

seattle's urban water

an urban stormwater management design to bring people closer to the water...

statement of intent

statement of intent: *“How can sustainable stormwater management practices be incorporated into an urban environment while also creating public awareness and involvement?”*

waterfront:

The site I have chosen is located along the waterfront of downtown Seattle, and the shoreline of Puget Sound. This area is directly affected by stormwater runoff issues. The site design for this area combines the concern of stormwater runoff with intent to educate the public about the stormwater management. By creating this park, boulevards, waterfront, and medians, the area will connect the city back to its waterfront while making it appealing to the public eye, and still be a sustainable functional design that treats and filters stormwater runoff from the city.



Seattle's continuous rainfall prevents the water supply from reestablishing its integrity by filtering out toxins without interception, the stormwater water flows through streets, down rooftops, and across parking lots, picking up debris and contaminants as it goes.



Seattle's over abundance of impermeable hardscapes cause a significant deficiency in existing green infrastructure. This makes the city's vast amounts of precipitation unable to be absorbed and filtrated by natural processes.



STORMWATER. foreign pollutants compromise the water supply.



photos by: Zerek Kroll

what is stormwater

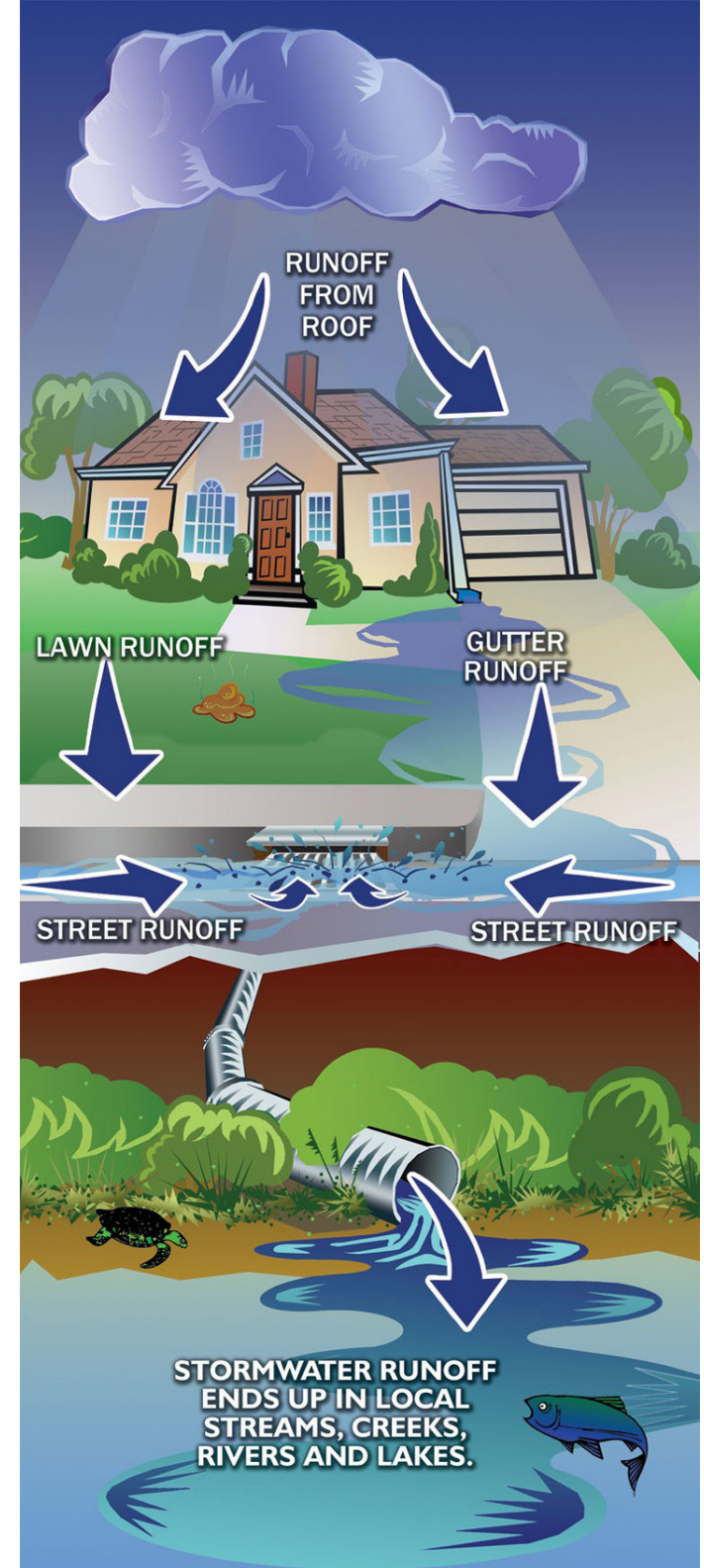
When it rains, stormwater runs off our streets, rooftops, and lawns and saturates our water supply with automobile chemicals, fertilizers, and other detrimental pollutants.

why is this bad?

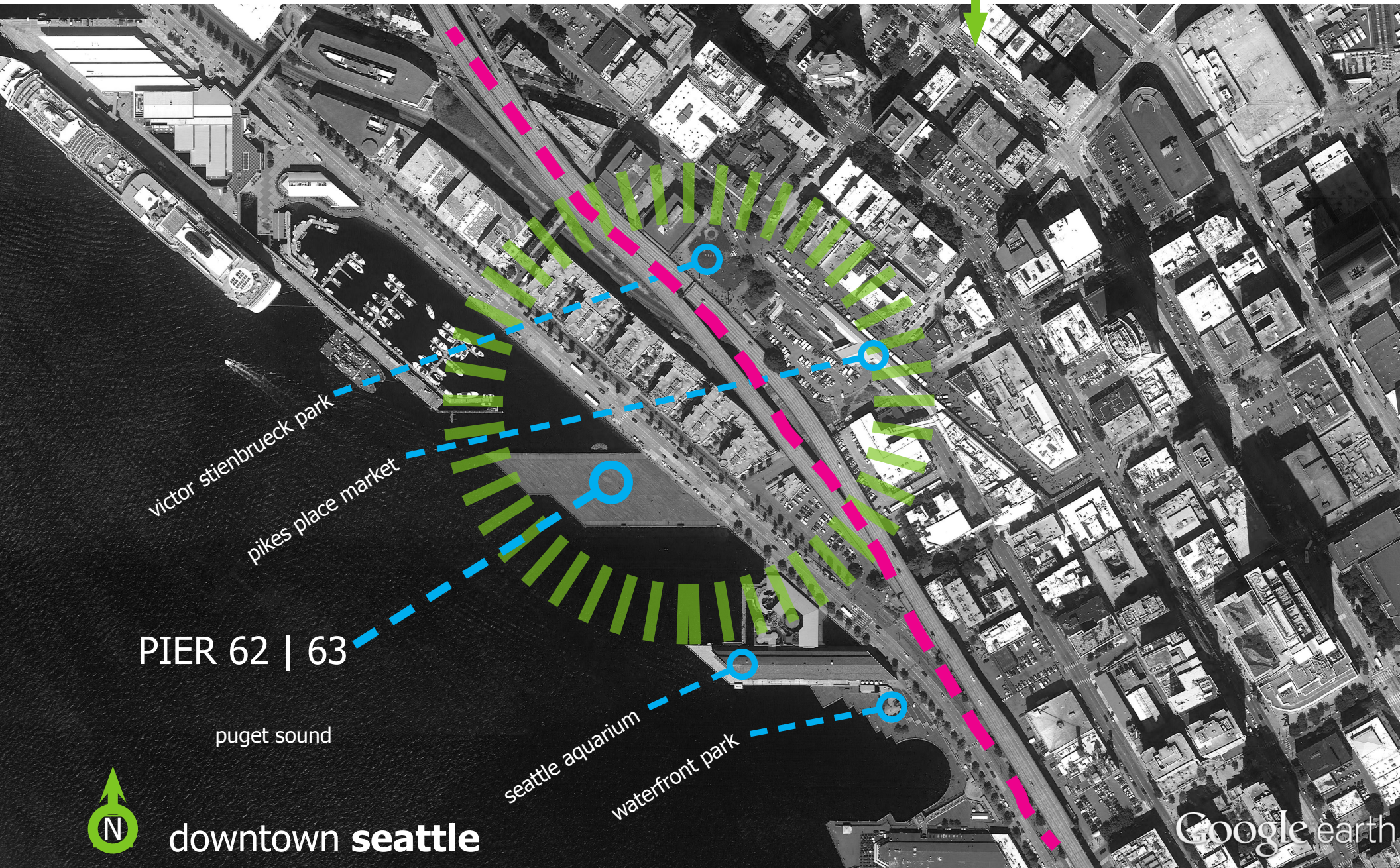
Ultimately, these contaminants compromise ecosystems, degrade our water quality, and jeopardize surrounding wildlife.

how can we stop it?

Understanding the importance of sustainable stormwater practices will enable the implementation of designs that are conscious of both human and environmental health.



