

Przeciwdziałanie powodziom, lokalnym podtopieniom, skutkom podnoszenia się poziomów mórz za pomocą rozwiązań opartym o naturę



Narodowe Centrum
Badań i Rozwoju



Wykład 3- NBS

ERANet LAC



UNIwersytet
Warszawski



<https://wiadomosci.wp.pl/wielka-powodz-w-niemczech-dramatyczne-relacje-z-nadrenii-polnocnej-westfalii-by-lismy-zdani-tylko-na-siebie-656920056952961v>



Powódź 1997 - Wrocław, okolice Dworca Głównego



<https://www.youtube.com/watch?v=JZ2NPj4BR0E>

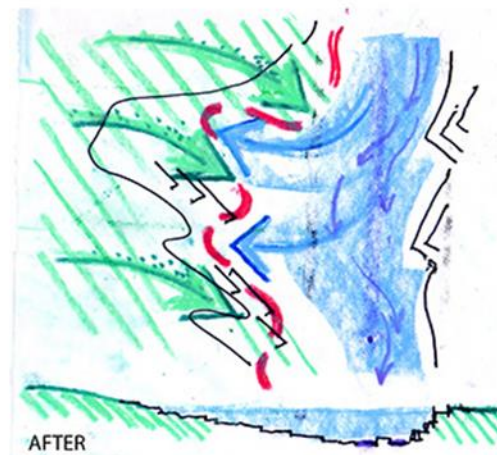
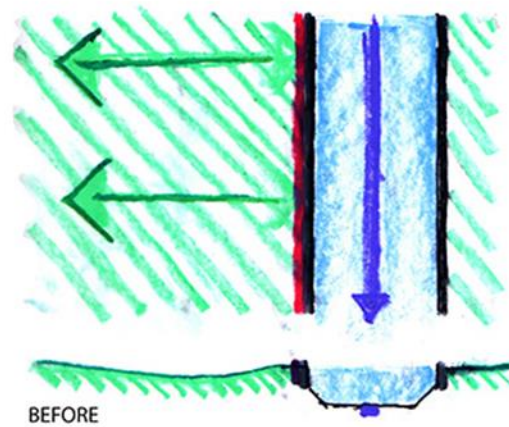
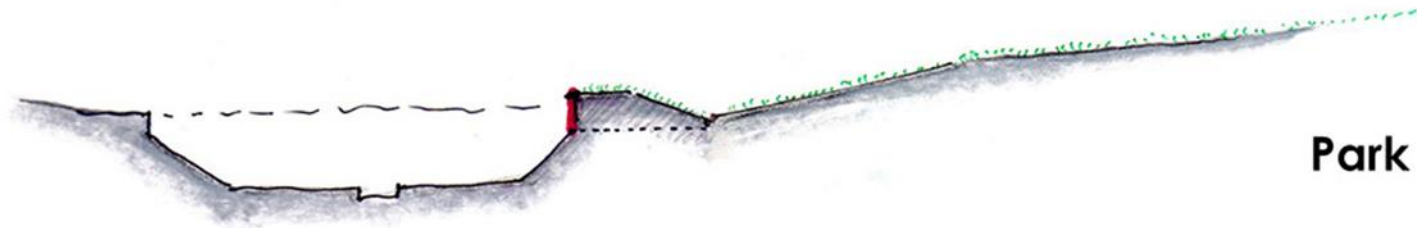














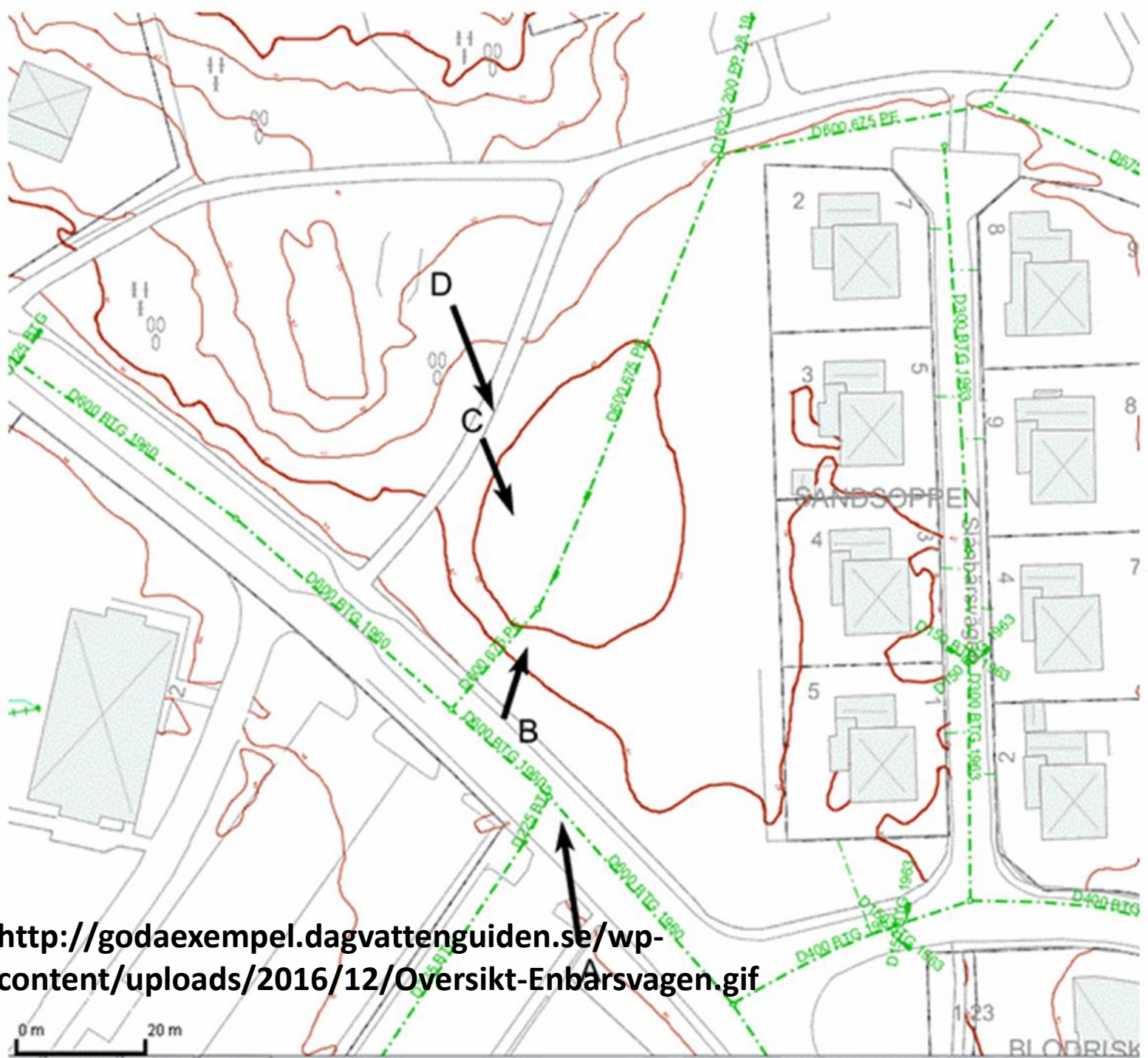
<https://www.asla.org/2016awards/169669.html>











