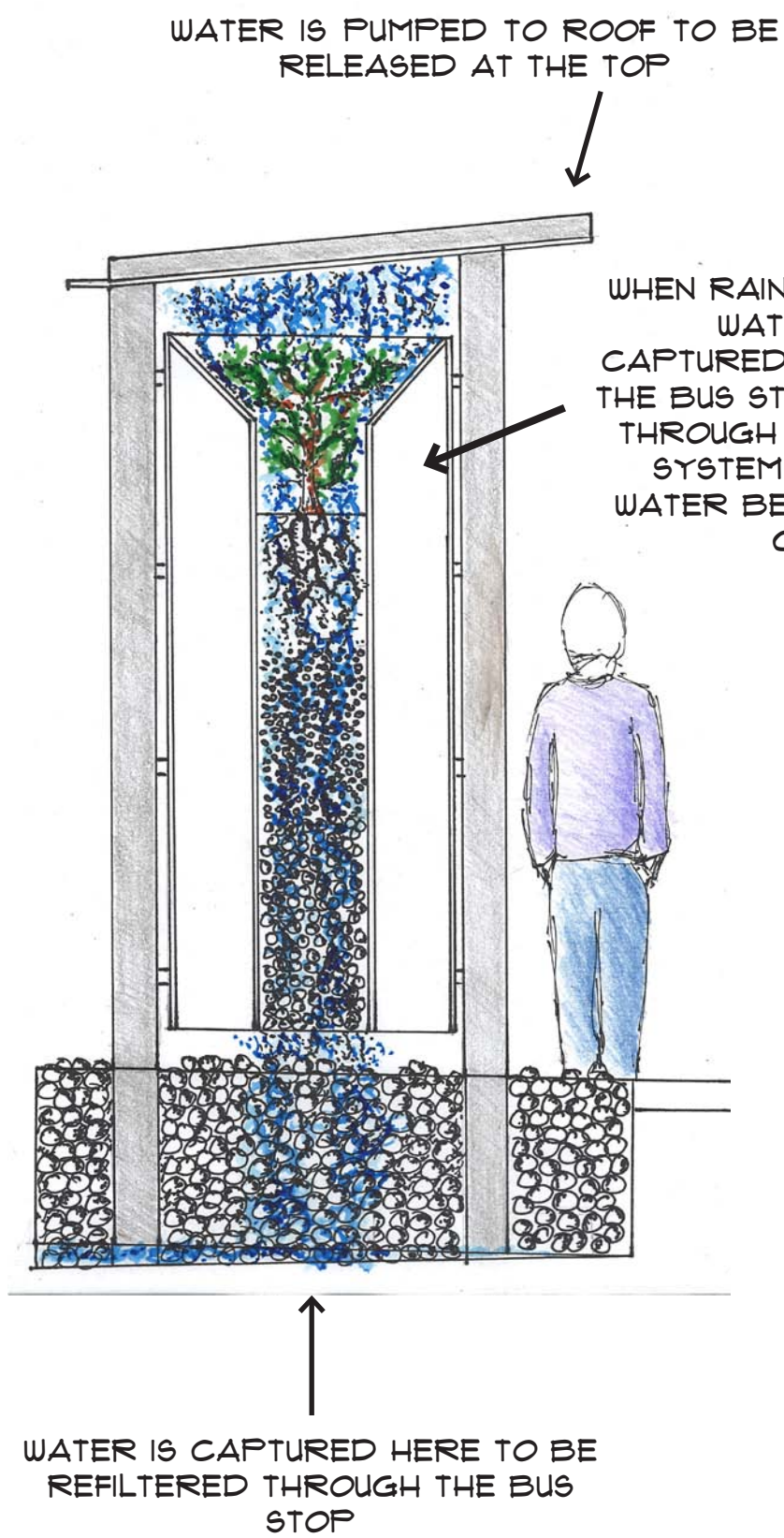
