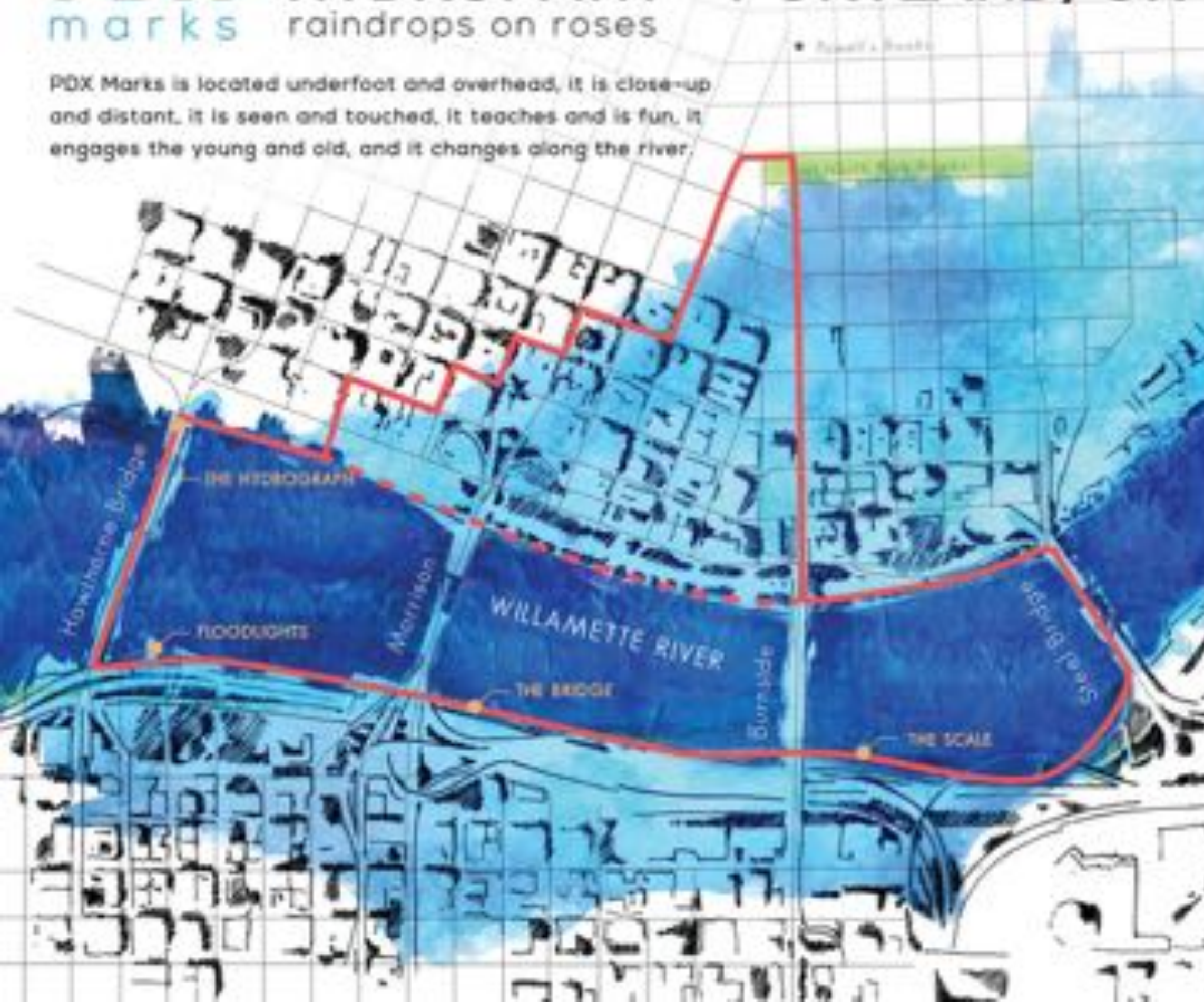


HYDROPATH - PORTLAND, OR

raindrops on roses

PDX Marks is located underfoot and overhead, it is close-up and distant, it is seen and touched, it teaches and is fun, it engages the young and old, and it changes along the river.



