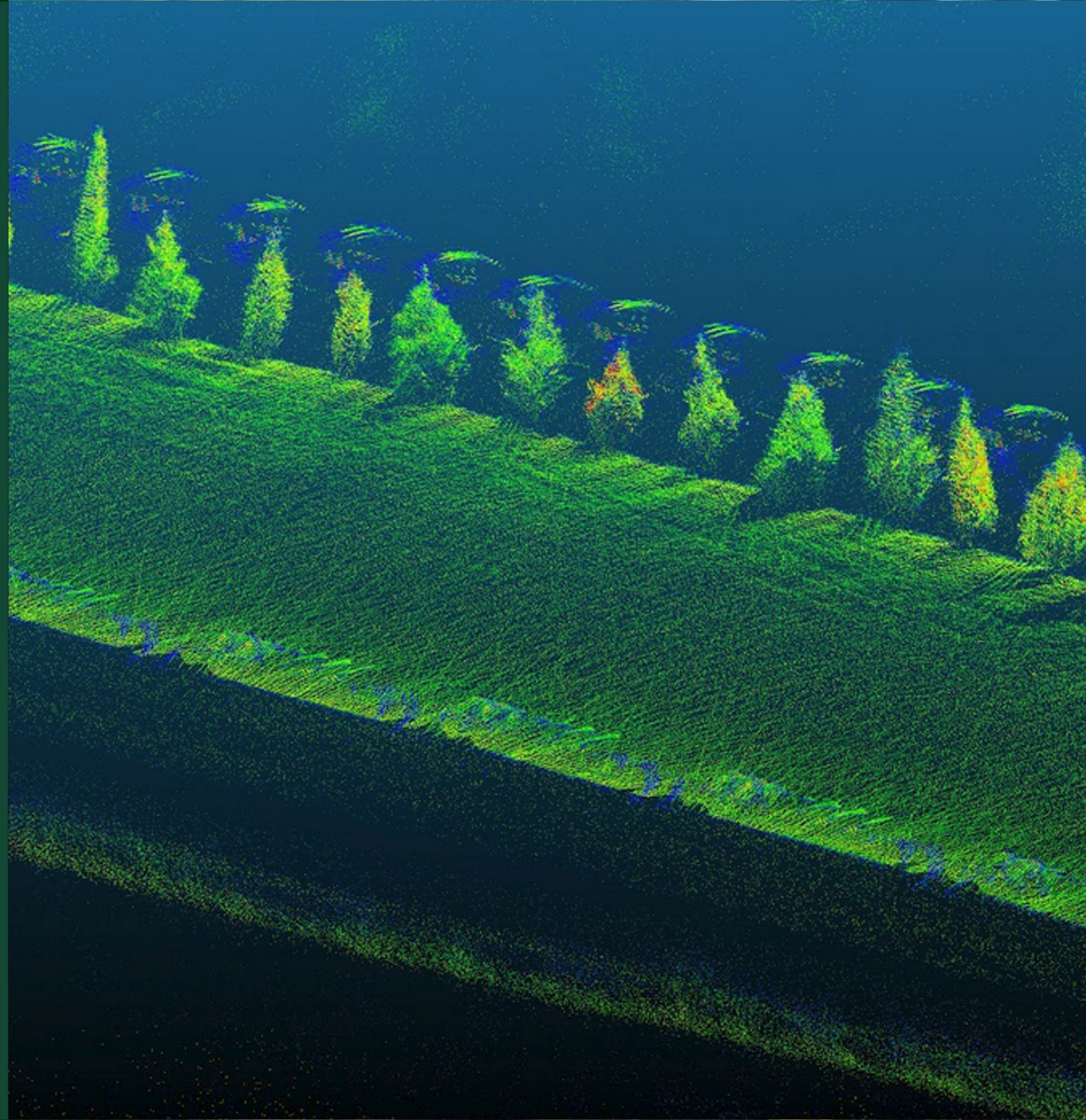
PARTNERS IN COMMUNITY FORESTRY

2024 CONFERENCE



Arbor Day Foundation™

Modeling Solutions for Air Quality

PRESENTED BY:

