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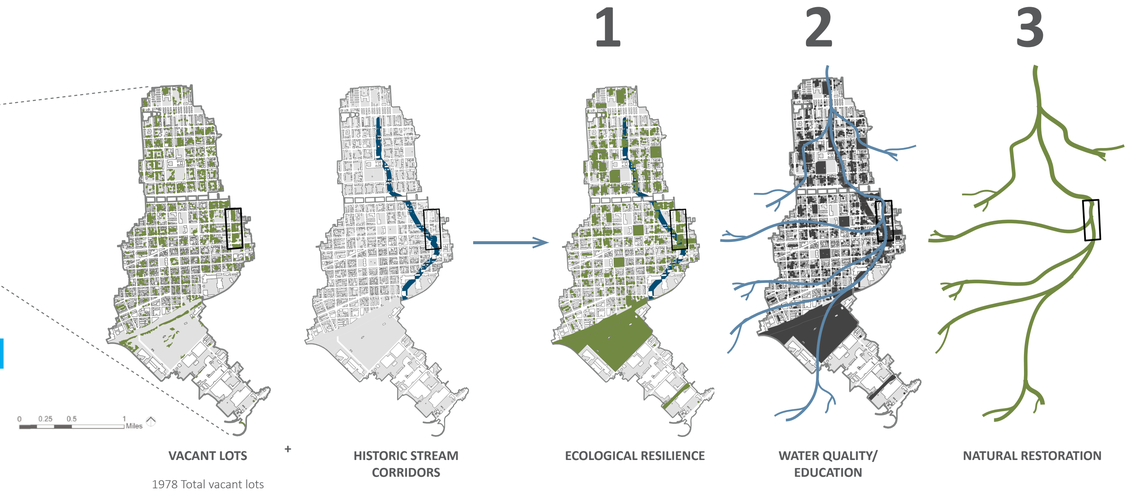
LARCH 414 SPRING 2016

CHESAPEAKE CONTINUUM

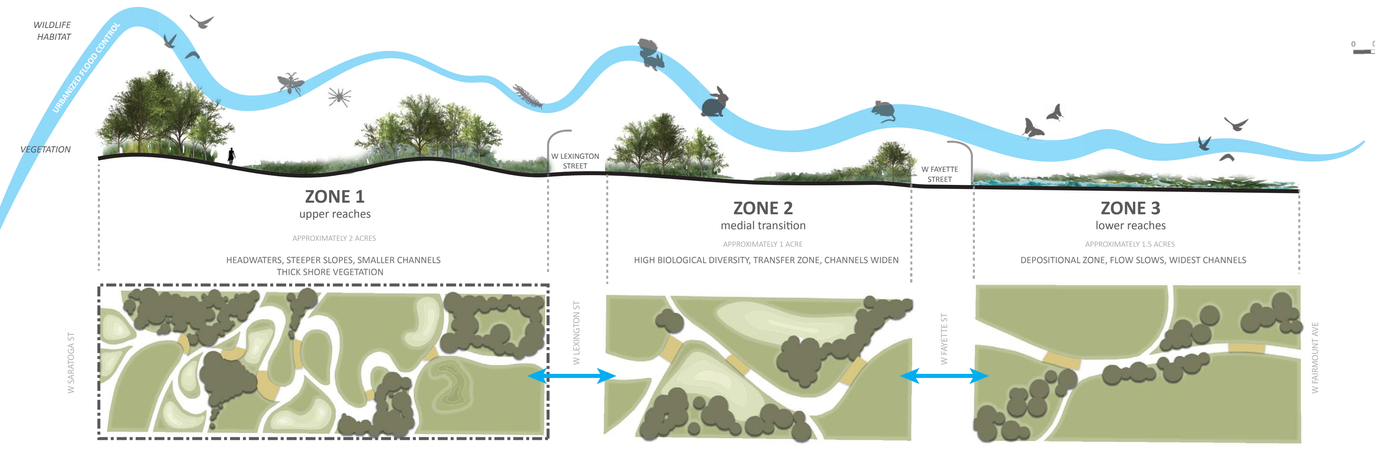
BALTIMORE ECOSYSTEM STUDY: POPPLETON SITE

Even though Baltimore may be categorized as a shrinking city, tackling the issues of water quality and polluted runoff from urban areas are extremely critical to the surrounding Chesapeake Bay Watershed. Seventy-five percent of Watershed 263, located in West Baltimore, is comprised of impervious surfaces that ultimately drain into Gwynn's Falls and enters our bay. Introducing environmental educational opportunities throughout Watershed 263, and the city of Baltimore, will produce awareness to the neighborhoods and community members within them to take a step in the right direction towards reducing this number. Starting with vacant lots and looking at historic stream corridors, we can begin to create a connection throughout the watershed and ultimately the entire city of Baltimore.

