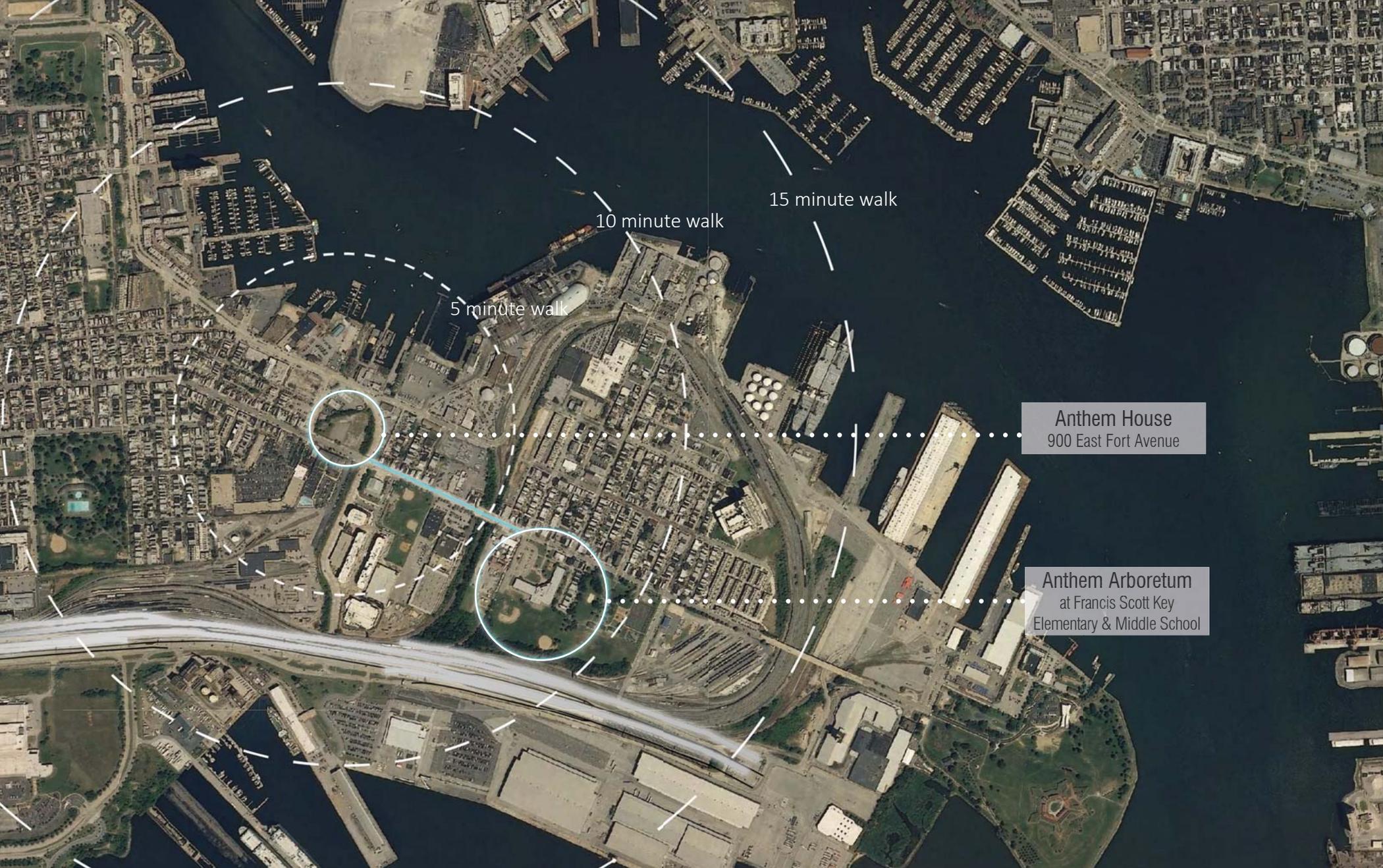




THE ANTHEM ARBORETUM
AT FRANCIS SCOTT KEY ELEMENTARY & MIDDLE SCHOOL
BALTIMORE, MD



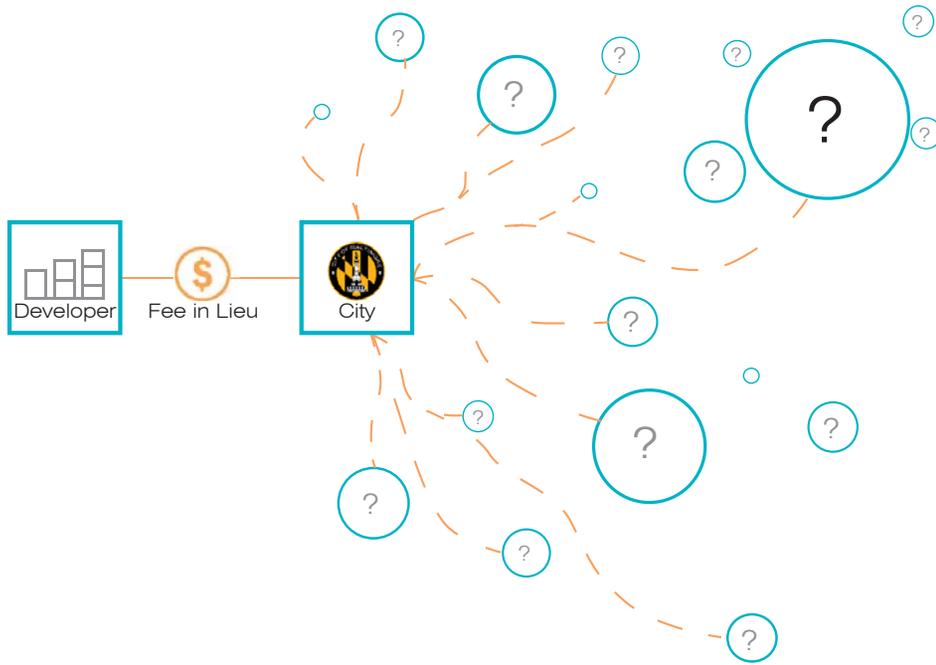
Anthem House
900 East Fort Avenue

Anthem Arboretum
at Francis Scott Key
Elementary & Middle School

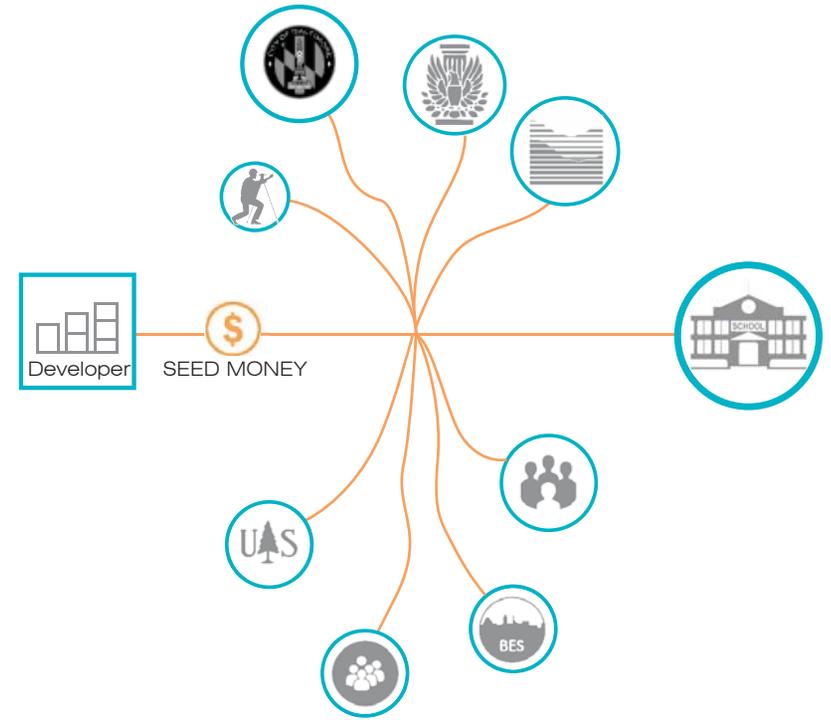
At 900 East Fort Avenue (Anthem House), located within the Critical Area of Baltimore City, approximately 100 trees were removed to accommodate a mixed-used development. Vegetative replacement ratios could not be met on site, which spurred the design team to explore reforestation at the Francis Scott Key Elementary/Middle School.