context map



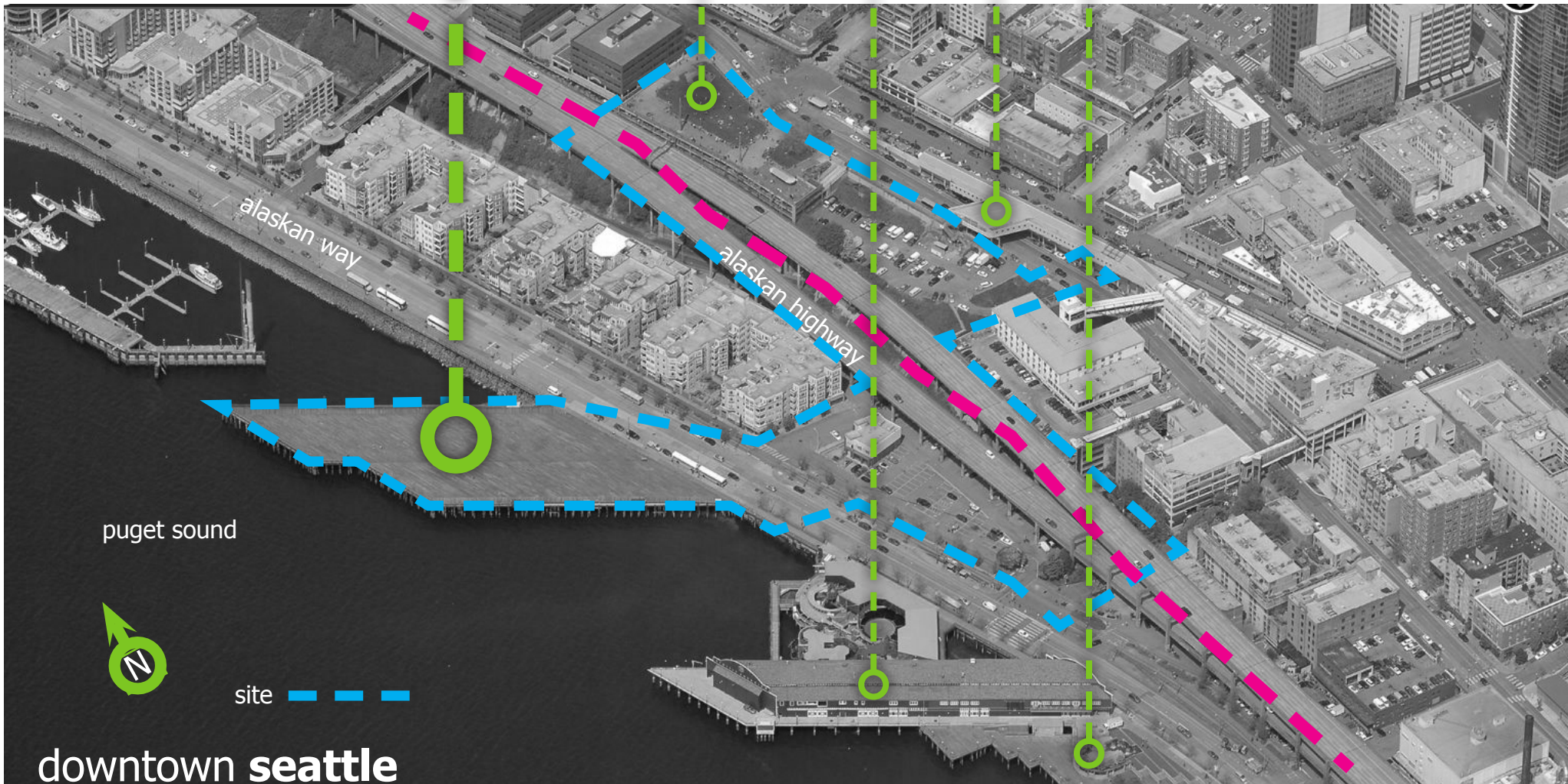
downtown **seattle**

Google earth

photos by: Google earth

context map

PIER 62 | 63



puget sound



site ———

downtown seattle

photos by: Bing Maps 3D



facing north toward pier 62/63



facing northwest on pier 62/63



facing north on pier 62/63



facing south east toward pier 62/63



facing north toward victor stienbrueck park



facing east toward pikes place market



facing south at victor stienbrueck park toward the Seattle aquarium



facing north underneath the alaskan highway



downtown seattle



Issue

Problem area 

Site 

Flow of City 

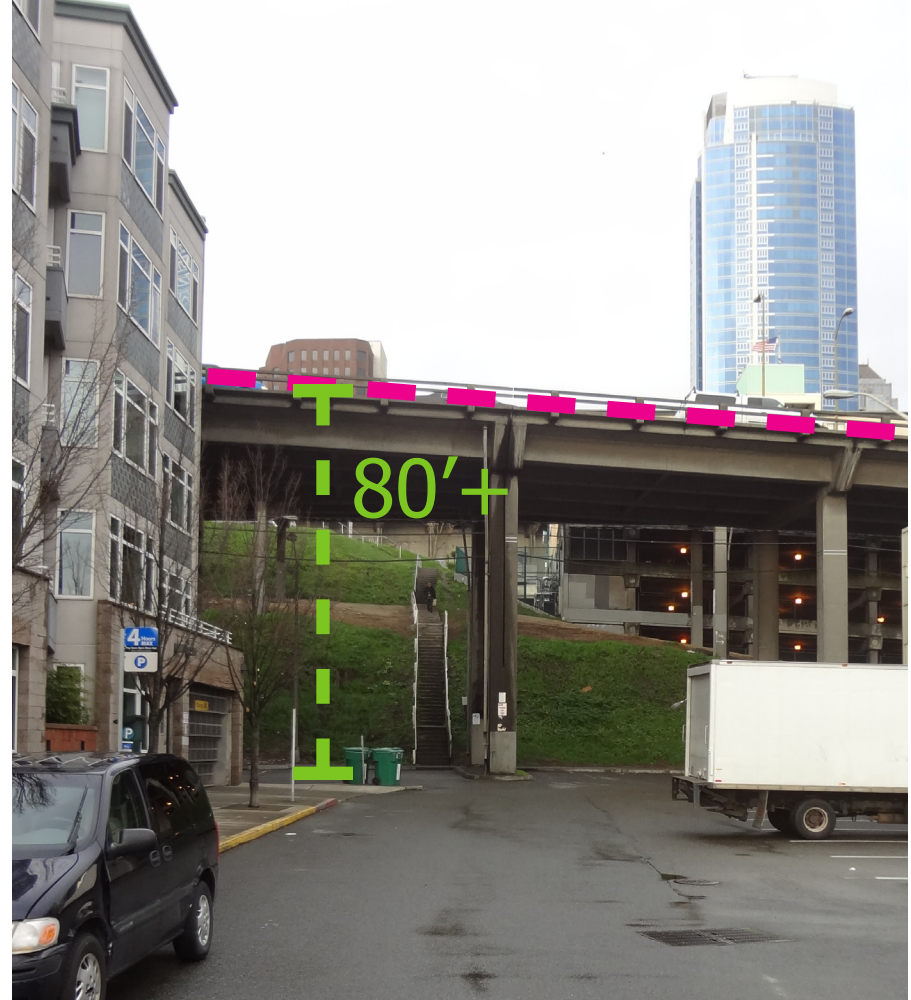
Pedestrian connections 

scale: 500'

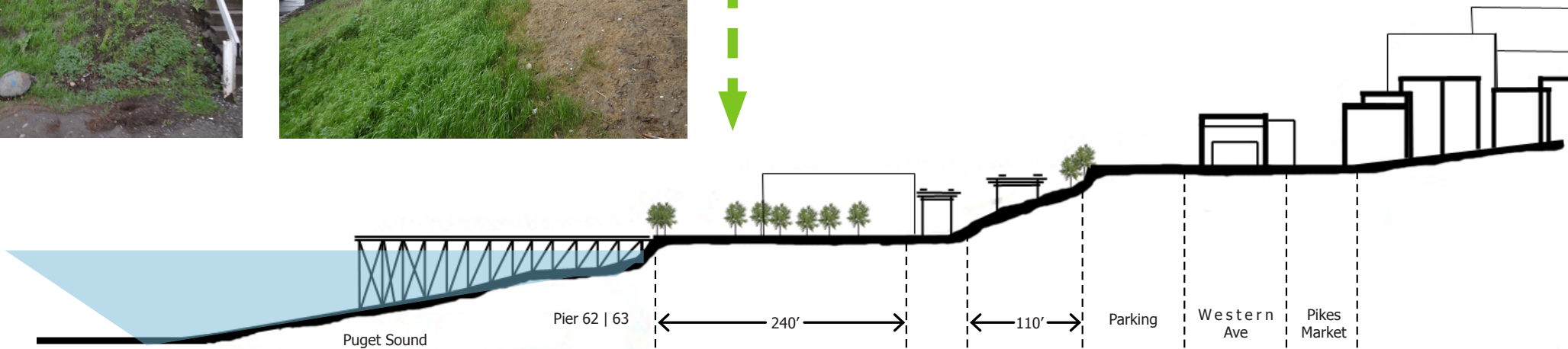
site issues

contour drop:

With a major contour drop going through my site it cuts off downtown Seattle with the waterfront of Puget Sound.



photos by: Zerek Kroll



site issues

downtown seattle

Elevations

- Pier 62 | 63
16.5' ft
- Olympic Sculpture Park
20' ft
- Victor Steinbrueck Park
110' ft
- Pikes Place Market
100' ft
- Seattle Aquarium
16.5' ft



site



scale: 400'



site issues

downtown seattle

Erosion

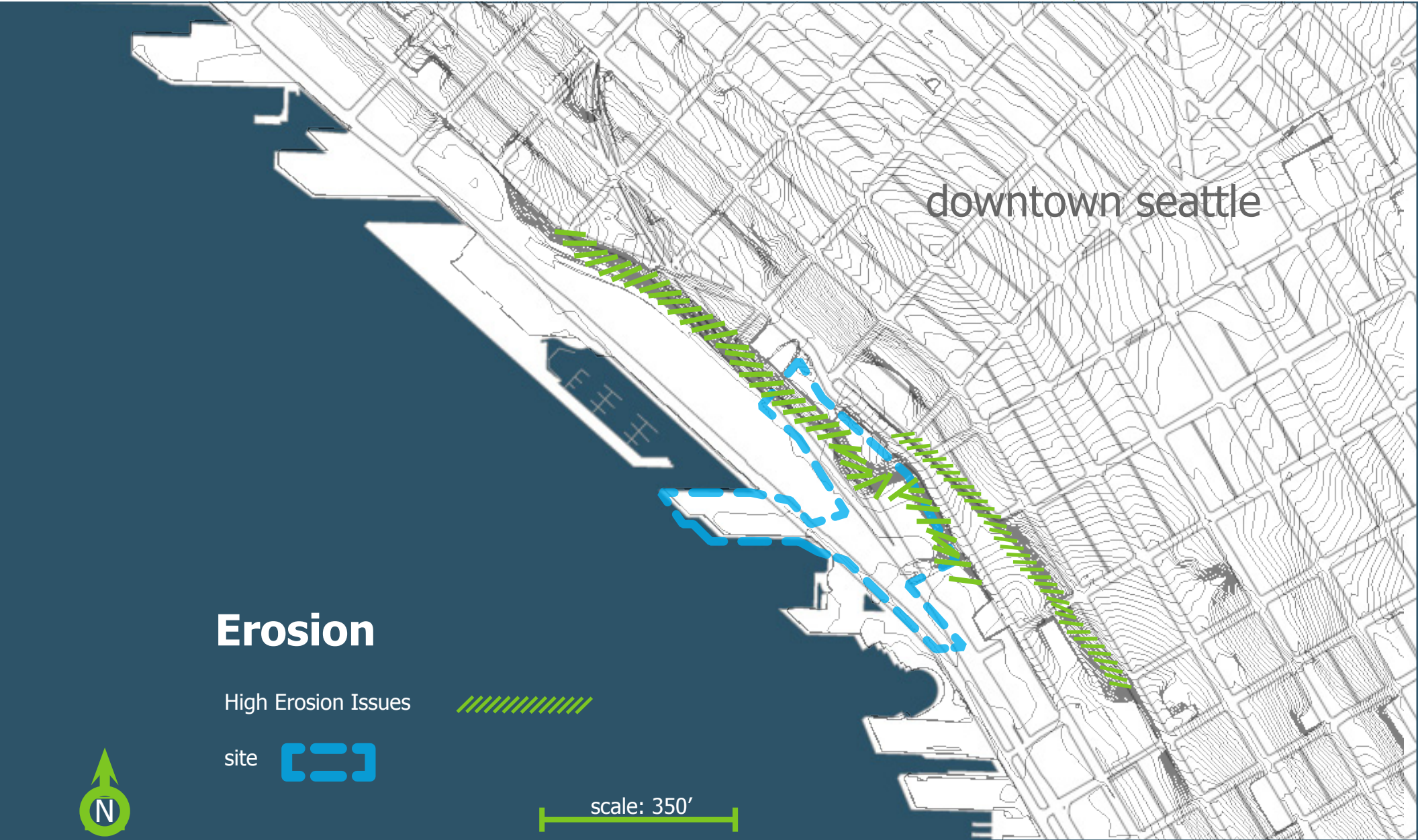
High Erosion Issues



site



scale: 350'



site issues



water levels:

With tide levels changing every hour of the day people start to develop a distance from the water driving them away from it. At night you can be 9 feet from the water however in the day up to 16 feet.