The historic characteristics of the site was since a small stream corridor that eventually led into the Inner Harbor. The traits of a typical stream are set up in a natural sequence, spanning from fast flowing headwaters all the way down to slow flowing corridors where it reaches the mouth of the bay. This particular vacant site will represent the fast flowing headwaters, with multiple tight-knit stream-like corridors that reflect the cultural and history of the area, as well as providing an educational awareness to the area, and looking into the future of the city of Baltimore and Watershed 263.

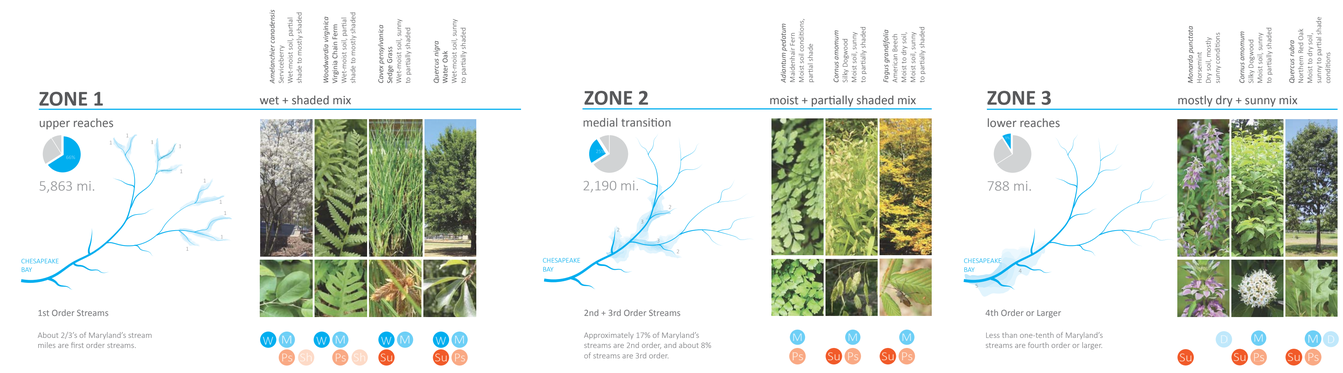


STREAM CONTINUUM REFLECTION



ECOLOGICAL STRATEGY DEVELOPMENT

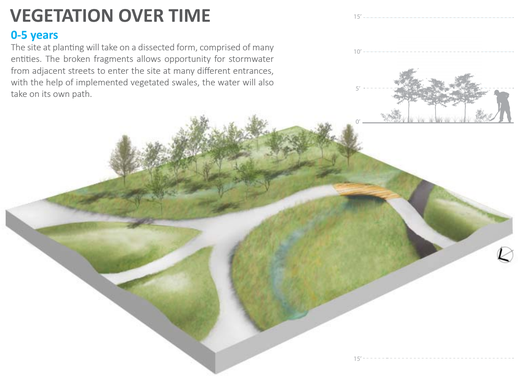
Maryland has over 8,800 mi. of non-tidal streams. Two-thirds of these corridors within Maryland are categorized into first order streams, which are comprised of small channels and steeper slopes. The plantings within these reaches are typically able to withstand wetter conditions without receiving much sunlight. The middle reaches, which makes up approximately 25% of Maryland's streams are rich in biological diversity and the stream channels begin to widen. The plantings within these zones are much more resistant to drought and require more sunlight throughout the day. In contrast, the lower reaches, making up around one-tenth of Maryland's streams are the widest channels and the flow of water slows down. The vegetation requires mostly sunny conditions with little to no moisture.



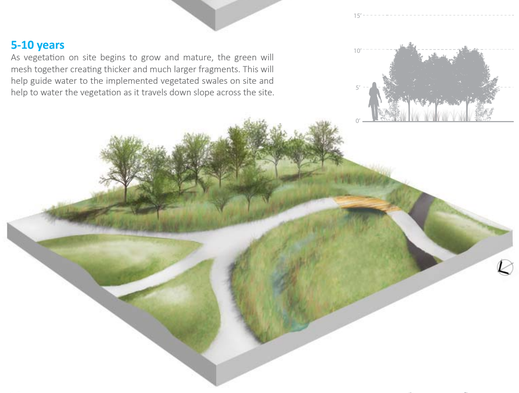
ELEMENT MORPHOLOGY

VEGETATION OVER TIME

0-5 years
The site at planting will take on a dissected form, comprised of many entities. The broken fragments allows opportunity for stormwater from adjacent streets to enter the site at many different entrances, with the help of implemented vegetated swales, the water will also take on its own path.



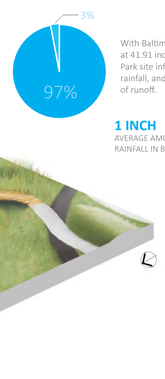
5-10 years
As vegetation on site begins to grow and mature, the green will mesh together creating thicker and much larger fragments. This will help guide water to the implemented vegetated swales on site and help to water the vegetation as it travels down slope across the site.