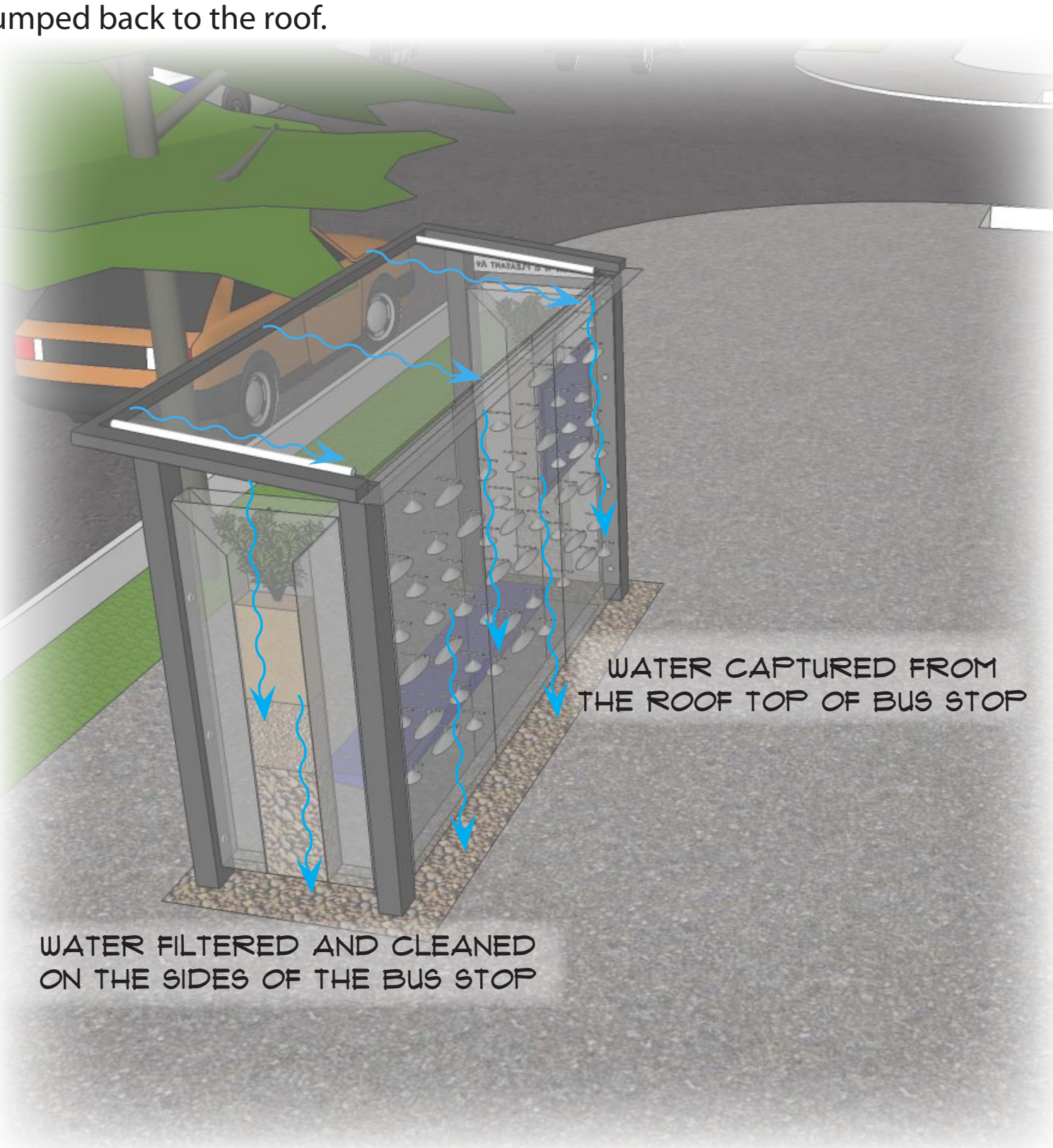