+16'

TOP OF WALL

+8.9'

HIGH WATER LEVEL

+4.2'

MEAN WATER LEVEL

+2.5'

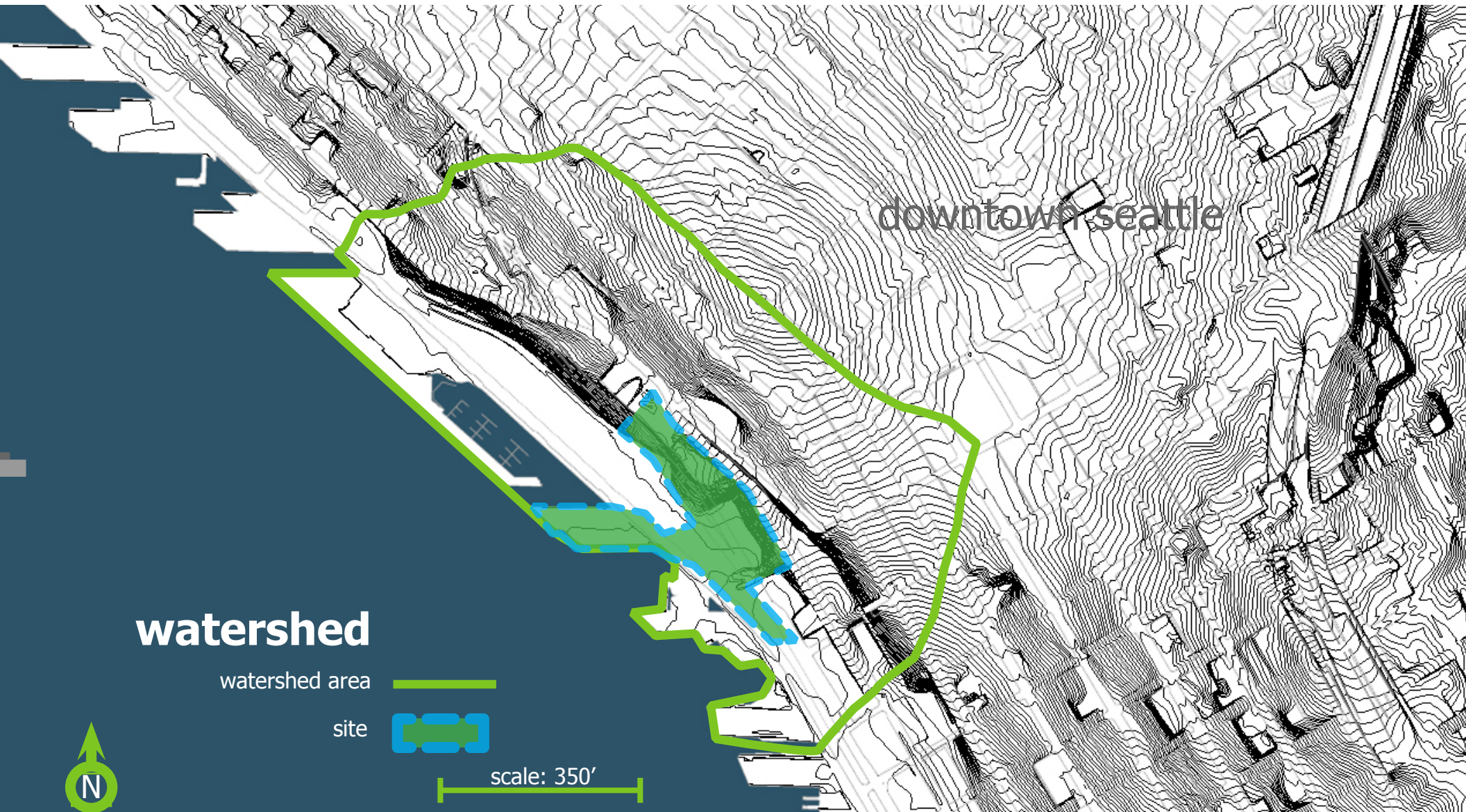
LOW WATER LEVEL

$$q = CiA$$

- q = Peak runoff rate, in cubic feet per second
- C = Dimensionless coefficient
- i = Rainfall intensity inches per hour
- A = Area of drainage

$$q = (.90)(.5)(6,417,500) = 2,887,875 \text{ ft}^3/\text{s}$$

→ Peak Runoff Rate = 2,887,875 ft³/s
Flow time = 3.25 minutes



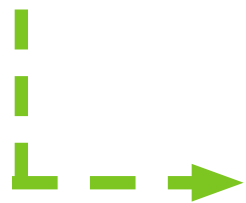
development +



photo by: Zerek Kroll

- sustainable stormwater management practices are investigated.
- relationships between the natural environment, and how it is able to be incorporated into an urban setting.
- solution to develop interaction and education among individuals and water.

goals



public access

Create a public access by knocking down barriers from the city to the waterfront. Make the waterfront more inviting and enjoyable

pollution

Create a treatment program that not only treats the stormwater before it enters puget sound but also educate the surroundings on stormwater management

green

Create a green infrastructure in downtown seattle, with connections for pedestrian uses with the use of stormwater management practices.

waterfront

Redevelop seattles waterfront as a better place for citizens to come and enjoy the water and views of the great puget sound





photo by: Google earth

conceptual design:

Going into the conceptual design phase I found myself really passionate about expanding the pier of 62/63 and creating a better connection to pikes place market that wouldn't be so exhausting for pedestrians.



design solution:

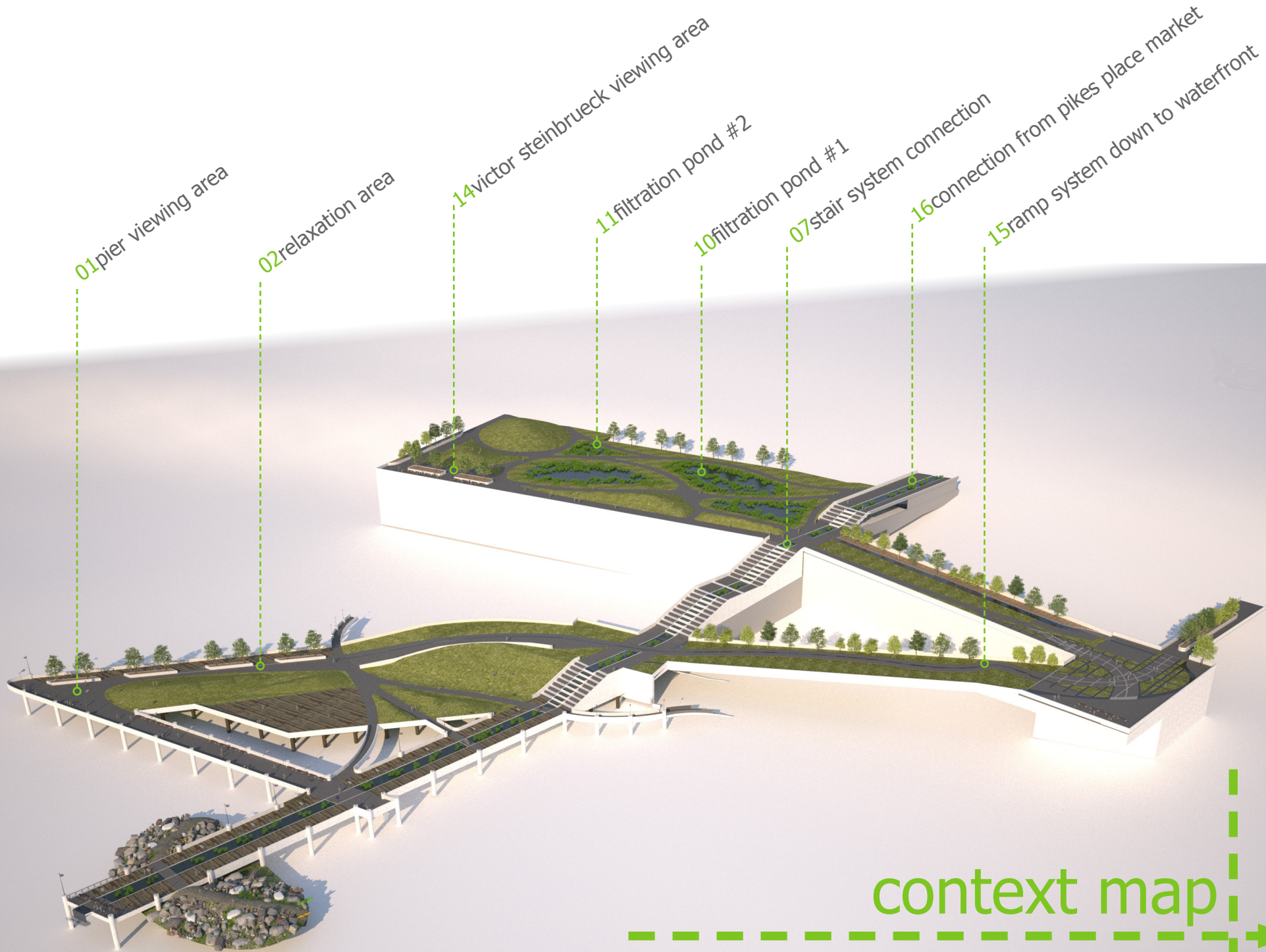
This design solution provides a method of incorporating nature into a vast expanse of cityscape, and connecting the Puget sound with the city of Seattle, WA. The integration of parks in the space allows users to relax, play, and enjoy this area while providing an environment to learn from the natural processes of their surrounding environment. The stairway provides quick and direct access to Puget Sound while incorporating reservoirs with plants that naturally clean the water being pumped back into the sound. The meandering pathways provide an alternative route for leisurely experiencing the space, and what it has to offer. Various observation areas allow for a relaxing experience and reflection. The overall solution provides greens space in an urban setting where users can be social and interact with the environment.

master plan

- 01 pier viewing area
- 02 relaxation area
- 03 hilltop viewing area
- 04 low flow water cleansing
- 05 end of pier viewing area and water release
- 06 pedestrian water interaction area
- 07 stair system connection
- 08 south side viewing area
- 09 entrance from pike street
- 10 filtration pond #1
- 11 filtration pond #2
- 12 filtration pond #3
- 13 filtration pond #4
- 14 victor stienbrueck viewing area
- 15 ramp system down to waterfront
- 16 connection from pikes place market



scale: 250'