10+ years
As vegetation reaches maturity, the overall site experience is transformed. The collected stormwater intertwines with the dense vegetated habitat and the human experience. The density of the vegetation creates an enclosed environment for the visitor and immerses them into urban ecology that reflects the historic traits of this vacant site.

CAPTURING RAINWATER

1-year storm
The state of Maryland gets 4.9 more inches of rain than the national average at 39.17. Baltimore's average rainfall at 41.91 inches is about 2.16 inches fewer than the average for the entire state of Maryland. With the average amount of rainfall for a rainstorm in Baltimore at about 1 inch, the sites transformation is not very apparent. Almost all rainfall is immediately infiltrated.



With Baltimore's annual rainfall at 41.91 inches, the Poppleton Park site infiltrates 97% of rainfall, and allows for only 3% of runoff.

1 INCH
AVERAGE AMOUNT OF RAINFALL IN BALTIMORE

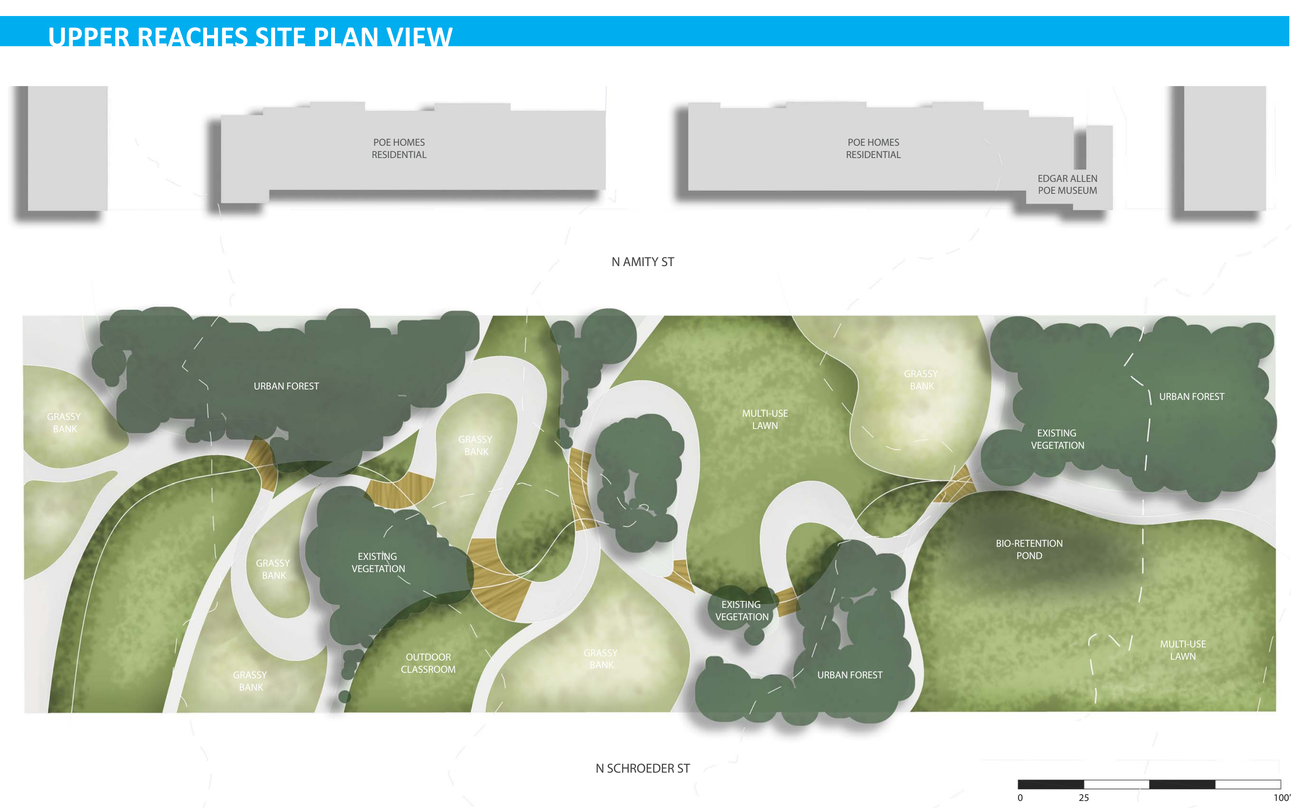
2-year storm
A 2-year storm event is approximately 2.6 inches of rainfall. In the event of this type of storm, the site will transform by capturing stormwater runoff from the surrounding roads. This site morphology of water would last about 10-12 hours until rainwater is fully absorbed.

2.6 INCHES
AVERAGE AMOUNT OF RAINFALL IN A 2-YEAR STORM EVENT

10-year storm
In the event of a 10-year storm surge, the site will take on approximately 5.1 inches of rainfall. At this point, the water will take on its own path through the site, and will not be fully absorbed into the ground until about 20 hours.