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AGENDA

Evidence Based Design

Prescott Greening

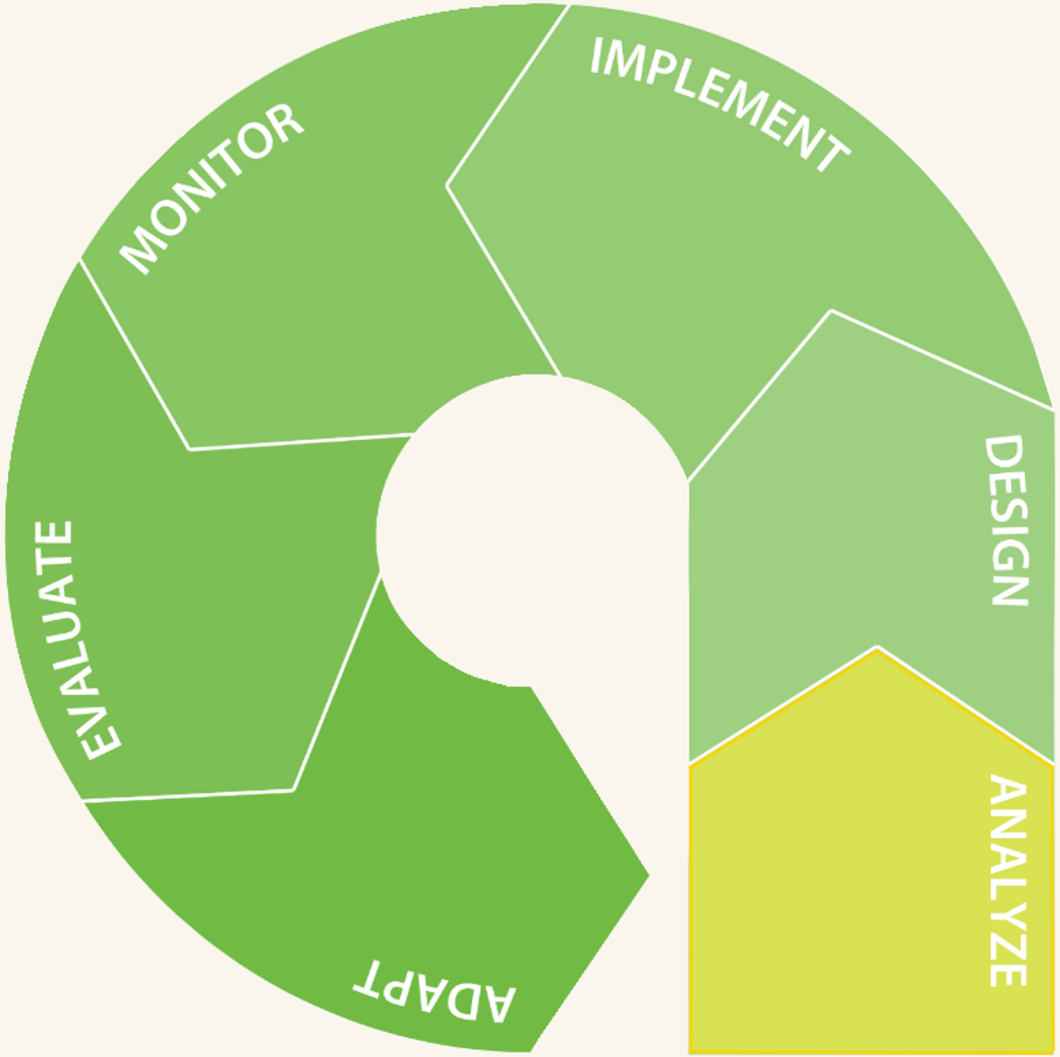
Modeling Pollution

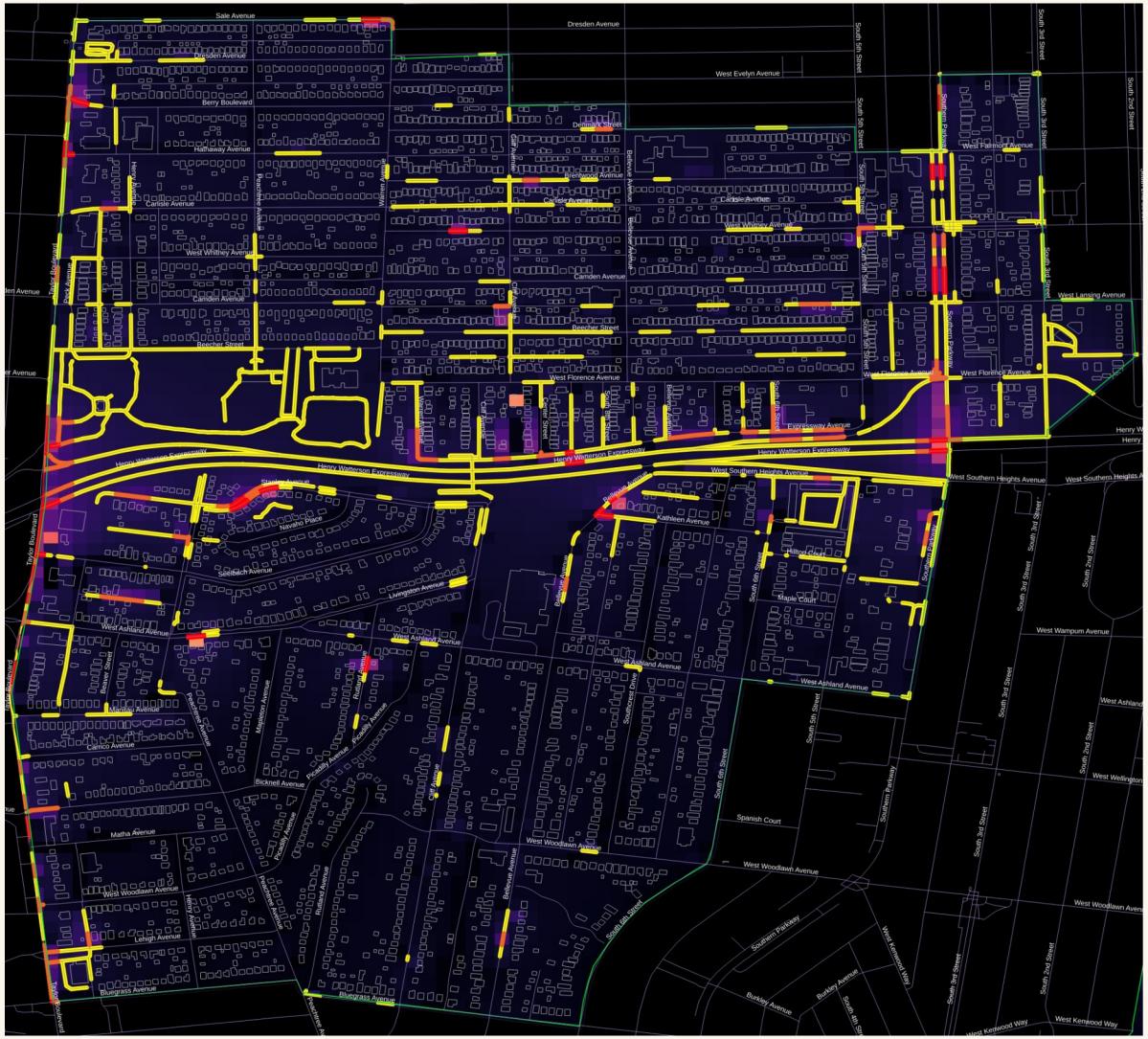
Vegetated Buffers

Prescott Concept Designs

Summary

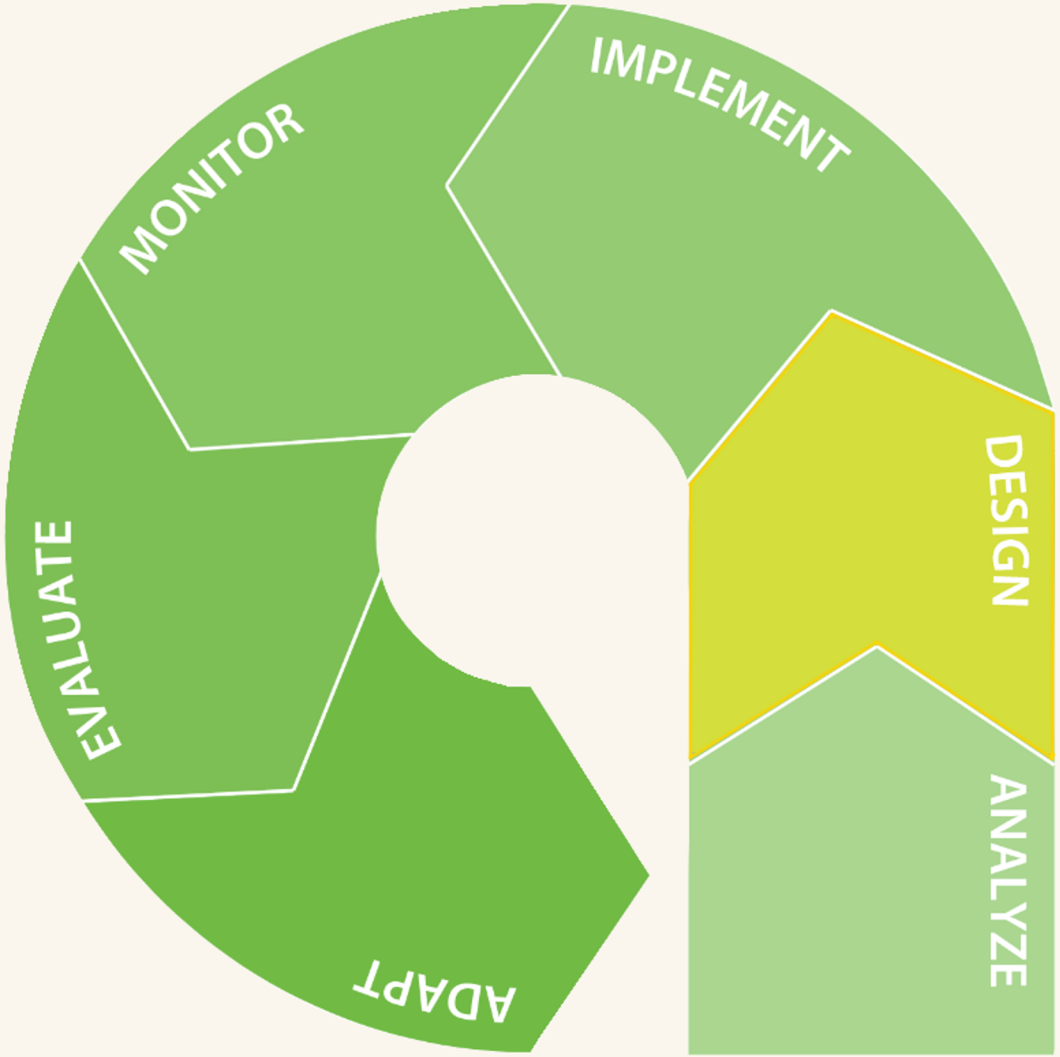
Evidence Based Design

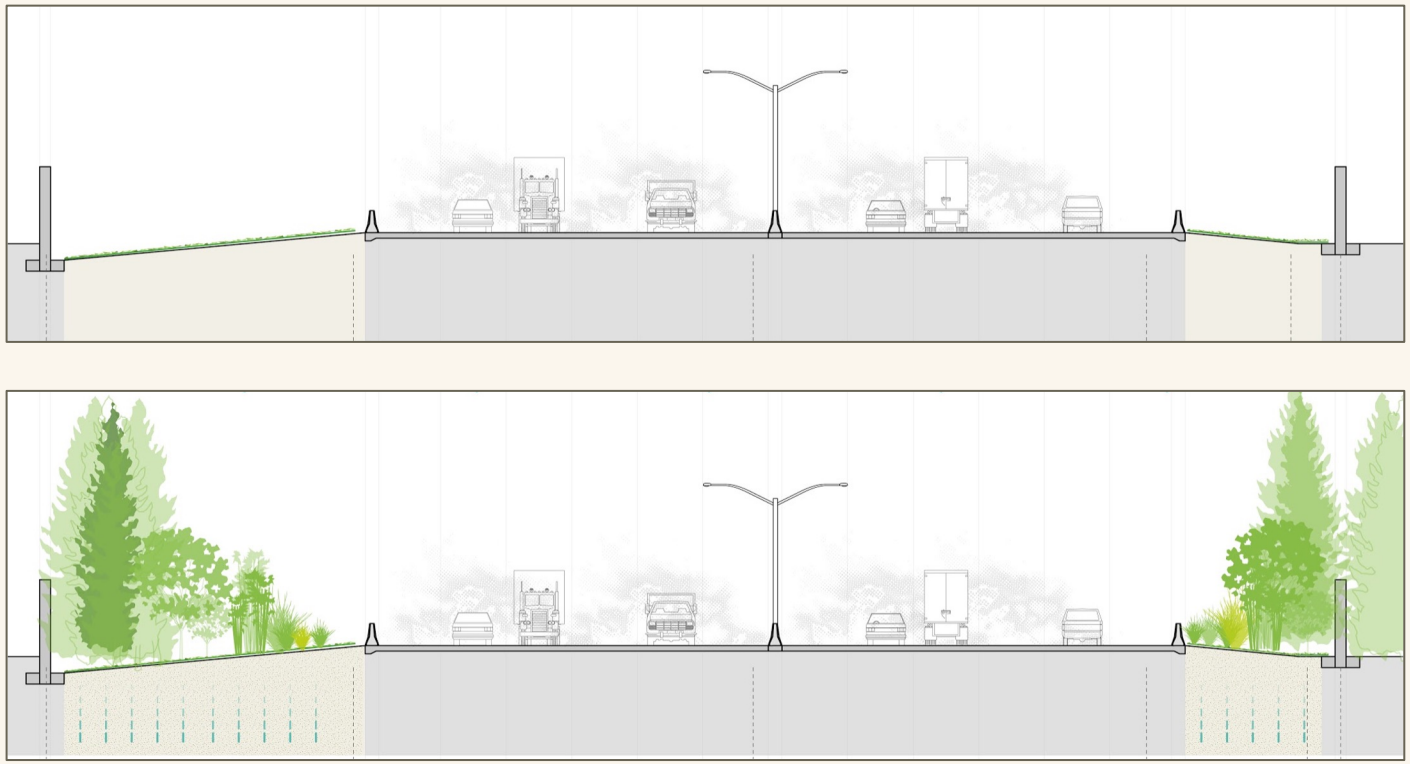




Analyze where pollution is the worst

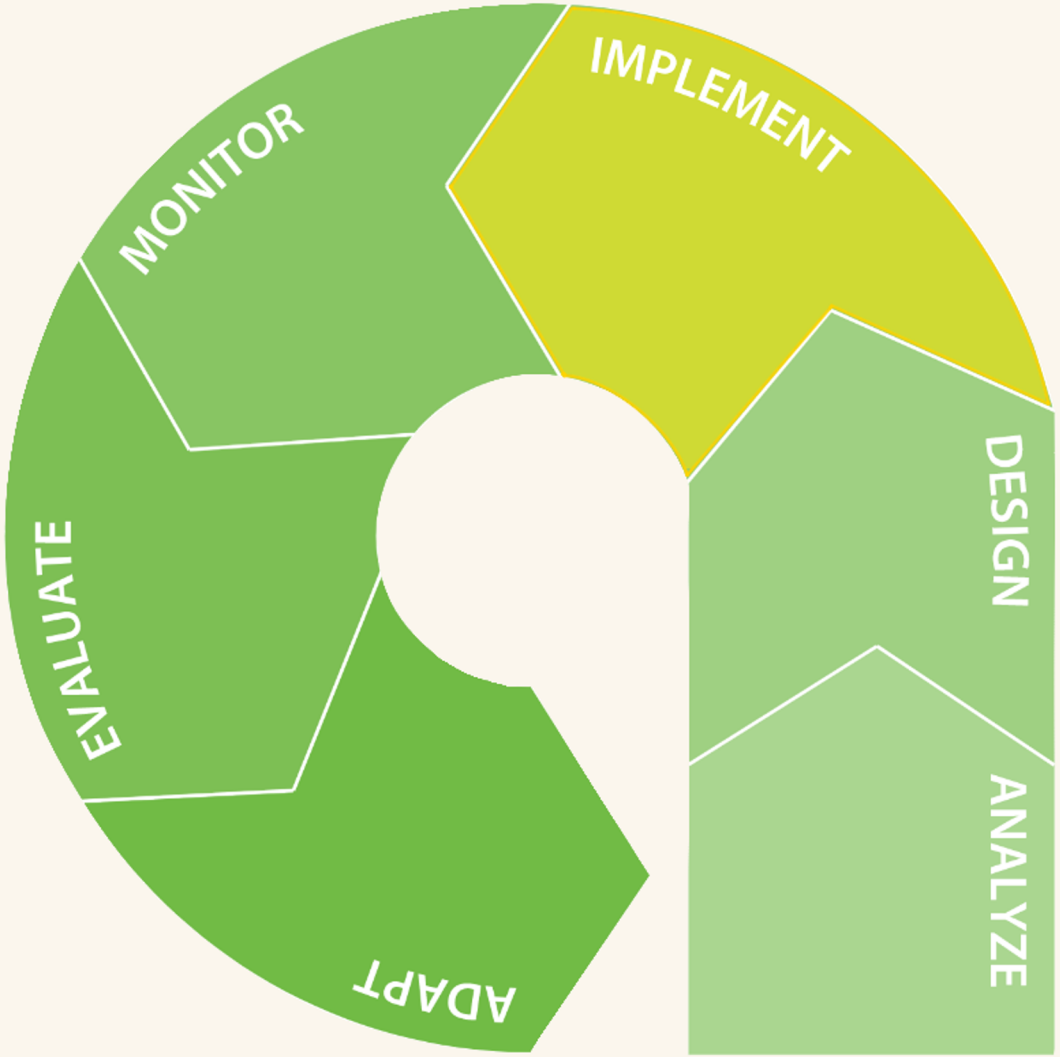
Evidence Based Design





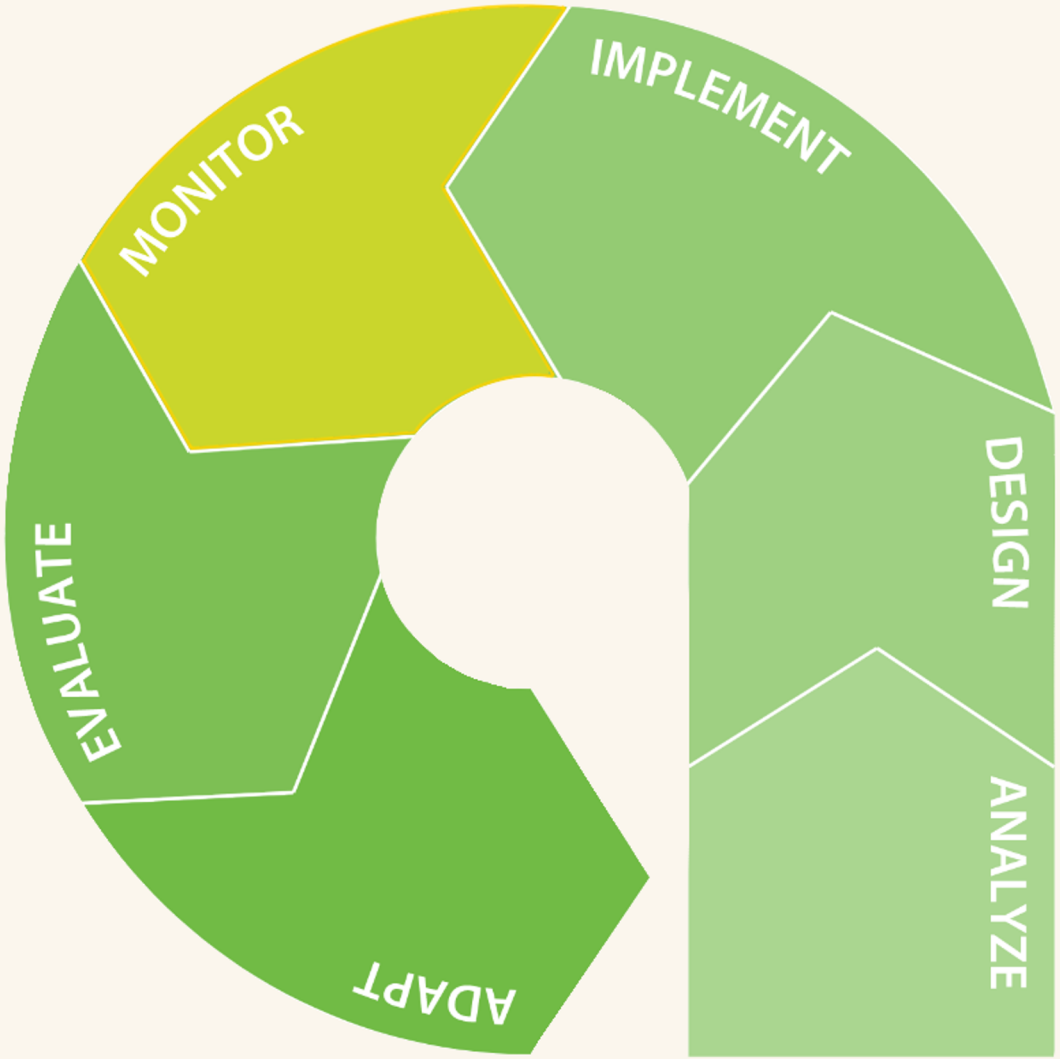
Design an intervention

Evidence Based Design



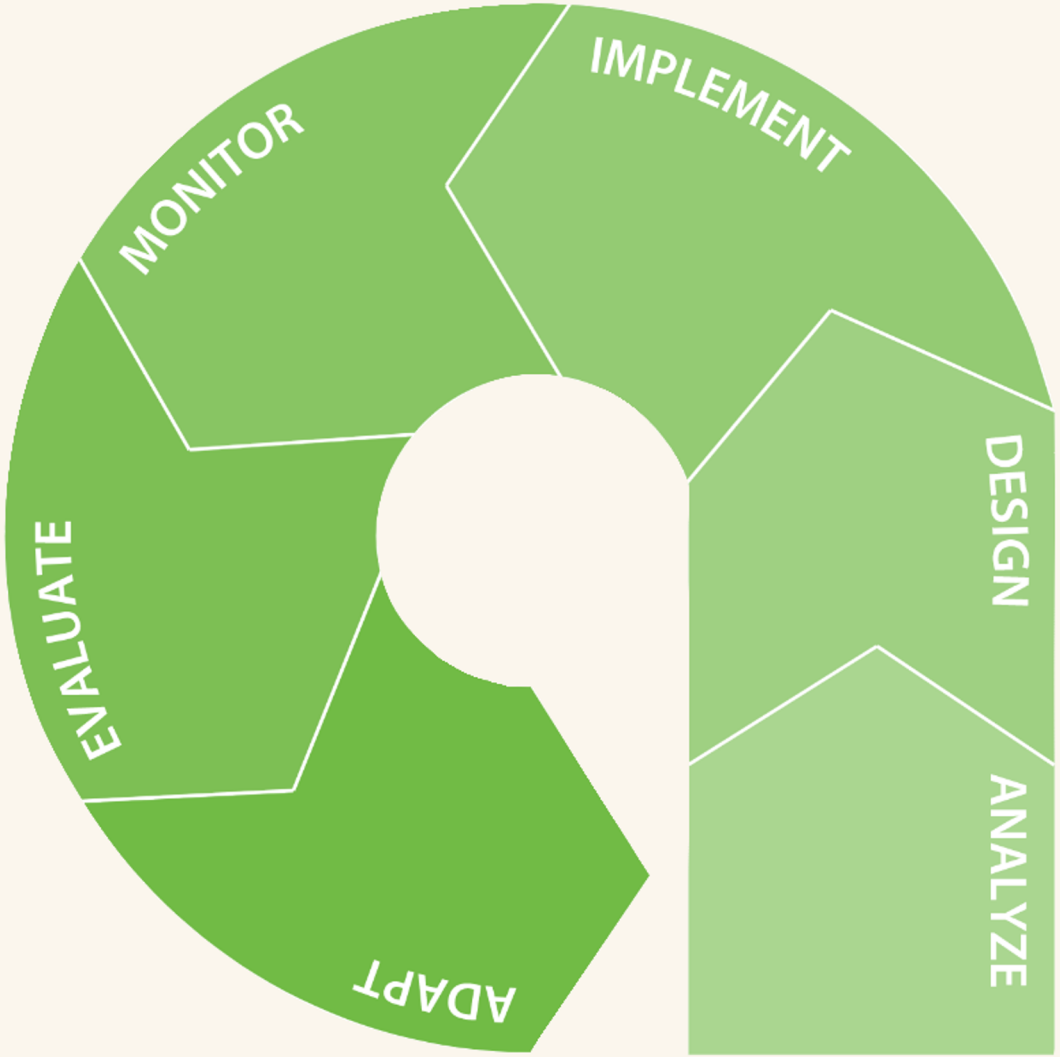
Implement/Install the design