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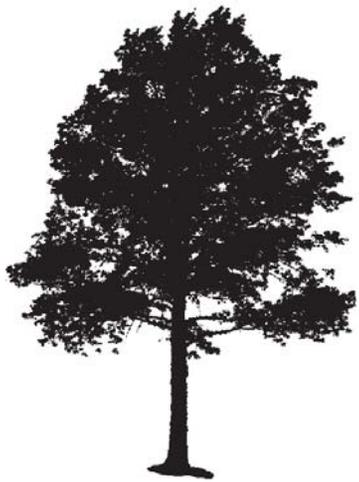
Typical Mitigation Process



Anthem Arboretum Mitigation Process

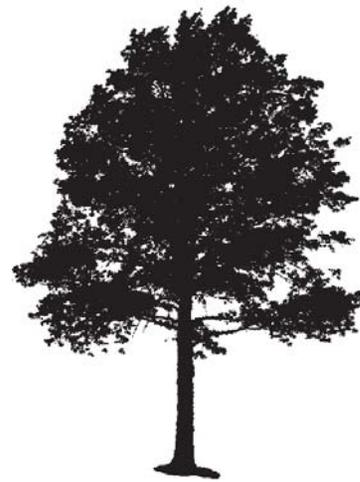
Asking how one project's environmental externalities can be used to catalyze other project opportunities and environmental services the design team recast 'fee-in-lieu' payments as seed money for the Anthem Arboretum at the Francis Scott Key Elementary/Middle School; bringing together community groups City agencies, urban ecologists, and the US Forest Service.

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DBH

Typical Regulatory Measure



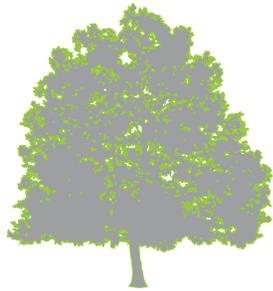
Landscape Performance Measure

Questioning the completeness of the Diameter at Breast Height (DBH) measurement typically used to determine tree replacement requirements in the Critical Area, the design team utilized the US Forest Service's iTree Software to analyze and quantify the value of trees based on their ecosystem services.

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Liriodendron tulipifera



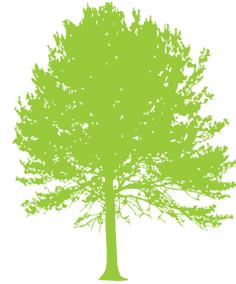
Acer rubrum



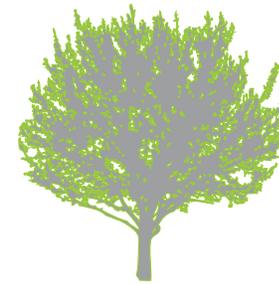
Ginkgo biloba



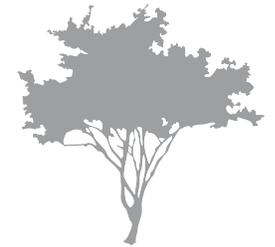
Betula nigra



Tilia americana



Zelkova serrata



Chionanthus virginicus

iTree Species Plant Performance Recommendations

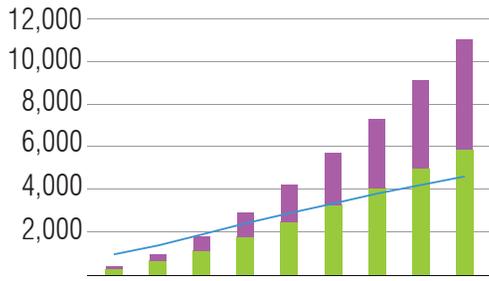
 Selected for FSK

 iTree Recommended

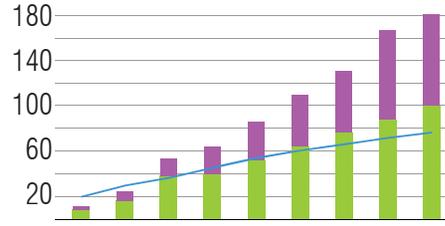
 Commonly Planted

In exploring design concepts for the Anthem Arboretum at the Francis Scott Key Elementary/Middle School, the design team utilized iTree Species to select high performance trees capable of replacing the ecosystem services lost at 900 East Fort Avenue.