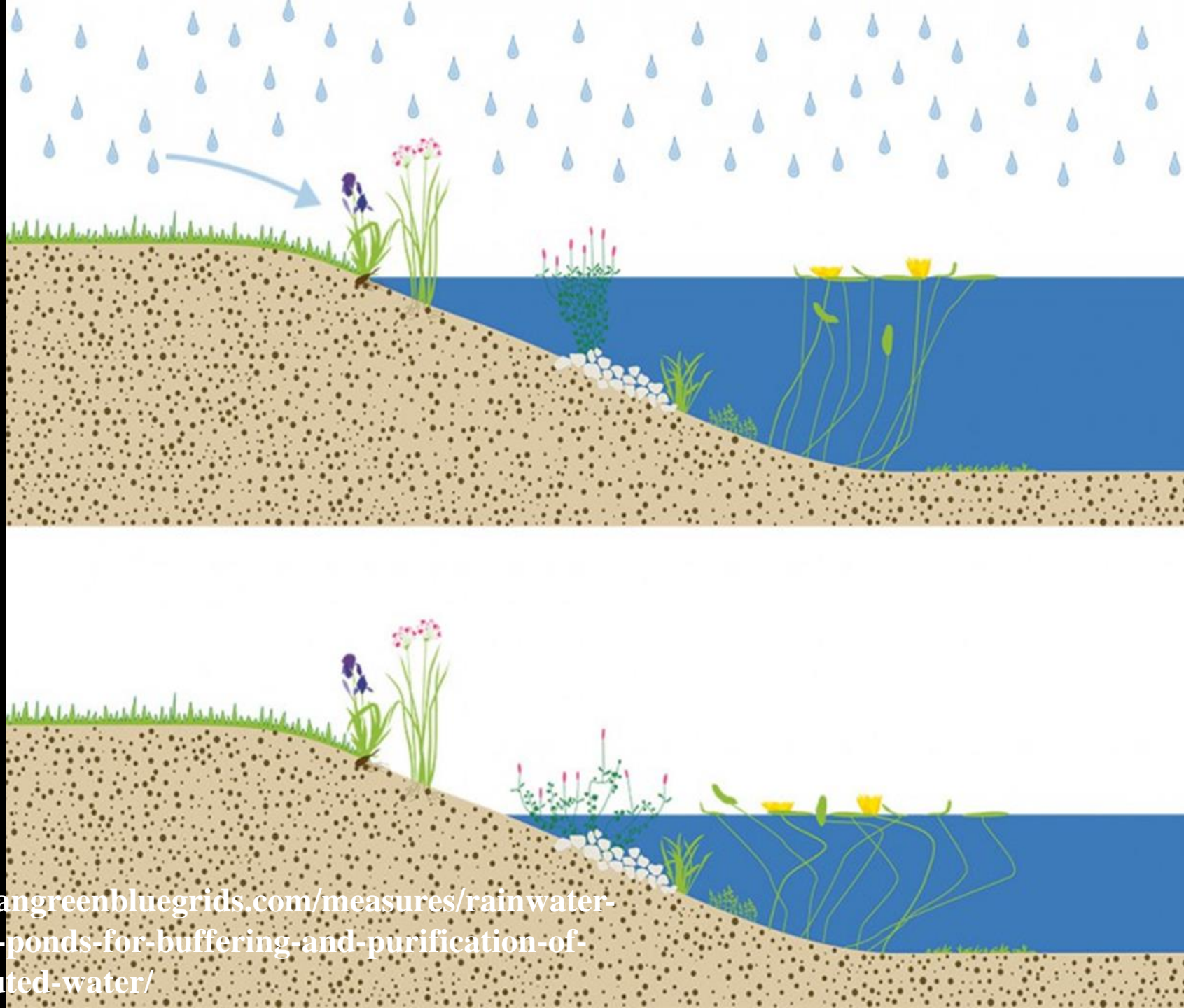












<https://www.urbangreenbluegrids.com/measures/rainwater-ponds/rainwater-ponds-for-buffering-and-purification-of-moderately-polluted-water/>



Dom Sąsiedzki Dom Sąsiedzki
ZAKOPIANKA ZAKOPIANKA

TELEFON

LOONEY.PL

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<https://www.asla.org/awards/2006/06winners/images/largesc/ale/341-03.jpg>