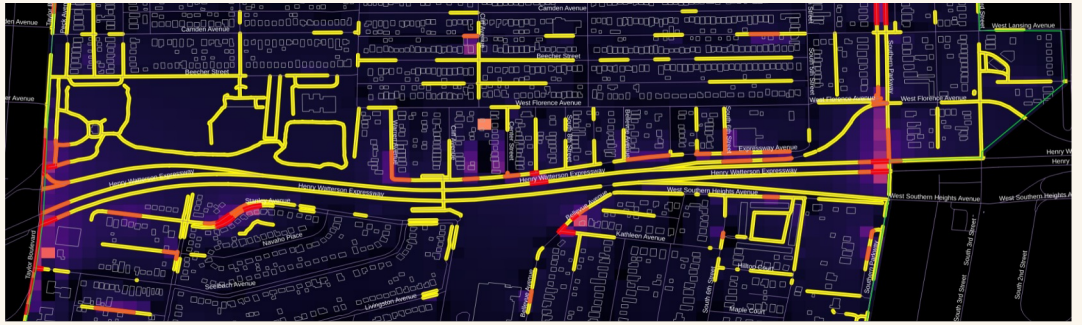
Evidence Based Design

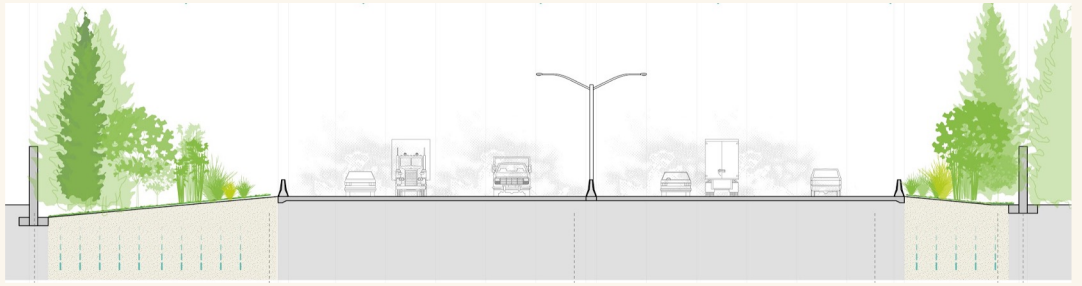


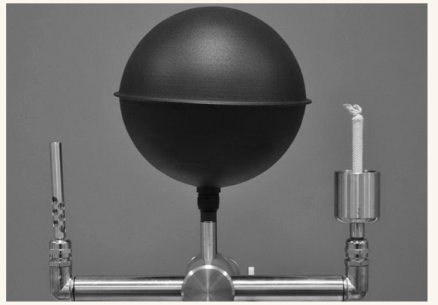
Monitor the results

Evidence Based Design

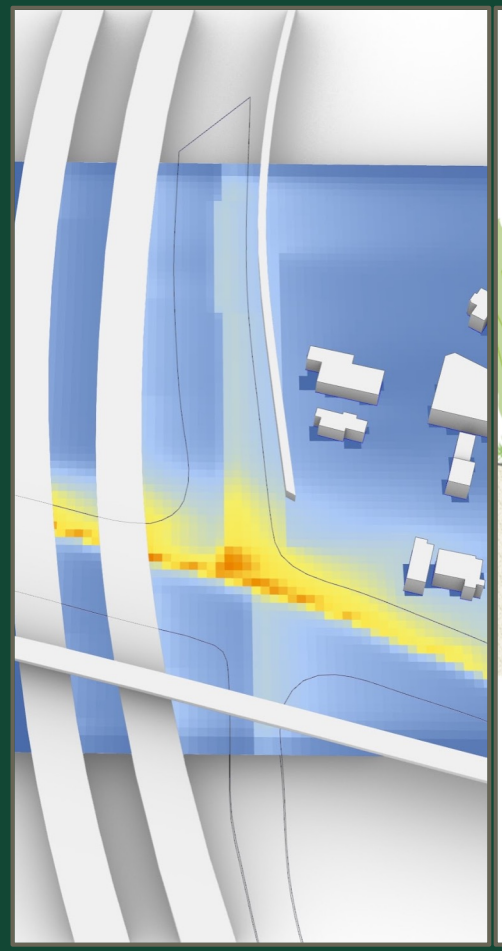




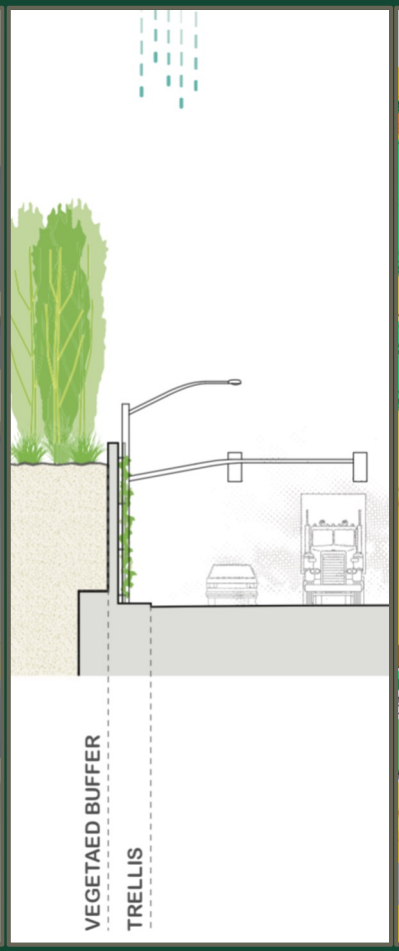




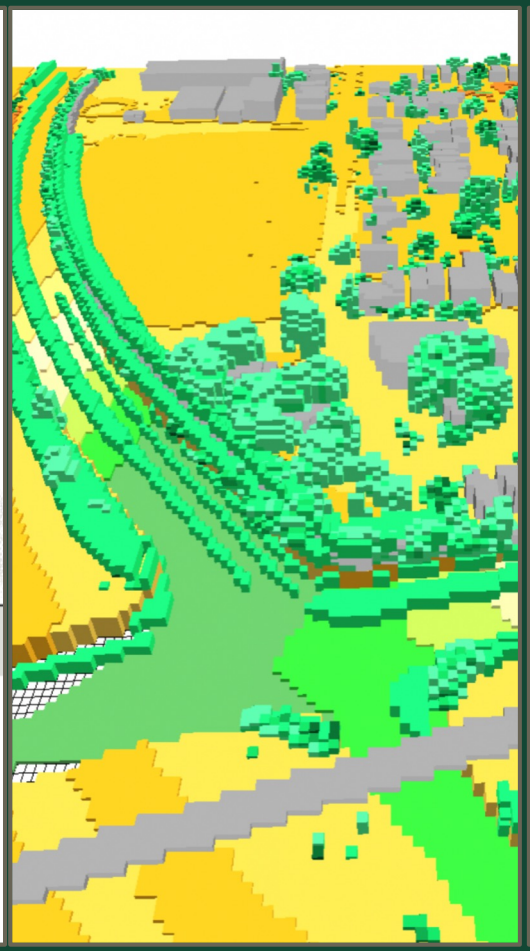
Prescott Greening Project



Model Pollution

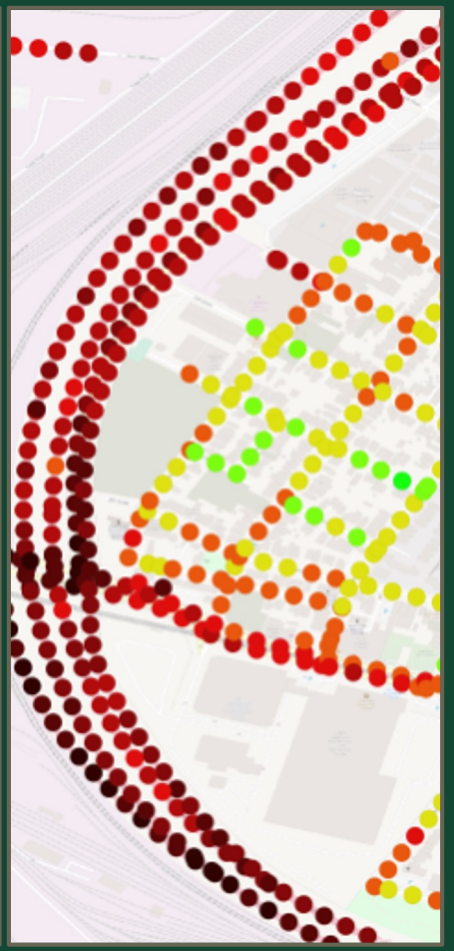


Design



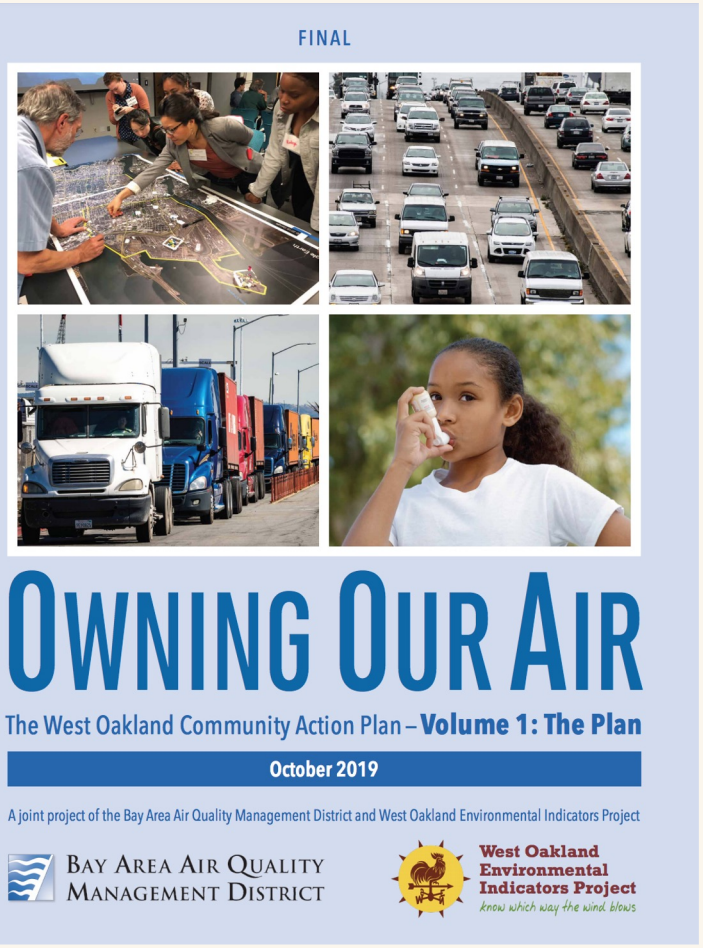
Model Solutions

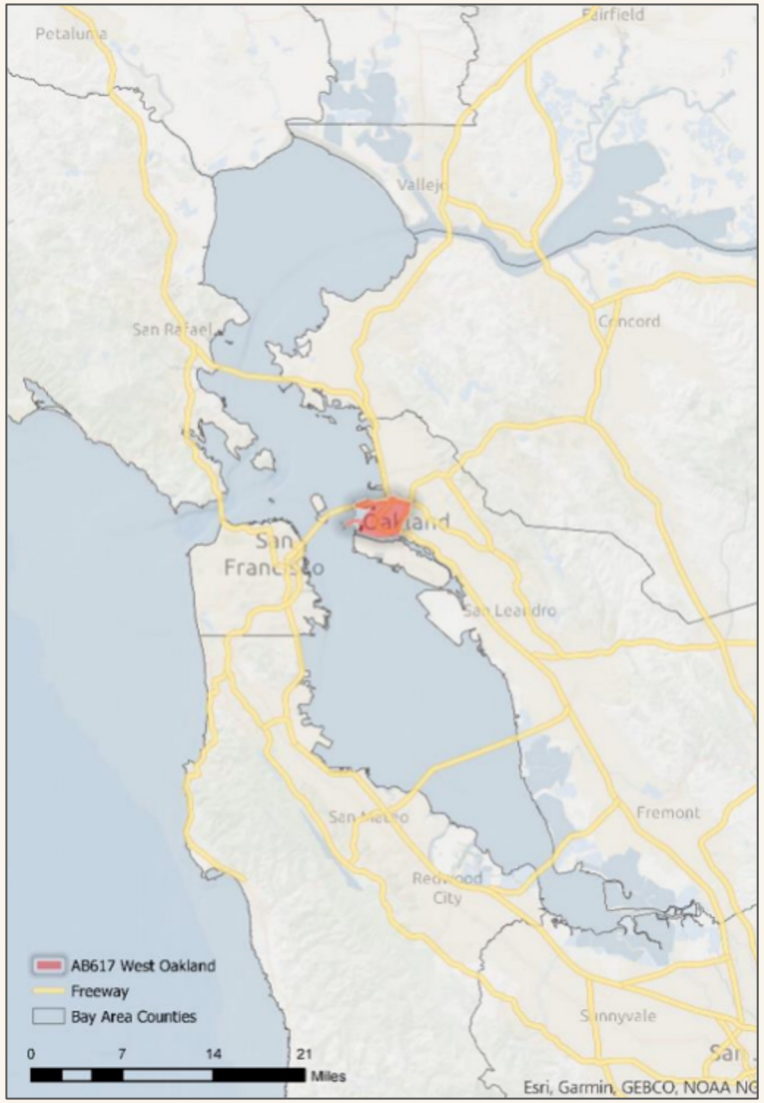
Build Interventions



Monitor Results

WEST OAKLAND





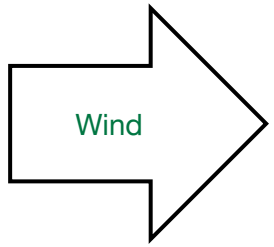
What we need to model how a green intervention impacts exposure risk