5.1 INCHES
AVERAGE AMOUNT OF RAINFALL IN A 10-YEAR STORM EVENT

UPPER REACHES SITE PLAN VIEW



HISTORIC STREAM CORRIDOR

In Baltimore City, over 70% of headwater streams have been buried (The Ecological Society of America). Stream burials significantly modify ecosystem metabolism and the natural cycles that occur due to these changes in the environment. Reintroducing the natural environment back into the city will help promote ecological resistance and present educational opportunities for the community.

[BALTIMORE ECOSYSTEM STUDY GOALS]

1 ECOLOGICAL RESISTANCE + RESILIENCE

This site will strive to establish ecological resilience with a self-sustaining environment. This will lead to less vegetation loss and less ecological disturbance in Watershed 263, and hopefully all of Baltimore City.

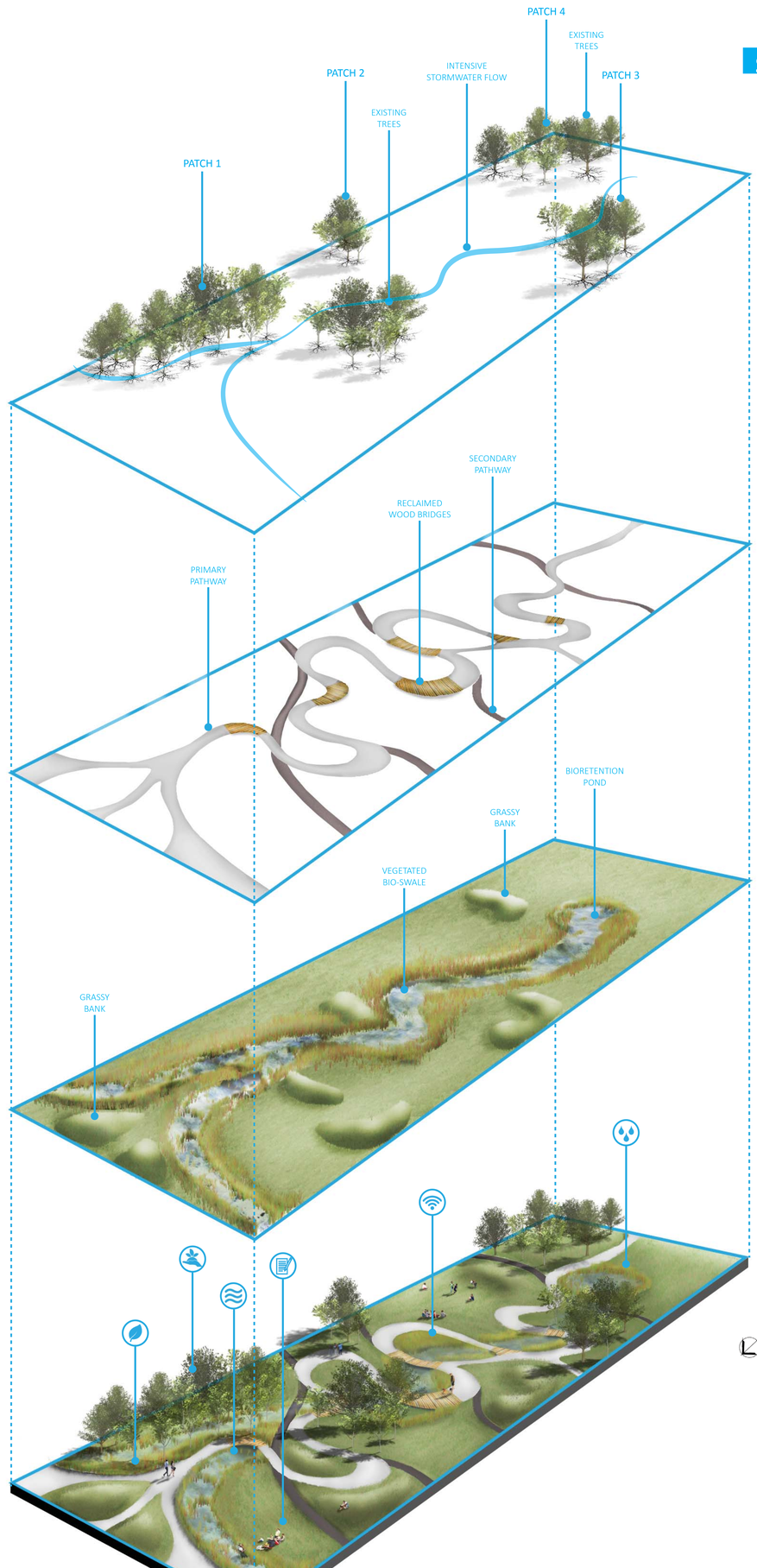
2 EDUCATIONAL OPPORTUNITIES

This site will aim to fill the gaps in knowledge about the importance of water quality and ecology in an urban environment.