<https://www.asla.org/awards/2006/06winners/images/largesc/ale/341-07.jpg>



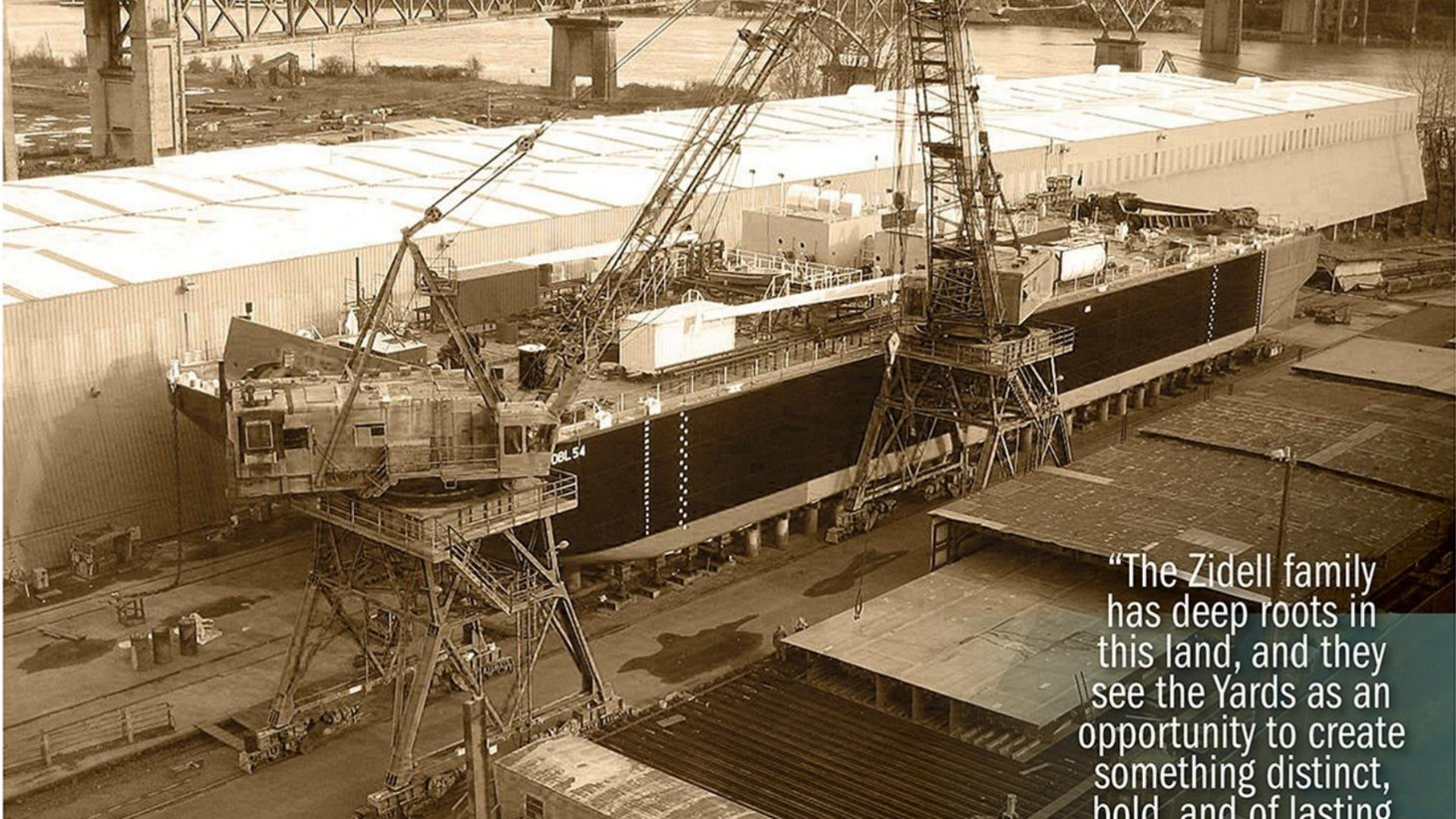




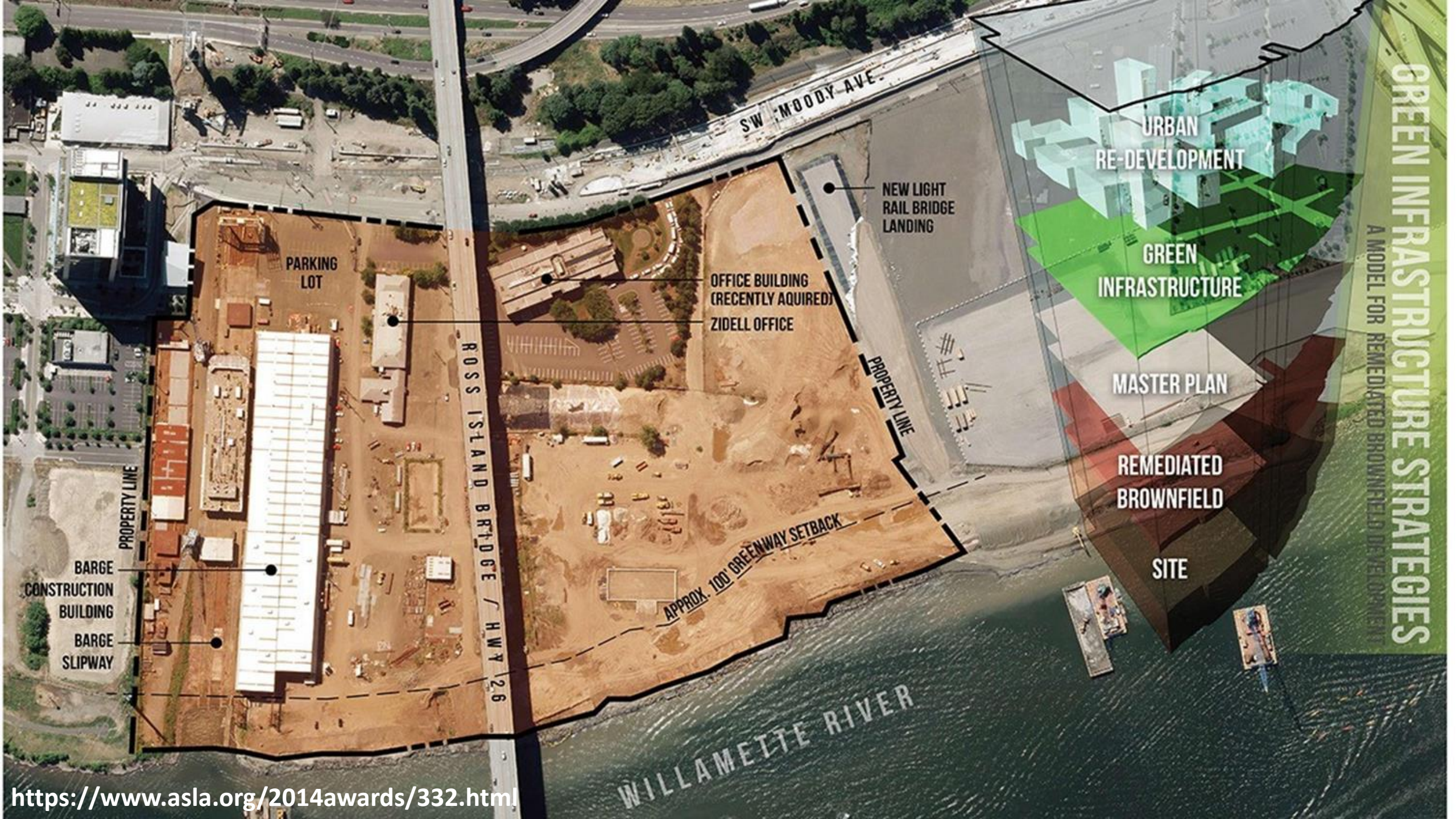








“The Zidell family has deep roots in this land, and they see the Yards as an opportunity to create something distinct, bold, and of lasting



S.W. MOODY AVE.