Change in Air Pollution Level =

Physical Environment

Pollution Sources

How Air Moves through the environment

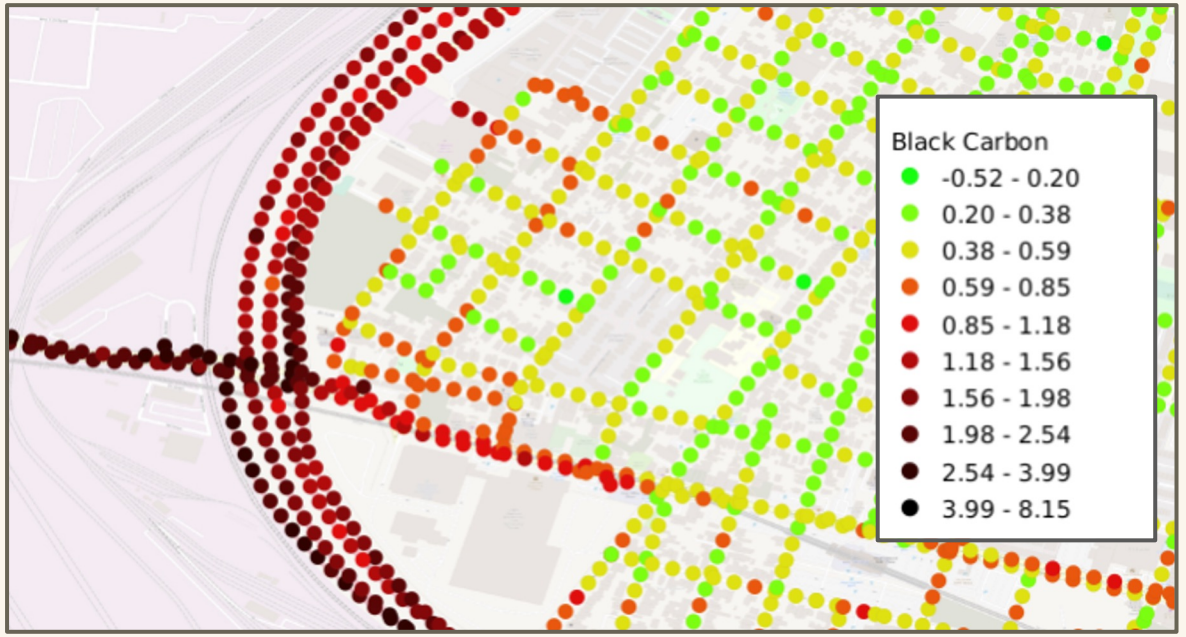


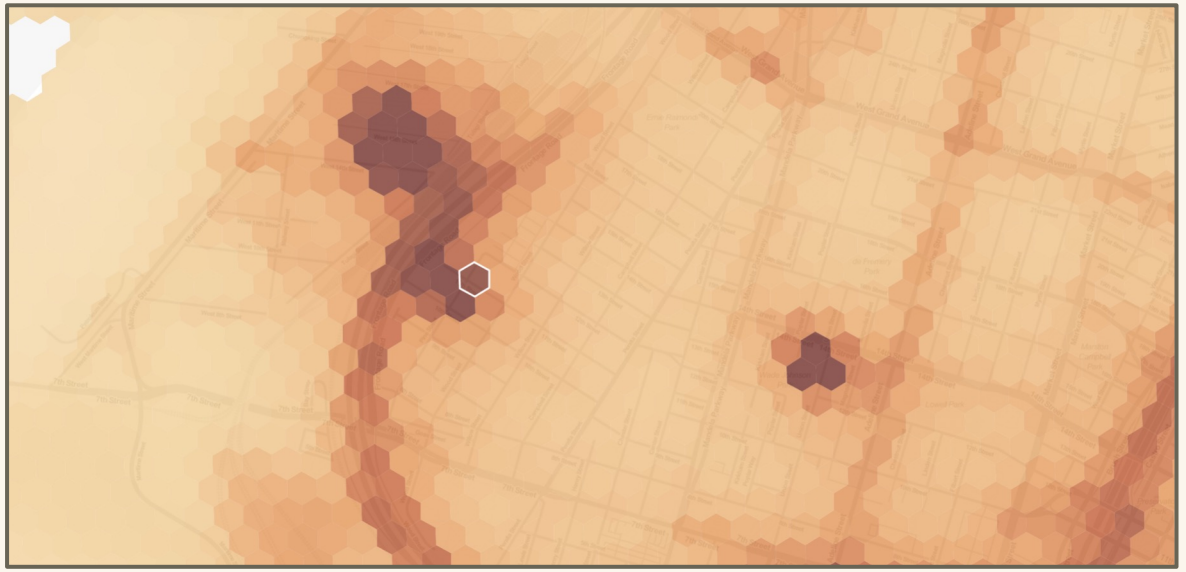
Different Buffer Designs

Collect LiDAR data of the structures and trees

Bridging scales

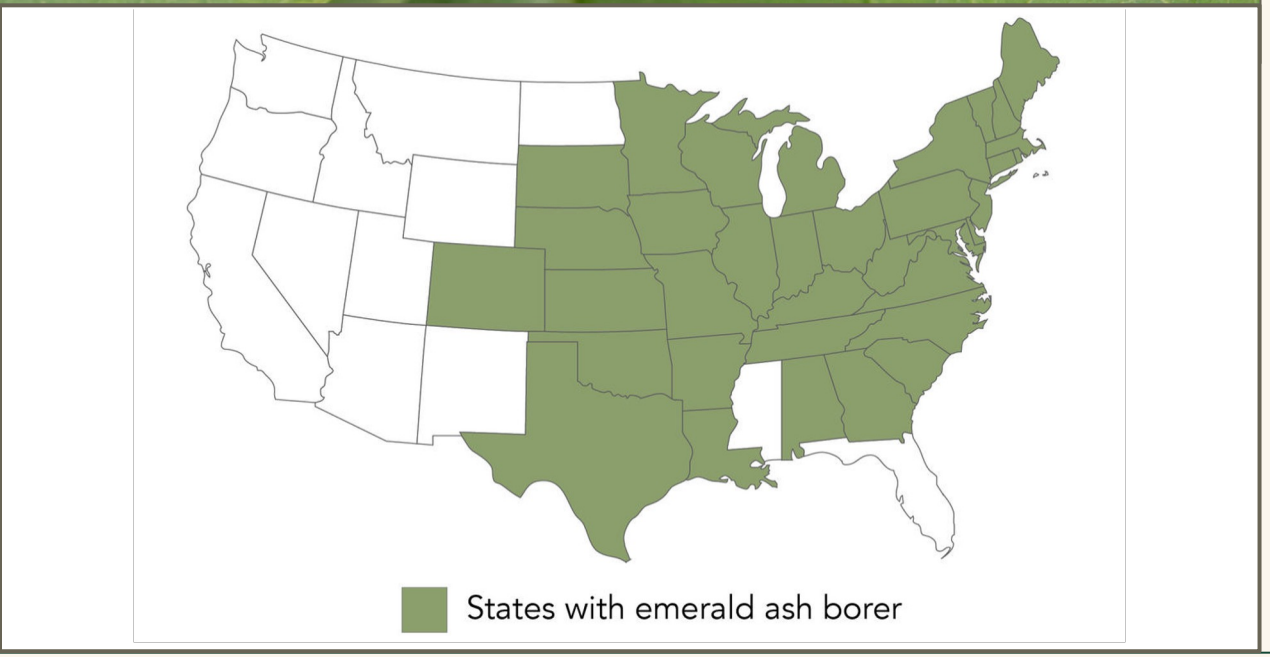
We want our simulations of site-scale interventions to exist in the context of larger models created by the Air District





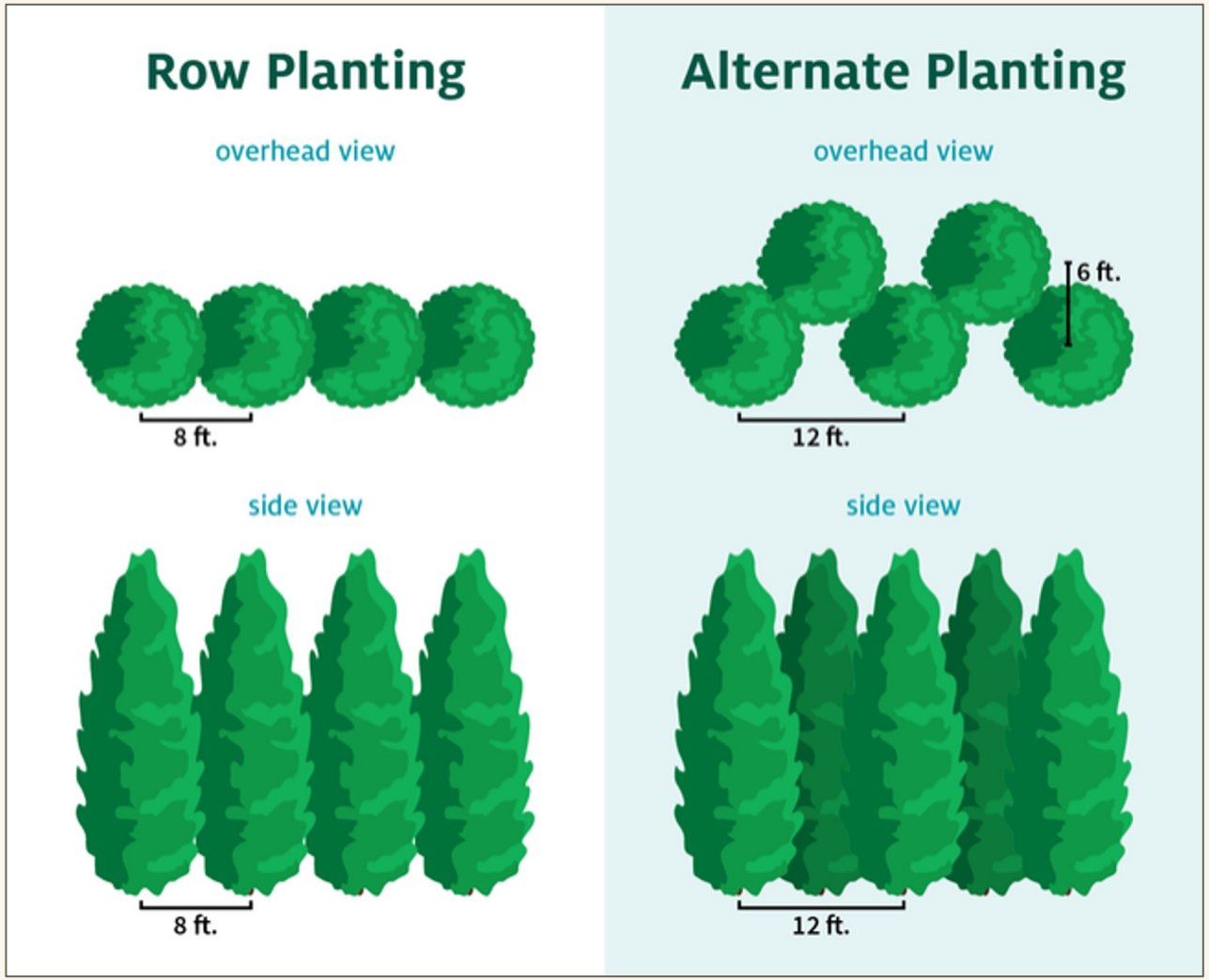
VEGETATED BUFFERS

Variable to test



Counties where the Emerald Ash Borer had killed more trees had more cardiovascular-related deaths