01 pier viewing area

02 relaxation area

14 victor steinbrueck viewing area

11 filtration pond #2

10 filtration pond #1

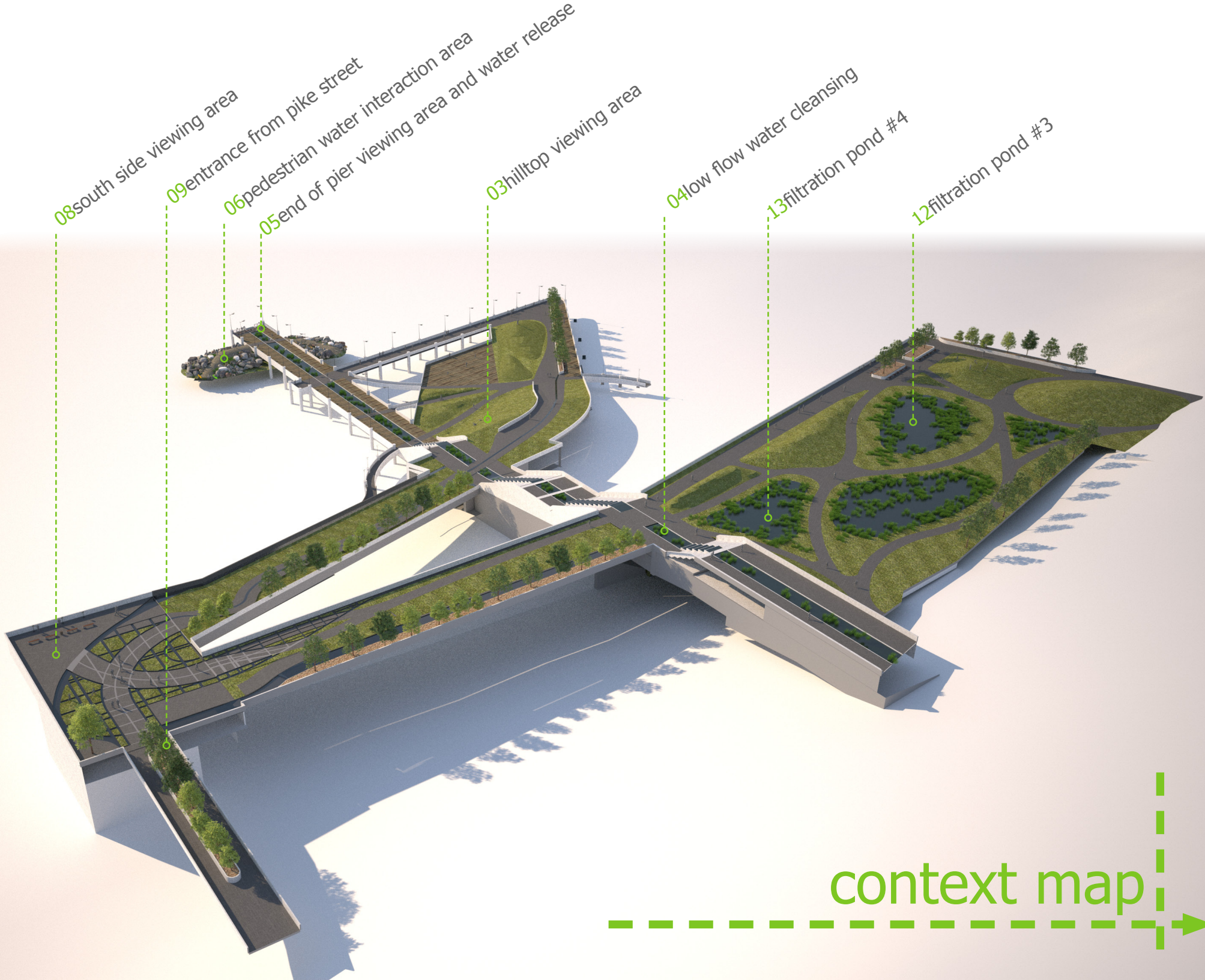
07 stair system connection

16 connection from pikes place market

15 ramp system down to waterfront

context map





08 south side viewing area

09 entrance from pike street

06 pedestrian water interaction area

05 end of pier viewing area and water release

03 hilltop viewing area

04 low flow water cleansing

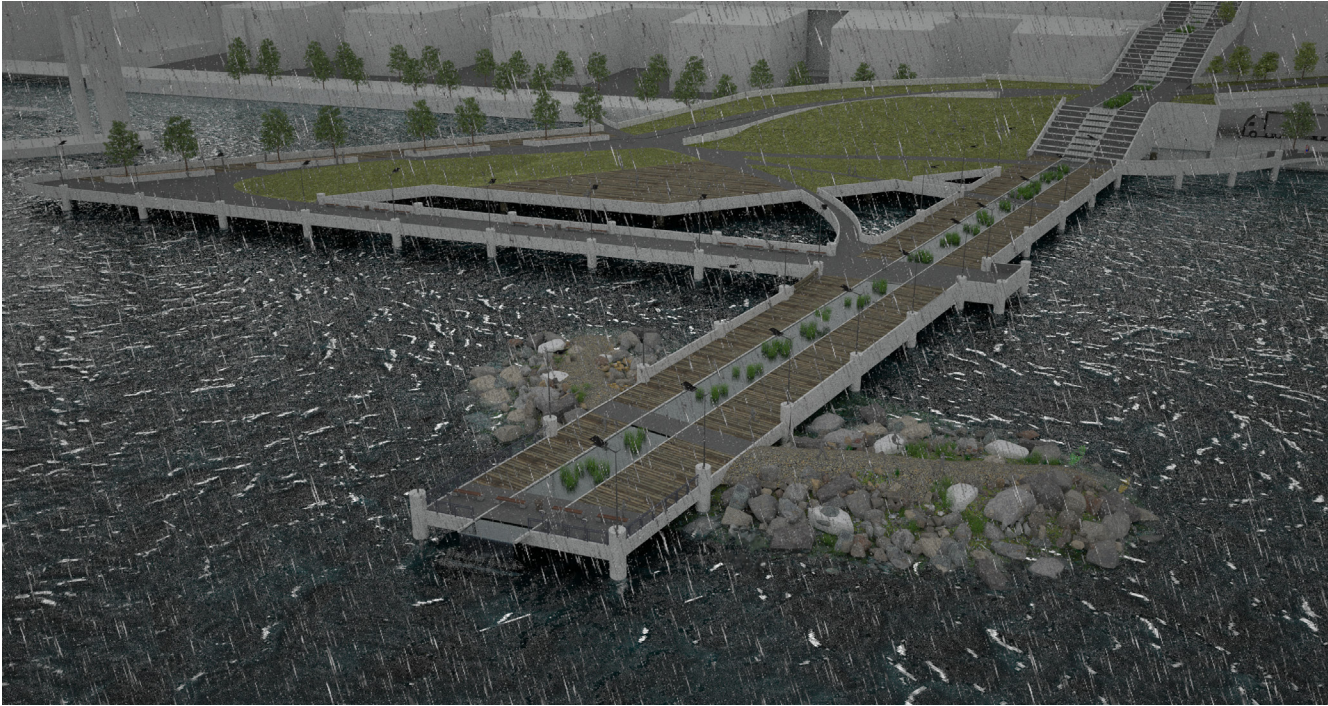
13 filtration pond #4

12 filtration pond #3

context map



urban stormwater

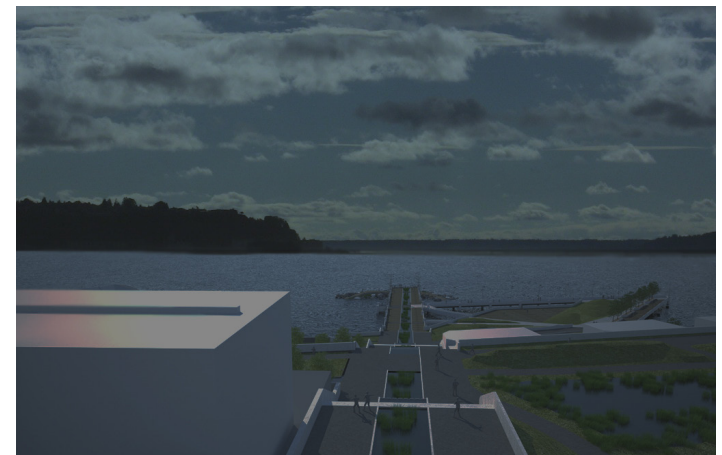


rain storm:
This perspective shows what the pier would look like in the event of a storm.

filtration system:
filtration system are comprised of several sustainable water retention techniques. Bioswales and urban planters intercept \ stormwater runoff, and allow it to be filtered before returning back into the water cycle.

stormwater management:

The stormwater management areas are located throughout the site. They will utilize stormwater retention by slowing down the flow of runoff, in a low flow system, filtering the water through plants, while producing value with vegetation within the site. In addition, there will be kiosks throughout this design that will educate individuals by incorporating an element of interaction.



- 01 seattle Washington
- 02 pikes place market stormwater collection
- 03 filtration pond #1
- 04 filtration pond #2
- 05 filtration pond #3
- 06 filtration pond #4
- 07 diversion hub and overflow diversion
- 08 low flow water cleansing and pedestrian water interaction area
- 09 stair system connection
- 10 end of pier viewing area and water release
- 11 end of pier relaxation area and water release

urban stormwater



puget sound



scale: 250'

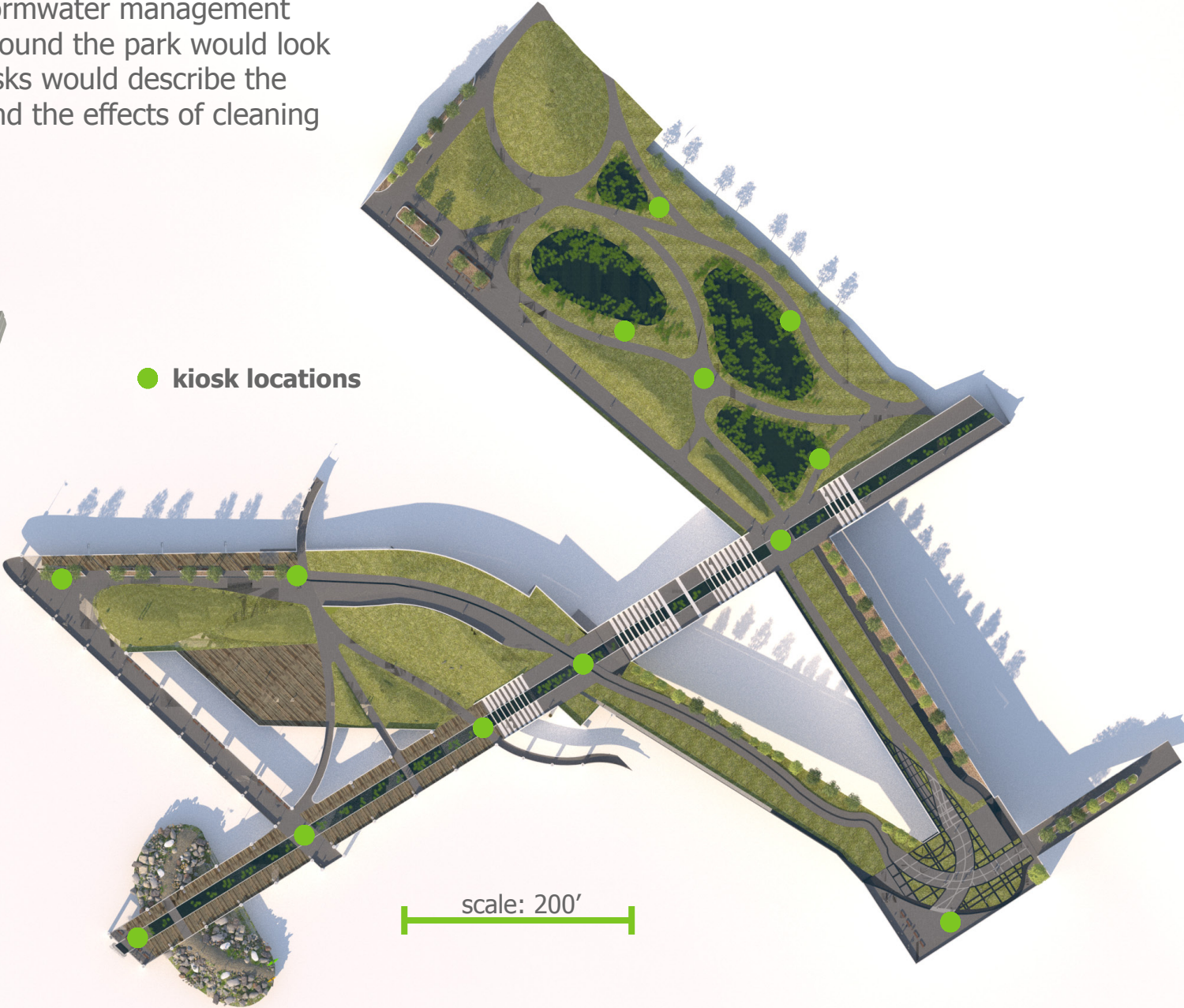
urban stormwater

kiosk:

This perspectives shows what the educational stormwater management kiosk placed around the park would look like. These kiosks would describe the three stages and the effects of cleaning the water.



● kiosk locations



scale: 200'



stage system

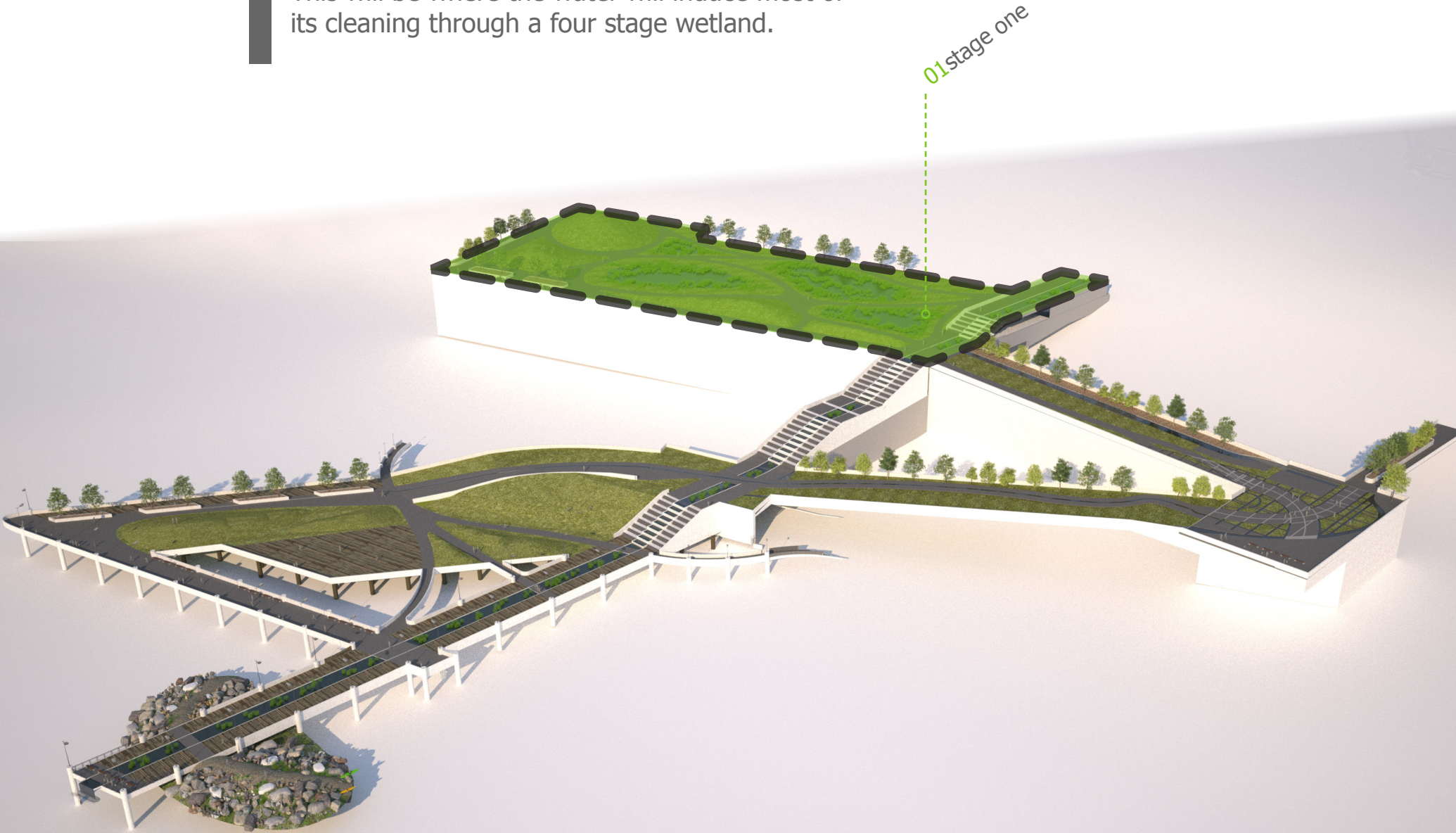
three stage system:
A three stage system will be used to clean the stormwater with interactive and educational areas along the way.