NEW LIGHT RAIL BRIDGE LANDING

OFFICE BUILDING (RECENTLY ACQUIRED) ZIDELL OFFICE

PARKING LOT

ROSS ISLAND BRIDGE / HWY 26

PROPERTY LINE

BARGE CONSTRUCTION BUILDING
BARGE SLIPWAY

APPROX. 100' GREENWAY SETBACK

PROPERTY LINE

WILLAMETTE RIVER

URBAN RE-DEVELOPMENT

GREEN INFRASTRUCTURE

MASTER PLAN

REMEDIATED BROWNFIELD SITE

GREEN INFRASTRUCTURE STRATEGIES
A MODEL FOR REMEDIATED BROWNFIELD DEVELOPMENT

OREGON HEALTH
SCIENCES UNIVERSITY

PORTLAND

EASTSIDE
INDUSTRIAL

37 inches of rainfall per year

NEW LIGHTRAIL BRIDGE

SOUTH
WATERFRONT DISTRICT

8 bridges, 1 in construction

1,000,000gal annual runoff per city block

ROSS ISLAND
NATURE PRESERVE

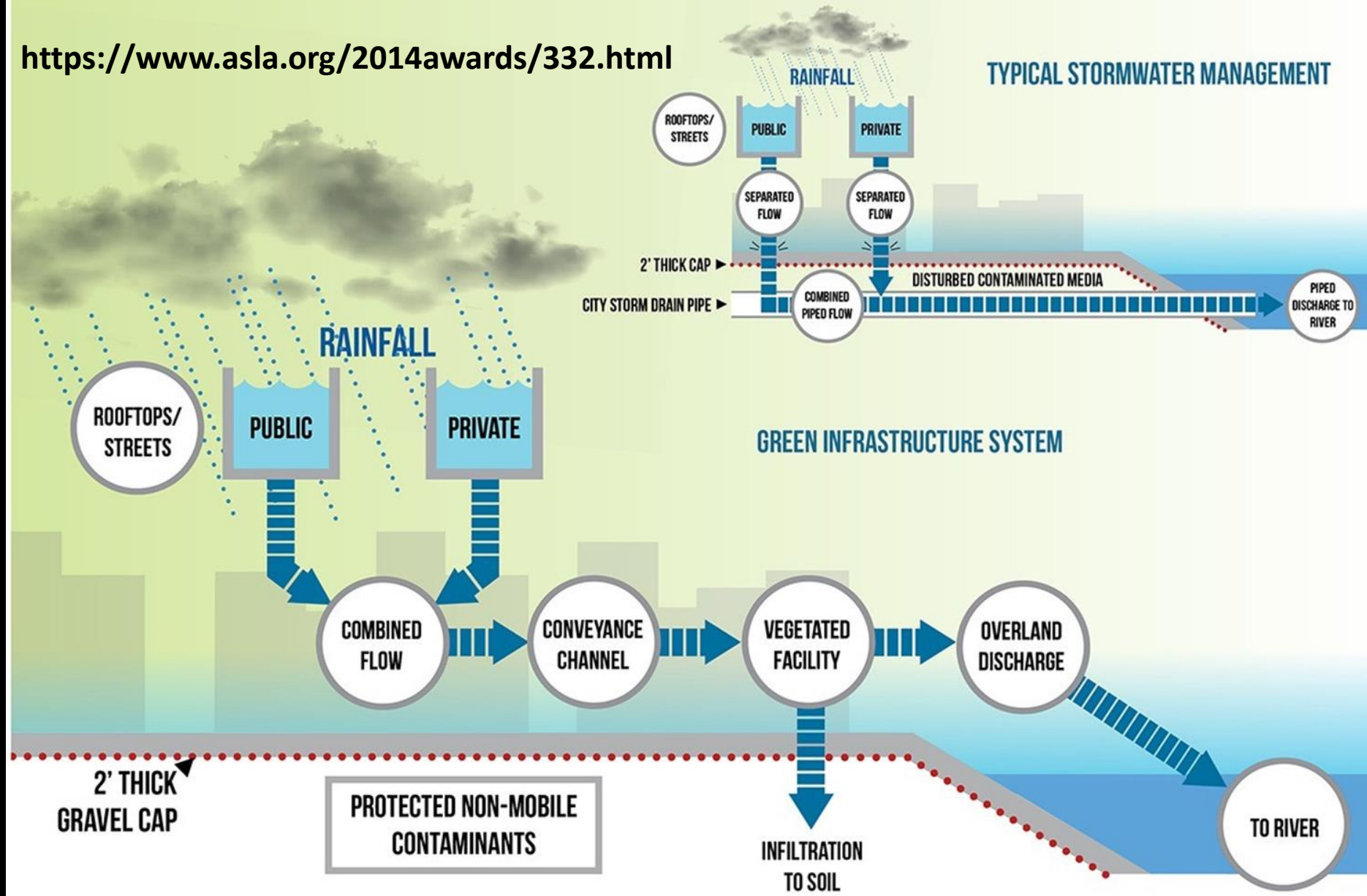
CONTEXT

<https://www.asla.org/2014awards/332.html>

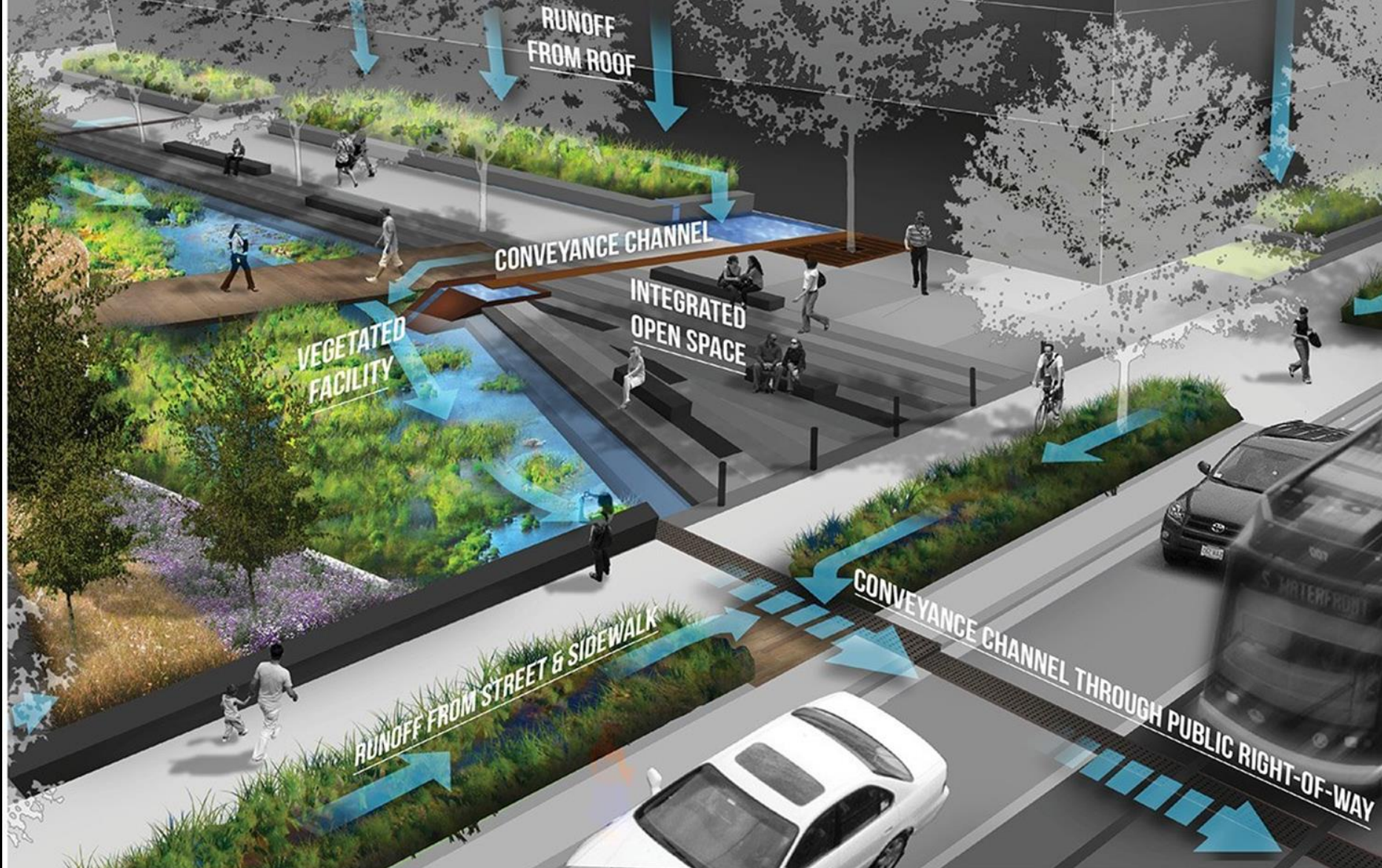
The site is a dynamic development location catalyzed by its adjacency to downtown Portland, recent development of the South Waterfront District, expansion of Oregon Health Sciences University, and the new light-rail bridge terminus to the north.