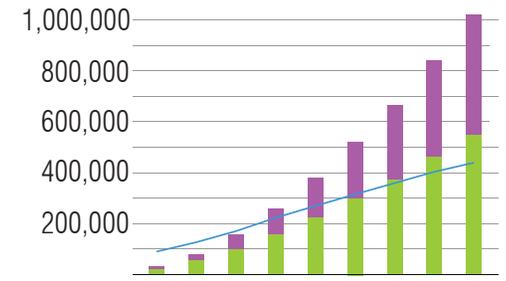
THE ANTHEM ARBORETUM
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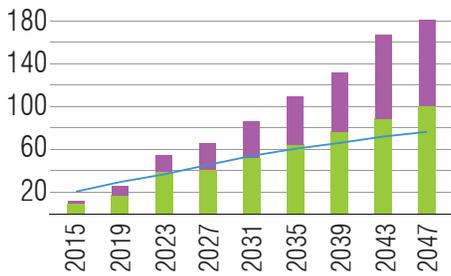
Overall Tree Benefits (\$)



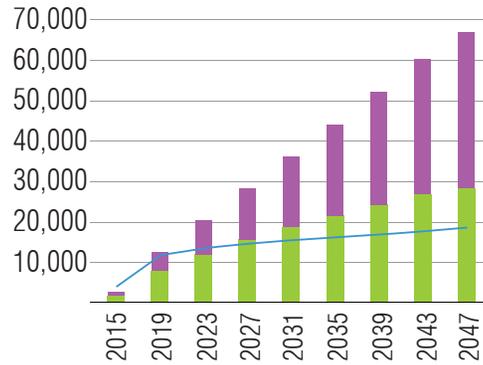
PM₁₀ Removed (\$)



Stormwater Reduction (gal.)



O₃ Removed (\$)



Carbon Sequestered (lbs.)



Plant Performance

— 900 East Fort Avenue Ecosystem Services Lost
 ■ Ecosystem Services of Proposed Design: Anthem Arboretum
 ■ Ecosystem Services of Proposed Design: Anthem House

For measures of stormwater reduction, carbon sequestration, particulate removal, ozone removal, and overall economic benefits, the combined Anthem House and Anthem Arboretum projects are estimated to completely replace the loss of ecosystem services from the Critical Area by 2027.

THE ANTHEM ARBORETUM
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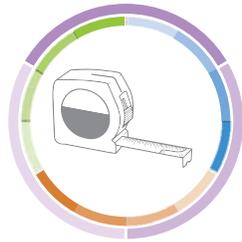
KEY:

- | | | | |
|---|--------------------------------|-------------------------------------|------------------------------|
| A - Entry Area with Oak/Hickory Planting | D - Outdoor Classroom | G - Composting Station | J - Observatory Space |
| B - Natural Play Area | E - Perennial Plantings | H - Raised Bed Planting Area | K - Living Laboratory |
| C - Perennial Plantings | F - Greenhouse | I - Vermiculture Station | |



The design of the Anthem Arboretum is intended to create a rich, sensory environment that offers a range of educational and recreational opportunities including passive learning through botanical displays, active learning through nature play, scientific discovery through a living laboratory, and a formal teaching space for discussion.

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Measurement Tools



Signage



Observation Area



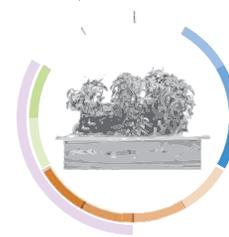
Benches



Living Lab



Compost Station



Raised Planters



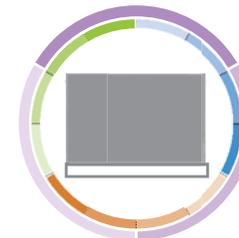
Edible Plantings



Greenhouse



Diverse Plantings



Outdoor Chalkboard

Kit of Parts

TIES TO CURRICULUM

BALTIMORE ECOSYSTEM STUDY

- » Tree Community Study
- » Sun/Shade Leaf Study
- » Urban Soils Investigation

6TH GRADE

- » Astronomy
- » Investigating Weather
- » Investigating Earth Systems
- » Investigating Geologic Processes

