Improving Health in Communities Near Highways

Northeast Sustainable Energy Association

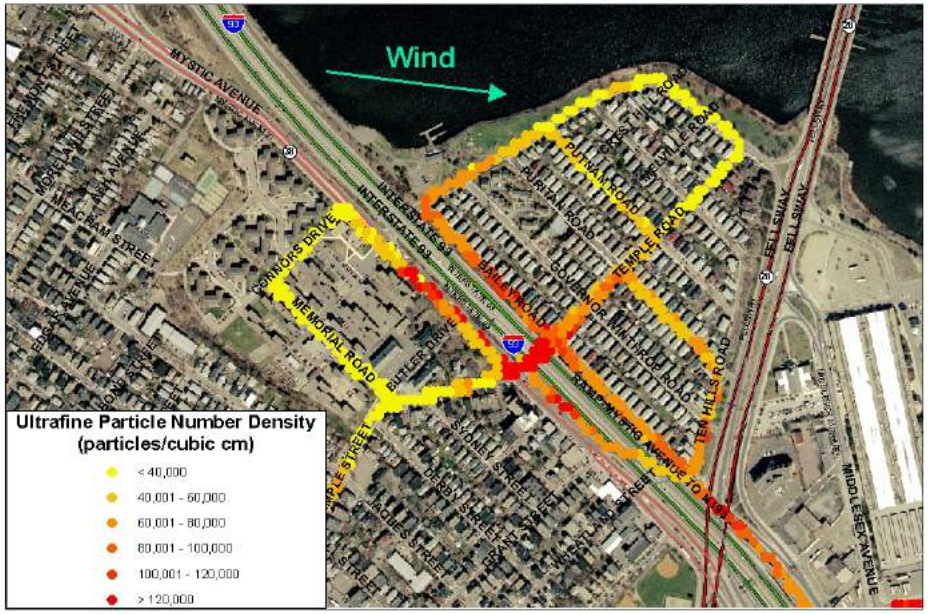
Jim Newman
Principal, Linnean Solutions

jim@linneansolutions.com

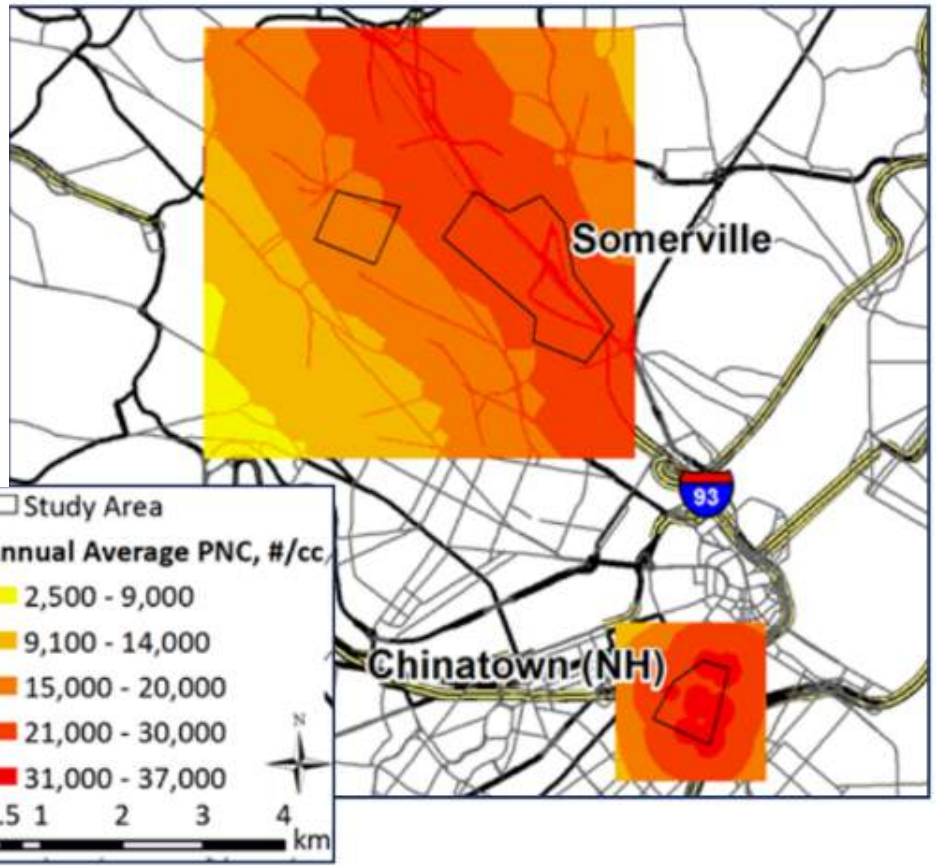
LINNEAN Solutions

POLLUTION CONCENTRATION

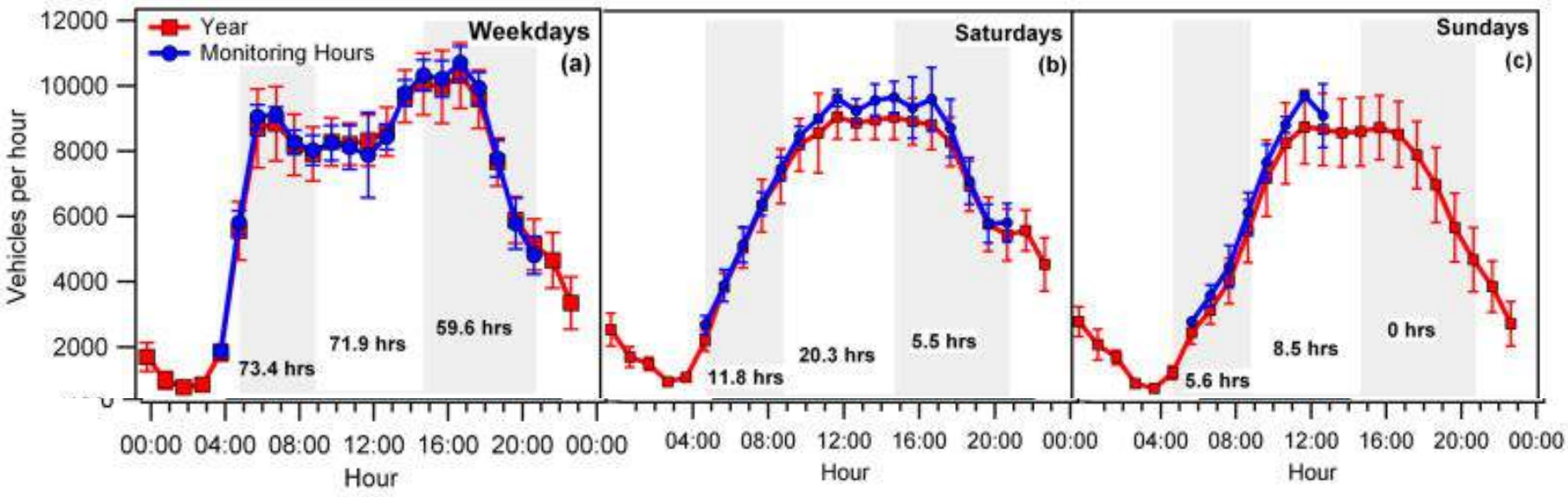
Point-Based Results



Normalized Results