Vegetated Buffers: Using trees as technology



According to the EPA, these are the important factors to roadside vegetation design:

Barrier Length
Extend at least 50 meters past area of concern to limit downwind concentrations

Height
At least 4 meters of height will prevent downwind spread

Porosity
High porosity leads to pollution stagnation, low porosity is similar to a wall

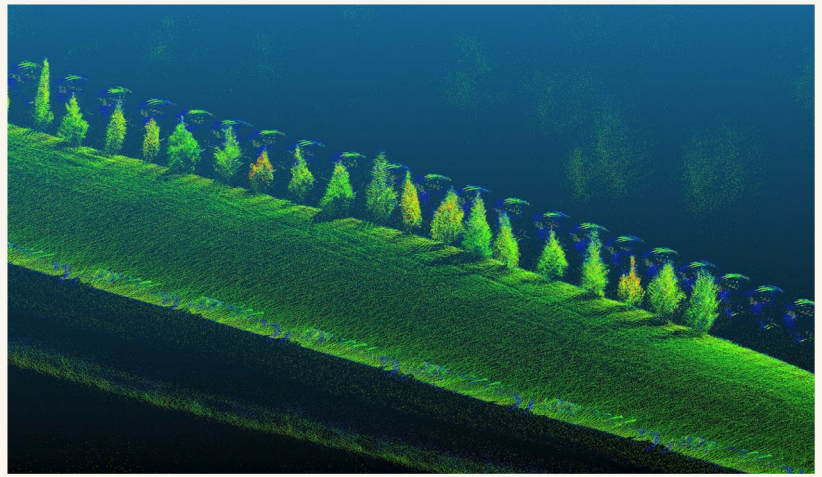
Coverage
No gaps between or below trees is ideal. Bushes can be used to block low gaps

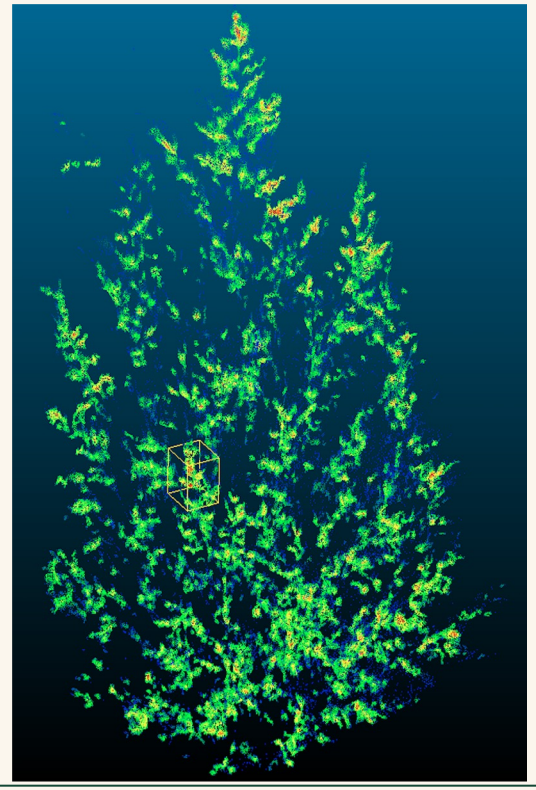
Thickness
5-10 meters recommended, but effectiveness impacted by porosity of barrier

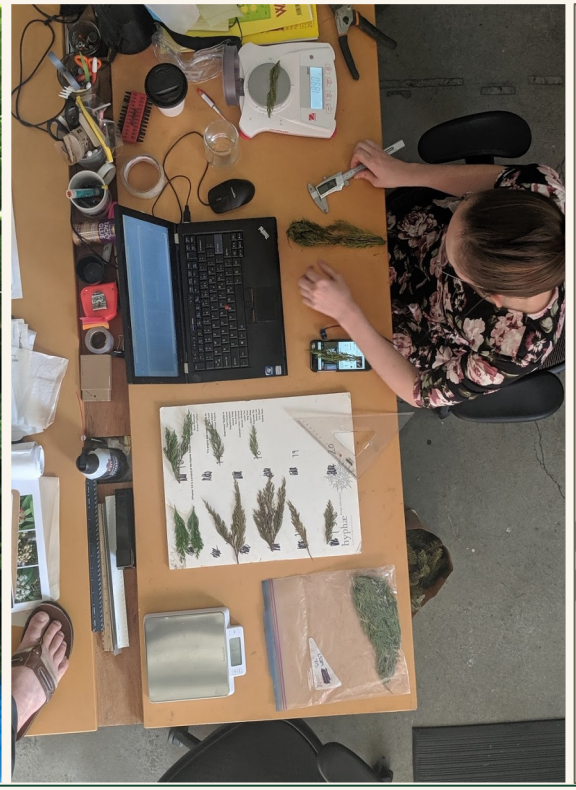
Effective Barrier

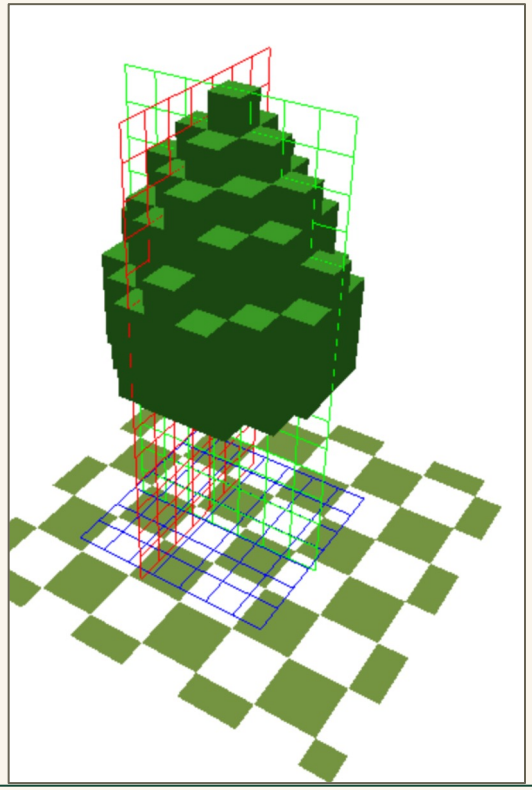
Ineffective Barrier

Measuring the leaf area density of trees to input into our models



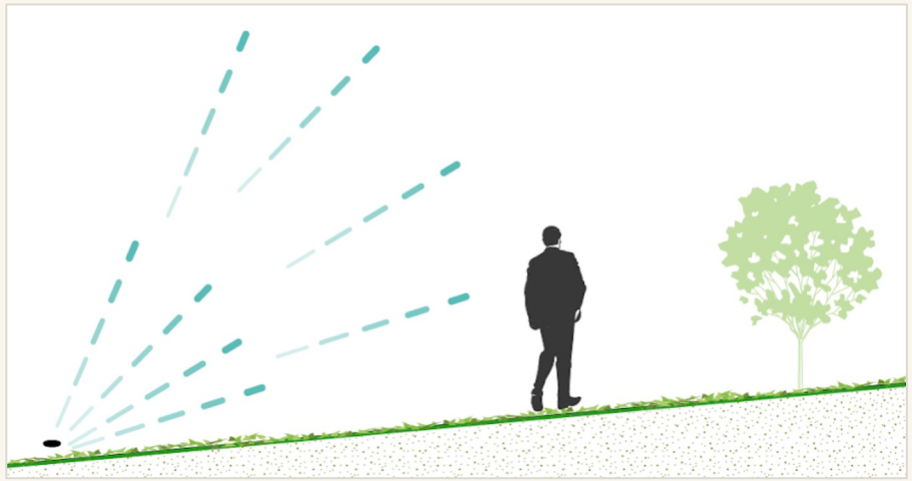






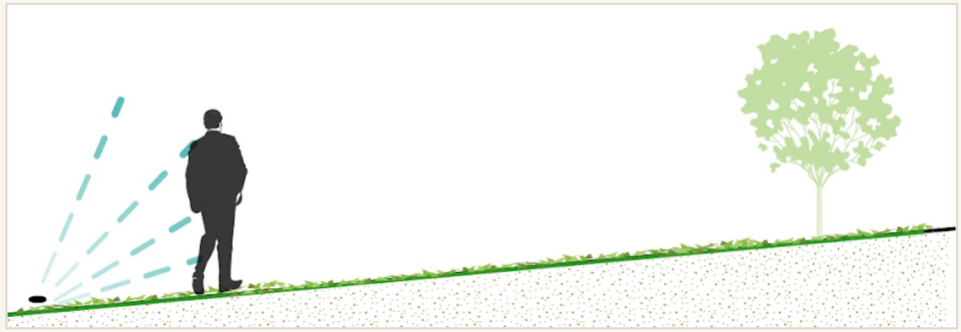
Planting a vegetated buffer closer to the source of pollution is more effective