7TH GRADE

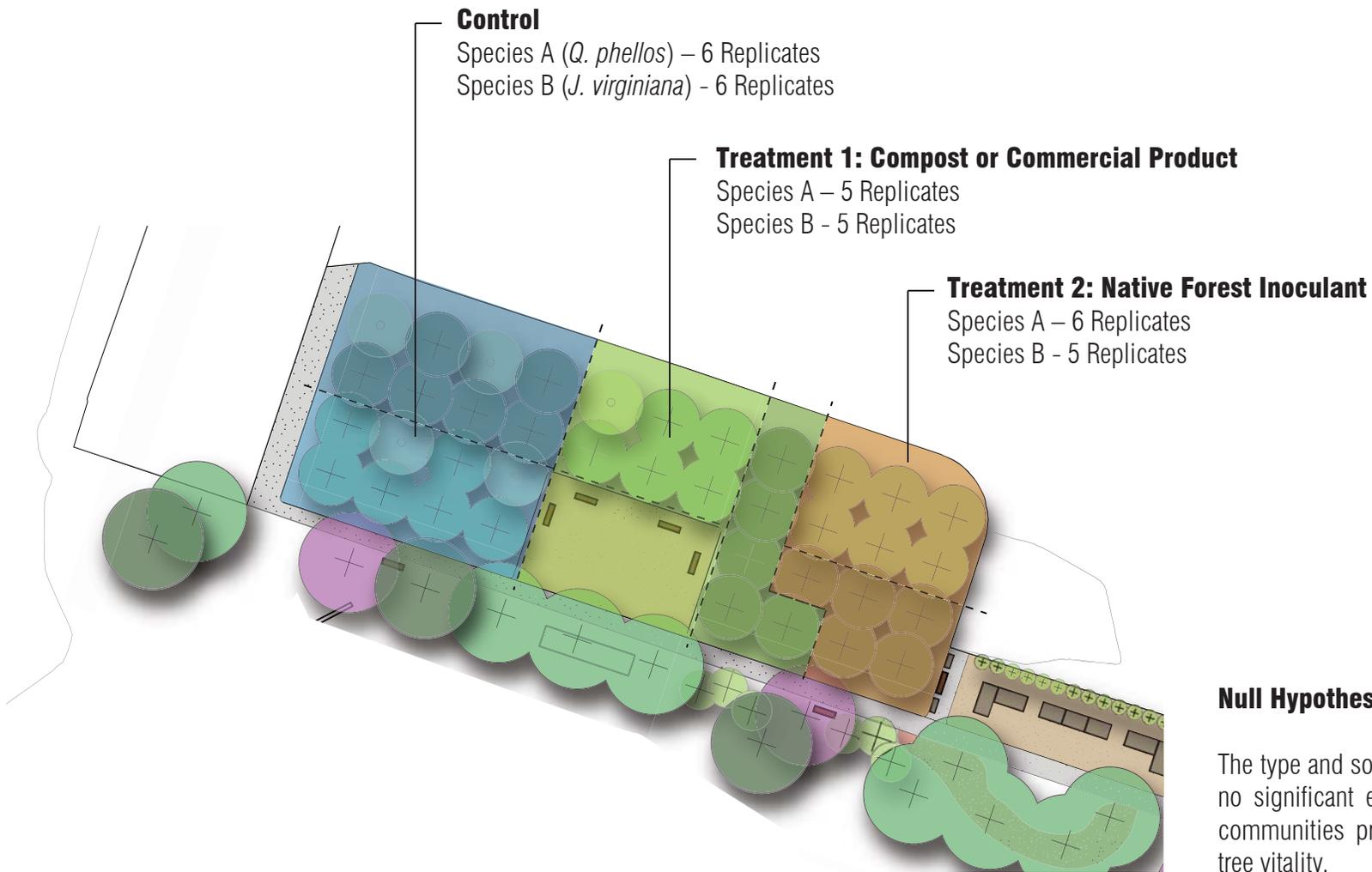
- » Investigating Structure & Function of Living Things
- » Investigating Structure & Function of the Human Body
- » Investigating Genetics & Evolution
- » Ecology

8TH GRADE

- » Basic Chemistry
- » Advanced Chemistry
- » Investigating Forces of Motion
- » Investigating Energy & Waves

The foundation of the Anthem Arboretum design is its the project's Kit of Parts, which outlines an array of design elements that are tied to specific STEAM (Science, Technology, Engineering, Arts, and Math) curriculum goals and can be implemented incrementally dependent on available funding, teacher capacity, and site constraints.

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Null Hypothesis

The type and source of soil amendment has no significant effect on the soil microbial communities present around trees and on tree vitality.

Designed Experiment

Embedded in the living laboratory and discover area at the Anthem Arboretum is a Designed Experiment that explores plant-soil interactions and the role of soil microbes in supporting tree vitality in the urban environment.

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DISPLAY - The Display area of the Anthem Arboretum provides a striking botanical collection of native Chesapeake species that offers students, teachers, parents, and community members passive learning and leisure opportunities.

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PLAY - The Play area of the Anthem Arboretum offers younger students a natural, active, multi-sensory learning environment that is safe, educational, and stimulating.