The water will be collected from the rooftop and stored in cisterns underground for later use by the tenants.

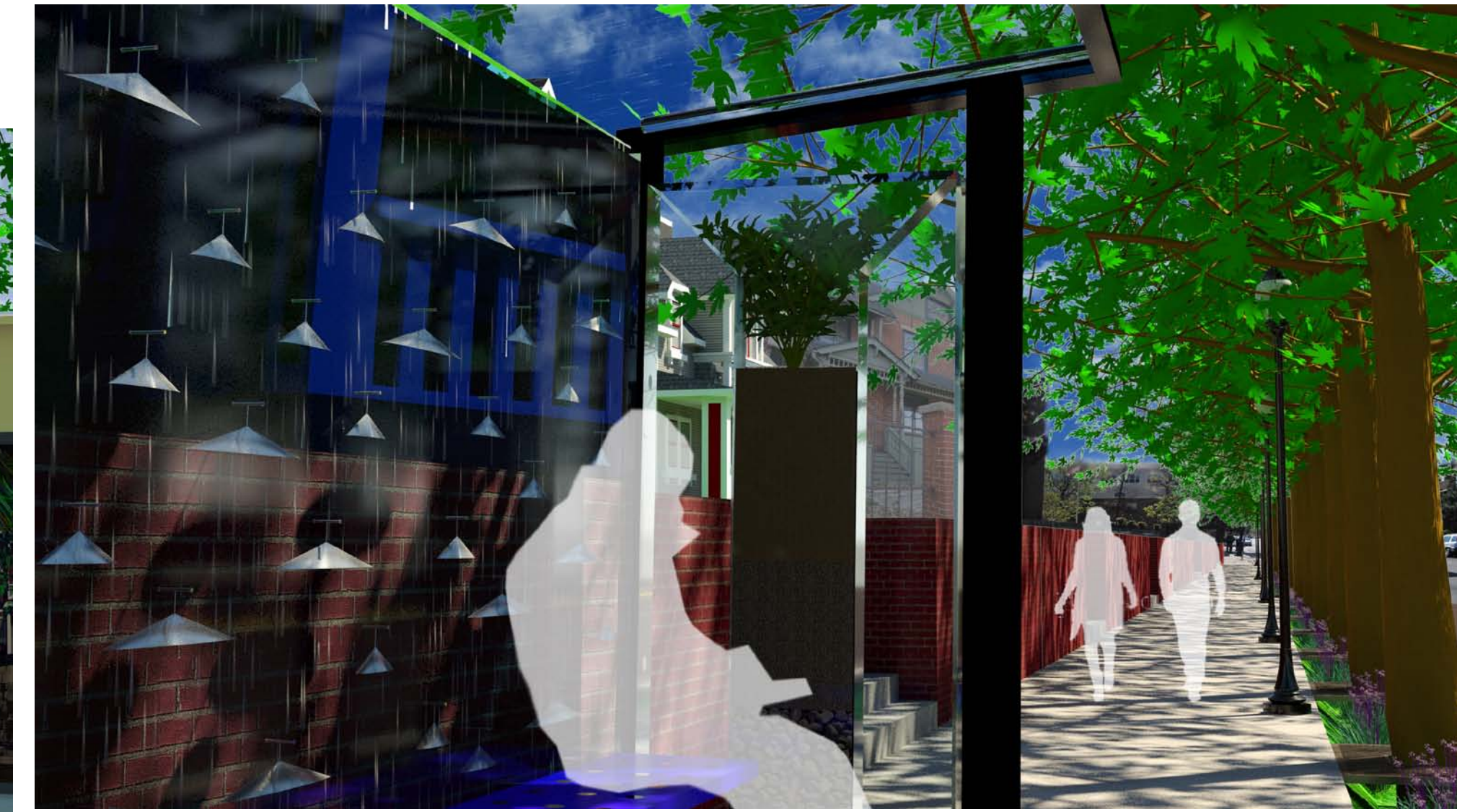


# 2. Bus Stops - exhibiting water

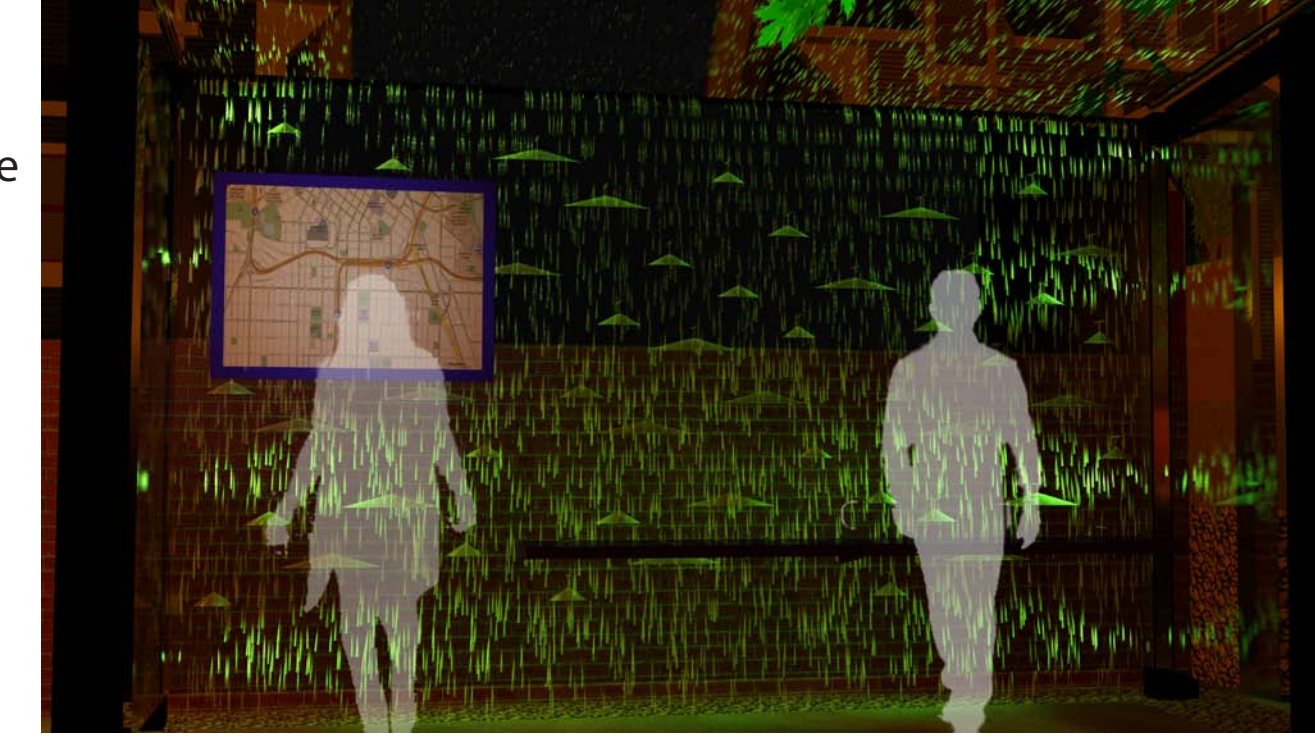
My design takes advantage of the amount of time people spend at bus stops waiting for the bus and uses it to demonstrate water and educate them. The water is pumped to the roof, flows across it and makes a "song" as it hits the symbols in between the two glass panels on the back side. Once the water gets to the ground it is then captured in a cistern underneath and eventually repumped back to the roof.



The flow rate at which the water is pumped onto the roof will correlate with the distance of the bus. The closer the bus is the faster the flow rate will be, while increasing the intensity of the "song" being created by the water.