3 NATURAL RESTORATION

Restoring a natural environment by providing habitat is a step in the right direction to restore Watershed 263 back to being as natural as possible.

SITE AXONOMETRIC



EXISTING VS. PROPOSED VEGETATION

PATCH 1: PROPOSED TREES
Amelanchier canadensis Serviceberry
Cercis canadensis Eastern Redbud
Acer rubrum Red Maple
Quercus palustris Pin Oak
Quercus nigra Water Oak

PATCH 2: PROPOSED TREES
Cornus florida Flowering Dogwood
Cercis canadensis Eastern Redbud
Acer rubrum Red Maple

PATCH 3: PROPOSED TREES
Liquidambar styraciflua Sweet Gum
Acer rubrum Red Maple
Quercus palustris Pin Oak
Celtis occidentalis Hackberry

PATCH 4: PROPOSED TREES
Cornus florida Flowering Dogwood
Cercis canadensis Eastern Redbud
Acer rubrum Red Maple
Quercus palustris Pin Oak
Quercus phellos Willow Oak

PROPOSED CIRCULATION + GRASSY BANKS

PRIMARY PATHWAYS:
The primary path of pedestrian circulation is made up of permeable concrete that meanders throughout the site. The ephemeral stretches create different experiences within the urban forest, and interacting with storm water runoff.

1,087 Ft. of impervious surface introduced

SECONDARY PATHWAYS:
Secondary pathways feed the desire lines that were engraved into the existing landscape. These secondary forms of circulation allow visitors to travel through the site from the high school to the adjacent neighborhood. These pathways are loosely structured with the use of pea gravel.

653 Ft. of impervious surface introduced

GRASSY BANKS:
As a natural stream meanders, the water carves into the landscape leaving its' mark. This reflects the natural environment of the historic stream corridor and leaves a memory of what once occurred on this vacant site.

PROPOSED SITE PROGRAM

NATIVE PLANTINGS
26,945 sq. ft of introduced native plantings
60% of the site is comprised of native plantings

URBAN FOREST
19,169 sq. ft of introduced native plantings
40% of the site is comprised of native plantings

STORMWATER MANAGEMENT
20,396 ft. of vegetated bio-swale

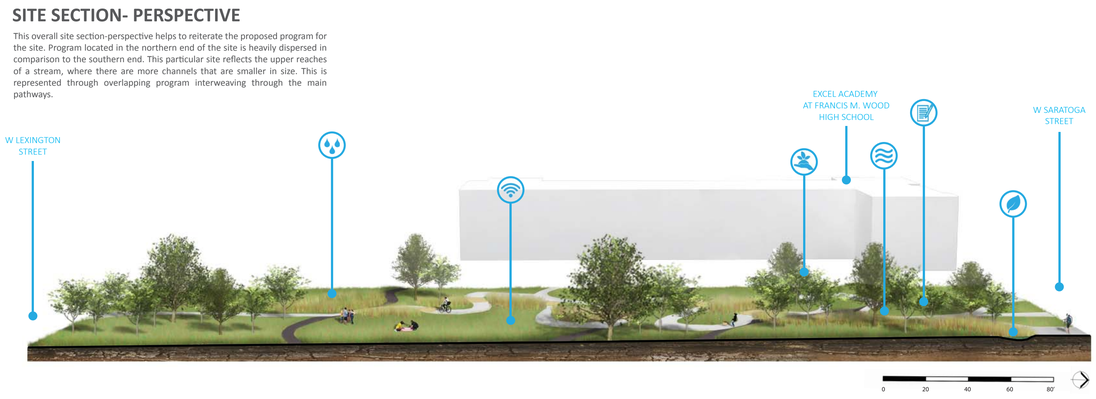
NATURAL EDUCATION
365 days available for interactive environmental education

EDUCATIONAL DATUM
FREE wireless internet to connect to for educational interactions