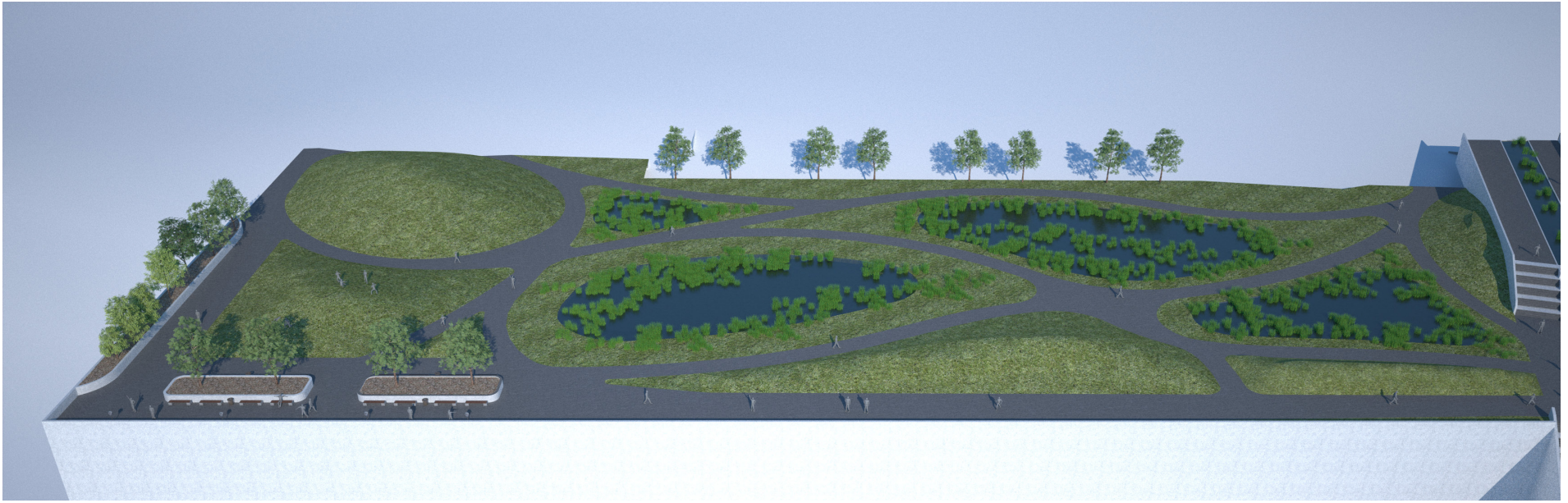
stage system

stage one:

This will be where the water will induce most of its cleaning through a four stage wetland.



stage one



bioswale collection:

Bioswales will be within the boulevards to collect the stormwater and divert it to the park for proper filtration. Here will be four ponds that will slow the water down and clean it step by step.



stage one



greenways | green infrastructure:

The greenways are linear vegetation buffers that connect my site to the rest of the community. The greenways treat stormwater while providing an enjoyable, living, green space serving as an aesthetically pleasing walkway for individuals.

stage one

→ victor stienbrueck park:

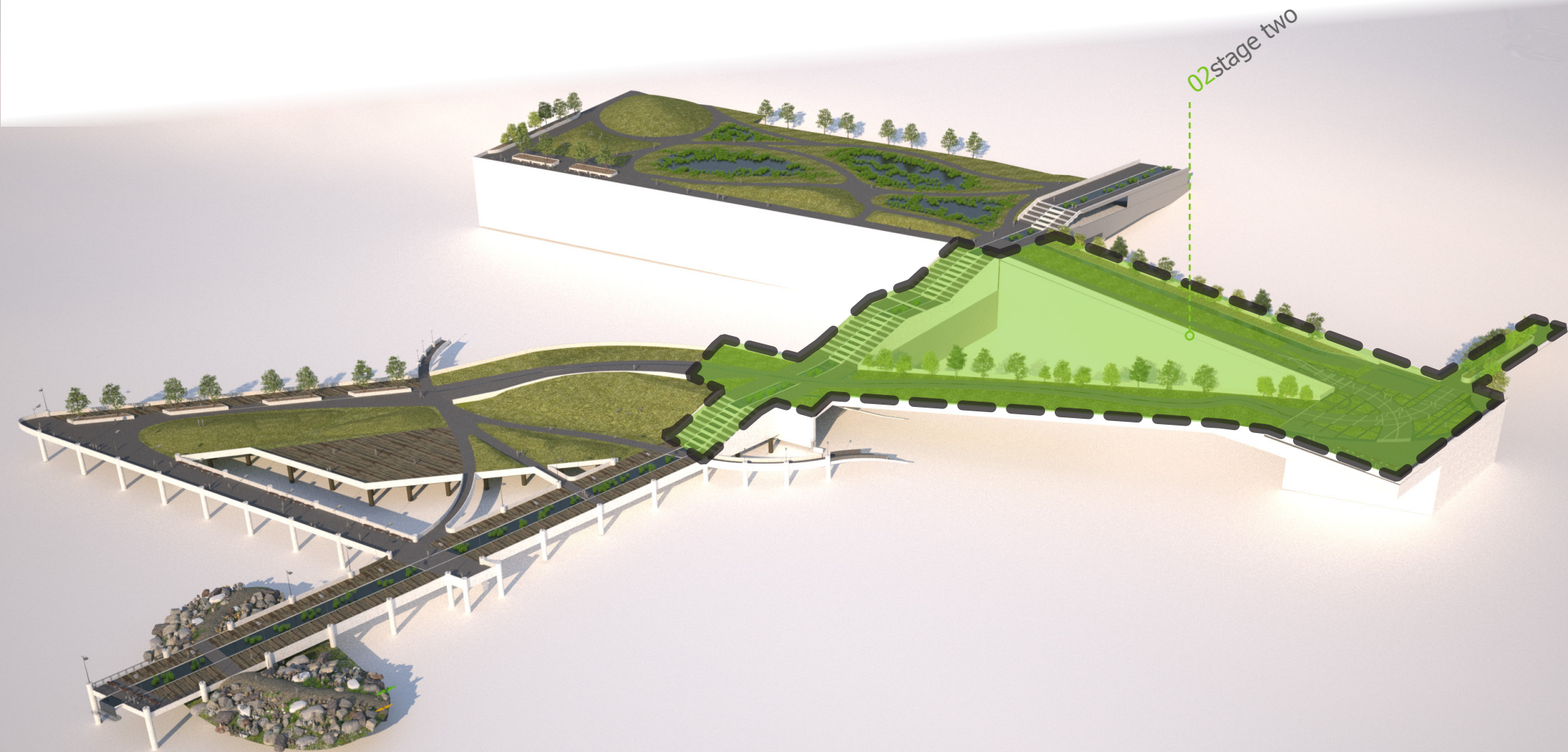
The old Victor Steinbrueck Park is transformed into a viewing area highlighting nature and the filtration ponds. While acting as a water cleansing system, the filtration ponds also create a space for individuals in the community to gather and learn.



stage system

stage two:

This stage will be where the water will be filtered through a low flow terrace system that doesn't release water until new water is brought in such as a rain storm or even a light sprinkle.



stage two



meandering ramp:

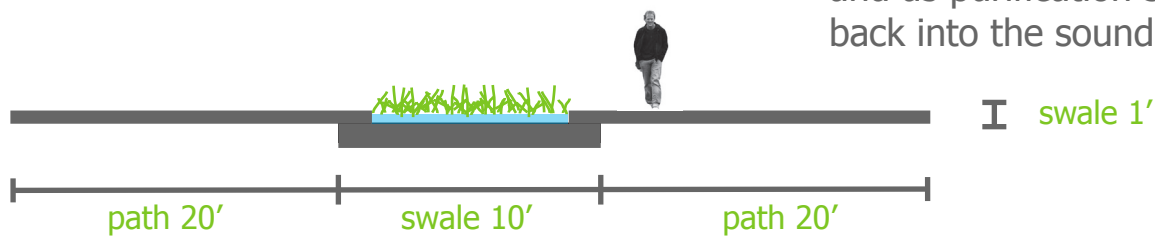
This birds-eye-view shows how the various path systems run throughout the space. The stairway provides access to the pier for those who are eager to be at the water's edge. On the other hand, the walking path serves as an outlet for individuals to meander and enjoy their surroundings on their way to the water. Additionally, this view shows the Southside viewing area, which directly connects the pier to Pike Street.

stage two



filtration terrace system:

Pikes Place Market is the starting point for the stairway that transports users to the waterfront of Puget Sound. These low-flow reservoirs serve as elements of interest and as purification systems for the water being released back into the sound.