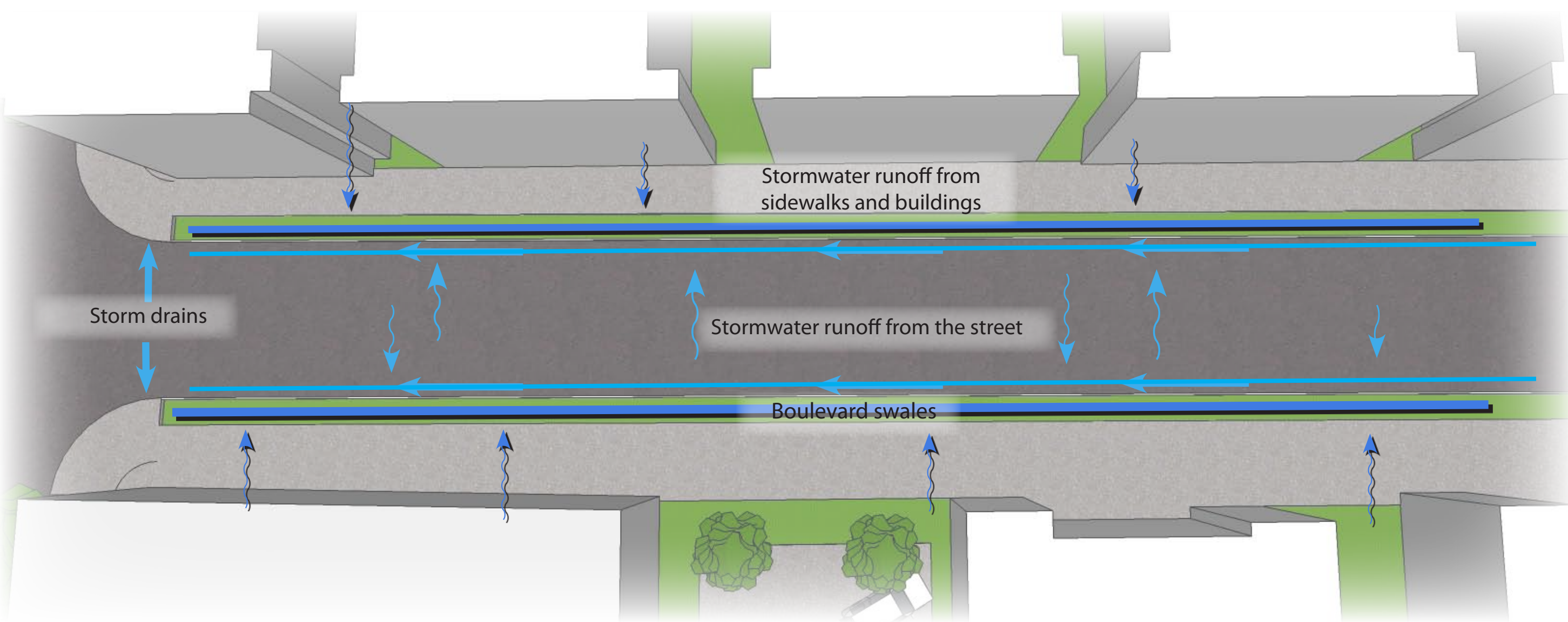


At night there will be lights shining through the glass that will change colors as the bus gets closer to the bus stop informing people how far the bus is.