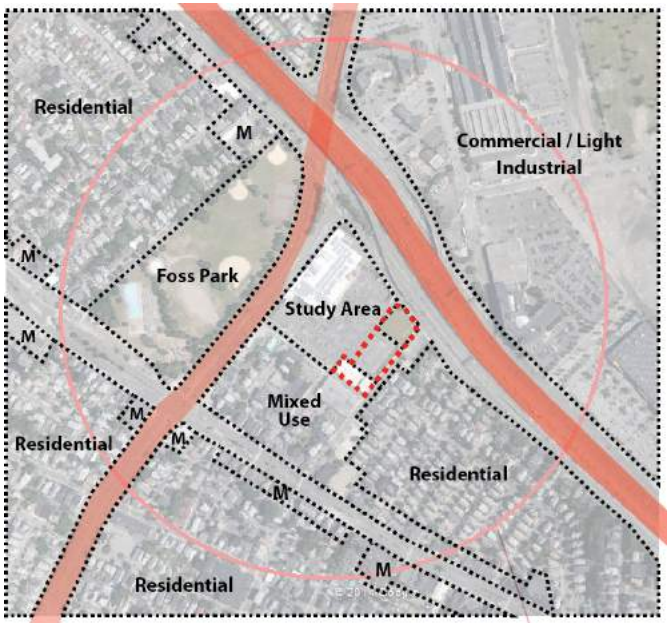
PREDICTABLE, YET DYNAMIC



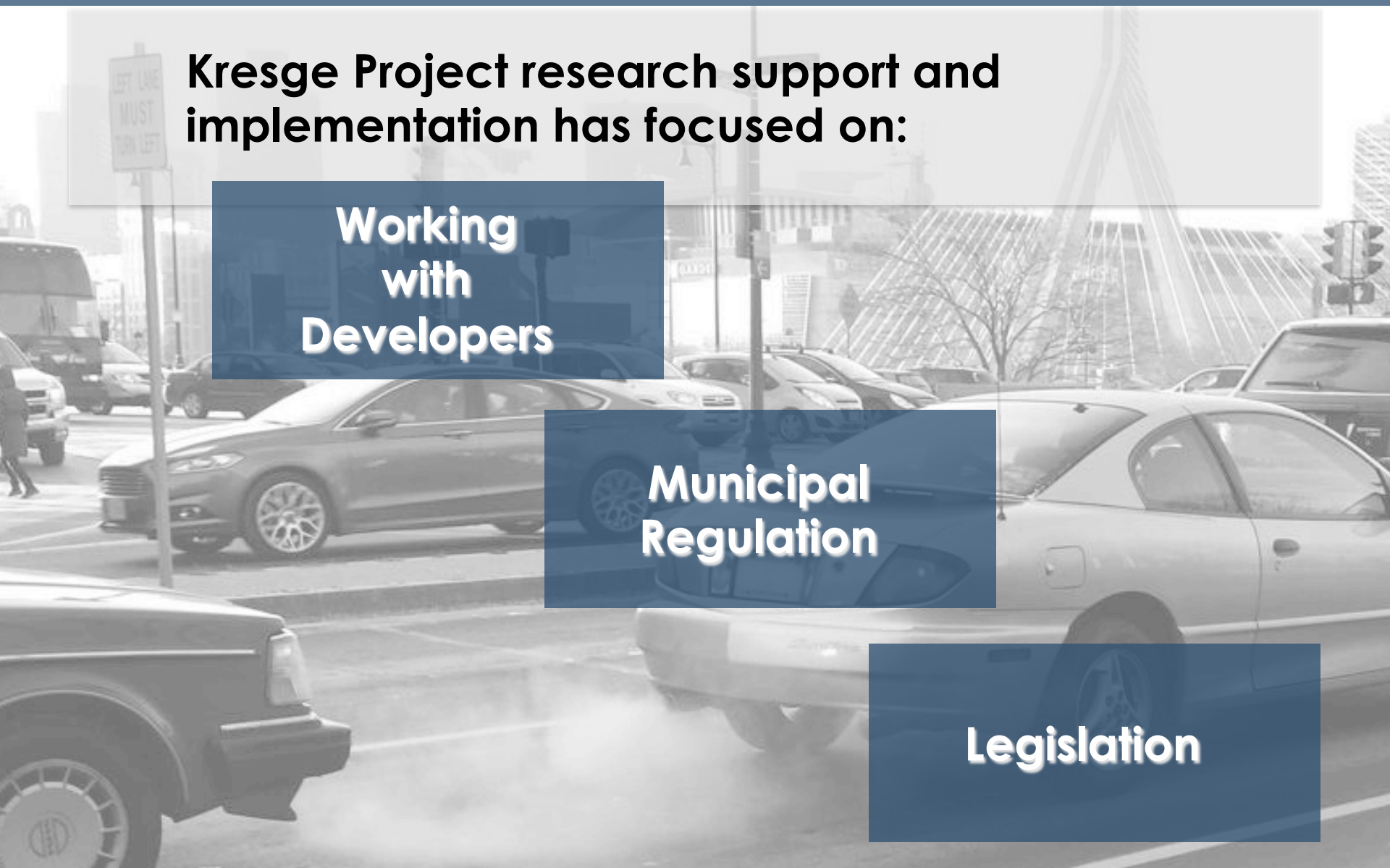
- Pollution concentration varies daily and weekly
- Highest pollution concentration at rush hour

HOW DOES THIS APPLY TO MY PROJECT?

- Conduct a site analysis to determine the main sources of pollution
- Consider solutions that can protect the most people



A PATH FORWARD



Kresge Project research support and implementation has focused on:

- **Working with Developers**
- **Municipal Regulation**
- **Legislation**

ACTIONS & ADVOCACY

Working with Developers

- Moving housing and parks outside of buffer zones,
- Installing more effective filtration,
- Placement of outside air intake grills.

