Improving Health in Communities Near Highways

Northeast Sustainable Energy Association

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POLLUTION CONCENTRATION

Point-Based Results

Normalized Results
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
Working with Developers

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

[Diagram showing distances and pollutant concentration near residential areas, schools, parks, and highways]
Pollution Reduction Potential: 50%

ASHRAE 62.1-2013
Minimum Distances

25’
5’

Parking

Building

Air Intake

Highway

Air Intake
Highway
Pollution Reduction Potential: 10-80% (depending on MERV Filters 4-16)
Example Diagram from the Design Charrette

- U-shaped building layout
- Protected public park and greenspace
- Ventilation air intakes in protected area
- Natural barriers
- Multi-story parking garage as barrier toward highway (with exterior green wall)
• **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

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?