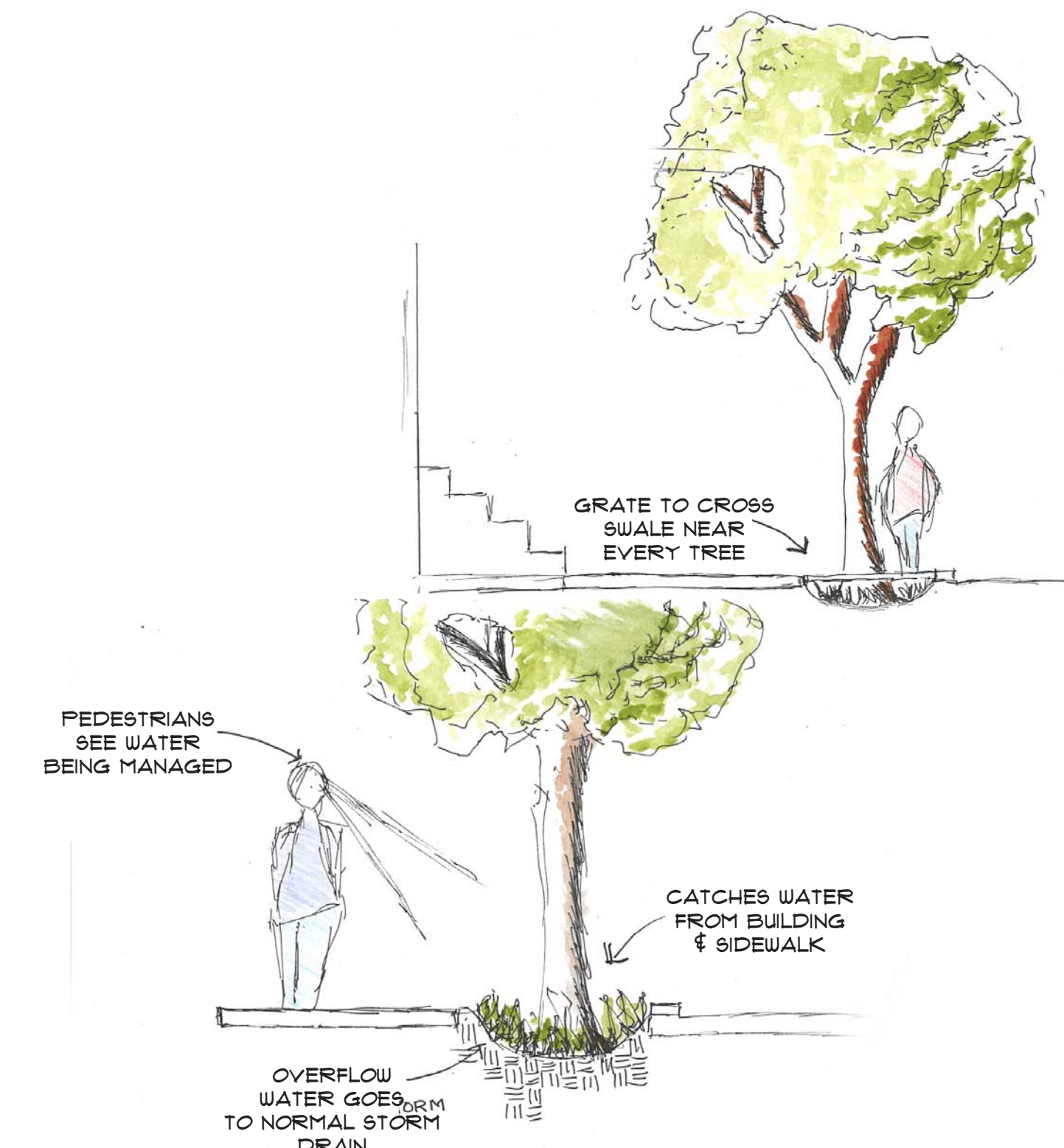


# 3. Boulevards - raingarden swales

All the boulevards throughout the neighborhood will be turned into raingarden swales that will capture runoff from the sidewalks and buildings. These swales will not affect the normal storm drains and will be able to handle up to 7 inches of rain before the water will overflow into the storm drains. These swales will have any array of colored plants making the boulevards places of high imageability while demonstrating water.