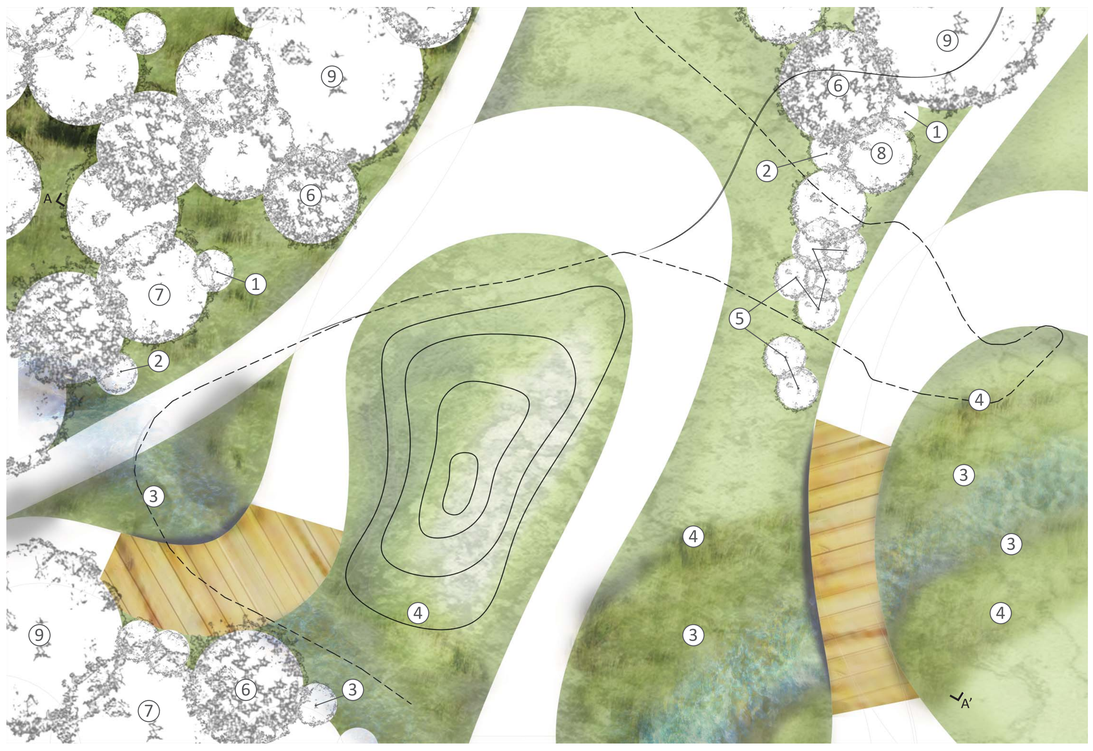
ON-SITE FILTRATION
100% stormwater infiltration
1.3 inches of average stormwater runoff

SITE SECTION- PERSPECTIVE

This overall site section-perspective helps to reiterate the proposed program for the site. Program located in the northern end of the site is heavily dispersed in comparison to the southern end. This particular site reflects the upper reaches of a stream, where there are more channels that are smaller in size. This is represented through overlapping program interweaving through the main pathways.



PLANTING PLAN



UPPER REACHES PLANTING PALLETE

W wet · M moist · D dry · Su sunny · Ps partly sunny · Sh shade

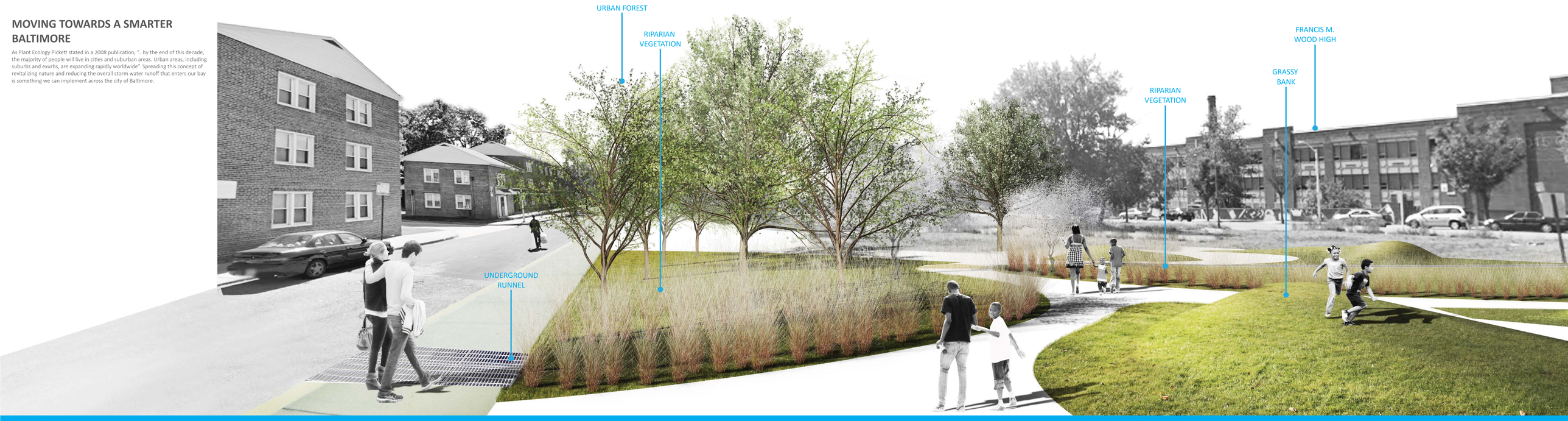
	1	2	3	4	5	6	7	8	9
SCIENTIFIC NAME	Osmunda cinnamomea	Woodwardia virginica	Cavex pensylvanica	Elymus virginicus	Eupatorium rogosum	Amelanchier canadensis	Quercus nigra	Liquidambar styraciflua	Acer rubrum
COMMON NAME	Cinnamon Fern	Virginia Chain Fern	Sedge Grass	Virginia Wild Rye	Joe-Pye Weed	Serviceberry	Water Oak	Sweet Gum	Red Maple
HEIGHT	2-3	4′	0.5-1.5′	1.5-5.5′	4-7′	35-50′	50-80′	60-80′	40-60′

PLANTING SECTION

Introducing native plantings on site in the various moisture zones will enhance the success of the site. Using a variety of heights throughout the introduced plantings will enhance the experience throughout the site, allowing the open space to feel much smaller than it is.