Less effective at blocking



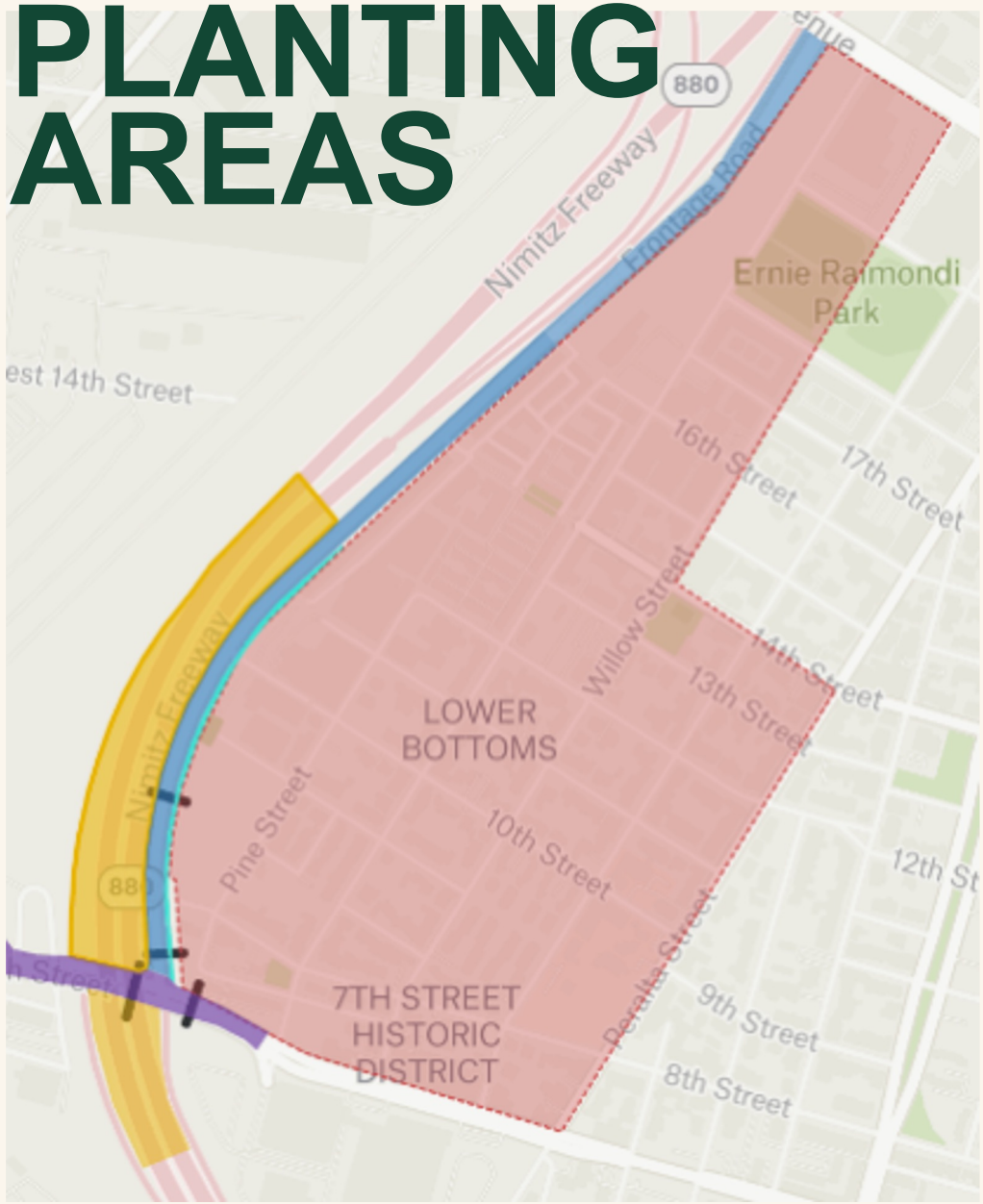
Less effective at blocking

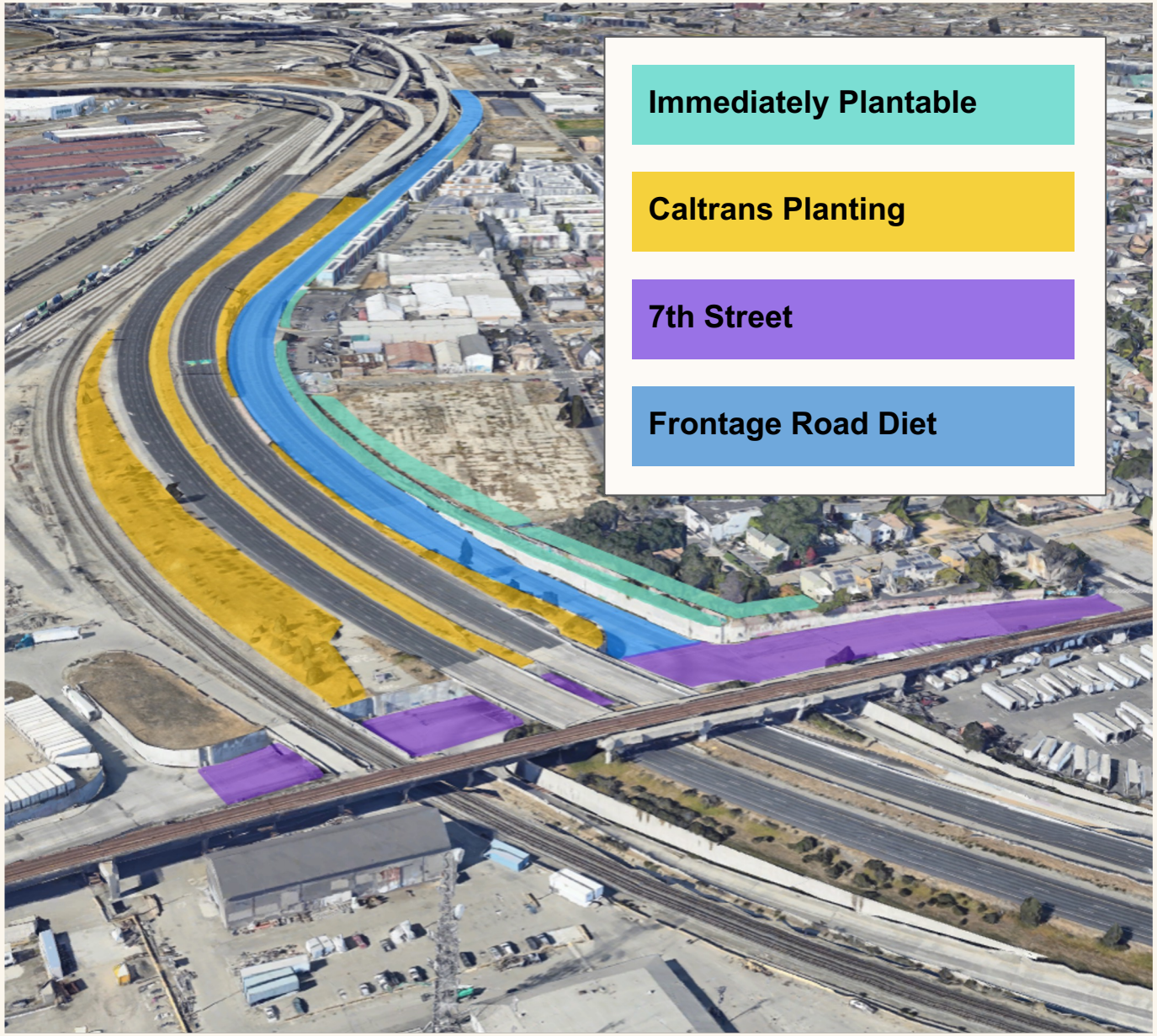
More effective at blocking

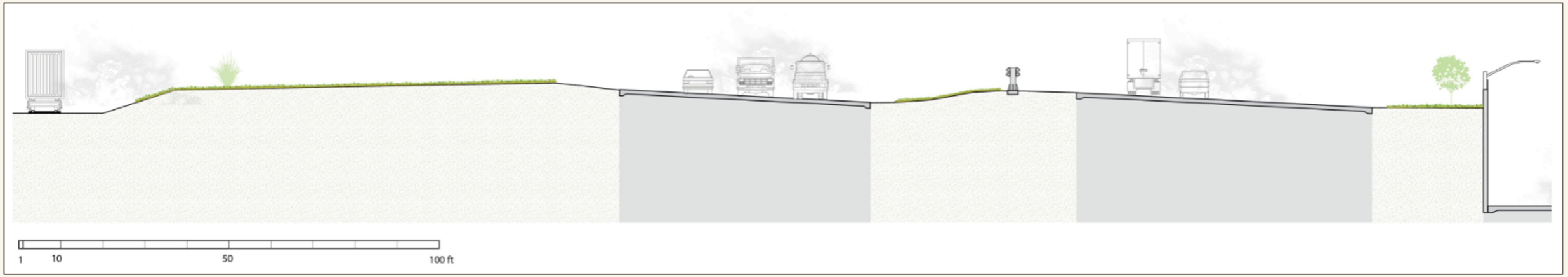


More effective at blocking

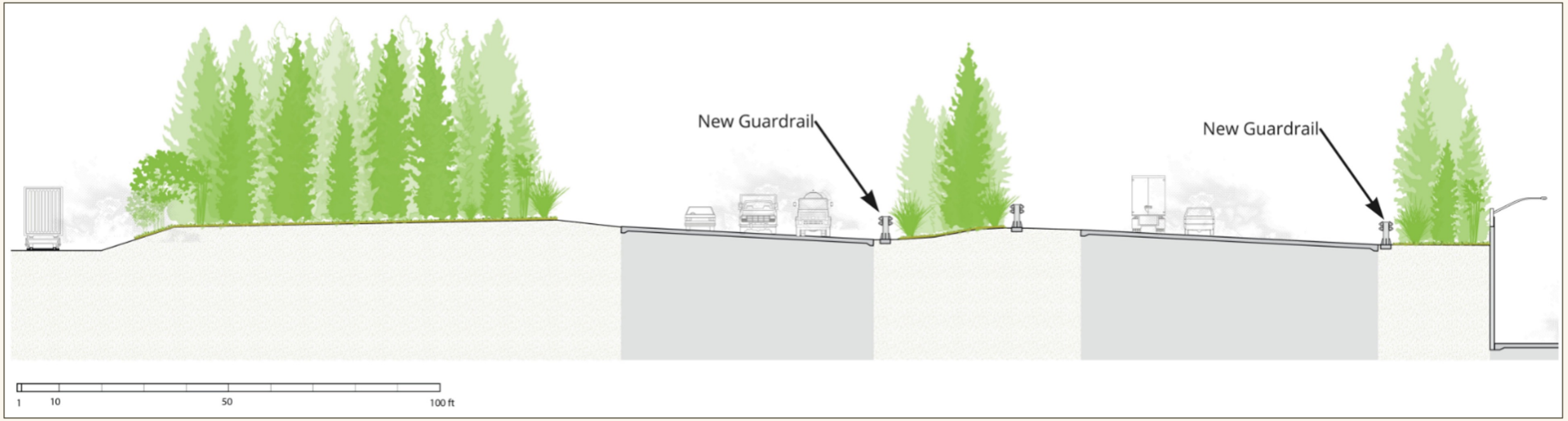
PLANTING AREAS





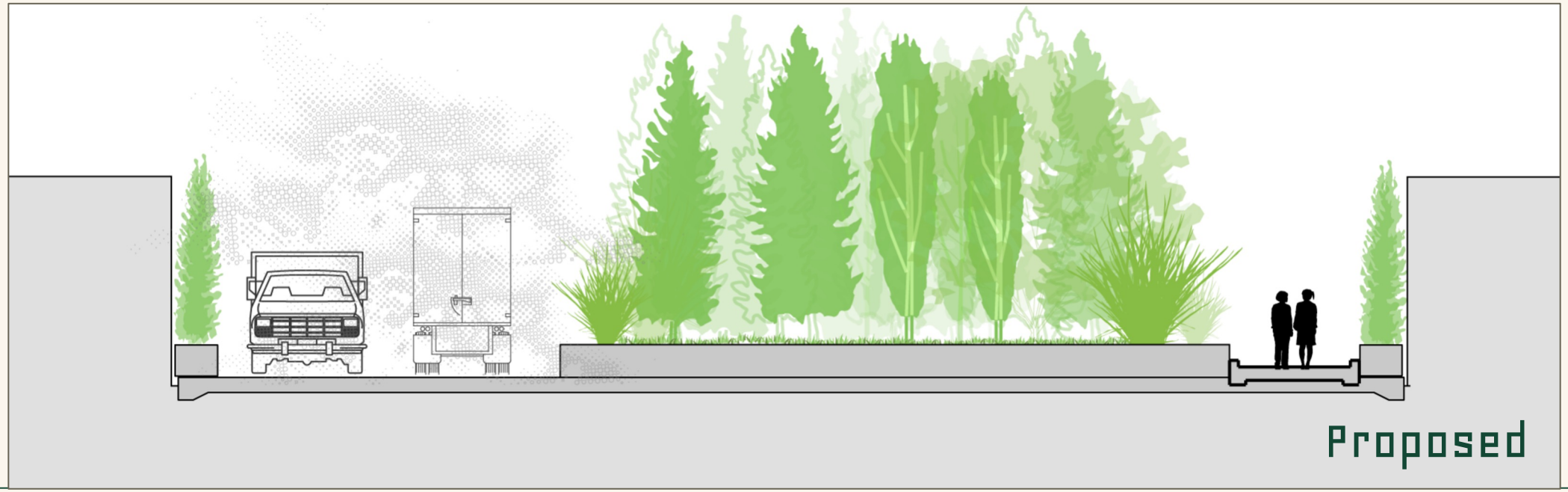


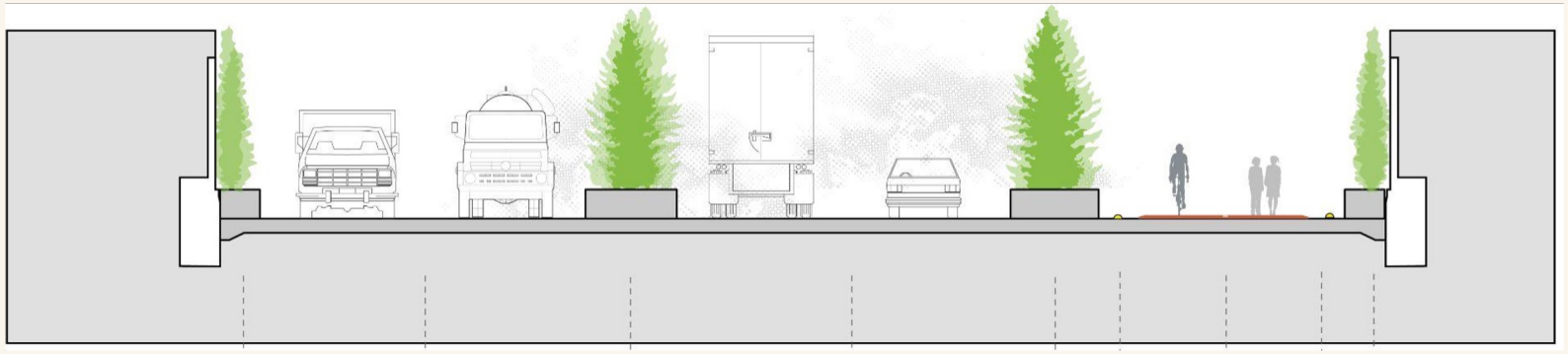
Caltrans Freeway ROW - Existing

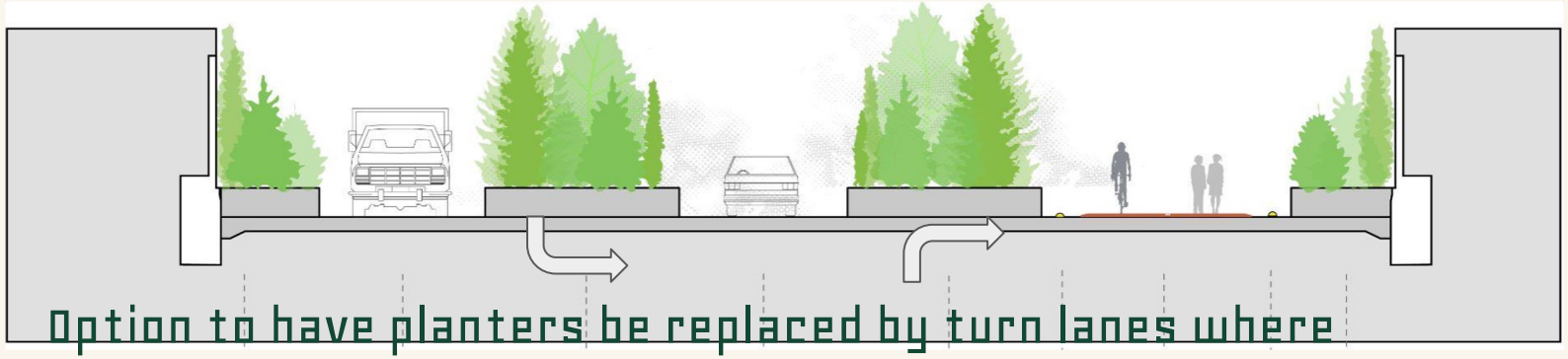


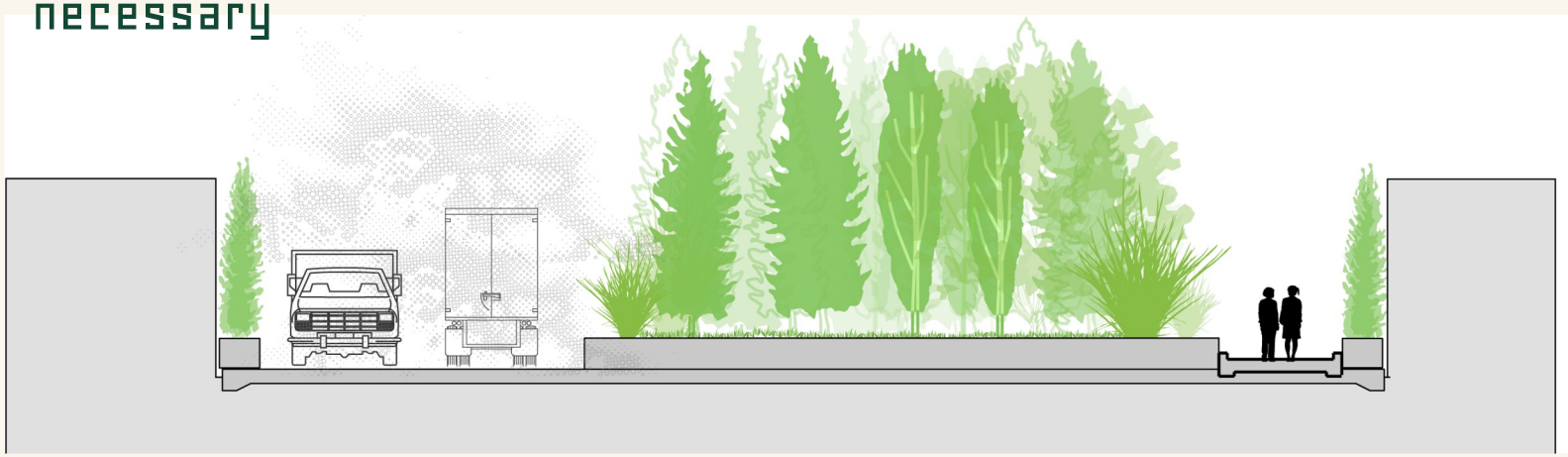
Caltrans Freeway ROW - Proposed


Frontage Rd
Existing