CONCEPT APPROACH

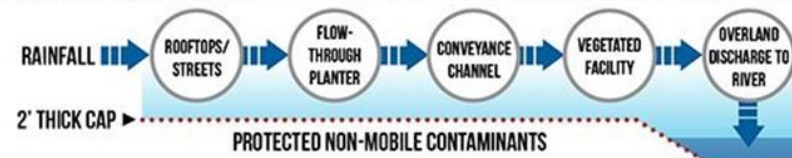
<https://www.asla.org/2014awards/332.html>



The concept diagram identifies how the four key design assumptions (mixing public and private stormwater, managing stormwater at the surface, integration of green infrastructure, and overland discharge to the river) come together to reduce disturbance of the remediated site.



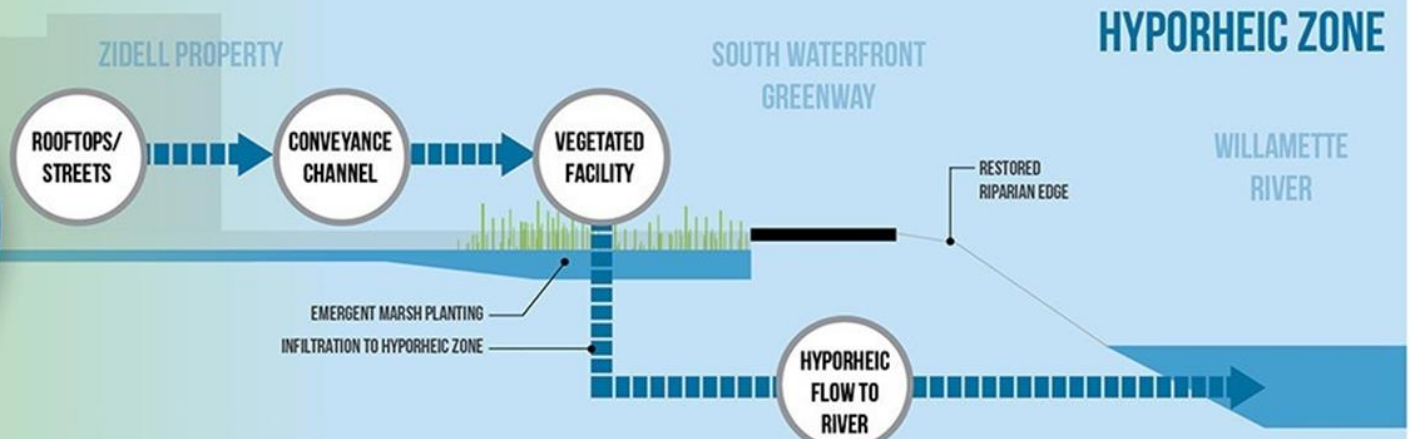
<https://www.asla.org/2014awards/332.html>



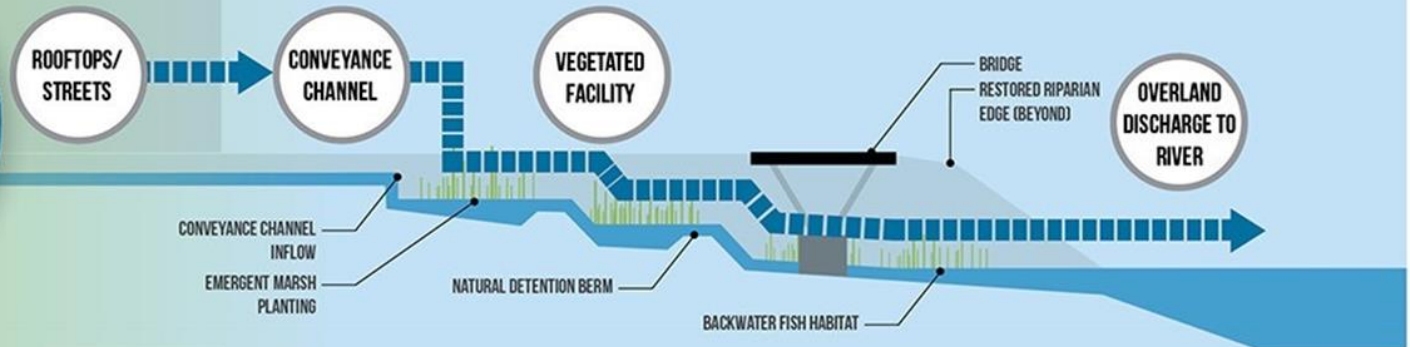
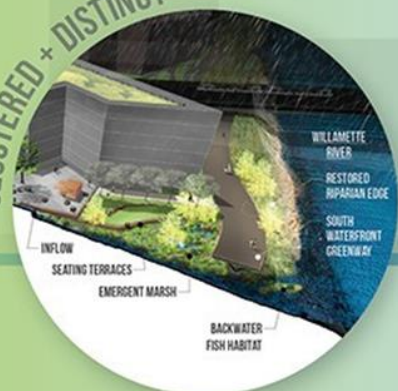
CONVEYANCE

The constraint of brownfield poses challenges for the traditional application of underground, piped gray infrastructure. All three scenarios developed for the site rely on a network of surface conveyance channels and infiltration facilities to manage stormwater.

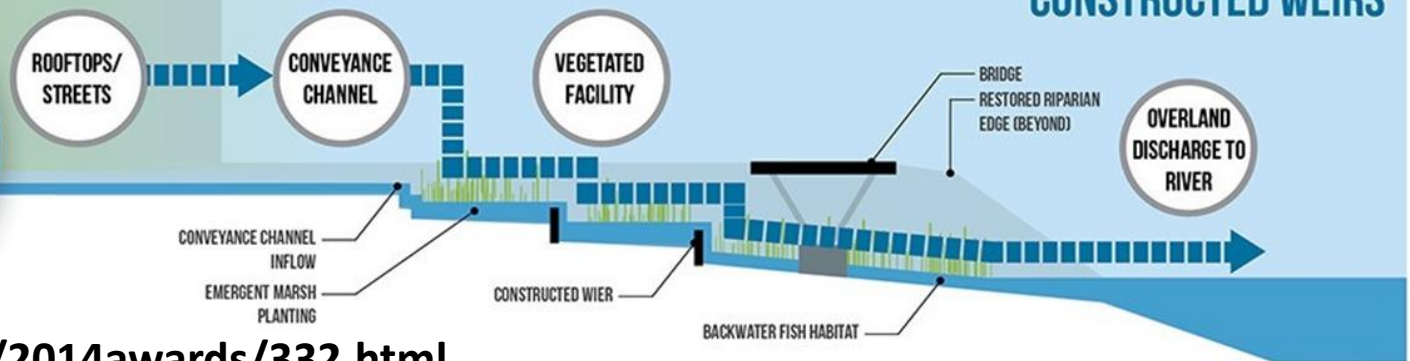
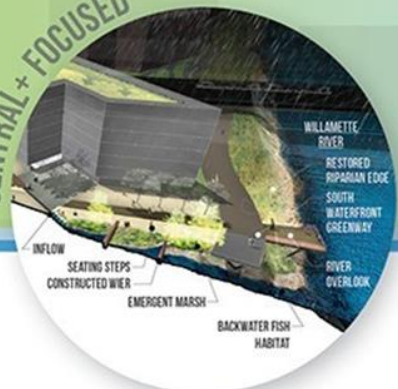
DIFFUSE + EMBEDDED