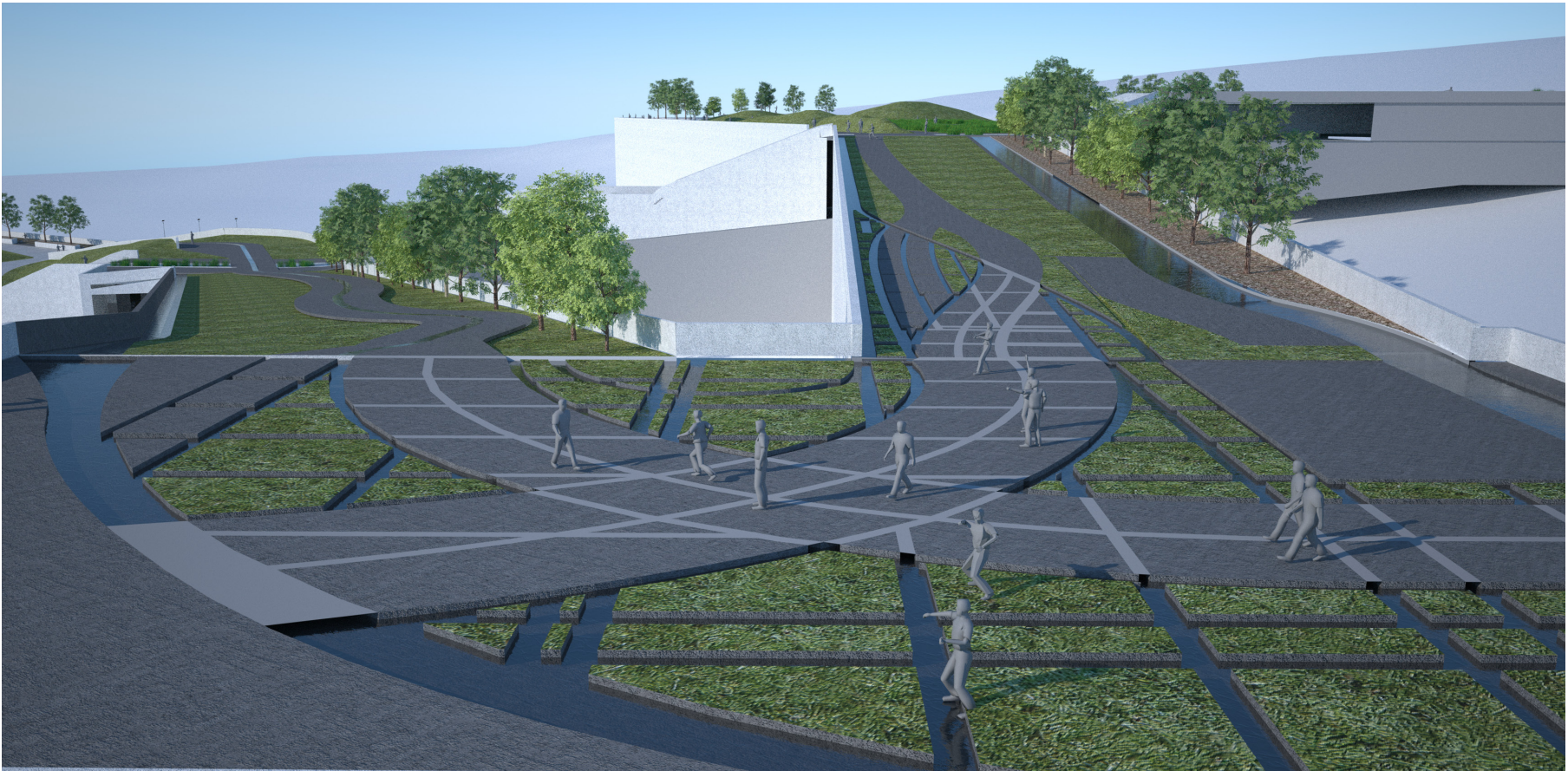
stage two



southside viewing area:

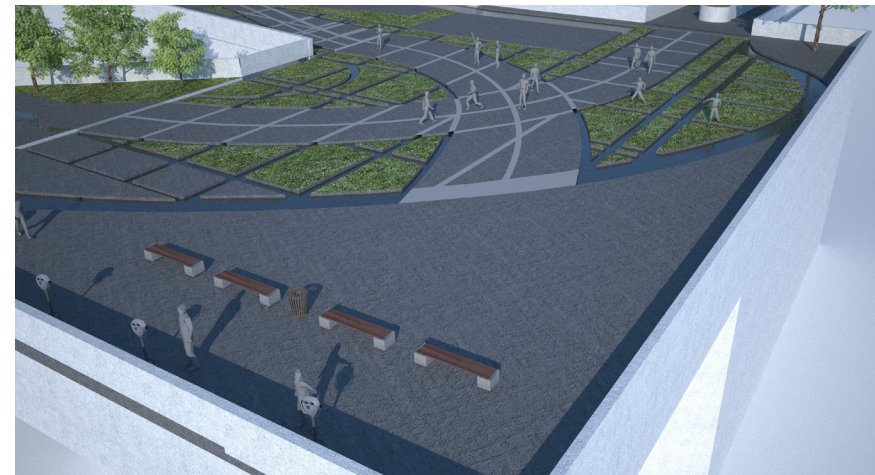
This view shows the Southside viewing area plan, which directly connects the pier to Pike Street. This area will be a delightful area to enjoy views of puget sound and of the skyline.

stage two



southside viewing area:

This view shows the Southside viewing area, which allows pedestrians to interact with the stormwater while they learn about it. This area will be a delightful area to enjoy views and hop over the water.

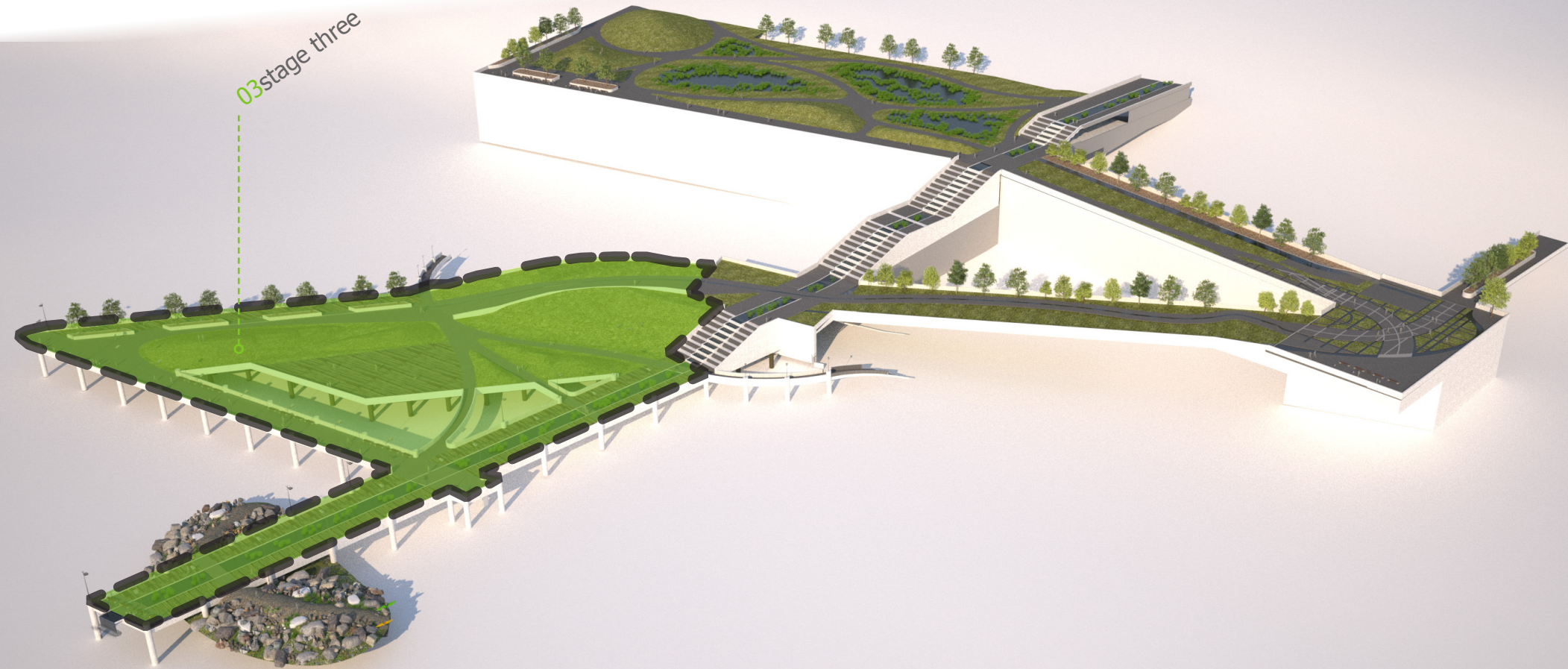


stage system

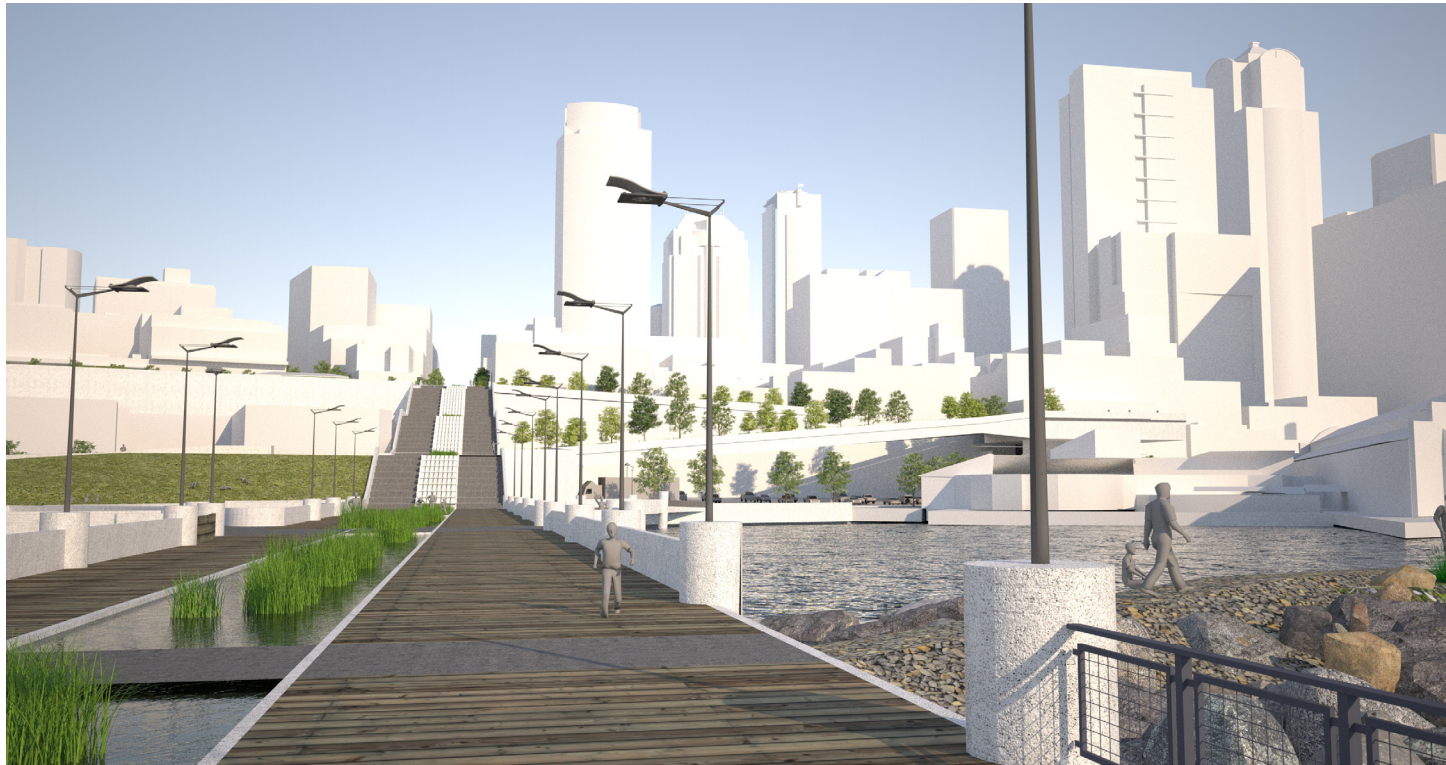
stage three:

This stage will be the final releasing of the filtered water.

03stage three



stage three



end of pier:

This perspective shows how users of the space would experience the end of the pier. Looking towards the city, individuals are able to see how this integrated nature fits into the city environment.