Downtown Portland already IS a Watershed. Walking the downtown riverbank loop you see bridges raised and lowered, the variations of water levels on columns, supports and walls, vegetation clinging to riverbanks, and debris floating downstream. You can walk or bike or stroll and fishing walkways.

The project proposes to reactivate the existing, what is IN SITU and build upon it. Few people are aware that they are within the 100 or 300 year floodplain, or what is the meaning of the number, or the volume and power, or the speed and power of the flowing water, or how what they observe is part of a greater system. The hydrograph that waters the river is practically invisible, almost in a box beneath the Morrison Bridge. PDX marks will bring its information to light.

Our concept builds upon this history, hydrology and place. It has four components:

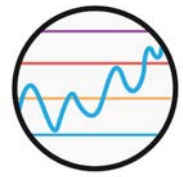
It is IN SITU

It employs the INSTRUMENTS of the river

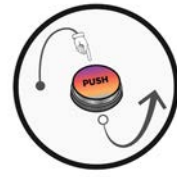
It offers INFORMATION

It is INTERACTIVE

MARKING A NEW PATH



PDX Marks employs the river's instruments



PDX Marks is interactive



PDX Marks offers information



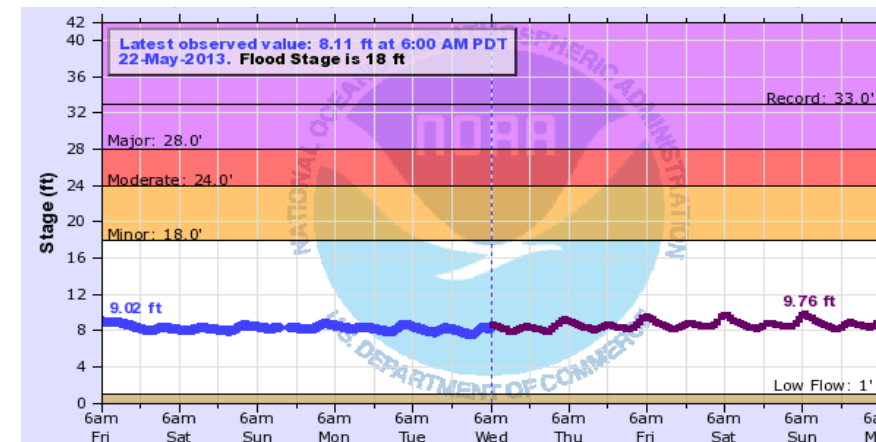
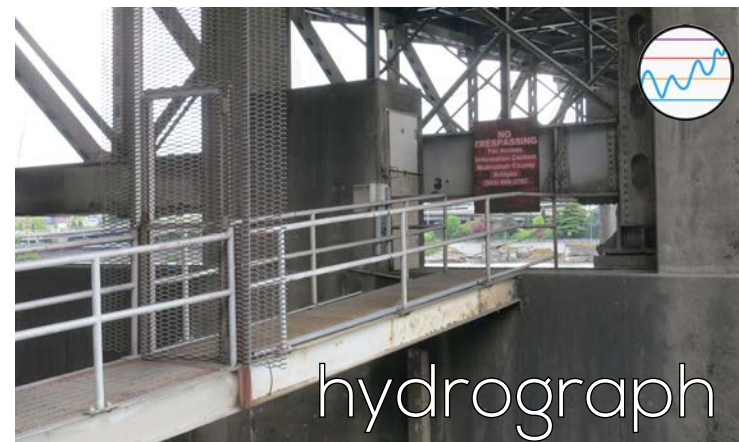
PDX Marks is in situ

The aim of PDX Marks is to make the hydrograph's data visible in the river, along its banks, and in the city.

Built on the fertile floodplain of the Willamette River, Portland is wet. Each year the river rises as rainfall in the Cascade Mountains reaches 12 feet and snow pack reaches 25 feet. In the city, Portland's annual rainfall averages 43", falling mostly between October and May.

In spring, after months of daily rain, the warm sun melts the snow and water seeps into the city through basement cracks and street puddles.