CLUSTERED + DISTINCT



CENTRAL + FOCUSED



<https://www.asla.org/2014awards/332.html>

OVERLAND DISCHARGE

A typical piped outfall would require a large-diameter pipe be installed through the cap, disturbing the contaminated media. To explore the overland discharge conversation thoroughly, the team applied three different indirect discharge systems to each of the three scenarios.

green roof



swale



planter



basin



artwork



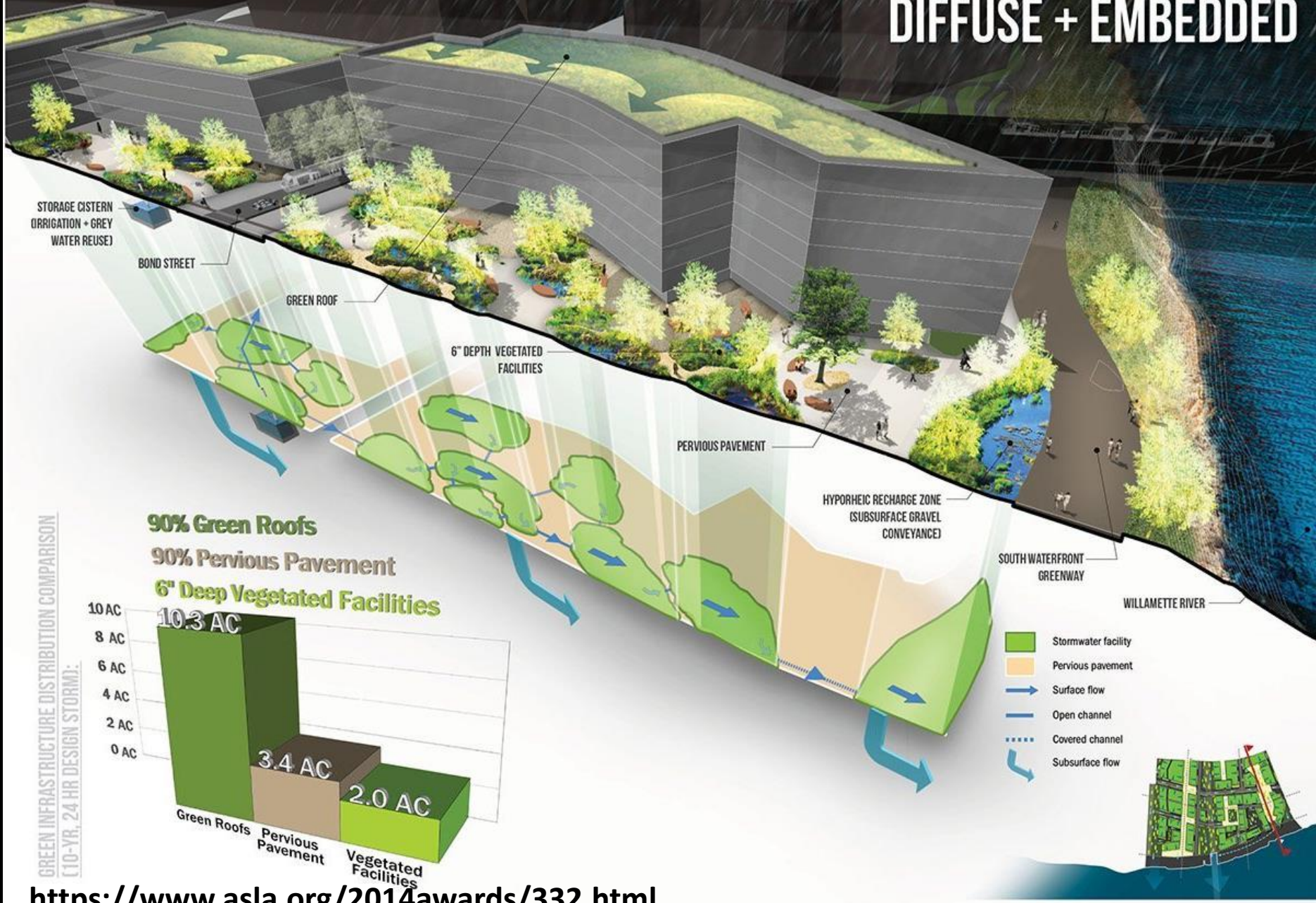
pervious pavement



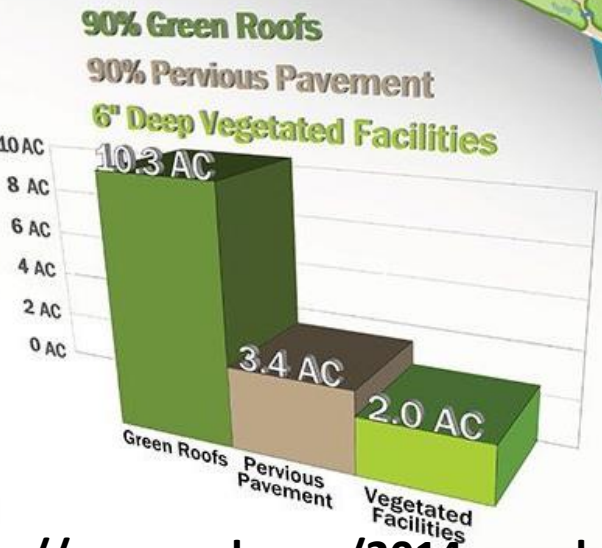
SCENARIO 1: DIFFUSE + EMBEDDED



DIFFUSE + EMBEDDED



GREEN INFRASTRUCTURE DISTRIBUTION COMPARISON
(10-YR, 24 HR DESIGN STORM):



- Stormwater facility
- Pervious pavement
- Surface flow
- Open channel
- Covered channel
- Subsurface flow