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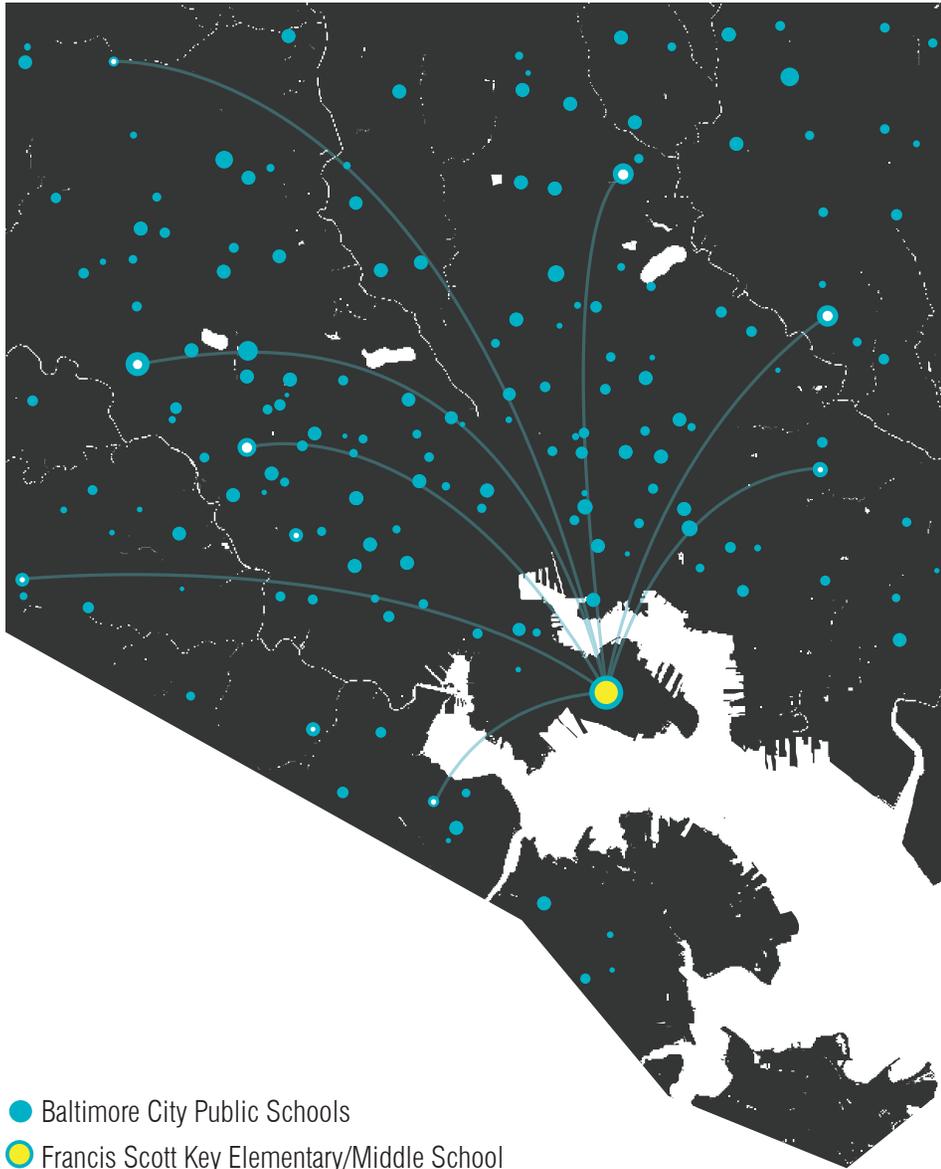
DISCOVER - The Discover area of the Anthem Arboretum is designed to highlight ecological cycles and connect directly with Next Generation Science Standards and the Baltimore Ecosystem Study's curricula. Compost stations, raised planters, a greenhouse, botanical collections, and the living laboratory Designed Experiment provide learning opportunities for different ages/grades.

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DISCUSS - The Discuss area of the Anthem Arboretum provides a formal gathering space or outdoor instruction, as well as sitting areas for groups and individuals. The Native species that frame and contain the space extend the Discover area, while benches, an outdoor blackboard, and a little library enrich the learning environment.

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- Baltimore City Public Schools
- Francis Scott Key Elementary/Middle School

The kit of parts developed for the Anthem Arboretum provides a replicable, scalable, and affordable approach to enrich and study educational landscapes throughout the Baltimore City school system that can strengthen public education and improve the urban environment.

1 KIT OF PARTS

179 OPPORTUNITIES TO ENRICH EDUCATIONAL LANDSCAPES & THE URBAN ENVIRONMENT

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