Most citizens suffer the delusion that the river has been "tamed," as if it was a wild animal, but much like an animal, the river's nature remains unchanged and floods can inundate downtown. Overflowing its banks, the Willamette would advance up streets and into buildings. City blocks become urban islands in a sea of debris.



Visible but not seen, the hydrograph inspired our design.

The Willamette River is monitored and controlled by the US Army Corps of Engineers who release water from dams throughout the riverine system. While this control provides a sense of protection, Portland still floods.

The river is monitored by strategically placed hydrographs. Encased in a steel cabinet beneath the Marquam Bridge is USGS stream gauge 14211720. This hydrograph continuously monitors the river's stages, flow, temperature, turbidity, dissolved oxygen, pH, and modest tidal fluctuation as it passes through Portland.

Native Americans



13,000 yrs ago
Missoula Floods 400 ft.



1805
Lewis and Clark



Port



1894
Flood 33.0 ft.



1920
Downtown Sea Wall



Commerce



1948
Flood 30.0 ft.



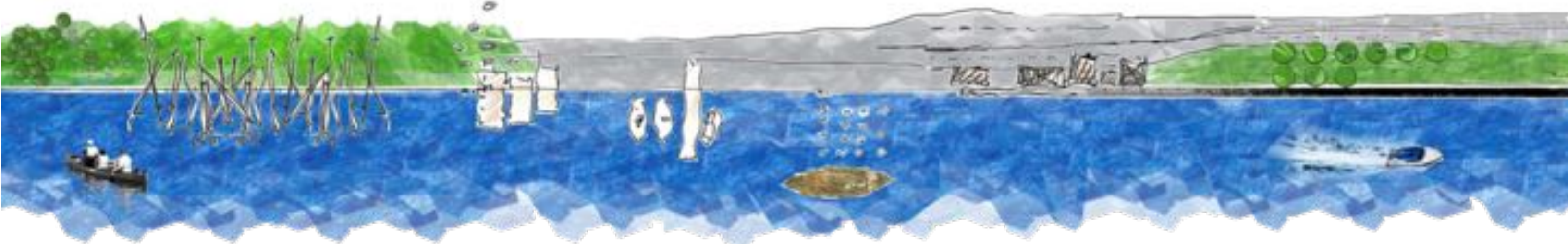
1964
Flood 29.8 ft.



Waterfront Park



1996
Flood 28.55 ft.



The Willamette is a **braided river** whose floodplain slithers across the fertile Willamette Valley.

The Indians knew floods. Their myths told of the great Missoula flood 13,000 years ago that **formed the valley**. Portland lies 400 feet below that ancient water level.

For early settlers **floods were commonplace**. Streets had elevated wooden sidewalks with rowboat patrols.

Downtown riverbank snags were removed, old growth cut and **Portland was known as Stumptown**. Wooden docks and pilings were tied with massive rafts of logs floating to mills.

In the 1920s downtown **docks were removed, the riverbank extended** and hardened by a sea wall.

In 1948 the **city of Vanport flooded**. 40,000 people were homeless, 15 perished. Never rebuilt portions of the city lie below the water.

After 1950 **dams upstream** were constructed for flood control and **cheap hydro-electric power**.

A harbor drive was built then removed in the 1970s for a waterfront park. On the East Bank **wharves and houseboats gave way to I-5**, Portland's link to the nation's interstate system.





Did You Know?

Within the 500 year floodplain, Portland's landscape is primarily industrial and open space but 500 households and at 4 schools are located in the area.



Painting the Landscape

Elements in the landscape like this parking garage and the east bank esplanade railing bring attention to flood history and warn of future events.





Hydrograph Warning Colors

In yellow, orange, red and purple bands, the graph notes the water level in four flood categories: action, minor, moderate and major.