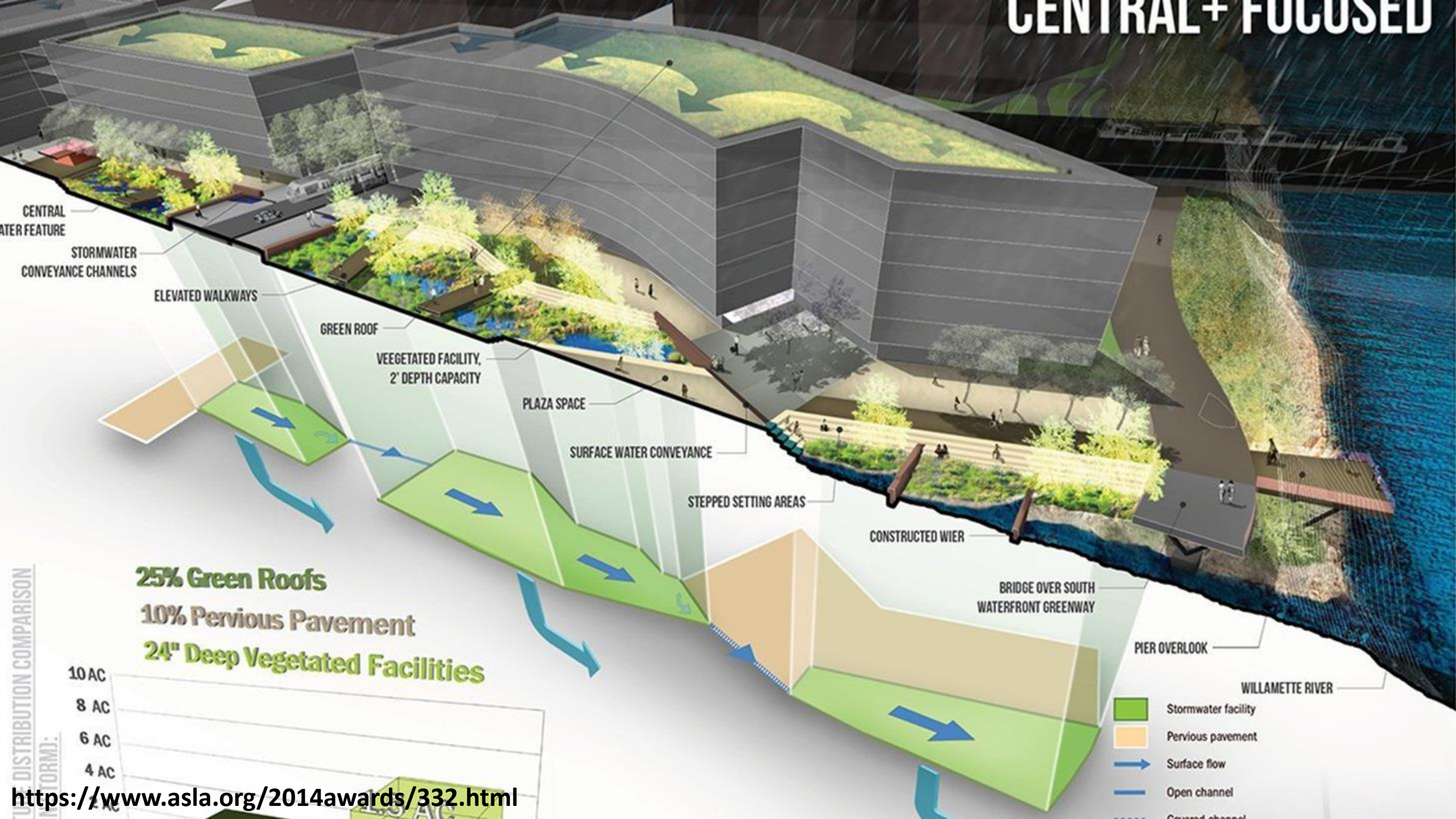
<https://www.asla.org/2014awards/332.html>

The site's evenly distributed green infrastructure maximizes stormwater infiltration through a network of techniques including eco-roofs, porous paving, and small-scale vegetated facilities. Overflow is provided via hyporheic ponds that indirectly discharge flows to the Willamette River via subsurface flow.

SCENARIO 3: CENTRAL+ FOCUSED



CENTRAL + FOCUSED



CENTRAL WATER FEATURE
STORMWATER CONVEYANCE CHANNELS
ELEVATED WALKWAYS

GREEN ROOF
VEGETATED FACILITY, 2' DEPTH CAPACITY

PLAZA SPACE
SURFACE WATER CONVEYANCE

STEPPED SETTING AREAS

CONSTRUCTED WIER

BRIDGE OVER SOUTH WATERFRONT GREENWAY

PIER OVERLOOK

WILLAMETTE RIVER

25% Green Roofs
10% Pervious Pavement
24" Deep Vegetated Facilities

10 AC
8 AC
6 AC
4 AC

- Stormwater facility
- Pervious pavement
- Surface flow
- Open channel
- Crossed channel

PERFORMANCE DISTRIBUTION COMPARISON

COASTAL RISK SCREENING TOOL

LAND PROJECTED TO BE BELOW ANNUAL FLOOD LEVEL IN 2050

Improved elevation data indicate far greater global threats from sea level rise and coastal flooding than previously thought, and thus greater benefits from reducing their causes.