ACTIONS & ADVOCACY

City of Somerville

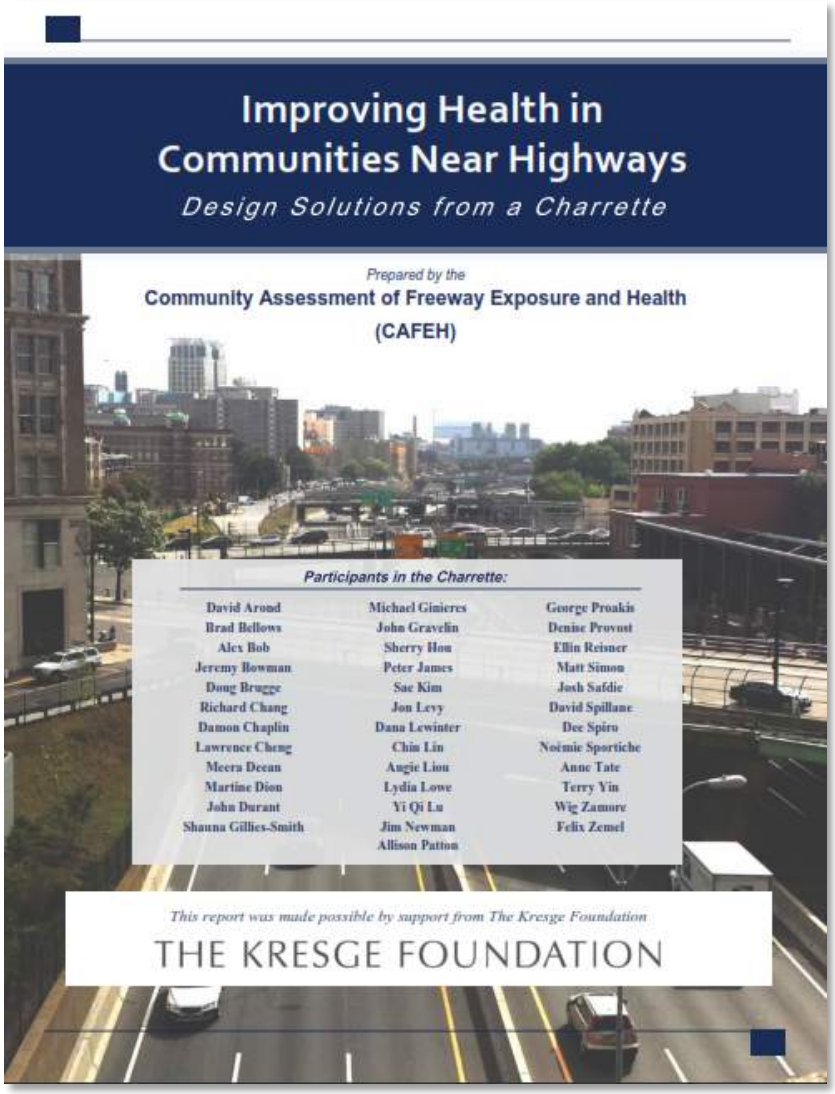
- Potential addition to updated city-wide zoning aimed at reducing occupant exposure to vehicle-generated pollution.
- Setting performance goals for buildings inside buffer zones,
- Defining testing protocol for compliance.

ACTIONS & ADVOCACY

Proposed Healthy Breathing Act

- Considers fine and ultra-fine particulate,
- Requires siting of publicly funded residential or sensitive buildings outside of defined buffer zones,
- And/or mitigation and testing.

POLLUTION MITIGATION TACTICS



Report compiled national research and categorized solutions

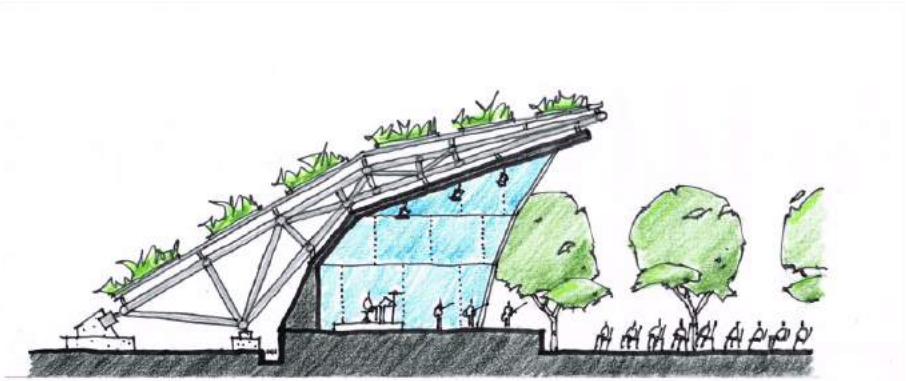
Solutions reduce exposure from 10-80%

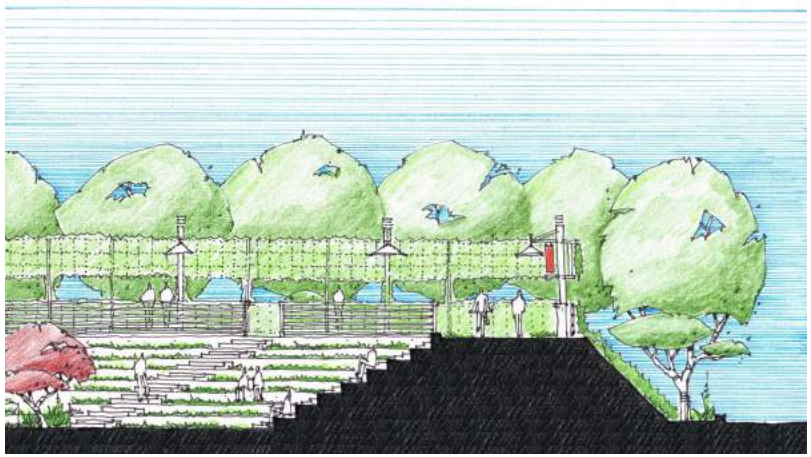
Why do these solutions matter?