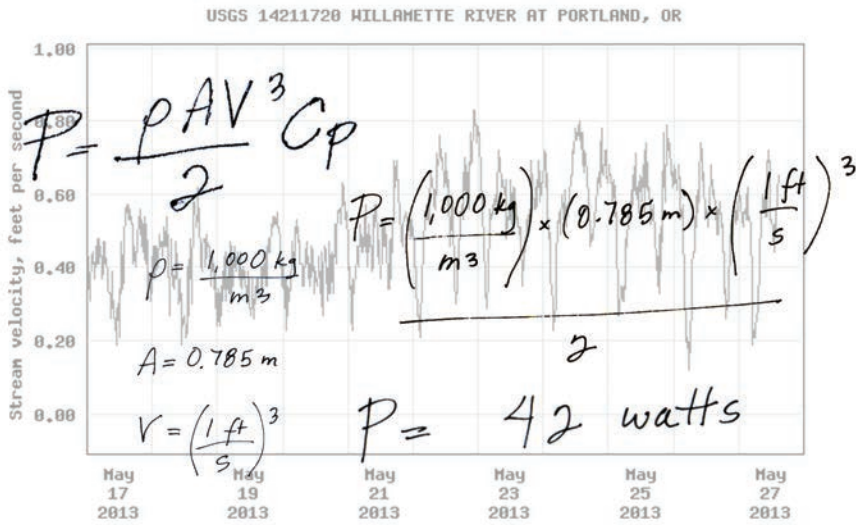
Pervasive Pattern

Capitalizing on the existing infrastructure, the flood warning levels are made visible over striations on columns and walls.



Category	Water Level
MAJOR	28'
MODERATE	24'
MINOR	18'
FLOODING	16'
	14'
	12'
	10'

FLOODLIGHTS



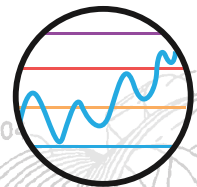
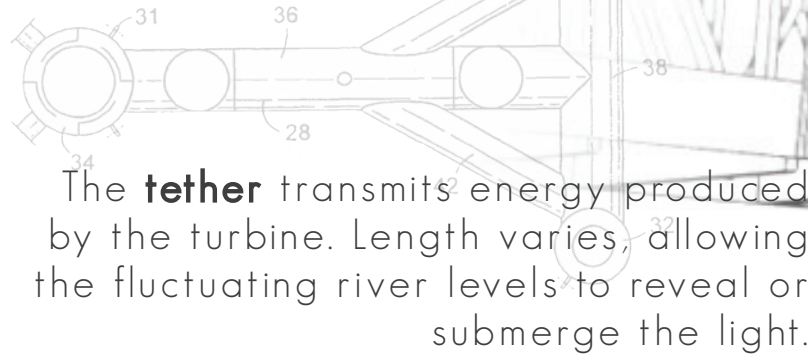
FLOATING LIGHTS - Downtown Map

The lights illustrated in the plan above and perspective below indicate the height of the river. As the waters rise more lights become submerged, representing the extent of potential flooding in downtown Portland.

Increasing Water Levels

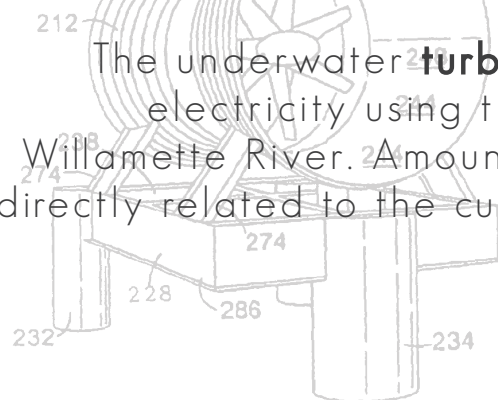


The **light** turns on when at or near the surface. Light intensity dependent on energy produced by turbine.