MOVING TOWARDS A SMARTER BALTIMORE

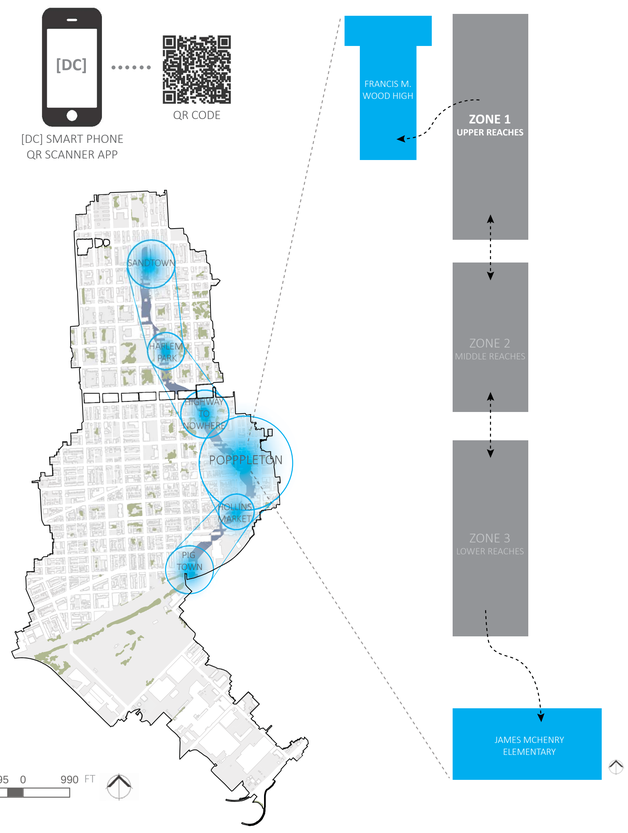
As Plant Ecology Pickett stated in a 2008 publication, "...by the end of this decade, the majority of people will live in cities and suburban areas. Urban areas, including suburbs and exurbs, are expanding rapidly worldwide". Spreading this concept of revitalizing nature and reducing the overall storm water runoff that enters our bay is something we can implement across the city of Baltimore.

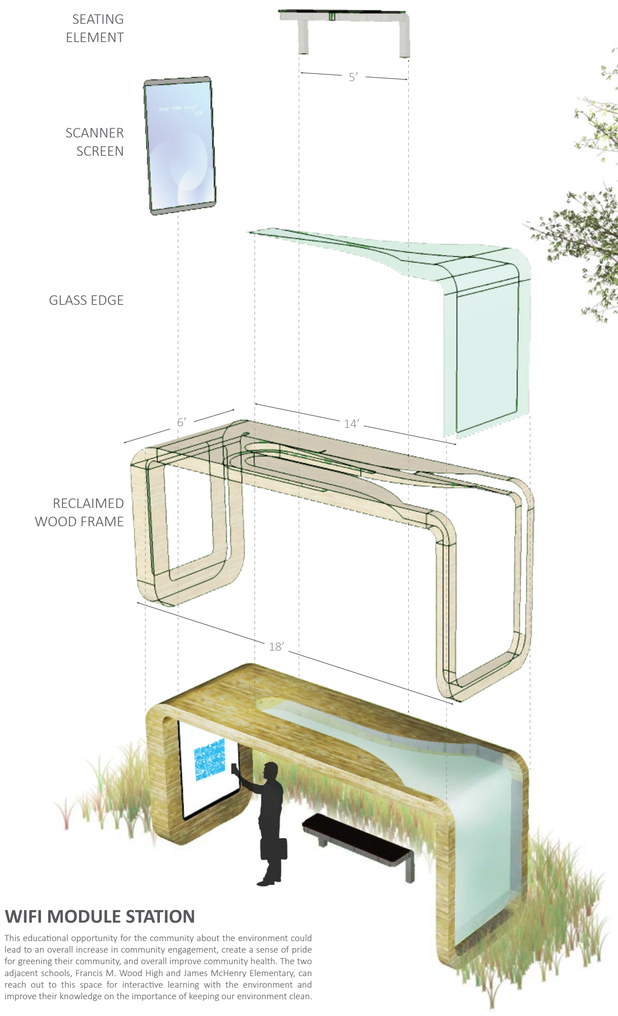


[DC] DIGITAL CONNECTION

EDUCATIONAL OPPORTUNITIES

Using technology to our advantage with a QR code scanning App designed for your smart phone could provide a different way of presenting environmental facts to the community of Watershed 263 and lead to a smarter Baltimore. Strategically placing multiple wifi nodes throughout the watershed can help to inform the community of their important natural resources and provide unity by linking divided neighborhoods with this educational datum.