DETAILS AND LIMITATIONS

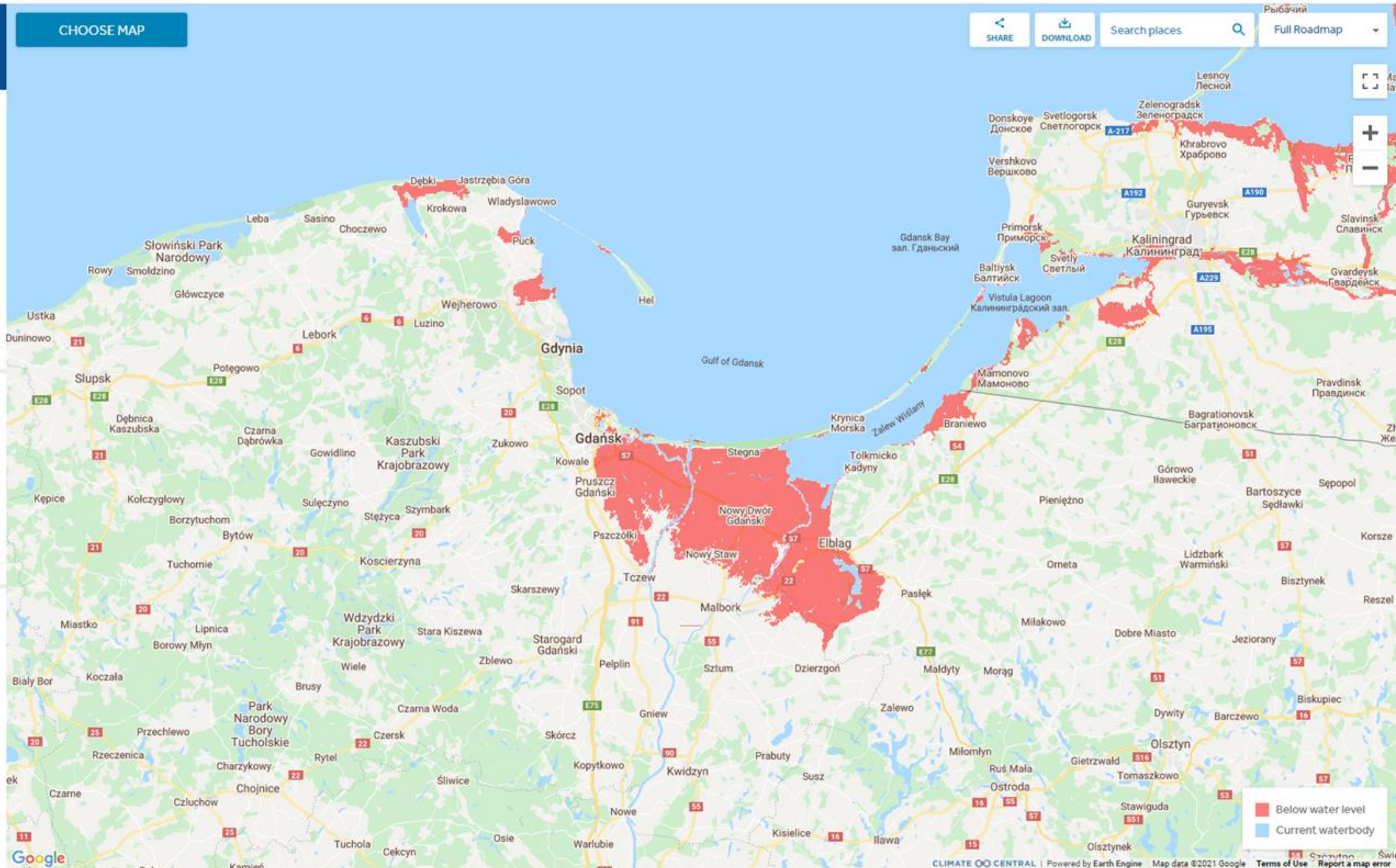
Report Scientific Paper In the News

Elevation Data Used

- Best available
- CoastalDEM® v1.1
- Legacy data

CHANGE OTHER SETTINGS

Video Tutorial

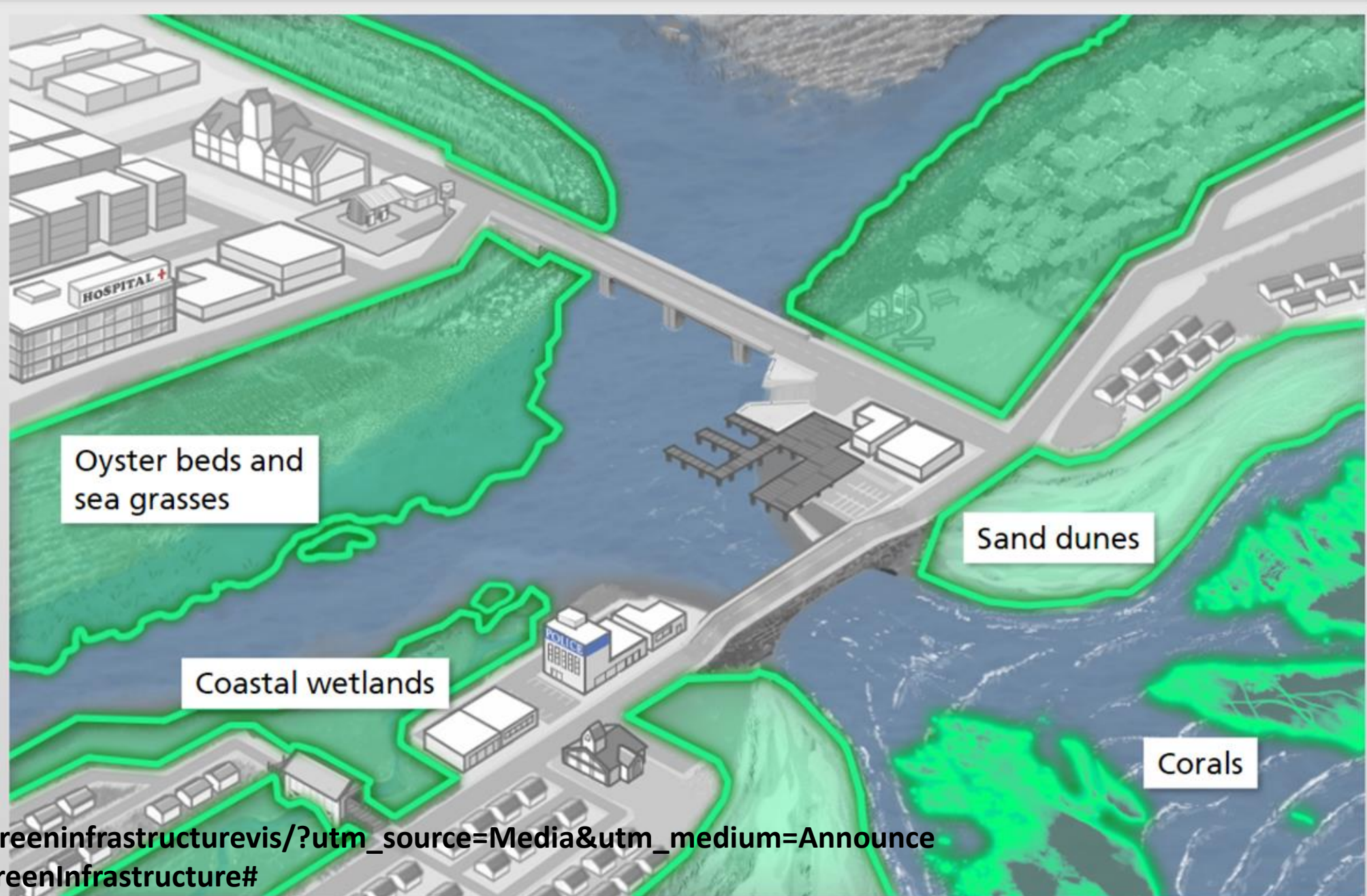




<https://dobrapogoda24.pl/artukul/wenecja-system-mose-chroni-przed-przyplywem-zalaniem>

Menu

- Introduction
- Storm Impacts
- Natural Protective Services
- Location Matters**
- Take Action
- Conclusion
- Resources



https://coast.noaa.gov/greeninfrastructurevis/?utm_source=Media&utm_medium=Announcement&utm_campaign=GreenInfrastructure#

Notice where the natural areas are located in this coastal community and their proximity to the hospital.



<https://whyy.org/articles/beach-replenishment-wont-destroy-tall-dunes-that-saved-n-j-community-feds-say/>







<https://ncseagrant.ncsu.edu/currents/2018/09/drones-deliver-data-on-oyster-reef-health/>



<https://ncseagrant.ncsu.edu/currents/2018/11/living-shorelines-can-enhance-saltmarsh-resilience-to-hurricanes/>