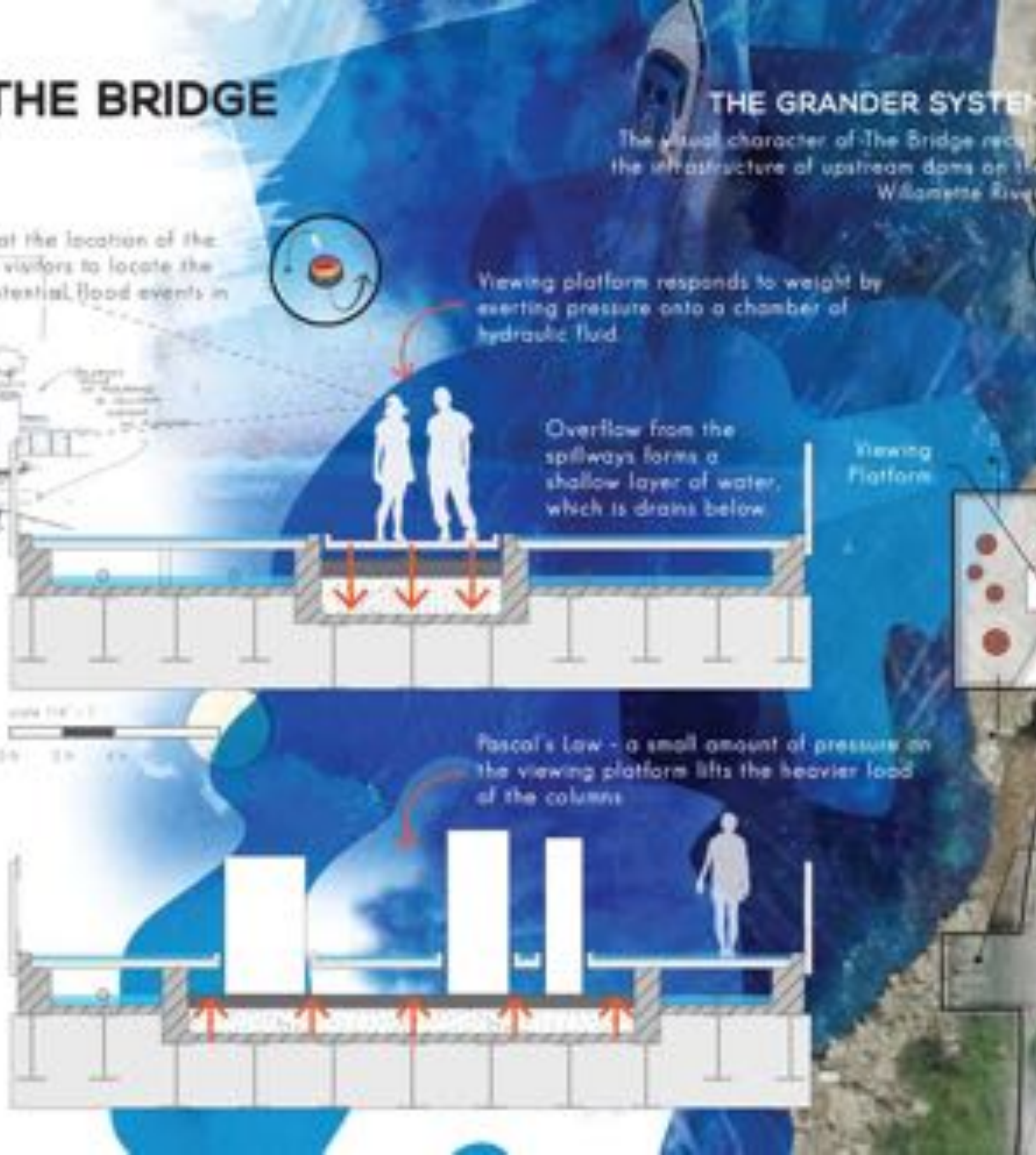
REVEALING the water's power

The underwater **turbine** generates electricity using the flow of the Willamette River. Amount of energy is directly related to the current velocity.



CRITICAL MASS

This proposed overlook at the location of the "Morrison Bluffs" allows visitors to locate the height of historic and potential flood events in downtown Portland.



THE GRANDER SYSTEM

The visual character of The Bridge reflects the infrastructure of upstream dams on the Willamette River.



Viewing platform responds to weight by exerting pressure onto a chamber of hydraulic fluid.

Overflow from the spillways forms a shallow layer of water, which is drains below.