Proposed

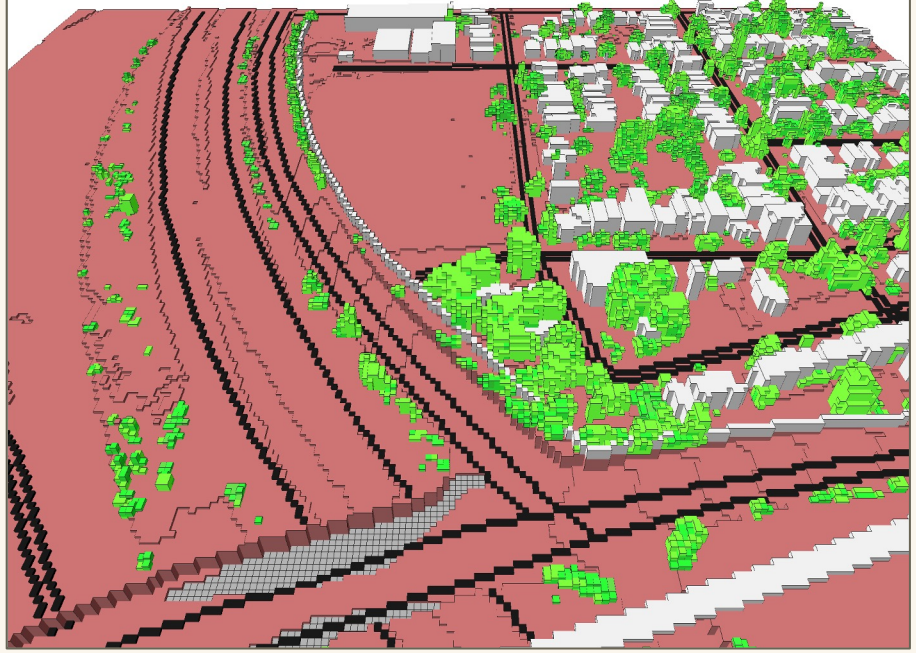




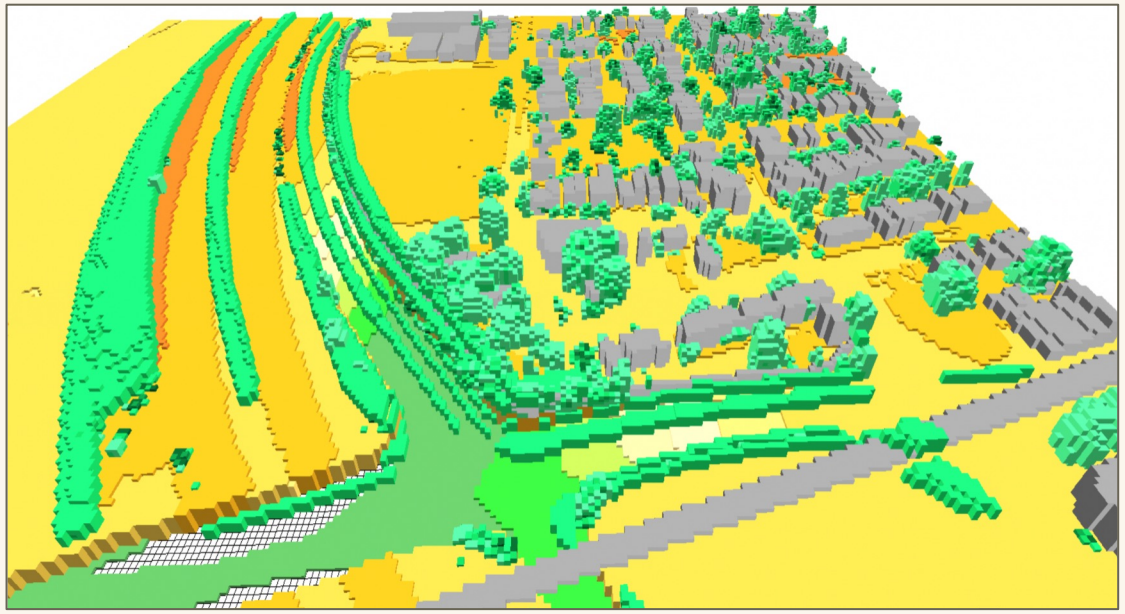


Exploring different buffer sizes and placements

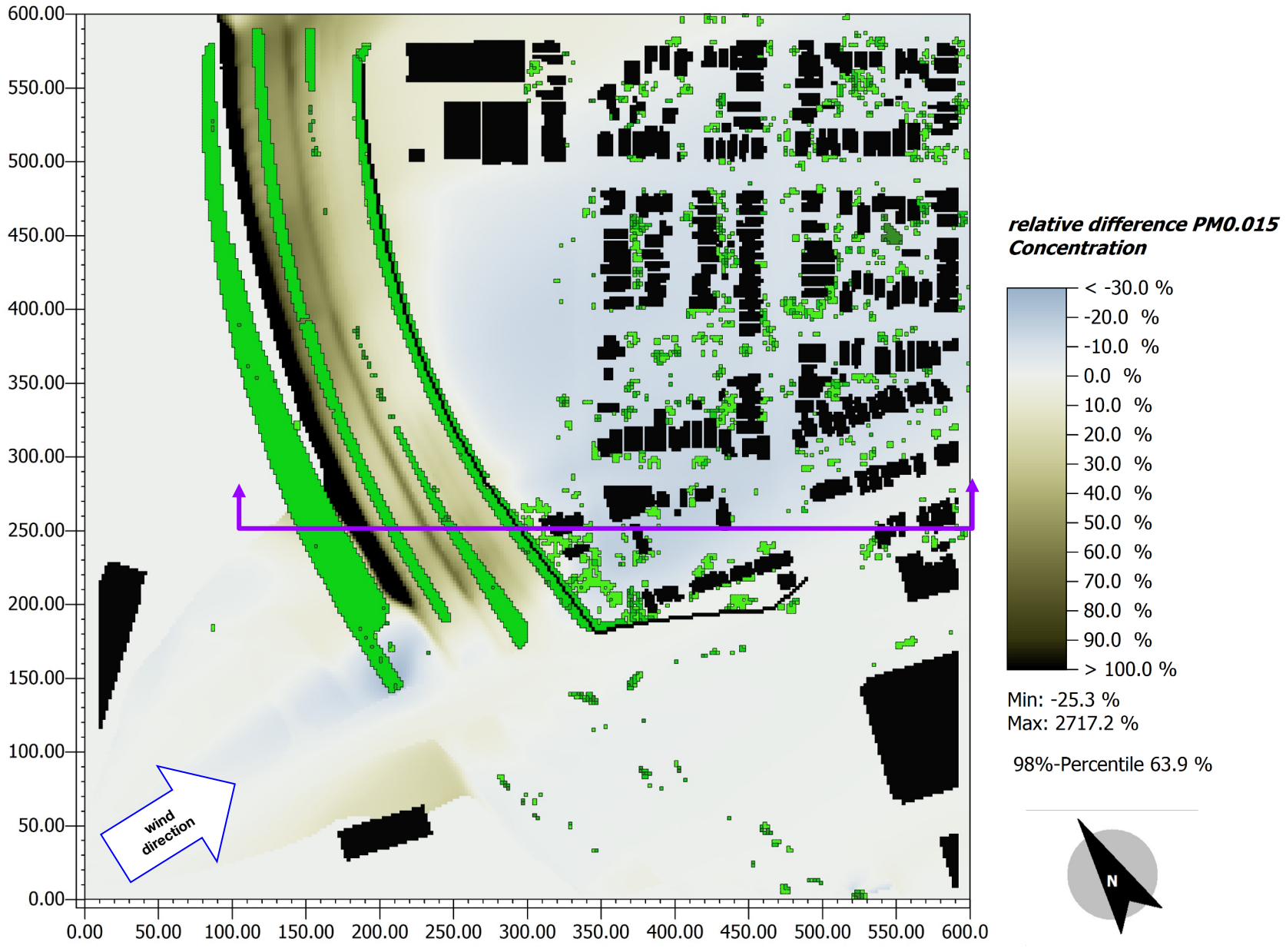
Exploring lane reduction



Existing Vegetation



Adding in proposed vegetation

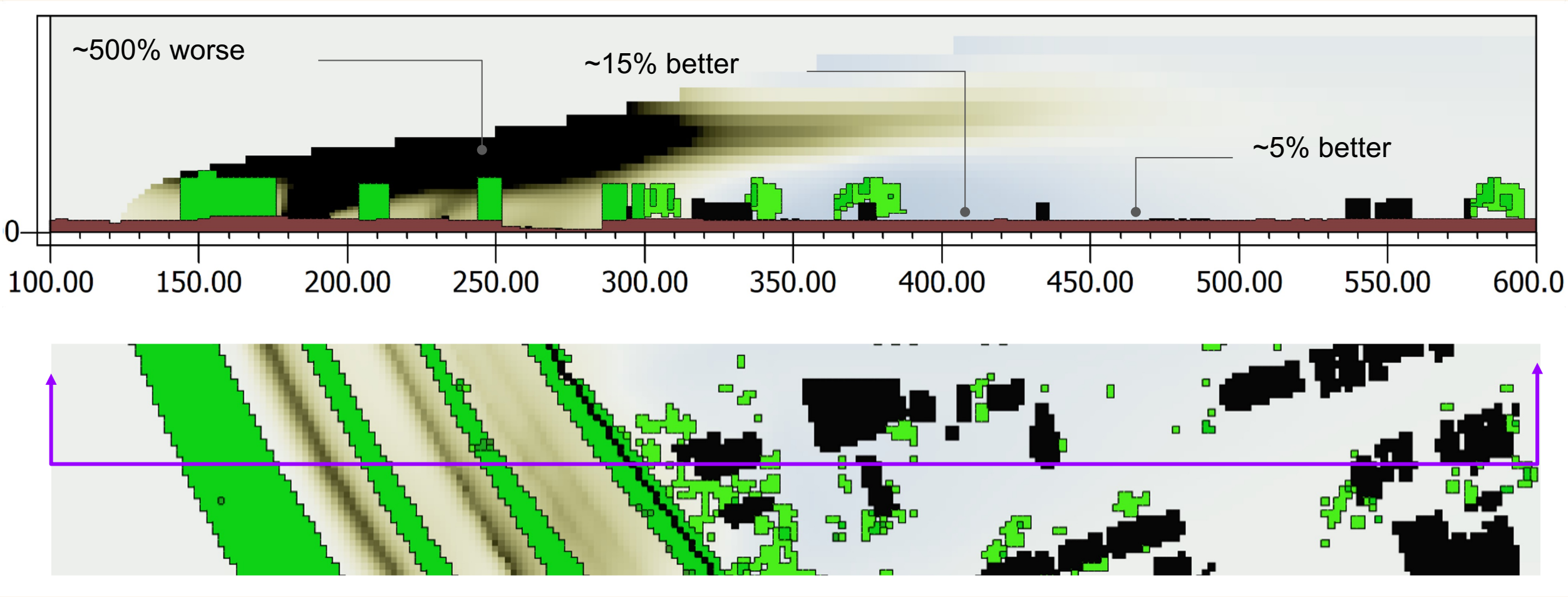


Simulation of Pollution Removal

Bluer areas are where the pollution is better than existing

Darker areas are where pollution is worse

Cross section view



What things should we can choose to prioritize in designing the place we live?