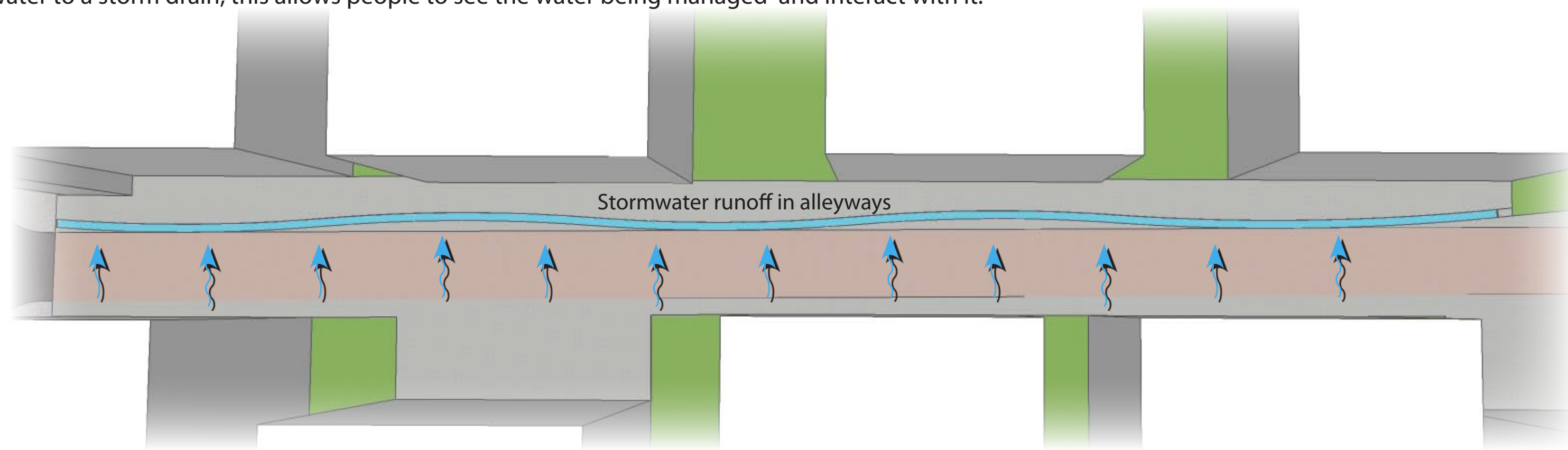


During the day or night the sidewalks will feel very safe and will be on a pedestrian scale.



# 4. Alleyways - permeable surface

All the alleyways will be repaved with permeable brick that will allow the water runoff to penetrate through the soil and recharge water tables. By repaving the alleys they will become more inviting for pedestrians and bikers creating a vertical connection throughout the entire neighborhood. Along the road of the alley there will be a change in paver pattern and color to signify where pedestrians should walk. Also along the side there will be a small trench that will collect water while it is raining and take the water to a storm drain, this allows people to see the water being managed and interact with it.



# 5. Parks -Stevens Square Park

There will be several parks throughout the neighborhood that connect together by serving different purposes for the community. For example Stevens Square Park will serve as a recreational park while another park may be used to meditate and relax. Because Stevens park is the biggest park and centrally located within the neighborhood a detailed design was created for it.



To emulate the Aborigines in the center of the park is swirling circle path and swale that has a gentle decreasing slope which captures any runoff during a storm. The water is then carried to the center of the circle where it is stored in a cistern and is used for a splash pad in the middle of the circle. The path that leads to the center of the park is surrounded by vegetation creating a strong ecology for the park and inviting environment for wildlife. The vegetation surrounding the path will correlate with every season as well ensuring that no matter what season it is the park will be alive with color.