WIFI MODULE STATION

This educational opportunity for the community about the environment could lead to an overall increase in community engagement, create a sense of pride for greening their community, and overall improve community health. The two adjacent schools, Francis M. Wood High and James McHenry Elementary, can reach out to this space for interactive learning with the environment and improve their knowledge on the importance of keeping our environment clean.

ACCESSING THE QR CODE

STEP 1:
Download the [DC] "app" on your phone. Open the app and begin scanning!

STEP 2:
Point your smart-phone's camera at the QR code on the Wifi station's QR code.

STEP 3:
Hold the phone steadily, allowing for your phone to process the QR code.

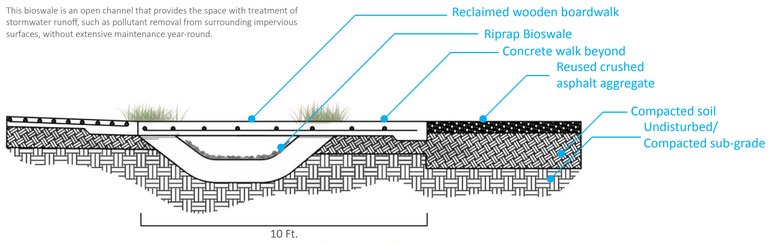
STEP 4:
Once the QR code is processed, the educational experience begins! Each QR code scanned will present different information for each individual node.

CAPTURING STORMWATER

Currently seventy-five percent of Watershed 263, is comprised of impervious surfaces that ultimately drain into Gwynn's falls and enters our bay. Introducing environmental educational opportunities throughout Watershed 263, and the city of Baltimore, will produce awareness to the neighborhoods and community members within them to take a step in the right direction towards reducing this number.

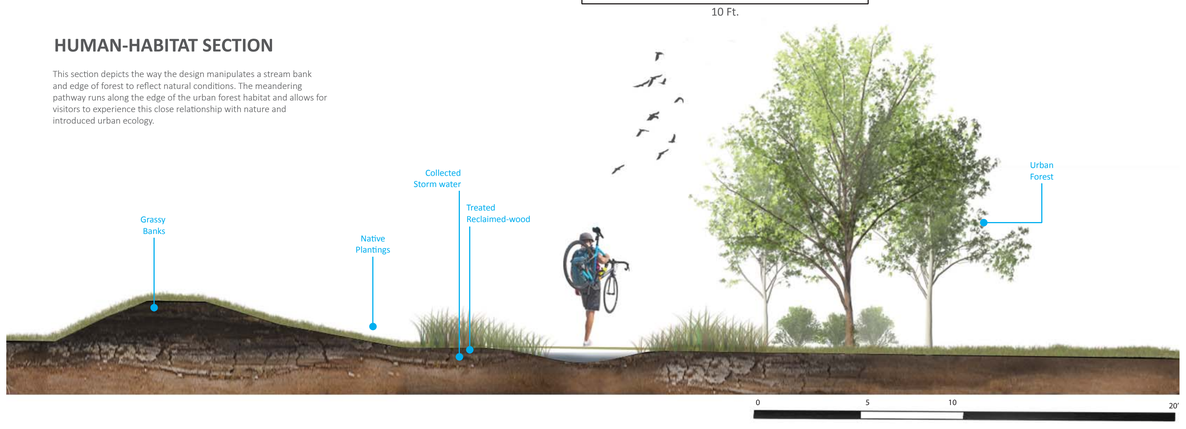
BIO-SWALE FILTER SYSTEM

This bioswale is an open channel that provides the space with treatment of stormwater runoff, such as pollutant removal from surrounding impervious surfaces, without extensive maintenance year-round.



HUMAN-HABITAT SECTION

This section depicts the way the design manipulates a stream bank and edge of forest to reflect natural conditions. The meandering pathway runs along the edge of the urban forest habitat and allows for visitors to experience this close relationship with nature and introduced urban ecology.



RECLAIMED WOODEN BOARDWALKS

As vacant homes within the city of Baltimore are being demolished, this site plans to utilize the collected wooden panels to construct wooden boardwalks. Treating the wooden panels to become weather resistant is important for the success of this implementation on site. Otherwise, reclaiming the wood from demolished vacant homes will reduce the overall cost of the boardwalks.

The boardwalks allow for visitors to experience the collected stormwater from above, meandering and crossing overtop of the water system.