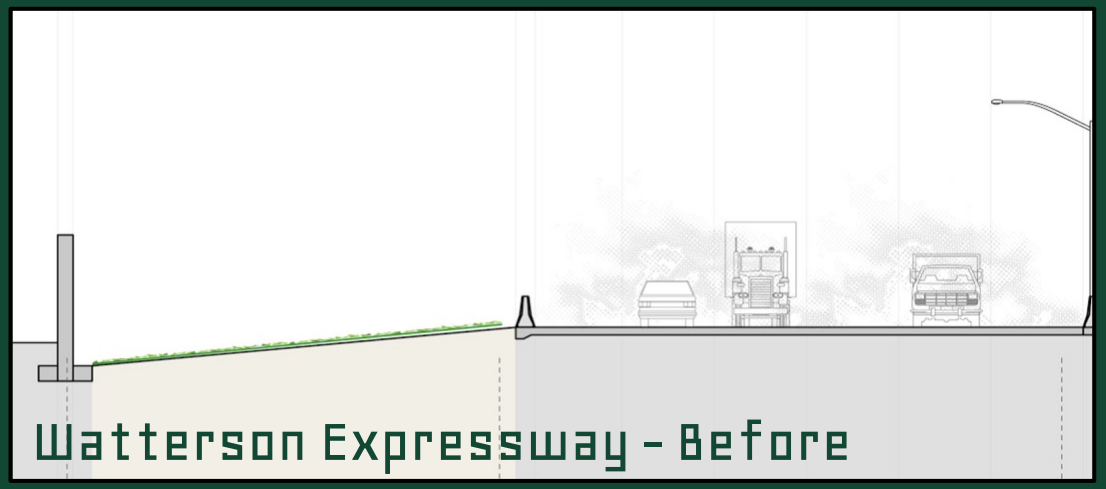
Habitat

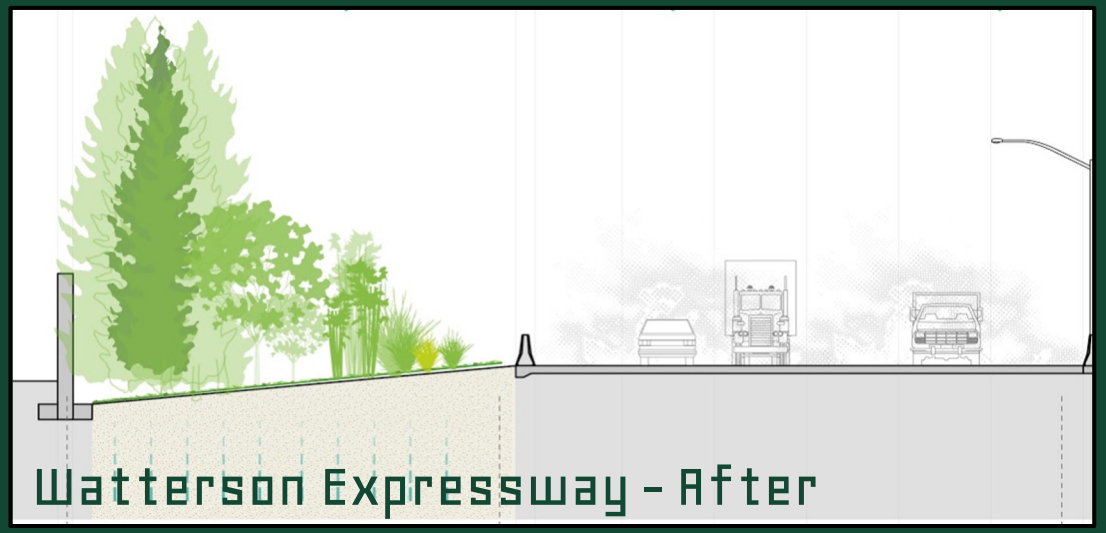
Stormwater

Aesthetics

Road safety

Implementation



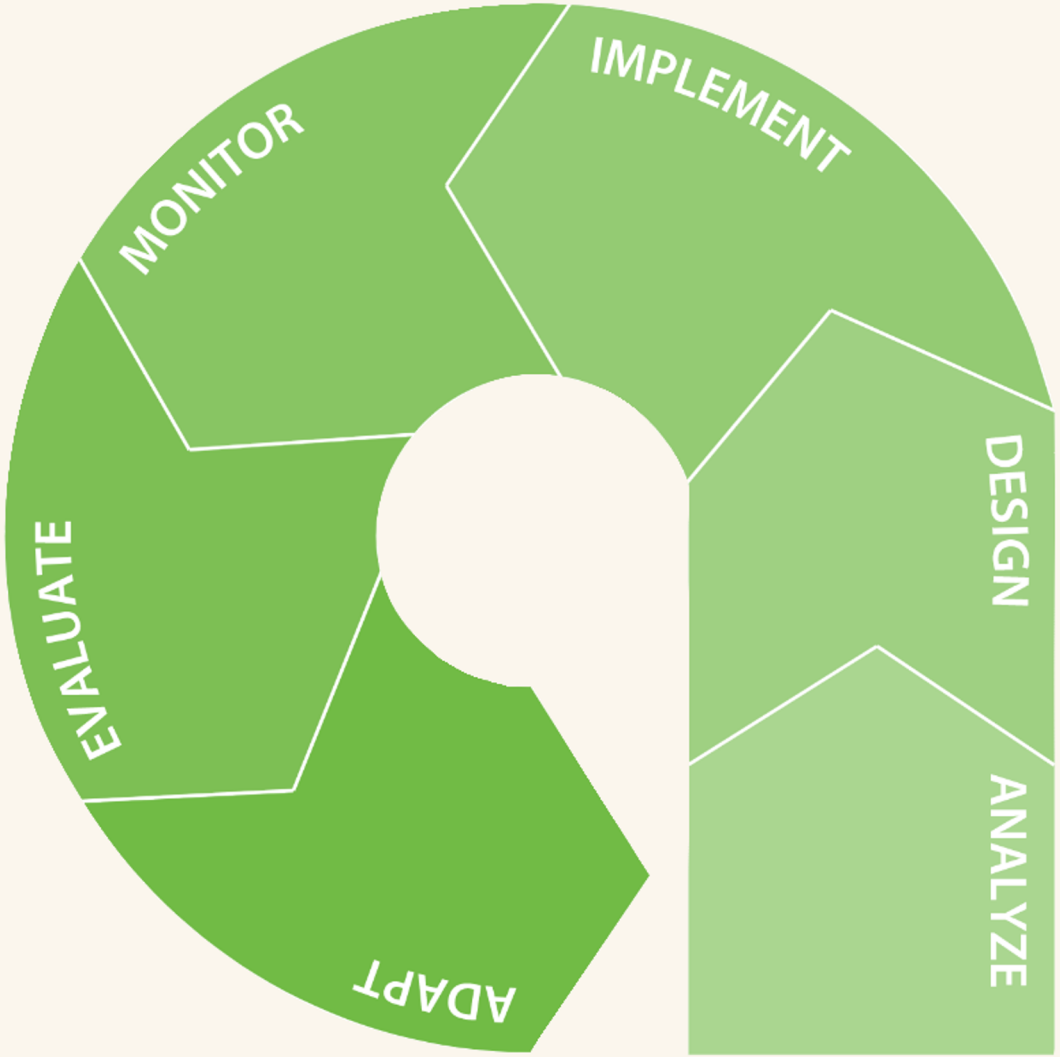


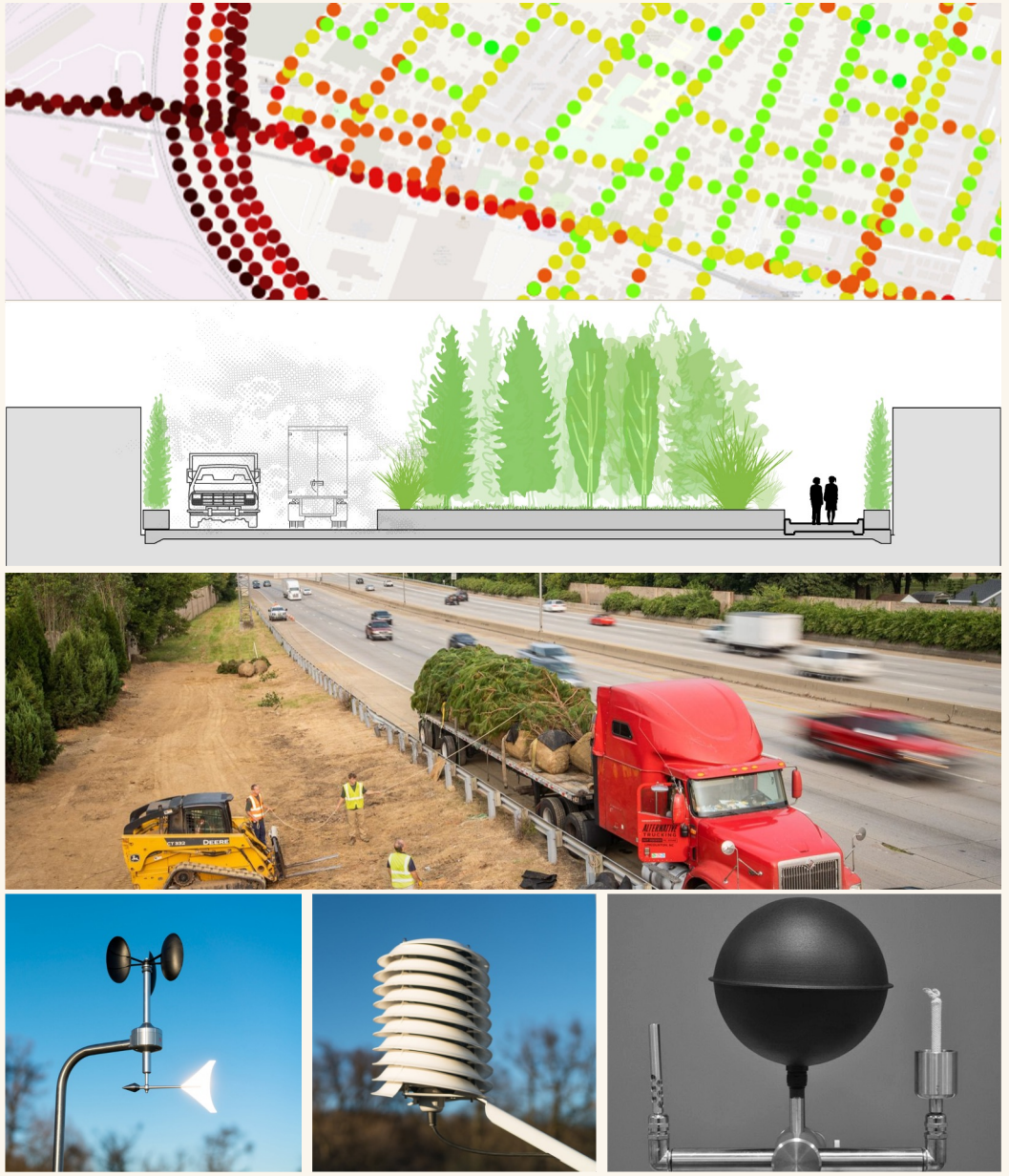
Watterson Expressway Planting

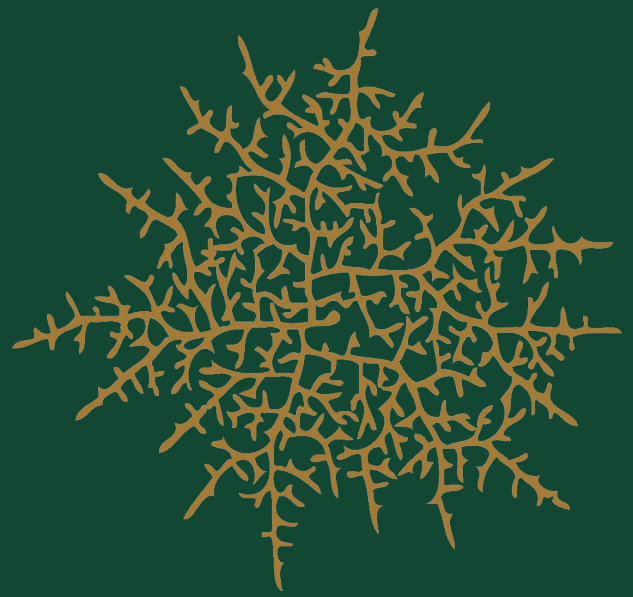
During Planting


After Planting

Summary







Thank you.

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