- Reduces exposure
- Reduces health risk

VEGETATIVE / BUILT WALL BARRIERS

Pollution Reduction Potential:
10-50%

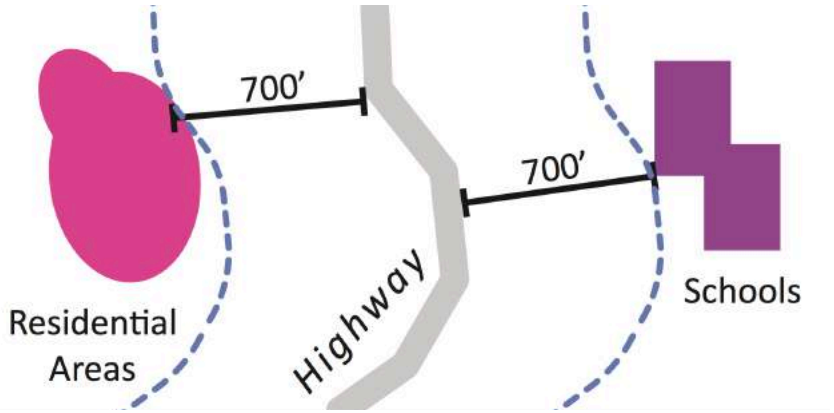


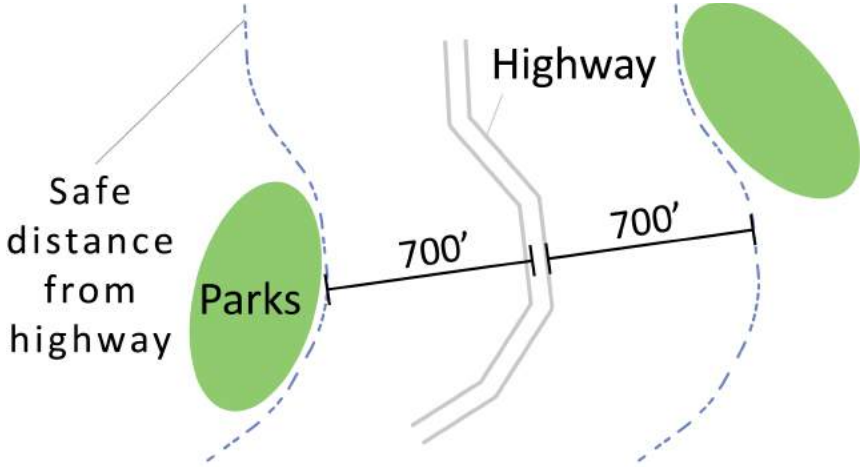


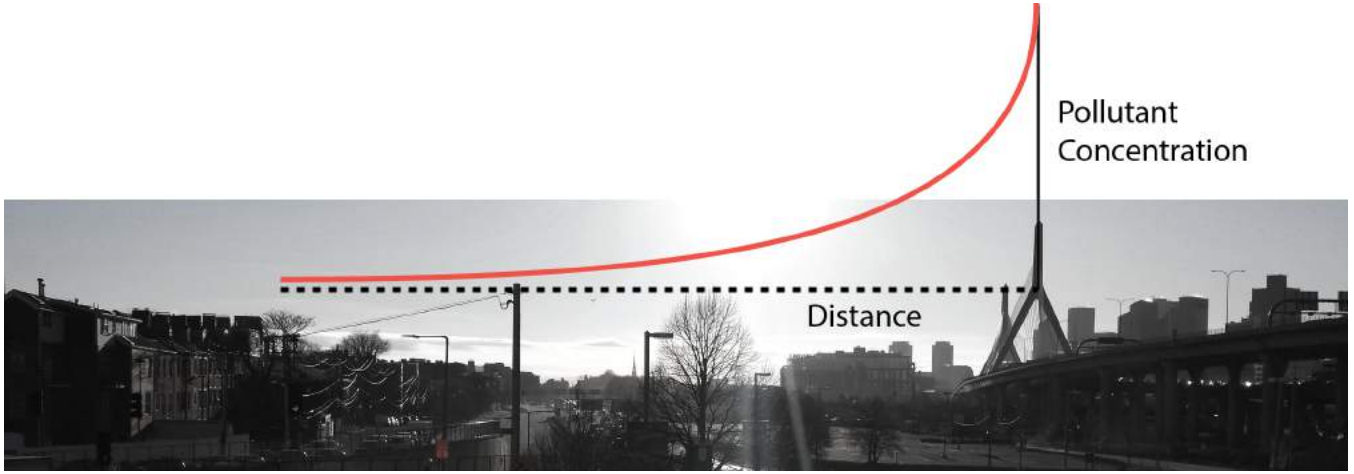
LAND USE BUFFERS

Pollution Reduction Potential:

40%



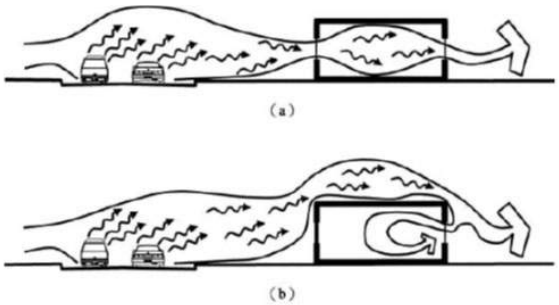


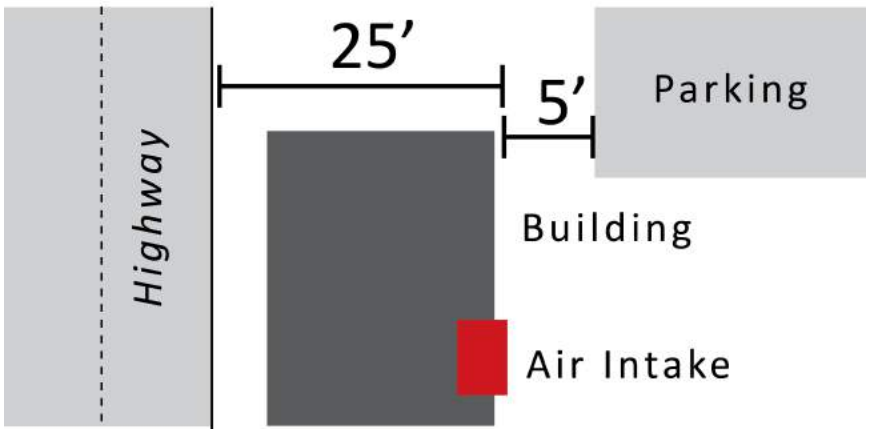


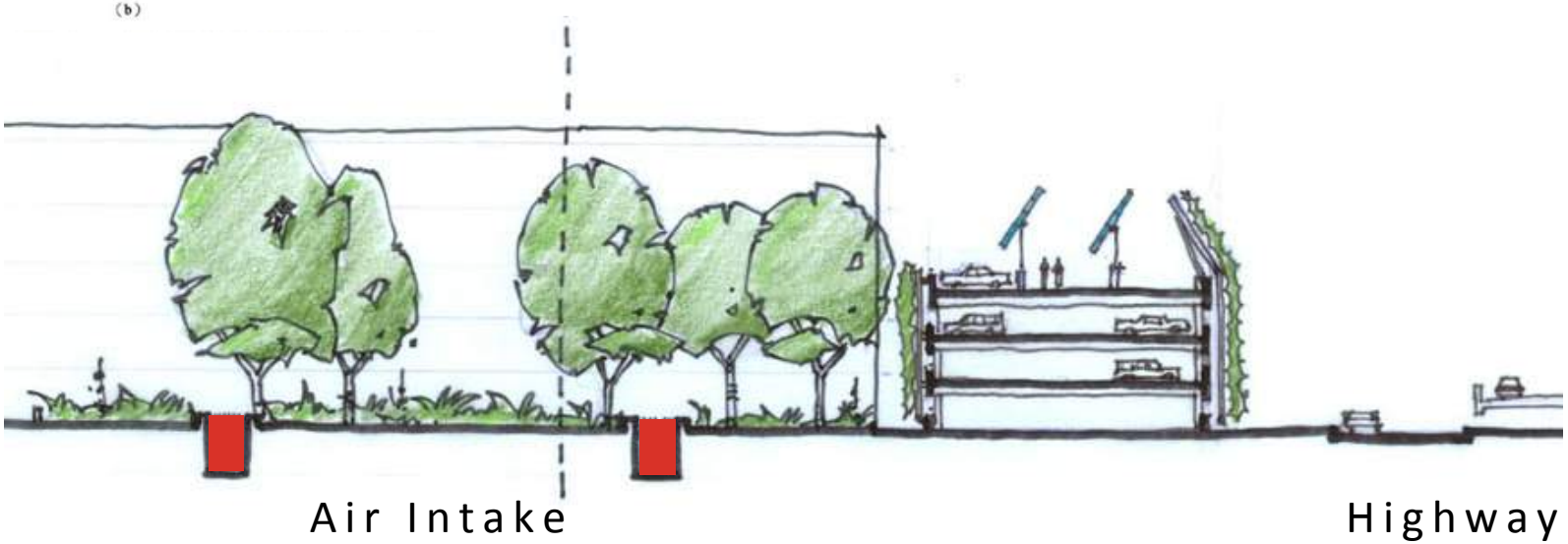
AIR INLET LOCATIONS

Pollution Reduction Potential:

50%



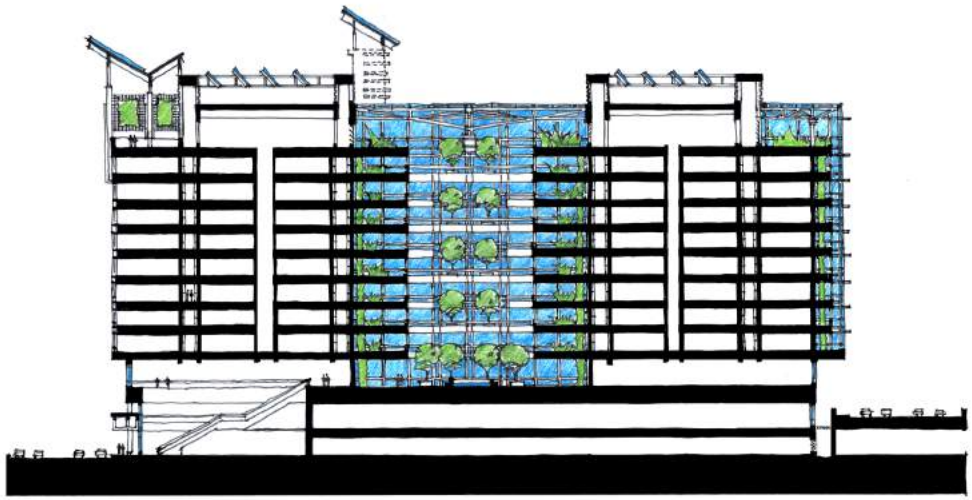


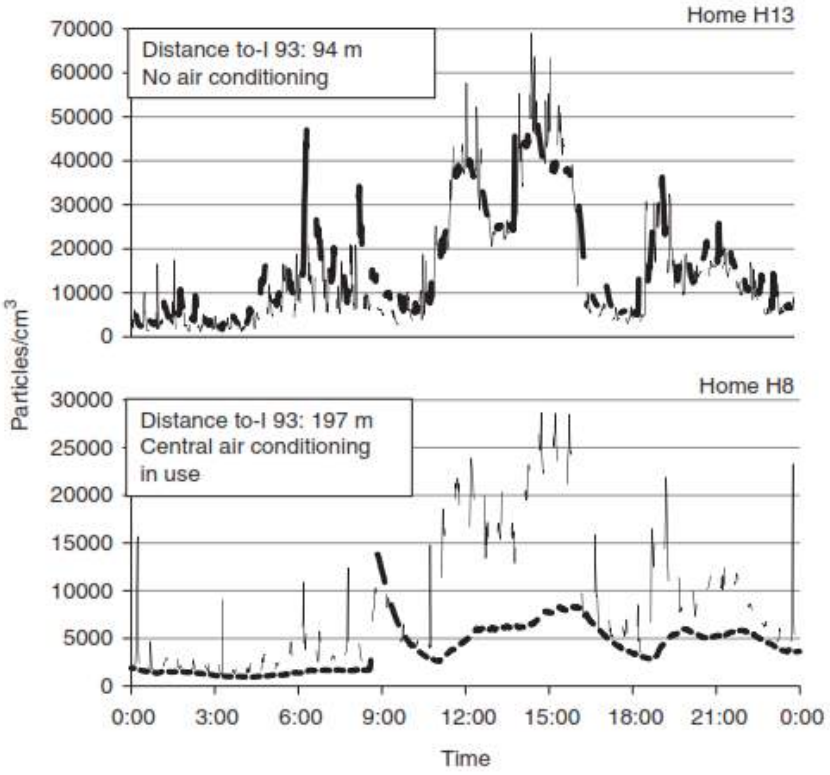


FILTRATION

Pollution Reduction Potential:

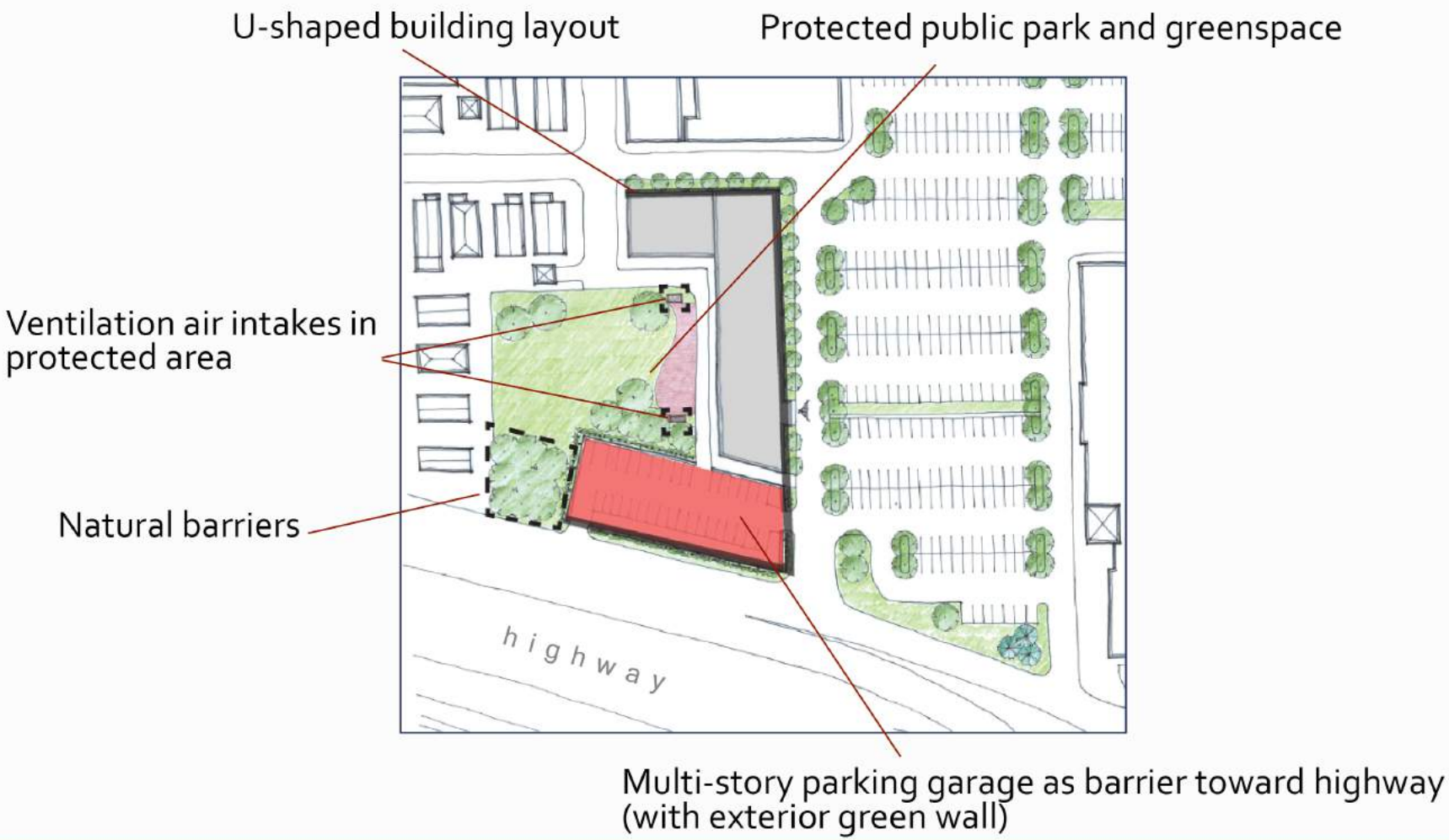
10-80% *(depending on MERV Filters 4-16)*





COMBINED SOLUTIONS

Example Diagram from the Design Charrette



GLUMAC SHANGHAI OFFICE

- Health Petal Goal: Maintain indoor air quality in a city that reports harmful air pollution levels
- At times, PM2.5 is measured at 250 ug/m^3
- (WELL Building standard must be below 15 ug/m^3
- Building employs 3 stage filtration system to achieve 50 ug/m^3
  - 1: MERV 8 filter
  - 2: Electrostatic
  - 3: MERV 15 filter

Source:
http://www.glumac.com/announcements/2-new-steps-for-sustainability-glumac-brings-the-living-building-challenge-to-asia-and-our-shanghai


GLUMAC
Shanghai Office
Indoor Air Monitoring
Particulate Matter
9
Temperature
Humidity
VOC
CO2

Key Questions

- What does the best possible filtration system look like?
- How can we increase filtration of air while reducing energy demand?
- How can we deal with operable windows and interior pollution sources?