<p><b>A</b></p> <p>australian aborigine</p> <p>indigenous people who mapped out watering holes in the desert through song and dance passed down from generation to generation.</p>	<p><b>C</b></p> <p>conservation</p> <p>the preservation and careful management of the environment and of natural resources.</p>	<p><b>E</b></p> <p>environment</p> <p>the natural world, as a whole or in a particular geographical area, esp. as affected by human activity.</p>	<p><b>G</b></p> <p>gardens</p> <p>a piece of ground, often near a house, used for growing flowers, fruit, or vegetables</p>	<p><b>I</b></p> <p>imageability</p> <p>that quality in a physical object which gives it a high probability of evoking a strong image in any given observer.</p>	<p><b>L</b></p> <p>landscape</p> <p>an expanse of scenery that can be seen in a single view.</p>
<p><b>A</b></p> <p>art</p> <p>a visual object or experience consciously created through an expression of skill or imagination, an expression of skill or imagination.</p>	<p><b>C</b></p> <p>connection</p> <p>a relation between things or events.</p>	<p><b>E</b></p> <p>education</p> <p>a body of knowledge acquired while being educated, possibly through an enlightening experience.</p>	<p><b>G</b></p> <p>gutters</p> <p>a channel at the side of a street or under the ridge of a roof for carrying away rainwater.</p>	<p><b>J</b></p> <p>journey</p> <p>the act of traveling from one space to another.</p>	<p><b>M</b></p> <p>memories</p> <p>a person's power to remember things.</p>
<p><b>B</b></p> <p>bus stop</p> <p>a place on a bus route where buses stop to discharge and take on passengers.</p>	<p><b>D</b></p> <p>detention</p> <p>a state of being confined, found useful for capturing runoff water.</p>	<p><b>F</b></p> <p>form</p> <p>the visible shape or configuration of elements within a landscape or the landscape itself.</p>	<p><b>H</b></p> <p>history</p> <p>the whole series of past events connected with someone or something.</p>	<p><b>K</b></p> <p>kinetic</p> <p>that quality in a physical object which gives it a high probability of evoking a strong image in any given observer.</p>	<p><b>N</b></p> <p>non-point pollution</p> <p>run off that picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters and ground waters.</p>
<p><b>C</b></p> <p>culture</p> <p>the attitudes and behavior that are characteristic of a particular social group or organization.</p>	<p><b>E</b></p> <p>economy</p> <p>the wealth and resources of a country or region, esp. in terms of the production and consumption of goods and services.</p>	<p><b>F</b></p> <p>function</p> <p>practical use or purpose in the design of a landscape.</p>	<p><b>I</b></p> <p>infiltration</p> <p>the slow passage of a liquid through a filtering medium "the percolation of rainwater through the soil".</p>	<p><b>L</b></p> <p>lighting</p> <p>apparatus for supplying artificial light effects for a landscape.</p>	<p><b>O</b></p> <p>opportunity</p> <p>a possibility due to a favorable combination of circumstances.</p>

pavement

material used to pave an area or landscape.

P

quality

an essential and distinguishing attribute of something or someone.

Q

slope

a rising or falling surface that can affect the flow rate of water runoff.

S

transportation

a facility consisting of the means and equipment necessary for the movement of passengers or goods.

T

water

an element that is a necessity to human a plant life.

W

plants

a living organism that can be used to beautify a landscape or create a better ecology for the area.

P

rain garden

an area that captures rain water and uses plants to help infiltrate the water into the soil.

R

snow

atmospheric water vapor frozen into ice crystals and falling in light white flakes or lying on the ground as a white layer.

S

urban

a facility consisting of the means and equipment necessary for the movement of passengers or goods.

U

youth

a state of quality of being young, considered to have vigor and freshness.

Y

permeable

allowing fluids to pass or diffuse through a surface.

P

stormwater

water runoff created during or after a storm.

S

trees

a tall perennial woody plant having a main trunk and branches forming a distinct elevated crown.

T

visionary

a person given to fanciful speculations and enthusiasms with little regard for what is actually possible.

V

walkability

a measure of how friendly an area is to walk in.

W

pedestrian

a person who travels on foot to get from one point to another.

P

sustainability

conserving an ecological balance by avoiding depletion of natural resources using society, economy and environment as the elements that must stay in balance.

S

technology

the discipline dealing with the art or science of applying scientific knowledge to practical problems.

T

wayfinding

the process of using spatial and environmental information to find our way in the built environment.

W

xeriscape

landscape designed in a way that decrease and reduce the need for supplemental water for plants with the area.

X

zen

a state of total focus and relaxation.

Z