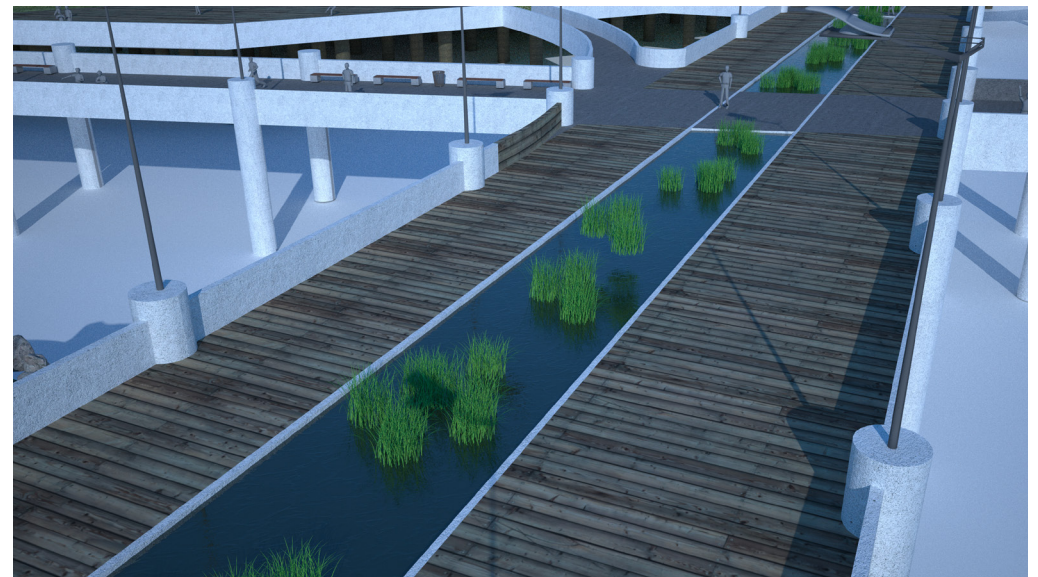
photo by: Zerek Kroll

stage three

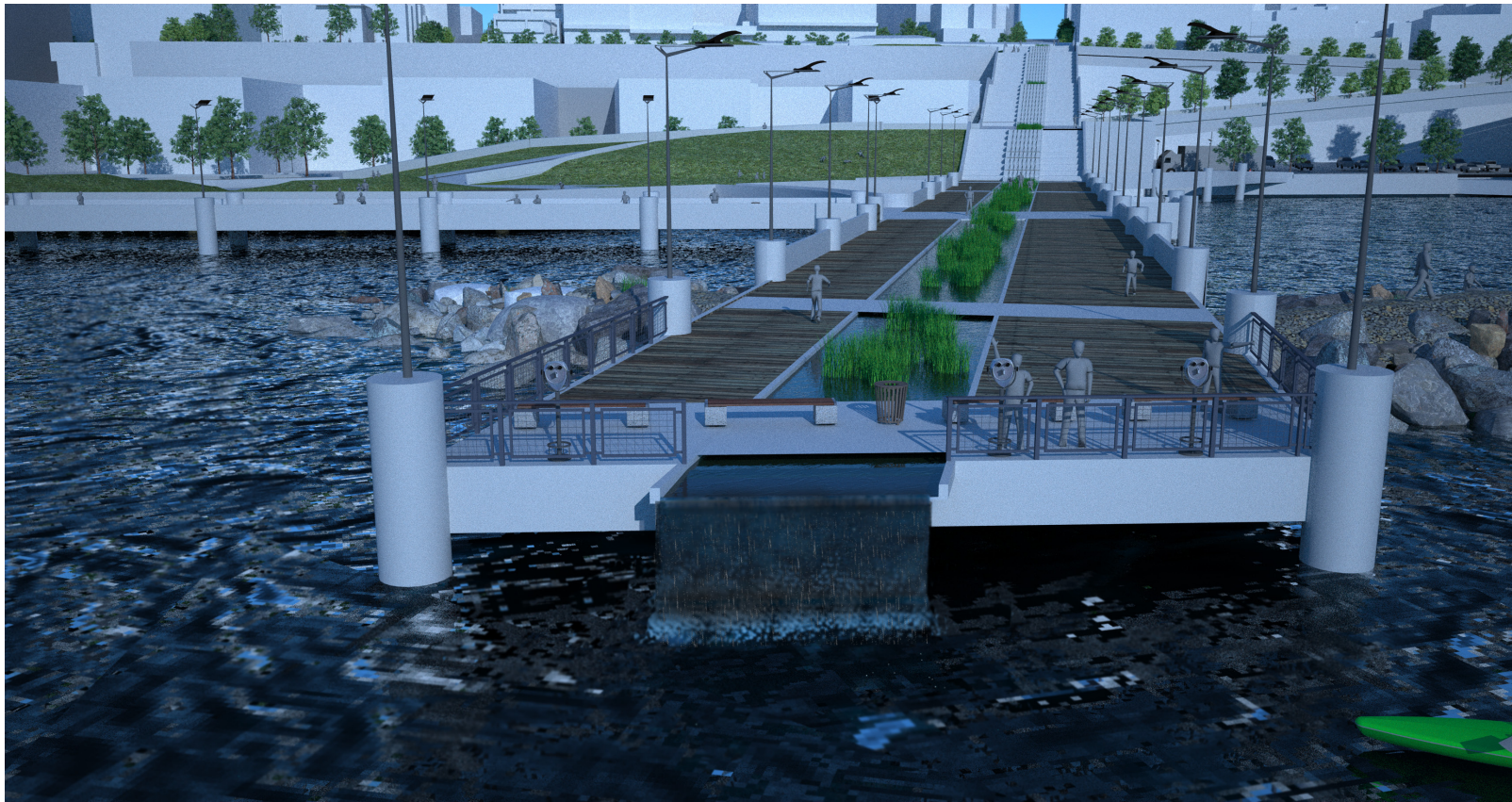


water interaction:

The end of the pier serves as an access point where individuals can interact with Puget Sound. This would be a great spot to put your kayak or canoe into the water and enjoy a day discovering puget sound or just able to touch the water. It also includes a stormwater filtration release waterfall that is fed by a long shallow yet narrow pool.

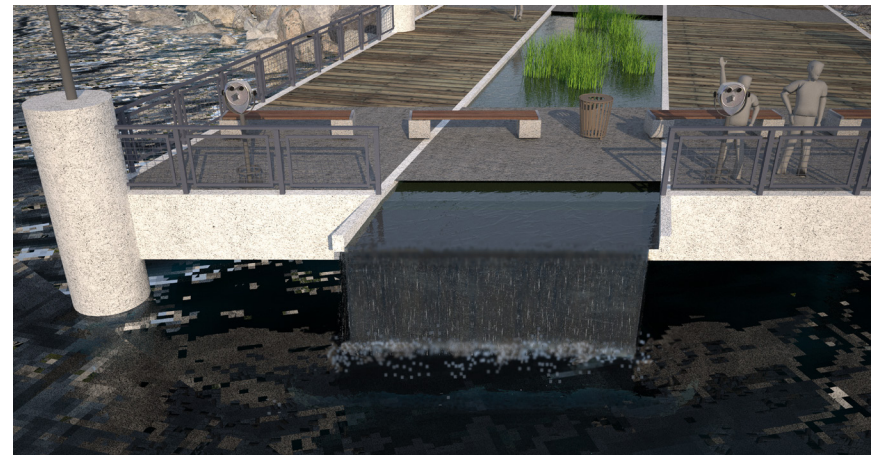


urban stormwater

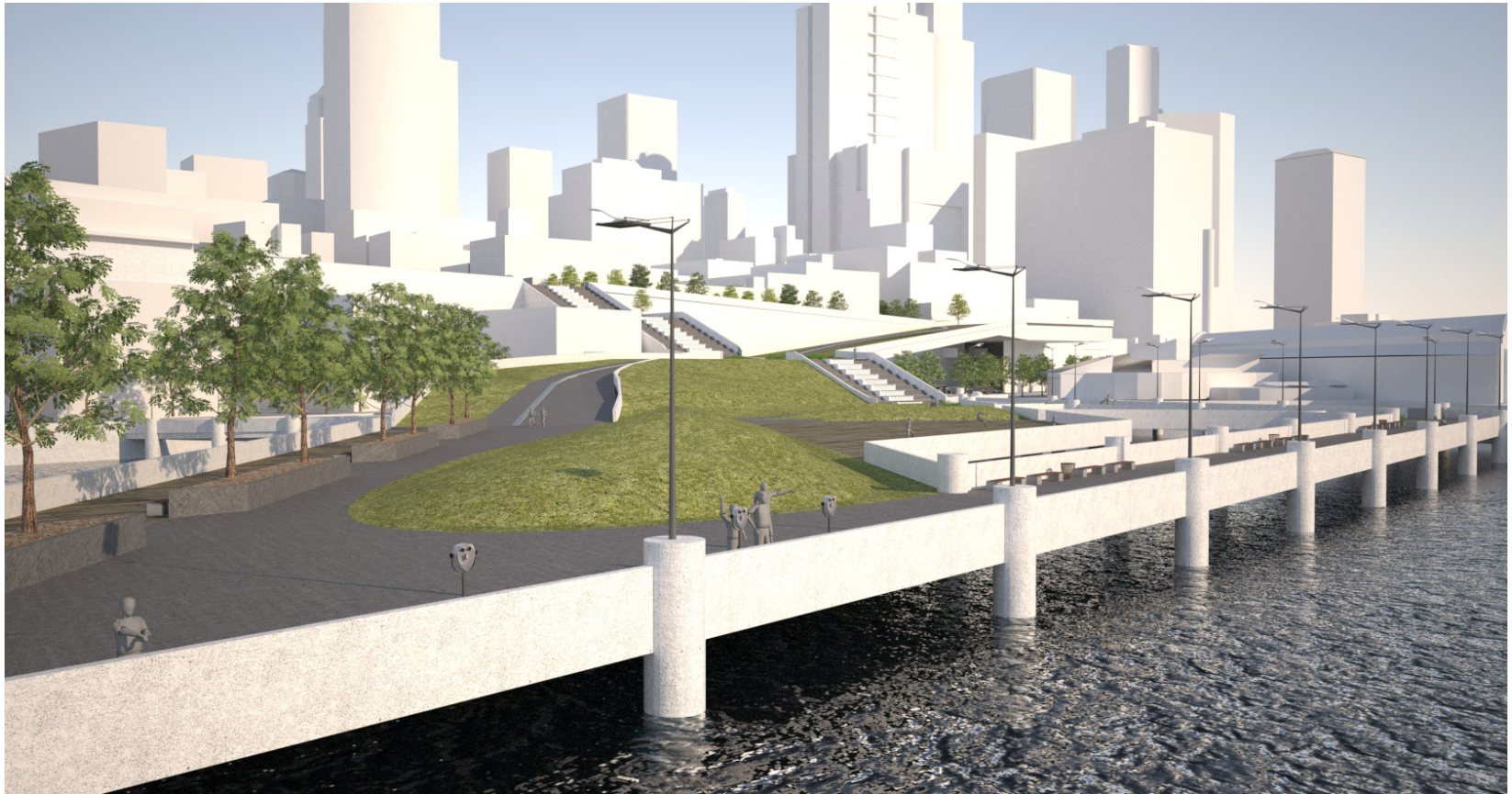


relaxation area:

This area of the pier displays fountain-like tubes that allow water to filtration from the reservoirs back into Puget Sound. The sound of running water paired with natural materials and fresh air create a tranquil area for relaxation and reflection.