Viewing Platform

Pascal's Law - a small amount of pressure on the viewing platform lifts the heavier load of the columns.



ACTIVATED by occupation

Bring your friends! The more people the farther the platform sinks. Asking visitors to answer: How much pressure do humans put on water systems? Hydraulic system with safety locking mechanisms means the ramp never exceeds 8.33% and the Scale is universally accessible all the time.



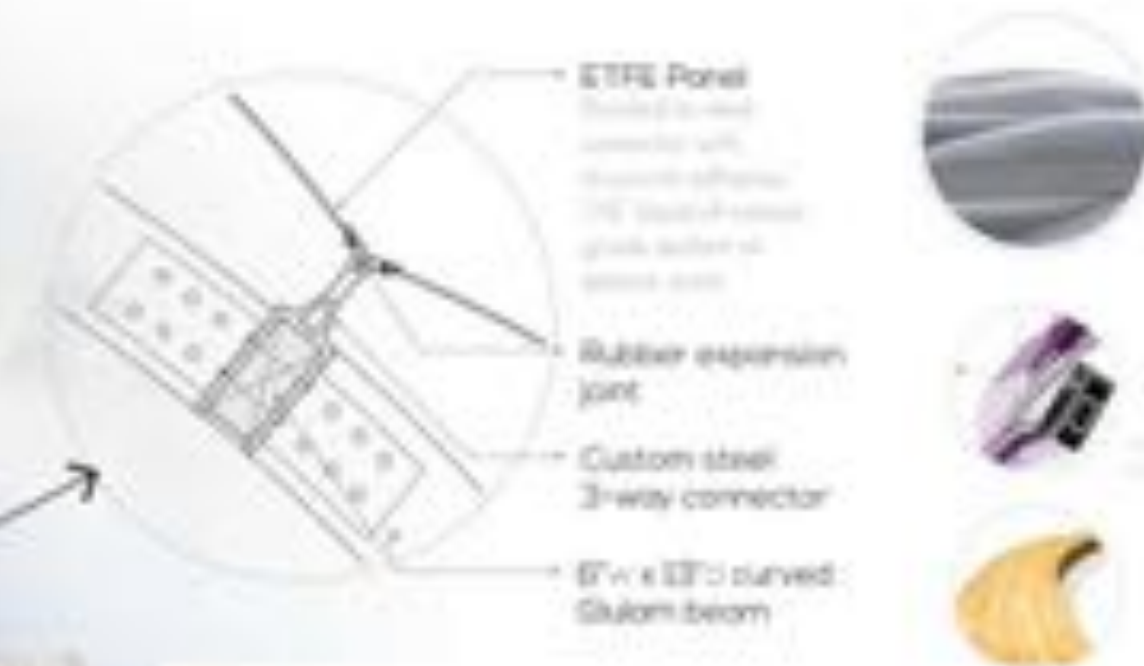
TETHERED to the esplanade

The Scale moves with the tides of the Willamette River. Attached to existing dock infrastructure along the East Bank Esplanade, the Scale shifts up and down as the tides rise and fall. No matter the water flow visitors can experience being in the river and learn about flood dynamics.



Each hydrocylinder
 42w/1000v
 1 w/1000v/1000v
 2 w/1000v/1000v
 PLE YIELDING
 2,500 w/1000v/1000v
 1000 w/1000v/1000v
 240 w/1000v/1000v
 7 LED lighting
 Emergency Power

Standard 40" LED TV 1000 w/1000v/1000v
 1000 w/1000v/1000v
 1000 w/1000v/1000v
 1000 w/1000v/1000v
 1000 w/1000v/1000v
 1000 w/1000v/1000v
 TOTAL DEMAND



WARNS of rising waters

The Scale's ETFE (ethylene tetrafluoroethylene) skin is embedded with LED lights. These will give the interior enough light for visitors to move and will illuminate in accordance with the measurements taken at the hydrograph on the Morrison St Bridge. As visitors in the river, tourists, runners, bike commuters and displaced residents of the riverside will know when the flood is coming.





HYDROCORE IDEAT ONE

PDX
marks