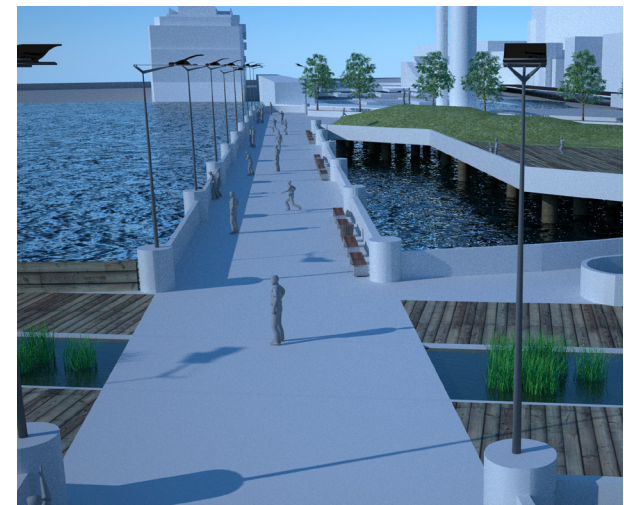


stage three

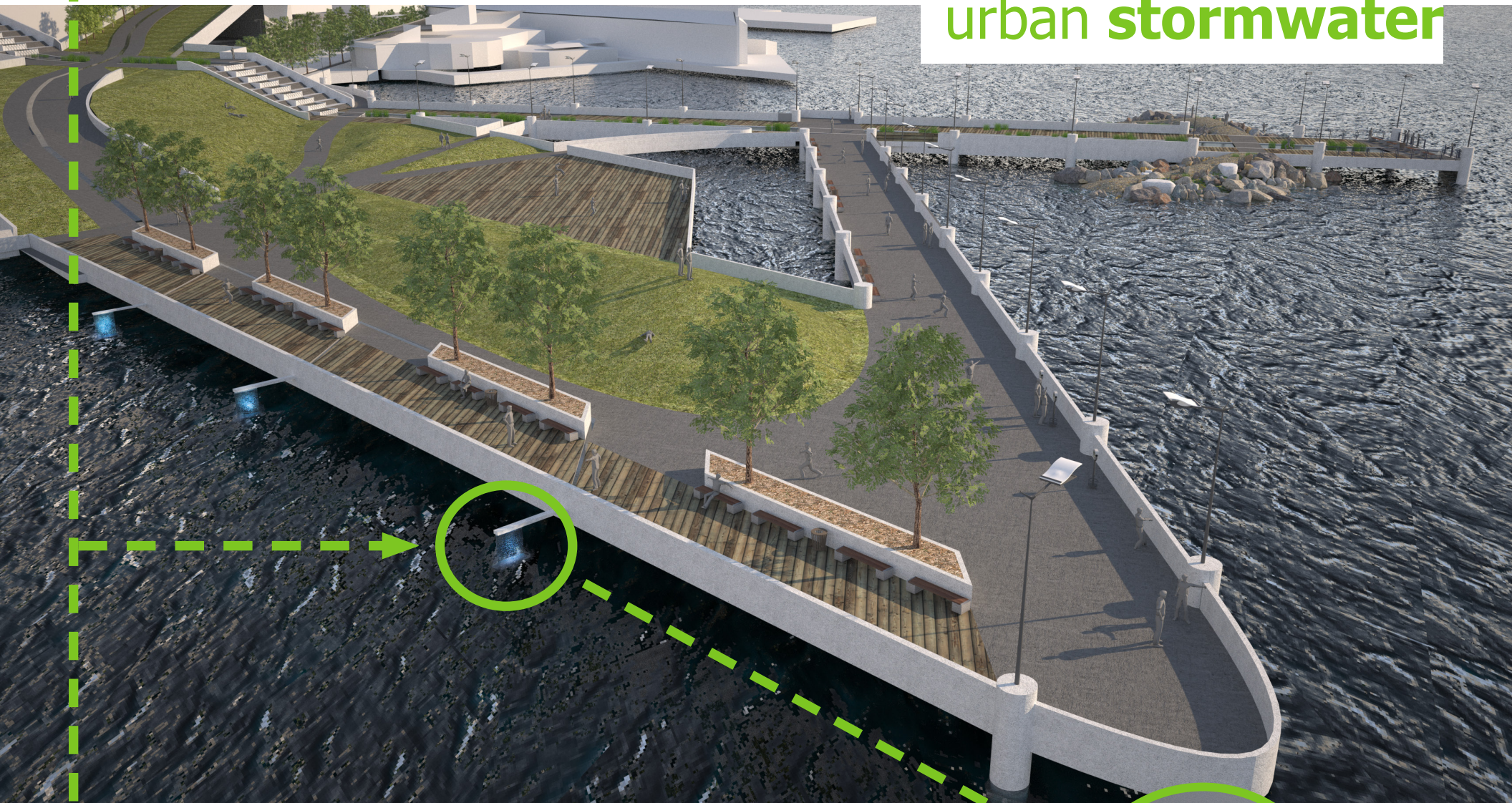


viewing area:

This part of the design solution allows users to experience the connection between Puget Sound and the city of Seattle, WA. Standing on this part of the pier allows individuals to look out onto the water, and turn around and see skyscrapers behind them. This space allows people to actually see how this built green environment fits into their neighborhood.



urban stormwater



relaxation area:

This area of the pier displays fountain-like tubes that allow water to filtration from the reservoirs back into Puget Sound. The sound of running water paired with natural materials and fresh air create a tranquil area for relaxation and reflection.



perspective

after:



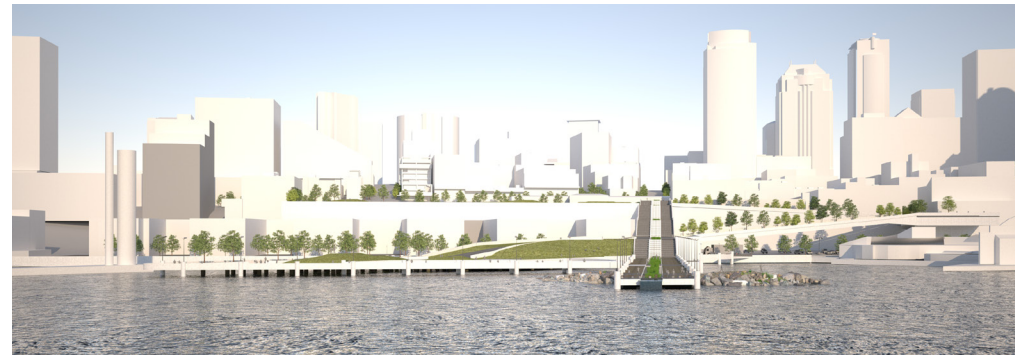
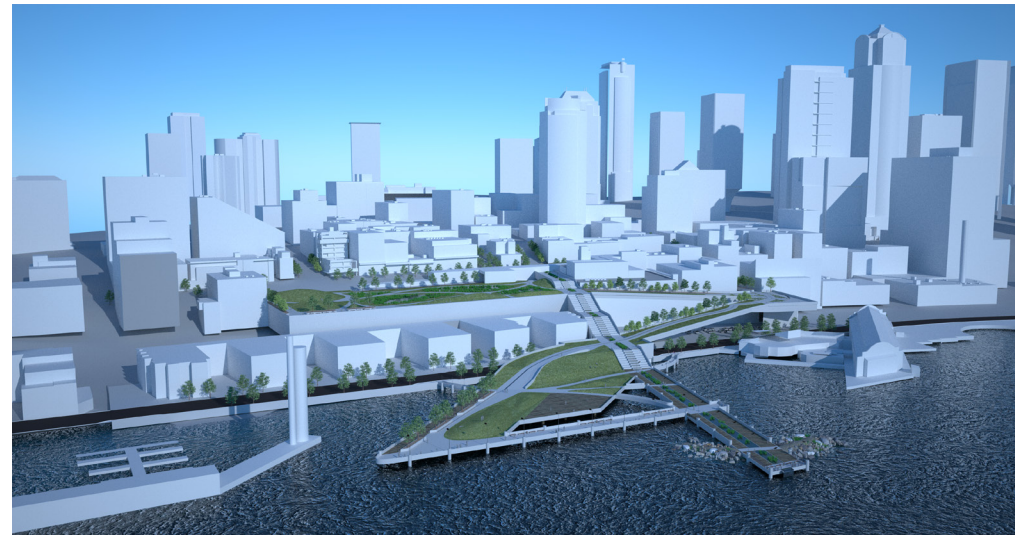
before:



photo by: Zerek Kroll

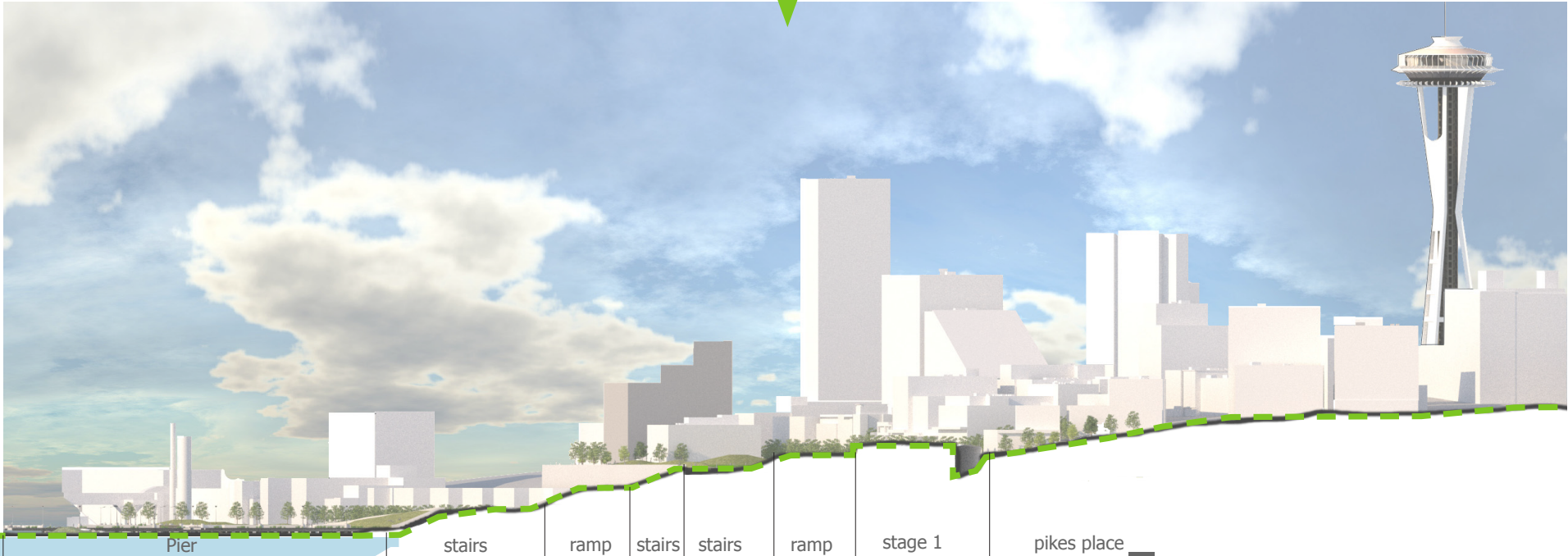


perspectives

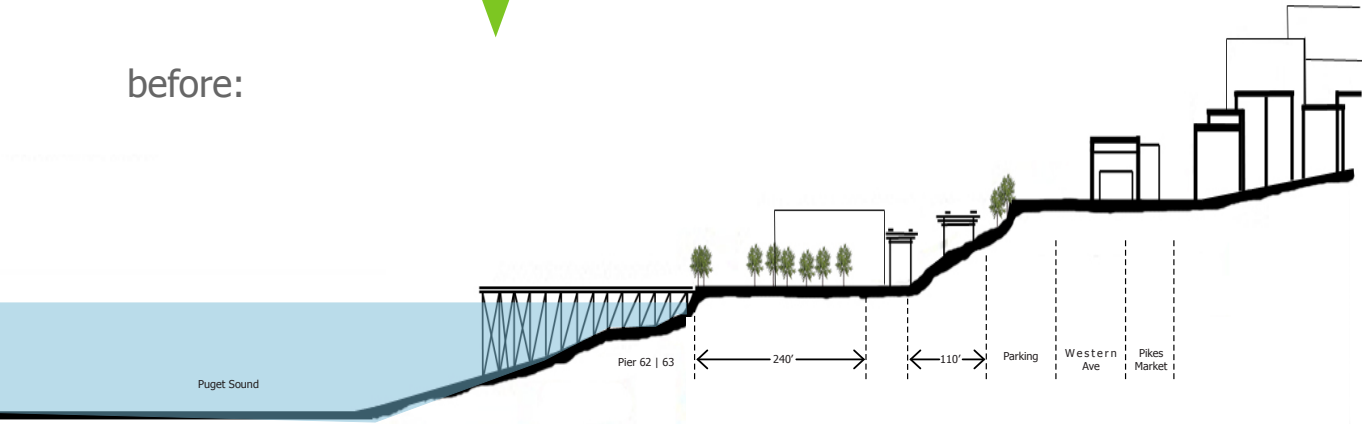


section plane

after:



before:



section:

This section shows what the drast topography that is present on site changed to what it could be. You can also start to see the context and size of everything.

scale: 500'

statement of intent: *“How can sustainable stormwater management practices be incorporated into an urban environment while also creating public awareness and involvement?”*

perspective

birds eye

